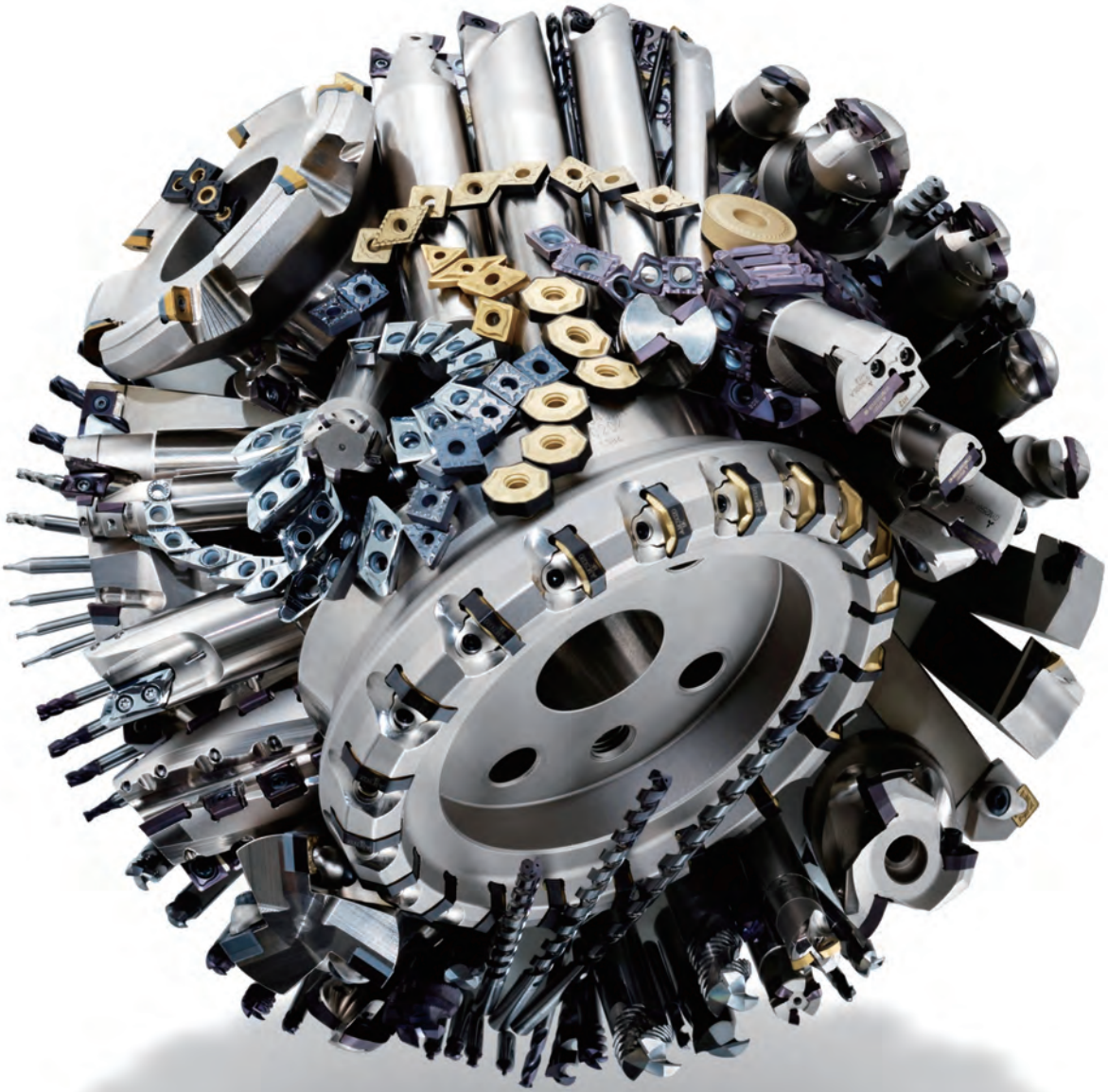
C004B

MITSUBISHI

MITSUBISHI MATERIALS

GENERAL CATALOGUE 2009-2010

TURNING TOOLS
ROTATING TOOLS
TOOLING SOLUTIONS



USING THIS CATALOGUE

●This catalogue was made in January 2009.

●Please note that products in this catalogue are continuously reviewed and updated. The products therefore may be changed in the future and thus become different from the catalogue.

●Stock status is mentioned for the products in this catalogue. However, please note that the products here may be replaced by new grades and products in the future.

●Stock status indication

- **● : Inventory maintained.**
- **○ : To be on sale.**
- **□ : Non stock, produced to order only.**
- **▲ : Inventory maintained. To be replaced by new products.**

(Note) Please contact us regarding order numbers and grades that are not mentioned in this catalogue.

HOW TO USE THIS CATALOGUE

In this catalogue our cutting tools are classified into three main categories, turning tools, milling tools and drilling tools, which are arranged according to types of machining. This helps to find the most suitable products through various references as follows. Please read the instructions to find the best products for your purpose.

①To find the products through the INDEX.
- Turning tools are classified by a green colour.
- Milling tools are classified by a blue colour.
- Drilling tools are classified by a red colour.

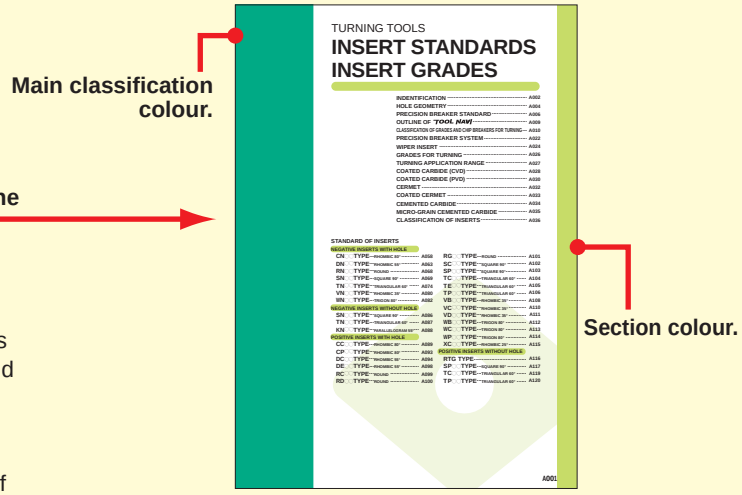
For the others, refer to the index on the following page.

②To find the series of products from the contents of the inside title.
Contents of each block are listed on each inside title.

③To find the product according to application.
The classification page of each block provides the series of products to be selected according to applications and purposes.

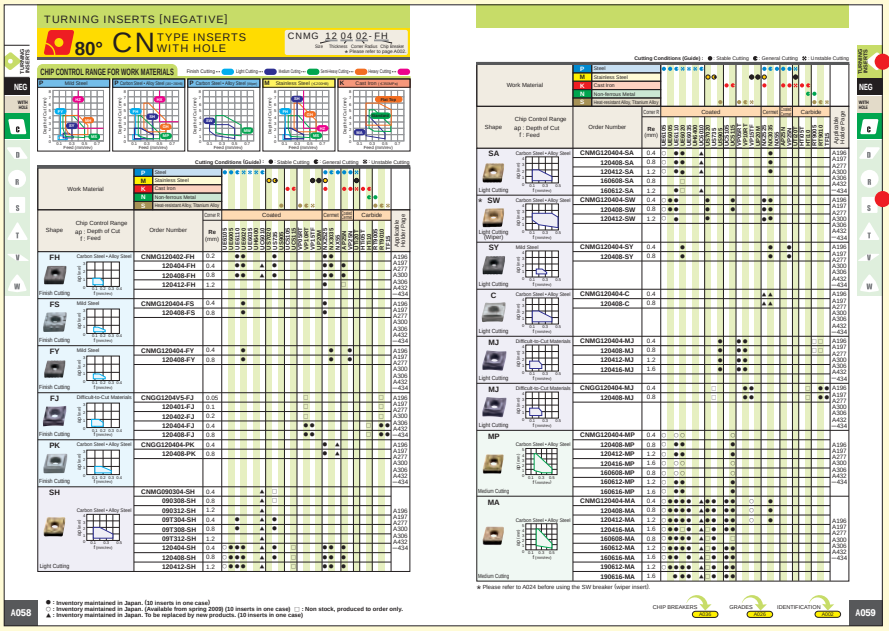
④Alphabetical index.
All tools are listed in the alphabetical index at the front of the catalogue.

⑤How to use the block sections.
A usage guide for each block is shown on the left of each index (not for all blocks). Refer to this page to know how to read the product information and how the page is organized.



Inside Title for Turning Inserts

●How Text and Index are organized



MITSUBISHI CARBIDE

2009-2010

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MITSUBISHI MATERIALS

TURNING TOOLS

New smooth coating technology ensuring stable cutting
High wear and fracture resistance for cast iron turning

CVD coated grades for cast iron turning

UC5100 series

UC5105/UC5115

A028

A wide variety of honing types suitable for continuous to light interrupted cutting
Exceptional wear and fracture resistance

Coated CBN grade for hardened steel

MBC series

MBC010/MBC020

A126

High wear and fracture resistance for steel turning

CVD coated grades for steel turning

UE6100 series

UE6105/UE6110/ UE6020/UE6035

A028

Able to withstand severe conditions and deliver a stable cutting performance with excellent surface finishes

Cermet grade for turning

NX3035

A032

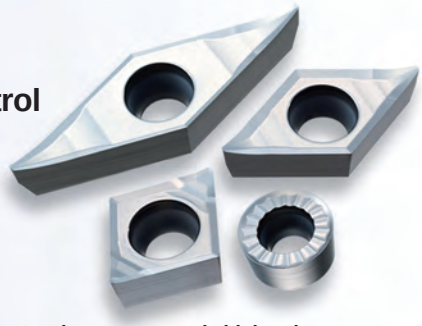
Offers excellent chip control when machining hardened steel

Coated CBN grade for hardened steel

MBC020

breaker insert

A133



A unique corrugated chipbreaker geometry ensures precise chip flow control

Breaker for aluminium alloy turning

AZ breaker

A046

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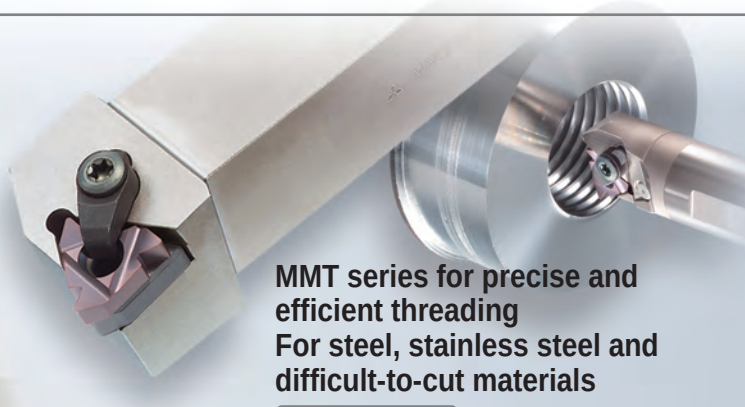
Exclusive design for steel machining
Superior chip control

Breaker for steel turning

MP breaker

➔A038



MMT series for precise and efficient threading
For steel, stainless steel and difficult-to-cut materials

Threading tools

MMT series

➔A388—A399

Small tools

SMALL TOOLS

Tools for a wide range of small parts machining
High quality, efficiency and long tool life

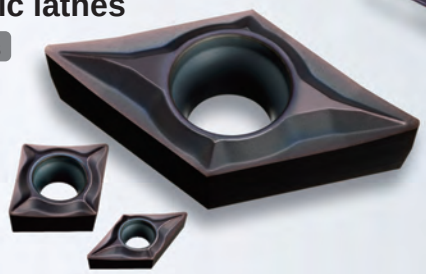
➔A236—A262

Excellent chip breaking
Ideal for continuous un-manned operations on automatic lathes

Moulded Breaker for Small Tools

SMG breaker

➔A048



Grooving revolution
Innovative clamping system ensures reliable grooving

Grooving system

GY series

➔A312—A333

25° rhombic insert for profile machining up to a 60° inclination
Tool consolidation and reduced cycle times

Double clamp type holder for copying

PROFILE HOLDER

➔A224

MILLING TOOLS

SOLID END MILL

The unique 4 flute geometry that has a full cutting edge to the centre of the ball nose allows higher efficiency, higher feed machining

4 flute IMPACT MIRACLE ball nose end mill

VF-4MB

B098

Single phase nano crystal coating technology for higher film hardness and heat resistance
New end mill series covering a wide range of machining applications

IMPACT MIRACLE end mill Series

IMPACT MIRACLE

B078—B102

Prevention of vibration with irregularhelix flutes
Excellent vibration resistance for the machining of difficult-to-cut materials and applications with long overhangs

IMPACT MIRACLE vibration control end mill

VF-MHV/ VF-MHVRB/ VF-6MHVRB

B080, B099, B100

For machining of undercut and complicated geometries using a 5-axis machine

2 flute IMPACT MIRACLE wide ball nose end mill

VF-2WB

B084

Wide range of tools to
cover all applications
1841 sizes available in 30 different types

MSTAR end mills

MSTAR

➔B018—B075

CBN ball nose type, the ultimate
choice for finish machining of moulds

2 flute CBN long neck ball nose slot drill/
Radius end mill

CBN-2XLB/
CBN-2XLRB

➔B182, B183

For high efficiency machining
of aluminium alloy parts

End mill series for high efficiency aluminium machining

ALIMASTER

➔B204—B210

High precision geometry and
Miracle coating greatly shortens
finish machining times of moulds

2-flute high precision ball nose end mills

MIRACLE NOVA
VC-2PSB/
VC-2PSB-P

➔B117, B118

For general and hardened steels through to
difficult-to-cut materials
Roughing end mills with
superior fracture resistance

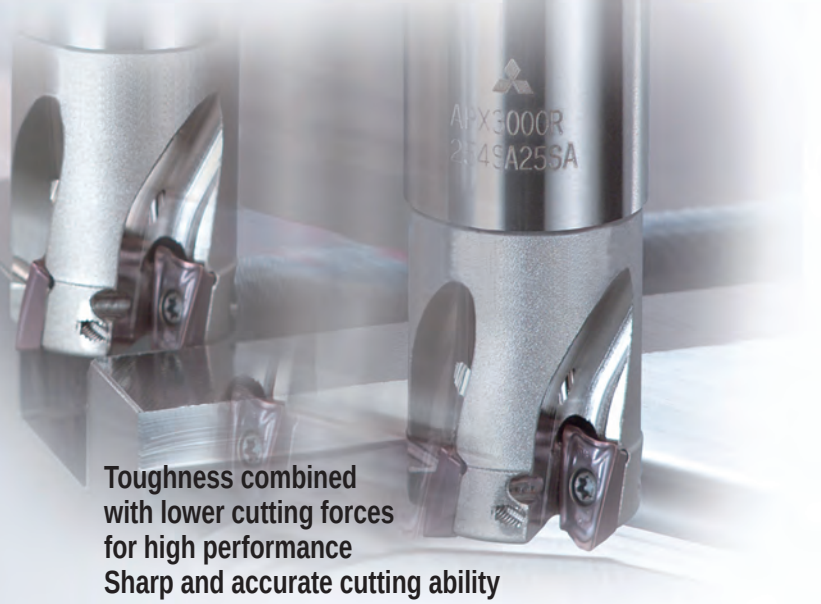
IMPACT MIRACLE
roughing end mill series

VF-SFPR/
VF-MFPR

➔B082, B083

MILLING TOOLS

CUTTER



Multi-functional tool
Center cutting edge for drilling and end milling

Multi-functional end mills

AQX

➔C128—C135

Toughness combined with lower cutting forces for high performance
Sharp and accurate cutting ability

Multi-functional end mills

APX3000/ APX4000

➔C106—C119

Offering a breakthrough in cast iron machining
A combination with new MC5020 grade allows longer tool life and higher efficiency

Milling cutter for cast iron

AHX640W

➔C080,C081

New grade for milling cast iron

MC5020

➔C006

Multi functional milling cutter for high speed & performance machining of aluminium alloys
Achieves metal removal rates of up to 9,000cc/min (ø50 cutter)

Milling cutter for aluminium alloys

AXD7000

➔C120—C123

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Accurate and simple clamping of high tolerance M-class inserts
For milling a wide range of materials from light alloys to hardened steels

ASX series

Wide selection of body sizes and inserts

Face milling cutters with screw-on type inserts

ASX445

C064—C069

Economical 4 cutting edge insert
High wall accuracy from the curved edge insert design

Screw-on insert, shoulder milling cutters

ASX400

C086—C091

Offers low cutting resistance for heavy machining & deep shoulder milling

Indexable end mill for deep shoulder milling

SPX

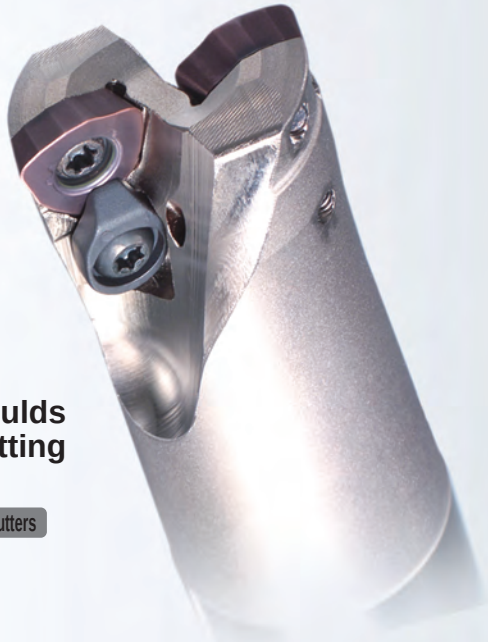
C162—C165

Excellent performance for roughing and efficient machining of moulds

Ball nose end mills for roughing to semi finishing

SRM2

C172—C179



High accuracy indexable end mills
The optimum tool for accurate finishing

Ball nose end mills for finishing

SRF

C169—C171

Ultra high feed machining of moulds
Economical 3 cutting edge insert

Ultra high feed rate radius milling cutters

AJX

C136—C143

DRILLING TOOLS

Indexable insert drill
with stable drilling performance

Indexable type drills

TAW

➔D112—D123

Innovative insert clamping offers stability and reliability when drilling small holes

Small diameter indexable drill

S-TAW

➔D108—D111

Non-step deep hole drilling (l/d 10-30)
80%-90% reduction of drilling time

Solid carbide drills for deep hole drilling

WSTAR
SUPER LONG DRILL

➔D035—D043

Versatile
"wavy cutting edge & flute geometry"
for drilling general steel through to difficult-to-cut materials

Solid carbide drill

MWE/MWS

➔D020—D034

For high efficiency micro deep hole drilling!

Solid carbide drill with through coolant holes

SMALL DIAMETER MWS

➔D012—D019

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Innovative drilling solutions for hardened steel Eliminates the need for a heat treatment process

Solid carbide drill for die & mould machining

MHS

➔D052—D060

Drilling and chamfering can be done at the same time

Chamfer ring for the TAW drills

CHAMFER RING

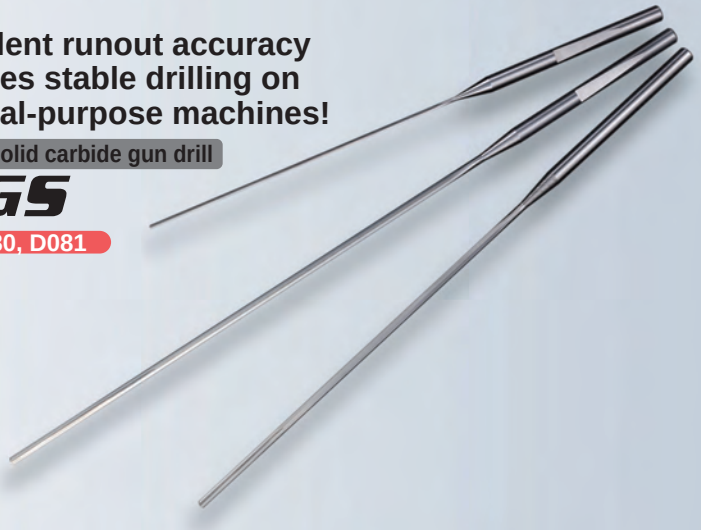
➔D124, D125

Excellent runout accuracy ensures stable drilling on general-purpose machines!

Micro solid carbide gun drill

MGS

➔D080, D081



Unique geometry offers high efficiency counter boring Excellent chip breaking and flat counterbored surface

Violet series, high precision drills for counter boring

VA-PDS-CB

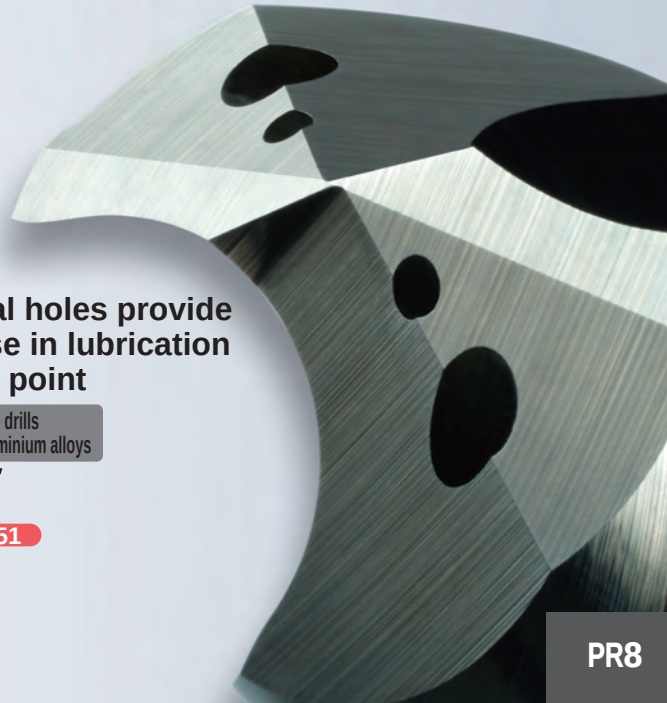
➔D162

The central holes provide an increase in lubrication to the drill point

Solid carbide drills for machining of aluminium alloys

MNS

➔D044—D051



Memo

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C

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C○○○○**R/L**	DG holder pack number	A338,A340
C○○○**R-BLS**	MICRO-MINI boring bar (Solid carbide)	A286 A367
C○○○**SCLCR/L**○○	S type boring bar/MICRO-MINI (Carbide shank)	A280,A294,E020
C○○○**SCZCR/L**○○	S type boring bar (Carbide shank)	E020
C○○○**SDQCR/L**○○	S type boring bar (Carbide shank)	A295
C○○○**SDUCR/L**○○	S type boring bar (Carbide shank)	A293,E020
C○○○**SDZCR/L**○○	S type boring bar (Carbide shank)	E020
C○○○**SSKCR/L**○○	S type boring bar (Carbide shank)	E020
C○○○**STFCR**○○	S type boring bar (Carbide shank)	A292
C○○○**STUCR06**	MICRO-DEX boring bar (Carbide shank)	A281
C○○○**SVQCR**○○	S type boring bar (Carbide shank)	A296
C○○○**SVUCR/L**○○	S type boring bar (Carbide shank)	E020
C○○○**SWUBR**○○	MICRO-DEX boring bar (Carbide shank)	A280
C-2JS	Carbide end mill, Semi long cut length, 2 flute	B195
C-2LA	Carbide end mill, Long cut length, 2 flute, For aluminium alloy	B198
C-2LS	Carbide end mill, Long cut length, 2 flute	B196
C-2MA	Carbide end mill, Medium cut length, 2 flute, For aluminium alloy	B197
C-2MB	Carbide end mill, Ball nose end mill, Medium cut length, 2 flute	B202
C-2MHA	Carbide end mill, Medium cut length, 2 flute, For aluminium alloy	B206
C-2MS	Carbide end mill, Medium cut length, 2 flute	B192—B194
C-2SA	Carbide end mill, Short cut length, 2 flute, For aluminium alloy	B204
C-2SS	Carbide end mill, Short cut length, 2 flute	B191
C-3SA	Carbide end mill, Short cut length, 3 flute, For aluminium alloy	B205
C-3SARB	Carbide end mill, Corner radius, Short cut length, 3 flute, For aluminium alloy	B209
C-4JC	Carbide end mill, Semi long cut length, 4 flute, Center cutting	B200
C-4LC	Carbide end mill, Long cut length, 4 flute, Center cutting	B201
C-4MC	Carbide end mill, Medium cut length, 4 flute, Center cutting	B199
CA○○○	Clamp bridge	E013
CAS51T	Set screw	E003
CB○○**RS**	MICRO-MINI TWIN	A283
CB○○**RS-B**	MICRO-MINI TWIN	A283
CBJPR○○○**S**○○	CBJP type end mill	C185
CBMPR○○○**S**○○	CBMP type end mill	C185
CBN-2XLB	CBN end mill, Ball nose, Short cut length, 2 flute, Long neck	B182
CBN-2XLRB	CBN end mill, Corner radius, Medium cut length, 2 flute, Long neck	B183
CBS○○	Breaker piece	E015
CBT○○	Breaker piece	E015
CBT○○○○	Breaker piece (For ET holder)	E015
CCET○○○○○○**R/L-SN**	Insert (Class E tolerance)	A091
CCET○○○○○○**R/L-SR**	Insert (Class E tolerance)	A091
CCET○○○○○○**R/LW-SN**	Insert (Class E tolerance)	A092
CCGH○○○○○○**R/L-F**	Insert (Class G tolerance)	A089
CCGT○○○○○○**-AZ**	Insert (Class G tolerance)	A089
CCGT○○○○○○**-FJ**	Insert (Class G tolerance)	A089
CCGT○○○○○○**L-F**	Insert (Class G tolerance)	A089
CCGT○○○○○○**M-SMG**	Insert (Class G tolerance)	A092
CCGT○○○○○○**R/L-SN**	Insert (Class G tolerance)	A092
CCGT○○○○○○**R/L-SS**	Insert (Class G tolerance)	A090
CCGW○○○○○○	Insert (Class G tolerance)	A092
CCK○○	Clamp bridge (For WP holder/M type boring bar)	E013
CCMH○○○○○○**-MV**	Insert (Class M tolerance)	A091
CCMH○○○○○○**-SV**	Insert (Class M tolerance)	A090
CCMT○○○○○○	Insert (Class M tolerance)	A090
CCMT○○○○○○**-FV**	Insert (Class M tolerance)	A089
CCMT○○○○○○**-MW**	Insert (Class M tolerance)	A091
CCMT○○○○○○**-SW**	Insert (Class M tolerance)	A090
CCMW○○○○○○	Insert (Class M tolerance)	A092,A158,A176
CCMX○○○○○○**EN-A**	Insert (For DCCC type end mill)	C021,C167
CCMX09T308EN-B	Insert (For DCCC type end mill)	C022,C167
CCP○○	Shim pin (For WP holder/M type boring bar)	E012
CCTC1	Clamp bridge	E013
CESPR○○○**S**○○	CESP type end mill	C183
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CFSPR○○○**S**○○	CFSP type end mill	C183
CFT○	Insert (For CF holder)	A377
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CGSPR○○○**S**○○	CGSP type end mill	C183
CK○○○	Clamp bridge	E013
CKW6	Clamp bridge	E014
C-MH	Carbide end mill, Medium cut length, 3 flute	B203
C-MRA	Carbide end mill, Roughing end mill, Medium cut length, 3 flute, For aluminium alloy	B208
CNGG○○○○○○**-FJ**	Insert (Class G tolerance)	A058
CNGG○○○○○○**-MJ**	Insert (Class G tolerance)	A059
CNGG○○○○○○**-PK**	Insert (Class G tolerance)	A058
CNGN○○○○○○	Insert (Class G tolerance)	A152
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CNMG○○○○○○-FH	Insert (Class M tolerance)	A058
CNMG○○○○○○-FS	Insert (Class M tolerance)	A058
CNMG○○○○○○-FY	Insert (Class M tolerance)	A058
CNMG○○○○○○-GH	Insert (Class M tolerance)	A061
CNMG○○○○○○-GJ	Insert (Class M tolerance)	A061
CNMG○○○○○○-HAS	Insert (Class M tolerance)	A062
CNMG○○○○○○-HDS	Insert (Class M tolerance)	A062
CNMG○○○○○○-MA	Insert (Class M tolerance)	A059
CNMG○○○○○○-MH	Insert (Class M tolerance)	A060
CNMG○○○○○○-MJ	Insert (Class M tolerance)	A059
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CNMG○○○○○○-MS	Insert (Class M tolerance)	A061
CNMG○○○○○○-MV	Insert (Class M tolerance)	A060
CNMG○○○○○○-MW	Insert (Class M tolerance)	A060
CNMG○○○○○○-SA	Insert (Class M tolerance)	A059
CNMG○○○○○○-SH	Insert (Class M tolerance)	A058
CNMG○○○○○○-SW	Insert (Class M tolerance)	A059
CNMG○○○○○○-SY	Insert (Class M tolerance)	A059
CNMM○○○○○○-HBS	Insert (Class M tolerance)	A062
CNMM○○○○○○-HCS	Insert (Class M tolerance)	A062
CNMM○○○○○○-HV	Insert (Class M tolerance)	A061
CNMM○○○○○○-HX	Insert (Class M tolerance)	A061
CNMM○○○○○○-HXD	Insert (Class M tolerance)	A062
CNMM○○○○○○-HZ	Insert (Class M tolerance)	A061
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CPMH○○○○○○-MV	Insert (Class M tolerance)	A093
CPMH○○○○○○R/L-F	Insert (Class M tolerance)	A093
CPMH○○○○○○-SV	Insert (Class M tolerance)	A093
CPMT○○○○ZPEN-M○	Insert (For PMR type end mill)	C022,C190
CPMX○○○○○○	Insert (Class M tolerance)	A093
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CRN-2MS	CRN end mill, Medium cut length, 2 flute, For copper electrodes	B162
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C-SRARB	Carbide end mill, Corner radius roughing end mill, Short cut length, 3 flute, For aluminium alloy	B210
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CSSPR/L○○○○	MC holder	E017
CSSPR○○CA○○	BC type cartridge	C208
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CSVTC○○○○R-B	Insert for external cutting off	A260
CSVTF○○○R/L	Insert for external front turning	A259
CSVTF○○○R/L-B	Insert for external front turning	A259
CSVTFXL	Insert for external front turning, Copying	A259
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CSYPR○○CA○○	BC type cartridge	C208
CT○○	Shim (For MC holder)	E009
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CTAHR1010-120S	Small tools holder (For external cutting off)	A250
CTANR/L○○○○	MC holder	E017
CTAPR/L2020	MC holder	E017
CTAT○○○○○○○○○-B○	Insert for cutting off	A251
CTAT○○○○○○○LL/RR	Insert for cutting off	A251
CTBHR/L○○○○-○○○	Small tools holder (For external cutting off)	A246,A252
CTBT○○○○○○○○○-B	Insert for cutting off	A252
CTCHR/L○○○○-200	Small tools holder (For external cutting off)	A253
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CTDT25350V5R-BS	Insert for cutting off	A254
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CTFPR/L○○CA○○	BC type cartridge	C208
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CWS○	Wedge (For FN548/FP590 type cutter)	C198
CWS42SER/L	Wedge (For FE404 type cutter)	C199
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D

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DC-2MB	Diamond coated end mill, Ball nose, Medium cut length, 2 flute, For graphite	B178
DC-2MB-NF	Diamond coated end mill, Ball nose, Medium cut length, 2 flute, For non-ferrous metals	B177
DC-2MS-3	Diamond coated end mill, Medium cut length, 2 flute, 3mm shank, For non-ferrous metals	B176
DC-2XLB	Diamond coated end mill, Ball nose, Medium cut length, 2 flute, Long neck, For graphite	B180
DC-BSS	Diamond coated drill, For hard brittle materials	D138
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DCET○○○○○○R/LW-SN	Insert (Class E tolerance)	A096
DCGT○○○○○○-AZ	Insert (Class G tolerance)	A094
DCGT○○○○○○M-SMG	Insert (Class G tolerance)	A096
DCGT○○○○○○R/L-F	Insert (Class G tolerance)	A094
DCGT○○○○○○R/L-SN	Insert (Class G tolerance)	A096
DCGT○○○○○○R/L-SS	Insert (Class G tolerance)	A094
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DCMT○○○○○○-FV	Insert (Class M tolerance)	A094
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DCSVN32	Shim	E009
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DGM○○○○○	Insert (For DG holder)	A358,A359,A375
DGS51	Clamp screw (For DG holder)	E003
DKS○	Clamp screw (For DCSD/DCSN type end mill)	E004
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DLC-2MB	DLC coated end mill, Ball nose, Medium cut length, 2 flute	B175
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DNGG○○○○○○-FJ	Insert (Class G tolerance)	A063
DNGG○○○○○○-PK	Insert (Class G tolerance)	A063
DNGG○○○○○○R/L	Insert (Class G tolerance)	A066
DNGM○○○○○○-MJ	Insert (Class G tolerance)	A064
DNGN○○○○○○	Insert (Class G tolerance)	A152
DNMA○○○○○○	Insert (Class M tolerance)	A067
DNMG○○○○○○	Insert (Class M tolerance)	A065
DNMG○○○○○○-C	Insert (Class M tolerance)	A064
DNMG○○○○○○-FH	Insert (Class M tolerance)	A063
DNMG○○○○○○-FS	Insert (Class M tolerance)	A063
DNMG○○○○○○-FY	Insert (Class M tolerance)	A063
DNMG○○○○○○-GH	Insert (Class M tolerance)	A066
DNMG○○○○○○-GJ	Insert (Class M tolerance)	A066
DNMG○○○○○○-MA	Insert (Class M tolerance)	A065
DNMG○○○○○○-MH	Insert (Class M tolerance)	A065
DNMG○○○○○○-MJ	Insert (Class M tolerance)	A064
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DNMG○○○○○○-MS	Insert (Class M tolerance)	A066
DNMG○○○○○○-MV	Insert (Class M tolerance)	A065
DNMG○○○○○○-SA	Insert (Class M tolerance)	A064
DNMG○○○○○○-SH	Insert (Class M tolerance)	A063
DNMG○○○○○○-SY	Insert (Class M tolerance)	A064
DNMM○○○○○○-HZ	Insert (Class M tolerance)	A066
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DNMX○○○○○○-SW	Insert (Class M tolerance)	A064
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E○○○STFPR○○	COBRA type boring bar (Carbide shank)	E020
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EST○○	Shim (For ML holder)	E009
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FA○-FASC○○○	Boring unit (Angular type)	C216
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GDCN2004PDFR3	Insert (For NF10000/QF10000 type cutter)	C043
GDCN2004PDR	Insert (For AF10000 type cutter)	C043
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H

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J

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MSCN63	Shim	E010
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MSE445 type	MSE445 type face mill	E025
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MSF	Semi-finish end mill, Medium cut length, 4—6 flute	B269
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NP-CCGW○○○○○○○	Insert (Class G tolerance)	A157
NP-CCGW○○○○○○○**2**	Insert (Class G tolerance)	A156
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NP-CCGW○○○○○○**GAW2**	Insert (Class G tolerance)	A157
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NP-DCGW○○○○○○○	Insert (Class G tolerance)	A161
NP-DCGW○○○○○○○2	Insert (Class G tolerance)	A160
NP-DCGW○○○○○○GWJR/L	Insert (Class G tolerance)	A161
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NP-DCMW○○○○○○○	Insert (Class M tolerance)	A161
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NP-DNMA○○○○○○○	Insert (Class M tolerance)	A146
NP-DNMA○○○○○○GWJR/L	Insert (Class M tolerance)	A146
NP-DNMM○○○○○○R/L-F	Insert (Class M tolerance)	A172
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SEE4L	Carbide end mill, Long cut length, 4 flute	B213
SEEN○○○○AF○N1	Insert (For SE445/545 type cutter)	C027,C071 C073,C075
SEEN○○○○EF○R/L1	Insert (For SE415/515 type cutter)	C028,C077 C079
SEER○○○○AFEN-JS	Insert (For SE445/545 type cutter)	C028,C071 C073,C075
SEER1203EFER-JS	Insert (For SE415 type cutter)	C029,C077
SEET13T3AGEN-JL	Insert (For ASX445 type cutter)	C029,C067
SEF○○○	Setting fixture	C200
SEG2SA	Carbide end mill, Short cut length, 2 flute, Irregular spiral helix angle, For aluminium alloy	B215
SEG4SA	Carbide end mill, Medium cut length, 4 flute, Irregular spiral helix angle, For aluminium alloy	B216
SEGT13T3AGFN-JP	Insert (For ASX445 type cutter)	C029,C067
SEKN○○○○AF○N	Insert (For SE445/545 type cutter)	C027,C071 C073,C075
SEKN○○○○AF○N1	Insert (For SE445/545 type cutter)	C027,C071 C073,C075
SEKN○○○○EF○R	Insert (For SE415/515 type cutter)	C028,C029 C077,C079
SEKN○○○○EF○R1	Insert (For SE415/515 type cutter)	C028,C029 C077,C079
SEKN1203AGTN	Insert (For corner angle 45° type cutter)	C030
SEMT13T3AGSN-FT	Insert (For ASX445 type cutter)	C029,C067
SEMT13T3AGSN-JH	Insert (For ASX445 type cutter)	C029,C067
SEMT13T3AGSN-JM	Insert (For ASX445 type cutter)	C029,C067
SENN1203AFTN1	Insert (For MSE445 type cutter)	C030
SET○○○R3X○○	Insert (For SET holder)	A401
SET○○○R3X○○○	Insert (For SET holder)	A401
SETHR○○○○○○○	SET holder	A400
SETHR12CA16	Cartridge (For external turning)	C214
SETK○○	Clamp bridge (For MMTE/MMTI/SET/SNT holder)	E014
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SFCN1203ZFFR/L2	Insert (For BF407/QBF407 type cutter)	C030 C044,C084
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SHP400 type	SHP400 type face mill	E027
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SLCW○○	Clamp wedge (For SL holder)	E018
SLG○○○○○L	Insert (For STLG type end mill)	C030,C188
SLN○○	Nut (For SL holder)	E018
SL-ONEN120404ASN	Insert (For AOX445 type cutter)	C044,C082
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SLSTN○○	Shim (For SL/WP holder)	E018
SMGHR○○○○○○○	SMG holder	A406,A366
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SMTTR○○○○○○○○	Insert (For SMT holder)	A407,A366
SN○F43B2○	Insert (For DN/BN425 type face mill)	C030
SNC○○B2○	Insert (For DN/BN425 type face mill)	C030
SNGA○○○○○○	Insert (Class G tolerance)	A073,A147,A173
SNGG○○○○○○-PK	Insert (Class G tolerance)	A069
SNGG○○○○○○R/L	Insert (Class G tolerance)	A071
SNGN○○○○○○	Insert (Class G tolerance)	A087,A154,A175
SNK43B2○	Insert (For DN/BN425 type face mill)	C030
SNMA○○○○○○	Insert (Class M tolerance)	A073
SNMG○○○○○○	Insert (Class M tolerance)	A071
SNMG○○○○○○-C	Insert (Class M tolerance)	A070
SNMG○○○○○○-FH	Insert (Class M tolerance)	A069
SNMG○○○○○○-FS	Insert (Class M tolerance)	A069
SNMG○○○○○○-FY	Insert (Class M tolerance)	A069
SNMG○○○○○○-GH	Insert (Class M tolerance)	A071
SNMG○○○○○○-HAS	Insert (Class M tolerance)	A072
SNMG○○○○○○-HDS	Insert (Class M tolerance)	A072
SNMG○○○○○○-MA	Insert (Class M tolerance)	A070
SNMG○○○○○○-MH	Insert (Class M tolerance)	A070
SNMG○○○○○○-MP	Insert (Class M tolerance)	A070
SNMG○○○○○○-MS	Insert (Class M tolerance)	A071
SNMG○○○○○○-MV	Insert (Class M tolerance)	A070
SNMG○○○○○○R/L-1G	Insert (Class M tolerance)	A070
SNMG○○○○○○-SA	Insert (Class M tolerance)	A069
SNMG○○○○○○-SH	Insert (Class M tolerance)	A069
SNMG○○○○○○-SY	Insert (Class M tolerance)	A069
SNMM○○○○○○-HBS	Insert (Class M tolerance)	A072
SNMM○○○○○○-HCS	Insert (Class M tolerance)	A072
SNMM○○○○○○-HDS	Insert (Class M tolerance)	A073
SNMM○○○○○○-HV	Insert (Class M tolerance)	A072
SNMM○○○○○○-HX	Insert (Class M tolerance)	A072
SNMM○○○○○○-HXD	Insert (Class M tolerance)	A073
SNMM○○○○○○-HZ	Insert (Class M tolerance)	A071
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SNT○○○R22○○	Insert (For SNT holder)	A403
SNT○○○R3X○○	Insert (For SNT holder)	A403
SNT○○○R3X○○○	Insert (For SNT holder)	A403
SNTF○○○○R	SNT holder	A402,E022
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SOGT12T308PEFR-JP	Insert (For ASX400 type cutter)	C031,C089
SOMT12T308PEER/L-JM	Insert (For ASX400 type cutter)	C031,C089
SOMT12T308PEER-JH	Insert (For ASX400 type cutter)	C031,C089
SOMT12T320PEER-FT	Insert (For ASX400 type cutter)	C031,C089
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SPCG53Z	Insert (For FF3000 type face mill)	C031,C196
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SPEN○○○A	Insert (For FP490/590 type cutter)	C032,C197 C198
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SPGR○○○○○○R/L	Insert (Class G tolerance)	A117
SPGX○○○○○○	Insert (Class G tolerance)	A103,A177
SPKN○○○○EDR/L	Insert (For corner angle 15° type cutter)	C032
SPMB1204APT	Insert (For BSP type end mill)	C032,C144
SPMN○○○○○○	Insert (Class M tolerance)	A117,C033
SPMN○○○○○○T	Insert (Class M tolerance)	C033
SPMR○○○○○○	Insert (Class M tolerance)	A117
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SPMT120408-A	Insert (For TBE1 type end mill)	C033
SPMW○○○○○○	Insert (Class M tolerance)	A103,C033,C183
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SPSG20R	Locator (For SG20 type face mill)	C085
SPSHP400R/L	Locator (For SHP400 type cutter)	E027
SPSVN32	Shim (For SP holder)	E011
SPTSE○○○R	Locator (For NSE300/400 type cutter)	C092 C094
SPX4R○○○○○BT50N○○	SPX type end mill	C162
SPX4R○○○○○CA058A	SPX type end mill	C163
SPX4R○○○○○MT5N○	SPX type end mill	C162
SPX4R○○○○○WN○○	SPX type end mill	C162
SR	Roughing end mill, Short cut length, 4−6 flute	B260
SRBT○○	Insert (For SRB type end mill)	C034,C170
SRDCN○○○○○○○	SP holder	A219
SRDCR12CA08	Cartridge (For external turning)	C212
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SRFH○○S○○○	SRF type end mill	C169
SRFH○○S○○○W	SRF type end mill (Carbide shank)	C170
SRFT○○	Insert (For SRF type end mill)	C034,C170
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SRGCR/L○○○○○○○	SP holder	A219
SRK1R	Clamp bridge (For SRE type end mill)	E015
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SRM○○E-M	Insert (For SRM2 type end mill)	C035,C173
SRM2○○○AM○○S/L○○	SRM type end mill	C174
SRM2○○○M/S/WNL○	SRM2 type end mill	C178
SRM2○○○S○○	SRM2 type end mill	C172,C172
SRS5	Clamp screw (For SRE type end mill)	E007
SRSGN○○○○○○○	SR holder	E019
SRSGR/L○○○○○○○	SR holder	E019
SRXCR/L○○○○○○○	SP holder	E018
SSBCR/L1616H09	SP holder	E018
SSE41R/L	Locator (For E404 type face mill)	E025
SSKPR○○CA○○	SS type cartridge	C210
SSSCR/L○○○○○○○	SP holder	A220
SSSPR○○CA○○	SS type cartridge	C210
SSYPR○○CA○○	SS type cartridge	C210

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STBE445NF	Shim (For LSE445 type face mill)	C072
STBS500N	Shim (For BSX type cutter)	E011
STFCR/L○○○○○○○	SP holder	A221
STFER/L○○○○○○○	AL holder	A229
STFPR/L○○CA○○	SS type cartridge	C210
STGCR/L○○○○○○○	SP holder	A221
STGER/L○○○○○○○	AL holder	A229
STGPR○○CA○○	SS type cartridge	C210
STJPR12CA16	Cartridge (For external turning)	C212
STLGR○○S○○	STLG type end mill	C188
STPMR○N	Shim (For PMR type end mill)	C190
STSE○○○R/L	Shim (For SE445/SE545/SE515 type cutter)	C070,C071,C074,C076,C078
STSP415R	Shim (For FBP415/QBP415 type cutter)	C083
STTPR○○CA○○	SS type cartridge	C210
SVJBR/L○○○○○○○-SM	Small tools holder (External front turning)	A244
SVJCR/L○○○○○○○	SP holder	A222,E018
SVJCR12CA16	Cartridge (For external turning)	C212
SVJDR/L○○○○○○○	AL holder	A230
SVPCR/L○○○○○○○	SP holder	A223,E018
SVPCR12CA16	Cartridge (For external turning)	C212
SVPDR/L○○○○○○○	AL holder	E019
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T

T○○○○R/L	DG holder pack number	A356
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TAW○B○○○○S32	TAW type drill (For bridge construction)	D123
TAW○N○○○○S○○	TAW type drill (General use)	D112−D117
TAW○NH○○○○S○○	TAW type drill (General use)	D112
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TAWB○○○○T	Insert (For TAW type drill)	C051,D123
TAWBH○○○○T	Insert (For TAW type drill)	C049,D123
TAWC12T301-45GM	Insert (For chamfer ring)	D125
TAWN○○○○T	Insert (For TAW type drill)	C050,C051 D112−D117,D120,D121
TAWNH○○○○T	Insert (For TAW type drill)	C048,C049 D112−D119
TBE1○○○S○	TBE1 type end mill	E031
TBE1 type	TBE1 type end mill	E031
TBE2 type	TBE2 type end mill	E031
TBGN○○○○○○	Insert (Class G tolerance)	A169
TCGN○○○○○○	Insert (Class G tolerance)	A119
TCGT○○○○○○-AZ	Insert (Class G tolerance)	A104
TCGT○○○○○○R/L-F	Insert (Class G tolerance)	A104
TCGW○○○○○○	Insert (Class G tolerance)	A179
TCMT○○○○○○	Insert (Class M tolerance)	A104
TCMT○○○○○○-FV	Insert (Class M tolerance)	A104
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TEEN○○○○PE○R/L1	Insert (For SE300/400 type cutter)	C036,C093 C095
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TEGX○○○○○○R/L	Insert (For AL holder)	A105,A183
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TKY○○F	Flag wrench	E002
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TNGG○○○○○○R/L-F	Insert (Class G tolerance)	A074
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TNGG○○○○○○R/L-K	Insert (Class G tolerance)	A075
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TNMG○○○○○○-FH	Insert (Class M tolerance)	A074
TNMG○○○○○○-FS	Insert (Class M tolerance)	A074
TNMG○○○○○○-FY	Insert (Class M tolerance)	A074
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TNMG○○○○○○-MJ	Insert (Class M tolerance)	A076
TNMG○○○○○○-MP	Insert (Class M tolerance)	A076
TNMG○○○○○○-MS	Insert (Class M tolerance)	A077
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TNMG○○○○○○R/L-2G	Insert (Class M tolerance)	A077
TNMG○○○○○○R/L-2M	Insert (Class M tolerance)	A077
TNMG○○○○○○R/L-ES	Insert (Class M tolerance)	A077
TNMG○○○○○○-SA	Insert (Class M tolerance)	A075
TNMG○○○○○○-SH	Insert (Class M tolerance)	A075
TNMG○○○○○○-SY	Insert (Class M tolerance)	A075
TNMM○○○○○○-HV	Insert (Class M tolerance)	A079
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TPGV○○○○○○R/L-F	Insert (Class G tolerance)	A180
TPGX○○○○○○	Insert (Class G tolerance)	A107,A164,A180
TPGX○○○○○○R/L	Insert (Class G tolerance)	A106
TPMH○○○○○○-MV	Insert (Class M tolerance)	A107
TPMH○○○○○○-SV	Insert (Class M tolerance)	A107
TPMN○○○○○○	Insert (Class M tolerance)	A120,C037
TPMR○○○○○○	Insert (Class M tolerance)	A120
TPMX○○○○○○	Insert (Class M tolerance)	A107
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TS○○	Clamp screw	E007
TS○○○	Clamp screw	E007
TSB○	Clamp screw	E021
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TSS○○○○○	Radial screw (For BC cartridge)	E008
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TTAT○○○○○○○R/L○-B	Insert (For small tools holder)	A256
TTD	Taper shank drill, For steel frame	D209

U

U○○○○R/L	DG holder pack number	A356
UCR	Clamp bridge (For UP/US/S500 type cutter)	E015
UDC○○F	Insert (For FBE2 type end mill)	C037,C045
UDK○○A	Insert (For TBE1 type end mill)	C037,C038
UDK15	Insert (For TBE1 type end mill)	C037
UGHN○○○	UG holder	A360
UGHR/L○○○○○○○	UG holder	A361
UGS1	Wrench (For UG holder)	A360
UPM○○	Insert (For TRM4 type end mill)	C038,C180
UPM○○P○	Insert (For TRM4 type end mill)	C038,C180

V

V10000-○○○○○○○	V10000 type face mill	C194
VA-2MB	VIOLET end mill, Ball nose end mill, Medium cut length, 2 flute	B220
VA-2MS	VIOLET end mill, Medium cut length, 2 flute	B218−B240
VA-2SS	VIOLET end mill, Short cut length, 2 flute	B217
VA-4MC	VIOLET end mill, Medium cut length, 4 flute	B219
VA-JR	VIOLET end mill, Roughing end mill, Semi long cut length, 4−6 flute	B224
VA-LH	VIOLET end mill, Long cut length, 3−4 flute, High helix	B227
VA-LR	VIOLET end mill, Roughing end mill, Long cut length, 4−6 flute	B225

ORDER NUMBER	PRODUCT NAME	PAGE
VA-MFPR	VIOLET end mill, Roughing end mill, Medium cut length, 4—6 flute, Fine pitch form	B222
VA-MH	VIOLET end mill, Medium cut length, 3—4 flute	B226
VA-MR	VIOLET end mill, Roughing end mill, Medium cut length, 4—6 flute	B223
VA-PDM	VIOLET drill, Medium, High precision	D145—D147
VA-PDM-SUS	VIOLET drill, Medium, High precision, For stainless steel	D155—D160
VA-PDS	VIOLET drill, Short, High precision	D140—D143
VA-PDS-CB	VIOLET drill, Short flute length, High precision, For counter boring	D162
VA-PDS-SUS	VIOLET drill, Short, High precision, For stainless steel	D149—D154
VA-SFPR	VIOLET end mill, Roughing end mill, Short cut length, 4—6 flute, Fine pitch form	B221
VBET○○○○○○R/L-SN	Insert (Class E tolerance)	A109
VBET○○○○○○R/L-SR	Insert (Class E tolerance)	A108
VBET○○○○○○R/LW-SN	Insert (Class E tolerance)	A109
VBGT○○○○○○R/L-F	Insert (Class G tolerance)	A108
VBMT○○○○○○	Insert (Class M tolerance)	A108
VBMT○○○○○○-MV	Insert (Class M tolerance)	A108
VBMT○○○○○○-SV	Insert (Class M tolerance)	A108
VC-2C	MIRACLE end mill, Chamfer cutter, 2 flute	B158
VC-2ESB	MIRACLE end mill, Ball nose, Extra short cut length, 2 flute, Short shank	B114
VC-2JRB	MIRACLE end mill, Corner radius end mill, Semi long cut length, 2 flute	B136
VC-2JS	MIRACLE end mill, Semi long cut length, 2 flute	B109
VC-2LB	MIRACLE end mill, Ball nose end mill, Medium cut length, 2 flute, Long shank	B123
VC-2MB	MIRACLE end mill, Ball nose end mill, Medium cut length, 2 flute	B119—B126
VC-2MB-OH	MIRACLE end mill, Ball nose end mill, Medium cut length, 2 flute, Through coolant holes	B121
VC-2MB-SS	MIRACLE end mill, Ball nose end mill, Medium cut length, 2 flute, Slim shank	B120
VC-2MDB	MIRACLE end mill, Ball nose, Medium cut length, 2 flute, Strong geometry type	B122
VC-2MS	MIRACLE end mill, Medium cut length, 2 flute	B106—B110
VC-2MS-SS	MIRACLE end mill, Medium cut length, 2 flute, Slim shank	B108
VC-2MT	MIRACLE end mill, Taper end mill, Medium cut length, 2 flute	B153,B165
VC-2PSB	MIRACLE end mill, Ball nose end mill, Short cut length, 2 flute, High precision	B117
VC-2PSB-P	MIRACLE end mill, Ball nose end mill, Short cut length, 2 flute, Ultra high precision	B118
VC-2SB	MIRACLE end mill, Ball nose end mill, Short cut length, 2 flute, Relieved neck	B116
VC-2SS	MIRACLE end mill, Extra short cut length, 2 flute	B104,B105
VC-2SSB	MIRACLE end mill, Ball nose, Short cut length, 2 flute, Short shank	B115
VC-2XL	MIRACLE end mill, Medium cut length, 2 flute, Long neck	B110
VC-2XLB	MIRACLE end mill, Ball nose end mill, Medium cut length, 2 flute, Long neck	B124
VC-2XLB-6	MIRACLE end mill, Ball nose, Medium cut length, 2 flute, Long neck, 6mm shank	B125
VC-3LB	MIRACLE end mill, Ball nose, Medium cut length, 3 flute, Long shank	B129
VC-3MB	MIRACLE end mill, Ball nose end mill, Medium cut length, 3 flute	B128
VC-4JC	MIRACLE end mill, Semi long cut length, 4 flute	B113
VC-4JRB	MIRACLE end mill, Corner radius end mill, Semi long cut length, 4 flute	B138
VC-4MB	MIRACLE end mill, Ball nose end mill, Medium cut length, 4 flute	B130
VC-4MC	MIRACLE end mill, Medium cut length, 4 flute	B111
VC-4MC-SS	MIRACLE end mill, Medium cut length, 4 flute, Slim shank	B112
VC-4MT	MIRACLE end mill, Taper end mill, Medium cut length, 4 flute	B154,B155
VC-4SRB	MIRACLE end mill, Corner radius end mill, Short cut length, 4 flute	B137
VC-4STB	MIRACLE end mill, Ball nose taper end mill, Short cut length, 4 flute	B156,B157
VC-6MH	MIRACLE end mill, Medium cut length, 6 flute, High helix angle	B150
VC-8MH	MIRACLE end mill, Medium cut length, 8 flute, High helix angle	B151
VCGT○○○○○○-AZ	Insert (Class G tolerance)	A110
VCGT○○○○○○R/L-F	Insert (Class G tolerance)	A110
VC-HFRB	MIRACLE end mill, Corner radius, Short flute length, 4 flute, High feed machining	B139,B140
VC-HSM	MIRACLE drill, Medium, For hardened material	D087
VC-LD	MIRACLE end mill, Long cut length, 6 flute	B144
VC-MD	MIRACLE end mill, Medium cut length, 4—6 flute	B141
VC-MDL	MIRACLE end mill, Medium cut length, 6 flute, Long shank	B143
VC-MDRB	MIRACLE end mill, Corner radius end mill, Medium cut length	B146
VC-MD-SC	MIRACLE end mill, Medium cut length, 4—6 flute	B142
VC-MH	MIRACLE end mill, Medium cut length, 3—4 flute, High helix angle	B149
VC-MHDRB	MIRACLE end mill, Corner radius end mill, Medium cut length, 4 flute, High helix angle	B147,B148
VCMT○○○○○○	Insert (Class M tolerance)	A110
VCMT○○○○○○-FV	Insert (Class M tolerance)	A110

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VCMT○○○○○○-MV	Insert (Class M tolerance)	A110
VCMT○○○○○○-SV	Insert (Class M tolerance)	A110
VCMW○○○○○○	Insert (Class M tolerance)	A110
VC-PSRB	MIRACLE end mill, Corner radius end mill, Short cut length, 2—4 flute, High precision	B131—B135
VC-RC	MIRACLE end mill, Corner rounding cutter, 3 flute	B159
VC-SDRB	MIRACLE end mill, Corner radius end mill, Short cut length	B145
VC-SFPR	MIRACLE end mill, Roughing end mill, Short cut length, 3—4 flute	B152
VC-SSM	MIRACLE drill, Medium, For steel	D085,D086
VC-SSS	MIRACLE drill, Short, For steel (3mm shank series)	D082
VC-SSS	MIRACLE drill, Short, For steel	D083,D084
VCT13R	Cartridge (For V10000 type cutter)	C194
VC-XB	MIRACLE end mill, Ball nose taper end mill, Medium cut length, Taper neck	B126,B127
VDGX○○○○○○R/L	Insert (Class G tolerance)	A111
VDGX○○○○○○R/L-F	Insert (Class G tolerance)	A184
VE-USM	VIOLET drill, Medium, For stainless steel	D163,D164
VF-2MD	IMPACT MIRACLE end mill, Medium cut length, 2 flute, For hardened materials	B076
VF-2SB	IMPACT MIRACLE end mill, Ball nose, Short cut length, 2 flute, For hardened materials	B086
VF-2SDB	IMPACT MIRACLE end mill, Ball nose, Short cut length, 2 flute, Strong geometry type	B087
VF-2SDBL	IMPACT MIRACLE end mill, Ball nose, Short cut length, 2 flute, Strong geometry type, Long shank	B088
VF-2SSB	IMPACT MIRACLE end mill, Ball nose, Short cut length, 2 flute, Short shank	B085
VF-2WB	IMPACT MIRACLE end mill, Wide ball nose, Medium cut length, 2 flute	B084
VF-2XL	IMPACT MIRACLE end mill, 2 flute, Long neck	B077
VF-2XLB	IMPACT MIRACLE end mill, Ball nose, Long cut length, 2 flute, For hardened materials	B090—B094
VF-2XLBS	IMPACT MIRACLE end mill, Ball nose, Medium cut length, 2 flute, Short shank	B089
VF-3XB	IMPACT MIRACLE end mill, Ball nose, Medium cut length, 3 flute, Taper neck	B095—B097
VF-4MB	IMPACT MIRACLE end mill, Ball nose, Medium cut length, 4 flute	B098
VF-4MD	IMPACT MIRACLE end mill, Medium cut length, 4 flute, For hardened materials	B078
VF-6MHVRB	IMPACT MIRACLE end mill, Corner radius, Medium cut length, 6 flute, Irregular helix flutes	B100
VF-MD	IMPACT MIRACLE end mill, Medium cut length, For hardened materials	B081
VF-MDRB	IMPACT MIRACLE end mill, Corner radius, Medium cut length, 6 flute, For hardened materials	B102
VF-MFPR	IMPACT MIRACLE end mill, Roughing type, Medium cut length, 4 flute	B083
VF-MHV	IMPACT MIRACLE end mill, Medium cut length, Irregular helix flutes	B079
VF-MHVRB	IMPACT MIRACLE end mill, Corner radius, Medium cut length, Irregular helix flutes	B099
VF-SD	IMPACT MIRACLE end mill, Short cut length, For hardened materials	B080
VF-SDRB	IMPACT MIRACLE end mill, Corner radius, Extra short cut length, For hardened materials	B101
VF-SFPR	IMPACT MIRACLE end mill, Roughing type, Short cut length, 3—4 flute	B082
VIP400 type	VIP400 type face mill	E027
VIP445 type	VIP445 type face mill	E027
VIPER type	VIPER type end mill	E030
VJ-2MS	MIRACLE end mill, Medium cut length, 2 flute	B160
VJ-4MS	MIRACLE end mill, Medium cut length, 4 flute	B161
VNGA○○○○○○	Insert (Class G tolerance)	A081,A150,A174
VNGG○○○○○○-FJ	Insert (Class G tolerance)	A080
VNGG○○○○○○R/L	Insert (Class G tolerance)	A081
VNGG○○○○○○R/L-F	Insert (Class G tolerance)	A080
VNGM○○○○○○-MJ	Insert (Class G tolerance)	A080
VNMG○○○○○○	Insert (Class M tolerance)	A081
VNMG○○○○○○-FH	Insert (Class M tolerance)	A080
VNMG○○○○○○-FS	Insert (Class M tolerance)	A080
VNMG○○○○○○-MA	Insert (Class M tolerance)	A081
VNMG○○○○○○-MH	Insert (Class M tolerance)	A081
VNMG○○○○○○-MJ	Insert (Class M tolerance)	A080
VNMG○○○○○○-MP	Insert (Class M tolerance)	A081
VNMG○○○○○○-MS	Insert (Class M tolerance)	A081
VNMG○○○○○○-MV	Insert (Class M tolerance)	A081
VNMG○○○○○○-SH	Insert (Class M tolerance)	A080
V-SD	VIOLET drill, Straight shank	D166,D167
VSD645 type	VSD645 type face mill	E027
V-TDS	VIOLET drill, Short, Taper shank	D169
V-TSD-OH	VIOLET drill, Oil hole, For steel frame	D168

W

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WBMT○○○○○○R/L-MV	Insert (Class M tolerance)	A112
WCGT○○○○○○R/L	Insert (Class G tolerance)	A113
WCMT○○○○○○	Insert (Class M tolerance)	A113
WCMW○○○○○○	Insert (Class M tolerance)	A182
WCS○○○○○○H	Shim screw (For BSX type cutter)	E008
WEC○○AF○R/L10C	Wiper insert (For SE445/545 type cutter)	C041 C071,C073
WEC○○AF○R/L5C	Wiper insert (For SE445/545 type cutter)	C041 C071,C073,C075
WEC○○EF○R/L5C	Wiper insert (For SE415/515 type face mill)	C041,C042,C077,C079
WEC300PEER9C	Wiper insert (For SE300 type cutter)	C041
WEC400PEER/L10C	Wiper insert (For SE400 type cutter)	C041
WEC42EF○R/L10C	Wiper insert (For SE415 type face mill)	C042 C077
WEC42W11R/L	Wiper insert (For E404 type face mill)	C046
WEEW13T3AG○R3C	Wiper insert (For ASX445 type cutter)	C046 C067
WEEW13T3AG○R8C	Wiper insert (For ASX445 type cutter)	C042 C067
WFC42ZFER/L2	Wiper insert (For BF407/QBF407 type cutter)	C046,C084

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WNEU2006ZEN7C-WK	Wiper insert (For AHX640W type cutter)	C041 C080
WNMA○○○○○○	Insert (Class M tolerance)	A085
WNMG○○○○○○	Insert (Class M tolerance)	A084
WNMG○○○○○○-C	Insert (Class M tolerance)	A083
WNMG○○○○○○-FH	Insert (Class M tolerance)	A082
WNMG○○○○○○-FS	Insert (Class M tolerance)	A082
WNMG○○○○○○-FY	Insert (Class M tolerance)	A082
WNMG○○○○○○-GH	Insert (Class M tolerance)	A084
WNMG○○○○○○-GJ	Insert (Class M tolerance)	A084
WNMG○○○○○○-MA	Insert (Class M tolerance)	A083
WNMG○○○○○○-MH	Insert (Class M tolerance)	A084
WNMG○○○○○○-MJ	Insert (Class M tolerance)	A083
WNMG○○○○○○-MP	Insert (Class M tolerance)	A083
WNMG○○○○○○-MS	Insert (Class M tolerance)	A084
WNMG○○○○○○-MV	Insert (Class M tolerance)	A083
WNMG○○○○○○-MW	Insert (Class M tolerance)	A084
WNMG○○○○○○-SA	Insert (Class M tolerance)	A082
WNMG○○○○○○-SH	Insert (Class M tolerance)	A082
WNMG○○○○○○-SW	Insert (Class M tolerance)	A082
WNMG○○○○○○-SY	Insert (Class M tolerance)	A083
WOEW12T308PE○○8C	Wiper insert (For ASX400 type cutter)	C042 C089
WPC42EEER/L10C	Wiper insert (For FBP415/QBP415 type cutter)	C042,C083
WPC42W3GR/L	Wiper insert (For P425/DP type cutter)	C042
WPGT○○○○○○	Insert (Class G tolerance)	A114,A182
WPGT○○○○○○R/L-FS	Insert (Class G tolerance)	A114
WPMT○○○○○○-MV	Insert (Class M tolerance)	A114
WPS1	Lock screw (For WP holder)	E008
WPSTN○○	Shim (For WP holder)	E011
WPSWC43	Shim (For M type boring bar)	E011
WPSWN43	Shim (For WP holder)	E011
WS○○○○○○T	Clamp screw (For TAW type drill)	E008
WS1	Wedge screw (For cutter)	E008

X

XCMT○○○○○○-SVX	Insert (Class M tolerance)	A115
XDGT○○○○PD○R-G○○	Insert (For BXD type cutter)	C039,C127
XDGT○○○○PDFR-GL○○	Insert (For BXD type cutter)	C039,C127
XDGX2270○○PDFR-GL	Insert (For AXD7000 type cutter)	C039,C122
XPGT○○○○PD○R-G○○	Insert (For BAP3500 type cutter)	C040,C097
XPMT○○○○PDER-M○○	Insert (For BAP3500 type end mill)	C040,C097

Z

ZCMX○○○○○○ER-○	Insert (For DCCC type end mill)	C040,C167
ZR○○○C	C type head (For ZR type end mill)	E030
ZR○○○T	T type head (For ZR type end mill)	E030
ZRM○○○○R-M○	Insert (For BAP300 type end mill)	C040,C105

NUMBER•OTHERS

01-○	Insert (For brazed tools holder)	A458
02-○	Insert (For brazed tools holder)	A458
03-○	Insert (For brazed tools holder)	A458
04-○	Insert (For brazed tools holder)	A458
05-○	Insert (For brazed tools holder)	A458
06-○	Insert (For brazed tools holder)	A458
07-○	Insert (For brazed tools holder)	A459
08-○	Insert (For brazed tools holder)	A459
09E1	Insert (For brazed tools holder)	A459
1LA	Light alloy steel end mill, Medium cut length, 1 flute	B273
1MA	Light alloy steel end mill, Medium cut length, 1 flute	B272
2FB	Ball nose end mill, Medium cut length, 2 flute	B258
2LS	End mill, Long cut length, 2 flute	B243,B244
2MA	Light alloy steel end mill, Medium cut length, 2 flute	B275
2MK	End mill, Short cut length, 2 flute, For key ways	B245,B246
2ML	Deep slotting end mill, Medium cut length, 2 flute	B277
2MS	End mill, Medium cut length, 2 flute	B240,B241
2SS	End mill, Short cut length, 2 flute	B229—B233
31-○	31 type brazed tools holder	A461
32-○	32 type brazed tools holder	A461
33-○	33 type brazed tools holder	A461
33-○C	Brazed tools with sintered PCD	A464
34-○	34 type brazed tools holder	A461
35-○	35 type brazed tools holder	A461
35-○C	Brazed tools with sintered PCD	A464
36-○	36 type brazed tools holder	A461
37-○	37 type brazed tools holder	A462
37-○C	Brazed tools with sintered PCD	A464
38-○	38 type brazed tools holder	A462
39-○	39 type brazed tools holder	A462
3KD	Triangular shank drill, (Type 6.5)(Type 10)(Type 13)	D210
3MS	End mill, Medium cut length, 3 flute	B248
40-○	40 type brazed tools holder	A462
41-○	41 type brazed tools holder	A462
42-○	42 type brazed tools holder	A462
43-○	43 type brazed tools holder	A462
47-○	47 type brazed tools holder	A463
49-○	49 type brazed tools holder	A463
4LC	End mill, Long cut length, 4 flute, Center cutting	B256
4MC	End mill, Medium cut length, 4 flute, Center cutting	B252,B253
4ML	Deep slotting end mill, Medium cut length, 4 flute, Long shank	B278
4MX	Deep slotting end mill, Extra long cut length, 4 flute	B280
4SX	Deep slotting end mill, Long cut length, 4 flute	B279
51-○	51 type brazed tools holder	A463
6100-1-75	Wrench for locator (For RRSN type holder)	A232
95-○	95 type brazed tools holder	A463
I-○	Insert (For former brazed tools holder)	A460
TO-○	Insert (For former brazed tools holder)	A460
HA-○	Insert (For former brazed tools holder)	A460
RI-○	Insert (For former brazed tools holder)	A460
RU-○	Insert (For former brazed tools holder)	A460

SAFETY OF CUTTING TOOL PRODUCTS

1. Use of Cutting Tool Products

Packages of Mitsubishi products carry a safety warning label. However, tools are not labeled with detailed warning indications. Please read the "Safety of Cutting Tool Products" in this catalogue before handling cutting tool products and cemented carbide materials. Moreover, as a part of your workers' safety education, please notify the contents of the "Safety of Cutting Tool Products" to all workers.

2. Basic Characteristics of Hard Tool Materials

In Terms of "Safety of Cutting Tool Products"

Hard Tool Materials **:** General term for tool materials like cemented carbide alloy, cermet, ceramics, sintered CBN, sintered diamond, high speed steel and alloy steel, etc.

Physical Characteristics

Appearance **:** Varies depending on the type of material. Eg. grey, black, gold, etc.
Smell **:** None
Hardness, Specific Gravity **:**

Hard Tool Materials	Hardness (HV)	Specific Gravity	Hard Tool Materials	Hardness (HV)	Specific Gravity
High Speed Steel (HSS)	200—1200kg/mm^2	7—9	Sintered CBN	2000—5000kg/mm^2	3—5
Cemented Carbide	500—3000kg/mm^2	9—16	Sintered Diamond	8000—12000kg/mm^2	3—5
Cermet	500—3000kg/mm^2	5—9	Alloy Steel	200—1200kg/mm^2	7—9
Ceramics	1000—4000kg/mm^2	2—7	Diamond Electroforming Product	8000—12000kg/mm^2	3—5

Constituents

Carbide, nitride, carbon nitride, oxide, such as W, Ti, Al, Si, Ta, B, V and metals such as Fe, Co, Ni, Cr, Mo.

3. Safety of Cutting Tool Products

○Hard tool materials have a large specific gravity. Thus, they require special attention as heavy materials when the size or quantity is large.

○Cutting tool products generate dust and mist during grinding operations or heating. This dust and mist can be harmful when coming in contact with the eyes or skin, or if substantial quantities are swallowed. When grinding and machining, it is recommended to use local exhaust ventilation and respirators, a dust protective mask, glasses, gloves etc. If dust makes contact with the hands, thoroughly wash the affected area with soap and water. Don't eat in the exposed area, and wash hands thoroughly before eating. Remove dust from the clothing by a cleaning or washing, but don't shake off.

○Cobalt and nickel contained in carbide or other cutting tool materials are reported as possibly carcinogenic to humans. It is also reported that cobalt and nickel dust and mist can affect the skin, respiratory organs and heart through repeated or prolonged contact.

○For further information, please refer to MSDS (Material Safety Data Sheet).
MSDS=Material Safety Data Sheet
Home page: http://www.mitsubishicarbide.com/msds/

4. Handling Cutting Tool Products

○Surface conditions affect toughness of cutting tools. Therefore, use a diamond grinding wheel for finishing.

○Hard tool materials are extremely hard and brittle at the same time. Thus, they may be broken by shocks and tightening with excess force.

○Hard tool materials and ferrous materials have different thermal expansion ratios. Shrinkage or swell fit products may suffer from cracks when applied temperature is higher or lower than the appropriate temperature for the tool.

○Pay special attention on storing hard tool materials. Toughness of hard tool materials is lowered when they corrode due to coolant and other liquid.

○When brazing hard tool materials, if the temperature is too high or too low from the melting point of the brazing material, loosening and breakage may occur.

○After regrinding cutting tools, make sure that there are no cracks.

○Machining hard tool materials on EDM may cause cracks on the surface due to electrons remaining after the EDM operation, resulting in lowering of the toughness. Eliminate these cracks by grinding, etc.

SUGGESTIONS ON HOW TO USE CUTTING TOOLS

Products	Hazard	Countermeasure
All Cutting Tools	◎Cutting tools have sharp cutting edges. Handling them with bare hands may cause injuries.	✱Take precautions such as wearing gloves especially when handling tools and during installation.
	◎Improper use of tools and application of inappropriate cutting conditions may cause the tool to break and be expelled from the machine providing risk of injury.	✱Ensure safety guards and goggles are used. ✱Refer to handling explanatory notes and catalogues. Use tools under recommended cutting conditions.
	◎Impact load and rapid increase of cutting resistance due to excessive wear may cause the tool to break and be expelled from the machine providing risk of injury.	✱Ensure safety guards and goggles are used. ✱Exchange tools before excessive wear occurs.
	◎Cutting tools and workpieces become extremely hot during cutting. Touching them with bare hands may cause burns.	✱Take precautions such as wearing gloves.
	◎Expelled hot chips produced in cutting produces risk of injuries and burns.	✱Ensure safety guards and goggles are used. ✱During swarf removal and machine cleaning ensure the machine is stopped and wear gloves. Please use tools, such as cutting nippers and cutting clippers.
	◎In cutting, sparks, hot chips and heat generation caused by tool breakage provides a risk of igniting a fire.	✱Avoid using cutting tools in places where there is a possibility of igniting a fire. ✱In case of using non-water soluble oil, make sure to have a fire prevention countermeasure.
	◎Using machines, chucks, and tools with poor balance at high revolutions may cause tools to break providing risk of injuries.	✱Ensure safety guards and goggles are used. ✱Check the machine for vibration, chattering, and abnormal noise.
	◎Handling machined parts with burrs using bare hands may cause injuries.	✱Wear gloves.
Indexable Inserts Type Tools	◎If inserts and spare parts are not held securely, they may become loose and be expelled producing risk of injuries.	✱Clean insert locating seat and spare parts before setting inserts. ✱Use the tool provided for setting inserts, and ensure the inserts and spare parts are clamped securely. Do not use the tool provided for things other than prescribed inserts and spare parts.
	◎Clamping inserts and spare parts too tightly by using tools such as extension pipes may cause them to break and be expelled.	✱Do not use extra tools for more leverage. Only use the tool provided.
	◎When applying high cutting speed, spare parts and inserts may be expelled due to centrifugal force. Pay special attention on each safety guidline.	✱Refer to the handling explanatory notes and catalogues. Use tools under recommended cutting conditions.
Cutters and Other Rotating Tools	◎Milling cutters have sharp edges. Handling them with bare hands may cause injuries.	✱Take precautions such as wearing gloves.
	◎Poor balance or off center revolving of tools may cause vibration and chattering which could cause the tool to break and be expelled.	✱Apply cutting speed within the range of recommended cutting conditions. ✱Adjust accuracy and balance of spindles and bearings periodically to prevent off center revolving and chattering caused by wear on these parts.
Drilling Tools	◎Through cutting in cases when the workpiece revolves may produce a disk shaped peice with sharp edges when the cutting tool breaks through.	✱Ensure safety guards and goggles are used. Also install a cover on the chuck.
	◎Drills with an extremely small diameter have a very sharp point which may puncture the skin if not handled carefully. If the drill breaks during cutting, the broken pieces may be expelled.	✱Handle with care. Take precautions such as wearing gloves and goggles.
Brazed Tools	◎Weakening of the braze and breakage of inserts may cause injury.	✱Before using them, ensure they are brazed securely. ✱Do not use them under conditions which produce very high temperature.
Others	◎Machine and tools may be damaged if they are used for purposes other than the prescribed application.	✱Use them strictly for the prescribed application.

INFORMATION

This catalogue completes the basic precautions for safety use of our company's products.
For further information, please refer to the guideline, catalogs or contact us. We are not responsible for any accidents causing by modifying tools without our permission.

HOW TO READ THE STANDARD OF TURNING INSERTS

●How this section page is organized

①Organized according to turning insert shape.
(Refer to the index on the next page.)
②Inserts are arranged in order of :
- Negative inserts (with hole→without hole)
- Positive inserts (with hole→without hole)

③Breakers are arranged in order of :
Finish Cutting→Light Cutting→Medium Cutting →Semi-Heavy Cutting→Heavy Cutting

●Graph of chip control by work material

Shows recommended chip breakers and chip control range according to work material and cutting application.
Graphs are colored according to cutting applications (Finish→Light→Medium→Semi-Heavy→Heavy) and contain recommended breakers for each application.

Finish Cutting : Light Cutting : Medium Cutting :
Semi-Heavy Cutting : Heavy Cutting :

GRADE APPLICATION RECOMMENDED FOR EACH WORK MATERIAL
cutting conditions suitable for each type of work material is shown as a general guide to select the grade.
●: Stable Cutting ◐: General Cutting ✱: Unstable Cutting

SHAPE & ANGLE MARK

INDICATION OF NEGATIVE/ POSITIVE TYPE

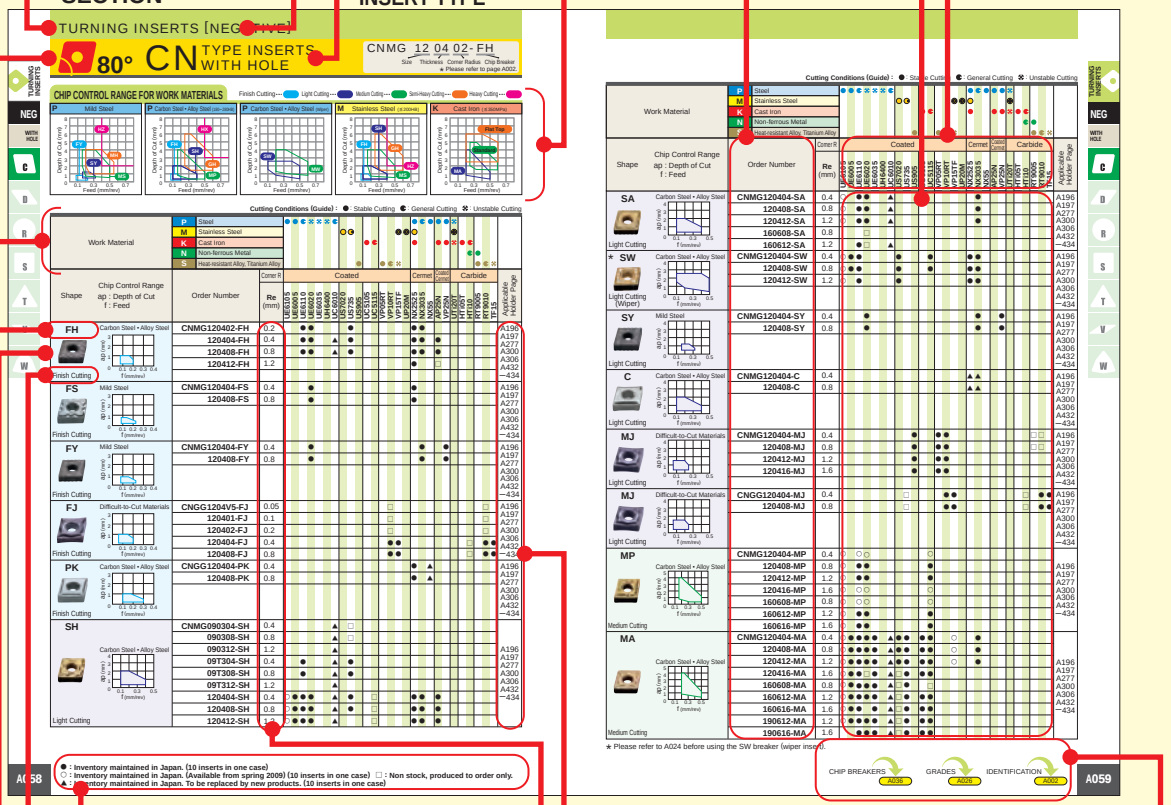
PRODUCT SECTION

TITLE OF PRODUCT ACCORDING TO THE INSERT TYPE

STOCK STATUS

INSERT GRADES

INSERT NUMBER



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

CUTTING APPLICATION
is shown in order of: Finish→Light →Medium→Semi-Heavy→Heavy.

PHOTO OF INSERT

INDICATION OF CHIPBREAKER
indicates the designation for a chipbreaker.

PAGE REFERENCE
·CHIP BREAKERS
·GRADES
·TECHNICAL DATA
indicates reference pages, on the right hand page of each double-page spread.

APPLICABLE HOLDER PAGE
indicates reference pages for details of applicable holders.

INSERT CORNER RADIUS

●To Order : Please specify
①insert number and ②grade.

TURNING TOOLS

INSERT STANDARDS
INSERT GRADES

INDENTIFICATION ····· A002
HOLE GEOMETRY ····· A004
PRECISION BREAKER STANDARD ····· A006
OUTLINE OF TOOL NAVI ····· A009
CLASSIFICATION OF GRADES AND CHIP BREAKERS FOR TURNING··· A010
PRECISION BREAKER SYSTEM ····· A022
WIPER INSERT ····· A024
GRADES FOR TURNING ····· A026
TURNING APPLICATION RANGE ····· A027
COATED CARBIDE (CVD) ····· A028
COATED CARBIDE (PVD) ····· A030
CERMET ····· A032
COATED CERMET ····· A033
CEMENTED CARBIDE ····· A034
MICRO-GRAIN CEMENTED CARBIDE ····· A035
CLASSIFICATION OF INSERTS ····· A036

STANDARD OF INSERTS

NEGATIVE INSERTS WITH HOLE

CN○○TYPE···RHOMBIC 80° ····· A058
DN○○TYPE···RHOMBIC 55° ····· A063
RN○○TYPE···ROUND ····· A068
SN○○TYPE···SQUARE 90° ····· A069
TN○○TYPE···TRIANGULAR 60° ····· A074
VN○○TYPE···RHOMBIC 35° ····· A080
WN○○TYPE···TRIGON 80° ····· A082

NEGATIVE INSERTS WITHOUT HOLE

SN○○TYPE···SQUARE 90° ····· A086
TN○○TYPE···TRIANGULAR 60° ····· A087
KN○○TYPE···PARALLELOGRAM 55°··· A088

POSITIVE INSERTS WITH HOLE

CC○○TYPE···RHOMBIC 80° ····· A089
CP○○TYPE···RHOMBIC 80° ····· A093
DC○○TYPE···RHOMBIC 55° ····· A094
DE○○TYPE···RHOMBIC 55° ····· A098
RC○○TYPE···ROUND ····· A099
RD○○TYPE···ROUND ····· A100
RG○○TYPE···ROUND ····· A101
SC○○TYPE···SQUARE 90° ····· A102
SP○○TYPE···SQUARE 90°····· A103
TC○○TYPE···TRIANGULAR 60° ····· A104
TE○○TYPE···TRIANGULAR 60°····· A105
TP○○TYPE···TRIANGULAR 60°····· A106
VB○○TYPE···RHOMBIC 35° ····· A108
VC○○TYPE···RHOMBIC 35° ····· A110
VD○○TYPE···RHOMBIC 35° ····· A111
WB○○TYPE···TRIGON 80° ····· A112
WC○○TYPE···TRIGON 80° ····· A113
WP○○TYPE···TRIGON 80° ····· A114
XC○○TYPE···RHOMBIC 25° ····· A115

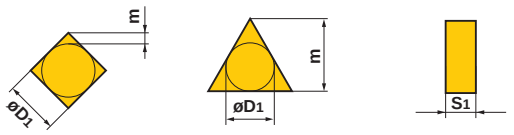
POSITIVE INSERTS WITHOUT HOLE

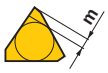
RTG TYPE····· A116
SP○○TYPE···SQUARE 90° ····· A117
TC○○TYPE···TRIANGULAR 60° ····· A119
TP○○TYPE···TRIANGULAR 60°····· A120

IDENTIFICATION

Symbol	Insert Shape
H	Hexagonal
O	Octagonal
P	Pentagonal
S	Square
T	Triangular
C	Rhombic80°
D	Rhombic55°
E	Rhombic75°
F	Rhombic50°
M	Rhombic86°
V	Rhombic35°
W	Trigon
L	Rectangular
A	Parallelogram85°
B	Parallelogram82°
K	Parallelogram55°
R	Round
X	Special Design

① Insert Shape





Triangular insert with a facet (Secondary Cutting Edge)

③ Tolerance Class

Symbol	Tolerance of Nose Height **m** (mm)	Tolerance of Inscribed Circle **øD1** (mm)	Tolerance of Thickness **S1** (mm)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05−±0.15	±0.025
K*	±0.013	±0.05−±0.15	±0.025
L*	±0.025	±0.05−±0.15	±0.025
M*	±0.08−±0.18	±0.05−±0.15	±0.13
N*	±0.08−±0.18	±0.05−±0.15	±0.025
U*	±0.13−±0.38	±0.08−±0.25	±0.13

The surface of insert with * mark is sintered.

Detail of M Class Insert Tolerance

● Tolerance of Nose Height **m** (mm)

D.I.C.	Triangular	Square	Rhombic 80°	Rhombic 55°	Rhombic 35°	Round
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	–
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	–
12.70	±0.13	±0.13	±0.13	±0.15	–	–
15.875	±0.15	±0.15	±0.15	±0.18	–	–
19.05	±0.15	±0.15	±0.15	±0.18	–	–
25.40	–	±0.18	–	–	–	–
31.75	–	±0.20	–	–	–	–

● Tolerance of Inscribed Circle **ϕD1** (mm)

D.I.C.	Triangular	Square	Rhombic 80°	Rhombic 55°	Rhombic 35°	Round
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	–
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.70	±0.08	±0.08	±0.08	±0.08	–	±0.08
15.875	±0.10	±0.10	±0.10	±0.10	–	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	–	±0.10
25.40	–	±0.13	–	–	–	±0.13
31.75	–	±0.15	–	–	–	±0.15

③ Tolerance Class

	①		③	
	C	**N**	**M**	**G**
		②		④

② Normal Clearance

Symbol	Normal Clearance
A	3
B	5
C	7
D	15
E	20
F	25
G	30
N	0
P	11
O	Other Normal Clearance

Major Normal Clearance

④ Fixing and/or for Chip Breaker

Metric

Symbol	Hole	Hole Configuration	Chip Breaker	Figure	Symbol	Hole	Hole Configuration	Chip Breaker	Figure
W	With Hole	Cylindrical Hole + One Countersink (40−60°)	No		A	With Hole	Cylindrical Hole	No	
T	With Hole		One Sided		M	With Hole	Cylindrical Hole	One Sided	
Q	With Hole	Cylindrical Hole + Double Countersink (40−60°)	No		G	With Hole	Cylindrical Hole	Double Sided	
U	With Hole		Double Sided		N	Without Hole	–	No	
B	With Hole	Cylindrical Hole + One Countersink (70−90°)	No		R	Without Hole	–	One Sided	
H	With Hole		One Sided		F	Without Hole	–	Double Sided	
C	With Hole	Cylindrical Hole + Double Countersink (70−90°)	No		X	–	–	–	Special Design
J	With Hole		Double Sided						

Symbol R	Symbol W	Symbol V	Symbol D	Symbol C	Symbol S	Symbol T	Diameter of Inscribed Circle (mm)
	02		04	03	03	06	3.97
	L3	08	05	04	04	08	4.76
	03	09	06	05	05	09	5.56
06							6.00
	04	11	07	06	06	11	6.35
	05	13	09	08	07	13	7.94
08							8.00
09	06	16	11	09	09	16	9.525
10							10.00
12							12.00
12	08	22	15	12	12	22	12.70
15	10		19	16	15	27	15.875
16							16.00
19	13		23	19	19	33	19.05
20							20.00
			27	22	22	38	22.225
25							25.00
25			31	25	25	44	25.40
31			38	32	31	54	31.75
32							32.00

⑤ Insert Size

*Thickness is from the bottom of the insert to the top of the cutting edge.

Symbol	Thickness (mm)
S1	1.39
01	1.59
T0	1.79
02	2.38
T2	2.78
03	3.18
T3	3.97
04	4.76
06	6.35
07	7.94
09	9.52

⑥ Insert Thickness

⑤	⑥	⑦	⑧	⑨	⑩
12	04	08	(E)	(N)	- MP

⑦ Insert Corner Configuration

Symbol	Corner Radius (mm)
00	Sharp Nose
V3	0.03
V5	0.05
01	0.1
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6
20	2.0
24	2.4
28	2.8
32	3.2
00 : Inch M0 : Metric	Round Insert

⑧ Cutting Edge Condition

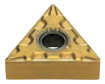
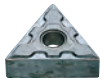
Figure	Cutting Edge	Symbol
	Sharp Cutting Edges	F
	Round Cutting Edges	E
	Chamfered Cutting Edges	T
	Chamfered and Rounded Cutting Edges	S

Mitsubishi Materials omit the honing symbol.

⑨ Cutting Direction

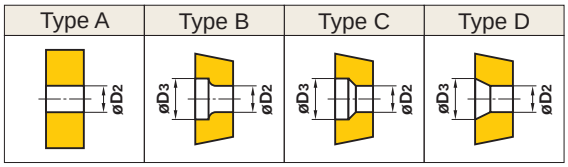
Figure	Hand	Symbol
	Right	R
	Left	L
	Neutral	N

⑩ Chip Breaker

Standard	C	FH
		
FJ	**FS**	**FV**
		
GH	**GJ**	**HV**
HX	**HZ**	**MA**
MH	**MJ**	**MP**
MS	**MV**	**MW**
SA	**SH**	**SW**

(Refer to JIS-B4120-1998)

HOLE GEOMETRY

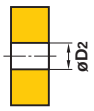
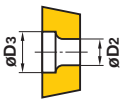
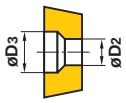
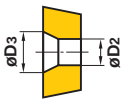


NEGATIVE

Insert Number		Dimension (mm) D2	Hole Type
CNGA CNGG CNMA CNMG CNMM CNMP	0903○○	3.81	A
	0904○○	3.81	A
	1204○○	5.16	A
	1606○○	6.35	A
	1906○○	7.93	A
	2509○○	9.12	A
DNGA DNGG DNGM DNMA DNMG DNMM DNMX	1104○○	3.81	A
	1504○○	5.16	A
	1506○○	5.16	A
SNGA SNGG SNMA SNMG SNMM	0903○○	3.81	A
	1204○○	5.16	A
	1506○○	6.35	A
	1906○○	7.93	A
	2507○○	9.12	A
	2509○○	9.12	A
TNGA TNGG TNMA TNMG TNMM TNMX	1103○○	2.26	A
	1603○○	3.81	A
	1604○○	3.81	A
	2204○○	5.16	A
	2706○○	6.35	A
	3309○○	7.93	A
VNGA VNGM VNGG VNMG VNMM	1604○○	3.81	A
WNMA WNMG	0603○○	3.81	A
	06T3○○	3.81	A
	0604○○	3.81	A
	0804○○	5.16	A
RNMG RNMA	090300	3.81	A
	120400	5.16	A
	190600	7.93	A
	250900	9.12	A
	310900	12.7	A

POSITIVE

Insert Number		Dimensions (mm) D2	D3	Hole Type
CCET	0602○○	2.8	3.8	B
	09T3○○	4.4	6.0	B
CCGB CCMB CCGH CCMH	0602○○	2.8	3.9	B
CCGT	03S1○○	2.0	2.9	B
	04T0○○	2.4	3.5	B
	0602○○	2.8	3.8	B
	09T3○○	4.4	6.0	B
	1204○○	5.5	7.5	B
CCMT	0602○○	2.8	3.8	B
	0803○○	3.4	4.5	B
	09T3○○	4.4	6.0	B
	1204○○	5.5	7.5	B
CCGW CCMW	0602○○	2.8	3.8	B
	09T3○○	4.4	6.0	B
	1204○○	5.5	7.5	B
CPGT	0802○○	3.4	4.5	B
	0903○○	4.4	6.0	B
CPGB CPMB CPMH	0802○○	3.5	5.3	D
	0903○○	4.5	6.3	D
CPMX	0802○○	3.5	5.6	D
	0903○○	4.6	6.6	D
DCET DCGT	0702○○	2.8	3.8	B
	11T3○○	4.4	6.0	B
DCGW DCMW DCMT	0702○○	2.8	3.8	B
	11T3○○	4.4	6.0	B
	1504○○	5.5	7.5	B
DEGX	1504○○	5.1	7.0	C
RCMX	1003M0	3.6	4.6	D
	1204M0	4.2	5.4	D
	1606M0	5.2	6.7	D
	2006M0	6.5	8.0	D
	2507M0	7.2	9.1	D
	3209M0	9.5	11.7	D
RCMT RCGT	0602M0	2.8	3.8	B
	0803M0	3.4	4.5	B
	10T3M0	4.4	6.0	B
RGGM	2004M0	5.6	7.5	C

Type A	Type B	Type C	Type D
			

POSITIVE

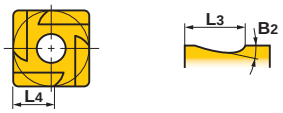
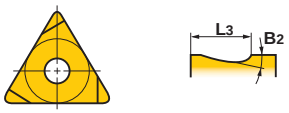
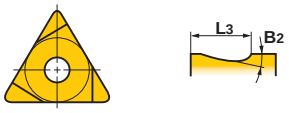
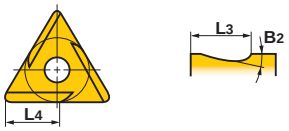
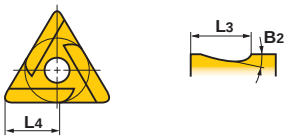
Insert Number		Dimensions (mm)		Hole Type
		D2	D3	
SCMT SCMW	09T3○○	4.4	6.0	B
	1204○○	5.5	7.5	B
SPMW	0903○○	4.6	6.0	B
	1203○○	5.7	7.5	B
SPMT	0903○○	4.4	6.0	B
	1203○○	5.5	7.5	B
SPGX	0903○○	4.8	6.4	D
	1203○○	5.9	7.7	D
TCGT TCMT TCGW TCMW	0601○○	2.3	3.2	B
	0802○○	2.3	3.0	B
	0902○○	2.5	3.3	B
	1102○○	2.8	3.8	B
	1303○○	3.4	4.5	B
	16T3○○	4.4	6.0	B
TEGX	1603○○	4.4	6.1	D
TPGX	0802○○	2.5	3.8	C
	0902○○	3.0	4.3	C
	1103○○	3.5	4.8	C
	1603○○	4.8	6.4	D
TPMX	0802○○	2.7	3.8	C
	0902○○	3.2	4.3	C
	1103○○	3.7	4.8	C
	1603○○	4.8	6.4	D
TPGB TPMB TPGH TPMH	0802○○	2.4	4.0	D
	0902○○	2.9	4.3	D
	1103○○	3.4	4.8	D
	1603○○	4.4	6.5	D
TPGV	0902○○	2.8	3.8	B
	1103○○	3.4	4.5	B
TPGT	1603○○	4.4	6.0	B
VBET VBGT VBMT VBGW	1103○○	2.9	3.8	B
	1604○○	4.4	6.0	B
VCGT VCMT VCGW VCMW	0802○○	2.4	3.2	B
	1103○○	2.8	3.8	B
	1604○○	4.4	6.0	B
VDGX	1603○○	4.5	6.1	D

Insert Number		Dimensions (mm)		Hole Type
		D2	D3	
WBGT WBMT	0201○○	2.3	3.2	B
	L302○○	2.3	3.2	B
WCGT WCMT WCMW	0201○○	2.3	3.0	B
	L302○○	2.3	3.0	B
	0402○○	2.8	3.8	B
	06T3○○	4.4	6.0	B
WPGT WPMT	0402○○	2.8	3.8	B
	0603○○	4.4	6.0	B
XCMT	1503○○	2.8	3.8	B

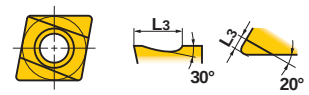
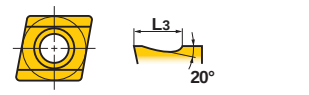
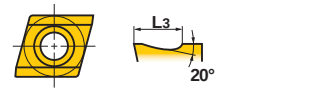
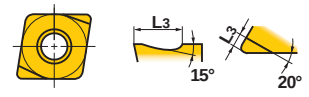
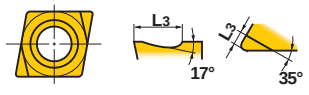
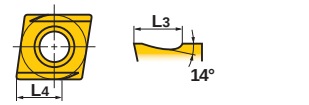
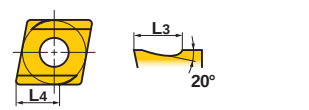
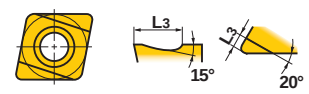
PRECISION BREAKER SYSTEM

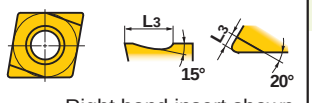
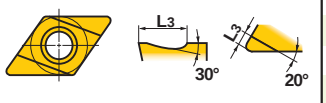
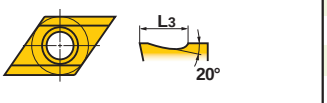
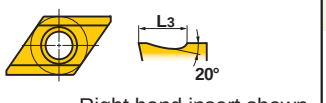
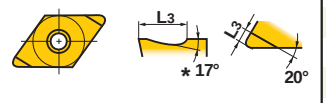
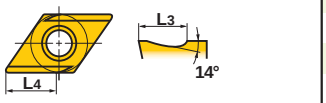
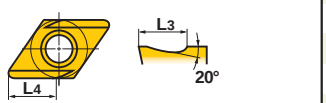
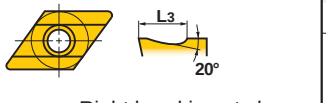
STANDARD OF INSERTS WITH HAND OF TOOL

NEGATIVE INSERTS

Geometry	Insert Number	L_3	L_4	B_2	B_7
Right hand insert shown.	**DNGG150404R/L**	2.8	–	15	–
	150408R/L	2.8	–	15	–
 Right hand insert shown.	**SNGG090304R/L**	1.8	1.6	15	–
	090308R/L	1.8	1.6	15	–
	120404R/L	2.3	3.7	15	–
	120408R/L	2.3	3.7	15	–
 Right hand insert shown.	**TNGG160402R/L-FS**	1.3	–	15	30
	160404R/L-FS	1.3	–	15	30
	160408R/L-FS	1.3	–	15	30
 Right hand insert shown.	**TNGG160402R/L-F**	2.5	–	15	30
	160404R/L-F	2.5	–	15	30
	160408R/L-F	2.5	–	15	30
 Right hand insert shown.	**TNGG160402R/L-K**	1.5	7.1	15	–
	160404R/L-K	1.5	5.4	15	–
	160408R/L-K	1.5	5.1	15	–
 Right hand insert shown.	**TNGG110302R/L**	1.3	3.2	15	–
	110304R/L	1.3	3.0	15	–
	110308R/L	1.3	2.7	15	–
	160304R/L	2.3	5.4	15	–
	160308R/L	2.3	5.1	15	–
	160402R/L	1.3	8.7	15	–
	160404R/L	2.3	5.4	15	–
	160408R/L	2.3	5.1	15	–
	160412R/L	2.3	4.8	15	–
	220404R/L	2.8	9.4	15	–
	220408R/L	2.8	9.1	15	–
	220412R/L	2.8	8.8	15	–
Right hand insert shown.	**VNGG160404R/L**	1.8	–	15	–
	160408R	1.8	–	15	–

POSITIVE INSERTS

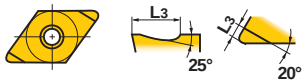
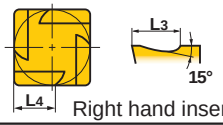
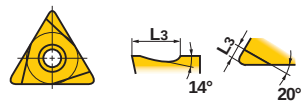
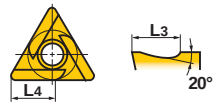
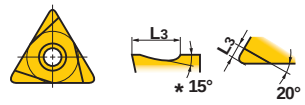
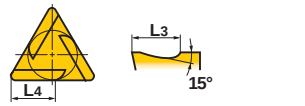
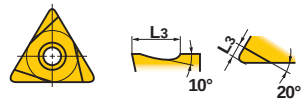
Geometry	Insert Number	L3	L4
 Right hand insert shown.	CCET0602V3R/L-SR	2.2	—
	060201R/L-SR	2.2	—
	060202R/L-SR	2.2	—
	060204R/L-SR	2.2	—
	09T3V3R/L-SR	3.2	—
	09T301R/L-SR	3.2	—
	09T302R/L-SR	3.2	—
	09T304R/L-SR	3.2	—
 Right hand insert shown.	CCET060200R/L-SN	1.0	—
	0602V3R/L-SN	1.0	—
	060201R/L-SN	1.0	—
	060202R/L-SN	1.0	—
	060204R/L-SN	1.0	—
	09T300R/L-SN	1.5	—
	09T3V3R/L-SN	1.5	—
	09T301R/L-SN	1.5	—
	09T302R/L-SN	1.5	—
	09T304R/L-SN	1.5	—
 Right hand insert shown.	CCET0602V3R/LW-SN	1.0	—
	09T3V3R/LW-SN	1.5	—
 Right hand insert shown.	CCGH060202R/L-F	1.2	—
	060204R/L-F	1.4	—
 Left hand insert shown.	CCGT03S1V3L-F	0.8	—
	03S101L-F	0.8	—
	03S102L-F	0.8	—
	03S104L-F	0.8	—
	04T0V3L-F	1.0	—
	04T001L-F	1.0	—
	04T002L-F	1.0	—
	04T004L-F	1.0	—
 Right hand insert shown.	CCGT0602V3R/L-SS	1.0	3.0
	060201R/L-SS	1.0	3.0
	060202R/L-SS	1.0	3.0
	09T3V3R/L-SS	1.0	5.0
	09T301R/L-SS	1.0	5.0
	09T302R/L-SS	1.0	5.0
 Right hand insert shown.	CCGT0602V3R-SN	1.0	3.0
	060201R/L-SN	1.0	3.0
	060202R/L-SN	1.0	3.0
	09T3V3R/L-SN	1.5	5.0
	09T301R/L-SN	1.5	5.0
	09T302R/L-SN	1.5	5.0
	09T304R/L-SN	1.5	5.0
 Right hand insert shown.	CPGT080204R/L-F	0.6	—
	090302R/L-F	0.8	—
	090304R/L-F	0.8	—

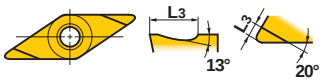
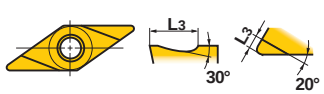
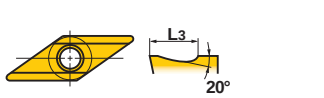
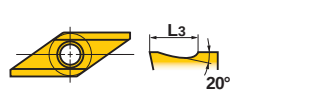
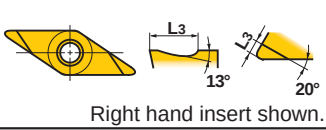
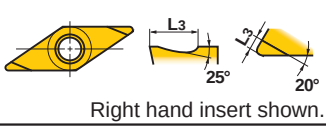
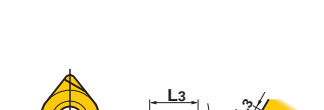
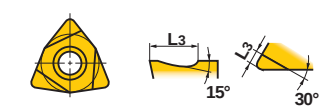
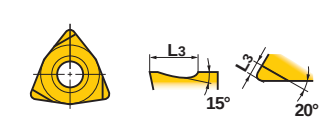
Geometry	Insert Number	L3	L4
 Right hand insert shown.	CPMH080204R/L-F	1.0	—
	090304R/L-F	1.4	—
 Right hand insert shown.	DCET0702V3R/L-SR	2.5	—
	070201R/L-SR	2.5	—
	070202R/L-SR	2.5	—
	070204R/L-SR	2.5	—
	11T3V3R/L-SR	3.7	—
	11T301R/L-SR	3.7	—
	11T302R/L-SR	3.7	—
	11T304R/L-SR	3.7	—
 Right hand insert shown.	DCET070200R/L-SN	1.0	—
	0702V3R/L-SN	1.0	—
	070201R/L-SN	1.0	—
	070202R/L-SN	1.0	—
	070204R/L-SN	1.0	—
	11T300R/L-SN	1.5	—
	11T3V3R/L-SN	1.5	—
	11T301R/L-SN	1.5	—
	11T302R/L-SN	1.5	—
	11T304R/L-SN	1.5	—
 Right hand insert shown.	DCET0702V3R/LW-SN	1.0	—
	11T3V3R/LW-SN	1.5	—
 ✶DCGT11T3□□type : 14° Right hand insert shown.	DCGT070202R/L-F	1.0	—
	070204R/L-F	1.0	—
	11T302R/L-F	1.0	—
	11T304R/L-F	1.0	—
 Right hand insert shown.	DCGT0702V3R/L-SS	1.0	3.5
	070201R/L-SS	1.0	3.5
	070202R/L-SS	1.0	3.5
	11T3V3R-SS	1.0	6.5
	11T301R-SS	1.0	6.5
	11T302R-SS	1.0	6.5
 Right hand insert shown.	DCGT0702V3R-SN	1.0	3.5
	070201R-SN	1.0	3.5
	070202R/L-SN	1.0	3.5
	11T3V3R/L-SN	1.5	6.5
	11T301R/L-SN	1.5	6.5
	11T302R/L-SN	1.5	6.5
	11T304R/L-SN	1.5	6.5
 Right hand insert shown.	DEGX150402R/L	2.8	—
	150404R/L	2.8	—

PRECISION BREAKER SYSTEM

STANDARD OF INSERTS WITH HAND OF TOOL

POSITIVE INSERTS

Geometry	Insert Number	L3	L4
 Right hand insert shown.	DEGX150402R/L-F	2.5	—
	150404R/L-F	2.5	—
 Right hand insert shown.	SPGR090304R/L	1.8	1.6
 Left hand insert shown.	TCGT0601V3L-F	1.0	—
	060101L-F	1.0	—
	060102R/L-F	1.0	—
	060104R/L-F	1.0	—
 Right hand insert shown.	TEGX160302R/L	2.0	6.0
	160304R/L	2.0	6.0
 ✱TPGH1603□□type : 14° Right hand insert shown.	TPGH080202R/L-FS	0.9	—
	080204R/L-FS	0.9	—
	090202R/L-FS	1.0	—
	090204R/L-FS	1.0	—
	110302R/L-FS	1.4	—
	110304R/L-FS	1.4	—
	160304R/L-FS	2.0	—
	160308R/L-FS	2.0	—
 Right hand insert shown.	TPGR110304R/L	1.3	3.0
	160304R/L	2.3	5.4
	160308R/L	2.3	5.1
 Right hand insert shown.	TPGX080202R/L	1.3	—
	080204R/L	1.3	—
	090202R/L	1.6	—
	090204R/L	1.6	—
	090208R/L	1.6	—
	110302R/L	1.8	—
	110304R/L	1.8	—
	110308R/L	1.8	—

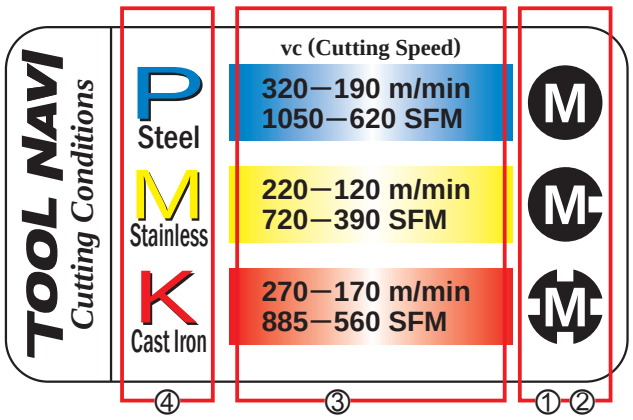
Geometry	Insert Number	L3	L4
 Right hand insert shown.	VBGT110302R/L-F	1.0	—
	110304R/L-F	1.5	—
	160402R/L-F	1.5	—
	160404R/L-F	1.5	—
 Right hand insert shown.	VBET1103V3R/L-SR	2.5	—
	110301R/L-SR	2.5	—
	110302R/L-SR	2.5	—
	110304R/L-SR	2.5	—
 Right hand insert shown.	VBET110300R/L-SN	1.0	—
	1103V3R/L-SN	1.0	—
	110301R/L-SN	1.0	—
	110302R/L-SN	1.0	—
	110304R/L-SN	1.0	—
 Right hand insert shown.	VBET1103V3R/LW-SN	1.0	—
 Right hand insert shown.	VCGT080202R/L-F	0.8	—
	080204R/L-F	0.8	—
 Right hand insert shown.	VDGX160302R/L	2.0	—
	160304R/L	2.0	—
 Left hand insert shown.	WBGT0201V3L-F	1.0	—
	020101L-F	1.0	—
	020102L-F	1.0	—
	020104L-F	1.0	—
	L302V3L-F	1.0	—
	L30201L-F	1.0	—
	L30202R/L-F	1.0	—
	L30204R/L-F	1.0	—
 Right hand insert shown.	WCGT020102R/L	1.0	—
	020104R/L	1.0	—
	L30202R/L	1.0	—
	L30204R/L	1.0	—
 Right hand insert shown.	WPGT040202R/L-FS	1.0	—
	040204R/L-FS	1.0	—
	060304R/L-FS	1.0	—
	060308R/L-FS	1.0	—

TOOL NAVI

OUTLINE

TOOL NAVI supports our customers with information and suitable cutting conditions for each work material by selecting an optimal indexable insert together with the optional tool.

LABEL INDICATION



① Cutting conditions

● Stable cutting ◔ General cutting ✠ Unstable cutting

② Cutting areas

F : Finishing (ap≤0.5mm) **S** : Light Cutting (ap=0.5—1.5mm)
M : Medium Cutting (ap=1.5—4.0mm) **G** : Rough Cutting (ap=4.0—7.0mm)

③ Cutting speed standards

(Performance versus tool life)
●Calculations based on maximum performance : Tool life is 15min.
●Calculation based on maximum tool life : Tool life is 90min.

④ Work materials

P : Steel (Material reference : Carbon steel, alloy steel 180HB)
M : Stainless steel (Material reference : Austenitic stainless steel 180HB)
K : Cast iron (Material reference : Gray cast iron, ductile cast iron 180HB)

TOOL LIFE

Cutting speed affects tool life. Mitsubishi's TOOL NAVI suggests cutting speeds for 15—90 minute tool life and is based on Taylor's equation (Relationship for tool grade, cutting conditions and tool life). When the customer requires a different tool life, obtain coefficient values of the grade you use from the charts below. Multiply the coefficient values by the cutting speed to calculate a new cutting speed.

P Grade (Steel) cutting speed coefficient values.

Grade \ Tool life	15min	30min	45min	60min	90min
UE6105	1.00	0.79	0.69	0.63	0.55
UE6005	1.00	0.81	0.71	0.65	0.57
UE6110	1.00	0.82	0.72	0.67	0.59
UE6020	1.00	0.83	0.74	0.69	0.62
UE6035	1.00	0.88	0.82	0.78	0.73
AP25N	1.00	0.84	0.76	0.71	0.64
VP25N	1.00	0.84	0.76	0.71	0.64

M Grade (Stainless Steel) cutting speed coefficient values.

Grade \ Tool life	15min	30min	45min	60min	90min
US735	1.00	0.78	0.68	0.61	0.53
US7020	1.00	0.70	0.57	0.49	0.40
VP15TF	1.00	0.78	0.67	0.61	0.52
AP25N	1.00	0.76	0.65	0.57	0.49

K Grade (Cast Iron) cutting speed coefficient values.

Grade \ Tool life	15min	30min	45min	60min	90min
UC5105	1.00	0.79	0.69	0.63	0.55
UC5115	1.00	0.79	0.69	0.63	0.55
AP25N	1.00	0.87	0.80	0.75	0.69
VP25N	1.00	0.87	0.80	0.75	0.69

(ex.) Medium cutting of steel
The 1st recommendation : UE6110
Indexable inserts : CNMG120408-MA
Recommended cutting speed : vc=325m/min
(Tool life : 15min.)

⬇

Tool life required by the customer : 30min.

325×0.82≒267m/min

HARDNESS OF THE WORK MATERIAL

Hardness of the work material also affects tool life. Mitsubishi's TOOL NAVI suggests cutting speed variations when hardness differs. Obtain the suitable coefficient value for each type of work material from the chart below. Multiply the coefficient value by the recommended cutting speed of the grade you use to calculate a new cutting speed.

Work material	Soft ← (Hardness of workpiece) → Hard			
	140HB	180HB	220HB	260HB
P	1.19	1.0	0.85	0.75
M	1.23	1.0	0.85	0.72
K	1.19	1.0	0.91	0.85

CLASSIFICATION OF GRADES AND CHIP BREAKERS FOR TURNING

Selection of optimum inserts for turning

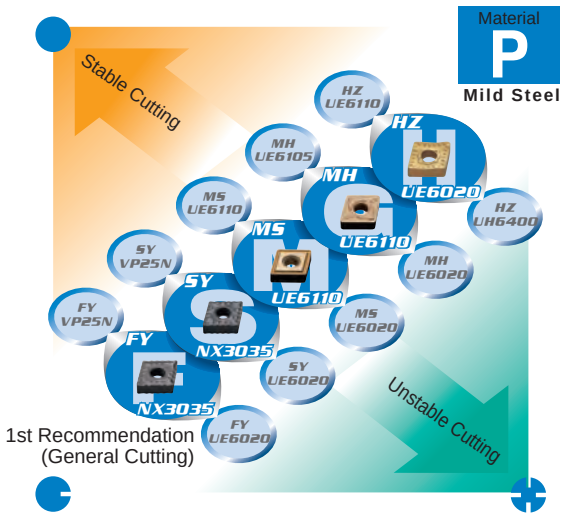
The following diagrams show for each type of work material, the optimal combination of suitable grades and chip breakers for each application area in turning.

CUTTING CONDITIONS

Stable Cutting	Continuous Cutting Constant Depth of Cut Pre-Machined Securely Clamped Component Cutting
General Cutting	
Unstable Cutting	Heavy Interrupted Cutting Irregular Depth of Cut Low Clamping Rigidity Cutting

CUTTING AREA

F	Finish Cutting	(ap≤0.5mm)
S	Light Cutting	(ap=0.5—1.5mm)
M	Medium Cutting	(ap=1.5—4.0mm)
G	Semi-Heavy Cutting	(ap=4.0—7.0mm)
H	Heavy Cutting	(ap=7.0—10mm)

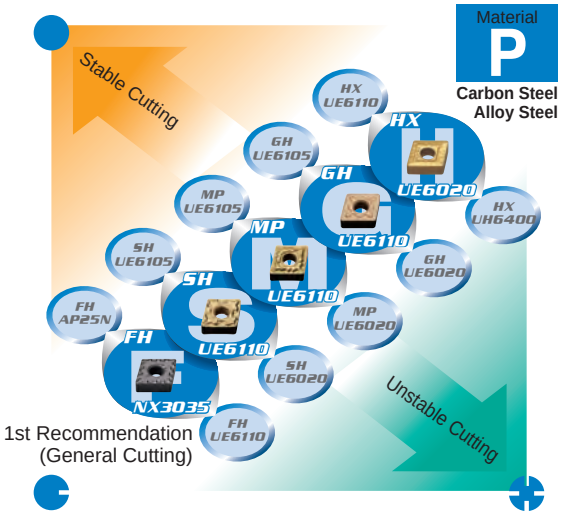


P Mild Steel

NEGATIVE INSERTS

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	FY VP25N	**vc** ↘	FY NX3035	**f** ↗ , **vc** ↘	SY VP25N
	S	SY VP25N	**vc** ↘	SY NX3035	FY VP25N	MS NX3035
	M	MS UE6110	**vc** ↘	MS UE6020	SY VP25N	MH UE6110
	G	MH UE6105	**vc** ↘	MH UE6110	MA UE6105	GH UE6105
	H	HZ UE6110	**vc** ↘	HZ UE6020	GH UE6110	HX UE6110
General Cutting	F	FY NX3035	FY VP25N	FY UE6020	**f** ↗ , **vc** ↘	SY NX3035
	S	SY NX3035	SY VP25N	SY UE6020	FY NX3035	MS NX3035
	M	MS UE6110	**vc** ↘	MS UE6020	SY UE6020	MH UE6110
	G	MH UE6110	MH UE6105	MH UE6020	MA UE6110	GH UE6110
	H	HZ UE6020	HZ UE6110	HZ UH6400	GH E6020	HX UE6020
Unstable Cutting	F	FY UE6020	FY NX3035	SY UE6020	**f** ↗ , **vc** ↘	SY UE6020
	S	SY UE6020	SY NX3035	MS UE6020	FY UE6020	MS UE6020
	M	MS UE6020	MS UE6110	MH UE6020	SY UE6020	MH UE6020
	G	MH UE6020	MH UE6110	MH UE6035	MA UE6020	GH UE6020
	H	HZ UH6400	HZ UE6020	**ap, f** ↘	GH UE6020	HX UH6400



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- S Light Cutting
- M Medium Cutting
- G Semi-Heavy Cutting
- H Heavy Cutting

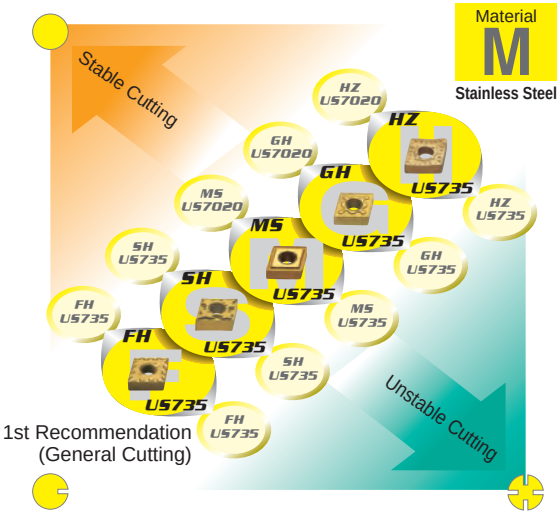
P Carbon Steel • Alloy Steel

NEGATIVE INSERTS

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	FH AP25N	**vc** ↘	FH NX3035	**f** ↗	SH AP25N
	S	SH UE6105	**vc** ↘	SH UE6110	FH UE6110	MP UE6105
	M	MP UE6105	**vc** ↘	MP UE6110	SH UE6105	MH UE6105
	G	GH UE6105	**vc** ↘	GH UE6110	MH UE6105	HZ UE6110
	H	HX UE6110	**vc** ↘	HX UE6020	HZ UE6110	HV UE6110
General Cutting	F	FH NX3035	FH AP25N	FH UE6110	**f** ↗	SH NX3035
	S	SH UE6110	SH UE6105	SH UE6020	FH UE6110	MP UE6110
	M	MP UE6110	MP UE6105	MP UE6020	SH UE6110	MH UE6110
	G	GH UE6110	GH UE6105	GH UE6020	MH UE6110	HZ UE6110
	H	HX UE6020	HX UE6110	HX UH6400	HZ UE6020	HV UE6020
Unstable Cutting	F	FH UE6110	**vc** ↘	FH UE6020	**f** ↗	SH UE6110
	S	SH UE6020	SH UE6110	MV UE6020	FH UE6020	MP UE6020
	M	MP UE6020	MP UE6110	MH UE6020	SH UE6020	MH UE6020
	G	GH UE6020	GH UE6110	GH US735	MH UE6020	HZ UE6020
	H	HX UH6400	HX UE6020	**ap, f** ↘	HZ UH6400	HV UH6400

CLASSIFICATION OF GRADES AND CHIP BREAKERS FOR TURNING



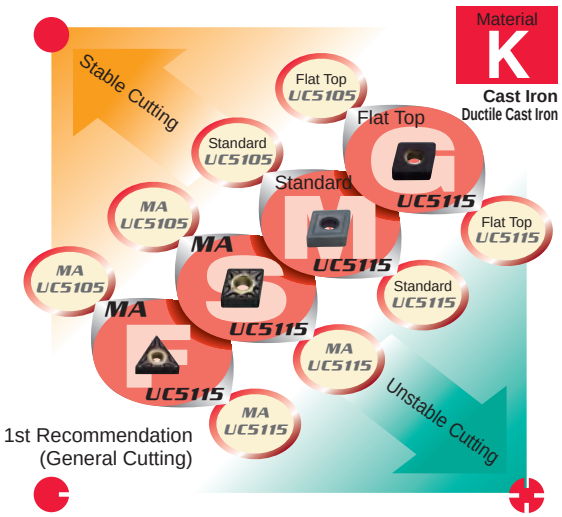
	Stable Cutting
	General Cutting
	Unstable Cutting
F	Finish Cutting
S	Light Cutting
M	Medium Cutting
G	Semi-Heavy Cutting
H	Heavy Cutting

M Stainless Steel

NEGATIVE INSERTS

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	FH US735	**vc** ↘	SH US735	—	SH US735
	S	SH US735	**vc** ↘	MS US735	FH US735	MS US7020
	M	MS US7020	**vc** ↘	MS US735	MA US7020	MH US7020
	G	GH US7020	**vc** ↘	GH US735	MH US7020	**f** ↘
	H	HZ US7020	**vc** ↘	HZ US735	GH US7020	**f** ↘
General Cutting	F	FH US735	**vc** ↘	SH US735	—	SH US735
	S	SH US735	**vc** ↘	MS US735	FH US735	MS US735
	M	MS US735	MS US7020	MA US735	MA US735	GH US735
	G	GH US735	GH US7020	**ap, f** ↘	MA US735	**f** ↘
	H	HZ US735	HZ US7020	**ap, f** ↘	GH US735	**f** ↘
Unstable Cutting	F	FH US735	**vc** ↘	SH US735	—	SH US735
	S	SH US735	**vc** ↘	MS US735	FH US735	MS US735
	M	MS US735	MS US7020	MA US735	MA US735	GH US735
	G	GH US735	GH US7020	**ap, f** ↘	MA US735	**f** ↘
	H	HZ US735	HZ US7020	**ap, f** ↘	GH US735	**f** ↘



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- S Light Cutting
- M Medium Cutting
- G Semi-Heavy Cutting

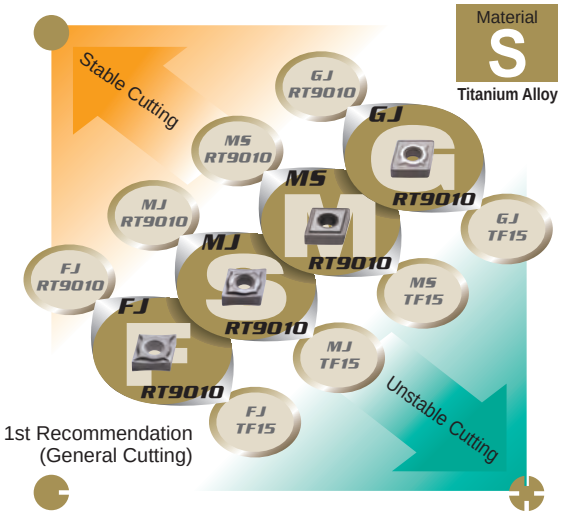
K Cast Iron • Ductile Cast Iron

NEGATIVE INSERTS

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation		Heavy Wear		Fracture	
Stable Cutting	F	MA	UC5105	vc	↘	MA	UC5115
	S	MA	UC5105	vc	↘	MA	UC5115
	M	Standard	UC5105	vc	↘	Standard	UC5115
	G	Flat Top	UC5105	vc	↘	Flat Top	UC5115
General Cutting	F	MA	UC5115	MA	UC5105	Standard	UC5115
	S	MA	UC5115	MA	UC5105	Standard	UC5115
	M	Standard	UC5115	Standard	UC5105	Flat Top	UC5115
	G	Flat Top	UC5115	Flat Top	UC5105	ap, f	↘
Unstable Cutting	F	MA	UC5115	MA	UC5105	Standard	UC5115
	S	MA	UC5115	MA	UC5105	Standard	UC5115
	M	Standard	UC5115	Standard	UC5105	Flat Top	UC5115
	G	Flat Top	UC5115	Flat Top	UC5105	ap, f	↘

CLASSIFICATION OF GRADES AND CHIP BREAKERS FOR TURNING



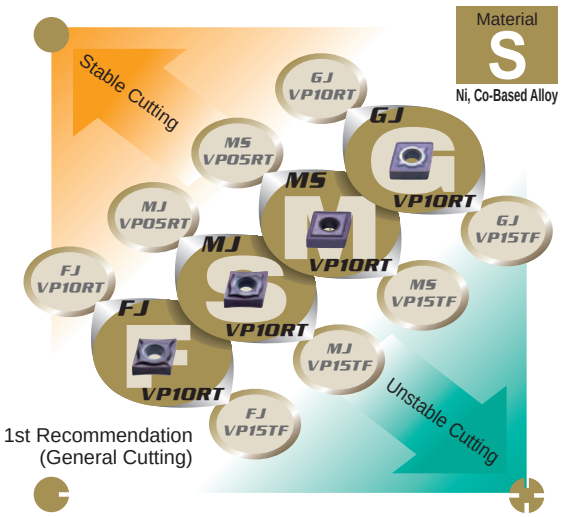
- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- S Light Cutting
- M Medium Cutting
- G Semi-Heavy Cutting

S Titanium Alloy

NEGATIVE INSERTS

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	FJ RT9010	**vc** ↘	FJ TF15	—	MJ RT9010
	S	MJ RT9010	**vc** ↘	MJ TF15	FJ RT9010	**f** ↘
	M	MS RT9010	**vc** ↘	MS TF15	—	GJ RT9010
	G	GJ RT9010	**vc** ↘	GJ TF15	—	**f** ↘
General Cutting	F	FJ RT9010	**vc** ↘	FJ TF15	—	MJ RT9010
	S	MJ RT9010	**vc** ↘	MJ TF15	FJ RT9010	**f** ↘
	M	MS RT9010	**vc** ↘	MS TF15	—	GJ RT9010
	G	GJ RT9010	**vc** ↘	GJ TF15	—	**f** ↘
Unstable Cutting	F	FJ TF15	FJ RT9010	MJ TF15	—	MJ TF15
	S	MJ TF15	MJ RT9010	MS TF15	FJ TF15	**f** ↘
	M	MS TF15	MS RT9010	GJ TF15	—	GJ TF15
	G	GJ TF15	GJ RT9010	**ap, f** ↘	—	**f** ↘



- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting
- S Light Cutting
- M Medium Cutting
- G Semi-Heavy Cutting

S Ni, Co-Based Alloy

NEGATIVE INSERTS

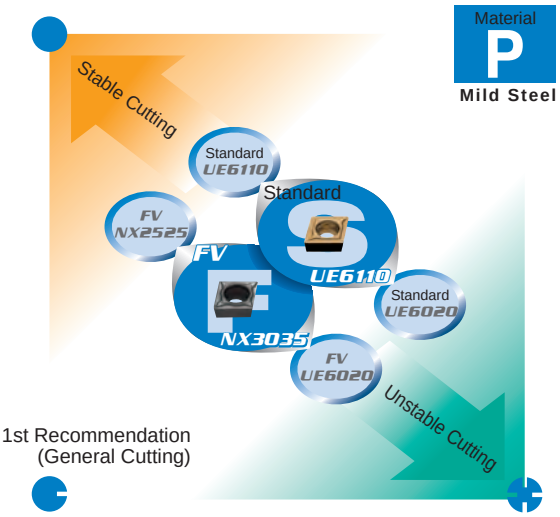
vc : Cutting Speed
f : Feed
ap : Depth of Cut

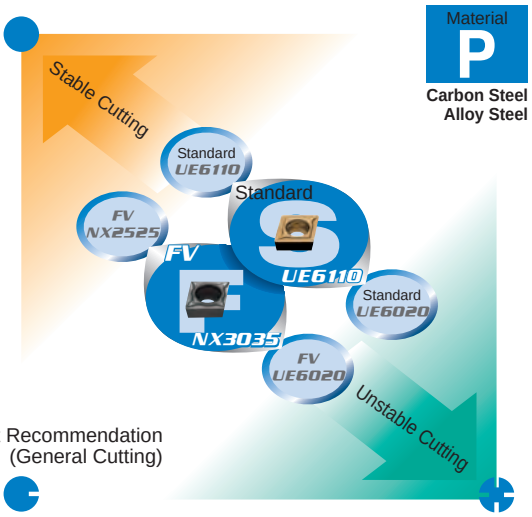
	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	FJ VP10RT	**vc** ↘	FJ VP15TF	—	MJ VP10RT
	S	MJ VP05RT	MJ US905	MJ VP10RT	FJ VP10RT	**f** ↘
	M	MS VP05RT	MS US905	MS VP10RT	—	GJ VP10RT
	G	GJ VP10RT	GJ US905	GJ VP15TF	—	**f** ↘
General Cutting	F	FJ VP10RT	**vc** ↘	FJ VP15TF	—	MJ VP10RT
	S	MJ VP10RT	MJ VP05RT	MJ VP15TF	FJ VP10RT	**f** ↘
	M	MS VP10RT	MS VP05RT	MS VP15TF	—	GJ VP10RT
	G	GJ VP10RT	GJ US905	GJ VP15TF	—	**f** ↘
Unstable Cutting	F	FJ VP15TF	FJ VP10RT	MJ VP15TF	—	MJ VP15TF
	S	MJ VP15TF	MJ VP10RT	MS VP15TF	FJ VP15TF	**f** ↘
	M	MS VP15TF	MS VP10RT	GJ VP15TF	—	GJ VP15TF
	G	GJ VP15TF	GJ VP10RT	**ap, f** ↘	—	**f** ↘

CLASSIFICATION OF GRADES AND CHIP BREAKERS FOR TURNING

Stable Cutting
General Cutting
Unstable Cutting

F Finish Cutting
S Light Cutting





P Mild Steel

7°POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	FV NX2525	FV AP25N	FV NX3035	f ↗, vc ↘	Standard NX2525
	S	Standard UE6110	vc ↘	Standard UE6020	FV UE6020	f ↘
General Cutting	F	FV NX3035	FV NX2525	FV UE6020	f ↗, vc ↘	Standard UE6110
	S	Standard UE6110	vc ↘	Standard UE6020	FV UE6020	f ↘
Unstable Cutting	F	FV UE6020	vc ↘	Standard UE6020	f ↗, vc ↘	Standard UE6020
	S	Standard UE6020	Standard UE6110	Standard US735	FV UE6020	f ↘

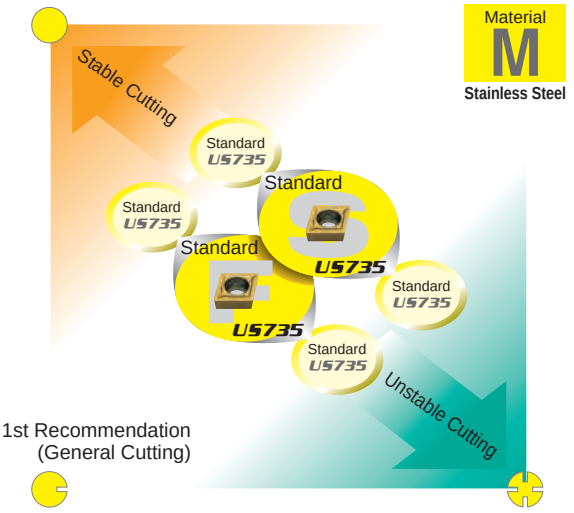
P Carbon Steel • Alloy Steel

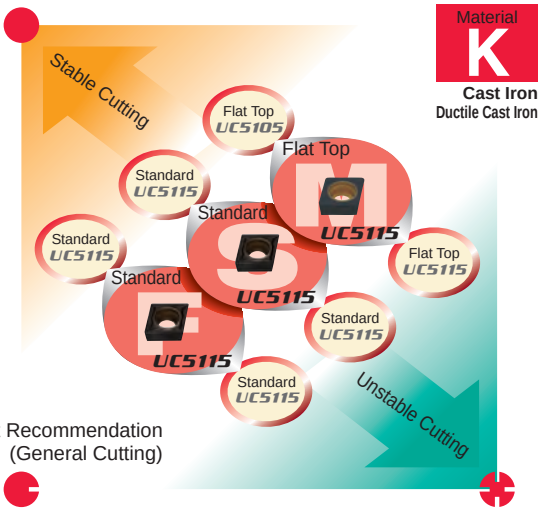
7°POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	FV NX2525	FV AP25N	FV NX3035	f ↗, vc ↘	Standard NX2525
	S	Standard UE6110	vc ↘	Standard UE6020	FV UE6020	f ↘
General Cutting	F	FV NX3035	FV NX2525	FV UE6020	f ↗, vc ↘	Standard UE6110
	S	Standard UE6110	vc ↘	Standard UE6020	FV UE6020	f ↘
Unstable Cutting	F	FV UE6020	vc ↘	Standard UE6020	f ↗, vc ↘	Standard UE6020
	S	Standard UE6020	Standard UE6110	Standard US735	FV UE6020	f ↘

Stable Cutting	F Finish Cutting
General Cutting	S Light Cutting
Unstable Cutting	M Medium Cutting





M Stainless Steel

7° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	Standard US735	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
	S	Standard US735	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
General Cutting	F	Standard US735	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
	S	Standard US735	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
Unstable Cutting	F	Standard US735	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
	S	Standard US735	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘

K Cast Iron • Ductile Cast Iron

7° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture
Stable Cutting	F	Standard UC5115	vc ↘	Standard UE6110
	S	Standard UC5115	vc ↘	Standard UE6110
	M	Flat Top UC5105	vc ↘	Flat Top UC5115
General Cutting	F	Standard UC5115	vc ↘	Standard UE6110
	S	Standard UC5115	vc ↘	Standard UE6110
	M	Flat Top UC5115	Flat Top UC5105	ap, f ↘
Unstable Cutting	F	Standard UC5115	vc ↘	Standard UE6110
	S	Standard UC5115	vc ↘	Standard UE6110
	M	Flat Top UC5115	Flat Top UC5105	ap, f ↘

CLASSIFICATION OF GRADES AND CHIP BREAKERS FOR TURNING

- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting

N Aluminium Alloy

7° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	AZ HTi10	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
General Cutting	F	AZ HTi10	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
Unstable Cutting	F	AZ HTi10	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘

S Titanium Alloy

7° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Chip Jamming
Stable Cutting	F	⁎ FJ RT9010	vc ↘	ap, f ↘	f ↘
General Cutting	F	⁎ FJ RT9010	vc ↘	ap, f ↘	f ↘
Unstable Cutting	F	⁎ FJ RT9010	vc ↘	ap, f ↘	f ↘

⁎Non stock, produced to order only.

S Ni, Co-Based Alloy

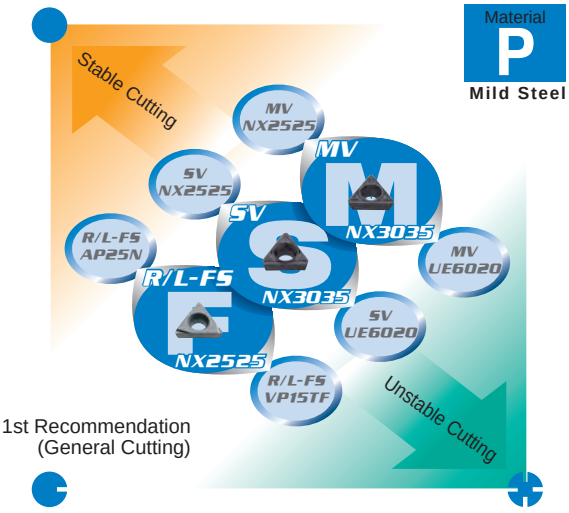
7° POSITIVE INSERT TYPE

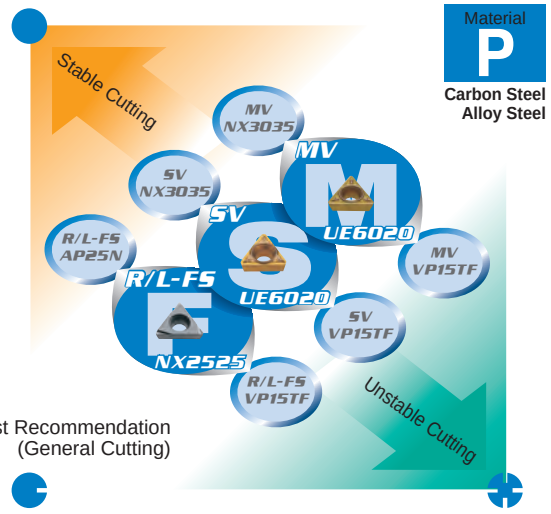
vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Chip Jamming
Stable Cutting	F	⁎ FJ VP10RT	vc ↘	ap, f ↘	f ↘
General Cutting	F	⁎ FJ VP10RT	vc ↘	ap, f ↘	f ↘
Unstable Cutting	F	⁎ FJ VP10RT	vc ↘	ap, f ↘	f ↘

⁎Non stock, produced to order only.

Stable Cutting	F Finish Cutting
General Cutting	S Light Cutting
Unstable Cutting	M Medium Cutting





P Mild Steel

11° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	R/L-FS AP25N	**vc** ↘	R/L-FS VP15TF	**f** ↗ , **vc** ↘	**f**
	S	SV NX2525	**vc** ↘	SV NX3035	**f** ↗ , **vc** ↘	MV NX2525
	M	MV NX2525	MV AP25N	MV NX3035	SV NX2525	**f** ↘
General Cutting	F	R/L-FS NX2525	L-FS AP25N	R/L-FS VP15TF	**f** ↗ , **vc** ↘	**f** ↘
	S	SV NX3035	SV NX2525	SV VP45N	**f** ↗ , **vc** ↘	MV NX3035
	M	MV NX3035	MV NX2525	MV VP25N	SV NX3035	**f** ↘
Unstable Cutting	F	R/L-FS VP15TF	R/L-FS NX2525	**ap, f** ↘	**f** ↗ , **vc** ↘	**f** ↘
	S	SV UE6020	SV US7020	SV VP15TF	**f** ↗ , **vc** ↘	MV UE6020
	M	MV UE6020	MV US7020	MV VP15TF	SV UE6020	**f** ↘

P Carbon Steel • Alloy Steel

11° POSITIVE INSERT TYPE

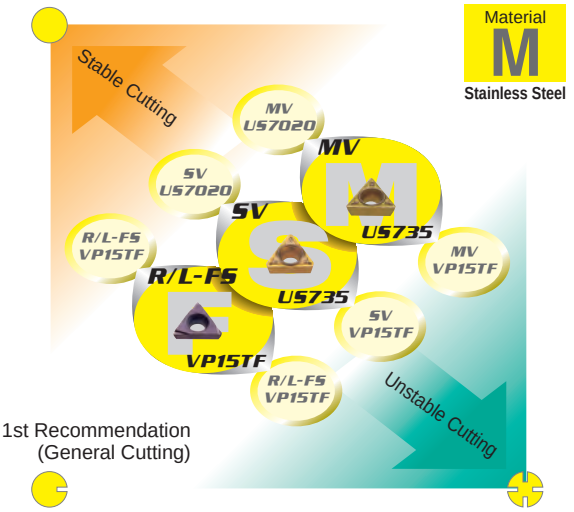
vc : Cutting Speed
f : Feed
ap : Depth of Cut

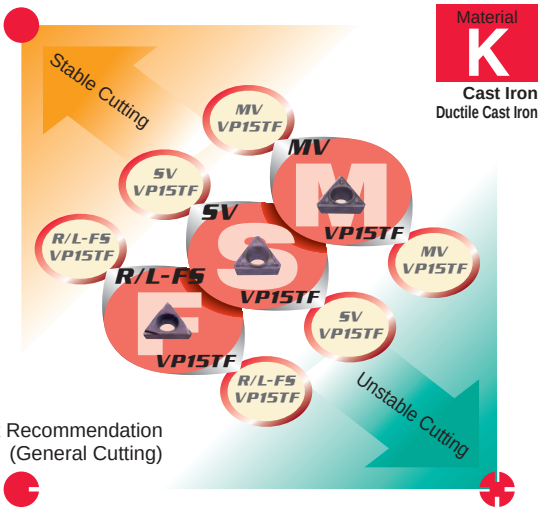
	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	R/L-FS AP25N	**vc** ↘	R/L-FS VP15TF	**f** ↗ , **vc** ↘	**f** ↘
	S	SV NX3035	SV NX2525	SV VP45N	**f** ↗ , **vc** ↘	MV NX3035
	M	MV NX3035	MV NX2525	MV VP45N	SV NX3035	**f** ↘
General Cutting	F	R/L-FS NX2525	L-FS AP25N	R/L-FS VP15TF	**f** ↗ , **vc** ↘	**f** ↘
	S	SV UE6020	SV US7020	SV VP15TF	**f** ↗ , **vc** ↘	MV UE6020
	M	MV UE6020	MV US7020	MV VP15TF	SV UE6020	**f** ↘
Unstable Cutting	F	R/L-FS VP15TF	R/L-FS NX2525	**ap, f** ↘	**f** ↗ , **vc** ↘	**f** ↘
	S	SV VP15TF	SV UE6020	MV VP15TF	**f** ↗ , **vc** ↘	MV VP15TF
	M	MV VP15TF	MV UE6020	**ap, f** ↘	SV VP15TF	**f** ↘

CLASSIFICATION
A046, A050

CLASSIFICATION OF GRADES AND CHIP BREAKERS FOR TURNING

Stable Cutting	F Finish Cutting
General Cutting	S Light Cutting
Unstable Cutting	M Medium Cutting





M Stainless Steel

11° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

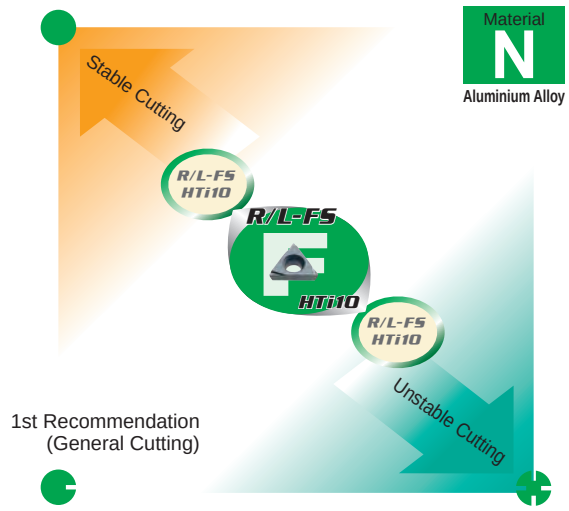
	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘	—	f ↘
	S	SV US7020	vc ↘	SV US735	—	MV US7020
	M	MV US7020	vc ↘	MV US735	SV US7020	f ↘
General Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘	—	f ↘
	S	SV US735	SV US7020	SV VP15TF	—	MV US735
	M	MV US735	MV US7020	MV VP15TF	SV US735	f ↘
Unstable Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘	—	f ↘
	S	SV VP15TF	SV US7020	MV VP15TF	—	MV VP15TF
	M	MV VP15TF	MV US7020	ap, f ↘	SV VP15TF	f ↘

K Cast Iron • Ductile Cast Iron

11° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture
Stable Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘
	S	SV VP15TF	vc ↘	MV VP15TF
	M	MV VP15TF	vc ↘	ap, f ↘
General Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘
	S	SV VP15TF	vc ↘	MV VP15TF
	M	MV VP15TF	vc ↘	ap, f ↘
Unstable Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘
	S	SV VP15TF	vc ↘	MV VP15TF
	M	MV VP15TF	vc ↘	ap, f ↘



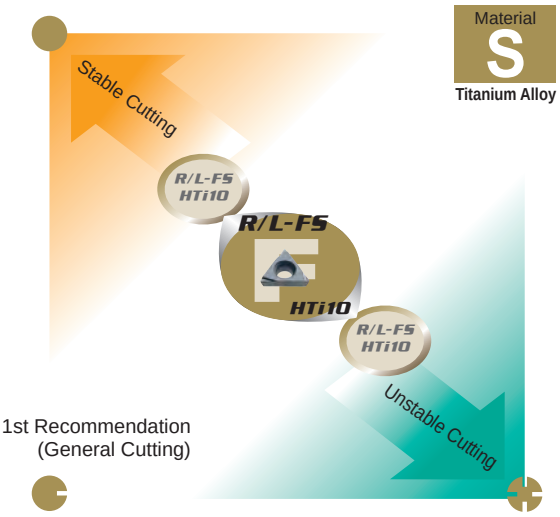
- Stable Cutting
- General Cutting
- Unstable Cutting
- F Finish Cutting

N Aluminium Alloy

11° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Long Chips	Chip Jamming
Stable Cutting	F	R/L-FS HTi10	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
General Cutting	F	R/L-FS HTi10	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘
Unstable Cutting	F	R/L-FS HTi10	vc ↘	ap, f ↘	f ↗ , vc ↘	f ↘



S Titanium Alloy

11° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Chip Jamming
Stable Cutting	F	R/L-FS HTi10	vc ↘	ap, f ↘	f ↘
General Cutting	F	R/L-FS HTi10	vc ↘	ap, f ↘	f ↘
Unstable Cutting	F	R/L-FS HTi10	vc ↘	ap, f ↘	f ↘

S Ni, Co-Based Alloy

11° POSITIVE INSERT TYPE

vc : Cutting Speed
f : Feed
ap : Depth of Cut

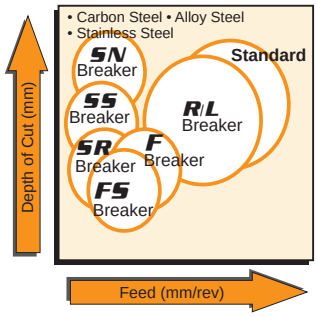
	Cutting Area	1st Recommendation	Heavy Wear	Fracture	Chip Jamming
Stable Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘	f ↘
General Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘	f ↘
Unstable Cutting	F	R/L-FS VP15TF	vc ↘	ap, f ↘	f ↘

PRECISION BREAKER SYSTEM

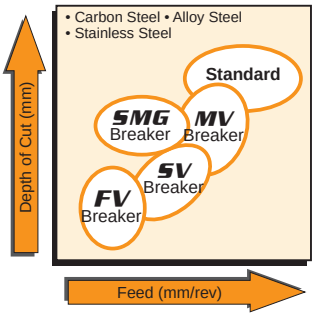
ANGULAR AND PARALLEL CHIP BREAKER

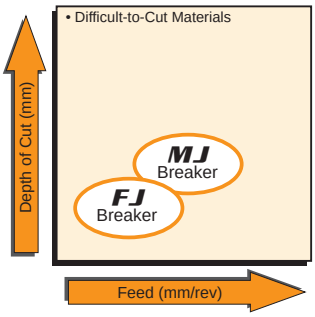
3-D CHIP BREAKER

CHIP CONTROL RANGE



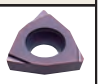
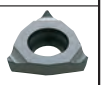
CHIP CONTROL RANGES

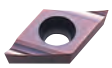
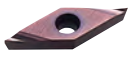
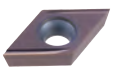
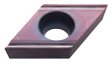
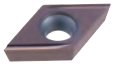
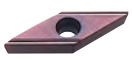




FEATURES OF CHIP BREAKER

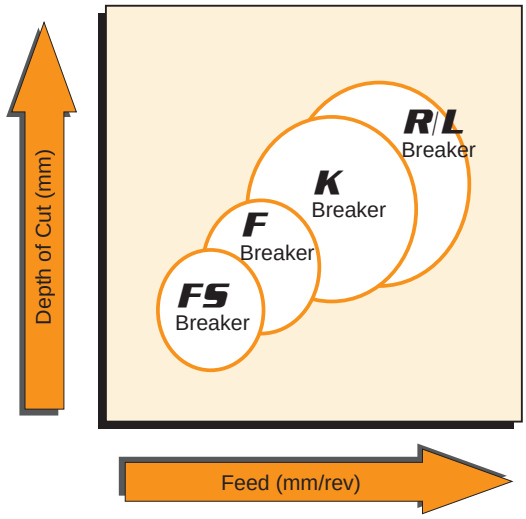
Breaker	Features	CCGH/CCGT Type	CCMH/CCMT CPMH/CPMT Type	DCMT Type	DCGT Type	TCGT/TCMT Type	TPMH Type	VBGT/VBMT Type	VCMT Type	WBMT/WCGT Type
SMG (G class)	● For medium cutting. ● 3D moulded chipbreaker provides good chip control. ● G class insert gives sharp cutting action, allowing high precision machining.		—	—		—	—	—	—	—
FV (M class)	● Sharp cutting edge and low resistance design achieves excellent cutting performance. ● Suitable for low depths of cut and low feed rates.	—			—		—	—		—
SV (M class)	● For light cutting. ● A peninsular dot ensures chip control at depths of cut under 1mm.	—			—	—	—	—	—	—
MV (M class)	● A positive insert and the large rake angle achieve sharp cutting edge performance. ● The double breakers and round-shaped dots in the rake face achieve a wide range of chip discharge.	—			—	—				
Standard (M class)	● For medium cutting. ● Balance of edge strength and sharpness due to a combination of a flat land and large rake angle.	—			—		—	—		—
FJ	● The curved edge allows smooth chip discharge. ● The large rake angle highly suitable for finishing difficult-to-cut materials.		—	—			—		—	
MJ	● The curved edge allows smooth chip discharge. ● Large rake angle highly suitable for finish-light cutting difficult-to-cut materials.		—	—			—		—	

Breaker	Features	CCGH/CCGT Type	CPGT Type	DCGT Type	TPGH Type	TPGV/TPGT Type	TCGT Type	VBGT/VCGT Type	WBGT Type	WCGT Type	WPGT Type
FS	● For precision finishing. ● Small width lead breaker for excellent chip control. ● Sharp cutting edge gives a good surface finish.	—	—	—		—	—	—	—	—	
F	● For finish cutting. ● Lead breaker controls chip flow. ● Sharp cutting edge gives a good surface finish.				—					—	—
R/L	● Lead breaker for light cutting. ● Good chip control for low to medium feed rates.	—	—	—	—	—	—	—	—		—
Standard	● For light cutting. ● Good chip control for low to medium feed rates.	—		—	—	—	—	—	—	—	

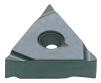
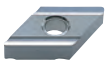
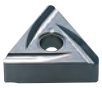
Breaker	Features	**CCET** Type	**CCGT** Type	**DCET** Type	**DCGT** Type	**VBET** Type
SR	● The wide lead breaker for medium cutting is suitable for automatic lathe machining. ● The insert design for low resistance controls chip flow.		—		—	
SS	● The parallel breaker for light cutting is suitable for automatic lathe machining. ● Excellent chip control at low feed rates.	—		—		—
SN	● The parallel breaker for general purpose is suitable for automatic lathe machining. ● Excellent chip control for low to medium feed rates.					

ANGULAR AND PARALLEL CHIP BREAKERS (NEGATIVE INSERTS)

CHIP CONTROL RANGE



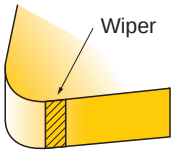
FEATURES OF CHIP BREAKER

Breaker	Features	DNGG Type	SNGG Type	TNGG Type	VNGG Type
FS	● For precision finishing. ● Small width lead breaker for good chip control. ● Sharp cutting edge gives a good surface finish.	—	—		—
F	● For finish cutting. ● Lead breaker controls chip flow. ● Sharp cutting edge gives a good surface finish.	—	—		—
K	● Parallel breaker for light cutting. ● Excellent chip control for low to medium feed rates.	—	—		—
R/L	● Parallel breaker for medium cutting. ● Good chip control for medium feed rates.				

WIPER INSERT

What is a Wiper Insert?

- The wiper insert is designed with a wiper edge that is situated where the straight edge meets the corner radius.
- In comparison to conventional breakers, the surface finish does not deteriorate even if the feed rate is doubled.
- Machining at high feed rates improves cutting efficiency.



●Improving Surface Finish
Under the same machining conditions as conventional breakers, but with the feed rate increased, the surface finish of the workpiece can be improved.

●Improving Efficiency
High feed rates not only shortened machining times but also make it possible to combine roughing and finishing operations.

●Increased Tool Life
When a change to high feed conditions, the time required to cut one component is decreased, thus more parts can be machined with each insert. In addition, the high feed rate prevents rubbing, therefore, delaying the progression of wear and increasing the tool life of the insert.

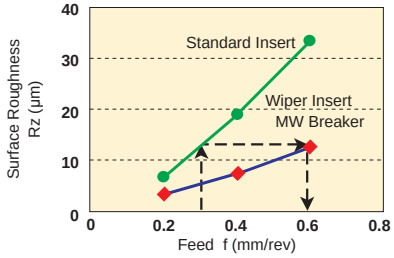
●Improving Chip Control
Under high feed conditions, the chips generated become thicker and are more easily broken, thus, chip control is improved.

Wiper insert + **High feed (The feed rate is doubled.)**

Finished surface Same surface roughness =

Standard insert + **The conventional feed condition**

⁎Please use a wiper insert at high feed rate.



<Cutting Conditions>
Workpiece : JIS S45C
Insert : CNMG120408-○○
Cutting Speed=200m/min
Depth of Cut=1.5mm
Feed Speed=0.2—0.6mm/rev
Wet Outer Diameter Cutting

<Ex>The surface roughness does not deteriorate even if the feed rate is doubled (0.3→0.6)!

■A wiper insert + machining at high feed rate
- Reduced machining time (per workpieces)
- Increased number of workpieces (per definitive time period)
- Improving chip control

■A wiper insert + machining at conventional feed rate
- Eliminating the finishing step by roughing and finishing together (Separate roughing and finishing steps → Single-step machining)

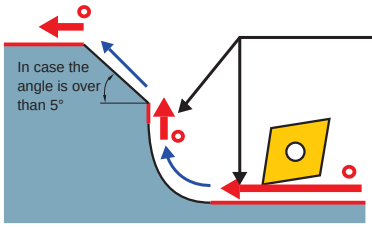
- Reducing cycle times
- Increased productivity
- Avoiding Line-Stoppage

<The realization of Reduced Costs!!>

The estimate of finished surface roughness when using a wiper insert

The effects of wiper inserts on external machining, boring and facing.

⁎The surface roughness when machining at corner R or taper angle over 5°, is the same as machining with standard inserts.



$$Rz(W)=Rz\times0.5$$

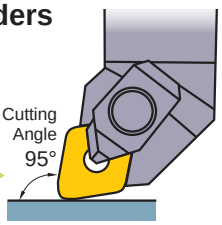
Rz(W)=Finished surface roughness when using a wiper insert.
Rz : Finished surface roughness from conventional conditions. (When using a standard insert)

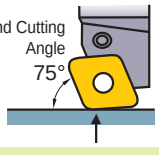
Effective uses of a wiper insert
Non effective uses of a wiper insert

Special attention is not necessary when using CNMG • WNMG • CCMT types

■No Restriction for Holders
A standard holders can be used.
(⁎A double clamp, high rigidity tool is recommended.)

Non restriction →

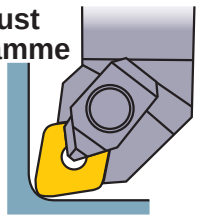




The CNMG type can be used as a wiper at the 100°corner.

■Not Necessary to Adjust the Machining Programme
Conventional machining programmes can be used.
(The CNMG • WNMG • CCMT types are based on the ISO/ANSI.)

Not necessary to adjust →

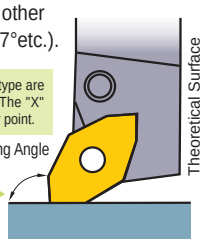


Special attention is necessary when using the DNMX • TNMX types due to the special top face geometry

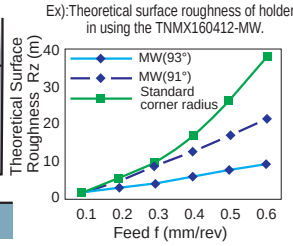
■Restriction for Holders
Use a holder with end cutting angle 93° for improving wiper efficiency. A holder with end cutting angle 91° can improve wiper efficiency (see the following figure), however, there is no wiper efficiency with other end cutting angles (60°, 90°, 107°etc.).

The hole geometry of the DNMX and TNMX type are the same as the DNMG and TNMG types. The "X" represents the special geometry of the corner point.

93° (Specified) →

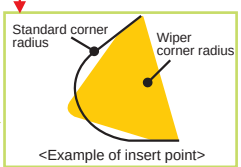


Ex):Theoretical surface roughness of holders in using the TNMX160412-MW.



■Necessary to Adjust the Machining Programme
When machining errors occur, please adjust the programme.
(The DNMX • TNMX types are not based on the ISO/ANSI. Please refer to the next page.)

Adjustment necessary →

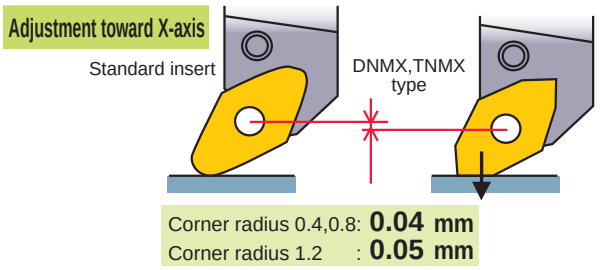


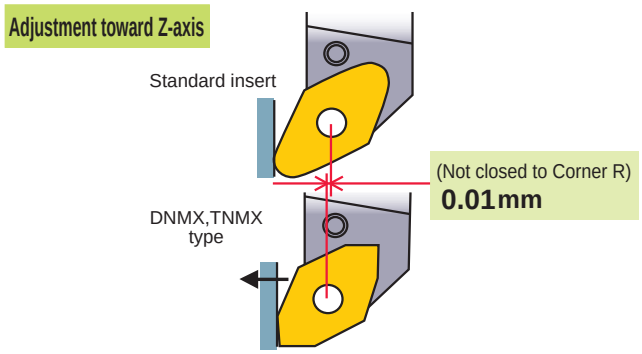
<Example of insert point>

Adjustment of machining programmes for DNMX • TNMX types

Basic Process) Adjusting Toward X-axis and Z-axis

Adjusting the differential between a standard insert and Z-axis / X-axis.

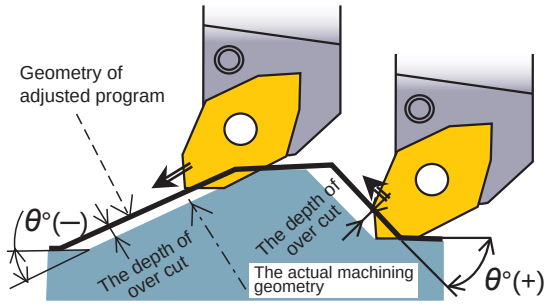




A) Adjusting a Taper ⁎Necessary to maintain a correct taper.

Adjust the relief angle toward the normal line.

Note) Adjust the angle toward the normal line in the case where the adjustment number is minus (θ=60°−70°) and is not machined completely.



Classification

Corner radius	Taper Angleθ°															
	-25−-15	-10	-5	**0**	5	10	15	20−35	40	45	50	55	60−65	70	75−85	**90**
1.2	0.04	0.03	0.01	**0**	0.02	0.03	0.04	0.05	0.04	0.04	0.02	0.01	-0.01	0	0.01	**0**
0.8	0.03	0.02	0.01	**0**	0.01	0.02	0.03	0.04	0.03	0.03	0.02	0	-0.01	0	0.01	**0**
0.4	0.02	0.01	0.01	**0**	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0	-0.01	-0.01	0	**0**

The number→+numbers:adjustment of relief angle, -numbers:adjustment of drive-in angle (mm)

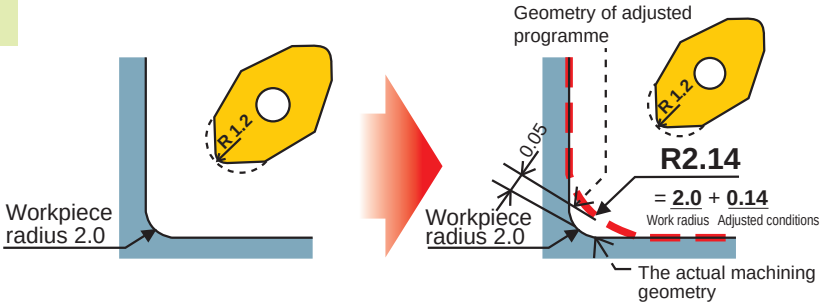
B) Adjusting a Corner R ⁎Necessary to maintain a correct corner radius.

Adjust the work diameter same as the taper to prevent cut-over.

The value of adjustment to work R = Work R + the adjustment value
⁎No adjusting the corner radius in this case.

The corner radius of the insert	The adjustment amount on the workpiece radius.
Corner Radius0.4 →	Work Radius **+0.05**(mm)
Corner Radius0.8 →	Work Radius **+0.11**(mm)
Corner Radius1.2 →	Work Radius **+0.14**(mm)

Ex) : In case of machining R 2.0 when using a corner R 1.2 type insert.



The Easy-to-correct Method

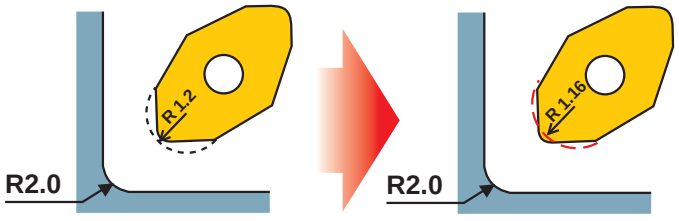
In correcting corner radius:
It is not necessary to adjust the machining program, however, machining errors can occur within max. ±0.03mm due to correcting by an approximate number.

Corner Radius Correction Input the correction number of each corner radius.

The value of corrected corner radius = approximation
⁎No adjusting the machining programme in this case.

The corner radius of a insert	The value of corrected corner radius = approximation
Corner Radius0.4 →	**R0.36**(mm)
Corner Radius0.8 →	**R0.76**(mm)
Corner Radius1.2 →	**R1.16**(mm)

Ex): In the case of machining a corner with a radius R 2.0 when using an insert with a corner radius R 1.2.



Others) The value of correction is same for both DNMX and TNMX. Discriminate them by the size of corner radius.

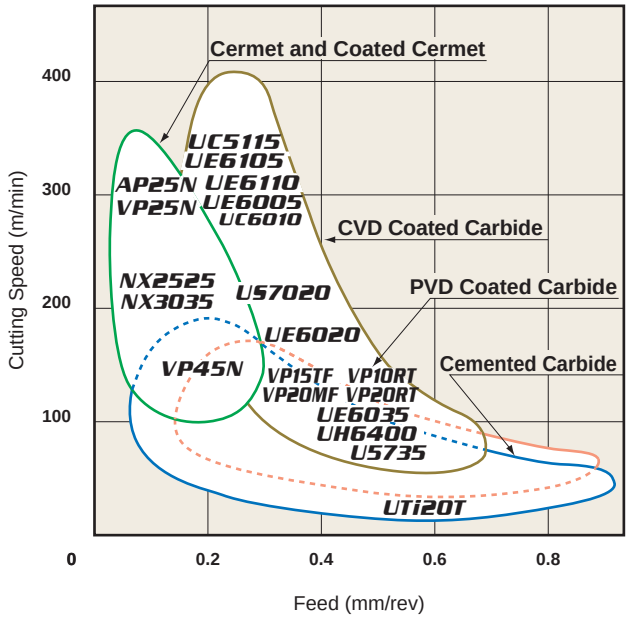
GRADES FOR TURNING

●INDEXABLE INSERT GRADES FOR TURNING

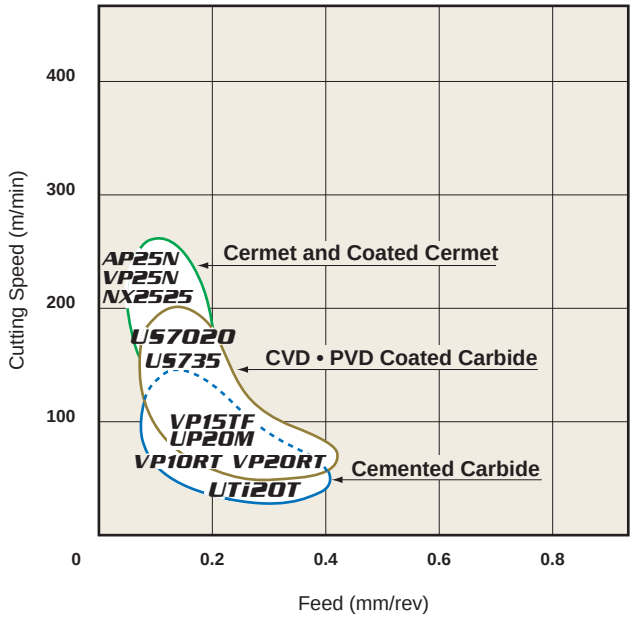
ISO		Coated Carbide		Cermet	Coated Cermet	Cemented Carbide	Coated CBN	CBN	PCD (Sintered Diamond)
		CVD	PVD						
P Steel	P01	UE6105 (NEW), UE6110, UE6020, UE6035, UH6400, UE6005, UC6010	VP10RT, VP15TF, VP20MF, VP20RT, UP20M	NX2525, NX3035, NX55	VP25N, AP25N, VP45N	UTi20T			
	P10								
	P20								
	P30								
	P40								
M Stainless Steel	M01								
	M10	US7020	VP10RT, VP15TF, VP20MF, VP20RT, UP20M	NX2525	VP25N, AP25N	UTi20T			
	M20								
	M30	US735							
	M40								
K Cast Iron	K01	UC5105, UC5115				HTi05T		MB710, MB730	
	K10		VP10RT, VP15TF, VP20RT	NX2525	VP25N, AP25N	HTi10		MB5140	
	K20					UTi20T			
	K30								
N Non-Ferrous Metal	N01								MD205, MD220, MD230
	N10					HTi10			
	N20								
	N30								
S Heat Resistant Alloy • Ti Alloy	S01	US905	VP05RT, VP10RT, VP15TF, VP20RT			RT9005		MB730	
	S10					RT9010			
	S20					TF15			
	S30								
H Hardened Steel	H01						MBC010	MB810	
	H10						MBC020	MB8025, MB820	
	H20							MB825	
	H30							MB835	

TURNING APPLICATION RANGE

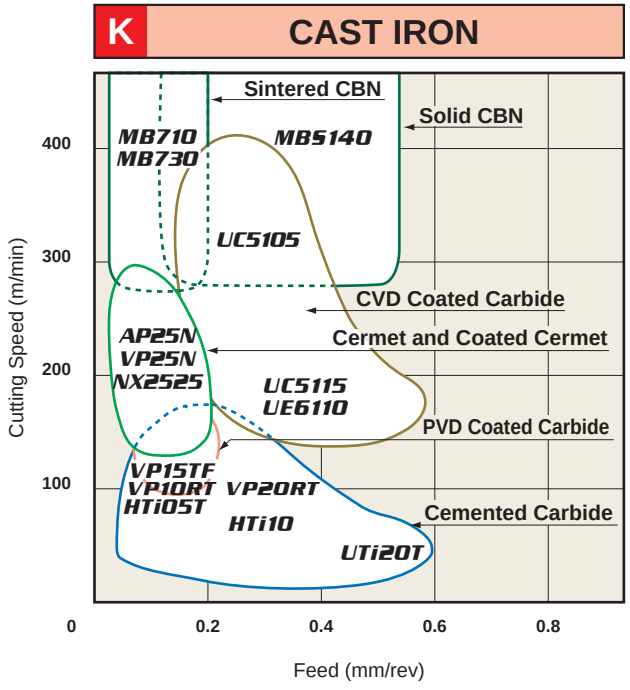
P STEEL



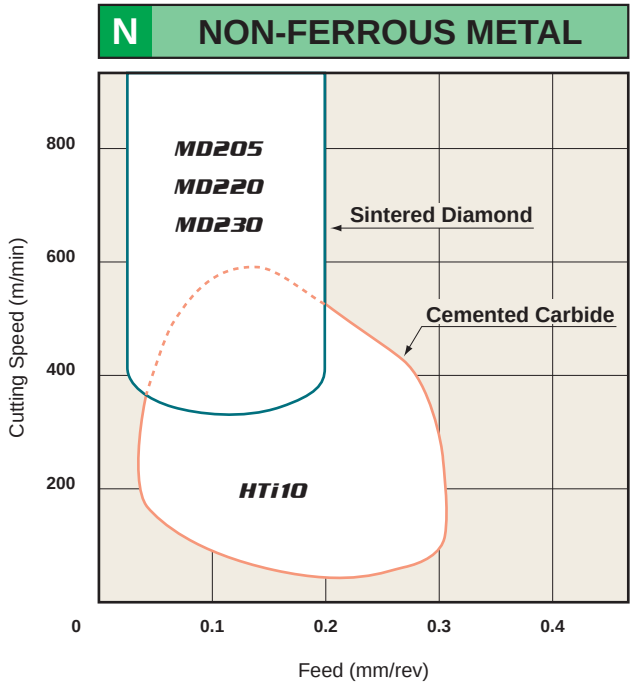
M STAINLESS STEEL



K CAST IRON

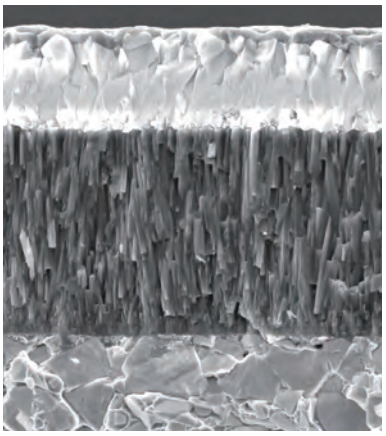


N NON-FERROUS METAL



COATED CARBIDE (CVD)

- Special tough fibrous structure improves wear and fracture resistance.
- It covers a wide application range and thus reduces the number of tools required.



Micro Structure of Coated Carbide **UE6110**

State-of-the-art **"2 in 1 technology"** achieves high wear resistance, high fracture resistance and high stability.

"2 in 1 technology" consists of "Nano-texture coating" and "Black-super smooth coating". The fibrous nanoscale TiCN and the crystal growth controlledAlumina(Al_2O_3) in the "Nano-texture coating" give far superior fracture and wear resistance compared to conventional coatings. "Black-super smooth coating" which is used for the periphery of the insert has an extremely smooth surface and provides stable cutting for prolonged periods without abnormal damage such as welding or chipping.

SELECTION STANDARD

TURNING

Work Material	Cutting Mode	Recommended Grade	Recommended Cutting Speed (m/min)	ISO	Application Range
P Steel	Continuous Cutting	**UE6105**	300 (200 — 400)	P01	UE6105 NEW, UE6110, UE6020, UE6005, UC6010
		UE6110	250 (150 — 400)	P10	
		UE6020	200 (100 — 250)	P20	
	Interrupted Cutting	**UE6035**	150 (80 — 200)	P30	UE6035, UH6400
				P40	
M Stainless Steel	Continuous Cutting	**US7020**	170 (120 — 220)	M10	US7020
				M20	
	Continuous and Interrupted Cutting	**US735**	100 (80 — 120)	M30	US735
				M40	
K Cast Iron Ductile Cast Iron	Continuous Cutting	**UC5105**	300 (200 — 400)	K01	UC5105
				K10	UC5115
	Interrupted Cutting	**UC5115**	250 (150 — 300)	K20	
				K30	
S Heat Resistant Alloy	Continuous and Interrupted Cutting	**US905**	80 (50 — 100)	S01	US905

CUTTING CONDITIONS

Stable Cutting

Continuous Cutting
Constant Depth of Cut
Pre-Machined
Securely Clamped Component Cutting

General Cutting

Unstable Cutting

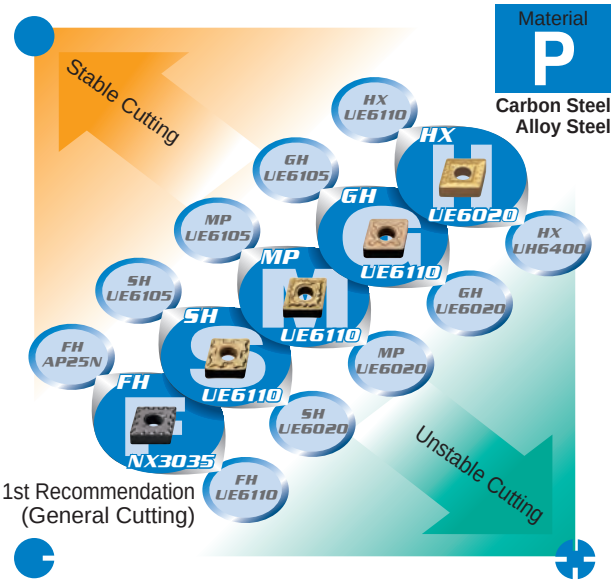
Heavy Interrupted Cutting
Irregular Depth of Cut
Low Clamping Rigidity Cutting

CUTTING AREA

F	Finish Cutting	(ap ≤0.5mm)
S	Light Cutting	(ap=0.5—1.5mm)
M	Medium Cutting	(ap=1.5—4.0mm)
G	Semi-Heavy Cutting	(ap=4.0—7.0mm)
H	Heavy Cutting	(ap=7.0—10mm)

NEGATIVE

Material **P** Carbon Steel Alloy Steel



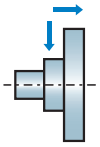
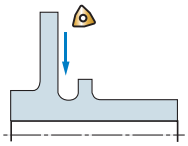
1st Recommendation (General Cutting)

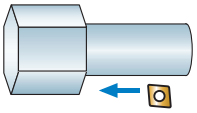
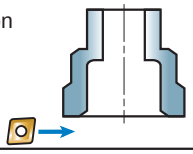
GRADE CHARACTERISTICS

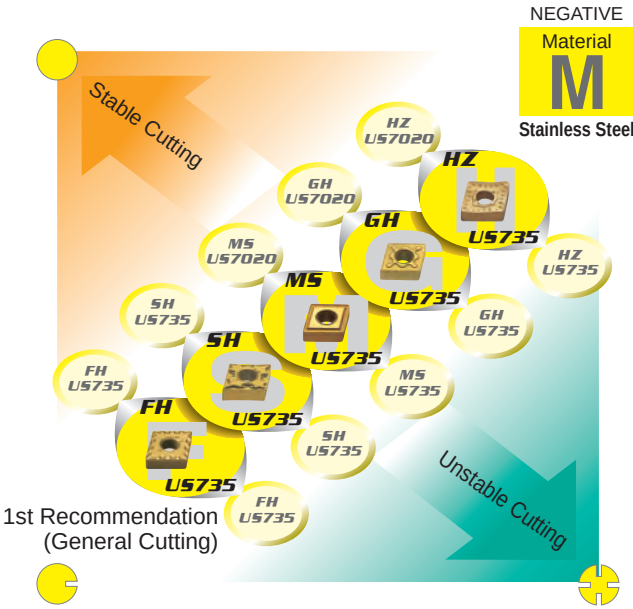
Grade	Substrate			Coating Layer	
	Hardness (HRA)	T.R.S (GPa)	Surface	Composition	Thickness
UC5105	92.2	2.0	–	TiCN-Al2O3	Thick
UC5115	91.0	2.2	–	TiCN-Al2O3	Thick
UE6105	90.8	1.8	Tough	Accumulated TiCN-Al2O3-Ti Compound	Thick
UE6005	91.0	1.8	Tough	TiCN-Al2O3-TiN	Thick
UE6110	90.3	2.0	Tough	Accumulated TiCN-Al2O3-Ti Compound	Thick
UC6010	90.5	2.0	Tough	TiCN-Al2O3-TiN	Thick
UE6020	90.0	2.2	Tough	Accumulated TiCN-Al2O3-Ti Compound	Thick
UE6035	89.5	2.3	Tough	TiCN-Al2O3-TiN	Thick
UH6400	89.5	2.3	Tough	Accumulated TiCN-Al2O3-Ti Compound	Thick
US7020	90.5	2.0	Tough	TiCN-Al2O3-TiN	Thin
US735	89.0	2.6	–	Ti Compound	Thin
US905	92.2	2.0	–	TiCN-Al2O3	Thin

∗ 1GPa=102kg/mm^2

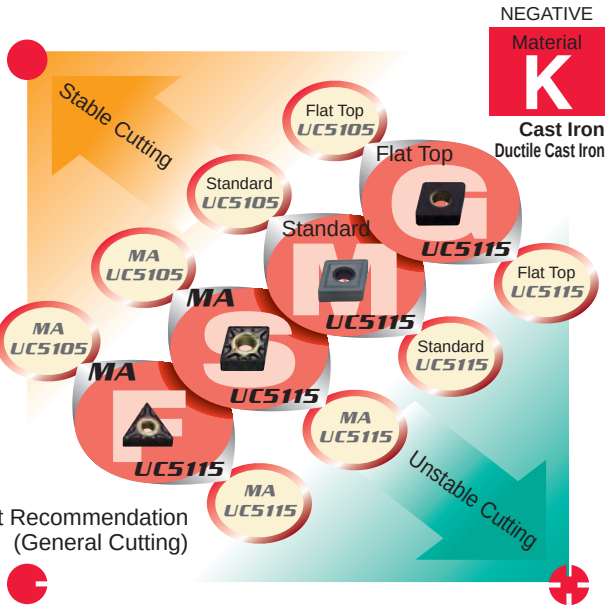
APPLICATION EXAMPLES

Insert (Grade)		CNMG120416-MA(UE6110)	WNMG080408-MV(UE6020)
Workpiece		Alloy steel (JIS SCM440) 	Alloy steel (JIS SCM420) 
Cutting Conditions	Cutting Speed (m/min)	210	160
	Feed (mm/rev)	0.3	0.25
	Depth of Cut (mm)	3.0	2.0
	Coolant	Wet cutting	Wet cutting
Result		10 20 pieces/corner UE6110 Competitor's P10 coating UE6110 achieved more than double the tool life.	50 100 pieces/corner UE6020 Competitor's P20 coating UE6020 achieved 6 times long tool life.

Insert (Grade)		CNMG120408-MS(US7020)	CNMA120408(UC5105)
Workpiece		Stainless steel (JIS SUS316) 	Gray cast iron (JIS FC300) 
Cutting Conditions	Cutting Speed (m/min)	Conventional coated grade=100, US7020=200	250
	Feed (mm/rev)	0.15–0.2	0.30
	Depth of Cut (mm)	2	2.5
	Coolant	Wet cutting	Wet cutting
Result		40 80 pieces/corner US7020 Previous coated grade US7020 achieved two times longer tool life compared to previous grade when turning in double cutting speed.	250 500 pieces/corner UC5105 Competitor's K01 coating **Large wear** UC5105 achieved more than double the tool life.

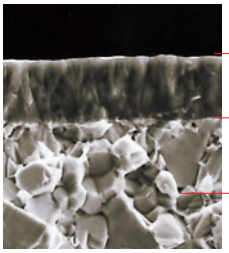


1st Recommendation (General Cutting)



1st Recommendation (General Cutting)

COATED CARBIDE (PVD)



- PVD coating prolongs tool life under the same cutting conditions compared to uncoated carbide.
- Coating of tools with sharp edges is possible without softening or changing the edge quality of the subsrate.

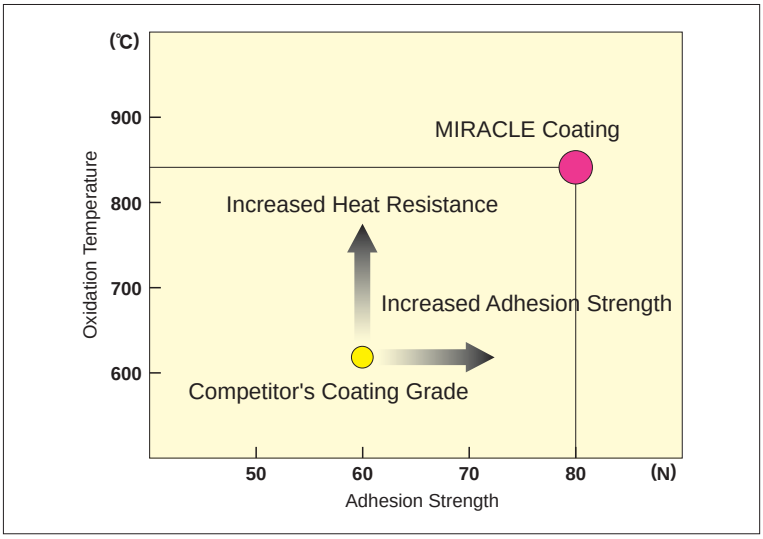
SELECTION STANDARD

TURNING

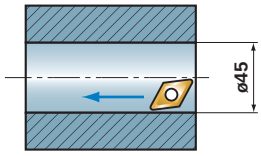
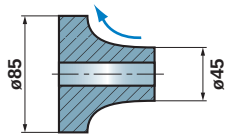
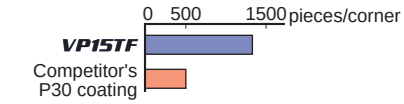
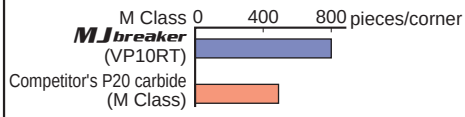
Work Material	Coating Name	Recommended Grade	Recommended Cutting Speed (m/min)	ISO	Application Range
P Steel	VP Coating	**VP10RT**	120 (100 — 150)	P01	
		VP15TF	120 (100 — 150)	P10	VP10RT
		VP20MF	120 (100 — 150)	P20	VP15TF, VP20MF, VP20RT, UP20M
		VP20RT	120 (100 — 150)	P30	
	UP Coating	**UP20M**	120 (100 — 150)	P40	
M Stainless Steel	VP Coating	**VP10RT**	120 (100 — 150)	M01	
		VP15TF	120 (100 — 150)	M10	VP10RT
		VP20MF	120 (100 — 150)	M20	VP15TF, VP20MF, VP20RT, UP20M
		VP20RT	120 (100 — 150)	M30	
	UP Coating	**UP20M**	120 (100 — 150)	M40	
K Cast Iron	VP Coating	**VP10RT**	120 (100 — 150)	K01	
		VP15TF	120 (100 — 150)	K10	VP10RT
		VP20RT	120 (100 — 150)	K20	VP15TF, VP20RT
				K30	
S Heat Resistant Alloy	VP Coating	**VP05RT**	50 (20 — 70)	S01	VP05RT
		VP10RT	40 (20 — 50)	S10	VP10RT
		VP20RT	40 (20 — 50)	S20	VP15TF, VP20RT
		VP15TF	40 (20 — 50)	S30	

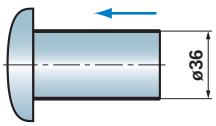
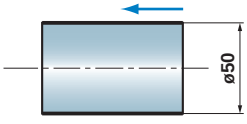
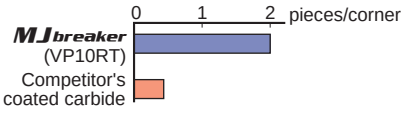
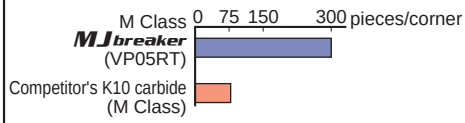
FEATURES OF VP (MIRACLE) COATING

Compared to conventional coating technology, VP (MIRACLE) coating features (Al, Ti) N coating with highly increased heat resistance and adhesion strength.



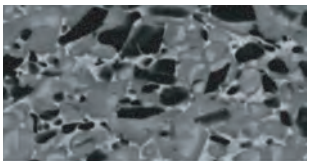
APPLICATION EXAMPLES

Insert (Grade)		DCMT11T304-MV(VP15TF)	CNMG120408-MJ(VP10RT)
Workpiece		Alloy steel 	Stainless Steel (Fan parts) 
Cutting Conditions	Cutting Speed (m/min)	170	200
	Feed (mm/rev)	0.14	0.25
	Depth of Cut (mm)	0.25	0.5
	Coolant	Wet cutting	Wet cutting
Result		 VP15TF does not experience chipping. This enables stable machining and much longer tool life.	 MJ breaker achieved 1.5 times longer tool life.

Insert (Grade)		CNMG120408-MJ(VP10RT)	TNMG160408-MJ(VP05RT)
Workpiece		Inconel 718 (Pin) 	Sintered iron parts (FH655) 
Cutting Conditions	Cutting Speed (m/min)	31	120
	Feed (mm/rev)	0.2	0.05
	Depth of Cut (mm)	2.3	0.5
	Coolant	Wet cutting	Wet cutting
Result		 VP10RT achieved 4 times longer tool life. MJ breaker for excellent chip disposal and vastly increased tool life.	 MJ breaker achieved 5 times longer tool life.

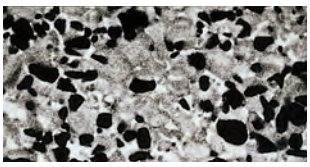
CERMET

- The optimized alloy structure and special alloy binder improves both wear and fracture resistance.
- It covers a wide application range and reduces the number of tools required.
- NX3035 for wet cutting.
- NX2525 for dry cutting.



Micro-Structure of **NX3035**

- NX3035 uses a special alloy substrate in the metal binder phase to deliver highly improved thermal shock resistance.



Micro-Structure of **NX2525**

- NX2525 has high hardened Ti compound particles within it's microstructure therefore the grade has both excellent wear and fracture resistance properties.

SELECTION STANDARD

●TURNING

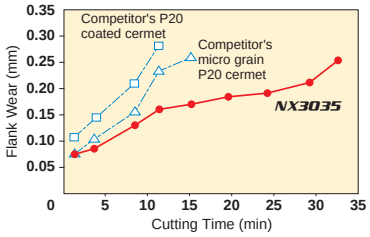
Work Material		Cutting Mode	Recommended Grade	Recommended Cutting Speed (m/min)	ISO	Application Range
P	Steel	Continuous Cutting	**NX2525**	250 (200 ─ 280)	P01	NX2525 NX3035 NX55
		Interrupted Cutting	**NX3035**	230 (190 ─ 260)	P10	
					P20	
K	Cast Iron Ductile Cast Iron	Finishing	**NX2525**	210 (170 ─ 230)	K01	NX2525
					K10	
					K20	

CUTTING PERFORMANCE

Cutting Performance

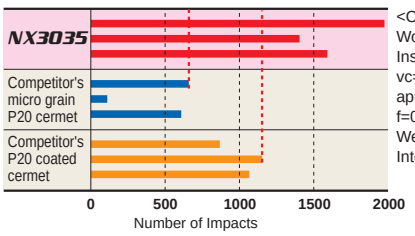
Cutting Speed : vc Depth of Cut : ap
Feed : f

Steel, Continuous Cutting (Wet)



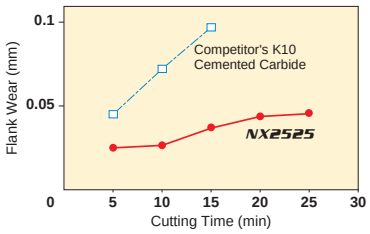
<Cutting Conditions>
Workpiece : JIS S45C
Insert : CNMG120408-○○
vc=250m/min
ap=1.0mm
f=0.15mm/rev
Wet Cutting
External Continuous Cutting

Steel, Interrupted Cutting



<Cutting Conditions>
Workpiece : JIS SCM440
Insert : CNMG120408-○○
vc=200m/min
ap=1.5mm
f=0.2mm/rev
Wet Cutting
Interrupted Cutting

Cast Iron, Continuous Cutting



<Cutting Conditions>
Workpiece : JIS FC300
Insert : CNMG120408
vc=100m/min
ap=1.5mm
f=0.3mm/rev
Wet Cutting

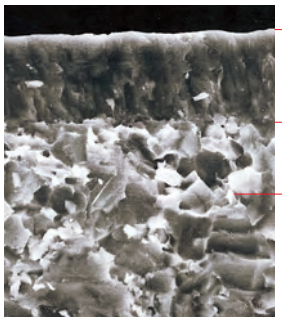
GRADE CHARACTERISTICS

Grade	Substrate			
	Hardness (HRA)	T.R.S (GPa)	Thermal Conductivity (W/m • K) ✱	Thermal Expansion ($\times 10^{-6}$/K)
NX2525	92.2	2.0	33	7.8
NX3035	91.5	2.1	35	7.8
NX55	91.7	1.8	25	7.8

✱ 1GPa=102kg/mm^2, 1W/m • K=2.39$\times 10^{-3}$cal/cm • sec • ℃

COATED CERMET

- Coated cermet (PVD coating) has superior wear and fracture resistance, and therefore provides a stable cutting performance.



- Coating Layer
  Outer layer is TiN (Welding resistance)
  Middle layer is (Ti, Al) N Compound. (wear resistance thermal shock resistance)
- Substrate
  Micro Grain Cermet NX2525 (wear resistance and fracture resistance)

Micro-Structure of **AP25N**

SELECTION STANDARD

●TURNING

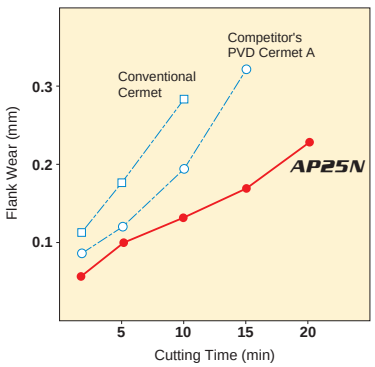
Work Material		Cutting Mode	Recommended Grade	Recommended Cutting Speed (m/min)	ISO	Application Range
P	Steel	Continuous Cutting	**VP25N** **AP25N**	280 (200 ─ 320)	P01 P10	VP25N, AP25N
		Interrupted Cutting	**VP45N**	180 (140 ─ 200)	P20 P30	VP45N
K	Cast Iron Ductile Cast Iron	Finishing	**VP25N** **AP25N**	220 (170 ─ 250)	K01 K10 K20	VP25N, AP25N

CUTTING PERFORMANCE

Cutting Performance

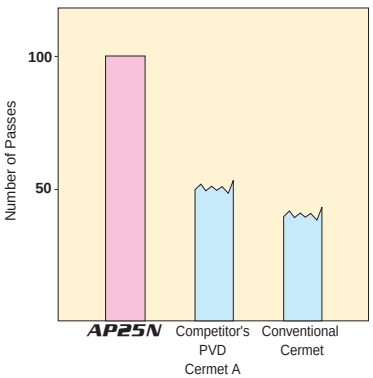
Cutting Speed : vc Depth of Cut : ap
Feed : f

Wear Resistance for Wet Cutting



<Cutting Conditions>
Workpiece : JIS SCM440 (HB230)
Insert : CNMG120408-◌◌
vc=300m/min
ap=0.5mm
f=0.2mm/rev
Wet Cutting

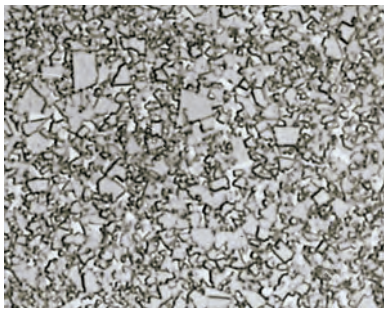
Thermal Shock Resistance for Interrupted Cutting



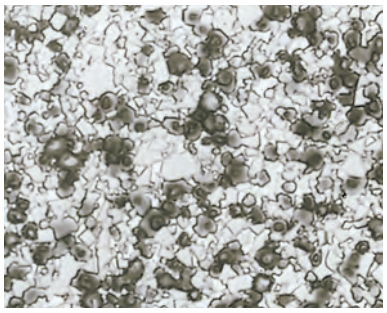
<Cutting Conditions>
Workpiece : JIS SCM440 (HB230)
Insert : CNMG120408-◌◌
vc=200m/min
ap=2.0mm
f=0.3mm/rev
Wet Cutting

CEMENTED CARBIDE

●UTi grades are available for steel and cast iron. HTi grades are available for non-ferrous and non-metal materials and are also suitable for cast iron.



K Class Grade (WC-Co) 10μm



P,M Class Grade (WC-TiC-TaC-Co) 10μm

SELECTION STANDARD

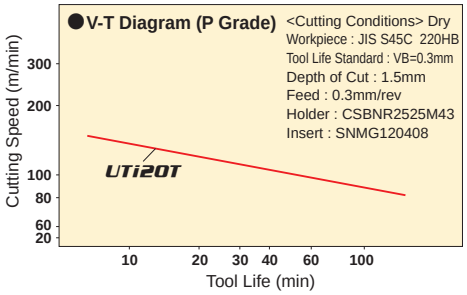
●TURNING

Work Material		Recommended Grade	Recommended Cutting Speed (m/min)	ISO	Application Range
P	Steel	**UTi20T**	100 (60 — 130)	P10	
				P20	UTi20T
				P30	
M	Stainless Steel	**UTi20T**	100 (60 — 130)	M10	
				M20	UTi20T
				M30	
K	Cast Iron	**HTi05T**	120 (80 — 150)	K01	HTi05T
		HTi10	100 (50 — 150)	K10	HTi10
		UTi20T	100 (50 — 150)	K20	UTi20T
				K30	
N	Non-Ferrous Metal	**HTi10**	600 (400 — 800)	N01	
				N10	HTi10
				N20	
				N30	
S	Heat-resistant Alloy Ti Alloy	**RT9005**	70 (50 — 100)	S01	RT9005
		RT9010	60 (40 — 80)	S10	RT9010
		TF15	50 (40 — 70)	S20	TF15
				S30	

MAIN COMPONENT AND APPLICATION

P series for steel cutting, K series for cast iron cutting and M series for general cutting.

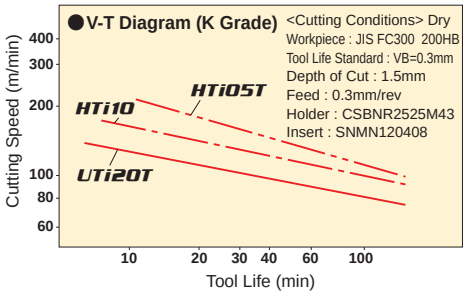
ISO	Main Component	Characteristics	Work Material
P M	WC-TiC-TaC-Co	Heat / deformation resistance.	Carbon steel, alloy steel, stainless steel and cast iron
K N	WC-Co	High rigidity and wear resistance.	Cast iron, non-ferrous metals, and non-metal
S	WC-Co	High heat resistance and wear resistance.	Heat-resistant alloy, Ti alloy



GRADE CHARACTERISTICS

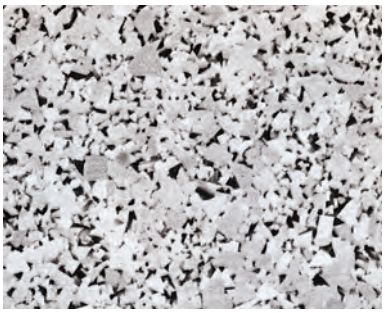
ISO	Grade	Hardness (HRA)	Thermal Conductivity (W/m•K)*	Thermal Expansion (x10⁻⁶/K)	Young's Modulus (GPa)*	T.R.S (GPa)*
P M	**UTi20T**	90.5	38	5.5	520	2.0
K N	**HTi05T**	92.5	79	4.5	600	1.5
K N	**HTi10**	92.0	79	4.6	630	2.0
S	**RT9005**	92.2	79	4.5	600	2.0
S	**RT9010**	92.0	79	4.6	630	2.2
S	**TF15**	91.5	71	5.3	580	2.5

* 1GPa=102kg/mm^2, 1W/m • K=2.39×10^{-3}cal/cm • sec • ℃



MICRO-GRAIN CEMENTED CARBIDE (SOLID TOOLS)

- Compared to normal cemented carbide, micro-grain types have higher wear resistance and toughness.



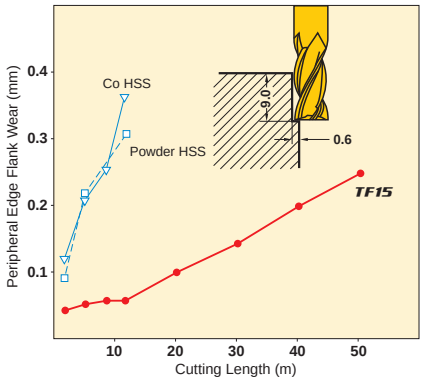
Micro-Structure of **MF10** 2μm

Micro-Structure of **TF15** 2μm

SELECTION STANDARD

Cutting Tool	Recommended Grade	Work Material
PCB miniature drill	**SF10** **MF07** **MF10** **MF20**	Non-Metal
Solid Carbide Drill Turning Inserts Milling Inserts	**TF15**	Steel • Cast Iron
Solid End Mill	**HTi10** **TF15** **MF10**	Steel • Cast Iron
Gear Hob Reamer Tap etc.	**TF15** **MF20** **MF30**	Steel • Cast Iron, etc.

CUTTING PERFORMANCE



<Cutting Conditions>
Workpiece : JIS NAK55(40HRC)
Tool : ϕ6mm, 4 flutes(SED4060 S)
Helical Angle : 30°
vc=30m/min
n=1,600m/min^{-1}
fz=0.02mm/tooth
vf=128mm/min
Depth of Cut in the Axial Direction=9.0mm
Depth of Cut in the Radial Direction=0.6mm
Down Cut, Dry

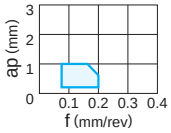
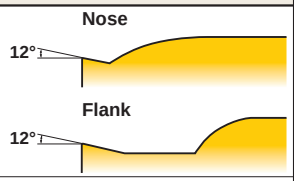
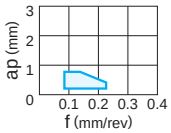
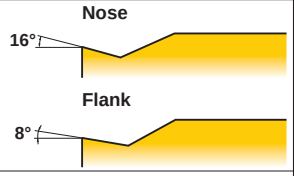
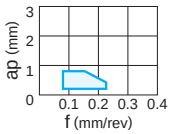
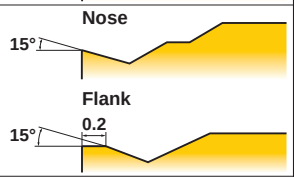
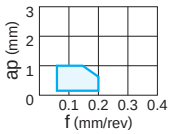
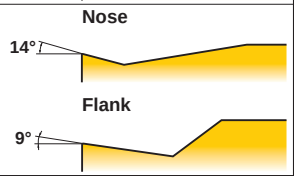
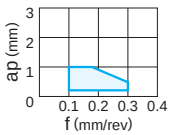
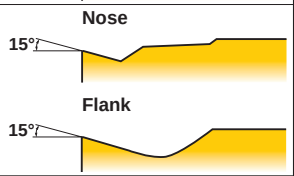
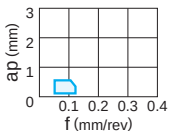
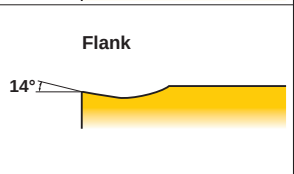
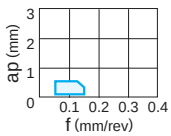
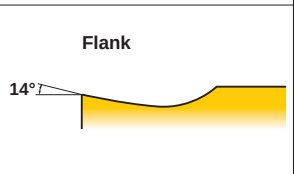
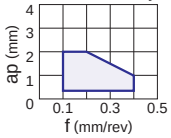
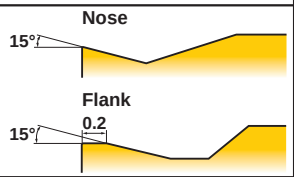
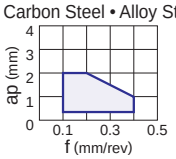
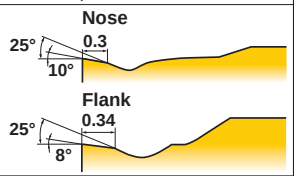
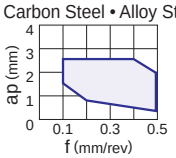
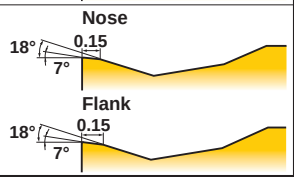
GRADE CHARACTERISTICS

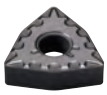
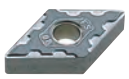
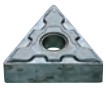
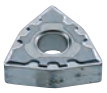
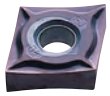
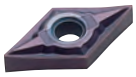
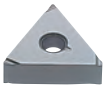
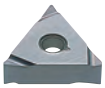
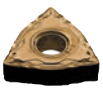
Grade	Grade Characteristics ⁎⁎			ISO	Wear Resistance	Fracture Resistance	Corrosion Resistance
	Specific Gravity	Hardness (HRA)	T.R.S (Gpa) ⁎				
HTi10	**14.9**	92.0	3.2	K10	◎	○	○
TF15	**14.5**	91.0	4.0	K20	◎	○	◎
SF10	**14.9**	92.7	3.8	K01	◎	○	◎
MF07	**14.7**	93.2	3.9	K01	◎	○	◎
MF10	**14.6**	93.0	4.0	K01	◎	○	◎
MF20	**14.2**	92.0	4.4	K10	○	◎	◎
MF30	**13.7**	90.7	4.3	K20	○	◎	◎

⁎ 1GPa=102kg/mm^2
⁎⁎ After HIP

CLASSIFICATION

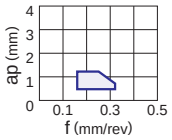
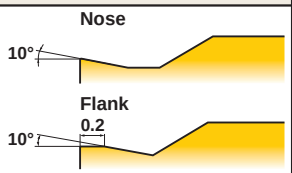
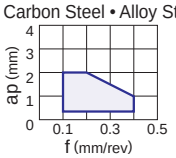
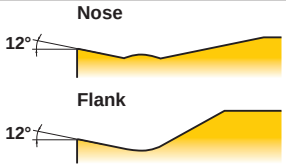
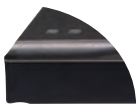
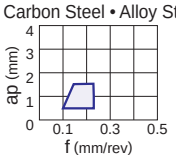
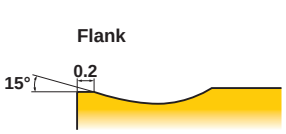
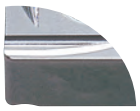
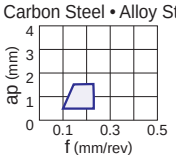
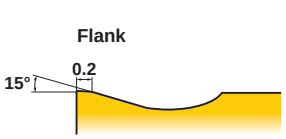
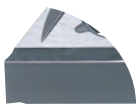
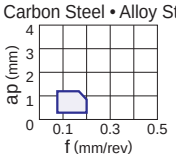
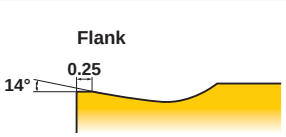
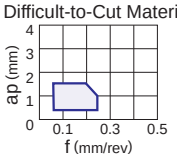
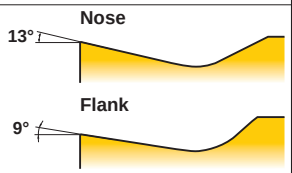
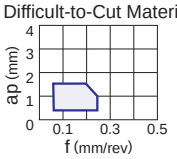
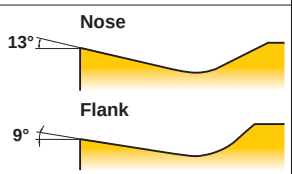
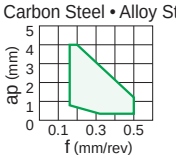
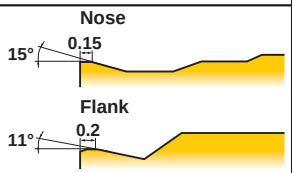
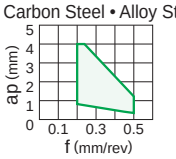
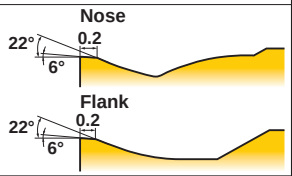
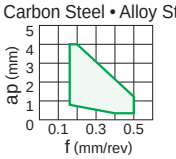
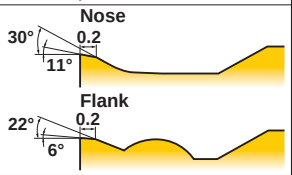
NEGATIVE INSERTS WITH HOLE

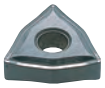
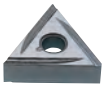
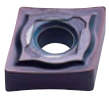
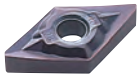
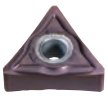
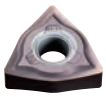
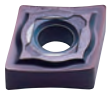
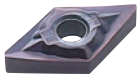
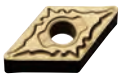
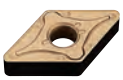
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Finish Cutting	M	**FH**	**First recommendation for finishing carbon steel, alloy steel and stainless steel** Double sided chipbreaker. Stable chip control even at small depth of cut.	Carbon Steel • Alloy Steel  
	M	**FS**	**Alternative chipbreaker for finishing mild steel** Double sided chipbreaker. Stable chip control even at small depth of cut. Sharp edge gives best performance.	Mild Steel  
	M	**FY**	**First recommendation for finishing mild steel** Double sided chipbreaker. Effectively controls adhesive chips. Suitable for mild steel finishing.	Mild Steel  
	G	**FJ**	**First recommendation for finishing difficult-to-cut materials** Double sided chipbreaker. Ideal for heat-resistant alloy and titanium alloy. The sharp edge produces good cutting surface. The curved edge allows smooth chip discharge.	Difficult-to-Cut Materials  
	G	**PK**	**Alternative chipbreaker for finishing carbon steel and alloy steel** Double sided chipbreaker. G class insert tolerance is suitable for workpieces requiring close dimensional tolerances. Stable chip control even at small depth of cut.	Carbon Steel • Alloy Steel  
	G	**R/L-FS**	**Precise finishing** Double sided chipbreaker. A narrow lead chipbreaker for good chip control. The sharp edge produces a good surface finish.	Carbon Steel • Alloy Steel  
	G	**R/L-F**	**Finishing** Double sided chipbreaker. Lead chipbreaker controls chip flow. The sharp edge produces a good surface finish.	Carbon Steel • Alloy Steel  
Light Cutting	M	**SH**	**First recommendation for light cutting of carbon steel, alloy steel and stainless steel** Double sided chipbreaker. Can be used at low depth of cuts and high feed rates. The curved edge allows smooth chip discharge. Recommended for workpieces in the 160—250HB range.	Carbon Steel • Alloy Steel  
	M	**SA**	**Alternative chipbreaker for light cutting of carbon steel and alloy steel** Double sided chipbreaker. Superior chip control at small depth of cuts. Covers copying and back turning with wavy edge. Recommended for workpieces in the 200—300HB range.	Carbon Steel • Alloy Steel  
	M	**SW**	**Wiper insert for light cutting of carbon steel and alloy steel** Double sided chipbreaker. The wiper allows up to two times higher feed. Wiper design for increased productivity and improved surface finish.	Carbon Steel • Alloy Steel  

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
	CNMG_FH A058	DNMG_FH A063	SNMG_FH A069	TNMG_FH A074	VNMG_FH A080	WNMG_FH  A082		FH
	CNMG_FS A058	DNMG_FS  A063	SNMG_FS A069	TNMG_FS  A074	VNMG_FS A080	WNMG_FS  A082		FS
	CNMG_FY A058	DNMG_FY A063	SNMG_FY A069	TNMG_FY A074		WNMG_FY A082		FY
	CNGG_FJ  A058	DNGG_FJ  A063			VNGG_FJ A080			FJ
	CNGG_PK A058	DNGG_PK A063	SNGG_PK A069	TNGG_PK A074				PK
				TNGG_R/L-FS  A074				R/L-FS
				TNGG_R/L-F  A074	VNGG_R/L-F NEW A080			R/L-F
	CNMG_SH A058	DNMG_SH A063	SNMG_SH A069	TNMG_SH A075	VNMG_SH A080	WNMG_SH A082		SH
	CNMG_SA A059	DNMG_SA A064	SNMG_SA A069	TNMG_SA A075		WNMG_SA  A082		SA
	CNMG_SW A059	DNMX_SW A064		TNMX_SW A075		WNMG_SW A082		SW

CLASSIFICATION

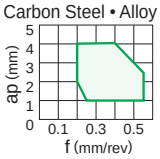
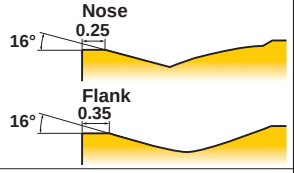
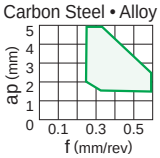
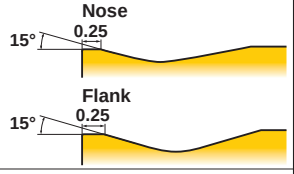
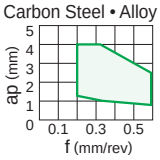
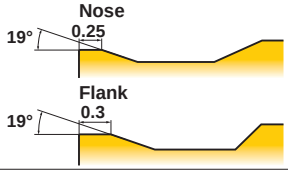
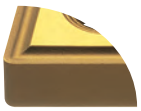
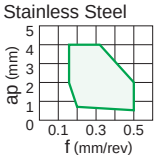
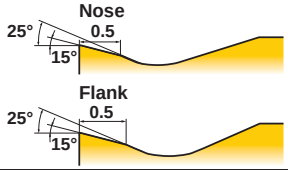
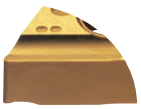
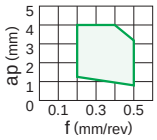
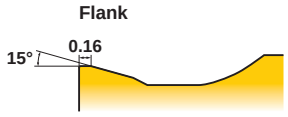
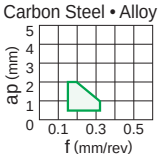
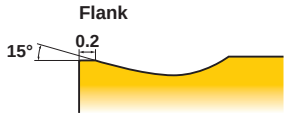
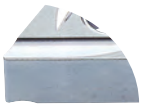
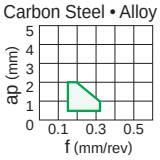
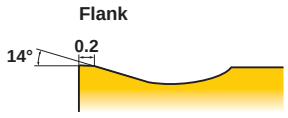
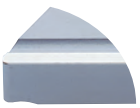
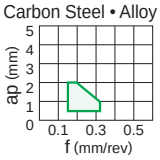
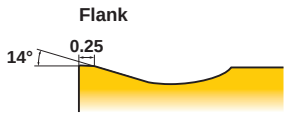
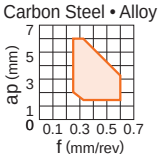
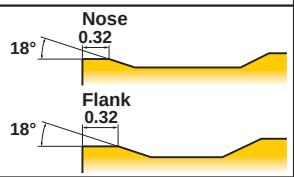
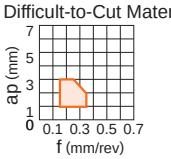
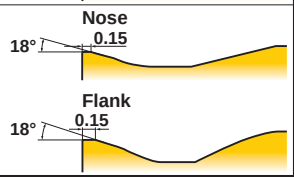
NEGATIVE INSERTS WITH HOLE

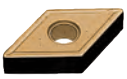
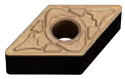
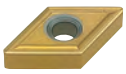
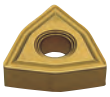
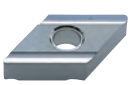
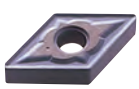
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Light Cutting	M	**SY**	**First recommendation for light cutting of mild steel** Double sided chipbreaker. Effectively controls adhesive chips. Suitable for mild steel light cutting.	Mild Steel  
		C	**Alternative chipbreaker for light cutting of carbon steel and alloy steel** Double sided chipbreaker. Suitable for light cutting. The curved edge allows smooth chip discharge.	Carbon Steel • Alloy Steel  
		R/L-1M 	**Alternative chipbreaker for light cutting of carbon steel and alloy steel** Double sided chipbreaker. Parallel chipbreaker controls chip flow. Suitable for finish-light cutting. Moulded chipbreaker.	Carbon Steel • Alloy Steel  
		R/L-1G 	**Alternative chipbreaker for light cutting of carbon steel and alloy steel** Double sided chipbreaker. Parallel chipbreaker controls chip flow. Suitable for finish-light cutting. Precision chipbreaker.	Carbon Steel • Alloy Steel  
	G	**R/L-K** 	**Light cutting** Double sided chipbreaker. Parallel chipbreaker. Excellent chip control at low to medium feed rates.	Carbon Steel • Alloy Steel  
	M	**MJ(M)**	**First recommendation for light cutting of difficult-to-cut materials** Double sided chipbreaker. Ideal for heat-resistant alloy and titanium alloy. The sharp edge produces a good surface finish. The curved edge allows smooth chip discharge.	Difficult-to-Cut Materials  
	G	**MJ(G)**	**First recommendation for light cutting of difficult-to-cut materials** Double sided chipbreaker, Single sided chipbreaker (D type, V type). The sharp edge produces a good surface finish. Ideal for heat-resistant alloy and titanium alloy. The curved edge allows smooth chip discharge.	Difficult-to-Cut Materials  
Medium Cutting	M	NEW **MP**	**First recommendation for medium cutting of carbon steel and alloy steel** Double sided chipbreaker. Suitable for medium to light cutting. Breaker geometry appropriate for copying and back turning. Cutting edge geometry for an optimum balance of sharpness and fracture resistance.	Carbon Steel • Alloy Steel  
		MA	**First recommendation for medium cutting of carbon steel and alloy steel** **Alternative chipbreaker for finishing and light cutting of cast iron** Double sided chipbreaker. Positive land provides sharp cutting action.	Carbon Steel • Alloy Steel  
		MV	**Alternative chipbreaker for medium cutting of carbon steel and alloy steel** Double sided chipbreaker. Suitable for medium to light cutting. Breaker geometry appropriate for copying and back turning. Positive land provides sharp cutting action.	Carbon Steel • Alloy Steel  

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
	CNMG_SY A059	DNMG_SY A064	SNMG_SY A069	TNMG_SY A075		WNMG_SY A083		SY
	CNMG_C A059	DNMG_C A064	SNMG_C A070	TNMG_C A075		WNMG_C  A083		C
				TNMG_R/L-1M A075				R/L-1M
			SNMG_R/L-1G A070	TNMG_R/L-1G A075				R/L-1G
				TNGG_R/L-K  A075				R/L-K
	CNMG_MJ  A059	DNMG_MJ  A064		TNMG_MJ  A076	VNMG_MJ A080	WNMG_MJ  A083		MJ(M)
	CNGG_MJ  A059	DNGM_MJ  A064			VNGM_MJ A080			MJ(G)
	CNMG_MP A059	DNMG_MP  A065	SNMG_MP A070	TNMG_MP A076	VNMG_MP A081	WNMG_MP A083		NEW MP
	CNMG_MA A059	DNMG_MA  A065	SNMG_MA A070	TNMG_MA A076	VNMG_MA A081	WNMG_MA A083		MA
	CNMG_MV A060	DNMG_MV A065	SNMG_MV A070	TNMG_MV A076	VNMG_MV A081	WNMG_MV A083		MV

CLASSIFICATION

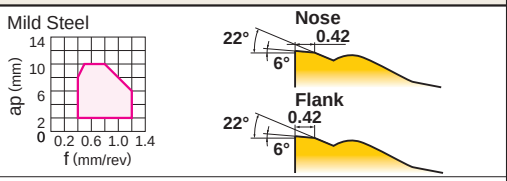
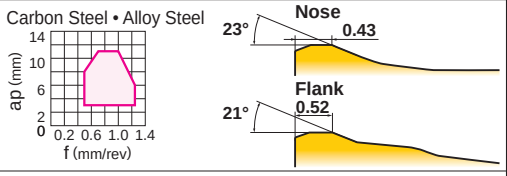
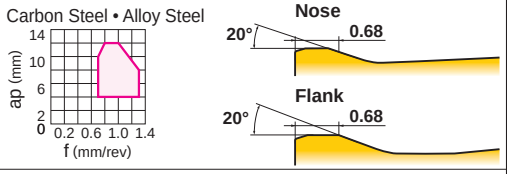
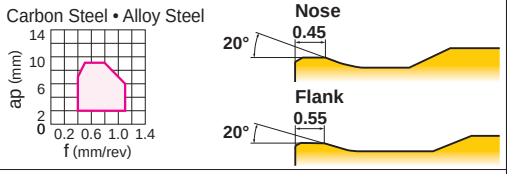
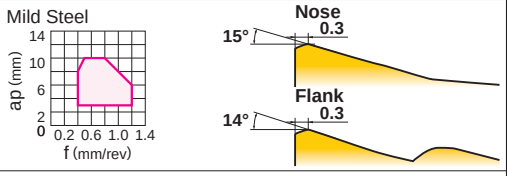
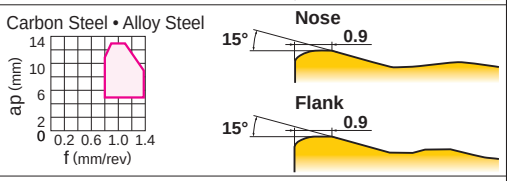
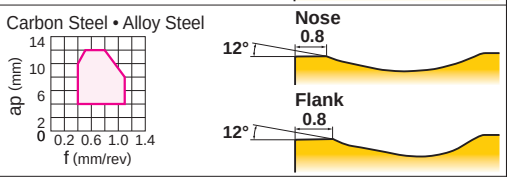
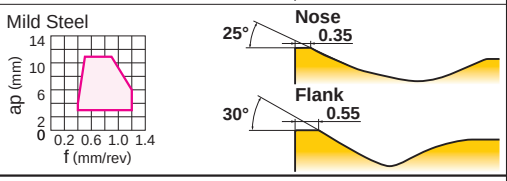
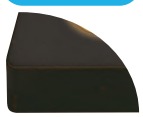
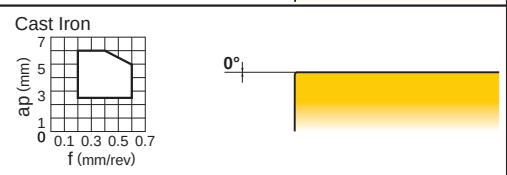
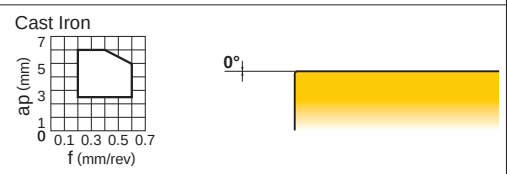
NEGATIVE INSERTS WITH HOLE

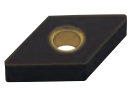
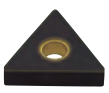
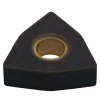
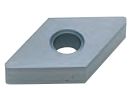
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Medium Cutting	M	**MH**	**First recommendation for semi-heavy cutting of mild steel** **Alternative chipbreaker for medium cutting of carbon steel and alloy steel** Double sided chipbreaker. Flat land offers high edge strength.	Carbon Steel • Alloy Steel  
		Standard	**First recommendation for medium cutting of cast iron** **Alternative chipbreaker for medium cutting of carbon steel and alloy steel** Double sided chipbreaker. Flat land offers high edge strength.	Carbon Steel • Alloy Steel  
		MW	**Wiper insert for medium cutting carbon steel and alloy steel** Double sided chipbreaker. The wiper allows up to two times higher feed. A wide chip pocket prevents chip jamming.	Carbon Steel • Alloy Steel  
		MS 	**First recommendation for medium cutting of stainless steel, mild steel and difficult-to-cut materials** Double sided chipbreaker. The sharp edge gives best performance.	Stainless Steel  
		R/L-ES 	**Alternative chipbreaker for medium cutting of stainless steel** Double sided chipbreaker. Good balance of edge strength and sharpness. Right- or left-hand breaker for unidirectional chip control.	Stainless Steel  
		R/L-2M	**Alternative chipbreaker for medium cutting of carbon steel and alloy steel** Double sided chipbreaker. Parallel chipbreaker controls chip flow. Suitable for light to medium cutting. Moulded chipbreaker.	Carbon Steel • Alloy Steel  
		R/L-2G 	**Alternative chipbreaker for medium cutting of carbon steel and alloy steel** Double sided chipbreaker. Parallel chipbreaker controls chip flow. Suitable for light to medium cutting.	Carbon Steel • Alloy Steel  
	G	**R/L** 	**Medium cutting** Double sided chipbreaker. Parallel chipbreaker. Good chip control for medium feed rates.	Carbon Steel • Alloy Steel  
Semi-heavy Cutting	M	**GH**	**First recommendation for semi-heavy cutting of carbon steel, alloy steel and stainless steel** Double sided chipbreaker. For interrupted cuts and removing scale. A combination of wide land and a large chip pocket allows high feed rates.	Carbon Steel • Alloy Steel  
		GJ	**First recommendation for semi-heavy cutting of difficult-to-cut materials** Double sided chipbreaker. Excellent balance of edge sharpness and strength. Edge geometry with high face wear resistance.	Difficult-to-Cut Materials  

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
	CNMG_MH A060	DNMG_MH A065	SNMG_MH A070	TNMG_MH A076	VNMG_MH A081	WNMG_MH A084		MH
	CNMG A060	DNMG  A065	SNMG A071	TNMG A077	VNMG A081	WNMG A084	RNMG A068	Standard
	CNMG_MW A060	DNMX_MW  A065		TNMX_MW A077		WNMG_MW A084		MW
	CNMG_MS A061	DNMG_MS  A066	SNMG_MS A071	TNMG_MS A077	VNMG_MS A081	WNMG_MS  A084		MS
				TNMG_R/L-ES A077				R/L-ES
				TNMG_R/L-2M A077				R/L-2M
				TNMG_R/L-2G A077				R/L-2G
		DNGG_R/L  A066	SNGG_R/L A071	TNGG_R/L A078	VNGG_R/L A081			R/L
	CNMG_GH A061	DNMG_GH A066	SNMG_GH A071	TNMG_GH A078		WNMG_GH A084		GH
	CNMG_GJ A061	DNMG_GJ  A066				WNMG_GJ A084		GJ

CLASSIFICATION

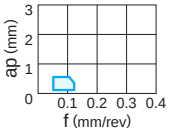
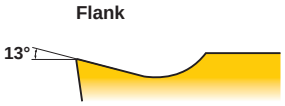
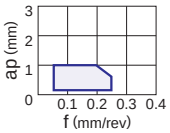
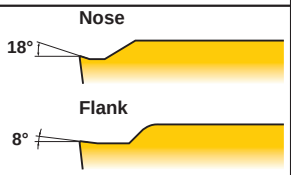
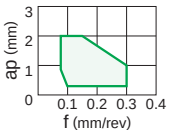
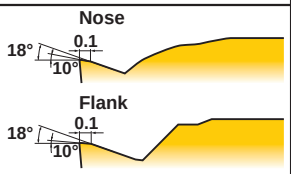
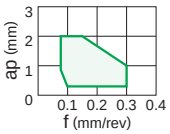
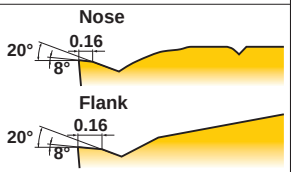
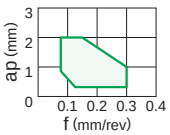
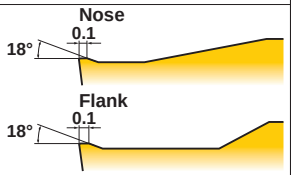
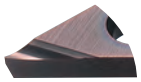
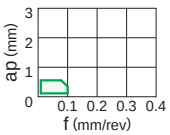
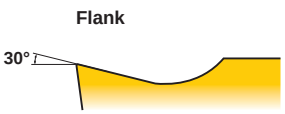
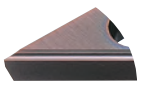
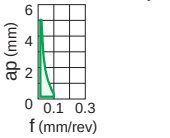
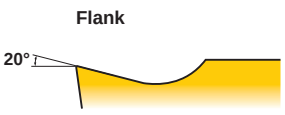
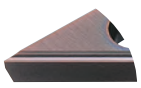
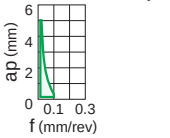
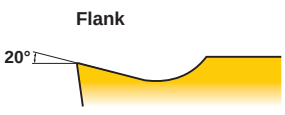
NEGATIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Heavy Cutting	M	**HZ**	**First recommendation for heavy cutting of mild steel and stainless steel** Single sided chipbreaker. Covers the lower end of the heavy cutting region. Low cutting resistance due to positive land and curved edge. Teardrop dots improve chip control without increasing cutting resistance.	
		HX	**First recommendation for heavy cutting of carbon steel and alloy steel** Single sided chipbreaker. Covers the medium range of the heavy cutting region. Owing to the straight edge and chamfer, it gives a balance of sharpness and strength. Variable land and a wavy chipbreaker for good chip control.	
		HV	**Alternative chipbreaker for heavy cutting of carbon steel and alloy steel** Single sided chipbreaker. Covers the upper end of the heavy cutting region. Wide land and large chamfer offer high edge strength. A wide chipbreaker prevents chip jamming.	
		HAS	**Alternative chipbreaker for heavy cutting of carbon steel and alloy steel** Double sided chipbreaker. Cover the lower end through to the medium range of the heavy cutting region. Due to the variable land, it gives a balance of sharpness and strength. A narrow chipbreaker for good chip control.	
		HBS	**Alternative chipbreaker for heavy cutting of mild steel and stainless steel** Single sided chipbreaker. Cover the lower end through to the medium range of the heavy cutting region. Balance of sharpness and strength owing to a narrow land and large chamfer.	
		HCS	**Alternative chipbreaker for heavy cutting of carbon steel and alloy steel** Single sided chipbreaker. Covers the upper end of the heavy cutting region. Double groove chipbreaker geometry for chip control over a wide application area. One groove near the edge is for chip control at small depths of cut, the other inside groove is for larger depths of cut.	
		HDS	**Alternative chipbreaker for heavy cutting of carbon steel and alloy steel** Single and double sided types. High edge strength at large depths of cut. A narrow chipbreaker for superior chip control.	
		HXD	**Alternative chipbreaker for heavy cutting of mild steel and stainless steel** Single sided chipbreaker. Cover the lower end through to the medium range of the heavy cutting region. Balance of sharpness and strength owing to a narrow chamfer and variable land.	
For Cast Iron	M	**Flat Top(M)** 	**First recommendation for semi-heavy cutting of cast iron** Double sided flat insert. Most effective for unstable machining due to its high edge strength.	
	G	**Flat Top(G)**	**For cast iron** Double sided flat insert. Most effective for unstable machining due to its high edge strength. Can be used on workpieces requiring close tolerances due to G class insert tolerance.	

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
	CNMM_HZ A061	DNMM_HZ A066	SNMM_HZ A071	TNMM_HZ A079				HZ
	CNMM_HX A061		SNMM_HX A072					HX
	CNMM_HV A061		SNMM_HV A072	TNMM_HV A079				HV
	CNMG_HAS A062		SNMG_HAS A072					HAS
	CNMM_HBS A062		SNMM_HBS A072					HBS
	CNMM_HCS A062		SNMM_HCS A072					HCS
	CNMG_HDS A062		SNMG_HDS SNMM_HDS A072, A073					HDS
	CNMM_HXD A062		SNMM_HXD A073					HXD
	CNMA A062	DNMA  A067	SNMA A073	TNMA  A079		WNMA  A085		Flat Top(M)
		DNGA  A067	SNGA A073	TNGA A079	VNGA A081			Flat Top(G)

CLASSIFICATION

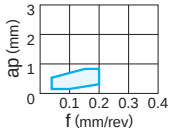
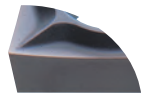
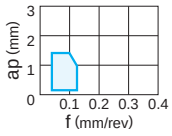
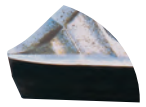
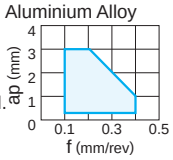
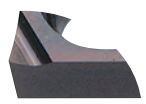
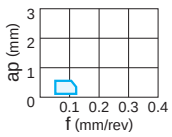
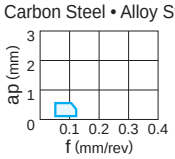
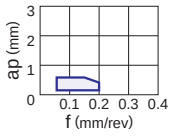
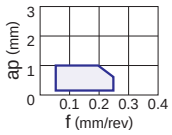
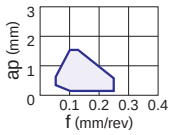
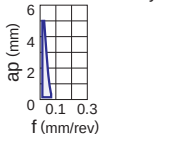
5° POSITIVE INSERTS WITH HOLE

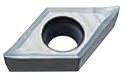
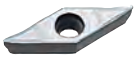
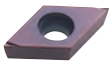
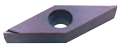
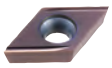
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Finish Cutting	G	**R/L-F**	**Finishing** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.	Carbon Steel • Alloy Steel  
Light Cutting	M	**SV**	**Light cutting of carbon steel, alloy steel, mild steel and stainless steel** Large rake angle provides sharp cutting action. A peninsular dot ensures chip control at depths of cut under 1mm.	Carbon Steel • Alloy Steel  
Medium Cutting	M	**MV**	**Medium cutting of carbon steel, alloy steel, mild steel and stainless steel** A positive insert with a large rake angle achieves sharp cutting edge performance. The double breakers and round-shaped dots in the rake face achieve a wide range of chip discharge.	Carbon Steel • Alloy Steel  
		R/L-MV	**Medium cutting of carbon steel, alloy steel, mild steel and stainless steel** A positive insert with a large rake angle achieves sharp cutting edge performance. The double breakers and round-shaped dots in the rake face achieve a wide range of chip discharge.	Carbon Steel • Alloy Steel  
		NEW **Standard**	**Medium cutting of carbon steel, alloy steel and stainless steel** Balance of edge strength and sharpness due to a combination of a flat land and large rake angle.	Carbon Steel • Alloy Steel  
	E	**R/L-SR** 	**Medium cutting of automatic lathe machining** A wide lead chipbreaker. Insert designed for low resistance chip control.	Carbon Steel • Alloy Steel  
		R/L-SN 	**Medium cutting of automatic lathe machining** A parallel chipbreaker. Excellent chip control for low to medium feed rates.	Carbon Steel • Alloy Steel  
		R/LW-SN 	**Medium cutting of automatic lathe machining** A parallel chipbreaker. Excellent chip control for low to medium feed rates. The wiper produces good cutting surface.	Carbon Steel • Alloy Steel  

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
					VBGT_R/L-F A108	WBGT_R/L-F A112		R/L-F
					VBMT_SV A108			SV
					VBMT_MV A108			MV
						WBMT_R/L-MV A112		R/L-MV
					VBMT A108			NEW Standard
					VBET_R/L-SR A108			R/L-SR
					VBET_R/L-SN A109			R/L-SN
					VBET_R/LW-SN A109			R/LW-SN

CLASSIFICATION

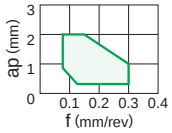
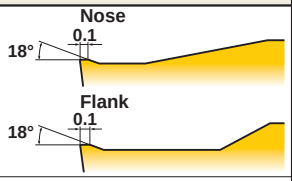
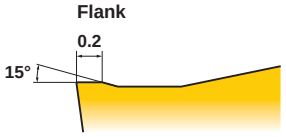
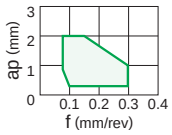
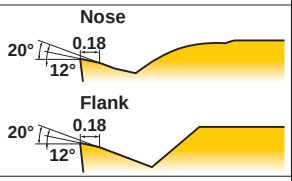
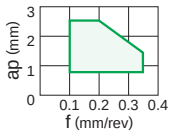
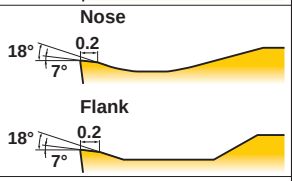
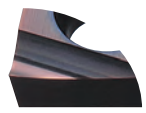
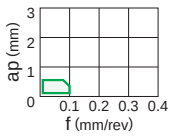
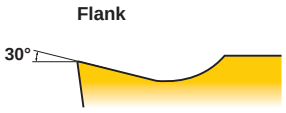
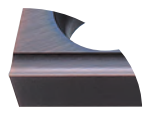
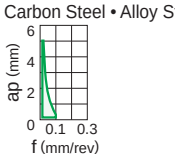
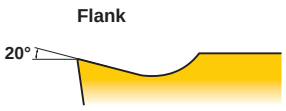
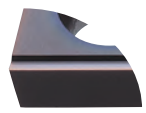
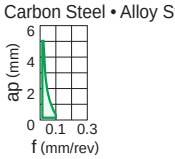
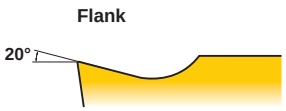
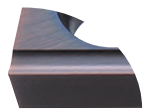
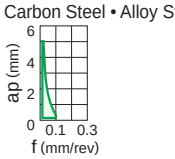
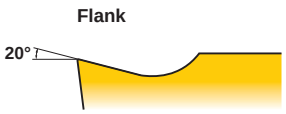
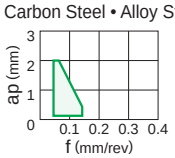
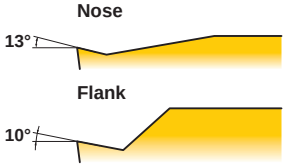
7° POSITIVE INSERTS WITH HOLE

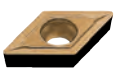
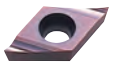
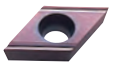
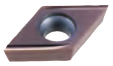
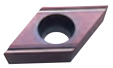
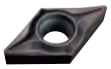
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Finish Cutting	M	FV	**First recommendation for finishing carbon steel, alloy steel, mild steel and stainless steel** Suitable for low depths of cut and low feed rates. Sharp cutting edge and low resistance design achieves excellent cutting performance.	Carbon Steel • Alloy Steel  Nose 18° Flank 8°
	G	FJ 	**First recommendation for finishing difficult-to-cut materials** Ideal for heat-resistant alloy and titanium alloy. The sharp edge produces a good surface finish. The curved edge allows smooth chip discharge.	Difficult-to-Cut Materials  Nose 14° Flank 14°
		NEW AZ 	**For aluminium alloy** The high rake angle and 3D curved cutting edge provides sharpness at the cutting point. Additionally the 3D shape of the rake face enables excellent chip control. Lapping of the top surface gives a mirror finish for improved welding resistance.	Aluminium Alloy  Flank 30°
		R/L-F 	**Finishing** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.	Carbon Steel • Alloy Steel  Flank 17°
		R/L	**Finishing** Lead chipbreaker. Excellent chip control at low feed rates.	Carbon Steel • Alloy Steel  Flank 15°
Light Cutting	M	NEW SVX	**Light cutting of carbon steel and alloy steel** Chip control is improved by having a chip breaker geometry suitable for copying.	Carbon Steel • Alloy Steel  Nose 18° Flank 8°
		SV	**Alternative chipbreaker for light cutting of carbon steel, alloy steel, mild steel and stainless steel** Large rake angle provides sharp cutting action. A peninsular dot ensures chip control at depths of cut under 1mm.	Carbon Steel • Alloy Steel  Nose 18° Flank 8°
		SW	**Wiper insert for light cutting of carbon steel, alloy steel, mild steel and stainless steel** The wiper allows up to two times higher feed. Positive land improves sharpness.	Carbon Steel • Alloy Steel  Nose 20° 0.12 12° Flank 16° 0.12 8°
	G	R/L-SS	**Light cutting of automatic lathe machining** A parallel chipbreaker. Excellent chip control at low feed rates.	Carbon Steel • Alloy Steel  Flank 14°

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Rhombic 25°	Round	Breaker Name and Cross Section
	CCMT_FV A089	DCMT_FV A094	SCMT_FV A102	TCMT_FV A104	VCMT_FV A110				FV
	CCGT_FJ A089								FJ
	CCGT_AZ A089	DCGT_AZ  A094		TCGT_AZ A104	VCGT_AZ  A110			RCGT_AZ A099	NEW AZ
	CCGT_L-F CCGH_R/L-F A089	DCGT_R/L-F  A094		TCGT_R/L-F A104	VCGT_R/L-F  A110				R/L-F
						WCGT_R/L A113			R/L
							XCMT_SVX A115		NEW SVX
	CCMH_SV A090	DCMT_SV A094			VCMT_SV A110				SV
	CCMT_SW A090								SW
	CCGT_R/L-SS A090	DCGT_R/L-SS  A094							R/L-SS

CLASSIFICATION

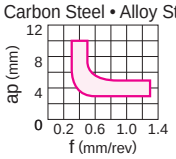
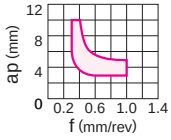
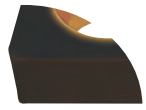
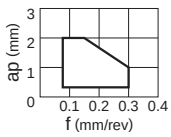
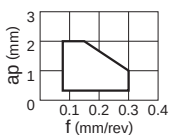
7° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Medium Cutting	M	**Standard**	**First recommendation for medium cutting of carbon steel, alloy steel, mild steel, stainless steel and cast iron** Balance of edge strength and sharpness due to a combination of a flat land and large rake angle.	Carbon Steel • Alloy Steel   
	M	**MV**	**Alternative chipbreaker for medium cutting of carbon steel, alloy steel, mild steel and stainless steel** A positive insert and the large rake angle achieve sharp cutting edge performance. The double breakers and round shape in the rake face achieve a wide range of chip discharge.	Carbon Steel • Alloy Steel  
	M	**MW**	**Wiper insert for medium cutting of carbon steel, alloy steel, mild steel and stainless steel** The wiper allows up to two times higher feed. A wide chip pocket prevents chip jamming.	Carbon Steel • Alloy Steel  
	E	**R/L-SR** 	**Medium cutting of automatic lathe machining** A wide lead chipbreaker. Insert designed for low resistance chip control.	Carbon Steel • Alloy Steel  
	E	**R/L-SN(E)** 	**Medium cutting of automatic lathe machining** A parallel chipbreaker. Excellent chip control at low to medium feed rates. Suitable for precise machining with E class tolerance.	Carbon Steel • Alloy Steel  
	G	**R/L-SN(G)** 	**Medium cutting of automatic lathe machining** A parallel chipbreaker. Excellent chip control at low to medium feed rates.	Carbon Steel • Alloy Steel  
	E	**R/LW-SN** 	**Medium cutting of automatic lathe machining** A parallel chipbreaker. Excellent chip control at low to medium feed rates. The wiper produces a good surface finish.	Carbon Steel • Alloy Steel  
	G	NEW **SMG**	**Medium cutting of automatic lathe machining** 3D moulded chipbreaker provides good chip control. G class insert gives sharp cutting action, allowing high precision machining. Breaker geometry appropriate for copying and back turning.	Carbon Steel • Alloy Steel  

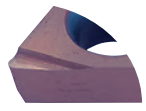
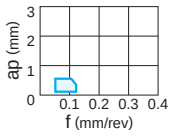
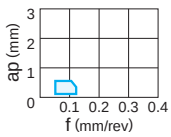
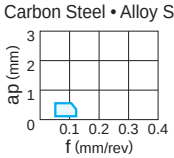
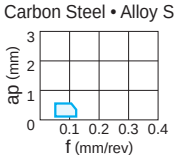
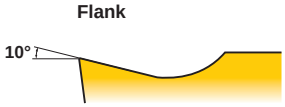
	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
	CCMT A090	DCMT  A095	SCMT A102	TCMT A104	VCMT A110	WCMT A113	RCMT A099	Standard
							RCMX A099	
	CCMH_MV A091	DCMT_MV A095			VCMT_MV A110			MV
	CCMT_MW A091							MW
	CCET_R/L-SR A091	DCET_R/L-SR  A095						R/L-SR
	CCET_R/L-SN A091	DCET_R/L-SN  A095, A096						R/L-SN(E)
	CCGT_R/L-SN A092	DCGT_R/L-SN  A096						R/L-SN(G)
	CCET_R/LW-SN A092	DCET_R/LW-SN  A096						R/LW-SN
	CCGT_SMG A092	DCGT_SMG  A096						NEW SMG

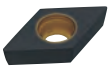
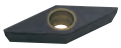
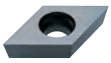
CLASSIFICATION

7° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Heavy Cutting	M	**RR**	**Heavy cutting of carbon steel and alloy steel** A wide groove chipbreaker prevents chips from jamming at large depths of cut. Small dimples improve chip control at small depths of cut.	Carbon Steel • Alloy Steel 
		RBS	**Heavy cutting of mild steel and stainless steel** A wide groove chipbreaker and a sharp angle chipbreaker wall controls chips. Large chamfer provides high edge strength.	Mild Steel 
For Cast Iron	M	**Flat Top(M)** 	**Heavy cutting of cast iron** Flat top. Most effective for unstable machining due to its high edge strength.	Cast Iron 
	G	**Flat Top(G)**	**For cast iron** Flat top. Most effective for unstable machining due to its high edge strength. Can be used on workpieces requiring close tolerances due to G class insert tolerance.	Cast Iron 

11° POSITIVE INSERTS WITH HOLE

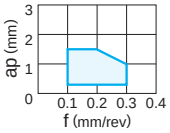
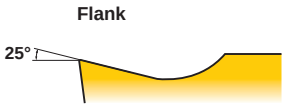
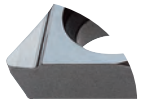
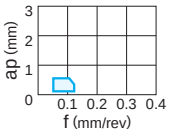
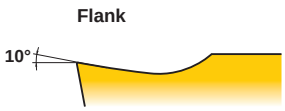
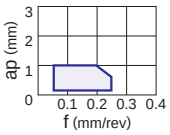
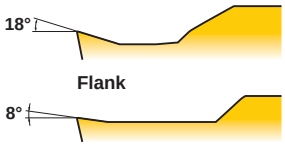
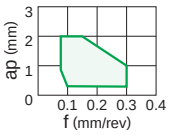
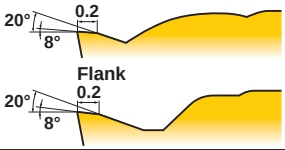
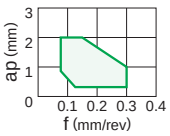
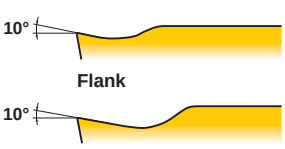
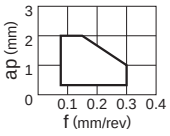
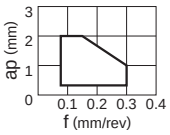
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Finish Cutting	G	**R/L-FS** 	**First recommendation for finishing carbon steel, alloy steel, stainless steel, cast iron and aluminium alloy** Small wide lead chipbreaker. Sharp cutting edge gives a good surface finish.	Carbon Steel • Alloy Steel 
	M	**R/L-F(M)**	**Finishing** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.	Carbon Steel • Alloy Steel 
	G	**R/L-F(G)**	**Finishing** Lead chipbreaker controls chip flow. Sharp cutting edge gives a good surface finish.	Carbon Steel • Alloy Steel 
		R/L	**Finishing** Lead chipbreaker controls chip flow. Good chip control for low to medium feed rates.	Carbon Steel • Alloy Steel  

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
							RCMX_RR A099	RR
							RCMX_RBS A099	RBS
	CCMW A092	DCMW  A096	SCMW A102	TCMW A104	VCMW  A110			Flat Top(M)
	CCGW A092	DCGW  A097						Flat Top(G)

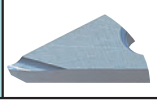
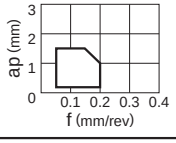
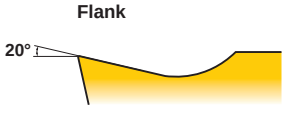
	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
				TPGH_R/L-FS A106		WPGT_R/L-FS A114		R/L-FS
	CPMH_R/L-F A093							R/L-F(M)
	CPGT_R/L-F A093							R/L-F(G)
				TPGX_R/L A106				R/L

CLASSIFICATION

11° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Finish Cutting	G	**Standard**	**Finishing** Lead chipbreaker controls chip flow. Good chip control for low to medium feed rates.	Aluminium Alloy  
	M	**L** 	**Finishing** Lead chipbreaker controls chip flow. Good chip control for low to medium feed rates.	Carbon Steel • Alloy Steel  
Light Cutting	M	**SV**	**First recommendation for light cutting of carbon steel, alloy steel, mild steel, stainless steel and cast iron** Large rake angle provides sharp cutting action. A peninsular dot ensures chip control at depths of cut under 1mm.	Carbon Steel • Alloy Steel  
Medium Cutting	M	**MV**	**First recommendation for medium cutting of carbon steel, alloy steel, mild steel, stainless steel and cast iron** A positive insert and large rake angle achieves sharp cutting edge performance. Double breakers in the rake face achieve a wide range of chip discharge.	Carbon Steel • Alloy Steel  
		Standard	**Alternative chipbreaker for medium cutting of carbon steel, alloy steel and stainless steel** Standard, general purpose chipbreaker.	Carbon Steel • Alloy Steel  
For Cast Iron	M	**Flat Top(M)**	**Heavy cutting of cast iron** Flat top. Most effective for unstable machining due to its high edge strength.	Cast Iron 
	G	**Flat Top(G)**	**For cast iron** Flat top. Most effective for unstable machining due to its high edge strength. Can be used on workpieces requiring close tolerances due to G class insert tolerance.	Cast Iron 

15° POSITIVE INSERTS WITH HOLE

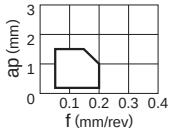
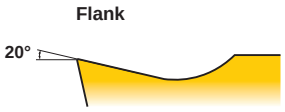
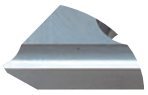
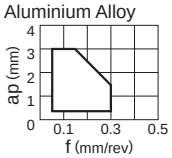
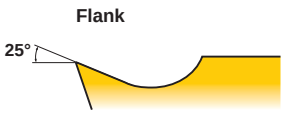
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
For Aluminium Alloy	G	**R/L** 	**For aluminium alloy cutting** Lead chipbreaker. Sharp cutting edge gives a good surface finish.	Aluminium Alloy  

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
	CPGT A093					WPGT A114		Standard
				TPMX_L A107				L
	CPMH_SV A093			TPMH_SV A107				SV
	CPMH_MV A093			TPMH_MV A107		WPMT_MV A114		MV
	CPMX A093		SPMT A103	TPMX A107				Standard
			SPMW A103					Flat Top(M)
			SPGX A103	TPGX A107				Flat Top(G)

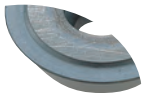
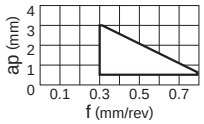
	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
					VDGX_R/L A111			R/L

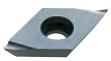
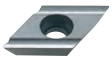
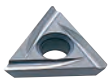
CLASSIFICATION

20° POSITIVE INSERTS WITH HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
For Aluminium Alloy	G	**R/L-F**	**For aluminium alloy cutting** Lead chipbreaker. Sharp cutting edge gives a good surface finish.	Aluminium Alloy  
		R/L 	**For aluminium alloy cutting** A parallel chipbreaker. Sharp cutting edge gives a good surface finish. Good chip control for medium feed rates.	Aluminium Alloy  

30° POSITIVE INSERTS WITH HOLE

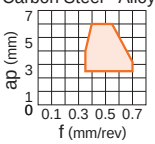
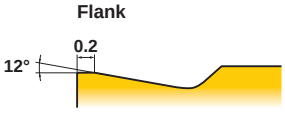
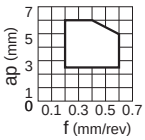
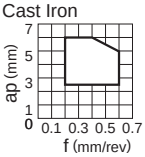
Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
General Cutting	G	**Standard** 	**For difficult-to-cut materials** Ideal for heat-resistant alloy and titanium alloy.	Difficult-to-Cut Materials 

	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
		DEGX_R/L-F  A098						**R/L-F**
		DEGX_R/L  A098		**TEGX_R/L**  A105				**R/L**

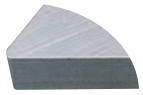
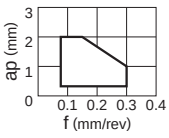
	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°	Round	Breaker Name and Cross Section
							RGGM A100	**Standard**

CLASSIFICATION

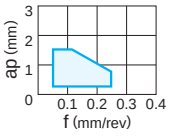
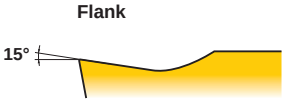
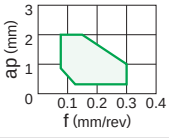
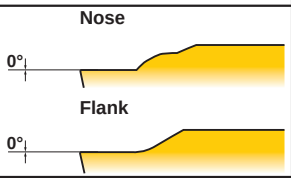
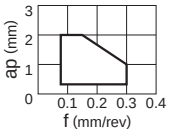
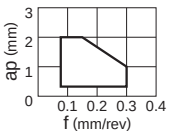
NEGATIVE INSERTS WITHOUT HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Semi-heavy Cutting	M	**R/L**	**Semi-heavy cutting of carbon steel and alloy steel** Single sided chipbreaker. Can be used for copying. A parallel chipbreaker for good chip discharge.	Carbon Steel • Alloy Steel  
For Cast Iron	M	**Flat Top(M)**	**Heavy cutting of cast iron** Double sided flat insert. Most effective for unstable machining due to high edge strength and stable insert clamping.	Cast Iron 
For Cast Iron	G	**Flat Top(G)**	**For cast iron** Double sided flat insert. Most effective for unstable machining due to high edge strength and stable insert clamping. Can be used on workpieces requiring close tolerances due to G class insert tolerance.	Cast Iron 

7° POSITIVE INSERTS WITHOUT HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
For Cast Iron	G	**Flat Top** 	**For cast iron** Double sided flat insert. Most effective for unstable machining due to high edge strength and stable insert clamping. Can be used on workpieces requiring close tolerances due to G class insert tolerance.	Cast Iron 

11° POSITIVE INSERTS WITHOUT HOLE

Application	Tolerance	Breaker Name and Picture	Features	Cross Section Geometry
Finish Cutting	G	**R/L**	**Finishing** A parallel chipbreaker. Good chip control for low to medium feed rates.	Carbon Steel • Alloy Steel  
Light to Medium Cutting	M	**Standard**	**Light to medium cutting of carbon steel, alloy steel and stainless steel** Standard, general purpose chipbreaker.	Carbon Steel • Alloy Steel  
For Cast Iron	M	**Flat Top(M)**	**Heavy cutting of cast iron** Flat top. Most effective for unstable machining due to high edge strength and stable insert clamping.	Cast Iron 
For Cast Iron	G	**Flat Top(G)**	**For cast iron** Flat top. Most effective for unstable machining due to high edge strength and stable insert clamping. Can be used on workpieces requiring close tolerances due to G class insert tolerance.	Cast Iron 

SPECIAL PURPOSE INSERTS

Application	Tolerance	Tool Holder Type	Inserts
Special	G	ROTARY Holder	RNGJ, RDGH A068, A100
		TL Type	RTG A116
		CF Type	CFT A387

	Square 90°	Triangular 60°	Parallelogram 55°	Breaker Name and Cross Section
			KNMX_R/L A086	R/L
	SNMN A087	TNMN A088		Flat Top(M)
	SNGN A087	TNGN A088		Flat Top(G)

	Square 90°	Triangular 60°		Breaker Name and Cross Section
		TCGN A119		Flat Top

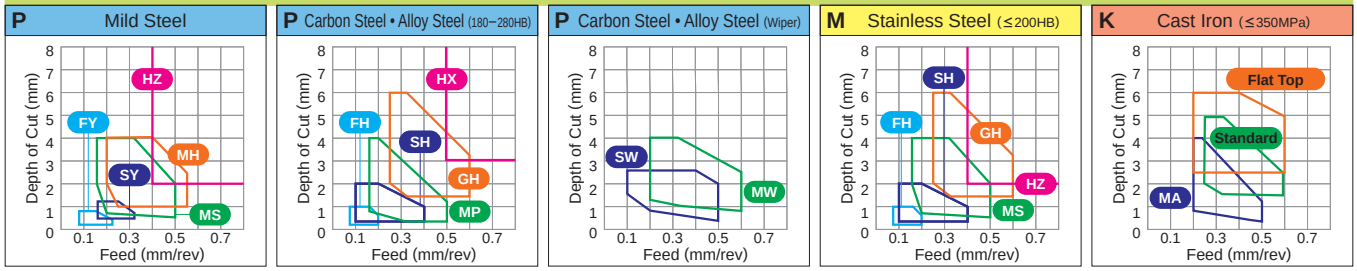
	Square 90°	Triangular 60°		Breaker Name and Cross Section
	SPGR_R/L A117	TPGR_R/L A120		R/L
	SPMR A117	TPMR A120		Standard
	SPMN A117	TPMN A120		Flat Top(M)
	SPGN A118	TPGN A121		Flat Top(G)

80° CN TYPE INSERTS WITH HOLE

CNMG 12 04 02 - FH
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Coated														Cermet		Coated Cermet	Carbide						Applicable Holder Page
		Corner R Re (mm)	UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
P	Steel		●	●	◕	✣	✣	✣	◕										●	◕	●	●	●	✣						
M	Stainless Steel									●	◕					✣	✣		○					✣						
K	Cast Iron												●	●					●			●	●	✣	●	●				
N	Non-ferrous Metal																									◕	●			
S	Heat-resistant Alloy, Titanium Alloy											●			●	◕	✣										●	◕	✣	
Shape	**Chip Control Range ap : Depth of Cut f : Feed**	**Order Number**																												
FH	Carbon Steel • Alloy Steel	**CNMG120402-FH**	0.2		●	●				●									●	●										A196 A197 A277 A300 A306 A432 −434
		120404-FH	0.4		●	●			▲	●									●	●		●								
		120408-FH	0.8		●	●			▲	●									●	●		●								
		120412-FH	1.2																●			□								
Finish Cutting																														
FS	Mild Steel	**CNMG120404-FS**	0.4			●													●											A196 A197 A277 A300 A306 A432 −434
		120408-FS	0.8			●													●											
Finish Cutting																														
FY	Mild Steel	**CNMG120404-FY**	0.4			●														●			●							A196 A197 A277 A300 A306 A432 −434
		120408-FY	0.8			●														●			●							
Finish Cutting																														
FJ	Difficult-to-Cut Materials	**CNGG1204V5-FJ**	0.05													□													□	A196 A197 A277 A300 A306 A432 −434
		120401-FJ	0.1													□													□	
		120402-FJ	0.2													□													□	
		120404-FJ	0.4													●	●									□			●	●
		120408-FJ	0.8													●	●									□			●	●
Finish Cutting																														
PK	Carbon Steel • Alloy Steel	**CNGG120404-PK**	0.4																●	▲										A196 A197 A277 A300 A306 A432 −434
		120408-PK	0.8																●	▲										
Finish Cutting																														
SH	Carbon Steel • Alloy Steel	**CNMG090304-SH**	0.4						▲	□																				A196 A197 A277 A300 A306 A432 −434
		090308-SH	0.8						▲	□																				
		090312-SH	1.2						▲																					
		09T304-SH	0.4		●				▲	●																				
		09T308-SH	0.8		●				▲	●																				
		09T312-SH	1.2						▲																					
		120404-SH	0.4	○	●	●	●		▲	●			□						●	●		●								
		120408-SH	0.8	○	●	●	●		▲	●			□						●	●		●								
Light Cutting		**120412-SH**	1.2	○	●	●	●		▲				□						●	●		●								

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✲ : Unstable Cutting

Work Material		Corner R	Coated														Cermet		Coated Cermet		Carbide					Applicable Holder Page
P Steel	Shape / Chip Control Range ap : Depth of Cut f : Feed	Order Number	Re (mm)	UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
M Stainless Steel																														
K Cast Iron																														
N Non-ferrous Metal																														
S Heat-resistant Alloy, Titanium Alloy																														
SA	Carbon Steel • Alloy Steel Light Cutting	**CNMG120404-SA**	0.4	○		●	●			▲											●										A196 A197 A277 A300 A306 A432 −434
		120408-SA	0.8	○		●	●			▲											●										
		120412-SA	1.2	○		●	●			▲											●										
		160608-SA	0.8				□																								
		160612-SA	1.2			●	□			▲																					
* **SW**	Carbon Steel • Alloy Steel Light Cutting (Wiper)	**CNMG120404-SW**	0.4	○	●	●					●			●						●	●										A196 A197 A277 A300 A306 A432 −434
		120408-SW	0.8	○	●	●					●			●						●	●										
		120412-SW	1.2	○		●					●									●	●										
SY	Mild Steel Light Cutting	**CNMG120404-SY**	0.4			●															●		●								A196 A197 A277 A300 A306 A432 −434
		120408-SY	0.8			●															●		●								
C	Carbon Steel • Alloy Steel Light Cutting	**CNMG120404-C**	0.4																	▲	▲										A196 A197 A277 A300 A306 A432 −434
		120408-C	0.8																	▲	▲										
MJ	Difficult-to-Cut Materials Light Cutting	**CNMG120404-MJ**	0.4										●			●	●										□	□			A196 A197 A277 A300 A306 A432 −434
		120408-MJ	0.8										●			●	●										□	□			
		120412-MJ	1.2										●			●	●														
		120416-MJ	1.6										●			●	●														
MJ	Difficult-to-Cut Materials Light Cutting	**CNGG120404-MJ**	0.4									□					●	●									□		●	●	A196 A197 A277 A300 A306 A432 −434
		120408-MJ	0.8									□					●	●									□		●	●	
MP	Carbon Steel • Alloy Steel Medium Cutting	**CNMG120404-MP**	0.4	○		○	○								○																A196 A197 A277 A300 A306 A432 −434
		120408-MP	0.8	○		●	●								●																
		120412-MP	1.2	○		●	●								●																
		120416-MP	1.6	○		○	○								○																
		160608-MP	0.8	○		○	○								○																
		160612-MP	1.2	○		●	●								●																
		160616-MP	1.6	○		●	●								●																
MA	Carbon Steel • Alloy Steel Medium Cutting	**CNMG120404-MA**	0.4	○	●	●	●	●		▲	●	●		●	●			○			●										A196 A197 A277 A300 A306 A432 −434
		120408-MA	0.8	○	●	●	●	●		▲	●	●		●	●			○			●										
		120412-MA	1.2	○	●	●	●	●		▲	●	●		●	●			○			●										
		120416-MA	1.6	○	●	●	□	●		▲	□	●		●	●																
		160608-MA	0.8	○	●	●	●	●		▲	□	●			□																
		160612-MA	1.2	○	●	●	●	●		▲	□	●		●	●																
		160616-MA	1.6	○	●	●		●		▲	□	●		●	●																
		190612-MA	1.2	○	●	●	●	●		▲	□	●		●	●																
		190616-MA	1.6			●	●	●		▲	□	●		●	●																

* Please refer to A024 before using the SW breaker (wiper insert).

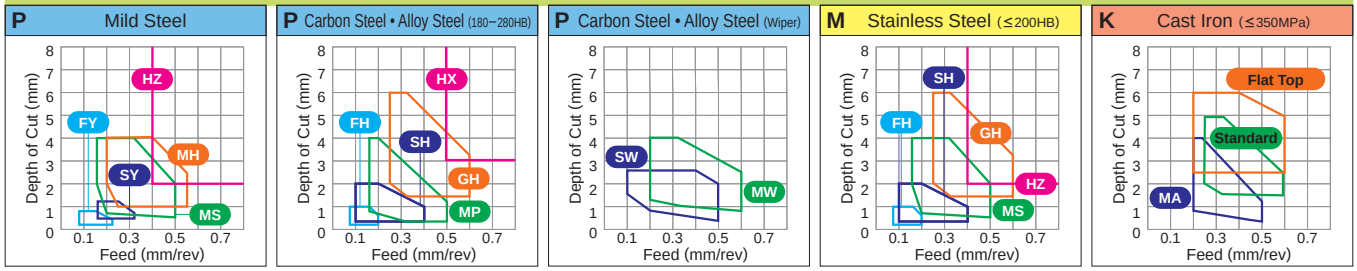
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

80° CN TYPE INSERTS WITH HOLE

CNMG 12 04 04 - MV
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
MV	Carbon Steel • Alloy Steel	**CNMG120404-MV**	0.4	○	●	●	●								□						●										A196
		120408-MV	0.8	○	●	●	●								□						●										A197
		120412-MV	1.2	○	●	●	●								□						●										A277
		120416-MV	1.6	○	●	●	●								□																A300 A306 A432 −434
Medium Cutting																															
MH	Carbon Steel • Alloy Steel	**CNMG120404-MH**	0.4	○	●	●	●	●		▲	●				●																A196 A197 A277 A300 A306 A432 −434
		120408-MH	0.8	○	●	●	●	●		▲	●				●																
		120412-MH	1.2	○	●	●	●	●		▲	●				●																
		120416-MH	1.6	○		●	□				●				●																
		160608-MH	0.8	○		●									●																
		160612-MH	1.2	○	●	●	●	●		▲	●				●																
		160616-MH	1.6	○		●									●																
		190612-MH	1.2	○	●	●	●	●		▲	●				●																
Medium Cutting		**190616-MH**	1.6	○		●	□								●																
Standard	Carbon Steel • Alloy Steel	**CNMG090304**	0.4							▲																					A196 A197 A277 A300 A306 A432 −434
		090308	0.8			●				▲																					
		09T304	0.4			●				▲										●											
		09T308	0.8			●				▲										●											
		120404	0.4	○	●	●	●	□		▲				●	●					●	●				●		●				
		120408	0.8	○	●	●	●	●		▲				●	●			○		●	●				●		●				
		120412	1.2	○	●	●	●	●		▲				●	●			○		●	●				●		□				
		120416	1.6	○	●	●		□		▲				●	●																
		160608	0.8	○	●	●	●	□		▲																					
		160612	1.2	○	●	●	●	●		▲				●	●										●						
		160616	1.6	○	●	●	●	●		▲				●	●																
		190608	0.8	○	●	□	●	●		▲																					
		190612	1.2	○	●	●	●	●		▲				●	●										●						
		190616	1.6	○	●	●	●	●		▲				●	●																
Medium Cutting		**190624**	2.4				□																								
★ **MW**	Carbon Steel • Alloy Steel	**CNMG120408-MW**	0.8	○	●	●	□			▲	●			●	●																A196 A197 A277 A300 A306 A432 −434
		120412-MW	1.2	○	●	●	□			▲	●			●	●																
Medium Cutting (Wiper)																															

★ Please refer to A024 before using the MW breaker (wiper insert).

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material			Coated														Cermet			Coated Cermet		Carbide						
			UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15
	P	Steel	●	●	◐	✣	✣	✣	◐										●	◐	●	●	●	✣					
	M	Stainless Steel								○	◐						✣	✣	○					✣					
	K	Cast Iron											●	◐					●			●	●	✣	●	◐			
	N	Non-ferrous Metal																								◐	●		
	S	Heat-resistant Alloy, Titanium Alloy										●			●	◐	✣										●	◐	✣

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Applicable Holder Page
MS	Stainless Steel	**CNMG090304-MS**	0.4	A196 A197 A277 A300 A306 A432 −434
		090308-MS	0.8	
		09T304-MS	0.4	
		09T308-MS	0.8	
		120404-MS	0.4	
		120408-MS	0.8	
		120412-MS	1.2	
		120416-MS	1.6	
		160604-MS	0.4	
		160608-MS	0.8	
		160612-MS	1.2	
		190612-MS	1.2	
		190616-MS	1.6	
Medium Cutting				
GH	Carbon Steel • Alloy Steel	**CNMG120408-GH**	0.8	A196 A197 A277 A300 A306 A432 −434
		120412-GH	1.2	
		120416-GH	1.6	
		160612-GH	1.2	
		160616-GH	1.6	
		190612-GH	1.2	
		190616-GH	1.6	
Semi-Heavy Cutting				
GJ	Difficult-to-Cut Materials	**CNMG120408-GJ**	0.8	A196 A197 A277 A300 A306 A432 −434
		120412-GJ	1.2	
		120416-GJ	1.6	
		160612-GJ	1.2	
		190612-GJ	1.2	
		190616-GJ	1.6	
Semi-Heavy Cutting				
HZ	Carbon Steel • Alloy Steel	**CNMM120408-HZ**	0.8	A196 A197 A277 A300 A306 A432 −434
		120412-HZ	1.2	
		160612-HZ	1.2	
		160616-HZ	1.6	
		190612-HZ	1.2	
		190616-HZ	1.6	
		190624-HZ	2.4	
Heavy Cutting				
HX	Carbon Steel • Alloy Steel	**CNMM160612-HX**	1.2	A196 A197
		160616-HX	1.6	
		190612-HX	1.2	
		190616-HX	1.6	
		190624-HX	2.4	
		250724-HX	2.4	
		250732-HX	3.2	
		250924-HX	2.4	
		250932-HX	3.2	
Heavy Cutting				
HV	Carbon Steel • Alloy Steel	**CNMM190616-HV**	1.6	A198 A277 A300 A302 A305
		190624-HV	2.4	
		250724-HV	2.4	
		250924-HV	2.4	
Heavy Cutting				

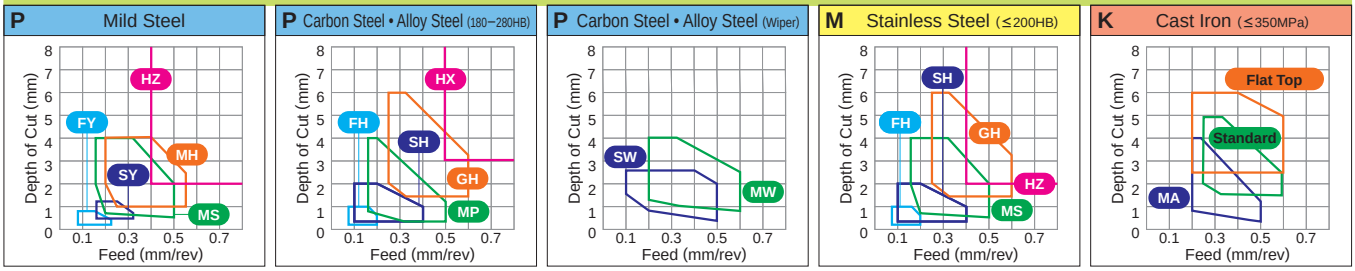
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

80° CN TYPE INSERTS WITH HOLE

CNMG 25 09 24 - HAS
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

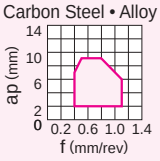
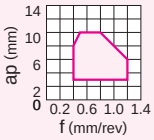
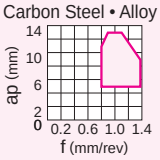
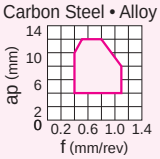
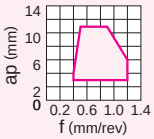
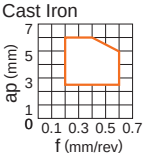
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
HAS Heavy Cutting  Carbon Steel • Alloy Steel	**CNMG250924-HAS**	2.4				□		□																						–
HBS Heavy Cutting  Mild Steel	**CNMM250924-HBS**	2.4				□		●																						–
HCS Heavy Cutting  Carbon Steel • Alloy Steel	**CNMM190616-HCS**	1.6				□		●																						A196 A197
	190624-HCS	2.4				□		●																						
	250924-HCS	2.4				□		●																						
HDS Heavy Cutting  Carbon Steel • Alloy Steel	**CNMG250924-HDS**	2.4				□		□																						–
HXD Heavy Cutting  Mild Steel	**CNMM190612-HXD**	1.2				□		●																						A196 A197
	190616-HXD	1.6				□		●																						
	190624-HXD	2.4				□		●																						
	250924-HXD	2.4				□		●																						
Flat Top  Cast Iron	**CNMA120404**	0.4	●										●	●												●	●			A196 A197 A277 A300 A306 A432 –434
	120408	0.8	●										●	●										●	●	●				
	120412	1.2	●										●	●										□	●	●				
	120416	1.6	●										●	●																
	160612	1.2	●										●	●																
	160616	1.6	●										●	●																
	190612	1.2	●										●	●												●				
	190616	1.6	●										●	●																

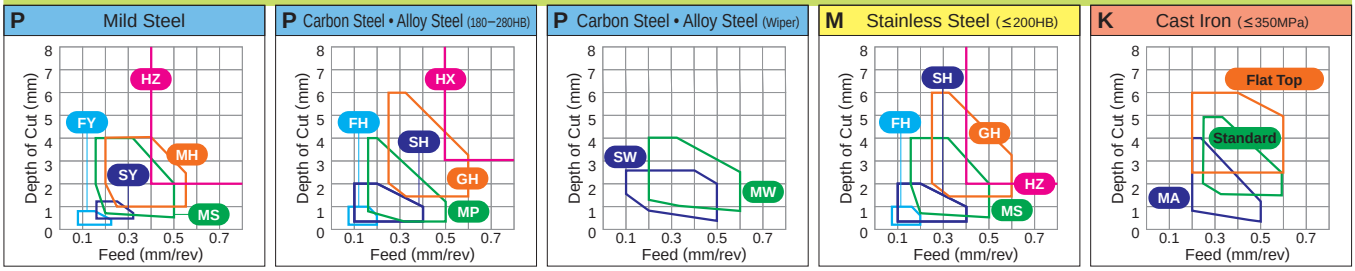
● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

55° DN TYPE INSERTS WITH HOLE

DNMG 15 04 02 - FH
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

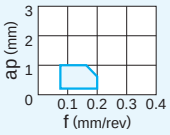
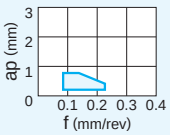
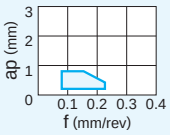
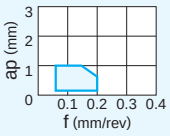
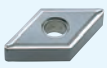
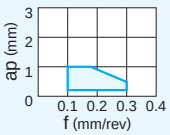
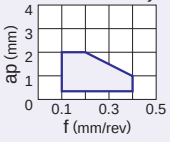
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
FH	Carbon Steel • Alloy Steel  Finish Cutting	**DNMG150402-FH**	0.2			●	●				●									●	●										A198 A199 A277 A300 —302 A305 A306 A435 A437
		150404-FH	0.4			●	●			▲	●									●	●		●								
		150408-FH	0.8			●	●			▲	●									●	●		●								
		150602-FH	0.2			●	●				●									●	●										
		150604-FH	0.4			●	●				●									●	●										
		150608-FH	0.8			●	●				●									●	●										
FS	Mild Steel  Finish Cutting	**DNMG150404-FS**	0.4			●														●											A198 A199 A277 A300 —302 A305 A306 A435 A437
		150408-FS	0.8			●														●											
FY	Mild Steel  Finish Cutting	**DNMG150404-FY**	0.4			●															●			●							A198 A199 A277 A300 —302 A305 A306 A435 A437
		150408-FY	0.8			●															●			●							
		150604-FY	0.4			●															●			●							
		150608-FY	0.8			●															●			●							
FJ	Difficult-to-Cut Materials  Finish Cutting	**DNGG150404-FJ**	0.4														●	●									□		●	●	A198 A199 A277 A300 —302 A305 A306 A435 A437
		150408-FJ	0.8														●	●									□		●	●	
PK 	Carbon Steel • Alloy Steel  Finish Cutting	**DNGG150404-PK**	0.4																	●	▲										A198 A199 A277 A300 —302 A305 A306 A435 A437
		150408-PK	0.8																	●	▲										
SH	Carbon Steel • Alloy Steel  Light Cutting	**DNMG110404-SH**	0.4	○		●			▲		●																				A198 A199 A277 A300 —302 A305 A306 A435 A437
		110408-SH	0.8	○		●			▲		●																				
		150404-SH	0.4	○		●	●		▲		●			□						●	●		●								
		150408-SH	0.8	○		●	●		▲		●			□						●	●		●								
		150412-SH	1.2	○		●	●		▲		●			□						●	●		●								
		150604-SH	0.4	○		●								□							●										
		150608-SH	0.8	○		●								□							●										
		150612-SH	1.2	○		●								□							●										

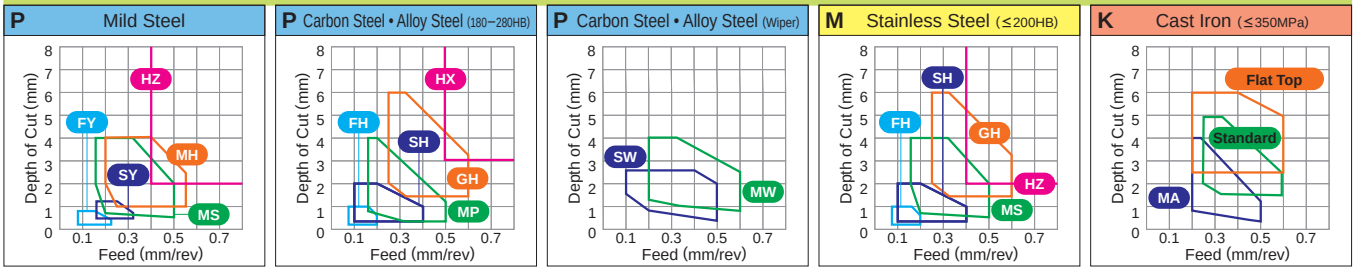
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

55° DN TYPE INSERTS WITH HOLE

DNMG 15 04 04 - SA
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	● ● ◕ ✣ ✣ ✣ ◕
M	Stainless Steel	○ ◕ ● ● ✣ ✣ ○ ✣
K	Cast Iron	● ● ✣ ● ● ◕
N	Non-ferrous Metal	◕ ●
S	Heat-resistant Alloy, Titanium Alloy	● ◕ ✣

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	Carbide UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
SA	Carbon Steel • Alloy Steel	DNMG150404-SA	0.4	○		●	●			▲										●											A198 A199 A277 A300 −302 A305 A306 A435 A437
		150408-SA	0.8	○		●	●			▲										●											
		150412-SA	1.2	○		●	●			▲										●											
		150604-SA	0.4	○		●	●													●											
		150608-SA	0.8	○		●	●													●											
		150612-SA	1.2	○		●	●													●											
Light Cutting																															
★ **SW**	Carbon Steel • Alloy Steel	DNMX150404-SW	0.4	○	●	●					●									●	●										A198 A277 A300 A302 A305
		150408-SW	0.8	○	●	●					●									●	●										
		150412-SW	1.2	○		●					●									●	●										
		150604-SW	0.4	○	●	●					●									●	●										
		150608-SW	0.8	○	●	●					●									●	●										
		150612-SW	1.2	○		●					●									●	●										
Light Cutting (Wiper)																															
SY	Mild Steel	DNMG150404-SY	0.4				●													●			●								A198 A199 A277 A300 −302 A305 A306 A435 A437
		150408-SY	0.8				●													●			●								
		150604-SY	0.4				●													●			●								
		150608-SY	0.8				●													●			●								
Light Cutting																															
C	Carbon Steel • Alloy Steel	DNMG150404-C	0.4																	▲	▲										A198 A199 A277 A300 −302 A305 A306 A435 A437
		150408-C	0.8																	▲	▲										
		150604-C	0.4																	▲	▲										
		150608-C	0.8																	▲	▲										
Light Cutting																															
MJ	Difficult-to-Cut Materials	DNMG150404-MJ	0.4										●			●	●												□	□	A198 A199 A277 A300 −302 A305 A306 A435 A437
		150408-MJ	0.8										●			●	●												□	□	
		150412-MJ	1.2										●			●	●														
		150416-MJ	1.6										●			●	●														
		150604-MJ	0.4										●			●	●														
		150608-MJ	0.8										●			●	●														
		150612-MJ	1.2										●			●	●														
		150616-MJ	1.6										●			●	●														
Light Cutting																															
MJ	Difficult-to-Cut Materials	DNGM150404-MJ	0.4								□						●	●									□		●	●	A198 A199 A277 A300 −302 A305 A306 A435 A437
		150408-MJ	0.8								□						●	●									□		●	●	
Light Cutting																															

★ Please refer to A024 before using the SW breaker (wiper insert).

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	● ● ◐ ✣ ✣ ✣ ◐ ○ ◐ ● ◐ ✣ ✣ ● ◐ ○ ● ● ✣ ● ◐ ● ◐
M	Stainless Steel	✣
K	Cast Iron	● ◐ ● ● ✣ ● ◐
N	Non-ferrous Metal	◐ ●
S	Heat-resistant Alloy, Titanium Alloy	● ◐ ✣ ● ◐ ✣

Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
MP	DNMG150404-MP	0.4	○		○	○							○																	A198 A199 A277 A300 −302 A305 A306 A435 A437
Carbon Steel • Alloy Steel	150408-MP	0.8	○		●	●							●																	
	150412-MP	1.2	○		●	●							●																	
	150416-MP	1.6	○		○	○							○																	
	150604-MP	0.4	○		○	○							○																	
	150608-MP	0.8	○		●	●							●																	
	150612-MP	1.2	○		●	●							●																	
Medium Cutting	150616-MP	1.6	○		○	○							○																	
MA	DNMG110404-MA	0.4	○		●																									A198 A199 A277 A300 −302 A305 A306 A435 A437
Carbon Steel • Alloy Steel	110408-MA	0.8	○		●																									
	110412-MA	1.2	○		●																									
	150404-MA	0.4	○	●	●	●	●		▲	●	●		●	●		○				●										
	150408-MA	0.8	○	●	●	●	●		▲	●	●		●	●		○				●										
	150412-MA	1.2	○	●	●	●	●		▲	□	●		●	●						●										
	150416-MA	1.6			●																									
	150604-MA	0.4	○	●	●	●	□		▲	□	●					○				●										
	150608-MA	0.8	○	●	●	●	●		▲	□	●		●	●		○				●										
	150612-MA	1.2	○	●	●	●	□		▲	□	●		●	●						●										
Medium Cutting	150616-MA	1.6			●																									
MV	DNMG150404-MV	0.4	○	●	●	●							□							●										A198 A199 A277 A300 −302 A305 A306 A435 A437
Carbon Steel • Alloy Steel	150408-MV	0.8	○	●	●	●							□							●										
	150412-MV	1.2	○	●	●	●							□							●										
	150416-MV	1.6		●	●	●							□																	
	150604-MV	0.4	○	●	●	●							□							●										
	150608-MV	0.8	○	●	●	●							□							●										
	150612-MV	1.2	○	●	●	●							□							●										
Medium Cutting	150616-MV	1.6		●	●	●							□																	
MH	DNMG150404-MH	0.4	○	●	●	●	●		▲	●			●																	A198 A199 A277 A300 −302 A305 A306 A435 A437
Carbon Steel • Alloy Steel	150408-MH	0.8	○	●	●	●	●		▲	●			●																	
	150412-MH	1.2	○	●	●	●	●		▲	●			●																	
	150604-MH	0.4	○		●	●				●			●																	
	150608-MH	0.8	○		●	●				●			●																	
Medium Cutting	150612-MH	1.2	○		●	●				●			●																	
Standard	DNMG110408	0.8			●				▲																					A198 A199 A277 A300 −302 A305 A306 A435 A437
Carbon Steel • Alloy Steel	150404	0.4	○	●	●	●			▲				●	●					●	●				●		●				
	150408	0.8	○	●	●	●	●		▲				●	●		○			●	●				●		●				
	150412	1.2	○	●	●	●	●		▲				●	●		○			●	●										
	150416	1.6			●				▲																					
	150604	0.4	○	●	●	□			▲				□	□					●	●										
	150608	0.8	○	●	●	●			▲				●	●		○			●	●						□				
	150612	1.2	○	●	●	●			▲				●	●		○				●										
Medium Cutting	150616	1.6			●				▲																					
* **MW**	DNMX150408-MW	0.8	○	●	●	□				□			□	□																A198 A277 A300 A302 A305
Carbon Steel • Alloy Steel	150412-MW	1.2	○	●	●	□				□			□	□																
	150608-MW	0.8	○	●	●	□				□			□	□																
	150612-MW	1.2	○	●	●	□				□			□	□																
Medium Cutting (Wiper)																														

* Please refer to A024 before using the MW breaker (wiper insert).

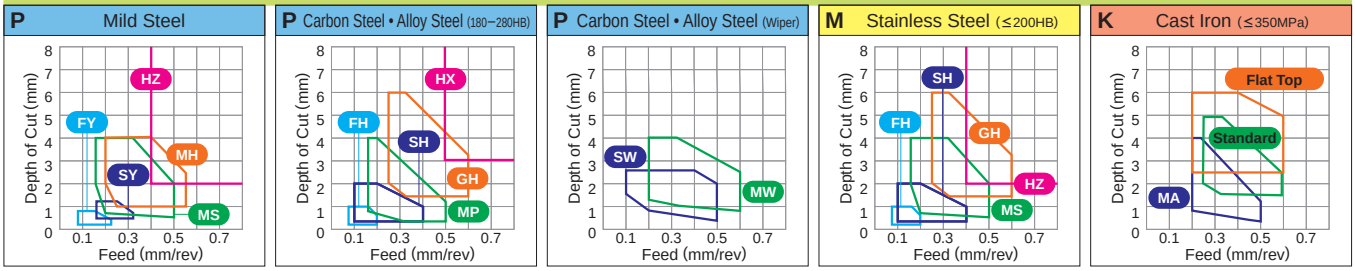
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

55° DN TYPE INSERTS WITH HOLE

DNMG 11 04 08-MS
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

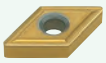
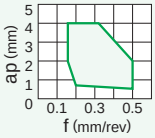
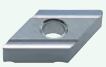
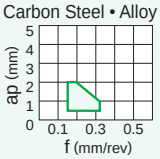
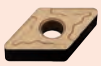
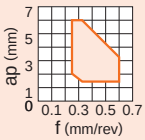
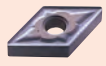
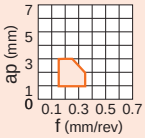
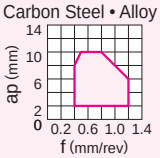
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



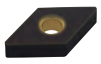
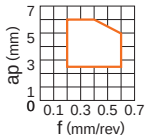
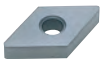
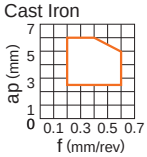
Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	●●◐✣✣✣◐ ○◐ ●◐ ✣✣ ●◐✣ ○ ●● ✣ ●● ✣●◐ ●◐ ●● ✣ ●◐ ●◐✣
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
MS	DNMG110408-MS	0.8			●			▲		□	●				●	●				●				●						A198
Stainless Steel	150404-MS	0.4			●●			▲		●●	●				●●	●●				●				●			□	●●		A199
	150408-MS	0.8			●●			▲		●●	●				●●	●●				●				●			□	●●		A277
	150412-MS	1.2			●					□	●●				●●	●				●							□	●●		A300
ap (mm) 5 4 3 2 1 0	150604-MS	0.4			●			▲		□	●●				●●			□		●				□						A305
0.1 0.3 0.5	150608-MS	0.8			●			▲		□	●●				●●			●		●				□						A306
f (mm/rev)	150612-MS	1.2			●						●				●●					●										A435
Medium Cutting																														A437
R/L	DNGG150404R	0.4																	●●	▲				●		●				A198
Carbon Steel • Alloy Steel	150404L	0.4																	●●	▲				●		●				A199
	150408R	0.8																	●●	▲				●		●				A277
	150408L	0.8																	●●	▲				●		●				A300
ap (mm) 5 4 3 2 1 0	150604R	0.4																	●					□						A305
0.1 0.3 0.5	150604L	0.4																	●											A306
f (mm/rev)	150608R	0.8																	●											A435
Medium Cutting	150608L	0.8																	●											A437
GH	DNMG150408-GH	0.8	○	●	●●			▲		●●	●		●●																	A198
Carbon Steel • Alloy Steel	150412-GH	1.2	○	●	●●			▲		●●	●		●●																	A199
	150608-GH	0.8	○	●	●●			▲		●●	●		●●																	A277
	150612-GH	1.2	○	●	●●			▲		●●	●		●●																	A300
ap (mm) 7 5 3 1 0																														—302
0.1 0.3 0.5 0.7																														A305
f (mm/rev)																														A306
Semi-Heavy Cutting																														A435
																														A437
GJ	DNMG150408-GJ	0.8										●				●●												●●		A198
Difficult-to-Cut Materials	150412-GJ	1.2										●				●●												●●		A199
	150416-GJ	1.6										●				●●												●●		A277
	150608-GJ	0.8										●				●														A300
ap (mm) 7 5 3 1 0	150612-GJ	1.2										●				●														—302
0.1 0.3 0.5 0.7	150616-GJ	1.6										●				●														A305
f (mm/rev)																														A306
Semi-Heavy Cutting																														A435
																														A437
HZ	DNMM150408-HZ	0.8			●●					□□																				A198
Carbon Steel • Alloy Steel	150412-HZ	1.2			●●					□□																				A199
	150416-HZ	1.6			●●					□□																				A277
	150608-HZ	0.8			●●					□□																				A300
ap (mm) 14 10 6 2 0	150612-HZ	1.2			●●					□□																				—302
0.2 0.6 1.0 1.4	150616-HZ	1.6			●●					□□																				A305
f (mm/rev)																														A306
Heavy Cutting																														A435
																														A437

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated														Cermet			Coated Cermet		Carbide						Applicable Holder Page
Shape Chip Control Range ap : Depth of Cut f : Feed		Order Number	Re (mm)	UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
Flat Top  Cast Iron 	P	DNMA150404	0.4											●	●												●				A198 A199 A277 A300 —302 A305 A306 A435 A437
	M	150408	0.8		●									●	●					●							●			
	K	150412	1.2		●									●	●															
	N	150416	1.6											□	□															
	S	150608	0.8											●	●															
		150612	1.2											●	●															
Flat Top  Cast Iron 	P	DNGA150404	0.4																						□	●	●				A198 A199 A277 A300 —302 A305 A306 A435 A437
	M	150408	0.8																						●	●	●			
	K																													
	N																													
	S																													

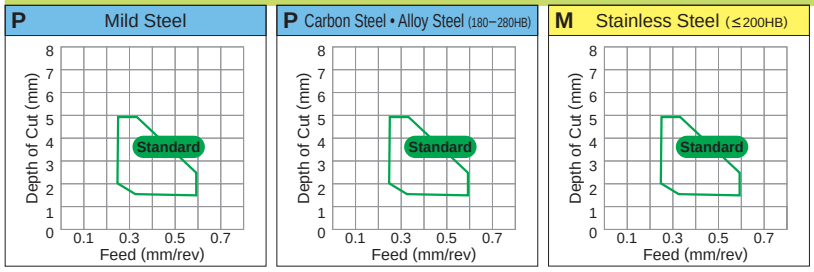
CHIP BREAKERS A036
GRADES A026
IDENTIFICATION A002

RN TYPE INSERTS WITH HOLE

RNMG 09 03 00
Size Thickness Corner Radius
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Medium Cutting ····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
	P	Steel					●	●	◕	✣	✣	✣	◕	○	◕			●	◕	✣	✣	●	◕	●	●	●	✣			◕	●			
	M	Stainless Steel												●		●	●			✣	○	○					✣							
	K	Cast Iron																				●			●	●	✣	●	●	◕	●			
	N	Non-ferrous Metal																												◕	●			
	S	Heat-resistant Alloy, Titanium Alloy													●			●	◕	✣												●	◕	✣	
			Standard	Carbon Steel • Alloy Steel ap (mm) 0 1 2 3 4 5 f (mm/rev) 0.1 0.3 0.5 Medium Cutting	**RNMG090300**	–			●																									–
					120400	–			●	●		▲															□						
					150600	–			●																								
					190600	–			●	●		●	▲																				
					250900	–			●			●																					
					310900	–			●																								
			M5 For Special Use (For Rotary Tools)		**RNGJ190600-M5**	–								●																			●	A232

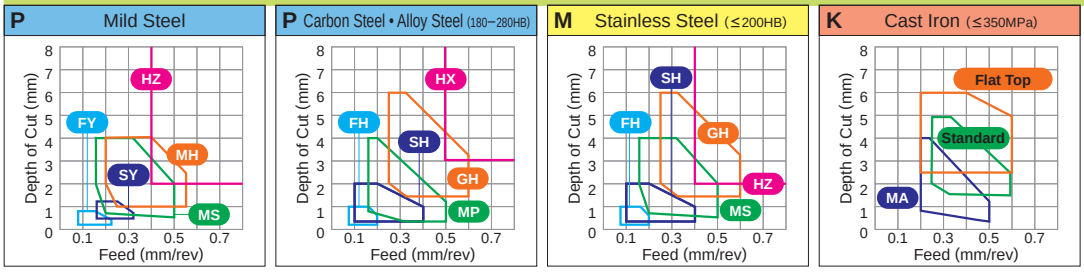
● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

90° SN TYPE INSERTS WITH HOLE

SNMG 09 03 04 - FH
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated														Cermet		Coated Cermet	Carbide						Applicable Holder Page
			Re (mm)	UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
P	Steel			●	●	◕	✣	✣	✣	◕										●	◕	●	●	●	✣						
M	Stainless Steel										○	◕						✣	✣	○					✣						
K	Cast Iron													●	◕					●			●	●	✣	●	◕				
N	Non-ferrous Metal																										◕	●		
S	Heat-resistant Alloy, Titanium Alloy											●				●	◕	✣										●	◕	✣	
FH	Carbon Steel • Alloy Steel	**SNMG090304-FH**	0.4																	●											A200 – 204 A278 A299
Finish Cutting		**090308-FH**	0.8																	●											
		120404-FH	0.4			●	●													●	●										
		120408-FH	0.8			●	●													●	●										
FS	Mild Steel	**SNMG120404-FS**	0.4				●													●											A200 – 204 A278 A299
Finish Cutting		**120408-FS**	0.8				●													●											
FY	Mild Steel	**SNMG120408-FY**	0.8				●														●		●								A200 – 204 A278 A299
Finish Cutting																															
PK	Carbon Steel • Alloy Steel	**SNGG120408-PK**	0.8																	□		▲									A200 – 204 A278 A299
Finish Cutting																															
SH	Carbon Steel • Alloy Steel	**SNMG120404-SH**	0.4		□	●	●							□						●	●		□								A200 – 204 A278 A299
Light Cutting		**120408-SH**	0.8	○	●	●	●		▲					□						●	●		●								
		120412-SH	1.2		□	●	●							□						●	●		□								
SA	Carbon Steel • Alloy Steel	**SNMG120404-SA**	0.4			●	□		▲												●										A200 – 204 A278 A299
Light Cutting		**120408-SA**	0.8	○		●	●		▲												●										
		120412-SA	1.2			●	●		▲												●										
SY	Mild Steel	**SNMG120408-SY**	0.8				●														●		●								A200 – 204 A278 A299
Light Cutting																															

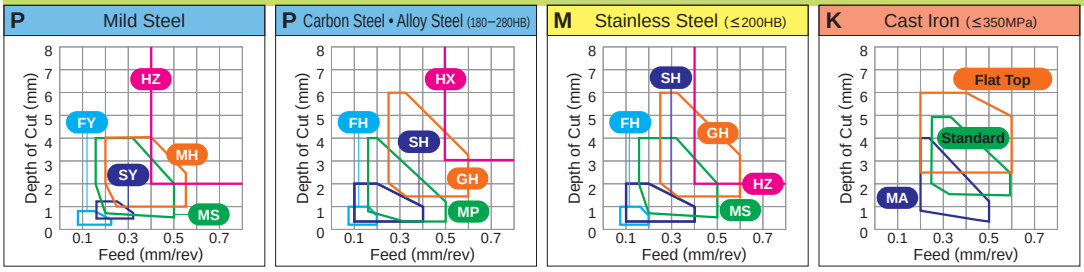
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

90° SN TYPE INSERTS WITH HOLE

SNMG 09 03 04 - C
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Coated														Cermet		Coated Cermet	Carbide						Applicable Holder Page
	P	Steel	●	●	◔	✣	✣	✣	◔								●	◔	●	●	✣						
	M	Stainless Steel								○	◔					✣	○			✣						
	K	Cast Iron										●	◔				●		●	●	✣	●	◔			
	N	Non-ferrous Metal																					●	●		
	S	Heat-resistant Alloy, Titanium Alloy										●		◔	✣									●	◔	✣
Shape / Chip Control Range (ap : Depth of Cut, f : Feed)		Order Number	Corner R Re (mm)	UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HT110	RT9005	RT9010	TF15	
C		SNMG090304-C	0.4																	▲									A200 –204 A278 A299
		090308-C	0.8																	▲									
		120408-C	0.8																	▲	▲								
		120416-C	1.6																	▲									
Light Cutting																													
R/L-1G		SNMG120404R-1G	0.4																	●									A200 –204 A278 A299
		120404L-1G	0.4																	●									
		120408R-1G	0.8																	●									
		120408L-1G	0.8																	●									
Light Cutting																													
MP		SNMG120404-MP	0.4	○		○	○							○															A200 –204 A278 A299
		120408-MP	0.8	○		●	●							●															
		120412-MP	1.2	○		●	●							●															
Medium Cutting																													
MA		SNMG120404-MA	0.4	○	●	●	●	●	▲	□	●		□						●										A200 –204 A278 A299
		120408-MA	0.8	○	●	●	●	●	▲	●	●		●	●			○		●										
		120412-MA	1.2	○	●	●	●	●	▲	●	●		●	●					●										
		120416-MA	1.6										●	●															
		150608-MA	0.8	○	●	●	□	□	▲	□	●																		
		150612-MA	1.2	○	●	●	●	□	▲	□	●		□	□															
		150616-MA	1.6			●																							
		190612-MA	1.2	○		●	□							●	●														
Medium Cutting		190616-MA	1.6	○	●	●	●	□	▲	□	●			●	●														
MV		SNMG120404-MV	0.4	○	●	●	●							□						●									A200 –204 A278 A299
		120408-MV	0.8	○	●	●	●							□						●									
		120412-MV	1.2	○	●	●	●							□						●									
Medium Cutting																													
MH		SNMG120404-MH	0.4			●								●															A200 –204 A278 A299
		120408-MH	0.8	○	●	●	●	●	▲	●				●															
		120412-MH	1.2	○	●	●	●	●	▲	●				●															
		190612-MH	1.2	○		●	□							●															
Medium Cutting		190616-MH	1.6	○		●	□							●															

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

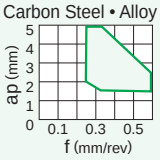
Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	● ● ◐ ✣ ✣ ✣ ◐ ◐ ◐ ✣ ✣ ● ◐ ● ● ✣
M	Stainless Steel	○ ◐ ✣ ✣ ○ ◐ ✣ ✣
K	Cast Iron	● ● ● ● ● ✣ ● ● ●
N	Non-ferrous Metal	◐ ●
S	Heat-resistant Alloy, Titanium Alloy	● ◐ ✣ ● ◐ ✣

Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
Standard	SNMG090304	0.4			●	●			▲										●	●				●		●				A200
	090308	0.8	○		●	●			▲										●	●				●	●	●				–204
	090312	1.2																						●						A278
	120404	0.4	○	●	●	●	□		▲										●	●				●		●				A299
	120408	0.8	○	●	●	●	●		▲				●	●			○		●	●				●	●	●				
	120412	1.2	○	●	●	●	●		▲				●	●					●	●				●	□	●				
	120416	1.6		●	□	●			▲				●	●					●	●				●						
	120420	2.0		●		●			▲																					
	150412	1.2			□																									
	150612	1.2	○	●	□	●	●		▲				□	□										●						
	190612	1.2	○	●	●	●	●		▲				●	●										●						
	190616	1.6	○	●	●	●	●		▲				●	●										●						
	250724	2.4																						□						
	250924	2.4																						●						
MS	SNMG090304-MS	0.4								□	□																			A200
	090308-MS	0.8								□	●																			–204
	120404-MS	0.4			●					□	●							●		●				●						A278
	120408-MS	0.8			●	●			▲	●	●	●			●	●	●	●		●				●		□	□	●	□	A299
	120412-MS	1.2			●					●	●	●			●	●	●			●				●			□	●	□	
	120416-MS	1.6								□	●																			
	150608-MS	0.8								□	□																			
	150612-MS	1.2								□	□																			
	190616-MS	1.6								□	□																			
R/L	SNGG090304R	0.4																	●	●	▲			●		●				A200
	090304L	0.4																	●	●	▲			●		●				–204
	090308R	0.8																	●	●	▲			●		●				A278
	090308L	0.8																	●	●				●		●				A299
	120404R	0.4																	●	●	▲			●		●				
	120404L	0.4																	●	●	▲			●		●				
	120408R	0.8																	●	●	▲			●		●				
	120408L	0.8																	●	●	▲			●		●				
	120412R	1.2																			▲					●				
	120412L	1.2																								●				
GH	SNMG120408-GH	0.8	○	●	●	●			▲	●	●		●	●																A200
	120412-GH	1.2	○	●	●	●			▲	●	●		●	●																–204
	120416-GH	1.6	○		●				▲	●	●																			A278
	150612-GH	1.2	○		●				▲	●	●																			A299
	150616-GH	1.6			●																									
	190612-GH	1.2	○		●				▲	●	●																			
	190616-GH	1.6	○		●				▲	●	●																			
HZ	SNMM120408-HZ	0.8			●	●				□	□																			A200
	120412-HZ	1.2			●	●				□	□																			–204
	150612-HZ	1.2			●	●				□	□																			A278
	190612-HZ	1.2			●	●		●		□	□																			A299
	190616-HZ	1.6			●	●		●		□	□																			
	190624-HZ	2.4			□	□		●																						

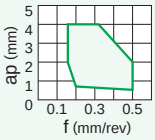
Medium Cutting

Carbon Steel • Alloy Steel



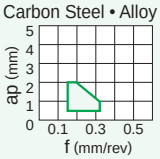
Medium Cutting

Stainless Steel



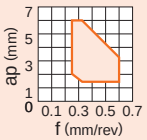
Medium Cutting

Carbon Steel • Alloy Steel



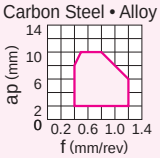
Semi-Heavy Cutting

Carbon Steel • Alloy Steel



Heavy Cutting

Carbon Steel • Alloy Steel



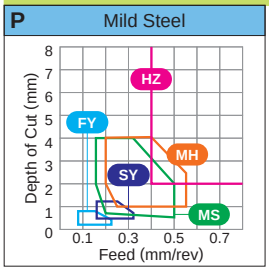
CHIP BREAKERS A036
GRADES A026
IDENTIFICATION A002

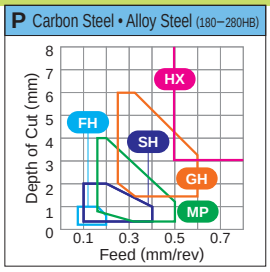
90° SN TYPE INSERTS WITH HOLE

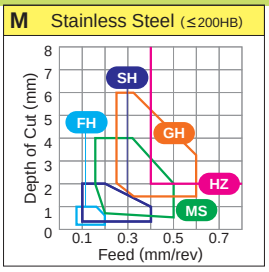
SNMM 15 06 12 - HX
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

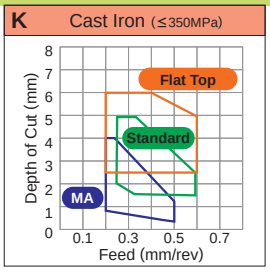
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····









Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
	P	Steel				●	●	◔	✣	✣	✣	◔	○	◔			●	◔		✣	✣	●	○		●	●	✣		✣	●	◔		
	M	Stainless Steel													●	◔																
	K	Cast Iron																	✣	✣	●				●	●	✣	●	◔				
	N	Non-ferrous Metal																										◔	●				
	S	Heat-resistant Alloy, Titanium Alloy												●			●	◔	✣											●	◔	✣	
HX			Carbon Steel • Alloy Steel; Heavy Cutting	SNMM150612-HX	1.2			□	□	□	□																					A200 A202
				150616-HX	1.6			□	□		□																					
				190612-HX	1.2			●	●	□	●																					
				190616-HX	1.6			●	●	□	●																					
				190624-HX	2.4			●	●	□	●																					
				250724-HX	2.4			●	●	□	●																					
				250732-HX	3.2				□	□	●																					
				250924-HX	2.4			●	●	□	●																					
				250932-HX	3.2				□	□	●																					
HV			Carbon Steel • Alloy Steel; Heavy Cutting	SNMM190616-HV	1.6	□	●	●	□	●	▲																					A200 A202
				190624-HV	2.4	□	●	●	□	●	▲																					
				250724-HV	2.4	□	●	●	□	●	▲																					
				250924-HV	2.4	□	●	●	□	●	▲																					
HAS			Carbon Steel • Alloy Steel; Heavy Cutting	SNMG250924-HAS	2.4				□		□																					–
HBS			Mild Steel; Heavy Cutting	SNMM250924-HBS	2.4				□		●																					–
HCS			Carbon Steel • Alloy Steel; Heavy Cutting	SNMM190616-HCS	1.6				□		●																					–
				190624-HCS	2.4				□		●																					
				250724-HCS	2.4				□		●																					
				250924-HCS	2.4				□		●																					
HDS			Carbon Steel • Alloy Steel; Heavy Cutting	SNMG250924-HDS	2.4				□		□																					–

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Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
	P	Steel				●	●	◐	✣	✣	✣	◐	○	◐			●	◐		✣	✣	○			●	●	✣						
	M	Stainless Steel																									✣						
	K	Cast Iron														●	◐				●				●	●	✣	●	◐				
	N	Non-ferrous Metal																											◐	●			
	S	Heat-resistant Alloy, Titanium Alloy												●				●	◐	✣	✣									●	◐	✣	
HDS			Carbon Steel • Alloy Steel; Heavy Cutting; ap (mm) 14/10/6/2/0; f (mm/rev) 0.2 0.6 1.0 1.4	**SNMM250924-HDS**	2.4				□		□																						–
HXD			Mild Steel; Heavy Cutting; ap (mm) 14/10/6/2/0; f (mm/rev) 0.2 0.6 1.0 1.4	**SNMM190612-HXD**	1.2				□		●																						A200 A202
				190616-HXD	1.6				□		●																						
				190624-HXD	2.4				□		●																						
				250924-HXD	2.4				□		●																						
Flat Top			Cast Iron; ap (mm) 7/5/3/1/0; f (mm/rev) 0.1 0.3 0.5 0.7	**SNMA090304**	0.4																								●				A200 –204 A278 A299
				090308	0.8		●									●	●									●		●				
				090312	1.2																							□				
				120404	0.4																							●				
				120408	0.8		●									●	●									●	●	●				
				120412	1.2		●									●	●									●	●	●				
				120416	1.6		●									●	●										●					
				190612	1.2		●									●	●															
				190616	1.6		●									●	●															
Flat Top			Cast Iron; ap (mm) 7/5/3/1/0; f (mm/rev) 0.1 0.3 0.5 0.7	**SNGA090302**	0.2																							●		●			A200 –204 A278 A299
				090304	0.4																	●					●	●	●				
				090308	0.8																						●	●	●				
				120404	0.4																	●					●	●	●				
				120408	0.8																	●					●	●	●				
				120412	1.2																	□						□					

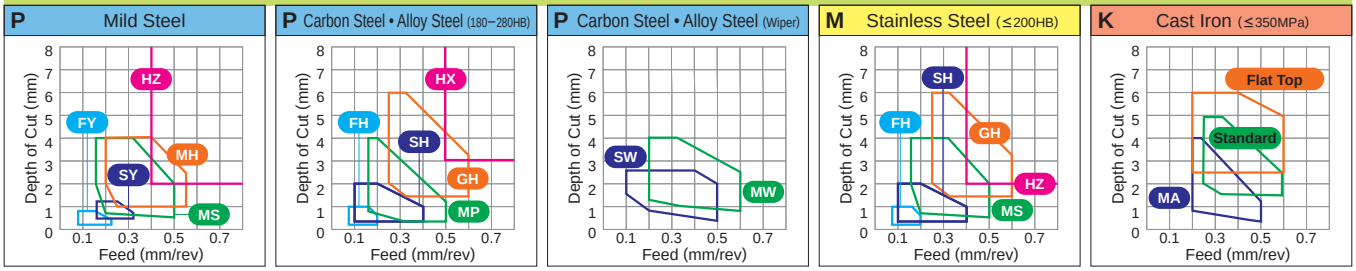
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

60° TN TYPE INSERTS WITH HOLE

TNMG 11 03 04 - FH
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	Carbide UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
FH	Carbon Steel • Alloy Steel	TNMG110304-FH	0.4																	●			□								
		160402-FH	0.2			●	●					●								●	●										
		160404-FH	0.4			●	●			▲		●								●	●		●								
		160408-FH	0.8			●	●			▲		●								●	●		●								
	Finish Cutting																														A206 –211 A278 A299 A305
FS	Mild Steel	TNMG160404-FS	0.4				●													●											
		160408-FS	0.8				●													●											
	Finish Cutting																														A206 –211 A278 A299 A305
FY	Mild Steel	TNMG160404-FY	0.4				●														●			●							
		160408-FY	0.8				●														●			●							
	Finish Cutting																														A206 –211 A278 A299 A305
PK	Carbon Steel • Alloy Steel	TNGG160404-PK	0.4																	●		▲									
		160408-PK	0.8																	●		▲									
	Finish Cutting																														A206 –211 A278 A299 A305
R/L-FS	Carbon Steel • Alloy Steel	TNGG160402R-FS	0.2																	●											
		160402L-FS	0.2																	●											
		160404R-FS	0.4																	●											
		160404L-FS	0.4																	●											
		160408R-FS	0.8																	●											
		160408L-FS	0.8																	●											
	Finish Cutting																														A206 –211 A278 A299 A305
R/L-F	Carbon Steel • Alloy Steel	TNGG160402R-F	0.2															●		●	●										
		160402L-F	0.2															●		●	●										
		160404R-F	0.4															●		●	●										
		160404L-F	0.4															●		●	●										
		160408R-F	0.8															●		●	●										
		160408L-F	0.8															●		●	●										
	Finish Cutting																														A206 –211 A278 A299 A305

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material		Corner R	Coated													Cermet		Coated Cermet	Carbide						Applicable Holder Page
P	Steel		UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
M	Stainless Steel																												
K	Cast Iron																												
N	Non-ferrous Metal																												
S	Heat-resistant Alloy, Titanium Alloy																												
Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Re (mm)																										
SH	Carbon Steel • Alloy Steel	**TNMG160404-SH**	0.4	○	●	●	●			▲	●		□						●	●		●								A206
		160408-SH	0.8	○	●	●	●			▲	●		□						●	●		●								–211
		160412-SH	1.2																●	●		●								A278
		220408-SH	0.8	○	●	●	●			▲	□																			A299
																														A305
SA	Carbon Steel • Alloy Steel	**TNMG160404-SA**	0.4	○		●	●			▲										●										A206
		160408-SA	0.8	○		●	●			▲										●										–211
		160412-SA	1.2	○		●	●			▲										●										A278
		220408-SA	0.8	○		●	●			▲																				A299
		220412-SA	1.2			●	●			▲																				A305
* **SW**	Carbon Steel • Alloy Steel	**TNMX160404-SW**	0.4	○	●	●					●								●	●										A206
		160408-SW	0.8	○	●	●					●								●	●										A207
																														A209
																														A278
																														A299
SY	Mild Steel	**TNMG160404-SY**	0.4				●													●			●							A206
		160408-SY	0.8				●													●			●							–211
																														A278
																														A299
																														A305
C	Carbon Steel • Alloy Steel	**TNMG110308-C**	0.8																▲											
		160404-C	0.4																▲	▲										A206
		160408-C	0.8																▲	▲										–211
		160412-C	1.2																▲											A278
		220404-C	0.4																▲	▲										A299
		220408-C	0.8																▲	▲										A305
R/L-1M	Carbon Steel • Alloy Steel	**TNMG160404R-1M**	0.4																	●										A206
		160404L-1M	0.4																	●										–211
		160408R-1M	0.8																	●										A278
		160408L-1M	0.8																	●										A299
																														A305
R/L-1G	Carbon Steel • Alloy Steel	**TNMG160404R-1G**	0.4																	●										A206
		160404L-1G	0.4																	●										–211
		160408R-1G	0.8																	●										A278
		160408L-1G	0.8																	●										A299
		220404R-1G	0.4																	●										A305
		220404L-1G	0.4																	●										
		220408L-1G	0.8																	●										
		220408R-1G	0.8																	●										
R/L-K	Carbon Steel • Alloy Steel	**TNGG160402R-K**	0.2																	●	●									A206
		160402L-K	0.2																	●	●									–211
		160404R-K	0.4																	●	●									A278
		160404L-K	0.4																	●	●									A299
		160408R-K	0.8																	●	●									A305
		160408L-K	0.8																	●	●									

Light Cutting / Light Cutting (Wiper)

* Please refer to A024 before using the SW breaker (wiper insert).

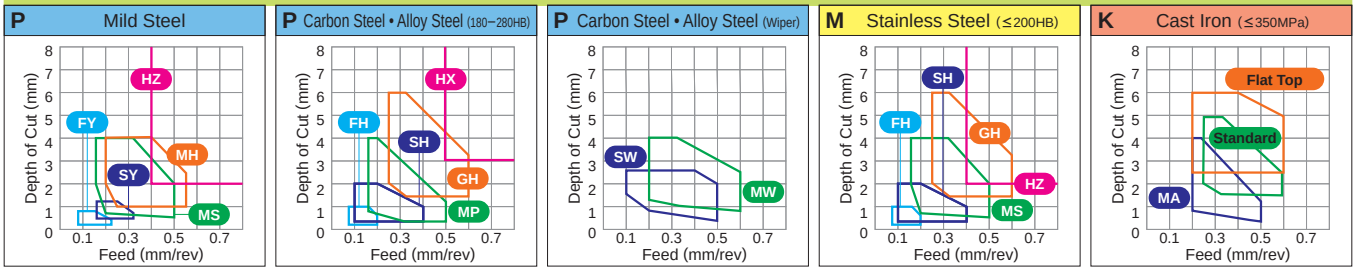
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

60° TN TYPE INSERTS WITH HOLE

TNMG 16 04 04 - MJ
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	●●◕✣✣✣◕ ◔◕ ●◕ ◔✣ ✣◔ ●◕✣ ●● ✣ ●◕ ◕◕
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
MJ	Difficult-to-Cut Materials	**TNMG160404-MJ**	0.4										●			●	●												□	□	A206 –211 A278 A299 A305
		160408-MJ	0.8										●			●	●												□	□	
		160412-MJ	1.2										●			●	●														
Light Cutting																															
MP	Carbon Steel • Alloy Steel	**TNMG160404-MP**	0.4	○		○	○							○																A206 –211 A278 A299 A305
		160408-MP	0.8			●	●							●																
		160412-MP	1.2			●	●							●																
		220408-MP	0.8	○		○	○							○																
Medium Cutting		**220412-MP**	1.2	○		○	○							○																
MA	Carbon Steel • Alloy Steel	**TNMG160404-MA**	0.4	○	●	●	●	●		▲	●	●		●	●			○		●										A206 –211 A278 A299 A305
		160408-MA	0.8	○	●	●	●	●		▲	●	●		●	●			○		●										
		160412-MA	1.2	○	●	●	●	●		▲	●	●		●	●					●										
		160416-MA	1.6											●	●															
		220408-MA	0.8	○	●	●	●	●		▲	●	●		●	●															
		220412-MA	1.2	○	●	●	●	●		▲	□	●		●	●															
		220416-MA	1.6											●	●															
		270608-MA	0.8	○		●	●	□		▲	□																			
Medium Cutting		**270612-MA**	1.2	○		●	●	●		▲	□	●																		
MV	Carbon Steel • Alloy Steel	**TNMG160404-MV**	0.4	○	●	●	●							□						●										A206 –211 A278 A299 A305
		160408-MV	0.8	○	●	●	●							□						●										
		160412-MV	1.2	○	●	●	●							□						●										
		220408-MV	0.8	○	●	●	●																							
Medium Cutting		**220412-MV**	1.2	○	●	●	●																							
MH	Carbon Steel • Alloy Steel	**TNMG160404-MH**	0.4	○	●	●	●	●		▲	●			●																A206 –211 A278 A299 A305
		160408-MH	0.8	○	●	●	●	●		▲	●			●																
		160412-MH	1.2	○	●	●	●	●		▲	●			●																
		220408-MH	0.8	○	●	●	●	●		▲	●			●																
Medium Cutting		**220412-MH**	1.2	○	●	●	●	●		▲	●			●																

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○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	● ● ◐ ✣ ✣ ✣ ◐ ◐ ◐ ✣ ✣ ● ◐ ● ● ● ✣ ◐ ● ◐
M	Stainless Steel	◐ ◐ ✣ ✣ ✣ ✣ ◐ ◐ ✣ ✣ ✣
K	Cast Iron	● ●
N	Non-ferrous Metal	● ●
S	Heat-resistant Alloy, Titanium Alloy	● ●

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
Standard	Carbon Steel • Alloy Steel	TNMG110304	0.4			●	●			▲										●					●		●				A206
		110308	0.8			●	●			▲										●					●						—211
		160304	0.4			□	□			▲															●		●				A278
		160308	0.8			□	●			▲															●		●				A299
		160404	0.4	○	●	●	●			▲				●	●			○		●	●				●	●	●				A305
		160408	0.8	○	●	●	●	●		▲				●	●			○		●	●				●	●	●				
		160412	1.2	○	●	●	●	●		▲				●	●					●	●				●	●	●				
		160416	1.6		●	□	□			▲				●	●					●	●										
		160420	2.0											●	●										●						
		220404	0.4	○	●	●	●			▲											●				●						
		220408	0.8	○	●	●	●	●		▲				●	●					●	●				●		●				
		220412	1.2	○	●	●	●	●		▲				●	●										●						
		220416	1.6		●	●	●			▲				●	●																
		270608	0.8			●				▲																					
		270612	1.2			●	□			▲															●						
		270616	1.6			●	□			▲																					
		330924	2.4							▲															●						
✱ **MW**	Carbon Steel • Alloy Steel	TNMX160408-MW	0.8	○	●	●	□				□			□	□																A206
		160412-MW	1.2	○	●	●	□				□			□	□																A207
																															A209
																															A278
																															A299
MS	Stainless Steel	TNMG160404-MS	0.4			●	●			▲	●	●	●			●	●	●	●		●				●			□	●	□	A206
		160408-MS	0.8			●	●			▲	●	●	●			●	●	●	●		●				●		●	□	●	□	—211
		160412-MS	1.2			●					●	●	●			●	●		●		●				●						A278
		220408-MS	0.8			●	□			▲	●	●	●			●	●	□	●						●			□	●	□	A299
		220412-MS	1.2								□	●																			A305
R/L-ES	Stainless Steel	TNMG160404R-ES	0.4								●	●																			
		160404L-ES	0.4								●	●																			A206
		160408R-ES	0.8								●	●																			—211
		160408L-ES	0.8								●	●																			A278
		220408R-ES	0.8									●																			A299
		220408L-ES	0.8									●																			A305
R/L-2M	Carbon Steel • Alloy Steel	TNMG160404R-2M	0.4																		●										
		160404L-2M	0.4																		●										A206
		160408R-2M	0.8																		●										—211
		160408L-2M	0.8																		●										A278
																															A299
																															A305
R/L-2G	Carbon Steel • Alloy Steel	TNMG160404R-2G	0.4																	●											
		160404L-2G	0.4																	●											A206
		160408R-2G	0.8																	●											—211
		160408L-2G	0.8																	●											A278
																															A299
																															A305

✱ Please refer to A024 before using the MW breaker (wiper insert).

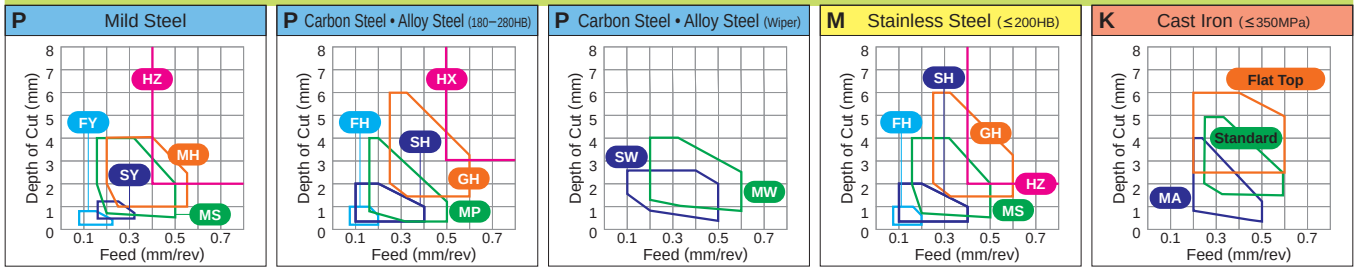
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

60° TN TYPE INSERTS WITH HOLE

TNGG 11 03 02 R
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	●●◕✣✣✣◕ ◯◕ ●● ●✣✣ ●◕✣ ●● ✣ ●● ✣ ●◕ ●● ◕● ●◕✣
M	Stainless Steel	◯ ✣
K	Cast Iron	●● ●● ✣ ●◕
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	● ◕✣

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
R/L	Carbon Steel • Alloy Steel	TNGG110302R	0.2																	●	●				●		●				A206 —211 A278 A299 A305
		110302L	0.2																	●	●						●				
		110304R	0.4																	●	●				●		●				
		110304L	0.4																	●	●				●		●				
		110308R	0.8																	●	●						□				
		110308L	0.8																	●	●				□		●				
		160304R	0.4																	●	●				●		●				
		160304L	0.4																	●	●				●		●				
		160308R	0.8																	●	●				●		●				
		160308L	0.8																	●	●						●				
		160402R	0.2																	●	●	▲			●		●				
		160402L	0.2																	●	●	▲			●		●				
		160404R	0.4																	●	●	▲			●	●	●				
		160404L	0.4																	●	●	▲			●	●	●				
		160408R	0.8																	●	●	▲			●	●	●				
		160408L	0.8																	●	●	▲			●	●	●				
		160412R	1.2																	●	●	▲			●	□	●				
		160412L	1.2																	●	●										
		220404R	0.4																	●	●	▲			●		●				
		220404L	0.4																	●	●	▲			●		●				
		220408R	0.8																	●	●	▲			●	●	●				
		220408L	0.8																	●	●	▲			●	●	●				
		220412R	1.2																			▲			●						
Medium Cutting		220412L	1.2																						●						
GH	Carbon Steel • Alloy Steel	TNMG160408-GH	0.8	○	●	●	●			▲	●	●		●	●																A206 —211 A278 A299 A305
		160412-GH	1.2	○	●	●	●			▲	●	●		●	●																
		220408-GH	0.8	○	●	●	●			▲	●	●		●	●																
		220412-GH	1.2	○	●	●	●			▲	●	●		●	●																
		220416-GH	1.6	○	●	●	●			▲	●	●																			
		270612-GH	1.2	○		●	●			▲	●	●																			
Semi-Heavy Cutting		270616-GH	1.6	○		□																									

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
	P	Steel				●	●	◐	✣	✣	✣	◐	○	◐			●	◐		✣	✣	○	●	◐	●	●	✣						
	M	Stainless Steel											●	◐			●	◐		✣	○					✣						
	K	Cast Iron														●	●		●	◐		●			●	●	✣	●	◐				
	N	Non-ferrous Metal																											◐	●			
	S	Heat-resistant Alloy, Titanium Alloy													●			●	◐	✣										●	◐	✣	
HZ			Carbon Steel • Alloy Steel; Heavy Cutting; ap (mm) 14/10/6/2/0; f (mm/rev) 0.2 0.6 1.0 1.4	TNMM160408-HZ	0.8			●	●				□	□																			A206 –211 A278 A299 A305
				220408-HZ	0.8			●	●				□	□																		
				220412-HZ	1.2			●	●				□	□																		
				220416-HZ	1.6			●	●				□	□																		
HV			Carbon Steel • Alloy Steel; Heavy Cutting; ap (mm) 14/10/6/2/0; f (mm/rev) 0.2 0.6 1.0 1.4	TNMM330924-HV	2.4		□		□	□																						—
Flat Top			Cast Iron; ap (mm) 7/5/3/1/0; f (mm/rev) 0.1 0.3 0.5 0.7	TNMA110304	0.4																								●	●			A206 –211 A278 A299 A305
				110308	0.8																□										
				160308	0.8		●																			●		●			
				160404	0.4		●									●	●				●					●	●	●			
				160408	0.8		●									●	●				●					●	●	●			
				160412	1.2		●									●	●				●						●	●			
				160416	1.6		●									●	●										●				
				160420	2.0		●									●	●									□					
				220404	0.4																						●	□			
				220408	0.8		●									●	●				●					●	●	●			
				220412	1.2		●									●	●									●		●			
				220416	1.6		●									●	●									□					
				220420	2.0																										
				220432	3.2																					●					
				270612	1.2																					□					
Flat Top			Cast Iron; ap (mm) 7/5/3/1/0; f (mm/rev) 0.1 0.3 0.5 0.7	TNGA110304	0.4																							□	●			A206 –211 A278 A299 A305
				110308	0.8																●							●			
				160304	0.4																							□	●			
				160308	0.8																●							●			
				160402	0.2																●							●			
				160404	0.4																●					●	●	●			
				160408	0.8																●					●	●	●			
				160412	1.2																●							●	●		
				160416	1.6																							●			
				220404	0.4																					●	□	●			
				220408	0.8																●					●	●	●			
				220412	1.2																					●		●			

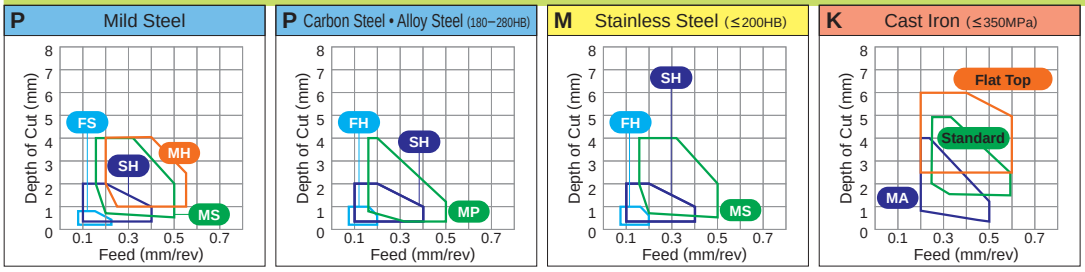
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

35° VN TYPE INSERTS WITH HOLE

VNMG 16 04 02 - FH
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	●●◕✣✣✣◕ ◔◔ ●● ● ✣✣ ●◕✣ ●●✣ ✣ ●● ●●✣ ●● ◕◕ ●◕ ✣
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	Carbide UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
FH	Carbon Steel • Alloy Steel	**VNMG160402-FH**	0.2			●	●													●	●										A212
		160404-FH	0.4			●	●													●	●		●								—214
		160408-FH	0.8			●	●													●	●		●								A279
																															A307
Finish Cutting	ap (mm) 0 1 2 3 / f (mm/rev) 0.1 0.2 0.3 0.4																														
FS	Mild Steel	**VNMG160404-FS**	0.4				●													●											A212
		160408-FS	0.8				●													●											—214
																															A279
																															A307
Finish Cutting	ap (mm) 0 1 2 3 / f (mm/rev) 0.1 0.2 0.3 0.4																														
FJ	Difficult-to-Cut Materials	**VNGG1604V5-FJ**	0.05														□												□		A212
		160401-FJ	0.1														□												□		—214
		160402-FJ	0.2														□												□		A279
																															A307
Finish Cutting	ap (mm) 0 1 2 3 / f (mm/rev) 0.1 0.2 0.3 0.4																														
R/L-F	Carbon Steel • Alloy Steel	**VNGG160402R-F**	0.2															●			●	●									A212
		160402L-F	0.2															●			●	●									—214
		160404R-F	0.4															●			●	●									A279
		160404L-F	0.4															●			●	●									A307
Finish Cutting	ap (mm) 0 1 2 3 / f (mm/rev) 0.1 0.2 0.3 0.4																														
SH	Carbon Steel • Alloy Steel	**VNMG160404-SH**	0.4	○		●	●													●	●		●								A212
		160408-SH	0.8	○		●	●													●	●		●								—214
																															A279
																															A307
Light Cutting	ap (mm) 0 1 2 3 4 / f (mm/rev) 0.1 0.3 0.5																														
MJ	Difficult-to-Cut Materials	**VNMG160404-MJ**	0.4										●			●	●											□	□		A212
		160408-MJ	0.8										●			●	●											□	□		—214
		160412-MJ	1.2										●			●	●														A279
																															A307
Light Cutting	ap (mm) 0 1 2 3 4 / f (mm/rev) 0.1 0.3 0.5																														
MJ	Difficult-to-Cut Materials	**VNGM160404-MJ**	0.4														□												□		A212
		160408-MJ	0.8														□												□		—214
																															A279
																															A307
Light Cutting	ap (mm) 0 1 2 3 4 / f (mm/rev) 0.1 0.3 0.5																														

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated														Cermet		Coated Cermet		Carbide						Applicable Holder Page
							UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
P	Steel		MP	Carbon Steel • Alloy Steel	VNMG160404-MP	0.4	○		○	○							○																
M	Stainless Steel			Medium Cutting	160408-MP	0.8	○		●	●							●																A212 –214 A279 A307
K	Cast Iron			ap (mm) 0 1 2 3 4 5 / f (mm/rev) 0.1 0.3 0.5	160412-MP	1.2	○		○	○							○																
N	Non-ferrous Metal		MA	Carbon Steel • Alloy Steel	VNMG160404-MA	0.4	○	●	●	●		▲	●	●			●	●															
S	Heat-resistant Alloy, Titanium Alloy			Medium Cutting	160408-MA	0.8	○	●	●	●	●	▲	●	●			●	●															A212 –214 A279 A307
				ap (mm) 0 1 2 3 4 5 / f (mm/rev) 0.1 0.3 0.5																													
			MV	Carbon Steel • Alloy Steel	VNMG160404-MV	0.4	○	●	●	●							□						●										
				Medium Cutting	160408-MV	0.8	○	●	●	●							□						●										A212 –214 A279 A307
				ap (mm) 0 1 2 3 4 5 / f (mm/rev) 0.1 0.3 0.5																													
			MH	Carbon Steel • Alloy Steel	VNMG160404-MH	0.4	○	●	●	●	●	▲	●				●																
				Medium Cutting	160408-MH	0.8	○	●	●	●	●	▲	●				●																A212 –214 A279 A307
				ap (mm) 0 1 2 3 4 5 / f (mm/rev) 0.1 0.3 0.5																													
			Standard	Carbon Steel • Alloy Steel	VNMG160404	0.4	○	●	●	●		▲				●	●			○			●	●				●		●			
				Medium Cutting	160408	0.8	○	●	●	●		▲				●	●			○			●	●				●		●			A212 –214 A279 A307
				ap (mm) 0 1 2 3 4 5 / f (mm/rev) 0.1 0.3 0.5	160412	1.2	○	□				▲					●	●						●	●								
			MS	Stainless Steel	VNMG160404-MS	0.4		●				▲	●	●	●				●	●		●		●				●			□	●	
				Medium Cutting	160408-MS	0.8		●				▲	●	●	●				●	●		●		●				●			□	●	A212 –214 A279 A307
				ap (mm) 0 1 2 3 4 5 / f (mm/rev) 0.1 0.3 0.5																													
			R/L	Carbon Steel • Alloy Steel	VNGG160404R	0.4																	●	●				●		●			
				Medium Cutting	160404L	0.4																	●	●				●		●			A212 –214 A279 A307
				ap (mm) 0 1 2 3 4 5 / f (mm/rev) 0.1 0.3 0.5	160408R	0.8																						●		●			
			Flat Top	Cast Iron	VNGA160404	0.4																						□	●	●			
					160408	0.8																						●	●	●			A212 –214 A279 A307
				ap (mm) 0 1 2 3 4 5 6 7 / f (mm/rev) 0.1 0.3 0.5 0.7																													

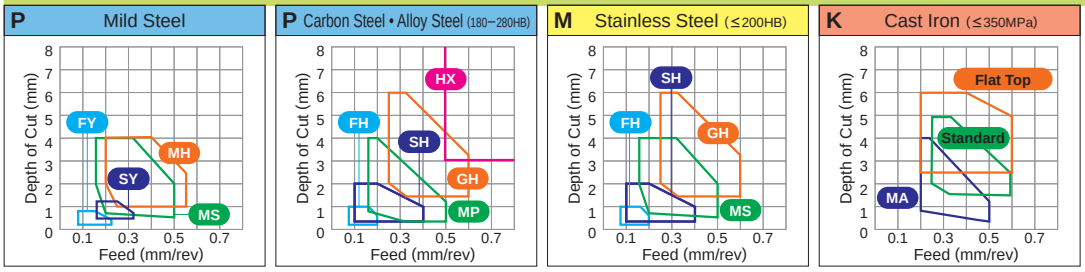
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

80° WN TYPE INSERTS WITH HOLE

WNMG 08 04 04 - FH
Size Thickness Corner Radius Chip Breaker
⁎ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	●●◕✣✣✣◕
M	Stainless Steel	○◕ ✣✣
K	Cast Iron	●◕ ●● ✣●●
N	Non-ferrous Metal	◕●
S	Heat-resistant Alloy, Titanium Alloy	● ●◕✣

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	Carbide UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
FH	Carbon Steel • Alloy Steel	**WNMG080404-FH**	0.4			●	●			▲		●								●	●		●								A215 A279 A301 A303
Finish Cutting	ap (mm) 0–3, f (mm/rev) 0.1 0.2 0.3 0.4	**080408-FH**	0.8			●	●			▲		●								●	●		●								
FS	Mild Steel	**WNMG080404-FS**	0.4				●													●											A215 A279 A301 A303
Finish Cutting	ap (mm) 0–3, f (mm/rev) 0.1 0.2 0.3 0.4	**080408-FS**	0.8				●													●											
FY	Mild Steel	**WNMG080404-FY**	0.4				●														●			●							A215 A279 A301 A303
Finish Cutting	ap (mm) 0–3, f (mm/rev) 0.1 0.2 0.3 0.4	**080408-FY**	0.8				●														●			●							
SH	Carbon Steel • Alloy Steel	**WNMG06T304-SH**	0.4	○		●				▲		●																			A215 A279 A301 A303
	ap (mm) 0–4, f (mm/rev) 0.1 0.3 0.5	**06T308-SH**	0.8	○		●				▲		●																			
		06T312-SH	1.2			●				▲																					
		060404-SH	0.4	○		●				▲		●																			
		060408-SH	0.8	○		●				▲		●																			
		060412-SH	1.2			●				▲		□																			
		080404-SH	0.4	○	●	●	●			▲		●			□					●	●		●								
		080408-SH	0.8	○	●	●	●			▲		●			□					●	●		●								
Light Cutting		**080412-SH**	1.2	○	●	●	●			▲		□			□					●	●										
SA	Carbon Steel • Alloy Steel	**WNMG080404-SA**	0.4	○		●	□			▲											●										A215 A279 A301 A303
	ap (mm) 0–4, f (mm/rev) 0.1 0.3 0.5	**080408-SA**	0.8	○		●	●			▲											●										
Light Cutting		**080412-SA**	1.2	○		●	●			▲											●										
* **SW**	Carbon Steel • Alloy Steel	**WNMG060404-SW**	0.4	○	●	●					●									●											A215 A279 A301 A303
	ap (mm) 0–4, f (mm/rev) 0.1 0.3 0.5	**060408-SW**	0.8	○	●	●					●									●											
		080404-SW	0.4	○	●	●					●				●					●	●										
		080408-SW	0.8	○	●	●					●				●					●	●										
Light Cutting (Wiper)		**080412-SW**	1.2	○		●					●									●	●										

⁎ Please refer to A024 before using the SW breaker (wiper insert).

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated														Cermet		Coated Cermet	Carbide						Applicable Holder Page
							UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
P	Steel		SY	Mild Steel	WNMG080404-SY	0.4				●														●		●							A215 A279 A301 A303
M	Stainless Steel				080408-SY	0.8				●														●		●							
K	Cast Iron		C	Carbon Steel • Alloy Steel	WNMG080404-C	0.4																	▲	▲								A215 A279 A301 A303
N	Non-ferrous Metal				080408-C	0.8																		▲									
S	Heat-resistant Alloy, Titanium Alloy		MJ	Difficult-to-Cut Materials	WNMG080408-MJ	0.8										●				●	●												A215 A279 A301 A303
					080412-MJ	1.2										●				●	●												
					080416-MJ	1.6										●				●	●												
			MP	Carbon Steel • Alloy Steel	WNMG06T304-MP	0.4	○		○	○							○															A215 A279 A301 A303
					06T308-MP	0.8	○		○	○							○															
					06T312-MP	1.2	○		○	○							○															
					060404-MP	0.4	○		○	○							○															
					060408-MP	0.8	○		○	○							○															
					060412-MP	1.2	○		○	○							○															
					080404-MP	0.4	○		○	○							○															
					080408-MP	0.8	○		●	●							●															
					080412-MP	1.2	○		●	●							●															
					080416-MP	1.6	○		○	○							○															
			MA	Carbon Steel • Alloy Steel	WNMG06T304-MA	0.4	○		●			▲	□	●																		A215 A279 A301 A303
					06T308-MA	0.8	○		●			▲	□	●																		
					06T312-MA	1.2	○		●			▲	□	●																		
					060404-MA	0.4	○		●			▲	□	●																		
					060408-MA	0.8	○		●			▲	□	●																		
					060412-MA	1.2	○		●			▲	□	●																		
					080404-MA	0.4	○	●	●	●	□	▲	●	●			●	●			○			●								
					080408-MA	0.8	○	●	●	●	●	▲	●	●			●	●			○			●								
					080412-MA	1.2	○	●	●	●	●	▲	●	●			●	●			○			●								
					080416-MA	1.6	○		●								●	●														
					100612-MA	1.2		●		●	□	▲	□																			
					100616-MA	1.6							□																			
			MV	Carbon Steel • Alloy Steel	WNMG06T304-MV	0.4	○	●	●	●														●									A215 A279 A301 A303
					06T308-MV	0.8	○	●	●	●														●									
					06T312-MV	1.2	○	●	●	●														●									
					060404-MV	0.4	○	●	●	●														●									
					060408-MV	0.8	○	●	●	●														●									
					060412-MV	1.2	○	●	●	●														●									
					080404-MV	0.4	○	●	●	●								□						●									
					080408-MV	0.8	○	●	●	●								□						●									
					080412-MV	1.2	○	●	●	●								□						●									

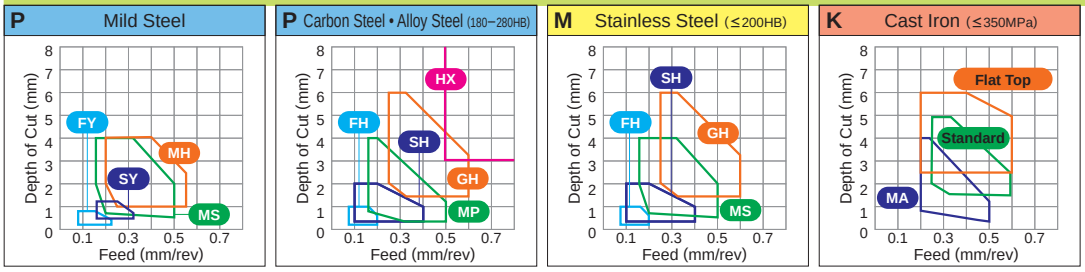
CHIP BREAKERS A036 GRADES A026 IDENTIFICATION A002

80° WN TYPE INSERTS WITH HOLE

WNMG 08 04 04 - MH
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting···· Semi-Heavy Cutting···· Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
	P	Steel					●	●	◕	✣	✣	✣	◕																				
	M	Stainless Steel												○	◕			●	◕		✣	✣	○			✣							
	K	Cast Iron														●				●	◕		●		●	●	✣	●	◕				
	N	Non-ferrous Metal																												◕	●		
	S	Heat-resistant Alloy, Titanium Alloy														●			●	◕	✣										●	◕	✣	
MH			Medium Cutting	Carbon Steel • Alloy Steel	**WNMG080404-MH**	0.4	○	●	●	●	●	▲	●			●																	A215 A279 A301 A303
					080408-MH	0.8	○	●	●	●	●	▲	●			●																	
					080412-MH	1.2	○	●	●	●	●	▲	●			●																	
Standard			Medium Cutting	Carbon Steel • Alloy Steel	**WNMG080404**	0.4	○	●	●	●		▲				●	●					●	●				●					A215 A279 A301 A303
					080408	0.8	○	●	●	●		▲				●	●			○		●	●				●		□			
					080412	1.2	○	●	●	●		▲				●	●			○		●	●				●					
					080416	1.6										●	●															
★ MW			Medium Cutting (Wiper)	Carbon Steel • Alloy Steel	**WNMG060408-MW**	0.8	○	●	●	□				□			□	□															A215 A279 A301 A303
					060412-MW	1.2	○	●	●	□				□			□	□															
					080408-MW	0.8	○	●	●	□		▲	●			●	●																
					080412-MW	1.2	○	●	●			▲	●			●	●																
MS			Medium Cutting	Stainless Steel	**WNMG06T304-MS**	0.4			●			▲	□	●																			A215 A279 A301 A303
					06T308-MS	0.8			●			▲	□	●																			
					060404-MS	0.4			●			▲	□	●																			
					060408-MS	0.8			●			▲	□	●																			
					080404-MS	0.4			●	□		▲	●	●									●										
					080408-MS	0.8			●	□		▲	●	●	●			●	●	●	●		●			●			□	●	□	
					080412-MS	1.2			●	□		▲	●	●	●			●	●				●									
GH			Semi-Heavy Cutting	Carbon Steel • Alloy Steel	**WNMG080408-GH**	0.8	○	●	●	●		▲	●	●		●	●																A215 A279 A301 A303
					080412-GH	1.2	○	●	●	●		▲	●	●		●	●																
GJ			Semi-Heavy Cutting	Difficult-to-Cut Materials	**WNMG080408-GJ**	0.8									●				●												□		A215 A279 A301 A303
					080412-GJ	1.2									●				●												□		
					080416-GJ	1.6									●				□												□		
					100612-GJ	1.2													□												□		

★ Please refer to A024 before using the MW breaker (wiper insert).

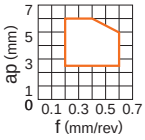
● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet	Carbide					Applicable Holder Page
			Re (mm)	UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
P	Steel	Shape: Flat Top		●	●	◔	✣	✣	✣	◔	○	◔						✣	✣	●	◔	●	●	●	✣						
M	Stainless Steel	Order Number: WNMA080404	0.4											●	●												●				
K	Cast Iron	080408	0.8		●									●	●										●		●				A215 A279 A301 A303
N	Non-ferrous Metal	080412	1.2		●									●	●																
S	Heat-resistant Alloy, Titanium Alloy	080416	1.6											●	●																

Chip Control Range
ap : Depth of Cut
f : Feed

Cast Iron



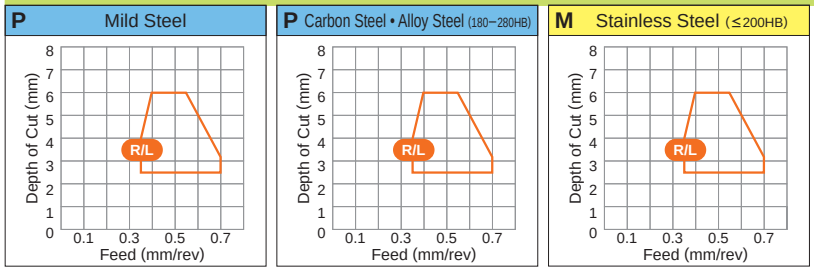
CHIP BREAKERS A036
GRADES A026
IDENTIFICATION A002

55° KN TYPE INSERTS WITHOUT HOLE

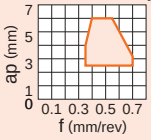
KNMX 19 05 04 R
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Semi-Heavy Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	Applicable Holder Page
	P	Steel				●	●	◔	✣	✣	✣	◔	○	◔		●	◔			✣	✣	●	◔	●	●	✣	●	●	✣	✣	●	◔	
	M	Stainless Steel																			○					✣							
	K	Cast Iron													●	◔			✣	✣	●			●	●	✣					●	◔	
			R/L Semi-Heavy Cutting  Carbon Steel • Alloy Steel	KNMX190504R	0.4			●			▲																							–
				190508R	0.8			●			▲																●						
				190508L	0.8																						●						
				190512R	1.2			●			▲																						

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

CHIP BREAKERS A056

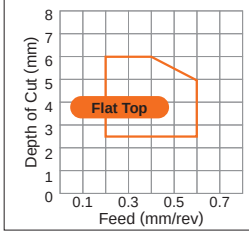
90° SN TYPE INSERTS WITHOUT HOLE

SNMN 09 03 04
Size Thickness Corner Radius
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Semi-Heavy Cutting ····

K Cast Iron (≤350MPa)



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	Carbide: UTi20T	HTi05T	HT10	RT9005	RT9010	TF15	Applicable Holder Page
	P	Steel				●	●	◔	✣	✣	✣	◔										●	◔	●	●	●	✣						
	M	Stainless Steel											●	◔						✣	✣	●					✣						
	K	Cast Iron														●	◔			✣	✣	●			●	●	✣	●	◔				
	N	Non-ferrous Metal																											◔	●			
	S	Heat-resistant Alloy, Titanium Alloy													●			●	◔	✣										●	◔	✣	
Flat Top			Cast Iron ap (mm) 7 5 3 1 0 · 0.1 0.3 0.5 0.7 f (mm/rev)	**SNMN090304**	0.4																							□					A201 A204 A205
				090308	0.8																						□					
				120308	0.8																							●				
				120408	0.8		●									●	●					●						●	●	●			
				120412	1.2		●									●	●					●						●	□	●			
				120416	1.6		●									●	●											●					
				120420	2.0		●																						●				
				150412	1.2																							●					
				190412	1.2																							●					
Flat Top			Cast Iron ap (mm) 7 5 3 1 0 · 0.1 0.3 0.5 0.7 f (mm/rev)	**SNGN090304**	0.4																									●			A201 A204 A205
				090308	0.8																									●			
				120308	0.8																									●			
				120404	0.4																	▲		▲				●	●	●			
				120408	0.8																	▲		▲				●	●	●			
				120412	1.2																	▲						□	●	●			

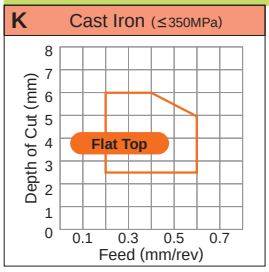
CHIP BREAKERS A056 GRADES A026 IDENTIFICATION A002

60° TN TYPE INSERTS WITHOUT HOLE

TNMN 16 03 08
Size Thickness Corner Radius
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Semi-Heavy Cutting ····



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated													Cermet		Coated Cermet		Carbide						Applicable Holder Page
							UE6105	UE6005	UE6110	UE6020	UE6035	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	UTi20T	HTi05T	HTi10	RT9005	RT9010	TF15	
	P	Steel					●	●	◔	✣	✣	✣	◔	○	◔						✣	✣	●	◔	●	●	●	✣						
	M	Stainless Steel																			✣	○						✣						
	K	Cast Iron															●	◔					●			●	●	✣	●	◔				
	N	Non-ferrous Metal																												◔	●			
	S	Heat-resistant Alloy, Titanium Alloy														●			●	◔	✣										●	◔	✣	
			Flat Top	Cast Iron	**TNMN160308**	0.8																	●					●		□				A208 A210
					160408	0.8		●									●	●					●					●		□				
					160412	1.2		●									●	●																
					160416	1.6		●									●	●																
					160420	2.0		●									●	●																
					220408	0.8																□	●					●						
					220412	1.2																						●						
			Flat Top	Cast Iron	**TNGN110304**	0.4																	●							●				A208 A210
					110308	0.8																								●				
					160304	0.4																						●		●				
					160308	0.8																	●					●		●				
					160404	0.4																						●		●				
					160408	0.8																	●					●		●				
					160412	1.2																								●				

● : Inventory maintained in Japan. (10 inserts in one case)
□ : Non stock, produced to order only.

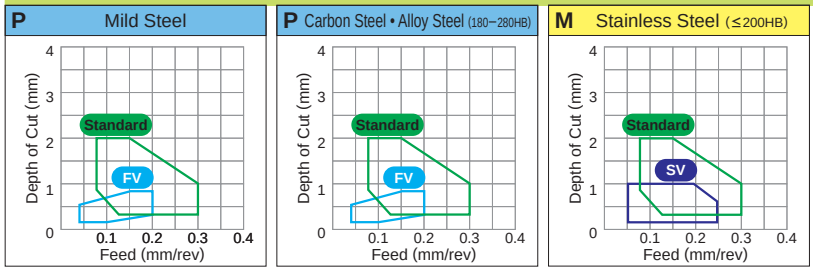
CHIP BREAKERS A056

80° CC TYPE INSERTS WITH HOLE

CCMT 06 02 02 - FV
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide				Applicable Holder Page
			Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
	P	Steel		●	◔	✣	✣	◔	○	◔						✣	✣	●	◔	●	●	◔	●	✣					
	M	Stainless Steel							○	◔						✣	✣	○						✣					
	K	Cast Iron										●	◔					●			●	●		✣	●	◔			
	N	Non-ferrous Metal																								◔			
	S	Heat-resistant Alloy, Titanium Alloy									●				●	◔	✣										◔	✣	
FV Finish Cutting	Carbon Steel • Alloy Steel	CCMT060202-FV	0.2			●												●	●		●		●						A216 A242 A270 A294 A298
		060204-FV	0.4			●												●	●		●		●						
		09T302-FV	0.2			●												●	●				●						
		09T304-FV	0.4			●												●	●		●		●						
		09T308-FV	0.8			●												●	●		●		●						
FJ Finish Cutting	Difficult-to-Cut Materials	CCGT09T301-FJ	0.1												□												□		A216 A242 A294 A298
		09T302-FJ	0.2												□												□		
		09T304-FJ	0.4												□												□		
AZ Finish Cutting	Aluminium Alloy	CCGT060202-AZ	0.2																							●			A216 A242 A270 A294 A298
		060204-AZ	0.4																							●			
		09T302-AZ	0.2																							●			
		09T304-AZ	0.4																							●			
		09T308-AZ	0.8																							●			
		120402-AZ	0.2																							●			
		120404-AZ	0.4																							●			
		120408-AZ	0.8																							●			
L-F Finish Cutting	Carbon Steel • Alloy Steel	CCGT03S1V3L-F	0.03													●		●											A280
		03S101L-F	0.1													●		●											
		03S102L-F	0.2													●		●											
		03S104L-F	0.4													●		●											
		04T0V3L-F	0.03													●		●											
		04T001L-F	0.1													●		●											
		04T002L-F	0.2													●		●											
		04T004L-F	0.4													●		●											
R/L-F Finish Cutting	Carbon Steel • Alloy Steel	CCGH060202R-F	0.2													●		●			□					●			A216 A242 A270 A294 A298
		060202L-F	0.2													●		●			●					●			
		060204R-F	0.4													●		●			□					●			
		060204L-F	0.4													●		●			●					●			

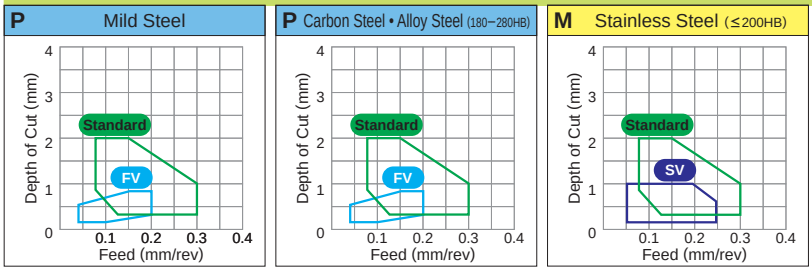
CHIP BREAKERS A046 GRADES A026 IDENTIFICATION A002

80° CC TYPE INSERTS WITH HOLE

CCMH 06 02 02 - SV
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material		Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	VP45N	Carbide UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
P	Steel																													
M	Stainless Steel																													
K	Cast Iron																													
N	Non-ferrous Metal																													
S	Heat-resistant Alloy, Titanium Alloy																													
		SV Light Cutting	Carbon Steel • Alloy Steel	**CCMH060202-SV**	0.2		●			●	●						●		●	●			●						A216 A242 A270 A294 A298
				060204-SV	0.4		●			●	●						●		●	●			●						
		★ SW Light Cutting (Wiper)	Carbon Steel • Alloy Steel	**CCMT060202-SW**	0.2		●	●			●									●			□							A216 A242 A270 A294 A298
				060204-SW	0.4		●	●			●				□					●			□							
				09T302-SW	0.2		●	●			●				□					●			□							
				09T304-SW	0.4		●	●			●				□					●			□							
		R/L-SS Light Cutting	Carbon Steel • Alloy Steel	**CCGT0602V3R-SS**	0.03													●												A216 A242 A270 A294 A298
				0602V3L-SS	0.03													●												
				060201R-SS	0.1													●												
				060201L-SS	0.1													●												
				060202R-SS	0.2													●												
				060202L-SS	0.2													●												
				09T3V3R-SS	0.03													●												
				09T3V3L-SS	0.03													●												
				09T301R-SS	0.1													●												
				09T301L-SS	0.1													●												
				09T302R-SS	0.2													●												
				09T302L-SS	0.2													●												
		Standard Medium Cutting	Carbon Steel • Alloy Steel	**CCMT060202**	0.2		●	●	▲		●				●					●	●		●			●					A216 A242 A270 A294 A298
				060204	0.4		●	●	▲		●				●			○	●	●	●		●		●					
				060208	0.8		●	●	▲		●				□			○		□			□		●					
				080302	0.2		●																							
				080304	0.4		●	□	▲		●									●	●		●			●					
				080308	0.8		●	□	▲		●									□			□			●					
				09T302	0.2		●	●	▲		●									●	●		●								
				09T304	0.4		●	●	▲		●				●			○		●	●		●			●					
				09T308	0.8		●	●	▲		●				●			○	●	●	●		●			●					
				120404	0.4		●	●	▲		●				●			○		●	●		●			●					
				120408	0.8		●	●	▲		●				●			○		●	●		●			●					
				120412	1.2		●	●	▲		●				□					□	●		□								

★ Please refer to A024 before using the SW breaker (wiper insert).

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	VP45N	Carbide: UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
	P	Steel				●	◕	✣	✣	◕	○	◕						✣	✣	●	◕	●	●	●	◕	✣						
	M	Stainless Steel									○	◕								●	○					✣						
	K	Cast Iron												●	◕					●			●	●					◕			
	N	Non-ferrous Metal																								✣	●	◕				
	S	Heat-resistant Alloy, Titanium Alloy											●			●	◕	✣											◕	✣		
MV			Carbon Steel • Alloy Steel; Medium Cutting	CCMH060202-MV	0.2			●			●	●						●		●	●		●	●							A216 A242 A270 A294 A298
				060204-MV	0.4			●			●	●						●		●	●		●	●							
* **MW**			Carbon Steel • Alloy Steel; Medium Cutting (Wiper)	CCMT060204-MW	0.4			●			●									●			□								A216 A242 A270 A294 A298
				060208-MW	0.8		●	●			●									●			□								
				09T304-MW	0.4		●	●			●									●			□								
				09T308-MW	0.8		●	●			●									●			□								
				120404-MW	0.4		●	●			●				□					●			□								
				120408-MW	0.8		●	●			●				□					●			□								
R/L-SR			Carbon Steel • Alloy Steel; Medium Cutting	CCET0602V3R-SR	0.03													●		●								●		A216 A242 A270 A294 A298
				0602V3L-SR	0.03													●		●								●		
				060201R-SR	0.1													●		●								●		
				060201L-SR	0.1													●		●								●		
				060202R-SR	0.2													●		●								●		
				060202L-SR	0.2													●		●								●		
				060204R-SR	0.4													●		●								●		
				060204L-SR	0.4													●		●								●		
				09T3V3R-SR	0.03													●		●								●		
				09T3V3L-SR	0.03													●		●								●		
				09T301R-SR	0.1													●		●								●		
				09T301L-SR	0.1													●		●								●		
				09T302R-SR	0.2													●		●								●		
				09T302L-SR	0.2													●		●								●		
				09T304R-SR	0.4													●		●								●		
				09T304L-SR	0.4													●		●								●		
R/L-SN			Carbon Steel • Alloy Steel; Medium Cutting	CCET060200R-SN	0													●		●								●		A216 A242 A270 A294 A298
				060200L-SN	0													●		●								●		
				0602V3R-SN	0.03													●		●								●		
				0602V3L-SN	0.03													●		●								●		
				060201R-SN	0.1													●		●								●		
				060201L-SN	0.1													●		●								●		
				060202R-SN	0.2													●		●								●		
				060202L-SN	0.2													●		●								●		
				060204R-SN	0.4													●		●								●		
				060204L-SN	0.4													●		●								●		
				09T300R-SN	0													●		●								●		
				09T300L-SN	0													●		●								●		
				09T3V3R-SN	0.03													●		●								●		
				09T3V3L-SN	0.03													●		●								●		
				09T301R-SN	0.1													●		●								●		
				09T301L-SN	0.1													●		●								●		
				09T302R-SN	0.2													●		●								●		
				09T302L-SN	0.2													●		●								●		
				09T304R-SN	0.4													●		●								●		
				09T304L-SN	0.4													●		●								●		

* Please refer to A024 before using the MW breaker (wiper insert).

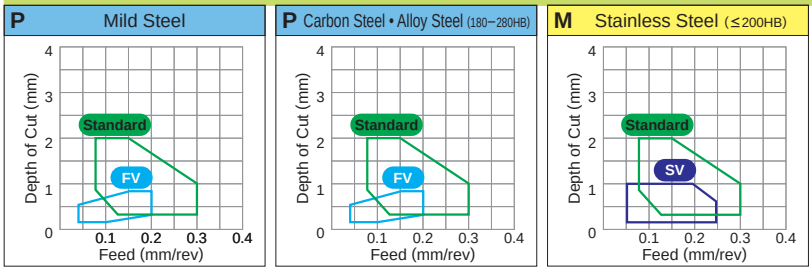
CHIP BREAKERS A046 GRADES A026 IDENTIFICATION A002

80° CC TYPE INSERTS WITH HOLE

CCGT 06 02 V3 R-SN
Size Thickness Corner Radius Chip Breaker
∗ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
	P	Steel	●	◔	✣	✣	◔	○	◔		●	◔		✣	✣	●	◔	●	●	●	◔	✣	✣					
	M	Stainless Steel														○						✣					
	K	Cast Iron									●	◔				●			●	●		✣	●	◔			
	N	Non-ferrous Metal																						◔			
	S	Heat-resistant Alloy, Titanium Alloy							●				●	◔	✣										✣		
Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
R/L-SN	Carbon Steel • Alloy Steel	CCGT0602V3R-SN	0.03													●											A216 A242 A270 A294 A298
		060201R-SN	0.1													●											
		060201L-SN	0.1													●											
		060202R-SN	0.2													●											
		060202L-SN	0.2													●											
		09T3V3R-SN	0.03													●											
		09T3V3L-SN	0.03													●											
		09T301R-SN	0.1													●											
		09T301L-SN	0.1													●											
		09T302R-SN	0.2													●											
		09T302L-SN	0.2													●											
		09T304R-SN	0.4													●											
Medium Cutting		09T304L-SN	0.4													●											
R/LW-SN ∗	Carbon Steel • Alloy Steel	CCET0602V3RW-SN	0.03													●											A216 A242 A270 A294 A298
		0602V3LW-SN	0.03													●											
		09T3V3RW-SN	0.03													●											
Medium Cutting (Wiper)		09T3V3LW-SN	0.03													●											
SMG	Carbon Steel • Alloy Steel	CCGT060202M-SMG	0.2													●											A216 A242 A270 A294 A298
		060204M-SMG	0.4													●											
Medium Cutting																											
Flat Top	Cast Iron	CCMW060202	0.2																						●		A216 A242 A270 A294 A298
		060204	0.4									●	●											●	●		
		09T304	0.4									●	●												●		
		09T308	0.8									●	●											●	●		
		120404	0.4									●	●												●		
		120408	0.8									●	●												●		
		120412	1.2									□	□														
Flat Top	Cast Iron	CCGW060200	0															●	▲								A216 A242 A270 A294 A298
		0602V5	0.05															●	▲								
		09T300	0															●	▲								
		09T3V5	0.05															●	▲								

∗ Please refer to A024 before using the R/LW-SN breaker (wiper insert).

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

CHIP BREAKERS A046

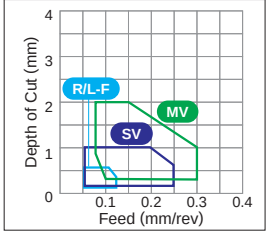
80° CP TYPE INSERTS WITH HOLE

CPMH 08 02 04 R-F
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

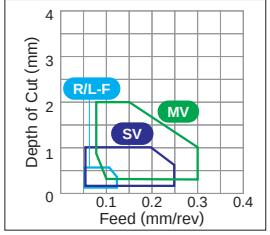
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting····

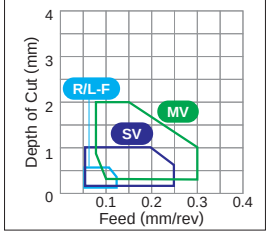
P Mild Steel



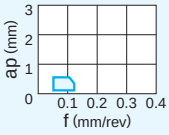
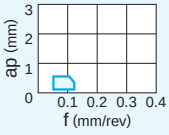
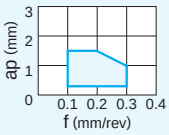
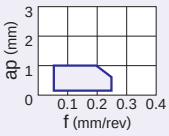
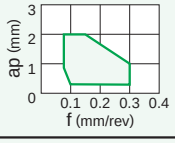
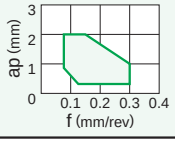
P Carbon Steel • Alloy Steel (180–280HB)



M Stainless Steel (≤200HB)



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
	P	Steel	●	◕	✣	✣	◕	○	◕		●	◕		✣	✣	○	●	◕	●	●	◕	✣	✣			◕	✣	
	M	Stainless Steel						●	◕							●						✣					
	K	Cast Iron								●	◕					●			●	●		✣	●	◕			
	N	Non-ferrous Metal																						◕			
	S	Heat-resistant Alloy, Titanium Alloy										●	◕	✣											◕	✣	
Shape / Chip Control Range (ap : Depth of Cut, f : Feed)		Order Number	Corner R Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
R/L-F Finish Cutting		Carbon Steel • Alloy Steel 	CPMH080204R-F	0.4												●			●		□				●			A270
		080204L-F	0.4												●			●		●				●			
		090304R-F	0.4												●			●		□				●			
		090304L-F	0.4												●			●		●				●			
R/L-F Finish Cutting		Carbon Steel • Alloy Steel 	CPGT080204R-F	0.4												●								□				–
		080204L-F	0.4												●								□				
		090302R-F	0.2												●												
		090302L-F	0.2												●								●				
		090304R-F	0.4												●								□				
		090304L-F	0.4												●								●				
Standard Finish Cutting		Aluminium Alloy 	CPGT080202	0.2																					●			–
		080204	0.4																						●			
		090302	0.2																						●			
		090304	0.4																						●			
SV Light Cutting		Carbon Steel • Alloy Steel 	CPMH080202-SV	0.2		●			●	●						●		●	●			●						A270
		080204-SV	0.4			●			●	●						●		●	●			●						
		090302-SV	0.2			●			●	●						●		●	●			●						
		090304-SV	0.4			●			●	●						●		●	●			●						
		090308-SV	0.8			●			●	●						●		●	●			●						
MV Medium Cutting		Carbon Steel • Alloy Steel 	CPMH080204-MV	0.4		●			●	●						●		●	●		●	●						A270
		080208-MV	0.8			●			●	●						●		●	●		●	●						
		090304-MV	0.4			●			●	●						●		●	●		●	●						
		090308-MV	0.8			●			●	●						●		●	●		●	●						
Standard Medium Cutting		Carbon Steel • Alloy Steel 	CPMX080204	0.4	●	□	▲									●		●						●				A270
		080208	0.8	●	□	▲									□		●						●					
		090304	0.4	●	●	▲									●		●						●					
		090308	0.8	●	●	▲									●		●						●					

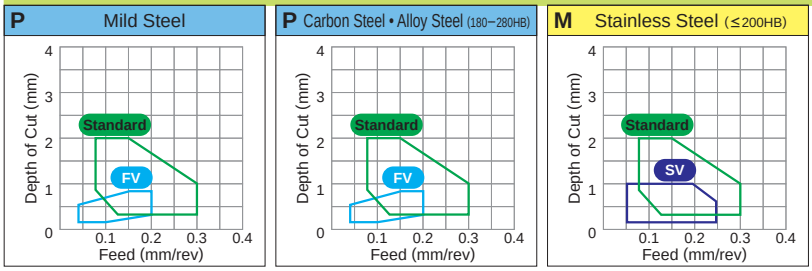
CHIP BREAKERS A050 GRADES A026 IDENTIFICATION A002

55° DC TYPE INSERTS WITH HOLE

DCMT 07 02 02 - FV
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

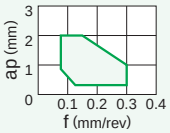
Work Material			Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
P	Steel		●	◕	✣	✣	◕											●	◕	●	●	●	◕	✣				
M	Stainless Steel							○	◕					✣	✣	○						✣						
K	Cast Iron									●	◕					●			●	●		✣	●	◕				
N	Non-ferrous Metal																							◕				
S	Heat-resistant Alloy, Titanium Alloy											●		●	◕	✣									◕	✣		
Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
FV	Carbon Steel • Alloy Steel	**DCMT070202-FV**	0.2		□	●												●	●		●							A217 A243 A258 A272 A273 A293 A295
		070204-FV	0.4		□	●												●	●		●							
		11T304-FV	0.4		□	●												●	●		●							
		11T308-FV	0.8		□	●												●	●		●							
Finish Cutting																												
AZ	Aluminium Alloy	**DCGT070202-AZ**	0.2																						●			A217 A243 A258 A272 A273 A293 A295
		070204-AZ	0.4																						●			
		11T302-AZ	0.2																						●			
		11T304-AZ	0.4																						●			
Finish Cutting		**11T308-AZ**	0.8																						●			
R/L-F	Carbon Steel • Alloy Steel	**DCGT070202R-F**	0.2													●		●			□				●			A217 A243 A258 A272 A273 A293 A295
		070202L-F	0.2													●		●			●				●			
		070204R-F	0.4													●		●			□				●			
		070204L-F	0.4													●		●			●				●			
		11T302R-F	0.2													●		●			□				●			
		11T302L-F	0.2													●		●			●				●			
		11T304R-F	0.4													●		●			□				●			
Finish Cutting		**11T304L-F**	0.4													●		●			●				●			
SV	Carbon Steel • Alloy Steel	**DCMT070202-SV**	0.2		□	●			●	●						●		●	●				●					A217 A243 A258 A272 A273 A293 A295
		070204-SV	0.4		□	●			●	●						●		●	●				●					
		070208-SV	0.8		□	●			●	●						●		●	●				●					
		11T302-SV	0.2		□	●			●	●						●		●	●				●					
		11T304-SV	0.4		□	●			●	●						●		●	●				●					
Light Cutting		**11T308-SV**	0.8		□	●			●	●						●		●	●				●					
R/L-SS	Carbon Steel • Alloy Steel	**DCGT0702V3R-SS**	0.03													●												A217 A243 A258 A272 A273 A293 A295
		0702V3L-SS	0.03													●												
		070201R-SS	0.1													●												
		070201L-SS	0.1													●												
		070202R-SS	0.2													●												
		070202L-SS	0.2													●												
		11T3V3R-SS	0.03													●												
		11T301R-SS	0.1													●												
Light Cutting		**11T302R-SS**	0.2													●												

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

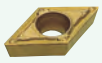
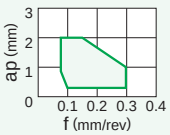
Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	● ◕ ✣ ✣ ◕ ○ ◕ ✣ ✣ ● ◕ ● ● ◕ ✣ ● ● ◕ ✣ ● ◕ ✣
M	Stainless Steel	○ ◕ ○ ✣
K	Cast Iron	● ● ● ● ● ● ✣ ● ● ●
N	Non-ferrous Metal	● ● ● ◕ ✣
S	Heat-resistant Alloy, Titanium Alloy	● ◕ ✣ ● ✣

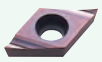
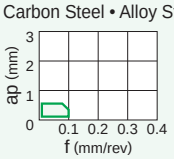
Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	VP45N	Carbide: UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
Standard	DCMT070202	0.2	●	●		▲		●									●	●		●			●					A217 A243 A258 A272 A273 A293 A295
	070204	0.4	●	●		▲		●				□			○		●	●		●			●					
	070208	0.8	□					□				□					●	●		●								
	11T302	0.2	●	●		▲		●									●	●		●			●					
	11T304	0.4	●	●		▲		●				●			○		●	●		●			●					
	11T308	0.8	●	●		▲		●				●			○	□	●	●		●			●					
	11T312	1.2	●																									
	150404	0.4	●	●		▲		●				□					●	●		●			●					
	150408	0.8	●	●		▲		●				□					●	●		●			●					
	150412	1.2	●	□		▲		□															□					
MV	DCMT070202-MV	0.2	□	●				●	●						●		●	●		●		●						A217 A243 A258 A272 A273 A293 A295
	070204-MV	0.4	□	●				●	●						●		●	●		●		●						
	070208-MV	0.8	□	●				●	●						●		●	●		●		●						
	11T302-MV	0.2	□	●				●	●						●		●	●		●		●						
	11T304-MV	0.4	□	●				●	●						●		●	●		●		●						
	11T308-MV	0.8	□	●				●	●						●		●	●		●		●						
R/L-SR	DCET0702V3R-SR	0.03													●		●								●			A217 A243 A258 A272 A273 A293 A295
	0702V3L-SR	0.03													●		●								●			
	070201R-SR	0.1													●		●								●			
	070201L-SR	0.1													●		●								●			
	070202R-SR	0.2													●		●								●			
	070202L-SR	0.2													●		●								●			
	070204R-SR	0.4													●		●								●			
	070204L-SR	0.4													●		●								●			
	11T3V3R-SR	0.03													●		●								●			
	11T3V3L-SR	0.03													●		●								●			
	11T301R-SR	0.1													●		●								●			
	11T301L-SR	0.1													●		●								●			
	11T302R-SR	0.2													●		●								●			
	11T302L-SR	0.2													●		●								●			
	11T304R-SR	0.4													●		●								●			
	11T304L-SR	0.4													●		●								●			
R/L-SN	DCET070200R-SN	0													●		●								●			A217 A243 A258 A272 A273 A293 A295
	070200L-SN	0													●		●								●			
	0702V3R-SN	0.03													●		●								●			
	0702V3L-SN	0.03													●		●								●			
	070201R-SN	0.1													●		●								●			
	070201L-SN	0.1													●		●								●			
	070202R-SN	0.2													●		●								●			
	070202L-SN	0.2													●		●								●			
	070204R-SN	0.4													●		●								●			
	070204L-SN	0.4													●		●								●			
	11T300R-SN	0													●		●								●			
	11T300L-SN	0													●		●								●			
	11T3V3R-SN	0.03													●		●								●			
	11T3V3L-SN	0.03													●		●								●			



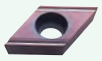
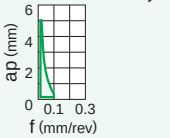
Medium Cutting

Medium Cutting

Medium Cutting

Medium Cutting

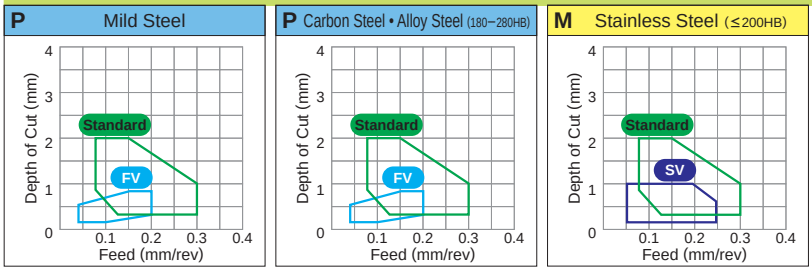
CHIP BREAKERS A046
GRADES A026
IDENTIFICATION A002

55° DC TYPE INSERTS WITH HOLE

DCET 11 T3 01 R-SN
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

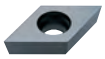
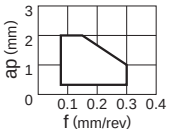
Work Material		
P	Steel	● ◔ ✣ ✣ ◔ ○ ◔ ● ● ✣ ✣ ○ ● ◔ ◔ ● ◔ ✣ ✣ ○ ● ● ✣ ● ◔ ◔ ◔
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	VP45N	Carbide UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
R/L-SN	Carbon Steel • Alloy Steel ap (mm) 0 2 4 6 / 0.1 0.3 f (mm/rev) Medium Cutting	DCET11T301R-SN	0.1													●		●								●			A217 A243 A258 A272 A273 A293 A295
		11T301L-SN	0.1													●		●								●			
		11T302R-SN	0.2													●		●								●			
		11T302L-SN	0.2													●		●								●			
		11T304R-SN	0.4													●		●								●			
		11T304L-SN	0.4													●		●								●			
R/L-SN	Carbon Steel • Alloy Steel ap (mm) 0 2 4 6 / 0.1 0.3 f (mm/rev) Medium Cutting	DCGT0702V3R-SN	0.03													●													A217 A243 A258 A272 A273 A293 A295
		070201R-SN	0.1													●													
		070202R-SN	0.2													●													
		070202L-SN	0.2													●													
		11T3V3R-SN	0.03													●													
		11T3V3L-SN	0.03													●													
		11T301R-SN	0.1													●													
		11T301L-SN	0.1													●													
		11T302R-SN	0.2													●													
		11T302L-SN	0.2													●													
		11T304R-SN	0.4													●													
		11T304L-SN	0.4													●													
R/LW-SN *	Carbon Steel • Alloy Steel ap (mm) 0 2 4 6 / 0.1 0.3 f (mm/rev) Medium Cutting (Wiper)	DCET0702V3RW-SN	0.03													●													A217 A243 A258 A272 A293
		0702V3LW-SN	0.03													●													
		11T3V3RW-SN	0.03													●													
		11T3V3LW-SN	0.03													●													
SMG	Carbon Steel • Alloy Steel ap (mm) 0 1 2 3 / 0.1 0.2 0.3 0.4 f (mm/rev) Medium Cutting	DCGT070202M-SMG	0.2													●													A217 A243 A258 A272 A273 A293 A295
		070204M-SMG	0.4													●													
		11T302M-SMG	0.2													●													
		11T304M-SMG	0.4													●													
Flat Top	Cast Iron ap (mm) 0 1 2 3 / 0.1 0.2 0.3 0.4 f (mm/rev)	DCMW070202	0.2																							□			A217 A243 A258 A272 A273 A293 A295
		070204	0.4									□	□													●			
		11T304	0.4									●	●											●		●			
		11T308	0.8									●	●													●			
		150404	0.4										□													●			
		150408	0.8									□	□													●			

★ Please refer to A024 before using the R/LW-SN breaker (wiper insert).

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
				UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel	Shape	Re (mm)																								
M	Stainless Steel	Chip Control Range ap : Depth of Cut f : Feed	Order Number																								
K	Cast Iron	**Flat Top**	**DCGW070200**	0														●		▲								A217
N	Non-ferrous Metal		**0702V5**	0.05														●		▲								A243 A258
S	Heat-resistant Alloy, Titanium Alloy	Cast Iron 	**11T300**	0														●		▲								A272 A273
			11T3V5	0.05														●		▲								A293 A295

CHIP BREAKERS A046 GRADES A026 IDENTIFICATION A002

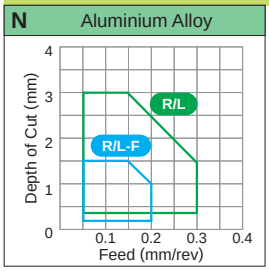
55° DE TYPE INSERTS WITH HOLE

DEGX 15 04 02 R-F
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

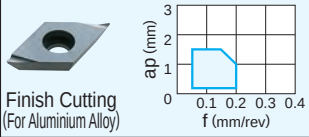
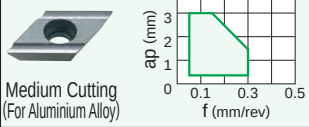
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Medium Cutting····

N Aluminium Alloy



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
			Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
	P	Steel		●	◕	✣	✣	◕	○	◕						✣	✣	○			●	◕	●	◕	✣					
	M	Stainless Steel							○	◕						✣	✣	○							✣					
	K	Cast Iron										●	◕					●			●	●		✣	●	◕				
	N	Non-ferrous Metal																								◕			
	S	Heat-resistant Alloy, Titanium Alloy									●				●	◕	✣							✣			◕	✣	
R/L-F Finish Cutting (For Aluminium Alloy) 		**DEGX150402R-F**	0.2																						●			A228
		150402L-F	0.2																						●			
		150404R-F	0.4																						●			
		150404L-F	0.4																						●			
R/L Medium Cutting (For Aluminium Alloy) 		**DEGX150402R**	0.2																						●			A228
		150402L	0.2																						●			
		150404R	0.4																						●			
		150404L	0.4																						●			

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

CHIP BREAKERS A054

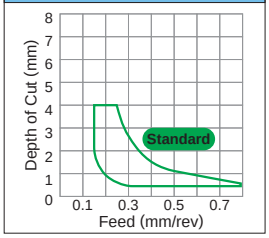
RC TYPE INSERTS WITH HOLE

RCGT 08 03 M0- AZ
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

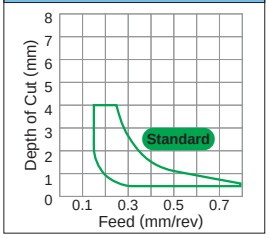
CHIP CONTROL RANGE FOR WORK MATERIALS

Medium Cutting ····

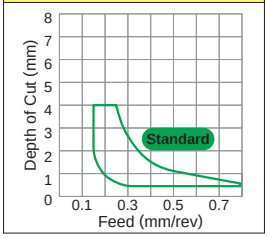
P Mild Steel



P Carbon Steel • Alloy Steel (180–280HB)



M Stainless Steel (≤200HB)



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	VP45N	Carbide UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
	P	Steel																													
	M	Stainless Steel																													
	K	Cast Iron																													
	N	Non-ferrous Metal																													
	S	Heat-resistant Alloy, Titanium Alloy																													
			AZ Finish Cutting	Aluminium Alloy	**RCGT0803M0-AZ**	–																							●		A219
					10T3M0-AZ	–																							●		
			Standard Medium Cutting	Carbon Steel • Alloy Steel	**RCMT0602M0**	–		●												●	●					●				A219
					0803M0	–		●		▲		●								●	●					●				
			Standard Medium Cutting	Carbon Steel • Alloy Steel	**RCMX1003M0**	–		●	●	▲		●	●				●	●		●	●					●				A218 A438
					1204M0	–		●	●	▲		●	●		●	●	●			●	●					●				
					1606M0	–		●	●	●	▲		●	●			●	●									□				
					2006M0	–		●	●	●	▲		●														●				
					2507M0	–		●	●	●	▲																				
					3209M0	–		□	□	●																					
			RR Heavy Cutting	Carbon Steel • Alloy Steel	**RCMX1606M0-RR**	–		□	□	●			□																		A218
					2006M0-RR	–		□	□	●			□																		
					2507M0-RR	–		□	□	●			□																		
					3209M0-RR	–		□	□	●			□																		
			RBS Heavy Cutting	Mild Steel	**RCMX1606M0-RBS**	–				●																					A218
					2006M0-RBS	–				●																					
					2507M0-RBS	–				●																					
					3209M0-RBS	–				●																					

CHIP BREAKERS A046 GRADES A026 IDENTIFICATION A002

RD TYPE INSERTS WITH HOLE

RDGH 12 04 00 - M4
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated											Cermet			Coated Cermet			Carbide					Applicable Holder Page
							UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel	● ◐ ✣ ✣ ◐	M4 For Special Use (For Rotary Tools)		RDGH120400-M4	–							●																		●	A231
M	Stainless Steel	○ ◐																														
K	Cast Iron	● ◐																														
N	Non-ferrous Metal	◐																														
S	Heat-resistant Alloy, Titanium Alloy	● ◐ ✣																														

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

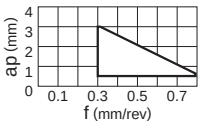
RG TYPE INSERTS WITH HOLE

RGGM 20 04 M0
Size Thickness Corner Radius
★ Please refer to page A002.

Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
			Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel			●	◕	✣	✣	◕	●	◕		●	◕			✣	✣	●	◕	●	●	●	◕	✣					
M	Stainless Steel								●	◕						✣	✣	●						✣					
K	Cast Iron											●	◕					●			●	●		✣	●	◕			
N	Non-ferrous Metal																									◕			
S	Heat-resistant Alloy, Titanium Alloy										●			●	◕	✣	✣										◕	✣	
Standard	Difficult-to-Cut Materials	**RGGM2004M0**	–																					●		●			–

(For General Cutting)



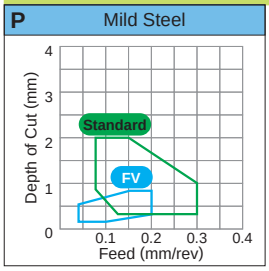
CHIP BREAKERS A054
GRADES A026
IDENTIFICATION A002

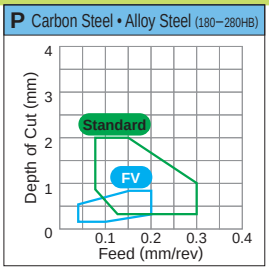
90° SC TYPE INSERTS WITH HOLE

SCMT 09 T3 04 - FV
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Medium Cutting····





Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material		Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	VP45N	Carbide: UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
P	Steel	FV	Carbon Steel • Alloy Steel	SCMT09T304-FV	0.4		●													●	●		●		●						A220 A297
M	Stainless Steel	Finish Cutting																													
K	Cast Iron	Standard	Carbon Steel • Alloy Steel	SCMT09T304	0.4		●	●	▲		●				●					●	●		●			●						A220 A297
N	Non-ferrous Metal			09T308	0.8		●	●	▲		●				●					●	●		●			●					
S	Heat-resistant Alloy, Titanium Alloy	Medium Cutting		120404	0.4		●	□	▲		●				●					●	●		●			●					
				120408	0.8		●	●	▲		●				●					●	●		●			●					
				120412	1.2		●								□																
		Flat Top	Cast Iron	SCMW09T304	0.4									●	●											●		●			A220 A297
				09T308	0.8									●	●													□			
				120404	0.4									●	●																
				120408	0.8									●	●													□			
				120412	1.2										□																

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

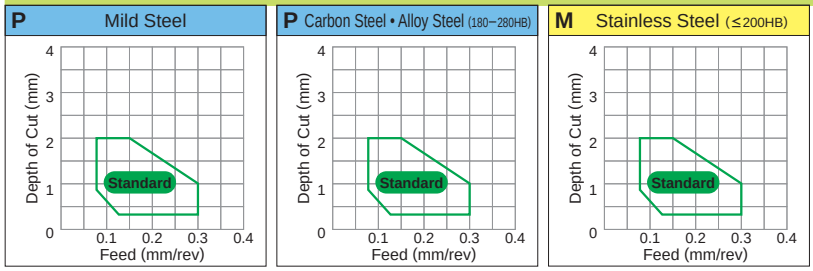
CHIP BREAKERS A046

90° SP TYPE INSERTS WITH HOLE

SPMT 09 03 04
Size Thickness Corner Radius
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Medium Cutting ····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
			Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
	P	Steel		●	◕	✣	✣	◕	○	◕		●	◕			✣	✣	○			●	◕	◕	✣					
	M	Stainless Steel							○	◕								○						✣					
	K	Cast Iron										●	◕					●			●	●		✣	●	◕			
	N	Non-ferrous Metal																								◕			
	S	Heat-resistant Alloy, Titanium Alloy									●			●	◕	✣											◕	✣	
Standard Medium Cutting	Carbon Steel • Alloy Steel	**SPMT090304**	0.4														●												–
		090308	0.8														●												
		120304	0.4														●												
		120308	0.8														●							●					
Flat Top	Cast Iron	**SPMW090304**	0.4														●	●						●	●				–
		090308	0.8														●	●						●	●				
		120304	0.4														●	●						●	●				
		120308	0.8														●	●						●	●				
Flat Top	Cast Iron	**SPGX090304**	0.4														●	●							●				–
		090308	0.8														●	●	▲						●				
		120304	0.4																						●				
		120308	0.8																						●				

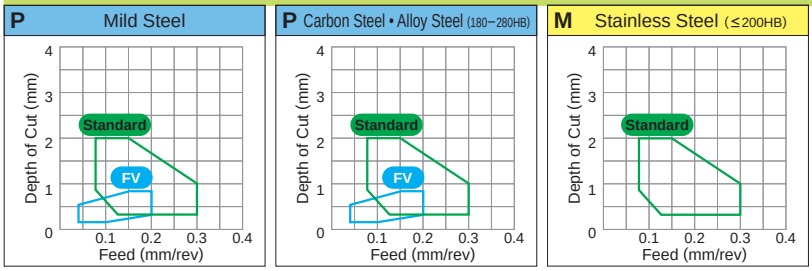
CHIP BREAKERS A050 GRADES A026 IDENTIFICATION A002

60° TC TYPE INSERTS WITH HOLE

TCMT 11 02 04 - FV
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Medium Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
		Corner R Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel		●	◔	✣	✣	◔								✣	✣	●	◔	◔	●	◔	◔	✣					
M	Stainless Steel							○	◔						✣		○						✣					
K	Cast Iron										●	◔					●			●	●		✣	●	◔			
N	Non-ferrous Metal																								◔			
S	Heat-resistant Alloy, Titanium Alloy									●			●	◔	✣											◔	✣	
FV Finish Cutting	Carbon Steel • Alloy Steel	**TCMT110204-FV**	0.4		●												●	●		●		●						A221 A292
		16T304-FV	0.4		●												●	●		●		●						
AZ Finish Cutting	Aluminium Alloy	**TCGT110202-AZ**	0.2																					●				A221 A292
		110204-AZ	0.4																					●				
		110208-AZ	0.8																					●				
		16T302-AZ	0.2																					●				
		16T304-AZ	0.4																					●				
		16T308-AZ	0.8																					●				
R/L-F Finish Cutting	Carbon Steel • Alloy Steel	**TCGT0601V3L-F**	0.03												□		●											A281
		060101L-F	0.1												●		●											
		060102R-F	0.2												●		●						●	●				
		060102L-F	0.2												●		●						●	●				
		060104R-F	0.4												□		●						●	●				
		060104L-F	0.4												●		●						●	●				
Standard Medium Cutting	Carbon Steel • Alloy Steel	**TCMT080204**	0.4		□			□									□	●		□			●					A221 A292
		090204	0.4	●	●		▲	□									●	●		●			●					
		110202	0.2	●	□		▲	●							○		●	●		●			□					
		110204	0.4	●	●		▲	●				□			○		●	●		●			●					
		110208	0.8	●											○													
		130302	0.2		□			□									□	●		□								
		130304	0.4	●	□		▲	●									●	●		●			●					
		16T304	0.4	●	●		▲	●				●			○		●	●		●			●					
		16T308	0.8	●	●		▲	●				●			○		●	●		●			●					
		16T312	1.2	●																								
Flat Top	Cast Iron	**TCMW110204**	0.4								□	□												●				A221 A292
		130304	0.4																					●				
		16T304	0.4								●	●												●				
		16T308	0.8								●	●												●				

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

CHIP BREAKERS A046

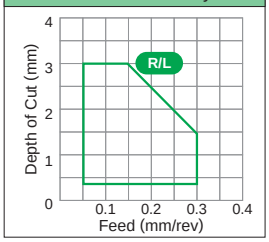
60° TE TYPE INSERTS WITH HOLE

TEGX 16 03 02 R
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

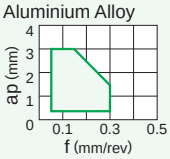
Medium Cutting ···· ●

N Aluminium Alloy



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	VP45N	Carbide: UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
	P	Steel	R/L	TEGX160302R	0.2																										
	M	Stainless Steel	Aluminium Alloy	160302L	0.2																										
	K	Cast Iron	Medium Cutting (For Aluminium Alloy)	160304R	0.4																										
	N	Non-ferrous Metal		160304L	0.4																										
	S	Heat-resistant Alloy, Titanium Alloy																												



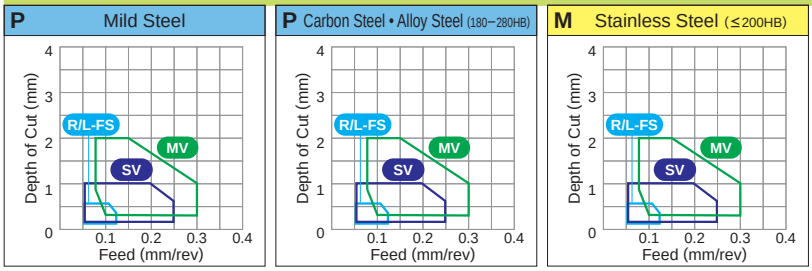
CHIP BREAKERS A054 GRADES A026 IDENTIFICATION A002

60° TP TYPE INSERTS WITH HOLE

TPGH 08 02 02 R-FS
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting····



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
			UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel		●	◕	✣	✣	◕																					
M	Stainless Steel							●	◕						✣	✣	●						✣					
K	Cast Iron										●	◕					●			●	●		✣	●	◕			
N	Non-ferrous Metal																								◕			
S	Heat-resistant Alloy, Titanium Alloy									●			●	◕	✣											◕	✣	
Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)																									
R/L-FS		**TPGH080202R-FS**	0.2												●		●			□					●			A271
		080202L-FS	0.2												●		●			●					●			
		080204R-FS	0.4												●		●			□					●			
		080204L-FS	0.4												●		●			●					●			
		090202R-FS	0.2												●		●			□					●			
		090202L-FS	0.2												●		●			●					●			
		090204R-FS	0.4												●		●			□					●			
		090204L-FS	0.4												●		●			●					●			
		110302R-FS	0.2												●		●			□					●			
		110302L-FS	0.2												●		●			●					●			
		110304R-FS	0.4												●		●			□					●			
		110304L-FS	0.4												●		●			●					●			
		160304R-FS	0.4												●		●			□					●			
		160304L-FS	0.4												●		●			●					●			
		160308R-FS	0.8												●		●			□					●			
		160308L-FS	0.8												●		●			●					●			
R/L		**TPGX080202R**	0.2														●											A289
		080202L	0.2														●		▲				●		●			
		080204R	0.4													●	●						●		●			
		080204L	0.4													●	●		▲				●		●			
		090202R	0.2														●		▲				●		●			
		090202L	0.2														●		▲				●	□	●			
		090204R	0.4													●	●		▲				●	□	●			
		090204L	0.4													●	●		▲				●	●	●			
		090208R	0.8														●						●		●			
		090208L	0.8													●	●		▲				●		●			
		110302R	0.2														●						□	●	●			
		110302L	0.2														●		▲				●	●	●			
		110304R	0.4													●	●		▲				●		●			
		110304L	0.4													●	●		▲				●		●			
		110308R	0.8														●						●		●			
		110308L	0.8													●	●		▲				●	●	●			

Carbon Steel • Alloy Steel
ap (mm) 0 1 2 3
0.1 0.2 0.3 0.4
f (mm/rev)

Finish Cutting

Carbon Steel • Alloy Steel
ap (mm) 0 1 2 3
0.1 0.2 0.3 0.4
f (mm/rev)

Finish Cutting

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	VP45N	Carbide: UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
	P	Steel				●	◐	✣	✣	◐	◐	◐						✣	✣	●	◐	●	●	●	◐	✣						
	M	Stainless Steel									◐	◐						✣	✣	◐						✣						
	K	Cast Iron												●	◐					●			●	●			✣	●	◐			
	N	Non-ferrous Metal																										◐			
	S	Heat-resistant Alloy, Titanium Alloy											●			●	◐	✣											✣		
L			Carbon Steel • Alloy Steel; ap (mm) 0–3; f (mm/rev) 0.1 0.2 0.3 0.4	TPMX080202L	0.2															□												
				080204L	0.4															□												
				090204L	0.4															●											A289
				110304L	0.4															●											
Finish Cutting																														
SV			Carbon Steel • Alloy Steel; ap (mm) 0–3; f (mm/rev) 0.1 0.2 0.3 0.4	TPMH080202-SV	0.2		●				●	●						●		●	●			●								
				080204-SV	0.4		●				●	●						●		●	●			●								
				090202-SV	0.2		●				●	●						●		●	●			●								
				090204-SV	0.4		●				●	●						●		●	●			●								
				110302-SV	0.2		●				●	●						●		●	●			●								
				110304-SV	0.4		●				●	●						●		●	●			●								
				110308-SV	0.8		●				●	●						●		●	●			●								
				160302-SV	0.2		●				●	●						●		●	●			●								
				160304-SV	0.4		●				●	●						●		●	●			●								
				160308-SV	0.8		●				●	●						●		●	●			●								
Light Cutting																														
MV			Carbon Steel • Alloy Steel; ap (mm) 0–3; f (mm/rev) 0.1 0.2 0.3 0.4	TPMH080202-MV	0.2		●				●	●						●		●	●		●	●								
				080204-MV	0.4		●				●	●						●		●	●		●	●								
				090202-MV	0.2		●				●	●						●		●	●		●	●								
				090204-MV	0.4		●				●	●						●		●	●		●	●								
				090208-MV	0.8		●											●			●											
				110302-MV	0.2		●				●	●						●		●	●		●	●								
				110304-MV	0.4		●				●	●						●		●	●		●	●								
				110308-MV	0.8		●				●	●						●		●	●		●	●								
				160304-MV	0.4		●				●	●						●		●	●		●	●								
				160308-MV	0.8		●				●	●						●		●	●		●	●								
Medium Cutting																														
Standard			Carbon Steel • Alloy Steel; ap (mm) 0–3; f (mm/rev) 0.1 0.2 0.3 0.4	TPMX110304	0.4															●	◐					□					
				110308	0.8															●	◐										A289
Medium Cutting																														
Flat Top			Cast Iron; ap (mm) 0–3; f (mm/rev) 0.1 0.2 0.3 0.4	TPGX080204	0.4													●		●	●					●		●			
				080208	0.8															●						●		●			
				090202	0.2																					●		●			
				090204	0.4													●		●	●	▲				●		●			
				090208	0.8													●		●	●					●	●	●			
				110302	0.2																							●			
				110304	0.4													●		●	●	▲				●	●	●			
				110308	0.8													●		●	●					●	●	●			
				160304	0.4													□		●						●		●			
				160308	0.8																					□		●			

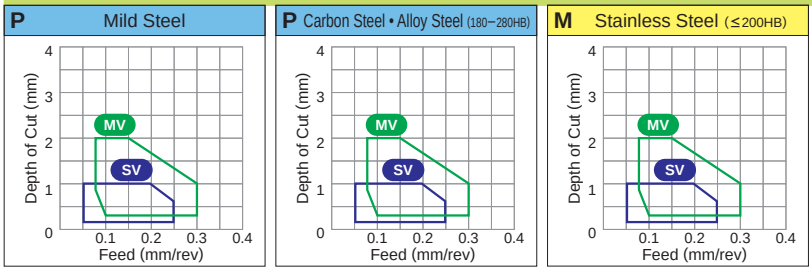
CHIP BREAKERS A050 GRADES A026 IDENTIFICATION A002

35° VB TYPE INSERTS WITH HOLE

VBGT 11 03 02 R-F
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Light Cutting ···· Medium Cutting ····



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material		
P	Steel	● ◔ ✣ ✣ ◔ ○ ◔ ● ● ● ✣ ✣ ○ ● ◔ ● ● ● ✣ ✣ ● ◔ ◔ ✣
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	

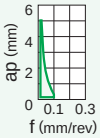
Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	VP45N	Carbide UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
R/L-F	Carbon Steel • Alloy Steel	**VBGT110302R-F**	0.2													●		●			●					●			A244 A275 A276 A439
		110302L-F	0.2													●		●			●					●			
		110304R-F	0.4													●		●			●					●			
		110304L-F	0.4													●		●			●					●			
		160402R-F	0.2													●		●			●					●			
		160402L-F	0.2													●		●			●					●			
		160404R-F	0.4													●		●			●					●			
		160404L-F	0.4													●		●			●					●			
Finish Cutting																													
SV	Carbon Steel • Alloy Steel	**VBMT110304-SV**	0.4			●										●			●										A244 A275 A276 A439
		110308-SV	0.8			●										●			●										
		160404-SV	0.4			●										●			●										
		160408-SV	0.8			●										●			●										
Light Cutting																													
MV	Carbon Steel • Alloy Steel	**VBMT110304-MV**	0.4			●			●	●						●		●	●		●	●							A244 A275 A276 A439
		110308-MV	0.8			●			●	●						●		●	●		●	●							
		160404-MV	0.4			●			●	●						●		●	●		●	●							
		160408-MV	0.8			●			●	●						●		●	●		●	●							
Medium Cutting																													
Standard	Carbon Steel • Alloy Steel	**VBMT160404**	0.4		●																								A275 A439
		160408	0.8		●																								
Medium Cutting																													
R/L-SR	Carbon Steel • Alloy Steel	**VBET1103V3R-SR**	0.03													●		●								●			A244 A275 A276
		1103V3L-SR	0.03													●		●								●			
		110301R-SR	0.1													●		●								●			
		110301L-SR	0.1													●		●								●			
		110302R-SR	0.2													●		●								●			
		110302L-SR	0.2													●		●								●			
		110304R-SR	0.4													●		●								●			
Medium Cutting		**110304L-SR**	0.4													●		●								●			

● : Inventory maintained in Japan. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

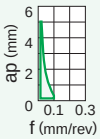
Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
		Order Number	Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel			●	◕	✣	✣	◕	○	◕						✣	✣	●	◕	●	●	●	◕	✣					
M	Stainless Steel																	○						✣					
K	Cast Iron											●	◕					●			●	●		✣	●	◕			
N	Non-ferrous Metal																									◕			
S	Heat-resistant Alloy, Titanium Alloy										●			●	◕	✣											◕	✣	
R/L-SN		**VBET110300R-SN**	0												●			●							●			A244 A275 A276
		110300L-SN	0												●			●							●			
		1103V3R-SN	0.03												●			●							●			
		1103V3L-SN	0.03												●			●							●			
		110301R-SN	0.1												●			●							●			
		110301L-SN	0.1												●			●							●			
		110302R-SN	0.2												●			●							●			
		110302L-SN	0.2												●			●							●			
		110304R-SN	0.4												●			●							●			
		110304L-SN	0.4												●			●							●			
R/LW-SN *		**VBET1103V3RW-SN**	0.03												●													A244 A275
		1103V3LW-SN	0.03												●													

Carbon Steel • Alloy Steel



Medium Cutting

Carbon Steel • Alloy Steel



Medium Cutting (Wiper)

* Please refer to A024 before using the R/LW-SN breaker (wiper insert).

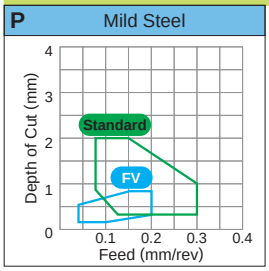
CHIP BREAKERS A044
GRADES A026
IDENTIFICATION A002

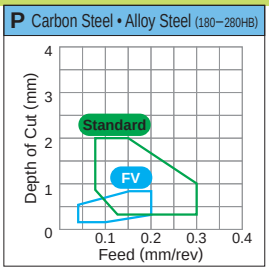
35° VC TYPE INSERTS WITH HOLE

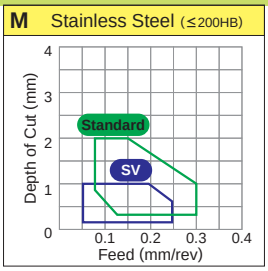
VCMT 16 04 04 - FV
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Light Cutting···· Medium Cutting····







Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated: UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	VP45N	Carbide: UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
	P	Steel					●	◔	✣	✣	◔									✣	✣	●	◔	◔	◔	✣					✣		
	M	Stainless Steel										○	◔						✣	✣	○					✣							
	K	Cast Iron													●	◔					●			●	●		✣	●	◔				
	N	Non-ferrous Metal																											◔			
	S	Heat-resistant Alloy, Titanium Alloy												●				●	◔	✣										◔	✣	
							Coated														Cermet			Coated Cermet			Carbide					
							UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
			FV	Carbon Steel • Alloy Steel	VCMT160404-FV	0.4		□	●												●	●		●								A222 A223 A296 A297
			Finish Cutting	ap (mm) 0 1 2 3 / 0.1 0.2 0.3 0.4 f (mm/rev)	160408-FV	0.8		□	●												●	●		●								
			AZ	Aluminium Alloy	VCGT160404-AZ	0.4																								●			A222 A223 A296 A297
			Finish Cutting	ap (mm) 0 1 2 3 4 / 0.1 0.3 0.5 f (mm/rev)	160408-AZ	0.8																								●			
					160412-AZ	1.2																								●			
					220530-AZ	3																								●			
			R/L-F	Carbon Steel • Alloy Steel	VCGT080202R-F	0.2													●		●			●					●		A275 A276
			Finish Cutting	ap (mm) 0 1 2 3 / 0.1 0.2 0.3 0.4 f (mm/rev)	080202L-F	0.2													●		●			●					●		
					080204R-F	0.4													●		●			●					●		
					080204L-F	0.4													●		●			●					●		
			SV	Carbon Steel • Alloy Steel	VCMT080202-SV	0.2			●										●			●									A275 A276
			Light Cutting	ap (mm) 0 1 2 3 / 0.1 0.2 0.3 0.4 f (mm/rev)	080204-SV	0.4			●										●			●									
			Standard	Carbon Steel • Alloy Steel	VCMT110304	0.4		●	●	▲		●							○		●	●		●			●		□			A222 A223 A296 A297
			Medium Cutting	ap (mm) 0 1 2 3 / 0.1 0.2 0.3 0.4 f (mm/rev)	160404	0.4		●	●	▲		●				□			○		●	●		●			●		□			
					160408	0.8		●	●	▲		●				●			○		●	●		●			●		□			
					160412	1.2		●	●	▲		●									●	●		●								
			MV	Carbon Steel • Alloy Steel	VCMT080202-MV	0.2			●			●	●						●		●	●		●	●							A275 A276
			Medium Cutting	ap (mm) 0 1 2 3 / 0.1 0.2 0.3 0.4 f (mm/rev)	080204-MV	0.4			●			●	●						●		●	●		●	●							
			Flat Top	Cast Iron	VCMW110304	0.4																								●			A222 A223 A296 A297
				ap (mm) 0 1 2 3 / 0.1 0.2 0.3 0.4 f (mm/rev)	160404	0.4		□							□	□													●			
					160408	0.8		□							●	●													●			

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case)
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

CHIP BREAKERS A046

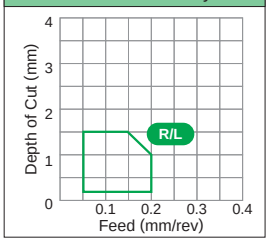
35° VD TYPE INSERTS WITH HOLE

VDGX 16 03 02 R
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

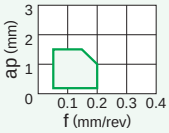
CHIP CONTROL RANGE FOR WORK MATERIALS

Medium Cutting ····

N Aluminium Alloy



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
			Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
	P	Steel		●	◕	✣	✣	◕									✣	●	◕	●	●	◕	●	✣					
	M	Stainless Steel							○	◕							✣	○						✣					
	K	Cast Iron										●	◕					●			●	●		✣	●	◕			
	N	Non-ferrous Metal																								◕			
	S	Heat-resistant Alloy, Titanium Alloy									●			●	◕	✣											◕	✣	
R/L Medium Cutting (For Aluminium Alloy)		Aluminium Alloy 																										
		VDGX160302R	0.2																						●			A230
		160302L	0.2																						●			
		160304R	0.4																						●			
		160304L	0.4																						●			

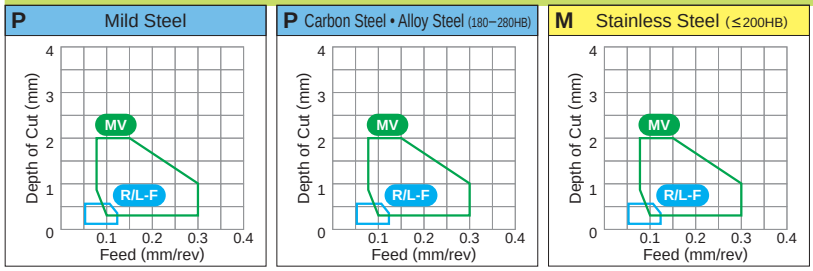
CHIP BREAKERS A054
GRADES A026
IDENTIFICATION A002

80° WB TYPE INSERTS WITH HOLE

WBGT 02 01 V3 L-F
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Medium Cutting····

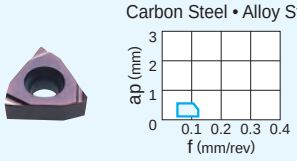


Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	VP45N	Carbide: UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
	P	Steel				●	◔	✣	✣	◔																					
	M	Stainless Steel									○	◔						✣	✣	○						✣					
	K	Cast Iron												●	◔					●			●	●		✣	●	◔			
	N	Non-ferrous Metal																										◔			
	S	Heat-resistant Alloy, Titanium Alloy											●			●	◔	✣											◔	✣	
R/L-F			Carbon Steel • Alloy Steel	WBGT0201V3L-F	0.03													●		●											A274 A280
				020101L-F	0.1													●		●											
				020102L-F	0.2													●		●											
				020104L-F	0.4													●		●											
				L302V3L-F	0.03													●		●											
				L30201L-F	0.1													●		●											
				L30202R-F	0.2													●		●		□					●				
				L30202L-F	0.2													●		●		□					●				
				L30204R-F	0.4													●		●		□					●				
				L30204L-F	0.4													●		●		□					●				
R/L-MV			Carbon Steel • Alloy Steel	WBMTL30202R-MV	0.2			●			●	●						●		●	●	□		●							A274 A280
				L30202L-MV	0.2			●			●	●						●		●	●	□		●							
				L30204R-MV	0.4			●			●	●						●		●	●	□		●							
				L30204L-MV	0.4			●			●	●						●		●	●	□		●							

Finish Cutting

Medium Cutting



● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

CHIP BREAKERS A044

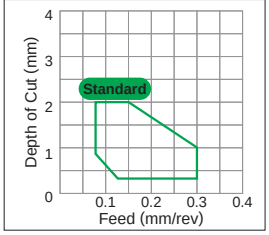
80° WC TYPE INSERTS WITH HOLE

WCGT 02 01 02 R
Size Thickness Corner Radius Chip Breaker
* Please refer to page A002.

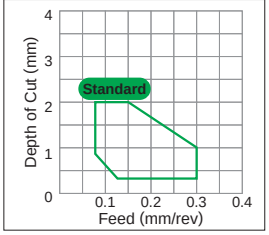
CHIP CONTROL RANGE FOR WORK MATERIALS

Medium Cutting ····

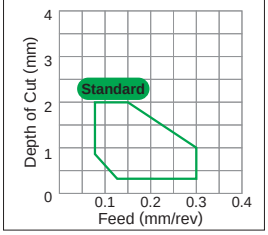
P Mild Steel



P Carbon Steel • Alloy Steel (180–280HB)



M Stainless Steel (≤200HB)



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
	P	Steel	●	◕	✣	✣	◕	○	◕		●	◕			✣	✣	◕	○		●	◕	●	✣		●	◕	◕	✣	
	M	Stainless Steel						○	◕						✣	✣		○					✣					
	K	Cast Iron									●	◕						●		●	●		✣	●	◕			
	N	Non-ferrous Metal																							◕		
	S	Heat-resistant Alloy, Titanium Alloy								●					○	◕	✣									◕	✣	
Shape / Chip Control Range ap : Depth of Cut f : Feed		Order Number	Corner R Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
R/L		**WCGT020102R**	0.2															●		▲					●			
		020102L	0.2															●		▲					●			
		020104R	0.4															●		▲					□			
		020104L	0.4															●		▲					●			
		L30202R	0.2															●		▲					●			
		L30202L	0.2															●		▲					●			
		L30204R	0.4															●		▲					□			
		L30204L	0.4															●		▲					●			
Carbon Steel • Alloy Steel																												A291
Finish Cutting																												
Standard		**WCMT020102**	0.2	●	□				●									●	●		●			●				
		020104	0.4	●	□				●									●	●		●			●				
		L30202	0.2	●					●									●	●		●			●				
		L30204	0.4	●					●									●	●		●			●				
		040202	0.2	●	□				●									●	●		●			●				
		040204	0.4	●	□				●									●	●		●			●				
		040208	0.8		□																							
		06T304	0.4	●	□				●									●	●		●			●				
		06T308	0.8	●	□				●									●	●		●			●				
Carbon Steel • Alloy Steel																												A291
Medium Cutting																												

CHIP BREAKERS A046 GRADES A026 IDENTIFICATION A002

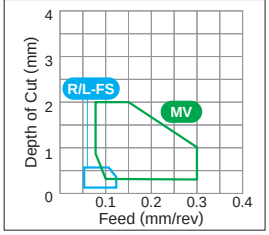
80° WP TYPE INSERTS WITH HOLE

WPGT 04 02 02 R-FS
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

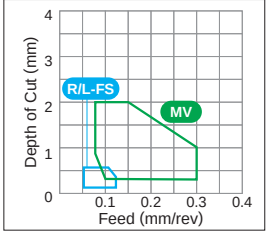
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Medium Cutting····

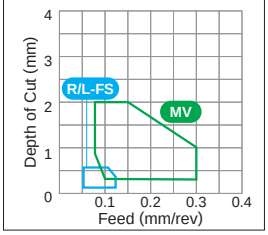
P Mild Steel



P Carbon Steel • Alloy Steel (180–280HB)

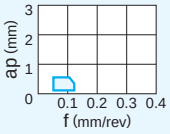
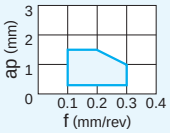
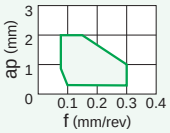


M Stainless Steel (≤200HB)



Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
	P	Steel	●	◕	✣	✣	◕		○	◕			●	●		✣	✣	●	◕	●	●	●	◕	✣	✣			
	M	Stainless Steel							○	◕						✣	✣	○						✣				
	K	Cast Iron											●	●				●			●	●	◕					
	N	Non-ferrous Metal																					◕					
	S	Heat-resistant Alloy, Titanium Alloy									●				●	◕	✣								◕	✣		

Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
R/L-FS Carbon Steel • Alloy Steel  Finish Cutting	**WPGT040202R-FS**	0.2													●		●			□					●			A274
	040202L-FS	0.2													●		●			□					●			
	040204R-FS	0.4													●		●			□					●			
	040204L-FS	0.4													●		●			□					●			
	060304R-FS	0.4													●		●			□					●			
	060304L-FS	0.4													●		●			□					●			
	060308R-FS	0.8													●		●			□					●			
	060308L-FS	0.8													●		●			□					●			
Standard Aluminium Alloy  Finish Cutting	**WPGT040202**	0.2																							●			A274
	040204	0.4																							●			
	060302	0.2																							●			
	060304	0.4																							●			
MV Carbon Steel • Alloy Steel  Medium Cutting	**WPMT040202-MV**	0.2		●				●	●						●		●	●		□		●						A274
	040204-MV	0.4		●				●	●						●		●	●		□		●						
	060304-MV	0.4		●				●	●						●		●	●		□		●						
	060308-MV	0.8		●				●	●						●		●	●		□		●						

● : Inventory maintained in Japan. (10 inserts in one case)
□ : Non stock, produced to order only.

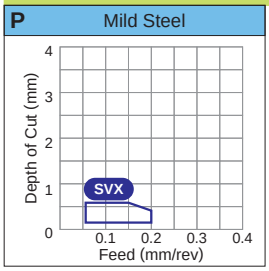
CHIP BREAKERS A050

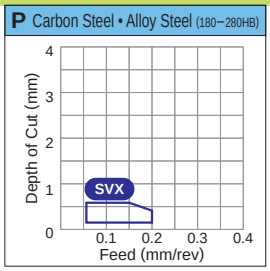
25° XC TYPE INSERTS WITH HOLE

XCMT 15 03 04 - SVX
Size / Thickness / Corner Radius / Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

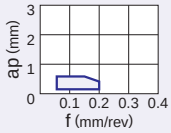
Light Cutting ····





Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
			Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel			●	◔	✣	✣	◔										◔	◔	●	●	◔	●	✣					
M	Stainless Steel								○	◔						✣	✣	○						✣					
K	Cast Iron											●	◔					●			●	●		✣	●	◔			
N	Non-ferrous Metal																										◔	✣	
S	Heat-resistant Alloy, Titanium Alloy										●			●	◔	✣													
Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number																											
SVX	Carbon Steel • Alloy Steel	XCMT150304-SVX	0.4			●																							A224
		150308-SVX	0.8			●																							
Light Cutting																													



CHIP BREAKERS A046
GRADES A026
IDENTIFICATION A002

RTG TYPE INSERTS WITHOUT HOLE

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated											Cermet			Coated Cermet			Carbide					Applicable Holder Page
							UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
	P	Steel	Special Purpose (For TL Holder)		RTG05A	—																					●		●			A233
	M	Stainless Steel			06A	—																					●		●			
	K	Cast Iron			07A	—																					●		●			
	N	Non-ferrous Metal			08A	—																					●		●			
	S	Heat-resistant Alloy, Titanium Alloy			10A	—																					●		●			
					12A	—																					●		●			

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

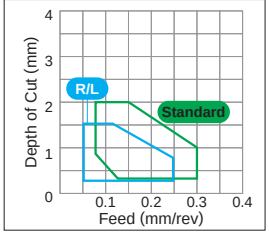
90° SP TYPE INSERTS WITHOUT HOLE

SPGR 09 03 04 R
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

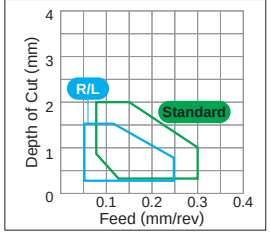
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Medium Cutting····

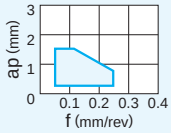
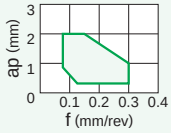
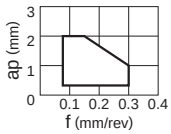
P Mild Steel



P Carbon Steel • Alloy Steel (180–280HB)



Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Shape	Chip Control Range ap : Depth of Cut f : Feed	Order Number	Corner R Re (mm)	Coated UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet NX2525	NX3035	NX55	Coated Cermet AP25N	VP25N	VP45N	Carbide UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
	P	Steel					●	◔	✣	✣	◔																				
	M	Stainless Steel										○	◔						✣	✣	○					✣					
	K	Cast Iron													●	◔					●			●	●	✣	●	◔			
	N	Non-ferrous Metal																											◔		
	S	Heat-resistant Alloy, Titanium Alloy												●			●	◔	✣											◔	✣	
			R/L Finish Cutting	Carbon Steel • Alloy Steel 	SPGR090304R	0.4																					●		●			A226
					090304L	0.4																					●		●			
			Standard Light to Medium Cutting	Carbon Steel • Alloy Steel 	SPMR090304	0.4	●	●	▲											●	●												A226
					090308	0.8	●	●	▲											●	●										
					120304	0.4	●	●	▲											●	●										
					120308	0.8	●	●	▲											●	●										
					120312	1.2	●	□	▲																						
			Flat Top	Cast Iron 	SPMN090304	0.4														●							●		●			A226
					090308	0.8	●													●						●		●			
					120304	0.4	●	□	▲																	●		●			
					120308	0.8	●	●	▲										●							●		●			
					120312	1.2	●	●																		●		●			
					120408	0.8																				●		●			
					120412	1.2																				●					
					120416	1.6																									
					150408	0.8																				●					
					150412	1.2																				●					
					190404	0.4																				●					
					190408	0.8		□											●							●					
					190412	1.2	●	□	▲																	●					
					190416	1.6																				●					

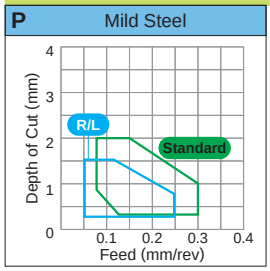
CHIP BREAKERS A056 GRADES A026 IDENTIFICATION A002

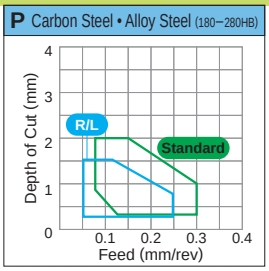
90° SP TYPE INSERTS WITHOUT HOLE

SPGN 09 03 04
Size Thickness Corner Radius
★ Please refer to page A002.

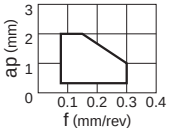
CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Medium Cutting····





Cutting Conditions (Guide) : ● : Stable Cutting ◕ : General Cutting ✣ : Unstable Cutting

Work Material			Shape / Chip Control Range (ap : Depth of Cut, f : Feed)	Order Number	Corner R Re (mm)	Coated: UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	Cermet: NX2525	NX3035	NX55	Coated Cermet: AP25N	VP25N	VP45N	Carbide: UTi20T	HTi05T	HTi10	RT9010	TF15	Applicable Holder Page
	P	Steel				●	◕	✣	✣	◕	○	◕			●	◕			✣	✣	○	●	●	◕	✣	✣	●	●		◕	✣	
	M	Stainless Steel																	○		●										
	K	Cast Iron												●	◕				●			●	●	◕	✣	●	◕				
	N	Non-ferrous Metal																										◕			
	S	Heat-resistant Alloy, Titanium Alloy										●				●	◕	✣	✣										◕	✣	
Flat Top			Cast Iron 	**SPGN090304**	0.4														●		▲				●		●			A226
				090308	0.8													●	●		▲				●		●			
				120304	0.4																▲				●		●			
				120308	0.8													●			▲				●		●			
				120312	1.2																						●			
				120404	0.4																						●			
				120408	0.8																▲				●		●			
				120412	1.2																▲									
				150404	0.4																				●					
				150408	0.8																▲				●		●			
				190402	0.2																				●					
				190404	0.4															●		▲				●		●			
				190408	0.8																				●					

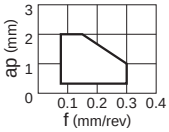
● : Inventory maintained in Japan. (10 inserts in one case)
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

60° TC TYPE INSERTS WITHOUT HOLE

TCGN 06 01 04
Size Thickness Corner Radius
★ Please refer to page A002.

Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide				Applicable Holder Page
			Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel			●	◔	✣	✣	◔								✣	✣											
M	Stainless Steel								○	◔								○					✣					
K	Cast Iron											●	◔					●			●	●		✣	●	◔			
N	Non-ferrous Metal																									◔			
S	Heat-resistant Alloy, Titanium Alloy										●			●	◔	✣											◔	✣	
Flat Top	Cast Iron	**TCGN060104**	0.4																						●				–
		090204	0.4																						●				
		090208	0.8																						●				



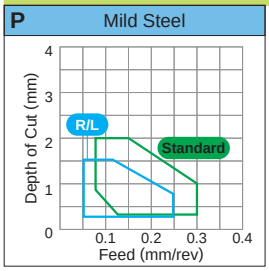
CHIP BREAKERS A056 GRADES A026 IDENTIFICATION A002

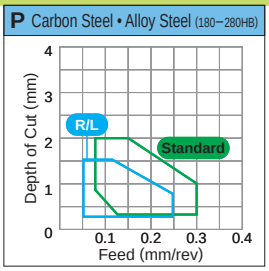
60° TP TYPE INSERTS WITHOUT HOLE

TPGR 11 03 04 R
Size Thickness Corner Radius Chip Breaker
★ Please refer to page A002.

CHIP CONTROL RANGE FOR WORK MATERIALS

Finish Cutting···· Medium Cutting····



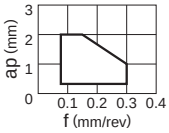


Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
	P	Steel	●	◔	✣	✣	◔									●	◔	●	●	●	◔	✣					
	M	Stainless Steel						○	◔					✣	✣	●						✣					
	K	Cast Iron								●	◔					●			●	●		✣	●	◔			
	N	Non-ferrous Metal																						◔			
	S	Heat-resistant Alloy, Titanium Alloy							●				●	◔	✣										◔	✣	
Shape / Chip Control Range (ap : Depth of Cut, f : Feed)		Order Number	Corner R Re (mm)	UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
R/L		TPGR110304R	0.4															●		▲				●		●			A227 A290
		110304L	0.4															●		▲				●		●			
		110308L	0.8																							●			
		160304R	0.4															●		▲				●		●			
		160304L	0.4															●		▲				●		●			
		160308R	0.8															●						●		●			
		160308L	0.8															●		▲				●		●			
Carbon Steel • Alloy Steel																													
Finish Cutting																													
Standard		TPMR090202	0.2															●	●										A227 A290
		090204	0.4		□	□		▲										●	●										
		090208	0.8		□	□													●										
		110302	0.2		□	□		▲										●	●										
		110304	0.4		●	●		▲										●	●										
		110308	0.8		●	●		▲										●	●										
		160304	0.4		●	●		▲										●	●										
		160308	0.8		●	●		▲										●	●										
Carbon Steel • Alloy Steel																													
Light to Medium Cutting																													
Flat Top		TPMN110304	0.4	●	●	□		▲				●	●				●	●						●		●			A227 A290
		110308	0.8	●	●	□		▲				●	●					●						●		●			
		110312	1.2			□																		□					
		160304	0.4	●	●	□		▲				●	●				□	●						●		●			
		160308	0.8	●	●	●		▲				●	●				●	●						●	●	●			
		160312	1.2		●	□						□	□				●							●		□			
		160316	1.6			□																		●					
		160320	2.0			□																		●					
		160408	0.8			●		▲																●					
		220404	0.4		●	●		▲																●					
		220408	0.8	●	●	●		▲				□	□				●							●		●			
		220412	1.2		●	●																		●		□			
		220416	1.6			□		▲																●					
		220420	2.0																					●					
Cast Iron																													

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Cutting Conditions (Guide) : ● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Work Material			Corner R	Coated												Cermet			Coated Cermet			Carbide					Applicable Holder Page
				UE6005	UE6110	UE6020	UH6400	UC6010	US7020	US735	US905	UC5105	UC5115	VP05RT	VP10RT	VP15TF	UP20M	NX2525	NX3035	NX55	AP25N	VP25N	VP45N	UTi20T	HTi05T	HTi10	RT9010	TF15	
P	Steel	Shape / Chip Control Range / Order Number	Re (mm)																								
M	Stainless Steel	**Flat Top**																									
K	Cast Iron		**TPGN110302**	0.2																▲				●		●		
N	Non-ferrous Metal		**110304**	0.4												●	●	▲				●	●	●			
S	Heat-resistant Alloy, Titanium Alloy		**110308**	0.8												●	●					●	●	●			
		Cast Iron	**160302**	0.2												●	●	▲				●		●			
			**160304**	0.4												●	●	▲				●	●	●			
			160308	0.8												●	●	▲				●	●	●			
			160312	1.2																		□		●			
			160316	1.6																				●			
			160404	0.4																		●					
			160408	0.8														□				●		●			
			220404	0.4												●						●		●			
			220408	0.8												●						●		●			
			220412	1.2																		●		●			

A227
A290

CHIP BREAKERS A056
GRADES A026
IDENTIFICATION A002

HOW TO READ THE STANDARD OF CBN&PCD TURNING INSERTS

●How this section page is organized

①Organized according to turning insert shape.
(Refer to the index on the next page.)

②Inserts are arranged in order of :

- Negative inserts (with hole→without hole)
- Positive inserts (with hole→without hole)

GRADE APPLICATION RECOMMENDED FOR EACH WORK MATERIAL
cutting conditions suitable for each type of work material is shown as a general guide to select the grade.
●: Stable Cutting ◐: General Cutting ✠: Unstable Cutting

SHAPE & ANGLE MARK

INDICATION OF NEGATIVE/POSITIVE TYPE

TITLE OF PRODUCT ACCORDING TO THE INSERT TYPE

PRODUCT SECTION

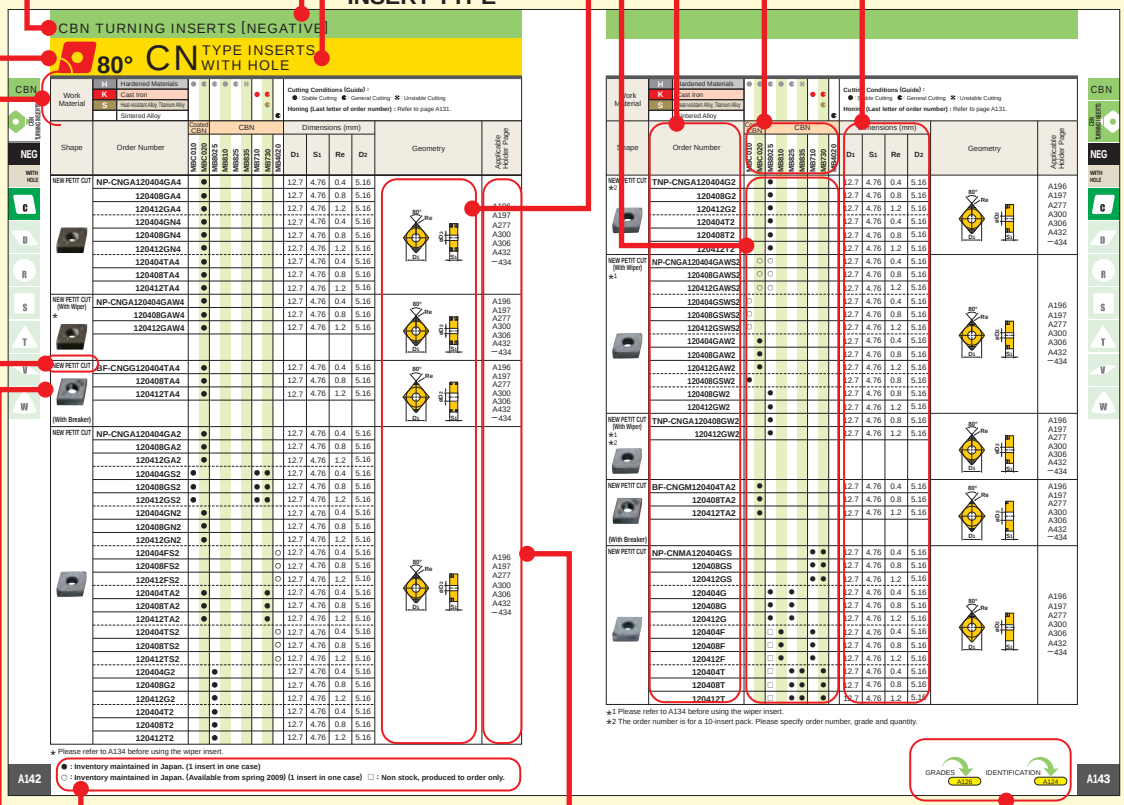
FIGURE SHOWING THE INSERT GEOMETRY
D1 : Diameter of Inscribed Circle S1 : Thickness
Re : Corner Radius ϕD2 : Diameter of Hole
Dimensions are detailed in the "Dimensions" column.

STOCK STATUS

INSERT NUMBER

INSERT GRADES

INSERT DIMENSIONS



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

PHOTO OF INSERT

PRODUCT NAME

PAGE REFERENCE
·CHIP BREAKERS
·GRADES
·TECHNICAL DATA
indicates reference pages, on the right hand page of each double-page spread.

APPLICABLE HOLDER PAGE
indicates reference pages for details of applicable holders.

●To Order : Please specify
①insert number and ②grade.

TURNING TOOLS

CBN & PCD INSERT STANDARDS
CBN & PCD INSERT GRADES

INDENTIFICATION ····· A124
CBN (CUBIC BORON NITRIDE) ····· A126
PCD (SINTERED DIAMOND) ····· A135
CLASSIFICATION OF CBN & PCD INSERTS ····· A136

STANDARD OF CBN TURNING INSERTS

NEGATIVE INSERTS WITH HOLE

CN○○TYPE···RHOMBIC 80° ····· A142
DN○○TYPE···RHOMBIC 55° ····· A145
SN○○TYPE···SQUARE 90° ····· A147
TN○○TYPE···TRIANGULAR 60° ····· A148
VN○○TYPE···RHOMBIC 35° ····· A150
WN○○TYPE···TRIGON 80° ····· A151

NEGATIVE INSERTS WITHOUT HOLE

CN○○TYPE···RHOMBIC 80° ····· A152
DN○○TYPE···RHOMBIC 55° ····· A152
RN○○TYPE···ROUND ····· A153
SN○○TYPE···SQUARE 90° ····· A154
TN○○TYPE···TRIANGULAR 60° ····· A155

POSITIVE INSERTS WITH HOLE

CC○○TYPE···RHOMBIC 80° ····· A156
CP○○TYPE···RHOMBIC 80° ····· A159
DC○○TYPE···RHOMBIC 55° ····· A160
TC○○TYPE···TRIANGULAR 60° ····· A162
TP○○TYPE···TRIANGULAR 60° ····· A163
VB○○TYPE···RHOMBIC 35° ····· A165
VC○○TYPE···RHOMBIC 35° ····· A166
WC○○TYPE···TRIGON 80° ····· A166

POSITIVE INSERTS WITHOUT HOLE

SP○○TYPE···SQUARE 90° ····· A168
TB○○TYPE···TRIANGULAR 60° ····· A169
TP○○TYPE···TRIANGULAR 60° ····· A169
RBGTYPE ····· A167
RTGTYPE ····· A167
DGJTYPE ····· A170
GYTYPE ····· A170
MGTRTYPE ····· A171

STANDARD OF PCD TURNING INSERTS

NEGATIVE INSERTS WITH HOLE

CN○○TYPE···RHOMBIC 80° ····· A172
DN○○TYPE···RHOMBIC 55° ····· A172
SN○○TYPE···SQUARE 90° ····· A173
TN○○TYPE···TRIANGULAR 60° ····· A173
VN○○TYPE···RHOMBIC 35° ····· A174

NEGATIVE INSERTS WITHOUT HOLE

SN○○TYPE···SQUARE 90° ····· A175

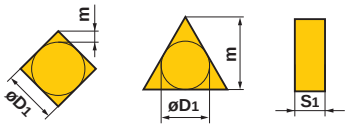
POSITIVE INSERTS WITH HOLE

CC○○TYPE···RHOMBIC 80° ····· A176
CP○○TYPE···RHOMBIC 80° ····· A176
DC○○TYPE···RHOMBIC 55° ····· A177
SP○○TYPE···SQUARE 90° ····· A177
TC○○TYPE···TRIANGULAR 60° ····· A178
TP○○TYPE···TRIANGULAR 60° ····· A179
VB○○TYPE···RHOMBIC 35° ····· A181
VC○○TYPE···RHOMBIC 35° ····· A181
WC○○TYPE···TRIGON 80° ····· A182
WP○○TYPE···TRIGON 80° ····· A182
DE○○TYPE···RHOMBIC 55° ····· A183
TE○○TYPE···TRIANGULAR 60° ····· A183
VD○○TYPE···RHOMBIC 35° ····· A184

POSITIVE INSERTS WITHOUT HOLE

SP○○TYPE···SQUARE 90° ····· A185
TP○○TYPE···TRIANGULAR 60° ····· A185

IDENTIFICATION



Symbol	Tolerance of Nose Height **m** (mm)	Tolerance of Inscribed Circle **ϕD1** (mm)	Tolerance of Thickness **S1** (mm)
G	±0.025	±0.025	±0.13
M*	±0.08–±0.18	±0.05–±0.15	±0.13

The surface of insert with * mark is sintered.

Detail of M Class Insert Tolerance

● Tolerance of Nose Height **m** (mm)

D.I.C.	Triangular	Square	Rhombic 80°	Rhombic 55°	Rhombic 35°	Round
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	–
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	–
12.70	±0.13	±0.13	±0.13	±0.15	–	–

● Tolerance of Inscribed Circle **ϕD1** (mm)

D.I.C.	Triangular	Square	Rhombic 80°	Rhombic 55°	Rhombic 35°	Round
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	–
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.70	±0.08	±0.08	±0.08	±0.08	–	±0.08

⑤ Tolerance Class

T	10-inserts Package
No mark	1-insert Package

① Insert Case

BF	With Breaker
NP	New Petit Cut
No mark	Standard Type

② Insert Geometry

T ① **NP** ② **-** **C** ③ **N** ④ **G** ⑤ **A** ⑥

③ Insert Shape

Symbol	Insert Shape
S	Square
T	Triangular
C	Rhombic80°
D	Rhombic55°
V	Rhombic35°
W	Trigon
R	Round

④ Normal Clearance

Symbol	Normal Clearance
B	5°
C	7°
D	15°
E	20°
N	0°
P	11°

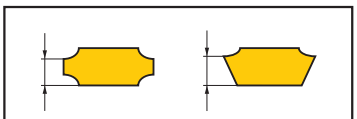
⑥ Fixing and/or for Chip Breaker

Metric

Symbol	Hole	Hole Configuration	Chip Breaker	Figure
W	With Hole	Cylindrical Hole + One Countersink (40–60°)	No	
T	With Hole		One Sided	
B	With Hole	Cylindrical Hole + One Countersink (70–90°)	No	
H	With Hole		One Sided	
A	With Hole	Cylindrical Hole	No	
M	With Hole	Cylindrical Hole	One Sided	
N	Without Hole	–	No	
X	–	–	–	Special Design

Diameter of Inscribed Circle (mm)	Symbol						
	R	W	V	D	C	S	T
3.97		02		04	03	03	06
4.76		L3	08	05	04	04	08
5.56		03	09	06	05	05	09
6.35		04	11	07	06	06	11
7.94		05	13	09	08	07	13
9.525	09	06	16	11	09	09	16
12.70	12	08	22	15	12	12	22

⑦ Insert Size



*Thickness is from the bottom of the insert to the top of the cutting edge.

Symbol	Thickness (mm)
S1	1.39
01	1.59
T0	1.79
02	2.38
T2	2.78
03	3.18
T3	3.97
04	4.76

⑧ Insert Thickness

Symbol	Corner Radius (mm)
02	0.2
04	0.4
08	0.8
12	1.2
16	1.6

⑨ Insert Corner Configuration

⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭
12	04	04	G	W	2	J	R

⑩ Application (Honing)

Symbol	Honing
GA GS GN G	General Cutting
FA FS FN F	Continuous Cutting
TA TS TN T	Interrupted Cutting

Please refer to page A131 for further information.

⑪ Wiper

W	With Wiper
No mark	Without Wiper

⑫ Number of Teeth

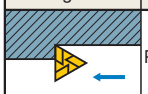
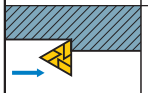
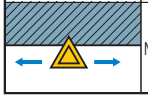
2	2
3	3
4	4
6	6
No mark	1

⑬ Cutting Edge Angle

F	91°
J	93°
No mark	Non Restriction

Please pay special attention when using an indexable insert.
Please refer to page A134 for further information.

⑭ Cutting Direction

Figure	Hand	Symbol
	Right	R
	Left	L
	Neutral	N

COATED CBN SERIES
MBC010 / MBC020

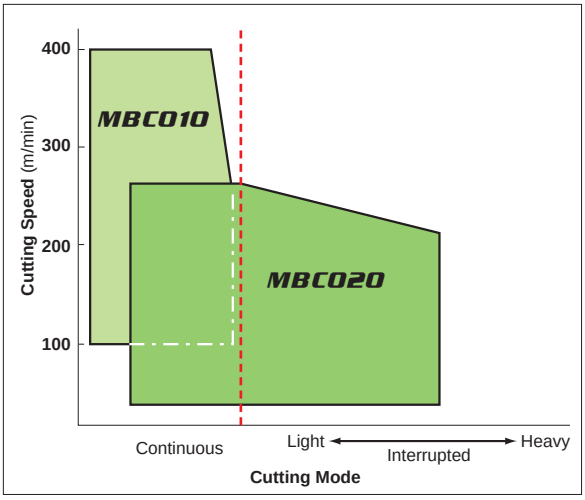
FEATURES

MBC010

MBC010 is a coated CBN grade for hardened steels. High wear resistance enables high-speed cutting.
Micrograin CBN makes **MBC010** a "high-grade" grade for excellent surface finish.

MBC020

MBC020 is a general purpose coated CBN grade suitable for machining hardened steel. It covers a wide range of applications from continuous to light interrupted cutting.
The CBN substrate with high cutting edge rigidity and the coating based on MIRACLE coating technology improves wear resistance and allows **MBC020** to cover a wider range of machining applications than conventional CBN grades.

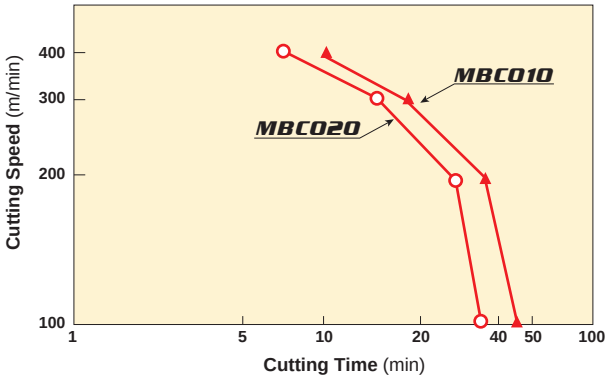


Grade	Grade Features and Application	Main Component	Coating Layer
MBC010	**Coated CBN for High Speed Continuous Cutting** MBC010 makes the best use of special ceramic binder structure, actualizing high wear resistance. High wear resistance enables continuous machining at high speed of over 300m/min.	CBN (Micro Grain) TiN Al_2O_3	TiN
MBC020	**Coated CBN for general cutting (First recommendation)** Uses a CBN substrate that has high cutting edge rigidity. The TiAlN based coating delivers superb wear resistance. CBN grade first recommendation.	CBN (Micro Grain) TiN Al_2O_3	TiAlN

CUTTING PERFORMANCE

Continuous Cutting

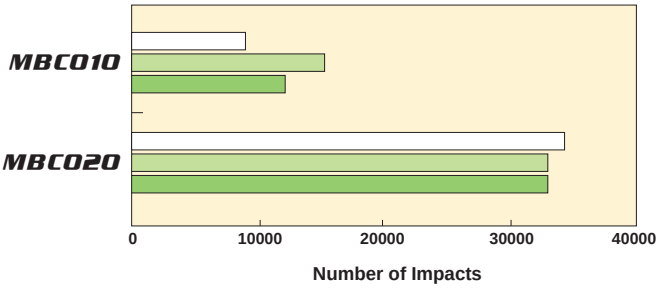
V-T Diagram (VB=0.1mm)



<Cutting Conditions>
Workpiece : JIS SCM415 (60HRC)
Feed : 0.1mm/rev
Depth of Cut : 0.1mm
External Continuous Cutting
Wet Cutting

Interrupted Cutting

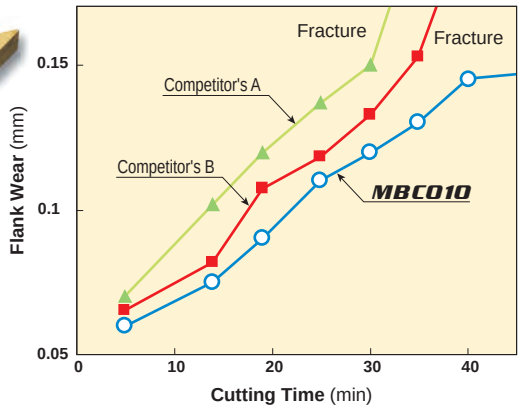
Impact frequency before fracturing



<Cutting Conditions>
Workpiece : JIS SCM415 (60HRC)
External Interrupted Cutting 8 Groove
Cutting Speed : 150m/min
Feed : 0.15mm/rev
Depth of Cut : 0.2mm
Dry Cutting

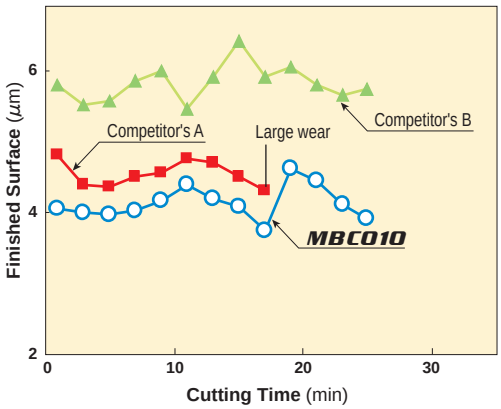
MBC010

WEAR RESISTANCE



<Cutting Conditions>
Workpiece : JIS SCM415 (60HRC)
Insert : NP-CNGA120408GS2
Cutting speed : 300m/min
Feed : 0.05mm/rev
Depth of Cut : 0.1mm
Dry Continuous Cutting

FINISHED SURFACE

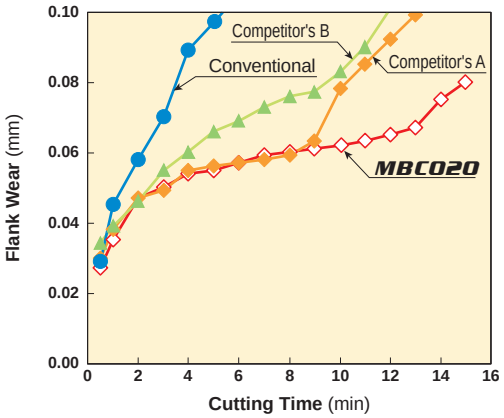


<Cutting Conditions>
Workpiece : JIS SCM415 (60HRC)
Insert : NP-CNGA120408GS2
Cutting speed : 150m/min
Feed : 0.15mm/rev
Depth of Cut : 0.2mm
Dry Continuous Cutting

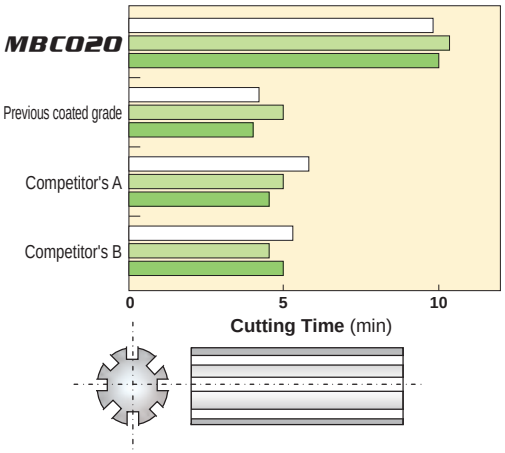
MBC010 employs TiN based coating for superior, consistent surface finishes.

MBC020

TOUGHNESS



<Cutting Conditions>
Workpiece : JIS SCr420 (60HRC)
Round bar
Insert : NP-CNGA120408GA4
Cutting speed : 220m/min
Feed : 0.1mm/rev
Depth of Cut : 0.1mm
Dry Continuous Cutting



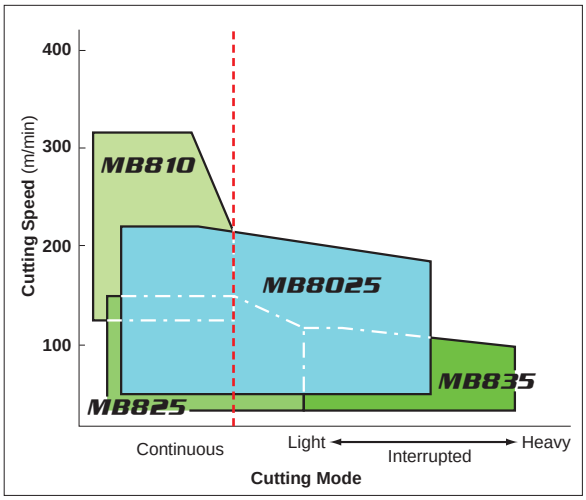
<Cutting Conditions>
Workpiece : JIS SCr420 (60HRC)
8 Grooves
Insert : NP-CNGA120408GA4
Cutting speed : 200m/min
Feed : 0.1mm/rev
Depth of Cut : 0.1mm
Dry Interrupted Cutting

MBC020 exhibits excellent cutting performance for a wide range of applications from continuous through to interrupted machining.

NON-COATED CBN SERIES

OUTLINE

Mitsubishi Materials is one of the few tool manufacturers producing it's own sintered CBN for use in CBN tools. The original CBN material, honing, brazing and other various technologies means that CBN inserts are especially effective for efficient, high speed and accurate machining of hardened steel and cast iron.



FEATURES

- CBN tool material is produced by mixing the main component CBN (cubic boron nitride), which has a hardness second only to diamond, with a special ceramic or metal binder. It is then sintered at a pressure of over 5GPa and at a temperature of 1200°C or higher.
- CBN has lower affinity to iron than diamond. The low affinity and high hardness properties means that sintered CBN delivers a superior cutting performance especially during high speed machining of materials such hardened steel, cast iron and sintered alloys etc.

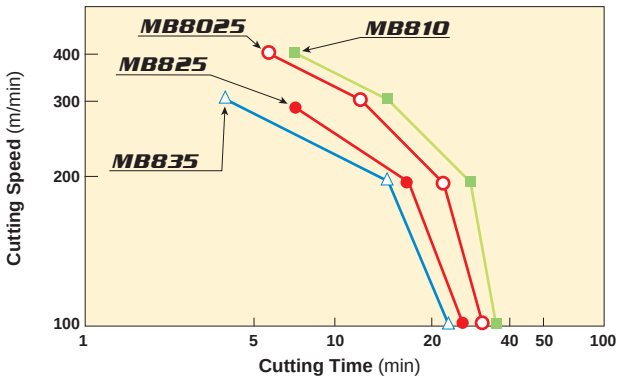
HARDENED STEEL MACHINING

Grade	Grade Features and Application	Main Component
MB8025	**For General Purpose Turning** By employing a "Particle-activated Sintering Method", the new sintered CBN technology is recommended for continuous cutting from medium to high speeds.	CBN (Micro Grain) TiN Al_2O_3
MB810	**For High Speed Continuous Cutting** It features improved wear resistance due to impregnation with larger CBN particles.	CBN TiN Al_2O_3
MB825	**For Continuous to Medium Interrupted Cutting** Excellent balance of wear resistance and fracture resistance due to introduction of micro-grain CBN particles.	CBN (Micro Grain) TiC Al_2O_3
MB835	**For Heavy Interrupted Cutting** Improved grade employing micro-grain CBN particles. Excellent fracture resistance for use in heavy interrupted cutting.	CBN (Micro Grain) TiN Al_2O_3

CUTTING PERFORMANCE

Continuous Cutting

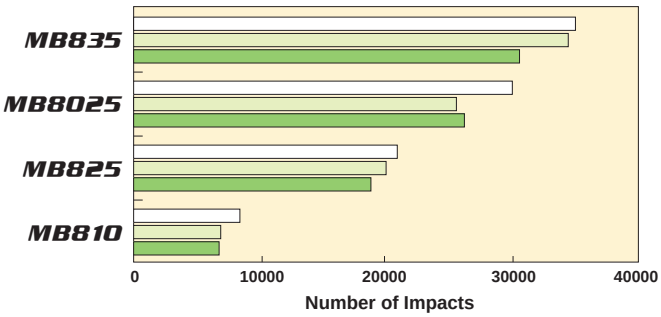
V-T Diagram (VB=0.1mm)



<Cutting Conditions>
Workpiece : JIS SCM415 (60HRC)
Feed : 0.1mm/rev
Depth of Cut : 0.1mm
Wet Cutting

Interrupted Cutting

Impact frequency before fracturing



<Cutting Conditions>
Workpiece : JIS SCM415 (60HRC)
External Interrupted Cutting 8 Groove
Feed : 0.15mm/rev
Depth of Cut : 0.2mm
Dry Cutting
Cutting Speed : 150m/min

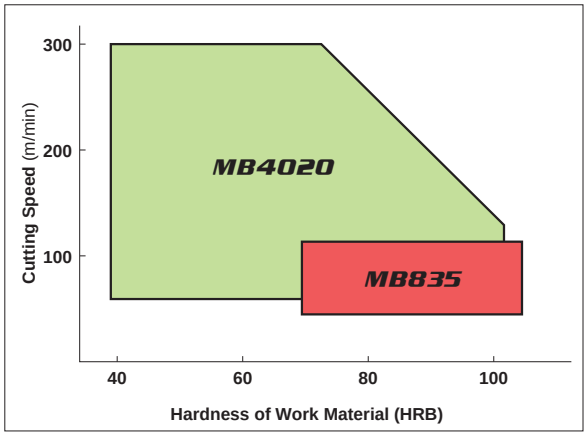
SINTERED ALLOY MACHINING NEW MB4020

FEATURES AND RECOMMENDED CUTTING CONDITIONS

For General Cutting

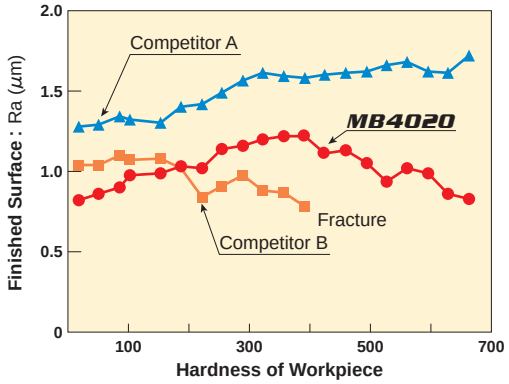
High CBN content and a special binder to bind CBN particles allows MB4020 to deliver long tool life during the machining of sintered alloys. A general-purpose grade suitable for the machining of various sintered alloys with different hardness and structures and varied workpiece geometries.

Work Material	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
General sintered alloy	80 – 300	−0.2	−0.3
High density sintered alloy	80 – 250	−0.2	−0.3
Sintered alloy	80 – 150	−0.2	−0.3



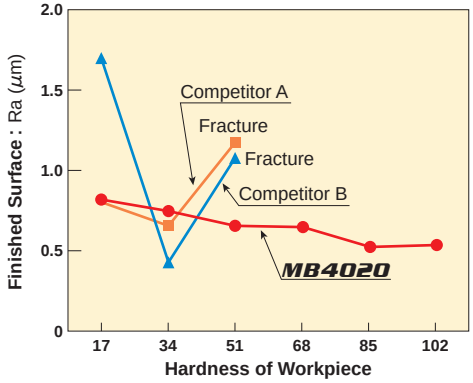
CUTTING PERFORMANCE

Continuous cutting of high density sintered alloy



<Cutting Conditions>
Workpiece : High density sintered alloy Insert : NP-CNGA120408
Cutting Speed : 190m/min Feed : 0.15mm/rev
Depth of Cut : 0.1mm
Wet Cutting

Continuous cutting of sintered alloy



<Cutting Conditions>
Workpiece : Sintered alloy Insert : NP-CNGA120408
Cutting Speed : 100m/min Feed : 0.15mm/rev
Depth of Cut : 0.1mm
Wet Cutting

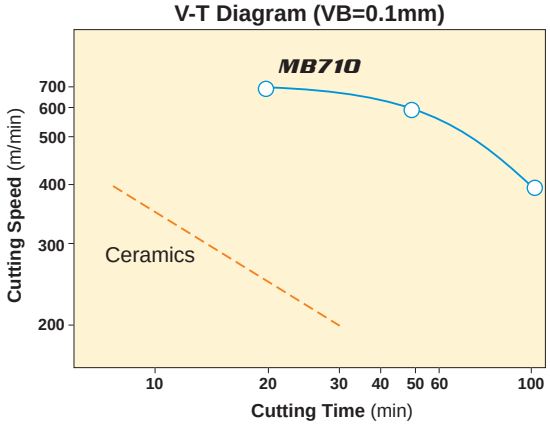
CAST IRON MACHINING

Grade	Grade Features and Application	Main Component
MB710	**For General Cutting** General purpose grade with well balanced wear and fracture resistance.	CBN TiC Al_2O_3
MB730	**For High Speed Cutting** Has the larger CBN content and therefore displays good thermal conductivity. It is suitable for the high temperatures that are generated in high speed cutting.	CBN (High Content) Co Base Alloy
MB5140	**For High Speed Cutting and Roughing of Cast Iron** Highest CBN content, high thermal conductivity. Enables deep depth of cut.	CBN AlN (Solid)

CUTTING PERFORMANCE

Continuous Cutting

V-T Diagram (VB=0.1mm)



<Cutting Condition of MB710>
Workpiece : JIS FC250
Insert : TNGA160408
Feed : 0.1mm/rev
Depth of Cut : 0.15mm
Wet Cutting

<Cutting Condition of Ceramics>
Workpiece : JIS FC250
Insert : TNGA160408
Feed : 0.1mm/rev
Depth of Cut : 0.1mm
Dry Cutting

CBN

- Suitable for high speed finishing of heat treated steel, sintered ferrous alloy and cast iron.
- Low affinity to iron, thus good surface finishes are possible.
- Grinding can be replaced by machining.

SELECTION STANDARD

●Heat Treated Steel

Work Material		Type	Cutting Mode	Recommended Grade	Recommended Cutting Conditions		
					Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
Structural Steel Esp. Carburized Steel (SC, SCM, SCr) High Alloy Steel (SKD, SKH)	HRC 35–65	Coated	High speed finishing cutting	**MBC010**	250 (150–400)	–0.2	–0.2
			Continuous cutting for general purpose	**MBC020**	200 (80–250)	–0.3	–0.5
			Interrupted cutting for general purpose		150 (60–200)	–0.2	–0.3
		Non-coated	Continuous cutting for general purpose	**MB8025**	180 (80–250)	–0.3	–0.5
			Interrupted cutting for general purpose		120 (60–150)	–0.2	–0.3
			High speed finishing cutting	**MB810**	200 (150–300)	–0.15	–0.15
			Continuous to medium interrupted cutting	**MB825**	120 (70–150)	–0.3	–0.5
			Heavy interrupted cutting	**MB835**	100 (50–120)	–0.3	–0.5

●Cast Iron

Work Material		Workpiece Structure	Cutting Speed (m/min) 250 500 750 1000 1250	Feed (mm/rev)	Depth of Cut (mm)	Coolant
Gray Cast Iron	JIS FC250	Ferritic + Pearlitic	MBS140, MB710, MB730	–0.5	–1.0 MBS140 –5.0	Dry,Wet
	JIS FC300	Pearlitic				
Alloy Cast Iron		Pearlitic		–0.4	–0.5	Dry,Wet
Ductile Cast Iron	JIS FCD400	Ferritic	MB710, MB730	–0.4	–0.5	Dry,Wet
	JIS FCD700	Ferritic + Pearlitic Pearlitic				

●Sintered Alloy

Work Material	Recommended Grade	Recommended Cutting Conditions		
		Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
General Sintered Alloy	**MB4020**	250 (80–300)	–0.2	–0.3
High Density Sintered Alloy	**MB4020**	150 (80–250)	–0.2	–0.3
Sintered Alloy	**MB4020, MB835**	100 (80–150)	–0.2	–0.3

●Valve Seat

Amount of Hard Particles	None or Small ← → Large			
Hardness of Workpiece (HV)	150	250	300	350
Plunge Cut	MB730	MB825	MB835	
Traverse Cut	MB730	MB710	MB825	

●Roll

Work Material	Grade	Recommended Cutting Conditions		
		Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
Cast Steel Adamite Cast Steel	**MB825, MB8025**	80 (30–130)	0.3 (0.1–0.5)	0.2–3.0
Ductile Cast Iron Granular Cast Iron Chilled Cast Iron	**MB710**	80 (30–130)	0.3 (0.1–0.5)	0.2–3.0
High Chromium Steel High Alloy Steel	**MB825, MB8025**	80 (30–130)	0.3 (0.1–0.5)	0.2–3.0
High Speed Steel	**MB730**	50 (20–70)	0.25 (0.1–0.4)	0.1–3.0
Cemented Carbide	**MB730, MBS140**	20 (10–30)	–0.2	–0.2

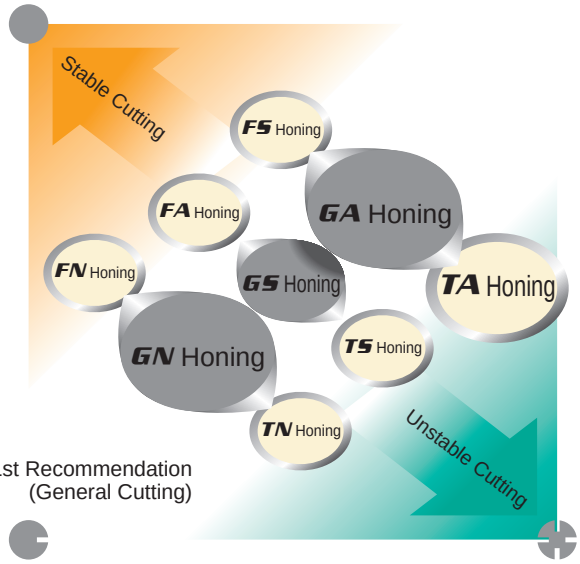
●Heat Resistant Alloy

Work Material	Grade	Recommended Cutting Conditions		
		Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
Ni Base Heat Resistant Alloy (e.g. Inconel)	**MB730**	120 (100–150)	–0.2	–0.5
Co Base Heat Resistant Alloy (e.g. Stellite)	**MB730**	70 (50–100)	–0.2	–0.5

HONING

NEW HONING TYPES

For CBN **MBC010** and **MBC020** coated grades, **MB4020** for sintered alloys, **MB710** and **MB730** for cast irons, a wide range of edge honing styles is offered to cover a wide variety of machining applications and to represent Mitsubishi Materials unique cutting tool technology.



General cutting

GA honing is the first recommendation.
GS honing if the depth of cut is 0.1mm or less.
GN honing if the crater wear is large.

Continuous cutting, stable cutting

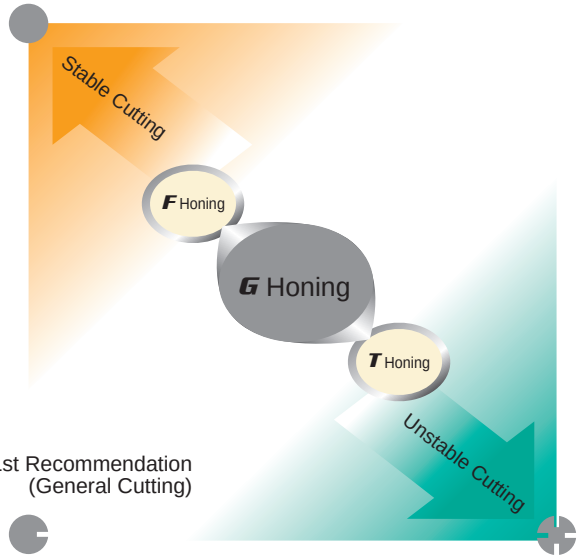
FS honing is the first recommendation.
FA honing to improve the initial machining performance.
FN honing if the crater wear is large.

Medium and heavy interrupted cutting, unstable cutting

TA honing is the first recommendation.
TS honing if the depth of cut is 0.1mm or less.
TN honing if the crater wear is large.

CONVENTIONAL HONING TYPES

For CBN grades except new honing types, three conventional honing types, namely F, G and T types are available for different applications.



For Stable Continuous Cutting

F HONING

For General Purpose Cutting (Including light to medium interrupted cutting)

G HONING

For medium to heavy interrupted cutting For unstable cutting

T HONING

CBN GROOVING SERIES

(NEW GY/ NEW MG/DG)

FEATURES

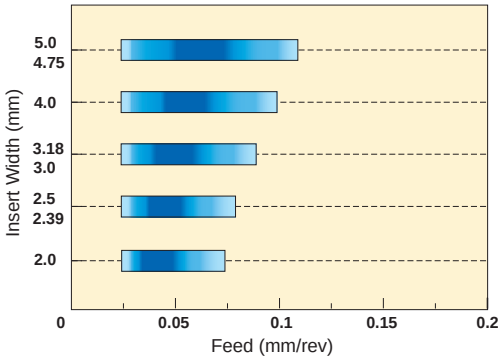
A combination with a high-rigidity holder ensures high accuracy and long tool life.

Holder rigidity is essential when grooving hardened steel. The GY series Tri Lock system offers high rigidity equivalent to a 1-piece type despite being a 2-piece type.MG has a wide insert location face for high gripping force. A combination with these holders allows it to deliver excellent performance when grooving hardened steel.

Product line-up for different holder properties

MG for narrow grooves and GY for general grooves are both lined up to allow selection of the most suitable tool.

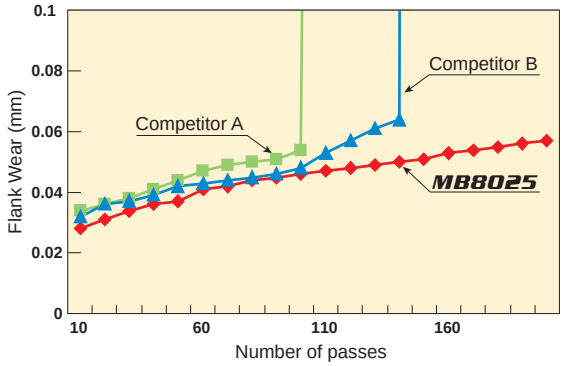
RECOMMENDED CUTTING CONDITIONS



Work Material		Hardness	Grade	Cutting Speed (m/min)	Coolant
H	Hardened Steel	35—65HRC	**MB8025**	100 (60—120)	Dry,Wet

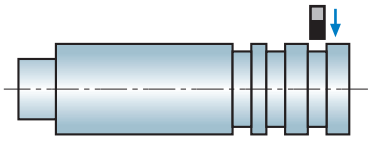
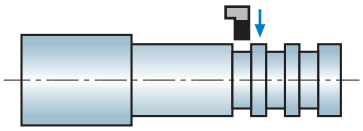
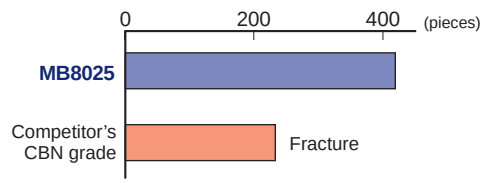
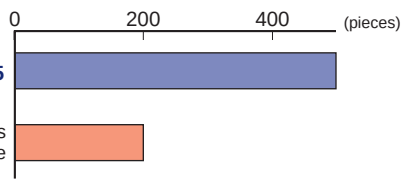
CUTTING PERFORMANCE

Tool life evaluation for the GY holder



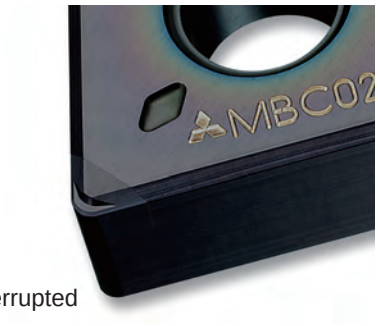
<Cutting Conditions>
Workpiece : JIS SCM415 (HRC60) Depth of Cut : 0.35mm
Cutting Speed : 120m/min Dry Cutting
Feed : 0.1mm/rev

APPLICATION EXAMPLE

Insert	**GY1G0300F020N-GFGS** (Grade : **MB8025**)	**MGTR43200** (Grade : **MB8025**)
Workpiece	Transmission shaft (SNCM230H (HRC58～62)) 	Transmission shaft (SCr420H (HRC61～65)) 
Cutting Conditions: Cutting Speed (m/min)	129	100
Cutting Conditions: Feed (mm/rev)	0.1	0.05
Result	 GY achieves longer tool life without fracturing.	 2.5 times longer tool life than the conventional insert.

CBN BREAKER INSERT NEW

FEATURES



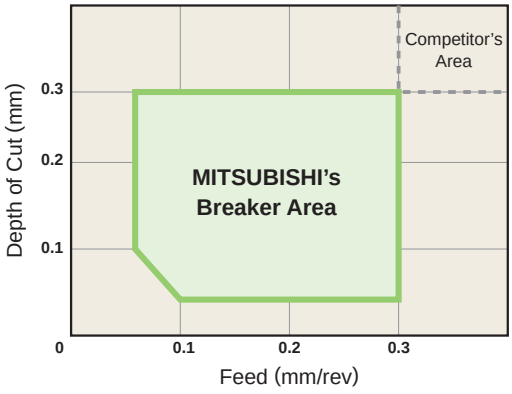
Chip Breaker Geometry Designed for Excellent Chip Control

R-shaped chip breaker ensures optimization of the cutting point and the chip breaker position. Enables effective chip discharge even when copying and prevents the chips from wrapping around the holder under the cutting conditions for finishing.Additionally, inserts are available in positive type that offers improved chip disposal for boring.

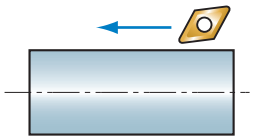
Long Life Coated CBN Grade

The coated grade MBC020 made with MIRACLE coatingtechnology exhibits high cutting performance over a widerrange of machining applications from continuous to medium interrupted cutting and enables long tool life.

Application Area



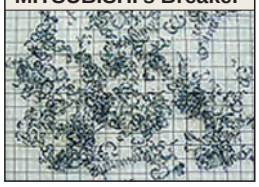
External Turning



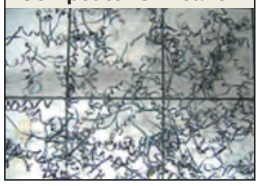
<Cutting Conditions>

Workpiece	: SCr420H(55HRC)
Insert	: BF-CNGG120408TA4
Cutting Speed	: 100m/min
Feed	: 0.2mm/rev
Depth of Cut	: 0.1mm
Dry Cutting	

MITSUBISHI's Breaker



Competitor's Breaker



MULTI-CORNER TYPE INSERTS

A single sided, multi-corner type insert hasno cutting edges on the underside. The type of grade is stamped on the upper side.

Double Sided, multi-corner type insert, ex.

Available in MBC020 grade.

NP-CNGA120408GA4

No. of Cutting Edge Corners

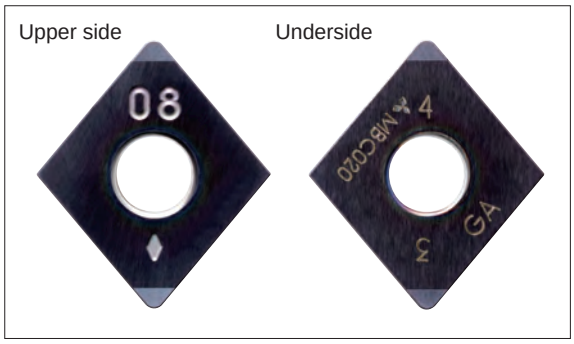
Single Sided, multi-corner type insert, ex.

Available in CBN grades except MB810 and MB825.

NP-CNGA120408GA2

No. of Cutting Edge Corners

Double sided, multi-corner type insert



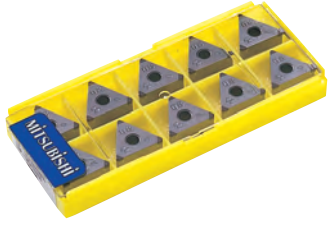
NEW Corner R0.2 insert

Corner R0.2 inserts are available in MBC020, making it suitable for copying and corner radius machining.

10-INSERTS PACKS

Two types of packs for ***MB8025*** Multi-corner type inserts, are available, a single insert pack and a ten insert pack. For easy storage.

10-Insert Pack



TNP-CNGA120404G2

10-Insert Pack Symbol

WIPER INSERT

●Improving Surface Finish

Under the same machining conditions as conventional breakers, but with the feed rate increased, the surface finish of the workpiece can be improved.

●Improving Efficiency

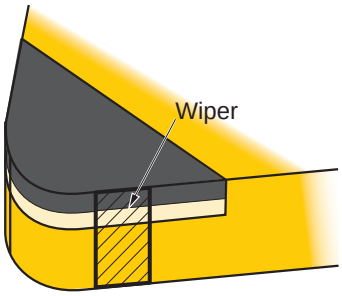
High feed rates not only shortened machining times but also make it possible to combine roughing and finishing operations.

●Increased Tool Life

When a change to high feed conditions, the time required to cut one component is decreased, thus more parts can be machined with each insert. In addition, the high feed rate prevents rubbing, therefore, delaying the progression of wear and increasing the tool life of the insert.

●Improving Chip Control

Under high feed conditions, the chips generated become thicker and are more easily broken, thus, chip control is improved.



Insert example

General-purpose wiper insert

NP-CNGA120408GW

Wiper Symbol

NEW

Wiper insert for low rigidity workpieces

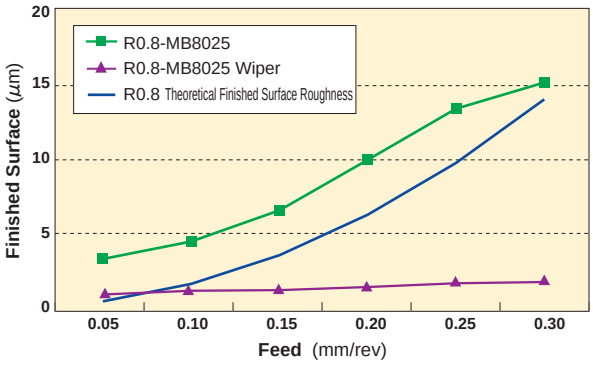
NP-CNGA120408GAWS2

New wiper edge code

CBN wiper inserts for low rigidity workpices are now available in MBC010, MBC020 and MB8025 grade, making it suitable for use in application areas where conventional inserts cannot be used due to vibrations.

CUTTING PERFORMANCE

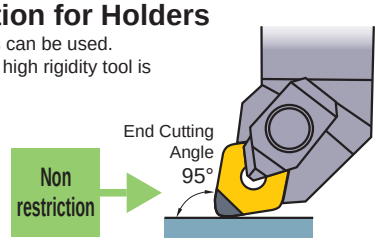
<Cutting Conditions> Workpiece : Hardened Material(HRC60) Depth of Cut : 0.1mm
Insert : NP-CNGA120408 Dry Cutting
Cutting Speed : 120m/min



NOTES FOR USE

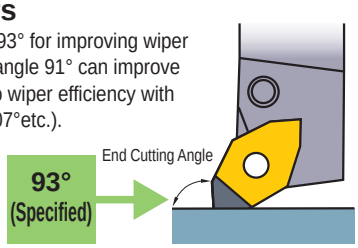
No Restriction for Holders

A standard holders can be used.
(★A double clamp, high rigidity tool is recommended.)

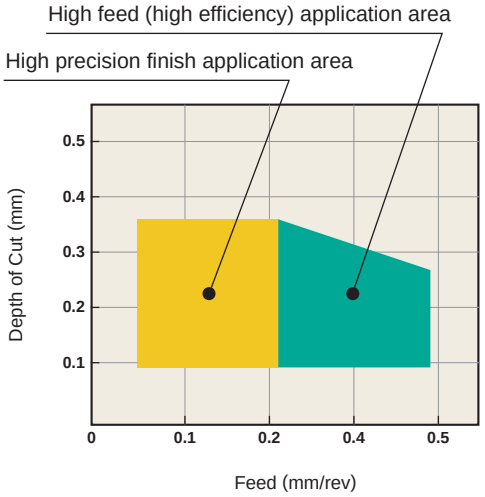


Restriction for Holders

Use a holder with end cutting angle 93° for improving wiper efficiency. A holder with end cutting angle 91° can improve wiper efficiency, however, there is no wiper efficiency with other end cutting angles (60°, 90°,107°etc.).

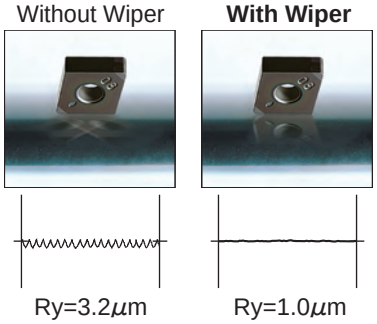


RECOMMENDED CUTTING CONDITIONS AND PERFORMANCE



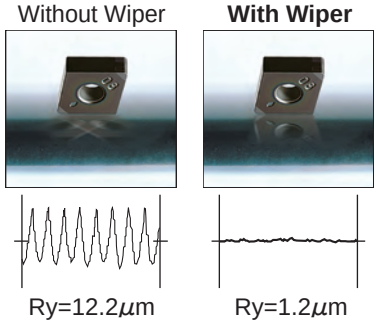
High precision finishing

Cutting Speed: 100m/min Feed: 0.1mm/rev
Depth of Cut: 0.1mm Dry Cutting

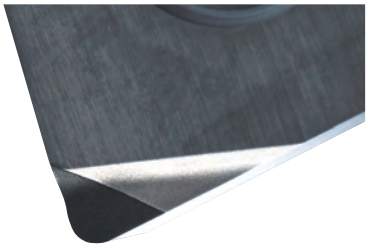


High feed, high efficiency machining

Cutting Speed: 100m/min Feed: 0.3mm/rev
Depth of Cut: 0.1mm Dry Cutting



PCD (SINTERED DIAMOND)



- Suitable for materials such as aluminium alloy, non-ferrous metals, and fibre strengthened plastic.
- Suitable for extremely high speed finishing.

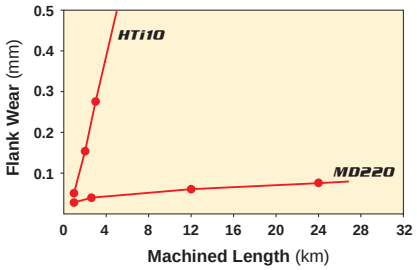
SELECTION STANDARD

TURNING

Work Material	Recommended Grade			Recommended Cutting Conditions		
	MD205	MD220	MD230	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
Aluminium		◎		1000 (200—1500)	—0.2	—1.0
Aluminium Alloy (Si ≤ 16%)		◎		800 (200—1200)	—0.2	—1.0
Aluminium Alloy (Si ≥ 16%)	◎	○		600 (200—1000)	—0.2	—1.0
Copper Alloy		◎		700 (200—1200)	—0.2	—1.0
Strengthened Plastic		◎		600 (100—1000)	—0.4	—1.0
Glass Fiber Reinforced Plastic		◎		500 (100—800)	—0.25	—1.0
Carbon	○	◎		400 (100—600)	—0.3	—1.0
Ceramics		○		50 (30—80)	—0.1	—1.0
Hard Rubber		◎		600 (300—800)	—0.15	—1.0
Wood Inorganic Board		◎		1300 (300—4000)	—0.4	—
Cemented Carbide	◎	○		15 (5—20)	—0.2	—0.5

(Note 1) ◎:1st recommendation. ○: 2nd recommendation.
(Note 2) Not suitable for steel.

CUTTING PERFORMANCE



Sintered diamond tool wear for high Si aluminium alloy cutting

<Cutting Conditions>
Workpiece : High Si Aluminium Alloy
Tool : P11R,SPGN120308
Cutting Speed : 200m/min
Depth of Cut : 1.5mm
Feed : 0.15mm/rev
Coolant : W.S.O

APPLICATION

Grade		
MD205	MD220	MD230
Please use when there is insufficient resistance to wear with the MD220.	Apply for general finishing of non-ferrous metals and non-metal cutting.	Please use when a fracture has occured with the MD 220 and you desire a high-quality finished surface.

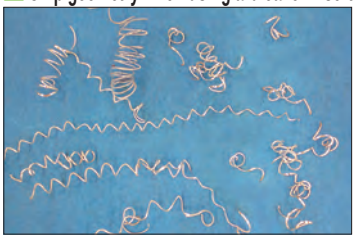
NEW PETIT CUT INSERT SERIES

FEATURES

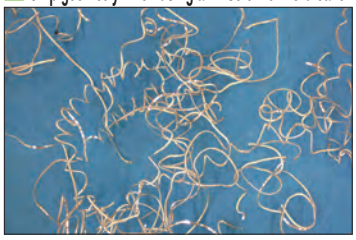
- **Economical** The small PCD delivers long tool life. Eliminates the need for regrinding, making tool management easier and economical.
- **With Breaker** Chip breaker formed directly on the PCD portion delivers superior chip control.
- NEW Corner R0.05 inserts are available, making it suitable for the machining of small work corner radii.

CUTTING PERFORMANCE

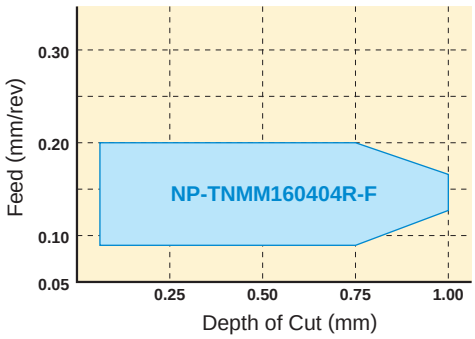
Chip geometry when using a breaker insert



Chip geometry when using an insert with no breaker



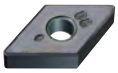
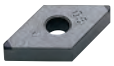
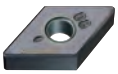
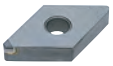
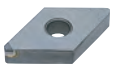
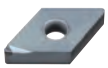
<Cutting Conditions>
Workpiece : A5052
Cutting Speed : 340m/min
Feed : 0.1mm/rev
Depth of Cut : 0.1mm
Dry Cutting



<Cutting Conditions>
Workpiece : A1050
Cutting Speed : 400m/min
Wet Cutting

CLASSIFICATION

NEGATIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker Name and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
NEW PETIT CUT	Multi-corner Type Double Sided	G	Flat Top	NP-CNGA_○4 A142	NP-DNGA_○4 A145	NP-SNGA_○4 A147	NP-TNGA_○6 A148	NP-VNGA_○4 A150	NP-WNGA_○6 A151
	Multi-corner Type Double Sided With Wiper		Flat Top	NP-CNGA_○W4 A142					
	NEW Multi-corner Type Double Sided With Breaker		BF	BF-CNGG_○4 A142	BF-DNGG_○4  A145				
	Multi-corner Type Single Sided		Flat Top	NP-CNGA_○2 * A142	NP-DNGA_○2 *  A145	NP-SNGA_○2 * A147	NP-TNGA_○3 * A148	NP-VNGA_○2 * A150	NP-WNGA_○3 A151
	Multi-corner Type Single Sided With Wiper		Flat Top	NP-CNGA_○W○2 * A143	NP-DNGA_○W○2J_R/L A146				NP-WNGA_○WS3 A151
	NEW Multi-corner Type Single Sided With Breaker		BF	BF-CNGM_○2 A143	BF-DNGM_○2  A146				
	One-corner Type Single Sided	M	Flat Top	NP-CNMA_○ A143	NP-DNMA_○  A146	NP-SNMA_○ A147	NP-TNMA_○ A149	NP-VNMA_○ A150	
	One-corner Type Single Sided With Wiper		Flat Top	NP-CNMA_○W A144					NP-WNMA_○W A151
	One-corner Type Single Sided With Wiper		Flat Top		NP-DNMA_GWJ_R/L  A146				
	One-corner Type Single Sided With Breaker		R/L-F	NP-CNMM_R/L-F A172	NP-DNMM_R/L-F  A172	NP-SNMM_R/L-F A173	NP-TNMM_R/L-F A173	NP-VNMM_R/L-F A174	

(Note) Two types of packs for ★ type inserts, pack of single insert and pack of ten inserts, are available. (The single pack is standard.)
Please refer to the "Standard of inserts".

NEGATIVE INSERTS WITH HOLE

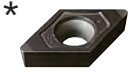
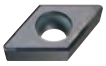
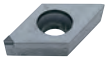
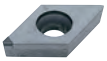
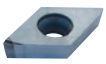
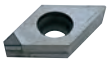
Product Name	Type	Tolerance	Breaker Name and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
STANDARD	One-corner Type Single Sided	M	Flat Top	CNMA A144, A172					
STANDARD	One-corner Type Single Sided	G	Flat Top		DNGA A146, A172	SNGA A147, A173	TNGA A149, A173	VNGA A150, A174	

5° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker Name and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
NEW PETIT CUT	Multi-corner Type Single Sided	G	Flat Top					NP-VBGW_○2 A165	
NEW PETIT CUT	One-corner Type Single Sided	G	Flat Top					NP-VBGW_○ A165	
NEW PETIT CUT	NEW One-corner Type Single Sided With Breaker	G	R-F					NP-VBGT_R-F A181	

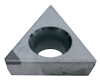
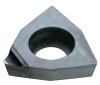
CLASSIFICATION

7° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker Name and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
NEW PETIT CUT	Multi-corner Type Single Sided	G	Flat Top	NP-CCGW/B_○2 * A156	NP-DCGW_○2 *  A160		NP-TCGW_○3 A162	NP-VCGW_○2 A166	
	Multi-corner Type Single Sided With Wiper	G	Flat Top	NP-CCGW_○W○2 A157					
	NEW Multi-corner Type Single Sided With Breaker	G	BF	BF-CCGT_○2 A157	BF-DCGT_○2  A160				
	One-corner Type Single Sided	M	Flat Top	NP-CCMB_○ A157					
	One-corner Type Single Sided With Breaker	M	Standard	NP-CCMH A176					
	One-corner Type Single Sided	G	Flat Top	NP-CCGW_○ A157	NP-DCGW_○  A161				
	One-corner Type Single Sided With Wiper	G	Flat Top	NP-CCGW_○W A157					
	One-corner Type Single Sided	M	Flat Top	NP-CCMW_○ A158	NP-DCMW_○  A161				NP-WCMW_○ A166
	One-corner Type Single Sided	M	Flat Top	NP-CCMW A176					
	One-corner Type Single Sided With Breaker	M	R/L-F		NP-DCMT_R/L-F  A177				
	NEW One-corner Type Single Sided With Breaker	G	R-F					NP-VCGT_R-F A181	
	One-corner Type Single Sided With Wiper	G	R/L		NP-DCGW_GWJ_R/L A161				
STANDARD	One-corner Type Single Sided	M G	Flat Top	CCMW A158, A176	DCMW  A161, A177		TCMW TCGW A162, A178		WCMW A182

(Note) Two types of packs for * type inserts, pack of single insert and pack of ten inserts, are available. (The single pack is standard.)
Please refer to the "Standard of inserts".

11° POSITIVE INSERTS WITH HOLE

Product Name	Type	Tolerance	Breaker Name and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Rhombic 35°	Trigon 80°
NEW PETIT CUT	Multi-corner Type Single Sided	G	Flat Top	NP-CPGB_○2 A159			NP-TPGB_○3 A163		
	Multi-corner Type Single Sided		Flat Top				NP-TPGX_○3 A163		
	One-corner Type Single Sided	M	Flat Top	NP-CPMB_○ A159			NP-TPMB_○ A163		
	One-corner Type Single Sided With Breaker		Standard	NP-CPMH A176					
	One-corner Type Single Sided	G	Flat Top				NP-TPGX_○  A163		
	One-corner Type Single Sided With Wiper		Flat Top				NP-TPGX_○WF A164		
	One-corner Type Single Sided With Breaker	M	R/L-F				NP-TPMX_R/L-F A179		
	One-corner Type Single Sided With Breaker		R/L-F				NP-TPMH_R/L-F A179		
STANDARD	One-corner Type Single Sided With Breaker	G	Standard	CPGT A176					WPGT  A182
	One-corner Type Single Sided		Flat Top			SPGX A177	TPGX A164, A180		
	One-corner Type Single Sided With Breaker		R/L-F				TPGT/V_R/L-F A179, A180		

CLASSIFICATION

15° POSITIVE INSERTS WITH HOLE

Type	Tolerance	Breaker Name and Cross Section	Rhombic 35°	
One-corner Type Single Sided (For Aluminium With Breaker	G	**R/L**	**VDGX_R/L-F** A184	

20° POSITIVE INSERTS WITH HOLE

Type	Tolerance	Breaker Name and Cross Section	Rhombic 55°	Triangular 60°
One-corner Type Single Sided (For Aluminium With Breaker	G	**R/L**		**TEGX_R/L** A183
One-corner Type Single Sided (For Aluminium With Breaker		**R/L-F**	**DEGX_R/L-F** A183	
One-corner Type Single Sided (For Aluminium)		**Flat Top**		**TEGX** A183

NEGATIVE INSERTS WITHOUT HOLE

Type	Tolerance	Breaker Name and Cross Section	Rhombic 80°	Rhombic 55°	Square 90°	Triangular 60°	Round
One-corner Type Single Sided	G	Flat Top			SNGN A154, A175	TNGN A155	
Multi-corner Type Double Sided (Solid CBN)	G	Flat Top	CNGN A152	DNGN A152	SNGN A154, A175	TNGN A155	RNGN A153

5° POSITIVE INSERTS WITHOUT HOLE

Type	Tolerance	Breaker Name and Cross Section	Triangular 60°	
Multi-corner Type Single Sided	G	Flat Top	TBGN A169	

11° POSITIVE INSERTS WITHOUT HOLE

Type	Tolerance	Breaker Name and Cross Section	Square 90°	Triangular 60°
One-corner Type Single Sided	G	Flat Top	SPGN A168, A185	TPGN A169, A185

SPECIAL PURPOSE INSERTS

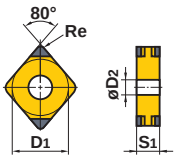
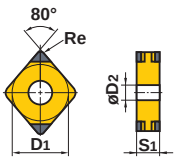
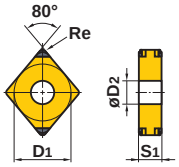
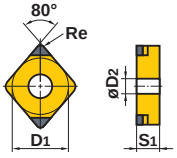
Tool Holder Type	Tolerance	Inserts
DG Type	G	DGJ-CE A170
GY Type		GY_GFGS A170
MG Type		MGTR A171
TL Type		RTG-A A167
–		RBG A167

80° CN TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ◐ ✣ ● ◐ ◐
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	◐

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

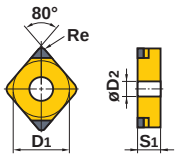
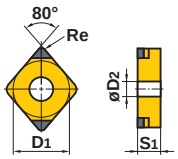
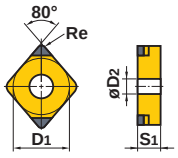
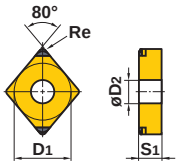
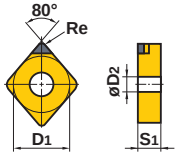
Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-CNGA120404GA4		●								12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 −434
	120408GA4		●								12.7	4.76	0.8	5.16		
	120412GA4		●								12.7	4.76	1.2	5.16		
	120404GN4		●								12.7	4.76	0.4	5.16		
	120408GN4		●								12.7	4.76	0.8	5.16		
	120412GN4		●								12.7	4.76	1.2	5.16		
	120404TA4		●								12.7	4.76	0.4	5.16		
	120408TA4		●								12.7	4.76	0.8	5.16		
	120412TA4		●								12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Wiper) *	NP-CNGA120404GAW4		●								12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 −434
	120408GAW4		●								12.7	4.76	0.8	5.16		
	120412GAW4		●								12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Breaker)	BF-CNGG120404TA4		●								12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 −434
	120408TA4		●								12.7	4.76	0.8	5.16		
	120412TA4		●								12.7	4.76	1.2	5.16		
NEW PETIT CUT	NP-CNGA120404GA2		●								12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 −434
	120408GA2		●								12.7	4.76	0.8	5.16		
	120412GA2		●								12.7	4.76	1.2	5.16		
	120404GS2	●						●	●		12.7	4.76	0.4	5.16		
	120408GS2	●						●	●		12.7	4.76	0.8	5.16		
	120412GS2	●						●	●		12.7	4.76	1.2	5.16		
	120404GN2		●								12.7	4.76	0.4	5.16		
	120408GN2		●								12.7	4.76	0.8	5.16		
	120412GN2		●								12.7	4.76	1.2	5.16		
	120404FS2									○	12.7	4.76	0.4	5.16		
	120408FS2									○	12.7	4.76	0.8	5.16		
	120412FS2									○	12.7	4.76	1.2	5.16		
	120404TA2		●						●		12.7	4.76	0.4	5.16		
	120408TA2		●						●		12.7	4.76	0.8	5.16		
	120412TA2		●						●		12.7	4.76	1.2	5.16		
	120404TS2									○	12.7	4.76	0.4	5.16		
	120408TS2									○	12.7	4.76	0.8	5.16		
	120412TS2									○	12.7	4.76	1.2	5.16		
	120404G2			●							12.7	4.76	0.4	5.16		
	120408G2			●							12.7	4.76	0.8	5.16		
	120412G2			●							12.7	4.76	1.2	5.16		
	120404T2			●							12.7	4.76	0.4	5.16		
	120408T2			●							12.7	4.76	0.8	5.16		
	120412T2			●							12.7	4.76	1.2	5.16		

* Please refer to A134 before using the wiper insert.

● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case) □ : Non stock, produced to order only.

Work Material			Coated CBN		CBN							Cutting Conditions (Guide) : ●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting Honing (Last letter of order number) : Refer to page A131.
	H	Hardened Materials	●	◐	◐	●	◐	✣		●	◐	
	K	Cast Iron									◐	
	S	Heat-resistant Alloy, Titanium Alloy										
		Sintered Alloy										◐

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT ★2	TNP-CNGA120404G2			●							12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 —434
	120408G2			●							12.7	4.76	0.8	5.16		
	120412G2			●							12.7	4.76	1.2	5.16		
	120404T2			●							12.7	4.76	0.4	5.16		
	120408T2			●							12.7	4.76	0.8	5.16		
	120412T2			●							12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Wiper) ★1	NP-CNGA120404GAWS2		○	○							12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 —434
	120408GAWS2		○	○							12.7	4.76	0.8	5.16		
	120412GAWS2		○	○							12.7	4.76	1.2	5.16		
	120404GSWS2	○									12.7	4.76	0.4	5.16		
	120408GSWS2	○									12.7	4.76	0.8	5.16		
	120412GSWS2	○									12.7	4.76	1.2	5.16		
	120404GAW2		●								12.7	4.76	0.4	5.16		
	120408GAW2		●								12.7	4.76	0.8	5.16		
	120412GAW2		●								12.7	4.76	1.2	5.16		
	120408GSW2	●									12.7	4.76	0.8	5.16		
	120408GW2			●							12.7	4.76	0.8	5.16		
	120412GW2			●							12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Wiper) ★1 ★2	TNP-CNGA120408GW2			●							12.7	4.76	0.8	5.16		A196 A197 A277 A300 A306 A432 —434
	120412GW2			●							12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Breaker)	BF-CNGM120404TA2		●								12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 —434
	120408TA2		●								12.7	4.76	0.8	5.16		
	120412TA2		●								12.7	4.76	1.2	5.16		
NEW PETIT CUT	NP-CNMA120404GS							●	●		12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 —434
	120408GS							●	●		12.7	4.76	0.8	5.16		
	120412GS							●	●		12.7	4.76	1.2	5.16		
	120404G			●		●					12.7	4.76	0.4	5.16		
	120408G			●		●					12.7	4.76	0.8	5.16		
	120412G			●		●					12.7	4.76	1.2	5.16		
	120404F			□	●			●			12.7	4.76	0.4	5.16		
	120408F			□	●			●			12.7	4.76	0.8	5.16		
	120412F			□	●			●			12.7	4.76	1.2	5.16		
	120404T			□		●	●		●		12.7	4.76	0.4	5.16		
	120408T			□		●	●		●		12.7	4.76	0.8	5.16		
	120412T			□		●	●		●		12.7	4.76	1.2	5.16		

★1 Please refer to A134 before using the wiper insert.
★2 The order number is for a 10-insert pack. Please specify order number, grade and quantity.

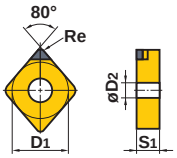
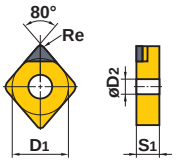
GRADES A126 IDENTIFICATION A124

80° CN TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT (With Wiper) *	NP-CNMA120408GW			●		●		●			12.7	4.76	0.8	5.16		A196 A197 A277 A300 A306 A432 −434
	120412GW					●					12.7	4.76	1.2	5.16		
	120408FW							●			12.7	4.76	0.8	5.16		
	120408FPW				●						12.7	4.76	0.8	5.16		
	120408TW						●				12.7	4.76	0.8	5.16		
	CNMA120404				●	●		●	●		12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 −434
	120408				●	●		●	●		12.7	4.76	0.8	5.16		
	120412					●		●	●		12.7	4.76	1.2	5.16		

* Please refer to A134 before using the wiper insert.

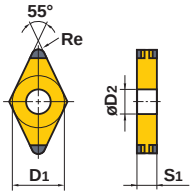
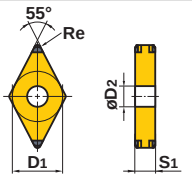
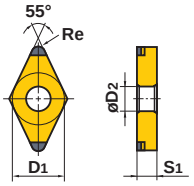
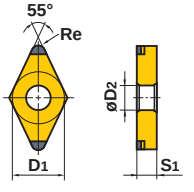
● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case)

55° DN TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-DNGA150404GA4		●								12.7	4.76	0.4	5.16		A198 A199 A277 A300 —302 A305 A306 A435 A437
	150408GA4		●								12.7	4.76	0.8	5.16		
	150412GA4		●								12.7	4.76	1.2	5.16		
	150404GN4		●								12.7	4.76	0.4	5.16		
	150408GN4		●								12.7	4.76	0.8	5.16		
	150412GN4		●								12.7	4.76	1.2	5.16		
	150404TA4		●								12.7	4.76	0.4	5.16		
	150408TA4		●								12.7	4.76	0.8	5.16		
	150412TA4		●								12.7	4.76	1.2	5.16		
NEW PETIT CUT	BF-DNGG150404TA4		●								12.7	4.76	0.4	5.16		A198 A199 A277 A300 —302 A305 A306 A435 A437
	150408TA4		●								12.7	4.76	0.8	5.16		
	150412TA4		●								12.7	4.76	1.2	5.16		
(With Breaker)																
NEW PETIT CUT	NP-DNGA150404GA2		●								12.7	4.76	0.4	5.16		A198 A199 A277 A300 —302 A305 A306 A435 A437
	150408GA2		●								12.7	4.76	0.8	5.16		
	150412GA2		●								12.7	4.76	1.2	5.16		
	150404GS2	●						●	●		12.7	4.76	0.4	5.16		
	150408GS2	●						●	●		12.7	4.76	0.8	5.16		
	150412GS2	●						●	●		12.7	4.76	1.2	5.16		
	150404GN2		●								12.7	4.76	0.4	5.16		
	150408GN2		●								12.7	4.76	0.8	5.16		
	150412GN2		●								12.7	4.76	1.2	5.16		
	150404FS2									○	12.7	4.76	0.4	5.16		
	150408FS2									○	12.7	4.76	0.8	5.16		
	150412FS2									○	12.7	4.76	1.2	5.16		
	150404TA2		●								12.7	4.76	0.4	5.16		
	150408TA2		●								12.7	4.76	0.8	5.16		
	150412TA2		●								12.7	4.76	1.2	5.16		
	150404TS2									○	12.7	4.76	0.4	5.16		
	150408TS2									○	12.7	4.76	0.8	5.16		
	150412TS2									○	12.7	4.76	1.2	5.16		
	150404G2			●							12.7	4.76	0.4	5.16		
	150408G2			●							12.7	4.76	0.8	5.16		
	150412G2			●							12.7	4.76	1.2	5.16		
	150404T2			●							12.7	4.76	0.4	5.16		
	150408T2			●							12.7	4.76	0.8	5.16		
	150412T2			●							12.7	4.76	1.2	5.16		
NEW PETIT CUT *	TNP-DNGA150404G2			●							12.7	4.76	0.4	5.16		A198 A199 A277 A300 —302 A305 A306 A435 A437
	150408G2			●							12.7	4.76	0.8	5.16		
	150412G2			●							12.7	4.76	1.2	5.16		
	150404T2			●							12.7	4.76	0.4	5.16		
	150408T2			●							12.7	4.76	0.8	5.16		
	150412T2			●							12.7	4.76	1.2	5.16		

* The order number is for a 10-insert pack. Please specify order number, grade and quantity.

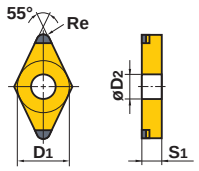
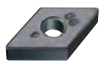
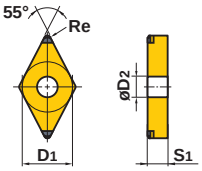
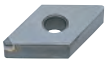
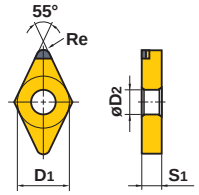
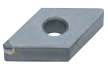
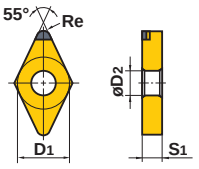
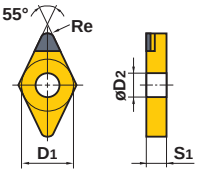
GRADES A126 IDENTIFICATION A124

55° DN TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ● ✣ ● ◐ ◐
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT (With Wiper) *	NP-DNGA150404GAWS2JR		○	○							12.7	4.76	0.4	5.16	 Right hand insert shown.	A198 A277 A300 A302 A305
	150404GAWS2JL		○	○							12.7	4.76	0.4	5.16		
	150408GAWS2JR		○	○							12.7	4.76	0.8	5.16		
	150408GAWS2JL		○	○							12.7	4.76	0.8	5.16		
	150404GSWS2JR	○									12.7	4.76	0.4	5.16		
	150404GSWS2JL	○									12.7	4.76	0.4	5.16		
	150408GSWS2JR	○									12.7	4.76	0.8	5.16		
	150408GSWS2JL	○									12.7	4.76	0.8	5.16		
	150404GAW2JR		●								12.7	4.76	0.4	5.16		
	150404GAW2JL		●								12.7	4.76	0.4	5.16		
	150408GAW2JR		●								12.7	4.76	0.8	5.16		
	150408GAW2JL		●								12.7	4.76	0.8	5.16		
NEW PETIT CUT  (With Breaker)	BF-DNGM150404TA2		●								12.7	4.76	0.4	5.16		A198 A199 A277 A300 —302 A305 A306 A435 A437
	150408TA2		●								12.7	4.76	0.8	5.16		
	150412TA2		●								12.7	4.76	1.2	5.16		
NEW PETIT CUT 	NP-DNMA150404GS							●	●		12.7	4.76	0.4	5.16		A198 A199 A277 A300 —302 A305 A306 A435 A437
	150408GS							●	●		12.7	4.76	0.8	5.16		
	150404G			●		●					12.7	4.76	0.4	5.16		
	150408G			●		●					12.7	4.76	0.8	5.16		
	150412G			●							12.7	4.76	1.2	5.16		
	150404F			□	●			●			12.7	4.76	0.4	5.16		
	150408F			□	●			●			12.7	4.76	0.8	5.16		
	150412F			□							12.7	4.76	1.2	5.16		
	150404T			□		●	●		●		12.7	4.76	0.4	5.16		
	150408T			□		●	●		●		12.7	4.76	0.8	5.16		
	150412T			□							12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Wiper) * 	NP-DNMA150408GWJR					●					12.7	4.76	0.8	5.16		A198 A277 A300 A302 A305
	150408GWJL					●					12.7	4.76	0.8	5.16		
	DNGA150404					●		□	□		12.7	4.76	0.4	5.16		A198 A199 A277 A300 —302 A305 A306 A435 A437
	150408					●		□	□		12.7	4.76	0.8	5.16		
	150412					●		□	□		12.7	4.76	1.2	5.16		

* Please refer to A134 before using the wiper insert.

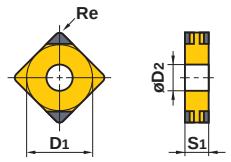
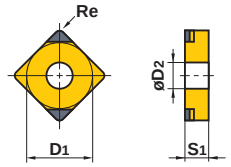
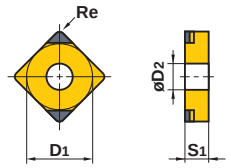
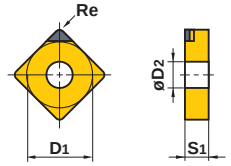
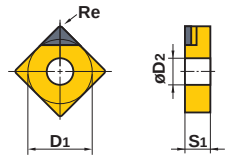
● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case) □ : Non stock, produced to order only.

90° SN TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-SNGA120404GA4		●								12.7	4.76	0.4	5.16		A200 −204 A278 A299
	120408GA4		●								12.7	4.76	0.8	5.16		
	120412GA4		●								12.7	4.76	1.2	5.16		
NEW PETIT CUT	NP-SNGA120404GS2	●									12.7	4.76	0.4	5.16		A200 −204 A278 A299
	120408GS2	●						●	●		12.7	4.76	0.8	5.16		
	120412GS2	●						●	●		12.7	4.76	1.2	5.16		
	120404FS2									○	12.7	4.76	0.4	5.16		
	120408FS2									○	12.7	4.76	0.8	5.16		
	120412FS2									○	12.7	4.76	1.2	5.16		
	120404TS2									○	12.7	4.76	0.4	5.16		
	120408TS2									○	12.7	4.76	0.8	5.16		
	120412TS2									○	12.7	4.76	1.2	5.16		
	120404G2			●							12.7	4.76	0.4	5.16		
	120408G2			●							12.7	4.76	0.8	5.16		
	120412G2			●							12.7	4.76	1.2	5.16		
	120404T2			●							12.7	4.76	0.4	5.16		
	120408T2			●							12.7	4.76	0.8	5.16		
	120412T2			●							12.7	4.76	1.2	5.16		
NEW PETIT CUT *	TNP-SNGA120404G2			●							12.7	4.76	0.4	5.16		A200 −204 A278 A299
	120408G2			●							12.7	4.76	0.8	5.16		
	120412G2			●							12.7	4.76	1.2	5.16		
	120404T2			●							12.7	4.76	0.4	5.16		
	120408T2			●							12.7	4.76	0.8	5.16		
	120412T2			●							12.7	4.76	1.2	5.16		
NEW PETIT CUT	NP-SNMA120404GS							●	●		12.7	4.76	0.4	5.16		A200 −204 A278 A299
	120408GS							●	●		12.7	4.76	0.8	5.16		
	120404G			●		●					12.7	4.76	0.4	5.16		
	120408G			●		●					12.7	4.76	0.8	5.16		
	120412G			●							12.7	4.76	1.2	5.16		
	120404F			□	●			●			12.7	4.76	0.4	5.16		
	120408F			□	●			●			12.7	4.76	0.8	5.16		
	120412F			□	●			●			12.7	4.76	1.2	5.16		
	120404T			□		●	●		●		12.7	4.76	0.4	5.16		
	120408T			□		●	●		●		12.7	4.76	0.8	5.16		
	120412T			□		●	●		●		12.7	4.76	1.2	5.16		
	SNGA120404					□		□	□		12.7	4.76	0.4	5.16		A200 −204 A278 A299
	120408					●		●	●		12.7	4.76	0.8	5.16		
	120412					●		●	●		12.7	4.76	1.2	5.16		

* The order number is for a 10-insert pack. Please specify order number, grade and quantity.

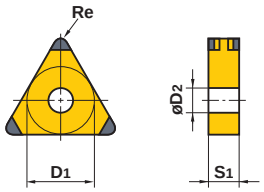
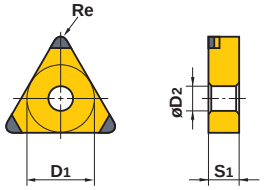
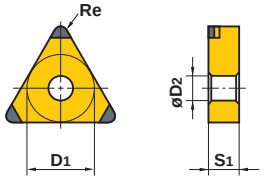
GRADES A126 IDENTIFICATION A124

60° TN TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN						Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-TNGA160404GA6		●								9.525	4.76	0.4	3.81		A206 —211 A278 A299 A305
	160408GA6		●								9.525	4.76	0.8	3.81		
	160412GA6		●								9.525	4.76	1.2	3.81		
	160404GN6		●								9.525	4.76	0.4	3.81		
	160408GN6		●								9.525	4.76	0.8	3.81		
	160412GN6		●								9.525	4.76	1.2	3.81		
	160404TA6		●								9.525	4.76	0.4	3.81		
	160408TA6		●								9.525	4.76	0.8	3.81		
	160412TA6		●								9.525	4.76	1.2	3.81		
NEW PETIT CUT	NP-TNGA160402GA3		●								9.525	4.76	0.2	3.81		A206 —211 A278 A299 A305
	160404GA3		●								9.525	4.76	0.4	3.81		
	160408GA3		●								9.525	4.76	0.8	3.81		
	160412GA3		●								9.525	4.76	1.2	3.81		
	160404GS3	●									9.525	4.76	0.4	3.81		
	160408GS3	●						●	●		9.525	4.76	0.8	3.81		
	160412GS3	●						●	●		9.525	4.76	1.2	3.81		
	160402GN3		●								9.525	4.76	0.2	3.81		
	160404GN3		●								9.525	4.76	0.4	3.81		
	160408GN3		●								9.525	4.76	0.8	3.81		
	160412GN3		●								9.525	4.76	1.2	3.81		
	160404FS3									○	9.525	4.76	0.4	3.81		
	160408FS3									○	9.525	4.76	0.8	3.81		
	160412FS3									○	9.525	4.76	1.2	3.81		
	160404TA3		●								9.525	4.76	0.4	3.81		
	160408TA3		●								9.525	4.76	0.8	3.81		
	160412TA3		●								9.525	4.76	1.2	3.81		
	160404TS3									○	9.525	4.76	0.4	3.81		
	160408TS3									○	9.525	4.76	0.8	3.81		
	160412TS3									○	9.525	4.76	1.2	3.81		
	160404G3			●							9.525	4.76	0.4	3.81		
	160408G3			●							9.525	4.76	0.8	3.81		
	160412G3			●							9.525	4.76	1.2	3.81		
	160404T3			●							9.525	4.76	0.4	3.81		
	160408T3			●							9.525	4.76	0.8	3.81		
	160412T3			●							9.525	4.76	1.2	3.81		
NEW PETIT CUT *	TNP-TNGA160404G3			●							9.525	4.76	0.4	3.81		A206 —211 A278 A299 A305
	160408G3			●							9.525	4.76	0.8	3.81		
	160412G3			●							9.525	4.76	1.2	3.81		
	160404T3			●							9.525	4.76	0.4	3.81		
	160408T3			●							9.525	4.76	0.8	3.81		
	160412T3			●							9.525	4.76	1.2	3.81		

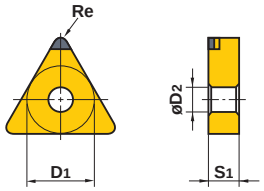
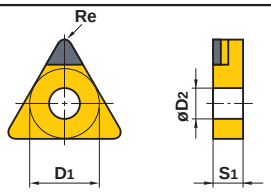
* The order number is for a 10-insert pack. Please specify order number, grade and quantity.

● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case) □ : Non stock, produced to order only.

Work Material			Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
	H	Hardened Materials	●	◐	◐	●	◐	✣									
	K	Cast Iron							●	◐							
	S	Heat-resistant Alloy, Titanium Alloy								◐							
		Sintered Alloy									◐						

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2	Geometry	Applicable Holder Page
NEW PETIT CUT	NP-TNMA160404GS							●	●		9.525	4.76	0.4	3.81		A206 —211 A278 A299 A305
	160408GS							●	●		9.525	4.76	0.8	3.81		
	160412GS							●	●		9.525	4.76	1.2	3.81		
	160404G			●		●					9.525	4.76	0.4	3.81		
	160408G			●		●					9.525	4.76	0.8	3.81		
	160412G			●		●					9.525	4.76	1.2	3.81		
	160404F			□	●			●			9.525	4.76	0.4	3.81		
	160408F			□	●			●			9.525	4.76	0.8	3.81		
	160412F			□	●			□			9.525	4.76	1.2	3.81		
	160404T			□		●	●		●		9.525	4.76	0.4	3.81		
	160408T			□		●	●		●		9.525	4.76	0.8	3.81		
	160412T			□		●	●		□		9.525	4.76	1.2	3.81		
	TNGA160404				●	●		●	●		9.525	4.76	0.4	3.81		A206 —211 A278 A299 A305
	160408				●	●		●	●		9.525	4.76	0.8	3.81		
	220404					□		●	□		12.7	4.76	0.4	5.16		
	220408					●		●	□		12.7	4.76	0.8	5.16		
	220412					●		●	□		12.7	4.76	1.2	5.16		

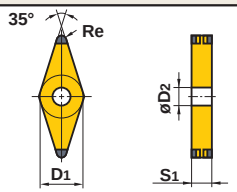
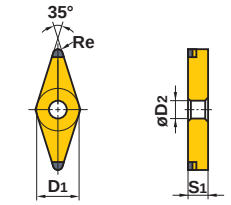
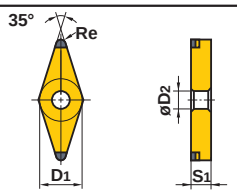
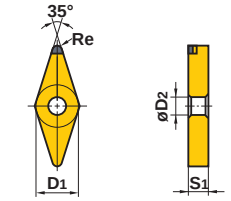
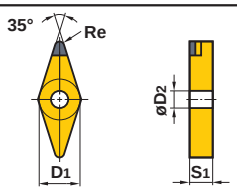
GRADES A126
IDENTIFICATION A124

35° VN TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ◐ ✣ ● ◐ ◐ ◐
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN						Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-VNGA160404GA4		●								9.525	4.76	0.4	3.81		A212 —214 A279 A307
	160408GA4		●								9.525	4.76	0.8	3.81		
NEW PETIT CUT	NP-VNGA160402GA2		●								9.525	4.76	0.2	3.81		A212 —214 A279 A307
	160404GA2		●								9.525	4.76	0.4	3.81		
	160408GA2		●								9.525	4.76	0.8	3.81		
	160404GS2	●									9.525	4.76	0.4	3.81		
	160408GS2	●									9.525	4.76	0.8	3.81		
	160402GN2		●								9.525	4.76	0.2	3.81		
	160404FS2									○	9.525	4.76	0.4	3.81		
	160408FS2									○	9.525	4.76	0.8	3.81		
	160404TS2									○	9.525	4.76	0.4	3.81		
	160408TS2									○	9.525	4.76	0.8	3.81		
	160404G2			●							9.525	4.76	0.4	3.81		
	160408G2			●							9.525	4.76	0.8	3.81		
	160404T2			●							9.525	4.76	0.4	3.81		
	160408T2			●							9.525	4.76	0.8	3.81		
NEW PETIT CUT *	TNP-VNGA160404G2			●							9.525	4.76	0.4	3.81		A212 —214 A279 A307
	160408G2			●							9.525	4.76	0.8	3.81		
	160404T2			●							9.525	4.76	0.4	3.81		
	160408T2			●							9.525	4.76	0.8	3.81		
NEW PETIT CUT	NP-VNMA160404GS							●	●		9.525	4.76	0.4	3.81		A212 —214 A279 A307
	160408GS							●	●		9.525	4.76	0.8	3.81		
	160404G			●		●					9.525	4.76	0.4	3.81		
	160408G			●		●					9.525	4.76	0.8	3.81		
	160404F			□	●			●			9.525	4.76	0.4	3.81		
	160408F			□	●			●			9.525	4.76	0.8	3.81		
	160404T			□		●	●		●		9.525	4.76	0.4	3.81		
	160408T			□		●	●		●		9.525	4.76	0.8	3.81		
	VNGA160404					●		□	□		9.525	4.76	0.4	3.81		A212 —214 A279 A307
	160408					●		□	□		9.525	4.76	0.8	3.81		

* The order number is for a 10-insert pack. Please specify order number, grade and quantity.

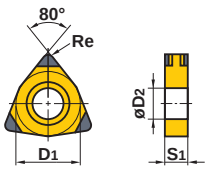
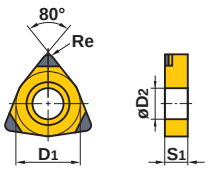
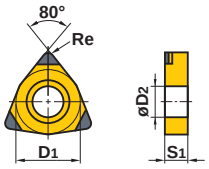
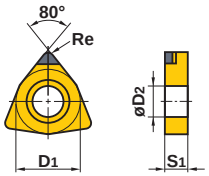
● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case) □ : Non stock, produced to order only.

80° WN TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ◐ ✣ ● ◐ ◐ ●
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

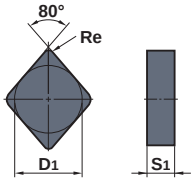
Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D_1	S_1	Re	D_2		
NEW PETIT CUT	**NP-WNGA080408GA6**		●								12.7	4.76	0.8	5.16		A215 A279 A301 A303
NEW PETIT CUT	**NP-WNGA080408GA3**		●								12.7	4.76	0.8	5.16		A215 A279 A301 A303
	080408FS3									○	12.7	4.76	0.8	5.16		
	080408TS3									○	12.7	4.76	0.8	5.16		
NEW PETIT CUT (With Wiper) *	**NP-WNGA080408GAWS3**		○	○							12.7	4.76	0.8	5.16		A215 A279 A301 A303
	080408GSWS3	○									12.7	4.76	0.8	5.16		
NEW PETIT CUT (With Wiper) *	**NP-WNMA080408GW**			□		□					12.7	4.76	0.8	5.16		A215 A279 A301 A303

* Please refer to A134 before using the wiper insert.

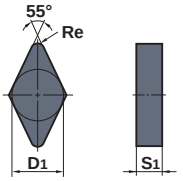
80° CN TYPE INSERTS WITHOUT HOLE

Work Material			Coated CBN		CBN					Solid CBN	Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	MBS140	
	H	Hardened Materials	●	◐	◐	●	◐	✤				✤	
	K	Cast Iron							●	◐			
	S	Heat-resistant Alloy, Titanium Alloy								◐			
		Sintered Alloy									◐		

Shape	Order Number	D1	S1	Re	Geometry	Applicable Holder Page
	CNGN120404	12.7	4.76	0.4		–
	120408	12.7	4.76	0.8		
	120412	12.7	4.76	1.2		

55° DN TYPE INSERTS WITHOUT HOLE

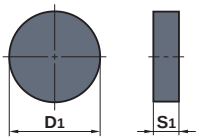
Work Material			Coated CBN		CBN					Solid CBN	Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting
			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	MBS140	
	H	Hardened Materials	●	◐	◐	●	◐	✤				✤	
	K	Cast Iron							●	◐			
	S	Heat-resistant Alloy, Titanium Alloy								◐			
		Sintered Alloy									◐		

Shape	Order Number	D1	S1	Re	Geometry	Applicable Holder Page
	DNGN110308	9.525	3.18	0.8		–
	110312	9.525	3.18	1.2		

● : Inventory maintained in Japan. (1 insert in one case)

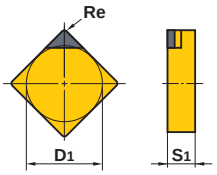
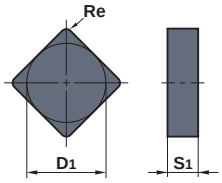
RN TYPE INSERTS WITHOUT HOLE

Work Material			Coated CBN		CBN						Solid CBN	Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting
	H	Hardened Materials	●	◐	◐	●	◐	✠			✠	
	K	Cast Iron							●	◐		
	S	Heat-resistant Alloy, Titanium Alloy								◐		
		Sintered Alloy									◐	

Shape	Order Number	MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	MBS140	D1	S1	Re	Geometry	Applicable Holder Page
	RNGN090300										●	9.525	3.18	–		–
	120300										●	12.7	3.18	–		
	120400										●	12.7	4.76	–		

GRADES A126
IDENTIFICATION A124

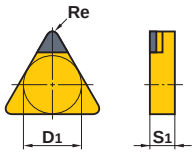
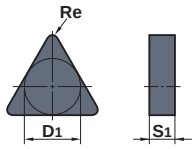
90° SN TYPE INSERTS WITHOUT HOLE

Work Material			Coated CBN		CBN						Solid CBN	Dimensions (mm)			Geometry	Applicable Holder Page
			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	MBS140	D1	S1	Re		
	H	Hardened Materials	●	◐	◐	●	◐	✤	●	◐		✤					
	K	Cast Iron								◐							
	S	Heat-resistant Alloy, Titanium Alloy									◐						
		Sintered Alloy															
Shape	Order Number																
	SNGN090304						□		□	□			9.525	3.18	0.4		A201 A204 A205
	090308						□		□	□			9.525	3.18	0.8		
	120404						□		□	□			12.7	4.76	0.4		
	120408						●		●	□			12.7	4.76	0.8		
	120412						●		●	□			12.7	4.76	1.2		
	SNGN090308											●	9.525	3.18	0.8		A201 A204 A205
	090312											●	9.525	3.18	1.2		
	090316											●	9.525	3.18	1.6		
	090408											●	9.525	4.76	0.8		
	090412											●	9.525	4.76	1.2		
	120408											●	12.7	4.76	0.8		
	120412											●	12.7	4.76	1.2		
	120416											●	12.7	4.76	1.6		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

● : Inventory maintained in Japan. (1 insert in one case)
□ : Non stock, produced to order only.

60° TN TYPE INSERTS WITHOUT HOLE

Work Material			Coated CBN		CBN						Solid CBN	Dimensions (mm)			Geometry	Applicable Holder Page
			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	MBS140	D_1	S_1	Re		
	H	Hardened Materials	●	◐	◐	●	◐	✤				✤					
	K	Cast Iron							●	◐							
	S	Heat-resistant Alloy, Titanium Alloy								◐							
		Sintered Alloy									◐						
		TNGN160404					●		●	□			9.525	4.76	0.4		A208 A210
		160408					●		●	□			9.525	4.76	0.8		
		TNGN160408										●	9.525	4.76	0.8		A208 A210
		160412										●	9.525	4.76	1.2		
		160416										●	9.525	4.76	1.6		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

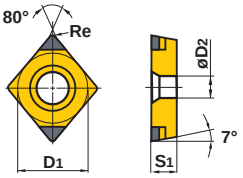
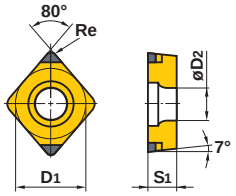
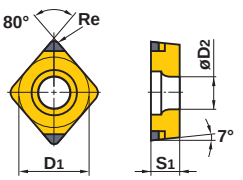
GRADES A126
IDENTIFICATION A124

80° CC TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ◐ ✣ ● ◐ ◐ ◐
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-CCGB060204GA2		●								6.35	2.38	0.4	2.8		A270 A294 A298
NEW PETIT CUT	NP-CCGW060202GA2		●								6.35	2.38	0.2	2.8		A216 A242 A270 A294 A298
	060204GA2		●								6.35	2.38	0.4	2.8		
	060208GA2		●								6.35	2.38	0.8	2.8		
	09T302GA2		●								9.525	3.97	0.2	4.4		
	09T304GA2		●								9.525	3.97	0.4	4.4		
	09T308GA2		●								9.525	3.97	0.8	4.4		
	060202GS2							●	●		6.35	2.38	0.2	2.8		
	060204GS2	●						●	●		6.35	2.38	0.4	2.8		
	060208GS2							●	●		6.35	2.38	0.8	2.8		
	09T304GS2	●						●	●		9.525	3.97	0.4	4.4		
	09T308GS2	●						●	●		9.525	3.97	0.8	4.4		
	09T302GN2		●								9.525	3.97	0.2	4.4		
	09T304GN2		●								9.525	3.97	0.4	4.4		
	09T308GN2		●								9.525	3.97	0.8	4.4		
	060202FA2							●	●		6.35	2.38	0.2	2.8		
	060204FA2							●	●		6.35	2.38	0.4	2.8		
	060208FA2							●	●		6.35	2.38	0.8	2.8		
	09T304FA2							●	●		9.525	3.97	0.4	4.4		
	09T308FA2							●	●		9.525	3.97	0.8	4.4		
	060202FS2									○	6.35	2.38	0.2	2.8		
	060204FS2									○	6.35	2.38	0.4	2.8		
	060208FS2									○	6.35	2.38	0.8	2.8		
	09T302FS2									○	9.525	3.97	0.2	4.4		
	09T304FS2									○	9.525	3.97	0.4	4.4		
	09T308FS2									○	9.525	3.97	0.8	4.4		
	060202TS2									○	6.35	2.38	0.2	2.8		
	060204TS2									○	6.35	2.38	0.4	2.8		
	060208TS2									○	6.35	2.38	0.8	2.8		
	09T302TS2									○	9.525	3.97	0.2	4.4		
	09T304TS2									○	9.525	3.97	0.4	4.4		
	09T308TS2									○	9.525	3.97	0.8	4.4		
	09T304G2			●							9.525	3.97	0.4	4.4		
	09T308G2			●							9.525	3.97	0.8	4.4		
NEW PETIT CUT *	TNP-CCGW09T304G2			●							9.525	3.97	0.4	4.4		A216 A242 A270 A294 A298
	09T308G2			●							9.525	3.97	0.8	4.4		

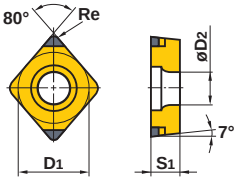
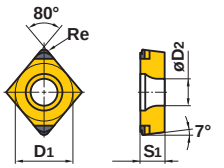
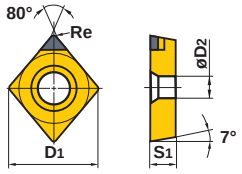
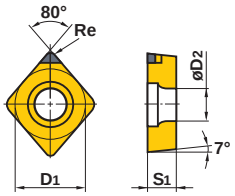
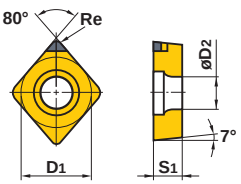
* The order number is for a 10-insert pack. Please specify order number, grade and quantity.

● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case) □ : Non stock, produced to order only.

Work Material												
	H	Hardened Materials	●	◕	◕	●	◕	✣		●	◕	
	K	Cast Iron									◕	
	S	Heat-resistant Alloy, Titanium Alloy										
		Sintered Alloy										◕

Cutting Conditions (Guide) :
●: Stable Cutting ◕: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT (With Wiper) *	NP-CCGW09T308GAWS2		○	○							9.525	3.97	0.8	4.4		A216 A242 A270 A294 A298
	09T308GSWS2	○									9.525	3.97	0.8	4.4		
	09T308GAW2		●								9.525	3.97	0.8	4.4		
NEW PETIT CUT (With Breaker)	BF-CCGT09T304TA2		●								9.525	3.97	0.4	4.4		A216 A242 A270 A294 A298
	09T308TA2		●								9.525	3.97	0.8	4.4		
NEW PETIT CUT	NP-CCMB060204G					●					6.35	2.38	0.4	2.8		A270 A294 A298
NEW PETIT CUT	NP-CCGW09T302GS							●	●		9.525	3.97	0.2	4.4		A216 A242 A270 A294 A298
	09T304GS							●	●		9.525	3.97	0.4	4.4		
	060202G			●		●					6.35	2.38	0.2	2.8		
	060204G			●		●					6.35	2.38	0.4	2.8		
	060208G			●							6.35	2.38	0.8	2.8		
	09T302G			●		●					9.525	3.97	0.2	4.4		
	09T304G			●		●					9.525	3.97	0.4	4.4		
	09T308G			●							9.525	3.97	0.8	4.4		
	060202F				●						6.35	2.38	0.2	2.8		
	060204F				●						6.35	2.38	0.4	2.8		
	09T302F				●						9.525	3.97	0.2	4.4		
	09T304F			□	●						9.525	3.97	0.4	4.4		
	09T308F			□							9.525	3.97	0.8	4.4		
	060202T						●				6.35	2.38	0.2	2.8		
	060204T						●				6.35	2.38	0.4	2.8		
	09T302T						●				9.525	3.97	0.2	4.4		
	09T304T			□			●				9.525	3.97	0.4	4.4		
	09T308T			□							9.525	3.97	0.8	4.4		
NEW PETIT CUT (With Wiper) *	NP-CCGW09T308GW			●		●		●			9.525	3.97	0.8	4.4		A216 A294 A298
	09T308FW							●			9.525	3.97	0.8	4.4		
	09T308FPW				●						9.525	3.97	0.8	4.4		
	09T308TW						●				9.525	3.97	0.8	4.4		

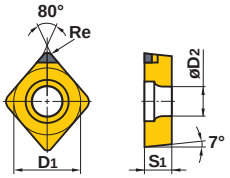
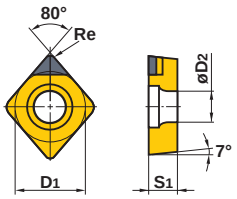
* Please refer to A134 before using the wiper insert.

80° CC TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-CCMW03S102F				●						3.57	1.39	0.2	2.0		A280
	03S104F				●						3.57	1.39	0.4	2.0		
	04T002F				●						4.37	1.79	0.2	2.4		
	04T004F				●						4.37	1.79	0.4	2.4		
	CCMW060202					□		□	□		6.35	2.38	0.2	2.8		A216 A242 A270 A294 A298
	060204					□		□	□		6.35	2.38	0.4	2.8		
	09T302					□		□	□		9.525	3.97	0.2	4.4		
	09T304					●		□	□		9.525	3.97	0.4	4.4		
	09T308					●		□	□		9.525	3.97	0.8	4.4		
	120404					□		□	□		12.7	4.76	0.4	5.5		
	120408					●		□	□		12.7	4.76	0.8	5.5		
	120412					□		□	□		12.7	4.76	1.2	5.5		

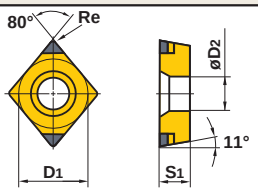
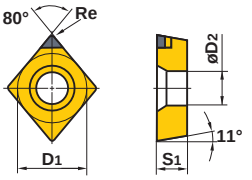
● : Inventory maintained in Japan. (1 insert in one case)
□ : Non stock, produced to order only.

80° CP TYPE INSERTS WITH HOLE

Work Material			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020
	H	Hardened Materials	●	◐	◐	●	◐	✣			
	K	Cast Iron							●	◐	
	S	Heat-resistant Alloy, Titanium Alloy								◐	
		Sintered Alloy									◐

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

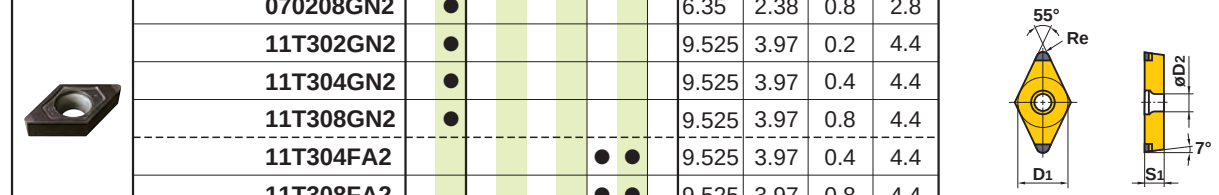
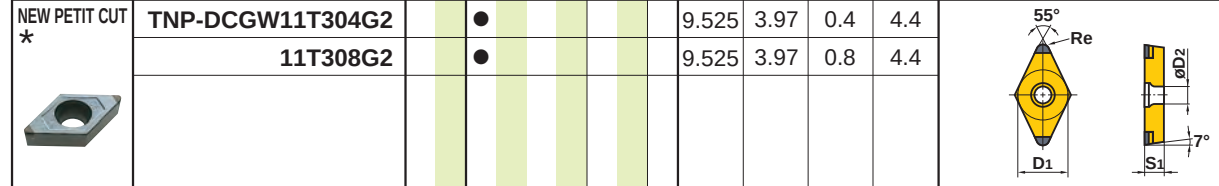
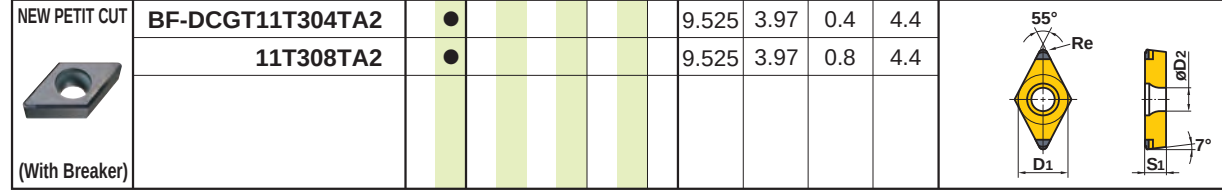
Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-CPGB080204GA2		●								7.94	2.38	0.4	3.5		A270
	080208GA2		●								7.94	2.38	0.8	3.5		
	090304GA2		●								9.525	3.18	0.4	4.5		
	090308GA2		●								9.525	3.18	0.8	4.5		
NEW PETIT CUT	NP-CPMB080204G					●					7.94	2.38	0.4	3.5		A270
	090304G					●					9.525	3.18	0.4	4.5		

55° DC TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ◐ ✣ ● ◐ ◐ ◐
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

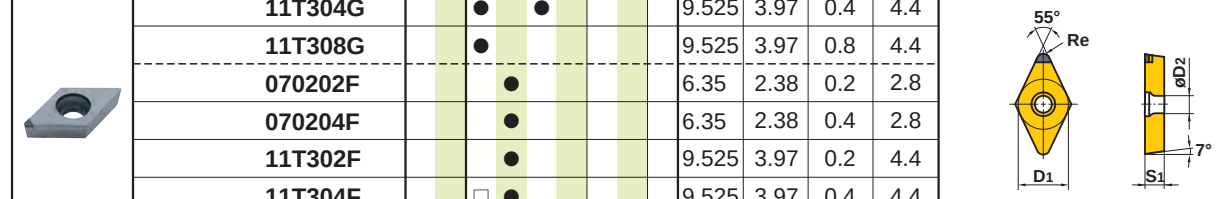
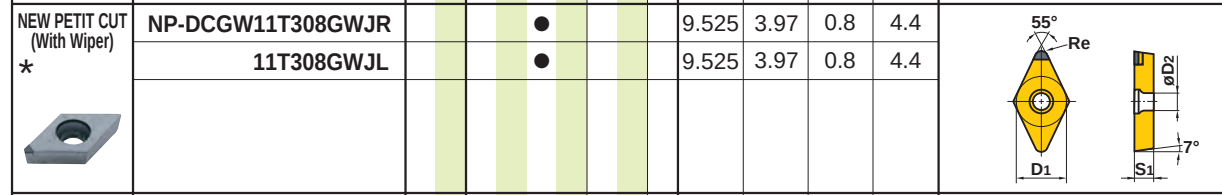
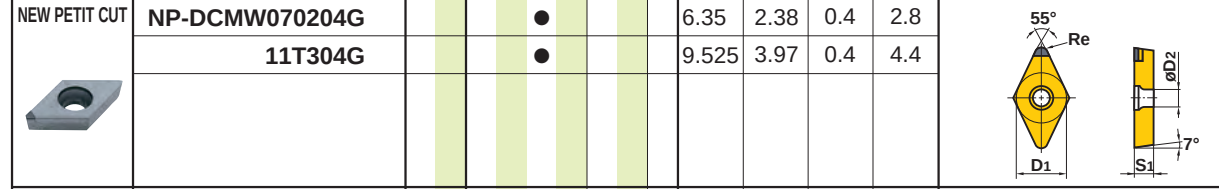
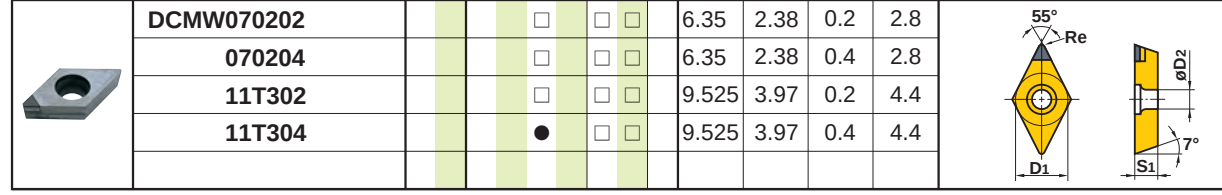
Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-DCGW070202GA2		●								6.35	2.38	0.2	2.8		A217 A243 A258 A272 A273 A293 A295
	070204GA2		●								6.35	2.38	0.4	2.8		
	070208GA2		●								6.35	2.38	0.8	2.8		
	11T302GA2		●								9.525	3.97	0.2	4.4		
	11T304GA2		●								9.525	3.97	0.4	4.4		
	11T308GA2		●								9.525	3.97	0.8	4.4		
	070204GS2	●									6.35	2.38	0.4	2.8		
	11T302GS2	●									9.525	3.97	0.2	4.4		
	11T304GS2	●						●	●		9.525	3.97	0.4	4.4		
	11T308GS2	●						●	●		9.525	3.97	0.8	4.4		
	070202GN2		●								6.35	2.38	0.2	2.8		
	070204GN2		●								6.35	2.38	0.4	2.8		
	070208GN2		●								6.35	2.38	0.8	2.8		
	11T302GN2		●								9.525	3.97	0.2	4.4		
	11T304GN2		●								9.525	3.97	0.4	4.4		
	11T308GN2		●								9.525	3.97	0.8	4.4		
	11T304FA2							●	●		9.525	3.97	0.4	4.4		
	11T308FA2							●	●		9.525	3.97	0.8	4.4		
	070204FS2									○	6.35	2.38	0.4	2.8		
	070208FS2									○	6.35	2.38	0.8	2.8		
	11T302FS2									○	9.525	3.97	0.2	4.4		
	11T304FS2									○	9.525	3.97	0.4	4.4		
	11T308FS2									○	9.525	3.97	0.8	4.4		
	070204TS2									○	6.35	2.38	0.4	2.8		
	070208TS2									○	6.35	2.38	0.8	2.8		
	11T302TS2									○	9.525	3.97	0.2	4.4		
	11T304TS2									○	9.525	3.97	0.4	4.4		
	11T308TS2									○	9.525	3.97	0.8	4.4		
	11T304G2			●							9.525	3.97	0.4	4.4		
	11T308G2			●							9.525	3.97	0.8	4.4		
NEW PETIT CUT ✱	TNP-DCGW11T304G2			●							9.525	3.97	0.4	4.4		A217 A243 A258 A272 A273 A293 A295
	11T308G2			●							9.525	3.97	0.8	4.4		
NEW PETIT CUT (With Breaker)	BF-DCGT11T304TA2		●								9.525	3.97	0.4	4.4		A217 A243 A258 A272 A273 A293 A295
	11T308TA2		●								9.525	3.97	0.8	4.4		

✱ The order number is for a 10-insert pack. Please specify order number, grade and quantity.

● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case) □ : Non stock, produced to order only.

Work Material			Coated CBN		CBN						Dimensions (mm)				Geometry	Applicable Holder Page
			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
	H	Hardened Materials	●	◐	◐	●	◐	✣									
	K	Cast Iron							●	◐							
	S	Heat-resistant Alloy, Titanium Alloy								◐							
		Sintered Alloy									◐						
NEW PETIT CUT		NP-DCGW11T302GS							●	●		9.525	3.97	0.2	4.4		A217 A243 A258 A272 A273 A293 A295
		11T304GS							●	●		9.525	3.97	0.4	4.4		
		070202G			●							6.35	2.38	0.2	2.8		
		070204G			●							6.35	2.38	0.4	2.8		
		070208G			●							6.35	2.38	0.8	2.8		
		11T302G			●		●					9.525	3.97	0.2	4.4		
		11T304G			●		●					9.525	3.97	0.4	4.4		
		11T308G			●							9.525	3.97	0.8	4.4		
		070202F				●						6.35	2.38	0.2	2.8		
		070204F				●						6.35	2.38	0.4	2.8		
		11T302F				●						9.525	3.97	0.2	4.4		
		11T304F			□	●						9.525	3.97	0.4	4.4		
		11T308F			□							9.525	3.97	0.8	4.4		
		070202T						●				6.35	2.38	0.2	2.8		
		070204T						●				6.35	2.38	0.4	2.8		
		11T302T						●				9.525	3.97	0.2	4.4		
		11T304T			□			●				9.525	3.97	0.4	4.4		
		11T308T			□			□				9.525	3.97	0.8	4.4		
NEW PETIT CUT (With Wiper) *		NP-DCGW11T308GWJR					●					9.525	3.97	0.8	4.4		A217 A243 A258 A272 A293
		11T308GWJL					●					9.525	3.97	0.8	4.4		
NEW PETIT CUT		NP-DCMW070204G					●					6.35	2.38	0.4	2.8		A217 A243 A258 A272 A273 A293 A295
		11T304G					●					9.525	3.97	0.4	4.4		
		DCMW070202					□		□	□		6.35	2.38	0.2	2.8		A217 A243 A258 A272 A273 A293 A295
		070204					□		□	□		6.35	2.38	0.4	2.8		
		11T302					□		□	□		9.525	3.97	0.2	4.4		
		11T304					●		□	□		9.525	3.97	0.4	4.4		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

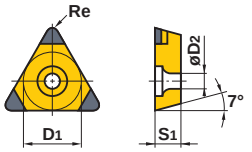
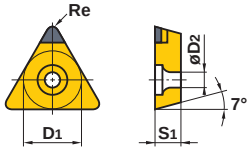
* Please refer to A134 before using the wiper insert.

60° TC TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ◐ ✣ ● ◐ ◐ ◐
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-TCGW090202GA3		●								5.56	2.38	0.2	2.5		A221 A292
	090204GA3		●								5.56	2.38	0.4	2.5		
	090208GA3		●								5.56	2.38	0.8	2.5		
	110202GA3		●								6.35	2.38	0.2	2.8		
	110204GA3		●								6.35	2.38	0.4	2.8		
	110208GA3		●								6.35	2.38	0.8	2.8		
	130304GA3		●								7.94	3.18	0.4	3.4		
	130308GA3		●								7.94	3.18	0.8	3.4		
	16T304GA3		●								9.525	3.97	0.4	4.4		
	16T308GA3		●								9.525	3.97	0.8	4.4		
	110204FA3							●	●		6.35	2.38	0.4	2.8		
	110208FA3							●	●		6.35	2.38	0.8	2.8		
	110204FS3									○	6.35	2.38	0.4	2.8		
	110208FS3									○	6.35	2.38	0.8	2.8		
	110204TS3									○	6.35	2.38	0.4	2.8		
	110208TS3									○	6.35	2.38	0.8	2.8		
	TCMW110202							□	□		6.35	2.38	0.2	2.8		A221 A292
	110204							□	□		6.35	2.38	0.4	2.8		

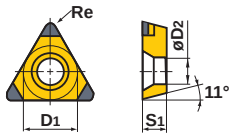
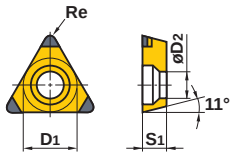
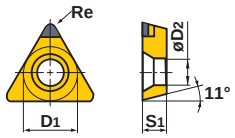
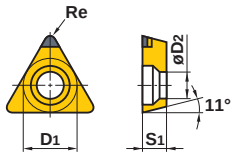
● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case) □ : Non stock, produced to order only.

60° TP TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-TPGB080204GA3		●								4.76	2.38	0.4	2.4		A271
	080208GA3		●								4.76	2.38	0.8	2.4		
	090204GA3		●								5.56	2.38	0.4	2.9		
	090208GA3		●								5.56	2.38	0.8	2.9		
	110304GA3		●								6.35	3.18	0.4	3.4		
	110308GA3		●								6.35	3.18	0.8	3.4		
	160304GA3		●								9.525	3.18	0.4	4.4		
	160308GA3		●								9.525	3.18	0.8	4.4		
NEW PETIT CUT	NP-TPGX080202GA3		□								4.76	2.38	0.2	2.5		A289
	080204GA3		□								4.76	2.38	0.4	2.5		
	080208GA3		□								4.76	2.38	0.8	2.5		
	090204GA3		□								5.56	2.38	0.4	3		
	090208GA3		□								5.56	2.38	0.8	3		
	110304GA3		□								6.35	3.18	0.4	3.5		
	110308GA3		□								6.35	3.18	0.8	3.5		
	080202GS3	●									4.76	2.38	0.2	2.5		
	080204GS3	●									4.76	2.38	0.4	2.5		
	090202GS3	●									5.56	2.38	0.2	3		
	090204GS3	●									5.56	2.38	0.4	3		
	110304GS3	●									6.35	3.18	0.4	3.5		
	110308GS3	●									6.35	3.18	0.8	3.5		
NEW PETIT CUT	NP-TPMB080204G					●					4.76	2.38	0.4	2.4		A271
	090204G					●					5.56	2.38	0.4	2.9		
	110304G					●					6.35	3.18	0.4	3.4		
	160304G					●					9.525	3.18	0.4	4.4		
NEW PETIT CUT	NP-TPGX090204G			●							5.56	2.38	0.4	3		A289
	090208G			●							5.56	2.38	0.8	3		
	110304G			●							6.35	3.18	0.4	3.5		
	110308G			●							6.35	3.18	0.8	3.5		
	080202F				●						4.76	2.38	0.2	2.5		
	080204F				●						4.76	2.38	0.4	2.5		
	090202F				●						5.56	2.38	0.2	3		
	090204F				●						5.56	2.38	0.4	3		
	110304F				●			●			6.35	3.18	0.4	3.5		
	110308F				●			●			6.35	3.18	0.8	3.5		
	080202T						●				4.76	2.38	0.2	2.5		
	080204T						●				4.76	2.38	0.4	2.5		
	090202T						●				5.56	2.38	0.2	3		
	090204T						●				5.56	2.38	0.4	3		
	110304T					●	●		●		6.35	3.18	0.4	3.5		
	110308T					●	●		●		6.35	3.18	0.8	3.5		

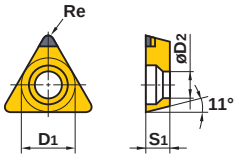
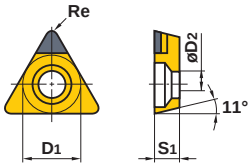
GRADES A126 IDENTIFICATION A124

60° TP TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT (With Wiper) *	NP-TPGX110308GWF					●		●			6.35	3.18	0.8	3.5		A289
	110308FWF							●			6.35	3.18	0.8	3.5		
	TPGX080202					□		●	●		4.76	2.38	0.2	2.5		A289
	080204				●	●		●	●		4.76	2.38	0.4	2.5		
	080208					□		□	□		4.76	2.38	0.8	2.5		
	090202					□		●	●		5.56	2.38	0.2	3		
	090204				●	●		●	●		5.56	2.38	0.4	3		
	090208					□		□	□		5.56	2.38	0.8	3		
	110302					□		□	□		6.35	3.18	0.2	3.5		
	110304				●	●		●	●		6.35	3.18	0.4	3.5		
	110308				●	●		●	●		6.35	3.18	0.8	3.5		
	160304					●		●	□		9.525	3.18	0.4	4.8		
	160308					●		●	□		9.525	3.18	0.8	4.8		
	160404					●		□	□		9.525	4.76	0.4	4.8		
	160408					●		□	□		9.525	4.76	0.8	4.8		

* Please refer to A134 before using the wiper insert.

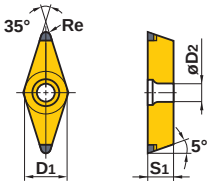
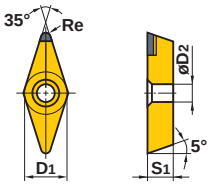
● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case) □ : Non stock, produced to order only.

35° VB TYPE INSERTS WITH HOLE

Work Material			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020
	H	Hardened Materials	●	◐	◐	●	◐	✣			
	K	Cast Iron							●	◐	
	S	Heat-resistant Alloy, Titanium Alloy								◐	
		Sintered Alloy									◐

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

Shape	Order Number	Coated CBN MBC010	Coated CBN MBC020	CBN MB8025	CBN MB810	CBN MB825	CBN MB835	CBN MB710	CBN MB730	CBN MB4020	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
NEW PETIT CUT	NP-VBGW160404GA2		●								9.525	4.76	0.4	4.43		A275 A276 A439
	160408GA2		●								9.525	4.76	0.8	4.43		
	110304GS2								●		6.35	3.18	0.4	2.85		
	110308GS2								●		6.35	3.18	0.8	2.85		
	160404GS2							●	●		9.525	4.76	0.4	4.43		
	160408GS2							●	●		9.525	4.76	0.8	4.43		
	110304FS2									○	6.35	3.18	0.4	2.85		
	110308FS2									○	6.35	3.18	0.8	2.85		
	160404FS2									○	9.525	4.76	0.4	4.43		
	160408FS2									○	9.525	4.76	0.8	4.43		
	110304TS2									○	6.35	3.18	0.4	2.85		
	110308TS2									○	6.35	3.18	0.8	2.85		
	160404TS2									○	9.525	4.76	0.4	4.43		
	160408TS2									○	9.525	4.76	0.8	4.43		
NEW PETIT CUT	NP-VBGW160404G			●							9.525	4.76	0.4	4.43		A275 A439
	160408G			●							9.525	4.76	0.8	4.43		

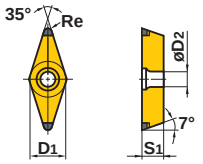
GRADES A126 IDENTIFICATION A124

35° VC TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

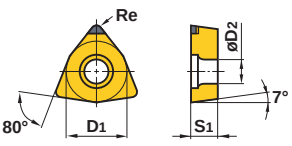
Shape	Order Number	Coated CBN		CBN						Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
NEW PETIT CUT	NP-VCGW160404GA2		●								9.525	4.76	0.4	4.4		A222 A223 A296 A297
	160408GA2		●								9.525	4.76	0.8	4.4		

80° WC TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Honing (Last letter of order number) : Refer to page A131.

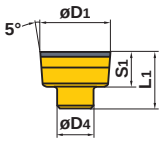
Shape	Order Number	Coated CBN		CBN						Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re	D2		
	NP-WCMWL30204FA								●		4.76	2.38	0.4	2.3		A291
	L30208FA								●		4.76	2.38	0.8	2.3		

● : Inventory maintained in Japan. (1 insert in one case)

RBG TYPE INSERTS WITHOUT HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ◐ ✣ ● ◐ ◐ ◐
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

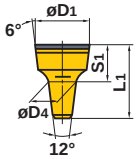
Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	L1	D4		
	RBG10							●			10	5	9	5		–
	12							●			12	6	11	6		
	16							●			16	8	13	8		

RTG TYPE INSERTS WITHOUT HOLE

Work Material		
H	Hardened Materials	● ◐ ◐ ● ◐ ✣ ● ◐ ◐ ◐
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

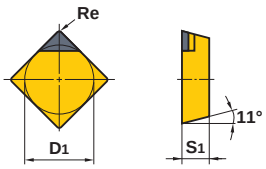
Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	L1	D4		
	RTG05A					●					5	3.5	7.5	2.5		A233
	06A					●					6	3.5	7.5	3.5		
	07A					●					7	5	11	3.5		
	08A					●					8	5	11	4.5		
	10A					●					10	6.5	14	5.5		

90° SP TYPE INSERTS WITHOUT HOLE

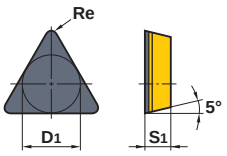
Work Material			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020
	H	Hardened Materials	●	◐	◐	●	◐	✣			
	K	Cast Iron							●	◐	
	S	Heat-resistant Alloy, Titanium Alloy								◐	
		Sintered Alloy									◐

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Shape	Order Number	Coated CBN		CBN							Dimensions (mm)			Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re		
	SPGN090302					□		□	□		9.525	3.18	0.2		A226
	090304					●		●	□		9.525	3.18	0.4		
	090308					●		●	□		9.525	3.18	0.8		
	090312					●		□	□		9.525	3.18	1.2		
	120304					□		●	●		12.7	3.18	0.4		
	120308					●		●	●		12.7	3.18	0.8		
	120312					●		□	□		12.7	3.18	1.2		
	120408					□		□	□		12.7	4.76	0.8		
	120412					□		□	□		12.7	4.76	1.2		

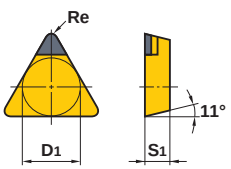
● : Inventory maintained in Japan. (1 insert in one case)
□ : Non stock, produced to order only.

60° TB TYPE INSERTS WITHOUT HOLE

Work Material			Coated CBN		CBN						Dimensions (mm)			Geometry	Applicable Holder Page
			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re		
	H	Hardened Materials	●	◐	◐	●	◐	✣								
	K	Cast Iron							●	◐						
	S	Heat-resistant Alloy, Titanium Alloy								◐						
		Sintered Alloy									◐					
	TBGN060104					●	●		●	□		3.97	1.59	0.4		–
	060108					●	●		●	□		3.97	1.59	0.8		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

60° TP TYPE INSERTS WITHOUT HOLE

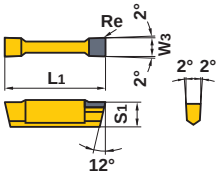
Work Material			Coated CBN		CBN						Dimensions (mm)			Geometry	Applicable Holder Page
			MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	MB4020	D1	S1	Re		
	H	Hardened Materials	●	◐	◐	●	◐	✣								
	K	Cast Iron							●	◐						
	S	Heat-resistant Alloy, Titanium Alloy								◐						
		Sintered Alloy									◐					
	TPGN090204						●		□	□		5.56	2.38	0.4		A227 A290
	110302						□		□	□		6.35	3.18	0.2		
	110304						●		●	●		6.35	3.18	0.4		
	110308						□		□	□		6.35	3.18	0.8		
	160304						●		●	●		9.525	3.18	0.4		
	160308						●		●	●		9.525	3.18	0.8		
	160312						□		□	□		9.525	3.18	1.2		
	160408						●		□	□		9.525	4.76	0.8		
	220408						●		□	□		12.7	4.76	0.8		

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

DGJ TYPE INSERTS WITHOUT HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

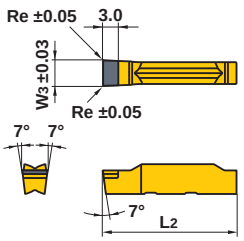
Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting

Shape	Order Number	Coated CBN		CBN						Dimensions (mm)				Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB820	MB825	MB835	MB710	MB730	D_1	W_3	Re	L_1		
	DGJ40CE					●	●				6	4	0.2	25		A338 −357
	50CE					●	●				6	5	0.2	25		
	60CE					●	●				6	6	0.2	25		

GY TYPE INSERTS WITHOUT HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✣: Unstable Cutting
Honing (Last letter of order number) : Refer to page A131.

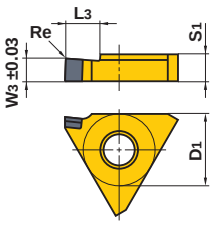
Shape	Order Number	Coated CBN		CBN						Dimensions (mm)			Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	W_3	Re	L_2		
	GY1G0200D020N-GFGS			●						2.00	0.2	20.70		A320 −329
	0239E020N-GFGS			●						2.39	0.2	20.70		
	0250E020N-GFGS			●						2.50	0.2	20.70		
	0300F020N-GFGS			●						3.00	0.2	20.70		
	0318F020N-GFGS			●						3.18	0.2	20.70		
	0400G020N-GFGS			●						4.00	0.2	25.65		
	0475H020N-GFGS			●						4.75	0.2	25.65		
	0500H020N-GFGS			●						5.00	0.2	25.65		

● : Inventory maintained in Japan. (1 insert in one case)

MGTR TYPE INSERTS WITH HOLE

Work Material		
H	Hardened Materials	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
	Sintered Alloy	

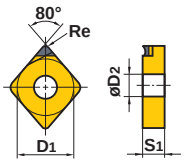
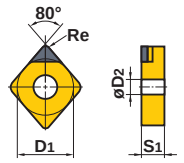
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Shape	Order Number	Coated CBN		CBN						Dimensions (mm)					Geometry	Applicable Holder Page
		MBC010	MBC020	MB8025	MB810	MB825	MB835	MB710	MB730	W_3	L_3	D_1	S_1	Re		
	MGTR43125			●						1.25	2.0	12.7	4.76	0.2	 Right hand tool holder only.	A364 A446
	43150			●						1.50	3.5	12.7	4.76	0.2		
	43200			●						2.00	3.5	12.7	4.76	0.2		
	43250			●						2.50	4.0	12.7	4.76	0.2		
	43300			●						3.00	4.0	12.7	4.76	0.2		
	43350			●						3.50	5.0	12.7	4.76	0.2		
	43400			●						4.00	5.0	12.7	4.76	0.2		

80° CN TYPE INSERTS WITH HOLE

Work Material	N	Non-ferrous Metal	●

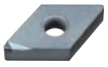
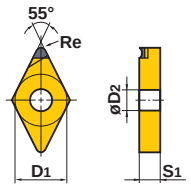
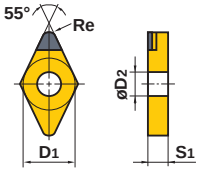
Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✥: Unstable Cutting

Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
NEW PETIT CUT (With Breaker)	NP-CNMM120402R-F	●	12.7	4.76	0.2	5.16	 Right hand insert shown.	A196 A197 A277 A300 A306 A432 —434
	120402L-F	□	12.7	4.76	0.2	5.16		
	120404R-F	●	12.7	4.76	0.4	5.16		
	120404L-F	□	12.7	4.76	0.4	5.16		
	120408R-F	●	12.7	4.76	0.8	5.16		
	120408L-F	□	12.7	4.76	0.8	5.16		
	CNMA120404	●	12.7	4.76	0.4	5.16		A196 A197 A277 A300 A306 A432 —434
	120408	●	12.7	4.76	0.8	5.16		

55° DN TYPE INSERTS WITH HOLE

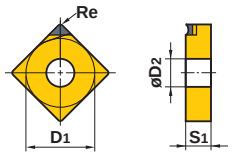
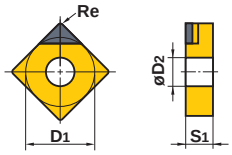
Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✥: Unstable Cutting

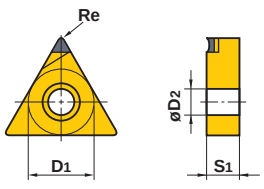
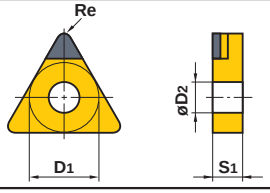
Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
NEW PETIT CUT  (With Breaker)	NP-DNMM150402R-F	●	12.7	4.76	0.2	5.16	 Right hand insert shown.	A198 A199 A277 A300 —302 A305 A306 A435 A437
	150402L-F	□	12.7	4.76	0.2	5.16		
	150404R-F	●	12.7	4.76	0.4	5.16		
	150404L-F	□	12.7	4.76	0.4	5.16		
	150408R-F	●	12.7	4.76	0.8	5.16		
	150408L-F	□	12.7	4.76	0.8	5.16		
	DNGA150404	●	12.7	4.76	0.4	5.16		A198 A199 A277 A300 —302 A305 A306 A435 A437
	150408	●	12.7	4.76	0.8	5.16		

● : Inventory maintained in Japan. (1 insert in one case)
□ : Non stock, produced to order only.

90° SN TYPE INSERTS WITH HOLE

Work Material				Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ❖ : Unstable Cutting						
	N	Non-ferrous Metal	●							
Shape	Order Number		PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry		Applicable Holder Page
NEW PETIT CUT (With Breaker)	NP-SNMM120404R-F		●	12.7	4.76	0.4	5.16	 Right hand insert shown.		A200 –204 A278 A299
	120404L-F		□	12.7	4.76	0.4	5.16			
	120408R-F		●	12.7	4.76	0.8	5.16			
	120408L-F		□	12.7	4.76	0.8	5.16			
	SNGA120404		□	12.7	4.76	0.4	5.16			A200 –204 A278 A299
	120408		●	12.7	4.76	0.8	5.16			

60° TN TYPE INSERTS WITH HOLE

Work Material				Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ❖ : Unstable Cutting						
	N	Non-ferrous Metal	●							
Shape	Order Number		PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry		Applicable Holder Page
NEW PETIT CUT (With Breaker)	NP-TNMM160402R-F		●	9.525	4.76	0.2	3.81	 Right hand insert shown.		A206 –211 A278 A299 A305
	160402L-F		□	9.525	4.76	0.2	3.81			
	160404R-F		●	9.525	4.76	0.4	3.81			
	160404L-F		□	9.525	4.76	0.4	3.81			
	160408R-F		●	9.525	4.76	0.8	3.81			
	160408L-F		□	9.525	4.76	0.8	3.81			
	TNGA160402		●	9.525	4.76	0.2	3.81			A206 –211 A278 A299 A305
	160404		●	9.525	4.76	0.4	3.81			
	160408		●	9.525	4.76	0.8	3.81			

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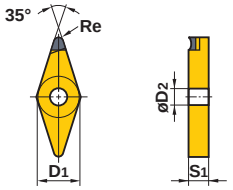
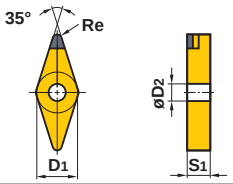
35° VN TYPE INSERTS WITH HOLE

Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

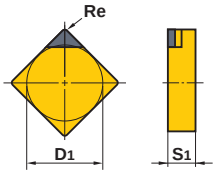
Shape	Order Number	PCD MD220	Dimensions (mm) D_1	S_1	Re	D_2	Geometry	Applicable Holder Page
NEW PETIT CUT (With Breaker)	**NP-VNMM160402R-F**	●	9.525	4.76	0.2	3.81	 Right hand insert shown.	A212 —214 A279 A307
	160402L-F	□	9.525	4.76	0.2	3.81		
	160404R-F	●	9.525	4.76	0.4	3.81		
	160404L-F	□	9.525	4.76	0.4	3.81		
	160408R-F	●	9.525	4.76	0.8	3.81		
	160408L-F	□	9.525	4.76	0.8	3.81		
	VNGA160404	●	9.525	4.76	0.4	3.81		A212 —214 A279 A307
	160408	●	9.525	4.76	0.8	3.81		

● : Inventory maintained in Japan. (1 insert in one case)
□ : Non stock, produced to order only.

90° SN TYPE INSERTS WITHOUT HOLE

Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

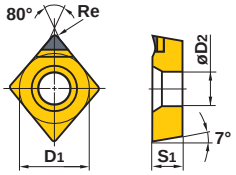
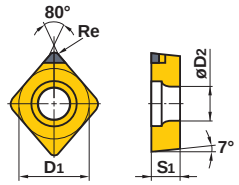
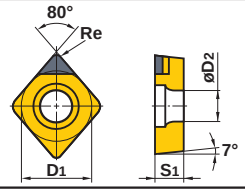
Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	Geometry	Applicable Holder Page
	SNGN120404	□	12.7	4.76	0.4		A201 A204 A205
	120408	●	12.7	4.76	0.8		

PCD TURNING INSERTS [POSITIVE]

80° CC TYPE INSERTS WITH HOLE

Work Material	N	Non-ferrous Metal	●

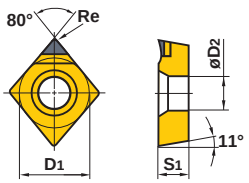
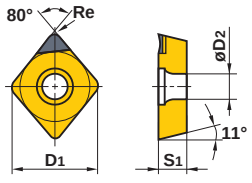
Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✥ : Unstable Cutting

Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
NEW PETIT CUT (With Breaker)	**NP-CCMH060202**	●	6.35	2.38	0.2	2.8		A270 A294 A298
	060204	●	6.35	2.38	0.4	2.8		
NEW PETIT CUT	**NP-CCMW03S102**	●	3.57	1.39	0.2	2.0		A280
	03S104	●	3.57	1.39	0.4	2.0		
	04T002	●	4.37	1.79	0.2	2.4		
	04T004	●	4.37	1.79	0.4	2.4		
	CCMW060202	●	6.35	2.38	0.2	2.8		A216 A270 A294 A298
	060204	●	6.35	2.38	0.4	2.8		
	09T302	●	9.525	3.97	0.2	4.4		
	09T304	●	9.525	3.97	0.4	4.4		

80° CP TYPE INSERTS WITH HOLE

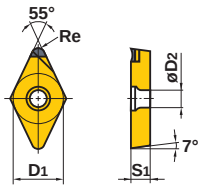
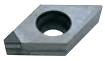
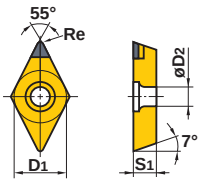
Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✥ : Unstable Cutting

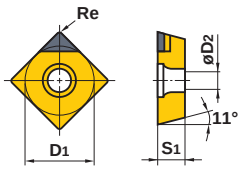
Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
NEW PETIT CUT (With Breaker)	**NP-CPMH080202**	●	7.94	2.38	0.2	3.5		A270
	080204	●	7.94	2.38	0.4	3.5		
	090302	●	9.525	3.18	0.2	4.5		
	090304	●	9.525	3.18	0.4	4.5		
(With Breaker)	**CPGT080202**	●	7.94	2.38	0.2	3.4		–
	080204	●	7.94	2.38	0.4	3.4		
	090302	●	9.525	3.18	0.2	4.4		
	090304	●	9.525	3.18	0.4	4.4		

● : **Inventory maintained in Japan. (1 insert in one case)**

55° DC TYPE INSERTS WITH HOLE

Work Material			PCD	Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting					
	N	Non-ferrous Metal	●						
Shape	Order Number		MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
NEW PETIT CUT	NP-DCMT070202R-F		●	6.35	2.38	0.2	2.8		A217 A243 A258 A272 A273 A293 A295
	070202L-F		●	6.35	2.38	0.2	2.8		
	070204R-F		●	6.35	2.38	0.4	2.8		
	070204L-F		●	6.35	2.38	0.4	2.8		
	11T302R-F		●	9.525	3.97	0.2	4.4		
	11T302L-F		●	9.525	3.97	0.2	4.4		
	11T304R-F		●	9.525	3.97	0.4	4.4		
(With Breaker)	11T304L-F		●	9.525	3.97	0.4	4.4	Left hand insert shown.	
	DCMW070202		●	6.35	2.38	0.2	2.8		A217 A243 A258 A272 A273 A293 A295
	070204		●	6.35	2.38	0.4	2.8		
	11T302		●	9.525	3.97	0.2	4.4		
	11T304		●	9.525	3.97	0.4	4.4		

90° SP TYPE INSERTS WITH HOLE

Work Material			PCD	Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting					
	N	Non-ferrous Metal	●						
Shape	Order Number		MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
	SPGX090304		●	9.525	3.18	0.4	4.8		–
	090308		●	9.525	3.18	0.8	4.8		

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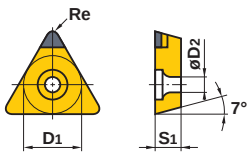
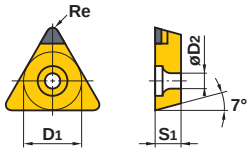
60° TC TYPE INSERTS WITH HOLE

Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✿ : Unstable Cutting

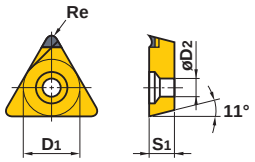
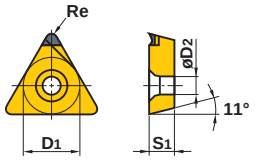
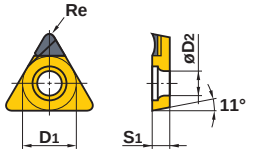
Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
	TCMW110202	●	6.35	2.38	0.2	2.8		A221 A292
	110204	●	6.35	2.38	0.4	2.8		
	TCGW060102	●	3.97	1.59	0.2	2.3		A221 A292
	060104	●	3.97	1.59	0.4	2.3		
	060108	●	3.97	1.59	0.8	2.3		

● : Inventory maintained in Japan. (1 insert in one case)
□ : Non stock, produced to order only.

60° TP TYPE INSERTS WITH HOLE

Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
NEW PETIT CUT	NP-TPMX090202R-F	●	5.56	2.38	0.2	3		A289
	090202L-F	●	5.56	2.38	0.2	3		
	090204R-F	□	5.56	2.38	0.4	3		
	090204L-F	●	5.56	2.38	0.4	3		
	090208R-F	□	5.56	2.38	0.8	3		
	090208L-F	●	5.56	2.38	0.8	3		
	110302R-F	□	6.35	3.18	0.2	3.5		
	110302L-F	●	6.35	3.18	0.2	3.5		
	110304R-F	□	6.35	3.18	0.4	3.5		
	110304L-F	●	6.35	3.18	0.4	3.5		
	110308R-F	□	6.35	3.18	0.8	3.5		
	110308L-F	●	6.35	3.18	0.8	3.5		
	160302R-F	□	9.525	3.18	0.2	4.8		
	160302L-F	●	9.525	3.18	0.2	4.8		
	160304R-F	□	9.525	3.18	0.4	4.8		
	160304L-F	●	9.525	3.18	0.4	4.8		
	160308R-F	□	9.525	3.18	0.8	4.8		
(With Breaker)	160308L-F	●	9.525	3.18	0.8	4.8	Right hand insert shown.	
NEW PETIT CUT	NP-TPMH080202R-F	●	4.76	2.38	0.2	2.5		A271
	080202L-F	●	4.76	2.38	0.2	2.5		
	080204R-F	●	4.76	2.38	0.4	2.5		
	080204L-F	●	4.76	2.38	0.4	2.5		
	090202R-F	●	5.56	2.38	0.2	2.9		
	090202L-F	●	5.56	2.38	0.2	2.9		
	090204R-F	●	5.56	2.38	0.4	2.9		
	090204L-F	●	5.56	2.38	0.4	2.9		
	110302R-F	●	6.35	3.18	0.2	3.4		
	110302L-F	●	6.35	3.18	0.2	3.4		
	110304R-F	●	6.35	3.18	0.4	3.4		
	110304L-F	●	6.35	3.18	0.4	3.4		
	160302R-F	●	9.525	3.18	0.2	4.4		
	160302L-F	●	9.525	3.18	0.2	4.4		
	160304R-F	●	9.525	3.18	0.4	4.4		
(With Breaker)	160304L-F	●	9.525	3.18	0.4	4.4	Left hand insert shown.	
	TPGT160302R-F	●	9.525	3.18	0.2	4.4		–
	160302L-F	●	9.525	3.18	0.2	4.4		
	160304R-F	●	9.525	3.18	0.4	4.4		
	160304L-F	●	9.525	3.18	0.4	4.4		
(With Breaker)							Right hand insert shown.	

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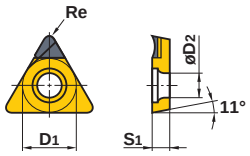
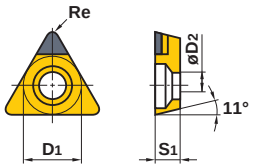
60° TP TYPE INSERTS WITH HOLE

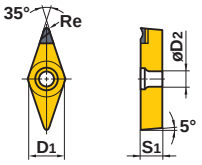
Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

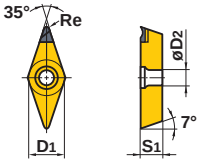
Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
(With Breaker)	**TPGV090202R-F**	●	5.56	2.38	0.2	2.8	 Right hand insert shown.	–
	090202L-F	●	5.56	2.38	0.2	2.8		
	090204R-F	●	5.56	2.38	0.4	2.8		
	090204L-F	●	5.56	2.38	0.4	2.8		
	110302R-F	●	6.35	3.18	0.2	3.4		
	110302L-F	●	6.35	3.18	0.2	3.4		
	110304R-F	●	6.35	3.18	0.4	3.4		
	110304L-F	●	6.35	3.18	0.4	3.4		
	TPGX080202	●	4.76	2.38	0.2	2.5		A289
	080204	●	4.76	2.38	0.4	2.5		
	080208	●	4.76	2.38	0.8	2.5		
	090202	●	5.56	2.38	0.2	3		
	090204	●	5.56	2.38	0.4	3		
	090208	●	5.56	2.38	0.8	3		
	110302	●	6.35	3.18	0.2	3.5		
	110304	●	6.35	3.18	0.4	3.5		
	110308	●	6.35	3.18	0.8	3.5		
	160304	●	9.525	3.18	0.4	4.8		
	160308	●	9.525	3.18	0.8	4.8		

● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (1 insert in one case)

35° VB TYPE INSERTS WITH HOLE

Work Material				Cutting Conditions (Guide) : ●: Stable Cutting ◐: General Cutting ✤: Unstable Cutting					
	N	Non-ferrous Metal	●						
Shape	Order Number	PCD	Dimensions (mm)				Geometry	Applicable Holder Page	
		MD220	D_1	S_1	Re	D_2			
(With Breaker)	NP-VBGT1103V5R-F	○	6.35	3.18	0.05	2.85		A275 A276	
	110301R-F	○	6.35	3.18	0.1	2.85			
	110302R-F	○	6.35	3.18	0.2	2.85			
	110304R-F	○	6.35	3.18	0.4	2.85			

35° VC TYPE INSERTS WITH HOLE

Work Material				Cutting Conditions (Guide) : ●: Stable Cutting ◐: General Cutting ✤: Unstable Cutting					
	N	Non-ferrous Metal	●						
Shape	Order Number	PCD	Dimensions (mm)				Geometry	Applicable Holder Page	
		MD220	D_1	S_1	Re	D_2			
(With Breaker)	NP-VCGT0802V5R-F	○	4.76	2.38	0.05	2.4		A222 A296 A297	
	080201R-F	○	4.76	2.38	0.1	2.4			
	080202R-F	○	4.76	2.38	0.2	2.4			
	080204R-F	○	4.76	2.38	0.4	2.4			
	1103V5R-F	○	6.35	3.18	0.05	2.8			
	110301R-F	○	6.35	3.18	0.1	2.8			
	110302R-F	○	6.35	3.18	0.2	2.8			
	110304R-F	○	6.35	3.18	0.4	2.8			

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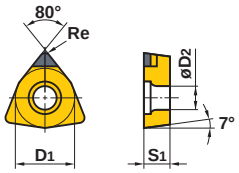
80° WC TYPE INSERTS WITH HOLE

Work Material	N	Non-ferrous Metal	●

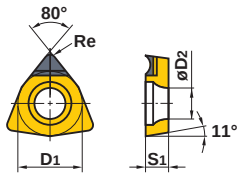
Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✥: Unstable Cutting

Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
	WCMWL30202	●	4.76	2.38	0.2	2.3		A291
	L30204	□	4.76	2.38	0.4	2.3		
	040202	●	6.35	2.38	0.2	2.8		
	040204	□	6.35	2.38	0.4	2.8		
	06T304	●	9.525	3.97	0.4	4.4		
	06T308	□	9.525	3.97	0.8	4.4		

80° WP TYPE INSERTS WITH HOLE

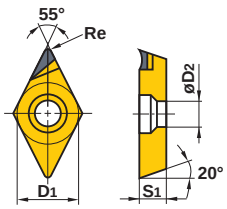
Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✥: Unstable Cutting

Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
(With Breaker)	**WPGT040202**	●	6.35	2.38	0.2	2.8		–
	040204	●	6.35	2.38	0.4	2.8		
	060302	●	9.525	3.18	0.2	4.4		
	060304	●	9.525	3.18	0.4	4.4		

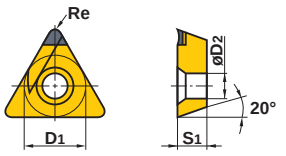
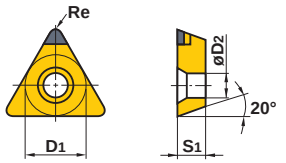
● : Inventory maintained in Japan. (1 insert in one case)
□ : Non stock, produced to order only.

55° DE TYPE INSERTS WITH HOLE

Work Material			PCD	Dimensions (mm)				Geometry	Applicable Holder Page
			MD220	D1	S1	Re	D2		
Shape	Order Number								
	DEGX150402R-F	N Non-ferrous Metal ●	●	12.7	4.76	0.2	5.1	 Right hand insert shown.	A228
	150402L-F		●	12.7	4.76	0.2	5.1		
	150404R-F		●	12.7	4.76	0.4	5.1		
	150404L-F		●	12.7	4.76	0.4	5.1		
(With Breaker)									

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

60° TE TYPE INSERTS WITH HOLE

Work Material			PCD	Dimensions (mm)				Geometry	Applicable Holder Page
			MD220	D1	S1	Re	D2		
Shape	Order Number								
	TEGX160302R	N Non-ferrous Metal ●	●	9.525	3.18	0.2	4.3	 Right hand insert shown.	A229 A304
	160302L		●	9.525	3.18	0.2	4.3		
	160304R		●	9.525	3.18	0.4	4.3		
	160304L		●	9.525	3.18	0.4	4.3		
(With Breaker)									
	TEGX160302		●	9.525	3.18	0.2	4.3		A229 A304
	160304		●	9.525	3.18	0.4	4.3		

Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

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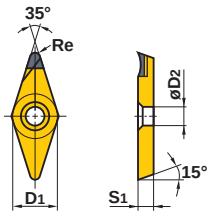
IDENTIFICATION A124

35° VD TYPE INSERTS WITH HOLE

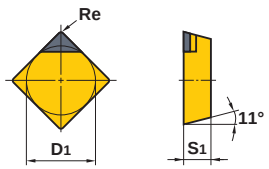
Work Material	N	Non-ferrous Metal	●

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

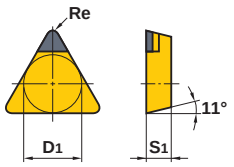
Shape	Order Number	PCD MD220	Dimensions (mm) D1	S1	Re	D2	Geometry	Applicable Holder Page
(With Breaker)	**VDGX160302R-F**	●	9.525	3.18	0.2	4.5	 Right hand insert shown.	A230
	160302L-F	●	9.525	3.18	0.2	4.5		
	160304R-F	●	9.525	3.18	0.4	4.5		
	160304L-F	●	9.525	3.18	0.4	4.5		

● : Inventory maintained in Japan. (1 insert in one case)
□ : Non stock, produced to order only.

90° SP TYPE INSERTS WITHOUT HOLE

Work Material				Cutting Conditions (Guide) : ●: Stable Cutting ◐: General Cutting ✥: Unstable Cutting				
	N	Non-ferrous Metal	●					
Shape	Order Number	PCD MD220		Dimensions (mm) D1	S1	Re	Geometry	Applicable Holder Page
	SPGN090302	●		9.525	3.18	0.2		A226
	090304	●		9.525	3.18	0.4		
	090308	●		9.525	3.18	0.8		
	090312	□		9.525	3.18	1.2		
	120304	●		12.7	3.18	0.4		
	120308	●		12.7	3.18	0.8		
	120312	●		12.7	3.18	1.2		

60° TP TYPE INSERTS WITHOUT HOLE

Work Material				Cutting Conditions (Guide) : ●: Stable Cutting ◐: General Cutting ✥: Unstable Cutting				
	N	Non-ferrous Metal	●					
Shape	Order Number	PCD MD220		Dimensions (mm) D1	S1	Re	Geometry	Applicable Holder Page
	TPGN110302	●		6.35	3.18	0.2		A227 A290
	110304	●		6.35	3.18	0.4		
	110308	●		6.35	3.18	0.8		
	160302	●		9.525	3.18	0.2		
	160304	●		9.525	3.18	0.4		
	160308	●		9.525	3.18	0.8		
	160312	□		9.525	3.18	1.2		

GRADES A135
IDENTIFICATION A124

HOW TO READ THE STANDARD OF EXTERNAL TURNING TOOLS

●How this section page is organized

①Organized according to turning insert shape.
(Refer to the index on the next page.)

TYPE OF TOOL HOLDER
indicates the first four letters of the order number, as well as cutting applications.

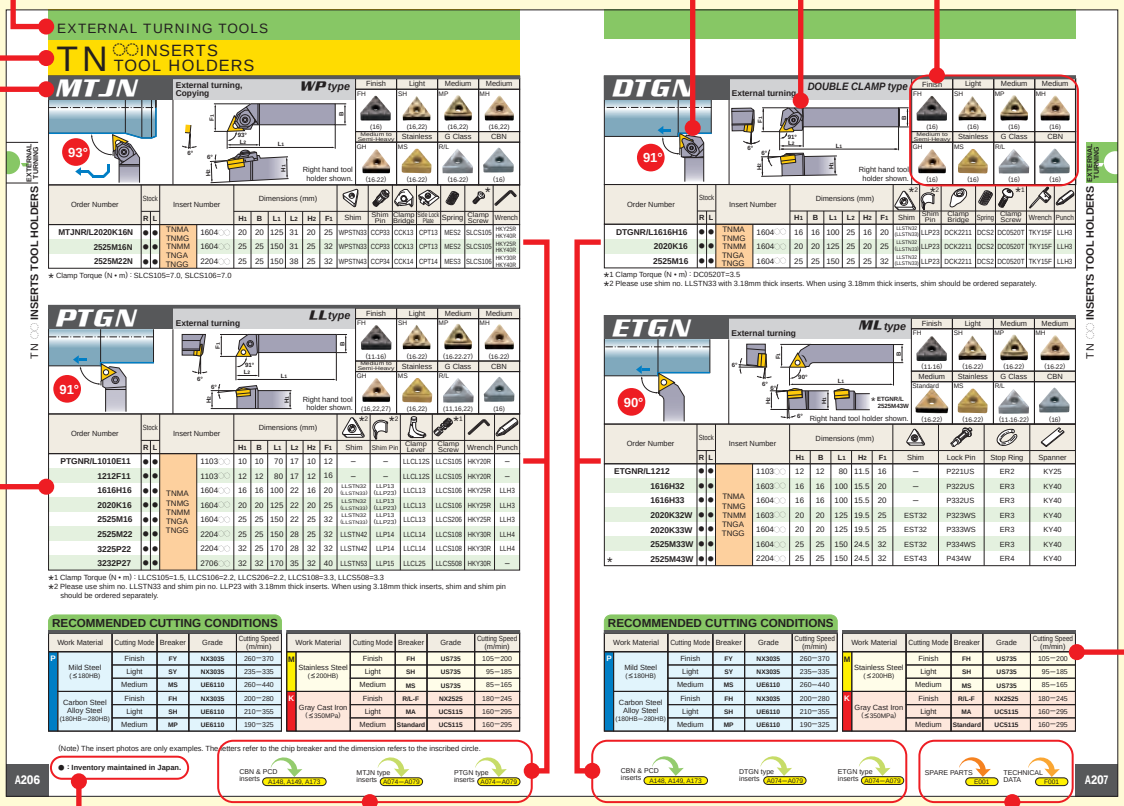
TITLE OF PRODUCT BY INSERT TYPE

PRODUCT SECTION

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict the available machining applications such as external turning, copying, facing, and chamfering together with cutting edge lead angles.

GEOMETRY

CHIP BREAKER BY CUTTING APPLICATION



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

REFERENCE PAGE FOR APPLICABLE INSERTS
indicates reference pages giving details of inserts that are applicable to the product.

PAGE REFERENCE
·SPARE PARTS
·TECHNICAL DATA
indicates reference pages, including the above, on the right hand page of each double-page spread.

PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, and spare parts.

RECOMMENDED CUTTING CONDITIONS
for each work material classification, indicates recommended cutting conditions according to the ISO categories for cutting grades, P, M, and K.

●To Order : Please specify
①order number and hand of tool (right/left).

TURNING TOOLS

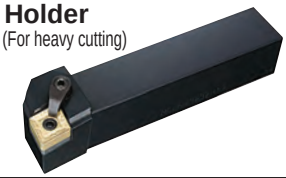
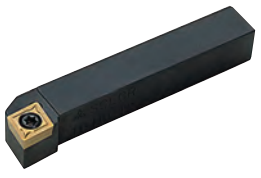
EXTERNAL TURNING TOOLS

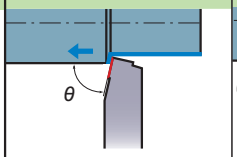
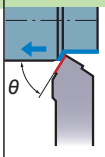
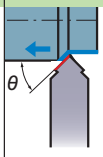
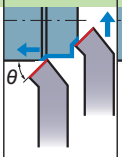
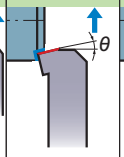
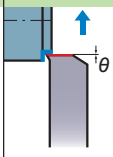
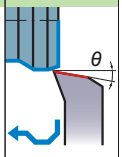
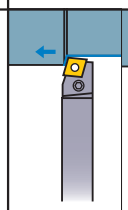
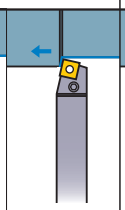
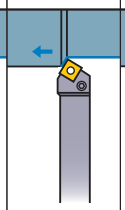
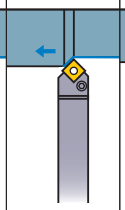
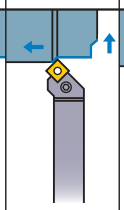
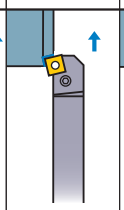
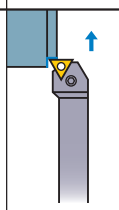
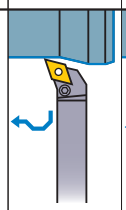
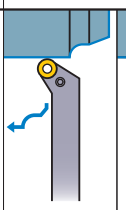
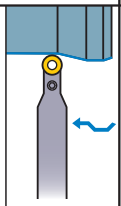
CLASSIFICATION ····· A188
IDENTIFICATION ····· A192
METHOD OF HOLDING ····· A194
STANDARD HOLDERS
CN◯◯ INSERTS TOOL HOLDERS ····· A196
DN◯◯ INSERTS TOOL HOLDERS ····· A198
SN◯◯ INSERTS TOOL HOLDERS ····· A200
TN◯◯ INSERTS TOOL HOLDERS ····· A206
VN◯◯ INSERTS TOOL HOLDERS ····· A212
WN◯◯ INSERTS TOOL HOLDERS ····· A215
CC◯◯ INSERTS TOOL HOLDERS ····· A216
DC◯◯ INSERTS TOOL HOLDERS ····· A217
RC◯◯ INSERTS TOOL HOLDERS ····· A218
SC◯◯ INSERTS TOOL HOLDERS ····· A220
TC◯◯ INSERTS TOOL HOLDERS ····· A221
VC◯◯ INSERTS TOOL HOLDERS ····· A222
XC◯◯ INSERTS TOOL HOLDERS ····· A224
SP◯◯ INSERTS TOOL HOLDERS ····· A226
TP◯◯ INSERTS TOOL HOLDERS ····· A227
●AL HOLDER
DE◯◯ INSERTS TOOL HOLDERS ····· A228
TE◯◯ INSERTS TOOL HOLDERS ····· A229
VD◯◯ INSERTS TOOL HOLDERS ····· A230
●ROTARY HOLDER
RD◯◯ INSERTS TOOL HOLDERS ····· A231
RN◯◯ INSERTS TOOL HOLDERS ····· A232
TL HOLDER ····· A233

*Arranged by Alphabetical order

A201 **CSBN**
A204 **CSDN**
A226 **CSDP**
A205 **CSKN**
A210 **CTFN**
A227 **CTFP**
A208 **CTGN**
A227 **CTGP**
A196 **DCLN**
A198 **DDJN**
A207 **DTGN**
A212 **DVJN**
A214 **DVPN**
A213 **DVVN**
A215 **DWLN**
A203 **ESSN**
A209 **ETEN**
A210 **ETFN**
A207 **ETGN**
A211 **ETXN**
A197 **MCLN**
A200 **MSBN**
A202 **MSSN**
A208 **MTEN**
A206 **MTJN**
A211 **MTQN**
A197 **PCBN**
A196 **PCLN**
A199 **PDHN**
A198 **PDJN**
A218 **PRDC**
A218 **PRGC**
A200 **PSBN**
A203 **PSDN**
A204 **PSKN**
A202 **PSSN**
A201 **PSTN**
A209 **PTFN**
A206 **PTGN**
A212 **PVJN**
A214 **PVPN**
A213 **PVVN**
A215 **PWLN**
A231 **RRSD**
A232 **RRSN**
A216 **SCLC**
A217 **SDJC**
A228 **SDJE**
A217 **SDNC**
A228 **SDNE**
A219 **SRDC**
A219 **SRGC**
A220 **SSSC**
A221 **STFC**
A229 **STFE**
A221 **STGC**
A229 **STGE**
A222 **SVJC**
A230 **SVJD**
A223 **SVPC**
A222 **SVVC**
A224 **SXZC**
A233 **TLHN**
A233 **TLHR**

CLASSIFICATION

Tool Holder	Features Shank Size (H x W x L)	External Turning, Facing θ=95°	External Turning, Copying θ=93°	External Turning, Copying θ=63°30' 72°30'	External Turning θ=90°
LL Holder	● Lever lock type. ● ISO standard. ● Various holder shapes. ● Suitable for light to heavy cutting. ● Economical negative insert. 10 x 10 x 70 12 x 12 x 80 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150 32 x 25 x 170 32 x 32 x 170	 PCLN A196 PWLN A215	 PDJN A198		 PTGN A206
DOUBLE CLAMP Holder	● New double clamp type. ● Holds inserts securely. ● Excellent cutting edge tolerance. ● Economical negative insert. ● Small insert series. 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150 32 x 25 x 170	 DCLN A196 DWLN A215	 DDJN A198 DVJN A212	 DVVN A213	 DTGN A207
DOUBLE CLAMP Holder (For heavy cutting) 	● Double clamp holder type. ● Holds inserts securely. ● Suitable for heavy cutting. ● Negative insert. 32 x 32 x 170 40 x 40 x 200	 MCLN A197			
WP Holder	● Double clamp holder type. ● Simple insert exchange. ● Economical negative insert. 20 x 20 x 125 25 x 25 x 150 32 x 25 x 170		 MTJN A206		
SP Holder 	● Screw-on type. ● Miniature holder with 7°positive insert. 8 x 8 x 60 10 x 10 x 70 12 x 12 x 80 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150	 SCLC A216	 SDJC A217 SVJC A222	 SDNC A217 SVVC A222	 STGC A221
ML Holder	● Cam lock type. ● Economical negative insert. 12 x 12 x 80 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150				 ETGN A207

	External Turning		External Turning, Chamfering		External Turning, Facing, Chamfering	Facing		Facing, Copying	External Turning, Copying		Selection Standard				
	θ=75°		θ=60°	θ=45°	θ=45°	θ=15°	θ=0°–-1°	θ=10°–	Special Design		Economical	Low Cutting Resistance (Sharpness)	Clamp Rigidity	Operation Efficiency	Specialised
															
											◎		○	◎	
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								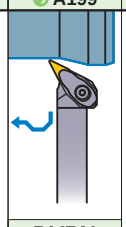			◎		◎	◎	
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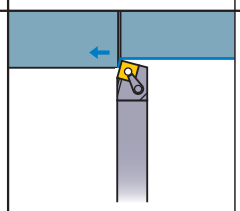
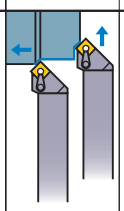
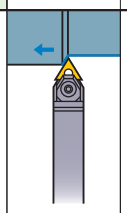
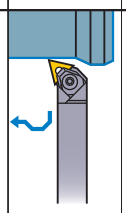
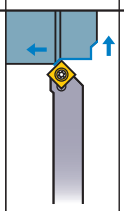
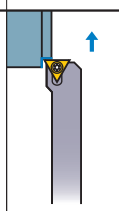
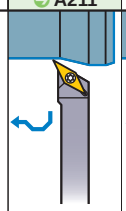
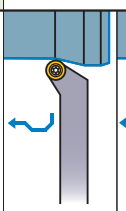
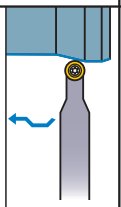
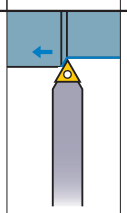
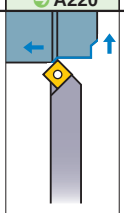
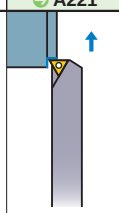
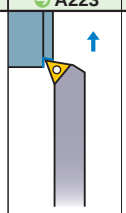
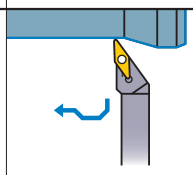
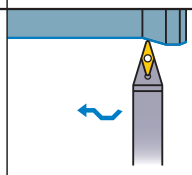
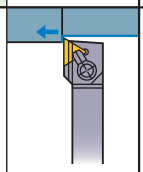
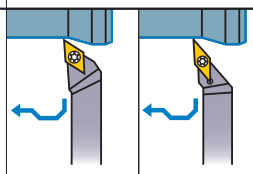
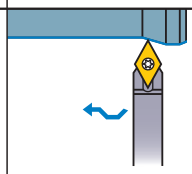
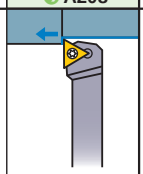
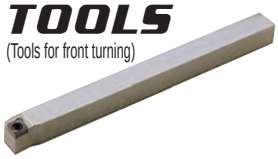
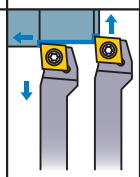
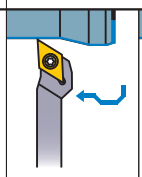
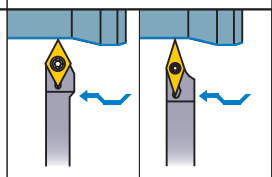
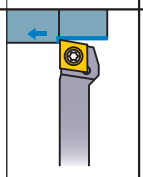
													◎		
	MSBN ➲ A200				MSSN ➲ A202										
											◎		◎	◎	
			MTEN ➲ A208					MTQN ➲ A211							
												○			
					SSSC ➲ A220		STFC ➲ A221	SVPC ➲ A223	SRGC ➲ A219	SRDC ➲ A219					
											◎			◎	
			ETEN ➲ A209		ESSN ➲ A203		ETFN ➲ A210	ETXN ➲ A211							

(Note) ◎ : 1st recommendation. ○ : 2nd recommendation.

CLASSIFICATION

Tool Holder	Features Shank Size (H x W x L)	External Turning, Facing θ=99°–95°	External Turning, Copying θ=93°	External Turning, Copying θ=62°30' 72°30'	External Turning θ=90°
Profile Holder NEW	● Screw-on type. ● 25°rhombic shape insert. ● Possible to machine a face relief with up to 60º inclination. 25 x 25 x 150				
MP Holder	● Pin lock type. ● 35°rhombic shape insert. ● Suitable for recessing. 20 x 20 x 125 25 x 25 x 150		 **PVJN** ➲ A212	 **PVVN** ➲ A213	
MC Holder	● Clamp-on Type. ● Positive insert series. ● Negative insert series. 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150				 **CTGN** ➲ A208
AL Holder	● Screw-on type. ● 20° positive insert. (35° rhombic shape insert is 15°) ● High rake and good sharpness. 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150		 **SDJE** ➲ A228 / **SVJD** ➲ A230	 **SDNE** ➲ A228	 **STGE** ➲ A229
TL Holder	● Taper lock type. ● Excellent finished surface with round shape insert. 20 x 20 x 125 25 x 25 x 150 32 x 25 x 170				
SMALL TOOLS (Tools for front turning) 	● Screw-on type. ● Tools to be equipped on gang type tool posts. ● Miniature holder with 7°positive insert. 8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	 **SCLC-SM** ➲ A242	 **SDJC-SM** ➲ A243 / **SVJB-SM** ➲ A244	 **SDNC-SM** ➲ A243 / **SVVB-SM** ➲ A244	 **SCAC-SM** ➲ A242
SMALL TOOLS (Tools for back turning)	● Screw-on type. ● Tools to be equipped on gang type tool posts. ● High rigidity due to designing of vertical insert. (BTA/CTB type) ● Back machining. (BTA/CTB type) 8 x 10 x 120 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120				

External Turning		External Turning, Chamfering	Facing		Facing, Copying	External Turning, Copying	Selection Standard				
θ=90°	θ=75°	θ=45°	θ=15°	θ=0°– -1°	θ=10°–	Special Design	Economical	Low Cutting Resistance (Sharpness)	Clamp Rigidity	Operation Efficiency	Specialised
						SXZC A224		◎	◎		
					PVPN A214		◎			◎	
CTGP A227	CSBN A201	CSDN A204	CSDP A226	CSKN A205	CTFN A210	CTFP A227	◎ (Negative insert)	○ (Positive insert)	◎		
				STFE A229				◎			◎
						TLHR A233 / TLHN A233		○			◎
								○			
					Special Design: BTAH A245 / CTBH A246 / BTVH A247			○			

(Note) ◎ : 1st recommendation. ○ : 2nd recommendation.

IDENTIFICATION

LL Type, Double Clamp Type, WP Type, SP Type, Profile Holder, AL Type

P	C	L	N	R	25	25	M	12
①	②	③	④	⑤	⑥	⑥	⑦	⑧

①Clamp Structure

D	Double Clamp Type
M	Wedge Lock Type Multiple Clamp Type
P	Lever Lock Type
S	Screw-on Type

②Insert Shape

C	Rhombic 80°
D	Rhombic 55°
R	Round
S	Square
T	Triangular
V	Rhombic 35°
W	Trigon
X	Special Design

③Cutting Angle

A	90°Without Offset
B	75°
D	45°Neutral
E	60°
F	90°
G	90°With Offset
J	93°
K	75°
L	95°
N	62°30´
P	117°30´
Q	105°
S	45°
T	60°
V	72°30´
Z	Special

④Insert Clearance

C	7°Positive
N	Negative
E	20°Positive

⑤Hand of Tool

R	Right Hand
L	Left Hand
N	Neutral

⑥ Tool Size (mm) (Height and Width)

8	8
10	10
12	12
16	16
20	20
25	25
32	32

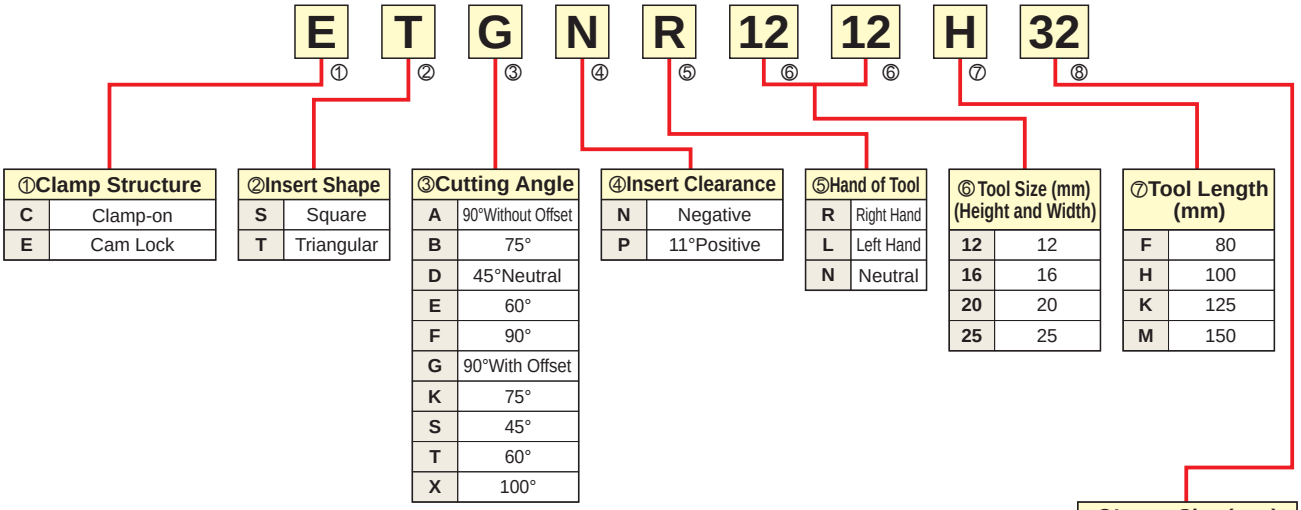
⑦Tool Length (mm)

D	60
E	70
F	80
H	100
K	125
M	150
P	170
Q	180
R	200

⑧Cutting Edge Length (mm)

Inscribed Circle	Insert Shape					
	Square	Triangular	Round	Rhombic 80°	Rhombic 55°	Rhombic 35°
6.00	–	–	06	–	–	–
6.35	–	11	–	06	07	11
7.94	–	13	–	–	–	–
8.00	–	–	08	–	–	–
9.525	09	16	–	09	11	16
10.00	–	–	10	–	–	–
12.00	–	–	12	–	–	–
12.70	12	22	–	12	15	–
15.875	15	27	–	16	–	–
16.00	–	–	16	–	–	–
19.05	19	–	–	19	–	–
20.00	–	–	20	–	–	–
25.00	–	–	25	–	–	–
25.40	25	–	–	–	–	–
32.00	–	–	32	–	–	–

ML Type, MC Type



①Clamp Structure	
C	Clamp-on
E	Cam Lock

②Insert Shape	
S	Square
T	Triangular

③Cutting Angle	
A	90°Without Offset
B	75°
D	45°Neutral
E	60°
F	90°
G	90°With Offset
K	75°
S	45°
T	60°
X	100°

④Insert Clearance	
N	Negative
P	11°Positive

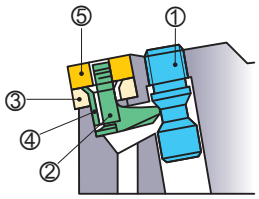
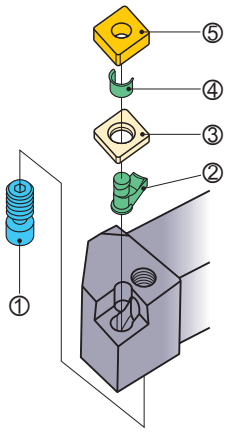
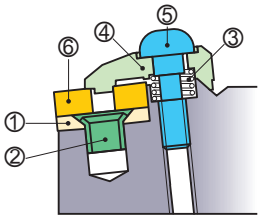
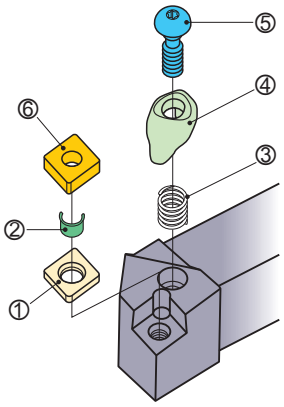
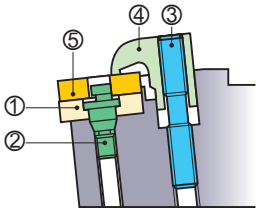
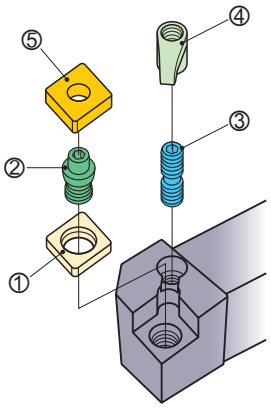
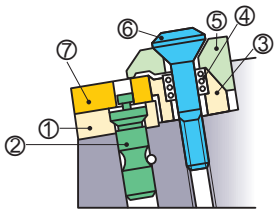
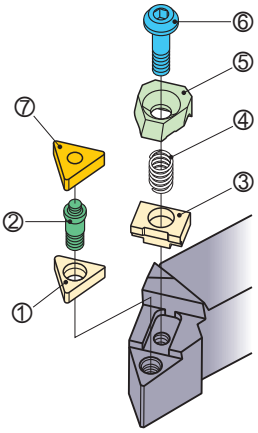
⑤Hand of Tool	
R	Right Hand
L	Left Hand
N	Neutral

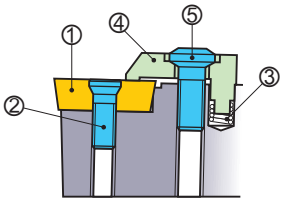
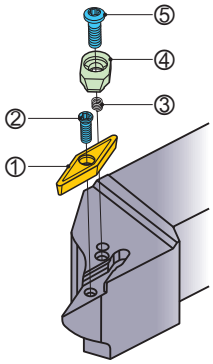
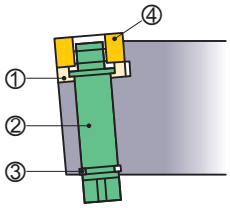
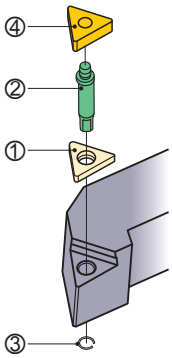
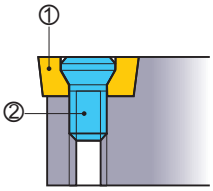
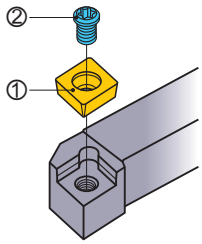
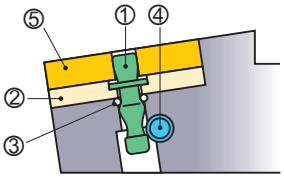
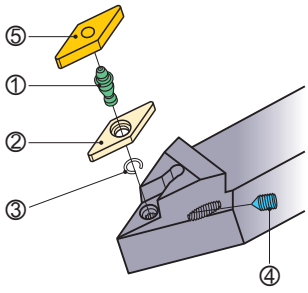
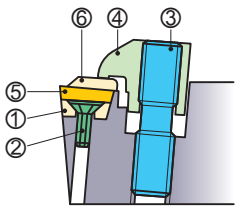
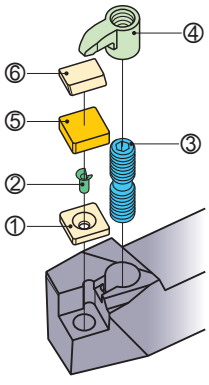
⑥Tool Size (mm) (Height and Width)	
12	12
16	16
20	20
25	25

⑦Tool Length (mm)	
F	80
H	100
K	125
M	150

⑧Insert Size (mm)		
Symbol	Insert Size	
	Diameter of Inscribed Circle	Thickness
22	6.35	3.18
32	9.525	3.18
33	9.525	4.76
43	12.70	4.76

METHOD OF HOLDING

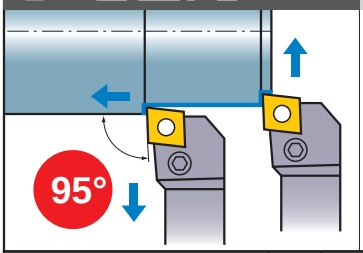
Type (Holder)	Structure
Lever Lock (LL HOLDER)	 ①Clamp Screw ②Lever ③Shim ④Shim Pin ⑤Insert 
Double Clamp (DOUBLE CLAMP HOLDER)	 ①Shim ②Shim Pin ③Spring ④Clamp Bridge ⑤Clamp Screw ⑥Insert 
Multiple Clamp (DOUBLE CLAMP HOLDER) (For heavy cutting)	 ①Shim ②Shim Pin ③Clamp Screw ④Clamp Bridge ⑤Insert 
Wedge Lock (WP HOLDER)	 ①Shim ②Shim Pin ③Plate ④Spring ⑤Clamp Bridge ⑥Clamp Screw ⑦Insert 

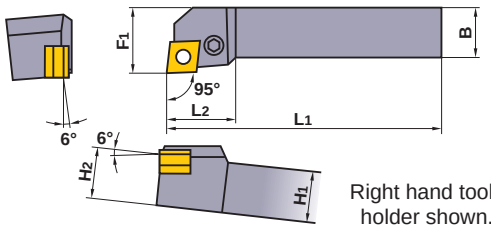
Type (Holder)	Structure
Two action double clamp (PROFILE HOLDER)	 ①Insert ②Clamp Screw (1) ③Spring ④Clamp Bridge ⑤Clamp Screw (2) 
Cam Lock (ML HOLDER)	 ①Shim ②Lock Pin ③Stop Ring ④Insert 
Screw-on (SP HOLDER AL HOLDER)	 ①Insert ②Clamp Screw 
Pin lock (MP HOLDER)	 ①Lock Pin ②Shim ③Stop Ring ④Lock Screw ⑤Insert 
Clamp-on (MC HOLDER)	 ①Shim ②Shim Pin ③Clamp Screw ④Clamp Bridge ⑤Insert ⑥Breaker Piece 

CN INSERTS TOOL HOLDERS

PCLN

External turning, Facing — ***LL type***





Right hand tool holder shown.

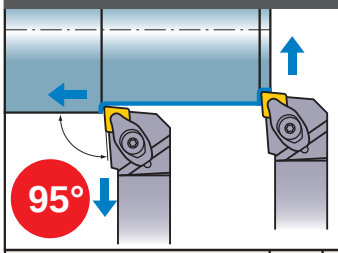
Finish	Light	Medium	Medium
FH	SH	MP	MH
(12)	(09,12)	(12,16,19)	(12,16,19)
Medium	**Medium to Semi-Heavy**	**Stainless**	**CBN**
Standard	GH	MS	
(09,12,16,19)	(12,16,19)	(09,12,16,19)	(12)

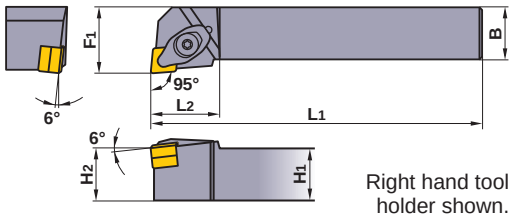
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench	Punch
PCLNR/L1616H09	●	●	CNMG	09T3○○	16	16	100	22	16	20	LLSCN3T3	LLP13	LLCL13	LLCS106	HKY25R	LLH3
2020K09	●	●		09T3○○	20	20	125	22	20	25	LLSCN3T3	LLP13	LLCL13	LLCS106	HKY25R	LLH3
2525M09	●	●		09T3○○	25	25	150	22	25	32	LLSCN3T3	LLP13	LLCL13	LLCS106	HKY25R	LLH3
2020K12	●	●	CNMA CNMG CNMM CNGG	1204○○	20	20	125	28	20	25	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
2525M12	●	●		1204○○	25	25	150	28	25	32	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
3225P12	●	●		1204○○	32	25	170	28	32	32	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
3232P16	●	●		1606○○	32	32	170	32	32	40	LLSCN53	LLP15	LLCL25	LLCS508	HKY30R	–
3232P19	●	●		1906○○	32	32	170	40	32	40	LLSCN63	LLP16	LLCL16	LLCS310	HKY40R	–

* Clamp Torque (N • m) : LLCS106=2.2, LLCS108=3.3, LLCS508=3.3, LLCS310=7.0

DCLN

External turning, Facing — ***DOUBLE CLAMP type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(12)	(09,12)	(12)	(12)
Medium	**Medium to Semi-Heavy**	**Stainless**	**CBN**
Standard	GH	MS	
(09,12)	(12)	(09,12)	(12)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	*2 Shim	Shim Pin	Clamp Bridge	Spring	*1 Clamp Screw	Wrench	Punch
DCLNR/L1616H09	●	●	CNMG	09T3○○	16	16	100	25	16	20	LLSCN3T3 (LLSCN33)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2020K09	●	●		09T3○○	20	20	125	25	20	25	LLSCN3T3 (LLSCN33)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2525M09	●	●		09T3○○	25	25	150	25	25	32	LLSCN3T3 (LLSCN33)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2020K12	●	●	CNMA CNMG CNMM CNGG	1204○○	20	20	125	29	20	25	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
2525M12	●	●		1204○○	25	25	150	29	25	32	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
3225P12	●	●		1204○○	32	25	170	29	32	32	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4

*1 Clamp Torque (N • m) : DC0520T=3.5, DC0621T=5.0
*2 Please use shim no. LLSCN33 with 3.18mm thick inserts. When using 3.18mm thick inserts, shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260–370
		Light	SY	NX3035	235–335
		Medium	MS	UE6110	260–440
	Carbon Steel Alloy Steel (180HB–280HB)	Finish	FH	NX3035	200–280
		Light	SH	UE6110	210–355
		Medium	MP	UE6110	190–325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105–200
		Light	SH	US735	95–185
		Medium	MS	US735	85–165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160–295
		Medium	Standard	UC5115	160–295
		Semi-Heavy	Flat Top	UC5115	155–280

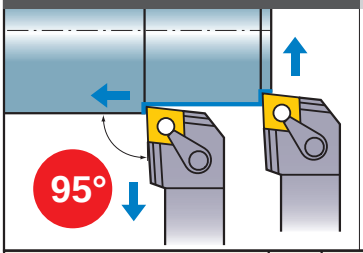
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

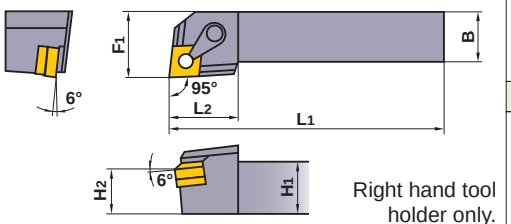
● : **Inventory maintained in Japan.**

CBN & PCD inserts A142–A144, A172
PCLN type inserts A058–A062
DCLN type inserts A058–A062

MCLN

External turning, Facing — ***DOUBLE CLAMP type*** For heavy cutting





Right hand tool holder only.

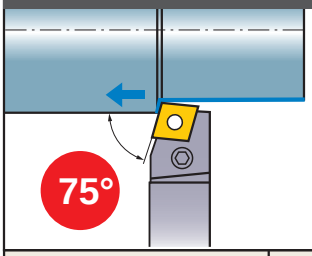
Medium	Medium	Medium	Medium to Semi-Heavy
MH	Standard	MS	GH
(19)	(19)	(19)	(19)
Heavy	**Heavy**	**Heavy**	**M Class**
HZ	HX	HV	
(19)	(19)	(19)	(19)

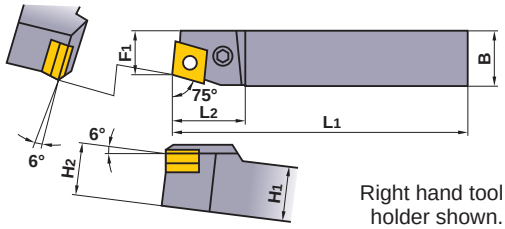
Order Number	Stock	Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Bridge	Clamp Screw *	Wrench
	R			H1	B	L1	L2	H2	F1					
MCLNR3232P19	●	CNMG CNMM CNMA	1906○○	32	32	170	36	32	40	MSCN63	MP6	CKW6	LS25	HKY40R
4040R19	●		1906○○	40	40	200	36	40	50	MSCN63	MP6	CKW6	LS25	HKY40R

∗ Clamp Torque (N • m) : LS25=8.2

PCBN

External turning — ***LL type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(12)	(12)	(12)	(12)
Medium	**Medium to Semi-Heavy**	**Stainless**	
Standard	GH	MS	
(12)	(12)	(12)	

Order Number	Stock		Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench	Punch
	R	L			H1	B	L1	L2	H2	F1						
PCBNR/L2020K12	●	●	CNMA CNMG CNMM CNGG	1204○○	20	20	125	28	20	17	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
2525M12	●	●		1204○○	25	25	150	25	25	22	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4

∗ Clamp Torque (N • m) : LLCS108=3.3

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	**FY**	**NX3035**	260—370
		Light	**SY**	**NX3035**	235—335
		Medium	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	**FH**	**NX3035**	200—280
		Light	**SH**	**UE6110**	210—355
		Medium	**MP**	**UE6110**	190—325

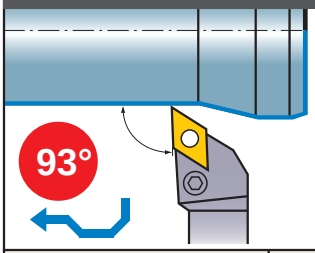
	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	**FH**	**US735**	105—200
		Light	**SH**	**US735**	95—185
		Medium	**MS**	**US735**	85—165
K	Gray Cast Iron (≤350MPa)	Light	**MA**	**UC5115**	160—295
		Medium	**Standard**	**UC5115**	160—295
		Semi-Heavy	**Flat Top**	**UC5115**	155—280

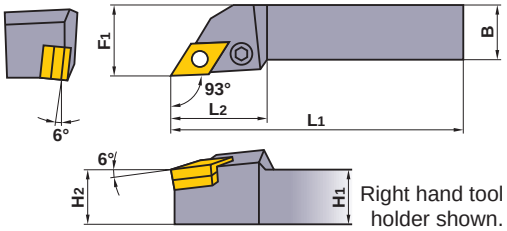
CBN & PCD inserts A142—A144, A172
MCLN type inserts A059—A062
PCBN type inserts A058—A062
SPARE PARTS E001
TECHNICAL DATA F001

DN INSERTS TOOL HOLDERS

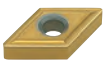
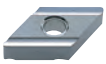
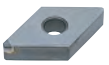
PDJN

External turning, Copying — ***LL type***





Right hand tool holder shown.

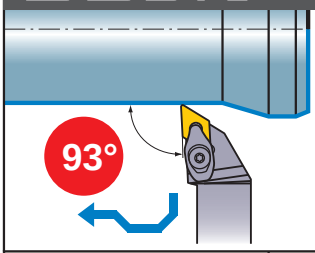
Finish	Light	Medium	Medium
FH	SH	MP	MH
(15)	(15)	(15)	(15)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
			
(15)	(15)	(15)	(15)

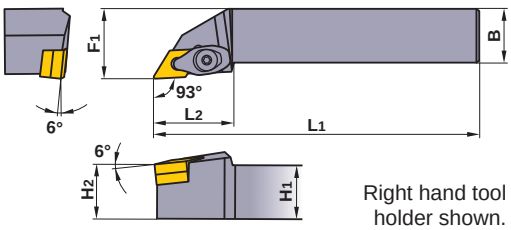
Order Number	Stock		Insert Number		Dimensions (mm)						✶2			✶1		
	R	L			H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Lever	Clamp Screw	Wrench	Punch
PDJNR/L2020K15	●	●	DNMA DNMG DNMM DNMX DNGA DNGG	1504◌◌	20	20	125	35	20	25	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HKY30R	LLH4
2525M15	●	●		1504◌◌	25	25	150	35	25	32	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HKY30R	LLH4
3225P15	●	●		1504◌◌	32	25	170	35	32	32	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HKY30R	LLH4

✶1 Clamp Torque (N • m) : LLCS108=3.3
✶2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, shim should be ordered separately.

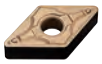
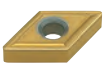
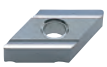
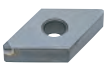
DDJN

External turning, Copying — ***DOUBLE CLAMP type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
			
(15)	(11,15)	(15)	(15)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
			
(15)	(11,15)	(15)	(15)

Order Number	Stock		Insert Number		Dimensions (mm)						✶2				✶1		
	R	L			H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw	Wrench	Punch
DDJNR/L1616H11	●	●	DNMG	1104◌◌	16	16	100	28	16	20	LLSDN32	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2020K11	●	●		1104◌◌	20	20	125	28	20	25	LLSDN32	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2525M11	●	●		1104◌◌	25	25	150	28	25	32	LLSDN32	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
3225P11	●	●		1104◌◌	32	25	170	28	32	32	LLSDN32	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2020K15	●	●	DNMA DNMG DNMM DNMX DNGA DNGG	1504◌◌	20	20	125	37	20	25	LLSDN43 (LLSDN42)	LLP24	DCK2613	DCS1	DC0621T	TKY20F	LLH4
2525M15	●	●		1504◌◌	25	25	150	37	25	32	LLSDN43 (LLSDN42)	LLP24	DCK2613	DCS1	DC0621T	TKY20F	LLH4
3225P15	●	●		1504◌◌	32	25	170	37	32	32	LLSDN43 (LLSDN42)	LLP24	DCK2613	DCS1	DC0621T	TKY20F	LLH4

✶1 Clamp Torque (N • m) : DC0520T=3.5, DC0621T=5.0
✶2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295
		Semi-Heavy	Flat Top	UC5115	155—280

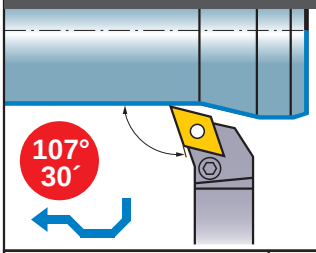
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

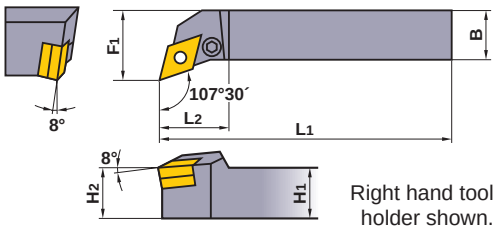
● : **Inventory maintained in Japan.**

CBN & PCD inserts A145, A146, A172
PDJN type inserts A063—A067
DDJN type inserts A063—A067

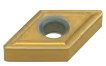
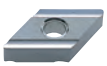
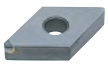
PDHN

Facing, Copying — LL type





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(15)	(15)	(15)	(15)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
			
(15)	(15)	(15)	(15)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	★2 Shim	Shim Pin	Clamp Lever	★1 Clamp Screw	Wrench
PDHNR/L2020K15	●	●	DNMA DNMG	1504○○	20	20	125	34	20	25	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HKY30R
2525M15	●	●	DNMM	1504○○	25	25	150	34	25	32	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HKY30R
3225P15	●	●	DNGA DNGG	1504○○	32	25	170	34	32	32	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HKY30R

★1 Clamp Torque (N • m) : LLCS108=3.3
★2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

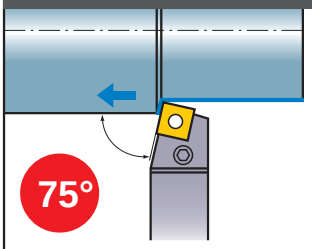
	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295
		Semi-Heavy	Flat Top	UC5115	155—280

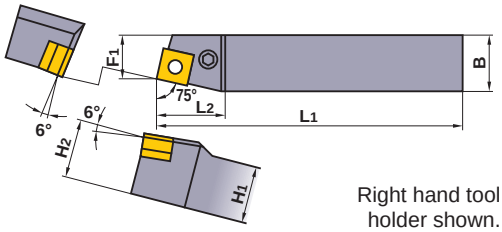
CBN & PCD inserts A145, A146, A172
PDHN type inserts A063—A067
SPARE PARTS E001
TECHNICAL DATA F001

SN INSERTS TOOL HOLDERS

PSBN



External turning — ***LL type***



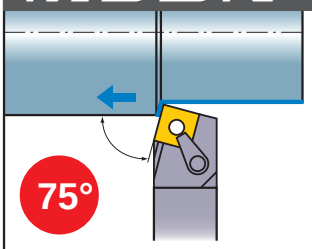
Right hand tool holder shown.

Finish	Light	Medium	Medium
FH (09,12)	SH (12)	MP (12,15,19)	MH (12)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH (12,15,19)	MS (09,12,15,19)	R/L (09,12)	(12)

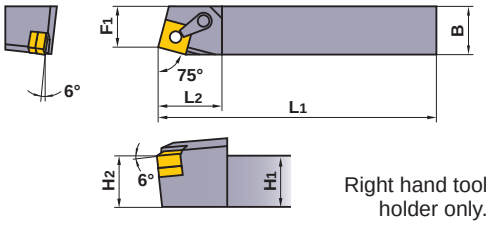
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench	Punch
PSBNR/L1212F09	●	●	SNMA SNMG SNMM SNGA SNGG	0903□□	12	12	80	20	12	13	—	—	LLCL13S	LLCS105	HKY20R	—
1616H09	●	●		0903□□	16	16	100	22	16	13	LLSSN33	LLP23	LLCL13	LLCS106	HKY25R	LLH3
2020K12	●	●		1204□□	20	20	125	28	20	17	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
2525M12	●	●		1204□□	25	25	150	25	25	22	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
2525M15	●	●		1506□□	25	25	150	33	25	22	LLSSN53	LLP15	LLCL25	LLCS508	HKY30R	—
3232P19	●	●		1906□□	32	32	170	40	32	27	LLSSN63	LLP16	LLCL16	LLCS310	HKY40R	—

* Clamp Torque (N • m) : LLCS105=1.5, LLCS106=2.2, LLCS108=3.3, LLCS508=3.3, LLCS310=7.0

MSBN



External turning — ***DOUBLE CLAMP type*** For heavy cutting



Right hand tool holder only.

Medium	Medium	Medium	Medium to Semi-Heavy
MH (19)	Standard (19)	MS (19)	GH (19)
Heavy	**Heavy**	**Heavy**	**M Class**
HZ (19)	HX (19)	HV (19)	(19)

Order Number	Stock R	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Bridge	Clamp Screw *	Wrench
MSBNR3232P19	●	SNMG SNMM SNMA	1906□□	32	32	170	41	32	27	MSSN63	MP6	CKW6	LS25	HKY40R
4040R19	●		1906□□	40	40	200	41	40	35	MSSN63	MP6	CKW6	LS25	HKY40R

* Clamp Torque (N • m) : LS25=8.2

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295
		Semi-Heavy	Flat Top	UC5115	155—280

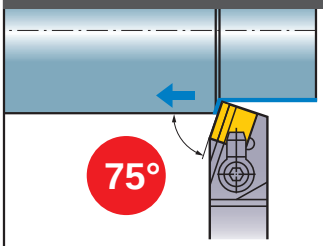
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

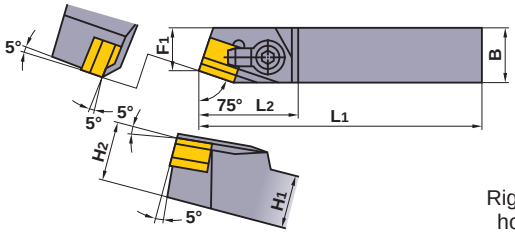
● : **Inventory maintained in Japan.**

CBN & PCD inserts A147, A173
PSBN type inserts A069—A073
MSBN type inserts A070—A073

CSBN

External turning — ***MC*type**





Right hand tool holder shown.

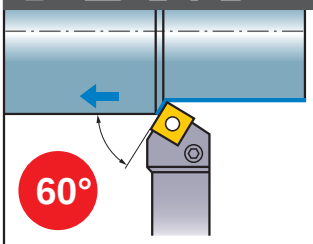
M Class	G Class
(12)	(12)
CBN/PCD	
(12)	

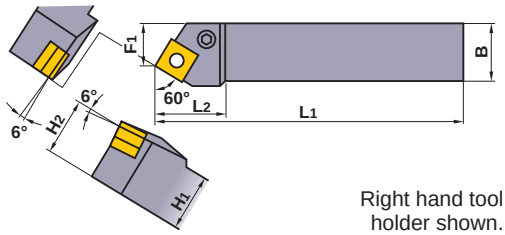
Order Number	Stock		Insert Number		Dimensions (mm)						✶2			✶1		
	R	L			H_1	B	L_1	L_2	H_2	F_1	Shim	Shim Pin	Clamp Bridge	Clamp Screw	Breaker Piece	Wrench
CSBNR/L2020	●	●	SNMN SNGN	1204◇◇	20	20	125	35	20	17	CS42	BCP301	CK342	LS2	CBS4 CBS4N CBS4F	HKY40R
2525M43	●	●		1204◇◇	25	25	150	35	25	22	CS42 (CS43)	BCP301	CK342	LS3		HKY40R

✶1 Clamp Torque (N • m) : LS2=8.2, LS3=8.2
✶2 Please use shim no. CS43 with 3.18mm thick inserts. When using 3.18mm thick inserts, shim should be ordered separately.

PSTN

External turning, Chamfering — ***LL*type**





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH (09,12)	SH (12)	MP (12)	MH (12)
Medium to Semi-Heavy	Stainless	G Class	CBN
GH (12)	MS (09,12)	R/L (09,12)	(12)

Order Number	Stock		Insert Number		Dimensions (mm)									✶		
	R	L			H_1	B	L_1	L_2	H_2	F_1	Shim	Shim Pin	Clamp Lever	Clamp Screw	Wrench	Punch
PSTNR/L1616H09	●	●	SNMA SNMG SNMM SNGA SNGG	0903◇◇	16	16	100	20	16	13	LLSSN33	LLP23	LLCL13	LLCS106	HKY25R	LLH3
2020K12	●	●		1204◇◇	20	20	125	25	20	17	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
2525M12	●	●		1204◇◇	25	25	150	25	25	22	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4

✶ Clamp Torque (N • m) : LLCS106=2.2, LLCS108=3.3

RECOMMENDED CUTTING CONDITIONS

Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

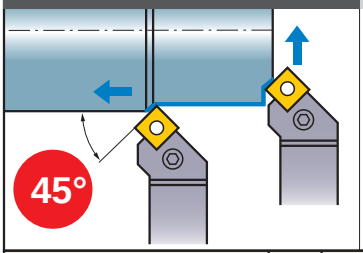
Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295
		Semi-Heavy	Flat Top	UC5115	155—280

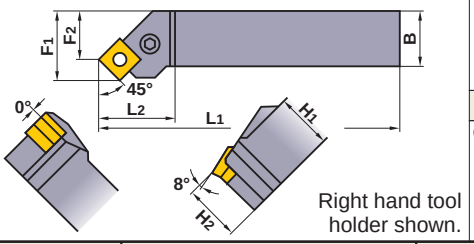
CBN & PCD inserts A147, A154, A173, A175
CSBN type inserts A086
PSTN type inserts A069—A073
SPARE PARTS E001
TECHNICAL DATA F001

SN INSERTS TOOL HOLDERS

PSSN

External turning, Facing, Chamfering — ***LL type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(09,12)	(12)	(12,15,19)	(12)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
(12,15,19)	(09,12,15,19)	(09,12)	(12)

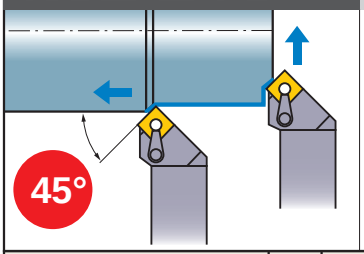
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	F2	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench	Punch
PSSNR/L1616H09	●	●	SNMA SNMG SNMM SNGA SNGG	0903○○	16	16	100	22	16	20	(14)	LLSSN33	LLP23	LLCL13	LLCS106	HKY25R	LLH3
2020K12	●	●		1204○○	20	20	125	31	20	25	(17)	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
2525M12	●	●		1204○○	25	25	150	31	25	32	(24)	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
3232P15	●	●		1506○○	32	32	170	34	32	40	(29)	LLSSN53	LLP15	LLCL25	LLCS508	HKY30R	—
3232P19	●	●		1906○○	32	32	170	40	32	40	(27)	LLSSN63	LLP16	LLCL16	LLCS310	HKY40R	—

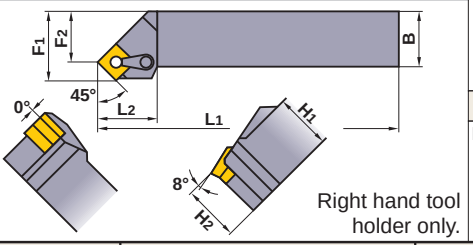
(Note) When facing or chamfering only and using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

* Clamp Torque (N • m) : LLCS106=2.2, LLCS108=3.3, LLCS508=3.3, LLCS310=7.0

MSSN

External turning, Facing, Chamfering — ***DOUBLE CLAMP type*** For heavy cutting





Right hand tool holder only.

Medium	Medium	Medium	Semi-Heavy
MH	Standard	MS	GH
(19)	(19)	(19)	(19)
Heavy	**Heavy**	**Heavy**	**M Class**
HZ	HX	HV	
(19)	(19)	(19)	(19)

Order Number	Stock R	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	F2	Shim	Shim Pin	Clamp Bridge	Clamp Screw *	Wrench
MSSNR3232P19	●	SNMG SNMM SNMA	1906○○	32	32	170	44	32	40	27	MSSN63	MP6	CKW6	LS25	HKY40R
4040R19	●		1906○○	40	40	200	44	40	50	37	MSSN63	MP6	CKW6	LS25	HKY40R

* Clamp Torque (N • m) : LS25=8.2

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295
		Semi-Heavy	Flat Top	UC5115	155—280

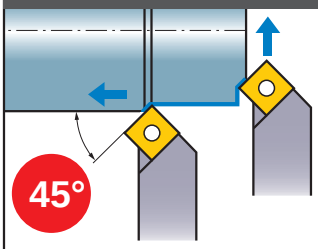
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

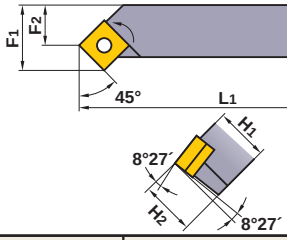
● : **Inventory maintained in Japan.**

CBN & PCD inserts A147, A173
PSSN type inserts A069—A073
MSSN type inserts A070—A073

ESSN

External turning, Facing, Chamfering — **ML type**





Right hand tool holder shown.

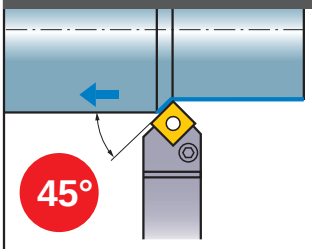
Finish	Light	Medium	Medium
FH	SH	MP	MH
(09,12)	(12)	(12)	(12)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(09,12)	(09,12)	(09,12)	(12)

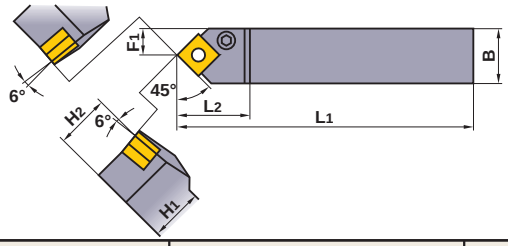
Order Number	Stock		Insert Number		Dimensions (mm)									
	R	L			H_1	B	L_1	H_2	F_1	F_2	Shim	Lock Pin	Stop Ring	Spanner
ESSNR/L1212	●	●	SNMA SNMG SNMM SNGA SNGG	0903○○	12	12	80	11.5	16	10	—	P321US	ER3	KY40
1616H32	●	●		0903○○	16	16	100	15.5	20	14	—	P322US	ER3	KY40
2020W	●	●		1204○○	20	20	125	19.5	25	17	ESS42	P433W	ER4	KY40
2525W	●	●		1204○○	25	25	150	24.5	32	24	ESS42	P434W	ER4	KY40

(Note) When facing or chamfering only and using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

PSDN

External turning, Chamfering — **LL type**





Finish	Light	Medium	Medium
FH	SH	MP	MH
(09,12)	(12)	(12)	(12)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
(12)	(09,12)	(09,12)	(12)

Order Number	Stock	Insert Number		Dimensions (mm)											
				H_1	B	L_1	L_2	H_2	F_1	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench	Punch
PSDNN1212F09	●	SNMA SNMG SNMM SNGA SNGG	0903○○	12	12	80	20	12	6.0	—	—	LLCL13S	LLCS105	HKY20R	—
1616H09	●		0903○○	16	16	100	22	16	8.0	LLSSN33	LLP23	LLCL13	LLCS106	HKY25R	LLH3
2020K12	●		1204○○	20	20	125	28	20	10.0	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
2525M12	●		1204○○	25	25	150	28	25	12.5	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
3225P12	●		1204○○	32	25	170	28	32	12.5	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4

* Clamp Torque (N • m) : LLCS105=1.5, LLCS106=2.2, LLCS108=3.3

RECOMMENDED CUTTING CONDITIONS

Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

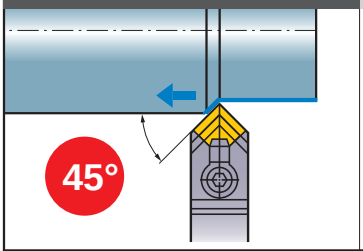
Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295
		Semi-Heavy	Flat Top	UC5115	155—280

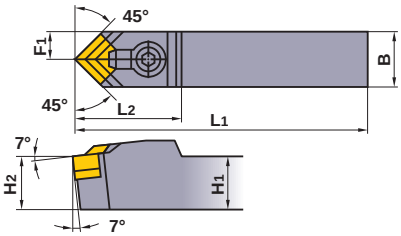
CBN & PCD inserts A147, A173
ESSN type inserts A069—A073
PSDN type inserts A069—A073
SPARE PARTS E001
TECHNICAL DATA F001

SN INSERTS TOOL HOLDERS

CSDN

External turning, Chamfering — ***MC type***





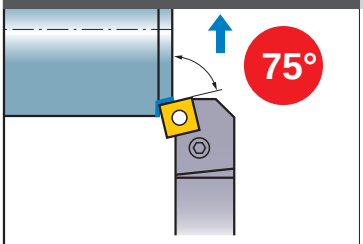
M Class	G Class
(09,12)	(09,12)
CBN/PCD	
(09,12)	

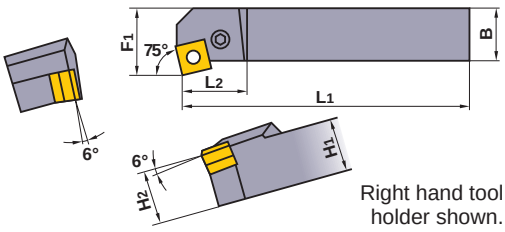
Order Number	Stock	Insert Number		Dimensions (mm)						✶2 Shim	Shim Pin	Clamp Bridge	✶1 Clamp Screw	Breaker Piece	Wrench
				H1	B	L1	L2	H2	F1						
CSDNN1616	●	SNMN SNGN	0903○○	16	16	100	28	16	8.0	CS32	BCP251	CK232	LS1	CBS3D	HKY30R
2020	●		1204○○	20	20	125	35	20	10.0	CS42	BCP301	CK341	LS2	CBS4D	HKY40R
2525M43	●		1204○○	25	25	150	35	25	12.5	CS42 (CS43)	BCP301	CK341	LS3	CBS4D	HKY40R

✶1 Clamp Torque (N • m) : LS1=5.0, LS2=8.2, LS3=8.2
✶2 Please use shim no. CS43 with 3.18mm thick inserts. When using 3.18mm thick inserts, shim should be ordered separately.

PSKN

Facing — ***LL type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH (09,12)	SH (12)	MP (12)	MH (12)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH (12)	MS (09,12)	R/L (09,12)	(12)

Order Number	Stock		Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Lever	✶ Clamp Screw	Wrench	Punch
	R	L			H1	B	L1	L2	H2	F1						
PSKNR/L1616H09	●	●	SNMA SNMG SNMM SNGA SNGG	0903○○	16	16	100	20	16	20	LLSSN33	LLP23	LLCL13	LLCS106	HKY25R	LLH3
2020K12	●	●		1204○○	20	20	125	25	20	25	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
2525M12	●	●		1204○○	25	25	150	25	25	32	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4

(Note) When using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

✶ Clamp Torque (N • m) : LLCS106=2.2, LLCS108=3.3

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295
		Semi-Heavy	Flat Top	UC5115	155—280

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

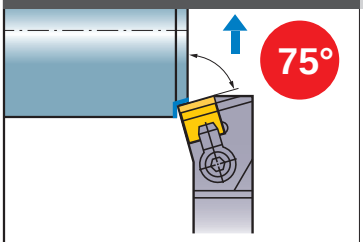
● : **Inventory maintained in Japan.**

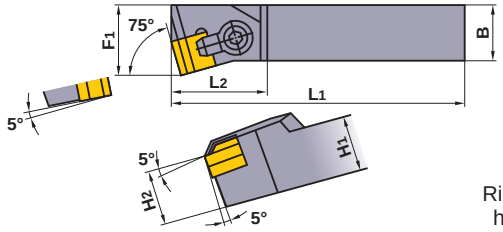
CBN & PCD inserts A147, A154, A173, A175
CSDN type inserts A086
PSKN type inserts A069—A073

CSKN

Facing

MC type





Right hand tool holder shown.

M Class	G Class
(12)	(12)
CBN/PCD	
(12)	

Order Number	Stock		Insert Number		Dimensions (mm)						✶2			✶1		
	R	L			H_1	B	L_1	L_2	H_2	F_1	Shim	Shim Pin	Clamp Bridge	Clamp Screw	Breaker Piece	Wrench
CSKNR/L2020	●	●	SNMN SNGN	1204○○	20	20	125	32	20	25	CS42	BCP301	CK341	LS2	CBS4 CBS4N CBS4F	HKY40R
2525M43	●	●		1204○○	25	25	150	32	25	32	CS42 (CS43)	BCP301	CK341	LS3		HKY40R

✶1 Clamp Torque (N • m) : LS2=8.2, LS3=8.2

✶2 Please use shim no. CS43 with 3.18mm thick inserts. When using 3.18mm thick inserts, shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295
		Semi-Heavy	Flat Top	UC5115	155—280

CBN & PCD inserts A154, A175

CSKN type inserts A086

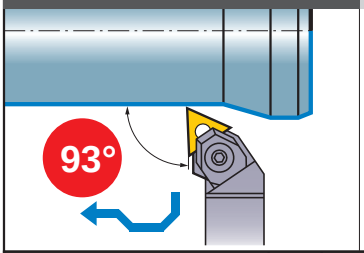
SPARE PARTS E001

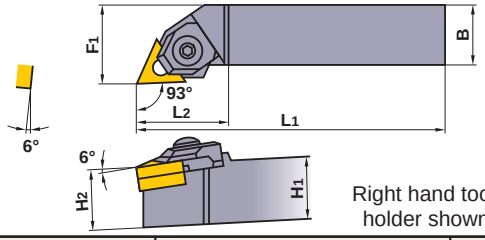
TECHNICAL DATA F001

TN ∞ INSERTS TOOL HOLDERS

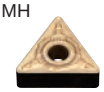
MTJN

External turning, Copying — ***WP type***





Right hand tool holder shown.

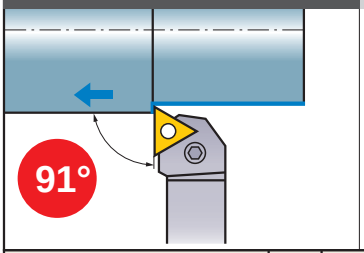
Finish	Light	Medium	Medium
FH	SH	MP	MH
			
(16)	(16,22)	(16,22)	(16,22)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
(16,22)	(16,22)	(16,22)	(16)

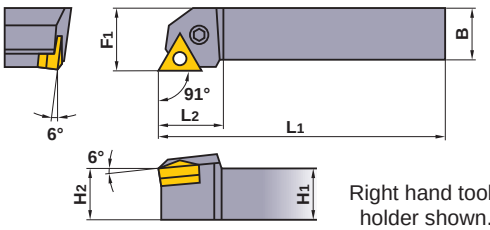
Order Number	Stock		Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Bridge	Side Lock Plate	Spring	Clamp Screw *	Wrench
	R	L			H1	B	L1	L2	H2	F1							
MTJNR/L2020K16N	●	●	TNMA TNMG TNMM TNGA TNGG	1604∞	20	20	125	31	20	25	WPSTN33	CCP33	CCK13	CPT13	MES2	SLCS105	HKY25R HKY40R
2525M16N	●	●		1604∞	25	25	150	31	25	32	WPSTN33	CCP33	CCK13	CPT13	MES2	SLCS105	HKY25R HKY40R
2525M22N	●	●		2204∞	25	25	150	38	25	32	WPSTN43	CCP34	CCK14	CPT14	MES3	SLCS106	HKY30R HKY40R

* Clamp Torque (N • m) : SLCS105=7.0, SLCS106=7.0

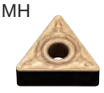
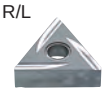
PTGN

External turning — ***LL type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
			
(11,16)	(16,22)	(16,22,27)	(16,22)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
			
(16,22,27)	(16,22)	(11,16,22)	(16)

Order Number	Stock		Insert Number		Dimensions (mm)						Shim *2	Shim Pin *2	Clamp Lever	Clamp Screw *1	Wrench	Punch
	R	L			H1	B	L1	L2	H2	F1						
PTGNR/L1010E11	●	●	TNMA TNMG TNMM TNGA TNGG	1103∞	10	10	70	17	10	12	–	–	LLCL12S	LLCS105	HKY20R	–
1212F11	●	●		1103∞	12	12	80	17	12	16	–	–	LLCL12S	LLCS105	HKY20R	–
1616H16	●	●		1604∞	16	16	100	22	16	20	LLSTN32 (LLSTN33)	LLP13 (LLP23)	LLCL13	LLCS106	HKY25R	LLH3
2020K16	●	●		1604∞	20	20	125	22	20	25	LLSTN32 (LLSTN33)	LLP13 (LLP23)	LLCL13	LLCS106	HKY25R	LLH3
2525M16	●	●		1604∞	25	25	150	22	25	32	LLSTN32 (LLSTN33)	LLP13 (LLP23)	LLCL13	LLCS206	HKY25R	LLH3
2525M22	●	●		2204∞	25	25	150	28	25	32	LLSTN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
3225P22	●	●		2204∞	32	25	170	28	32	32	LLSTN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
3232P27	●	●		2706∞	32	32	170	35	32	40	LLSTN53	LLP15	LLCL25	LLCS508	HKY30R	–

*1 Clamp Torque (N • m) : LLCS105=1.5, LLCS106=2.2, LLCS206=2.2, LLCS108=3.3, LLCS508=3.3

*2 Please use shim no. LLSTN33 and shim pin no. LLP23 with 3.18mm thick inserts. When using 3.18mm thick inserts, shim and shim pin should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Finish	R/L-F	NX2525	180—245
		Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295

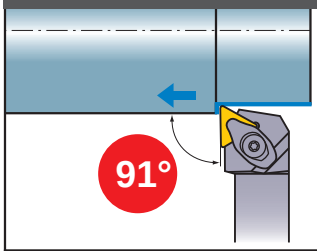
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

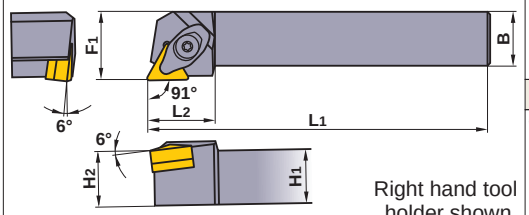
● : **Inventory maintained in Japan.**

CBN & PCD inserts A148, A149, A173
MTJN type inserts A074—A079
PTGN type inserts A074—A079

DTGN

External turning — **DOUBLE CLAMP type**





Right hand tool holder shown.

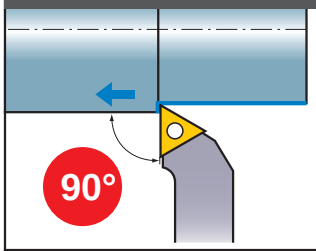
Finish	Light	Medium	Medium
FH (16)	SH (16)	MP (16)	MH (16)
Medium to Semi-Heavy	Stainless	G Class	CBN
GH (16)	MS (16)	R/L (16)	(16)

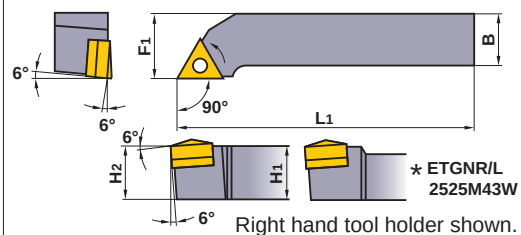
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	★2 Shim	★2 Shim Pin	Clamp Bridge	Spring	★1 Clamp Screw	Wrench	Punch
DTGNR/L1616H16	●	●	TNMA TNMG TNMM TNGA TNGG	1604□□	16	16	100	25	16	20	LLSTN32 (LLSTN33)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2020K16	●	●		1604□□	20	20	125	25	20	25	LLSTN32 (LLSTN33)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2525M16	●	●		1604□□	25	25	150	25	25	32	LLSTN32 (LLSTN33)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3

★1 Clamp Torque (N • m) : DC0520T=3.5
★2 Please use shim no. LLSTN33 with 3.18mm thick inserts. When using 3.18mm thick inserts, shim should be ordered separately.

ETGN

External turning — **ML type**





★ ETGNR/L 2525M43W

Right hand tool holder shown.

Finish	Light	Medium	Medium
FH (11,16)	SH (16,22)	MP (16,22)	MH (16,22)
Medium	Stainless	G Class	CBN
Standard (16,22)	MS (16,22)	R/L (11,16,22)	(16)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	H2	F1	Shim	Lock Pin	Stop Ring	Spanner
ETGNR/L1212	●	●	TNMA TNMG TNMM TNGA TNGG	1103□□	12	12	80	11.5	16	—	P221US	ER2	KY25
1616H32	●	●		1603□□	16	16	100	15.5	20	—	P322US	ER3	KY40
1616H33	●	●		1604□□	16	16	100	15.5	20	—	P332US	ER3	KY40
2020K32W	●	●		1603□□	20	20	125	19.5	25	EST32	P323WS	ER3	KY40
2020K33W	●	●		1604□□	20	20	125	19.5	25	EST32	P333WS	ER3	KY40
2525M33W	●	●		1604□□	25	25	150	24.5	32	EST32	P334WS	ER3	KY40
★ 2525M43W	●	●		2204□□	25	25	150	24.5	32	EST43	P434W	ER4	KY40

RECOMMENDED CUTTING CONDITIONS

Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

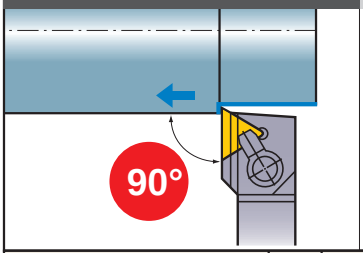
Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Finish	R/L-F	NX2525	180—245
		Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295

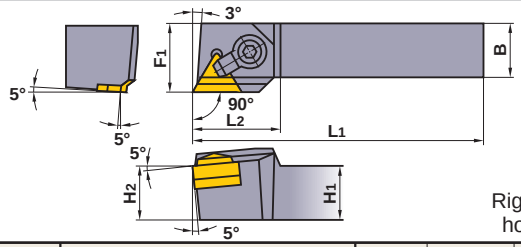
CBN & PCD inserts A148, A149, A173
DTGN type inserts A074—A079
ETGN type inserts A074—A079
SPARE PARTS E001
TECHNICAL DATA F001

TN INSERTS TOOL HOLDERS

CTGN

External turning — ***MC*type**





Right hand tool holder shown.

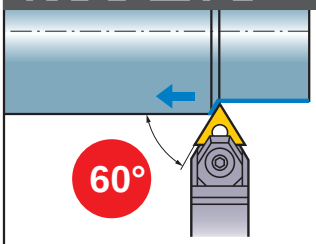
M Class	G Class
(16)	(16)
CBN/PCD	
(16)	

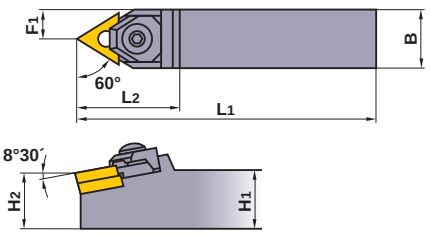
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	⁎2 Shim	Shim Pin	Clamp Bridge	⁎1 Clamp Screw	Breaker Piece	Wrench
CTGNR/L2020	●	●	TNMN TNGN	1604◌◌	20	20	125	31	20	25	CT32	BCP301	CK341	LS2	CBT3 CBT3N CBT3F	HKY40R
2525	●	●		1604◌◌	25	25	150	31	25	32	CT32 (CT33)	BCP301	CK341	LS3		HKY40R

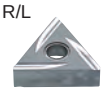
⁎1 Clamp Torque (N • m) : LS2=8.2, LS3=8.2
⁎2 Please use shim no. CT33 with 3.18mm thick inserts. When using 3.18mm thick inserts, shim should be ordered separately.

MTEN

External turning, Chamfering — ***WP*type**





Finish	Light	Medium	Medium
FH (16)	SH (16,22)	MP (16,22)	MH (16,22)
Medium to Semi-Heavy	Stainless	G Class	CBN
GH (16,22)	MS (16,22)	R/L  (16,22)	(16)

Order Number	Stock	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F2	Shim	Shim Pin	Clamp Bridge	Side Lock Plate	Spring	⁎ Clamp Screw	Wrench
MTENN2020K16N	●	TNMA TNMG TNMM TNGA TNGG	1604◌◌	20	20	125	34	20	10	WPSTN33	CCP33	CCK13	CPT13	MES2	SLCS105	HKY25R HKY40R
2525M22N	●		2204◌◌	25	25	150	44	25	12.5	WPSTN43	CCP34	CCK14	CPT14	MES3	SLCS106	HKY30R HKY40R

⁎ Clamp Torque (N • m) : SLCS105=7.0, SLCS106=7.0

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Finish	R/L-F	NX2525	180—245
		Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295

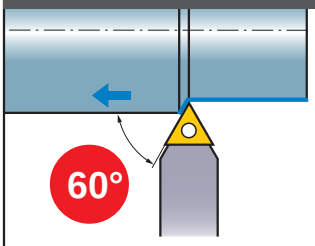
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

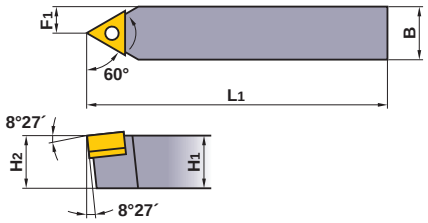
● : **Inventory maintained in Japan.**

CBN & PCD inserts A148, A149, A155, A173
CTGN type inserts A087
MTEN type inserts A074—A079

ETEN

External turning, Chamfering — ***ML type***



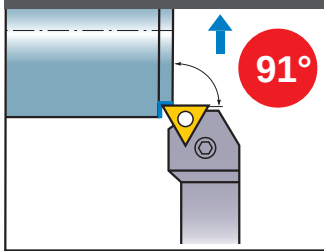


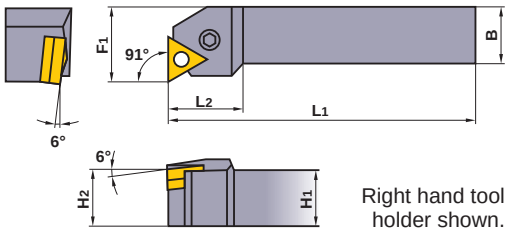
Finish	Light	Medium	Medium
FH	SH	MP	MH
(11,16)	(16,22)	(16,22)	(16,22)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16,22)	(16,22)	(11,16,22)	(16)

Order Number	Stock	Insert Number		Dimensions (mm)					Shim	Lock Pin	Stop Ring	Spanner
				H_1	B	L_1	H_2	F_1				
ETENN1212	●	TNMA TNMG TNMM TNGA TNGG	1103□□	12	12	80	11.5	6	–	P221US	ER2	KY25
1616H33	●		1604□□	16	16	100	15.5	8	–	P332US	ER3	KY40
2020K33W	●		1604□□	20	20	125	19.5	10	EST32	P333WS	ER3	KY40
2525M33W	●		1604□□	25	25	150	24.5	12.5	EST32	P334WS	ER3	KY40
2525M43W	●		2204□□	25	25	150	24.5	12.5	EST43	P434W	ER4	KY40

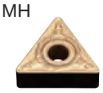
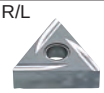
PTFN

Facing — ***LL type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
			
(16)	(16,22)	(16,22)	(16,22)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
			
(16,22)	(16,22)	(16,22)	(16)

Order Number	Stock		Insert Number		Dimensions (mm)						Shim ✶2	Shim Pin ✶2	Clamp Lever	Clamp Screw ✶1	Wrench	Punch
	R	L			H_1	B	L_1	L_2	H_2	F_1						
PTFNR/L1616H16	●	●	TNMA TNMG TNMM TNGA TNGG	1604□□	16	16	100	22	16	20	LLSTN32 (LLSTN33)	LLP13 (LLP23)	LLCL13	LLCS106	HKY25R	LLH3
2020K16	●	●		1604□□	20	20	125	22	20	25	LLSTN32 (LLSTN33)	LLP13 (LLP23)	LLCL13	LLCS106	HKY25R	LLH3
2525M16	●	●		1604□□	25	25	150	22	25	32	LLSTN32 (LLSTN33)	LLP13 (LLP23)	LLCL13	LLCS206	HKY25R	LLH3
2525M22	●	●		2204□□	25	25	150	28	25	32	LLSTN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4

(Note) When using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

✶1 Clamp Torque (N • m) : LLCS106=2.2, LLCS206=2.2, LLCS108=3.3

✶2 Please use shim no. LLSTN33 and shim pin no. LLP23 with 3.18mm thick inserts. When using 3.18mm thick inserts, shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

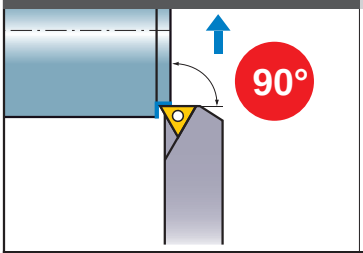
Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260–370
		Light	SY	NX3035	235–335
		Medium	MS	UE6110	260–440
	Carbon Steel Alloy Steel (180HB–280HB)	Finish	FH	NX3035	200–280
		Light	SH	UE6110	210–355
		Medium	MP	UE6110	190–325

Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105–200
		Light	SH	US735	95–185
		Medium	MS	US735	85–165
K	Gray Cast Iron (≤350MPa)	Finish	R/L-F	NX2525	180–245
		Light	MA	UC5115	160–295
		Medium	Standard	UC5115	160–295

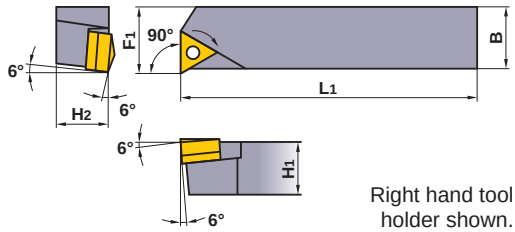
CBN & PCD inserts A148, A149, A173
ETEN type inserts A074–A079
PTFN type inserts A074–A079
SPARE PARTS E001
TECHNICAL DATA F001

TN INSERTS TOOL HOLDERS

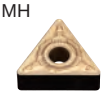
ETFN



Facing — ***ML type***



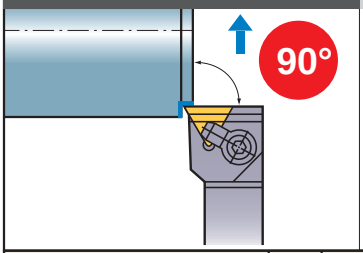
Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
			
(11,16)	(16)	(16)	(16)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(11,16)	(16)

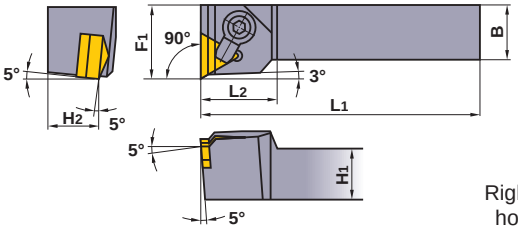
Order Number	Stock		Insert Number		Dimensions (mm)								
	R	L			H_1	B	L_1	H_2	F_1	Shim	Lock Pin	Stop Ring	Spanner
ETFNR/L1212	●	●	TNMA TNMG TNMM TNGA TNGG	1103◯◯	12	12	80	11.5	16	—	P221US	ER2	KY25
1616H33	●	●		1604◯◯	16	16	100	15.5	20	—	P332US	ER3	KY40
2020K33W	●	●		1604◯◯	20	20	125	19.5	25	EST32	P333WS	ER3	KY40
2525M33W	●	●		1604◯◯	25	25	150	24.5	32	EST32	P334WS	ER3	KY40

(Note) When using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

CTFN



Facing — ***MC type***



Right hand tool holder shown.

M Class	G Class
(16)	(11,16)
CBN/PCD	
(16)	

Order Number	Stock		Insert Number		Dimensions (mm)									*		
	R	L			H_1	B	L_1	L_2	H_2	F_1	Shim	Shim Pin	Clamp Bridge	Clamp Screw	Breaker Piece	Wrench
CTFNR/L1616	●	●	TNMN TNGN	1103◯◯	16	16	100	23	16	20	CT22	BCP201	CK231	LS1	CBT2 CBT2N	HKY30R
2020	●	●		1604◯◯	20	20	125	28	20	25	CT32	BCP301	CK341	LS2	CBT3 CBT3N	HKY40R
2525	●	●		1604◯◯	25	25	150	28	25	32	CT32	BCP301	CK341	LS3	CBT3F	HKY40R

(Note) When using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

* Clamp Torque (N • m) : LS1=5.0, LS2=8.2, LS3=8.2

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	**FY**	**NX3035**	260—370
		Light	**SY**	**NX3035**	235—335
		Medium	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	**FH**	**NX3035**	200—280
		Light	**SH**	**UE6110**	210—355
		Medium	**MP**	**UE6110**	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	**FH**	**US735**	105—200
		Light	**SH**	**US735**	95—185
		Medium	**MS**	**US735**	85—165
K	Gray Cast Iron (≤350MPa)	Finish	**R/L-F**	**NX2525**	180—245
		Light	**MA**	**UC5115**	160—295
		Medium	**Standard**	**UC5115**	160—295

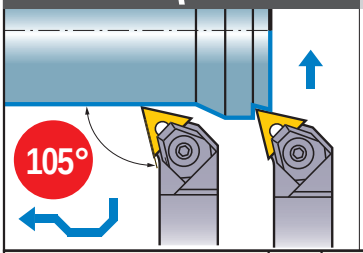
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

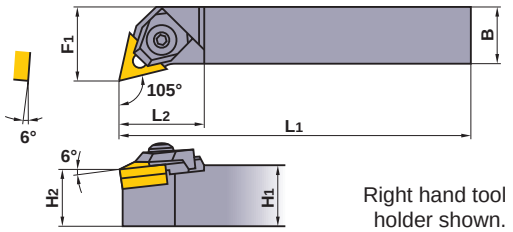
● : **Inventory maintained in Japan.**

CBN & PCD inserts A148, A149, A155, A173
ETFN type inserts A074—A079
CTFN type inserts A087

MTQN

Facing, Copying — ***WP type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16,22)	(16,22)	(16,22)
Medium to Semi-Heavy	**Stainless**	**G Class**	**CBN**
GH	MS	R/L	
(16,22)	(16,22)	(16,22)	(16)

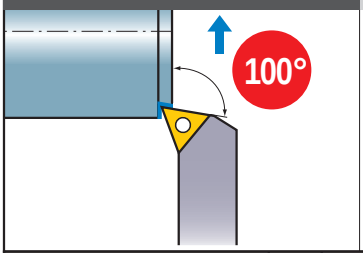
Order Number	Stock		Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Bridge	Side Lock Plate	Spring	Clamp Screw *	Wrench
	R	L			H1	B	L1	L2	H2	F1							
MTQNR/L2020K16N	●	●	TNMA TNMG TNMM TNGA TNGG	1604□□	20	20	125	31	20	25	WPSTN33	CCP33	CCK13	CPT13	MES2	SLCS105	HKY25R HKY40R
2525M22N	●	●		2204□□	25	25	150	36	25	32	WPSTN43	CCP34	CCK14	CPT14	MES3	SLCS106	HKY30R HKY40R

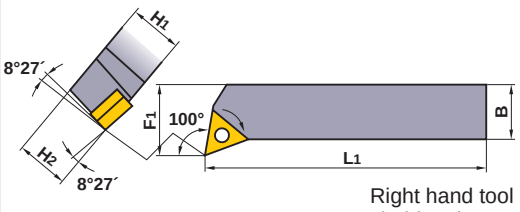
(Note) When facing only and using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

∗ Clamp Torque (N • m) : SLCS105=7.0, SLCS106=7.0

ETXN

Facing — ***ML type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(11,16)	(16)	(16)	(16)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(11,16)	(16)	(11,16)	(16)

Order Number	Stock		Insert Number		Dimensions (mm)					Shim	Lock Pin	Stop Ring	Spanner
	R	L			H1	B	L1	H2	F1				
ETXNR/L1212	●	●	TNMA TNMG TNMM TNGA TNGG	1103□□	12	12	80	11.5	16	—	P221US	ER2	KY25
1616H33	●	●		1604□□	16	16	100	15.5	20	—	P332US	ER3	KY40
2020K33W	●	●		1604□□	20	20	125	19.5	25	EST32	P333WS	ER3	KY40
2525M33W	●	●		1604□□	25	25	150	24.5	32	EST32	P334WS	ER3	KY40

(Note) When using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FY	NX3035	260—370
		Light	SY	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

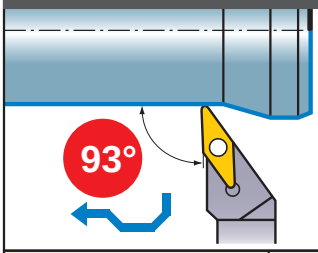
	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Finish	R/L-F	NX2525	180—245
		Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295

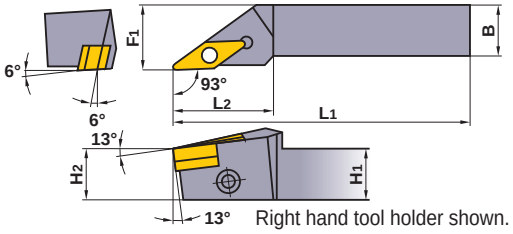
CBN & PCD inserts A148, A149, A173
MTQN type inserts A074—A079
ETXN type inserts A074—A079
SPARE PARTS E001
TECHNICAL DATA F001

VN INSERTS TOOL HOLDERS

PVJN

External turning, Copying — ***MP type***





Right hand tool holder shown.

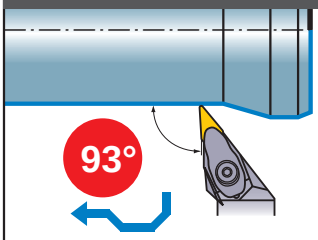
Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(16)	(16)

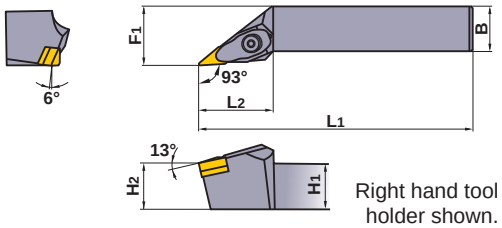
Order Number	Stock		Insert Number		Dimensions (mm)						Shim	Lock Pin	Lock Screw *	Stop Ring	Wrench
	R	L			H1	B	L1	L2	H2	F1					
PVJNR/L2020K16	●	●	VNMG VNGA VNGG	1604○○	20	20	125	32	20	25	PV321 PV322 PV323	P11S	HSP05008C	E03	HKY25R
2525M16	●	●			25	25	150	38	25	32					

∗ Clamp Torque (N • m) : HSP05008C=2.5

DVJN

External turning, Copying — ***DOUBLE CLAMP type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(16)	(16)

Order Number	Stock		Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Wrench	Punch
	R	L			H1	B	L1	L2	H2	F1							
DVJNR/L2020K16	●	●	VNMG VNGA VNGG	1604○○	20	20	125	41	20	25	DCSVN32	LLP13	DCK3113	DCS2	DC0520T	TKY15F	LLH3
2525M16	●	●			25	25	150	41	25	32							

∗ Clamp Torque (N • m) : DC0520T=3.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FS	NX2525	260—370
		Light	SH	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295

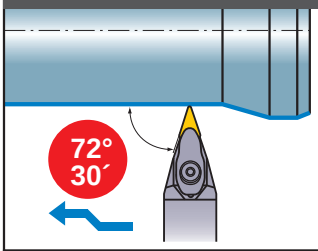
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

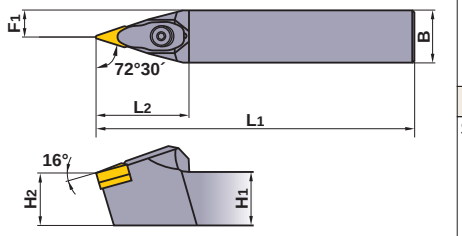
● : **Inventory maintained in Japan.**

CBN & PCD inserts A150, A174
PVJN type inserts A080, A081
DVJN type inserts A080, A081

DVVN

External turning, Copying ***DOUBLE CLAMP type***





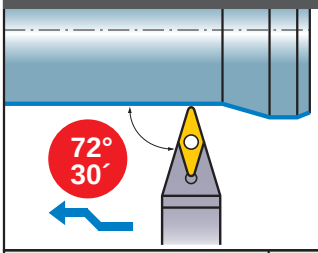
Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(16)	(16)

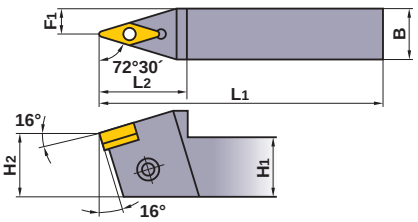
Order Number	Stock	Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Wrench	Punch
				H1	B	L1	L2	H2	F1							
DVVNN2020K16	●	VNMA VNMG VNGA VNGG	1604○○	20	20	125	44	20	10	DCSVN32	LLP13	DCK3113	DCS2	DC0520T	TKY15F	LLH3
2525M16	●		1604○○	25	25	150	44	25	12.5	DCSVN32	LLP13	DCK3113	DCS2	DC0520T	TKY15F	LLH3

* Clamp Torque (N • m) : DC0520T=3.5

PVVN

External turning, Copying ***MP type***





Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(16)	(16)

Order Number	Stock	Insert Number		Dimensions (mm)						Shim	Lock Pin	Lock Screw *	Stop Ring	Wrench
				H1	B	L1	L2	H2	F1					
PVVNN2020K16	●	VNMA VNMG VNGA VNGG	1604○○	20	20	125	38	20	10	PV321 PV322 PV323	P11S	HSP05008C	E03	HKY25R
2525M16	●		1604○○	25	25	150	38	25	12.5		P11S	HSP05008C	E03	HKY25R

* Clamp Torque (N • m) : HSP05008C=2.5

RECOMMENDED CUTTING CONDITIONS

Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FS	NX2525	260—370
		Light	SH	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

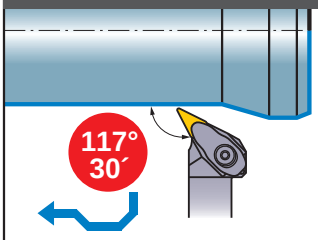
Work Material		Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295

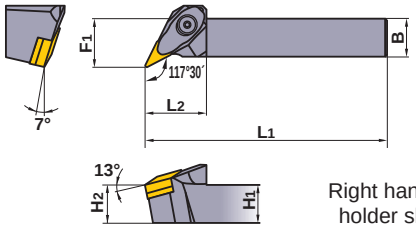
CBN & PCD inserts A150, A174
DVVN type inserts A080, A081
PVVN type inserts A080, A081
SPARE PARTS E001
TECHNICAL DATA F001

VN INSERTS TOOL HOLDERS

DVPN

Facing, Copying — ***DOUBLE CLAMP type***





Right hand tool holder shown.

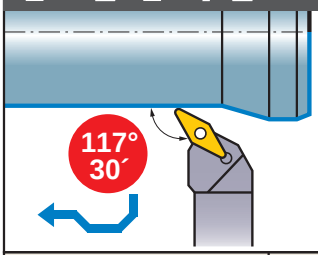
Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(16)	(16)

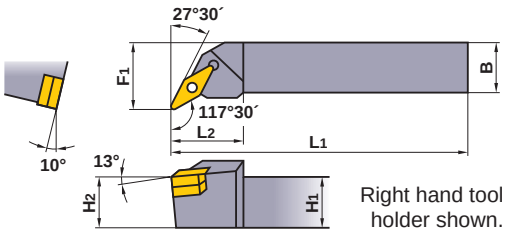
Order Number	Stock		Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Wrench	Punch
	R	L			H1	B	L1	L2	H2	F1							
DVPNR/L2020K16	●	●	VNMG VNGA VNGG	1604□□	20	20	125	32	20	25	DCSVN32	LLP13	DCK3113	DCS2	DC0520T	TKY15F	LLH3
2525M16	●	●		1604□□	25	25	150	32	25	32	DCSVN32	LLP13	DCK3113	DCS2	DC0520T	TKY15F	LLH3

∗ Clamp Torque (N • m) : DC0520T=3.5

PVPN

Facing, Copying — ***MP type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(16)	(16)

Order Number	Stock		Insert Number		Dimensions (mm)						Shim	Lock Pin	Lock Screw *	Stop Ring	Wrench
	R	L			H1	B	L1	L2	H2	F1					
PVPNR/L2020K16	●	●	VNMG VNGA VNGG	1604□□	20	20	125	32	20	25	PV321 PV322 PV323	P11S	HSP05008C	E03	HKY25R
2525M16	●	●		1604□□	25	25	150	32	25	32		P11S	HSP05008C	E03	HKY25R

∗ Clamp Torque (N • m) : HSP05008C=2.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	FS	NX2525	260—370
		Light	SH	NX3035	235—335
		Medium	MS	UE6110	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	FH	NX3035	200—280
		Light	SH	UE6110	210—355
		Medium	MP	UE6110	190—325

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	FH	US735	105—200
		Light	SH	US735	95—185
		Medium	MS	US735	85—165
K	Gray Cast Iron (≤350MPa)	Light	MA	UC5115	160—295
		Medium	Standard	UC5115	160—295

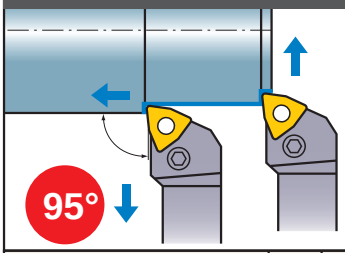
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

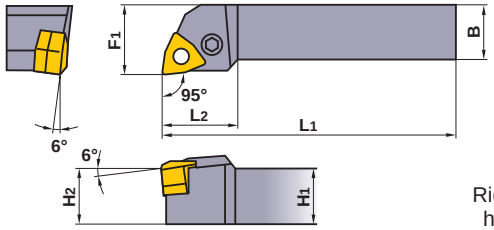
● : **Inventory maintained in Japan.**

CBN & PCD inserts A150, A174
DVPN type inserts A080, A081
PVPN type inserts A080, A081

PWLN

External turning, Facing — ***LL type***





Right hand tool holder shown.

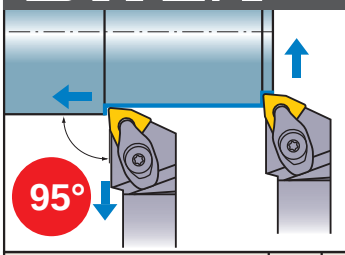
Light	Medium
SH (06)	MP (06)
Stainless	
MS (06)	

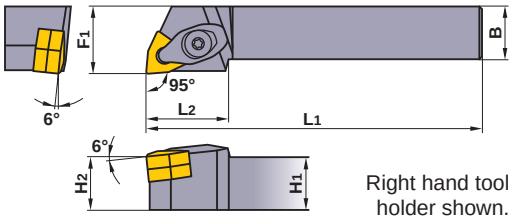
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	★2 Shim	Shim Pin	Clamp Lever	★1 Clamp Screw	Wrench	Punch
PWLNR/L1616H06	●	●	WNMG	06T3○○	16	16	100	22	16	20	LLSWN3T3 (LLSWN32)	LLP13	LLCL13	LLCS106	HKY25R	LLH3
2020K06	●	●		06T3○○	20	20	125	22	20	25	LLSWN3T3 (LLSWN32)	LLP13	LLCL13	LLCS106	HKY25R	LLH3
2525M06	●	●		06T3○○	25	25	150	25	25	32	LLSWN3T3 (LLSWN32)	LLP13	LLCL13	LLCS106	HKY25R	LLH3

★1 Clamp Torque (N • m) : LLCS106=2.2
★2 Please use shim no. LLSWN32 with 4.76mm thick inserts. When using 4.76mm thick inserts, shim should be ordered separately.

DWLN

External turning, Facing — ***DOUBLE CLAMP type***





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH (08)	SH (06,08)	MP (06,08)	MH (08)
Medium	**Medium to Semi-Heavy**	**Stainless**	**CBN**
Standard (08)	GH (08)	MS (06,08)	

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	★2 Shim	Shim Pin	Clamp Bridge	Spring	★1 Clamp Screw	Wrench	Punch
DWLNR/L1616H06	●	●	WNMG	06T3○○	16	16	100	25	16	20	LLSWN3T3 (LLSWN32)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2020K06	●	●		06T3○○	20	20	125	25	20	25	LLSWN3T3 (LLSWN32)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2525M06	●	●		06T3○○	25	25	150	25	25	32	LLSWN3T3 (LLSWN32)	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
2020K08	●	●	WNMA WNMG	0804○○	20	20	125	31	20	25	LLSWN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
2525M08	●	●		0804○○	25	25	150	31	25	32	LLSWN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
3225P08	●	●		0804○○	32	25	170	31	32	32	LLSWN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4

★1 Clamp Torque (N • m) : DC0520T=3.5, DC0621T=5.0
★2 Please use shim no. LLSWN32 with 4.76mm thick inserts. When using 4.76mm thick inserts, shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel (≤180HB)	Finish	**FY**	**NX3035**	260—370
		Light	**SY**	**NX3035**	235—335
		Medium	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel (180HB—280HB)	Finish	**FH**	**NX3035**	200—280
		Light	**SH**	**UE6110**	210—355
		Medium	**MP**	**UE6110**	190—325

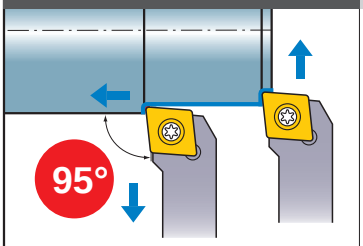
	Work Material	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
M	Stainless Steel (≤200HB)	Finish	**FH**	**US735**	105—200
		Light	**SH**	**US735**	95—185
		Medium	**MS**	**US735**	85—165
K	Gray Cast Iron (≤350MPa)	Light	**MA**	**UC5115**	160—295
		Medium	**Standard**	**UC5115**	160—295
		Semi-Heavy	**Flat Top**	**UC5115**	155—280

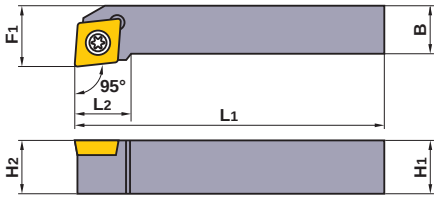
CBN inserts A151
PWLN type inserts A082—A084
DWLN type inserts A082—A085
SPARE PARTS E001
TECHNICAL DATA F001

CC INSERTS TOOL HOLDERS

SCLC

External turning, Facing — **SP type**





Right hand tool holder shown.

Finish	Medium
FV	Standard
(06,09)	(06,09,12)
Flat Top	CBN/PCD
(06,09,12)	(06,09,12)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	* Clamp Screw	Wrench
SCLCR/L0808D06	●	●	CCMW CCMT CCGW	0602□□	8	8	60	8.9	8	10	TS25	TKY08F
1010E06	●	●		0602□□	10	10	70	8.9	10	12	TS25	TKY08F
1212F09	●	●		09T3□□	12	12	80	13.6	12	16	TS43	TKY15F
1616H12	●	●		1204□□	16	16	100	16.7	16	20	TS5	TKY25F

* Clamp Torque (N • m) : TS25=1.0, TS43=3.5, TS5=7.5

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FV**	**NX3035**	205—290
			Medium Cutting	**Standard**	**UE6110**	205—350
	Carbon Steel, Alloy Steel	180HB—280HB	Finish Cutting	**FV**	**NX3035**	160—225
			Medium Cutting	**Standard**	**UE6110**	150—260
M	Stainless Steel	≤200HB	Light Cutting	**Standard**	**US735**	70—130
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	**Flat Top**	**UC5115**	130—235

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

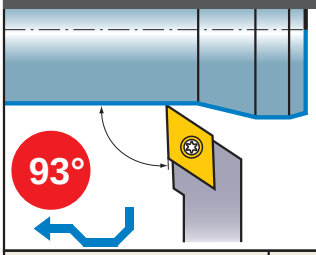
● : **Inventory maintained in Japan.**

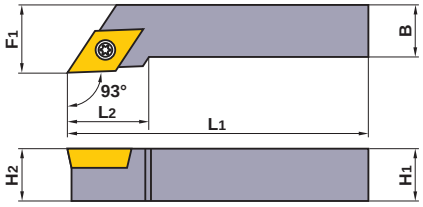
CBN & PCD inserts A156—A158, A176

SCLC type inserts A089—A092

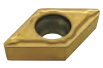
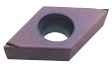
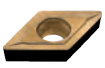
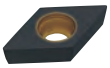
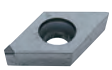
SDJC

External turning, Copying — **SP type**





Right hand tool holder shown.

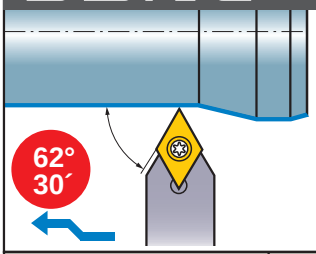
Finish	Finish	Light	Medium
FV	R/L-F	SV	MV
			
(07,11)	(07,11)	(07,11)	(07,11)
Medium	**Flat Top**	**CBN/PCD**	
Standard			
			
(07,11)	(07,11)	(07,11)	

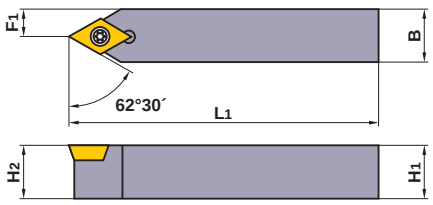
Order Number	Stock		Insert Number		Dimensions (mm)						*	
	R	L			H_1	B	L_1	L_2	H_2	F_1	Clamp Screw	Wrench
SDJCR/L1010E07	●	●	DCMW DCMT DCGW	0702○○	10	10	70	12	10	12	TS25	TKY08F
1212F11	●	●		11T3○○	12	12	80	18	12	16	TS43	TKY15F
1616H11	●	●		11T3○○	16	16	100	18	16	20	TS43	TKY15F

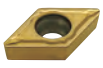
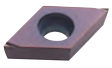
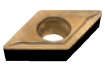
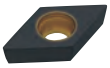
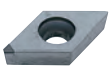
* Clamp Torque (N • m) : TS25=1.0, TS43=3.5

SDNC

External turning, Copying — **SP type**





Finish	Finish	Light	Medium
FV	R/L-F	SV	MV
			
(07,11)	(07,11)	(07,11)	(07,11)
Medium	**Flat Top**	**CBN/PCD**	
Standard			
			
(07,11)	(07,11)	(07,11)	

Order Number	Stock	Insert Number		Dimensions (mm)					*	
				H_1	B	L_1	H_2	F_1	Clamp Screw	Wrench
SDNCN0808D07	●	DCMW DCMT DCGW	0702○○	8	8	60	8	4	TS25	TKY08F
1010E07	●		0702○○	10	10	70	10	5	TS25	TKY08F
1212F11	●		11T3○○	12	12	80	12	6	TS43	TKY15F
1616H11	●		11T3○○	16	16	100	16	8	TS43	TKY15F

* Clamp Torque (N • m) : TS25=1.0, TS43=3.5

RECOMMENDED CUTTING CONDITIONS

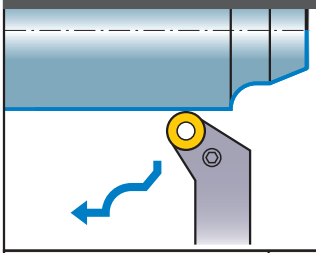
Work Material		Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FV**	**NX3035**	205—290
			Medium Cutting	**Standard**	**UE6110**	205—350
	Carbon Steel, Alloy Steel	180HB—280HB	Finish Cutting	**FV**	**NX3035**	160—225
			Medium Cutting	**Standard**	**UE6110**	150—260
M	Stainless Steel	≤200HB	Light Cutting	**Standard**	**US735**	70—130
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	**Flat Top**	**UC5115**	130—235

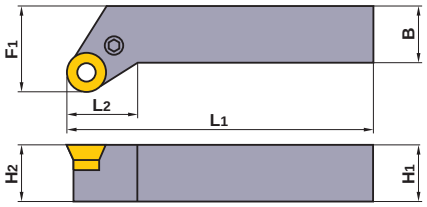
CBN & PCD inserts A160, A161, A177
SDJC type inserts A094—A097
SDNC type inserts A094—A097
SPARE PARTS E001
TECHNICAL DATA F001

RC INSERTS TOOL HOLDERS

PRGC

External turning, Facing, Copying — **LL type** — Medium





(10,12,16,20)

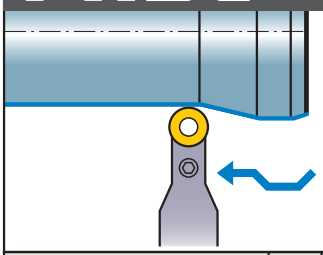
Right hand tool holder shown.

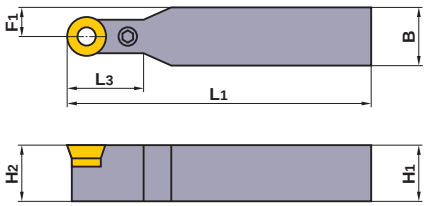
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench	Punch
PRGCR/L2525M10	●	●	RCMX	1003M0	25	25	150	16.7	25	32	LLSRN103	LLP13	LLCL110	LLCS205	HKY20R	LLH3
2525M12	●	●		1204M0	25	25	150	17.5	25	32	LLSRN123	LLP13	LLCL112	LLCS106	HKY25R	LLH3
2525M16	●	●		1606M0	25	25	150	19.9	25	32	LLSRN164	LLP24	LLCL116	LLCS306	HKY25R	LLH4
3232P20	●	●		2006M0	32	32	170	23.8	32	40	LLSRN204	LLP15	LLCL120	LLCS508	HKY30R	—

* Clamp Torque (N • m) : LLCS205=1.5, LLCS106=2.2, LLCS306=2.2, LLCS508=3.3

PRDC

External turning, Copying — **LL type** — Medium





(10,12,16,20)

Order Number	Stock	Insert Number		Dimensions (mm) H1	B	L1	L3	H2	F1	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench	Punch
PRDCN2020K10	●	RCMX	1003M0	20	20	125	23	20	10.0	LLSRN103	LLP13	LLCL110	LLCS205	HKY20R	LLH3
2525M12	●		1204M0	25	25	150	24	25	12.5	LLSRN123	LLP13	LLCL112	LLCS106	HKY25R	LLH3
3225P12	●		1204M0	32	25	170	24	32	12.5	LLSRN123	LLP13	LLCL112	LLCS106	HKY25R	LLH3
3225P16	●		1606M0	32	25	170	28	32	12.5	LLSRN164	LLP24	LLCL116	LLCS306	HKY25R	LLH4
3232P20	●		2006M0	32	32	170	33	32	16.0	LLSRN204	LLP15	LLCL120	LLCS508	HKY30R	—

* Clamp Torque (N • m) : LLCS205=1.5, LLCS106=2.2, LLCS306=2.2, LLCS508=3.3

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Medium Cutting	**Standard**	**UE6110**	205—350
	Carbon Steel, Alloy Steel	180HB—280HB	Medium Cutting	**Standard**	**UE6110**	150—260
M	Stainless Steel	≤200HB	Medium Cutting	**Standard**	**US735**	70—130

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

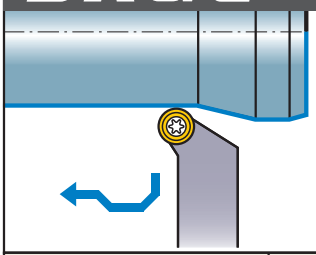
● : **Inventory maintained in Japan.**

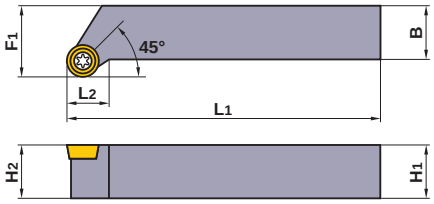
PRGC type inserts A099
PRDC type inserts A099

SRGC

External turning, Facing, Copying — **SPtype**

Medium
Standard
(06,08)





Right hand tool holder shown.

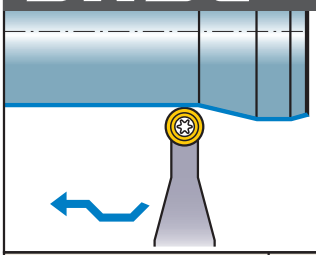
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	* Clamp Screw	Wrench
SRGCR/L1616H06	●	●	RCMT	0602□□	16	16	100	10	16	20	TS25	TKY08F
1616H08	●	●	RCMT	0803□□	16	16	100	14.5	16	22	TS3	TKY08F

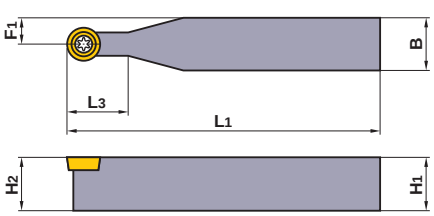
* Clamp Torque (N • m) : TS25=1.0, TS3=1.0

SRDC

External turning, Copying — **SPtype**

Medium
Standard
(06,08)





Order Number	Stock	Insert Number		Dimensions (mm) H1	B	L1	L3	H2	F1	* Clamp Screw	Wrench
SRDCN1616H06	●	RCMT	0602□□	16	16	100	12	16	8	TS25	TKY08F
1616H08	●	RCMT	0803□□	16	16	100	16	16	8	TS3	TKY08F

* Clamp Torque (N • m) : TS25=1.0, TS3=1.0

RECOMMENDED CUTTING CONDITIONS

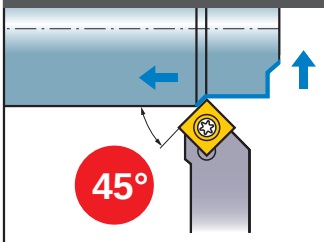
	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Medium Cutting	**Standard**	**UE6110**	205—350
P	Carbon Steel, Alloy Steel	180HB—280HB	Medium Cutting	**Standard**	**UE6110**	150—260
M	Stainless Steel	≤200HB	Medium Cutting	**Standard**	**US735**	70—130

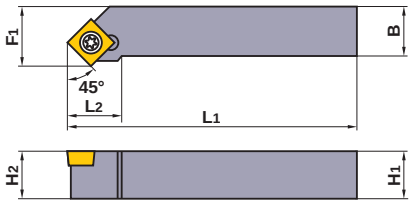
SRGC type inserts A099
SRDC type inserts A099
SPARE PARTS E001
TECHNICAL DATA F001

SC INSERTS TOOL HOLDERS

SSSC

External turning, Facing, Chamfering — **SP type**





Right hand tool holder shown.

Finish	Medium
FV (09)	Standard (09)
Flat Top	
(09)	

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	* Clamp Screw	Wrench
SSSCR/L1212F09	●	●	SCMW SCMT	09T3○○	12	12	80	15.2	12	13	TS43	TKY15F
1616H09	●	●	SCMW SCMT	09T3○○	16	16	100	15.2	16	17	TS43	TKY15F

∗ Clamp Torque (N • m) : TS43=3.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FV**	**NX3035**	205—290
			Medium Cutting	**Standard**	**UE6110**	205—350
	Carbon Steel, Alloy Steel	180HB—280HB	Finish Cutting	**FV**	**NX3035**	160—225
			Medium Cutting	**Standard**	**UE6110**	150—260
M	Stainless Steel	≤200HB	Light Cutting	**Standard**	**US735**	70—130
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	**Flat Top**	**UC5115**	130—235

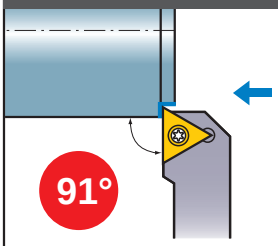
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

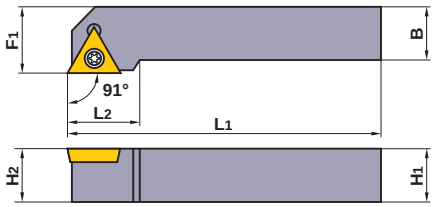
● : **Inventory maintained in Japan.**

SSSC type inserts A102

STGC

External turning — **SP type**





Right hand tool holder shown.

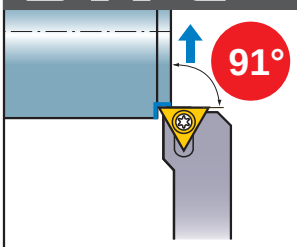
Finish	Medium
FV	Standard
(11,16)	(11,13,16)
Flat Top	CBN/PCD
(11,13,16)	(11,13)

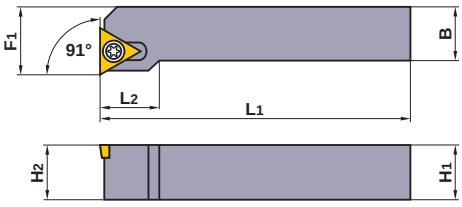
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	* Clamp Screw	Wrench
STGCR/L1010E11	●	●	TCMW TCMT	1102○○	10	10	70	13.5	10	12	TS25	TKY08F
1212F13	●	●		1303○○	12	12	80	17.6	12	16	TS3	TKY08F
1616H16	●	●		16T3○○	16	16	100	20.7	16	20	TS43	TKY15F

∗ Clamp Torque (N • m) : TS25=1.0, TS3=1.0, TS43=3.5

STFC

Facing — **SP type**





Right hand tool holder shown.

Finish	Medium
FV	Standard
(11)	(11,13)
Flat Top	CBN/PCD
(11,13)	(11,13)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	* Clamp Screw	Wrench
STFCR/L1010E11	●	●	TCMW TCMT	1102○○	10	10	70	12.5	10	12	TS25	TKY08F
1212F13	●	●		1303○○	12	12	80	14.5	12	16	TS3	TKY08F
1616H13	●	●		1303○○	16	16	100	14.5	16	20	TS3	TKY08F

(Note) When using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

∗ Clamp Torque (N • m) : TS25=1.0, TS3=1.0

RECOMMENDED CUTTING CONDITIONS

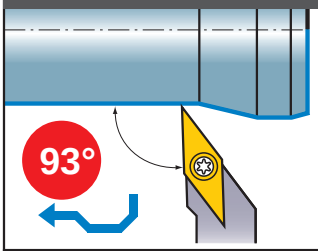
	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FV**	**NX3035**	205—290
			Medium Cutting	**Standard**	**UE6110**	205—350
	Carbon Steel, Alloy Steel	180HB—280HB	Finish Cutting	**FV**	**NX3035**	160—225
			Medium Cutting	**Standard**	**UE6110**	150—260
M	Stainless Steel	≤200HB	Light Cutting	**Standard**	**US735**	70—130
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	**Flat Top**	**UC5115**	130—235

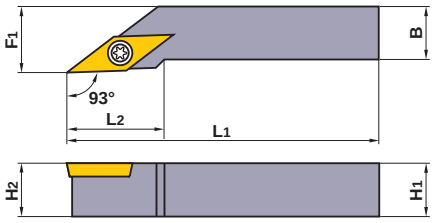
CBN & PCD inserts A162, A178
STGC type inserts A104
STFC type inserts A104
SPARE PARTS E001
TECHNICAL DATA F001

VC ∞ INSERTS TOOL HOLDERS

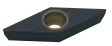
SVJC

External turning, Copying — **SP type**





Right hand tool holder shown.

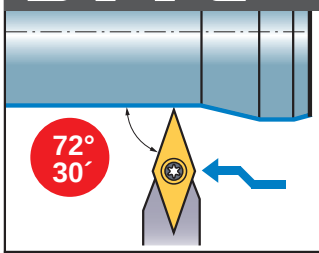
Finish	Medium
FV	Standard
(16)	(11,16)
Flat Top	
 (11,16)	

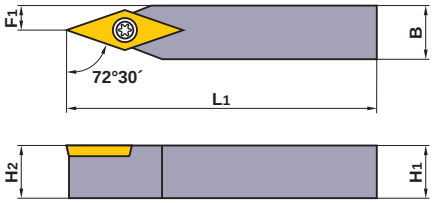
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	Shim	Shim Pin	* Clamp Screw	①② Wrench
SVJCR/L1010E11	●	●	VCMT VCMW	1103○○	10	10	70	17	10	12	–	–	TS25	①TKY08F
1616H16	●	●		1604○○	16	16	100	25	16	20	–	–	TS43	①TKY15F
2020K16	●	●		1604○○	20	20	125	40	20	25	SPSVN32	BCP141	TS44	②TKY15R
2525M16	●	●		1604○○	25	25	150	40	25	32	SPSVN32	BCP141	TS44	②TKY15R

∗ Clamp Torque (N • m) : TS25=1.0, TS43=3.5, TS44=3.5

SVVC

External turning, Copying — **SP type**





Finish	Medium
FV	Standard
(16)	(16)
Flat Top	
(16)	

Order Number	Stock	Insert Number		Dimensions (mm) H1	B	L1	H2	F1	Shim	Shim Pin	* Clamp Screw	①② Wrench
SVVCN1616H16	●	VCMT VCMW	1604○○	16	16	100	16	8	–	–	TS43	①TKY15F
2020K16	●		1604○○	20	20	125	20	10	SPSVN32	BCP141	TS44	②TKY15R
2525M16	●		1604○○	25	25	150	25	12.5	SPSVN32	BCP141	TS44	②TKY15R

∗ Clamp Torque (N • m) : TS43=3.5, TS44=3.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	FV	NX3035	205–290
			Medium Cutting	Standard	UE6110	205–350
	Carbon Steel, Alloy Steel	180HB–280HB	Finish Cutting	FV	NX3035	160–225
			Medium Cutting	Standard	UE6110	150–260
M	Stainless Steel	≤200HB	Light Cutting	Standard	US735	70–130
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	Flat Top	UC5115	130–235

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

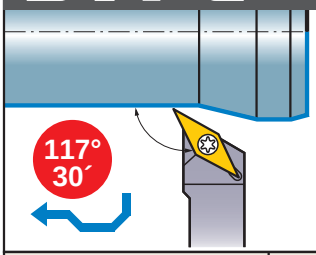
● : **Inventory maintained in Japan.**

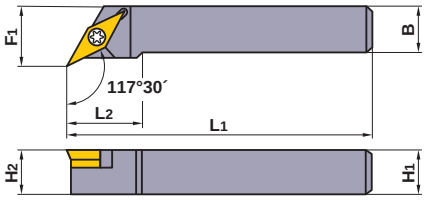
CBN inserts A166
SVJC type inserts A110
SVVC type inserts A110

SVPC

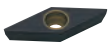
Facing, Copying

SP type





Right hand tool holder shown.

Finish	Medium
FV (16)	Standard (16)
Flat Top	
 (16)	

Order Number	Stock		Insert Number		Dimensions (mm)								*	
	R	L			H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Screw	Wrench
SVPCR/L2020K16	●	●	VCMT VCMW	1604◌◌	20	20	125	30	20	25	SPSVN32	BCP141	TS44	TKY15R
2525M16	●	●		1604◌◌	25	25	150	30	25	32	SPSVN32	BCP141	TS44	TKY15R

* Clamp Torque (N • m) : TS44=3.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FV**	**NX3035**	205—290
			Medium Cutting	**Standard**	**UE6110**	205—350
	Carbon Steel, Alloy Steel	180HB—280HB	Finish Cutting	**FV**	**NX3035**	160—225
			Medium Cutting	**Standard**	**UE6110**	150—260
M	Stainless Steel	≤200HB	Light Cutting	**Standard**	**US735**	70—130
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	**Flat Top**	**UC5115**	130—235

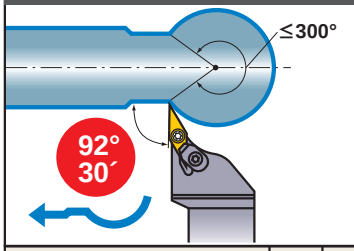
CBN inserts A166
SVPC type inserts A110
SPARE PARTS E001
TECHNICAL DATA F001

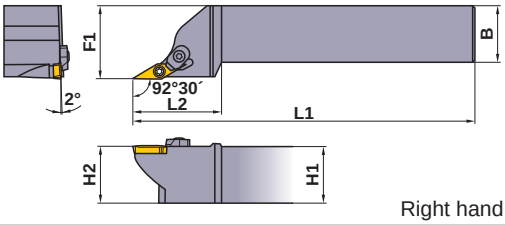
XC INSERTS TOOL HOLDERS

SXZC NEW

External turning, Copying — ***Profile Holder***

Finish: SVX





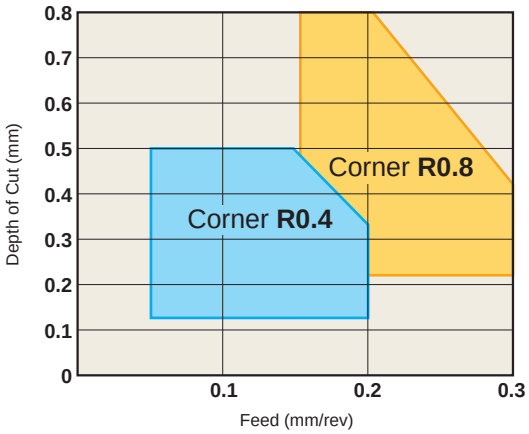
Right hand tool holder shown.

(15)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	Clamp Screw *	Clamp Bridge	Clamp Bridge Screw *	Spring	Insert Wrench	Wrench for clamp bridge
SXZCR/L1616H15	●	●	XCMT	1503◌◌-SVX	16	16	100	35	16	20	TS255	AMS3	AJS3010T10	ASS2	TKY08F	TKY10F
2020K15	●	●		1503◌◌-SVX	20	20	125	35	20	25	TS255	AMS3	AJS3010T10	ASS2	TKY08F	TKY10F
2525M15	●	●		1503◌◌-SVX	25	25	150	40	25	32	TS255	AMS3	AJS3010T10	ASS2	TKF08F	TKF10F

∗ Clamp Torque (N • m) : TS255=1.0, AJS3010T10=2.5

Applicable range



RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**UE6020**	150—350
	Carbon Steel, Alloy Steel	150HB—250HB	**UE6020**	100—250

(Note) The above cutting conditions are general guidelines.
Adjustments maybe necessary depending on machine rigidity, workpiece geometry and clamping.

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

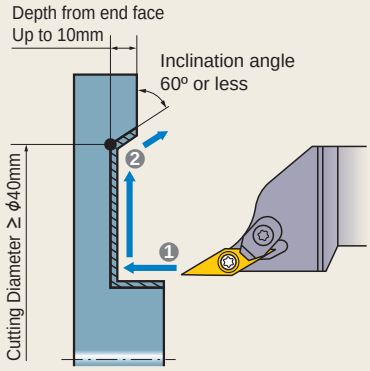
● : **Inventory maintained in Japan.**

SXZC type inserts A115

NOTE

Notes when end face copying

Pay special attention to the following when face copying.



●Machining of an outer diameter (Step ①)

- To prevent burr formation, the depth of cut should be below half the nose radius.

●Machining of an inclination (Step ②)

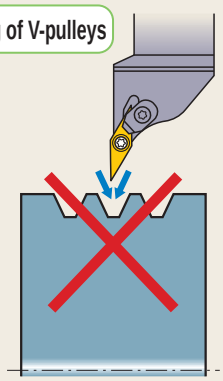
- To reduce the contact length of chips, the depth of cut should be below half the nose radius.
- To prevent interference between the tool and the workpiece, the cutting diameter should be 40mm or larger, inclination angle 60° or less and depth from the end face up to 10mm.

●When changing inserts

- When indexing the inserts, it is recommended to preset the cutting edge position to maintain machining accuracy.

Not possible

Machining of V-pulleys

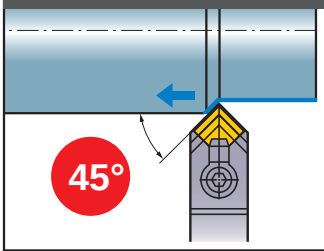


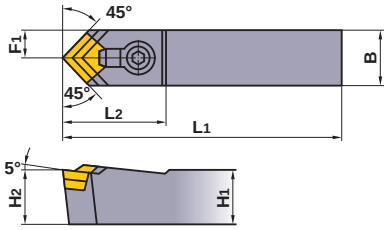
When machining V-pulleys, use a VNMG insert.

SP INSERTS TOOL HOLDERS

CSDP

External turning, Chamfering — ***MC*type**





M Class	M Class	G Class
(09,12)	(09,12)	R/L (09)
G Class	**CBN/PCD**	
(09,12)	(09,12)	

Order Number	Stock	Insert Number		Dimensions (mm)						Shim	Shim Pin	Clamp Bridge	Clamp Screw *	Breaker Piece	Wrench
				H_1	B	L_1	L_2	H_2	F_1						
CSDPN1616	●	SPMN SPMR SPGN SPGR	0903○○	16	16	100	27	16	8	PS31	BCP201	CK232	LS1	CBS3D	HKY30R
2020	●		1203○○	20	20	125	35	20	10	PS42	BCP251	CK342	LS2	CBS4D	HKY40R
2525	●		1203○○	25	25	150	35	25	12.5	PS42	BCP251	CK342	LS3	CBS4D	HKY40R

* Clamp Torque (N • m) : LS1=5.0, LS2=8.2, LS3=8.2

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Medium Cutting	**Standard**	**UE6110**	205−350
P	Carbon Steel, Alloy Steel	180HB−280HB	Medium Cutting	**Standard**	**UE6110**	150−260
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	**Flat Top**	**UC5115**	130−235

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

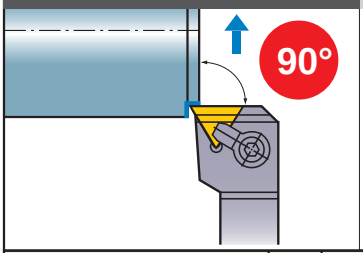
● : **Inventory maintained in Japan.**

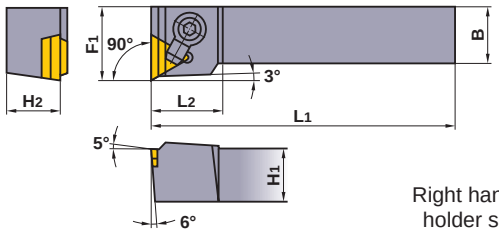
CBN & PCD inserts A168, A185

CSDP type inserts A117, A118

CTFP

Facing — MC type





Right hand tool holder shown.

M Class	M Class	G Class
		R/L
(11,16)	(11,16)	(11,16)
G Class	**CBN/PCD**	
(11,16)	(11,16)	

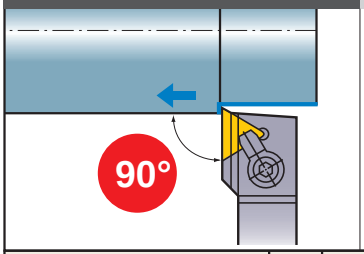
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Bridge	Clamp Screw *	Breaker Piece	Wrench
CTFPR/L1616	●	●	TPMN TPMR TPGN TPGR	1103○○	16	16	100	22	16	20	PT21	BCP141	CK231	LS1	CBT2 CBT2N CBT3 CBT3N CBT3F	HKY30R
2020	●	●		1603○○	20	20	125	26	20	25	PT32	BCP201	CK341	LS2		HKY40R
2525	●	●		1603○○	25	25	150	26	25	32	PT32	BCP201	CK341	LS3		HKY40R

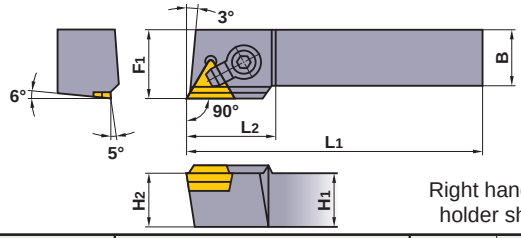
(Note) When using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

* Clamp Torque (N • m) : LS1=5.0, LS2=8.2, LS3=8.2

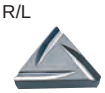
CTGP

External turning — MC type





Right hand tool holder shown.

M Class	M Class	G Class
		R/L 
(11,16)	(11,16)	(11,16)
G Class	**CBN/PCD**	
(11,16)	(11,16)	

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	Shim	Shim Pin	Clamp Bridge	Clamp Screw *	Breaker Piece	Wrench
CTGPR/L1616	●	●	TPMN TPMR TPGN TPGR	1103○○	16	16	100	21	16	20	PT21	BCP141	CK231	LS1	CBT2 CBT2N CBT3 CBT3N CBT3F	HKY30R
2020	●	●		1603○○	20	20	125	29	20	25	PT32	BCP201	CK341	LS2		HKY40R
2525	●	●		1603○○	25	25	150	29	25	32	PT32	BCP201	CK341	LS3		HKY40R

* Clamp Torque (N • m) : LS1=5.0, LS2=8.2, LS3=8.2

RECOMMENDED CUTTING CONDITIONS

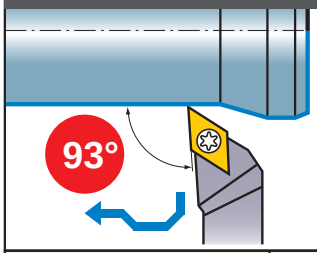
	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Medium Cutting	**Standard**	**UE6110**	205−350
	Carbon Steel, Alloy Steel	180HB−280HB	Medium Cutting	**Standard**	**UE6110**	150−260
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	**Flat Top**	**UC5115**	130−235

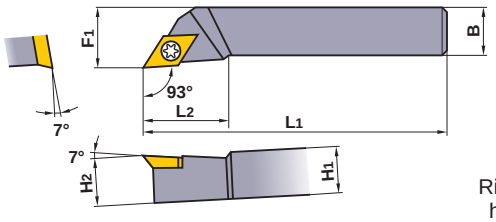
CBN & PCD inserts A169, A185
CTFP type inserts A120, A121
CTGP type inserts A120, A121
SPARE PARTS E001
TECHNICAL DATA F001

DE□□ INSERTS TOOL HOLDERS

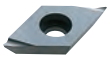
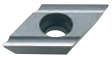
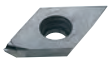
SDJE

External turning, Copying — ***AL*type**





Right hand tool holder shown.

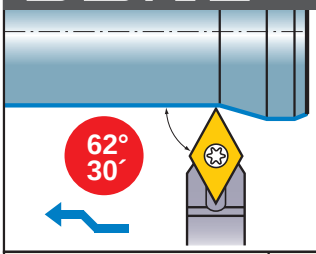
Finish	Medium
R/L-F	R/L
 (15)	 (15)
PCD	
R/L-F	
 (15)	

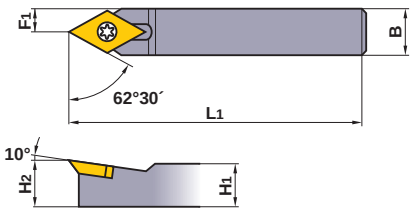
Order Number	Stock		Insert Number		Dimensions (mm)						✱	
	R	L			H_1	B	L_1	L_2	H_2	F_1	Clamp Screw	Wrench
SDJER/L1616H15	●	●	DEGX	1504□□	16	16	100	27	16	20	CS451190T	TKY20F
2020K15	●	●		1504□□	20	20	125	35	20	25	CS451190T	TKY20F
2525M15	●	●		1504□□	25	25	150	35	25	32	CS451190T	TKY20F

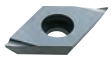
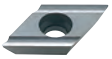
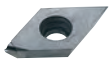
✱ Clamp Torque (N • m) : CS451190T=5.0

SDNE

External turning, Copying — ***AL*type**





Finish	Medium
R/L-F	R/L
 (15)	 (15)
PCD	
R/L-F	
 (15)	

Order Number	Stock	Insert Number		Dimensions (mm)					✱	
				H_1	B	L_1	H_2	F_1	Clamp Screw	Wrench
SDNEN1616H15	●	DEGX	1504□□	16	16	100	16	8	CS451190T	TKY20F
2020K15	●		1504□□	20	20	125	20	10	CS451190T	TKY20F
2525M15	●		1504□□	25	25	150	25	12.5	CS451190T	TKY20F

✱ Clamp Torque (N • m) : CS451190T=5.0

RECOMMENDED CUTTING CONDITIONS

Work Material		Grade	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
N	Aluminium Alloy	**HTi10**	400	0.05—0.3	0.2—3.0
		MD220	800	0.05—0.3	0.2—3.0

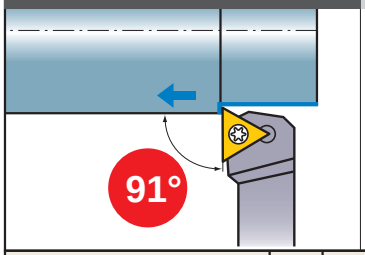
(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

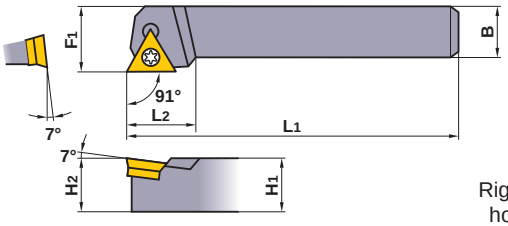
● : **Inventory maintained in Japan.**

PCD inserts A183
SDJE type inserts A098
SDNE type inserts A098

STGE

External turning — **AL type**





Right hand tool holder shown.

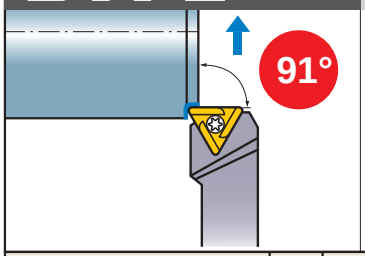
Medium	PCD
R/L	R/L
(16)	(16)
PCD	
(16)	

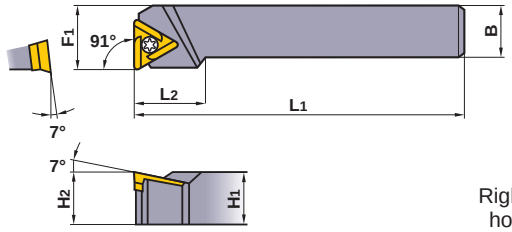
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	* Clamp Screw	Wrench
STGER/L1616H16	●	●	TEGX	1603□□	16	16	100	22	16	20	FC400890T	TKY10F
2020K16	●	●	TEGX	1603□□	20	20	125	22	20	25	FC400890T	TKY10F
2525M16	●	●	TEGX	1603□□	25	25	150	22	25	32	FC400890T	TKY10F

∗ Clamp Torque (N • m) : FC400890T=2.5

STFE

Facing — **AL type**





Right hand tool holder shown.

Medium	PCD
R/L	R/L
(16)	(16)
PCD	
(16)	

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L2	H2	F1	* Clamp Screw	Wrench
STFER/L1616H16	●	●	TEGX	1603□□	16	16	100	22	16	20	FC400890T	TKY10F
2020K16	●	●	TEGX	1603□□	20	20	125	22	20	25	FC400890T	TKY10F
2525M16	●	●	TEGX	1603□□	25	25	150	22	25	32	FC400890T	TKY10F

(Note) When using insert with right or left hand breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

∗ Clamp Torque (N • m) : FC400890T=2.5

RECOMMENDED CUTTING CONDITIONS

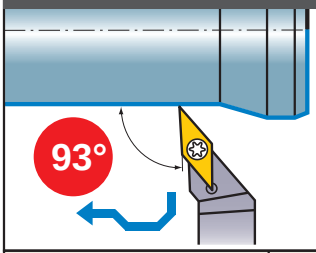
	Work Material	Grade	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
N	Aluminium Alloy	**HTi10**	400	0.05—0.3	0.2—3.0
		MD220	800	0.05—0.3	0.2—3.0

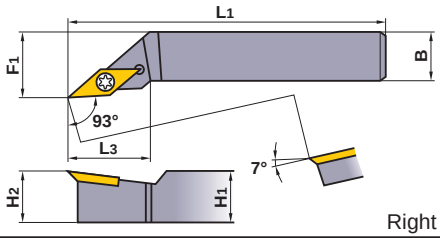
PCD inserts A183
STGE type inserts A105
STFE type inserts A105
SPARE PARTS E001
TECHNICAL DATA F001

VD INSERTS TOOL HOLDERS

SVJD

External turning, Copying — **AL type**





Right hand tool holder shown.

Finish

R/L

(16)

Flat Top

R/L-F

(16)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	L3	H2	F1	* Clamp Screw	Wrench
SVJDR/L1616H16	●	●	VDGX	1603□□	16	16	100	30	16	20	FC400890T	TKY10F
2020K16	●	●	VDGX	1603□□	20	20	125	30	20	25	FC400890T	TKY10F
2525M16	●	●	VDGX	1603□□	25	25	150	30	25	32	FC400890T	TKY10F

∗ Clamp Torque (N • m) : FC400890T=2.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Grade	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
N	Aluminium Alloy	**HTi10**	400	0.05—0.3	0.2—3.0
		MD220	800	0.05—0.3	0.2—3.0

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

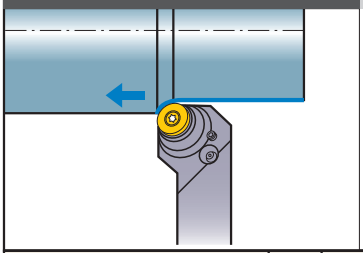
● : **Inventory maintained in Japan.**

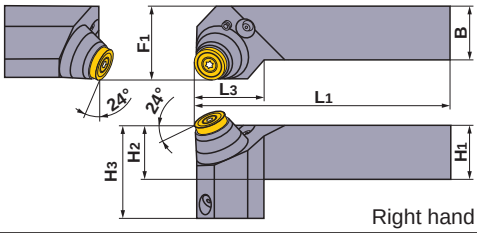
PCD inserts A184

SVJD type inserts A111

RD INSERTS TOOL HOLDERS

RRSD — ROTARY Holder



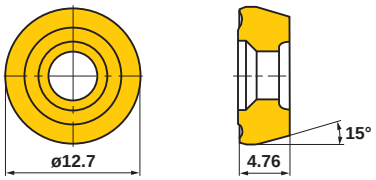


Right hand tool holder shown.

Order Number	Stock		Insert Number	Dimensions (mm)							Locator	Locator Screw	Clamp Screw *	Wrench (Locator)	Fixed Wrench	Wrench (Insert)
	R	L		H1	B	L1	L3	H2	H3	F1						
RRSDR/L2525M12	●	●	RDGH120400-M4	25	25	150	40	25	53	40	RRSDS1	HSP02505	CS401990T	HKY13R	RRKY4	TKY20T
3232P12	●	●		32	32	170	40	32	53	40	RRSDS1	HSP02505	CS401990T	HKY13R	RRKY4	TKY20T

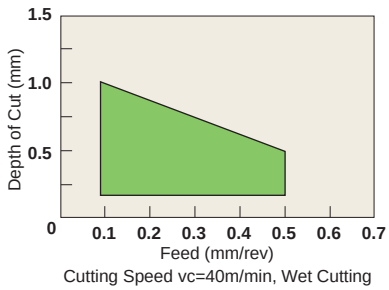
∗ Clamp Torque (N • m) : CS401990T=3.5

INSERT

Shape	Order Number	Stock		Geometry
		US735	TF15	
	RDGH120400-M4	●	●	

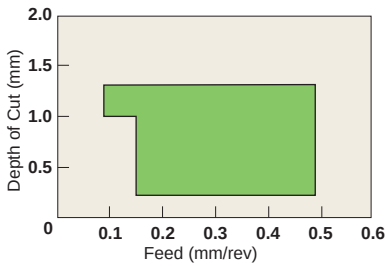
CHIP CONTROL RANGES

Inconel 718 (Nickel Base Alloy)



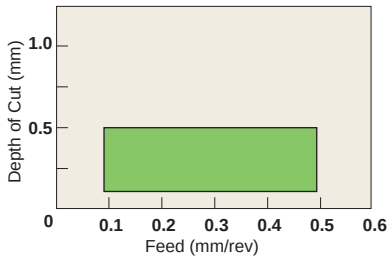
Cutting Speed vc=40m/min, Wet Cutting

Titanium Alloy Ti-6Al-4V



Cutting Speed vc=70m/min, Wet Cutting

Stainless Steel JIS SUS304

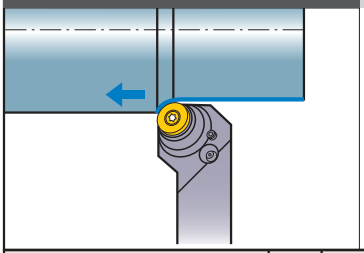


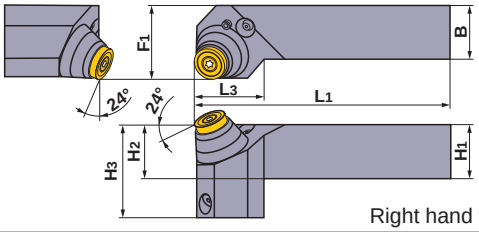
Cutting Speed vc=80m/min, Wet Cutting

RN INSERTS TOOL HOLDERS

RRSN

ROTARY Holder



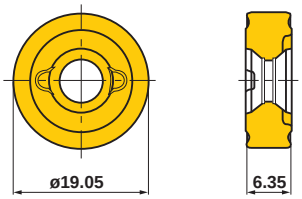


Right hand tool holder shown.

Order Number	Stock		Insert Number	Dimensions (mm)							Locator	Locator Screw	Clamp Screw *	Wrench (Locator)	Fixed Wrench	Wrench (Insert)
	R	L		H1	B	L1	L3	H2	H3	F1						
RRSNR/L3232P19	●	●	RNGJ190600-M5	32	32	170	43	32	55	43	RRSNS1	CFM02004-1	CS502190T	6100-1-75	RRKY4	TKY27T
4040R19	●	●		40	40	200	43	40	55	43	RRSNS1	CFM02004-1	CS502190T	6100-1-75	RRKY4	TKY27T

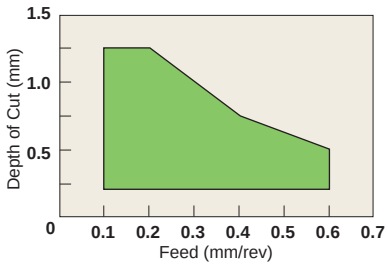
∗ Clamp Torque (N • m) : CS502190T=7.5

INSERT

Shape	Order Number	Stock		Geometry
		US735	TF15	
	RNGJ190600-M5	●	●	

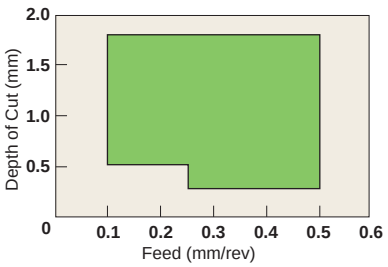
CHIP CONTROL RANGES

Inconel 718 (Nickel Base Alloy)



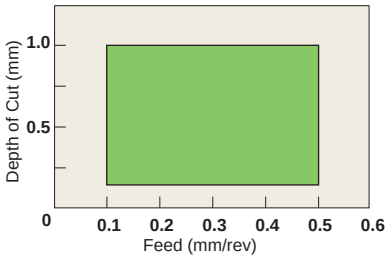
Cutting Speed vc=40m/min, Wet Cutting

Titanium Alloy Ti-6Al-4V



Cutting Speed vc=70m/min, Wet Cutting

Stainless Steel JIS SUS304

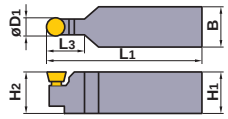
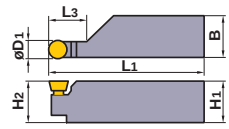


Cutting Speed vc=80m/min, Wet Cutting

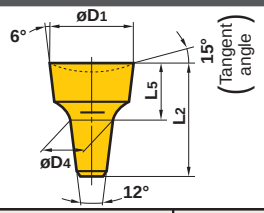
● : Inventory maintained in Japan. (10 inserts in one case)

TL HOLDER

HOLDER

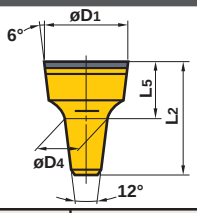
Geometry	Revised order number	Conventional order number	Stock	Insert Number	Dimensions (mm)					
					D1	H1	B	H2	L1	L3
TLHN (External turning, Copying) 	**TLHN2020K5**	TLHN2020K5	●	RTG05A	5	20	20	20	125	16
	2525M7	44M7	●	07A	7	25	25	25	150	20
	2525M8	2525M8	●	08A	8	25	25	25	150	20
	3225P10	54P10	●	10A	10	32	25	32	170	25
TLHR (External turning, Copying) 	**TLHR2020K5**	TLHR2020K5	●	RTG05A	5	20	20	20	125	16
	2020K6	2020K6	●	06A	6	20	20	20	125	16
	2525M7	2525M7	●	07A	7	25	25	25	150	20
	2525M8	44M8	●	08A	8	25	25	25	150	20
	3225P10	54P10	●	10A	10	32	25	32	170	25

INSERTS



Order Number	Stock Carbide		Dimensions (mm)			
	UTi20T	HTi10	D1	L2	D4	L5
RTG05A	●	●	5	7.5	2.5	3.5
06A	●	●	6	7.5	3.5	3.5
07A	●	●	7	11	3.5	5
08A	●	●	8	11	4.5	5
10A	●	●	10	14	5.5	6.5
12A	●	●	12	14	7.5	6.5

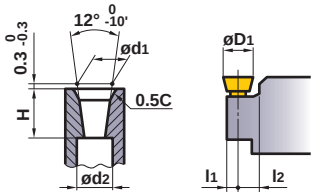
INSERTS (CBN)



Order Number	Stock CBN	Dimensions (mm)			
	MB825	D1	L2	D4	L5
RTG05A	●	5	7.5	2.5	3.5
06A	●	6	7.5	3.5	3.5
07A	●	7	11	3.5	5
08A	●	8	11	4.5	5
10A	●	10	14	5.5	6.5

INSERT SEAT LOCATION

When manufacturing a special tool holder, please machine insert seat in accordance to the drawing.

Insert Seat Dimensions	Insert Diameter D1	Dimensions (mm)					Taper Diameter
		H	d1	d2	l1	l2	
	5	4	2.5	1.9	1.85	3.2	1.5
	6	4	3.5	2.9	2.35	3.7	2.5
	7	6	3.5	2.5	2.75	4.3	2.1
	8	6	4.5	3.5	3.25	4.8	3.1
	10	7.5	5.5	4.2	4.15	5.9	3.8
	12	7.5	7.5	6.2	5.15	6.9	5.8

HOW TO READ THE STANDARD OF SMALL TOOLS

●How this section page is organized

①Organized according to the cutting mode of small tools.
(Refer to the inside title on the next page.)
②Shown as Turning → External Grooving → External Cutting Off → Threading → Boring.

TYPE OF TOOL HOLDER
indicates the first four letters of the order number, as well as cutting applications.

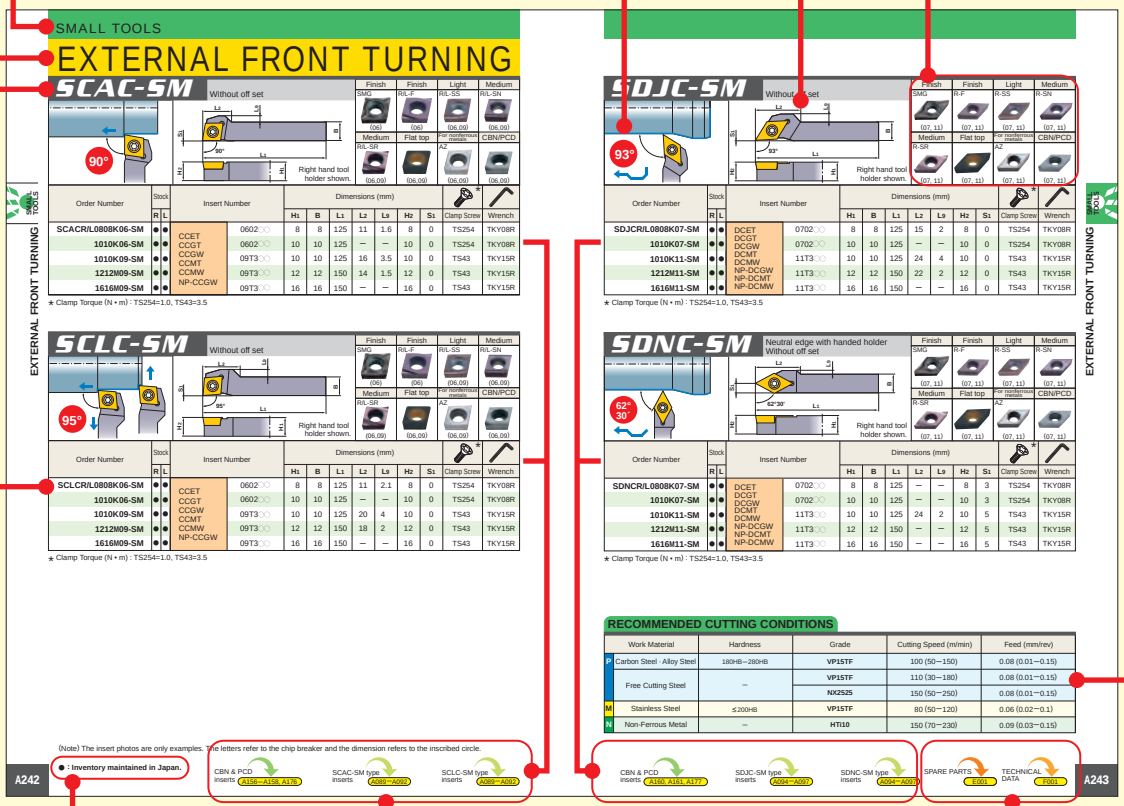
APPLICATION

PRODUCT SECTION

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict the available machining applications such as external turning, copying, facing, chamfering, threading, and grooving together with cutting edge lead angles.

GEOMETRY

CHIP BREAKER BY CUTTING APPLICATION



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

REFERENCE PAGE FOR APPLICABLE INSERTS
indicates reference pages giving details of inserts that are applicable to the product.

PAGE REFERENCE
·SPARE PARTS
·TECHNICAL DATA
indicates reference pages, including the above, on the right hand page of each double-page spread.

PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, and spare parts.

RECOMMENDED CUTTING CONDITIONS
for each work material classification, indicates recommended cutting conditions according to the ISO categories for cutting grades, P, M and N.

●To Order : Please specify
①order number and hand of tool (right/left).

TURNING TOOLS

SMALL TOOLS

OUTLINE OF SMALL TOOLS ····· A236
CLASSIFICATION ····· A238

STANDARD FOR GANG TYPE TOOL POSTS

EXTERNAL FRONT TURNING
SCAC-SM ····· A242
SCLC-SM ····· A242
SDJC-SM ····· A243
SDNC-SM ····· A243
SVJB-SM ····· A244
SVVB-SM ····· A244

EXTERNAL BACK TURNING
BTAH ····· A245
CTBH ····· A246
BTVH ····· A247

EXTERNAL GROOVING
GTAH ····· A248
GTBH ····· A248
GTCH ····· A248

EXTERNAL CUTTING OFF
CTAH ····· A250
CTAH-S ····· A250
CTBH ····· A252
CTCH ····· A253
CTDH ····· A254
CTEH ····· A255

EXTERNAL THREADING
TTAH ····· A256

EXTERNAL FRONT TURNING, COPYING, FACING
SH ····· A258

CAM TYPE TOOL POSTS
CSVH ····· A259

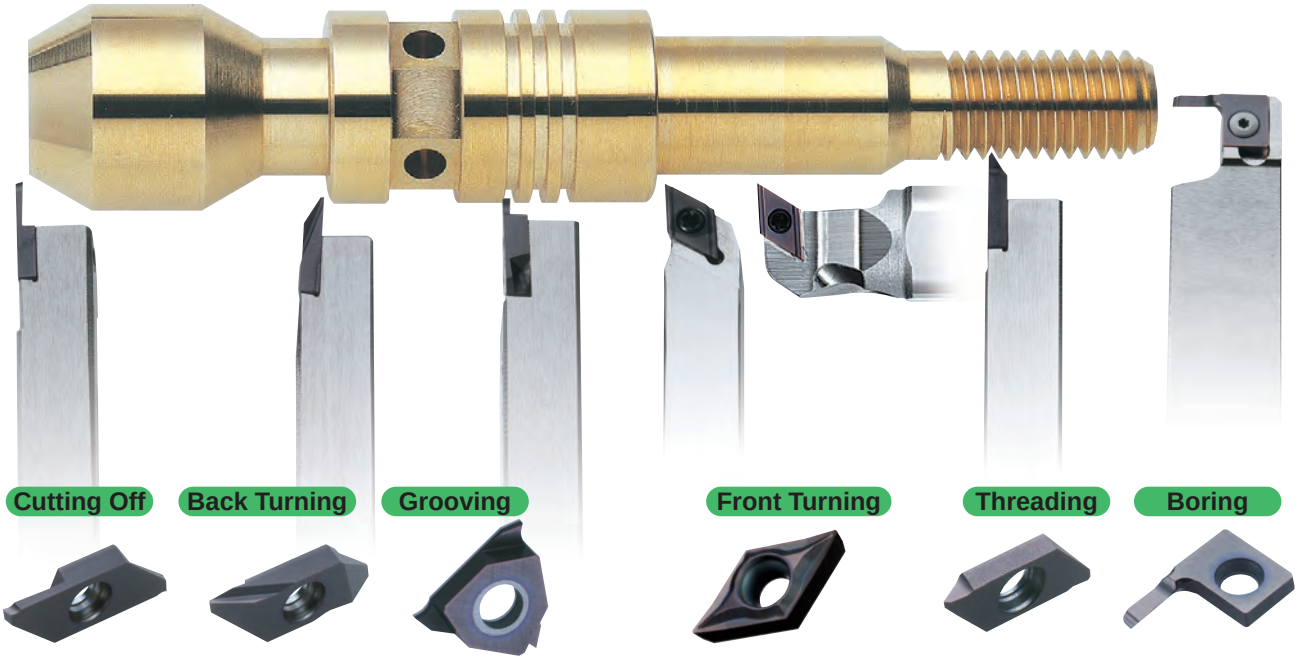
BORING
SBAH ····· A262

*Arranged by Alphabetical order

A245 **BTAH**
A245 **BTAT INSERTS**
A246 **BTBT INSERTS**
A247 **BTVH**
A247 **BTVT INSERTS**
A259 **CSVH**
A260 **CSVTBXL INSERTS**
A260 **CSVTB INSERTS**
A260 **CSVTC INSERTS**
A261 **CSVTG INSERTS**
A261 **CSVTT INSERTS**
A250 **CTAH**
A250 **CTAH-S**
A251 **CTAT INSERTS**
A246 **CTBH**
A252 **CTBH**
A252 **CTBT INSERTS**
A253 **CTCH**
A253 **CTCT INSERTS**
A254 **CTDH**
A254 **CTDT INSERTS**
A255 **CTEH**
A255 **CTET INSERTS**
A259 **CTVTFXL INSERTS**
A259 **CTVTF INSERTS**
A248 **GTAH**
A248 **GTAT INSERTS**
A248 **GTBH**
A248 **GTBT INSERTS**
A248 **GTCH**
A248 **GTCT INSERTS**
A262 **SBAH**
A262 **SBAT INSERTS**
A242 **SCAC-SM**
A242 **SCLC-SM**
A243 **SDJC-SM**
A243 **SDNC-SM**
A258 **SH**
A244 **SVJB-SM**
A244 **SVVB-SM**
A256 **TTAH**
A256 **TTAT INSERTS**

OUTLINE OF SMALL TOOLS

TOOLS FOR GANG TYPE AUTOMATIC LATHES (FOR EXTERNAL TURNING AND BORING)



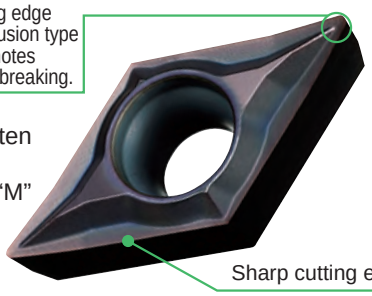
Cutting Off | Back Turning | Grooving | Front Turning | Threading | Boring

SMG Breaker Insert

Nose radii designed with minus tolerance

- Suitable for small parts applications that often require minus tolerance dimensions.
- The order number is shown with the letter "M" that indicates minus tolerance.
- The radius value is printed on the side of the insert label for easy recognition.

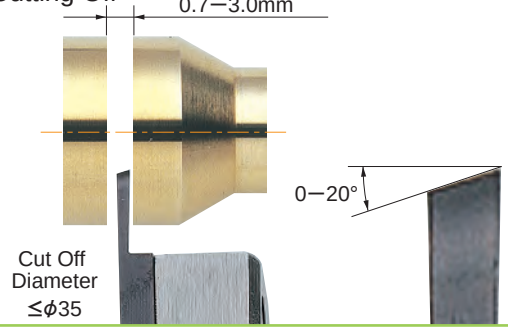
A combination of a curved cutting edge and the protrusion type breaker promotes efficient chip breaking.



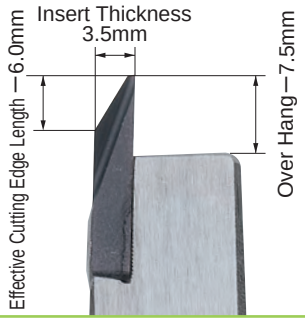
Tolerance Corner R

SMG Breaker Insert	E class
Re $^{0}_{-0.05}$ mm	Re $^{0}_{-0.02}$ mm
(Conventional G-class insert Re ±0.10 mm)	

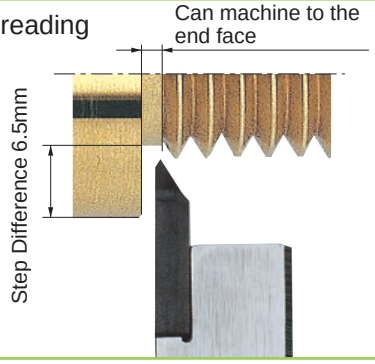
Cutting Off



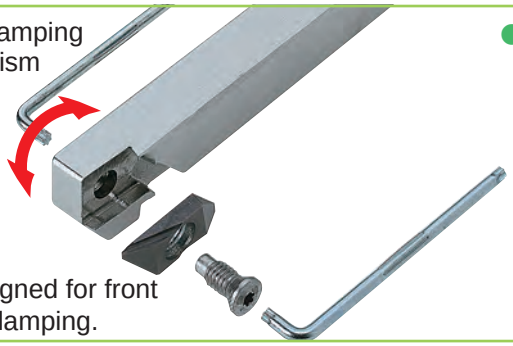
Back Turning



Threading



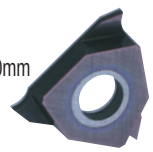
Back Clamping Mechanism

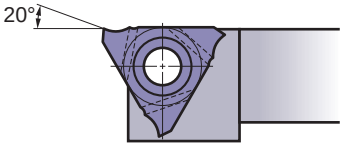


Screw designed for front and back clamping.

Grooving

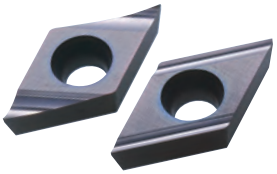
- 3-cornered
- Groove width 0.3—3.0mm
- Traversing possible





Front Turning

- ISO E class accuracy inserts
- A wide variety of small corner R inserts
- Rake angle 30°



Tools for a very wide range of small parts machining

External Turning	Tools for front turning, back turning, grooving, threading, and cutting off
Internal Turning	Tools for boring, internal grooving and internal threading
Drilling	Drills
End Milling	End Mills

Tools for CNC automatic and small lathes

Types of Tool Posts	Gang type, turret type, cam type (radial pattern type)
Tool Sizes	Square shank: 8—16 mm Round shank : less than ϕ25.4

Indexable inserts developed under the concept of "high quality, high efficiency and long tool life."

High Quality	E class tolerance, sharp cutting edge, high accuracy small corner R, smooth surface finish
Long Tool Life	Miracle Coating (VP15TF), cermet (NX2525), cemented carbide (HTi10)
High Efficiency	Regrinding not necessary due to the employment of indexable inserts. A wide variety of top cutting edge geometries

TOOLS FOR CAM TYPE AUTOMATIC LATHES

- The most suitable for the use with cam type automatic lathes (radial pattern tool posts)
- The most suitable for machining of small parts with work diameter 5mm or smaller
- Single holder for front turning, back turning, grooving, threading, and cutting off operations

Front Turning | Back Turning | Grooving | Threading | Cutting Off

INTERNAL TURNING TOOLS

Solid type ***MICRO-MINI TWIN Boring Bars***

Minimum cutting diameter ϕ2.2—

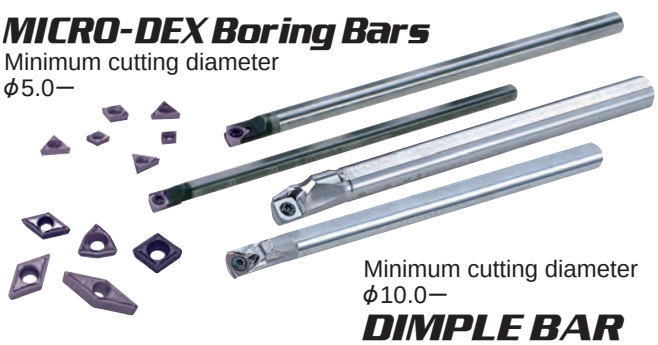
Boring
Grooving
Threading

Round Shank

Square Shank

MICRO-DEX Boring Bars

Minimum cutting diameter ϕ5.0—



Minimum cutting diameter ϕ10.0—

DIMPLE BAR

DRILLING TOOLS

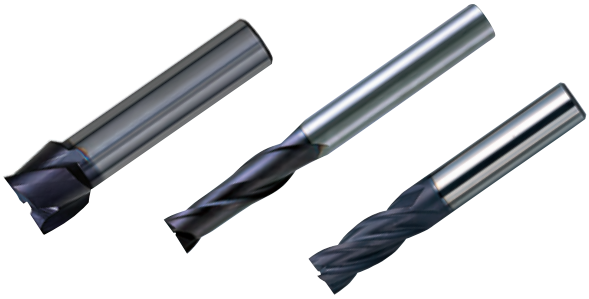
- Carbide drills
- HSS drills

Minimum cutting diameter ϕ12.0—

TAF Drill

END MILLING TOOLS

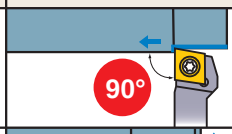
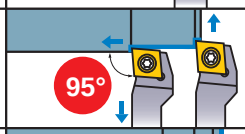
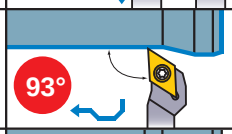
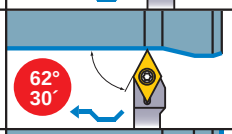
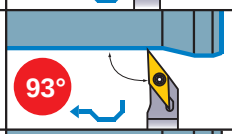
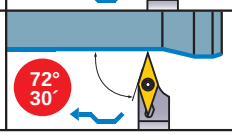
- Carbide end mills
- HSS end mills



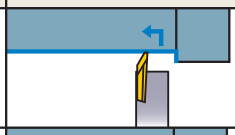
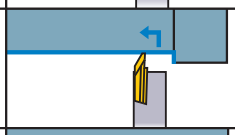
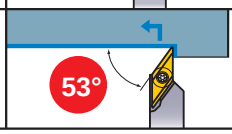
CLASSIFICATION OF EXTERNAL TURNING TOOLS

GANG TYPE TOOL POSTS

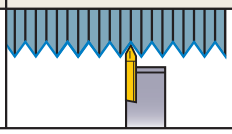
FRONT TURNING

Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
SCAC-SM → A242	8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	
SCLC-SM → A242	8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	
SDJC-SM → A243	8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	
SDNC-SM → A243	8 x 8 x 125 10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	
SVJB-SM → A244	10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	
SVVB-SM → A244	10 x 10 x 125 12 x 12 x 150 16 x 16 x 150	

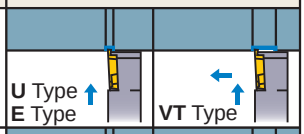
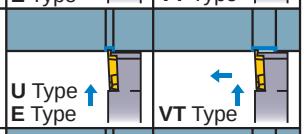
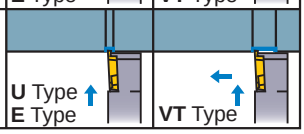
BACK TURNING

Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
BTAH (Insert Size 2.8, 3.5, 5.0mm) → A245	8 x 10 x 120 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
CTBH (Insert Size 4.5, 6.0mm) → A246	10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
BTVH (Insert Size 7.5mm) → A247	10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	

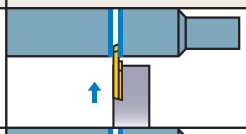
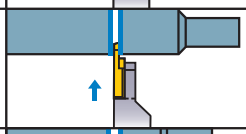
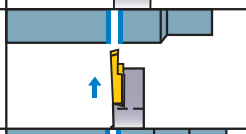
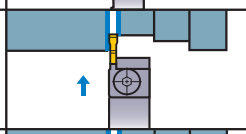
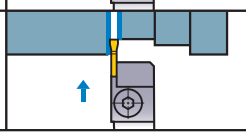
THREADING

Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
TTAH → A256	8 x 10 x 120 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	

GROOVING

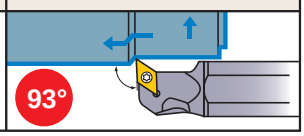
Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
GTAH (Groove Width 0.3—3.0mm) → A248	8 x 8 x 80 8 x 8 x 120 10 x 10 x 80 10 x 10 x 120 12 x 12 x 80 12 x 12 x 120 16 x 16 x 120	
GTBH (Groove Width 1.45—3.0mm) → A248	10 x 10 x 80 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
GTCH (Groove Width 2.5—3.0mm) → A248	10 x 10 x 80 10 x 10 x 120	

CUTTING OFF

Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
CTAH (Max. Cut Off Diameter 12mm) → A250	8 x 10 x 120 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
CTAH-S (Max. Cut Off Diameter 12mm) → A250	10 x 10 x 80	
CTBH (Max. Cut Off Diameter 16mm) → A252	10 x 10 x 120 12 x 12 x 120 16 x 16 x 120	
CTCH (Max. Cut Off Diameter 20mm) → A253	10 x 10 x 120 12 x 12 x 120	
CTDH (Max. Cut Off Diameter 23—35mm) → A254	16 x 16 x 120 16 x 16 x 125	
CTEH (Max. Cut Off Diameter 23—35mm) → A255	16 x 16 x 120 16 x 16 x 125	

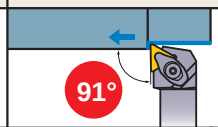
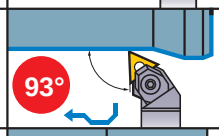
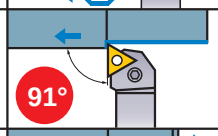
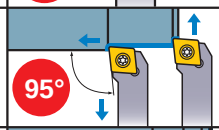
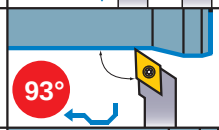
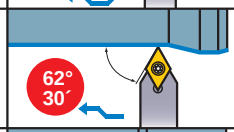
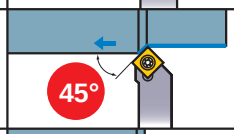
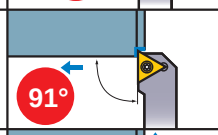
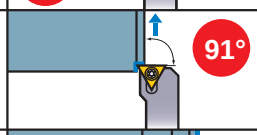
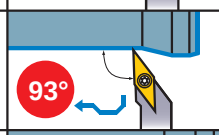
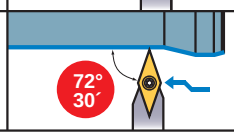
OPPOSITE TOOL POSTS

DIMPLE SLEEVE HOLDER

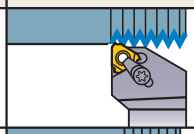
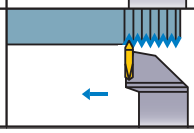
Name of Tool Holder	Shank Size (mm) (Shank Dia. x L)	Geometry
SH (Front Turning, Copying, Facing) → A258	ϕ15.875 x 100 ϕ19.05 x 125 ϕ20 x 125 ϕ22 x 125 ϕ25.4 x 150	

TURRET TYPE TOOL POSTS

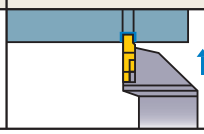
FRONT TURNING

Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
DTGN → A207	16 x 16 x 100 20 x 20 x 125 25 x 25 x 150	
MTJN → A206	20 x 20 x 125 25 x 25 x 150	
PTGN → A206	10 x 10 x 70 12 x 12 x 80 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150	
SCLC → A216	8 x 8 x 60 10 x 10 x 70 12 x 12 x 80 16 x 16 x 100	
SDJC → A217	10 x 10 x 70 12 x 12 x 80 16 x 16 x 100	
SDNC → A217	8 x 8 x 60 10 x 10 x 70 12 x 12 x 80 16 x 16 x 100	
SSSC → A220	12 x 12 x 80 16 x 16 x 100	
STGC → A221	10 x 10 x 70 12 x 12 x 80 16 x 16 x 100	
STFC → A221	10 x 10 x 70 12 x 12 x 80 16 x 16 x 100	
SVJC → A222	10 x 10 x 70 16 x 16 x 100	
SVVC → A222	16 x 16 x 100	

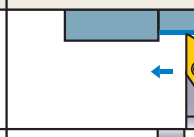
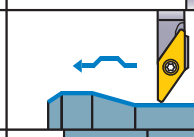
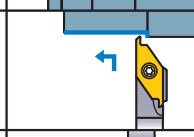
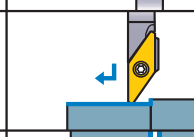
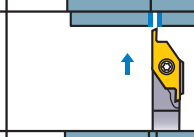
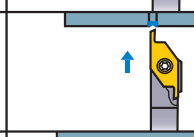
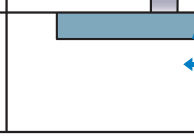
THREADING

Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
MMT → A390	12 x 12 x 100 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150 32 x 32 x 170	
SMGH → A406	10 x 10 x 70 12 x 12 x 80 16 x 16 x 100	

GROOVING

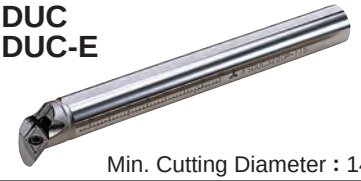
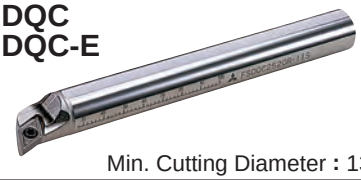
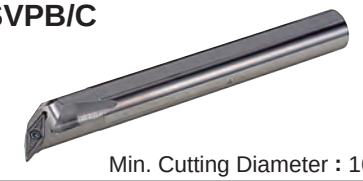
Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
SMGH → A366	10 x 10 x 70 12 x 12 x 80 16 x 16 x 100	

CAM TYPE TOOL POSTS

Name of Tool Holder	Shank Size (mm) (H x W x L)	Geometry
CSVH (Front Turning) → A259	7 x 7 x 140 8 x 8 x 140 9.5x 9.5x 140 10 x10 x 140 12 x12 x 140	
CSVH (Front Turning Copying) → A259	7 x 7 x 140 8 x 8 x 140 9.5x 9.5x 140 10 x10 x 140 12 x12 x 140	
CSVH (Back Turning) → A259	7 x 7 x 140 8 x 8 x 140 9.5x 9.5x 140 10 x10 x 140 12 x12 x 140	
CSVH (Back Turning Copying) → A259	7 x 7 x 140 8 x 8 x 140 9.5x 9.5x 140 10 x10 x 140 12 x12 x 140	
CSVH (Cutting Off) → A259	7 x 7 x 140 8 x 8 x 140 9.5x 9.5x 140 10 x10 x 140 12 x12 x 140	
CSVH (Grooving) → A259	7 x 7 x 140 8 x 8 x 140 9.5x 9.5x 140 10 x10 x 140 12 x12 x 140	
CSVH (Threading) → A259	7 x 7 x 140 8 x 8 x 140 9.5x 9.5x 140 10 x10 x 140 12 x12 x 140	

CLASSIFICATION OF INTERNAL TURNING TOOLS (FOR GENERAL USE)

Product Name	Holder
For Gang Type Tool Posts A262	**SBAH** Min. Cutting Diameter : 3mm
MICRO-MINI TWIN Boring Bars (Solid Carbide) A283	**CB** Min. Cutting Diameter : 2.2mm
MICRO-MINI Boring Bars (Solid Carbide) A286	**C○○FR-BLS** Min. Cutting Diameter : 3.2mm
MICRO-DEX Boring Bars (Carbide Shank) A294	**SCLC** Min. Cutting Diameter : 5mm
MICRO-DEX Boring Bars (Carbide Shank) A281	**STUC** Min. Cutting Diameter : 8mm
MICRO-DEX Boring Bars (Carbide Shank) A280	**SWUB** Min. Cutting Diameter : 6mm
F type Bars (Steel Shank) A291	**FSWL1** Min. Cutting Diameter : 5.8mm
F type Bars (Carbide Shank) A291	**FSWL2** Min. Cutting Diameter : 5.8mm
DIMPLE BAR (Steel Shank Carbide Shank) A270	**FSCLC/P FSCLC/P-E** Min. Cutting Diameter : 10mm

Product Name	Holder
DIMPLE BAR (Steel Shank Carbide Shank) A272	**FSDUC FSDUC-E**  Min. Cutting Diameter : 14mm
DIMPLE BAR (Steel Shank Carbide Shank) A273	**FSDQC FSDQC-E**  Min. Cutting Diameter : 13mm
DIMPLE BAR (Steel Shank Carbide Shank) A271	**FSTUP FSTUP-E** Min. Cutting Diameter : 10mm
DIMPLE BAR (Steel Shank) A275	**FSVUB/C** Min. Cutting Diameter : 16mm
DIMPLE BAR (Steel Shank) A275	**FSVPB/C**  Min. Cutting Diameter : 16mm
DIMPLE BAR (Steel Shank) A276	**FSVJC** Min. Cutting Diameter : 16mm
DIMPLE BAR (Steel Shank Carbide Shank) A274	**FSWUB/P FSWUB/P-E** Min. Cutting Diameter : 10mm

CLASSIFICATION OF INTERNAL TURNING TOOLS (GROOVING/THREADING END MILLING/DRILLING)

FOR GROOVING AND THREADING

Product Name	Holder
MICRO-MINI TWIN Boring Bars (Solid Type) ➲A368	**CG TYPE(Grooving)** Min. Cutting Diameter : 3mm
MICRO-MINI TWIN Boring Bars (Solid Type) ➲A408	**CT TYPE(Threading)** Min. Cutting Diameter : 3mm
F type Bars (Steel Shank Carbide Shank) ➲A372	**FSL51 FSL52** Min. Cutting Diameter : 10mm

END MILLS

Solid Carbide End Mill series	➲B006
HSS End Mill series	➲B015

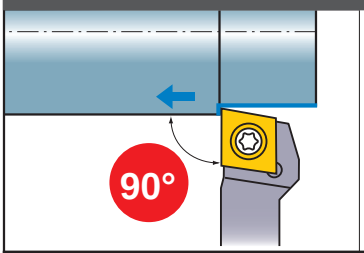
DRILLS

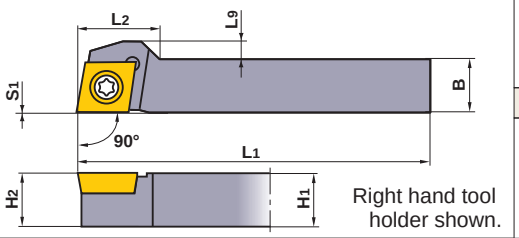
TAF Drill (Indexable type)	➲D126
Solid Carbide Drill series	➲D004
Solid gun drill series	➲D080
HSS Drill series	➲D008

EXTERNAL FRONT TURNING

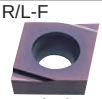
SCAC-SM

Without off set





Right hand tool holder shown.

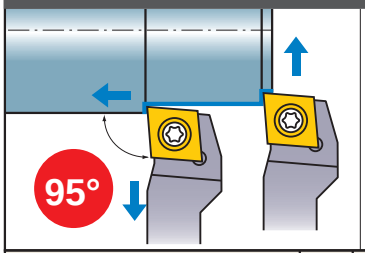
Finish	Finish	Light	Medium
SMG	R/L-F	R/L-SS	R/L-SN
(06)	 (06)	(06,09)	(06,09)
Medium	**Flat top**	**For nonferrous metals**	**CBN/PCD**
R/L-SR		AZ	
(06,09)	(06,09)	(06,09)	(06,09)

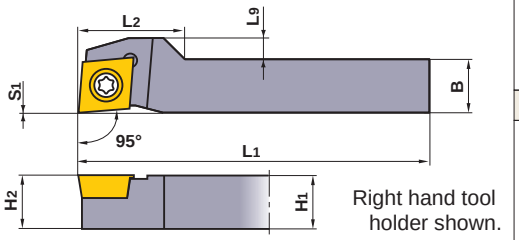
Order Number	Stock		Insert Number		Dimensions (mm)							*	
	R	L			H1	B	L1	L2	L9	H2	S1	Clamp Screw	Wrench
SCACR/L0808K06-SM	●	●	CCET CCGT CCGW CCMT CCMW NP-CCGW	0602□□	8	8	125	11	1.6	8	0	TS254	TKY08R
1010K06-SM	●	●		0602□□	10	10	125	—	—	10	0	TS254	TKY08R
1010K09-SM	●	●		09T3□□	10	10	125	16	3.5	10	0	TS43	TKY15R
1212M09-SM	●	●		09T3□□	12	12	150	14	1.5	12	0	TS43	TKY15R
1616M09-SM	●	●		09T3□□	16	16	150	—	—	16	0	TS43	TKY15R

∗ Clamp Torque (N • m) : TS254=1.0, TS43=3.5

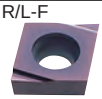
SCLC-SM

Without off set





Right hand tool holder shown.

Finish	Finish	Light	Medium
SMG	R/L-F	R/L-SS	R/L-SN
(06)	 (06)	(06,09)	(06,09)
Medium	**Flat top**	**For nonferrous metals**	**CBN/PCD**
R/L-SR		AZ	
(06,09)	(06,09)	(06,09)	(06,09)

Order Number	Stock		Insert Number		Dimensions (mm)							*	
	R	L			H1	B	L1	L2	L9	H2	S1	Clamp Screw	Wrench
SCLCR/L0808K06-SM	●	●	CCET CCGT CCGW CCMT CCMW NP-CCGW	0602□□	8	8	125	11	2.1	8	0	TS254	TKY08R
1010K06-SM	●	●		0602□□	10	10	125	—	—	10	0	TS254	TKY08R
1010K09-SM	●	●		09T3□□	10	10	125	20	4	10	0	TS43	TKY15R
1212M09-SM	●	●		09T3□□	12	12	150	18	2	12	0	TS43	TKY15R
1616M09-SM	●	●		09T3□□	16	16	150	—	—	16	0	TS43	TKY15R

∗ Clamp Torque (N • m) : TS254=1.0, TS43=3.5

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

● : **Inventory maintained in Japan.**

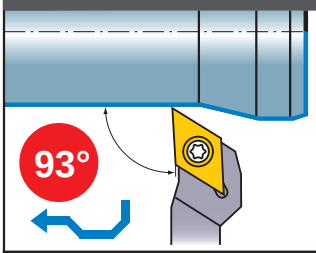
CBN & PCD inserts A156—A158, A176

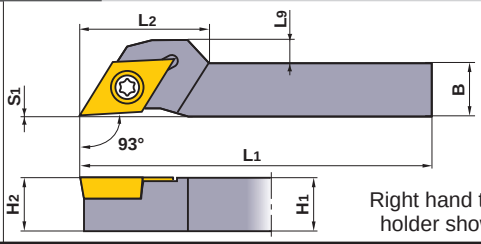
SCAC-SM type inserts A089—A092

SCLC-SM type inserts A089—A092

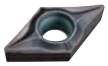
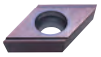
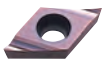
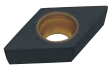
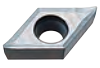
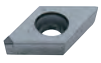
SDJC-SM

Without off set





Right hand tool holder shown.

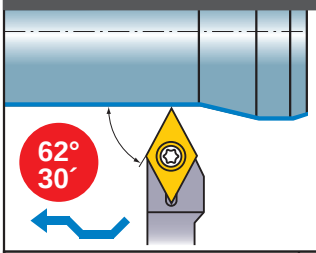
Finish	Finish	Light	Medium
SMG	R-F	R-SS	R-SN
 (07, 11)	(07, 11)	(07, 11)	 (07, 11)
Medium	**Flat top**	**For nonferrous metals**	**CBN/PCD**
R-SR		AZ	
 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)

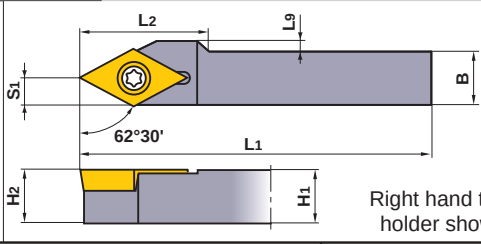
Order Number	Stock		Insert Number		Dimensions (mm)							*	
	R	L			H_1	B	L_1	L_2	L_9	H_2	S_1	Clamp Screw	Wrench
SDJCR/L0808K07-SM	●	●	DCET DCGT DCGW DCMT DCMW NP-DCGW NP-DCMT NP-DCMW	0702□□	8	8	125	15	2	8	0	TS254	TKY08R
1010K07-SM	●	●		0702□□	10	10	125	–	–	10	0	TS254	TKY08R
1010K11-SM	●	●		11T3□□	10	10	125	24	4	10	0	TS43	TKY15R
1212M11-SM	●	●		11T3□□	12	12	150	22	2	12	0	TS43	TKY15R
1616M11-SM	●	●		11T3□□	16	16	150	–	–	16	0	TS43	TKY15R

* Clamp Torque (N • m) : TS254=1.0, TS43=3.5

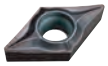
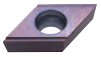
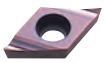
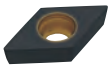
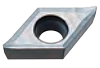
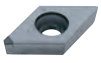
SDNC-SM

Neutral edge with handed holder
Without off set





Right hand tool holder shown.

Finish	Finish	Light	Medium
SMG	R-F	R-SS	R-SN
 (07, 11)	(07, 11)	(07, 11)	 (07, 11)
Medium	**Flat top**	**For nonferrous metals**	**CBN/PCD**
R-SR		AZ	
 (07, 11)	 (07, 11)	 (07, 11)	 (07, 11)

Order Number	Stock		Insert Number		Dimensions (mm)							*	
	R	L			H_1	B	L_1	L_2	L_9	H_2	S_1	Clamp Screw	Wrench
SDNCR/L0808K07-SM	●	●	DCET DCGT DCGW DCMT DCMW NP-DCGW NP-DCMT NP-DCMW	0702□□	8	8	125	–	–	8	3	TS254	TKY08R
1010K07-SM	●	●		0702□□	10	10	125	–	–	10	3	TS254	TKY08R
1010K11-SM	●	●		11T3□□	10	10	125	24	2	10	5	TS43	TKY15R
1212M11-SM	●	●		11T3□□	12	12	150	–	–	12	5	TS43	TKY15R
1616M11-SM	●	●		11T3□□	16	16	150	–	–	16	5	TS43	TKY15R

* Clamp Torque (N • m) : TS254=1.0, TS43=3.5

RECOMMENDED CUTTING CONDITIONS

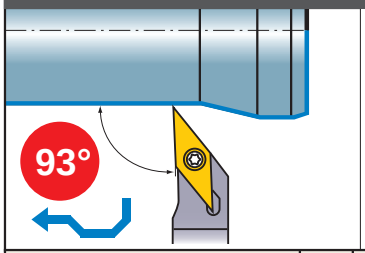
	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel · Alloy Steel	180HB–280HB	**VP15TF**	100 (50–150)	0.08 (0.01–0.15)
P	Free Cutting Steel	–	**VP15TF**	110 (30–180)	0.08 (0.01–0.15)
P	Free Cutting Steel	–	**NX2525**	150 (50–250)	0.08 (0.01–0.15)
M	Stainless Steel	≤200HB	**VP15TF**	80 (50–120)	0.06 (0.02–0.1)
N	Non-Ferrous Metal	–	**HTi10**	150 (70–230)	0.09 (0.03–0.15)

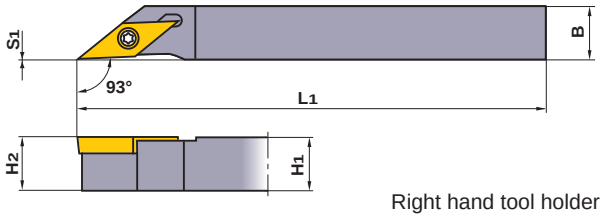
CBN & PCD inserts A160, A161, A177
SDJC-SM type inserts A094–A097
SDNC-SM type inserts A094–A097
SPARE PARTS E001
TECHNICAL DATA F001

EXTERNAL FRONT TURNING

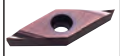
SVJB-SM

Without off set





Right hand tool holder shown.

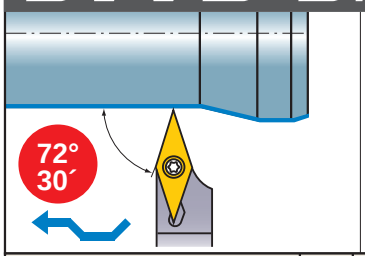
Finish	Medium
R/L-F	R/L-SN
(11)	(11)
Medium	**Medium**
MV	R/L-SR
(11)	 (11)

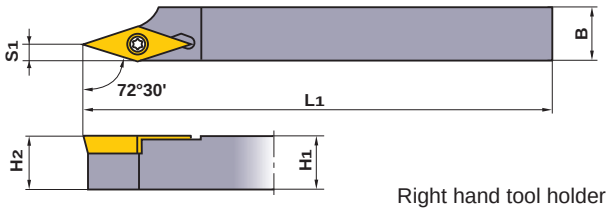
Order Number	Stock		Insert Number		Dimensions (mm)					* Clamp Screw	Wrench
	R	L			H_1	B	L_1	H_2	S_1		
SVJBR/L1010K11-SM	●	●	VBET VBGT VBMT	1103□□	10	10	125	10	0	TS255	TKY08R
1212M11-SM	●	●		1103□□	12	12	150	12	0	TS255	TKY08R
1616M11-SM	●	●		1103□□	16	16	150	16	0	TS255	TKY08R

∗ Clamp Torque (N • m) : TS255=1.0

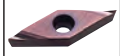
SVVB-SM

Neutral edge with handed holder





Right hand tool holder shown.

Finish	Medium
R/L-F	R/L-SN
(11)	(11)
Medium	**Medium**
MV	R/L-SR
(11)	 (11)

Order Number	Stock		Insert Number		Dimensions (mm)					* Clamp Screw	Wrench
	R	L			H_1	B	L_1	H_2	S_1		
SVVBR/L1010K11-SM	●	●	VBET VBGT VBMT	1103□□	10	10	125	10	3	TS255	TKY08R
1212M11-SM	●	●		1103□□	12	12	150	12	3	TS255	TKY08R
1616M11-SM	●	●		1103□□	16	16	150	16	3	TS255	TKY08R

∗ Clamp Torque (N • m) : TS255=1.0

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel · Alloy Steel	180HB–280HB	**VP15TF**	100 (50–150)	0.08 (0.01–0.15)
P	Free Cutting Steel	–	**VP15TF**	110 (30–180)	0.08 (0.01–0.15)
P	Free Cutting Steel	–	**NX2525**	150 (50–250)	0.08 (0.01–0.15)
M	Stainless Steel	≤200HB	**VP15TF**	80 (50–120)	0.06 (0.02–0.1)
N	Non-Ferrous Metal	–	**HTi10**	150 (70–230)	0.09 (0.03–0.15)

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

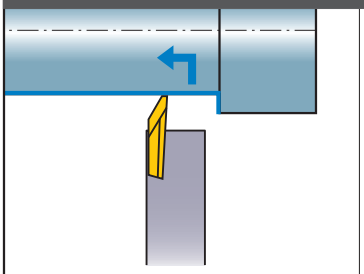
● : **Inventory maintained in Japan. (10 inserts in one case)**

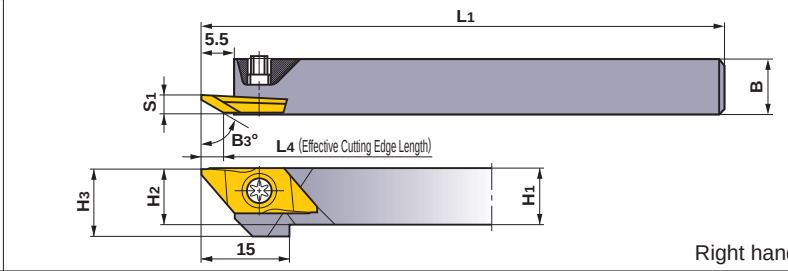
SVJB-SM type inserts A108, A109

SVVB-SM type inserts A108, A109

EXTERNAL BACK TURNING

BTAH





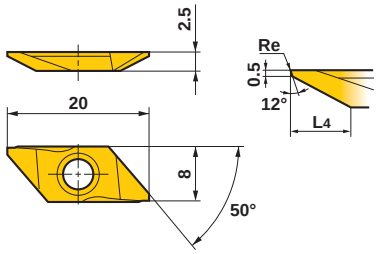
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	H2	H3	S1	* Clamp Screw	Wrench
BTAHR/L0810-50	●	●	BTAT	5528□□R/L-B	8	10	120	8	12	3.5	NS402W	NKY15R
1010-50	●	●		6035□□R/L-B	10	10	120	10	12	3.5	NS402W	NKY15R
1212-50	●	●		605000RX	12	12	120	12	–	3.5	NS403W	NKY15R
1616-50	●				16	16	120	16	–	3.5	NS403W	NKY15R

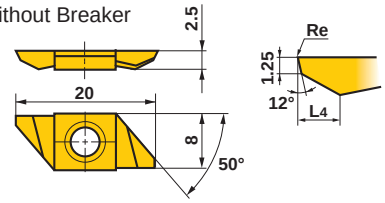
(Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
(Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length.
∗ Clamp Torque (N • m) : NS402W=0.7, NS403W=0.7

INSERTS

Order Number	Hand	Coated VP15TF	Dimensions (mm) B3	Dimensions (mm) Re	Effective Cutting Edge Length L4 (mm)	Geometry
BTAT552800R-B	R	●	55°	0	2.8	With Breaker
552800L-B	L	●	55°	0	2.8	
552801R-B	R	●	55°	0.1	2.8	
552801L-B	L	●	55°	0.1	2.8	
603500R-B	R	●	60°	0	3.5	
603500L-B	L	●	60°	0	3.5	
603501R-B	R	●	60°	0.1	3.5	
603501L-B	L	●	60°	0.1	3.5	
BTAT605000RX	R	●	60°	0	5.0	Without Breaker



Right hand insert shown.



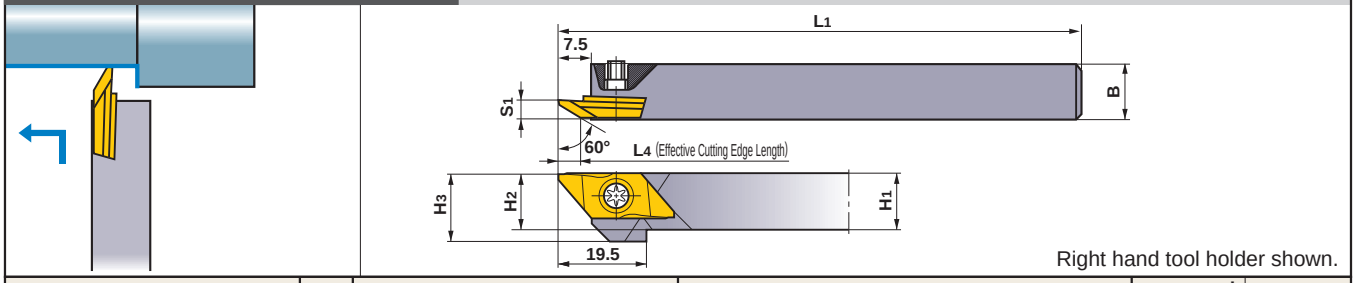
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel · Alloy Steel	180HB–280HB	**VP15TF**	100 (50–150)	0.08 (0.01–0.15)
P	Free Cutting Steel	–	**VP15TF**	110 (30–180)	0.08 (0.01–0.15)
M	Stainless Steel	≤200HB	**VP15TF**	80 (50–120)	0.06 (0.02–0.1)
N	Non-Ferrous Metal	–	**VP15TF**	150 (70–230)	0.09 (0.03–0.15)

SPARE PARTS E001
TECHNICAL DATA F001

EXTERNAL BACK TURNING

CTBH



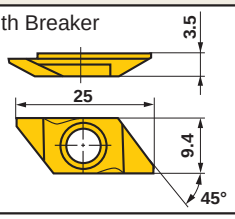
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	L1	H2	H3	S1	✱ Clamp Screw	Wrench
CTBHR/L1010-160	●	●	BTBT	60450□R/L-B	10	10	120	10	12	3.4	NS402W	NKY15R
1212-160	●	●		606000R/L	12	12	120	12	—	3.4	NS403W	NKY15R
1616-160	●	●			16	16	120	16	—	3.4	NS403W	NKY15R

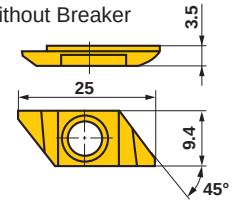
(Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
(Note 2) Set the maximum depth of cut at under 60% of the effective cutting edge length.
✱ Clamp Torque (N • m) : NS402W=0.7, NS403W=0.7

INSERTS

Order Number	Hand	Coated VP15TF	Dimensions (mm) Re	Dimensions (mm) S2	Effective Cutting Edge Length L4 (mm)	Geometry
BTBT604500R-B	R	●	0	0.2	4.5	With Breaker
604500L-B	L	●	0	0.2	4.5	
604501R-B	R	●	0.1	0.3	4.5	
604501L-B	L	●	0.1	0.3	4.5	
BTBT606000R	R	●	0	0.2	6.0	Without Breaker
606000L	L	●	0	0.2	6.0	



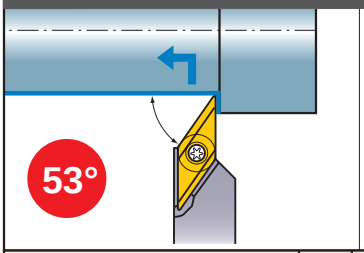
Right hand insert shown.

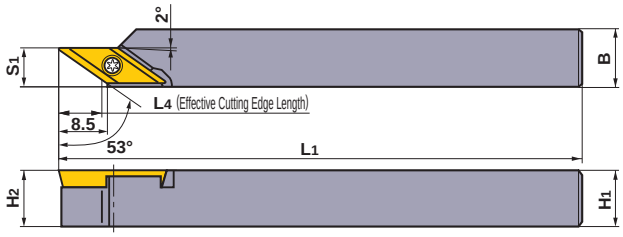


Right hand insert shown.

● : Inventory maintained in Japan. (10 inserts in one case)

BTVH





BTVHR□□□□-75F

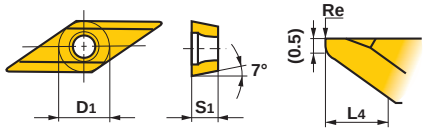
Right hand tool holder only.

Order Number	Stock	Insert Number		Dimensions (mm)					*	
	R			H_1	B	L_1	H_2	S_1	Clamp Screw	Wrench
BTVHR1010-75	●	BTVT	5375□□R-B	10	10	120	10	7.5	NS251	NKY15R
1212-75	●			12	12	120	12	7.5	NS251	NKY15R
1616-75	●			16	16	120	16	7.5	NS251	NKY15R
1010-75F	●			10	10	120	10	10.0	NS251	NKY15R
1212-75F	●			12	12	120	12	10.0	NS251	NKY15R
1616-75F	●			16	16	120	16	10.0	NS251	NKY15R

(Note 1) Set the maximum depth of cut at under 30% of the effective cutting edge length.
(Note 2) For high load machining, F type is recommended.
* Clamp Torque (N • m) : NS251=0.7

INSERTS

Order Number	Hand	Coated	Dimensions (mm)			Effective Cutting Edge Length L_4 (mm)	Geometry
		VP15TF	D_1	S_1	Re		
BTVT5375V5R-B	R	●	6.35	3.18	0.05	7.5	With Breaker
537501R-B	R	●	6.35	3.18	0.1	7.5	



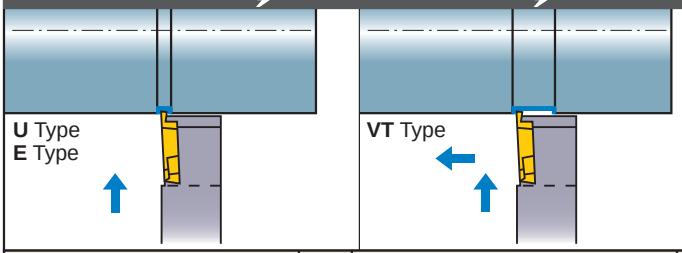
RECOMMENDED CUTTING CONDITIONS

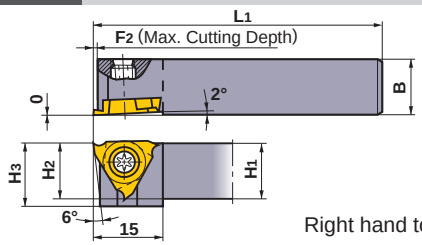
	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel · Alloy Steel	180HB–280HB	**VP15TF**	100 (50–150)	0.08 (0.01–0.15)
P	Free Cutting Steel	–	**VP15TF**	110 (30–180)	0.08 (0.01–0.15)
M	Stainless Steel	≤200HB	**VP15TF**	80 (50–120)	0.06 (0.02–0.1)
N	Non-Ferrous Metal	–	**VP15TF**	150 (70–230)	0.09 (0.03–0.15)

SPARE PARTS E001
TECHNICAL DATA F001

EXTERNAL GROOVING

GTAH, GTBH, GTCH





Right hand tool holder shown.

Order Number		Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	H2	L1	F2 *1	H3	Cutting Width (mm)	*2 Clamp Screw	Wrench
Standard Shank	GTAHR/L0808-20S	●	●	GTAT GTBT *1 GTCT *1	○○○○	8	8	8	80	2	13	0.3—3.0	NS404W	NKY15R
	1010-20S	●	●		○○○○	10	10	10	80	2	13	0.3—3.0	NS404W	NKY15R
	1212-20S	●	●		○○○○	12	12	12	80	2	13	0.3—3.0	NS404W	NKY15R
	GTBHR/L1010-30S	●	●	GTBT. GTCT	○○○○	10	10	10	80	3	13	1.45—3.0	NS404W	NKY15R
	GTCHR/L1010-30S	●	●	GTCT	○○○○	10	10	10	80	3	13	2.5—3.0	NS404W	NKY15R
Long Shank	GTAHR/L0808-20	●	●	GTAT GTBT *1 GTCT *1	○○○○	8	8	8	120	2	13	0.3—3.0	NS404W	NKY15R
	1010-20	●	●		○○○○	10	10	10	120	2	13	0.3—3.0	NS404W	NKY15R
	1212-20	●	●		○○○○	12	12	12	120	2	13	0.3—3.0	NS404W	NKY15R
	1616-20	●	●		○○○○	16	16	16	120	2	—	0.3—3.0	NS404W	NKY15R
	GTBHR/L1010-30	●	●	GTBT. GTCT	○○○○	10	10	10	120	3	13	1.45—3.0	NS404W	NKY15R
	1212-30	●	●		○○○○	12	12	12	120	3	13	1.45—3.0	NS404W	NKY15R
	1616-30	●	●		○○○○	16	16	16	120	3	16	1.45—3.0	NS404W	NKY15R
	GTCHR/L1010-30	●	●	GTCT	○○○○	10	10	10	120	3	13	2.5—3.0	NS404W	NKY15R

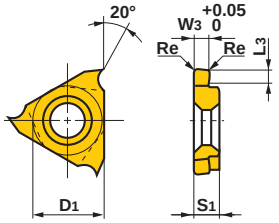
(Note) Please use right hand insert for right hand holder and left hand insert for left hand holder.

*1 Even if the insert dimension L_3 exceeds the holder dimension F_2, it is not possible to machine depths over F_2.

*2 Clamp Torque (N • m) : NS404W=0.7

INSERTS

Order Number	Hand	Coated VP15TF	Dimensions (mm) W3	L3 *1	Re	D1	S1	Geometry
GTAT03006V3R-U	R	●	0.3	0.6	0.03	9.525	3.18	U Type Breaker (Grooving)
03006V3L-U	L	●	0.3	0.6	0.03	9.525	3.18	
05012V5R-U	R	●	0.5	1.2	0.05	9.525	3.18	
05012V5L-U	L	●	0.5	1.2	0.05	9.525	3.18	
07520V5R-U	R	●	0.75	2.0	0.05	9.525	3.18	
07520V5L-U	L	●	0.75	2.0	0.05	9.525	3.18	
09520V5R-U	R	●	0.95	2.0	0.05	9.525	3.18	
09520V5L-U	L	●	0.95	2.0	0.05	9.525	3.18	
10020V5R-U	R	●	1.0	2.0	0.05	9.525	3.18	
10020V5L-U	L	●	1.0	2.0	0.05	9.525	3.18	
10320V5R-U	R	●	1.03	2.0	0.05	9.525	3.18	
12520V5R-U	R	●	1.25	2.0	0.05	9.525	3.18	
12520V5L-U	L	●	1.25	2.0	0.05	9.525	3.18	
GTBT14530V5R-U	R	●	1.45	3.0	0.05	9.525	3.18	
14530V5L-U	L	●	1.45	3.0	0.05	9.525	3.18	
15030V5R-U	R	●	1.5	3.0	0.05	9.525	3.18	
15030V5L-U	L	●	1.5	3.0	0.05	9.525	3.18	
17530V5R-U	R	●	1.75	3.0	0.05	9.525	3.18	
17530V5L-U	L	●	1.75	3.0	0.05	9.525	3.18	
20030V5R-U	R	●	2.0	3.0	0.05	9.525	3.18	
20030V5L-U	L	●	2.0	3.0	0.05	9.525	3.18	
GTCT25030V5R-U	R	●	2.5	3.0	0.05	9.525	3.18	
25030V5L-U	L	●	2.5	3.0	0.05	9.525	3.18	



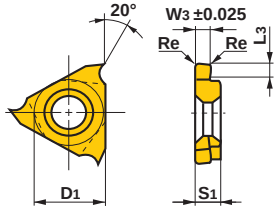
Right hand insert shown.

● : Inventory maintained in Japan. (10 inserts in one case)

INSERTS

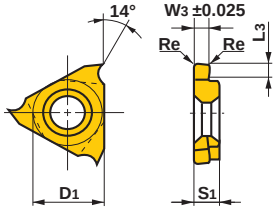
Order Number	Hand	Coated		Carbide	Dimensions (mm)					Geometry
		VP15TF	VP15KZ	TF15	W3	L3	Re	D1	S1	
GTAT03306V3R-E	R	●			0.33	0.6	0.03	9.525	3.18	**E** Type Breaker (Grooving)
03306V3L-E	L	●			0.33	0.6	0.03	9.525	3.18	
04312V3R-E	R	●			0.43	1.2	0.03	9.525	3.18	
04312V3L-E	L	●			0.43	1.2	0.03	9.525	3.18	
05312V5R-E	R	●			0.53	1.2	0.05	9.525	3.18	
05312V5L-E	L	●			0.53	1.2	0.05	9.525	3.18	
07520V5R-E	R	●			0.75	2.0	0.05	9.525	3.18	
07520V5L-E	L	●			0.75	2.0	0.05	9.525	3.18	
09520V5R-E	R	●			0.95	2.0	0.05	9.525	3.18	
09520V5L-E	L	●			0.95	2.0	0.05	9.525	3.18	
10020V5R-E	R	●			1.0	2.0	0.05	9.525	3.18	
10020V5L-E	L	●			1.0	2.0	0.05	9.525	3.18	
1002001R-E	R	●			1.0	2.0	0.1	9.525	3.18	
1002001L-E	L	●			1.0	2.0	0.1	9.525	3.18	
12020V5R-E	R	●			1.2	2.0	0.05	9.525	3.18	
12020V5L-E	L	●			1.2	2.0	0.05	9.525	3.18	
1202001R-E	R	●			1.2	2.0	0.1	9.525	3.18	
1202001L-E	L	●			1.2	2.0	0.1	9.525	3.18	
14020V5R-E	R	●			1.4	2.0	0.05	9.525	3.18	
14020V5L-E	L	●			1.4	2.0	0.05	9.525	3.18	
GTBT15030V5R-E	R	●			1.5	3.0	0.05	9.525	3.18	
15030V5L-E	L	●			1.5	3.0	0.05	9.525	3.18	
1503001R-E	R	●			1.5	3.0	0.1	9.525	3.18	
1503001L-E	L	●			1.5	3.0	0.1	9.525	3.18	
18030V5R-E	R	●			1.8	3.0	0.05	9.525	3.18	
18030V5L-E	L	●			1.8	3.0	0.05	9.525	3.18	
20030V5R-E	R	●			2.0	3.0	0.05	9.525	3.18	
20030V5L-E	L	●			2.0	3.0	0.05	9.525	3.18	
2003001R-E	R	●			2.0	3.0	0.1	9.525	3.18	
2003001L-E	L	●			2.0	3.0	0.1	9.525	3.18	
22530V5R-E	R	●			2.25	3.0	0.05	9.525	3.18	
22530V5L-E	L	●			2.25	3.0	0.05	9.525	3.18	
GTCT25030V5R-E	R	●			2.5	3.0	0.05	9.525	3.18	
25030V5L-E	L	●			2.5	3.0	0.05	9.525	3.18	
27530V5R-E	R	●			2.75	3.0	0.05	9.525	3.18	
27530V5L-E	L	●			2.75	3.0	0.05	9.525	3.18	
30030V5R-E	R	●			3.0	3.0	0.05	9.525	3.18	
30030V5L-E	L	●			3.0	3.0	0.05	9.525	3.18	
GTAT0330600R-VT	R		●		0.33	0.6	0	9.525	3.18	0.25
0431200R-VT	R		●		0.43	1.2	0	9.525	3.18	0.9
0532000R-VT	R		●		0.53	2.0	0	9.525	3.18	1.6
0652000R-VT	R		●		0.65	2.0	0	9.525	3.18	1.6
0752000R-VT	R		●		0.75	2.0	0	9.525	3.18	1.6
0802000R-VT	R		●		0.8	2.0	0	9.525	3.18	1.6
0852000R-VT	R		●		0.85	2.0	0	9.525	3.18	1.6
0952000R-VT	R		●		0.95	2.0	0	9.525	3.18	1.6
1002000R-VT	R		●		1.0	2.0	0	9.525	3.18	1.6
1102000R-VT	R		●		1.1	2.0	0	9.525	3.18	1.6
1202000R-VT	R		●		1.2	2.0	0	9.525	3.18	1.6
1302000R-VT	R		●		1.3	2.0	0	9.525	3.18	1.6
1402000R-VT	R		●		1.4	2.0	0	9.525	3.18	1.6
GTBT1503000R-VT	R		●		1.5	3.0	0	9.525	3.18	2.7
2003000R-VT	R		●		2.0	3.0	0	9.525	3.18	2.7
GTATR	R			●	1.76	3.0	–	9.525	3.18	Blank
GTATL	L			●	1.76	3.0	–	9.525	3.18	
GTBTR	R			●	–	0	–	9.525	3.18	
GTBTL	L			●	–	0	–	9.525	3.18	

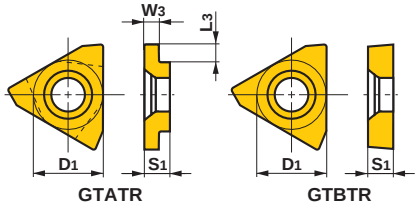
Max. Cutting Depth (mm)



Right hand insert shown.

VT Type Breaker
(Grooving, Side Turning)



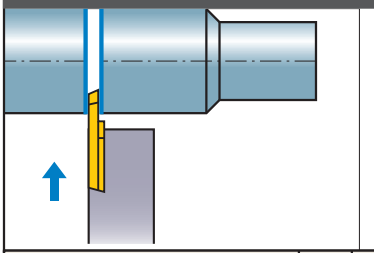


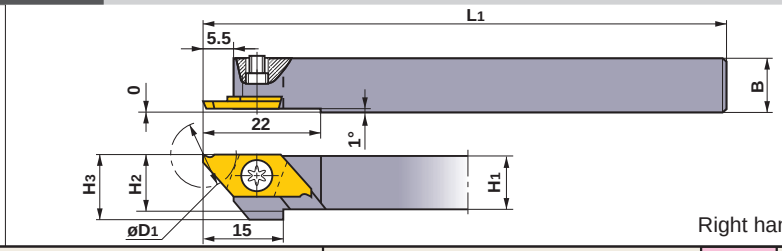
Right hand insert shown.

CUTTING CONDITIONS A250
SPARE PARTS E001
TECHNICAL DATA F001

EXTERNAL CUTTING OFF

CTAH



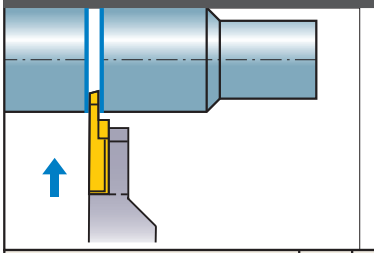


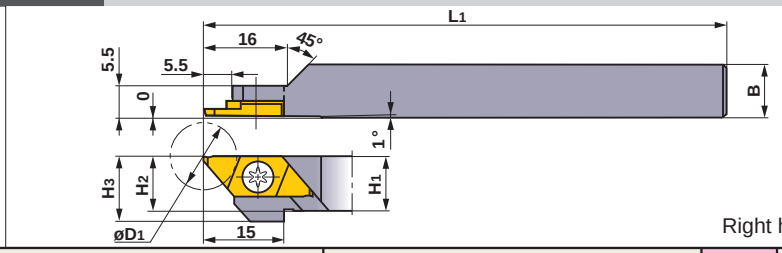
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	H2	L1	H3	Max. Cut Off Diameter D1 (mm)	✶2 Clamp Screw	Wrench
CTAHR/L0810-120	●	●	CTAT	○○○○	8	10	8	120	12	12 (8)✶1	NS402W	NKY15R
1010-120	●	●		○○○○	10	10	10	120	12		NS402W	NKY15R
1212-120	●	●		○○○○	12	12	12	120	–		NS403W	NKY15R
1616-120	●	●		○○○○	16	16	16	120	–		NS403W	NKY15R

✶1 When the width of cutting off is 0.7mm.
✶2 Clamp Torque (N • m) : NS402W=0.7, NS403W=0.7

CTAH-S





Right hand tool holder only.

Order Number	Stock R	Insert Number		Dimensions (mm) H1	B	H2	L1	H3	Max. Cut Off Diameter D1 (mm)	✶2 Clamp Screw	Wrench
CTAHR1010-120S	●	CTAT	○○○○	10	10	10	80	12	12 (8)✶1	NS401	NKY25R

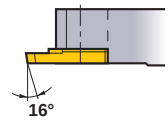
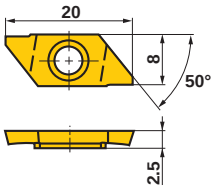
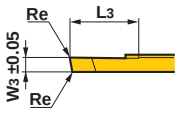
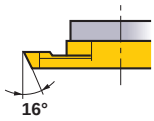
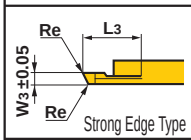
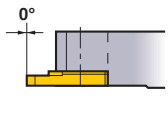
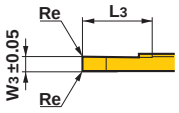
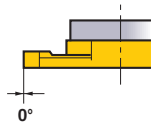
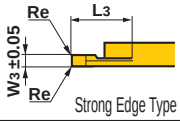
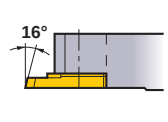
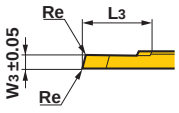
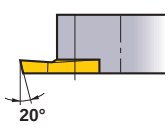
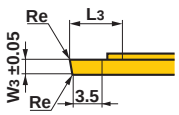
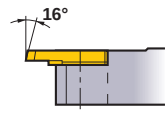
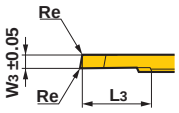
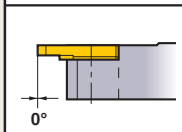
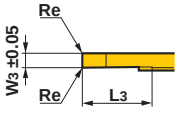
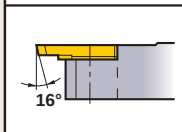
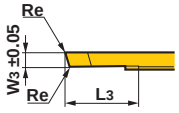
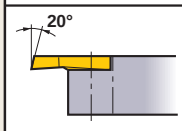
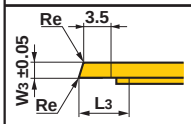
✶1 When the width of cutting off is 0.7mm.
✶2 Clamp Torque (N • m) : NS401=3.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel · Alloy Steel	180HB–280HB	**VP15TF/VP15KZ**	100 (50–150)	0.05 (0.02–0.09)
	Free Cutting Steel	–	**VP15TF/VP15KZ**	110 (30–180)	0.05 (0.01–0.09)
M	Stainless Steel	≤200HB	**VP15TF/VP15KZ**	80 (50–120)	0.03 (0.02–0.05)
N	Non-Ferrous Metal	–	**VP15TF/VP15KZ**	150 (70–230)	0.07 (0.03–0.11)

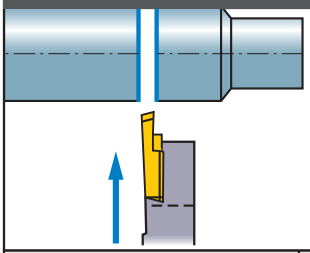
● : **Inventory maintained in Japan. (10 inserts in one case)**

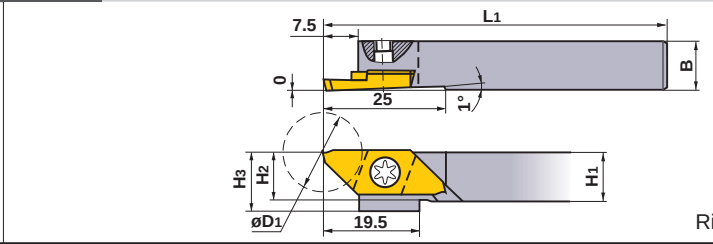
INSERTS

Holder	Setting Geometry	Breaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	Dimensions (mm) W3	L3	Re	Max. Cut Off Diameter (mm)
Right Hand (R)		With Breaker			CTAT07080V5RR-B	R	●	0.7	4.5	0.05	8
					10120V5RR-B	R	●	1.0	6.7	0.05	12
					15120V5RR-B	R	●	1.5	6.7	0.05	12
					20120V5RR-B	R	●	2.0	6.7	0.05	12
					CTAT15120V5RR-BX	R	●	1.5	6.7	0.05	12
					20120V5RR-BX	R	●	2.0	6.7	0.05	12
					CTAT10120V5RN-B	N	●	1.0	6.7	0.05	12
					15120V5RR-B	N	●	1.5	6.7	0.05	12
					20120V5RN-B	N	●	2.0	6.7	0.05	12
					CTAT15120V5RN-BX	N	●	1.5	6.7	0.05	12
					20120V5RN-BX	N	●	2.0	6.7	0.05	12
					CTAT10110V5RL-B	L	●	1.0	6.7	0.05	11
					15110V5RL-B	L	●	1.5	6.7	0.05	11
					20110V5RL-B	L	●	2.0	6.7	0.05	11
		Without Breaker			CTAT1012000RR	R	●	1.0	6.7	0	12
					1512000RR	R	●	1.5	6.7	0	12
					2012000RR	R	●	2.0	6.7	0	12
Left Hand (L)		With Breaker			CTAT07080V5LL-B	L	●	0.7	4.5	0.05	8
					10120V5LL-B	L	●	1.0	6.7	0.05	12
					15120V5LL-B	L	●	1.5	6.7	0.05	12
					20120V5LL-B	L	●	2.0	6.7	0.05	12
					CTAT10120V5LN-B	N	●	1.0	6.7	0.05	12
					15120V5LN-B	N	●	1.5	6.7	0.05	12
					20120V5LN-B	N	●	2.0	6.7	0.05	12
					CTAT10110V5LR-B	R	●	1.0	6.7	0.05	11
					15110V5LR-B	R	●	1.5	6.7	0.05	11
					20110V5LR-B	R	●	2.0	6.7	0.05	11
		Without Breaker	Right hand insert shown.		CTAT1012000LL	L	●	1.0	6.7	0	12
					1512000LL	L	●	1.5	6.7	0	12
					2012000LL	L	●	2.0	6.7	0	12

EXTERNAL CUTTING OFF

CTBH



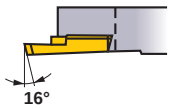
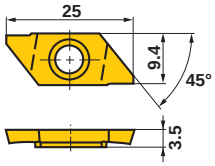
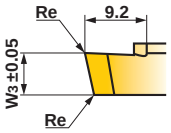
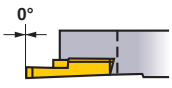
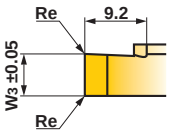
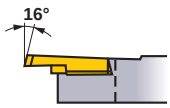
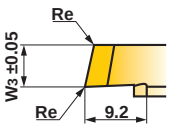
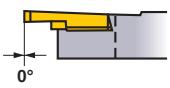
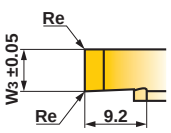
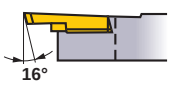
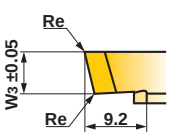


Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	H2	L1	H3	Max. Cut Off Diameter D1 (mm)	Clamp Screw *	Wrench
CTBHR/L1010-160	●	●	CTBT	○○○○	10	10	10	120	12	16	NS402W	NKY15R
1212-160	●	●		○○○○	12	12	12	120	—	16	NS403W	NKY15R
1616-160	●	●		○○○○	16	16	16	120	—	16	NS403W	NKY15R

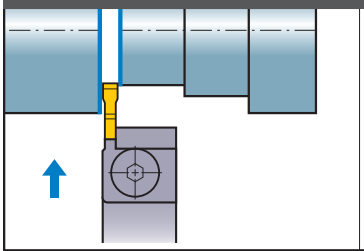
* Clamp Torque (N • m) : NS402W=0.7, NS403W=0.7

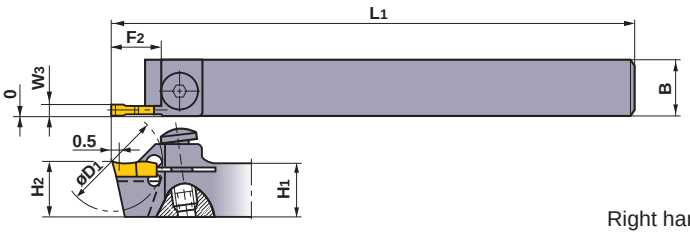
INSERTS

Holder	Setting Geometry	Breaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	Dimensions (mm) W3	Re	Max. Cut Off Diameter (mm)
Right Hand (R)		With Breaker			**CTBT15160V5RR-B**	R	●	1.5	0.05	16
					20160V5RR-B	R	●	2.0	0.05	16
					**CTBT20160V5RN-B**	N	●	2.0	0.05	16
Left Hand (L)					**CTBT20160V5LL-B**	L	●	2.0	0.05	16
					**CTBT20160V5LN-B**	N	●	2.0	0.05	16
			Right hand insert shown.		**CTBT20145V5LR-B**	R	●	2.0	0.05	14.5

● : Inventory maintained in Japan. (10 inserts in one case)

CTCH





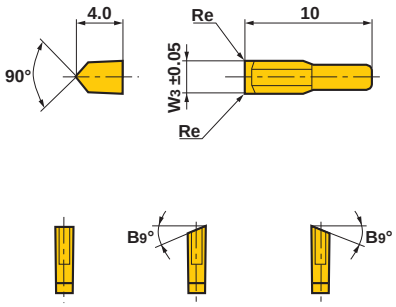
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	H2	L1	F2	Max. Cut Off Diameter (mm) D1	* Clamp Screw	Wrench
CTCHR/L1010-200	●	●	CTCT	2○○○	10	10	10	120	11	20	NS501W	HKY25RS
1212-200	●	●	CTCT	2○○○	12	12	12	120	11	20	NS501W	HKY25RS

∗ Clamp Torque (N • m) : NS501W=2.2

INSERTS

Breaker	Order Number	Hand	Coated VP15TF	Dimensions (mm) W3	B9	Re	Max. Cut Off Diameter (mm)	Geometry
With Breaker	**CTCT22200V5N-B**	N	●	2.2	0°	0.05	20	
	2220001N-B	N	●	2.2	0°	0.1	20	
	25200V5N-B	N	●	2.5	0°	0.05	20	
	2520001N-B	N	●	2.5	0°	0.1	20	
	22200V5R-B	R	●	2.2	17°	0.05	20	
	2220001R-B	R	●	2.2	17°	0.1	20	
	25200V5R-B	R	●	2.5	17°	0.05	20	
	2520001R-B	R	●	2.5	17°	0.1	20	
	22200V5L-B	L	●	2.2	17°	0.05	20	
	2220001L-B	L	●	2.2	17°	0.1	20	
	25200V5L-B	L	●	2.5	17°	0.05	20	
	2520001L-B	L	●	2.5	17°	0.1	20	



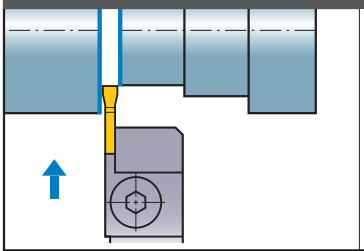
RECOMMENDED CUTTING CONDITIONS

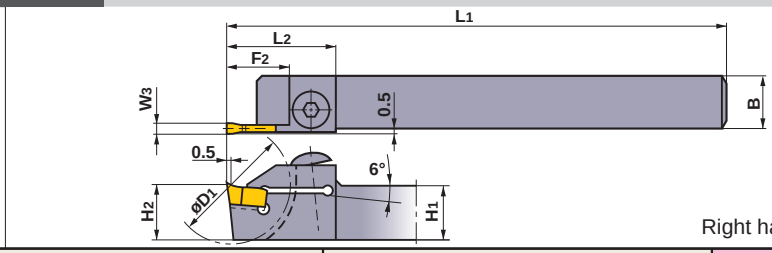
	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel · Alloy Steel	180HB−280HB	**VP15TF**	100 (50−150)	0.05 (0.02−0.09)
	Free Cutting Steel	–	**VP15TF**	110 (30−180)	0.05 (0.01−0.09)
M	Stainless Steel	≤200HB	**VP15TF**	80 (50−120)	0.03 (0.02−0.05)
N	Non-Ferrous Metal	–	**VP15TF**	150 (70−230)	0.07 (0.03−0.11)

SPARE PARTS E001
TECHNICAL DATA F001

EXTERNAL CUTTING OFF

CTDH





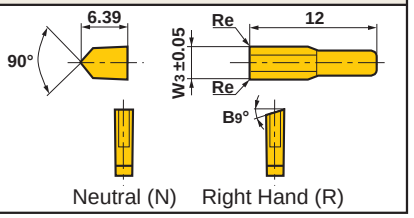
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	H2	L1	L2	F2	Max. Cut Off Diameter D1 (mm)	* Clamp Screw	Wrench
CTDHR/L1616-230	●		CTDT	2535○○	16	16	16	125	24	12.2	23	HBH06020	HKY40R
1616-280	●			2535○○	16	16	16	120	25	15	28	NS502W	HKY25R
1616-350	●	●		2535○○	16	16	16	125	32	18.5	35	HBH06020	HKY40R

∗ Clamp Torque (N • m) : HBH06020=7.0, NS502W=2.2

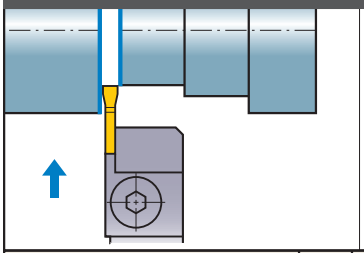
INSERTS

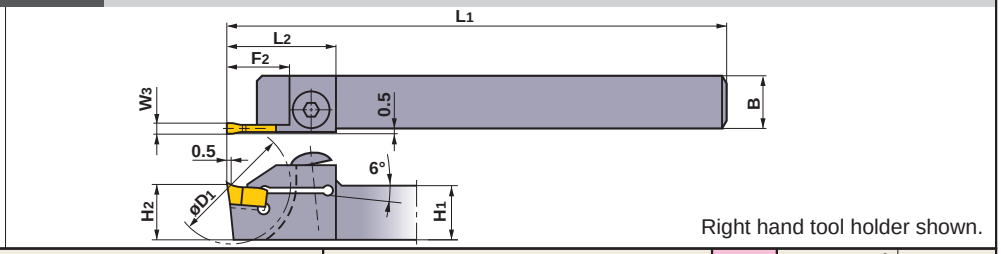
Breaker	Order Number	Hand	Coated VP15TF	Dimensions (mm) W3	B9	Re	Max. Cut Off Diameter (mm)	Geometry
With Breaker	**CTDT2535002N-B**	N	●	2.5	0°	0.2	23—35	
	25350V5R-B	R	●	2.5	8°	≦ 0.05	23—35	
	25350V5R-BS	R	●	2.5	17°	≦ 0.05	23—35	
	2535002R-B	R	●	2.5	8°	0.2	23—35	



● : Inventory maintained in Japan. (10 inserts in one case)

CTEH





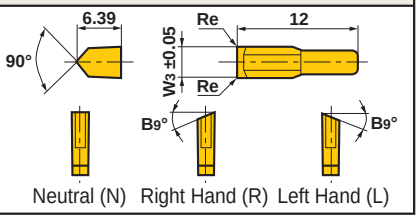
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	H2	L1	L2	F2	Max. Cut Off Diameter D1 (mm)	* Clamp Screw	Wrench
CTEHR/L1616-230	●		CTET	3035○○	16	16	16	125	24	12.2	23	HBH06020	HKY40R
1616-280	●			3035○○	16	16	16	120	25	15	28	NS502W	HKY25R
1616-350	●	●		3035○○	16	16	16	125	32	18.5	35	HBH06020	HKY40R

* Clamp Torque (N • m) : HBH06020=7.0, NS502W=2.2

INSERTS

Breaker	Order Number	Hand	Coated VP15TF	Dimensions (mm) W3	B9	Re	Max. Cut Off Diameter (mm)	Geometry
With Breaker	**CTET30350V5R-B**	R	●	3	8°	≤ 0.05	23—35	
	30350V5R-BS	R	●	3	17°	≤ 0.05	23—35	
	3035002N-B	N	●	3	0°	0.2	23—35	
	3035002R-B	R	●	3	8°	0.2	23—35	
	3035002L-B	L	●	3	8°	0.2	23—35	



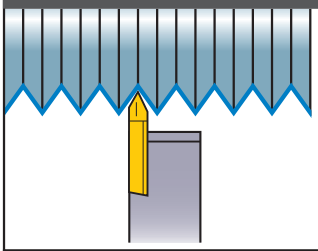
RECOMMENDED CUTTING CONDITIONS

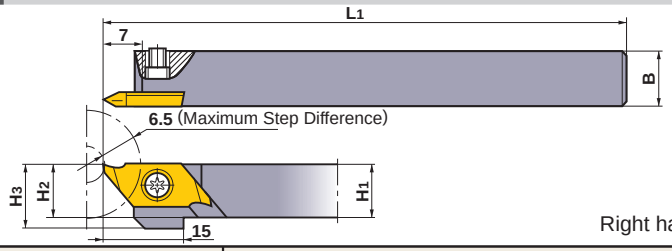
	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel · Alloy Steel	180HB—280HB	**VP15TF**	100 (50—150)	0.05 (0.02—0.09)
	Free Cutting Steel	—	**VP15TF**	110 (30—180)	0.05 (0.01—0.09)
M	Stainless Steel	≤200HB	**VP15TF**	80 (50—120)	0.03 (0.02—0.05)
N	Non-Ferrous Metal	—	**VP15TF**	150 (70—230)	0.07 (0.03—0.11)

SPARE PARTS E001
TECHNICAL DATA F001

EXTERNAL THREADING

TTAH





Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) H1	B	H2	L1	H3	* Clamp Screw	Wrench
TTAHR/L0810	●	●	TTAT	○○○○	8	10	8	120	12	NS402W	NKY15R
1010	●	●		○○○○	10	10	10	120	12	NS402W	NKY15R
1212	●	●		○○○○	12	12	12	120	–	NS403W	NKY15R
1616	●	●		○○○○	16	16	16	120	–	NS403W	NKY15R

* Clamp Torque (N • m) : NS402W=0.7, NS403W=0.7

INSERTS

Holder	Setting Geometry	Breaker	Geometry	Insert Geometry	Order Number	Hand	Coated VP15TF	Dimensions (mm) Z2	Dimensions (mm) Re	Pitch of Screw (mm) (thread/inch)
Right Hand (R)		With Breaker	General Purpose Partial Profile (60°)		**TTAT60075F5RR-B**	R	●	0.4	0.05 Flat	0.2—0.75 (80—36)
					60125V5RR-B	R	●	0.8	0.05	0.5—1.25 (40—16)
					60075F5RL-B	L	●	0.4	0.05 Flat	0.2—0.75 (80—36)
					60125V5RL-B	L	●	0.8	0.05	0.5—1.25 (40—16)
					6015001RN-B	N	●	1.25	0.1	1.0—1.5 (24—18)
Left Hand (L)					**60075F5LR-B**	R	●	0.4	0.05 Flat	0.2—0.75 (80—36)
					60125V5LR-B	R	●	0.8	0.05	0.5—1.25 (40—16)
					60075F5LL-B	L	●	0.4	0.05 Flat	0.2—0.75 (80—36)
					60125V5LL-B	L	●	0.8	0.05	0.5—1.25 (40—16)
					6015001LN-B	N	●	1.25	0.1	1.0—1.5 (24—18)
Right Hand (R)			General Purpose Partial Profile (55°)		**55158V5RR-B**	R	●	0.8	0.05	(40—16)
					55158V5RL-B	L	●	0.8	0.05	(40—16)
Left Hand (L)					**55158V5LR-B**	R	●	0.8	0.05	(40—16)
					55158V5LL-B	L	●	0.8	0.05	(40—16)

Right hand insert shown.

Right hand insert shown.

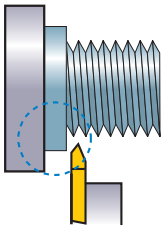
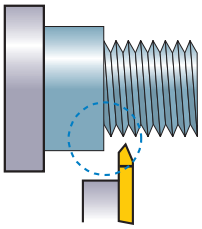
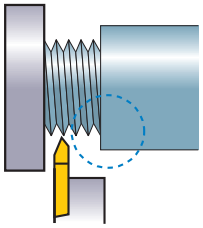
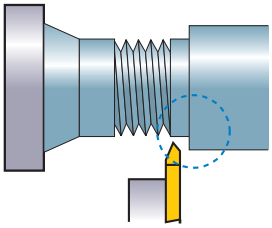
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Speed (m/min)
P	Carbon Steel · Alloy Steel	180HB—280HB	100 (50—150)
	Free Cutting Steel	–	110 (30—180)

	Work Material	Hardness	Cutting Speed (m/min)
M	Stainless Steel	≤200HB	80 (50—120)
N	Non-Ferrous Metal	–	150 (70—230)

● : **Inventory maintained in Japan. (10 inserts in one case)**

HOLDER APPLICATION

	Right Hand Holder	Left Hand Holder
Right Hand Insert		
Left Hand Insert		

∗The above combinations enable to machine the side of ◌.

THREAD RANGE

Application range

Pitch (mm)	Pitch Diameter of Thread (mm)										Number of Passes
	≥ϕ1.0	≥ϕ1.2	≥ϕ1.6	≥ϕ2.0	≥ϕ2.5	≥ϕ3.0	≥ϕ4.0	≥ϕ5.0	≥ϕ6.0	≥ϕ7.0	
0.2											2 – 4
0.25											
0.3											3 – 5
0.35											
0.4											4 – 6
0.45											
0.5											5 – 7
0.6											
0.7											
0.75											
0.8											
1											
1.25											6 – 8
1.5											

Threading impossible

∗Metric Thread (60°)

Pitch(thread/inch)	Pitch Diameter of Thread									Number of Passes
Inch	≥ϕ0.060	≥ϕ0.073	≥ϕ0.086	≥ϕ0.099	≥ϕ0.112	≥ϕ0.164	≥ϕ0.190	≥ϕ0.250	≥ϕ0.313	
mm	≥ϕ1.524	≥ϕ1.854	≥ϕ2.184	≥ϕ2.515	≥ϕ2.845	≥ϕ4.166	≥ϕ4.826	≥ϕ6.350	≥ϕ7.938	
80										3 – 5
72										
64										4 – 6
56										
48										5 – 7
44										
40										
32										
28										
26										
24										
20										6 – 8
18										
16										

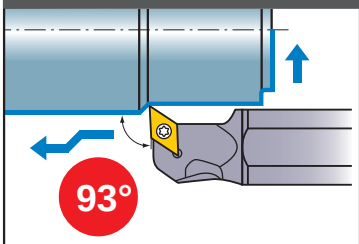
Threading impossible

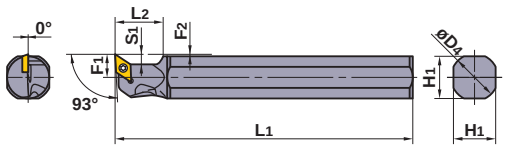
∗American UN, Whitworth

SPARE PARTS E001
TECHNICAL DATA F001

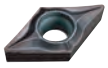
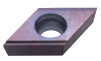
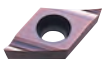
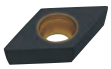
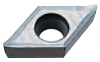
EXTERNAL FRONT TURNING, COPYING, FACING (FOR OPPOSITE TOOL POSTS)

SH





Left hand tool holder shown.

Finish	Finish	Light	Medium
SMG	R-F	R-SS	R-SN
			
(07, 11)	(07, 11)	(07, 11)	(07, 11)
Medium	**Flat top**	**For nonferrous metals**	**CBN/PCD**
R-SR		AZ	
			
(07, 11)	(07, 11)	(07, 11)	(07, 11)

Order Number	Stock	Insert Number		Dimensions (mm)							*	
	L			D4	L1	L2	H1	F1	S1	F2	Clamp Screw	Wrench
SH16H-FSDUCL07	●	DCET DCGT DCGW DCMT DCMW NP-DCGW NP-DCMT NP-DCMW	0702○○	15.875	100	20	14	7.75	4.2	0.75	TS254	TKY08R
19K-FSDUCL07	●			19.05	125	20	17	9.25	4.2	0.75	TS254	TKY08R
20K-FSDUCL07	●			20	125	20	18	9.75	4.2	0.75	TS254	TKY08R
22K-FSDUCL07	●			22	125	20	20	10.75	4.2	0.75	TS254	TKY08R
25M-FSDUCL07	●			25.4	150	20	23	12.25	4.2	0.75	TS254	TKY08R
SH16H-FSDUCL11	●	DCET DCGT DCGW DCMT DCMW NP-DCGW NP-DCMT NP-DCMW	11T3○○	15.875	100	20	15	7.75	6.4	0.75	TS43	TKY15R
19K-FSDUCL11	●			19.05	125	20	17	9.25	6.4	0.75	TS43	TKY15R
20K-FSDUCL11	●			20	125	20	18	9.75	6.4	0.75	TS43	TKY15R
22K-FSDUCL11	●			22	125	20	20	10.75	6.4	0.75	TS43	TKY15R
25M-FSDUCL11	●			25.4	150	20	23	12.25	6.4	0.75	TS43	TKY15R

(Note 1) When using insert with right and left hand chip breaker, please use right hand insert.
(Note 2) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
* Clamp Torque (N • m) : TS254=1.0, TS43=3.5

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel · Alloy Steel	180HB–280HB	**VP15TF**	100 (50–150)	0.08 (0.01–0.15)
	Free Cutting Steel	–	**VP15TF**	110 (30–180)	0.08 (0.01–0.15)
			NX2525	150 (50–250)	0.08 (0.01–0.15)
M	Stainless Steel	≤200HB	**VP15TF**	80 (50–120)	0.06 (0.02–0.1)
N	Non-Ferrous Metal	–	**HTi10**	150 (70–230)	0.09 (0.03–0.15)

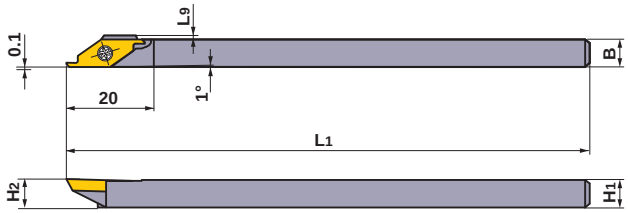
● : **Inventory maintained in Japan. (10 inserts in one case)**

CBN & PCD inserts A160, A161, A177

SH○○○ type inserts A094–A097

CAM TOOL POSTS

CSVH



Right hand tool holder shown.

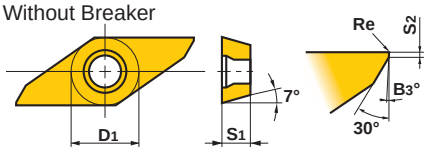
Order Number	Stock		Insert Number		Dimensions (mm)					Max. Cutting Depth (mm)	* Clamp Screw	Wrench
	R	L			H1	B	H2	L1	L9			
CSVHR/L0707	●	●	CSVT	○○○○	7	7	7	140	0.5	3.0	NS251	NKY15R
0808	●	●		○○○○	8	8	8	140	0	3.0	NS251	NKY15R
0909	●			○○○○	9.5	9.5	9.5	140	0	3.0	NS251	NKY15R
1010	●	●		○○○○	10	10	10	140	0	3.0	NS251	NKY15R
1212	●			○○○○	12	12	12	140	0	3.0	NS251	NKY15R

(Note 1) Please use right hand insert for right hand holder and left hand insert for left hand holder.
(Note 2) The depth of cut varies depending on the type of insert used.
* Clamp Torque (N • m) : NS251=0.7

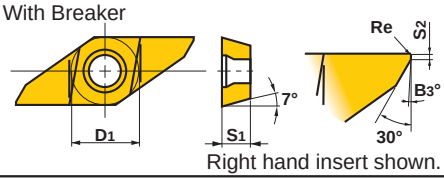
INSERTS

CSVTF — Front turning

Order Number	Hand	Coated	Dimensions (mm)					Max. Cutting Depth (mm)	Geometry
		VP15KZ	D1	S1	Re	S2	B3		
CSVTF30AR	R	●	6.35	2.38	0	0.3	5°	3.0	Without Breaker
30AL	L	●	6.35	2.38	0	0.3	5°	3.0	
30BR	R	●	6.35	2.38	0	0.3	2°	3.0	
30CR	R	●	6.35	2.38	0	0.15	2°	3.0	
30DR	R	●	6.35	2.38	0	0.15	5°	3.0	
CSVTF30AR-B	R	●	6.35	2.38	0	0.3	5°	3.0	With Breaker
30AL-B	L	●	6.35	2.38	0	0.3	5°	3.0	
30BR-B	R	●	6.35	2.38	0	0.3	2°	3.0	
30CR-B	R	●	6.35	2.38	0	0.15	2°	3.0	
30DR-B	R	●	6.35	2.38	0	0.15	5°	3.0	



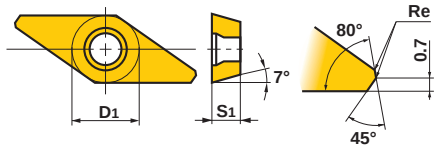
Right hand insert shown.



Right hand insert shown.

CSVTFXL — Front turning, Copying

Order Number	Hand	Coated	Dimensions (mm)			Max. Cutting Depth (mm)	Geometry
		VP15KZ	D1	S1	Re		
CSVTFXL	L	●	6.35	2.38	0	3.0	Without Breaker

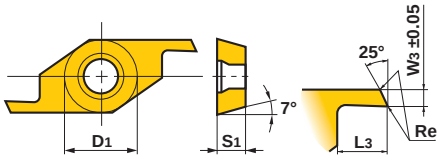


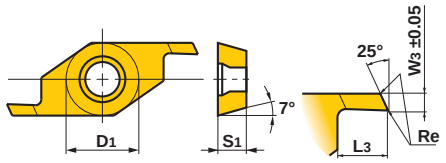
CAM TOOL POSTS

INSERTS

CSVTC — Cutting off

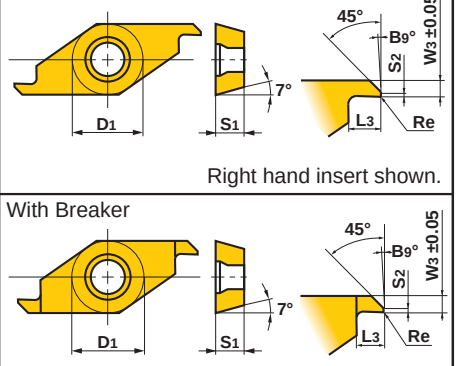
Order Number	Hand	Coated VP15KZ	Dimensions (mm) D1	S1	Re	L3	W3	Max. Cutting Depth (mm)	Geometry
CSVTC0640R	R	●	6.35	2.38	0	2.0	0.6	1.5	Without Breaker
0750R	R	●	6.35	2.38	0	2.5	0.7	2.0	
0750L	L	●	6.35	2.38	0	2.5	0.7	2.0	
0850R	R	●	6.35	2.38	0	2.5	0.8	2.0	
0850L	L	●	6.35	2.38	0	2.5	0.8	2.0	
0950R	R	●	6.35	2.38	0	2.5	0.9	2.0	
1060R	R	●	6.35	2.38	0	3.0	1.0	2.5	
1060L	L	●	6.35	2.38	0	3.0	1.0	2.5	
1360R	R	●	6.35	2.38	0	3.0	1.3	2.5	
1360L	L	●	6.35	2.38	0	3.0	1.3	2.5	
1560R	R	●	6.35	2.38	0	3.0	1.5	2.5	
1560L	L	●	6.35	2.38	0	3.0	1.5	2.5	Right hand insert shown.
CSVTC0640R-B	R	●	6.35	2.38	0	2.0	0.6	1.5	With Breaker
0750R-B	R	●	6.35	2.38	0	2.5	0.7	2.0	
0850R-B	R	●	6.35	2.38	0	2.5	0.8	2.0	
0950R-B	R	●	6.35	2.38	0	2.5	0.9	2.0	
1060R-B	R	●	6.35	2.38	0	3.0	1.0	2.5	
1360R-B	R	●	6.35	2.38	0	3.0	1.3	2.5	
1560R-B	R	●	6.35	2.38	0	3.0	1.5	2.5	





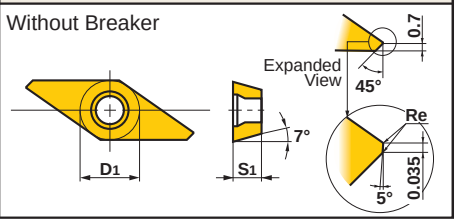
CSVTB — Back turning

Order Number	Hand	Coated VP15KZ	Dimensions (mm) D1	S1	Re	L3	W3	S2	B9	Max. Cutting Depth (mm)	Geometry
CSVTB10AR	R	●	6.35	2.38	0	2.5	1	0.3	5°	2.0	Without Breaker
10AL	L	●	6.35	2.38	0	2.5	1	0.3	5°	2.0	
10BR	R	●	6.35	2.38	0	2.5	1	0.3	2°	2.0	
10CR	R	●	6.35	2.38	0	2.5	1	0.15	2°	2.0	
10DR	R	●	6.35	2.38	0	2.5	1	0.15	5°	2.0	
12AR	R	●	6.35	2.38	0	2.5	1.2	0.3	5°	2.0	
14AR	R	●	6.35	2.38	0	2.5	1.4	0.3	5°	2.0	Right hand insert shown.
CSVTB10AR-B	R	●	6.35	2.38	0	2.5	1	0.3	5°	2.0	With Breaker
10BR-B	R	●	6.35	2.38	0	2.5	1	0.3	2°	2.0	
10CR-B	R	●	6.35	2.38	0	2.5	1	0.15	2°	2.0	
10DR-B	R	●	6.35	2.38	0	2.5	1	0.15	5°	2.0	
12AR-B	R	●	6.35	2.38	0	2.5	1.2	0.3	5°	2.0	
14AR-B	R	●	6.35	2.38	0	2.5	1.4	0.3	5°	2.0	



CSVTBXL — Back turning, Copying

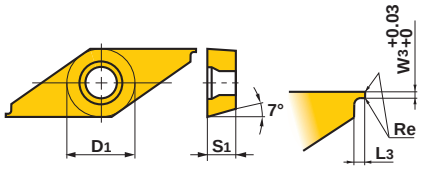
Order Number	Hand	Coated VP15KZ	Dimensions (mm) D1	S1	Re	Max. Cutting Depth (mm)	Geometry
CSVTBXL	L	●	6.35	2.38	0	3.0	Without Breaker



● : Inventory maintained in Japan. (10 inserts in one case)

CSVTG — Grooving

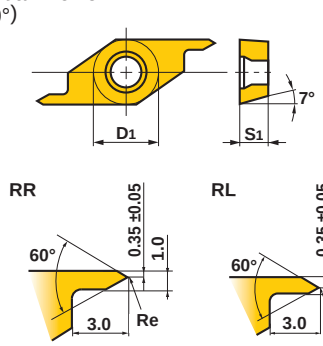
Order Number	Hand	Coated VP15KZ	Dimensions (mm) D1	S1	Re	L3	W3	Max. Cutting Depth (mm)	Geometry
CSVTG02505R	R	●	6.35	2.38	0	0.5	0.25	0.15	Without Breaker
03005R	R	●	6.35	2.38	0	0.5	0.3	0.15	
03505R	R	●	6.35	2.38	0	0.5	0.35	0.15	
04005R	R	●	6.35	2.38	0	0.5	0.4	0.15	
04510R	R	●	6.35	2.38	0	1.0	0.45	0.45	
05010R	R	●	6.35	2.38	0	1.0	0.5	0.45	
05510R	R	●	6.35	2.38	0	1.0	0.55	0.45	
06010R	R	●	6.35	2.38	0	1.0	0.6	0.45	
06510R	R	●	6.35	2.38	0	1.0	0.65	0.45	
07010R	R	●	6.35	2.38	0	1.0	0.7	0.45	
07520R	R	●	6.35	2.38	0	2.0	0.75	1.4	
07520L	L	●	6.35	2.38	0	2.0	0.75	1.4	
08020R	R	●	6.35	2.38	0	2.0	0.8	1.4	
08520R	R	●	6.35	2.38	0	2.0	0.85	1.4	
09020R	R	●	6.35	2.38	0	2.0	0.9	1.4	
09520R	R	●	6.35	2.38	0	2.0	0.95	1.4	
09520L	L	●	6.35	2.38	0	2.0	0.95	1.4	
10020R	R	●	6.35	2.38	0	2.0	1.0	1.4	
11030R	R	●	6.35	2.38	0	3.0	1.1	2.6	
12030R	R	●	6.35	2.38	0	3.0	1.2	2.6	
12030L	L	●	6.35	2.38	0	3.0	1.2	2.6	
13030R	R	●	6.35	2.38	0	3.0	1.3	2.6	
14030R	R	●	6.35	2.38	0	3.0	1.4	2.6	
15030R	R	●	6.35	2.38	0	3.0	1.5	2.6	



Right hand insert shown.

CSVTT — Threading

Order Number	Hand	Coated VP15KZ	Pitch (mm)	Dimensions (mm) D1	S1	Re	Geometry
CSVTT60050RR	R	●	0.2—0.5	6.35	2.38	0.03	Without Breaker General Purpose Partial Profile (60°)
60050RL	L	●	0.2—0.5	6.35	2.38	0.03	



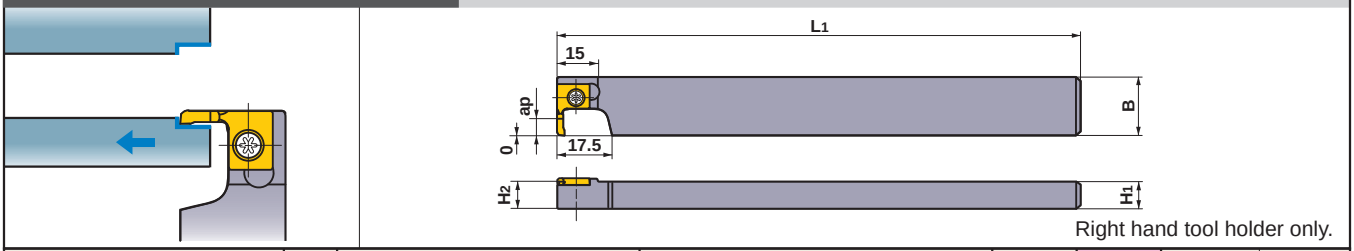
Right hand insert shown.

SPARE PARTS E001
TECHNICAL DATA F001

BORING

SBAH

Without off set



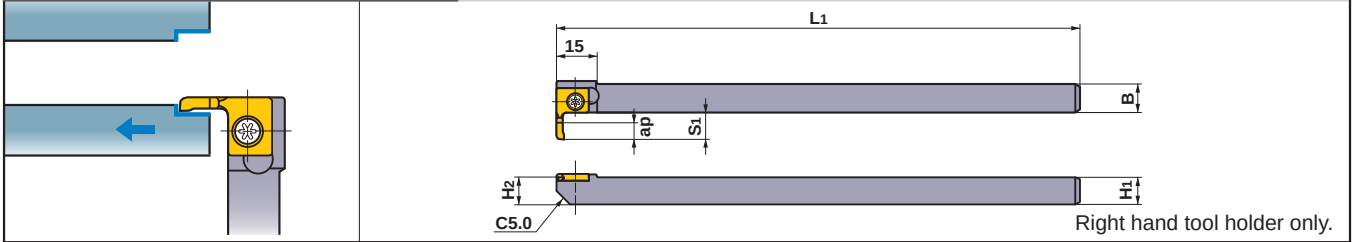
Right hand tool holder only.

Order Number	Stock	Insert Number		Dimensions (mm)				Max. Cutting Depth (mm)	Min. Cutting Diameter (mm)	*	
	R			H1	B	L1	H2	ap		Clamp Screw	Wrench
SBAHR1022	●	SBAT	3080□□L/L-B	10	21.5	120	10	8	3	NS402W	NKY15R
1222	●	SBAT	3080□□L/L-B	12	21.5	120	12	8	3	NS403W	NKY15R

∗ Clamp Torque (N • m) : NS402W=0.7, NS403W=0.7

SBAH

With off set



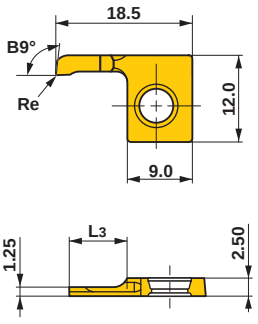
Right hand tool holder only.

Order Number	Stock	Insert Number		Dimensions (mm)					Max. Cutting Depth (mm)	Min. Cutting Diameter (mm)	*	
	R			H1	B	L1	H2	S1	ap		Clamp Screw	Wrench
SBAHR1010	●	SBAT	3080□□L/L-B	10	10	120	10	10	8	3	NS402W	NKY15R

∗ Clamp Torque (N • m) : NS402W=0.7

INSERTS

Breaker	Order Number	Coated	Dimensions (mm)			Min. Cutting Diameter (mm)	Geometry
		VP15KZ	B9°	Re	L3		
Without Breaker	**SBAT308000L**	●	95°	0	8.0	3	
	3080V5L	●	95°	0.05	8.0	3	
With Breaker	**SBAT308000L-B**	●	95°	0	8.0	3	
	3080V5L-B	●	95°	0.05	8.0	3	



● : Inventory maintained in Japan. (10 inserts in one case)

SPARE PARTS E001
TECHNICAL DATA F001

Memo

HOW TO READ THE STANDARD OF BORING BARS

●How this section page is organized

①Organized by product series.
(Refer to the index on the next page.)

TYPE OF BORING BAR
indicates the initial letters for the order number, as well as applicable insert types.

TITLE OF PRODUCT SERIES

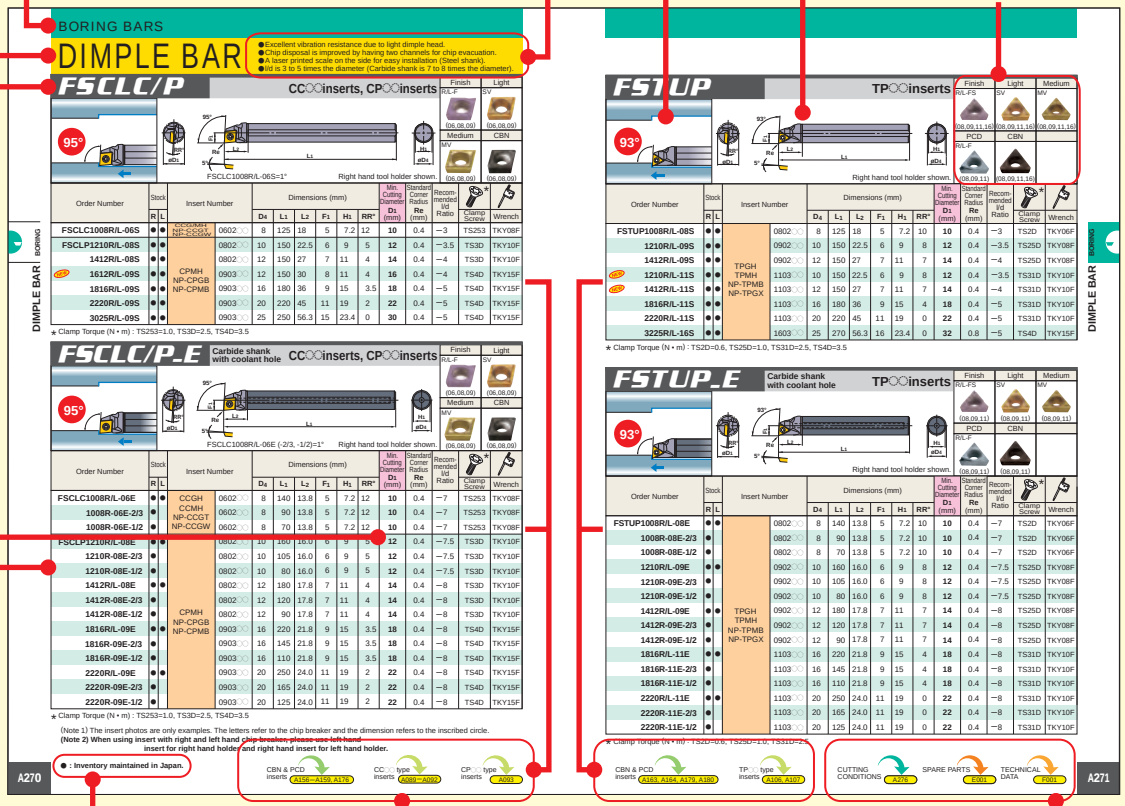
PRODUCT SECTION

PRODUCT FEATURES

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict available machining applications along with cutting edge lead angles.

GEOMETRY

CHIP BREAKER BY CUTTING APPLICATION



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

REFERENCE PAGE FOR APPLICABLE INSERTS
indicates reference pages for details of inserts that are applicable to the title product.

PAGE REFERENCE
·SPARE PARTS
·TECHNICAL DATA
indicates reference pages, including the above, on the right hand page of each double-page spread.

PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, minimum cutting diameters, standard corner radius, recommended l/d ratios, and spare parts.

MIN. CUTTING DIAMETER
is colour-coded to let you find, at a glance, the maximum / minimum cutting diameters for internal machining.

●To Order : Please specify
①order number and hand of tool (right/left).

TURNING TOOLS

BORING BARS

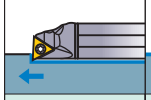
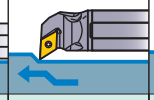
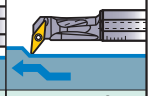
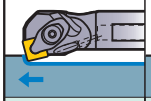
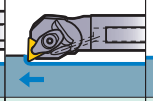
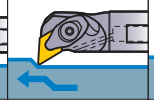
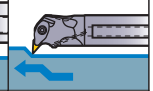
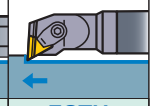
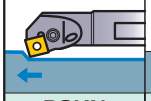
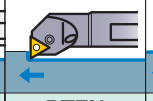
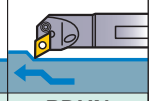
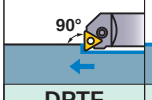
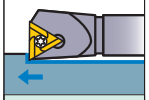
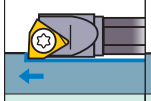
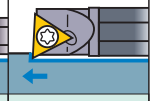
CLASSIFICATION OF BORING TOOLS ····· A266
IDENTIFICATION ····· A268

STANDARD BORING BARS
FEATURES OF DIMPLE BAR ····· A269
DIMPLE BAR ····· A270
DOUBLE CLAMP DIMPLE BAR ····· A277
MICRO-DEX BORING BARS ····· A280
MICRO-MINI TWIN BORING BARS ····· A283
MICRO-MINI BORING BARS ····· A286
F TYPE BORING BARS ····· A289
S TYPE BORING BARS ····· A292
P TYPE BORING BARS ····· A299
M TYPE BORING BARS ····· A303
AL TYPE BORING BARS ····· A304
D TYPE BORING HEAD ····· A305

*Arranged by Alphabetical order

A277 **A○○○-DCLN**
A277 **A○○○-DDUN**
A278 **A○○○-DSKN**
A278 **A○○○-DTFN**
A279 **A○○○-DVUN**
A279 **A○○○-DWLN**
A303 **A○○○MWLN**
A300 **A○○○PCLN**
A301 **A○○○PDQN**
A300 **A○○○PDUN**
A302 **A○○○PDZN**
A299 **A○○○PSKN**
A299 **A○○○PTFN**
A301 **A○○○PWLN**
A286 **C○○○○-BLS**
A280 **C○○○SCLC**
A294 **C○○○SCLC**
A295 **C○○○SDQC**
A293 **C○○○SDUC**
A292 **C○○○STFC**
A281 **C○○○STUC**
A296 **C○○○SVQC**
A280 **C○○○SWUB**
A283 **CB**
A284 **CR**
A306 **DPCL**
A306 **DPDH**
A305 **DPDU**
A305 **DPTF**
A307 **DPVP**
A290 **FCTU1**
A290 **FCTU2**
A270 **FSCLC/P**
A273 **FSDQC**
A272 **FSDUC**
A289 **FSTU1**
A289 **FSTU2**
A271 **FSTUP**
A276 **FSVJB/C**
A275 **FSVPB/C**
A275 **FSVUB/C**
A291 **FSWL1**
A291 **FSWL2**
A274 **FSWUB/P**
A282 **RBH**
A287 **RBH**
A294 **S○○○SCLC**
A298 **S○○○SCZC**
A295 **S○○○SDQC**
A293 **S○○○SDUC**
A297 **S○○○SSKC**
A292 **S○○○STFC**
A304 **S○○○STFE**
A296 **S○○○SVQC**
A297 **S○○○SVUC**
A288 **SBH**

CLASSIFICATION

Name of Tool Holder	Features	θ=75°	θ=91°	θ=93°		
DIMPLE BAR	● The minimum cutting diameter is from ϕ10. ● 5°, 7°, 11° positive insert. ● Excellent vibration resistance due to a light dimple head. ● l/d is 3 to 5 times the diameter (Carbide shank is 7 to 8 times the diameter).			 **FSTUP** ➲ A271	 **FSDUC** ➲ A272	 **FSVUB/C** ➲ A275
DOUBLE CLAMP DIMPLE BAR	● The minimum cutting diameter is from ϕ32. ● Economical negative insert. ● Single action type. ● Excellent vibration resistance due to a light dimple head. (With coolant hole.) ● l/d is 3 to 4 times the diameter.	 **DSKN** ➲ A278	 **DTFN** ➲ A278	 **DDUN** ➲ A277	 **DVUN** ➲ A279	
F Type Boring Bars	● The minimum cutting diameter is from ϕ5.8. ● 11°positive insert. ● Screw-on type and Clamp-on type. ● l/d is 3 to 5 times the diameter. ● FSWL type is 7°positive insert.			**FSTU** ➲ A289	 **FCTU** ➲ A290	
S Type Boring Bars	● The minimum cutting diameter is from ϕ11. ● ISO standard. ● 7°positive insert. ● Screw-on type. ● l/d is 3 to 5 times the diameter (Carbide shank is 7 times the diameter).	**SSKC** ➲ A297	**STFC** ➲ A292	**SDUC** ➲ A293	**SVUC** ➲ A297	
P Type Boring Bars	● The minimum cutting diameter is from ϕ25. ● ISO standard. ● Economical negative insert. ● Lever lock type, and pin lock type. ● l/d is 3 times the diameter.	 **PSKN** ➲ A299	 **PTFN** ➲ A299	 **PDUN** ➲ A300		
D Type Boring Head	● The minimum cutting diameter is from ϕ40. ● Economical negative insert. ● Lever lock type. ● Exchangeable head type.		 **DPTF** ➲ A305	**DPDU** ➲ A305		
M Type Boring Bars	● The minimum cutting diameter is from ϕ32. ● Negative trigon shape insert. ● Double clamp type. ● l/d is 3 times the diameter.					
AL Type Boring Bars	● The minimum cutting diameter is from ϕ20. ● Suitable for non-ferrous metal. ● 20°positive insert. ● Screw-on type. ● l/d is 6 times the diameter. ● Excellent vibration resistance.		 **STFE** ➲ A304			
MICRO-DEX Boring Bars (Carbide Shank)	● The minimum cutting diameter is from ϕ5. ● 7°positive insert. ● Carbide shank type. ● Easy-to-use tool geometries. ● Suitable for small workpieces. ● l/d is 5 times the diameter.			 **SWUB** ➲ A280	 **STUC** ➲ A281	
MICRO-MINI TWIN Boring Bars	● The minimum cutting diameter is from ϕ2.2. ● Solid carbide type with two cutting edges. ● Continuous cutting from boring to facing. ● With or without a chip breaker.					
MICRO-MINI Boring Bars	● The minimum cutting diameter is from ϕ3.2. ● Solid carbide type (Single cutting edges). ● l/d is 5 times the diameter. ● Cutting edge can be shaped according to the application. Thus, it covers a wide cutting range (threading,grooving,copying, etc.).	C○○FR-BLS ➲ A286				

(Note 1) Holders with blue colour symbol have an anti-vibration carbide shank. (For Micro-dex boring bars, carbide shank only.)

θ=93°	θ=95°	θ=107°30′—117°30′	θ=142°	θ=3°, 5°	Economical	Low Cutting Resistance (Sharpness)	Clamp Rigidity	Vibration Resistance	Operation Efficiency	Coolant Hole	Specialized	Small Diameter Cutting
FSWUB/P → A274	FSCLC/P → A270	FSDQC → A273	FSVPB/C → A275	FSVJB/C → A276		◎		◎*	◎	◎*		
	DCLN → A277	DWLN → A279										
	FSWL → A291					○		○*				○*
	SCLC → A280		SDQC → A295	SVQC → A296	SCZC → A298		○		○*				
	PCLN → A300	PWLN → A301	PDQN → A301		PDZN → A302	◎		○		◎	◎		
	DPCL → A306		DPDH → A306	DPVP → A307		◎		○		◎			
	MWLN → A303					◎		◎		○	◎		
							◎		○		◎		
	SCLC → A294							◎				◎
	CB□□RS(-B) → A283			CR → A284			◎		◎				◎
							◎						◎

(Note 2) ◎ : 1st recommendation. ○ : 2nd recommendation.
(Note 3) ✱Indicates that the shank material is carbide.

IDENTIFICATION

DIMPLE BAR

①Function	
F	Fix type

②Clamp Structure	
S	Screw-on

③Insert Shape	
C	RHOMBIC 80°
D	RHOMBIC 55°
T	TRIANGULAR 60°
V	RHOMBIC 35°
W	TRIGON

④Cutting Angle	
U	93°
L	95°
Q	107°30´
P	117°30´
J	142°

⑤Insert Clearance	
B	5°
C	7°
P	11°

⑥Min.Cutting Diameter (mm)			
10	10	22	22
12	12	25	25
13	13	30	30
14	14	32	32
16	16	34	34
18	18	40	40
20	20		

⑦Shank Diameter (mm)	
08	8
10	10
12	12
16	16
20	20
25	25
32	32

⑧Hand of Tool	
R	Right Hand
L	Left Hand

⑨Cutting Edge Length (mm)					
Inscribed circle of insert	4.76	5.56	6.35	7.94	9.525
RHOMBIC 80°	–	–	**06**	**08**	**09**
RHOMBIC 55°	–	–	**07**	–	**11**
TRIANGULAR 60°	**08**	**09**	**11**	–	**16**
RHOMBIC 35°	**08**	–	**11**	–	**16**
TRIGON	**L3**	–	**04**	–	**06**

⑩Shank Material	
E	Carbide Shank
S	Steel Shank

⑪Tool Length (Carbide shank only) (mm)					
Shank Dia.	8	10	12	16	20
No symbol	140	160	180	220	250
2/3	90	105	120	145	165
1/2	70	80	90	110	125

ISO TYPE Boring tools
[For Aluminium Alloy, M-type, P-type and S-type]

①Shank Material	
A	Steel Shank with Coolant Hole
C	Carbide Shank
E	Carbide Shank with Coolant Hole
S	Steel Shank

②Shank Diameter (mm)	
08	8
10	10
12	12
16	16
20	20
25	25
32	32
40	40

③Tool Length (mm)	
F	80
H	100
K	125
M	150
Q	180
R	200
S	250
T	300
U	350
V	400

④Clamp Structure	
M	Double Clamp
P	Lever Lock
S	Screw-on

⑤Insert Shape	
C	RHOMBIC 80°
D	RHOMBIC 55°
S	SQUARE 90°
T	TRIANGULAR 60°
V	RHOMBIC 35°

⑥Cutting Angle	
F	91°
K	75°
L	95°
Q	107°30´
U	93°

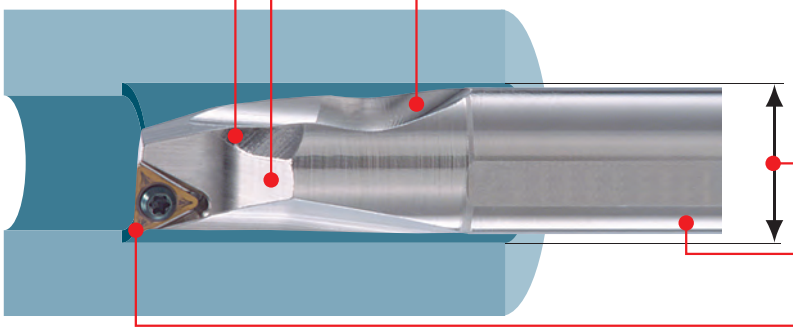
⑦Insert Clearance	
C	7°Positive
E	20°Positive
N	0°
P	11°Positive

⑧Hand of Tool	
R	Right Hand
L	Left Hand

⑨Cutting Edge Length (mm)					
Inscribed circle of insert	6.35	7.94	9.525	12.70	19.05
RHOMBIC 80°	**06**	**08**	**09**	**12**	**19**
RHOMBIC 55°	**07**	–	**11**	**15**	–
SQUARE 90°	–	–	**09**	**12**	**19**
TRIANGULAR 60°	**11**	–	**16**	**22**	–
RHOMBIC 35°	**11**	–	**16**	–	–

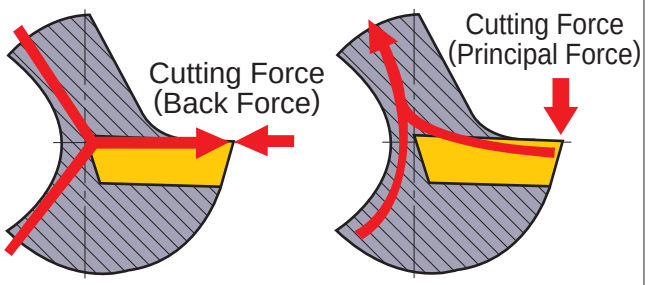
FEATURES OF DIMPLE BAR

Highly rigid steel shank and a lightweight head configuration designed by computer simulation analysis reduces chatter and improves the vibration damping properties.



- Chip disposal is improved by having two channels for chip evacuation.
- The lightweight head with its large dimple reduces chatter.
- Available in sizes smaller than the ISO standard. Therefore the boring of small diameter holes is possible.
- The boring bar has a laser printed scale on the shank to facilitate easy installation.
- "F and FS" breakers improves the quality of the surface finish, "MV" breaker offers excellent chip disposal. High wear resistant CBN inserts are also available for the machining of hardened materials.

DEFLECTION RESISTANCE



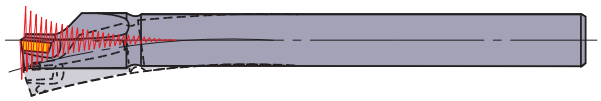
The unique cross sectional shape engineered into the dimple effectively balances the cutting forces (principal and back force), and reduces deflection by up to 17 %.

Boring Bar	Deflection
DIMPLE BAR	28.3μm
Conventional Bar	34μm

VIBRATION RESISTANCE

●DIMPLE BAR

Weight of the Head	Damping Time
49.7g	15.8ms



By reducing the weight of the head, the damping properties are increased.

●Conventional Product

Weight of the Head	Damping Time
70.1g	20ms

⁎The simulation data stated above was conducted with a FSCLP1816R-09S holder, under the following conditions; l/d=5, depth of cut=0.5mm, and feed=0.05mm/rev.

Direction for the use of CCG/MT • CPG/MT• CPMX • TPG/MX type inserts

By changing the clamp screw, it is possible to use the inserts listed in the table below.

Holder : FSCLC/P • FSCLC/P...E

Insert Number	Clamp Screw
CCG/MT0602○○ (ϕ6.35)	Can be used as it is.
CPG/MT0802○○ (ϕ7.94)	Change to **TS3**
CPG/MT0903○○ (ϕ9.525)	Change to **TS4**
CPMX0802○○ (ϕ7.94)	Can be used as it is.
CPMX0903○○ (ϕ9.525)	Can be used as it is.

Holder : FSTUP • FSTUP...E

Insert Number	Clamp Screw
TPG/MX0802○○ (ϕ4.76)	Change to **CS200T**
TPG/MX0902○○ (ϕ5.56)	Change to **CS250T**
TPG/MX1103○○ (ϕ9.525)	Change to **CS300890T**

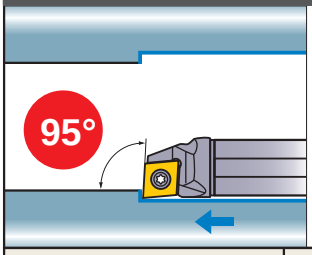
⁎If the screw is too long then please shorten as necessary.
(Note) TPMT/W09,W11 types cannot be used due to a different clamp screw size.

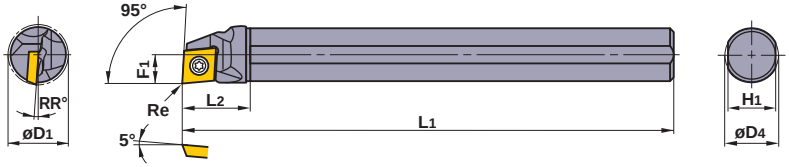
DIMPLE BAR

- Excellent vibration resistance due to light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- l/d is 3 to 5 times the diameter (Carbide shank is 7 to 8 times the diameter).

FSCLC/P

CC○○inserts, CP○○inserts





FSCLC1008R/L-06S=1°　　Right hand tool holder shown.

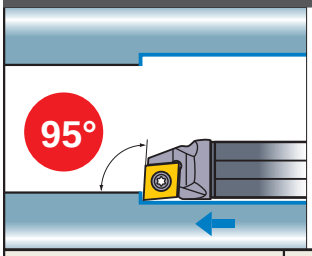
Finish	Light
R/L-F	SV
(06,08,09)	(06,08,09)
Medium	**CBN**
MV	
(06,08,09)	(06,08,09)

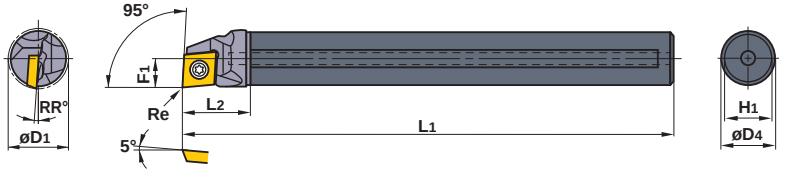
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	✱ Clamp Screw	Wrench
FSCLC1008R/L-06S	●	●	CCG/MH NP-CCGT NP-CCGW	0602○○	8	125	18	5	7.2	12	**10**	0.4	−3	TS253	TKY08F
FSCLP1210R/L-08S	●	●	CPMH NP-CPGB NP-CPMB	0802○○	10	150	22.5	6	9	5	**12**	0.4	−3.5	TS3D	TKY10F
1412R/L-08S	●	●		0802○○	12	150	27	7	11	4	**14**	0.4	−4	TS3D	TKY10F
NEW **1612R/L-09S**	●	●		0903○○	12	150	30	8	11	4	**16**	0.4	−4	TS4D	TKY15F
1816R/L-09S	●	●		0903○○	16	180	36	9	15	3.5	**18**	0.4	−5	TS4D	TKY15F
2220R/L-09S	●	●		0903○○	20	220	45	11	19	2	**22**	0.4	−5	TS4D	TKY15F
3025R/L-09S	●	●		0903○○	25	250	56.3	15	23.4	0	**30**	0.4	−5	TS4D	TKY15F

✱ Clamp Torque (N • m) : TS253=1.0, TS3D=2.5, TS4D=3.5

FSCLC/P_E

Carbide shank with coolant hole　**CC○○inserts, CP○○inserts**





FSCLC1008R/L-06E (-2/3, -1/2)=1°　　Right hand tool holder shown.

Finish	Light
R/L-F	SV
(06,08,09)	(06,08,09)
Medium	**CBN**
MV	
(06,08,09)	(06,08,09)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	✱ Clamp Screw	Wrench
FSCLC1008R/L-06E	●	●	CCGH CCMH NP-CCGT NP-CCGW	0602○○	8	140	13.8	5	7.2	12	**10**	0.4	−7	TS253	TKY08F
1008R-06E-2/3	●			0602○○	8	90	13.8	5	7.2	12	**10**	0.4	−7	TS253	TKY08F
1008R-06E-1/2	●			0602○○	8	70	13.8	5	7.2	12	**10**	0.4	−7	TS253	TKY08F
FSCLP1210R/L-08E	●	●	CPMH NP-CPGB NP-CPMB	0802○○	10	160	16.0	6	9	5	**12**	0.4	−7.5	TS3D	TKY10F
1210R-08E-2/3	●			0802○○	10	105	16.0	6	9	5	**12**	0.4	−7.5	TS3D	TKY10F
1210R-08E-1/2	●			0802○○	10	80	16.0	6	9	5	**12**	0.4	−7.5	TS3D	TKY10F
1412R/L-08E	●	●		0802○○	12	180	17.8	7	11	4	**14**	0.4	−8	TS3D	TKY10F
1412R-08E-2/3	●			0802○○	12	120	17.8	7	11	4	**14**	0.4	−8	TS3D	TKY10F
1412R-08E-1/2	●			0802○○	12	90	17.8	7	11	4	**14**	0.4	−8	TS3D	TKY10F
1816R/L-09E	●	●		0903○○	16	220	21.8	9	15	3.5	**18**	0.4	−8	TS4D	TKY15F
1816R-09E-2/3	●			0903○○	16	145	21.8	9	15	3.5	**18**	0.4	−8	TS4D	TKY15F
1816R-09E-1/2	●			0903○○	16	110	21.8	9	15	3.5	**18**	0.4	−8	TS4D	TKY15F
2220R/L-09E	●	●		0903○○	20	250	24.0	11	19	2	**22**	0.4	−8	TS4D	TKY15F
2220R-09E-2/3	●			0903○○	20	165	24.0	11	19	2	**22**	0.4	−8	TS4D	TKY15F
2220R-09E-1/2	●			0903○○	20	125	24.0	11	19	2	**22**	0.4	−8	TS4D	TKY15F

✱ Clamp Torque (N • m) : TS253=1.0, TS3D=2.5, TS4D=3.5

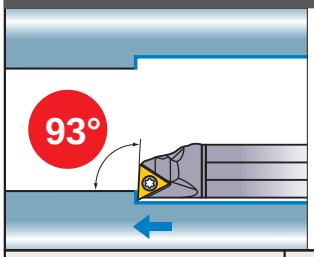
(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

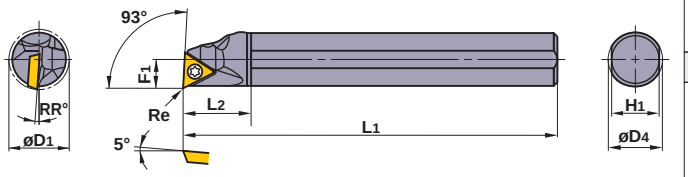
● : Inventory maintained in Japan.

CBN & PCD inserts A156−A159, A176
CC○○ type inserts A089−A092
CP○○ type inserts A093

FSTUP

TP○○inserts





Right hand tool holder shown.

Finish	Light	Medium
R/L-FS	SV	MV
(08,09,11,16)	(08,09,11,16)	(08,09,11,16)
PCD	**CBN**	
R/L-F		
(08,09,11)	(08,09,11,16)	

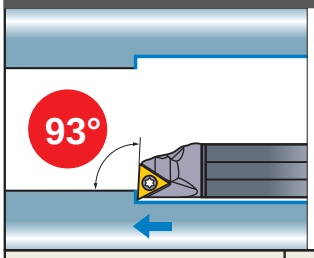
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	* Clamp Screw	Wrench
	R	L			D4	L1	L2	F1	H1	RR°	D1 (mm)	Re (mm)			
FSTUP1008R/L-08S	●	●	TPGH TPMH NP-TPMB NP-TPGX	0802○○	8	125	18	5	7.2	10	**10**	0.4	−3	TS2D	TKY06F
1210R/L-09S	●	●		0902○○	10	150	22.5	6	9	8	**12**	0.4	−3.5	TS25D	TKY08F
1412R/L-09S	●	●		0902○○	12	150	27	7	11	7	**14**	0.4	−4	TS25D	TKY08F
NEW **1210R/L-11S**	●	●		1103○○	10	150	22.5	6	9	8	**12**	0.4	−3.5	TS31D	TKY10F
NEW **1412R/L-11S**	●	●		1103○○	12	150	27	7	11	7	**14**	0.4	−4	TS31D	TKY10F
1816R/L-11S	●	●		1103○○	16	180	36	9	15	4	**18**	0.4	−5	TS31D	TKY10F
2220R/L-11S	●	●		1103○○	20	220	45	11	19	0	**22**	0.4	−5	TS31D	TKY10F
3225R/L-16S	●	●		1603○○	25	270	56.3	16	23.4	0	**32**	0.8	−5	TS4D	TKY15F

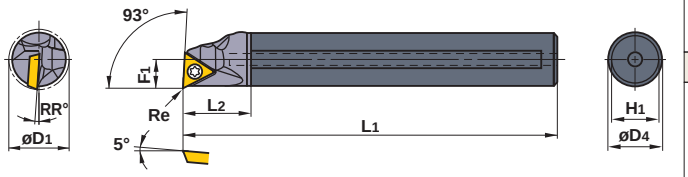
* Clamp Torque (N • m) : TS2D=0.6, TS25D=1.0, TS31D=2.5, TS4D=3.5

FSTUP_E

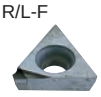
Carbide shank with coolant hole

TP○○inserts





Right hand tool holder shown.

Finish	Light	Medium
R/L-FS	SV	MV
(08,09,11)	(08,09,11)	(08,09,11)
PCD	**CBN**	
R/L-F		
		
(08,09,11)	(08,09,11)	

Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Recommended l/d Ratio	* Clamp Screw	Wrench
	R	L			D4	L1	L2	F1	H1	RR°	D1 (mm)	Re (mm)			
FSTUP1008R/L-08E	●	●	TPGH TPMH NP-TPMB NP-TPGX	0802○○	8	140	13.8	5	7.2	10	**10**	0.4	−7	TS2D	TKY06F
1008R-08E-2/3	●			0802○○	8	90	13.8	5	7.2	10	**10**	0.4	−7	TS2D	TKY06F
1008R-08E-1/2	●			0802○○	8	70	13.8	5	7.2	10	**10**	0.4	−7	TS2D	TKY06F
1210R/L-09E	●	●		0902○○	10	160	16.0	6	9	8	**12**	0.4	−7.5	TS25D	TKY08F
1210R-09E-2/3	●			0902○○	10	105	16.0	6	9	8	**12**	0.4	−7.5	TS25D	TKY08F
1210R-09E-1/2	●			0902○○	10	80	16.0	6	9	8	**12**	0.4	−7.5	TS25D	TKY08F
1412R/L-09E	●	●		0902○○	12	180	17.8	7	11	7	**14**	0.4	−8	TS25D	TKY08F
1412R-09E-2/3	●			0902○○	12	120	17.8	7	11	7	**14**	0.4	−8	TS25D	TKY08F
1412R-09E-1/2	●			0902○○	12	90	17.8	7	11	7	**14**	0.4	−8	TS25D	TKY08F
1816R/L-11E	●	●		1103○○	16	220	21.8	9	15	4	**18**	0.4	−8	TS31D	TKY10F
1816R-11E-2/3	●			1103○○	16	145	21.8	9	15	4	**18**	0.4	−8	TS31D	TKY10F
1816R-11E-1/2	●			1103○○	16	110	21.8	9	15	4	**18**	0.4	−8	TS31D	TKY10F
2220R/L-11E	●	●		1103○○	20	250	24.0	11	19	0	**22**	0.4	−8	TS31D	TKY10F
2220R-11E-2/3	●			1103○○	20	165	24.0	11	19	0	**22**	0.4	−8	TS31D	TKY10F
2220R-11E-1/2	●			1103○○	20	125	24.0	11	19	0	**22**	0.4	−8	TS31D	TKY10F

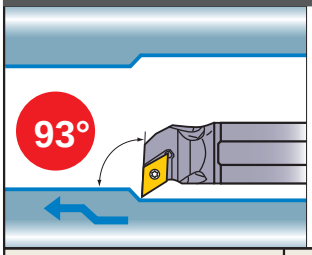
* Clamp Torque (N • m) : TS2D=0.6, TS25D=1.0, TS31D=2.5

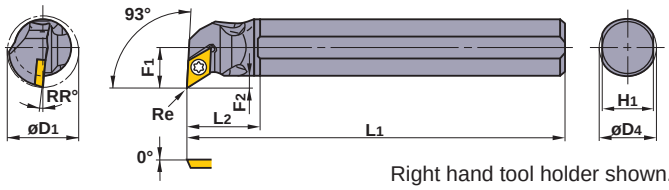
CBN & PCD inserts A163, A164, A179, A180
TP○○ type inserts A106, A107
CUTTING CONDITIONS A276
SPARE PARTS E001
TECHNICAL DATA F001

DIMPLE BAR

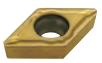
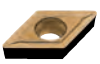
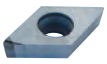
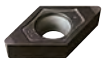
- Excellent vibration resistance due to light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- l/d is 3 to 5 times the diameter (Carbide shank is 7 to 8 times the diameter).

FSDUC — DC○○inserts





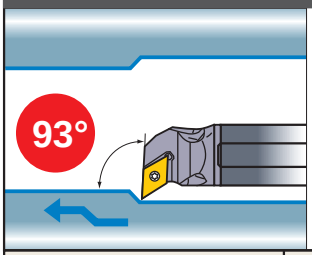
Right hand tool holder shown.

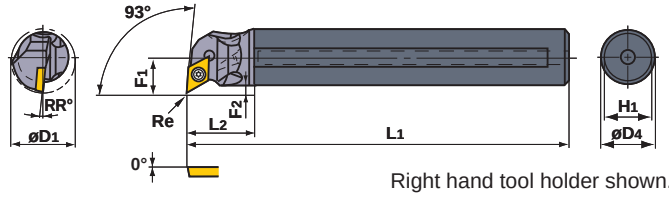
Finish	Light	Medium
FV	SV	MV
		
(07,11)	(07,11)	(07,11)
Medium	**PCD**	**CBN**
Standard	R/L-F	
		
(07,11)	(07,11)	(07,11)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	F2	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	* Clamp Screw	Wrench
FSDUC1410R/L-07S	●	●	DCMT DCET DCGT NP-DCMT NP-DCMW	0702○○	10	150	18	8.3	3.3	9	7.5	**14**	0.4	−3.5	TS25	TKY08F
1612R/L-07S	●	●		0702○○	12	150	20	9.3	3.3	11	6	**16**	0.4	−4	TS25	TKY08F
2016R/L-07S	●	●		0702○○	16	180	20	11.3	3.3	15	5	**20**	0.4	−5	TS25	TKY08F
3220R/L-11S	●	●		11T3○○	20	180	22.5	16.1	6.1	19	5	**32**	0.8	−5	TS43	TKY15F

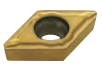
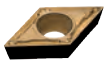
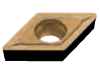
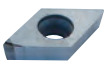
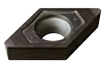
∗ Clamp Torque (N • m) : TS25=1.0, TS43=3.5

FSDUC_E — Carbide shank with coolant hole — DC○○inserts





Right hand tool holder shown.

Finish	Light	Medium
FV	SV	MV
		
(07,11)	(07,11)	(07,11)
Medium	**PCD**	**CBN**
Standard	R/L-F	
		
(07,11)	(07,11)	(07,11)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	F2	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	* Clamp Screw	Wrench
FSDUC1410R/L-07E	●	●	DCMT DCET DCGT NP-DCMT NP-DCMW	0702○○	10	160	16.0	8.3	3.3	9	7.5	**14**	0.4	−7.5	TS25	TKY08F
1612R/L-07E	●	●		0702○○	12	180	17.8	9.3	3.3	11	6.0	**16**	0.4	−8	TS25	TKY08F
2016R/L-07E	●	●		0702○○	16	220	21.8	11.3	3.3	15	5.0	**20**	0.4	−8	TS25	TKY08F
3220R/L-11E	●	●		11T3○○	20	250	24.0	16.1	6.1	19	5.0	**32**	0.8	−8	TS43	TKY15F

∗ Clamp Torque (N • m) : TS25=1.0, TS43=3.5

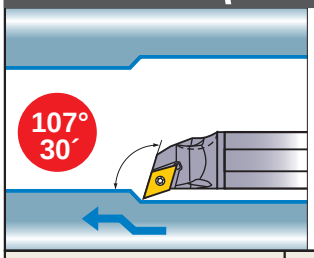
(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

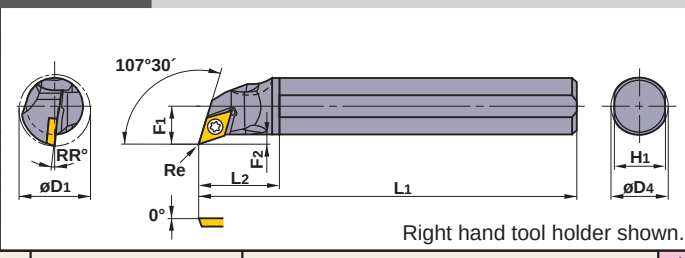
● : **Inventory maintained in Japan.**

CBN & PCD inserts A160, A161, A177
DC○○type inserts A094−A097

FSDQC

DC○○inserts





Right hand tool holder shown.

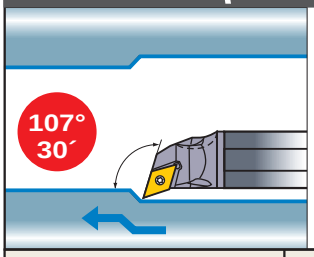
Finish	Light	Medium
FV	SV	MV
(07,11)	(07,11)	(07,11)
Medium	**PCD**	**CBN**
Standard	R/L-F	
(07,11)	(07,11)	(07,11)

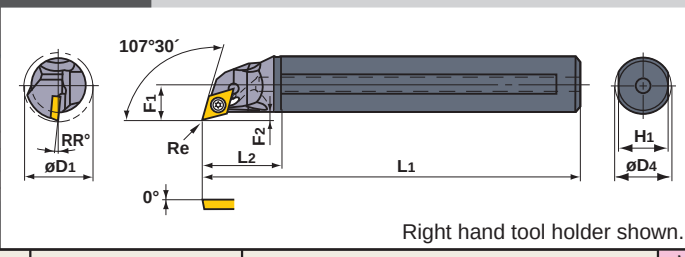
Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	* Clamp Screw	Wrench
	R	L			D4	L1	L2	F1	F2	H1	RR°					
FSDQC1310R/L-07S	●	●	DCMT DCET DCGT NP-DCMT NP-DCMW	0702○○	10	150	20.5	7.6	2.6	9	8	**13**	0.4	−3.5	TS25	TKY08F
1612R/L-07S	●	●		0702○○	12	150	22.5	8.6	2.6	11	6	**16**	0.4	−4	TS25	TKY08F
2016R/L-07S	●	●		0702○○	16	180	22.5	10.6	2.6	15	5	**20**	0.4	−5	TS25	TKY08F
2520R/L-11S	●	●		11T3○○	20	180	26	13.7	3.7	19	7	**25**	0.8	−5	TS43	TKY15F

* Clamp Torque (N • m) : TS25=1.0, TS43=3.5

FSDQC_E

Carbide shank with coolant hole
DC○○inserts





Right hand tool holder shown.

Finish	Light	Medium
FV	SV	MV
(07,11)	(07,11)	(07,11)
Medium	**PCD**	**CBN**
Standard	R/L-F	
(07,11)	(07,11)	(07,11)

Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	* Clamp Screw	Wrench
	R	L			D4	L1	L2	F1	F2	H1	RR°					
FSDQC1310R/L-07E	●	●	DCMT DCET DCGT NP-DCMT NP-DCMW	0702○○	10	162	18.4	7.6	2.6	9	8	**13**	0.4	−7.5	TS25	TKY08F
1612R/L-07E	●	●		0702○○	12	182	20.2	8.6	2.6	11	6	**16**	0.4	−8	TS25	TKY08F
2016R/L-07E	●	●		0702○○	16	222	24.2	10.6	2.6	15	5	**20**	0.4	−8	TS25	TKY08F
2520R/L-11E	●	●		11T3○○	20	254	28.0	13.7	3.7	19	7	**25**	0.8	−8	TS43	TKY15F

* Clamp Torque (N • m) : TS25=1.0, TS43=3.5

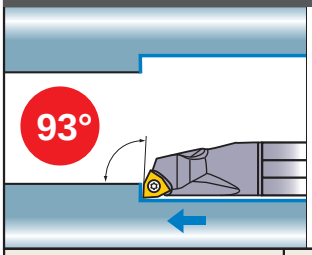
CBN & PCD inserts A160, A161, A177
DC○○ type inserts A094−A097
CUTTING CONDITIONS A276
SPARE PARTS E001
TECHNICAL DATA F001

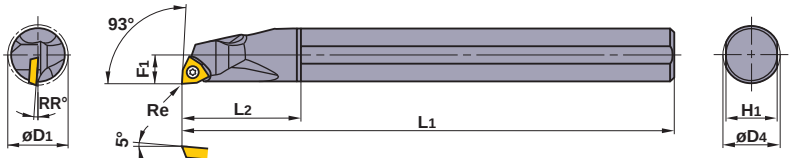
DIMPLE BAR

- Excellent vibration resistance due to light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- l/d is 3 to 5 times the diameter (Carbide shank is 7 to 8 times the diameter).

FSWUB/P

WB○○inserts, WP○○inserts





The ϕ8 and ϕ10 shanks are 0°

Right hand tool holder shown.

Finish
R/L-F·FS

(L3,04,06)

Medium
MV

(L3,04,06)

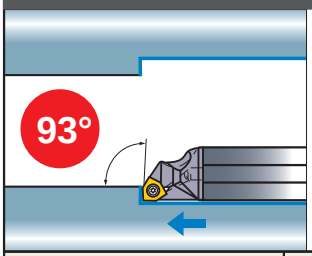
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	Clamp Screw *	Wrench
FSWUB1008R/L-L3S	●	●	WBMT WBGT	L302○○	8	125	18	5	7.2	14	10	0.2	−3	TS2	TKY06F
1210R/L-L3S	●	●		L302○○	10	150	22.5	6	9	11	12	0.2	−3.5	TS2	TKY06F
FSWUP1412R/L-04S	●	●	WPMT WPGT	0402○○	12	150	27	7	11	4	14	0.4	−4	TS253	TKY08F
1816R/L-04S	●	●		0402○○	16	180	36	9	15	1	18	0.4	−5	TS253	TKY08F
2220R/L-06S	●	●		0603○○	20	220	45	11	19	2	22	0.8	−5	TS4	TKY15F
3025R/L-06S	●	●		0603○○	25	250	56.3	15	23.4	0	30	0.8	−5	TS4	TKY15F

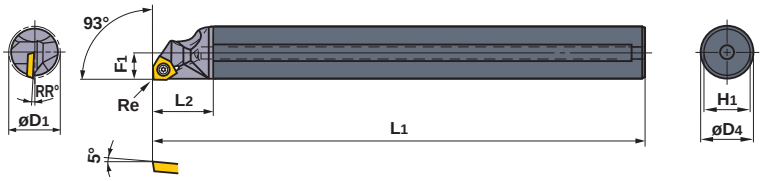
* Clamp Torque (N • m) : TS2=0.6, TS253=1.0, TS4=3.5

FSWUB/P_E

Carbide shank with coolant hole

WB○○inserts, WP○○inserts





The ϕ8 and ϕ10 shanks are 0°

Right hand tool holder shown.

Finish
R/L-F·FS

(L3,04,06)

Medium
MV

(L3,04,06)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	Clamp Screw *	Wrench
FSWUB1008R/L-L3E	●	●	WBMT WBGT	L302○○	8	140	13.8	5	7.2	14	10	0.2	−7	TS2	TKY06F
1008R-L3E-2/3	●			L302○○	8	90	13.8	5	7.2	14	10	0.2	−7	TS2	TKY06F
1008R-L3E-1/2	●			L302○○	8	70	13.8	5	7.2	14	10	0.2	−7	TS2	TKY06F
1210R/L-L3E	●	●		L302○○	10	160	16.0	6	9	11	12	0.2	−7.5	TS2	TKY06F
1210R-L3E-2/3	●			L302○○	10	105	16.0	6	9	11	12	0.2	−7.5	TS2	TKY06F
1210R-L3E-1/2	●			L302○○	10	80	16.0	6	9	11	12	0.2	−7.5	TS2	TKY06F
FSWUP1412R/L-04E	●	●	WPMT WPGT	0402○○	12	180	17.8	7	11	4	14	0.4	−8	TS253	TKY08F
1412R-04E-2/3	●			0402○○	12	120	17.8	7	11	4	14	0.4	−8	TS253	TKY08F
1412R-04E-1/2	●			0402○○	12	90	17.8	7	11	4	14	0.4	−8	TS253	TKY08F
1816R/L-04E	●	●		0402○○	16	220	21.8	9	15	1	18	0.4	−8	TS253	TKY08F
1816R-04E-2/3	●			0402○○	16	145	21.8	9	15	1	18	0.4	−8	TS253	TKY08F
1816R-04E-1/2	●			0402○○	16	110	21.8	9	15	1	18	0.4	−8	TS253	TKY08F
2220R/L-06E	●	●		0603○○	20	250	24.0	11	19	2	22	0.8	−8	TS4	TKY15F
2220R-06E-2/3	●			0603○○	20	165	24.0	11	19	2	22	0.8	−8	TS4	TKY15F
2220R-06E-1/2	●			0603○○	20	125	24.0	11	19	2	22	0.8	−8	TS4	TKY15F

* Clamp Torque (N • m) : TS2=0.6, TS253=1.0, TS4=3.5

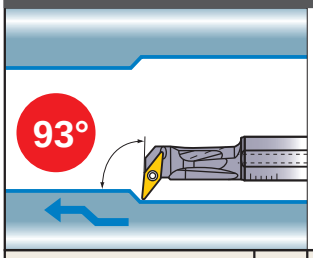
(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

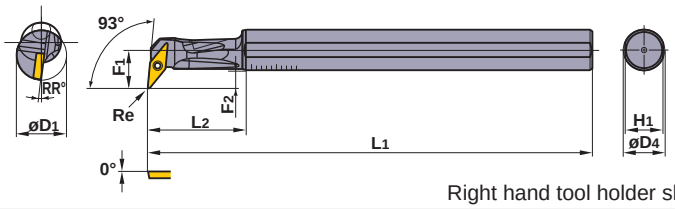
● : **Inventory maintained in Japan.**

PCD inserts A182
WB○○ type inserts A112
WP○○ type inserts A114

FSVUB/C

VC○○inserts, VB○○inserts





Right hand tool holder shown.

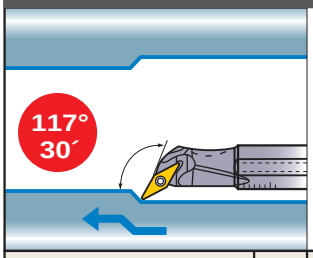
Finish	Medium
R/L-F	MV
(08,11,16)	(08,11,16)
Medium	**CBN**
Standard	
(11,16)	(16)

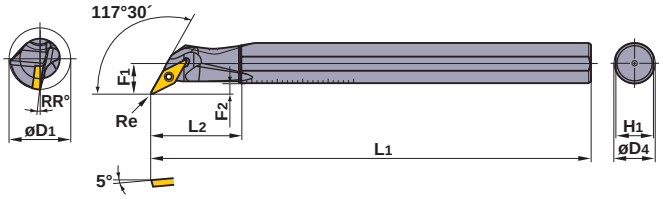
Order Number	Stock R	Stock L	Insert Number		D4	L1	L2	F1	F2	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	Shim	Shim Pin	Clamp Screw *	Wrench
FSVUC1612R/L-08S	●	●	VCGT VCMT	0802○○	12	150	25	11	5.5	11	8	**16**	0.4	—4	—	—	TS202	TKY06F
FSVUB2016R/L-11S	●	●	VBET VBGT VBMT NP-VBGW	1103○○	16	180	32.5	15.5	8	15	8	**20**	0.4	—5	—	—	TS255	TKY08F
2520R/L-11S	●	●		1103○○	20	200	40.5	17.5	8	19	7	**25**	0.4	—5	—	—	TS255	TKY08F
3425R/L-16S	●	●		1604○○	25	220	50	20.5	8.5	23.4	13	**34**	0.8	—5	SPSVN32	BCP141	TS35D	TKY15F
4032R/L-16S	●	●		1604○○	32	250	84.0	27.5	12	30.4	9	**40**	0.8	—5	SPSVN32	BCP141	TS35D	TKY15F

* Clamp Torque (N • m) : TS202=0.6, TS255=1.0, TS35D=3.5

FSVPB/C

VC○○inserts, VB○○inserts





Right hand tool holder shown.

Finish	Medium
R/L-F	MV
(08,11,16)	(08,11)
Medium	**CBN**
Standard	
(11,16)	(16)

Order Number	Stock R	Stock L	Insert Number		D4	L1	L2	F1	F2	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	Shim	Shim Pin	Clamp Screw *	Wrench
FSVPC1610R/L-08S	●	●	VCGT VCMT	0802○○	10	150	25	8	3	9	8	**16**	0.4	—3.5	—	—	TS202	TKY06F
FSVPB2012R/L-11S	●	●	VBET VBGT VBMT NP-VBGW	1103○○	12	150	28	10	4.5	11	8	**20**	0.4	—4	—	—	TS255	TKY08F
2516R/L-11S	●	●		1103○○	16	180	35	12.5	5	15	5	**25**	0.4	—5	—	—	TS255	TKY08F
3020R/L-11S	●	●		1103○○	20	200	40	15	5	19	5	**30**	0.4	—5	—	—	TS255	TKY08F
3425R/L-16S	●	●		1604○○	25	220	50	17	5	23.4	13	**34**	0.8	—5	SPSVN32	BCP141	TS35D	TKY15F
4032R/L-16S	●	●		1604○○	32	250	55	22	6.5	30.4	9	**40**	0.8	—5	SPSVN32	BCP141	TS35D	TKY15F

* Clamp Torque (N • m) : TS202=0.6, TS255=1.0, TS35D=3.5

CBN inserts A165
VB○○ type inserts A108, A109
VC○○ type inserts A110
CUTTING CONDITIONS A276
SPARE PARTS E001
TECHNICAL DATA F001

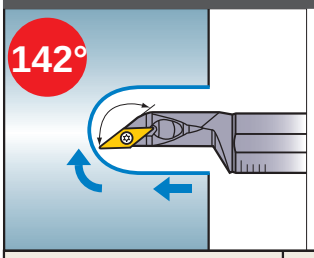
DIMPLE BAR

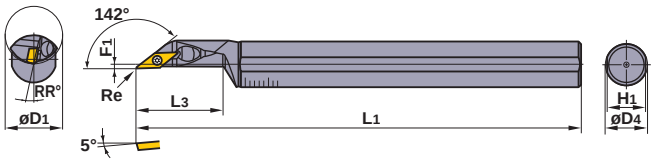
- Excellent vibration resistance due to light dimple head.
- Chip disposal is improved by having two channels for chip evacuation.
- A laser printed scale on the side for easy installation (Steel shank).
- l/d is 3 to 5 times the diameter.

FSVJB/C

VC○○inserts, VB○○inserts

Finish	Medium
R/L-F	MV
(08,11)	(08,11)
Medium	
Standard	
(11)	





Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Recommended l/d Ratio	Clamp Screw *	Wrench
FSVJC1612R/L-08S	●	●	VCGT VCMT	0802○○	12	150	26	2	11	5	**16**	0.4	−4	TS202	TKY06F
2016R/L-08S	●	●		0802○○	16	180	36	2	15	5	**20**	0.4	−5	TS202	TKY06F
FSVJB2520R/L-11S	●	●	VBET VBGT VBMT	1103○○	20	200	37.5	2	19	5	**25**	0.4	−5	TS255	TKY08F
3025R/L-11S	●	●		1103○○	25	250	45	3.5	23.4	5	**30**	0.4	−5	TS255	TKY08F

* Clamp Torque (N • m) : TS202=0.6, TS255=1.0

RECOMMENDED CUTTING CONDITIONS

Work Material		Cutting Mode	Breaker	Recommendation	Grade	Cutting Speed (m/min)	l/d ≤ 3 (Steel shank) l/d ≤ 6 (Carbide shank) Feed (mm/rev)	Depth of Cut (mm)	l/d = 4−5 (Steel shank) l/d = 7−8 (Carbide shank) Feed (mm/rev)	Depth of Cut (mm)
P	Mild Steel ≤180HB	Finish	F, FS	①	NX2525	170 (120−220)	0.10 (0.05−0.15)	−0.5	0.10 (0.05−0.15)	−0.5
		Light	SV	①	NX3035	150 (100−200)	0.20 (0.10−0.25)	−1.0	0.15 (0.05−0.20)	−1.0
				②	NX2525	160 (110−210)	0.20 (0.10−0.25)	−1.0	0.15 (0.05−0.20)	−1.0
		Medium	MV	①	NX3035	140 (90−190)	0.25 (0.15−0.35)	−2.0	0.20 (0.15−0.25)	−1.5
				②	NX2525	150 (100−200)	0.25 (0.15−0.35)	−2.0	0.20 (0.15−0.25)	−1.5
	Carbon Steel Alloy Steel 180−350HB	Finish	F FS	①	VP15TF	140 (90−190)	0.10 (0.05−0.15)	−0.5	0.10 (0.05−0.15)	−0.5
				②	NX2525	130 (80−180)	0.10 (0.05−0.15)	−0.5	0.10 (0.05−0.15)	−0.5
		Light	SV	①	UE6020	140 (90−190)	0.20 (0.10−0.25)	−1.0	0.15 (0.05−0.20)	−1.0
				②	NX3035	110 (60−160)	0.20 (0.10−0.25)	−1.0	0.15 (0.05−0.20)	−1.0
		Medium	MV	①	UE6020	130 (80−180)	0.25 (0.15−0.35)	−2.0	0.20 (0.15−0.25)	−1.5
				②	NX3035	100 (60−150)	0.25 (0.15−0.35)	−2.0	0.20 (0.15−0.25)	−1.5
M	Stainless Steel ≤200HB	Finish	F, FS	①	VP15TF	150 (110−190)	0.10 (0.05−0.15)	−0.5	0.10 (0.05−0.15)	−0.5
		Light	SV	①	US735	125 (85−165)	0.20 (0.10−0.25)	−1.0	0.15 (0.05−0.20)	−1.0
				②	VP15TF	130 (90−170)	0.20 (0.10−0.25)	−1.0	0.15 (0.05−0.20)	−1.0
		Medium	MV	①	US735	105 (70−135)	0.20 (0.15−0.25)	−2.0	0.20 (0.15−0.25)	−1.0
				②	VP15TF	120 (80−160)	0.20 (0.15−0.25)	−2.0	0.20 (0.15−0.25)	−1.0
K	Gray Cast Iron Tensile Strength ≤350MPa	Finish	F, FS	①	HTi10	130 (90−160)	0.15 (0.10−0.20)	−0.5	0.15 (0.10−0.20)	−0.5
		Medium	MV	①	VP15TF	90 (60−120)	0.20 (0.15−0.25)	−2.0	0.20 (0.15−0.25)	−1.5
N	Aluminium Alloy	Finish	F, FS	①	HTi10	300 (200−400)	0.10 (0.05−0.15)	−0.5	0.10 (0.05−0.15)	−0.5
			Flat Top	①	MD220	200 (150−250)	0.10 (0.05−0.15)	−2.0	0.10 (0.05−0.15)	−1.0
H	Heat Treated Steel 35−65HRC	Finish	Flat Top	①	MB825	100 (80−200)	0.10 (0.05−0.15)	−0.15	0.10 (0.05−0.15)	−0.1

(Note 1) When vibrations occur, reduce cutting speed by 30%.
(Note 2) The depth of cut needs to be less than the corner diameter when using the FSVJ type.

(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● : **Inventory maintained in Japan.**

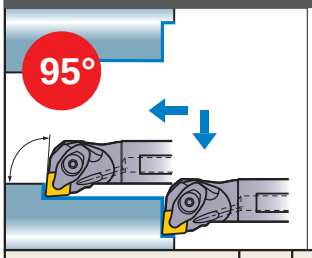
CBN inserts A165
VB○○ type inserts A108, A109
VC○○ type inserts A110

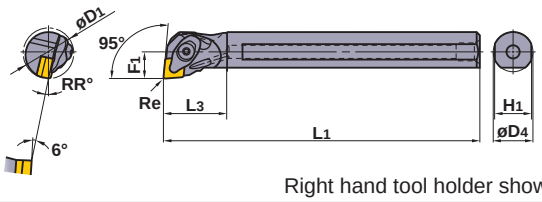
DOUBLE CLAMP DIMPLE BAR

- Economical negative insert.
- Single action type.
- Excellent vibration resistance due to a light dimple head. (With coolant hole.)
- l/d is 3 to 4 times the diameter.

DCLN

With coolant hole **CN○○ inserts**





Right hand tool holder shown.

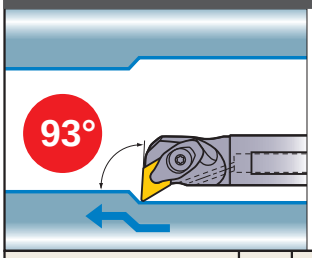
Finish	Light	Light	Medium
FH (12)	SA (12)	SH (12)	MP (12)
Medium	**Medium**	**Stainless**	**CBN**
MH (12)	Standard (12)	MS (12)	(12)

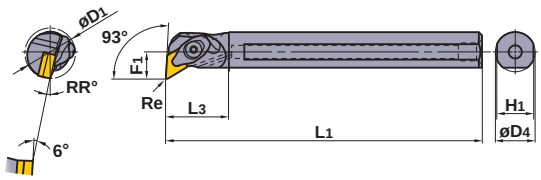
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Wrench	Punch
A25R-DCLNR/L12	●	●	CNMA CNMG CNMM CNGG	1204○○	25	200	40	17	23	11	32	0.8	LLSCP42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
A32S-DCLNR/L12	●	●		1204○○	32	250	50	22	30	13	40	0.8	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
A40T-DCLNR/L12	●	●		1204○○	40	300	63	27	37	10	50	0.8	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4

* Clamp Torque (N • m) : DC0621T=5.0

DDUN

With coolant hole **DN○○ inserts**





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH (15)	SH (15)	MP (15)	MH (15)
Medium	**Stainless**	**G class**	**CBN**
Standard (15)	MS (15)	R/L (15)	(15)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Wrench	Punch
A25R-DDUNR/L15	●	●	DNMA DNMG DNMX DNGA DNGG	1504○○	25	200	40	17	23	13	32	0.8	LLSDP42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
A32S-DDUNR/L15	●	●		1504○○	32	250	50	22	30	13	40	0.8	LLSDN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
A40T-DDUNR/L15	●	●		1504○○	40	300	63	27	37	10	50	0.8	LLSDN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4

* Clamp Torque (N • m) : DC0621T=5.0

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	l/d≤3 Cutting Speed (m/min)	l/d≤3 Feed (mm/rev)	l/d≤3 Depth of Cut (mm)	l/d=3−4 Cutting Speed (m/min)	l/d=3−4 Feed (mm/rev)	l/d=3−4 Depth of Cut (mm)
P	Carbon Steel Alloy Steel	180−350HB	Medium	110 (80−140)	0.25 (0.1−0.4)	−5.0	110 (80−140)	0.2 (0.1−0.3)	−4.0
M	Stainless Steel	≤200HB	Medium	80 (60−100)	0.2 (0.1−0.3)	−4.0	70 (50−100)	0.15 (0.1−0.25)	−3.0
K	Gray Cast Iron	Tensile Strength ≤350MPa	Medium	80 (60−100)	0.25 (0.1−0.4)	−5.0	80 (60−100)	0.2 (0.1−0.3)	−4.0

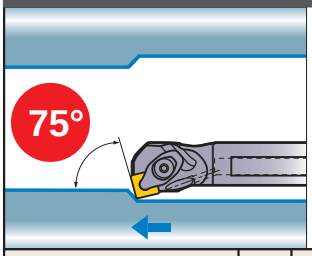
CBN & PCD inserts A142−A146, A172
CN○○ type inserts A058−A062
DN○○ type inserts A063−A067
SPARE PARTS E001
TECHNICAL DATA F001

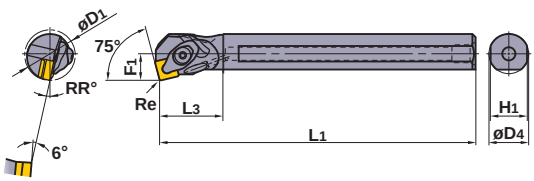
DOUBLE CLAMP DIMPLE BAR

- Economical negative insert.
- Single action type.
- Excellent vibration resistance due to a light dimple head. (With coolant hole.)
- l/d is 3 to 4 times the diameter.

DSKN

With coolant hole **SN○○ inserts**





Right hand tool holder shown.

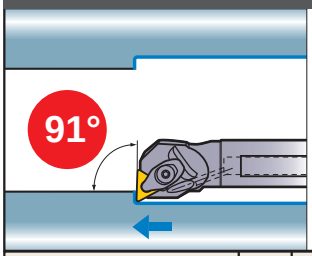
Finish	Light	Medium	Medium
FH	SH	MP	MH
(12)	(12)	(12)	(12)
Medium	**Stainless**	**G class**	**CBN**
Standard	MS	R/L	
(12)	(12)	(12)	(12)

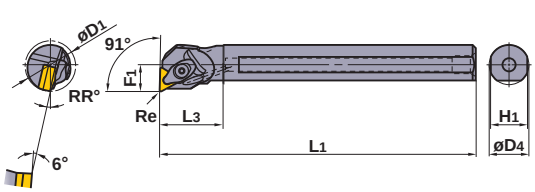
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Wrench	Punch
	R	L			D4	L1	L3	F1	H1	RR°	D1 (mm)	Re (mm)							
A25R-DSKNR/L12	●	●	SNMA SNMG SNMM SNGA SNGG	1204○○	25	200	40	17	23	13	32	0.8	LLSSP42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
A32S-DSKNR/L12	●	●		1204○○	32	250	50	22	30	13	40	0.8	LLSSN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4

* Clamp Torque (N • m) : DC0621T=5.0

DTFN

With coolant hole **TN○○ inserts**





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Medium	**Stainless**	**G class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(16)	(16)

Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Wrench	Punch
	R	L			D4	L1	L3	F1	H1	RR°	D1 (mm)	Re (mm)							
A25R-DTFNR/L16	●	●	TNMA TNMG TNMM TNGA TNGG	1604○○	25	200	40	17	23	13	32	0.8	LLSTP32	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
A32S-DTFNR/L16	●	●		1604○○	32	250	50	22	30	13	40	0.8	LLSTN32	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3

* Clamp Torque (N • m) : DC0520T=3.5

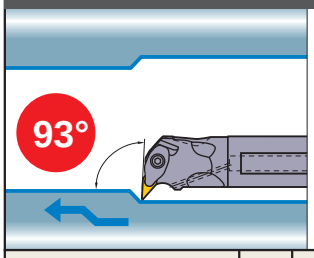
(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

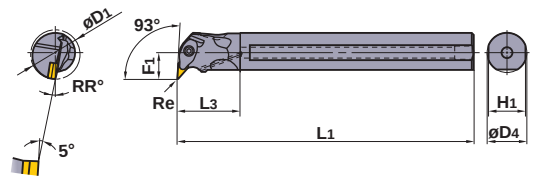
● : Inventory maintained in Japan.

CBN & PCD inserts A147—A149, A173
SN○○ type inserts A069—A073
TN○○ type inserts A074—A079

DVUN

With coolant hole **VN○○inserts**





Right hand tool holder shown.

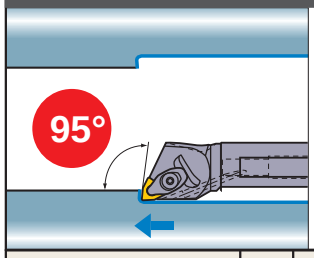
Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Medium	**Stainless**	**G class**	**CBN**
Standard	MS	R/L	
(16)	(16)	(16)	(16)

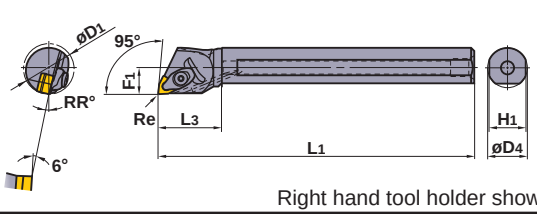
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw*	Wrench	Punch
	R	L			D_4	L_1	L_3	F_1	H_1	RR°	D_1 (mm)	Re (mm)							
A40T-DVUNR/L16	●	●	VNMA VNGA	1604○○	40	300	63	27	37	9	50	0.8	DCSVN32	LLP13	DCK3113	DCS2	DC0520T	TKY15F	LLH3

∗ Clamp Torque (N • m) : DC0520T=3.5

DWLN

With coolant hole **WN○○inserts**





Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(08)	(06,08)	(06,08)	(08)
Medium	**Medium — Semi-Heavy**	**Stainless**	
Standard	GH	MS	
(08)	(08)	(06,08)	

Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw*	Wrench	Punch
	R	L			D_4	L_1	L_3	F_1	H_1	RR°	D_1 (mm)	Re (mm)							
A25R-DWLNR/L06	●	●	WNMG	0604○○	25	200	40	17	23	13	32	0.8	LLSWP32	LLP23	DCK2211	DCS2	DC0520T	TKY15F	LLH3
A25R-DWLNR/L08	●	●	WNMA WNMG	0804○○	25	200	40	17	23	13	32	0.8	LLSWP42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
A32S-DWLNR/L08	●	●		0804○○	32	250	50	22	30	13	40	0.8	LLSWN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
A40T-DWLNR/L08	●	●		0804○○	40	300	63	27	37	10	50	0.8	LLSWN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4

∗ Clamp Torque (N • m) : DC0520T=3.5, DC0621T=5.0

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Cutting Mode	l/d≤3			l/d=3—4		
				Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
P	Carbon Steel Alloy Steel	180—350HB	Medium	110 (80—140)	0.25 (0.1—0.4)	—5.0	110 (80—140)	0.2 (0.1—0.3)	—4.0
M	Stainless Steel	≤200HB	Medium	80 (60—100)	0.2 (0.1—0.3)	—4.0	70 (50—100)	0.15 (0.1—0.25)	—3.0
K	Gray Cast Iron	Tensile Strength ≤350MPa	Medium	80 (60—100)	0.25 (0.1—0.4)	—5.0	80 (60—100)	0.2 (0.1—0.3)	—4.0

CBN & PCD inserts A150, A151, A174
VN○○ type inserts A080, A081
WN○○ type inserts A082—A085
SPARE PARTS E001
TECHNICAL DATA F001

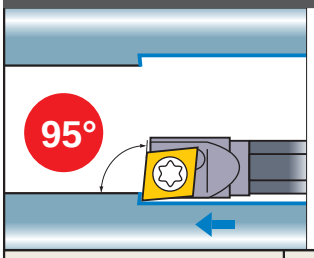
MICRO-DEX BORING BARS

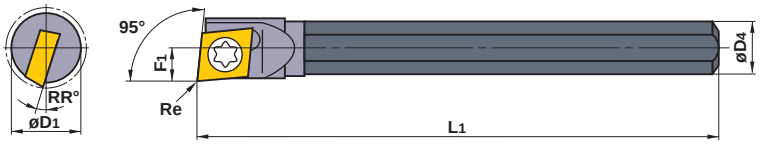
- The minimum cutting diameter is from ϕ5.
- 7° positive insert, carbide shank type.
- Easy-to-use tool geometries.
- Suitable for small workpieces.
- l/d is 5 times the diameter.

SCLC

Carbide shank — **CC○○inserts**

Finish: L-F (03,04) / PCD/CBN (03,04)





Right hand tool holder only.

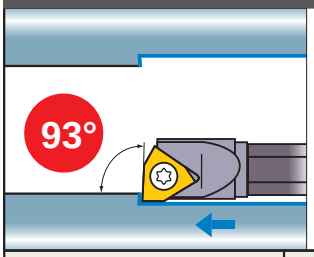
Order Number	Stock R	Insert Number		Dimensions (mm) D4	L1	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
C04GSCLCR03	●	CCGT NP-CCMW	03S1○○L-F	4	90	2.5	3.7	15	**5**	0.2	TS16	TKY06F
C05HSCLCR03	●		03S1○○L-F	5	100	3.0	4.7	13	**6**	0.2	TS16	TKY06F
C06JSCLCR04	●		04T0○○L-F	6	110	3.5	5.7	13	**7**	0.2	TS21	TKY06F
C07KSCLCR04	●		04T0○○L-F	7	125	4.0	6.7	11	**8**	0.2	TS21	TKY06F

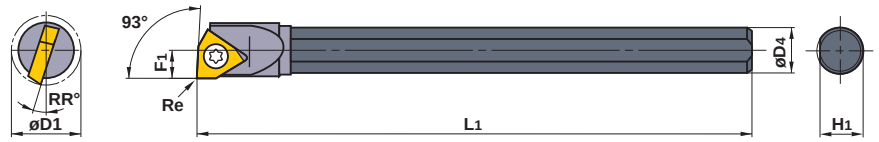
∗ Clamp Torque (N • m) : TS16=0.6, TS21=0.6

SWUB

Carbide shank — **WBGT inserts**

Finish: L-F (02,L3)





Right hand tool holder only.

Order Number	Stock R	Insert Number		Dimensions (mm) D4	L1	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
C05HSWUBR02	●	WBGT	0201○○L-F	5	100	3.0	4.7	15	**6**	0.2	TS21	TKY06F
C06JSWUBR02	●		0201○○L-F	6	110	3.5	5.7	13	**7**	0.2	TS2C	TKY06F
C07KSWUBRL3	●		L302○○L-F	7	125	4.0	6.7	15	**8**	0.2	TS2	TKY06F

∗ Clamp Torque (N • m) : TS21=0.6, TS2C=0.6, TS2=0.6

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

● : **Inventory maintained in Japan.**

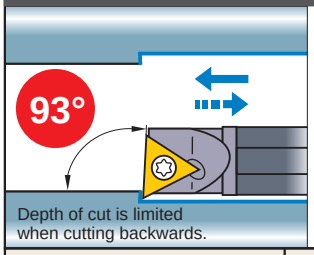
CBN & PCD inserts A158, A176
CCGT type inserts A089
WBGT type inserts A112

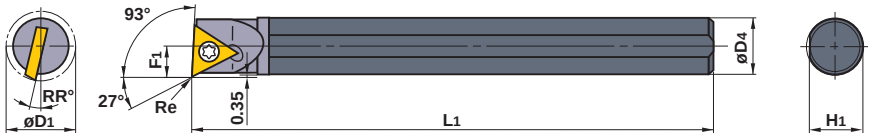
STUC

Carbide shank

TCGT inserts

Finish: L-F





Right hand tool holder only.

Order Number	Stock	Insert Number		Dimensions (mm)					Min. Cutting Diameter	Standard Corner Radius	*	
	R			D4	L1	F1	H1	RR°	D1 (mm)	Re (mm)	Clamp Screw	Wrench
C07KSTUCR06	●	TCGT	0601◌◌L-F	7	125	4.0	6.7	12	**8**	0.2	TS2C	TKY06F

* Clamp Torque (N • m) : TS2C=0.6

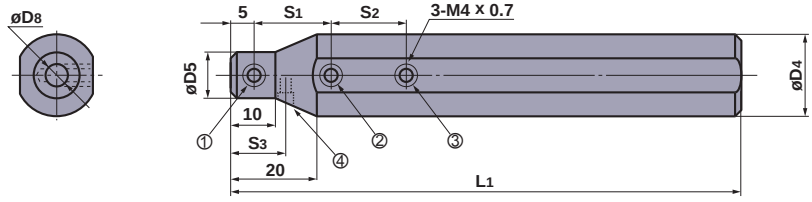
RECOMMENDED CUTTING CONDITIONS

	Work Material	Grade	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	l/d
P	Carbon Steel, Alloy Steel 180–350HB	**NX2525**	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5
M	Stainless Steel ≤200HB	**VP15TF**	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5
K	Gray Cast Iron ≤350MPa	**VP15TF**	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5
N	Non-Ferrous Meterial	**VP15TF**	120 (80–160)	0.05 (0.01–0.08)	0.4 (0.1–0.6)	3–5
		MD220	120 (80–160)	0.05 (0.01–0.08)	0.4 (0.1–0.6)	3–5
H	Heat Treated Steel 35–65HRC	**MB810**	80 (40–120)	0.03 (0.01–0.05)	0.1 (0.03–0.2)	3–5

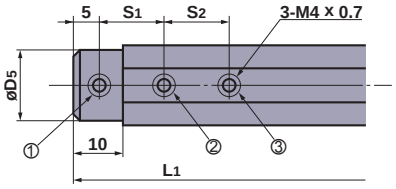
TCGT type inserts A104
SPARE PARTS E001
TECHNICAL DATA F001

MICRO-DEX BORING BARS

STANDARD HOLDER



RBH22◌◌N has a temporary set screw for different machine specifications.
(Represented by number 4)



RBH158◌◌N, RBH16◌◌N,
RBH190◌◌N

Order Number	Stock	Dimensions (mm)							MICRO-DEX	⁎1 Clamp Screw				Wrench	Torque (N • m)
		D4	D8	D5	L1	S1	S2	S3		①	②	③	④		
NEW RBH15840N	●	15.875	4	15	100	15	15	—	C04GS◌◌◌R◌◌	A	A	A	—	HKY20F	2.0
NEW 15850N	●	15.875	5	15	100	15	15	—	C05HS◌◌◌R◌◌	A	A	A	—	HKY20F	2.0
NEW 15860N	●	15.875	6	15	100	15	15	—	C06JS◌◌◌R◌◌	A	A	A	—	HKY20F	2.0
NEW 15870N	●	15.875	7	15	100	20	20	—	C07KS◌◌◌R◌◌	A	A	A	—	HKY20F	2.0
RBH1640N	●	16	4	15	100	15	15	—	C04GS◌◌◌R◌◌	A	A	A	—	HKY20F	2.0
1650N	●	16	5	15	100	15	15	—	C05HS◌◌◌R◌◌	A	A	A	—	HKY20F	2.0
1660N	●	16	6	15	100	15	15	—	C06JS◌◌◌R◌◌	A	A	A	—	HKY20F	2.0
1670N	●	16	7	15	100	20	20	—	C07KS◌◌◌R◌◌	A	A	A	—	HKY20F	2.0
⁎2 RBH19040N	●	19.05	4	18	125	15	15	—	C04GS◌◌◌R◌◌	B	B	B	—	HKY20F	2.0
⁎2 19050N	●	19.05	5	18	125	15	15	—	C05HS◌◌◌R◌◌	B	B	B	—	HKY20F	2.0
⁎2 19060N	●	19.05	6	18	125	15	15	—	C06JS◌◌◌R◌◌	B	B	B	—	HKY20F	2.0
⁎2 19070N	●	19.05	7	18	125	20	20	—	C07KS◌◌◌R◌◌	B	B	B	—	HKY20F	2.0
RBH2040N	●	20	4	13	125	15	15	—	C04GS◌◌◌R◌◌	A	B	B	—	HKY20F	2.0
2050N	●	20	5	14	125	15	15	—	C05HS◌◌◌R◌◌	A	B	B	—	HKY20F	2.0
2060N	●	20	6	15	125	15	15	—	C06JS◌◌◌R◌◌	A	B	B	—	HKY20F	2.0
2070N	●	20	7	16	125	20	20	—	C07KS◌◌◌R◌◌	A	B	B	—	HKY20F	2.0
RBH2240N	●	22	4	13	125	15	15	12.5	C04GS◌◌◌R◌◌	A	B	B	A	HKY20F	2.0
2250N	●	22	5	14	125	15	15	12.5	C05HS◌◌◌R◌◌	A	B	B	A	HKY20F	2.0
2260N	●	22	6	15	125	15	15	15	C06JS◌◌◌R◌◌	A	B	B	A	HKY20F	2.0
2270N	●	22	7	16	125	20	20	15	C07KS◌◌◌R◌◌	A	B	B	A	HKY20F	2.0
RBH2540N	●	25	4	13	150	15	15	—	C04GS◌◌◌R◌◌	A	C	C	—	HKY20F	2.0
2550N	●	25	5	14	150	15	15	—	C05HS◌◌◌R◌◌	A	C	C	—	HKY20F	2.0
2560N	●	25	6	15	150	15	15	—	C06JS◌◌◌R◌◌	A	C	C	—	HKY20F	2.0
2570N	●	25	7	16	150	20	20	—	C07KS◌◌◌R◌◌	A	C	C	—	HKY20F	2.0
NEW RBH25440N	●	25.4	4	13	150	15	15	—	C04GS◌◌◌R◌◌	A	C	C	—	HKY20F	2.0
NEW 25450N	●	25.4	5	14	150	15	15	—	C05HS◌◌◌R◌◌	A	C	C	—	HKY20F	2.0
NEW 25460N	●	25.4	6	15	150	15	15	—	C06JS◌◌◌R◌◌	A	C	C	—	HKY20F	2.0
NEW 25470N	●	25.4	7	16	150	20	20	—	C07KS◌◌◌R◌◌	A	C	C	—	HKY20F	2.0

⁎1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008
⁎2 Revised order number.

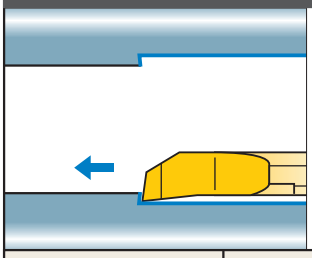
Conventional Order Number	Revised Order Number
RBH1940N	RBH19040N
1950N	19050N
1960N	19060N
1970N	19070N

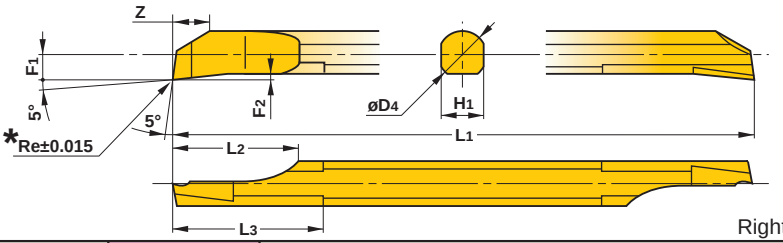
● : Inventory maintained in Japan. (MICRO-MINI TWIN is available in 1 piece in one pack.)

MICRO-MINI TWIN

CB

For internal machining





Right hand tool only.

Order Number	Stock		Breaker	Min. Cutting Diameter (mm)		Dimensions (mm)								
	Micro Grain	Coated												
	TF15	VP15TF		l/d ≤ 3	l/d>3	Re	D4	L1	L2	L3	F1	F2	H1	Z
CB02RS	●	●	without	2.2	3.6	0.05	2	50	5	6	1	0.25	1.8	1.4
02RS-B	●	●	with	2.2	3.9	0.05	2	50	5	6	1	0.25	1.8	1.4
02RS-01	●	●	without	2.2	3.6	0.1	2	50	5	6	1	0.25	1.8	1.4
02RS-01B	●	●	with	2.2	4.2	0.1	2	50	5	6	1	0.25	1.8	1.4
02RS-02	●	●	without	2.2	3.6	0.2	2	50	5	6	1	0.25	1.8	1.4
02RS-02B	●	●	with	2.2	4.9	0.2	2	50	5	6	1	0.25	1.8	1.4
03RS	●	●	without	3.2	4.2	0.05	3	50	7.5	9	1.5	0.35	2.7	2.3
03RS-B	●	●	with	3.2	4.4	0.05	3	50	7.5	9	1.5	0.35	2.7	2.3
03RS-01	●	●	without	3.2	4.2	0.1	3	50	7.5	9	1.5	0.35	2.7	2.3
03RS-01B	●	●	with	3.2	4.5	0.1	3	50	7.5	9	1.5	0.35	2.7	2.3
03RS-02	●	●	without	3.2	4.2	0.2	3	50	7.5	9	1.5	0.35	2.7	2.3
03RS-02B	●	●	with	3.2	4.8	0.2	3	50	7.5	9	1.5	0.35	2.7	2.3
04RS	●	●	without	4.2	5.1	0.05	4	60	10	12	2	0.45	3.6	3.1
04RS-B	●	●	with	4.2	5.2	0.05	4	60	10	12	2	0.45	3.6	3.1
04RS-01	●	●	without	4.2	5.1	0.1	4	60	10	12	2	0.45	3.6	3.1
04RS-01B	●	●	with	4.2	5.3	0.1	4	60	10	12	2	0.45	3.6	3.1
04RS-02	●	●	without	4.2	5.1	0.2	4	60	10	12	2	0.45	3.6	3.1
04RS-02B	●	●	with	4.2	5.5	0.2	4	60	10	12	2	0.45	3.6	3.1
05RS	●	●	without	5.2	6.0	0.05	5	70	12.5	15	2.5	0.55	4.5	3.9
05RS-B	●	●	with	5.2	6.1	0.05	5	70	12.5	15	2.5	0.55	4.5	3.9
05RS-02	●	●	without	5.2	6.0	0.2	5	70	12.5	15	2.5	0.55	4.5	3.9
05RS-02B	●	●	with	5.2	6.4	0.2	5	70	12.5	15	2.5	0.55	4.5	3.9
NEW CB06RS	●	●	without	6.2	7.2	0.05	6	75	12.5	18	3	0.65	5.4	4.7
NEW 06RS-B	●	●	with	6.2	7.3	0.05	6	75	12.5	18	3	0.65	5.4	4.7
NEW 06RS-02	●	●	without	6.2	7.2	0.2	6	75	12.5	18	3	0.65	5.4	4.7
NEW 06RS-02B	●	●	with	6.2	7.8	0.2	6	75	12.5	18	3	0.65	5.4	4.7
NEW CB07RS	●	●	without	7.2	8.6	0.05	7	85	12.5	21	3.5	0.75	6.3	5.5
NEW 07RS-B	●	●	with	7.2	8.8	0.05	7	85	12.5	21	3.5	0.75	6.3	5.5
NEW 07RS-02	●	●	without	7.2	8.6	0.2	7	85	12.5	21	3.5	0.75	6.3	5.5
NEW 07RS-02B	●	●	with	7.2	9.2	0.2	7	85	12.5	21	3.5	0.75	6.3	5.5
NEW CB08RS	●	●	without	8.2	9.5	0.05	8	95	15	24	4	0.85	7.2	6.3
NEW 08RS-B	●	●	with	8.2	9.6	0.05	8	95	15	24	4	0.85	7.2	6.3
NEW 08RS-02	●	●	without	8.2	9.5	0.2	8	95	15	24	4	0.85	7.2	6.3
NEW 08RS-02B	●	●	with	8.2	9.8	0.2	8	95	15	24	4	0.85	7.2	6.3

* The Re dimension represents the size before grinding a chip breaker.

RECOMMENDED CUTTING CONDITIONS

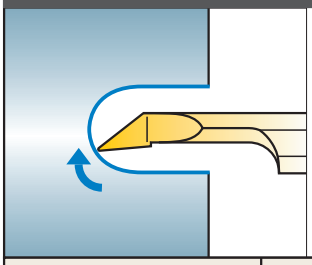
Work Material		Micro-Mini Twin **CB**				Micro-Mini Twin **CR**		
		Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	l/d	Cutting Speed (m/min)	Feed (mm/rev) 03RS/04RS	Feed (mm/rev) 05RS
P	Carbon Steel, Alloy Steel 180–350HB	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5	80 (40–120)	0.02 (0.01–0.03)	0.03 (0.01–0.05)
M	Stainless Steel ≤200HB	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5	80 (40–120)	0.02 (0.01–0.03)	0.03 (0.01–0.05)
K	Gray Cast Iron ≤350MPa	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5	80 (40–120)	0.03 (0.01–0.05)	0.03 (0.01–0.05)
N	Non-Ferrous Meterial	120 (80–160)	0.05 (0.01–0.08)	0.3 (0.1–0.5)	3–5	120 (80–160)	0.03 (0.01–0.05)	0.05 (0.01–0.08)

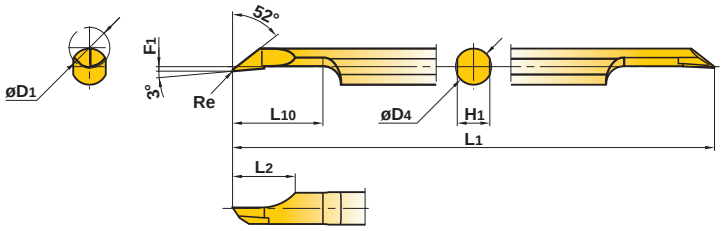
(Note 1) Recommend wet machining.
(Note 2) The recommended tool overhang of CR type is L10+2mm.

MICRO-MINI TWIN

CR

For internal copying





Right hand tool only.

Order Number	Stock		Breaker	Min. Cutting Diameter D1 (mm)	Dimensions (mm)						
	Micro Grain	Coated									
	TF15	VP15TF			Re	D4	L1	L10	L2	F1	H1
CR03RS-01	●	●	without	**3.5**	0.1	3	50	8	6	0.15	2.7
03RS-01B	●	●	with	**3.5**	0.1	3	50	8	6	0.15	2.7
04RS-01	●	●	without	**4.5**	0.1	4	60	10	7	0.15	3.6
04RS-01B	●	●	with	**4.5**	0.1	4	60	10	7	0.15	3.6
05RS-01	●	●	without	**5.5**	0.1	5	70	12	8	0.15	4.5
05RS-01B	●	●	with	**5.5**	0.1	5	70	12	8	0.15	4.5

RECOMMENDED CUTTING CONDITIONS

Work Material		Micro-Mini Twin **CB**				Micro-Mini Twin **CR**		
		Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	l/d	Cutting Speed (m/min)	Feed (mm/rev) 03RS/04RS	Feed (mm/rev) 05RS
P	Carbon Steel, Alloy Steel 180–350HB	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5	80 (40–120)	0.02 (0.01–0.03)	0.03 (0.01–0.05)
M	Stainless Steel ≤200HB	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5	80 (40–120)	0.02 (0.01–0.03)	0.03 (0.01–0.05)
K	Gray Cast Iron ≤350MPa	80 (40–120)	0.03 (0.01–0.05)	0.2 (0.1–0.3)	3–5	80 (40–120)	0.03 (0.01–0.05)	0.03 (0.01–0.05)
N	Non-Ferrous Meterial	120 (80–160)	0.05 (0.01–0.08)	0.3 (0.1–0.5)	3–5	120 (80–160)	0.03 (0.01–0.05)	0.05 (0.01–0.08)

(Note 1) Recommend wet machining.
(Note 2) The recommended tool overhang of CR type is L10+2mm.

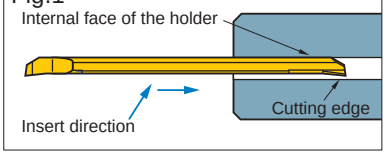
● : **Inventory maintained in Japan. (MICRO-MINI TWIN is available in 1 piece in one pack.)**

PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

●When using a holder for general purpose / small automatic lathe:

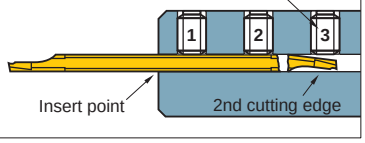
1 To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.

Fig.1



2 When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

Fig.2

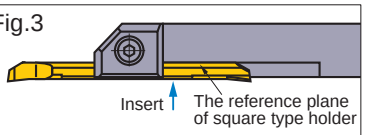


◎When using Mitsubishi holders
When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining.
(RBH1620N, RBH19020N, RBH2020N and RBH2520N do not have the 3rd screw.) The set torque value for clamping screw is 2.0 N•m.

●When using a square type holder:

1 When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the micro-mini bar. Refer to fig.3.
2 Make sure that the clamping screws are tightened to the recommended values.
3 Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.

Fig.3



Tighten the clamping screw ensuring making the micro-mini twin boring bars in contact with the reference plane of square type holder.

MACHINING METHODS OF THE CR TYPE

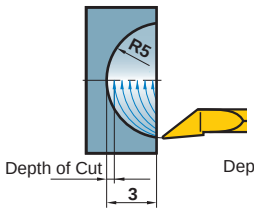
●Profile turning

By drilling a pre-prepared hole, the machining time will be shortened and chip control will be improved.

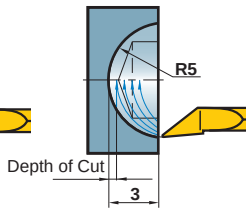
<Cutting Conditions>

Workpiece	: JIS S20C
Holder	: CR05RS-01B
Cutting Speed	: 80m/min
Feed	: 0.05mm/rev
Depth of Cut	: 0.05mm
Wet Cutting	

Machining a work piece without a pre-prepared hole



Machining a work piece with a pre-prepared hole



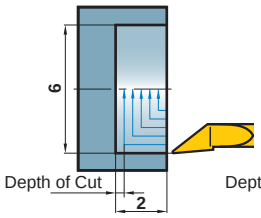
●Inner end facing

By drilling a pre-prepared hole, the machining time will be shortened and chip control will be improved.

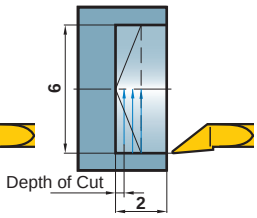
<Cutting Conditions>

Workpiece	: JIS S20C
Holder	: CR05RS-01B
Cutting Speed	: 80m/min
Feed	: 0.05mm/rev
Depth of Cut	: 0.05mm
Wet Cutting	

Machining a work piece without a pre-prepared hole

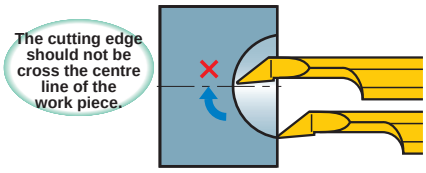


Machining a work piece with a pre-prepared hole



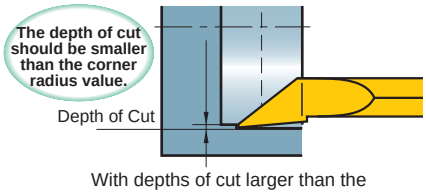
NOTES FOR USE

Profile turning, Inner end facing



If the cutting edge crosses the centre line of a work piece, the cutting edge can fracture.

Copying



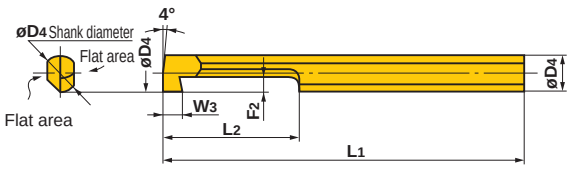
With depths of cut larger than the corner radius value, burrs will be formed.

MICRO-MINI BORING BARS

- Solid carbide type with minimum cutting diameter ϕ3.2mm.
- l/d is 5 times the diameter.
- Cutting edge can be shaped according to the application thus, it covers a wide application range (threading, grooving, copying, etc).

STANDARD MICRO-MINI BORING BARS (Solid carbide boring bar)

Order Number	Stock	Dimensions (mm)				Min. Cutting Diameter	Max. Depth of Groove	Geometry
	TF15	W_3	D_4	L_1	L_2	(mm)	F_2 (mm)	
C03FR-BLS	●	2.0	3	80	15	**3.2**	1.0	
C04FR-BLS	●	2.5	4	80	20	**4.2**	1.5	
C05HR-BLS	●	3.0	5	100	25	**5.2**	2.0	



Right hand tool only.

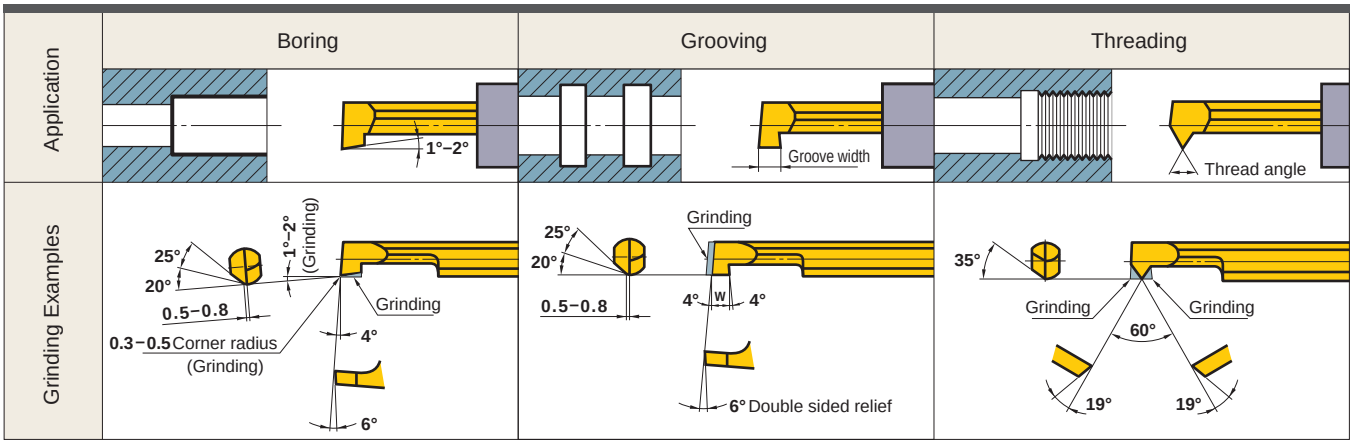
RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	l/d	Edge Condition (mm)	
						⁎Corner Radius or C	⁎Honing
P	Carbon Steel, Alloy Steel 180—350HB	40 (30—50)	0.05 (—0.1)	0.2 (0.1—0.3)	5	0.1—0.5	0.01—0.05
M	Stainless Steel ≤200HB	40 (30—50)	0.05 (—0.1)	0.2 (0.1—0.3)	5	≤0.4	≤0.03 (Honing not required)
K	Gray Cast Iron ≤350MPa	40 (30—50)	0.05 (—0.05)	0.2 (0.1—0.3)	5	0.1—0.5	0.01—0.05
N	Non-Ferrous Meterial	80 (60—100)	0.05 (—0.1)	0.3 (0.1—0.5)	5	0.1—0.5	≤0.03 (Honing not required)

⁎Cutting edge is not honed. Please hone according to the workpiece before machining.

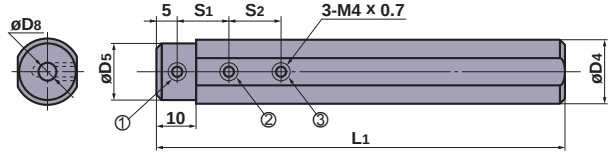
GRINDING THE CUTTING EDGE OF MICRO-MINI BORING BAR

- MICRO-MINI boring bar can be applied to boring and grooving without any modifications. It can also be reground as shown below.
- For shaping and regrinding, use a diamond whetstone approximately #250—#400. Please grind according to the application using the figure below as a reference.

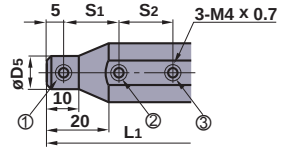


● : Inventory maintained in Japan. (MICRO MINI is available in 1 piece in one pack.)

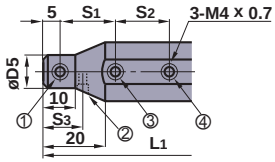
ROUND TYPE HOLDER



RBH158○○N, RBH16○○N, RBH190○○N



RBH20○○N, RBH25○○N, RBH254○○N



RBH22○○N

Order Number	Stock	Dimensions (mm)							Micro-Mini	Micro-Mini Twin		✶1 Clamp Screw				Wrench	Torque (N • m)
		D4	D8	D5	L1	S1	S2	S3	C	CB	CR	①	②	③	④		
NEW RBH15820N	●	15.875	2	15	100	10	—	—	—	02RS(-B) 02RS-0○(B)	—	B	B	—	—	HKY20F	2.0
NEW 15830N	●	15.875	3	15	100	10	10	—	03FR-BLS	03RS(-B) 03RS-0○(B)	03RS-01(B)	A	A	A	—	HKY20F	2.0
NEW 15840N	●	15.875	4	15	100	15	15	—	04FR-BLS	04RS(-B) 04RS-0○(B)	04RS-01(B)	A	A	A	—	HKY20F	2.0
NEW 15850N	●	15.875	5	15	100	15	15	—	05HR-BLS	05RS(-B) 05RS-0○(B)	05RS-01(B)	A	A	A	—	HKY20F	2.0
NEW 15860N	●	15.875	6	15	100	15	15	—	—	06RS(-B) 06RS-0○(B)	—	A	A	A	—	HKY20F	2.0
NEW 15870N	●	15.875	7	15	100	20	20	—	—	07RS(-B) 07RS-0○(B)	—	A	A	A	—	HKY20F	2.0
NEW 15880N	●	15.875	8	15	100	20	20	—	—	08RS(-B) 08RS-0○(B)	—	D	D	D	—	HKY20F	2.0
RBH1620N	●	16	2	15	100	10	—	—	—	02RS(-B) 02RS-0○(B)	—	B	B	—	—	HKY20F	2.0
1630N	●	16	3	15	100	10	10	—	03FR-BLS	03RS(-B) 03RS-0○(B)	03RS-01(B)	A	A	A	—	HKY20F	2.0
1640N	●	16	4	15	100	15	15	—	04FR-BLS	04RS(-B) 04RS-0○(B)	04RS-01(B)	A	A	A	—	HKY20F	2.0
1650N	●	16	5	15	100	15	15	—	05HR-BLS	05RS(-B) 05RS-0○(B)	05RS-01(B)	A	A	A	—	HKY20F	2.0
1660N	●	16	6	15	100	15	15	—	—	06RS(-B) 06RS-0○(B)	—	A	A	A	—	HKY20F	2.0
1670N	●	16	7	15	100	20	20	—	—	07RS(-B) 07RS-0○(B)	—	A	A	A	—	HKY20F	2.0
NEW 1680N	●	16	8	15	100	20	20	—	—	08RS(-B) 08RS-0○(B)	—	D	D	D	—	HKY20F	2.0
✶2 RBH19020N	●	19.05	2	18	125	10	—	—	—	02RS(-B) 02RS-0○(B)	—	C	C	—	—	HKY20F	2.0
✶2 19030N	●	19.05	3	18	125	10	10	—	03FR-BLS	03RS(-B) 03RS-0○(B)	03RS-01(B)	B	B	B	—	HKY20F	2.0
✶2 19040N	●	19.05	4	18	125	15	15	—	04FR-BLS	04RS(-B) 04RS-0○(B)	04RS-01(B)	B	B	B	—	HKY20F	2.0
✶2 19050N	●	19.05	5	18	125	15	15	—	05HR-BLS	05RS(-B) 05RS-0○(B)	05RS-01(B)	B	B	B	—	HKY20F	2.0
✶2 19060N	●	19.05	6	18	125	15	15	—	—	06RS(-B) 06RS-0○(B)	—	B	B	B	—	HKY20F	2.0
✶2 19070N	●	19.05	7	18	125	20	20	—	—	07RS(-B) 07RS-0○(B)	—	B	B	B	—	HKY20F	2.0
NEW 19080N	●	19.05	8	18	125	20	20	—	—	08RS(-B) 08RS-0○(B)	—	A	A	A	—	HKY20F	2.0
RBH2020N	●	20	2	11	125	10	—	—	—	02RS(-B) 02RS-0○(B)	—	A	A	—	—	HKY20F	2.0
2030N	●	20	3	12	125	10	10	—	03FR-BLS	03RS(-B) 03RS-0○(B)	03RS-01(B)	A	A	B	—	HKY20F	2.0
2040N	●	20	4	13	125	15	15	—	04FR-BLS	04RS(-B) 04RS-0○(B)	04RS-01(B)	A	B	B	—	HKY20F	2.0
2050N	●	20	5	14	125	15	15	—	05HR-BLS	05RS(-B) 05RS-0○(B)	05RS-01(B)	A	B	B	—	HKY20F	2.0
2060N	●	20	6	15	125	15	15	—	—	06RS(-B) 06RS-0○(B)	—	A	B	B	—	HKY20F	2.0
2070N	●	20	7	16	125	20	20	—	—	07RS(-B) 07RS-0○(B)	—	A	B	B	—	HKY20F	2.0
NEW 2080N	●	20	8	17	125	20	20	—	—	08RS(-B) 08RS-0○(B)	—	A	A	A	—	HKY20F	2.0
RBH2220N	●	22	2	11	125	10	—	10	—	02RS(-B) 02RS-0○(B)	—	A	B	—	A	HKY20F	2.0
2230N	●	22	3	12	125	10	10	10	03FR-BLS	03RS(-B) 03RS-0○(B)	03RS-01(B)	A	B	C	A	HKY20F	2.0
2240N	●	22	4	13	125	15	15	12.5	04FR-BLS	04RS(-B) 04RS-0○(B)	04RS-01(B)	A	B	B	A	HKY20F	2.0
2250N	●	22	5	14	125	15	15	12.5	05HR-BLS	05RS(-B) 05RS-0○(B)	05RS-01(B)	A	B	B	A	HKY20F	2.0
2260N	●	22	6	15	125	15	15	15	—	06RS(-B) 06RS-0○(B)	—	A	B	B	A	HKY20F	2.0
2270N	●	22	7	16	125	20	20	15	—	07RS(-B) 07RS-0○(B)	—	A	B	B	A	HKY20F	2.0
NEW 2280N	●	22	8	17	125	20	20	15	—	08RS(-B) 08RS-0○(B)	—	A	B	B	A	HKY20F	2.0
RBH2520N	●	25	2	11	150	10	—	—	—	02RS(-B) 02RS-0○(B)	—	A	B	—	—	HKY20F	2.0
2530N	●	25	3	12	150	10	10	—	03FR-BLS	03RS(-B) 03RS-0○(B)	03RS-01(B)	A	B	C	—	HKY20F	2.0
2540N	●	25	4	13	150	15	15	—	04FR-BLS	04RS(-B) 04RS-0○(B)	04RS-01(B)	A	C	C	—	HKY20F	2.0
2550N	●	25	5	14	150	15	15	—	05HR-BLS	05RS(-B) 05RS-0○(B)	05RS-01(B)	A	C	C	—	HKY20F	2.0
2560N	●	25	6	15	150	15	15	—	—	06RS(-B) 06RS-0○(B)	—	A	C	C	—	HKY20F	2.0
2570N	●	25	7	16	150	20	20	—	—	07RS(-B) 07RS-0○(B)	—	A	C	C	—	HKY20F	2.0
NEW 2580N	●	25	8	17	150	20	20	—	—	08RS(-B) 08RS-0○(B)	—	A	B	B	—	HKY20F	2.0
NEW RBH25420N	●	25.4	2	11	150	10	—	—	—	02RS(-B) 02RS-0○(B)	—	A	B	—	—	HKY20F	2.0
NEW 25430N	●	25.4	3	12	150	10	10	—	03FR-BLS	03RS(-B) 03RS-0○(B)	03RS-01(B)	A	B	C	—	HKY20F	2.0
NEW 25440N	●	25.4	4	13	150	15	15	—	04FR-BLS	04RS(-B) 04RS-0○(B)	04RS-01(B)	A	C	C	—	HKY20F	2.0
NEW 25450N	●	25.4	5	14	150	15	15	—	05HR-BLS	05RS(-B) 05RS-0○(B)	05RS-01(B)	A	C	C	—	HKY20F	2.0
NEW 25460N	●	25.4	6	15	150	15	15	—	—	06RS(-B) 06RS-0○(B)	—	A	C	C	—	HKY20F	2.0
NEW 25470N	●	25.4	7	16	150	20	20	—	—	07RS(-B) 07RS-0○(B)	—	A	C	C	—	HKY20F	2.0
NEW 25480N	●	25.4	8	17	150	20	20	—	—	08RS(-B) 08RS-0○(B)	—	A	B	B	—	HKY20F	2.0

✶1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008, D=HSS04003 ✶2 Revised order number.

Conventional Order Number	Revised Order Number
RBH1920N	RBH19020N
1930N	19030N
1940N	19040N

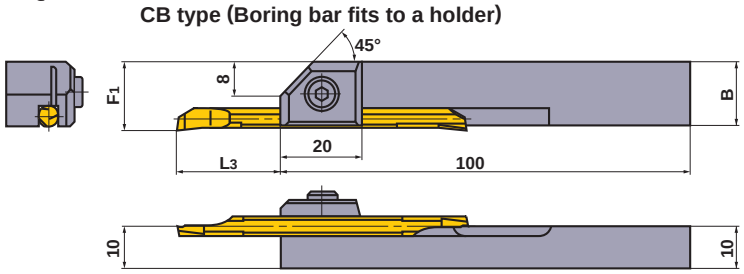
Conventional Order Number	Revised Order Number
RBH1950N	RBH19050N
1960N	19060N
1970N	19070N

SPARE PARTS E001
TECHNICAL DATA F001

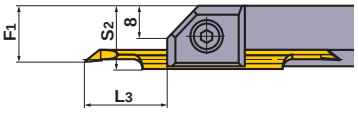
MICRO-MINI TWIN

SQUARE TYPE HOLDER

CB type (Boring bar fits to a holder)



CR type (Boring bar fits to a holder)



Order Number	Stock	Dimensions (mm)						Micro-Mini Twin		Clamp Screw	Wrench	Torque (N・m)
		F1		L3 ⁎		S2	B					
		CB	CR	CB	CR	CR	CR	CB	CR			
SBH1020R	●	13	—	6—24 (6—10)	—	—	12.9	02RS(-B) 02RS-0□(B)	—	HSC04010	HKY30R	4.8
1030R	●	14	12.65	8.5—22 (9—15)	11—19.5 (12)	14	13.8	03RS(-B) 03RS-0□(B)	03RS-01(B)	HSC05012	HKY40R	9.5
1040R	●	15	13.15	11—29.5 (12—20)	13—27.5 (14)	15	14.7	04RS(-B) 04RS-0□(B)	04RS-01(B)	HSC05012	HKY40R	9.5
1050R	●	16	13.65	13.5—37 (15—25)	15—35.5 (16)	16	15.6	05RS(-B) 05RS-0□(B)	05RS-01(B)	HSC05012	HKY40R	9.5
1060R	●	17	—	13.5—42 (18—30)	—	17	16.5	06RS(-B) 06RS-0□(B)	—	HSC05012	HKY40R	9.5
1070R	●	18	—	13.5—52 (21—35)	—	18	17.4	07RS(-B) 07RS-0□(B)	—	HSC05012	HKY40R	9.5

(Note) The MICRO-DEX and the MICRO-MINI cannot be fit to square holders.
⁎L3 is the length of overhang for sufficient clamping, and ( ) is the recommended length for machining of carbon and alloy steel.

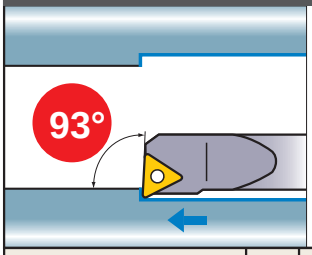
● : Inventory maintained in Japan.

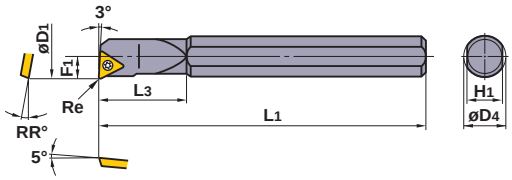
F TYPE BORING BARS

- The minimum cutting diameter is from ϕ10.
- 11°positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (up to 7 times with the carbide shank).

FSTU1

TP○○inserts





Right hand tool holder shown.

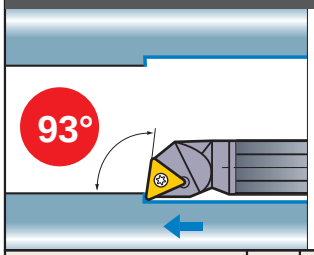
Light	Flat Top
R/L	
(08,09,11)	(08,09,11)
PCD	**CBN/PCD**
R/L-F	
(08,09,11)	(11)

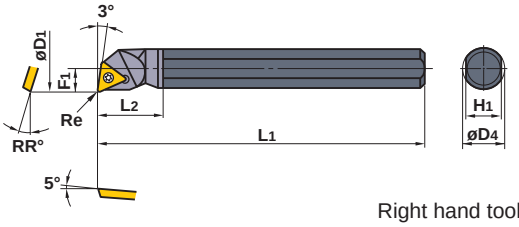
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
FSTU108R/L	●	●	TPGX TPMX NP-TPGX NP-TPMX	0802○○	8	125	18	5	7	15	**10**	0.4	CS200T	TKY06F
110R/L	●	●		0902○○	10	150	22	6	9	13	**12**	0.4	CS250T	TKY08F
112R/L	●	●		0902○○	12	180	25	8	11	10	**16**	0.4	CS250T	TKY08F
116R/L	●	●		1103○○	16	200	30	11	14	7	**22**	0.4	CS300890T	TKY08F

∗ Clamp Torque (N • m) : CS200T=0.6, CS250T=1.0, CS300890T=1.0

FSTU2

Carbide shank **TP○○inserts**





Right hand tool holder shown.

Light	Flat Top
R/L	
(08,09,11)	(08,09,11)
PCD	**CBN/PCD**
R/L-F	
(08,09,11)	(11)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
FSTU208R/L	●	●	TPGX TPMX NP-TPGX NP-TPMX	0802○○	8	125	13	5	7	15	**10**	0.4	CS200T	TKY06F
210R/L	●	●		0902○○	10	150	16	6	9	13	**12**	0.4	CS250T	TKY08F
212R/L	●	●		0902○○	12	180	19	8	11	10	**16**	0.4	CS250T	TKY08F
216R/L	●	●		1103○○	16	200	26	11	14	7	**22**	0.4	CS300890T	TKY08F

∗ Clamp Torque (N • m) : CS200T=0.6, CS250T=1.0, CS300890T=1.0

RECOMMENDED CUTTING CONDITIONS

Steel Shank			l/d≤3			l/d=3−4 (Shank Diameter ≥ 25mm)		
Carbide Shank			l/d≤5			l/d=6−7		
Work Material	Hardness	Cutting Mode	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
P Carbon Steel Alloy Steel	180−350HB	Light Cutting	130 (90−160)	0.1 (0.05−0.15)	0.2	120 (80−150)	0.1 (0.05−0.15)	0.2
		Medium Cutting	90 (60−120)	0.25 (0.15−0.35)	−3.0	80 (50−110)	0.15 (0.1−0.2)	−1.5
M Stainless Steel	≤200HB	Light Cutting	140 (100−180)	0.1 (0.05−0.15)	0.2	140 (100−180)	0.1 (0.05−0.15)	0.2
		Medium Cutting	70 (50−90)	0.2 (0.15−0.25)	−2.0	60 (40−80)	0.15 (0.1−0.2)	−1.0
N Aluminium Alloy	–	Light Cutting	300 (200−400)	0.1 (0.05−0.15)	0.2	300 (200−400)	0.1 (0.05−0.15)	0.2
		Medium Cutting	200 (150−250)	0.1 (0.05−0.15)	−2.0	200 (150−250)	0.1 (0.05−0.15)	−1.5

(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

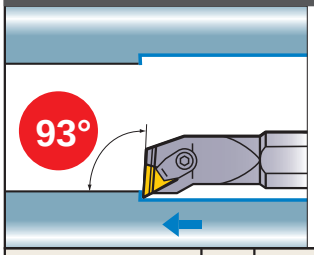
CBN & PCD inserts A163, A164, A179, A180
TP○○ type inserts A106, A107
SPARE PARTS E001
TECHNICAL DATA F001

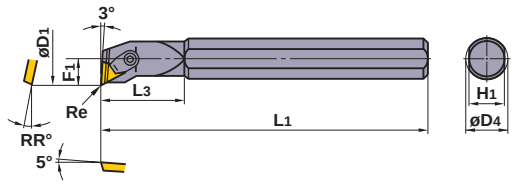
F TYPE BORING BARS

- The minimum cutting diameter is from ϕ22.
- 11°positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (up to 7 times with the carbide shank).

FCTU1

TP○○inserts





Right hand tool holder shown.

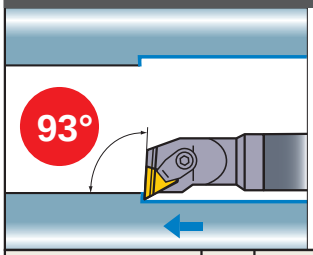
M Class	M Class	G Class
		R/L
(11,16)	(11,16)	(11,16)
G Class	**CBN/PCD**	
(11,16)	(11,16)	

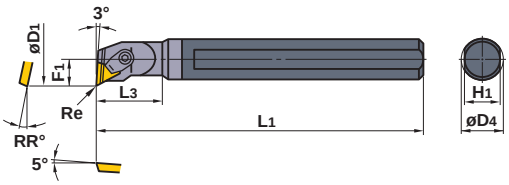
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Set *	Breaker Piece	Wrench
	R	L			D4	L1	L3	F1	H1	RR°	D1 (mm)	Re (mm)					
FCTU116R/L	●	●	TPMN TPMR TPGN TPGR	1103○○	16	200	30	11	14	7	**22**	0.4	—	—	C3	CBT2N	HKY25R
120R/L	●	●		1603○○	20	200	37	13	18	5	**26**	0.8	—	—	C4	CBT3F	HKY30R
125R/L (4 Side Flat Shank)	●	●		1603○○	25	250	40	16	22	5	**32**	0.8	PT32	BCP202	C4	CBT3F	HKY30R
132R/L (4 Side Flat Shank)	●	●		1603○○	32	300	45	20	29	0	**40**	0.8	PT32	BCP201	C4	CBT3F	HKY30R

∗ Clamp Torque (N • m) : C3=2.2, C4=3.3

FCTU2

Carbide shank **TP○○inserts**





Right hand tool holder only.

M Class	M Class	G Class
		R/L
(11,16)	(11,16)	(11,16)
G Class	**CBN/PCD**	
(11,16)	(11,16)	

Order Number	Stock	Insert Number		Dimensions (mm)						Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Set *	Breaker Piece	Wrench
	R			D4	L1	L3	F1	H1	RR°	D1 (mm)	Re (mm)					
FCTU216R	●	TPMN TPMR TPGN TPGR	1103○○	16	200	26	11	14	7	**22**	0.4	—	—	C3	CBT2N	HKY25R
220R	●		1603○○	20	200	33	13	18	5	**26**	0.8	—	—	C4	CBT3F	HKY30R
225R	●		1603○○	25	250	37	16	22	5	**32**	0.8	PT32	BCP202	C4	CBT3F	HKY30R

∗ Clamp Torque (N • m) : C3=2.2, C4=3.3

(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● : **Inventory maintained in Japan.**

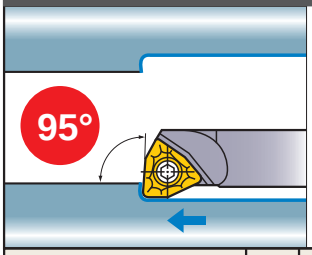
CBN & PCD inserts A169, A185
TP○○ type inserts A120, A121

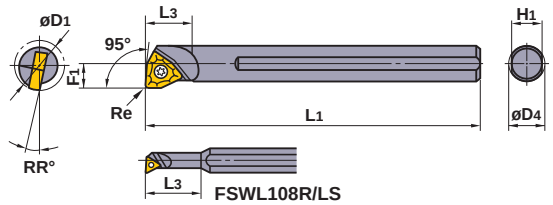
F TYPE BORING BARS

- The minimum cutting diameter is from ϕ5.8.
- 7°positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (up to 7 times with the carbide shank).

FSWL1

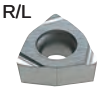
WC○○inserts





FSWL108R/LS
108R/LM

Right hand tool holder shown.

Light	Light
	R/L 
(02,L3,04,06)	(02,L3)
PCD	
(L3,04,06)	

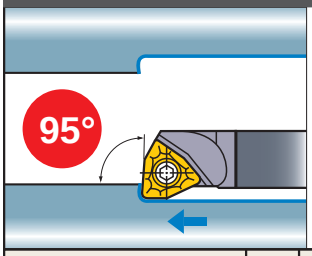
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
FSWL108R/LS	●	●	WCMT WCGT	0201○○	8	100	19	2.9	7	17	**5.8**	0.4	TS21	TKY06F
108R/LM	●	●	WCMT WCGT WCMW	L302○○	8	100	25	4	7	15	**8**	0.4	TS2	TKY06F
108R/L	●	●	WCMT WCMW	0402○○	8	125	10	5	7	15	**10**	0.4	TS25	TKY08F
110R/L	●	●		0402○○	10	150	12	6	9	13	**12**	0.4	TS25	TKY08F
112R/L	●	●		06T3○○	12	180	15	8	11	13	**16**	0.8	TS4	TKY15F
116R/L	●	●		06T3○○	16	200	20	11	14	7	**22**	0.8	TS4	TKY15F

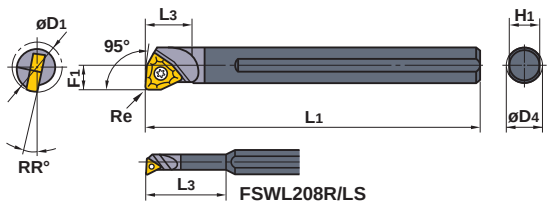
* Clamp Torque (N • m) : TS21=0.6, TS2=0.6, TS25=1.0, TS4=3.5

FSWL2

Carbide shank

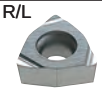
WC○○inserts





FSWL208R/LS
208R/LM

Right hand tool holder shown.

Light	Light
	R/L 
(02,L3,04,06)	(02,L3)
PCD	
(L3,04,06)	

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
FSWL208R/LS	●	●	WCMT WCGT	0201○○	8	122	25	2.9	7	17	**5.8**	0.4	TS21	TKY06F
208R/LM	●	●	WCMT WCGT WCMW	L302○○	8	125	33	4	7	15	**8**	0.4	TS2	TKY06F
208R/L	●	●	WCMT WCMW	0402○○	8	125	10	5	7	15	**10**	0.4	TS25	TKY08F
210R/L	●	●		0402○○	10	150	12	6	9	13	**12**	0.4	TS25	TKY08F
212R/L	●	●		06T3○○	12	180	15	8	11	13	**16**	0.8	TS4	TKY15F
216R/L	●	●		06T3○○	16	200	20	11	14	7	**22**	0.8	TS4	TKY15F

* Clamp Torque (N • m) : TS21=0.6, TS2=0.6, TS25=1.0, TS4=3.5

RECOMMENDED CUTTING CONDITIONS

Steel Shank			l/d≤3			l/d=3−4 (Shank Diameter ≥ 25mm)		
Carbide Shank			l/d≤5			l/d=6−7		
Work Material	Hardness	Cutting Mode	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
P Carbon Steel Alloy Steel	180−350HB	Light Cutting	130 (90−160)	0.1 (0.05−0.15)	0.2	120 (80−150)	0.1 (0.05−0.15)	0.2
		Medium Cutting	90 (60−120)	0.25 (0.15−0.35)	−3.0	80 (50−110)	0.15 (0.1−0.2)	−1.5
M Stainless Steel	≤200HB	Light Cutting	140 (100−180)	0.1 (0.05−0.15)	0.2	140 (100−180)	0.1 (0.05−0.15)	0.2
		Medium Cutting	70 (50−90)	0.2 (0.15−0.25)	−2.0	60 (40−80)	0.15 (0.1−0.2)	−1.0
N Aluminium Alloy	–	Light Cutting	300 (200−400)	0.1 (0.05−0.15)	0.2	300 (200−400)	0.1 (0.05−0.15)	0.2
		Medium Cutting	200 (150−250)	0.1 (0.05−0.15)	−2.0	200 (150−250)	0.1 (0.05−0.15)	−1.5

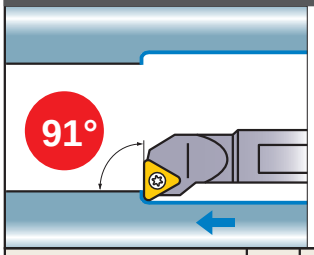
PCD inserts A182
WC○○ type inserts A113
SPARE PARTS E001
TECHNICAL DATA F001

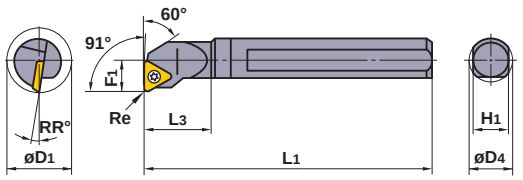
S TYPE BORING BARS

- The minimum cutting diameter is from ϕ11.
- ISO standard.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (up to 7 times with the carbide shank).

STFC

TC○○inserts





Right hand tool holder shown.

Finish	Medium
FV	Standard
(11,16)	(09,11,16)
Flat Top	PCD/CBN
(11,16)	(11)

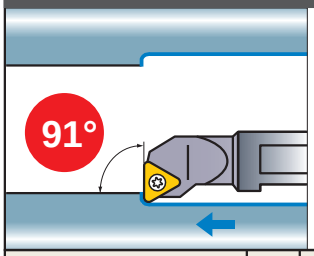
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	✱ Clamp Screw	Wrench
	R	L			D4	L1	L3	F1	H1	RR°				
S08FSTFCR/L09	●	●	TCMT	0902○○	8	80	12	6	7	15	11	0.4	TS22	TKY06F
S10HSTFCR/L11	●	●	TCMW TCMT	1102○○	10	100	16	7	9	13	13	0.4	TS25	TKY08F
S12KSTFCR/L11	●	●		1102○○	12	125	20	9	11	10	16	0.4	TS25	TKY08F
S16MSTFCR/L11	●	●		1102○○	16	150	25	11	14	7	20	0.4	TS25	TKY08F
S20QSTFCR/L16	●	●		16T3○○	20	180	32	13	18	7	25	0.8	TS4	TKY15F
S25RSTFCR/L16	●	●		16T3○○	25	200	40	17	23	5	32	0.8	TS4	TKY15F
S32SSTFCR/L16	●	●		16T3○○	32	250	50	22	30	5	40	0.8	TS4	TKY15F

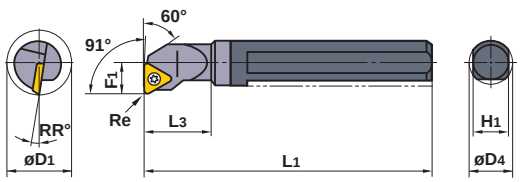
✱ Clamp Torque (N • m) : TS22=0.6, TS25=1.0, TS4=3.5

STFC

Carbide shank

TC○○inserts





Right hand tool holder only.

Finish	Medium
FV	Standard
(11,16)	(09,11,16)
Flat Top	PCD/CBN
(11,16)	(11)

Order Number	Stock	Insert Number		Dimensions (mm)						Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	✱ Clamp Screw	Wrench
	R			D4	L1	L3	F1	H1	RR°				
C08HSTFCR09	●	TCMT	0902○○	8	100	12	6	7	15	11	0.4	TS22	TKY06F
C10KSTFCR11	●	TCMW TCMT	1102○○	10	125	16	7	9	13	13	0.4	TS25	TKY08F
C12MSTFCR11	●		1102○○	12	150	20	9	11	10	16	0.4	TS25	TKY08F
C16RSTFCR11	●		1102○○	16	200	25	11	14	7	20	0.4	TS25	TKY08F
C20SSTFCR16	●		16T3○○	20	250	32	13	18	7	25	0.8	TS4	TKY15F
C25TSTFCR16	●		16T3○○	25	300	40	17	23	5	32	0.8	TS4	TKY15F

✱ Clamp Torque (N • m) : TS22=0.6, TS25=1.0, TS4=3.5

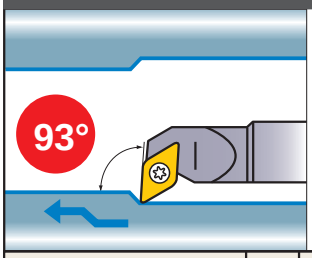
(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

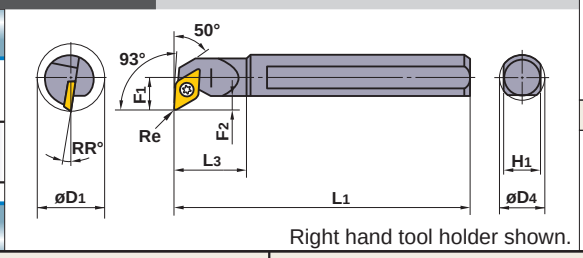
● : Inventory maintained in Japan.

CBN & PCD inserts A162, A178

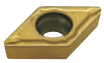
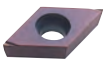
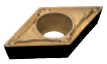
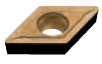
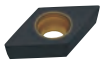
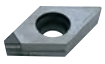
TC○○ type inserts A104

SDUC — DC○○inserts





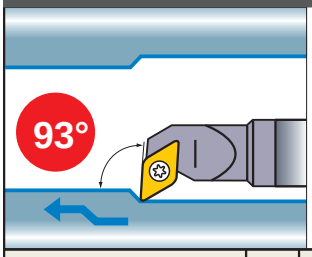
Right hand tool holder shown.

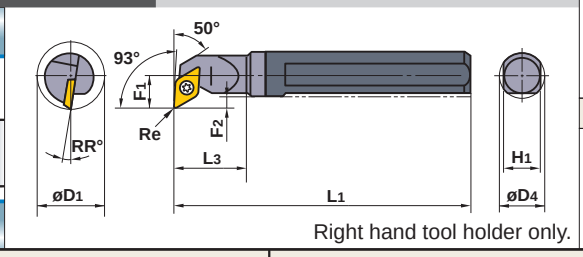
Finish	Finish	Light	Medium
FV	R/L-F	SV	MV
			
(07,11)	(07,11)	(07,11)	(07,11)
Medium	Flat Top	PCD/CBN	
Standard			
			
(07,11,15)	(07,11,15)	(07,11)	

Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
	R	L			D4	L1	L3	F1	F2	H1	RR°				
S10HSDUCR/L07	●	●	DCMT DCET DCGT DCMW DCGW NP-DCGW NP-DCMT	0702○○	10	100	16	7	2.4	9	13	13	0.4	TS25	TKY08F
S12KSDUCR/L07	●	●		0702○○	12	125	20	9	3.4	11	10	16	0.4	TS25	TKY08F
S16MSDUCR/L07	●	●		0702○○	16	150	25	11	3.9	14	7	20	0.4	TS25	TKY08F
S20QSDUCR/L11	●	●		11T3○○	20	180	32	13	4.4	18	7	25	0.8	TS4	TKY15F
S25RSDUCR/L15	●	●		1504○○	25	200	40	17	6.9	23	5	32	0.8	TS5	TKY25F
S32SSDUCR/L15	●	●		1504○○	32	250	50	22	8.4	30	5	40	0.8	TS5	TKY25F
S40TSDUCR/L15	●	●		1504○○	40	300	63	27	9.4	37	5	50	0.8	TS5	TKY25F

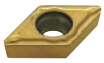
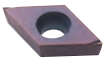
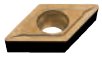
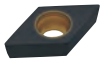
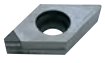
* Clamp Torque (N • m) : TS25=1.0, TS4=3.5, TS5=7.5

SDUC — Carbide shank DC○○inserts





Right hand tool holder only.

Finish	Finish	Light	Medium
FV	L-F	SV	MV
			
(07,11)	(07,11)	(07,11)	(07,11)
Medium	Flat Top	PCD/CBN	
Standard			
			
(07,11,15)	(07,11,15)	(07,11)	

Order Number	Stock	Insert Number		Dimensions (mm)							Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
	R			D4	L1	L3	F1	F2	H1	RR°				
C10KSDUCR07	●	DCMT DCET DCGT DCMW DCGW NP-DCGW NP-DCMT	0702○○	10	125	16	7	2.1	9	13	13	0.4	TS25	TKY08F
C12MSDUCR07	●		0702○○	12	150	20	9	3.1	11	10	16	0.4	TS25	TKY08F
C16RSDUCR07	●		0702○○	16	200	25	11	3.1	14	7	20	0.4	TS25	TKY08F
C20SSDUCR11	●		11T3○○	20	250	32	13	3.1	18	7	25	0.8	TS4	TKY15F
C25TSDUCR15	●	DCMW DCMT	1504○○	25	300	40	17	4.9	23	5	32	0.8	TS5	TKY25F

* Clamp Torque (N • m) : TS25=1.0, TS4=3.5, TS5=7.5

RECOMMENDED CUTTING CONDITIONS

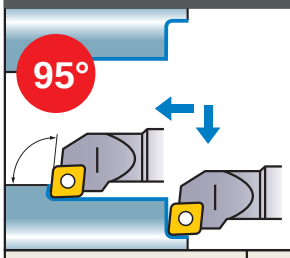
Steel Shank			l/d≤3			l/d=3−4 (Shank Diameter ≥ 25mm)		
Carbide Shank			l/d≤5			l/d=6−7		
Work Material	Hardness	Cutting Mode	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
P Carbon Steel Alloy Steel	180−350HB	Light Cutting	130 (90−160)	0.1 (0.05−0.15)	0.2	120 (80−150)	0.1 (0.05−0.15)	0.2
		Medium Cutting	90 (60−120)	0.25 (0.15−0.35)	−3.0	80 (50−110)	0.15 (0.1−0.2)	−1.5
M Stainless Steel	≤200HB	Light Cutting	140 (100−180)	0.1 (0.05−0.15)	0.2	140 (100−180)	0.1 (0.05−0.15)	0.2
		Medium Cutting	70 (50−90)	0.2 (0.15−0.25)	−2.0	60 (40−80)	0.15 (0.1−0.2)	−1.0
N Aluminium Alloy	–	Light Cutting	300 (200−400)	0.1 (0.05−0.15)	0.2	300 (200−400)	0.1 (0.05−0.15)	0.2
		Medium Cutting	200 (150−250)	0.1 (0.05−0.15)	−2.0	200 (150−250)	0.1 (0.05−0.15)	−1.5

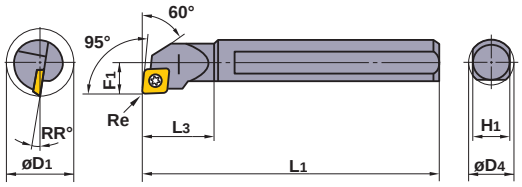
CBN & PCD inserts A160, A161, A177
DC○○ type inserts A094−A097
SPARE PARTS E001
TECHNICAL DATA F001

S TYPE BORING BARS

- The minimum cutting diameter is from ϕ11.
- ISO standard.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (up to 7 times with the carbide shank).

SCLC — CC○○ inserts





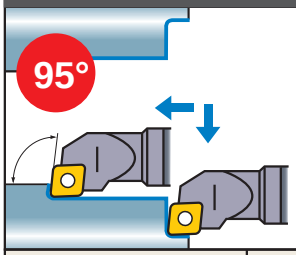
Right hand tool holder shown.

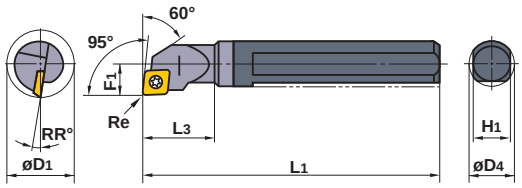
Finish	Medium
FV	Standard
(06,09)	(06,09,12)
Flat Top	PCD/CBN
(06,09,12)	(06,09,12)

Order Number	Stock R	Stock L	Insert Number		D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
S08FSCLCR/L06	●	●	CCMT CCET CCGT CCMW CCGW NP-CCGW	0602○○	8	80	12	6	7	15	**11**	0.4	TS25	TKY08F
S10HSCLCR/L06	●	●		0602○○	10	100	16	7	9	13	**13**	0.4	TS25	TKY08F
S12KSCLCR/L06	●	●		0602○○	12	125	20	9	11	10	**16**	0.4	TS25	TKY08F
S16MSCLCR/L09	●	●		09T3○○	16	150	25	11	14	7	**20**	0.8	TS4	TKY15F
S20QSCLCR/L09	●	●		09T3○○	20	180	32	13	18	7	**25**	0.8	TS4	TKY15F
S25RSCLCR/L12	●	●		1204○○	25	200	40	17	23	5	**32**	0.8	TS5	TKY25F
S32SSCLCR/L12	●	●		1204○○	32	250	50	22	30	5	**40**	0.8	TS5	TKY25F
S40TSCLCR/L12	●	●		1204○○	40	300	63	27	37	5	**50**	0.8	TS5	TKY25F

* Clamp Torque (N • m) : TS25=1.0, TS4=3.5, TS5=7.5

SCLC — Carbide shank — CC○○ inserts





Right hand tool holder only.

Finish	Medium
FV	Standard
(06,09)	(06,09)
Flat Top	PCD/CBN
(06,09)	(06,09)

Order Number	Stock R	Insert Number		D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
C08HSCLCR06	●	CCMT CCET CCGT CCMW CCGW NP-CCGW	0602○○	8	100	12	6	7	15	**11**	0.4	TS25	TKY08F
C10KSCLCR06	●		0602○○	10	125	16	7	9	13	**13**	0.4	TS25	TKY08F
C12MSCLCR06	●		0602○○	12	150	20	9	11	10	**16**	0.4	TS25	TKY08F
C16RSCLCR09	●		09T3○○	16	200	25	11	14	7	**20**	0.8	TS4	TKY15F
C20SSCLCR09	●		09T3○○	20	250	32	13	18	7	**25**	0.8	TS4	TKY15F

* Clamp Torque (N • m) : TS25=1.0, TS4=3.5

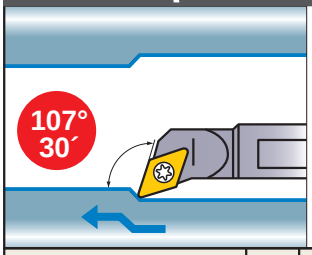
(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

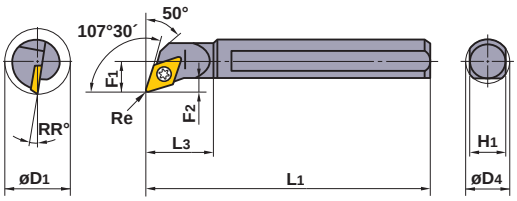
● : Inventory maintained in Japan.

CBN & PCD inserts A156−A158, A176

CC○○ type inserts A089−A092

SDQC — DC○○inserts





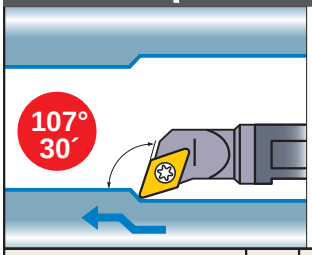
Right hand tool holder shown.

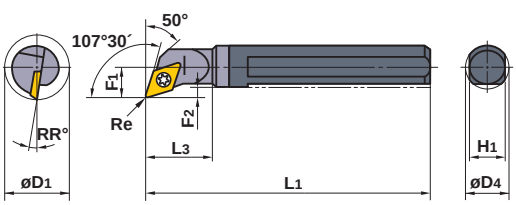
Finish	Finish	Light	Medium
FV	R/L-F	SV	MV
(07,11)	(07,11)	(07,11)	(07,11)
Medium	**Flat Top**	**PCD/CBN**	
Standard			
(07,11,15)	(07,11,15)	(07,11)	

Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	*	
	R	L			D4	L1	L3	F1	F2	H1	RR°	D1 (mm)	Re (mm)	Clamp Screw	Wrench
S10HSDQCR/L07	●	●	DCMT DCET DCGT DCMW DCGW NP-DCMW NP-DCMT	0702○○	10	100	16	7	2.4	9	13	**13**	0.4	TS25	TKY08F
S12KSDQCR/L07	●	●		0702○○	12	125	20	9	3.4	11	10	**16**	0.4	TS25	TKY08F
S16MSDQCR/L07	●	●		0702○○	16	150	25	11	3.9	14	7	**20**	0.4	TS25	TKY08F
S20QSDQCR/L11	●	●		11T3○○	20	180	32	13	4.4	18	7	**25**	0.8	TS4	TKY15F
S25RSDQCR/L15	●	●		1504○○	25	200	40	17	6.9	23	5	**32**	0.8	TS5	TKY25F
S32SSDQCR15	●			1504○○	32	250	50	22	8.4	30	5	**40**	0.8	TS5	TKY25F
S40TSDQCR15	●			1504○○	40	300	63	27	9.4	37	5	**50**	0.8	TS5	TKY25F

* Clamp Torque (N • m) : TS25=1.0, TS4=3.5, TS5=7.5

SDQC — Carbide shank DC○○inserts





Right hand tool holder only.

Finish	Finish	Light	Medium
FV	L-F	SV	MV
(07,11)	(07,11)	(07,11)	(07,11)
Medium	**Flat Top**	**PCD/CBN**	
Standard			
(07,11,15)	(07,11,15)	(07,11)	

Order Number	Stock	Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	*	
	R			D4	L1	L3	F1	F2	H1	RR°	D1 (mm)	Re (mm)	Clamp Screw	Wrench
C10KSDQCR07	●	DCMT DCET DCGT DCMW DCGW NP-DCMW NP-DCMT	0702○○	10	125	16	7	2.1	9	13	**13**	0.4	TS25	TKY08F
C12MSDQCR07	●		0702○○	12	150	20	9	3.1	11	10	**16**	0.4	TS25	TKY08F
C16RSDQCR07	●		0702○○	16	200	25	11	3.1	14	7	**20**	0.4	TS25	TKY08F
C20SSDQCR11	●		11T3○○	20	250	32	13	3.1	18	7	**25**	0.8	TS4	TKY15F
C25TSDQCR15	●	DCMW DCMT	1504○○	25	300	40	17	4.9	23	5	**32**	0.8	TS5	TKY25F

* Clamp Torque (N • m) : TS25=1.0, TS4=3.5, TS5=7.5

RECOMMENDED CUTTING CONDITIONS

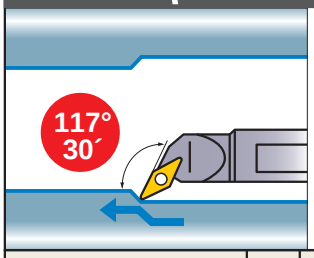
Steel Shank			l/d≤3			l/d=3−4 (Shank Diameter ≥ 25mm)		
Carbide Shank			l/d≤5			l/d=6−7		
Work Material	Hardness	Cutting Mode	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
P Carbon Steel Alloy Steel	180−350HB	Light Cutting	130 (90−160)	0.1 (0.05−0.15)	0.2	120 (80−150)	0.1 (0.05−0.15)	0.2
		Medium Cutting	90 (60−120)	0.25 (0.15−0.35)	−3.0	80 (50−110)	0.15 (0.1−0.2)	−1.5
M Stainless Steel	≤200HB	Light Cutting	140 (100−180)	0.1 (0.05−0.15)	0.2	140 (100−180)	0.1 (0.05−0.15)	0.2
		Medium Cutting	70 (50−90)	0.2 (0.15−0.25)	−2.0	60 (40−80)	0.15 (0.1−0.2)	−1.0
N Aluminium Alloy	–	Light Cutting	300 (200−400)	0.1 (0.05−0.15)	0.2	300 (200−400)	0.1 (0.05−0.15)	0.2
		Medium Cutting	200 (150−250)	0.1 (0.05−0.15)	−2.0	200 (150−250)	0.1 (0.05−0.15)	−1.5

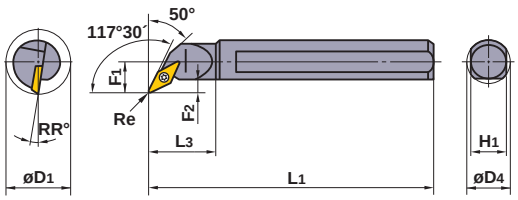
CBN & PCD inserts A160, A161, A177
DC○○ type inserts A094−A097
SPARE PARTS E001
TECHNICAL DATA F001

S TYPE BORING BARS

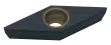
- The minimum cutting diameter is from ϕ20.
- ISO standard.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (up to 7 times with the carbide shank).

SVQC — VC○○ inserts





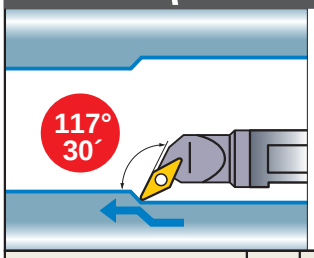
Right hand tool holder shown.

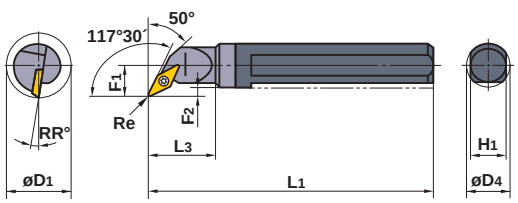
Finish	Medium
FV	Standard
(16)	(11,16)
Flat Top	
 (11,16)	

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	F2	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
S16MSVQCR/L11	●	●	VCMW VCMT	1103○○	16	150	25	11	3.9	14	7	**20**	0.4	TS25	TKY08F
S20QSVQCR/L11	●	●		1103○○	20	180	32	13	4.4	18	7	**25**	0.4	TS25	TKY08F
S25RSVQCR/L16	●	●		1604○○	25	200	40	17	6.9	23	5	**32**	0.8	TS4	TKY15F
S32SSVQCR/L16	●	●		1604○○	32	250	50	22	8.4	30	5	**40**	0.8	TS4	TKY15F
S40TSVQCR16	●			1604○○	40	300	63	27	9.4	37	5	**50**	0.8	TS4	TKY15F

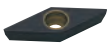
* Clamp Torque (N • m) : TS25=1.0, TS4=3.5

SVQC — Carbide shank — VC○○ inserts





Right hand tool holder only.

Finish	Medium
FV	Standard
(16)	(11,16)
Flat Top	
 (11,16)	

Order Number	Stock R	Insert Number		Dimensions (mm) D4	L1	L3	F1	F2	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	* Clamp Screw	Wrench
C16RSVQCR11	●	VCMT VCMW	1103○○	16	200	25	11	3.1	14	7	**20**	0.4	TS25	TKY08F
C20SSVQCR11	●		1103○○	20	250	32	13	3.1	18	7	**25**	0.4	TS25	TKY08F
C25TSVQCR16	●		1604○○	25	300	40	17	4.9	23	5	**32**	0.8	TS4	TKY15F

* Clamp Torque (N • m) : TS25=1.0, TS4=3.5

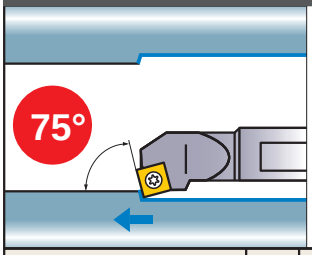
(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

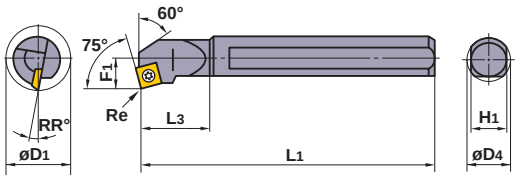
● : Inventory maintained in Japan.

CBN & PCD inserts A166, A181
VC○○ type inserts A110

SSKC

SC○○inserts





Right hand tool holder shown.

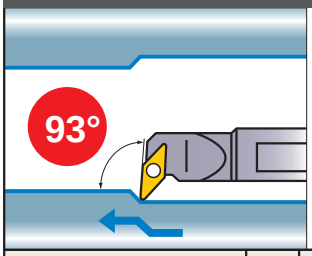
Finish	Medium
FV	Standard
(09)	(09,12)
Flat Top	
(09,12)	

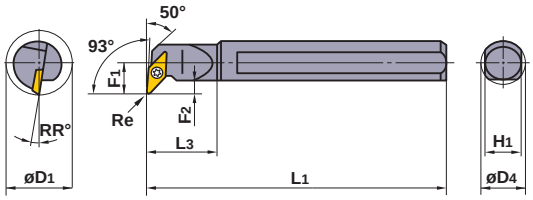
Order Number	Stock		Insert Number		Dimensions (mm)						Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Clamp Screw *	Wrench
	R	L			D4	L1	L3	F1	H1	RR°				
S16MSSKCR/L09	●	●	SCMW SCMT	09T3○○	16	150	25	11	14	7	20	0.8	TS4	TKY15F
S20QSSKCR/L09	●	●		09T3○○	20	180	32	13	18	7	25	0.8	TS4	TKY15F
S25RSSKCR/L12	●	●		1204○○	25	200	40	17	23	5	32	0.8	TS5	TKY25F

∗ Clamp Torque (N • m) : TS4=3.5, TS5=7.5

SVUC

VC○○inserts





Right hand tool holder only.

Finish	Medium
FV	Standard
(16)	(11,16)
Flat Top	
(11,16)	

Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Clamp Screw *	Wrench
	R	L			D4	L1	L3	F1	F2	H1	RR°				
S20QSVUCR/L11	●	●	VCMW VCMT	1103○○	20	180	32	13	4.4	18	7	25	0.4	TS25	TKY08F
S25RSVUCR/L16	●	●		1604○○	25	200	40	17	6.9	23	5	32	0.8	TS4	TKY15F
S32SSVUCR/L16	●	●		1604○○	32	250	50	22	8.4	30	5	40	0.8	TS4	TKY15F
S40TSVUCR/L16	●	●		1604○○	40	300	63	27	9.4	37	5	50	0.8	TS4	TKY15F

∗ Clamp Torque (N • m) : TS25=1.0, TS4=3.5

RECOMMENDED CUTTING CONDITIONS

Steel Shank			l/d≤3			l/d=3−4 (Shank Diameter ≥ 25mm)		
Carbide Shank			l/d≤5			l/d=6−7		
Work Material	Hardness	Cutting Mode	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
P Carbon Steel Alloy Steel	180−350HB	Light Cutting	130 (90−160)	0.1 (0.05−0.15)	0.2	120 (80−150)	0.1 (0.05−0.15)	0.2
		Medium Cutting	90 (60−120)	0.25 (0.15−0.35)	−3.0	80 (50−110)	0.15 (0.1−0.2)	−1.5
M Stainless Steel	≤200HB	Light Cutting	140 (100−180)	0.1 (0.05−0.15)	0.2	140 (100−180)	0.1 (0.05−0.15)	0.2
		Medium Cutting	70 (50−90)	0.2 (0.15−0.25)	−2.0	60 (40−80)	0.15 (0.1−0.2)	−1.0
N Aluminium Alloy	–	Light Cutting	300 (200−400)	0.1 (0.05−0.15)	0.2	300 (200−400)	0.1 (0.05−0.15)	0.2
		Medium Cutting	200 (150−250)	0.1 (0.05−0.15)	−2.0	200 (150−250)	0.1 (0.05−0.15)	−1.5

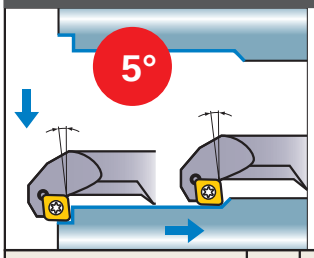
CBN inserts A166
SC○○ type inserts A102
VC○○ type inserts A110
SPARE PARTS E001
TECHNICAL DATA F001

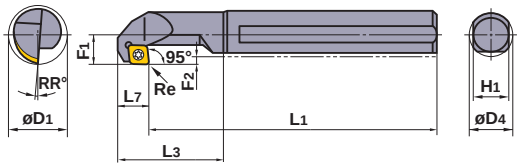
S TYPE BORING BARS

- The minimum cutting diameter is from ϕ20.
- ISO standard.
- 7° positive insert.
- Screw-on type.
- l/d is 3 to 5 times the diameter (up to 7 times with the carbide shank).

SCZC

CC○○inserts





Right hand tool holder shown.

Finish	Medium
FV	Standard
(06,09)	(06,09)
Flat Top	PCD/CBN
(06,09)	(06,09)

Order Number	Stock		Insert Number		Dimensions (mm)								Min. Cutting Diameter	Standard Corner Radius	*	
	R	L			D4	L1	L3	L7	F1	F2	H1	RR°	D1 (mm)	Re (mm)	Clamp Screw	Wrench
S16MSCZCR/L06	●	●	CCMT CCET CCGT CCMW	0602○○	16	150	36	11	11	3	14	10	**20**	0.4	TS25	TKY08F
S20QSCZCR/L09	●	●		09T3○○	20	180	50	18	13	3	18	7	**25**	0.8	TS4	TKY15F

(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

(Note 2) When using insert with right and left hand chip breaker, please use right hand insert for right hand holder and left hand insert for left hand holder.

* Clamp Torque (N • m) : TS25=1.0, TS4=3.5

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Cutting Mode	l/d≤3			l/d=3−4 (Shank Diameter ≥ 25mm)		
				Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
P	Carbon Steel Alloy Steel	180−350HB	Light Cutting	130 (90−160)	0.1 (0.05−0.15)	0.2	120 (80−150)	0.1 (0.05−0.15)	0.2
			Medium Cutting	90 (60−120)	0.25 (0.15−0.35)	−3.0	80 (50−110)	0.15 (0.1−0.2)	−1.5
M	Stainless Steel	≤200HB	Light Cutting	140 (100−180)	0.1 (0.05−0.15)	0.2	140 (100−180)	0.1 (0.05−0.15)	0.2
			Medium Cutting	70 (50−90)	0.2 (0.15−0.25)	−2.0	60 (40−80)	0.15 (0.1−0.2)	−1.0
N	Aluminium Alloy	−	Light Cutting	300 (200−400)	0.1 (0.05−0.15)	0.2	300 (200−400)	0.1 (0.05−0.15)	0.2
			Medium Cutting	200 (150−250)	0.1 (0.05−0.15)	−2.0	200 (150−250)	0.1 (0.05−0.15)	−1.5

● : **Inventory maintained in Japan.**

CBN & PCD inserts A156−A158, A176

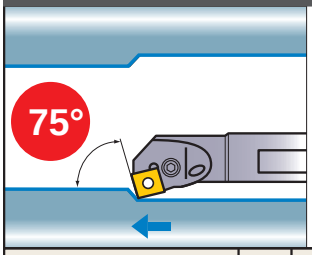
CC○○ type inserts A089−A092

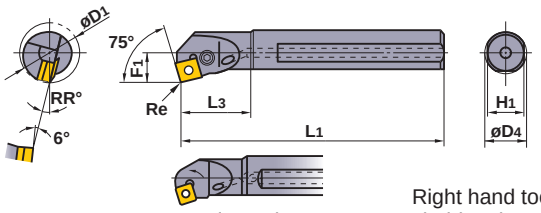
P TYPE BORING BARS

- The minimum cutting diameter is from ϕ25.
- l/d is 3 times the diameter.
- ISO standard.
- Economical negative insert.
- Lever lock type.

PSKN

With coolant hole **SN○○ inserts**





∗1 Pin Lock Type

Right hand tool holder shown.

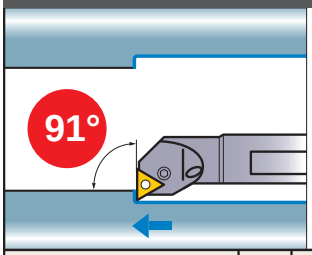
Finish	Light	Medium	Medium
FH	SH	MP	MH
(09,12)	(12)	(12)	(12)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(09,12)	(09,12)	(09,12)	(12)

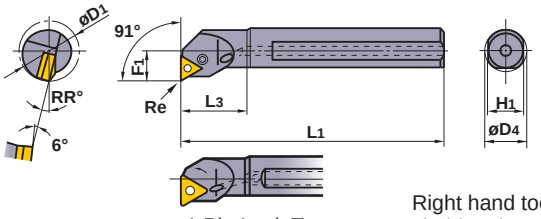
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Shim	Shim Pin	Clamp Lever	Clamp Screw ∗2	Wrench	Punch	Plug	Clamp Pin ∗2	Pin	Screw
∗1 **A20QPSKNR/L09**	●	●	SNMA SNMG SNMM SNGA SNGG	0903○○	20	180	32	13	18	13	**25**	0.8	—	—	—	—	HKY15R HKY25R	—	HGM-PT1/8	HP3T	P208AM	HSS03005
∗1 **A25RPSKNR/L12**	●	●		1204○○	25	200	40	17	23	13	**32**	0.8	MLSP42	—	—	—	HKY15R HKY30R	—	HGM-PT1/4	HP43	P210AM	HSS03005
A32SPSKNR/L12	●	●		1204○○	32	250	50	22	30	13	**44**	0.8	LLSSN42	LLP14	LLCL14	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A40TPSKNR12	●			1204○○	40	300	63	27	37	10	**54**	0.8	LLSSN42	LLP14	LLCL14	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—

∗2 Clamp Torque (N • m) : LLCS108S=3.3, HP3T=2.2, HP43=3.3

PTFN

With coolant hole **TN○○ inserts**





∗1 Pin Lock Type

Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16,22)	(16,22)	(16,22)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
(16,22)	(16,22)	(16,22)	(16)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Shim	Shim Pin	Clamp Lever	Clamp Screw ∗2	Wrench	Punch	Plug	Clamp Pin ∗2	Pin	Screw
∗1 **A20QPTFNR/L16**	●	●	TNMA TNMG TNMM TNGA TNGG	1604○○	20	180	32	13	18	15	**25**	0.8	—	—	—	—	HKY15R HKY25R	—	HGM-PT1/8	HP31	P208AM	HSS03005
∗1 **A25RPTFNR/L16**	●	●		1604○○	25	200	40	17	23	13	**32**	0.8	MLTP32	—	—	—	HKY15R HKY25R	—	HGM-PT1/4	HP33	P208AM	HSS03005
A32SPTFNR/L16	●	●		1604○○	32	250	50	22	30	13	**44**	0.8	LLSTN32	LLP13	LLCL13	LLCS106	HKY25R	LLH3	HGM-PT3/8	—	—	—
A40TPTFNR/L22	●	●		2204○○	40	300	63	27	37	10	**54**	0.8	LLSTN42	LLP14	LLCL14	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A50UPTFNR/L22	●	●		2204○○	50	350	80	35	47	9	**70**	0.8	LLSTN42	LLP14	LLCL14	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—

∗2 Clamp Torque (N • m) : LLCS106=2.2, LLCS108S=3.3, HP31=2.2, HP33=2.2

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	l/d≤3 Cutting Speed (m/min)	l/d≤3 Feed (mm/rev)	l/d≤3 Depth of Cut (mm)	l/d=3−4 Cutting Speed (m/min)	l/d=3−4 Feed (mm/rev)	l/d=3−4 Depth of Cut (mm)
P	Carbon Steel Alloy Steel	180−350HB	Medium Cutting	110 (80−140)	0.25 (0.1−0.4)	−5.0	110 (80−140)	0.2 (0.1−0.3)	−4.0
M	Stainless Steel	≤200HB	Medium Cutting	80 (60−100)	0.2 (0.1−0.3)	−4.0	70 (50−100)	0.15 (0.1−0.25)	−3.0
K	Gray Cast Iron	Tensile Strength ≤350MPa	Medium Cutting	80 (60−100)	0.25 (0.1−0.4)	−5.0	80 (60−100)	0.2 (0.1−0.3)	−4.0

(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

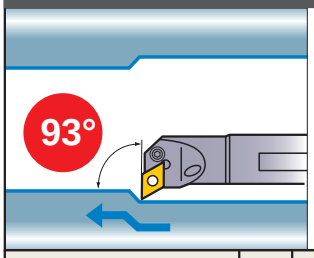
CBN & PCD inserts A147−A149, A173
SN○○ type inserts A069−A073
TN○○ type inserts A074−A079
SPARE PARTS E001
TECHNICAL DATA F001

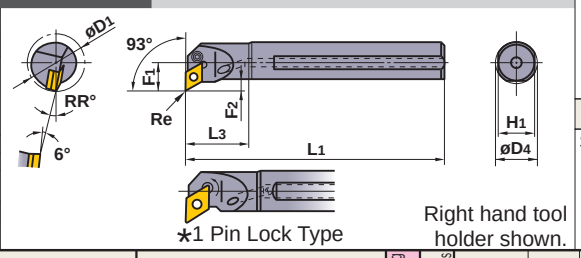
P TYPE BORING BARS

- The minimum cutting diameter is from ϕ20.
- ISO standard.
- Economical negative insert.
- Lever lock type.
- l/d is 3 times the diameter.

PDUN

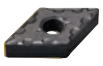
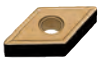
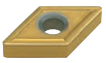
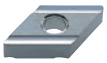
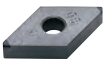
With coolant hole **DN○○ inserts**





∗1 Pin Lock Type

Right hand tool holder shown.

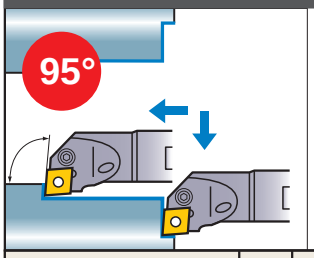
Finish	Light	Medium	Medium
FH	SH	MP	MH
			
(15)	(11,15)	(15)	(15)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
			
(11,15)	(11,15)	(15)	(15)

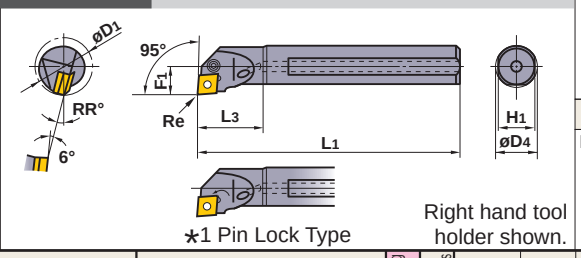
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	F2	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Shim	Shim Pin	Clamp Lever	Clamp Screw ∗2	Wrench	Punch	Plug	Clamp Pin ∗2	Pin	Screw
A20QPDUNR/L11	●	●	DNMA DNMG DNMX DNMM DNGA DNGG	1104○○	20	180	32	15	6.4	18	13	26	0.8	—	—	LLCL23S	LLCS125	HKY20R	—	HGM-PT1/8	—	—	—
A25RPDUNR/L11	●	●		1104○○	25	200	40	17	6.9	23	15	32	0.8	LLSDN32	LLP13	LLCL23	LLCS106	HKY25R	LLH3	HGM-PT1/4	—	—	—
∗1 A25RPDUNR/L15	●	●		1504○○	25	200	40	17	6.9	23	13	32	0.8	MLDP42	—	—	—	HKY15R HKY30R	—	HGM-PT1/4	HP43	P210AM	HSS03005
A32SPDUNR/L11	●	●		1104○○	32	250	50	22	8.4	30	13	44	0.8	LLSDN32	LLP13	LLCL23	LLCS106	HKY25R	LLH3	HGM-PT3/8	—	—	—
A32SPDUNR/L15	●	●		1504○○	32	250	50	22	8.4	30	13	44	0.8	LLSDN42	LLP14	LLCL24	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A40TPDUNR/L15	●	●		1504○○	40	300	63	27	9.4	37	10	54	0.8	LLSDN42	LLP14	LLCL24	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A50UPDUNR/L15	●	●		1504○○	50	350	80	35	12.4	47	9	70	0.8	LLSDN42	LLP14	LLCL24	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—

∗2 Clamp Torque (N • m) : LLCS125=1.5, LLCS106=2.2, LLCS108S=3.3, HP43=3.3

PCLN

With coolant hole **CN○○ inserts**





∗1 Pin Lock Type

Right hand tool holder shown.

Finish	Light	Light	Medium
FH	SA	SH	MP
(12)	(12)	(09,12)	(12)
Medium	**Medium**	**Stainless**	**CBN**
MH	Standard	MS	
(12)	(09,12)	(09,12)	(12)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Shim	Shim Pin	Clamp Lever	Clamp Screw ∗2	Wrench	Punch	Plug	Clamp Pin ∗2	Pin	Screw
A16MPCLNR/L09	●	●	CNMA CNMG CNMM CNGG	09T3○○	16	150	25	11	14	15	20	0.8	—	—	LLCL13S	LLCS105	HKY20R	—	HGM-PT1/8	—	—	—
∗1 A20QPCLNR/L09	●	●		09T3○○	20	180	32	13	18	13	25	0.8	—	—	—	—	HKY25R HKY15R	—	HGM-PT1/8	HP3T	P208AM	HSS03005
A20QPCLNR/L09N	●	●		09T3○○	20	180	32	13	18	13	25	0.8	—	—	LLCL13S	LLCS105	HKY20R	—	HGM-PT1/8	—	—	—
A25RPCLNR/L09	●	●		09T3○○	25	200	40	17	23	13	32	0.8	—	—	LLCL13S	LLCS105	HKY20R	—	HGM-PT1/4	—	—	—
∗1 A25RPCLNR/L12	●	●		1204○○	25	200	40	17	23	13	32	0.8	MLCP42	—	—	—	HKY30R HKY15R	—	HGM-PT1/4	HP43	P210AM	HSS03005
A32SPCLNR/L09	●	●		09T3○○	32	250	50	22	30	13	44	0.8	LLSCN3T3	LLP13	LLCL13	LLCS106	HKY25R	LLH3	HGM-PT3/8	—	—	—
A32SPCLNR/L12	●	●		1204○○	32	250	50	22	30	13	44	0.8	LLSCN42	LLP14	LLCL14	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A40TPCLNR/L12	●	●		1204○○	40	300	63	27	37	10	54	0.8	LLSCN42	LLP14	LLCL14	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A50UPCLNR12	●			1204○○	50	350	80	35	47	10	63	0.8	LLSCP42	LLP14	LLCL14	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—

∗2 Clamp Torque (N • m) : LLCS105=1.5, LLCS106=2.2, LLCS108S=3.3, HP3T=2.2, HP43=3.3

(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

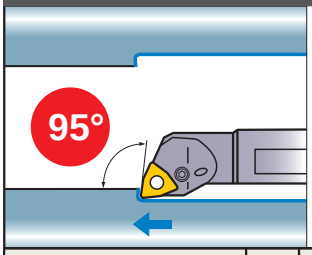
● : **Inventory maintained in Japan.**

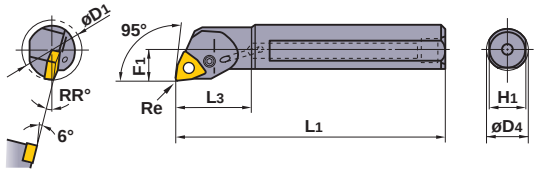
CBN & PCD inserts A142—A146, A172
DN○○ type inserts A063—A067
CN○○ type inserts A058—A062

PWLN

With coolant hole

WN○○inserts





Right hand tool holder shown.

Light	Medium
SH (06)	MP (06)
Stainless	
MS (06)	

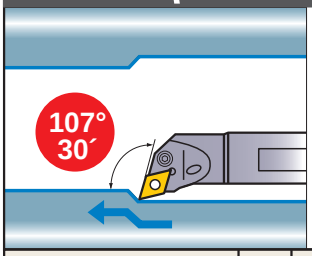
Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Clamp Lever	Clamp Screw *	Wrench	Plug
A16MPWLNR/L06	●	●	WNMG	06T3○○	16	150	25	11	14	15	20	0.8	LLCL13S	LLCS105	HKY20R	HGM-PT1/8
A20QPWLNR/L06	●	●	WNMG	06T3○○	20	180	32	13	18	13	25	0.8	LLCL13S	LLCS105	HKY20R	HGM-PT1/8
A25RPWLNR/L06	●	●	WNMG	06T3○○	25	200	40	17	23	13	32	0.8	LLCL13S	LLCS105	HKY20R	HGM-PT1/4

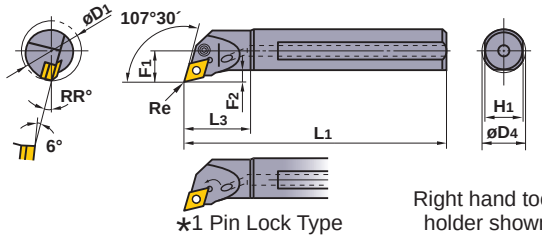
* Clamp Torque (N • m) : LLCS105=1.5

PDQN

With coolant hole

DN○○inserts





*1 Pin Lock Type

Right hand tool holder shown.

Finish	Light	Medium	Medium
FH (15)	SH (15)	MP (15)	MH (15)
Medium	Stainless	G Class	CBN
Standard (15)	MS (15)	R/L (15)	(15)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	F2	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Shim	Shim Pin	Clamp Lever	Clamp Screw *2	Wrench	Punch	Plug	Clamp Pin *2	Pin	Screw
*1 A25RPDQNR/L15	●	●	DNMA DNMG DNMM DNGA DNGG	1504○○	25	200	40	17	6.9	23	13	32	0.8	MLDP42	—	—	—	HKY15R HKY30R	—	HGM-PT1/4	HP43	P210AM	HSS03005
A32SPDQNR/L15	●	●	DNMA DNMG DNMM DNGA DNGG	1504○○	32	250	50	22	8.4	30	13	44	0.8	LLSDN42	LLP14	LLCL24	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A40TPDQNR/L15	●	●	DNMA DNMG DNMM DNGA DNGG	1504○○	40	300	63	27	9.4	37	10	54	0.8	LLSDN42	LLP14	LLCL24	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A50UPDQNR15	●		DNMA DNMG DNMM DNGA DNGG	1504○○	50	350	80	35	12.4	47	9	70	0.8	LLSDN42	LLP14	LLCL24	LLCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—

*2 Clamp Torque (N • m) : LLCS108S=3.3, HP43=3.3

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	l/d≤3 Cutting Speed (m/min)	l/d≤3 Feed (mm/rev)	l/d≤3 Depth of Cut (mm)	l/d=3—4 Cutting Speed (m/min)	l/d=3—4 Feed (mm/rev)	l/d=3—4 Depth of Cut (mm)
P	Carbon Steel Alloy Steel	180—350HB	Medium Cutting	110 (80—140)	0.25 (0.1—0.4)	—5.0	110 (80—140)	0.2 (0.1—0.3)	—4.0
M	Stainless Steel	≤200HB	Medium Cutting	80 (60—100)	0.2 (0.1—0.3)	—4.0	70 (50—100)	0.15 (0.1—0.25)	—3.0
K	Gray Cast Iron	Tensile Strength ≤350MPa	Medium Cutting	80 (60—100)	0.25 (0.1—0.4)	—5.0	80 (60—100)	0.2 (0.1—0.3)	—4.0

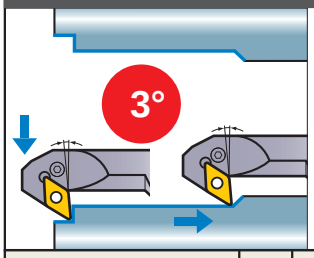
CBN & PCD inserts A145, A146, A172
WN○○ type inserts A082—A084
DN○○ type inserts A063—A067
SPARE PARTS E001
TECHNICAL DATA F001

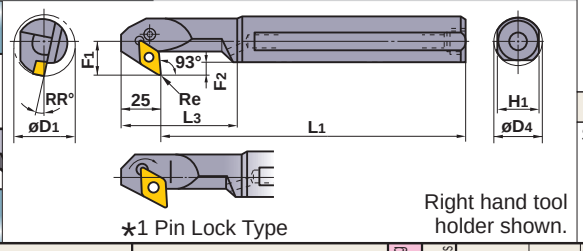
P TYPE BORING BARS

- The minimum cutting diameter is from ϕ32.
- ISO standard.
- Economical negative insert.
- Lever lock type.
- l/d is 3 times the diameter.

PDZN

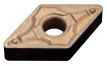
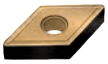
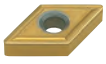
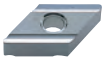
With coolant hole **DN○○ inserts**





∗1 Pin Lock Type

Right hand tool holder shown.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(15)	(15)	(15)	 (15)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	R/L	
 (15)	 (15)	 (15)	(15)

Order Number	Stock		Insert Number		Dimensions (mm)							Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Lever	Clamp Screw ∗2	Wrench	Punch	Plug	Clamp Pin ∗2	Pin	Screw
	R	L			D4	L1	L3	F1	F2	H1	RR°	D1 (mm)	Re (mm)	Shim	Shim Pin	Clamp Lever	Clamp Screw	Wrench	Punch	Plug	Clamp Pin	Pin	Screw
∗1 **A25RPDZNR/L15**	●	●	DNMA DNMG DNMX DNMM DNGA DNGG	1504○○	25	200	65	17	6.7	23	13	**32**	0.8	MLDP42	—	—	—	HKY15R HKY30R	—	HGM-PT1/4	HP43	P210AM	HSS03005
A32SPDZNR/L15	●	●		1504○○	32	250	75	22	8.2	30	13	**40**	0.8	LLSDN42	LLP14	LLCL24	LCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A40TPDZNR/L15	●	●		1504○○	40	300	88	27	9.2	37	10	**50**	0.8	LLSDN42	LLP14	LLCL24	LCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—
A50UPDZNR/L15	●	●		1504○○	50	350	105	35	12.2	47	9	**63**	0.8	LLSDN42	LLP14	LLCL24	LCS108S	HKY30R	LLH4	HGM-PT3/8	—	—	—

(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

(Note 2) When using insert with right and left hand chip breaker, please use right hand insert for right hand holder and left hand insert for left hand holder.

∗2 Clamp Torque (N • m) : LLCS108S=3.3, HP43=3.3

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	l/d≤3			l/d=3—4		
				Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
P	Carbon Steel Alloy Steel	180—350HB	Medium Cutting	110 (80—140)	0.25 (0.1—0.4)	—5.0	110 (80—140)	0.2 (0.1—0.3)	—4.0
M	Stainless Steel	≤200HB	Medium Cutting	80 (60—100)	0.2 (0.1—0.3)	—4.0	70 (50—100)	0.15 (0.1—0.25)	—3.0
K	Gray Cast Iron	Tensile Strength ≤350MPa	Medium Cutting	80 (60—100)	0.25 (0.1—0.4)	—5.0	80 (60—100)	0.2 (0.1—0.3)	—4.0

● : **Inventory maintained in Japan.**

CBN & PCD inserts A145, A146, A172

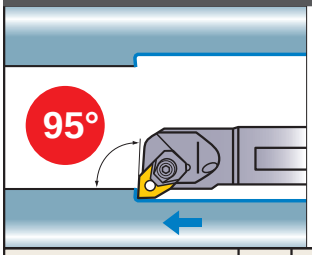
DN○○ type inserts A063—A067

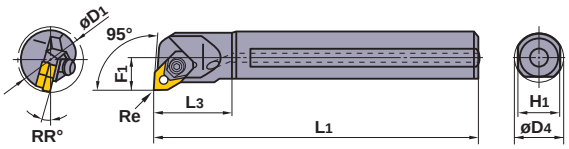
M TYPE BORING BARS

- The minimum cutting is from ϕ32.
- Negative trigon shape insert.
- Double clamp type.
- l/d is 3 times the diameter.

MWLN

With coolant hole **WN○○inserts**





Right hand tool holder shown.

Finish	Light	Medium
FH (08)	SH (08)	MP (08)
Medium	**Medium**	**Stainless**
MH (08)	Standard (08)	MS (08)

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L3	F1	H1	RR°	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	Shim	Shim Pin	Clamp Bridge	Side Lock Plate	Spring	Clamp Screw *	Wrench	Plug
A25RMWLNR/L08	●	●	WNMA WNMG	0804○○	25	200	40	17	23	13	**32**	0.8	—	—	CCK13	CPT24	MES2	SLCS105	HKY25R HKY40R	HGM-PT1/4
A32SMWLNR/L08	●	●		0804○○	32	250	50	22	30	13	**40**	0.8	WPS WC43	CCP44	CCK13	CPT24	MES2	SLCS105	HKY25R HKY40R	HGM-PT3/8
A40TMWLNR/L08	●	●		0804○○	40	300	63	27	37	10	**50**	0.8	WPS WC43	CCP44	CCK13	CPT24	MES2	SLCS105	HKY25R HKY40R	HGM-PT3/8
A50UMWLNR08	●			0804○○	50	350	80	35	63	9	**63**	0.8	WPS WC43	CCP44	CCK13	CPT24	MES2	SLCS105	HKY25R HKY40R	HGM-PT3/8

(Note) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.

* Clamp Torque (N • m) : SLCS105=7.0

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	l/d≤3 Cutting Speed (m/min)	l/d≤3 Feed (mm/rev)	l/d≤3 Depth of Cut (mm)	l/d=3−4 Cutting Speed (m/min)	l/d=3−4 Feed (mm/rev)	l/d=3−4 Depth of Cut (mm)
P	Carbon Steel Alloy Steel	180−350HB	Medium Cutting	110 (80−140)	0.25 (0.1−0.4)	−5.0	110 (80−140)	0.2 (0.1−0.3)	−4.0
M	Stainless Steel	≤200HB	Medium Cutting	80 (60−100)	0.2 (0.1−0.3)	−4.0	70 (50−100)	0.15 (0.1−0.25)	−3.0
K	Gray Cast Iron	Tensile Strength ≤350MPa	Medium Cutting	80 (60−100)	0.25 (0.1−0.4)	−5.0	80 (60−100)	0.2 (0.1−0.3)	−4.0

CBN inserts A151

WN○○ type inserts A082−A085

SPARE PARTS E001

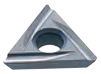
TECHNICAL DATA F001

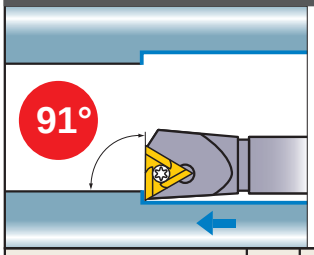
AL TYPE BORING BARS

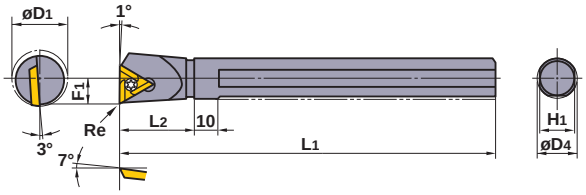
- Suitable for non-ferrous metal.
- 20° positive insert.
- Screw-on type.
- l/d is 6 times the diameter.
- Excellent vibration resistance.
- The minimum cutting diameter is from ϕ20.

STFE

TE○○inserts

Medium	PCD
R/L  (16)	R/L (16)
PCD	
(16)	





Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Dimensions (mm) D4	L1	L2	F1	H1	Min. Cutting Diameter D1 (mm)	Standard Corner Radius Re (mm)	✱ Clamp Screw	Wrench
S16RSTFER/L16	●	●	TEGX...R/L	1603○○	16	200	30	11	14.6	**20**	0.4	FC400890T	TKY10F
S20RSTFER/L16	●	●		1603○○	20	200	37	13	18	**25**	0.4	FC400890T	TKY10F
S25SSTFER/L16	●	●		1603○○	25	250	40	17	23	**32**	0.4	FC400890T	TKY10F

✱ Clamp Torque (N • m) : FC400890T=2.5

RECOMMENDED CUTTING CONDITIONS

Work Material		Grade	Cutting Speed (m/min)	l/d=3 Feed (mm/rev)	l/d=3 Depth of Cut (mm)	l/d=4 Feed (mm/rev)	l/d=4 Depth of Cut (mm)	l/d=5 Feed (mm/rev)	l/d=5 Depth of Cut (mm)	l/d=6 Feed (mm/rev)	l/d=6 Depth of Cut (mm)
N	Aluminium Alloy	**HTi10**	400 (200—600)	0.15 (0.05—0.25)	—3.0	0.15 (0.05—0.25)	—3.0	0.1 (0.05—0.2)	—2.5	0.1 (0.05—0.2)	—1.0
		MD220	800 (200—1500)	0.15 (0.05—0.25)	—3.0	0.15 (0.05—0.25)	—3.0	0.1 (0.05—0.2)	—2.5	0.1 (0.05—0.2)	—1.0

(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

● **: Inventory maintained in Japan.**

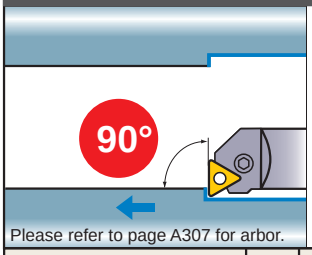
PCD inserts A183
TE○○ type inserts A105

D TYPE BORING HEAD

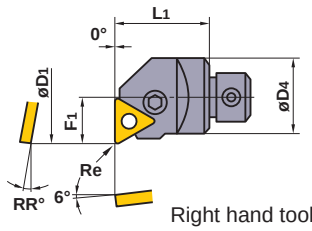
- The minimum cutting diameter is from ϕ40.
- Economical negative insert.
- Lever lock type.
- Exchangeable head type.

DPTF

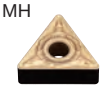
TN○○inserts



Please refer to page A307 for arbor.



Right hand tool holder only.

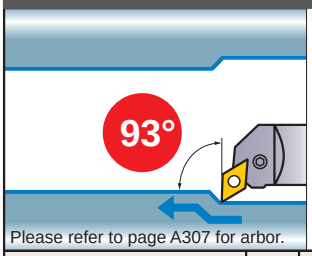
Finish	Light	Medium	Medium
FH	SH	MP	MH
			
(16)	(16,22)	(16,22)	(16,22)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	L	
(16,22)	(16,22)	(16,22)	(16)

Order Number	Stock	Insert Number		Dimensions (mm)				Min. Cutting Diameter	Standard Corner Radius					
	R			D4	L1	F1	RR°	D1 (mm)	Re (mm)	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench
DPTF132R	●	TNMA TNMG TNMM TNGA TNGG	1604○○	32	40	20	12	**40**	0.8	LLSTN32	LLP13	LLCL13	LLCS106	HKY25R
140R	●		2204○○	40	50	25	10	**50**	0.8	LLSTN42	LLP14	LLCL14	LLCS108	HKY30R

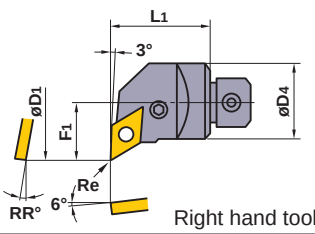
∗ Clamp Torque (N • m) : LLCS106=2.2, LLCS108=3.3

DPDU

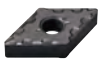
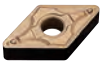
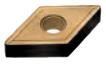
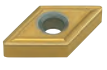
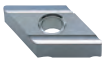
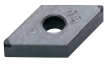
DN○○inserts



Please refer to page A307 for arbor.



Right hand tool holder only.

Finish	Light	Medium	Medium
FH	SH	MP	MH
			
(15)	(15)	(15)	(15)
Medium	**Stainless**	**G Class**	**CBN**
Standard	MS	L	
			
(15)	(15)	(15)	(15)

Order Number	Stock	Insert Number		Dimensions (mm)				Min. Cutting Diameter	Standard Corner Radius					
	R			D4	L1	F1	RR°	D1 (mm)	Re (mm)	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench
DPDU132R	●	DNMA DNMG DNMX DNMM DNGA DNGG	1504○○	32	40	25	10	**50**	0.8	LLSDN42	LLP14	LLCL24	LLCS108	HKY30R
140R	●		1504○○	40	50	30	9	**60**	0.8	LLSDN42	LLP14	LLCL24	LLCS108	HKY30R

∗ Clamp Torque (N • m) : LLCS108=3.3

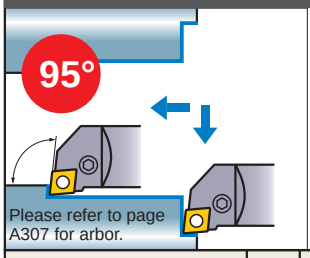
CBN & PCD inserts A145, A146, A148, A149, A172, A173
TN○○ type inserts A074—A079
DN○○ type inserts A063—A067
SPARE PARTS E001
TECHNICAL DATA F001

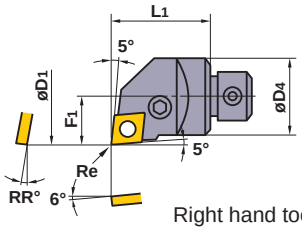
D TYPE BORING HEAD

- The minimum cutting diameter is from ϕ40.
- Economical negative insert.
- Lever lock type.
- Exchangeable head type.

DPCL

CN○○ inserts





Right hand tool holder only.

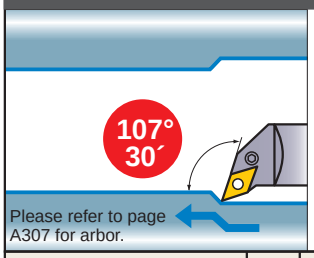
Finish	Light	Light	Medium
FH	SH	SA	MP
(12)	(12)	(12)	(12)
Medium	**Medium**	**Stainless**	**CBN**
MH	Standard	MS	
(12)	(12)	(12)	(12)

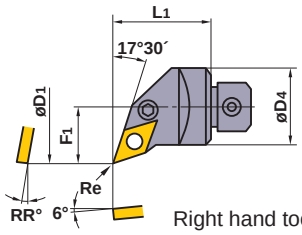
Order Number	Stock	Insert Number		Dimensions (mm)				Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench
	R			D4	L1	F1	RR°	D1 (mm)	Re (mm)					
DPCL132R	●	CNMA CNMG	1204○○	32	40	20	12	**40**	0.8	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R
140R	●	CNMM CNGG	1204○○	40	50	25	10	**50**	0.8	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R

∗ Clamp Torque (N • m) : LLCS108=3.3

DPDH

DN○○ inserts





Right hand tool holder only.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(15)	(15)	(15)	(15)
Medium	**Medium**	**G Class**	**CBN**
Standard	MS	L	
(15)	(15)	(15)	(15)

Order Number	Stock	Insert Number		Dimensions (mm)				Min. Cutting Diameter	Standard Corner Radius	Shim	Shim Pin	Clamp Lever	Clamp Screw *	Wrench
	R			D4	L1	F1	RR°	D1 (mm)	Re (mm)					
DPDH132R	●	DNMA DNMG	1504○○	32	40	25	10	**50**	0.8	LLSDN42	LLP14	LLCL24	LLCS108	HKY30R
140R	●	DNMM DNGA DNGG	1504○○	40	50	30	9	**60**	0.8	LLSDN42	LLP14	LLCL24	LLCS108	HKY30R

∗ Clamp Torque (N • m) : LLCS108=3.3

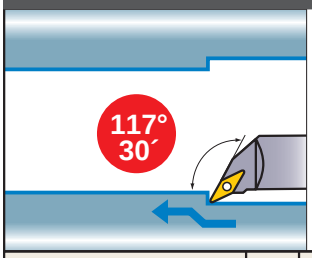
(Note 1) The insert photos are only examples. The letters refer to the chip breaker and the dimension refers to the inscribed circle.
(Note 2) When using insert with right and left hand chip breaker, please use left hand insert for right hand holder and right hand insert for left hand holder.

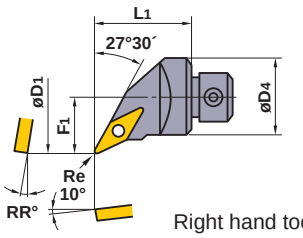
● : **Inventory maintained in Japan.**

CBN & PCD inserts A142—A146, A172
CN○○ type inserts A058—A062
DN○○ type inserts A063—A067

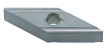
DPVP

VN○○inserts





Right hand tool holder only.

Finish	Light	Medium	Medium
FH	SH	MP	MH
(16)	(16)	(16)	(16)
Stainless	**G Class**	**PCD**	**CBN**
MS	L	L-F	
			
(16)	(16)	(16)	(16)

Order Number	Stock	Insert Number		Dimensions (mm)				Min. Cutting Diameter	Standard Corner Radius			*		
	R			D4	L1	F1	RR°	D1 (mm)	Re (mm)	Shim	Lock Pin	Lock Screw	Stop Ring	Wrench
DPVP132R	●	VNMG VNGA VNGG	1604○○	32	40	25	13	**50**	0.8	PV322	P11S	HSP05008C	E03	HKY25R
140R	●			40	50	30	13	**60**	0.8	PV322	P11S	HSP05008C	E03	HKY25R

* Clamp Torque (N • m) : HSP05008C=2.5

STANDARD ARBOR FOR D TYPE BORING HEAD

① **B** ② **1** ③ **32** ④ **32**

①General Term for Arbor

②Arbor Length (mm)

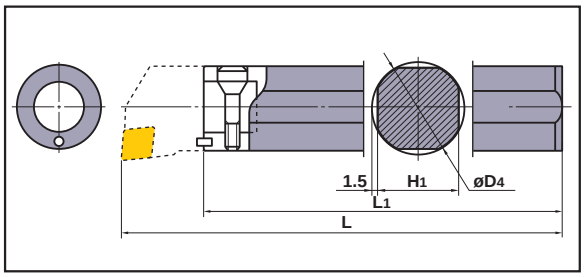
Symbol	D4	L1	L
1	32	260	300
	40	310	360

③Arbor Diameter (mm)

Symbol	Diameter(D4)
32	32
40	40

④Head Diameter (mm)

Symbol	Diameter (D4)
32	32
40	40



Order Number	Stock	Dimensions (mm)				Set Bolt	Wrench	Head Order Number
		D4	L1	H1	L			
B13232	●	32	260	29	300	SD32	HKY60R	DP○○132R
B14040	●	40	310	37	360	SD40	HKY60R	DP○○140R

HOW TO READ THE STANDARD OF GROOVING

●How this section page is organized

①Classified according to external or internal applications.
②Sub-classified according to product series.
(Refer to the index on the next page.)

[For External Grooving] [For Internal Grooving]

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict available machining applications such as cutting off, grooving, copying, and recessing.

INDICATION OF HOLDER TYPE ACCORDING TO APPLICATION
indicates the holder types, such as the standard type or the L type, according to machining application.

TITLE OF PRODUCT

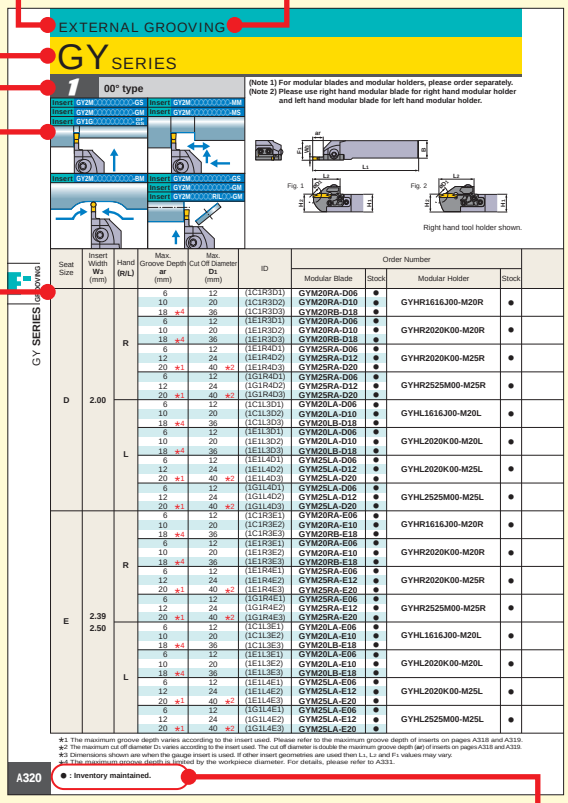
PRODUCT SECTION

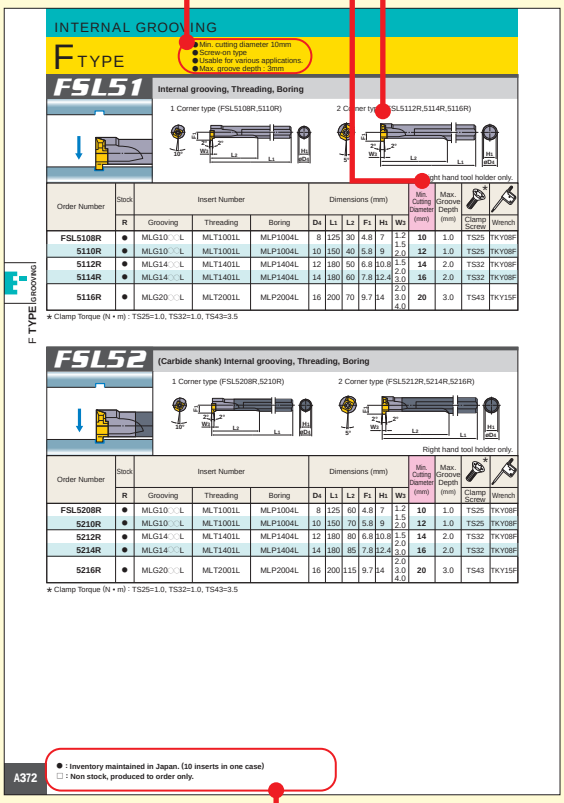
INDICATION OF EXTERNAL/ INTERNAL APPLICATION

PRODUCT FEATURES

MIN. CUTTING DIAMETER
is colour-coded to let you find, at a glance, the minimum cutting diameters for internal machining.

GEOMETRY


EXTERNAL GROOVING
GY SERIES
1 00° type
(Note 1) For modular blades and modular holders, please order separately.
(Note 2) Please use right hand modular blade for right hand modular holder and left hand modular blade for left hand modular holder.
Right hand tool holder shown.
GY SERIES (EXTERNAL GROOVING)
A320
● : Inventory maintained.


INTERNAL GROOVING
F TYPE
●Min. cutting diameter 10mm
●Screw-on type
●Unable for various applications.
●Max. groove depth : 3mm
FSL51 Internal grooving, Threading, Boring
FSL52 (Carbide shank) Internal grooving, Threading, Boring
Right hand tool holder only.
★ Clamp Torque (N • m) : TS25=1.0, TS32=1.0, TS43=3.5
F TYPE (GROOVING)
A372
● : Inventory maintained in Japan. (10 inserts in one case)
□ : Non stock, produced to order only.

PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), holders, locators, clamp bridges, groove widths, maximum groove depths, maximum cut-off diameters, dimensions, applicable inserts, and cutting edge shapes.

LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

●To Order : For holder, please specify ①order number and hand of tool (right/left).
For insert, please specify ①insert number and ②grade.

TURNING TOOLS

GROOVING

CLASSIFICATION (EXTERNAL CUTTING) ····· A310
CLASSIFICATION (INTERNAL CUTTING) ····· A311

STANDARD OF GROOVING TOOLS

EXTERNAL CUTTING

FEATURES OF THE GY SERIES ····· A312
CLASSIFICATION OF THE GY SERIES ····· A313
HOW TO SELECT GY SERIES ····· A314
GY SERIES ORDER NUMBER ····· A316
GY SERIES INSERTS ····· A318
GY SERIES ····· A320
CLASSIFICATION OF DG HOLDER ····· A334
SELECTION OF DG HOLDER ····· A335
IDENTIFICATION OF DG HOLDER ····· A336
DG HOLDER ····· A338
DG INSERTS ····· A358
UG HOLDER ····· A360
EG HOLDER ····· A362
MG HOLDER ····· A363
SMG HOLDER ····· A366

INTERNAL CUTTING

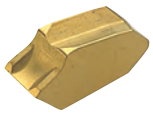
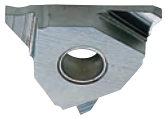
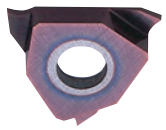
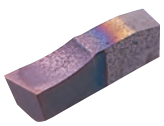
MICRO-MINI BORING BARS ····· A367
MICRO-MINI TWIN BORING BARS ····· A368
F TYPE BORING BARS ····· A372
D TYPE BORING HEAD ····· A376

*Arranged by Alphabetical order

A367 **C○○○R-BLS**
A368 **CG**
A338 **DG**
A376 **DPT4**
A362 **EGHR**
A362 **EGT**
A374 **FCDG4**
A372 **FSL51**
A372 **FSL52**
A318 **GY**
A360 **KGBN**
A361 **KGT**
A363 **MG1**
A364 **MGH**
A365 **MGT**
A373 **MLG**
A373 **MLP**
A373 **MLT**
A370 **RBH**
A371 **SBH**
A366 **SMGH**
A366 **SMGT**
A366 **SMTT**
A361 **UGH**
A360 **UGHN**

CLASSIFICATION

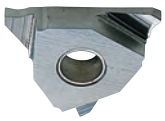
EXTERNAL CUTTING

Name of Tool Holder	Insert Shape	Features	Groove Width According to Cutting Mode (mm)						Page
			Shallow Grooving	Deep Grooving	Cutting Off	Copying	Recessing	Face Grooving	
GY Series NEW		● Clamp-on type. ● The modular blade allows for high rigidity and accuracy. (Tri Lock System) ● Various insert types.	2 2.39 2.5 3 3.18 4 4.75 5 6 6.35	2 2.39 2.5 3 3.18 4 4.75 5 6 6.35	2 2.39 2.5 3 3.18 4 4.75 5 6 6.35	3 3.18 4 4.75 5 6 6.35			**A320**
DG Holder		● Clamp-on type. ● Various insert types. ● Insert series for copying is available. ● Face grooving series with minimum cutting diameter 20mm.	2 3 4 5 6 7 8	2 3 4 5 6 7 8	2 3 4 5 6 7 8	3 4 5 6	4 5 6	3 4 5 6 7 8	**A338**
UG Holder		● Spring clamp type. ● Strengthened insert clamping. ● Block and blade type and solid type series. ● Maximum cut off diameter : 120mm.	2.2 3.1 4.1 5.1	2.2 3.1 4.1 5.1	2.2 3.1 4.1 5.1				**A360**
EG Holder		● Clamp-on type. ● High clamping rigidity due to integrated clamp bridge. ● Excellent sharpness with positive inserts. ● Maximum cut off diameter : 50mm.	3 4 5 6	3 4 5 6	3 4 5 6				**A362**
MG Holder		● Clamp-on type. ● Precision class insert. ● Positive insert suffers from negligible chattering and thus produces a good finished surface.	1.25 I 6						**A363**
SMG Holder		● Screw-on type. ● Precision class insert. ● Positive insert suffers from negligible chattering and thus produces a good finished surface.	0.3 I 1.3						**A366**
SMALL TOOLS **GTAH GTBH GTCH**		● For gang type tool posts. ● Small Shank : 8mm—16mm ● Possible to control the back clamping. ● High rigidity due to design of vertical insert. ● Economical due to the design of three-corner inserts.	0.3 I 3.0						**A248**
CTAH		● For gang type tool posts. ● Small Shank : 8mm—16mm ● Due to the design of handed tool holders, able to minimize accumulation of workpieces. ● High rigidity due to design of vertical insert. ● Maximum cut off diameter : 12mm	0.7 1.0 1.5 2.0	0.7 1.0 1.5 2.0	0.7 1.0 1.5 2.0				**A250**
CTBH		● For gang type tool posts. ● Small Shank : 10mm—16mm ● Single holder for inserts for back turning and cutting off. ● High rigidity due to design of vertical insert. ● Maximum cut off diameter : 16mm	1.5 2.0	1.5 2.0	1.5 2.0				**A252**
CTCH		● For gang type tool posts. ● Small Shank : 10mm,12mm ● High cutting edge sharpness and excellent chip discharge. ● Maximum cut off diameter : 20mm	2.2 2.5	2.2 2.5	2.2 2.5				**A253**

EXTERNAL CUTTING

	Name of Tool Holder	Insert Shape	Features	Groove Width According to Cutting Mode (mm)						Page
				Shallow Grooving	Deep Grooving	Cutting Off	Copying	Recessing	Face Grooving	
SMALL TOOLS	**CTDH**		● For gang type tool posts. ● Small Shank : 16mm ● High cutting edge sharpness and excellent chip discharge. ● Maximum cut off diameter : 23—35mm	2.5	2.5	2.5				**A254**
	CTEH		● For gang type tool posts. ● Small Shank : 16mm ● High cutting edge sharpness and excellent chip discharge. ● Maximum cut off diameter : 23—35mm	3.0	3.0	3.0				**A255**
	CSVH		● For cam type tool posts. ● Small Shank : 7—12mm ● Single holder responds to front turning, back turning, grooving, threading and cutting off operations. ● The most suitable for machining of small parts with work diameter 5mm or smaller. ● Maximum groove depth : 0.3—2.5mm ● Maximum cut off diameter : 3—5mm	0.25 I 1.5		0.6 I 1.5				**A259**

INTERNAL CUTTING

Name of Tool Holder	Insert Shape	Features	Min. Cutting Diameter (mm)	Groove Width (mm)	Max. Groove Depth (mm)	Page
FSLS		● Screw-on type. ● Precision class insert. ● Holder is capable of performing both grooving and threading. ● Maximum groove depth : 3mm.	10	1.2 I 4.0	1.0 I 3.0	**A372**
FCDG4		● Clamp-on type. ● Available for grooving and copying. ● Maximum groove depth : 8mm.	25	1 I 4	2 I 8	**A374**
DPT4		● Pin lock type. ● Precision class insert. ● Exchangable head type.	40	1.25 I 4.5	1.2 I 4.5	**A376**
MICRO-MINI TWIN Boring Bars	–	● Solid carbide type. ● Economical due to single holder with two cutting edges.	3.0	1.0 I 2.0	1.0 I 3.0	**A368**
MICRO-MINI Boring Bars	–	● Solid carbide type. ● Insert can be ground to suit the application.	3.2	2.0 I 3.0	1.0 I 2.0	**A367**

FEATURES OF THE GY SERIES

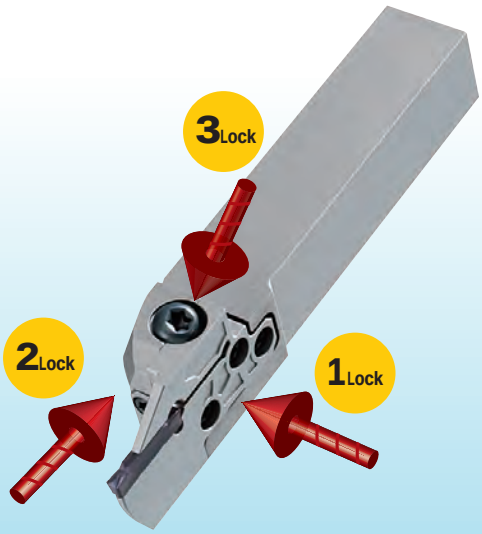
GY series offers ultimate rigidity and accuracy for stable grooving applications.
Modular system allows for high flexibility while maintaining overall strength comparable to a mono block type holder.

New Tri Lock System for increased stability and performance!

Innovative Tri Lock System

Mitsubishi Materials has developed a new geometry modular blade that is totally original and incomparable.* Tri lock system ensures that the modular blade is securely located from 3 directions (side, front and top). This leads to high rigidity clamping and stable grooving.

*Mitsubishi Materials study data



External GY Holder

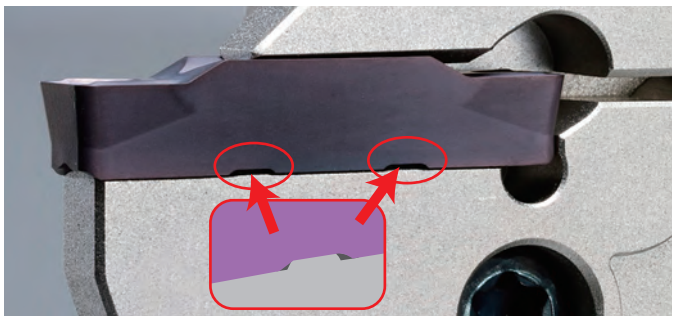
Outstanding compatibility

One tool holder can be used to have a number of modular blades offering flexibility and improved tool management.

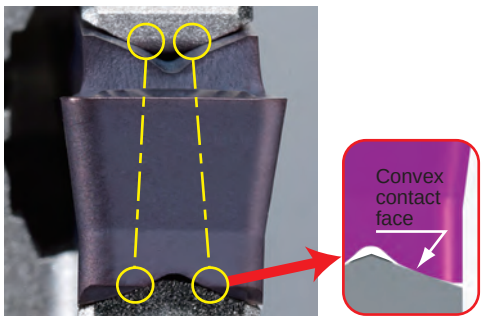
New insert design leading the way for new grooving applications !

Highly reliable insert clamping

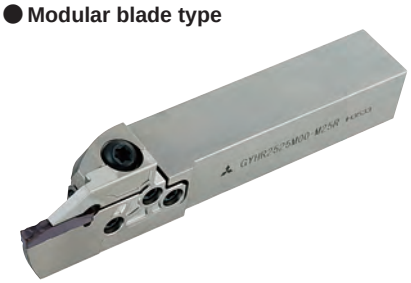
●Safety keys prevent insert movement.

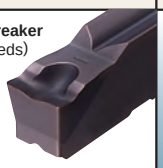
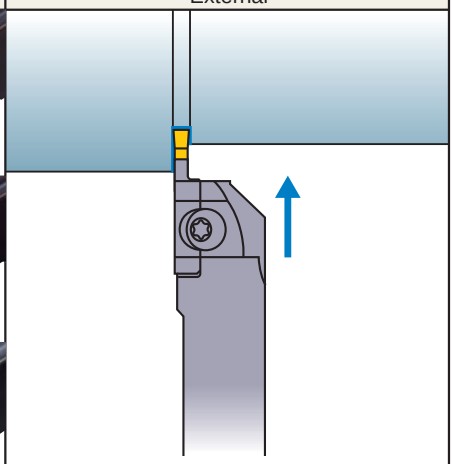
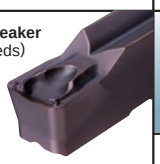
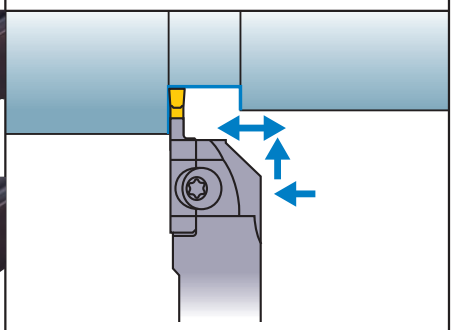
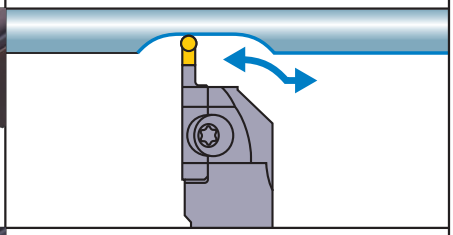
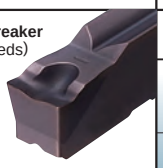
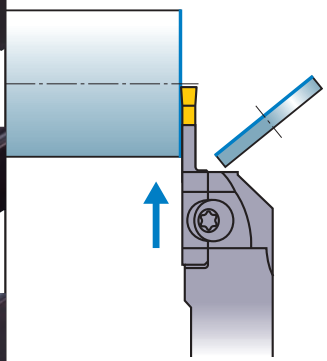


●The convex geometry ensures high precision clamping.



CLASSIFICATION OF GY SERIES

	Holder
External	**1** 00° type ● Modular blade type  ➔ A320
	2 90° type ● Modular blade type ➔ A326

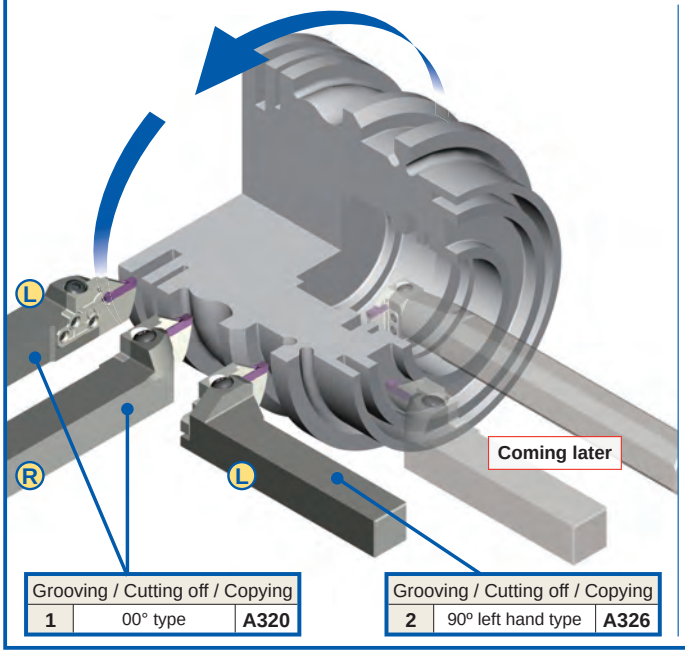
	Insert	Cutting Mode: External
Grooving	**GS**Breaker (Low feeds) 	
	GMBreaker (Medium feeds) 	
	GFGS (CBN) 	
For Multifunctional Grooving	**MS**Breaker (Low feeds) 	
	MMBreaker (Medium feeds) 	
Copying	**BM**Breaker 	
Cutting Off	**GS**Breaker (Low feeds) 	
	GMBreaker (Medium feeds) 	
	R/L05-GM Breaker (Medium feeds) 	

HOW TO SELECT GY SERIES

STEP 1 SELECT AN APPLICATION

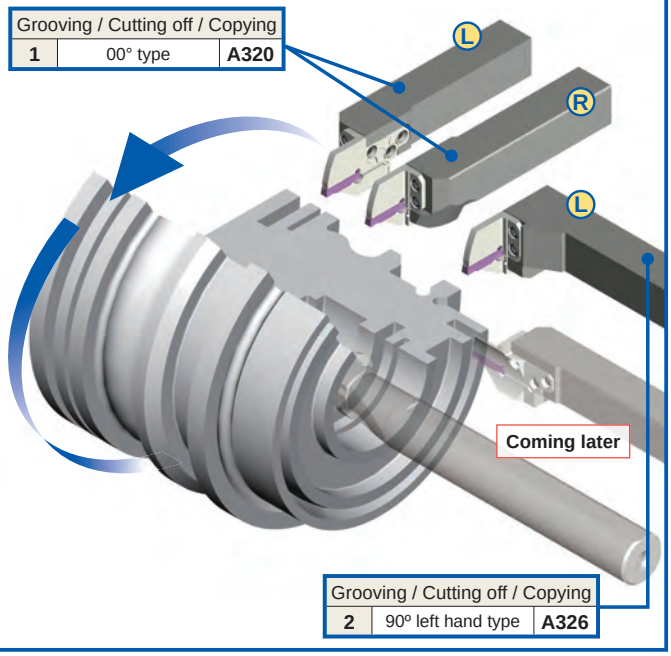
1 Select the application and the direction of the workpiece rotation, then follow the next steps.

Normal use — **Clockwise** — **Reverse holder use**



Grooving / Cutting off / Copying		
1	00° type	A320

Grooving / Cutting off / Copying		
2	90º left hand type	A326



Grooving / Cutting off / Copying		
1	00° type	A320

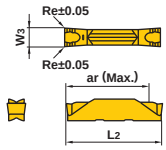
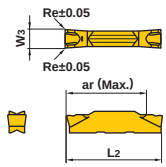
Grooving / Cutting off / Copying		
2	90º left hand type	A326

STEP 2 SELECT AN INSERT

1 Select an insert suitable for the machining application, then select the corresponding seat size.

✶ Seat size refers to the width of the seat of the modular blade.

INSERTS

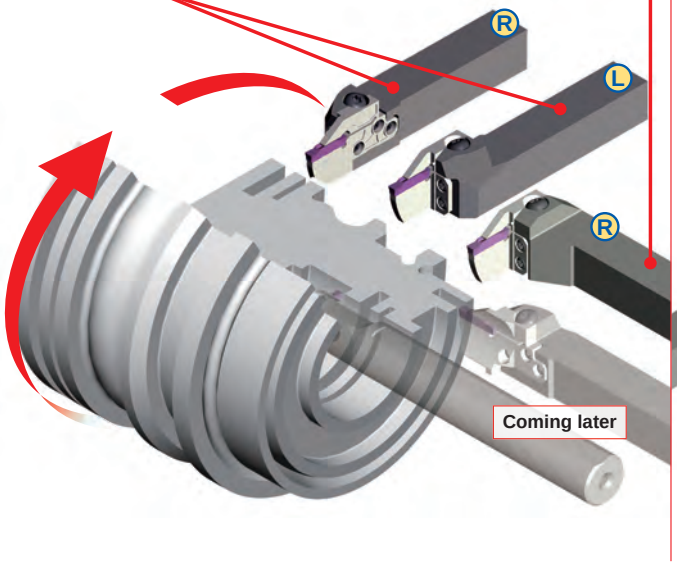
Applications	Geometry	Order Number	Stock: Coated VP10RT	Stock: Coated VP20RT	Stock: CBN MB8025	Seat Size	Dimensions (mm): W3 Grooving Width	W3 Tolerance	Re	ar (Max.)	L2
For Grooving / Cutting off	**GS Breaker** (Low feeds) 	GY2M0200D020N-GS	●	●		D	2.00	±0.03	0.2	18.7	20.70
		0239E020N-GS	●	●		E	2.39	±0.03	0.2	18.5	20.70
		0250E020N-GS	●	●		E	2.50	±0.03	0.2	18.5	20.70
		0300F020N-GS	●	●		F	3.00	±0.03	0.2	18.5	20.70
		0318F020N-GS	●	●		F	3.18	±0.03	0.2	18.5	20.70
		0400G020N-GS	●	●		G	4.00	±0.04	0.2	23.9	25.65
		0475H030N-GS	●	●		H	4.75	±0.04	0.3	23.9	25.65
		0500H030N-GS	●	●		H	5.00	±0.04	0.3	24.0	25.65
		0600J030N-GS	●	●		J	6.00	±0.04	0.3	24.1	25.65
		0635J030N-GS	●	●		J	6.35	±0.04	0.3	24.1	25.65
	GM Breaker (Medium feeds) 	GY2M0200D020N-GM	●	●		D	2.00	±0.03	0.2	19.4	20.70
		0239E020N-GM	●	●		E	2.39	±0.03	0.2	19.4	20.70
		0250E020N-GM	●	●		E	2.50	±0.03	0.2	19.4	20.70
		0300F030N-GM	●	●		F	3.00	±0.03	0.3	19.4	20.70
		0318F030N-GM	●	●		F	3.18	±0.03	0.3	19.4	20.70
		0400G030N-GM	●	●		G	4.00	±0.04	0.3	24.4	25.65
		0475H040N-GM	●	●		H	4.75	±0.04	0.4	24.3	25.65
		0500H040N-GM	●	●		H	5.00	±0.04	0.4	24.3	25.65
		0600J040N-GM	●	●		J	6.00	±0.04	0.4	24.3	25.65
		0635J040N-GM	●	●		J	6.35	±0.04	0.4	24.3	25.65

Counter Clockwise

Normal use

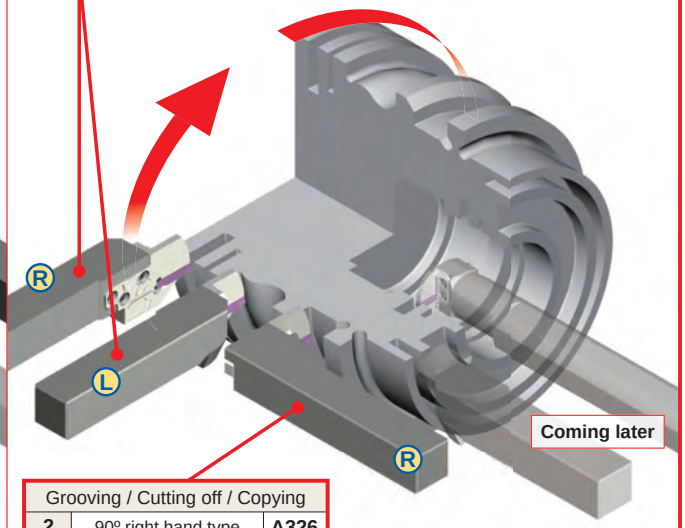
Grooving / Cutting off / Copying		
1	00° type	A320

Grooving / Cutting off / Copying		
2	90º right hand type	A326



Reverse holder use

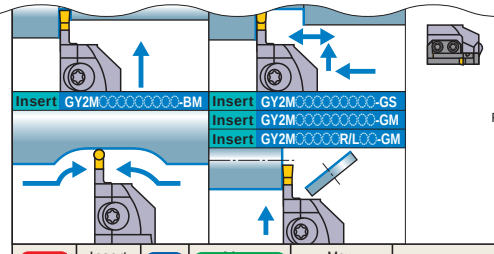
Grooving / Cutting off / Copying		
1	00° type	A320

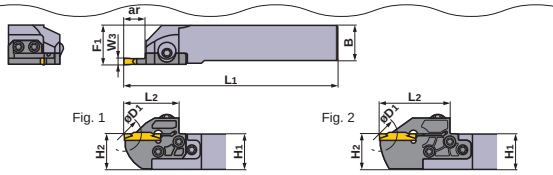


Grooving / Cutting off / Copying		
2	90º right hand type	A326

STEP 3 SELECT A MODULAR HOLDER & A MODULAR BLADE

1. Proceed to the tool holder page in STEP1,then go to the column of the seat size selected in STEP 2.
2. Select the hand of the tool holder.
3. Select a modular holder suitable for the machine used.
4. Select the maximum groove depth.
5. Select the modular blade corresponding to 4 .





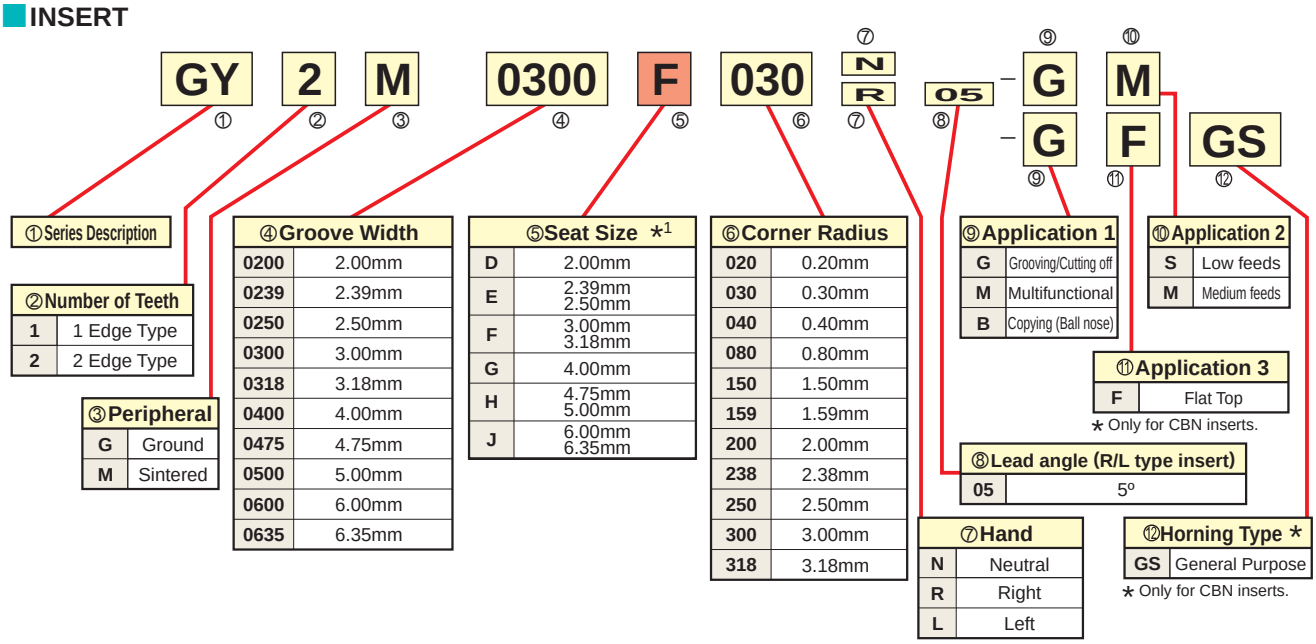
Right hand tool holder shown.

Seat Size	Insert Width W3 (mm)	Hand (R/L)	Max. Groove Depth ar (mm)	Max. Cut Off Diameter D1 (mm)	ID	Order Number: Modular Blade	Stock	Order Number: Modular Holder	Stock
D	2.00	R	6	12	(1C1R3D1)	GYM20RA-D06	●	GYHR1616J00-M20R	●
			10	20	(1C1R3D2)	GYM20RA-D10	●		
			18 ★4	36	(1C1R3D3)	GYM20RB-D18	●		
			6	12	(1E1R3D1)	GYM20RA-D06	●	GYHR2020K00-M20R	●
			10	20	(1E1R3D2)	GYM20RA-D10	●		
			18 ★4	36	(1E1R3D3)	GYM20RB-D18	●		
			6	12	(1E1R4D1)	GYM25RA-D06	●	GYHR2020K00-M25R	●
			12	24	(1E1R4D2)	GYM25RA-D12	●		
			20 ★1	40 ★2	(1E1R4D3)	GYM25RA-D20	●		
			6	12	(1G1R4D1)	GYM25RA-D06	●	GYHR2525M00-M25R	●
			12	24	(1G1R4D2)	GYM25RA-D12	●		
			20 ★1	40 ★2	(1G1R4D3)	GYM25RA-D20	●		
			6	12	(1C1L3D1)	GYM20LA-D06	●	GYHL1616J00-M20L	●
			10	20	(1C1L3D2)	GYM20LA-D10	●		
			18 ★4	36	(1C1L3D3)	GYM20LB-D18	●		
			6	12	(1E1L3D1)	GYM20LA-D06	●		

1 2 4 5 3

GY SERIES ORDER NUMBER

INSERT



①Series Description

②Number of Teeth	
1	1 Edge Type
2	2 Edge Type

③Peripheral	
G	Ground
M	Sintered

④Groove Width	
0200	2.00mm
0239	2.39mm
0250	2.50mm
0300	3.00mm
0318	3.18mm
0400	4.00mm
0475	4.75mm
0500	5.00mm
0600	6.00mm
0635	6.35mm

⑤Seat Size ⁎1	
D	2.00mm
E	2.39mm 2.50mm
F	3.00mm 3.18mm
G	4.00mm
H	4.75mm 5.00mm
J	6.00mm 6.35mm

⑥Corner Radius	
020	0.20mm
030	0.30mm
040	0.40mm
080	0.80mm
150	1.50mm
159	1.59mm
200	2.00mm
238	2.38mm
250	2.50mm
300	3.00mm
318	3.18mm

⑦Hand	
N	Neutral
R	Right
L	Left

⑧Lead angle (R/L type insert)	
05	5º

⑨Application 1	
G	Grooving/Cutting off
M	Multifunctional
B	Copying (Ball nose)

⑩Application 2	
S	Low feeds
M	Medium feeds

⑪Application 3	
F	Flat Top

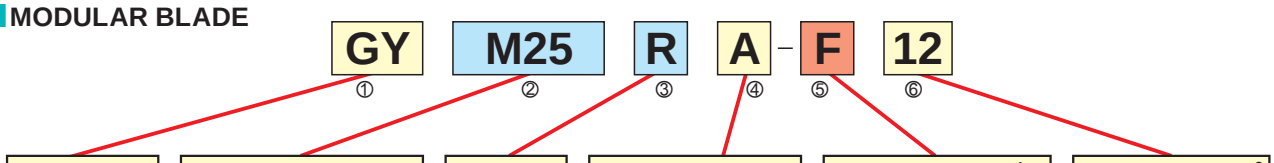
⁎ Only for CBN inserts.

⑫Horning Type ⁎	
GS	General Purpose

⁎ Only for CBN inserts.

⁎1 Select a seat size with the same symbol as that of modular blade and holder.

MODULAR BLADE



①Series Description

②Modular Blade Size

③Hand	
R	Right
L	Left

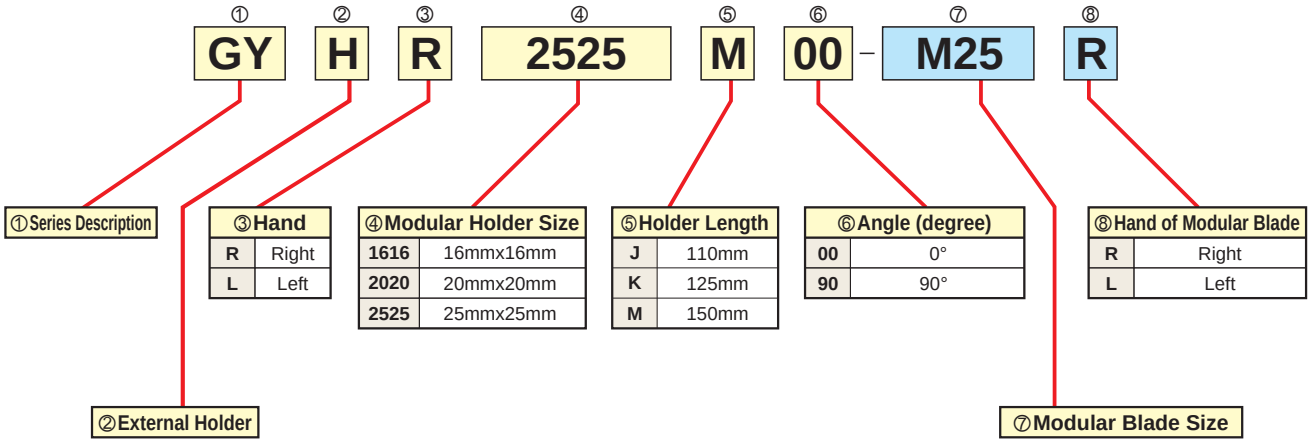
④Modular Blade Type	
A	Standard Type
B	Reinforced Type

⑤Seat Size ⁎1	
D	2.00mm
E	2.39mm 2.50mm
F	3.00mm 3.18mm
G	4.00mm
H	4.75mm 5.00mm
J	6.00mm 6.35mm

⑥Max. Groove Depth⁎2	
06	6mm
08	8mm
10	10mm
12	12mm
14	14mm
18	18mm
20	20mm
25	25mm

⁎1 Select a seat size with the same symbol as that of insert.
⁎2 The maximum groove depth changes according to the insert used.

MODULAR HOLDER (EXTERNAL)



③Hand	
R	Right
L	Left

④Modular Holder Size	
1616	16mmx16mm
2020	20mmx20mm
2525	25mmx25mm

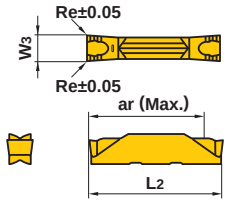
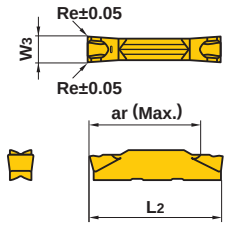
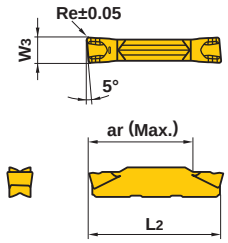
⑤Holder Length	
J	110mm
K	125mm
M	150mm

⑥Angle (degree)	
00	0°
90	90°

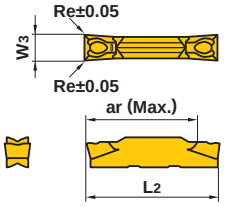
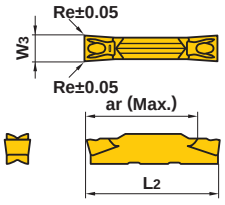
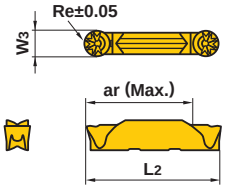
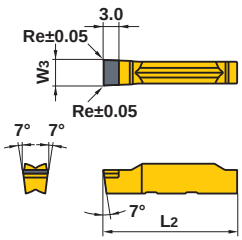
⑧Hand of Modular Blade	
R	Right
L	Left

GY SERIES INSERTS

INSERTS

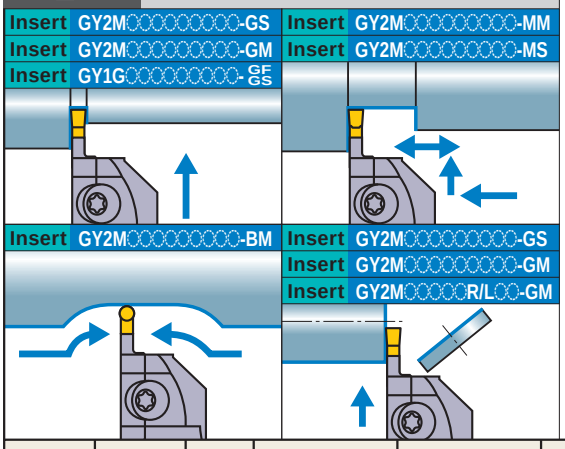
Applications	Geometry	Order Number	Stock: Coated VP10RT	Stock: Coated VP20RT	Stock: CBN MB8025	Seat Size	Dimensions (mm): W3 Grooving Width	W3 Tolerance	Re	ar (Max.)	L2
For Grooving / Cutting off	**GS Breaker** (Low feeds) 	**GY2M0200D020N-GS**	●	●		D	2.00	±0.03	0.2	18.7	20.70
		0239E020N-GS	●	●		E	2.39	±0.03	0.2	18.5	20.70
		0250E020N-GS	●	●		E	2.50	±0.03	0.2	18.5	20.70
		0300F020N-GS	●	●		F	3.00	±0.03	0.2	18.5	20.70
		0318F020N-GS	●	●		F	3.18	±0.03	0.2	18.5	20.70
		0400G020N-GS	●	●		G	4.00	±0.04	0.2	23.9	25.65
		0475H030N-GS	●	●		H	4.75	±0.04	0.3	23.9	25.65
		0500H030N-GS	●	●		H	5.00	±0.04	0.3	24.0	25.65
		0600J030N-GS	●	●		J	6.00	±0.04	0.3	24.1	25.65
		0635J030N-GS	●	●		J	6.35	±0.04	0.3	24.1	25.65
	GM Breaker (Medium feeds) 	**GY2M0200D020N-GM**	●	●		D	2.00	±0.03	0.2	19.4	20.70
		0239E020N-GM	●	●		E	2.39	±0.03	0.2	19.4	20.70
		0250E020N-GM	●	●		E	2.50	±0.03	0.2	19.4	20.70
		0300F030N-GM	●	●		F	3.00	±0.03	0.3	19.4	20.70
		0318F030N-GM	●	●		F	3.18	±0.03	0.3	19.4	20.70
		0400G030N-GM	●	●		G	4.00	±0.04	0.3	24.4	25.65
		0475H040N-GM	●	●		H	4.75	±0.04	0.4	24.3	25.65
		0500H040N-GM	●	●		H	5.00	±0.04	0.4	24.3	25.65
		0600J040N-GM	●	●		J	6.00	±0.04	0.4	24.3	25.65
		0635J040N-GM	●	●		J	6.35	±0.04	0.4	24.3	25.65
For Cutting off	**R/L05-GM Breaker**  Right hand insert shown.	**GY2M0200D020R05-GM**	●	●		D	2.00	±0.03	0.2	19.5	20.80
		0200D020L05-GM	●	●		D	2.00	±0.03	0.2	19.5	20.80
		0250E020R05-GM	●	●		E	2.50	±0.03	0.2	19.5	20.825
		0250E020L05-GM	●	●		E	2.50	±0.03	0.2	19.5	20.825
		0300F030R05-GM	●	●		F	3.00	±0.03	0.3	19.5	20.85
		0300F030L05-GM	●	●		F	3.00	±0.03	0.3	19.5	20.85
		0400G030R05-GM	●	●		G	4.00	±0.04	0.3	24.5	25.85
		0400G030L05-GM	●	●		G	4.00	±0.04	0.3	24.5	25.85
		0500H040R05-GM	●	●		H	5.00	±0.04	0.4	24.5	25.95
		0500H040L05-GM	●	●		H	5.00	±0.04	0.4	24.5	25.95

● : Inventory maintained in Japan. (10 inserts in one case) (CBN is available in 1 piece in one case.)

Applications	Geometry	Order Number	Stock			Seat Size	Dimensions (mm)				
			Coated		CBN		W3		Re	ar (Max.)	L2
			VP10RT	VP20RT	MB8025		Grooving Width	Tolerance			
For Multifunctional Grooving	**MS Breaker** (Low feeds) 	**GY2M0300F020N-MS**	●	●		F	3.00	±0.03	0.2	19.2	20.70
		0300F040N-MS	●	●		F	3.00	±0.03	0.4	18.9	20.70
		0400G020N-MS	●	●		G	4.00	±0.04	0.2	24.2	25.65
		0400G040N-MS	●	●		G	4.00	±0.04	0.4	23.9	25.65
		0500H040N-MS	●	●		H	5.00	±0.04	0.4	23.9	25.65
		0500H080N-MS	●	●		H	5.00	±0.04	0.8	23.5	25.65
		0600J040N-MS	●	●		J	6.00	±0.04	0.4	23.9	25.65
		0600J080N-MS	●	●		J	6.00	±0.04	0.8	23.5	25.65
	MM Breaker (Medium feeds) 	**GY2M0300F020N-MM**	●	●		F	3.00	±0.03	0.2	19.1	20.70
		0300F040N-MM	●	●		F	3.00	±0.03	0.4	18.9	20.70
		0400G040N-MM	●	●		G	4.00	±0.04	0.4	23.9	25.65
		0400G080N-MM	●	●		G	4.00	±0.04	0.8	23.5	25.65
		0500H040N-MM	●	●		H	5.00	±0.04	0.4	23.9	25.65
		0500H080N-MM	●	●		H	5.00	±0.04	0.8	23.5	25.65
		0600J040N-MM	●	●		J	6.00	±0.04	0.4	23.9	25.65
		0600J080N-MM	●	●		J	6.00	±0.04	0.8	23.5	25.65
For Copying	**BM Breaker** 	**GY2M0300F150N-BM**	●	●		F	3.00	±0.03	1.50	19.0	20.90
		0318F159N-BM	●	●		F	3.18	±0.03	1.59	18.9	20.90
		0400G200N-BM	●	●		G	4.00	±0.04	2.00	23.4	25.80
		0475H238N-BM	●	●		H	4.75	±0.04	2.38	22.9	25.80
		0500H250N-BM	●	●		H	5.00	±0.04	2.50	22.8	25.80
		0600J300N-BM	●	●		J	6.00	±0.04	3.00	22.5	25.90
		0635J318N-BM	●	●		J	6.35	±0.04	3.18	22.3	25.90
For Grooving	**Flat Top** (CBN) 	**GY1G0200D020N-GFGS**			●	D	2.00	±0.03	0.2	—	20.70
		0239E020N-GFGS			●	E	2.39	±0.03	0.2	—	20.70
		0250E020N-GFGS			●	E	2.50	±0.03	0.2	—	20.70
		0300F020N-GFGS			●	F	3.00	±0.03	0.2	—	20.70
		0318F020N-GFGS			●	F	3.18	±0.03	0.2	—	20.70
		0400G020N-GFGS			●	G	4.00	±0.03	0.2	—	25.65
		0475H020N-GFGS			●	H	4.75	±0.03	0.2	—	25.65
		0500H020N-GFGS			●	H	5.00	±0.03	0.2	—	25.65

GY SERIES

1 00° type



(Note 1) For modular blades and modular holders, please order separately.
(Note 2) Please use right hand modular blade for right hand modular holder and left hand modular blade for left hand modular holder.

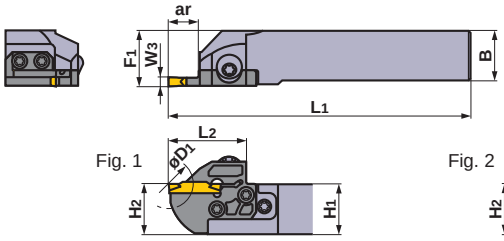


Fig. 1 Fig. 2

Right hand tool holder shown.

Seat Size	Insert Width W3 (mm)	Hand (R/L)	Max. Groove Depth ar (mm)	Max. Cut Off Diameter D1 (mm)	ID	Order Number			
						Modular Blade	Stock	Modular Holder	Stock
D	2.00	R	6	12	(1C1R3D1)	GYM20RA-D06	●	GYHR1616J00-M20R	●
			10	20	(1C1R3D2)	GYM20RA-D10	●		
			18 ✶4	36	(1C1R3D3)	GYM20RB-D18	●		
			6	12	(1E1R3D1)	GYM20RA-D06	●	GYHR2020K00-M20R	●
			10	20	(1E1R3D2)	GYM20RA-D10	●		
			18 ✶4	36	(1E1R3D3)	GYM20RB-D18	●		
			6	12	(1E1R4D1)	GYM25RA-D06	●	GYHR2020K00-M25R	●
			12	24	(1E1R4D2)	GYM25RA-D12	●		
			20 ✶1	40 ✶2	(1E1R4D3)	GYM25RA-D20	●		
			6	12	(1G1R4D1)	GYM25RA-D06	●	GYHR2525M00-M25R	●
			12	24	(1G1R4D2)	GYM25RA-D12	●		
			20 ✶1	40 ✶2	(1G1R4D3)	GYM25RA-D20	●		
		L	6	12	(1C1L3D1)	GYM20LA-D06	●	GYHL1616J00-M20L	●
			10	20	(1C1L3D2)	GYM20LA-D10	●		
			18 ✶4	36	(1C1L3D3)	GYM20LB-D18	●		
			6	12	(1E1L3D1)	GYM20LA-D06	●	GYHL2020K00-M20L	●
			10	20	(1E1L3D2)	GYM20LA-D10	●		
			18 ✶4	36	(1E1L3D3)	GYM20LB-D18	●		
			6	12	(1E1L4D1)	GYM25LA-D06	●	GYHL2020K00-M25L	●
			12	24	(1E1L4D2)	GYM25LA-D12	●		
			20 ✶1	40 ✶2	(1E1L4D3)	GYM25LA-D20	●		
			6	12	(1G1L4D1)	GYM25LA-D06	●	GYHL2525M00-M25L	●
			12	24	(1G1L4D2)	GYM25LA-D12	●		
			20 ✶1	40 ✶2	(1G1L4D3)	GYM25LA-D20	●		
E	2.39 2.50	R	6	12	(1C1R3E1)	GYM20RA-E06	●	GYHR1616J00-M20R	●
			10	20	(1C1R3E2)	GYM20RA-E10	●		
			18 ✶4	36	(1C1R3E3)	GYM20RB-E18	●		
			6	12	(1E1R3E1)	GYM20RA-E06	●	GYHR2020K00-M20R	●
			10	20	(1E1R3E2)	GYM20RA-E10	●		
			18 ✶4	36	(1E1R3E3)	GYM20RB-E18	●		
			6	12	(1E1R4E1)	GYM25RA-E06	●	GYHR2020K00-M25R	●
			12	24	(1E1R4E2)	GYM25RA-E12	●		
			20 ✶1	40 ✶2	(1E1R4E3)	GYM25RA-E20	●		
			6	12	(1G1R4E1)	GYM25RA-E06	●	GYHR2525M00-M25R	●
			12	24	(1G1R4E2)	GYM25RA-E12	●		
			20 ✶1	40 ✶2	(1G1R4E3)	GYM25RA-E20	●		
		L	6	12	(1C1L3E1)	GYM20LA-E06	●	GYHL1616J00-M20L	●
			10	20	(1C1L3E2)	GYM20LA-E10	●		
			18 ✶4	36	(1C1L3E3)	GYM20LB-E18	●		
			6	12	(1E1L3E1)	GYM20LA-E06	●	GYHL2020K00-M20L	●
			10	20	(1E1L3E2)	GYM20LA-E10	●		
			18 ✶4	36	(1E1L3E3)	GYM20LB-E18	●		
			6	12	(1E1L4E1)	GYM25LA-E06	●	GYHL2020K00-M25L	●
			12	24	(1E1L4E2)	GYM25LA-E12	●		
			20 ✶1	40 ✶2	(1E1L4E3)	GYM25LA-E20	●		
			6	12	(1G1L4E1)	GYM25LA-E06	●	GYHL2525M00-M25L	●
			12	24	(1G1L4E2)	GYM25LA-E12	●		
			20 ✶1	40 ✶2	(1G1L4E3)	GYM25LA-E20	●		

✶1 The maximum groove depth varies according to the insert used. Please refer to the maximum groove depth of inserts on pages A318 and A319.
✶2 The maximum cut off diameter D1 varies according to the insert used. The cut off diameter is double the maximum groove depth (**ar**) of inserts on pages A318 and A319.
✶3 Dimensions shown are when the gauge insert is used. If other insert geometries are used then L1, L2 and F1 values may vary.
✶4 The maximum groove depth is limited by the workpiece diameter. For details, please refer to A331.

● : **Inventory maintained.**

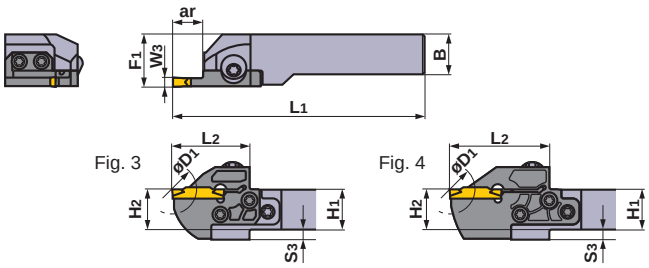


Fig. 3 Fig. 4

Right hand tool holder shown.

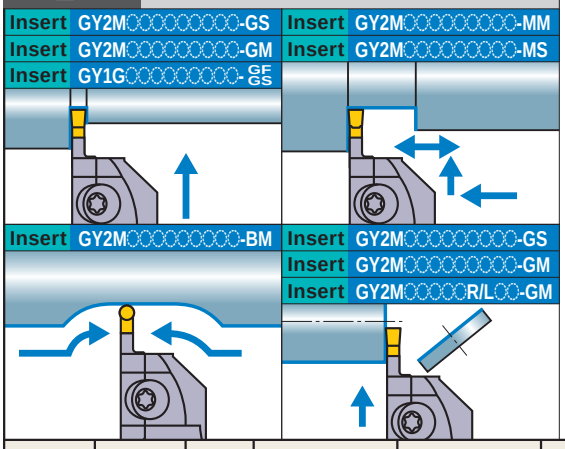
SPARE PARTS

Modular Holder	Clamp Screw	Blade Screw (5 pieces)	Wrench
GYHR/L1616J00-M20R/L	GY06013M (Tightening torque : 6.0N·m)	TS407 (Tightening torque : 3.5N·m)	TKY30R TKY15R
GYHR/L2020K00-M20R/L			
GYHR/L2020K00-M25R/L		TS55 (Tightening torque : 5.0N·m)	TKY30R TKY25R
GYHR/L2525M00-M25R/L			

Dimensions (mm) *3							Fig.	Insert	
H1	B	L1	L2	H2	F1	S3		Geometry / Insert Number	Page
16	16	104	28	16	20	4	3	GY2M0200D020N-GS GY2M0200D020N-GM (Gauge insert) GY2M0200D020R/L05-GM GY1G0200D020N-GFGS	A318 A319
16	16	110	34	16	20	4	3		
16	16	116	40	16	20	4	4		
20	20	119	28	20	23	–	1		
20	20	125	34	20	23	–	1		
20	20	131	40	20	23	–	2		
20	20	117	31	20	26	5	3		
20	20	125	39	20	26	5	3		
20	20	131	45	20	26	5	4		
25	25	142	31	25	28	–	1		
25	25	150	39	25	28	–	1		
25	25	156	45	25	28	–	2		
16	16	104	28	16	20	4	3		
16	16	110	34	16	20	4	3		
16	16	116	40	16	20	4	4		
20	20	119	28	20	23	–	1		
20	20	125	34	20	23	–	1		
20	20	131	40	20	23	–	2		
20	20	117	31	20	26	5	3		
20	20	125	39	20	26	5	3		
20	20	131	45	20	26	5	4		
25	25	142	31	25	28	–	1		
25	25	150	39	25	28	–	1		
25	25	156	45	25	28	–	2		
16	16	104	28	16	20	4	3	GY2M0239E020N-GS GY2M0250E020N-GS GY2M0239E020N-GM GY2M0250E020N-GM (Gauge insert) GY2M0250E020R/L05-GM GY1G0239E020N-GFGS GY1G0250E020N-GFGS	A318 A319
16	16	110	34	16	20	4	3		
16	16	116	40	16	20	4	4		
20	20	119	28	20	23	–	1		
20	20	125	34	20	23	–	1		
20	20	131	40	20	23	–	2		
20	20	117	31	20	26	5	3		
20	20	125	39	20	26	5	3		
20	20	131	45	20	26	5	4		
25	25	142	31	25	28	–	1		
25	25	150	39	25	28	–	1		
25	25	156	45	25	28	–	2		
16	16	104	28	16	20	4	3		
16	16	110	34	16	20	4	3		
16	16	116	40	16	20	4	4		
20	20	119	28	20	23	–	1		
20	20	125	34	20	23	–	1		
20	20	131	40	20	23	–	2		
20	20	117	31	20	26	5	3		
20	20	125	39	20	26	5	3		
20	20	131	45	20	26	5	4		
25	25	142	31	25	28	–	1		
25	25	150	39	25	28	–	1		
25	25	156	45	25	28	–	2		

GY SERIES

1 00° type



(Note 1) For modular blades and modular holders, please order separately.
(Note 2) Please use right hand modular blade for right hand modular holder and left hand modular blade for left hand modular holder.

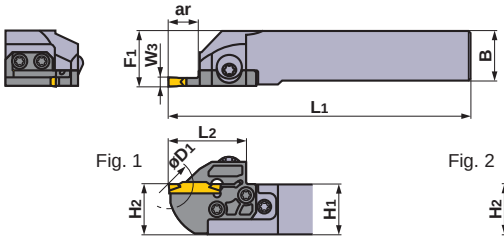


Fig. 1 Fig. 2

Right hand tool holder shown.

Seat Size	Insert Width W3 (mm)	Hand (R/L)	Max. Groove Depth ar (mm)	Max. Cut Off Diameter D1 (mm)	ID	Order Number			
						Modular Blade	Stock	Modular Holder	Stock
F	3.00 3.18	R	6	12	(1C1R3F1)	GYM20RA-F06	●	GYHR1616J00-M20R	●
			10	20	(1C1R3F2)	GYM20RA-F10	●		
			18 ✶4	36	(1C1R3F3)	GYM20RB-F18	●		
			6	12	(1E1R3F1)	GYM20RA-F06	●	GYHR2020K00-M20R	●
			10	20	(1E1R3F2)	GYM20RA-F10	●		
			18 ✶4	36	(1E1R3F3)	GYM20RB-F18	●		
			6	12	(1E1R4F1)	GYM25RA-F06	●	GYHR2020K00-M25R	●
			12	24	(1E1R4F2)	GYM25RA-F12	●		
			20 ✶1	40 ✶2	(1E1R4F3)	GYM25RA-F20	●		
			6	12	(1G1R4F1)	GYM25RA-F06	●	GYHR2525M00-M25R	●
			12	24	(1G1R4F2)	GYM25RA-F12	●		
			20 ✶1	40 ✶2	(1G1R4F3)	GYM25RA-F20	●		
		L	6	12	(1C1L3F1)	GYM20LA-F06	●	GYHL1616J00-M20L	●
			10	20	(1C1L3F2)	GYM20LA-F10	●		
			18 ✶4	36	(1C1L3F3)	GYM20LB-F18	●		
			6	12	(1E1L3F1)	GYM20LA-F06	●	GYHL2020K00-M20L	●
			10	20	(1E1L3F2)	GYM20LA-F10	●		
			18 ✶4	36	(1E1L3F3)	GYM20LB-F18	●		
			6	12	(1E1L4F1)	GYM25LA-F06	●	GYHL2020K00-M25L	●
			12	24	(1E1L4F2)	GYM25LA-F12	●		
			20 ✶1	40 ✶2	(1E1L4F3)	GYM25LA-F20	●		
			6	12	(1G1L4F1)	GYM25LA-F06	●	GYHL2525M00-M25L	●
			12	24	(1G1L4F2)	GYM25LA-F12	●		
			20 ✶1	40 ✶2	(1G1L4F3)	GYM25LA-F20	●		
G	4.00	R	12	24	(1C1R3G1)	GYM20RA-G12	●	GYHR1616J00-M20R	●
			12	24	(1E1R3G1)	GYM20RA-G12	●	GYHR2020K00-M20R	●
			8	16	(1E1R4G1)	GYM25RA-G08	●	GYHR2020K00-M25R	●
			14	28	(1E1R4G2)	GYM25RA-G14	●		
			25 ✶1	50 ✶2	(1E1R4G3)	GYM25RA-G25	●		
			8	16	(1G1R4G1)	GYM25RA-G08	●	GYHR2525M00-M25R	●
			14	28	(1G1R4G2)	GYM25RA-G14	●		
			25 ✶1	50 ✶2	(1G1R4G3)	GYM25RA-G25	●		
		L	12	24	(1C1L3G1)	GYM20LA-G12	●	GYHL1616J00-M20L	●
			12	24	(1E1L3G1)	GYM20LA-G12	●	GYHL2020K00-M20L	●
			8	16	(1E1L4G1)	GYM25LA-G08	●	GYHL2020K00-M25L	●
			14	28	(1E1L4G2)	GYM25LA-G14	●		
			25 ✶1	50 ✶2	(1E1L4G3)	GYM25LA-G25	●		
			8	16	(1G1L4G1)	GYM25LA-G08	●	GYHL2525M00-M25L	●
			14	28	(1G1L4G2)	GYM25LA-G14	●		
			25 ✶1	50 ✶2	(1G1L4G3)	GYM25LA-G25	●		

✶1 The maximum groove depth varies according to the insert used. Please refer to the maximum groove depth of inserts on pages A318 and A319.
✶2 The maximum cut off diameter D1 varies according to the insert used. The cut off diameter is double the maximum groove depth (**ar**) of inserts on pages A318 and A319.
✶3 Dimensions shown are when the gauge insert is used. If other insert geometries are used then L1, L2 and F1 values may vary.
✶4 The maximum groove depth is limited by the workpiece diameter. For details, please refer to A331.

● : **Inventory maintained in Japan.**

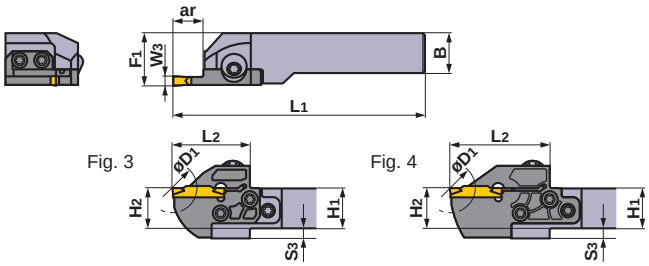


Fig. 3 Fig. 4

Right hand tool holder shown.

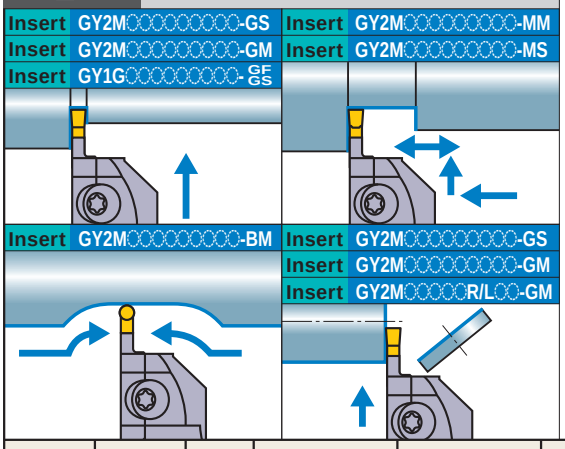
SPARE PARTS

Modular Holder	Clamp Screw	Blade Screw (5 pieces)	Wrench
GYHR/L1616J00-M20R/L	GY06013M (Tightening torque : 6.0N·m)	TS407 (Tightening torque : 3.5N·m)	TKY30R TKY15R
GYHR/L2020K00-M20R/L			
GYHR/L2020K00-M25R/L		TS55 (Tightening torque : 5.0N·m)	TKY30R TKY25R
GYHR/L2525M00-M25R/L			

Dimensions (mm) *3							Fig.	Insert	
H1	B	L1	L2	H2	F1	S3		Geometry / Insert Number	Page
16	16	104	28	16	20	4	3	GY2M0300F020N-GS GY2M0318F020N-GS	A318 A319
16	16	110	34	16	20	4	3		
16	16	116	40	16	20	4	4		
20	20	119	28	20	23	–	1	GY2M0300F030N-GM (Gauge insert) GY2M0318F030N-GM	
20	20	125	34	20	23	–	1		
20	20	131	40	20	23	–	2		
20	20	117	31	20	26	5	3	GY2M0300F030R/L05-GM	
20	20	125	39	20	26	5	3		
20	20	131	45	20	26	5	4		
25	25	142	31	25	28	–	1	GY2M0300F020N-MS GY2M0300F040N-MS	
25	25	150	39	25	28	–	1		
25	25	156	45	25	28	–	2		
16	16	104	28	16	20	4	3	GY2M0300F020N-MM GY2M0300F040N-MM	
16	16	110	34	16	20	4	3		
16	16	116	40	16	20	4	4		
20	20	119	28	20	23	–	1	GY2M0300F150N-BM GY2M0318F159N-BM	
20	20	125	34	20	23	–	1		
20	20	131	40	20	23	–	2		
20	20	117	31	20	26	5	3	GY1G0300F020N-GFGS GY1G0318F020N-GFGS	
20	20	125	39	20	26	5	3		
20	20	131	45	20	26	5	4		
25	25	142	31	25	28	–	1		
25	25	150	39	25	28	–	1		
25	25	156	45	25	28	–	2		
16	16	110	34	16	20	4	3	GY2M0400G020N-GS	A318 A319
20	20	125	34	20	23	–	1	GY2M0400G030N-GM (Gauge insert)	
20	20	119	33	20	26	5	3		
20	20	125	39	20	26	5	3		
20	20	136	50	20	26	5	4	GY2M0400G030R/L05-GM	
25	25	144	33	25	28	–	1		
25	25	150	39	25	28	–	1	GY2M0400G020N-MS GY2M0400G040N-MS	
25	25	161	50	25	28	–	2		
16	16	110	34	16	20	4	3		
20	20	125	34	20	23	–	1	GY2M0400G040N-MM GY2M0400G080N-MM	
20	20	119	33	20	26	5	3		
20	20	125	39	20	26	5	3		
20	20	136	50	20	26	5	4	GY2M0400G200N-BM	
25	25	144	33	25	28	–	1		
25	25	150	39	25	28	–	1	GY1G0400G020N-GFGS	
25	25	161	50	25	28	–	2		

GY SERIES

1 00° type



(Note 1) For modular blades and modular holders, please order separately.
(Note 2) Please use right hand modular blade for right hand modular holder and left hand modular blade for left hand modular holder.

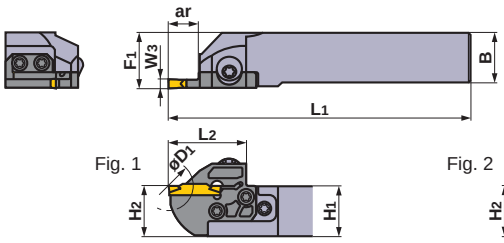


Fig. 1 Fig. 2

Right hand tool holder shown.

Seat Size	Insert Width W3 (mm)	Hand (R/L)	Max. Groove Depth ar (mm)	Max. Cut Off Diameter D1 (mm)	ID	Order Number: Modular Blade	Stock	Order Number: Modular Holder	Stock
H	4.75 5.00	R	12	24	(1C1R3H1)	**GYM20RA-H12**	●	**GYHR1616J00-M20R**	●
			12	24	(1E1R3H1)	**GYM20RA-H12**	●	**GYHR2020K00-M20R**	●
			8	16	(1E1R4H1)	**GYM25RA-H08**	●	**GYHR2020K00-M25R**	●
			14	28	(1E1R4H2)	**GYM25RA-H14**	●		
			25 ✶1	50 ✶2	(1E1R4H3)	**GYM25RA-H25**	●		
			8	16	(1G1R4H1)	**GYM25RA-H08**	●	**GYHR2525M00-M25R**	●
			14	28	(1G1R4H2)	**GYM25RA-H14**	●		
			25 ✶1	50 ✶2	(1G1R4H3)	**GYM25RA-H25**	●		
		L	12	24	(1C1L3H1)	**GYM20LA-H12**	●	**GYHL1616J00-M20L**	●
			12	24	(1E1L3H1)	**GYM20LA-H12**	●	**GYHL2020K00-M20L**	●
			8	16	(1E1L4H1)	**GYM25LA-H08**	●	**GYHL2020K00-M25L**	●
			14	28	(1E1L4H2)	**GYM25LA-H14**	●		
			25 ✶1	50 ✶2	(1E1L4H3)	**GYM25LA-H25**	●		
			8	16	(1G1L4H1)	**GYM25LA-H08**	●	**GYHL2525M00-M25L**	●
			14	28	(1G1L4H2)	**GYM25LA-H14**	●		
			25 ✶1	50 ✶2	(1G1L4H3)	**GYM25LA-H25**	●		
J	6.00 6.35	R	8	16	(1E1R4J1)	**GYM25RA-J08**	●	**GYHR2020K00-M25R**	●
			14	28	(1E1R4J2)	**GYM25RA-J14**	●		
			25 ✶1	50 ✶2	(1E1R4J3)	**GYM25RA-J25**	●		
			8	16	(1G1R4J1)	**GYM25RA-J08**	●	**GYHR2525M00-M25R**	●
			14	28	(1G1R4J2)	**GYM25RA-J14**	●		
			25 ✶1	50 ✶2	(1G1R4J3)	**GYM25RA-J25**	●		
		L	8	16	(1E1L4J1)	**GYM25LA-J08**	●	**GYHL2020K00-M25L**	●
			14	28	(1E1L4J2)	**GYM25LA-J14**	●		
			25 ✶1	50 ✶2	(1E1L4J3)	**GYM25LA-J25**	●		
			8	16	(1G1L4J1)	**GYM25LA-J08**	●	**GYHL2525M00-M25L**	●
			14	28	(1G1L4J2)	**GYM25LA-J14**	●		
			25 ✶1	50 ✶2	(1G1L4J3)	**GYM25LA-J25**	●		

✶1 The maximum groove depth varies according to the insert used. Please refer to the maximum groove depth of inserts on pages A318 and A319.
✶2 The maximum cut off diameter D1 varies according to the insert used. The cut off diameter is double the maximum groove depth (**ar**) of inserts on pages A318 and A319.
✶3 Dimensions shown are when the gauge insert is used. If other insert geometries are used then L1, L2 and F1 values may vary.

● : **Inventory maintained in Japan.**

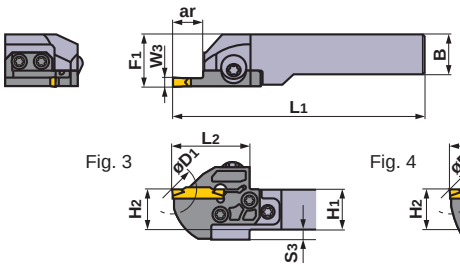


Fig. 3 Fig. 4

Right hand tool holder shown.

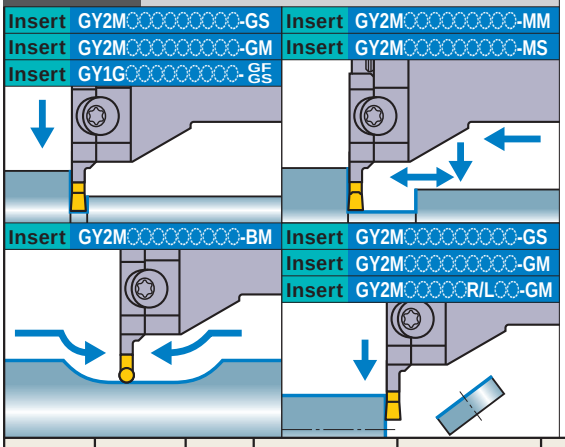
SPARE PARTS

Modular Holder	Clamp Screw	Blade Screw (5 pieces)	Wrench
GYHR/L1616J00-M20R/L	GY06013M (Tightening torque : 6.0N·m)	TS407 (Tightening torque : 3.5N·m)	TKY30R TKY15R
GYHR/L2020K00-M20R/L			
GYHR/L2020K00-M25R/L		TS55 (Tightening torque : 5.0N·m)	TKY30R TKY25R
GYHR/L2525M00-M25R/L			

Dimensions (mm) *3							Fig.	Insert	
H1	B	L1	L2	H2	F1	S3		Geometry / Insert Number	Page
16	16	110	34	16	20	4	3	GY2M0475H030N-GS GY2M0500H030N-GS	A318 A319
20	20	125	34	20	23	–	1		
20	20	119	33	20	26	5	3	GY2M0475H040N-GM GY2M0500H040N-GM (Gauge insert)	
20	20	125	39	20	26	5	3		
20	20	136	50	20	26	5	4		
25	25	144	33	25	28	–	1	GY2M0500H040R/L05-GM	
25	25	150	39	25	28	–	1		
25	25	161	50	25	28	–	2	GY2M0500H040N-MS GY2M0500H080N-MS	
16	16	110	34	16	20	4	3		
20	20	125	34	20	23	–	1	GY2M0500H040N-MM GY2M0500H080N-MM	
20	20	119	33	20	26	5	3	GY2M0475H238N-BM GY2M0500H250N-BM	
20	20	125	39	20	26	5	3		
20	20	136	50	20	26	5	4		
25	25	144	33	25	28	–	1	GY1G0475H020N-GFGS GY1G0500H020N-GFGS	
25	25	150	39	25	28	–	1		
25	25	161	50	25	28	–	2		
20	20	119	33	20	26	5	3	GY2M0600J030N-GS GY2M0635J030N-GS	A318 A319
20	20	125	39	20	26	5	3		
20	20	136	50	20	26	5	4		
25	25	144	33	25	28	–	1	GY2M0600J040N-GM (Gauge insert) GY2M0635J040N-GM	
25	25	150	39	25	28	–	1		
25	25	161	50	25	28	–	2		
20	20	119	33	20	26	5	3	GY2M0600J040N-MS GY2M0600J080N-MS	
20	20	125	39	20	26	5	3		
20	20	136	50	20	26	5	4		
25	25	144	33	25	28	–	1	GY2M0600J040N-MM GY2M0600J080N-MM	
25	25	150	39	25	28	–	1		
25	25	161	50	25	28	–	2		
								GY2M0600J300N-BM GY2M0635J318N-BM	

GY SERIES

2 90° type



(Note 1) For modular blades and modular holders, please order separately.
(Note 2) Please use left hand modular blade for right hand modular holder and right hand modular blade for left hand modular.

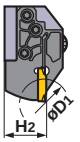


Fig. 2

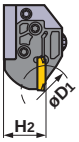
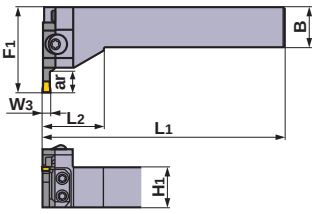


Fig. 1



Right hand tool holder shown.

Seat Size	Insert Width W3 (mm)	Hand (R/L)	Max. Groove Depth ar (mm)	Max. Cut Off Diameter D1 (mm)	I D	Order Number: Modular Blade	Stock	Modular Holder	Stock
D	2.00	R	6	12	(2E1R3D1)	GYM20LA-D06	●	GYHR2020K90-M20L	●
			10	20	(2E1R3D2)	GYM20LA-D10	●		
			18 ✶4	36	(2E1R3D3)	GYM20LB-D18	●		
			6	12	(2G1R4D1)	GYM25LA-D06	●	GYHR2525M90-M25L	●
			12	24	(2G1R4D2)	GYM25LA-D12	●		
			20 ✶1	40 ✶2	(2G1R4D3)	GYM25LA-D20	●		
		L	6	12	(2E1L3D1)	GYM20RA-D06	●	GYHL2020K90-M20R	●
			10	20	(2E1L3D2)	GYM20RA-D10	●		
			18 ✶4	36	(2E1L3D3)	GYM20RB-D18	●		
			6	12	(2G1L4D1)	GYM25RA-D06	●	GYHL2525M90-M25R	●
			12	24	(2G1L4D2)	GYM25RA-D12	●		
			20 ✶1	40 ✶2	(2G1L4D3)	GYM25RA-D20	●		
E	2.39 2.50	R	6	12	(2E1R3E1)	GYM20LA-E06	●	GYHR2020K90-M20L	●
			10	20	(2E1R3E2)	GYM20LA-E10	●		
			18 ✶4	36	(2E1R3E3)	GYM20LB-E18	●		
			6	12	(2G1R4E1)	GYM25LA-E06	●	GYHR2525M90-M25L	●
			12	24	(2G1R4E2)	GYM25LA-E12	●		
			20 ✶1	40 ✶2	(2G1R4E3)	GYM25LA-E20	●		
		L	6	12	(2E1L3E1)	GYM20RA-E06	●	GYHL2020K90-M20R	●
			10	20	(2E1L3E2)	GYM20RA-E10	●		
			18 ✶4	36	(2E1L3E3)	GYM20RB-E18	●		
			6	12	(2G1L4E1)	GYM25RA-E06	●	GYHL2525M90-M25R	●
			12	24	(2G1L4E2)	GYM25RA-E12	●		
			20 ✶1	40 ✶2	(2G1L4E3)	GYM25RA-E20	●		
F	3.00 3.18	R	6	12	(2E1R3F1)	GYM20LA-F06	●	GYHR2020K90-M20L	●
			10	20	(2E1R3F2)	GYM20LA-F10	●		
			18 ✶4	36	(2E1R3F3)	GYM20LB-F18	●		
			6	12	(2G1R4F1)	GYM25LA-F06	●	GYHR2525M90-M25L	●
			12	24	(2G1R4F2)	GYM25LA-F12	●		
			20 ✶1	40 ✶2	(2G1R4F3)	GYM25LA-F20	●		
		L	6	12	(2E1L3F1)	GYM20RA-F06	●	GYHL2020K90-M20R	●
			10	20	(2E1L3F2)	GYM20RA-F10	●		
			18 ✶4	36	(2E1L3F3)	GYM20RB-F18	●		
			6	12	(2G1L4F1)	GYM25RA-F06	●	GYHL2525M90-M25R	●
			12	24	(2G1L4F2)	GYM25RA-F12	●		
			20 ✶1	40 ✶2	(2G1L4F3)	GYM25RA-F20	●		
G	4.00	R	12	24	(2E1R3G1)	GYM20LA-G12	●	GYHR2020K90-M20L	●
			8	16	(2G1R4G1)	GYM25LA-G08	●	GYHR2525M90-M25L	●
			14	28	(2G1R4G2)	GYM25LA-G14	●		
			25 ✶1	50 ✶2	(2G1R4G3)	GYM25LA-G25	●		
		L	12	24	(2E1L3G1)	GYM20RA-G12	●	GYHL2020K90-M20R	●
			8	16	(2G1L4G1)	GYM25RA-G08	●	GYHL2525M90-M25R	●
			14	28	(2G1L4G2)	GYM25RA-G14	●		
			25 ✶1	50 ✶2	(2G1L4G3)	GYM25RA-G25	●		

✶1 The maximum groove depth varies according to the insert used. Please refer to the maximum groove depth of inserts on pages A318 and A319.
✶2 The maximum cut off diameter D_1 varies according to the insert used. The cut off diameter is double the maximum groove depth (**ar**) of inserts on pages A318 and A319.
✶3 Dimensions shown are when the gauge insert is used. If other insert geometries are used then L_1, L_2 and F_1 values may vary.
✶4 The maximum groove depth is limited by the workpiece diameter. For details, please refer to A331.

● : **Inventory maintained in Japan.**

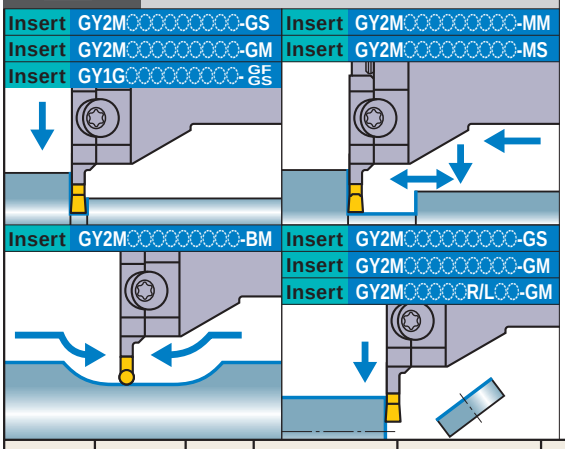
SPARE PARTS

Modular Holder	Clamp Screw	(5 pieces) Blade Screw	Wrench
GYHR/L2020K90-M20L/R	GY06013M (Tightening torque : 6.0N·m)	TS407 (Tightening torque : 3.5N·m)	TKY30R TKY15R
GYHR/L2525M90-M25L/R		TS55 (Tightening torque : 5.0N·m)	TKY30R TKY25R

Dimensions (mm) *3						Fig.	Insert	
H_1	B	L_1	L_2	H_2	F_1		Geometry / Insert Number	Page
20	20	125	35	20	39	1	**GY2M0200D020N-GS**	A318 A319
20	20	125	35	20	45	1		
20	20	125	35	20	51	2		
25	25	150	38	25	45	1	**GY2M0200D020N-GM** (Gauge insert)	
25	25	150	38	25	53	1		
25	25	150	38	25	59	2		
20	20	125	35	20	39	1	**GY2M0200D020R/L05-GM**	
20	20	125	35	20	45	1		
20	20	125	35	20	51	2		
25	25	150	38	25	45	1	**GY1G0200D020N-GFGS**	
25	25	150	38	25	53	1		
25	25	150	38	25	59	2		
20	20	125	35	20	39	1	**GY2M0239E020N-GS** **GY2M0250E020N-GS**	A318 A319
20	20	125	35	20	45	1		
20	20	125	35	20	51	2		
25	25	150	38	25	45	1	**GY2M0239E020N-GM** **GY2M0250E020N-GM** (Gauge insert)	
25	25	150	38	25	53	1		
25	25	150	38	25	59	2		
20	20	125	35	20	39	1	**GY2M0250E020R/L05-GM**	
20	20	125	35	20	45	1		
20	20	125	35	20	51	2		
25	25	150	38	25	45	1	**GY1G0239E020N-GFGS** **GY1G0250E020N-GFGS**	
25	25	150	38	25	53	1		
25	25	150	38	25	59	2		
20	20	125	35	20	39	1	**GY2M0300F020N-GS** **GY2M0318F020N-GS**	A318 A319
20	20	125	35	20	45	1		
20	20	125	35	20	51	2	**GY2M0300F030N-GM** (Gauge insert)	
25	25	150	38	25	45	1	**GY2M0318F030N-GM**	
25	25	150	38	25	53	1	**GY2M0300F030R/L05-GM**	
25	25	150	38	25	59	2	**GY2M0300F020N-MS** **GY2M0300F040N-MS**	
20	20	125	35	20	39	1		
20	20	125	35	20	45	1	**GY2M0300F020N-MM** **GY2M0300F040N-MM**	
20	20	125	35	20	51	2		
25	25	150	38	25	45	1	**GY2M0300F150N-BM** **GY2M0318F159N-BM**	
25	25	150	38	25	53	1		
25	25	150	38	25	59	2	**GY1G0300F020N-GFGS** **GY1G0318F020N-GFGS**	
20	20	125	35	20	45	1	**GY2M0400G020N-GS**	A318 A319
25	25	150	38	25	47	1	**GY2M0400G020N-GM** (Gauge insert)	
25	25	150	38	25	53	1		
25	25	150	38	25	64	2	**GY2M0400G030R/L05-GM**	
20	20	125	35	20	45	1	**GY2M0400G020N-MS** **GY2M0400G040N-MS**	
25	25	150	38	25	47	1	**GY2M0400G040N-MM** **GY2M0400G080N-MM**	
25	25	150	38	25	53	1		
25	25	150	38	25	64	2	**GY2M0400G200N-BM**	
							GY1G0400G020N-GFGS	

GY SERIES

2 90° type



(Note 1) For modular blades and modular holders, please order separately.
(Note 2) Please use left hand modular blade for right hand modular holder and right hand modular blade for left hand modular.

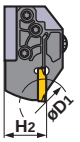


Fig. 2

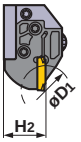
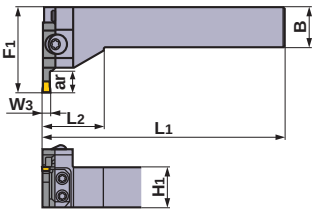


Fig. 1



Right hand tool holder shown.

Seat Size	Insert Width W3 (mm)	Hand (R/L)	Max. Groove Depth ar (mm)	Max. Cut Off Diameter D1 (mm)	ID	Order Number: Modular Blade	Stock	Modular Holder	Stock
H	4.75 5.00	R	12	24	(2E1R3H1)	**GYM20LA-H12**	●	**GYHR2020K90-M20L**	●
			8	16	(2G1R4H1)	**GYM25LA-H08**	●	**GYHR2525M90-M25L**	●
			14	28	(2G1R4H2)	**GYM25LA-H14**	●		
			25 ✶1	50 ✶2	(2G1R4H3)	**GYM25LA-H25**	●		
		L	12 ✶4	24	(2E1L3H1)	**GYM20RA-H12**	●	**GYHL2020K90-M20R**	●
			8	16	(2G1L4H1)	**GYM25RA-H08**	●	**GYHL2525M90-M25R**	●
			14	28	(2G1L4H2)	**GYM25RA-H14**	●		
			25 ✶1	50 ✶2	(2G1L4H3)	**GYM25RA-H25**	●		
J	6.00 6.35	R	8	16	(2G1R4J1)	**GYM25LA-J08**	●	**GYHR2525M90-M25L**	●
			14	28	(2G1R4J2)	**GYM25LA-J14**	●		
			25 ✶1	50 ✶2	(2G1R4J3)	**GYM25LA-J25**	●		
		L	8	16	(2G1L4J1)	**GYM25RA-J08**	●	**GYHL2525M90-M25R**	●
			14	28	(2G1L4J2)	**GYM25RA-J14**	●		
			25 ✶1	50 ✶2	(2G1L4J3)	**GYM25RA-J25**	●		

✶1 The maximum groove depth varies according to the insert used. Please refer to the maximum groove depth of inserts on pages A318 and A319.
✶2 The maximum cut off diameter D1 varies according to the insert used. The cut off diameter is double the maximum groove depth (**ar**) of inserts on pages A318 and A319.
✶3 Dimensions shown are when the gauge insert is used. If other insert geometries are used then L1, L2 and F1 values may vary.
✶4 The maximum groove depth is limited by the workpiece diameter. For details, please refer to A331.

● : **Inventory maintained in Japan.**

SPARE PARTS

Modular Holder	Clamp Screw	(5 pieces) Blade Screw	Wrench
GYHR/L2020K90-M20L/R	GY06013M (Tightening torque : 6.0N·m)	TS407 (Tightening torque : 3.5N·m)	TKY30R TKY15R
GYHR/L2525M90-M25L/R		TS55 (Tightening torque : 5.0N·m)	TKY30R TKY25R

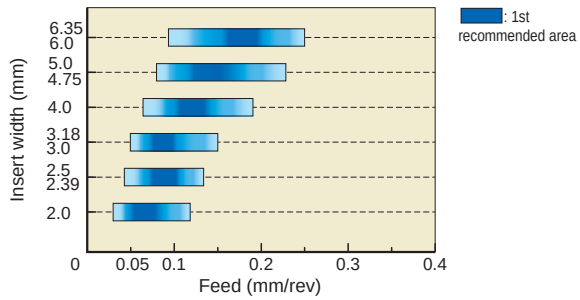
Dimensions (mm) *3						Fig.	Insert	
H_1	B	L_1	L_2	H_2	F_1		Geometry / Insert Number	Page
20	20	125	35	20	45	1	**GY2M0475H030N-GS** **GY2M0500H030N-GS**	A318 A319
25	25	150	38	25	47	1	**GY2M0475H040N-GM**	
25	25	150	38	25	53	1	**GY2M0500H040N-GM** (Gauge insert)	
25	25	150	38	25	64	2	**GY2M0500H040R/L05-GM**	
20	20	125	35	20	45	1	**GY2M0500H040N-MS** **GY2M0500H080N-MS**	
25	25	150	38	25	47	1	**GY2M0500H040N-MM** **GY2M0500H080N-MM**	
25	25	150	38	25	53	1		
25	25	150	38	25	64	2	**GY2M0475H238N-BM** **GY2M0500H250N-BM**	
							GY1G0475H020N-GFGS **GY1G0500H020N-GFGS**	
25	25	150	38	25	47	1	**GY2M0600J030N-GS** **GY2M0635J030N-GS**	A318 A319
25	25	150	38	25	53	1		
25	25	150	38	25	64	2	**GY2M0600J040N-GM** (Gauge insert)	
25	25	150	38	25	47	1	**GY2M0635J040N-GM**	
25	25	150	38	25	53	1		
25	25	150	38	25	64	2	**GY2M0600J040N-MS** **GY2M0600J080N-MS**	
							GY2M0600J040N-MM **GY2M0600J080N-MM**	
							GY2M0600J300N-BM **GY2M0635J318N-BM**	

RECOMMENDED CUTTING CONDITIONS

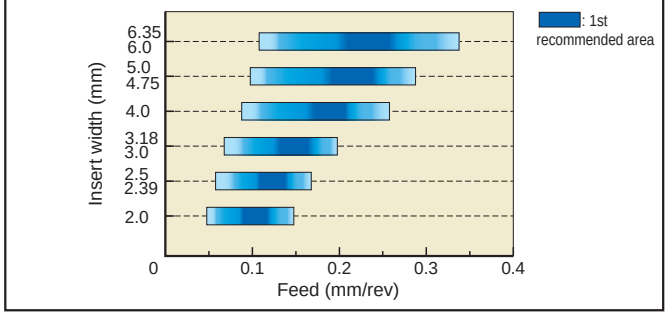
★Below are the recommended cutting conditions when using the modular holder GYHR/L2525M00-M25R/L with the modular blade GYM25◯A-◯◯.

Recommended feed rate and depth of cut

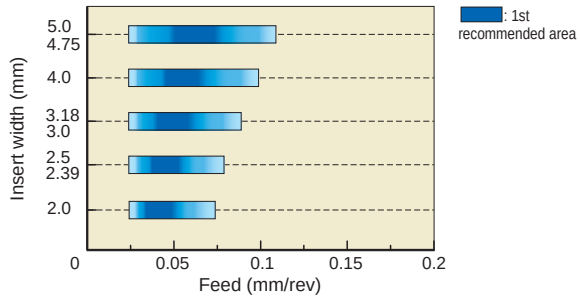
GS BREAKER



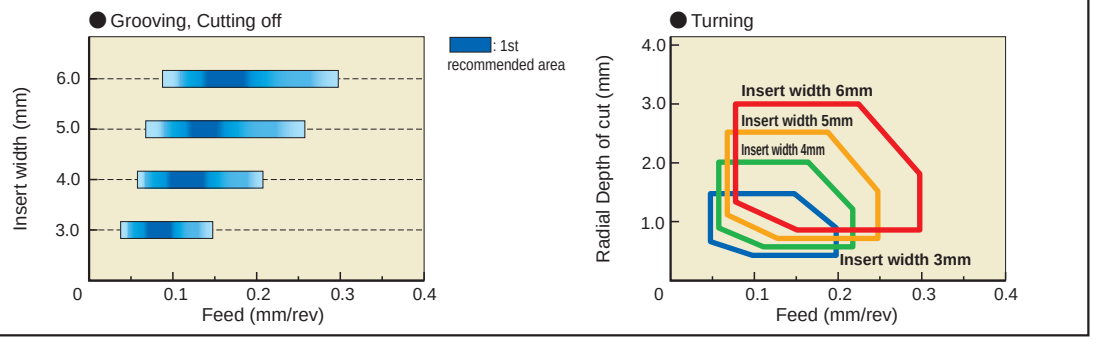
GM BREAKER



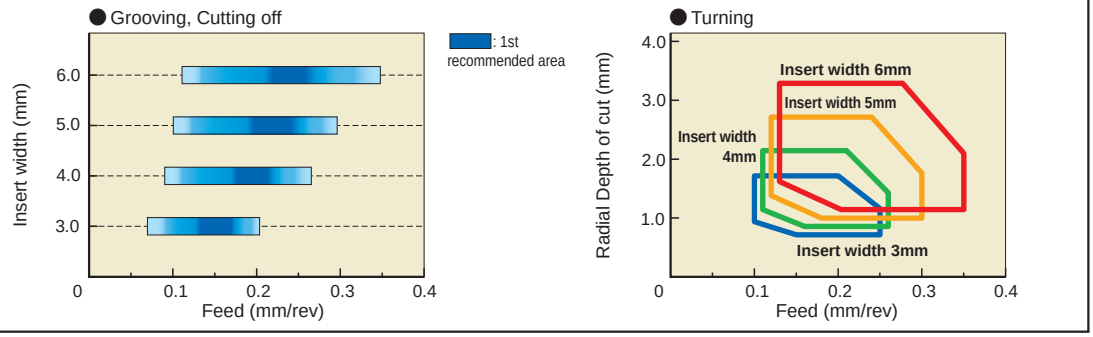
FLAT TOP GFGS (CBN)



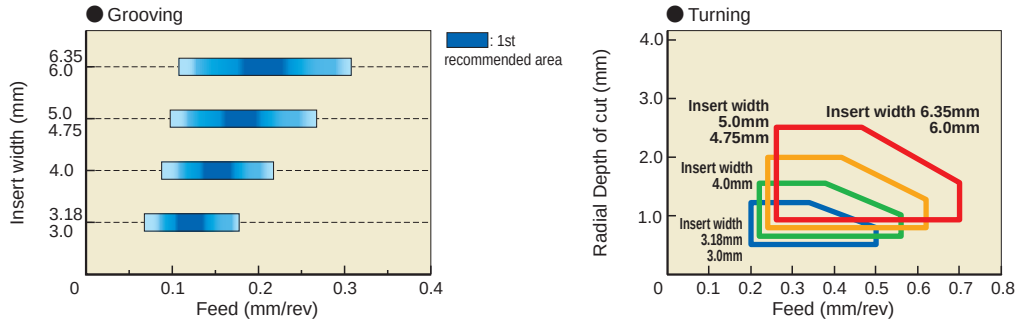
MS BREAKER



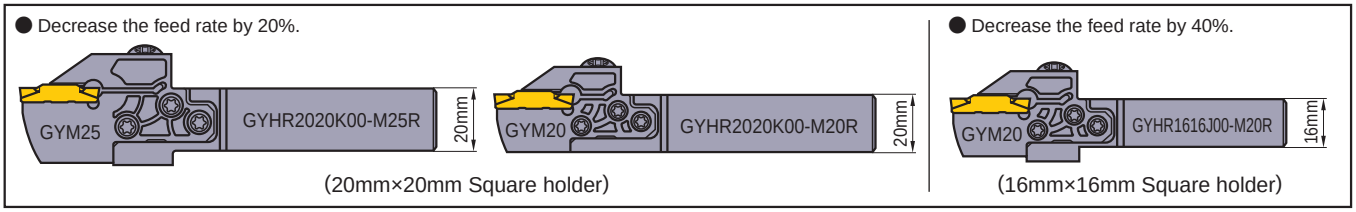
MM BREAKER



BM BREAKER



(Note) When using a combination as shown below, decrease the recommended feed rate respectively by 20% and 40%.



Recommended cutting speed

	Work Material	Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤160HB	VP10RT **VP20RT**	160 (100—220)
P	Carbon Steel Alloy Steel	160—280HB	VP10RT **VP20RT**	130 (80—180)
P	Carbon Steel Alloy Steel	280HB≤	VP10RT **VP20RT**	100 (60—140)
M	Stainless Steel	≤270HB	VP10RT **VP20RT**	100 (60—140)

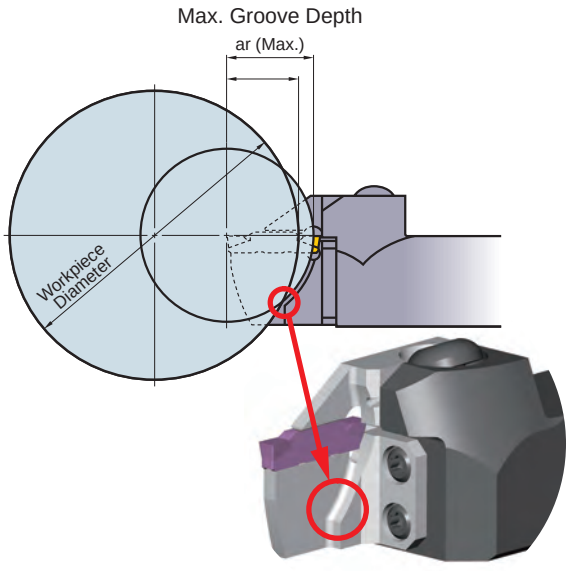
	Work Material	Hardness	Grade	Cutting Speed (m/min)
K	Gray Cast Iron	Tensile Strength ≤300MPa	VP10RT **VP20RT**	160 (100—220)
K	Ductile Cast Iron	Tensile Strength ≤800MPa	VP10RT **VP20RT**	130 (80—180)
S	Heat Resistant Alloy Titanium Alloy	—	VP10RT **VP20RT**	40 (30—60)
H	Hardened steel	50HRC≤	**MB8025**	100 (80—120)

(Note 1) VP20RT is the first recommended grade for materials other than hardened steel.
(Note 2) For VP10RT and VP20RT, wet cutting is recommended.

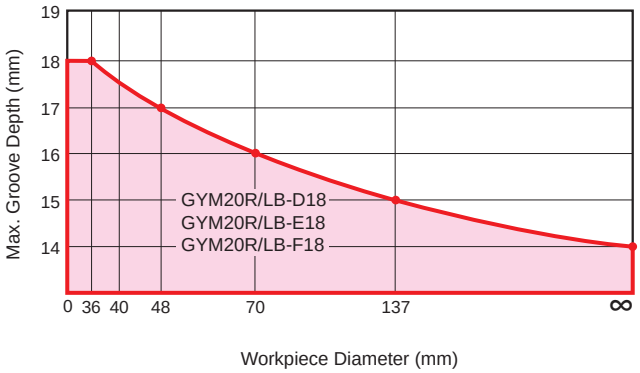
LIMITATION OF THE MAXIMUM GROOVE DEPTH

•When using the modular blade GYM○○R/LA-○○
The maximum groove depth is not limited by the workpiece diameter.

•When using the modular blade GYM○○R/LB-○○○
The maximum groove depth is limited by the workpiece diameter.



Due to the interference on this part, the maximum groove depth is limited by the workpiece diameter.



CORRESPONDING TABLE OF MODULAR HOLDERS AND BLADES

Grooving/Cutting off/Copying (00° type/90° type)

Modular Holder Order Number	Modular Blades		Insert Width (mm)	Page
	Order Number	Max. Groove Depth (mm)		
GYHR1616J00-M20R	GYM20RA-D06	6	2.00	A320 A322 A324
	∗GYM20RA-D10	10		
	GYM20RB-D18	18		
	GYM20RA-E06	6	2.39 2.50	
	∗GYM20RA-E10	10		
	GYM20RB-E18	18		
	GYM20RA-F06	6	3.00 3.18	
	∗GYM20RA-F10	10		
	GYM20RB-F18	18		
	∗GYM20RA-G12	12	4.00	
	∗GYM20RA-H12	12	4.75 5.00	
GYHL1616J00-M20L	GYM20LA-D06	6	2.00	A320 A322 A324
	∗GYM20LA-D10	10		
	GYM20LB-D18	18		
	GYM20LA-E06	6	2.39 2.50	
	∗GYM20LA-E10	10		
	GYM20LB-E18	18		
	GYM20LA-F06	6	3.00 3.18	
	∗GYM20LA-F10	10		
	GYM20LB-F18	18		
	∗GYM20LA-G12	12	4.00	
	∗GYM20LA-H12	12	4.75 5.00	
GYHR2020K00-M20R GYHL2020K90-M20R	GYM20RA-D06	6	2.00	A320 A322 A324 A326 A328
	∗GYM20RA-D10	10		
	GYM20RB-D18	18		
	GYM20RA-E06	6	2.39 2.50	
	∗GYM20RA-E10	10		
	GYM20RB-E18	18		
	GYM20RA-F06	6	3.00 3.18	
	∗GYM20RA-F10	10		
	GYM20RB-F18	18		
	∗GYM20RA-G12	12	4.00	
	∗GYM20RA-H12	12	4.75 5.00	
GYHL2020K00-M20L GYHR2020K90-M20L	GYM20LA-D06	6	2.00	A320 A322 A324 A326 A328
	∗GYM20LA-D10	10		
	GYM20LB-D18	18		
	GYM20LA-E06	6	2.39 2.50	
	∗GYM20LA-E10	10		
	GYM20LB-E18	18		
	GYM20LA-F06	6	3.00 3.18	
	∗GYM20LA-F10	10		
	GYM20LB-F18	18		
	∗GYM20LA-G12	12	4.00	
	∗GYM20LA-H12	12	4.75 5.00	

Modular Holder Order Number	Modular Blades		Insert Width (mm)	Page
	Order Number	Max. Groove Depth (mm)		
GYHR2020K00-M25R	GYM25RA-D06	6	2.00	A320 A322 A324
	∗GYM25RA-D12	12		
	GYM25RA-D20	20		
	GYM25RA-E06	6	2.39 2.50	
	∗GYM25RA-E12	12		
	GYM25RA-E20	20		
	GYM25RA-F06	6	3.00 3.18	
	∗GYM25RA-F12	12		
	GYM25RA-F20	20		
	GYM25RA-G08	8	4.00	
	∗GYM25RA-G14	14		
	GYM25RA-G25	25		
	GYM25RA-H08	8	4.75 5.00	
	∗GYM25RA-H14	14		
	GYM25RA-H25	25		
	GYM25RA-J08	8	6.00 6.35	
	∗GYM25RA-J14	14		
	GYM25RA-J25	25		
GYHL2020K00-M25L	GYM25LA-D06	6	2.00	A320 A322 A324
	∗GYM25LA-D12	12		
	GYM25LA-D20	20		
	GYM25LA-E06	6	2.39 2.50	
	∗GYM25LA-E12	12		
	GYM25LA-E20	20		
	GYM25LA-F06	6	3.00 3.18	
	∗GYM25LA-F12	12		
	GYM25LA-F20	20		
	GYM25LA-G08	8	4.00	
	∗GYM25LA-G14	14		
	GYM25LA-G25	25		
	GYM25LA-H08	8	4.75 5.00	
	∗GYM25LA-H14	14		
	GYM25LA-H25	25		
	GYM25LA-J08	8	6.00 6.35	
	∗GYM25LA-J14	14		
	GYM25LA-J25	25		

∗ Can be used with an internal holder.

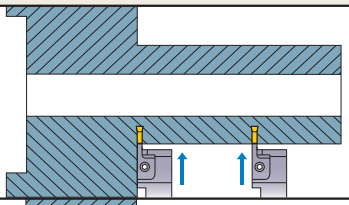
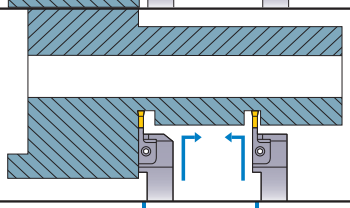
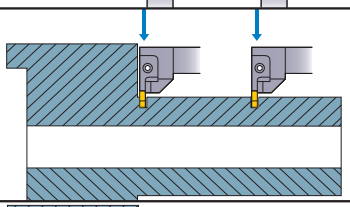
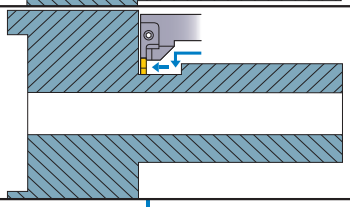
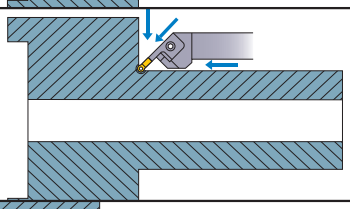
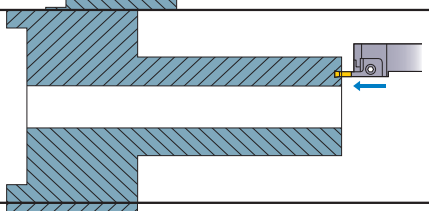
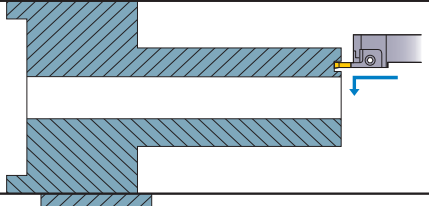
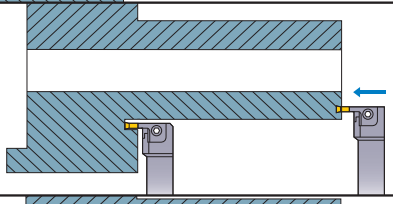
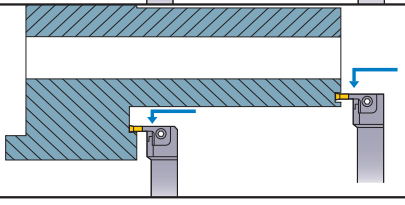
External Grooving/Cutting off/Copying (00º type/90º type)

Modular Holder Order Number	Modular Blades		Insert Width (mm)	Page
	Order Number	Max. Groove Depth (mm)		
GYHR2525M00-M25R GYHL2525M90-M25R	GYM25RA-D06	6	2.00	A320 A322 A324 A326 A328
	∗GYM25RA-D12	12		
	GYM25RA-D20	20		
	GYM25RA-E06	6	2.39 2.50	
	∗GYM25RA-E12	12		
	GYM25RA-E20	20		
	GYM25RA-F06	6	3.00 3.18	
	∗GYM25RA-F12	12		
	GYM25RA-F20	20		
	GYM25RA-G08	8	4.00	
	∗GYM25RA-G14	14		
	GYM25RA-G25	25		
	GYM25RA-H08	8	4.75 5.00	
	∗GYM25RA-H14	14		
	GYM25RA-H25	25		
	GYM25RA-J08	8	6.00 6.35	
	∗GYM25RA-J14	14		
	GYM25RA-J25	25		

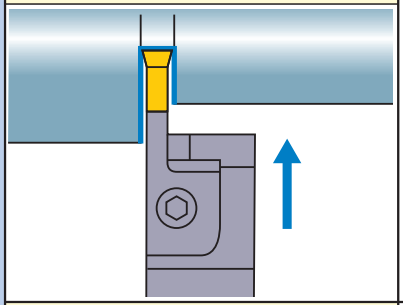
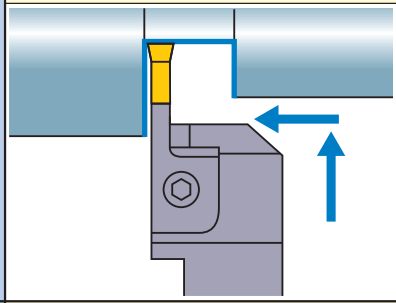
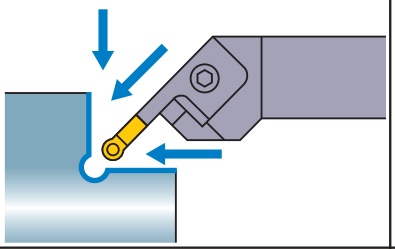
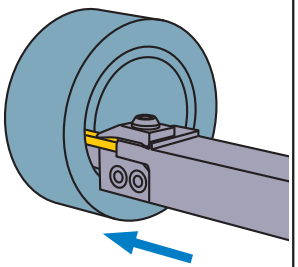
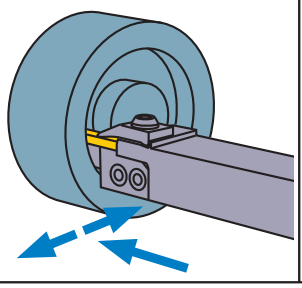
Modular Holder Order Number	Modular Blades		Insert Width (mm)	Page
	Order Number	Max. Groove Depth (mm)		
GYHL2525M00-M25L GYHR2525M90-M25L	GYM25LA-D06	6	2.00	A320 A322 A324 A326 A328
	∗GYM25LA-D12	12		
	GYM25LA-D20	20		
	GYM25LA-E06	6	2.39 2.50	
	∗GYM25LA-E12	12		
	GYM25LA-E20	20		
	GYM25LA-F06	6	3.00 3.18	
	∗GYM25LA-F12	12		
	GYM25LA-F20	20		
	GYM25LA-G08	8	4.00	
	∗GYM25LA-G14	14		
	GYM25LA-G25	25		
	GYM25LA-H08	8	4.75 5.00	
	∗GYM25LA-H14	14		
	GYM25LA-H25	25		
	GYM25LA-J08	8	6.00 6.35	
	∗GYM25LA-J14	14		
	GYM25LA-J25	25		

∗ Can be used with an internal holder.

CLASSIFICATION OF DG HOLDER

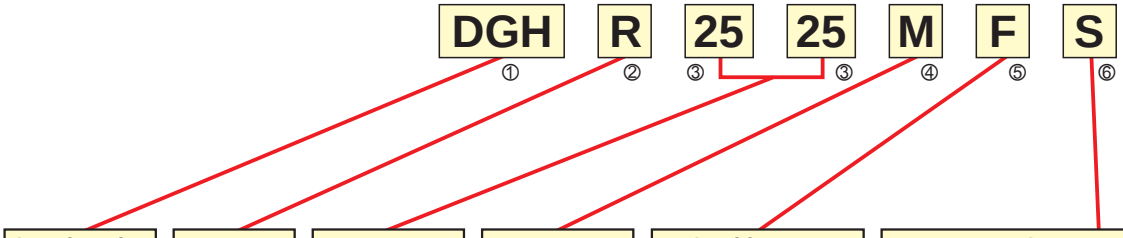
Shape	Type	Cutting Mode	Page
	1 ● External cutting off, grooving Standard type holder		A338
	2 ● External cutting off, copying Standard type holder		A340
	3 ● External cutting off, grooving L type holder		A342
	4 ● External cutting off, copying L type holder		A343
	5 ● External recessing, copying		A344
	6 ● Face grooving Standard type holder		A346
	7 ● Face grooving, copying Standard type holder		A350
	8 ● Face grooving L type holder		A354
	9 ● Face grooving, copying L type holder		A356

SELECTION OF DG HOLDER

Classification of DG Holder (by cutting mode)		Insert		
		Type	Insert Number	Features
External Grooving	Cutting off, Grooving 	CE	DGM...CE DGJ...CE	● Insert width less than 4mm. Standard insert type can cut deeper grooves than CT type. ● Stocked precision class insert (DGJ...CE).
	Cutting off, Grooving + Copying 	CT	DGM...CT DGJ...CT1 DGM...CTB DGM...CTD DGM...CTR/L	● CT type insert has a three dimensional chip breaker for better chip control. Enables copying. ● Stocked precision class insert (DGJ...CT1).
External Recessing	Recessing + Copying 	CT	DGM...CTB	● CT type insert has three a dimensional chip breaker for better chip control. Enables recessing and copying.
Face Grooving	Grooving 	CF	DGJ...CFS DGJ...CF	● Stock precision class insert. ● DGJ...CFS type insert is more suitable for cutting of small diameters than the CTF type insert due to a large clearance angle.
	Grooving + Copying 	CTF	DGM...CTF	● CTF type insert has a three dimensional chip breaker for better chip control. Enables copying.

IDENTIFICATION OF DG HOLDER

DG HOLDER



①Designation

②Cutting Direction	
R	Right
L	Left

③Shank Size (Height and Width)	
16	16mm
20	20mm
25	25mm

④Shank Length (mm)	
K	124 – 125
M	149 – 150

⑤Holder Type	
None	Standard
F	Standard with Off Set
L	L type
C	Recess type

⑥Locator Type		
	Locator Type	Applicable Insert
None	Block Type	Length 25mm
S	Block Type	Length 20mm
2G	Solid Type	Groove Width 2mm / Length 25mm
3G	Solid Type	Groove Width 3mm / Length 25mm
3	Solid Type	Groove Width 3mm / Length 20mm

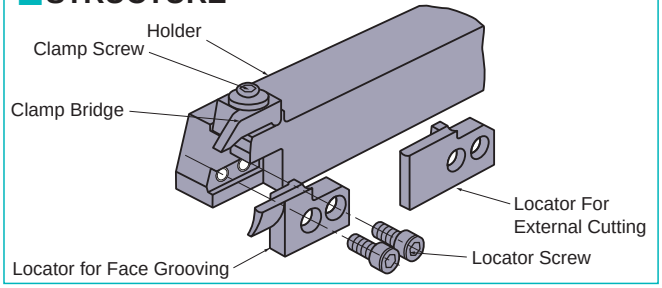
CLAMP BRIDGE

①Designation

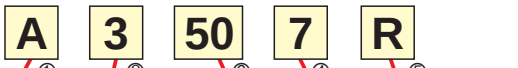
③Cutting Direction	
R	Right
L	Left

②Applicable Insert		
2	Groove Width 2mm	
3	Groove Width 3mm (Except DGJ30CFS and DGJ30CF)	
4	Groove Width 4mm (Except DGJ40CFS and DGJ40CF)	
5	Groove Width 5mm	
	DGJ30CFS (Groove Width 3mm)	Insert Shape
	DGJ30CF (Groove Width 3mm)	
	DGJ40CFS (Groove Width 4mm)	
	DGJ40CF (Groove Width 4mm)	
6	Groove Width 6mm	
7	Groove Width 7mm	
8	Groove Width 8mm	

STRUCTURE



PACK NUMBER



②Shank Size	
1	16 x 16
2	20 x 20
3	25 x 25
4	25 x 25 (Face Grooving)

③Insert Width	
20	2.0mm
30	3.0mm
40	4.0mm
50	5.0mm
60	6.0mm
70	7.0mm
80	8.0mm

⑤Cutting Direction	
R	Right
L	Left

④Application		
0	Face Grooving	Grooving Diameter ϕ20—ϕ50
2	Face Grooving	Grooving Diameter ϕ40—ϕ100 (ϕ50—ϕ100)
4	Face Grooving	Grooving Diameter ϕ100—ϕ250 (ϕ100—$\phi\infty$)
7	External Grooving	For Square Insert
8	External Grooving	For Other than Square Insert

( ) Diameter is for minimum insert width 5mm.

①Designation	
A,B,C,D	Standard Type for External Grooving
E,F	L Type for External Grooving
G	Recess Type for Recessing and Copying
H,J,K,L,M,N,P,Q	Standard Type for Face Grooving
R,S,T,U	L Type for Face Grooving

LOCATOR [For External Grooving and Recessing]

E ① A ② 3 ③ R ④ S ⑤

①Application	
E	For External Grooving and Recessing

②Shank Size (mm)	
A	20 x 20
B	25 x 25

③Insert Width	
2	2mm
3	3mm
4	4mm
5	5mm
6	6mm
7	7mm
8	8mm

④Cutting Direction	
R	Right
L	Left

⑤Applicable Insert		
	Shape	Insert Length
None		25mm
S		20mm
X		20mm, 25mm

LOCATOR [For Face Grooving]

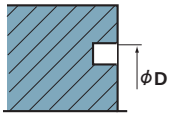
F ① B ② 5 ③ R ④ 2 ⑤ D ⑥

①Application	
F	Face Grooving

③Insert Width	
3	3mm
4	4mm
5	5mm
6	6mm
7	7mm
8	8mm

④Cutting Direction	
R	Right
L	Left

⑤Cutting Range

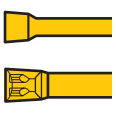


	Groove Width ≤4mm ϕD (mm)	Groove Width ≤5mm ϕD (mm)
0	ϕ20 – 50	–
2	ϕ40 – 100	ϕ50 – 100
4	ϕ100 – 250	ϕ100 – ∞

②Shape Seen from the Spindle

	Shank Size (mm)	Right	Left
A	20 x 20		
B	25 x 25		
C	20 x 20		
D	25 x 25		

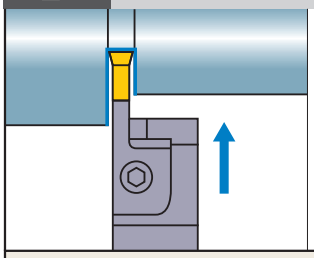
⑥Applicable Insert

	Shape	Insert Length
None		25mm
S		20mm
D		Deep Groove (Max. Groove Depth 16mm)

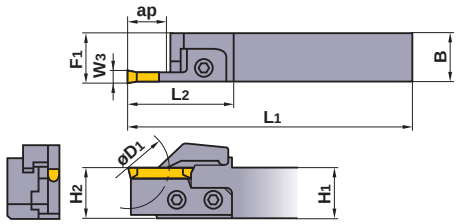
DG HOLDER

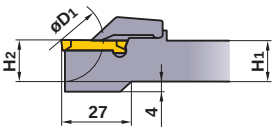
- Clamp-on type
- Groove width 2—8mm

1 External cutting off, Grooving standard holder



Without off set





DGHR1616K○G

Right hand tool holder shown.

Pack				Component		
	Pack Order Number ⁎1	Stock R	Stock L	Holder	Locator	Clamp Bridge
Without Off Set	**A1207R/L**	●	●	**DGHR/L1616K2G**	—	**Set on the Holder**
	A1307R/L	●	●	**DGHR/L1616K3G**	—	**Set on the Holder**
	A2207R/L	●	●	**DGHR/L2020K**	**EA2R/L**	**DGK2R/L**
	A2307R/L	●	●	**DGHR/L2020K**	**EA3R/L**	**DGK3R/L**
	A3207R/L	●	●	**DGHR/L2525M**	**EB2R/L**	**DGK2R/L**
	A3307R/L	●	●	**DGHR/L2525M**	**EB3R/L**	**DGK3R/L**
	A3407R/L	●	●	**DGHR/L2525M**	**EB4R/L**	**DGK4R/L**
	⁎3 **A3507R/L**	●	●	**DGHR/L2525M**	**EB5R/L**	**DGK5R/L**
	A3607R/L	●	●	**DGHR/L2525M**	**EB6R/L**	**DGK6R/L**
	A3707R/L	●	●	**DGHR/L2525M**	**EB7R/L**	**DGK7R/L**
	A3807R/L	●	●	**DGHR/L2525M**	**EB8R/L**	**DGK8R/L**
With Off Set	**C3207R/L**	●	●	**DGHR/L2525MF**	**EB2R/L**	**DGK2R/L**
	C3307R/L	●	●	**DGHR/L2525MF**	**EB3R/L**	**DGK3R/L**
	C3407R/L	●	●	**DGHR/L2525MF**	**EB4R/L**	**DGK4R/L**
	⁎3 **C3507R/L**	●	●	**DGHR/L2525MF**	**EB5R/L**	**DGK5R/L**
	C3607R/L	●	●	**DGHR/L2525MF**	**EB6R/L**	**DGK6R/L**
	C3707R/L	●	●	**DGHR/L2525MF**	**EB7R/L**	**DGK7R/L**
	C3807R/L	●	●	**DGHR/L2525MF**	**EB8R/L**	**DGK8R/L**

(Note) Please set right hand parts for right hand holder and left hand parts for left hand holder.

⁎1 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.) To order the parts separately, please refer to their description.

⁎2 The maximum depth of groove is shown in the diagram on the next page.

⁎3 Compatible with straight holder for external cutting off and copying.

SPARE PARTS

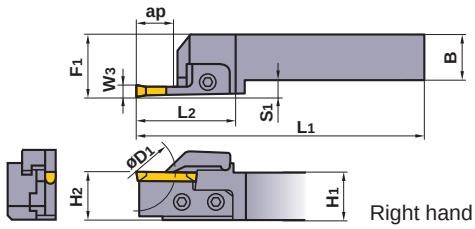
	Tool Holder Number	Clamp Bridge	⁎ Locator Screw	⁎ Clamp Screw	Spring	Wrench
Without Off Set	**DGHR/L1616K2G**	DGK2R/L	—	DGS51	MES2	HKY40R
	DGHR/L1616K3G	DGK3R/L				
	DGHR/L2020K	—	HSC04014			HKY30R HKY40R
	DGHR/L2525M		HSC05012			HKY40R
With Off Set	**DGHR/L2525MF**	—	HSC05012	DGS51	MES2	HKY40R

(Note) Please set right hand parts for right hand holder and left hand parts for left hand holder.

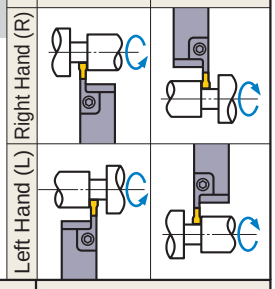
⁎ Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

● : **Inventory maintained in Japan.**

With off set

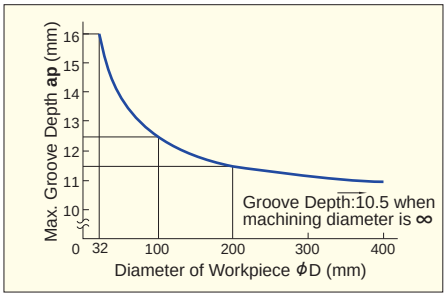


Right hand tool holder shown.

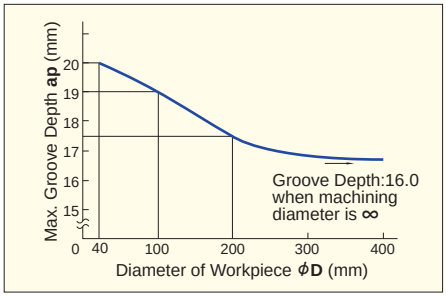


Groove Width W3 (mm)	Max. Groove Depth ap*2 (mm)	Max. Cut Off Diameter D1 (mm)	Dimensions (mm) H1	B	L1	L2	H2	F1	S1	Insert Number	Insert Shape
2	10.5	32	16	16	125	40	16	16.2	—	DGM20CE	DGM...CE
3	10.5	32	16	16	125	40	16	16.2	—	DGM30CE DGJ30CE	
2	10.5	32	20	20	125	40	20	20.2	—	DGM20CE	
3	10.5	32	20	20	125	40	20	20.2	—	DGM30CE DGJ30CE	
2	16	40	25	25	150	40	25	25.2	—	DGM20CE	
3	16	40	25	25	150	40	25	25.2	—	DGM30CE DGJ30CE	
4	16	40	25	25	150	40	25	25.2	—	DGJ40CE	DGJ...CE
5	16	40	25	25	150	40	25	25.2	—	DGJ50CE	
6	16	40	25	25	150	40	25	25.2	—	DGJ60CE	
7	16	40	25	25	150	40	25	25.2	—	DGJ70CE	
8	16	40	25	25	150	40	25	25.2	—	DGJ80CE	
2	16	40	25	25	150	40	25	32	7	DGM20CE	DGM...CE
3	16	40	25	25	150	40	25	32	7	DGM30CE DGJ30CE	
4	16	40	25	25	150	40	25	32	7	DGJ40CE	
5	16	40	25	25	150	40	25	32	7	DGJ50CE	DGJ...CE
6	16	40	25	25	150	40	25	32	7	DGJ60CE	
7	16	40	25	25	150	40	25	32	7	DGJ70CE	
8	16	40	25	25	150	40	25	32	7	DGJ80CE	

RANGE OF GROOVING



DGHR/L1616K□G
DGHR/L2020K

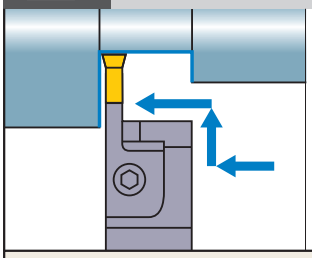


DGHR/L2525M
DGHR/L2525MF

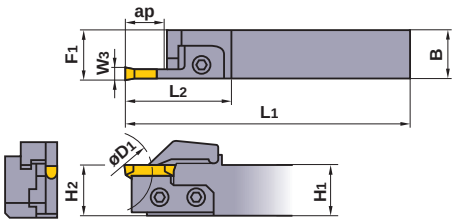
DG HOLDER

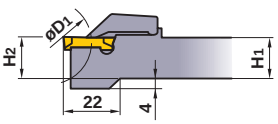
- Clamp-on type
- Groove width 3−6mm

2 External cutting off, Copying standard holder



Without off set





DGHR1616K3

Right hand tool holder shown.

Pack				Component		
	Pack Order Number ⁎1	Stock R	Stock L	Holder	Locator	Clamp Bridge
Without Off Set	**B1307R/L**	●	●	**DGHR/L1616K3**	—	**Set on the Holder**
	B2307R/L	●	●	**DGHR/L2020KS**	**EA3R/LS**	**DGK3R/L**
	B3307R/L	●	●	**DGHR/L2525MS**	**EB3R/LS**	**DGK3R/L**
	B3407R/L	●	●	**DGHR/L2525MS**	**EB4R/LS**	**DGK4R/L**
	B3408R/L	●	●	**DGHR/L2525MS**	**EB4R/LX**	**DGK4R/L**
	⁎3 **A3507R/L**	●	●	**DGHR/L2525M**	**EB5R/L**	**DGK5R/L**
	A3508R/L	●	●	**DGHR/L2525M**	**EB5R/LX**	**DGK5R/L**
	A3608R/L	●	●	**DGHR/L2525M**	**EB6R/LX**	**DGK6R/L**
With Off Set	**D1307R/L**	●	●	**DGHR/L1616KF3**	—	**Set on the Holder**
	D2307R/L	●	●	**DGHR/L2020KFS**	**EA3R/LS**	**DGK3R/L**
	D3307R/L	●	●	**DGHR/L2525MFS**	**EB3R/LS**	**DGK3R/L**
	D3407R/L	●	●	**DGHR/L2525MFS**	**EB4R/LS**	**DGK4R/L**
	D3408R/L	●	●	**DGHR/L2525MFS**	**EB4R/LX**	**DGK4R/L**
	⁎3 **C3507R/L**	●	●	**DGHR/L2525MF**	**EB5R/L**	**DGK5R/L**
	C3508R/L	●	●	**DGHR/L2525MF**	**EB5R/LX**	**DGK5R/L**
	C3608R/L	●	●	**DGHR/L2525MF**	**EB6R/LX**	**DGK6R/L**

(Note) Please set right hand parts for right hand holder and left hand parts for left hand holder.

⁎1 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.) To order the parts separately, please refer to their description.

⁎2 The maximum depth of groove is shown in the diagram on the next page.

⁎3 Compatible with straight holder for external cutting off and copying.

SPARE PARTS

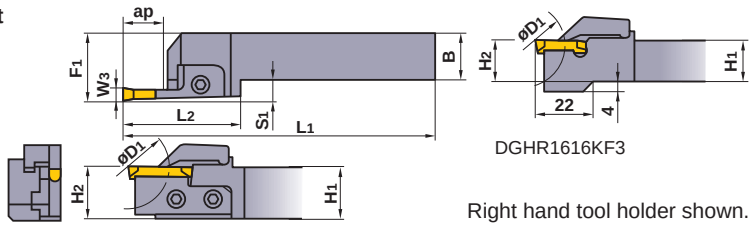
	Tool Holder Number	Clamp Bridge	⁎ Locator Screw	⁎ Clamp Screw	Spring	Wrench
Without Off Set	**DGHR/L1616K3**	DGK3R/L	—	DGS51	MES2	HKY40R
	DGHR/L2020KS	—	HSC04014			HKY30R HKY40R
	DGHR/L2525MS		HSC05012			HKY40R
	DGHR/L2525M					
With Off Set	**DGHR/L1616KF3**	DGK3R/L	—	DGS51	MES2	HKY40R
	DGHR/L2020KFS	—	HSC04014			HKY30R HKY40R
	DGHR/L2525MFS		HSC05012			HKY40R
	DGHR/L2525MF					

(Note) Please set right hand parts for right hand holder and left hand parts for left hand holder.

⁎ Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

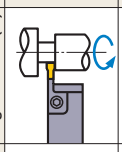
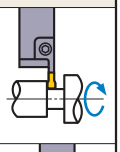
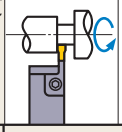
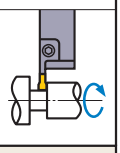
● : **Inventory maintained in Japan.**

With off set



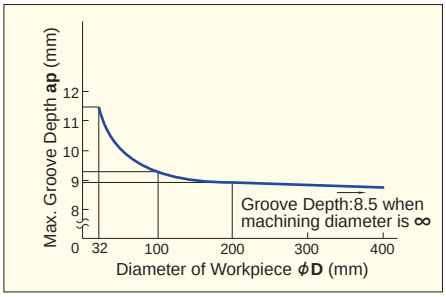
DGHR1616KF3

Right hand tool holder shown.

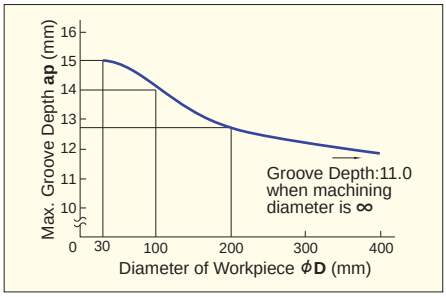
	Clockwise	Anticlockwise
Right Hand (R)		
Left Hand (L)		

Groove Width W_3 (mm)	Max. Groove Depth a_p*2 (mm)	Max. Cut Off Diameter D_1 (mm)	Dimensions (mm) H_1	B	L_1	L_2	H_2	F_1	S_1	Insert Number	Insert Shape
3	8.5	23	16	16	125	38	16	16.2	—	DGM30CT	DGM...CT
3	8.5	23	20	20	125	38	20	20.2	—	DGM30CT	
3	11	30	25	25	150	38	25	25.2	—	DGM30CT	
4	11	30	25	25	150	38	25	25.2	—	DGM40CT	
4	11	30	25	25	150	38	25	25.2	—	DGM40CTB	DGM...CTB
5	16	40	25	25	150	40	25	25.2	—	DGM50CT DGJ50CT1	
5	16	40	25	25	150	40	25	25.2	—	DGM50CTB DGM50CTD○○ DGM50CTR/L04	
6	16	40	25	25	150	40	25	25.2	—	DGM60CTB	DGJ...CT1
3	8.5	23	16	16	125	38	16	20	4	DGM30CT	
3	8.5	23	20	20	125	38	20	25	4	DGM30CT	
3	11	30	25	25	150	38	25	32	7	DGM30CT	DGM...CTD
4	11	30	25	25	150	38	25	32	7	DGM40CT	
4	11	30	25	25	150	38	25	32	7	DGM40CTB	
5	16	40	25	25	150	40	25	32	7	DGM50CT DGJ50CT1	
5	16	40	25	25	150	40	25	32	7	DGM50CTB DGM50CTD○○ DGM50CTR/L04	DGM...CTR/L
6	16	40	25	25	150	40	25	32	7	DGM60CTB	

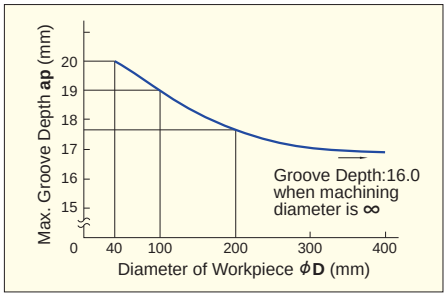
RANGE OF GROOVING



DGHR/L1616K3
DGHR/L1616KF3
DGHR/L2020KS
DGHR/L2020KFS



DGHR/L2525MS
DGHR/L2525MFS

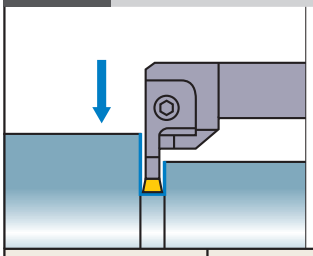


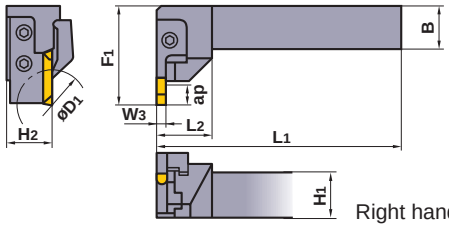
DGHR/L2525M
DGHR/L2525MF

DG HOLDER

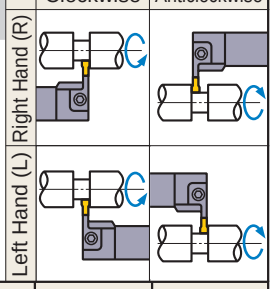
- Clamp-on type
- Groove width 2—8mm

3 External cutting off, Grooving L type holder





Right hand tool holder shown.



Pack			Component			Groove Width	Max. Groove Depth	Max. Cut Off Diameter	Dimensions (mm)						Insert Number	Insert Shape
Pack Order Number ✶1	Stock R	Stock L	Holder	Locator	Clamp Bridge	W3 (mm)	ap ✶2 (mm)	D1 (mm)	H1	B	L1	L2	H2	F1		
E2207R/L	●	●	**DGHR/L2020KL**	**EA2L/R**	**DGK2L/R**	2	10.5	32	20	20	125	25	20	45	DGM20CE	DGM...CE
E2307R/L	●	●	**DGHR/L2020KL**	**EA3L/R**	**DGK3L/R**	3	10.5	32	20	20	125	25	20	45	DGM30CE DGJ30CE	
E3207R/L	●	●	**DGHR/L2525ML**	**EB2L/R**	**DGK2L/R**	2	16	40	25	25	150	25	25	45	DGM20CE	
E3307R/L	●	●	**DGHR/L2525ML**	**EB3L/R**	**DGK3L/R**	3	16	40	25	25	150	25	25	45	DGM30CE DGJ30CE	
E3407R/L	●	●	**DGHR/L2525ML**	**EB4L/R**	**DGK4L/R**	4	16	40	25	25	150	25	25	45	DGJ40CE	DGJ...CE
✶3 **E3507R/L**	●	●	**DGHR/L2525ML**	**EB5L/R**	**DGK5L/R**	5	16	40	25	25	150	25	25	45	DGJ50CE	
E3607R/L	●	●	**DGHR/L2525ML**	**EB6L/R**	**DGK6L/R**	6	16	40	25	25	150	25	25	45	DGJ60CE	
E3707R/L	●	●	**DGHR/L2525ML**	**EB7L/R**	**DGK7L/R**	7	16	40	25	25	150	25	25	45	DGJ70CE	
E3807R/L	●	●	**DGHR/L2525ML**	**EB8L/R**	**DGK8L/R**	8	16	40	25	25	150	25	25	45	DGJ80CE	

(Note) Please set left hand parts for right hand holder and right hand parts for left hand holder.]

✶1 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.) To order the parts separately, please refer to their description.

✶2 The maximum depth of groove is shown in the diagram below.

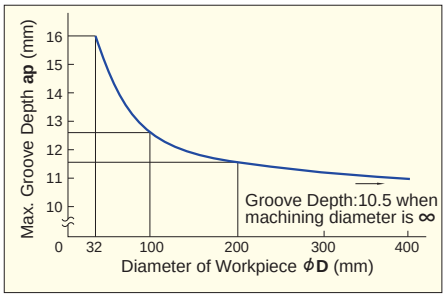
✶3 Compatible with L type holder for external cutting off and copying.

SPARE PARTS

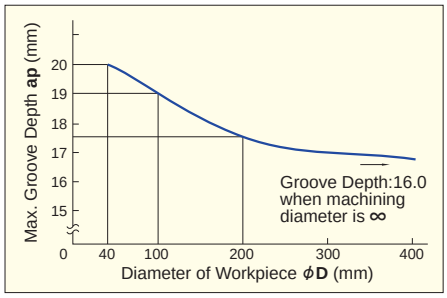
Tool Holder Number	* Locator Screw	* Clamp Screw	Spring	Wrench
DGHR/L2020KL	HSC04014	DGS51	MES2	HKY30R HKY40R
DGHR/L2525ML	HSC05012			HKY40R

✶ Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

RANGE OF GROOVING



DGHR/L2020KL



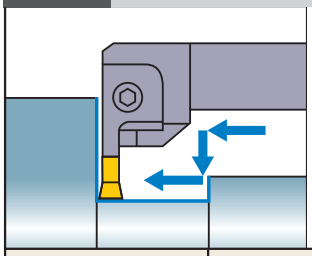
DGHR/L2525ML

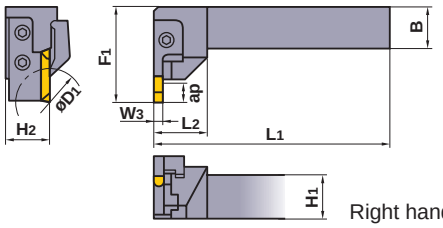
● : Inventory maintained in Japan.

DG HOLDER

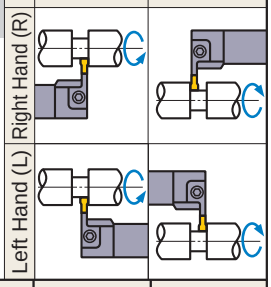
- Clamp-on type
- Groove width 2−8mm

4 External cutting off, Copying L type holder





Right hand tool holder shown.



Pack			Component			Groove Width	Max. Groove Depth	Max. Cut Off Diameter	Dimensions (mm)						Insert Number	Insert Shape
Pack Order Number ✶1	Stock R	Stock L	Holder	Locator	Clamp Bridge	W3 (mm)	ap✶2 (mm)	D1 (mm)	H1	B	L1	L2	H2	F1		
F2307R/L	●	●	DGHR/L2020KLS	EA3L/RS	DGK3L/R	3	8.5	23	20	20	125	25	20	40	DGM30CT	DGM...CT
F3307R/L	●	●	DGHR/L2525MLS	EB3L/RS	DGK3L/R	3	11	30	25	25	150	25	25	40	DGM30CT	DGM...CTB
F3407R/L	●	●	DGHR/L2525MLS	EB4L/RS	DGK4L/R	4	11	30	25	25	150	25	25	40	DGM40CT	DGJ...CT1
F3408R/L	●	●	DGHR/L2525MLS	EB4L/RX	DGK4L/R	4	11	30	25	25	150	25	25	40	DGM40CTB	DGM...CTD
✶3 E3507R/L	●	●	DGHR/L2525ML	EB5L/R	DGK5L/R	5	16	40	25	25	150	25	25	45	DGM50CT DGJ50CT1	DGM...CTR/L
E3508R/L	●	●	DGHR/L2525ML	EB5L/RX	DGK5L/R	5	16	40	25	25	150	25	25	45	DGM50CTB DGM50CTD DGM50CTR/L04	
E3608R/L	●	●	DGHR/L2525ML	EB6L/RX	DGK6L/R	6	16	40	25	25	150	25	25	45	DGM60CTB	

(Note) Please set left hand parts for right hand holder and right hand parts for left hand holder.

✶1 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.) To order the parts separately, please refer to their description.

✶2 The maximum depth of groove is shown in the diagram below.

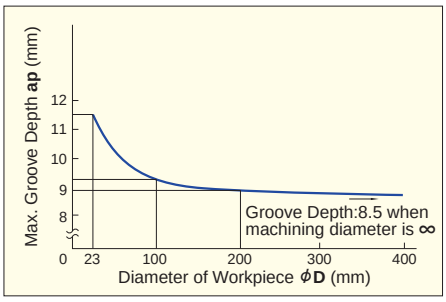
✶3 Compatible with L Type holder for external cutting off and grooving.

SPARE PARTS

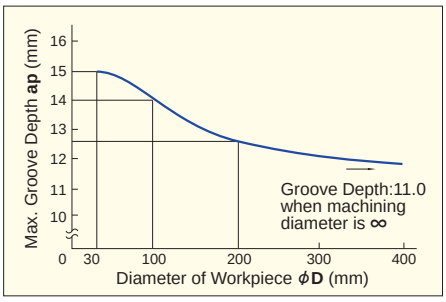
Tool Holder Number	✶ Locator Screw	✶ Clamp Screw	Spring	Wrench
DGHR/L2020KLS	HSC04014	DGS51	MES2	HKY30R HKY40R
DGHR/L2525MLS	HSC05012			HKY40R
DGHR/L2525ML				

✶ Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

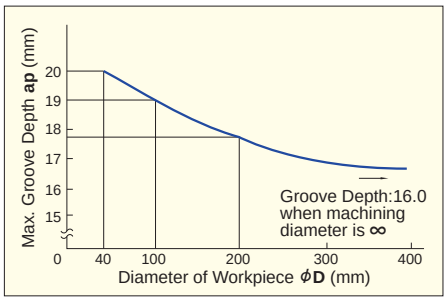
RANGE OF GROOVING



DGHR/L2020KLS



DGHR/L2525MLS

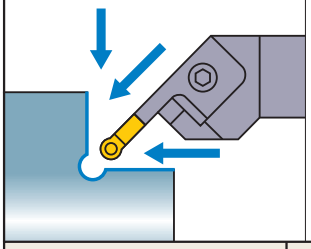


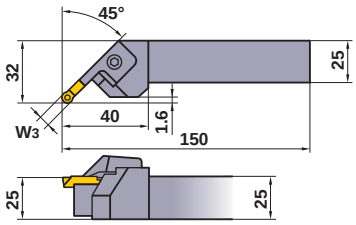
DGHR/L2525ML

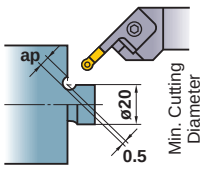
DG HOLDER

- Clamp-on type
- Groove width 4−6mm

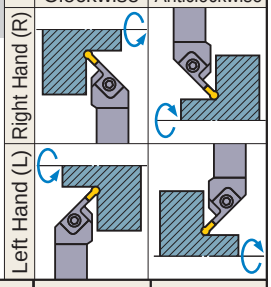
5 External recessing, Copying holder







Right hand tool holder shown.



Pack			Component			Groove Width	Max. Depth of Recess	Insert Number	Insert Shape
Pack Order Number *	Stock R	Stock L	Holder	Locator	Clamp Bridge	**W3** (mm)	**ap** (mm)		
G3408R/L	●	●	**DGHR/L2525MCS**	**EB4L/RX**	**DGK4L/R**	4	2.5	DGM40CTB	DGM...CTB
G3508R/L	●	●	**DGHR/L2525MC**	**EB5L/RX**	**DGK5L/R**	5	3.0	DGM50CTB	
G3608R/L	●	●	**DGHR/L2525MC**	**EB6L/RX**	**DGK6L/R**	6	3.5	DGM60CTB	

(Note) Please set left hand parts for right hand holder and right hand parts for left hand holder.

* The order pack number includes a holder, locators and clamp screws. (Refer to the list below.) To order the parts separately, please refer to their description.

SPARE PARTS

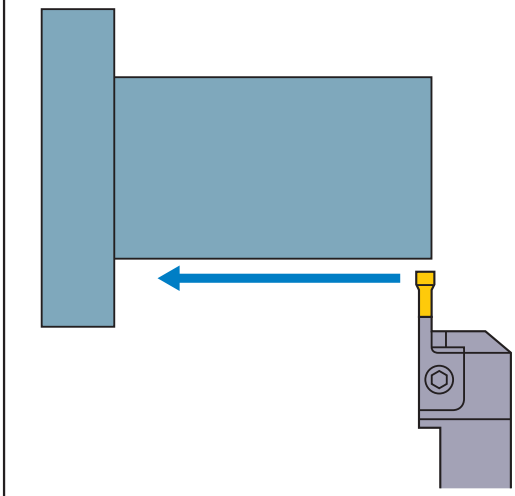
Tool Holder Number	* Locator Screw	* Clamp Screw	Spring	Wrench
DGHR/L2525MCS	HSC05010	DGS51	MES2	HKY40R
DGHR/L2525MC	HSC05012			

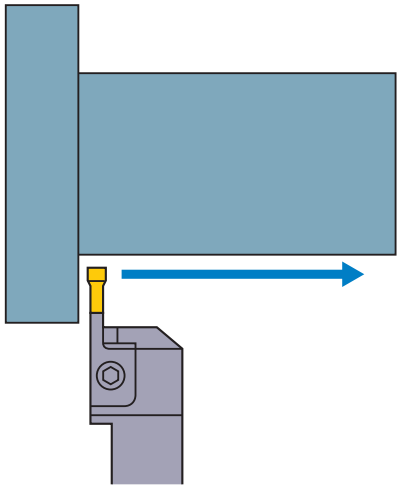
* Clamp Torque (N • m) : DGS51=7.0, HSC05010=7.0, HSC05012=7.0

● : **Inventory maintained in Japan.**

TRAVERSE MACHINING

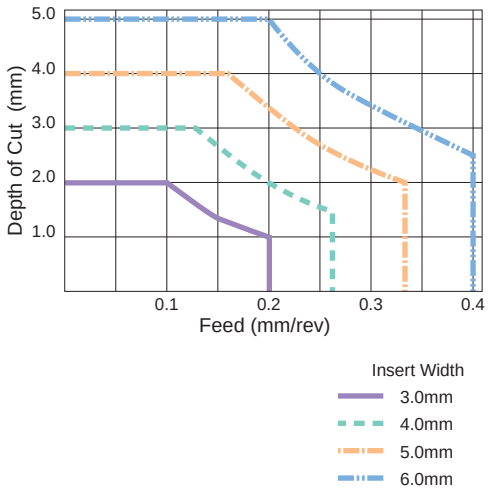
Cutting Mode

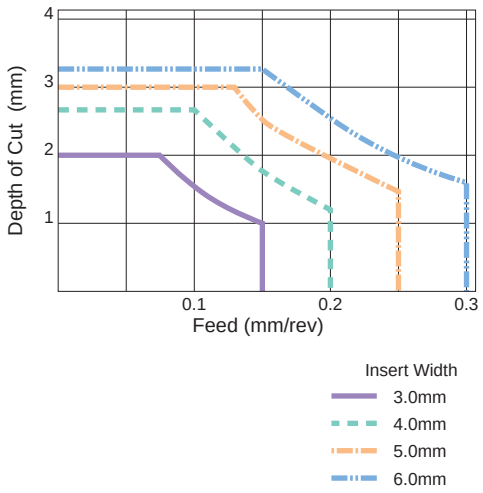




Cutting Conditions			Max. Depth of Cut **d** (mm)	Max. Feed **f** (mm/rev)	Depth of Cut x Feed **d×f** (mm^2)	Max. Depth of Cut **d** (mm)	Max. Feed **f** (mm/rev)	Depth of Cut x Feed **d×f** (mm^2)
Insert Number DGM...CT DGM...CTD DM...CTF	Insert Width (mm)	3	2.0 (≤Groove Width 65%)	0.20 (≤Groove Width 6.5%)	≤ 0.20	2.0 (≤Groove Width 65%)	0.15 (≤Groove Width 5%)	≤ 0.16
		4	3.0 (≤Groove Width 75%)	0.26 (≤Groove Width 6.5%)	≤ 0.39	2.6 (≤Groove Width 65%)	0.20 (≤Groove Width 5%)	≤ 0.26
		5	4.0 (≤Groove Width 80%)	0.33 (≤Groove Width 6.5%)	≤ 0.65	3.0 (≤Groove Width 60%)	0.25 (≤Groove Width 5%)	≤ 0.38
		6	5.0 (≤Groove Width 85%)	0.39 (≤Groove Width 6.5%)	≤ 0.98	3.3 (≤Groove Width 55%)	0.30 (≤Groove Width 5%)	≤ 0.50

Cutting Range



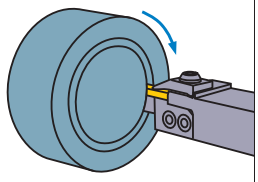


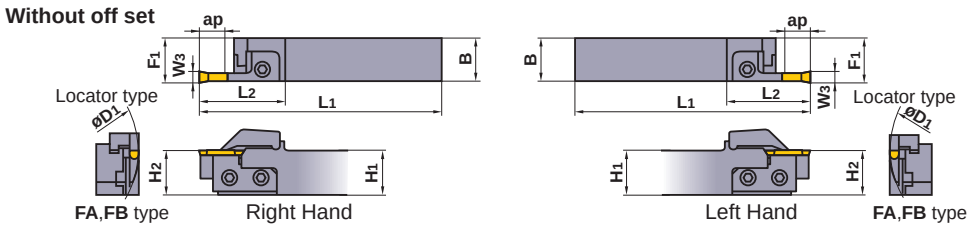
(Note) The conditions above were used to machine JIS S45C at vc=120m/min. Wet cutting is recommended.

DG HOLDER

- Clamp-on type
- Groove width 3−8mm

6 Face grooving standard type holder



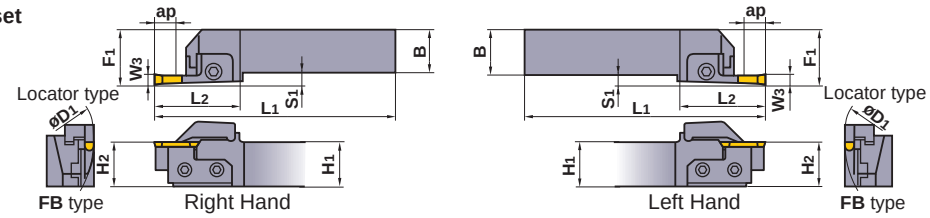


Pack					Component			Range of Cutting Diameter ϕD1 ✶3 (mm)	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm)						
Pack Order Number ✶1			Stock R	Stock L	Holder	Locator	Clamp Bridge				H1	B	L1	L2	H2	F1	S1
Without Off Set	FA type	H2300R/L	●	●	DGHR/L2020K	FA3R/L0	DGK5R/L	20 — 50	3	6	20	20	125	40	20	19.2	—
		H2302R/L	●	●	DGHR/L2020K	FA3R/L2	DGK5R/L	40 — 100	3	6	20	20	125	40	20	19.2	—
		H2304R/L	●	●	DGHR/L2020K	FA3R/L4	DGK5R/L	100 — 250	3	6	20	20	125	40	20	19.2	—
		H2400R/L	●	●	DGHR/L2020K	FA4R/L0	DGK5R/L	20 — 50	4	6	20	20	125	40	20	19.7	—
		H2402R/L	●	●	DGHR/L2020K	FA4R/L2	DGK5R/L	40 — 100	4	6	20	20	125	40	20	19.7	—
		H2404R/L	●	●	DGHR/L2020K	FA4R/L4	DGK5R/L	100 — 250	4	6	20	20	125	40	20	19.7	—
	FB type	H3300R/L	●	●	DGHR/L2525M	FB3R/L0	DGK5R/L	20 — 50	3	6	25	25	150	40	25	24.2	—
		H3302R/L	●	●	DGHR/L2525M	FB3R/L2	DGK5R/L	40 — 100	3	6	25	25	150	40	25	24.2	—
		H3304R/L	●	●	DGHR/L2525M	FB3R/L4	DGK5R/L	100 — 250	3	6	25	25	150	40	25	24.2	—
		H3400R/L	●	●	DGHR/L2525M	FB4R/L0	DGK5R/L	20 — 50	4	6	25	25	150	40	25	24.7	—
		H3402R/L	●	●	DGHR/L2525M	FB4R/L2	DGK5R/L	40 — 100	4	6	25	25	150	40	25	24.7	—
		H3404R/L	●	●	DGHR/L2525M	FB4R/L4	DGK5R/L	100 — 250	4	6	25	25	150	40	25	24.7	—
		✶2 H3502R/L	●	●	DGHR/L2525M	FB5R/L2	DGK5R/L	50 — 100	5	10	25	25	150	40	25	25.2	—
		✶2 H3504R/L	●	●	DGHR/L2525M	FB5R/L4	DGK5R/L	100 — ∞	5	10	25	25	150	40	25	25.2	—
		✶2 H4502R/L	●	●	DGHR/L2525M	FB5R/L2D	DGK5R/L	50 — 100	5	16	25	25	150	40	25	25.2	—
		✶2 H4504R/L	●	●	DGHR/L2525M	FB5R/L4D	DGK5R/L	100 — ∞	5	16	25	25	150	40	25	25.2	—
		✶2 H3602R/L	●	●	DGHR/L2525M	FB6R/L2	DGK6R/L	50 — 100	6	10	25	25	150	40	25	25.2	—
		✶2 H3604R/L	●	●	DGHR/L2525M	FB6R/L4	DGK6R/L	100 — ∞	6	10	25	25	150	40	25	25.2	—
		✶2 H4602R/L	●	●	DGHR/L2525M	FB6R/L2D	DGK6R/L	50 — 100	6	16	25	25	150	40	25	25.2	—
		✶2 H4604R/L	●	●	DGHR/L2525M	FB6R/L4D	DGK6R/L	100 — ∞	6	16	25	25	150	40	25	25.2	—
		H3702R/L	●	●	DGHR/L2525M	FB7R/L2	DGK7R/L	50 — 100	7	10	25	25	150	40	25	25.2	—
		H3704R/L	●	●	DGHR/L2525M	FB7R/L4	DGK7R/L	100 — ∞	7	10	25	25	150	40	25	25.2	—
		H4702R/L	●	●	DGHR/L2525M	FB7R/L2D	DGK7R/L	50 — 100	7	16	25	25	150	40	25	25.2	—
		H4704R/L	●	●	DGHR/L2525M	FB7R/L4D	DGK7R/L	100 — ∞	7	16	25	25	150	40	25	25.2	—
		H3802R/L	●	●	DGHR/L2525M	FB8R/L2	DGK8R/L	50 — 100	8	10	25	25	150	40	25	25.2	—
		H3804R/L	●	●	DGHR/L2525M	FB8R/L4	DGK8R/L	100 — ∞	8	10	25	25	150	40	25	25.2	—
		H4802R/L	●	●	DGHR/L2525M	FB8R/L2D	DGK8R/L	50 — 100	8	16	25	25	150	40	25	25.2	—
		H4804R/L	●	●	DGHR/L2525M	FB8R/L4D	DGK8R/L	100 — ∞	8	16	25	25	150	40	25	25.2	—
With Off Set	FB type	M3300R/L	●	●	DGHR/L2525MF	FB3R/L0	DGK5R/L	20 — 50	3	6	25	25	150	40	25	31	6
		M3302R/L	●	●	DGHR/L2525MF	FB3R/L2	DGK5R/L	40 — 100	3	6	25	25	150	40	25	31	6
		M3304R/L	●	●	DGHR/L2525MF	FB3R/L4	DGK5R/L	100 — 250	3	6	25	25	150	40	25	31	6
		M3400R/L	●	●	DGHR/L2525MF	FB4R/L0	DGK5R/L	20 — 50	4	6	25	25	150	40	25	31.5	6.5
		M3402R/L	●	●	DGHR/L2525MF	FB4R/L2	DGK5R/L	40 — 100	4	6	25	25	150	40	25	31.5	6.5
		M3404R/L	●	●	DGHR/L2525MF	FB4R/L4	DGK5R/L	100 — 250	4	6	25	25	150	40	25	31.5	6.5
		✶2 M3502R/L	●	●	DGHR/L2525MF	FB5R/L2	DGK5R/L	50 — 100	5	10	25	25	150	40	25	32	7
		✶2 M3504R/L	●	●	DGHR/L2525MF	FB5R/L4	DGK5R/L	100 — ∞	5	10	25	25	150	40	25	32	7
		✶2 M4502R/L	●	●	DGHR/L2525MF	FB5R/L2D	DGK5R/L	50 — 100	5	16	25	25	150	40	25	32	7
		✶2 M4504R/L	●	●	DGHR/L2525MF	FB5R/L4D	DGK5R/L	100 — ∞	5	16	25	25	150	40	25	32	7
		✶2 M3602R/L	●	●	DGHR/L2525MF	FB6R/L2	DGK6R/L	50 — 100	6	10	25	25	150	40	25	32	7
		✶2 M3604R/L	●	●	DGHR/L2525MF	FB6R/L4	DGK6R/L	100 — ∞	6	10	25	25	150	40	25	32	7
		✶2 M4602R/L	●	●	DGHR/L2525MF	FB6R/L2D	DGK6R/L	50 — 100	6	16	25	25	150	40	25	32	7
		✶2 M4604R/L	●	●	DGHR/L2525MF	FB6R/L4D	DGK6R/L	100 — ∞	6	16	25	25	150	40	25	32	7
		M3702R/L	●	●	DGHR/L2525MF	FB7R/L2	DGK7R/L	50 — 100	7	10	25	25	150	40	25	32	7
		M3704R/L	●	●	DGHR/L2525MF	FB7R/L4	DGK7R/L	100 — ∞	7	10	25	25	150	40	25	32	7
		M4702R/L	●	●	DGHR/L2525MF	FB7R/L2D	DGK7R/L	50 — 100	7	16	25	25	150	40	25	32	7
		M4704R/L	●	●	DGHR/L2525MF	FB7R/L4D	DGK7R/L	100 — ∞	7	16	25	25	150	40	25	32	7
		M3802R/L	●	●	DGHR/L2525MF	FB8R/L2	DGK8R/L	50 — 100	8	10	25	25	150	40	25	32	7
		M3804R/L	●	●	DGHR/L2525MF	FB8R/L4	DGK8R/L	100 — ∞	8	10	25	25	150	40	25	32	7
		M4802R/L	●	●	DGHR/L2525MF	FB8R/L2D	DGK8R/L	50 — 100	8	16	25	25	150	40	25	32	7
		M4804R/L	●	●	DGHR/L2525MF	FB8R/L4D	DGK8R/L	100 — ∞	8	16	25	25	150	40	25	32	7

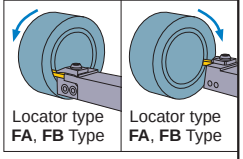
(Note) Please set right hand parts for right hand holder and left hand parts for left hand holder.

● : Inventory maintained in Japan.

With off set



Right Hand (R)	Left Hand (L)
Clockwise	Anticlockwise



	Insert Number	Insert Shape
	DGJ30CFS	⁎4
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ30CFS	
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ30CFS	⁎4
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	

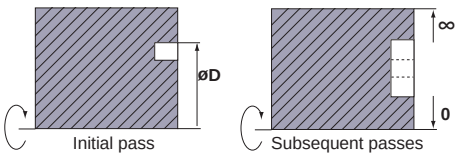
SPARE PARTS

Tool Holder Number		Locator Screw ⁎	Clamp Screw ⁎	Spring	Wrench
Without Off Set	**DGHR/L2020K**	HSC04014	DGS51	MES2	HKY30R HKY40R
Without Off Set	**DGHR/L2525M**	HSC05012	DGS51	MES2	HKY40R
With Off Set	**DGHR/L2525MF**	HSC05012	DGS51	MES2	HKY40R

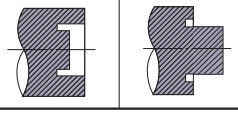
⁎ Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

⁎REFERENCE DATA

⁎1	The order pack number includes a holder, locators and clamp screws. (Refer to the list above.) To order the parts separately, please refer to their description.
⁎2	Compatible with standard type holder for face grooving and copying.
⁎3	The table above shows maximum and minimum achievable diameters for initial cut when face recessing.
⁎4	Operational guidance for a facing tool holder. Inserts of ⁎4 are not suited to machine the two forms shown due to collision problems.



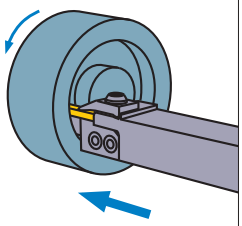
Internal Obstacle	External Obstacle

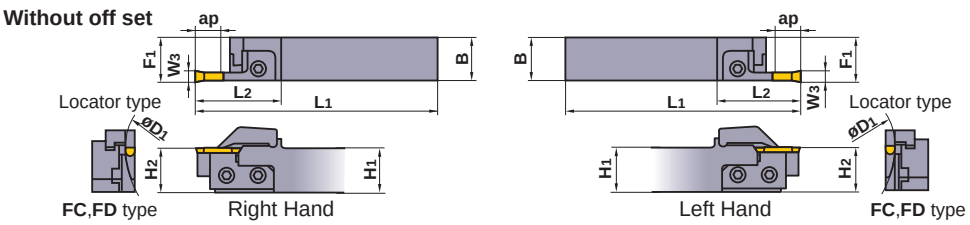


DG HOLDER

- Clamp-on type
- Groove width 3−8mm

6 Face grooving standard type holder



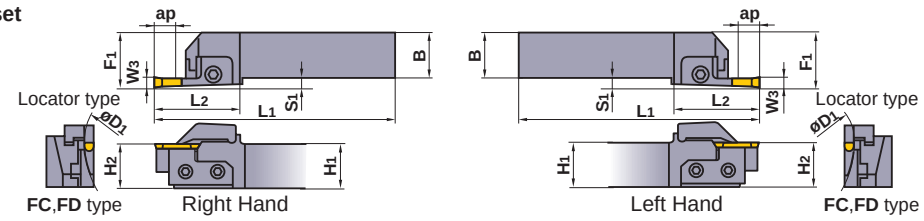


Pack				Component			Range of Cutting Diameter ϕD1 ✶3 (mm)	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm)						
Pack Order Number ✶1		Stock R	Stock L	Holder	Locator	Clamp Bridge				H1	B	L1	L2	H2	F1	S1
Without Off Set / FC type																
J2300R/L		●	●	DGHR/L2020K	FC3R/L0	DGK5R/L	20 — 50	3	6	20	20	125	40	20	19.2	—
J2302R/L		●	●	DGHR/L2020K	FC3R/L2	DGK5R/L	40 — 100	3	6	20	20	125	40	20	19.2	—
J2304R/L		●	●	DGHR/L2020K	FC3R/L4	DGK5R/L	100 — 250	3	6	20	20	125	40	20	19.2	—
J2400R/L		●	●	DGHR/L2020K	FC4R/L0	DGK5R/L	20 — 50	4	6	20	20	125	40	20	19.7	—
J2402R/L		●	●	DGHR/L2020K	FC4R/L2	DGK5R/L	40 — 100	4	6	20	20	125	40	20	19.7	—
J2404R/L		●	●	DGHR/L2020K	FC4R/L4	DGK5R/L	100 — 250	4	6	20	20	125	40	20	19.7	—
Without Off Set / FD type																
J3300R/L		●	●	DGHR/L2525M	FD3R/L0	DGK5R/L	20 — 50	3	6	25	25	150	40	25	24.2	—
J3302R/L		●	●	DGHR/L2525M	FD3R/L2	DGK5R/L	40 — 100	3	6	25	25	150	40	25	24.2	—
J3304R/L		●	●	DGHR/L2525M	FD3R/L4	DGK5R/L	100 — 250	3	6	25	25	150	40	25	24.2	—
J3400R/L		●	●	DGHR/L2525M	FD4R/L0	DGK5R/L	20 — 50	4	6	25	25	150	40	25	24.7	—
J3402R/L		●	●	DGHR/L2525M	FD4R/L2	DGK5R/L	40 — 100	4	6	25	25	150	40	25	24.7	—
J3404R/L		●	●	DGHR/L2525M	FD4R/L4	DGK5R/L	100 — 250	4	6	25	25	150	40	25	24.7	—
✶2 J3502R/L		●	●	DGHR/L2525M	FD5R/L2	DGK5R/L	50 — 100	5	10	25	25	150	40	25	25.2	—
✶2 J3504R/L		●	●	DGHR/L2525M	FD5R/L4	DGK5R/L	100 — ∞	5	10	25	25	150	40	25	25.2	—
✶2 J4502R/L		●	●	DGHR/L2525M	FD5R/L2D	DGK5R/L	50 — 100	5	16	25	25	150	40	25	25.2	—
✶2 J4504R/L		●	●	DGHR/L2525M	FD5R/L4D	DGK5R/L	100 — ∞	5	16	25	25	150	40	25	25.2	—
✶2 J3602R/L		●	●	DGHR/L2525M	FD6R/L2	DGK6R/L	50 — 100	6	10	25	25	150	40	25	25.2	—
✶2 J3604R/L		●	●	DGHR/L2525M	FD6R/L4	DGK6R/L	100 — ∞	6	10	25	25	150	40	25	25.2	—
✶2 J4602R/L		●	●	DGHR/L2525M	FD6R/L2D	DGK6R/L	50 — 100	6	16	25	25	150	40	25	25.2	—
✶2 J4604R/L		●	●	DGHR/L2525M	FD6R/L4D	DGK6R/L	100 — ∞	6	16	25	25	150	40	25	25.2	—
J3702R/L		●	●	DGHR/L2525M	FD7R/L2	DGK7R/L	50 — 100	7	10	25	25	150	40	25	25.2	—
J3704R/L		●	●	DGHR/L2525M	FD7R/L4	DGK7R/L	100 — ∞	7	10	25	25	150	40	25	25.2	—
J4702R/L		●	●	DGHR/L2525M	FD7R/L2D	DGK7R/L	50 — 100	7	16	25	25	150	40	25	25.2	—
J4704R/L		●	●	DGHR/L2525M	FD7R/L4D	DGK7R/L	100 — ∞	7	16	25	25	150	40	25	25.2	—
J3802R/L		●	●	DGHR/L2525M	FD8R/L2	DGK8R/L	50 — 100	8	10	25	25	150	40	25	25.2	—
J3804R/L		●	●	DGHR/L2525M	FD8R/L4	DGK8R/L	100 — ∞	8	10	25	25	150	40	25	25.2	—
J4802R/L		●	●	DGHR/L2525M	FD8R/L2D	DGK8R/L	50 — 100	8	16	25	25	150	40	25	25.2	—
J4804R/L		●	●	DGHR/L2525M	FD8R/L4D	DGK8R/L	100 — ∞	8	16	25	25	150	40	25	25.2	—
With Off Set / FD type																
N3300R/L		●	●	DGHR/L2525MF	FD3R/L0	DGK5R/L	20 — 50	3	6	25	25	150	40	25	31	6
N3302R/L		●	●	DGHR/L2525MF	FD3R/L2	DGK5R/L	40 — 100	3	6	25	25	150	40	25	31	6
N3304R/L		●	●	DGHR/L2525MF	FD3R/L4	DGK5R/L	100 — 250	3	6	25	25	150	40	25	31	6
N3400R/L		●	●	DGHR/L2525MF	FD4R/L0	DGK5R/L	20 — 50	4	6	25	25	150	40	25	31.5	6.5
N3402R/L		●	●	DGHR/L2525MF	FD4R/L2	DGK5R/L	40 — 100	4	6	25	25	150	40	25	31.5	6.5
N3404R/L		●	●	DGHR/L2525MF	FD4R/L4	DGK5R/L	100 — 250	4	6	25	25	150	40	25	31.5	6.5
✶2 N3502R/L		●	●	DGHR/L2525MF	FD5R/L2	DGK5R/L	50 — 100	5	10	25	25	150	40	25	32	7
✶2 N3504R/L		●	●	DGHR/L2525MF	FD5R/L4	DGK5R/L	100 — ∞	5	10	25	25	150	40	25	32	7
✶2 N4502R/L		●	●	DGHR/L2525MF	FD5R/L2D	DGK5R/L	50 — 100	5	16	25	25	150	40	25	32	7
✶2 N4504R/L		●	●	DGHR/L2525MF	FD5R/L4D	DGK5R/L	100 — ∞	5	16	25	25	150	40	25	32	7
✶2 N3602R/L		●	●	DGHR/L2525MF	FD6R/L2	DGK6R/L	50 — 100	6	10	25	25	150	40	25	32	7
✶2 N3604R/L		●	●	DGHR/L2525MF	FD6R/L4	DGK6R/L	100 — ∞	6	10	25	25	150	40	25	32	7
✶2 N4602R/L		●	●	DGHR/L2525MF	FD6R/L2D	DGK6R/L	50 — 100	6	16	25	25	150	40	25	32	7
✶2 N4604R/L		●	●	DGHR/L2525MF	FD6R/L4D	DGK6R/L	100 — ∞	6	16	25	25	150	40	25	32	7
N3702R/L		●	●	DGHR/L2525MF	FD7R/L2	DGK7R/L	50 — 100	7	10	25	25	150	40	25	32	7
N3704R/L		●	●	DGHR/L2525MF	FD7R/L4	DGK7R/L	100 — ∞	7	10	25	25	150	40	25	32	7
N4702R/L		●	●	DGHR/L2525MF	FD7R/L2D	DGK7R/L	50 — 100	7	16	25	25	150	40	25	32	7
N4704R/L		●	●	DGHR/L2525MF	FD7R/L4D	DGK7R/L	100 — ∞	7	16	25	25	150	40	25	32	7
N3802R/L		●	●	DGHR/L2525MF	FD8R/L2	DGK8R/L	50 — 100	8	10	25	25	150	40	25	32	7
N3804R/L		●	●	DGHR/L2525MF	FD8R/L4	DGK8R/L	100 — ∞	8	10	25	25	150	40	25	32	7
N4802R/L		●	●	DGHR/L2525MF	FD8R/L2D	DGK8R/L	50 — 100	8	16	25	25	150	40	25	32	7
N4804R/L		●	●	DGHR/L2525MF	FD8R/L4D	DGK8R/L	100 — ∞	8	16	25	25	150	40	25	32	7

(Note) Please set right hand parts for right hand holder and left hand parts for left hand holder.

● : Inventory maintained in Japan.

With off set



Right Hand (R)	Left Hand (L)
Anticlockwise	Clockwise
Locator type **FC**, **FD** Type	Locator type **FC**, **FD** Type

	Insert Number	Insert Shape
	DGJ30CFS	⁎4
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ30CFS	
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ30CFS	⁎4
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	

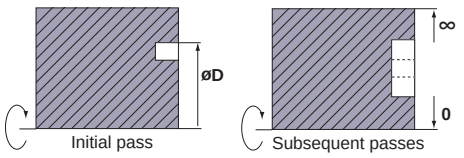
SPARE PARTS

	Tool Holder Number	Locator Screw ⁎	Clamp Screw ⁎	Spring	Wrench
Without Off Set	**DGHR/L2020K**	HSC04014	DGS51	MES2	HKY30R HKY40R
Without Off Set	**DGHR/L2525M**	HSC05012	DGS51	MES2	HKY40R
With Off Set	**DGHR/L2525MF**	HSC05012	DGS51	MES2	HKY40R

⁎ Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

⁎REFERENCE DATA

⁎1	The order pack number includes a holder, locators and clamp screws. (Refer to the list above.) To order the parts separately, please refer to their description.
⁎2	Compatible with standard type holder for face grooving and copying.
⁎3	The table above shows maximum and minimum achievable diameters for initial cut when face recessing.
⁎4	Operational guidance for a facing tool holder. Inserts of ⁎4 are not suited to machine the two forms shown due to collision problems.

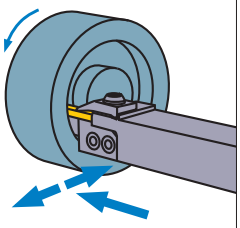


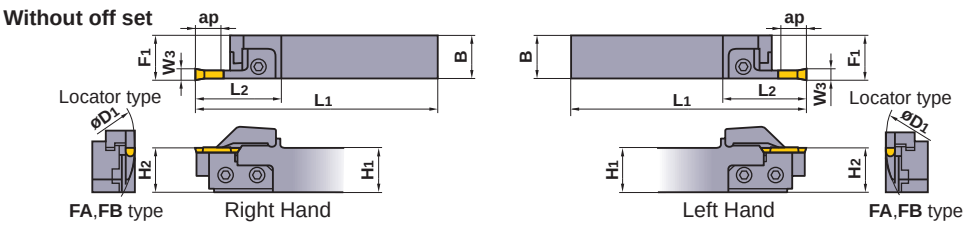
Internal Obstacle	External Obstacle

DG HOLDER

- Clamp-on type
- Groove width 3−6mm

7 Face grooving, Copying standard type holder



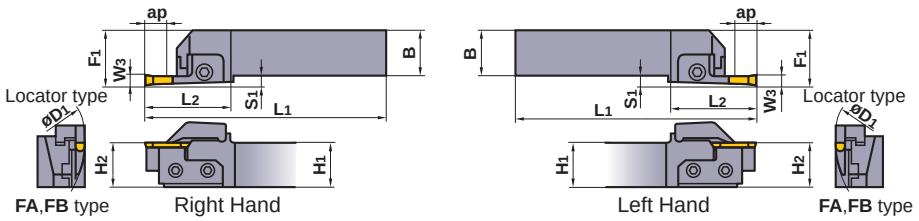


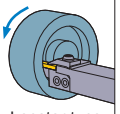
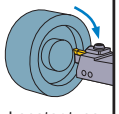
Pack					Component			Range of Cutting Diameter ØD1 ✶3 (mm)	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm)						
		Pack Order Number ✶1	Stock R	Stock L	Holder	Locator	Clamp Bridge				H1	B	L1	L2	H2	F1	S1
Without Off Set	FA type	K2302R/L	●	●	DGHR/L2020KS	FA3R/L2S	DGK3R/L	40 − 100	3	6	20	20	125	38	20	20.2	−
		K2304R/L	●	●	DGHR/L2020KS	FA3R/L4S	DGK3R/L	100 − 250	3	6	20	20	125	38	20	20.2	−
		K2402R/L	●	●	DGHR/L2020KS	FA4R/L2S	DGK4R/L	40 − 100	4	6	20	20	125	38	20	20.2	−
		K2404R/L	●	●	DGHR/L2020KS	FA4R/L4S	DGK4R/L	100 − 250	4	6	20	20	125	38	20	20.2	−
	FB type	K3302R/L	●	●	DGHR/L2525MS	FB3R/L2S	DGK3R/L	40 − 100	3	6	25	25	150	38	25	25.2	−
		K3304R/L	●	●	DGHR/L2525MS	FB3R/L4S	DGK3R/L	100 − 250	3	6	25	25	150	38	25	25.2	−
		K3402R/L	●	●	DGHR/L2525MS	FB4R/L2S	DGK4R/L	40 − 100	4	6	25	25	150	38	25	25.2	−
		K3404R/L	●	●	DGHR/L2525MS	FB4R/L4S	DGK4R/L	100 − 250	4	6	25	25	150	38	25	25.2	−
		✶2 H3502R/L	●	●	DGHR/L2525M	FB5R/L2	DGK5R/L	50 − 100	5	10	25	25	150	40	25	25.2	−
		✶2 H3504R/L	●	●	DGHR/L2525M	FB5R/L4	DGK5R/L	100 − ∞	5	10	25	25	150	40	25	25.2	−
		✶2 H4502R/L	●	●	DGHR/L2525M	FB5R/L2D	DGK5R/L	50 − 100	5	16	25	25	150	40	25	25.2	−
		✶2 H4504R/L	●	●	DGHR/L2525M	FB5R/L4D	DGK5R/L	100 − ∞	5	16	25	25	150	40	25	25.2	−
		✶2 H3602R/L	●	●	DGHR/L2525M	FB6R/L2	DGK6R/L	50 − 100	6	10	25	25	150	40	25	25.2	−
		✶2 H3604R/L	●	●	DGHR/L2525M	FB6R/L4	DGK6R/L	100 − ∞	6	10	25	25	150	40	25	25.2	−
		✶2 H4602R/L	●	●	DGHR/L2525M	FB6R/L2D	DGK6R/L	50 − 100	6	16	25	25	150	40	25	25.2	−
		✶2 H4604R/L	●	●	DGHR/L2525M	FB6R/L4D	DGK6R/L	100 − ∞	6	16	25	25	150	40	25	25.2	−
With Off Set	FA type	P2302R/L	●	●	DGHR/L2020KFS	FA3R/L2S	DGK3R/L	40 − 100	3	6	20	20	125	38	20	25	5
		P2304R/L	●	●	DGHR/L2020KFS	FA3R/L4S	DGK3R/L	100 − 250	3	6	20	20	125	38	20	25	5
		P2402R/L	●	●	DGHR/L2020KFS	FA4R/L2S	DGK4R/L	40 − 100	4	6	20	20	125	38	20	25	5
		P2404R/L	●	●	DGHR/L2020KFS	FA4R/L4S	DGK4R/L	100 − 250	4	6	20	20	125	38	20	25	5
	FB type	P3302R/L	●	●	DGHR/L2525MFS	FB3R/L2S	DGK3R/L	40 − 100	3	6	25	25	150	38	25	32	7
		P3304R/L	●	●	DGHR/L2525MFS	FB3R/L4S	DGK3R/L	100 − 250	3	6	25	25	150	38	25	32	7
		P3402R/L	●	●	DGHR/L2525MFS	FB4R/L2S	DGK4R/L	40 − 100	4	6	25	25	150	38	25	32	7
		P3404R/L	●	●	DGHR/L2525MFS	FB4R/L4S	DGK4R/L	100 − 250	4	6	25	25	150	38	25	32	7
		✶2 M3502R/L	●	●	DGHR/L2525MF	FB5R/L2	DGK5R/L	50 − 100	5	10	25	25	150	40	25	32	7
		✶2 M3504R/L	●	●	DGHR/L2525MF	FB5R/L4	DGK5R/L	100 − ∞	5	10	25	25	150	40	25	32	7
		✶2 M4502R/L	●	●	DGHR/L2525MF	FB5R/L2D	DGK5R/L	50 − 100	5	16	25	25	150	40	25	32	7
		✶2 M4504R/L	●	●	DGHR/L2525MF	FB5R/L4D	DGK5R/L	100 − ∞	5	16	25	25	150	40	25	32	7
		✶2 M3602R/L	●	●	DGHR/L2525MF	FB6R/L2	DGK6R/L	50 − 100	6	10	25	25	150	40	25	32	7
		✶2 M3604R/L	●	●	DGHR/L2525MF	FB6R/L4	DGK6R/L	100 − ∞	6	10	25	25	150	40	25	32	7
		✶2 M4602R/L	●	●	DGHR/L2525MF	FB6R/L2D	DGK6R/L	50 − 100	6	16	25	25	150	40	25	32	7
		✶2 M4604R/L	●	●	DGHR/L2525MF	FB6R/L4D	DGK6R/L	100 − ∞	6	16	25	25	150	40	25	32	7

(Note) Please set right hand parts for right hand holder and left hand parts for left hand holder.

● : Inventory maintained in Japan.

With off set



Right Hand (R)	Left Hand (L)
Clockwise	Anticlockwise
 Locator type **FA**, **FB** Type	 Locator type **FA**, **FB** Type

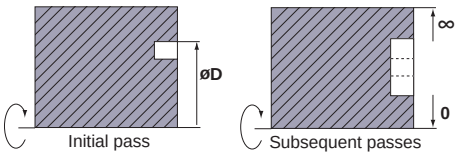
	Insert Number	Insert Shape
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	

SPARE PARTS

	Tool Holder Number	* Locator Screw	* Clamp Screw	Spring	Wrench
Without Off Set	**DGHR/L2020KS**	HSC04014	DGS51	MES2	HKY30R HKY40R
	DGHR/L2525MS	HSC05012			HKY40R
	DGHR/L2525M				
With Off Set	**DGHR/L2020KFS**	HSC04014	DGS51	MES2	HKY30R HKY40R
	DGHR/L2525MFS	HSC05012			HKY40R
	DGHR/L2525MF				

* Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

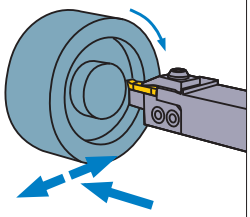
*REFERENCE DATA

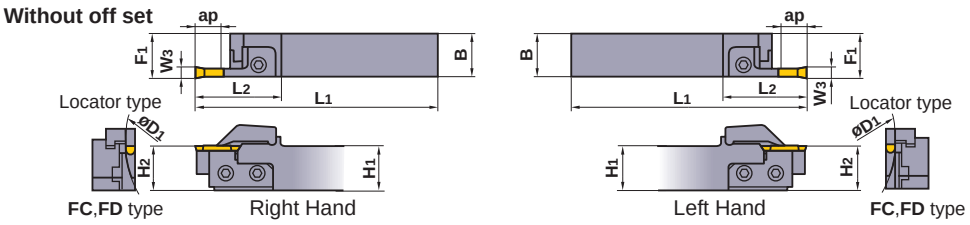
*1	The order pack number includes a holder, locators and clamp screws. (Refer to the list above.) To order the parts separately, please refer to their description.
*2	Compatible with standard type holder for face grooving and copying.
*3	The table above shows maximum and minimum achievable diameters for initial cut when face recessing. 

DG HOLDER

- Clamp-on type
- Groove width 3−6mm

7 Face grooving, Copying standard type holder



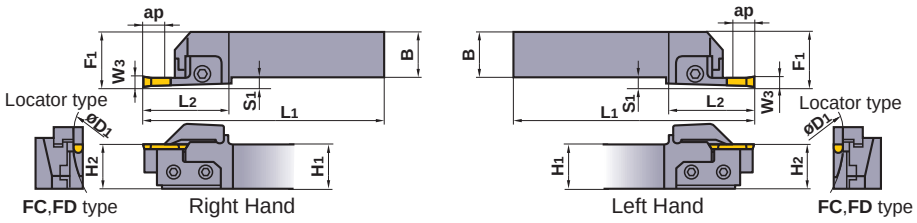


Pack					Component			Range of Cutting Diameter ϕD1 ✶3 (mm)	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm)						
Pack Order Number ✶1			Stock R	Stock L	Holder	Locator	Clamp Bridge				H1	B	L1	L2	H2	F1	S1
Without Off Set	FC type	L2302R/L	●	●	DGHR/L2020KS	FC3R/L2S	DGK3R/L	40 — 100	3	6	20	20	125	38	20	20.2	—
		L2304R/L	●	●	DGHR/L2020KS	FC3R/L4S	DGK3R/L	100 — 250	3	6	20	20	125	38	20	20.2	—
		L2402R/L	●	●	DGHR/L2020KS	FC4R/L2S	DGK4R/L	40 — 100	4	6	20	20	125	38	20	20.2	—
		L2404R/L	●	●	DGHR/L2020KS	FC4R/L4S	DGK4R/L	100 — 250	4	6	20	20	125	38	20	20.2	—
	FD type	L3302R/L	●	●	DGHR/L2525MS	FD3R/L2S	DGK3R/L	40 — 100	3	6	25	25	150	38	25	25.2	—
		L3304R/L	●	●	DGHR/L2525MS	FD3R/L4S	DGK3R/L	100 — 250	3	6	25	25	150	38	25	25.2	—
		L3402R/L	●	●	DGHR/L2525MS	FD4R/L2S	DGK4R/L	40 — 100	4	6	25	25	150	38	25	25.2	—
		L3404R/L	●	●	DGHR/L2525MS	FD4R/L4S	DGK4R/L	100 — 250	4	6	25	25	150	38	25	25.2	—
		✶2 J3502R/L	●	●	DGHR/L2525M	FD5R/L2	DGK5R/L	50 — 100	5	10	25	25	150	40	25	25.2	—
		✶2 J3504R/L	●	●	DGHR/L2525M	FD5R/L4	DGK5R/L	100 — ∞	5	10	25	25	150	40	25	25.2	—
		✶2 J4502R/L	●	●	DGHR/L2525M	FD5R/L2D	DGK5R/L	50 — 100	5	16	25	25	150	40	25	25.2	—
		✶2 J4504R/L	●	●	DGHR/L2525M	FD5R/L4D	DGK5R/L	100 — ∞	5	16	25	25	150	40	25	25.2	—
		✶2 J3602R/L	●	●	DGHR/L2525M	FD6R/L2	DGK6R/L	50 — 100	6	10	25	25	150	40	25	25.2	—
		✶2 J3604R/L	●	●	DGHR/L2525M	FD6R/L4	DGK6R/L	100 — ∞	6	10	25	25	150	40	25	25.2	—
		✶2 J4602R/L	●	●	DGHR/L2525M	FD6R/L2D	DGK6R/L	50 — 100	6	16	25	25	150	40	25	25.2	—
		✶2 J4604R/L	●	●	DGHR/L2525M	FD6R/L4D	DGK6R/L	100 — ∞	6	16	25	25	150	40	25	25.2	—
With Off Set	FC type	Q2302R/L	●	●	DGHR/L2020KFS	FC3R/L2S	DGK3R/L	40 — 100	3	6	20	20	125	38	20	25	5
		Q2304R/L	●	●	DGHR/L2020KFS	FC3R/L4S	DGK3R/L	100 — 250	3	6	20	20	125	38	20	25	5
		Q2402R/L	●	●	DGHR/L2020KFS	FC4R/L2S	DGK4R/L	40 — 100	4	6	20	20	125	38	20	25	5
		Q2404R/L	●	●	DGHR/L2020KFS	FC4R/L4S	DGK4R/L	100 — 250	4	6	20	20	125	38	20	25	5
	FD type	Q3302R/L	●	●	DGHR/L2525MFS	FD3R/L2S	DGK3R/L	40 — 100	3	6	25	25	150	38	25	32	7
		Q3304R/L	●	●	DGHR/L2525MFS	FD3R/L4S	DGK3R/L	100 — 250	3	6	25	25	150	38	25	32	7
		Q3402R/L	●	●	DGHR/L2525MFS	FD4R/L2S	DGK4R/L	40 — 100	4	6	25	25	150	38	25	32	7
		Q3404R/L	●	●	DGHR/L2525MFS	FD4R/L4S	DGK4R/L	100 — 250	4	6	25	25	150	38	25	32	7
		✶2 N3502R/L	●	●	DGHR/L2525MF	FD5R/L2	DGK5R/L	50 — 100	5	10	25	25	150	40	25	32	7
		✶2 N3504R/L	●	●	DGHR/L2525MF	FD5R/L4	DGK5R/L	100 — ∞	5	10	25	25	150	40	25	32	7
		✶2 N4502R/L	●	●	DGHR/L2525MF	FD5R/L2D	DGK5R/L	50 — 100	5	16	25	25	150	40	25	32	7
		✶2 N4504R/L	●	●	DGHR/L2525MF	FD5R/L4D	DGK5R/L	100 — ∞	5	16	25	25	150	40	25	32	7
		✶2 N3602R/L	●	●	DGHR/L2525MF	FD6R/L2	DGK6R/L	50 — 100	6	10	25	25	150	40	25	32	7
		✶2 N3604R/L	●	●	DGHR/L2525MF	FD6R/L4	DGK6R/L	100 — ∞	6	10	25	25	150	40	25	32	7
		✶2 N4602R/L	●	●	DGHR/L2525MF	FD6R/L2D	DGK6R/L	50 — 100	6	16	25	25	150	40	25	32	7
		✶2 N4604R/L	●	●	DGHR/L2525MF	FD6R/L4D	DGK6R/L	100 — ∞	6	16	25	25	150	40	25	32	7

(Note) Please set right hand parts for right hand holder and left hand parts for left hand holder.

● : Inventory maintained in Japan.

With off set



Right Hand (R)	Left Hand (L)
Anticlockwise	Clockwise
Locator type **FC,FD** Type	Locator type **FC,FD** Type

	Insert Number	Insert Shape
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
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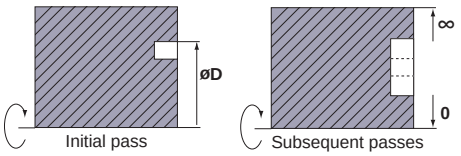
	DGM40CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	

SPARE PARTS

	Tool Holder Number	* Locator Screw	* Clamp Screw	Spring	Wrench
Without Off Set	**DGHR/L2020KS**	HSC04014	DGS51	MES2	HKY30R HKY40R
	DGHR/L2525MS	HSC05012			HKY40R
	DGHR/L2525M				
With Off Set	**DGHR/L2020KFS**	HSC04014	DGS51	MES2	HKY30R HKY40R
	DGHR/L2525MFS	HSC05012			HKY40R
	DGHR/L2525MF				

* Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

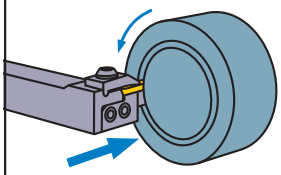
*REFERENCE DATA

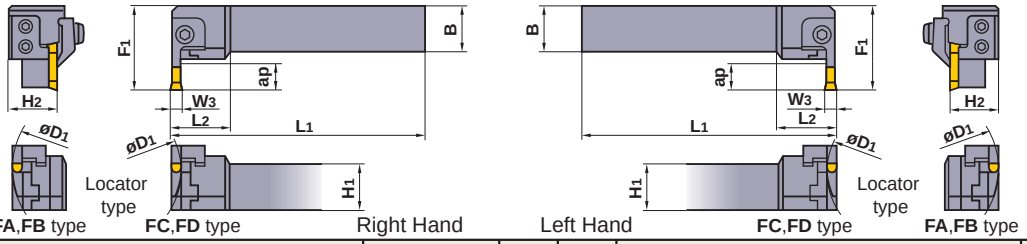
*1	The order pack number includes a holder, locators and clamp screws. (Refer to the list above.) To order the parts separately, please refer to their description.
*2	Compatible with standard type holder for face grooving.
*3	The table above shows maximum and minimum achievable diameters for initial cut when face recessing. 

DG HOLDER

- Clamp-on type
- Groove width 3—8mm

8 Face grooving L type holder

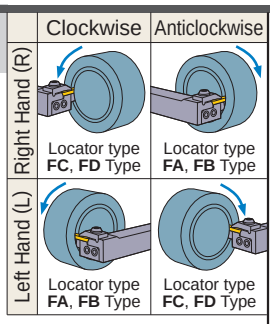




Pack				Component			Range of Cutting Diameter ϕD1 ✶3 (mm)	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm)					
	Pack Order Number ✶1	Stock R	Stock L	Holder	Locator	Clamp Bridge				H1	B	L1	L2	H2	F1
FA type	R2300R/L	●	●	DGHR/L2020KL	FA3L/R0	DGK5L/R	20 — 50	3	6	20	20	124	24	20	45
	R2302R/L	●	●	DGHR/L2020KL	FA3L/R2	DGK5L/R	40 — 100	3	6	20	20	124	24	20	45
	R2304R/L	●	●	DGHR/L2020KL	FA3L/R4	DGK5L/R	100 — 250	3	6	20	20	124	24	20	45
	R2400R/L	●	●	DGHR/L2020KL	FA4L/R0	DGK5L/R	20 — 50	4	6	20	20	124.5	24.5	20	45
	R2402R/L	●	●	DGHR/L2020KL	FA4L/R2	DGK5L/R	40 — 100	4	6	20	20	124.5	24.5	20	45
	R2404R/L	●	●	DGHR/L2020KL	FA4L/R4	DGK5L/R	100 — 250	4	6	20	20	124.5	24.5	20	45
FB type	R3300R/L	●	●	DGHR/L2525ML	FB3L/R0	DGK5L/R	20 — 50	3	6	25	25	149	24	25	45
	R3302R/L	●	●	DGHR/L2525ML	FB3L/R2	DGK5L/R	40 — 100	3	6	25	25	149	24	25	45
	R3304R/L	●	●	DGHR/L2525ML	FB3L/R4	DGK5L/R	100 — 250	3	6	25	25	149	24	25	45
	R3400R/L	●	●	DGHR/L2525ML	FB4L/R0	DGK5L/R	20 — 50	4	6	25	25	149.5	24.5	25	45
	R3402R/L	●	●	DGHR/L2525ML	FB4L/R2	DGK5L/R	40 — 100	4	6	25	25	149.5	24.5	25	45
	R3404R/L	●	●	DGHR/L2525ML	FB4L/R4	DGK5L/R	100 — 250	4	6	25	25	149.5	24.5	25	45
✶2	R3502R/L	●	●	DGHR/L2525ML	FB5L/R2	DGK5L/R	50 — 100	5	10	25	25	150	25	25	45
✶2	R3504R/L	●	●	DGHR/L2525ML	FB5L/R4	DGK5L/R	100 — ∞	5	10	25	25	150	25	25	45
✶2	R4502R/L	●	●	DGHR/L2525ML	FB5L/R2D	DGK5L/R	50 — 100	5	16	25	25	150	25	25	45
✶2	R4504R/L	●	●	DGHR/L2525ML	FB5L/R4D	DGK5L/R	100 — ∞	5	16	25	25	150	25	25	45
✶2	R3602R/L	●	●	DGHR/L2525ML	FB6L/R2	DGK6L/R	50 — 100	6	10	25	25	150	25	25	45
✶2	R3604R/L	●	●	DGHR/L2525ML	FB6L/R4	DGK6L/R	100 — ∞	6	10	25	25	150	25	25	45
✶2	R4602R/L	●	●	DGHR/L2525ML	FB6L/R2D	DGK6L/R	50 — 100	6	16	25	25	150	25	25	45
✶2	R4604R/L	●	●	DGHR/L2525ML	FB6L/R4D	DGK6L/R	100 — ∞	6	16	25	25	150	25	25	45
	R3702R/L	●	●	DGHR/L2525ML	FB7L/R2	DGK7L/R	50 — 100	7	10	25	25	150	25	25	45
	R3704R/L	●	●	DGHR/L2525ML	FB7L/R4	DGK7L/R	100 — ∞	7	10	25	25	150	25	25	45
	R4702R/L	●	●	DGHR/L2525ML	FB7L/R2D	DGK7L/R	50 — 100	7	16	25	25	150	25	25	45
	R4704R/L	●	●	DGHR/L2525ML	FB7L/R4D	DGK7L/R	100 — ∞	7	16	25	25	150	25	25	45
	R3802R/L	●	●	DGHR/L2525ML	FB8L/R2	DGK8L/R	50 — 100	8	10	25	25	150	25	25	45
	R3804R/L	●	●	DGHR/L2525ML	FB8L/R4	DGK8L/R	100 — ∞	8	10	25	25	150	25	25	45
	R4802R/L	●	●	DGHR/L2525ML	FB8L/R2D	DGK8L/R	50 — 100	8	16	25	25	150	25	25	45
	R4804R/L	●	●	DGHR/L2525ML	FB8L/R4D	DGK8L/R	100 — ∞	8	16	25	25	150	25	25	45
FC type	S2300R/L	●	●	DGHR/L2020KL	FC3L/R0	DGK5L/R	20 — 50	3	6	20	20	124	24	20	45
	S2302R/L	●	●	DGHR/L2020KL	FC3L/R2	DGK5L/R	40 — 100	3	6	20	20	124	24	20	45
	S2304R/L	●	●	DGHR/L2020KL	FC3L/R4	DGK5L/R	100 — 250	3	6	20	20	124	24	20	45
	S2400R/L	●	●	DGHR/L2020KL	FC4L/R0	DGK5L/R	20 — 50	4	6	20	20	124.5	24.5	20	45
	S2402R/L	●	●	DGHR/L2020KL	FC4L/R2	DGK5L/R	40 — 100	4	6	20	20	124.5	24.5	20	45
	S2404R/L	●	●	DGHR/L2020KL	FC4L/R4	DGK5L/R	100 — 250	4	6	20	20	124.5	24.5	20	45
FD type	S3300R/L	●	●	DGHR/L2525ML	FD3L/R0	DGK5L/R	20 — 50	3	6	25	25	149	24	25	45
	S3302R/L	●	●	DGHR/L2525ML	FD3L/R2	DGK5L/R	40 — 100	3	6	25	25	149	24	25	45
	S3304R/L	●	●	DGHR/L2525ML	FD3L/R4	DGK5L/R	100 — 250	3	6	25	25	149	24	25	45
	S3400R/L	●	●	DGHR/L2525ML	FD4L/R0	DGK5L/R	20 — 50	4	6	25	25	149.5	24.5	25	45
	S3402R/L	●	●	DGHR/L2525ML	FD4L/R2	DGK5L/R	40 — 100	4	6	25	25	149.5	24.5	25	45
	S3404R/L	●	●	DGHR/L2525ML	FD4L/R4	DGK5L/R	100 — 250	4	6	25	25	149.5	24.5	25	45
✶2	S3502R/L	●	●	DGHR/L2525ML	FD5L/R2	DGK5L/R	50 — 100	5	10	25	25	150	25	25	45
✶2	S3504R/L	●	●	DGHR/L2525ML	FD5L/R4	DGK5L/R	100 — ∞	5	10	25	25	150	25	25	45
✶2	S4502R/L	●	●	DGHR/L2525ML	FD5L/R2D	DGK5L/R	50 — 100	5	16	25	25	150	25	25	45
✶2	S4504R/L	●	●	DGHR/L2525ML	FD5L/R4D	DGK5L/R	100 — ∞	5	16	25	25	150	25	25	45
✶2	S3602R/L	●	●	DGHR/L2525ML	FD6L/R2	DGK6L/R	50 — 100	6	10	25	25	150	25	25	45
✶2	S3604R/L	●	●	DGHR/L2525ML	FD6L/R4	DGK6L/R	100 — ∞	6	10	25	25	150	25	25	45
✶2	S4602R/L	●	●	DGHR/L2525ML	FD6L/R2D	DGK6L/R	50 — 100	6	16	25	25	150	25	25	45
✶2	S4604R/L	●	●	DGHR/L2525ML	FD6L/R4D	DGK6L/R	100 — ∞	6	16	25	25	150	25	25	45
	S3702R/L	●	●	DGHR/L2525ML	FD7L/R2	DGK7L/R	50 — 100	7	10	25	25	150	25	25	45
	S3704R/L	●	●	DGHR/L2525ML	FD7L/R4	DGK7L/R	100 — ∞	7	10	25	25	150	25	25	45
	S4702R/L	●	●	DGHR/L2525ML	FD7L/R2D	DGK7L/R	50 — 100	7	16	25	25	150	25	25	45
	S4704R/L	●	●	DGHR/L2525ML	FD7L/R4D	DGK7L/R	100 — ∞	7	16	25	25	150	25	25	45
	S3802R/L	●	●	DGHR/L2525ML	FD8L/R2	DGK8L/R	50 — 100	8	10	25	25	150	25	25	45
	S3804R/L	●	●	DGHR/L2525ML	FD8L/R4	DGK8L/R	100 — ∞	8	10	25	25	150	25	25	45
	S4802R/L	●	●	DGHR/L2525ML	FD8L/R2D	DGK8L/R	50 — 100	8	16	25	25	150	25	25	45
	S4804R/L	●	●	DGHR/L2525ML	FD8L/R4D	DGK8L/R	100 — ∞	8	16	25	25	150	25	25	45

(Note) Please set left hand parts for right hand holder and right hand parts for left hand holder.

● : Inventory maintained in Japan.



	Insert Number	Insert Shape
	DGJ30CFS	⁎4
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ30CFS	
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ30CFS	⁎4
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ30CFS	
	DGJ30CF	
	DGJ30CF	
	DGJ40CFS	
	DGJ40CF	
	DGJ40CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ50CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ60CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ70CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	
	DGJ80CF	

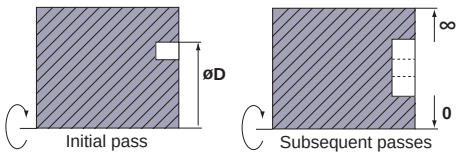
SPARE PARTS

Tool Holder Number		Locator Screw ⁎	Clamp Screw ⁎	Spring	Wrench
FA	**DGHR/L2020KL**	HSC04014	DGS51	MES2	HKY30R HKY40R
FB	**DGHR/L2525ML**	HSC05012			HKY40R

⁎ Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

⁎REFERENCE DATA

⁎1	The order pack number includes a holder, locators and clamp screws. (Refer to the list above.) To order the parts separately, please refer to their description.
⁎2	Compatible with L type holder for face grooving and copying.
⁎3	The table above shows maximum and minimum achievable diameters for initial cut when face recessing.
⁎4	Operational guidance for a facing tool holder. Inserts of ⁎4 are not suited to machine the two forms shown due to collision problems.

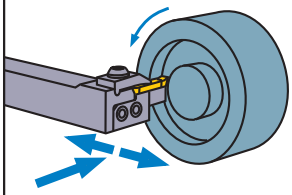


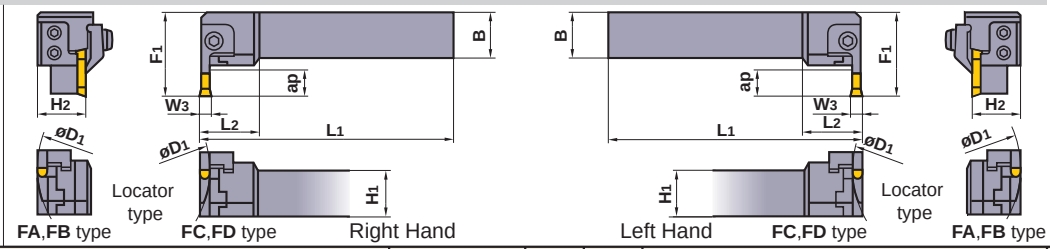
Internal Obstacle	External Obstacle

DG HOLDER

- Clamp-on type
- Groove width 3–6mm

9 Face grooving, Copying L type holder

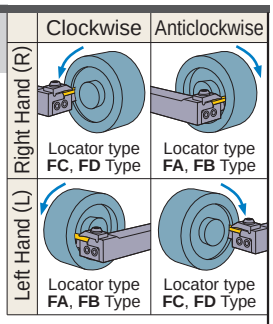




Pack				Component			Range of Cutting Diameter ϕD1 ✶3 (mm)	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm)					
Pack Order Number ✶1		Stock R	Stock L	Holder	Locator	Clamp Bridge				H1	B	L1	L2	H2	F1
FA type	T2302R/L	●	●	DGHR/L2020KLS	FA3L/R2S	DGK3L/R	40 – 100	3	6	20	20	125	25	20	40
	T2304R/L	●	●	DGHR/L2020KLS	FA3L/R4S	DGK3L/R	100 – 250	3	6	20	20	125	25	20	40
	T2402R/L	●	●	DGHR/L2020KLS	FA4L/R2S	DGK4L/R	40 – 100	4	6	20	20	125	25	20	40
	T2404R/L	●	●	DGHR/L2020KLS	FA4L/R4S	DGK4L/R	100 – 250	4	6	20	20	125	25	20	40
FB type	T3302R/L	●	●	DGHR/L2525MLS	FB3L/R2S	DGK3L/R	40 – 100	3	6	25	25	150	25	25	40
	T3304R/L	●	●	DGHR/L2525MLS	FB3L/R4S	DGK3L/R	100 – 250	3	6	25	25	150	25	25	40
	T3402R/L	●	●	DGHR/L2525MLS	FB4L/R2S	DGK4L/R	40 – 100	4	6	25	25	150	25	25	40
	T3404R/L	●	●	DGHR/L2525MLS	FB4L/R4S	DGK4L/R	100 – 250	4	6	25	25	150	25	25	40
	✶2 R3502R/L	●	●	DGHR/L2525ML	FB5L/R2	DGK5L/R	50 – 100	5	10	25	25	150	25	25	45
	✶2 R3504R/L	●	●	DGHR/L2525ML	FB5L/R4	DGK5L/R	100 – ∞	5	10	25	25	150	25	25	45
	✶2 R4502R/L	●	●	DGHR/L2525ML	FB5L/R2D	DGK5L/R	50 – 100	5	16	25	25	150	25	25	45
	✶2 R4504R/L	●	●	DGHR/L2525ML	FB5L/R4D	DGK5L/R	100 – ∞	5	16	25	25	150	25	25	45
	✶2 R3602R/L	●	●	DGHR/L2525ML	FB6L/R2	DGK6L/R	50 – 100	6	10	25	25	150	25	25	45
	✶2 R3604R/L	●	●	DGHR/L2525ML	FB6L/R4	DGK6L/R	100 – ∞	6	10	25	25	150	25	25	45
	✶2 R4602R/L	●	●	DGHR/L2525ML	FB6L/R2D	DGK6L/R	50 – 100	6	16	25	25	150	25	25	45
	✶2 R4604R/L	●	●	DGHR/L2525ML	FB6L/R4D	DGK6L/R	100 – ∞	6	16	25	25	150	25	25	45
FC type	U2302R/L	●	●	DGHR/L2020KLS	FC3L/R2S	DGK3L/R	40 – 100	3	6	20	20	125	25	20	40
	U2304R/L	●	●	DGHR/L2020KLS	FC3L/R4S	DGK3L/R	100 – 250	3	6	20	20	125	25	20	40
	U2402R/L	●	●	DGHR/L2020KLS	FC4L/R2S	DGK4L/R	40 – 100	4	6	20	20	125	25	20	40
	U2404R/L	●	●	DGHR/L2020KLS	FC4L/R4S	DGK4L/R	100 – 250	4	6	20	20	125	25	20	40
FD type	U3302R/L	●	●	DGHR/L2525MLS	FD3L/R2S	DGK3L/R	40 – 100	3	6	25	25	150	25	25	40
	U3304R/L	●	●	DGHR/L2525MLS	FD3L/R4S	DGK3L/R	100 – 250	3	6	25	25	150	25	25	40
	U3402R/L	●	●	DGHR/L2525MLS	FD4L/R2S	DGK4L/R	40 – 100	4	6	25	25	150	25	25	40
	U3404R/L	●	●	DGHR/L2525MLS	FD4L/R4S	DGK4L/R	100 – 250	4	6	25	25	150	25	25	40
	✶2 S3502R/L	●	●	DGHR/L2525ML	FD5L/R2	DGK5L/R	50 – 100	5	10	25	25	150	25	25	45
	✶2 S3504R/L	●	●	DGHR/L2525ML	FD5L/R4	DGK5L/R	100 – ∞	5	10	25	25	150	25	25	45
	✶2 S4502R/L	●	●	DGHR/L2525ML	FD5L/R2D	DGK5L/R	50 – 100	5	16	25	25	150	25	25	45
	✶2 S4504R/L	●	●	DGHR/L2525ML	FD5L/R4D	DGK5L/R	100 – ∞	5	16	25	25	150	25	25	45
	✶2 S3602R/L	●	●	DGHR/L2525ML	FD6L/R2	DGK6L/R	50 – 100	6	10	25	25	150	25	25	45
	✶2 S3604R/L	●	●	DGHR/L2525ML	FD6L/R4	DGK6L/R	100 – ∞	6	10	25	25	150	25	25	45
	✶2 S4602R/L	●	●	DGHR/L2525ML	FD6L/R2D	DGK6L/R	50 – 100	6	16	25	25	150	25	25	45
	✶2 S4604R/L	●	●	DGHR/L2525ML	FD6L/R4D	DGK6L/R	100 – ∞	6	16	25	25	150	25	25	45

(Note) Please set left hand parts for right hand holder and right hand parts for left hand holder.

● : Inventory maintained in Japan.



	Insert Number	Insert Shape
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM30CTF	
	DGM30CTF	
	DGM40CTF	
	DGM40CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM50CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	
	DGM60CTF	

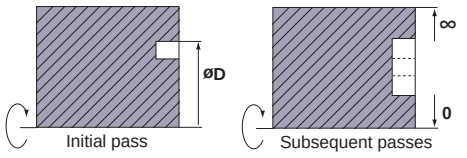
SPARE PARTS

	Tool Holder Number	Locator Screw *	Clamp Screw *	Spring	Wrench
FA	**DGHR/L2020KLS**	HSC04014	DGS51	MES2	HKY30R HKY40R
FB	**DGHR/L2525MLS** **DGHR/L2525ML**	HSC05012	DGS51	MES2	HKY40R

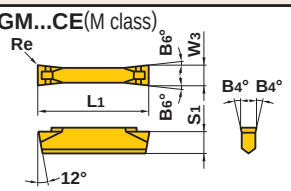
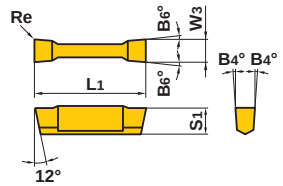
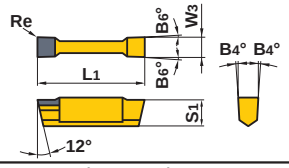
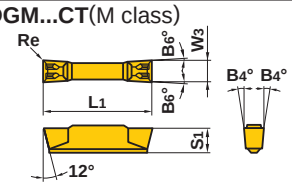
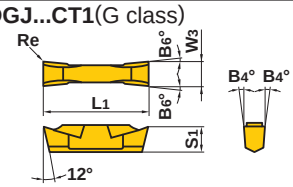
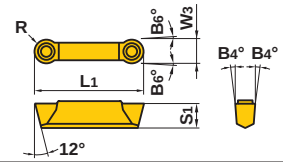
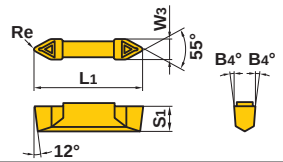
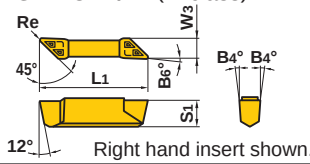
* Clamp Torque (N • m) : DGS51=7.0, HSC04014=3.3, HSC05012=7.0

*REFERENCE DATA

*1	The order pack number includes a holder, locators and clamp screws. (Refer to the list above.) To order the parts separately, please refer to their description.
*2	Compatible with L type holder for face grooving and copying.
*3	The table above shows maximum and minimum achievable diameters for initial cut when face recessing.



DG INSERTS

Application	Geometry	Order Number	Stock: Coated UE6020	Coated US735	Coated VP20MF	Coated UP20M	Cermet NX2525	Cermet NX55	Cathode UTi20T	CBN MB820	CBN MB825	Dimensions (mm): W3 Groove Width	W3 Tolerance	L1	S1	Re, R	B4	B6
External Grooving — Cutting Off, Grooving CE Type	**DGM...CE**(M class) 	**DGM20CE**			●	□	●	▲	●			2	±0.05	25	3	0.2	7°	2°30′
		30CE			●	□	●	▲	●			3	±0.05	25	5	0.2	7°	2°30′
	DGJ...CE(G class) 	**DGJ30CE**			●	□	●	▲	●			3	±0.05	25	5	0.2	2°	2°
		40CE			●	□	●	▲	●			4	±0.05	25	6	0.2	2°	2°
		50CE			●	□	●	▲	●			5	±0.05	25	6	0.2	2°	2°
		60CE			●	□	●	▲	●			6	±0.05	25	6	0.2	2°	2°
		70CE			●	□	●	▲	●			7	±0.05	25	8	0.2	2°	2°
		80CE			●	□	□	▲	●			8	±0.05	25	8	0.2	2°	2°
	DGJ...CE(G class) 	**DGJ40CE**								●	●	4	±0.05	25	6	0.2	2°	2°
		50CE								●	●	5	±0.05	25	6	0.2	2°	2°
		60CE								●	●	6	±0.05	25	6	0.2	2°	2°
Cutting Off, Copying CT Type	**DGM...CT**(M class) 	**DGM30CT**	●	●	●		●	▲				3	±0.05	20	5	0.4	3°	1°30′
		40CT	●	●	●		●	▲				4	±0.05	20	5	0.4	5°	2°
		50CT	●	●	●		●	▲				5	±0.05	25	6	0.4	5°	2°
	DGJ...CT1(G class) 	**DGJ50CT1**			●	●			●			5	±0.05	25	6	0.2	2°	2°
	DGM...CTB(M class) 	**DGM40CTB**	●	●								4	±0.05	20	5	2	5°	7°
		50CTB	●	●								5	±0.05	25	6	2.5	6°	10°
		60CTB	●	●								6	±0.05	25	6	3	9°	10°
	DGM...CTD(M class) 	**DGM50CTD04**	●	●								5	±0.05	25	6	0.4	6°	–
		50CTD08	●	●								5	±0.05	25	6	0.8	6°	–
	DGM...CTR/L...(M class)  Right hand insert shown.	**DGM50CTR04**	●	●								5	±0.05	25	6	0.4	5°	3°
		50CTL04	●	●								5	±0.05	25	6	0.4	5°	3°

● : Inventory maintained in Japan. (10 inserts in one case) (CBN is available in 1 piece in one case.)
□ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Application	Geometry	Order Number	Stock							Dimensions (mm)							Face Grooving Diameter
			Coated				Cermet		Carbide	W3		L1	S1	Re	B4	B6	
			UE6020	US735	VP20MF	UP20M	NX2525	NX55	UTi20T	Groove Width	Tolerance						
Face Grooving — Grooving CF Type	DGJ...CFS/CF(G class)	DGJ30CFS			●		●	▲	●	3	±0.05	25	3	0.2	15°	2°	ø20 — ø50
		30CF			●		●	▲	●	3	±0.05	25	5	0.2	10°	2°	ø40 —
		40CFS			●		●	▲	●	4	±0.05	25	3	0.2	15°	2°	ø20 — ø50
		40CF			●		●	▲	●	4	±0.05	25	5	0.2	10°	2°	ø40 —
	DGJ...CF(G class)	DGJ50CF			●	□	●	▲	●	5	±0.05	25	5	0.2	10°	2°	ø50 —
		60CF			●	□	●	▲	●	6	±0.05	25	5	0.2	10°	2°	ø50 —
		70CF			●	□	●	▲	●	7	±0.05	25	6	0.2	10°	2°	ø50 —
		80CF			●	□		▲	●	8	±0.05	25	6	0.2	10°	2°	ø50 —
Grooving, Copying CTF Type	DGM...CTF(M class)	DGM30CTF	●	●						3	±0.05	20	3	0.4	10°	2°	ø40 —
		40CTF	●	●						4	±0.05	20	3	0.4	10°	2°	ø50 —
		50CTF	●	●						5	±0.05	25	5	0.4	9°	2°	ø40 —
		60CTF	●	●						6	±0.05	25	5	0.4	9°	2°	ø50 —
Blank Type	DG...BE	⁎ DG35BE						▲	●	3.5	±0.1	25.55	5	0.2	0°	0°	—
		⁎ 45BE						▲	●	4.5	±0.1	25.55	6	0.2	0°	0°	—
		⁎ 55BE						▲	●	5.5	±0.1	25.55	6	0.2	0°	0°	—
		⁎ 65BE						▲	●	6.5	±0.1	25.55	6	0.2	0°	0°	—
		⁎ 75BE						▲	●	7.5	±0.1	25.55	8	0.2	0°	0°	—
		⁎ 85BE						▲	●	8.5	±0.1	25.55	8	0.2	0°	0°	—

⁎When grinding blank inserts ensure the relief angles are accurate.

RECOMMENDED CUTTING CONDITIONS

● For Cutting off, Grooving

Work Material		Hardness	Grade		Cutting Speed (m/min)	Maximum Feed **f** (mm/rev) Groove Width **W3** (mm)			
			Continuous	Interrupted		**2**	**3, 4**	**5, 6**	**7, 8**
P	Carbon Steel · Alloy Steel	≤150HB	**NX2525**	**VP20MF**	160 (120—200)	0.1	0.2	0.25	0.3
		150—250HB	**UE6020**	**VP20MF**	120 (100—150)	0.1	0.15	0.2	0.25
		≤250HB	**UE6020**	**VP20MF**	120 (100—150)	0.08	0.15	0.15	0.2
M	Stainless Steel	≤200HB	**US735**	**VP20MF**	120 (100—140)	0.1	0.15	0.2	0.2
K	Gray Cast Iron	Tensile Strength≤350MPa	**UE6020**	**VP20MF**	120 (100—140)	0.1	0.2	0.25	0.3
H	Hardened Steel	≤50HRC	**MB820**	**MB820**	100 (80—120)	—	0.06	0.1	—

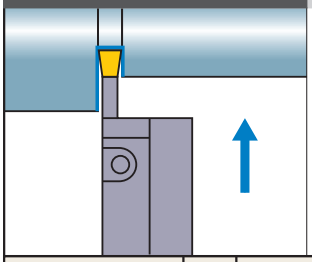
(Note) Wet cutting is recommended, lower feed rate 15—20% for face turning.

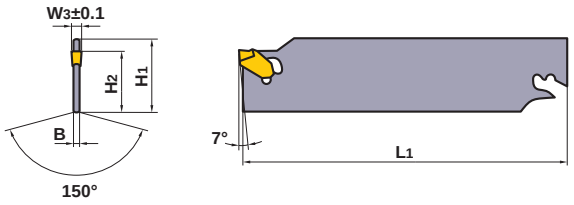
UG HOLDER

- Strengthened insert clamping force.
- Block and blade type and solid type series.
- Groove width 2.2—5.1mm

UGHN

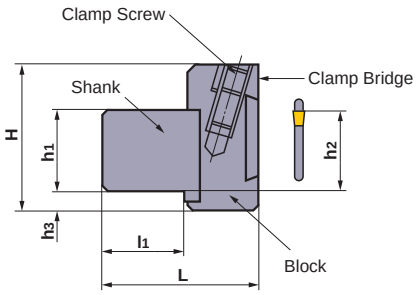
External cutting off, Grooving

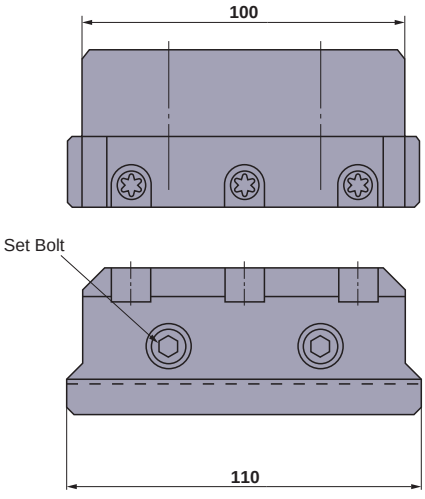


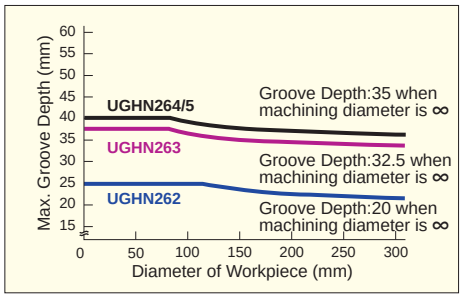


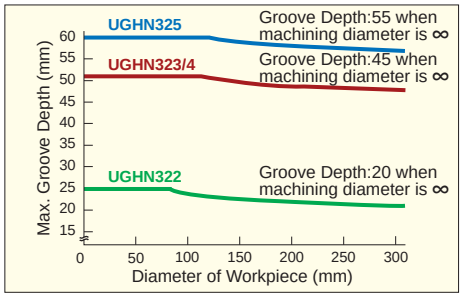
Order Number	Stock	Insert Number		Groove Width W3 (mm)	Max. Cut off Diameter (mm)	Max. Groove Depth (mm)	Dimensions (mm) B	H2	H1	L1	Wrench	Tool Block
UGHN262	●	KGT	2○	2.2	50	20	1.60	21.4	26	110	UGS1	KGBN26-20 KGBN26-25
263	●		3○	3.1	75	32.5	2.35	21.4	26	110	UGS1	
264	●		4○	4.1	80	35	3.20	21.4	26	110	UGS1	
265	●		5○	5.1	80	35	4.00	21.4	26	110	UGS1	
322	●		2○	2.2	50	20	1.60	25.0	32	150	UGS1	KGBN32-20 KGBN32-25
323	●		3○	3.1	100	45	2.35	25.0	32	150	UGS1	
324	●		4○	4.1	100	45	3.20	25.0	32	150	UGS1	
325	●		5○	5.1	120	55	4.00	25.0	32	150	UGS1	

TOOL BLOCK









Order Number	Stock	Dimensions (mm) h1	h2	h3	H	l1	L	Spare Parts (Block) Block	Clamp Bridge	Clamp Screw *	Wrench	Spare Parts (Shank) Shank	Set Bolt *	Wrench
KGBN26-20	●	20	20	11	45	20	43	KGBN26	KGC1	LS15T	TKY25R	KGS20	HSC08016	HKY60R
26-25	●	25	25	6	45	25	48	KGBN26	KGC1	LS15T	TKY25R	KGS25	HSC08016	HKY60R
32-20	●	20	20	15.6	52	20	43	KGBN32	KGC1	LS15T	TKY25R	KGS20	HSC08016	HKY60R
32-25	●	25	25	10.6	52	25	48	KGBN32	KGC1	LS15T	TKY25R	KGS25	HSC08016	HKY60R

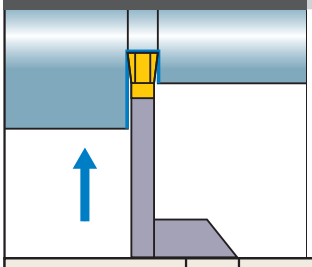
(Note) ①When ordering a block, the clamp bridge and clamp screw are included.
②When ordering a shank, the set bolts are included.

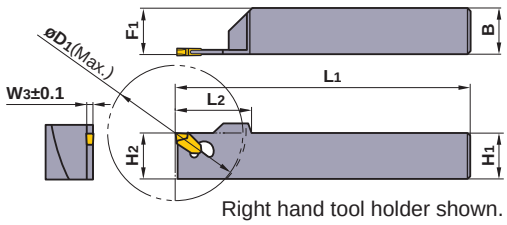
* Clamp Torque (N • m) : LS15T=8.5, HSC08016=24.0

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

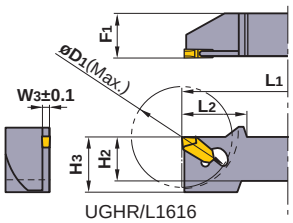
UGH

External cutting off, Grooving





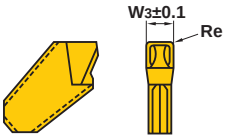
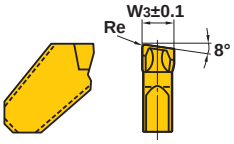
Right hand tool holder shown.



UGHR/L1616

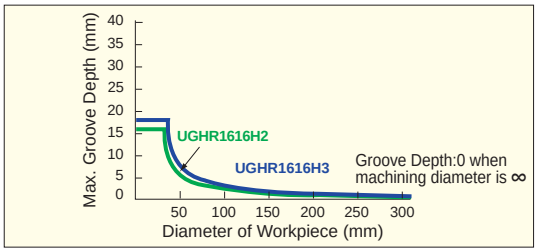
Order Number	Stock		Insert Number		Groove Width W3 (mm)	Max. Cut off Diameter D1 (mm)	Max. Groove Depth (mm)	Dimensions (mm)							Wrench
	R	L						B	H2	L1	L2	H1	F1	H3	
UGHR/L1616H2	●	●	KGT	2○	2.2	32	—	16	16	100	24	16	16.3	20	UGS1
1616H3	●	●		3○	3.1	36	—	16	16	100	24	16	16.4	20	UGS1
2020K2A	●	●		2○	2.2	32	—	20	20	125	24	20	20.3	—	UGS1
2020K2	●	●		2○	2.2	42	8	20	20	125	25	20	20.3	—	UGS1
2020K3A	●	●		3○	3.1	36	—	20	20	125	24	20	20.4	—	UGS1
2020K3	●	●		3○	3.1	58	21	20	20	125	32	20	20.4	—	UGS1
2525M3	●	●		3○	3.1	76	29	25	25	150	42	25	25.4	—	UGS1
2525M4	●	●		4○	4.1	76	29	25	25	150	42	25	25.5	—	UGS1

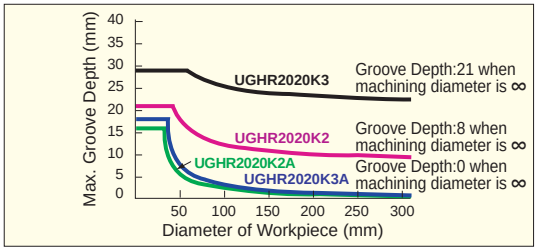
INSERTS

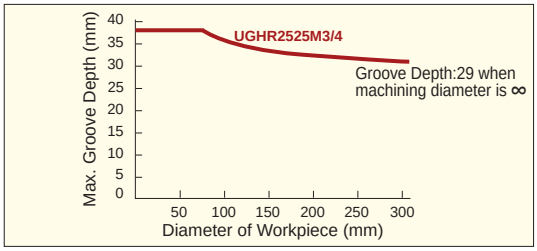
Order Number	Stock						Dimensions (mm)		Geometry
	Coated		Cermet		Carbide		W3	Re	
	UE6020	US735	NX2525	NX55	UTi20T				
KGT2N	●		●	▲	●		2.2	0.2	
3N	●	●	●	▲	●		3.1	0.2	
4N	●	●	●	▲	●		4.1	0.2	
5N	●	●	●	▲	●		5.1	0.2	
KGT2R	●		●	▲	●		2.2	0.2	
2L	●		●	▲	●		2.2	0.2	
3R	●		●	▲	●		3.1	0.2	
3L	●		●	▲	●		3.1	0.2	
4R	□		●	▲	●		4.1	0.2	
4L	□		●	▲	●		4.1	0.2	
5R	□		●	▲	●		5.1	0.2	
5L	□		●	▲	●		5.1	0.2	

Left hand tool holder shown.

(Note) The above insert is not compatible with other manufacturer's holders.







RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)			
					Groove Width 2.2mm	Groove Width 3.1mm	Groove Width 4.1mm	Groove Width 5.1mm
P	Mild Steel	≤180HB	UE6020 • NX2525 UTi20T	120 (100—140)	0.08 (0.06—0.1)	0.1 (0.08—0.12)	0.12 (0.1—0.14)	0.12 (0.1—0.14)
P	Carbon Steel Alloy Steel	180—280HB	UE6020 • NX2525 UTi20T	100 (80—120)	0.05 (0.04—0.06)	0.08 (0.06—0.1)	0.1 (0.08—0.12)	0.1 (0.08—0.12)
P	Carbon Steel Alloy Steel	280—350HB	UTi20T	80 (60—100)	0.05 (0.04—0.06)	0.08 (0.06—0.1)	0.1 (0.08—0.12)	0.1 (0.08—0.12)
M	Stainless Steel	≤200HB	US735	80 (60—100)	0.05 (0.04—0.06)	0.08 (0.06—0.1)	0.1 (0.08—0.12)	0.1 (0.08—0.12)

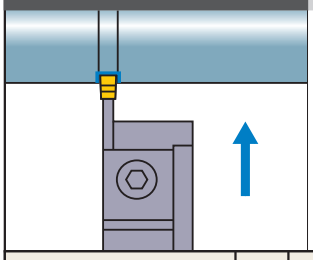
(Note) Please set the cutting edge height 0.1—0.2mm higher than center.

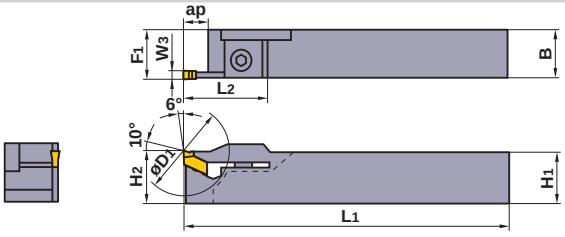
SPARE PARTS E001 TECHNICAL DATA F001

EG HOLDER

- High clamp rigidity due to integrated clamp bridge.
- Excellent sharpness with positive inserts.
- Groove width 3—6mm
- Max. depth of groove : 20mm
- Max. cut off diameter : 50mm

EGHR — External cutting off



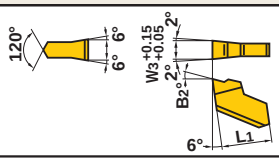


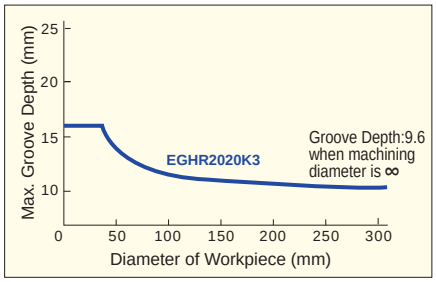
Right hand tool holder only.

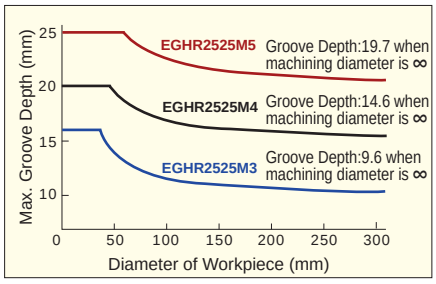
Order Number	Stock	Insert Number		Groove Width W3 (mm)	Max. Cut off Diameter D1 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm)						✶2	
	R						H1	B	L1	L2	H2	F1	Clamp Screw	Wrench
EGHR2020K3	●	EGT	3	3	32	10	20	20	125	33	20	20.3	EGS06019	HKY30R
2525M3	●		3	3	32	10	25	25	150	33	25	25.3	EGS06019	HKY30R
2525M4	●		4	4	40	15	25	25	150	44	25	25.3	EGS08024	HKY40R
✶1 **2525M5**	●		5	5	50	20	25	25	150	48	25	25.3	EGS08024	HKY40R
✶1 **2525M5**	●		6	6	50	20	25	25	150	48	25	25.3	EGS08024	HKY40R

✶1 Compatible with this holder for inserts of 5mm and 6mm width.
✶2 Clamp Torque (N • m) : EGS06019=3.3, EGS08024=7.0

INSERTS

Order Number	Stock			Dimensions (mm)			Geometry
	Cermet		Carbide				
	NX2525	NX55	UTi20T	L1	W3	B2	
EGT3	●	▲	●	9	3	10°	
4	●	▲	●	9	4	10°	
5	●	▲	●	9	5	10°	
6	□	▲	●	9	6	20°	



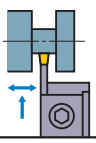
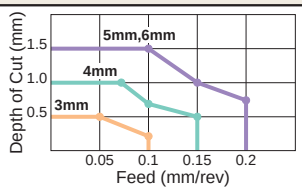


RECOMMENDED CUTTING CONDITIONS ●Cutting Off

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)			
					Groove Width 3mm	Groove Width 4mm	Groove Width 5mm	Groove Width 6mm
P	Carbon Steel Alloy Steel	180—280HB	NX2525 UTi20T	100 (80—120)	0.08 (0.06—0.1)	0.1 (0.08—0.12)	0.1 (0.08—0.12)	0.1 (0.08—0.12)
		280—350HB	UTi20T	80 (60—100)	0.08 (0.06—0.1)	0.1 (0.08—0.12)	0.1 (0.08—0.12)	0.1 (0.08—0.12)
M	Stainless Steel	≤200HB	UTi20T	80 (60—100)	0.08 (0.06—0.1)	0.1 (0.08—0.12)	0.1 (0.08—0.12)	0.1 (0.08—0.12)

(Note) Wet cutting is recommended.

●Traverse Machining

Cutting Mode	Cutting Conditions	Insert Width				Range of Cutting
		3mm	4mm	5mm	6mm	
These conditions are used for machining carbon steel (180—280HB) at vc=100m/min. Wet cutting is recommended. 	Max. Depth of Cut (mm)	0.5	1.0	1.5	1.5	
	Max. Feed (mm/rev)	0.1	0.15	0.2	0.2	

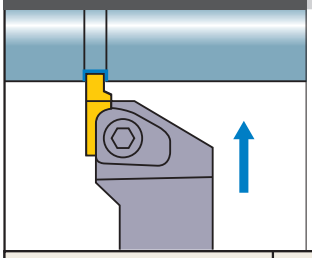
● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

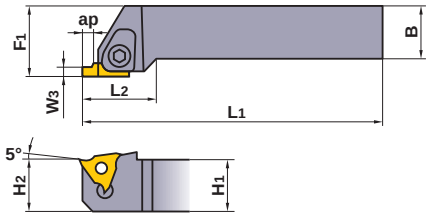
MG HOLDER

- Clamp-on type
- Positive insert suffers from negligible chattering and thus produces a good finished surface.
- Groove width 1.5—4.7mm

MG1

External grooving





Right hand tool holder shown.

Order Number	Stock		Insert Number		Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm)					
	R	L					H1	B	L1	L2	H2	F1
MG1R/L2020K4315	●	●	MGTR/L	43150 I 43470	1.5≤W3≤2.3	3	20	20	125	30	20	25
2020K4323	●	●			2.3<W3≤3.3	4.5	20	20	125	30	20	25
2020K4333	●	●			3.3<W3≤4.7	4.5	20	20	125	30	20	25
2525M4315	●	●			1.5≤W3≤2.3	3	25	25	150	30	25	32
2525M4323	●	●			2.3<W3≤3.3	4.5	25	25	150	30	25	32
2525M4333	●	●			3.3<W3≤4.7	4.5	25	25	150	30	25	32

SPARE PARTS

Order Number		*		
	Clamp Bridge	Clamp Screw	Spring	Wrench
MG1R/L2020K4315 I MG1R/L2525M4333	MTK1R/L	HBH06020	MES3	HKY40R

* Clamp Torque (N • m) : HBH06020=7.0

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel Alloy Steel	180—280HB	**VP20MF**	120 (100—140)	0.14 (0.03—0.25)
			NX2525	130 (100—160)	0.12 (0.03—0.2)
M	Stainless Steel	≤200HB	**VP20MF**	120 (100—140)	0.12 (0.03—0.18)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP20MF**	120 (100—140)	0.12 (0.03—0.18)

(Note) For machining a narrow groove, apply a lower feed within the recommended range.

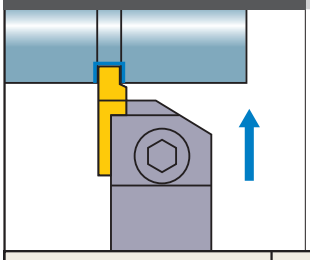
SPARE PARTS E001 TECHNICAL DATA F001

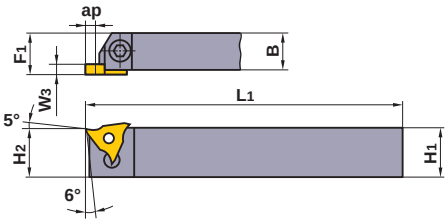
MG HOLDER

- Clamp-on type
- Positive insert suffers from negligible chattering and thus produces a good finished surface.
- Groove width 1.25−6.0mm

MGH

External grooving





Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number		Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm) H1	B	L1	H2	F1
MGHR/L2020K3315	●	●	MGTR/L	33125 I 33470	1.25	1.2	20	20	125	20	20.2
					1.45	1.5					
					1.5≤W3≤2.3	3.0					
2020K3323	●	●			2.3<W3≤3.3	3.0	20	20	125	20	20.2
2525M3315	●	●			1.25	1.2	25	25	150	25	25.2
					1.45	1.5					
					1.5≤W3≤2.3	3.0					
2525M3323	●	●			2.3<W3≤3.3	3.0	25	25	150	25	25.2
2525M3333	●	●			3.3<W3≤4.7	3.0	25	25	150	25	25.2
2020K4315	●	●	MGTR/L	43125 I 43470	1.25	1.2 (2.0)*	20	20	125	20	20.2
					1.45	1.5					
					1.5≤W3≤2.3	3.0 (3.5)*					
2020K4323	●	●			2.3<W3≤3.3	4.5 (4.0)*	20	20	125	20	20.2
2020K4333	●	●			3.3<W3≤4.7 (4.0)*	4.5 (5.0)*	20	20	125	20	20.2
2525M4315	●	●			1.25	1.2 (2.0)*	25	25	150	25	25.2
					1.45	1.5					
					1.5≤W3≤2.3	3.0 (3.5)*					
2525M4323	●	●			2.3<W3≤3.3	4.5 (4.0)*	25	25	150	25	25.2
2525M4333	●	●			3.3<W3≤4.7 (4.0)*	4.5 (5.0)*	25	25	150	25	25.2
2525M4447	●	●	MGTR/L	44500 I 44600	4.7<W3≤6.3	4.5	25	25	150	25	25.2

* Dimensions when installing the CBN insert.

SPARE PARTS

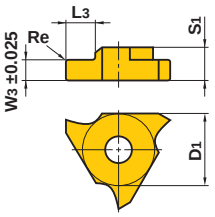
Order Number		*		
	Clamp Bridge	Clamp Screw	Spring	Wrench
MGHR/L2020K3315 I MGHR/L2525M4447	MTK1R/L	HBH06020	MES3	HKY40R

* Clamp Torque (N • m) : HBH06020=7.0

● : Inventory maintained in Japan. (10 inserts in one case) (CBN inserts are available in 1 piece in one case.)
□ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

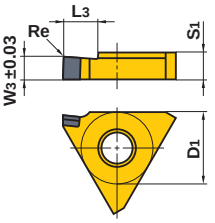
INSERTS

Order Number	Stock									Groove Width W_3 (mm)	Dimensions (mm)				Geometry
	Coated		Cermet				Carbide		CBN						
	VP20MF		NX2525		NX55		UTi20T		MB8025		L_3	D_1	S_1	Re	
	R	L	R	L	R	L	R	L	R						
MGTR/L33125	●	□	□				●	●		1.25	1.2	9.525	4.76	0.2	**MGTR/L...**
33145	●	□	□				●	□		1.45	1.5	9.525	4.76	0.2	
33150	●	●	●	□	▲	▲	●	●		1.5	3	9.525	4.76	0.2	
33175	●	●	□	□	▲		●	●		1.75	3	9.525	4.76	0.2	
33200	●	●	●	●	▲	▲	●	●		2	3	9.525	4.76	0.2	
33230	●	□					●	●		2.3	3	9.525	4.76	0.2	
33250	●	●	●	□	▲	▲	●	●		2.5	3	9.525	4.76	0.3	
33270	●	□					●	□		2.7	3	9.525	4.76	0.3	
33280	●	□					□	□		2.8	3	9.525	4.76	0.3	
33300	●	●	□	□	▲	▲	●	●		3	3	9.525	4.76	0.3	
33320	●	□					●			3.2	3	9.525	4.76	0.3	
33330	●	□					●	□		3.3	3	9.525	4.76	0.3	
33350	●	□	□		▲		●	●		3.5	3	9.525	4.76	0.3	
33400	●	□	●	□	▲		●	●		4	3	9.525	4.76	0.3	
33470	●	□					□	□		4.7	3	9.525	4.76	0.4	
43125	●	●	●	□	▲	▲	●	●	●	1.25	1.2	12.7	4.76	0.2	
43145	●	□	□	□	▲		●	□		1.45	1.5	12.7	4.76	0.2	
43150	●	●	●	●	▲	▲	●	●	●	1.5	3	12.7	4.76	0.2	
43175	●	●	●	□	▲		●	●		1.75	3	12.7	4.76	0.2	
43200	●	●	●	●	▲	▲	●	●	●	2	3	12.7	4.76	0.2	
43230	●	●	●	●	▲	▲	●	●		2.3	3	12.7	4.76	0.2	
43250	●	●	●	●	▲	▲	●	●	●	2.5	4.5	12.7	4.76	0.3	
43260	●	□	□				●	●		2.6	4.5	12.7	4.76	0.3	
43270	●	□					●	□		2.7	4.5	12.7	4.76	0.3	
43280	●	●	●	□	▲	▲	●	●		2.8	4.5	12.7	4.76	0.3	
43300	●	●	●	●	▲	▲	●	●	●	3	4.5	12.7	4.76	0.3	
43320	●	●	□		▲	▲	●	●		3.2	4.5	12.7	4.76	0.3	
43330	●	●	●	□	▲	▲	●	●		3.3	4.5	12.7	4.76	0.3	
43350	●	□	●	□	▲	▲	●	●	●	3.5	4.5	12.7	4.76	0.3	
43400	●	●	●		▲	▲	●	●	●	4	4.5	12.7	4.76	0.3	
43420	●	□	□				●	□		4.2	4.5	12.7	4.76	0.4	
43430	●	□	□		▲	▲	●	●		4.3	4.5	12.7	4.76	0.4	
43450	●	●	●	●	▲	▲	●	●		4.5	4.5	12.7	4.76	0.4	
43470	●	□	□	□			●	□		4.7	4.5	12.7	4.76	0.4	
44500	●	●			▲		●	●		5	4.5	12.7	6.35	0.4	
44550	●	□			▲		●	□		5.5	4.5	12.7	6.35	0.4	
44600	●	□			▲		●	●		6	4.5	12.7	6.35	0.4	
56600							●			6	6	15.875	9.525	0.4	
56700							●			7	6	15.875	9.525	0.4	
56800							●			8	6	15.875	9.525	0.4	
56900							●			9	6	15.875	9.525	0.4	



Right hand insert shown.

CBN Insert



Right hand tool only.

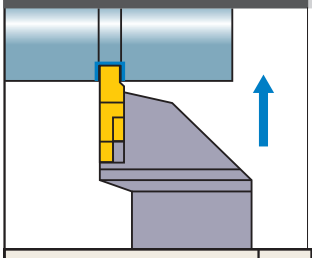
SPARE PARTS E001
TECHNICAL DATA F001

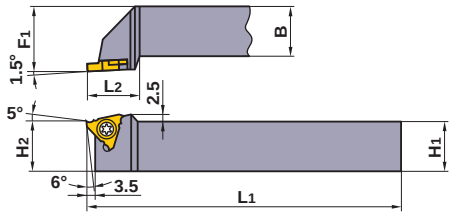
SMG HOLDER

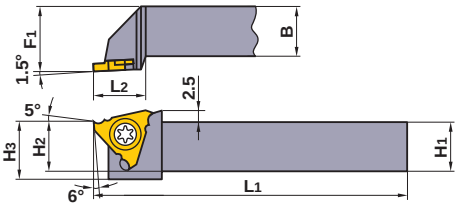
- Screw-on type
- Positive insert suffers from negligible chattering.
- Applicable to narrow grooving and threading.
- Groove width 0.3—1.3mm

SMGH

External grooving, Threading





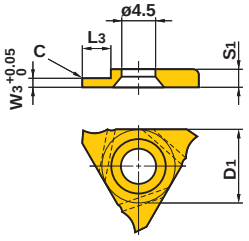


Right hand tool holder only.

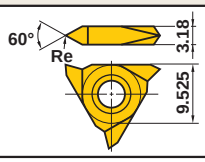
Order Number	Stock	Insert Number		Dimensions (mm)							*	
	R	Grooving	Threading	H1	B	L1	L2	H2	F1	H3	Clamp Screw	Wrench
SMGHR1010E16	●	SMGTR 16×2○○○ 16×2○○○C	SMTTR 160360○○	10	10	70	16.5	10	12	14	FC400890T	TKY10F
1212F16	●			12	12	80	16.5	12	16	14	FC400890T	TKY10F
1616H16	●			16	16	100	20	16	20	—	FC400890T	TKY10F
2020K16	●			20	20	125	20	20	25	—	FC400890T	TKY10F
2525M16	●			25	25	150	20	25	32	—	FC400890T	TKY10F

* Clamp Torque (N • m) : FC400890T=2.5

SMG INSERTS (GROOVING)

Order Number	Stock				Groove Width	Dimensions (mm)				Geometry
	Cermet		Carbide							
	NX2525	NX55	UTi20T	HTi10	W3 (mm)	L3	D1	S1	C	
SMGTR16X2030	●	▲	●	●	0.3	1	9.525	2	—	
16X2040	□		□	□	0.4	1	9.525	2	—	
16X2050	●	▲	●	●	0.5	1.5	9.525	2	—	
16X2060	□		□	□	0.6	1.5	9.525	2	—	
16X2070	●	▲	●	●	0.7	2	9.525	2	—	
16X2050C	●	▲	●	●	0.5	1.5	9.525	2	0.05	
16X2060C	□		□	□	0.6	1.5	9.525	2	0.05	
16X2070C	□		□	□	0.7	2	9.525	2	0.05	
16X2075C	●	▲	●	●	0.75	2	9.525	2	0.05	
16X2080C	●	▲	●	●	0.8	2	9.525	2	0.1	
16X2090C	□		□	□	0.9	2	9.525	2	0.1	
16X2095C	●	▲	●	●	0.95	2	9.525	2	0.1	
16X2100C	●	▲	●	●	1	2.5	9.525	2	0.1	
16X2110C	□		□	□	1.1	2.5	9.525	2	0.1	
16X2120C	●	▲	●	●	1.2	2.5	9.525	2	0.1	
16X2130C	□		□	□	1.3	2.5	9.525	2	0.1	

SMT INSERTS (THREADING)

Order Number	Stock		Dimensions(mm)	Thread Pitch (mm)	Geometry
	Cermet	Carbide			
	NX55	UTi20T	Re		
SMTTR160360V5	●	●	0.05	−0.8	
16036001	●	●	0.1	1.0−1.5	
16036002	●	●	0.2	1.75−2.0	

(Note) Wet cutting is recommended.

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel Alloy Steel	180−280HB	UTi20T	100 (80−120)	0.07 (0.03−0.1)
			NX2525	130 (100−160)	0.07 (0.03−0.1)
M	Stainless Steel	≤200HB	UTi20T	130 (100−160)	0.1 (0.05−0.15)
K	Gray Cast Iron	Tensile Strength ≤350MPa	UTi20T HTi10	100 (80−120)	0.1 (0.05−0.15)
N	Aluminium Alloy	—	HTi10	350 (300−400)	0.1 (0.05−0.15)
	Brass	—	HTi10	250 (200−300)	0.1 (0.03−0.15)
	Acrylic	—	HTi10	250 (200−300)	0.1 (0.03−0.15)

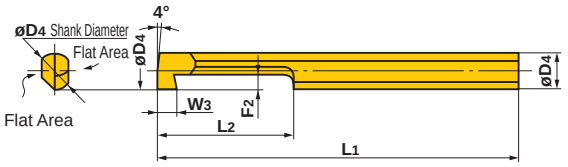
● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

MICRO-MINI

- Solid carbide type with min. cutting diameter 3.2mm.
- l/d is 5 times the diameter.
- Insert can be ground to suit the application.
- Suitable for a wide range of tooling including threading and grooving.

MICRO-MINI STANDARD (SOLID CARBIDE BORING BAR)

Order Number	Stock: Micro Grain Carbide TF15	Dimensions (mm) W3	D4	L1	L2	Min. Cutting Diameter (mm)	Max. Groove Depth F2 (mm)	Geometry
C03FR-BLS	●	2.0	3	80	15	3.2	1.0	
C04FR-BLS	●	2.5	4	80	20	4.2	1.5	
C05HR-BLS	●	3.0	5	100	25	5.2	2.0	



Right hand tool only.

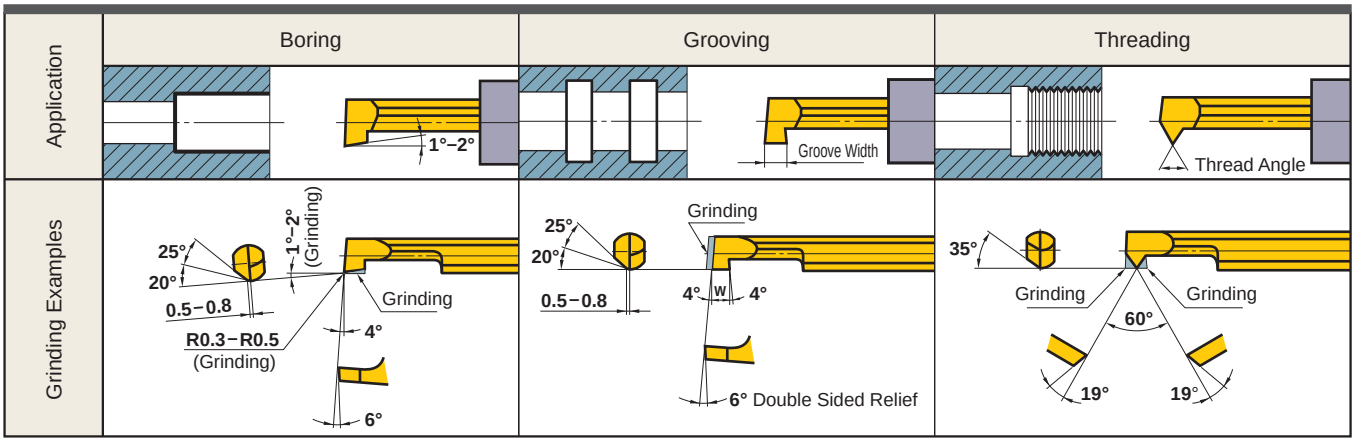
RECOMMENDED CUTTING CONDITIONS

	Work Material	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)	Excrescence Quantity (l /d)	Edge Condition: Corner Radius or C ⋆	Edge Condition: Honing ⋆
P	Carbon Steel · Alloy Steel 180–280HB	40 (30–50)	0.05 (–0.1)	0.2 (0.1–0.3)	5	0.1–0.5	0.01–0.05
M	Stainless Steel ≤200HB	40 (30–50)	0.05 (–0.1)	0.2 (0.1–0.3)	5	≤0.4	≤0.03 (No honing is okay.)
K	Gray Cast Iron ≤350MPa	40 (30–50)	0.05 (–0.05)	0.2 (0.1–0.3)	5	0.1–0.5	0.01–0.05
N	Non-ferrous Metal	80 (60–100)	0.05 (–0.1)	0.3 (0.1–0.5)	5	0.1–0.5	≤0.03 (No honing is okay.)

⋆Cutting edge is not honed. Please hone according to the application before machining.

GRINDING THE CUTTING EDGE OF MICRO-MINI

- MICRO-MINI can be applied to boring and grooving as supplied. But, it can also be reground as shown below.
- For shaping and regrinding, use a diamond whetstone approximately #250–#400. Please grind according to the application using the figure below as a reference.

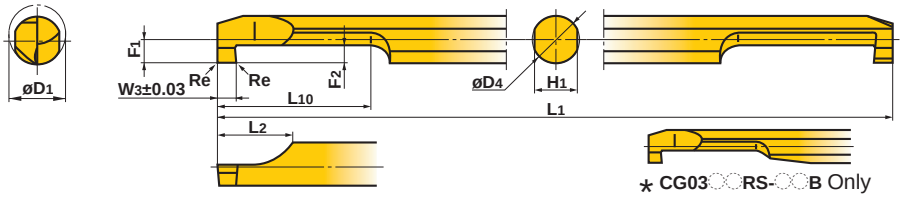


● : Inventory maintained in Japan. (MICRO MINI is available in 1 piece in one pack.)

SPARE PARTS E001
TECHNICAL DATA F001

MICRO-MINI TWIN

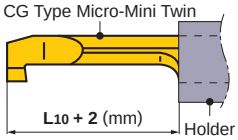
CG TYPE (Internal Grooving)



Order Number	Stock		Breaker	Min. Cutting Diameter D1 (mm)	Groove Width W3 (mm)	Max. Groove Depth F2 (mm)	Dimensions (mm)						
	Micro Grain Carbide	Coated											
	TF15	VP15TF					Re	D4	L1	L10	L2	F1	H1
NEW CG0305RS-10	●	●	Without	3	1	1	0.05	3	50	5	6	1.3	2.7
NEW 0305RS-10B	●	●	With	3	1	1	0.05	3	50	5	6	1.3	2.7
NEW 0306RS-20	●	●	Without	3	2	1	0.1	3	50	6	6	1.3	2.7
NEW 0306RS-20B	●	●	With	3	2	1	0.1	3	50	6	6	1.3	2.7
03RS-10	●	●	Without	3	1	1	0.05	3	50	10	6	1.3	2.7
03RS-10B	●	●	With	3	1	1	0.05	3	50	10	6	1.3	2.7
03RS-20	●	●	Without	3	2	1	0.1	3	50	11	6	1.3	2.7
03RS-20B	●	●	With	3	2	1	0.1	3	50	11	6	1.3	2.7
NEW 0407RS-10	●	●	Without	4	1	1.5	0.05	4	60	7	7	1.8	3.6
NEW 0407RS-10B	●	●	With	4	1	1.5	0.05	4	60	7	7	1.8	3.6
NEW 0408RS-20	●	●	Without	4	2	1.5	0.1	4	60	8	7	1.8	3.6
NEW 0408RS-20B	●	●	With	4	2	1.5	0.1	4	60	8	7	1.8	3.6
04RS-10	●	●	Without	4	1	1.5	0.05	4	60	15	7	1.8	3.6
04RS-10B	●	●	With	4	1	1.5	0.05	4	60	15	7	1.8	3.6
04RS-20	●	●	Without	4	2	1.5	0.1	4	60	16	7	1.8	3.6
04RS-20B	●	●	With	4	2	1.5	0.1	4	60	16	7	1.8	3.6
NEW 0510RS-10	●	●	Without	5	1	2	0.05	5	70	10	8	2.3	4.5
NEW 0510RS-10B	●	●	With	5	1	2	0.05	5	70	10	8	2.3	4.5
NEW 0511RS-20	●	●	Without	5	2	2	0.1	5	70	11	8	2.3	4.5
NEW 0511RS-20B	●	●	With	5	2	2	0.1	5	70	11	8	2.3	4.5
05RS-10	●	●	Without	5	1	2	0.05	5	70	20	8	2.3	4.5
05RS-10B	●	●	With	5	1	2	0.05	5	70	20	8	2.3	4.5
05RS-20	●	●	Without	5	2	2	0.1	5	70	21	8	2.3	4.5
05RS-20B	●	●	With	5	2	2	0.1	5	70	21	8	2.3	4.5
NEW 0610RS-10	●	●	Without	6	1	2	0.05	6	75	10	8	2.8	5.4
NEW 0610RS-10B	●	●	With	6	1	2	0.05	6	75	10	8	2.8	5.4
NEW 0611RS-20	●	●	Without	6	2	2	0.1	6	75	11	8	2.8	5.4
NEW 0611RS-20B	●	●	With	6	2	2	0.1	6	75	11	8	2.8	5.4
06RS-10	●	●	Without	6	1	2	0.05	6	75	20	8	2.8	5.4
06RS-10B	●	●	With	6	1	2	0.05	6	75	20	8	2.8	5.4
06RS-20	●	●	Without	6	2	2	0.1	6	75	21	8	2.8	5.4
06RS-20B	●	●	With	6	2	2	0.1	6	75	21	8	2.8	5.4
NEW 0712RS-10	●	●	Without	7	1	2	0.05	7	85	12	8	3.3	6.4
NEW 0712RS-10B	●	●	With	7	1	2	0.05	7	85	12	8	3.3	6.4
NEW 0713RS-20	●	●	Without	7	2	2	0.1	7	85	13	8	3.3	6.4
NEW 0713RS-20B	●	●	With	7	2	2	0.1	7	85	13	8	3.3	6.4
07RS-10	●	●	Without	7	1	2	0.05	7	85	25	8	3.3	6.4
07RS-10B	●	●	With	7	1	2	0.05	7	85	25	8	3.3	6.4
07RS-20	●	●	Without	7	2	2	0.1	7	85	26	8	3.3	6.4
07RS-20B	●	●	With	7	2	2	0.1	7	85	26	8	3.3	6.4

● : Inventory maintained in Japan. (MICRO-MINI TWIN is available in 1 piece in one pack.)

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Cutting Speed (m/min)	Feed (mm/rev)		Recommended Tool Overhang (mm)
				CG03RS/CG04RS	CG05RS/CG06RS/CG07RS	
P	Carbon Steel · Alloy Steel	180−280HB	80 (40−120)	0.02 (0.01−0.03)	0.03 (0.01−0.05)	CG Type Micro-Mini Twin 
M	Stainless Steel	≤200HB	80 (40−120)	0.02 (0.01−0.03)	0.03 (0.01−0.05)	
K	Gray Cast Iron	Tensile Strength ≤350MPa	80 (40−120)	0.03 (0.01−0.05)	0.03 (0.01−0.05)	
N	Non-ferrous Metal	–	120 (80−160)	0.03 (0.01−0.05)	0.05 (0.01−0.08)	

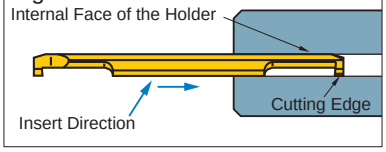
(Note) Wet cutting is recommended.

PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

●When using a holder for general purpose / small automatic lathe:

1To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.

Fig.1

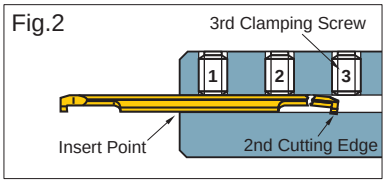


2When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

◎When using Mitsubishi holders:

When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. The set torque value for clamping screw is 2.0 N • m.

Fig.2



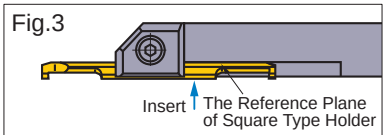
●When using a square type holder:

1When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the micro-mini bar. Refer to fig.3.

2Make sure that the clamping screws are tightened to the recommended values.

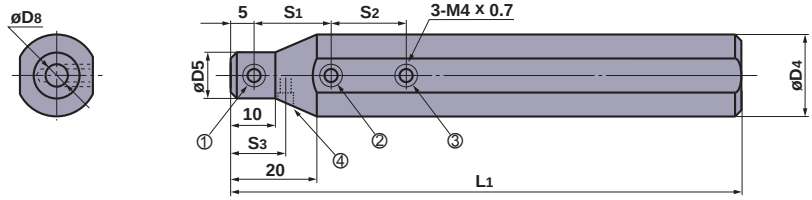
3Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.

Fig.3

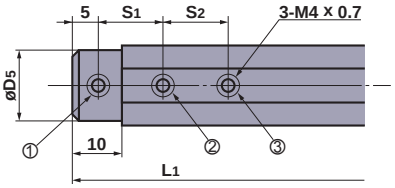


Tighten the clamping screw ensuring making the micro-mini twin boring bars in contact with the reference plane of square type holder.

ROUND TYPE HOLDER



RBH22○○N has a temporary set screw for different machine specifications.
(Represented by number 4)



RBH158○○N, RBH16○○N,
RBH190○○N

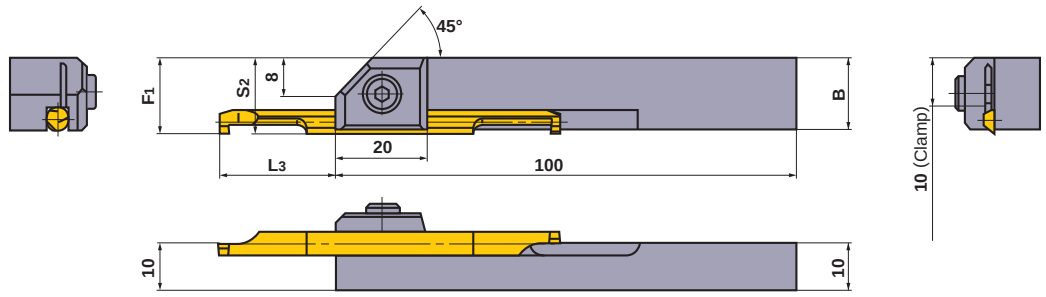
Order Number	Stock	Dimensions (mm)							MICRO-MINI C	MICRO-MINI TWIN CG	✶1 Clamp Screw				Wrench	Torque (N • m)
		D4	D8	D5	L1	S1	S2	S3			①	②	③	④		
NEW RBH15830N	●	15.875	3	15	100	10	10	—	03FR-BLS	03RS-○○(B)	A	A	A	—	HKY20F	2.0
NEW 15840N	●	15.875	4	15	100	15	15	—	04FR-BLS	04RS-○○(B)	A	A	A	—	HKY20F	2.0
NEW 15850N	●	15.875	5	15	100	15	15	—	05HR-BLS	05RS-○○(B)	A	A	A	—	HKY20F	2.0
NEW 15860N	●	15.875	6	15	100	15	15	—	—	06RS-○○(B)	A	A	A	—	HKY20F	2.0
NEW 15870N	●	15.875	7	15	100	20	20	—	—	07RS-○○(B)	A	A	A	—	HKY20F	2.0
RBH1630N	●	16	3	15	100	10	10	—	03FR-BLS	03RS-○○(B)	A	A	A	—	HKY20F	2.0
1640N	●	16	4	15	100	15	15	—	04FR-BLS	04RS-○○(B)	A	A	A	—	HKY20F	2.0
1650N	●	16	5	15	100	15	15	—	05HR-BLS	05RS-○○(B)	A	A	A	—	HKY20F	2.0
1660N	●	16	6	15	100	15	15	—	—	06RS-○○(B)	A	A	A	—	HKY20F	2.0
1670N	●	16	7	15	100	20	20	—	—	07RS-○○(B)	A	A	A	—	HKY20F	2.0
✶2 RBH19030N	●	19.05	3	18	125	10	10	—	03FR-BLS	03RS-○○(B)	B	B	B	—	HKY20F	2.0
✶2 19040N	●	19.05	4	18	125	15	15	—	04FR-BLS	04RS-○○(B)	B	B	B	—	HKY20F	2.0
✶2 19050N	●	19.05	5	18	125	15	15	—	05HR-BLS	05RS-○○(B)	B	B	B	—	HKY20F	2.0
✶2 19060N	●	19.05	6	18	125	15	15	—	—	06RS-○○(B)	B	B	B	—	HKY20F	2.0
✶2 19070N	●	19.05	7	18	125	20	20	—	—	07RS-○○(B)	B	B	B	—	HKY20F	2.0
RBH2030N	●	20	3	12	125	10	10	—	03FR-BLS	03RS-○○(B)	A	A	B	—	HKY20F	2.0
2040N	●	20	4	13	125	15	15	—	04FR-BLS	04RS-○○(B)	A	B	B	—	HKY20F	2.0
2050N	●	20	5	14	125	15	15	—	05HR-BLS	05RS-○○(B)	A	B	B	—	HKY20F	2.0
2060N	●	20	6	15	125	15	15	—	—	06RS-○○(B)	A	B	B	—	HKY20F	2.0
2070N	●	20	7	16	125	20	20	—	—	07RS-○○(B)	A	B	B	—	HKY20F	2.0
RBH2230N	●	22	3	12	125	10	10	10	03FR-BLS	03RS-○○(B)	A	B	C	A	HKY20F	2.0
2240N	●	22	4	13	125	15	15	12.5	04FR-BLS	04RS-○○(B)	A	B	B	A	HKY20F	2.0
2250N	●	22	5	14	125	15	15	12.5	05HR-BLS	05RS-○○(B)	A	B	B	A	HKY20F	2.0
2260N	●	22	6	15	125	15	15	15	—	06RS-○○(B)	A	B	B	A	HKY20F	2.0
2270N	●	22	7	16	125	20	20	15	—	07RS-○○(B)	A	B	B	A	HKY20F	2.0
RBH2530N	●	25	3	12	150	10	10	—	03FR-BLS	03RS-○○(B)	A	B	C	—	HKY20F	2.0
2540N	●	25	4	13	150	15	15	—	04FR-BLS	04RS-○○(B)	A	C	C	—	HKY20F	2.0
2550N	●	25	5	14	150	15	15	—	05HR-BLS	05RS-○○(B)	A	C	C	—	HKY20F	2.0
2560N	●	25	6	15	150	15	15	—	—	06RS-○○(B)	A	C	C	—	HKY20F	2.0
2570N	●	25	7	16	150	20	20	—	—	07RS-○○(B)	A	C	C	—	HKY20F	2.0
NEW RBH25430N	●	25.4	3	12	150	10	10	—	03FR-BLS	03RS-○○(B)	A	B	C	—	HKY20F	2.0
NEW 25440N	●	25.4	4	13	150	15	15	—	04FR-BLS	04RS-○○(B)	A	C	C	—	HKY20F	2.0
NEW 25450N	●	25.4	5	14	150	15	15	—	05HR-BLS	05RS-○○(B)	A	C	C	—	HKY20F	2.0
NEW 25460N	●	25.4	6	15	150	15	15	—	—	06RS-○○(B)	A	C	C	—	HKY20F	2.0
NEW 25470N	●	25.4	7	16	150	20	20	—	—	07RS-○○(B)	A	C	C	—	HKY20F	2.0

✶1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008
✶2 Revised order number.

Conventional Order Number	Revised Order Number
RBH1930N	RBH19030N
1940N	19040N
1950N	19050N
1960N	19060N
1970N	19070N

● : Inventory maintained in Japan.

SQUARE TYPE HOLDER



Order Number	Stock	Dimensions (mm)					MICRO-MINI TWIN **CG**	Clamp Screw	Wrench	Torque (N • m)
		MICRO-MINI TWIN **CG**								
		B	**F1**	**L3** ✶		**S2**				
				Width of Cutting Edge 1mm	Width of Cutting Edge 2mm					
SBH1030R	●	13.8	13.8	13—17.5 (14)	14—16.5 (15)	14	03RS-10(B), 03RS-20(B)	HSC05012	HKY40R	9.5
1040R	●	14.7	14.8	18—22.5 (19)	19—21.5 (20)	15	04RS-10(B), 04RS-20(B)	HSC05012	HKY40R	9.5
1050R	●	15.6	15.8	23—27.5 (24)	24—26.5 (25)	16	05RS-10(B), 05RS-20(B)	HSC05012	HKY40R	9.5
1060R	●	16.5	16.8	23—32.5 (24)	24—31.5 (25)	17	06RS-10(B), 06RS-20(B)	HSC05012	HKY40R	9.5
1070R	●	17.4	17.8	28—38 (29)	29—37 (30)	18	07RS-10(B), 07RS-20(B)	HSC05012	HKY40R	9.5

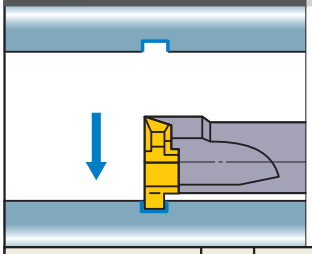
✶ L3 is the length of overhang for sufficient clamping, and ( ) is the recommended length for machining of carbon and alloy steel.

F TYPE

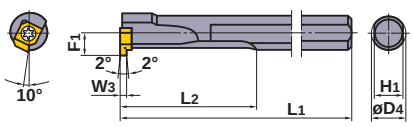
- Min. cutting diameter 10mm
- Screw-on type
- Usable for various applications.
- Max. groove depth : 3mm

FSL51

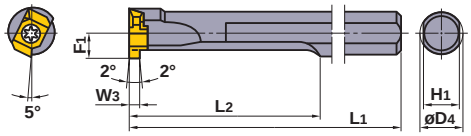
Internal grooving, Threading, Boring



1 Corner type (FSL5108R,5110R)



2 Corner type (FSL5112R,5114R,5116R)



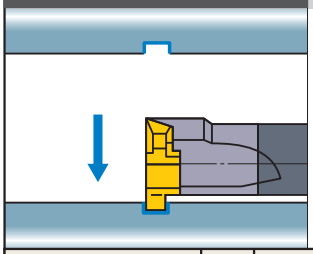
Right hand tool holder only.

Order Number	Stock	Insert Number			Dimensions (mm)						Min. Cutting Diameter (mm)	Max. Groove Depth (mm)	* Clamp Screw	Wrench
	R	Grooving	Threading	Boring	D4	L1	L2	F1	H1	W3				
FSL5108R	●	MLG10□□L	MLT1001L	MLP1004L	8	125	30	4.8	7	1.2 1.5 2.0	**10**	1.0	TS25	TKY08F
5110R	●	MLG10□□L	MLT1001L	MLP1004L	10	150	40	5.8	9		**12**	1.0	TS25	TKY08F
5112R	●	MLG14□□L	MLT1401L	MLP1404L	12	180	50	6.8	10.8	1.5 2.0 3.0	**14**	2.0	TS32	TKY08F
5114R	●	MLG14□□L	MLT1401L	MLP1404L	14	180	60	7.8	12.4		**16**	2.0	TS32	TKY08F
5116R	●	MLG20□□L	MLT2001L	MLP2004L	16	200	70	9.7	14	2.0 3.0 4.0	**20**	3.0	TS43	TKY15F

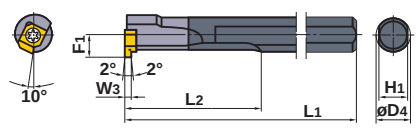
* Clamp Torque (N • m) : TS25=1.0, TS32=1.0, TS43=3.5

FSL52

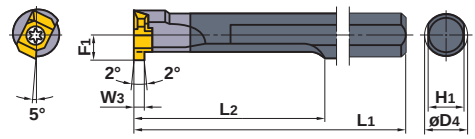
(Carbide shank) Internal grooving, Threading, Boring



1 Corner type (FSL5208R,5210R)



2 Corner type (FSL5212R,5214R,5216R)



Right hand tool holder only.

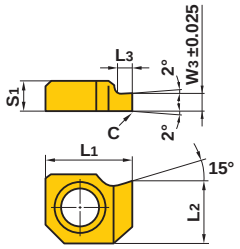
Order Number	Stock	Insert Number			Dimensions (mm)						Min. Cutting Diameter (mm)	Max. Groove Depth (mm)	* Clamp Screw	Wrench
	R	Grooving	Threading	Boring	D4	L1	L2	F1	H1	W3				
FSL5208R	●	MLG10□□L	MLT1001L	MLP1004L	8	125	60	4.8	7	1.2 1.5 2.0	**10**	1.0	TS25	TKY08F
5210R	●	MLG10□□L	MLT1001L	MLP1004L	10	150	70	5.8	9		**12**	1.0	TS25	TKY08F
5212R	●	MLG14□□L	MLT1401L	MLP1404L	12	180	80	6.8	10.8	1.5 2.0 3.0	**14**	2.0	TS32	TKY08F
5214R	●	MLG14□□L	MLT1401L	MLP1404L	14	180	85	7.8	12.4		**16**	2.0	TS32	TKY08F
5216R	●	MLG20□□L	MLT2001L	MLP2004L	16	200	115	9.7	14	2.0 3.0 4.0	**20**	3.0	TS43	TKY15F

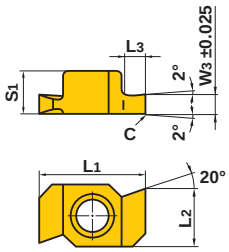
* Clamp Torque (N • m) : TS25=1.0, TS32=1.0, TS43=3.5

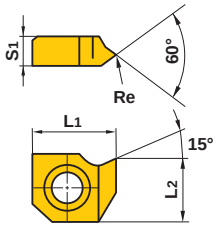
● : Inventory maintained in Japan. (10 inserts in one case)
□ : Non stock, produced to order only.

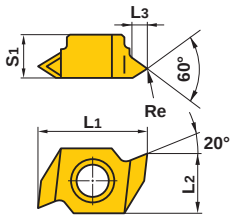
INSERTS

Application	Groove Width Thread Pitch W3 (mm)	Order Number	Coated UP20M	Carbide UTi20T	L1	L2	L3	S1	Re	C	Geometry
Grooving	1.2	**MLG1012L**	□	●	7	5	1	2.38	—	0.1	**MLG...L**
	1.5	**1015L**	□	●	7	5	1	2.38	—	0.1	
	2	**1020L**	□	●	7	5	1	2.38	—	0.1	
	1.5	**MLG1415L**		●	11.8	6.5	2	4.76	—	0.1	**MLG...L**
	2	**1420L**		●	11.8	6.5	2	4.76	—	0.1	
	3	**1430L**		●	11.8	6.5	2	4.76	—	0.1	
	2	**2020L**		●	16.8	9.03	3	6.35	—	0.1	
	3	**2030L**		●	16.8	9.03	3	6.35	—	0.1	
	4	**2040L**		●	16.8	9.03	3	6.35	—	0.1	
Threading	Pitch 1.5—2.0	**MLT1001L**	●	●	7	5	—	2.38	0.1	—	**MLT • MLP**
	Pitch 1.5—2.5	**1401L**	●	●	11.8	6.5	—	4.76	0.1	—	
	Pitch 1.5—3.5	**2001L**	●	●	16.8	9.03	—	6.35	0.1	—	
Boring	—	**MLP1004L**		●	7	5	1	2.38	0.4	—	**MLT • MLP14,20**
	—	**1404L**		●	11.8	6.3	2	4.76	0.4	—	
	—	**2004L**		●	16.8	9.03	3	6.35	0.4	—	









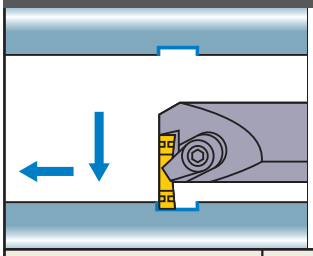
RECOMMENDED CUTTING CONDITIONS

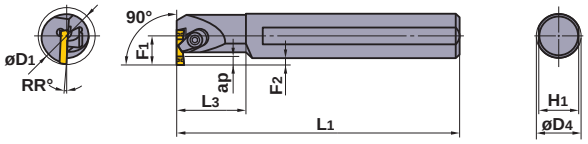
Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)			
					1.2, 1.5mm	2.0mm	3.0mm	4.0mm
P	Carbon Steel Alloy Steel	180—280HB	**UP20M • UTi20T**	90 (60—120)	0.05 (0.02—0.08)	0.05 (0.02—0.08)	0.05 (0.02—0.08)	0.05 (0.02—0.08)
		280—350HB	**UP20M • UTi20T**	80 (50—100)	0.03 (0.02—0.04)	0.03 (0.02—0.04)	0.03 (0.02—0.04)	0.03 (0.02—0.04)

F TYPE

- Clamp-on type
- This series is suitable for grooving and copying.
- Max. groove depth : 8mm

FCDG4..M — Grooving, Copying



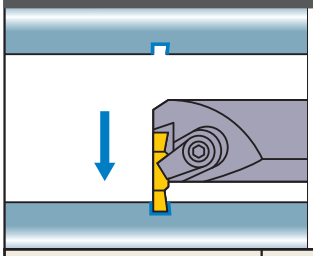


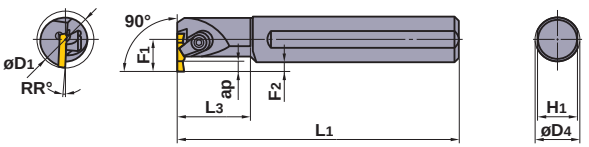
Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number	D4	L1	L3	F1	H1	RR	Min. Cutting Diameter D1 (mm)	Groove Depth (mm) ap	Groove Depth (mm) F2	* Clamp Set	Wrench
FCDG4120R/L3M	●	●	DGM30CT	20	180	32	13	18	5°	**25**	5	2.5	BC5	TKY20R
4125R/L3M	●	●		25	200	40	17	23	3°	**32**	7	4.0	BC5	TKY20R
4132R/L3M	●	●		32	250	50	22	30	1°	**40**	8	5.5	BC5	TKY20R
4120R/L4M	●	●	DGM40CT DGJ40SN	20	180	32	13	18	5°	**25**	5	2.5	BC5	TKY20R
4125R/L4M	●	●		25	200	40	17	23	3°	**32**	7	4.0	BC5	TKY20R
4132R/L4M	●	●		32	250	50	22	30	1°	**40**	8	5.5	BC5	TKY20R

∗ Clamp Torque (N • m) : BC5=5.0

FCDG4..J — Grooving





Right hand tool holder shown.

Order Number	Stock R	Stock L	Insert Number	D4	L1	L3	F1	H1	RR	Min. Cutting Diameter D1 (mm)	Groove Depth (mm) ap	Groove Depth (mm) F2	* Clamp Set	Wrench
FCDG4120R/L4J	●	●	DGJ□□□SNL/R DGJ40SN	20	180	32	13	18	5°	**25**	5	2.5	BC5	TKY20R
4125R/L4J	●	●		25	200	40	17	23	3°	**32**	5	4.0	BC5	TKY20R
4132R/L4J	●	●		32	250	50	22	30	1°	**40**	5	5.5	BC5	TKY20R

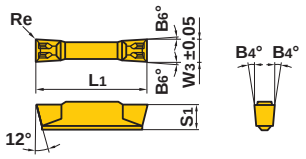
(Note) When using insert with right or left hand breaker,
please use left hand insert for right hand holder and right hand insert for left hand holder.

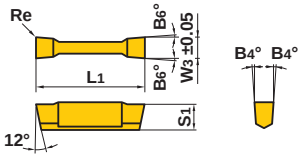
∗ Clamp Torque (N • m) : BC5=5.0

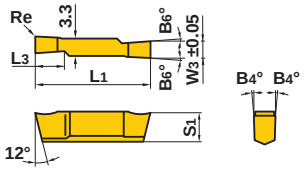
● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

INSERTS

Order Number	Stock: Coated UE6020	Coated US735	Coated VP20MF	Cermet NX2525	Cermet NX55	Carbide UTi20T	Carbide	Groove Width W3 (mm)	Dimensions (mm): L1	L3	S1	Re	B4	B6	Geometry
DGM30CT	●	●	●	●	▲			3	20	—	5	0.4	3°	1°30′	DGM...CT
40CT	●	●	●	●	▲			4	20	—	5	0.4	5°	2°	
DGJ40SN				□	▲	●		4	20	—	5	0.2	2°	2°	DGJ...SN
DGJ100SNR					▲	●		1	20	2	5	0.2	2°	2°	DGJ...SNR/L
100SNL				□	▲	●		1	20	2	5	0.2	2°	2°	
150SNR					▲	●		1.5	20	3	5	0.2	2°	2°	
150SNL				□	▲	●		1.5	20	3	5	0.2	2°	2°	
200SNR				□	▲	●		2	20	4	5	0.2	2°	2°	
200SNL				□	▲	●		2	20	4	5	0.2	2°	2°	
250SNR					▲	●		2.5	20	4	5	0.2	2°	2°	
250SNL				□	▲	●		2.5	20	4	5	0.2	2°	2°	
300SNR					▲	●		3	20	5	5	0.2	2°	2°	
300SNL				□	▲	●		3	20	5	5	0.2	2°	2°	
350SNR					▲	●		3.5	20	5	5	0.2	2°	2°	
350SNL					▲	●		3.5	20	5	5	0.2	2°	2°	





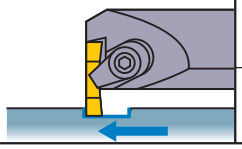
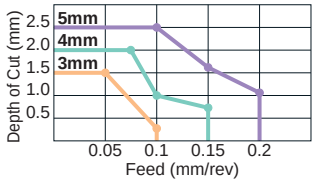


RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev): Groove Width 3mm	Groove Width 4mm	Groove Width 5mm
P	Mild Steel	≤180HB	UE6020 • NX2525 UTi20T	120 (100—150)	0.08 (0.05—0.1)	0.1 (0.08—0.15)	0.15 (0.1—0.2)
P	Carbon Steel • Alloy Steel	180—280HB	UE6020 • NX2525 UTi20T	100 (80—120)	0.08 (0.05—0.1)	0.1 (0.08—0.15)	0.12 (0.1—0.15)
M	Stainless Steel	≤200HB	US735 • UTi20T	80 (60—100)	0.08 (0.05—0.1)	0.1 (0.08—0.15)	0.12 (0.1—0.15)
K	Gray Cast Iron	Tensile Strength ≤350MPa	UTi20T	80 (60—100)	0.08 (0.05—0.1)	0.1 (0.08—0.15)	0.15 (0.1—0.2)

(Note) Wet cutting is recommended.

●TRAVERSE MACHINING

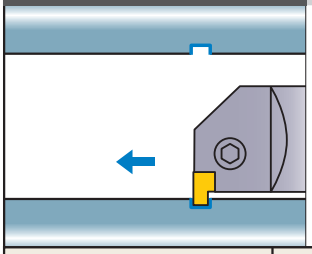
Cutting Mode	Cutting Conditions	Insert Width: 3mm	4mm	5mm	Application Range
These conditions are used for cutting Carbon Steel(180—280HB) at vc=100m/min. Wet cutting is recommended. 	Max. Depth of Cut (mm)	1.5	2.0	2.5	
	Max. Feed (mm/rev)	0.1	0.15	0.2	

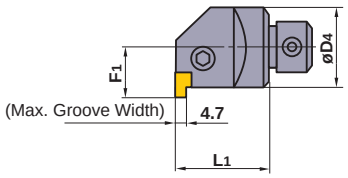
SPARE PARTS E001
TECHNICAL DATA F001

D TYPE BORING HEAD

- Min. cutting diameter : 40mm
- Pin lock type
- Exchangeable head type
- Groove width 1.25—4.7mm

DPT4 Internal grooving





Right hand tool holder only.

Order Number	Stock	Insert Number	Dimensions (mm)			Min. Cutting Diameter (mm)	Lock Pin	Lock Screw *	Stop Ring	Wrench
	R		D4	L1	F1					
DPT4132R	●	MGTL43○○○	32	40	20	40	P21S	HSP08014	E01	HKY40R
4140R	●		40	50	25	50	P21S	HSP08014	E01	HKY40R

(Note) Please use left hand insert.

∗ Clamp Torque (N • m) : HSP08014=7.0

STANDARD ARBOR FOR D TYPE BORING HEAD

① B ② 1 ③ 32 ④ 32

①Designation

②Arbor Length (mm)

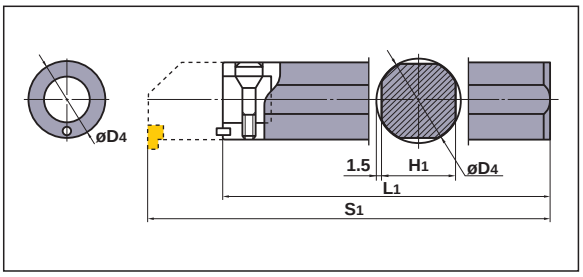
Symbol	D4	L1	S1
1	32	260	300
	40	310	360

③Arbor Diameter (mm)

Symbol	Diameter (D4)
32	32
40	40

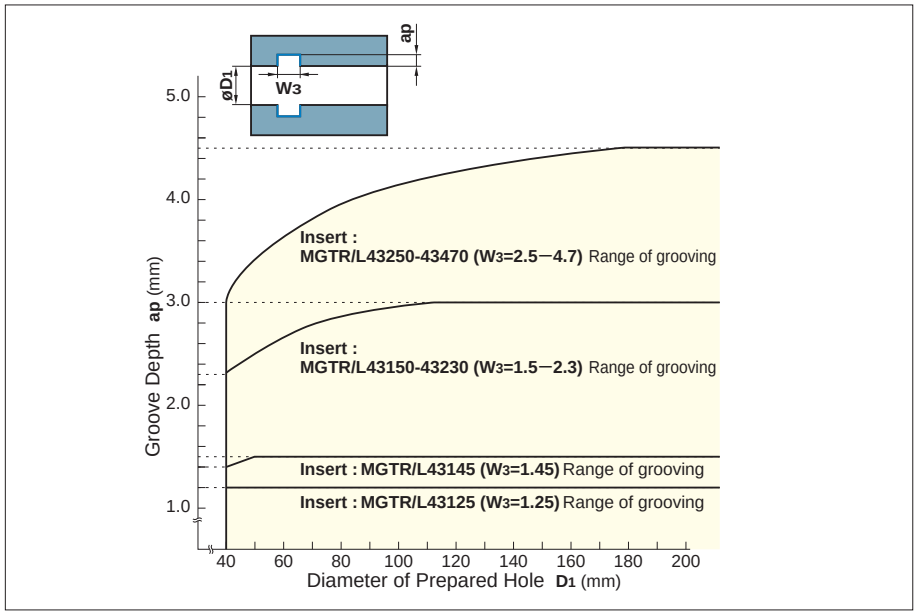
④Head Diameter (mm)

Symbol	Diameter (D4)
32	32
40	40



Order Number	Stock	Dimensions (mm)				Set Bolt	Wrench	Head Order Number
		D4	L1	H1	S1			
B13232	●	32	260	29	300	SD32	HKY60R	DPT4132R
B14040	●	40	310	37	360	SD40	HKY60R	DPT4140R

Relationship between prepared hole and groove depth for DPT4 type

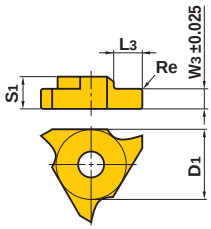


● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.

▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

INSERTS

Order Number	Stock				Groove Width W_3 (mm)	Dimensions (mm)				Geometry
	Coated	Cermet		Carbide						
	VP20MF	NX2525	NX55	UTi20T		L_3	D_1	S_1	Re	
MGTL43125	●	□	▲	●	1.25	1.2	12.7	4.76	0.2	**MGTL...**
43145	□	□		□	1.45	1.5	12.7	4.76	0.2	
43150	●	●	▲	●	1.5	3.0	12.7	4.76	0.2	
43175	●	□		●	1.75	3.0	12.7	4.76	0.2	
43200	●	●	▲	●	2	3.0	12.7	4.76	0.2	
43230	●	●	▲	●	2.3	3.0	12.7	4.76	0.2	
43250	●	●	▲	●	2.5	4.5	12.7	4.76	0.3	
43260	□			●	2.6	4.5	12.7	4.76	0.3	
43270	□			□	2.7	4.5	12.7	4.76	0.3	
43280	●	□	▲	●	2.8	4.5	12.7	4.76	0.3	
43300	●	●	▲	●	3	4.5	12.7	4.76	0.3	
43320	●		▲	●	3.2	4.5	12.7	4.76	0.3	
43330	●	□	▲	●	3.3	4.5	12.7	4.76	0.3	
43350	□	□	▲	●	3.5	4.5	12.7	4.76	0.3	
43400	●		▲	●	4	4.5	12.7	4.76	0.3	
43420	□			□	4.2	4.5	12.7	4.76	0.4	
43430	□		▲	●	4.3	4.5	12.7	4.76	0.4	
43450	●	●	▲	●	4.5	4.5	12.7	4.76	0.4	
43470	□	□		□	4.7	4.5	12.7	4.76	0.4	



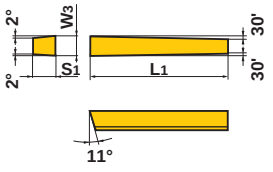
RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel Alloy Steel	180—280HB	**VP20MF**	120 (100—140)	0.14 (0.03—0.25)
			NX2525	130 (100—160)	0.12 (0.03—0.2)
M	Stainless Steel	≤200HB	**VP20MF**	120 (100—140)	0.12 (0.03—0.18)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP20MF**	120 (100—140)	0.12 (0.03—0.18)

(Note) For machining a narrow groove, apply a lower feed within the recommended range.

OTHER TYPES OF INSERTS FOR CUTTING OFF

Order Number	Stock			Dimensions (mm)			Geometry
	Carbide						
	UTi20T	HTi10		W_3	S_1	L_1	
CFT1	●			3	5	30	**CF Holder**
3	●	●		4	5	40	



SPARE PARTS E001
TECHNICAL DATA F001

HOW TO READ THE STANDARD OF THREADING

●How this section page is organized

①Classified according to external or internal applications.
②Sub-classified according to product series.
(Refer to the index on the next page.)

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict the available machining applications, such as external and internal threading.

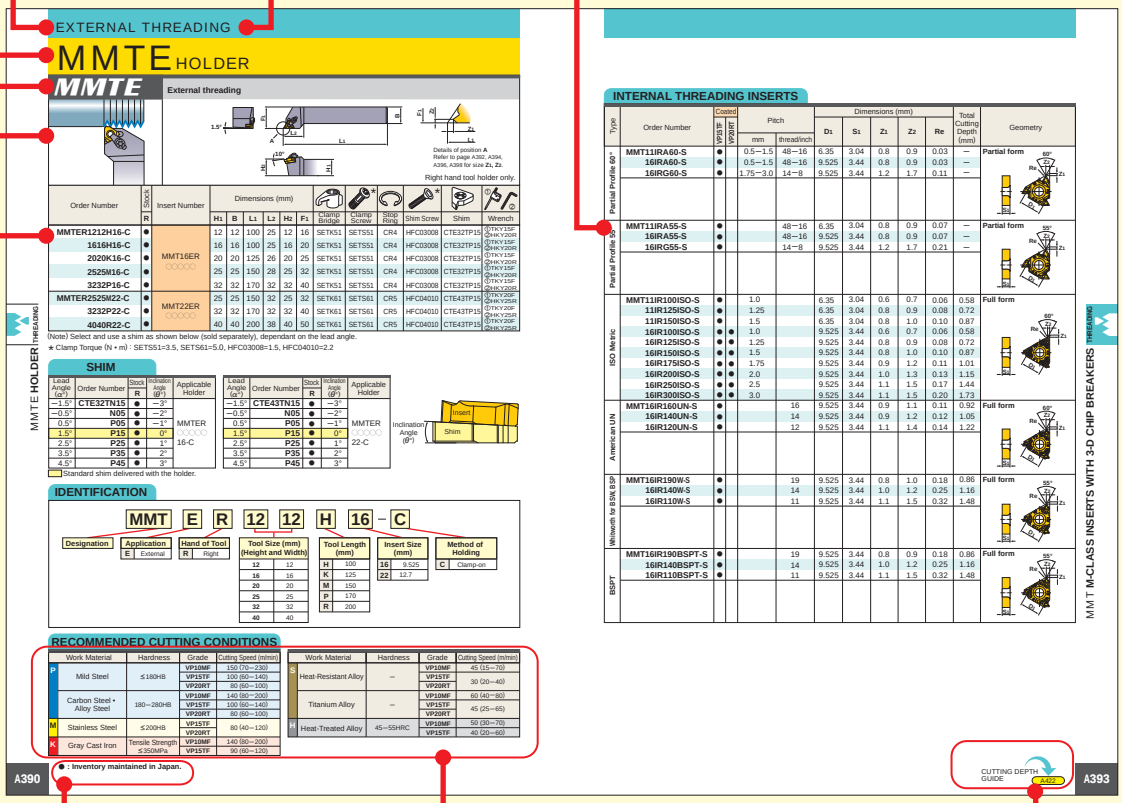
TYPE OF TOOL HOLDER
indicates the initial letters for the order number and cutting applications.

TITLE OF PRODUCT

PRODUCT SECTION

INDICATION OF EXTERNAL /INTERNAL APPLICATION

STANDARDS FOR APPLICABLE INSERTS
indicates stock status, dimensions, etc. for applicable inserts.



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

PAGE REFERENCE ·SPARE PARTS
indicates reference pages, including the above, on the right hand page of each double-page spread.

PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), applicable inserts, holder dimensions, and spare parts.

RECOMMENDED CUTTING CONDITIONS
for each work material classification, indicates recommended cutting conditions according to the ISO categories for cutting grades, P, M, K, S, and H.

●To Order : For holder, please specify ①order number and hand of tool (right/left).
For insert, please specify ①insert number and ②grade.

TURNING TOOLS

THREADING

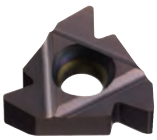
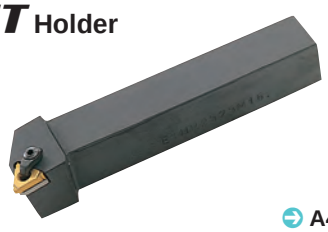
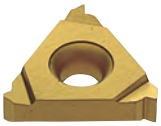
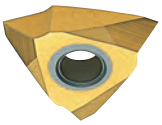
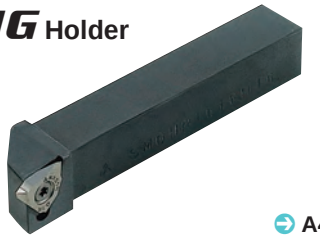
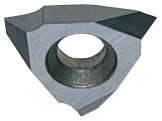
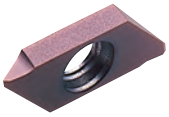
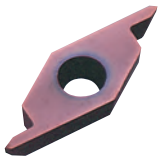
CLASSIFICATION (EXTERNAL THREADING) ····· A380
CLASSIFICATION (INTERNAL THREADING) ····· A381
CROSS REFERENCE OF THREAD PITCHES
EXTERNAL ····· A382
INTERNAL ····· A384
STANDARD THREAD AND CORRESPONDING INSERT • HOLDER ··· A386

STANDARD OF THREADING TOOLS
FEATURES OF MMT SERIES ····· A388
EXTERNAL THREADING
MMTE HOLDER ····· A390
SET HOLDER ····· A400
MT HOLDER ····· A404
SMG HOLDER ····· A406
INTERNAL THREADING
MMTI TYPE BORING BARS ····· A391
SNT TYPE BORING BARS ····· A402
MICRO-MINI TWIN BORING BARS ····· A408
F TYPE BORING BARS ····· A412
D TYPE BORING HEAD ····· A414
THREADING METHOD ····· A416
STANDARD OF DEPTH OF CUT ····· A420
TROUBLE SHOOTING ····· A424

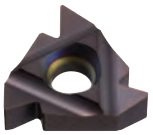
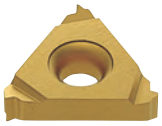
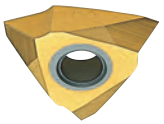
*Arranged by Alphabetical order

A408 **CT**
A414 **DPT2**
A412 **FSL51**
A412 **FSL52**
A413 **MLG (INSERTS)**
A413 **MLP (INSERTS)**
A413 **MLT (INSERTS)**
A392 **MMT (INSERTS)**
A390 **MMTE**
A391 **MMTI**
A404 **MT1**
A404 **MTH**
A405 **MTT (INSERTS)**
A415 **MTT (INSERTS)**
A410 **RBH**
A411 **SBH**
A401 **SET (INSERTS)**
A400 **SETH**
A406 **SMGH**
A407 **SMGT (INSERTS)**
A407 **SMTT (INSERTS)**
A403 **SNT (INSERTS)**
A402 **SNTF**

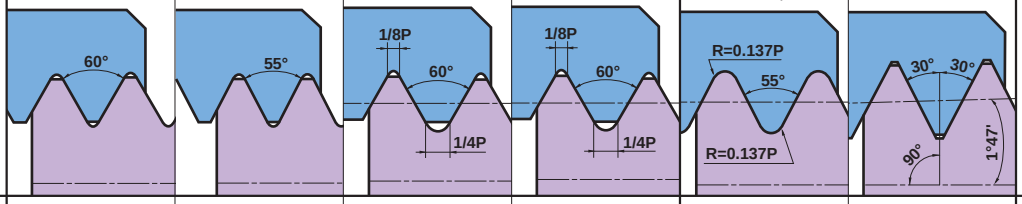
CLASSIFICATION (EXTERNAL THREADING)

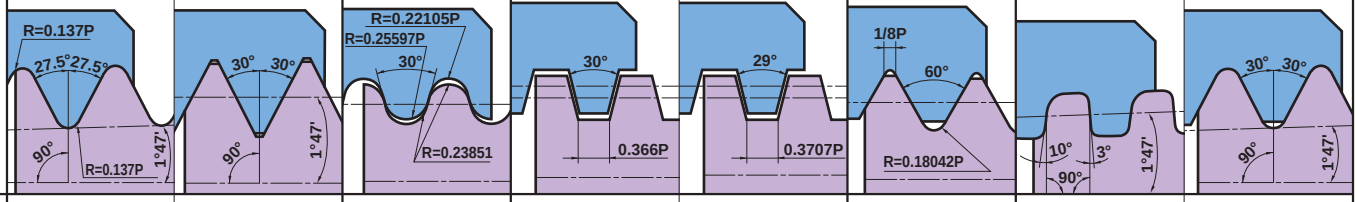
Name of Tool Holder	Insert Shape	Features	Shank Size (H x W x L) (mm)
MMTE Holder A390		● Various insert types. ● M-class 3-D breaker inserts and G-class ground inserts available. ● Available with a wiper cutting edge to provide a precise thread geometry. ● Able to change lead angle by replacing shim.	12 x 12 x 100 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150 32 x 32 x 170 40 x 40 x 200
SET Holder  A400		● Clamp-on type. ● Various insert types. ● Inserts with a chip breaker give excellent chip control.	16 x 16 x 100 20 x 20 x 125 25 x 25 x 150
MT Holder A404		● Clamp-on type. ● Precision class insert. ● Positive insert suffers from negligible chattering and thus produces good finished surface.	16 x 16 x 100 20 x 20 x 125 25 x 25 x 150 32 x 32 x 170
SMG Holder  A406		● Screw-on type. ● Precision class insert. ● Positive insert suffers from negligible chattering and thus produces good finished surface. ● Holder is capable of performing both threading and grooving.	10 x 10 x 70 12 x 12 x 80 16 x 16 x 100 20 x 20 x 125 25 x 25 x 150
SMALL TOOLS **TTAH** A256		● Tools to be equipped on Gang type tool posts. ● Small Shank: 8mm—16mm ● High rigidity due to designing of vertical insert. ● The screw designed for common use on front and back enables back clamping. ● Most suitable for threading diameters of 2 mm or smaller. ● Screw-on type.	8 x 10 x 120 10 x 10 x 120 12 x 12 x 120 16 x 16 x 120
CSVH A259		● Tools to be equipped on Cam type tool posts. ● Small Shank: 7mm—12mm ● Single holder for front turning, back turning, grooving, threading and cutting off operations. ● The most suitable for machining of small parts with work diameter ϕ5mm or less. ● Screw-on type.	7 x 7 x 140 8 x 8 x 140 9.5 x 9.5 x 140 10 x 10 x 140 12 x 12 x 140

CLASSIFICATION (INTERNAL THREADING)

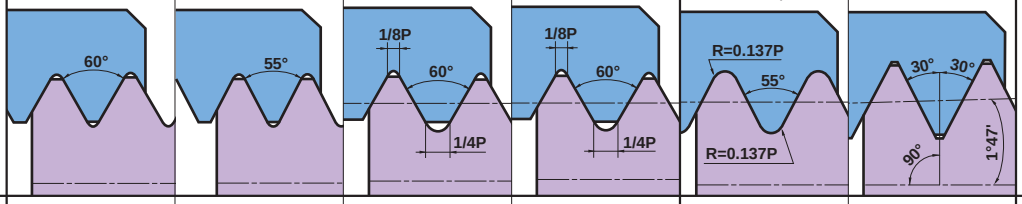
Name of Tool Holder	Insert Shape	Features	Shank Size (Dia. x L x Min. Cutting Dia.) (mm)
MMTI A391		● Minimum cutting diameter 12mm. ● Various insert types. ● M-class 3-D breaker inserts and G-class ground inserts available. ● Available with a wiper cutting edge to provide a precise thread geometry. ● Able to change lead angle by replacing shim.	16 x 125 x 13 16 x 150 x 15 20 x 170 x 24 25 x 200 x 29 32 x 250 x 37 40 x 300 x 46
SNT A402		● Minimum cutting diameter 12mm. ● Screw-on type. ● Various insert shapes and grades. ● Inserts with a chip breaker give excellent chip control.	16 x 125 x 12 20 x 150 x 19 25 x 170 x 24 25 x 200 x 29
FSL5 A412		● Minimum cutting diameter 10mm. ● Screw-on type. ● Precision class insert. ● Applicable for threading, grooving and boring. ● Available with a carbide shank to prevent vibration when machining deep holes.	8 x 125 x 10 10 x 150 x 12 12 x 180 x 14 14 x 180 x 16 16 x 200 x 20
DPT2 A414		● Minimum cutting diameter 40mm. ● Pin lock type. ● Precision class insert. ● Exchangeable head type.	32 x 300 x 40 40 x 360 x 50
MICRO-MINI TWIN Boring Bars A408	–	● Minimum cutting diameter 3mm. ● Solid carbide type. ● Economical two cutting edge type.	3 x 50 x 3 4 x 60 x 4.5 5 x 70 x 6 6 x 75 x 7
MICRO-MINI Boring Bars A286	–	● Minimum cutting diameter 3.2mm. ● Solid carbide type. ● Insert can be ground to suit the application.	3 x 80 x 3.2 4 x 80 x 4.2 5 x 100 x 5.2

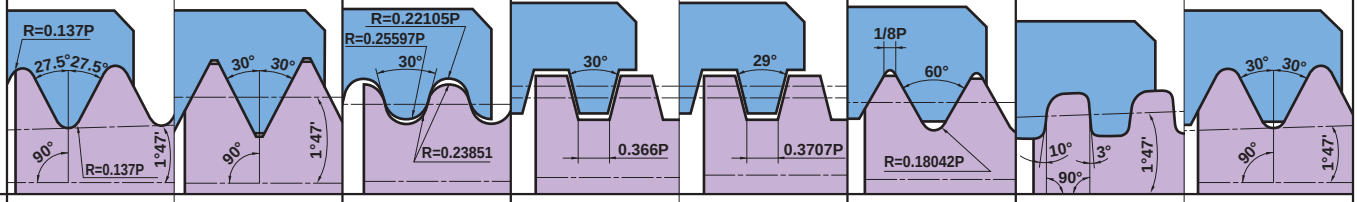
CROSS REFERENCE THREAD PITCH (EXTERNAL)

Application		General machining				Pipe fittings and couplings for gas and water		
Type		Partial Profile 60°	Partial Profile 55°	ISO Metric	American UN	Parallel Pipe Thread Whitworth for BSW, BSP	American NPT	
								
Symbol		M UNC UNF	W	M	UNC UNF	G Rp W	NPT	
Holder	Pitch	mm (thread/inch)	thread/inch	mm	thread/inch	thread/inch	thread/inch	
MMT Holder A390	Full form	–	–	0.5–5.0	32–5	28–5	27, 18, 14 11.5, 8	
	Partial form	0.5–5.0 (48–5)	48–5	0.5–5.0	48–5	–	–	
SET Holder A400	Full form	–	–	1.0–3.0	24, 20 16, 14, 12	19, 14 12, 11	–	
	Partial form	0.5–3.0 (48–8)	48–8	0.5–3.0	48–8	–	–	
MT Holder A404	Partial form	0.25–4.5 (64–6)	20–9	0.25–4.5	64–6	–	–	
SMG Holder A406	Partial form	0.25–2.0 (48–13)	–	0.25–2.0	48–13	–	–	

	Steam, gas and water line pipes		Pipe couplings for food and fire fighting industries	Motion transmissions		Aircraft and aerospace	Oil and gas	
	Taper Pipe Thread BSPT	American NPTF	Round DIN 405	ISO Trapezoidal 30°	American ACME	UNJ	API Buttress Casing	API Round Casing&Tubing
							
	R Rc	NPTF	Rd	Tr	ACME	UNJ	BCSG	CSG LCSG
	thread/inch	thread/inch	thread/inch	mm	thread/inch	thread/inch	thread/inch	thread/inch
	28, 19 14, 11	27, 18, 14 11.5, 8	10, 8 6, 4	1.5, 2 3, 4, 5	12, 10 8, 6, 5	32—8	5	10, 8
	–	–	–	–	–	–	–	–
	19, 14, 11	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–

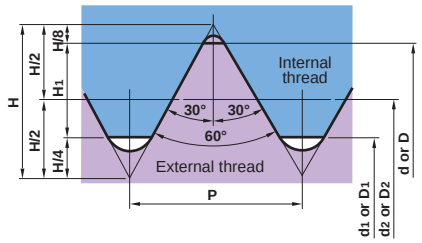
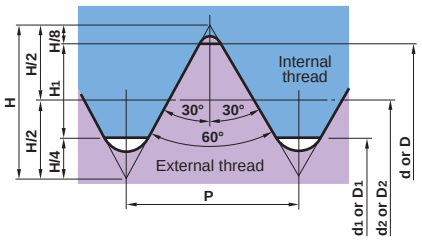
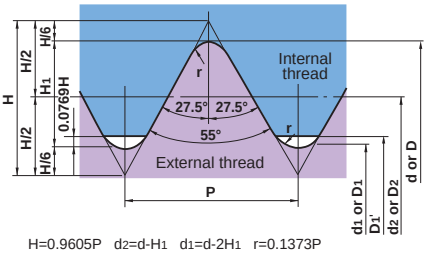
CROSS REFERENCE THREAD PITCH (INTERNAL)

Application		General machining				Pipe fittings and couplings for gas and water		
Type		Partial Profile 60°	Partial Profile 55°	ISO Metric	American UN	Parallel Pipe Thread Whitworth for BSW, BSP	American NPT	
								
Symbol		M UNC UNF	W	M	UNC UNF	G Rp W	NPT	
Holder	Pitch	mm (thread/inch)	thread/inch	mm	thread/inch	thread/inch	thread/inch	
MMT **Boring Bars** A391	Full form	–	–	0.5–5.0	32–5	28–5	27, 18, 14 11.5, 8	
	Partial form	0.5–5.0 (48–5)	48–5	0.5–5.0	48–5	–	–	
SNT **Boring Bars** A402	Full form	–	–	1.0–3.0	24, 20 16, 14, 12	19, 14 12, 11	–	
	Partial form	0.5–3.0 (48–8)	48–8	0.5–3.0	48–8	–	–	
FSL5 **Boring Bars** A412	Partial form	1.5–3.5 (16–8)	–	1.5–3.5	16–8	–	–	
DPT2 **Boring Head** A414	Partial form	0.25–4.5 (64–6)	–	0.25–4.5	64–6	–	–	
MICRO-MINI TWIN A408	Partial form	0.5–1.75 (36–16)	–	0.5–1.75	36–16	–	–	

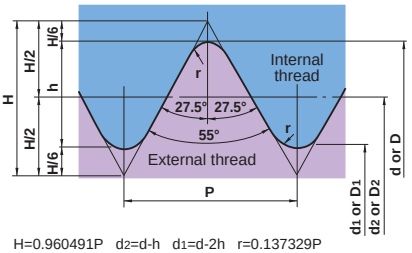
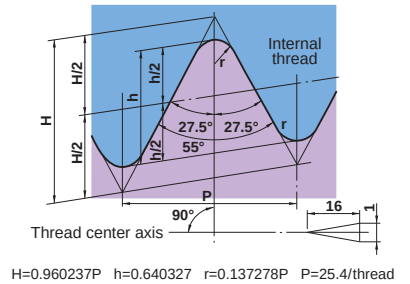
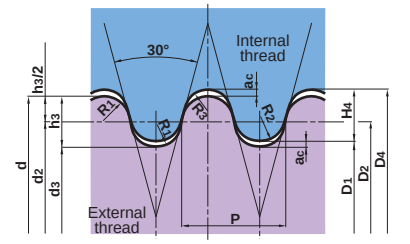
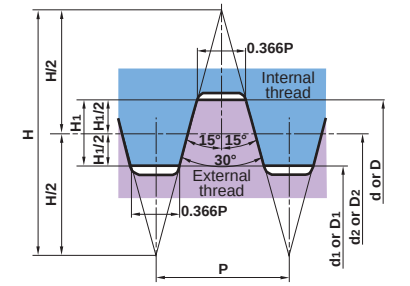
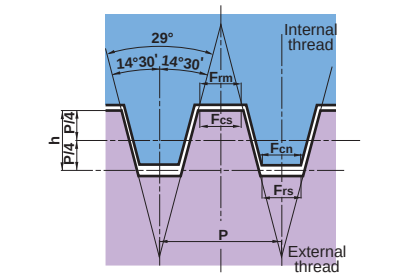
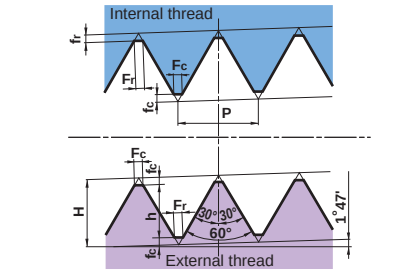
	Steam, gas and water line pipes		Pipe couplings for food and fire fighting industries	Motion transmissions		Aircraft and aerospace	Oil and gas	
	Taper Pipe Thread BSPT	American NPTF	Round DIN 405	ISO Trapezoidal 30°	American ACME	UNJ	API Buttress Casing	API Round Casing&Tubing
							
	R Rc	NPTF	Rd	Tr	ACME	UNJ	BCSG	CSG LCSG
	thread/inch	thread/inch	thread/inch	mm	thread/inch	thread/inch	thread/inch	thread/inch
	19, 14, 11	14, 11.5, 8	10, 8 6, 4	1.5, 2 3, 4, 5	12, 10 8, 6, 5	–	5	10, 8
	–	–	–	–	–	* –	–	–
	19, 14, 11	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–

* When machining an internal UNJ thread, cut an internal hole with the appropriate diameter. Then machine with 60° American UN. In this case, a full form type insert cannot be used.

STANDARD THREAD AND CORRESPONDING INSERT • HOLDER

Thread Name	Standard Thread Type	Type	Ext./Int.	Insert Number	Wiper/ General	Tool Holder	Page
ISO Metric	 H=0.866025P d₂=d-0.649519P H₁=0.541266P d₁=d-1.082532P D=d D₂=d₂ D₁=d₁	M	Ext.	MMT○○ER○○○ISO	Wiper	MMTER○○○○○-C	A390
				MMT○○ER○○○ISO-S	Wiper		
				MMT○○ER○○○60	General		
				MMT○○ER○○○60-S	General		
				SET○○○R3XMM	Wiper	SETHR○○○○○16	A400
				SET○○○○R3XMM	General		
				SMTTR/L160360○○	General	SMGHR/L○○○○16	A406
				MTTR/L4360○○	General	MTHR/L○○○○○4 MT1R/L○○○○○4	A404
			Int.	MMT○○IR○○○ISO	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	A391
				MMT○○IR○○○ISO-S	Wiper		
				MMT○○IR○○○60	General		
				MMT○○IR○○○60-S	General		
				SNT○○○R3XMM	Wiper	SNTF○○○R	A402
				SNT○○○○R3XMM	General		
				MTTR/L4360○○	General	DPT2○○○R	A414
American UN	 H=0.866025×25.4/n d₂=(d-0.649519/n)×25.4 H₁=0.541266×25.4/n d₁=(d-1.082532/n)×25.4 d=(d)×25.4 D=d D₂=d₂ D₁=d₁ P=25.4/thread	UNC UNF	Ext.	MMT○○ER○○○UN	Wiper	MMTER○○○○○-C	A390
				MMT○○ER○○○UN-S	Wiper		
				MMT○○ER○○○60	General		
				MMT○○ER○○○60-S	General		
				SET○○○○R3XMUN	Wiper	SETHR○○○○○16	A400
				SET○○○R3XMM	General		
				SMTTR/L160360○○	General	SMGHR/L○○○○16	A406
				MTTR/L4360○○	General	MTHR/L○○○○○4 MT1R/L○○○○○4	A404
			Int.	MMT○○IR○○○UN	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	A391
				MMT○○IR○○○UN-S	Wiper		
				MMT○○IR○○○60	General		
				MMT○○IR○○○60-S	General		
				SNT○○○R3XMUN	Wiper	SNTF○○○R	A402
				SNT○○○R3XMM	General		
				MTTR/L4360○○	General	DPT2○○○R	A414
Whitworth for BSW, BSP	 H=0.9605P d₂=d-H₁ d₁=d-2H₁ r=0.1373P H₁=0.6403P D₁'=d₁+2×0.0769H D=d D₂=d₂ D₁=d₁ P=25.4/thread	W	Ext.	MMT○○ER○○○W	Wiper	MMTER○○○○○-C	A390
				MMT○○ER○○○W-S	Wiper		
				MMT○○ER○○○55	General		
				MMT○○ER○○○55-S	General		
				SET○○○R3XMP	Wiper	SETHR○○○○○16	A400
				SET○○○○R3XMP	General		
				MTTR/L4355○○	General	MTHR/L○○○○○4 MT1R/L○○○○○4	A404
			Int.	MMT○○IR○○○W	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	A391
				MMT○○IR○○○W-S	Wiper		
				MMT○○IR○○○55	General		
				MMT○○IR○○○55-S	General		
				SNT○○○R3XMP	Wiper	SNTF○○○R	A402
				SNT○○○○R3XMP	General		
				MTTR/L4355○○	General	DPT2○○○R	A414

Wiper : Insert order number is determined by selected pitch.
General : An insert is applicable to several pitch types.

Thread Name	Standard Thread Type	Type	Ext./Int.	Insert Number	Wiper/ General	Tool Holder	Page
Parallel Pipe Thread	 H=0.960491P d2=d-h d1=d-2h r=0.137329P h=0.640327 D=d D2=d2 D1=d1 25.4/thread	PF G Rp	Ext.	MMT○○ER○○○W	Wiper	MMTER○○○○○-C	A390
				MMT○○ER○○○W-S	Wiper		
				SET○○○R3XMP	Wiper	SETHR○○○○○16	A400
			Int.	MMT○○IR○○○W	Wiper	MMTIR○○A○○○-SP○	A391
				MMT○○IR○○○W-S	Wiper	MMTIR○○A○16-C	
				SNT○○○R3XMP	Wiper	SNTF○○○R	A402
BSPT	 H=0.960237P h=0.640327 r=0.137278P P=25.4/thread	BSPT	Ext.	MMT○○ER○○○BSPT	Wiper	MMTER○○○○○-C	A390
				MMT○○ER○○○BSPT-S	Wiper		
				SET○○○R3XMPT	Wiper	SETHR○○○○○16	A400
			Int.	MMT○○IR○○○BSPT	Wiper	MMTIR○○A○○○-SP○	A391
				MMT○○IR○○○BSPT-S	Wiper	MMTIR○○A○16-C	
				SNT○○○R3XMPT	Wiper	SNTF○○○R	A402
Round DIN 405	 ac=0.05×P h3=H4=0.5×P R1=0.238507×P R2=0.255967×P R3=0.221047×P	Rd	Ext.	MMT○○ER○○○RD	Wiper	MMTER○○○○○-C	A390
			Int.	MMT○○IR○○○RD	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	A391
ISO Trapezoidal 30°		Tr	Ext.	MMT○○ER○○○TR	Wiper	MMTER○○○○○-C	A390
			Int.	MMT○○IR○○○TR	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	A391
American ACME		ACME	Ext.	MMT○○ER○○○ACME	Wiper	MMTER○○○○○-C	A390
			Int.	MMT○○IR○○○TACME	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	A391
American NPT	 H=0.866025P h=0.800000p	NPT	Ext.	MMT○○ER○○○NPT	Wiper	MMTER○○○○○-C	A390
			Int.	MMT○○IR○○○NPT	Wiper	MMTIR○○A○○○-SP○ MMTIR○○A○16-C	A391

Wiper : Insert order number is determined by selected pitch.
General : An insert is applicable to several pitch types.

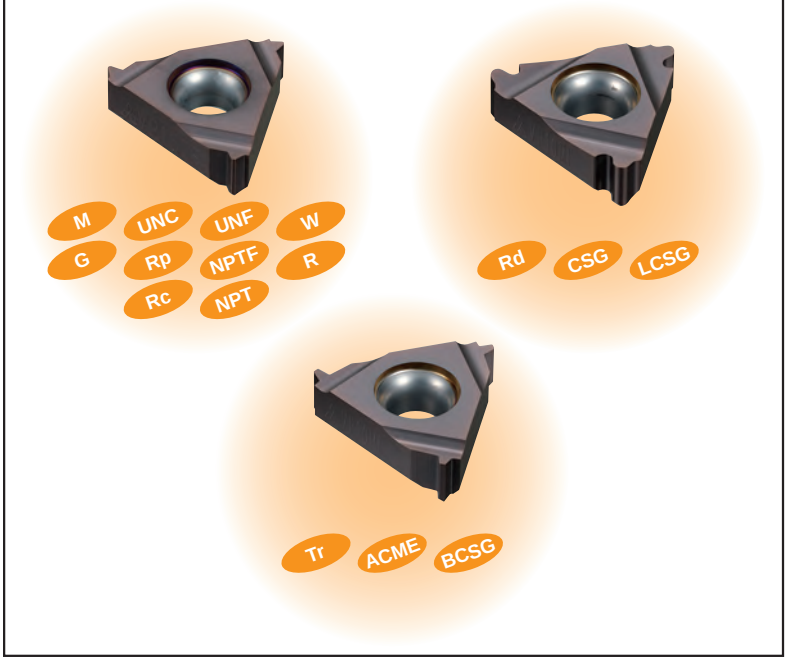
FEATURES OF MMT SERIES

A WIDE VARIETY OF PRODUCTS

Mitsubishi Miracle Threading (MMT) series. 283 inserts and 26 holders.

M-CLASS INSERTS WITH 3-D CHIP BREAKERS

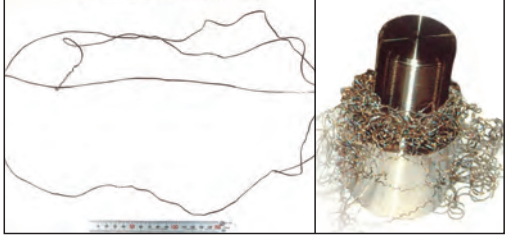
G-CLASS GROUND INSERTS



IDEAL CHIP CONTROL EVEN IN THE LATTER HALF OF PASSES WHEN CONTINUOUS CHIPS ARE USUALLY PRODUCED. (M-CLASS INSERTS WITH 3-D CHIP BREAKERS)

ISO metric external thread pitch 1.5mm Final pass (6th pass)

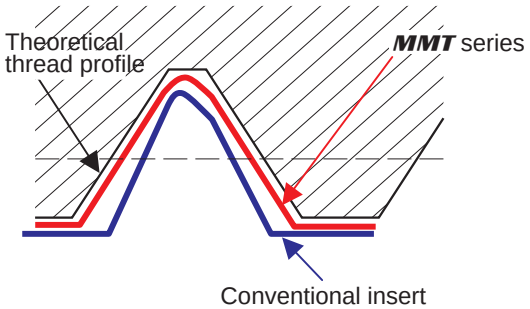
Competitor



MMT

<Cutting Conditions>
Workpiece : JIS SCM440
Insert : MMT16ER150ISO-S
Grade : VP15TF
Cutting speed : 120m/min
Cutting method : Radial Infeed
Depth of cut : Fixed cut area
Pass : 6 times
Coolant : Wet

A HIGHER LEVEL OF PRECISION THAN CONVENTIONAL INSERTS (G-CLASS GROUND INSERTS)

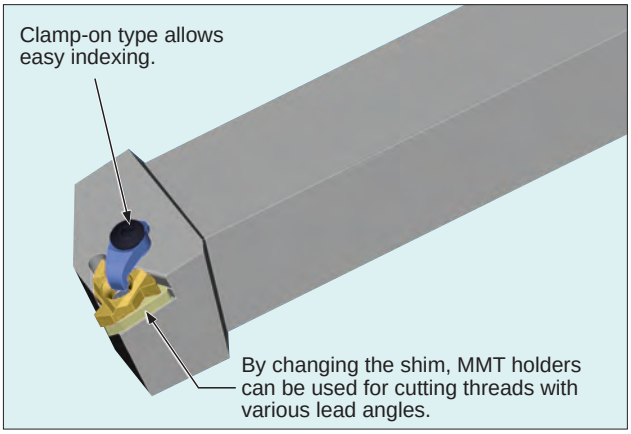


High precision threading can be achieved by using MMT inserts that feature a ground rake face and peripheral cutting edge.

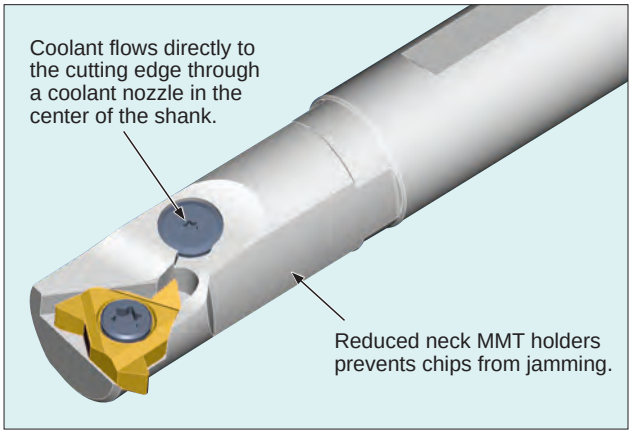
Thread Type	Threading Tolerance
ISO Metric	6g / 6H
American UN	2A / 2B
Whitworth for BSW, BSP	Medium Class A
BSPT	Standard BSPT
Round DIN 405	7h / 7H
ISO Trapezoidal 30°	7e / 7H
American ACME	3G
UNJ	3A
API Buttress Casing	Standard API
API Rounded Casing & Tubing	Standard API RD
American NPT	Standard NPT
American NPTF	Class2

HOLDER (Use of special surface treatment)

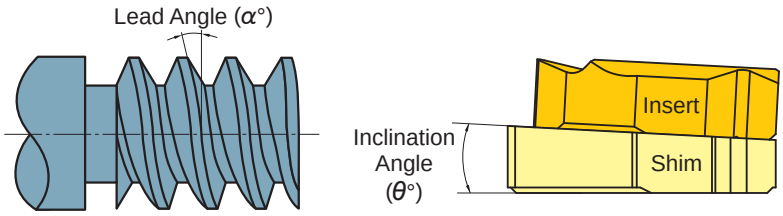
External



Internal



SUITABLE FOR THREADING WITH A LARGE LEAD ANGLE



By changing only the shim, MMT holders can be used for turning of threads with various lead angles as well as the turning of left hand threads.

Lead Angle (α°)	Inclination Angle (θ°)
−1.5°	−3°
−0.5°	−2°
0.5°	−1°
1.5°	0°
2.5°	1°
3.5°	2°
4.5°	3°

Standard shim delivered with the holder.

GRADE

VP10MF (G-class ground insert only)

● Superior wear and plastic deformation resistance

- High wear and plastic deformation resistance for threading when maintaining the thread form is important. Suitable for continuous high precision machining with extensive tool life.
- Effective in combination with G-class inserts for high precision threading.

VP15TF (G-class ground insert, M-class insert with 3-D chip breakers)

● Wide versatility

- High fracture resistance during low rigidity applications such as bar feed machining. Able to withstand harsh conditions for long periods where conventional inserts would be liable to breakage.
- Effective combination of high cost performance M-class inserts with 3-D chip breakers.

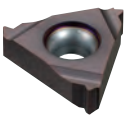
VP20RT (G-class ground insert, M-class insert with 3-D chip breakers)

● Excellent fracture resistance

- Suitable for stainless steel boring and unstable machining where inserts are vulnerable to fracturing.
- Effective combination of high cost performance M-class inserts with 3-D chip breakers.

CHOOSING M-CLASS INSERTS WITH 3-D CHIP BREAKERS OR G-CLASS INSERTS

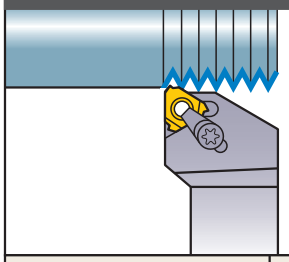
Insert	Chip control	Precision of thread
M-class inserts with 3-D chip breakers	◎	○

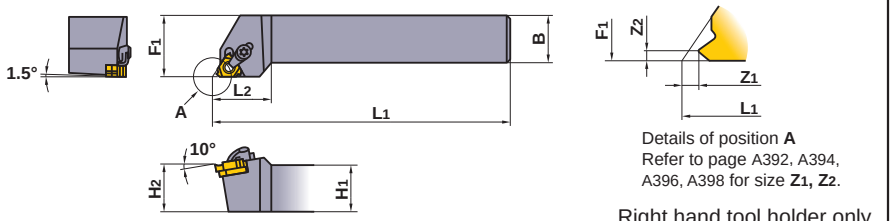
Insert	Chip control	Precision of thread
G-class inserts 	○	◎

- For ideal chip control and a high cost performance ratio, M-class inserts with 3-D chip breakers are recommended.
- G-class inserts are recommended where higher precision is required.

MMTE HOLDER

MMTE External threading





Details of position **A**
Refer to page A392, A394, A396, A398 for size **Z1, Z2**.

Right hand tool holder only.

Order Number	Stock R	Insert Number	Dimensions (mm) H1	B	L1	L2	H2	F1	Clamp Bridge	Clamp Screw *	Stop Ring	Shim Screw *	Shim	Wrench ①/②
MMTER1212H16-C	●	MMT16ER	12	12	100	25	12	16	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R
1616H16-C	●		16	16	100	25	16	20	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R
2020K16-C	●		20	20	125	26	20	25	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R
2525M16-C	●		25	25	150	28	25	32	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R
3232P16-C	●		32	32	170	32	32	40	SETK51	SETS51	CR4	HFC03008	CTE32TP15	①TKY15F ②HKY20R
MMTER2525M22-C	●	MMT22ER	25	25	150	32	25	32	SETK61	SETS61	CR5	HFC04010	CTE43TP15	①TKY20F ②HKY25R
3232P22-C	●		32	32	170	32	32	40	SETK61	SETS61	CR5	HFC04010	CTE43TP15	①TKY20F ②HKY25R
4040R22-C	●		40	40	200	38	40	50	SETK61	SETS61	CR5	HFC04010	CTE43TP15	①TKY20F ②HKY25R

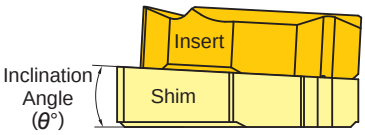
(Note) Select and use a shim as shown below (sold separately), dependant on the lead angle.

∗ Clamp Torque (N • m) : SETS51=3.5, SETS61=5.0, HFC03008=1.5, HFC04010=2.2

SHIM

Lead Angle (α°)	Order Number	Stock R	Inclination Angle (θ°)	Applicable Holder
−1.5°	**CTE32TN15**	●	−3°	MMTER 16-C
−0.5°	**N05**	●	−2°	
0.5°	**P05**	●	−1°	
1.5°	**P15**	●	0°	
2.5°	**P25**	●	1°	
3.5°	**P35**	●	2°	
4.5°	**P45**	●	3°	

Lead Angle (α°)	Order Number	Stock R	Inclination Angle (θ°)	Applicable Holder
−1.5°	**CTE43TN15**	●	−3°	MMTER 22-C
−0.5°	**N05**	●	−2°	
0.5°	**P05**	●	−1°	
1.5°	**P15**	●	0°	
2.5°	**P25**	●	1°	
3.5°	**P35**	●	2°	
4.5°	**P45**	●	3°	



Standard shim delivered with the holder.

IDENTIFICATION

MMT E R 12 12 H 16 – C

Designation	Application	Hand of Tool	Tool Size (mm) (Height and Width)	Tool Length (mm)	Insert Size (mm)	Method of Holding
	E External	R Right	12 12	H 100	16 9.525	C Clamp-on
			16 16	K 125	22 12.7	
			20 20	M 150		
			25 25	P 170		
			32 32	R 200		
			40 40			

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	VP10MF	150 (70–230)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
	Carbon Steel • Alloy Steel	180–280HB	VP10MF	140 (80–200)
			VP15TF	100 (60–140)
			VP20RT	80 (60–100)
M	Stainless Steel	≤200HB	VP15TF	80 (40–120)
			VP20RT	
K	Gray Cast Iron	Tensile Strength ≤350MPa	VP10MF	140 (80–200)
			VP15TF	90 (60–120)

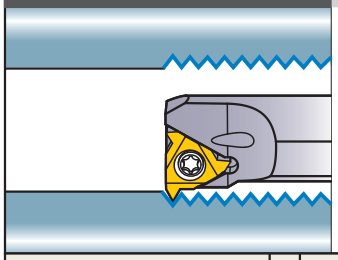
	Work Material	Hardness	Grade	Cutting Speed (m/min)
S	Heat-Resistant Alloy	–	VP10MF	45 (15–70)
			VP15TF	30 (20–40)
			VP20RT	
	Titanium Alloy	–	VP10MF	60 (40–80)
			VP15TF	45 (25–65)
			VP20RT	
H	Heat-Treated Alloy	45–55HRC	VP10MF	50 (30–70)
			VP15TF	40 (20–60)

● : **Inventory maintained in Japan.**

MMTI TYPE BORING BARS

MMTI

Internal threading



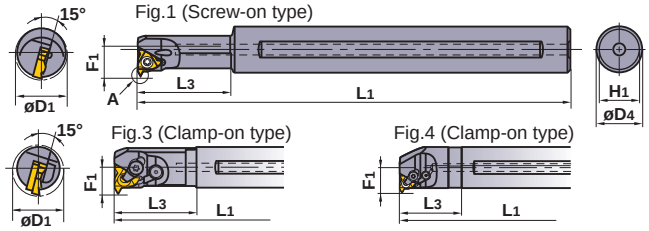


Fig.1 (Screw-on type)

Fig.3 (Clamp-on type)

Fig.4 (Clamp-on type)

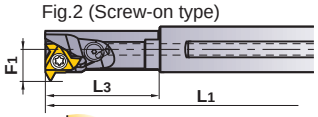
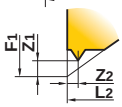


Fig.2 (Screw-on type)



Details of position **A**
Refer to page A393, A395, A397, A399 for size **Z1, Z2**.

Right hand tool holder only.

Order Number	Stock R	Insert Number	Lead Angle	Dimensions (mm) D4	L1	L3	F1	H1	Min. Cutting Diameter D1 (mm)	Clamp Bridge	Clamp Screw *	Stop Ring	Shim Screw *	Shim	Wrench ①/②	Fig
MMTIR1316AK11-SP15	●	MMT11IR ○○○○○	1.5°	16	125	25	8.7	15	**13**	—	TS25	—	—	—	①TKY08F	1
1316AK11-SP25	●		2.5°	16	125	25	8.7	15	**13**	—	TS25	—	—	—	①TKY08F	1
1316AK11-SP35	●		3.5°	16	125	25	8.7	15	**13**	—	TS25	—	—	—	①TKY08F	1
1516AM11-SP15	●		1.5°	16	150	32	9.7	15	**15**	—	TS25	—	—	—	①TKY08F	1
1516AM11-SP25	●		2.5°	16	150	32	9.7	15	**15**	—	TS25	—	—	—	①TKY08F	1
1516AM11-SP35	●		3.5°	16	150	32	9.7	15	**15**	—	TS25	—	—	—	①TKY08F	1
MMTIR1916AM16-SP15	●	MMT16IR ○○○○○	1.5°	16	150	40	12.2	15	**19**	—	CS350860T	—	—	—	①TKY15F	2
1916AM16-SP25	●		2.5°	16	150	40	12.2	15	**19**	—	CS350860T	—	—	—	①TKY15F	2
1916AM16-SP35	●		3.5°	16	150	40	12.2	15	**19**	—	CS350860T	—	—	—	①TKY15F	2
2420AQ16-C	●		1.5°	20	180	40	14.2	19	**24**	SETK51	SETS51	CR4	HFC03006	CTI32TP15	①TKY15F ②HKY20R	3
2925AS16-C	●		1.5°	25	250	60	16.7	23.4	**29**	SETK51	SETS51	CR4	HFC03006	CTI32TP15	①TKY15F ②HKY20R	3
3732AS16-C	●		1.5°	32	250	48	20.5	30.4	**37**	SETK51	SETS51	CR4	HFC03006	CTI32TP15	①TKY15F ②HKY20R	4
MMTIR2420AQ22-SP15	●	MMT22IR ○○○○○	1.5°	20	180	50	15.5	19	**24**	—	TS43	—	—	—	①TKY15F	2
2420AQ22-SP25	●		2.5°	20	180	50	15.5	19	**24**	—	TS43	—	—	—	①TKY15F	2
2420AQ22-SP35	●		3.5°	20	180	50	15.5	19	**24**	—	TS43	—	—	—	①TKY15F	2
3025AR22-C	●		1.5°	25	200	38	17.8	23.4	**30**	SETK61	SETS61	CR5	HFC04008	CTI43TP15	①TKY20F ②HKY25R	4
3832AS22-C	●		1.5°	32	250	48	21.8	30.4	**38**	SETK61	SETS61	CR5	HFC04008	CTI43TP15	①TKY20F ②HKY25R	4
4640AT22-C	●		1.5°	40	300	60	26.2	38	**46**	SETK61	SETS61	CR5	HFC04008	CTI43TP15	①TKY20F ②HKY25R	4

(Note) Select and use a shim as shown below (sold separately), dependant on the lead angle.
- A screw-on tool holder uses no shim. (The holder body has a lead angle.) Use a tool holder with the appropriate lead angle.
- Min. cutting diameter shows the internal hole diameter, not the thread diameter.

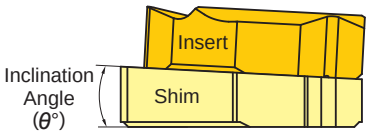
* Clamp Torque (N • m) : TS25=1.0, CS350860T=3.5, SETS51=3.5, TS43=3.5, SETS61=5.0, HFC03006=1.5, HFC04008=2.2

SHIM

Lead Angle (α°)	Order Number	Stock R	Inclination Angle (θ°)	Applicable Holder
−1.5°	**CTI32TN15**	●	−3°	MMTIR ○○○○ ○○16-C
−0.5°	**N05**	●	−2°	
0.5°	**P05**	●	−1°	
1.5°	**P15**	●	0°	
2.5°	**P25**	●	1°	
3.5°	**P35**	●	2°	
4.5°	**P45**	●	3°	

Lead Angle (α°)	Order Number	Stock R	Inclination Angle (θ°)	Applicable Holder
−1.5°	**CTI43TN15**	●	−3°	MMTIR ○○○○ ○○22-C
−0.5°	**N05**	●	−2°	
0.5°	**P05**	●	−1°	
1.5°	**P15**	●	0°	
2.5°	**P25**	●	1°	
3.5°	**P35**	●	2°	
4.5°	**P45**	●	3°	

Standard shim delivered with the holder.



IDENTIFICATION

MMT I R 13 16 A K 11 – S P15

Designation

Application
I	Internal

Hand of Tool
R	Right

Min.Cutting Diameter (mm)

Shank Diameter (mm)

Shank Material
A	Steel Shank with Coolant Hole

Tool Length (mm)
K	125	R	200
M	150	S	250
Q	180	T	300

Insert Size (mm)
11	6.35
16	9.525
22	12.7

Method of Holding
S	Screw-on
C	Clamp-on

Lead Angle
P15	1.5°
P25	2.5°
P35	3.5°

HOW TO SELECT A SHIM A419

MMT M-CLASS INSERTS WITH 3-D CHIP BREAKERS

EXTERNAL THREADING INSERTS

Type	Order Number	Coated VP15TF	Coated VP20RT	Pitch mm	Pitch thread/inch	Dimensions (mm) D_1	S_1	Z_1	Z_2	Re	Total Cutting Depth (mm)	Geometry
Partial Profile 60°	MMT16ERA60-S	●		0.5—1.5	48—16	9.525	3.44	0.8	0.9	0.06	—	Partial form 60°
	16ERG60-S	●		1.75—3.0	14—8	9.525	3.44	1.2	1.7	0.23	—	
Partial Profile 55°	MMT16ERA55-S	●			48—16	9.525	3.44	0.8	0.9	0.07	—	Partial form 55°
	16ERG55-S	●			14—8	9.525	3.44	1.2	1.7	0.23	—	
ISO Metric	MMT16ER100ISO-S	●	●	1.0		9.525	3.44	0.7	0.7	0.13	0.61	Full form 60°
	16ER125ISO-S	●	●	1.25		9.525	3.44	0.8	0.9	0.16	0.77	
	16ER150ISO-S	●	●	1.5		9.525	3.44	0.8	1.0	0.20	0.92	
	16ER175ISO-S	●	●	1.75		9.525	3.44	0.9	1.2	0.22	1.07	
	16ER200ISO-S	●	●	2.0		9.525	3.44	1.0	1.3	0.26	1.23	
	16ER250ISO-S	●	●	2.5		9.525	3.44	1.1	1.5	0.33	1.53	
	16ER300ISO-S	●	●	3.0		9.525	3.44	1.2	1.6	0.40	1.84	
American UN	MMT16ER160UN-S	●			16	9.525	3.44	0.9	1.1	0.23	0.97	Full form 60°
	16ER140UN-S	●			14	9.525	3.44	1.0	1.2	0.26	1.11	
	16ER120UN-S	●			12	9.525	3.44	1.1	1.4	0.30	1.30	
Whitworth for BSW, BSP	MMT16ER190W-S	●			19	9.525	3.44	0.8	1.0	0.18	0.86	Full form 55°
	16ER140W-S	●			14	9.525	3.44	1.0	1.2	0.25	1.16	
	16ER110W-S	●			11	9.525	3.44	1.1	1.5	0.32	1.48	
BSPT	MMT16ER190BSPT-S	●			19	9.525	3.44	0.8	0.9	0.18	0.86	Full form 55°
	16ER140BSPT-S	●			14	9.525	3.44	1.0	1.2	0.25	1.16	
	16ER110BSPT-S	●			11	9.525	3.44	1.1	1.5	0.32	1.48	

IDENTIFICATION

MMT 16 E R 050 ISO – S

- **Designation**: MMT
- **Diameter of Inscribed Circle (mm)**: 16
- **Application**: E
- **Hand of Tool**: R
- **Pitch**: 050
- **Threading Type**: ISO
- **S**: M-class inserts with 3-D chip breakers

Diameter of Inscribed Circle (mm)	
11	6.35
16	9.525

Application	
E	External
I	Internal

Hand of Tool	
R	Right

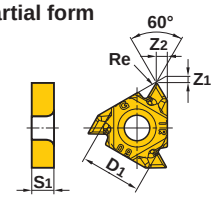
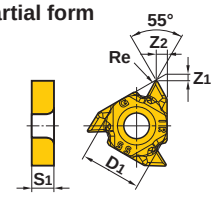
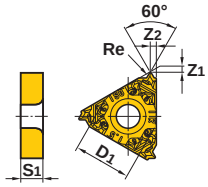
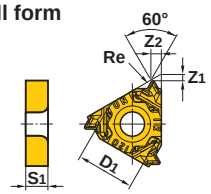
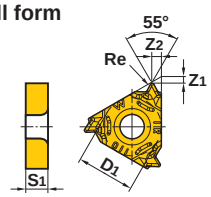
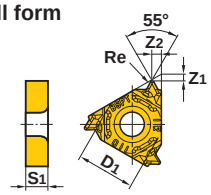
Pitch			
100	1.0mm	A	0.5—1.5mm or 48—16 thread/inch
125	1.25mm		
150	1.5mm	G	1.75—3.0mm or 14—8 thread/inch
175	1.75mm		
200	2.0mm		
250	2.5mm		
300	3.0mm		

Threading Type	
60	Partial Profile 60°
55	Partial Profile 55°
ISO	ISO Metric
W	Whitworth for BSW, BSP
BSPT	BSPT
UN	American UN

● : Inventory maintained in Japan. (5 inserts in one case)

CUTTING DEPTH GUIDE A420

INTERNAL THREADING INSERTS

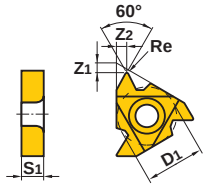
Type	Order Number	Coated VP15TF	Coated VP20RT	Pitch mm	Pitch thread/inch	Dimensions (mm) D1	S1	Z1	Z2	Re	Total Cutting Depth (mm)	Geometry
Partial Profile 60°	**MMT11IRA60-S**	●		0.5–1.5	48–16	6.35	3.04	0.8	0.9	0.03	–	Partial form 
	16IRA60-S	●		0.5–1.5	48–16	9.525	3.44	0.8	0.9	0.03	–	
	16IRG60-S	●		1.75–3.0	14–8	9.525	3.44	1.2	1.7	0.11	–	
Partial Profile 55°	**MMT11IRA55-S**	●			48–16	6.35	3.04	0.8	0.9	0.07	–	Partial form 
	16IRA55-S	●			48–16	9.525	3.44	0.8	0.9	0.07	–	
	16IRG55-S	●			14–8	9.525	3.44	1.2	1.7	0.21	–	
ISO Metric	**MMT11IR100ISO-S**	●		1.0		6.35	3.04	0.6	0.7	0.06	0.58	Full form 
	11IR125ISO-S	●		1.25		6.35	3.04	0.8	0.9	0.08	0.72	
	11IR150ISO-S	●		1.5		6.35	3.04	0.8	1.0	0.10	0.87	
	16IR100ISO-S	●	●	1.0		9.525	3.44	0.6	0.7	0.06	0.58	
	16IR125ISO-S	●	●	1.25		9.525	3.44	0.8	0.9	0.08	0.72	
	16IR150ISO-S	●	●	1.5		9.525	3.44	0.8	1.0	0.10	0.87	
	16IR175ISO-S	●	●	1.75		9.525	3.44	0.9	1.2	0.11	1.01	
	16IR200ISO-S	●	●	2.0		9.525	3.44	1.0	1.3	0.13	1.15	
	16IR250ISO-S	●	●	2.5		9.525	3.44	1.1	1.5	0.17	1.44	
	16IR300ISO-S	●	●	3.0		9.525	3.44	1.1	1.5	0.20	1.73	
American UN	**MMT16IR160UN-S**	●			16	9.525	3.44	0.9	1.1	0.11	0.92	Full form 
	16IR140UN-S	●			14	9.525	3.44	0.9	1.2	0.12	1.05	
	16IR120UN-S	●			12	9.525	3.44	1.1	1.4	0.14	1.22	
Whitworth for BSW, BSP	**MMT16IR190W-S**	●			19	9.525	3.44	0.8	1.0	0.18	0.86	Full form 
	16IR140W-S	●			14	9.525	3.44	1.0	1.2	0.25	1.16	
	16IR110W-S	●			11	9.525	3.44	1.1	1.5	0.32	1.48	
BSPT	**MMT16IR190BSPT-S**	●			19	9.525	3.44	0.8	0.9	0.18	0.86	Full form 
	16IR140BSPT-S	●			14	9.525	3.44	1.0	1.2	0.25	1.16	
	16IR110BSPT-S	●			11	9.525	3.44	1.1	1.5	0.32	1.48	

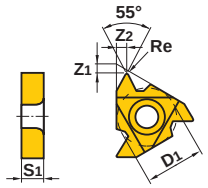
CUTTING DEPTH GUIDE A422

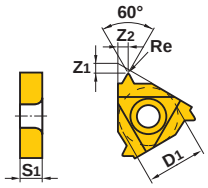
MMT G-CLASS GROUND INSERTS

EXTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated VP10MF	Coated VP15TF	Pitch mm	Pitch thread/inch	D1	S1	Z1	Z2	Re	Total Cutting Depth (mm)	Geometry
Partial Profile 60°	—	MMT16ERA60	●	●	0.5—1.5	48—16	9.525	3.44	0.8	0.9	0.05	—	Partial form
		16ERG60	●	●	1.75—3.0	14—8	9.525	3.44	1.2	1.7	0.27	—	
		16ERAG60	●		0.5—3.0	48—8	9.525	3.44	1.2	1.7	0.08	—	
		22ERN60	●		3.5—5.0	7—5	12.7	4.64	1.7	2.5	0.53	—	
Partial Profile 55°	—	MMT16ERA55	●	●		48—16	9.525	3.44	0.8	0.9	0.05	—	Partial form
		16ERG55	●	●		14—8	9.525	3.44	1.2	1.7	0.21	—	
		16ERAG55	●			48—8	9.525	3.44	1.2	1.7	0.07	—	
		22ERN55	●			7—5	12.7	4.64	1.7	2.5	0.44	—	
ISO Metric	6g	MMT16ER050ISO	●		0.5		9.525	3.44	0.6	0.4	0.06	0.31	Full form
		16ER075ISO	●		0.75		9.525	3.44	0.6	0.6	0.10	0.46	
		16ER100ISO	●	●	1.0		9.525	3.44	0.7	0.7	0.16	0.61	
		16ER125ISO	●	●	1.25		9.525	3.44	0.8	0.9	0.19	0.77	
		16ER150ISO	●	●	1.5		9.525	3.44	0.8	1.0	0.23	0.92	
		16ER175ISO	●	●	1.75		9.525	3.44	0.9	1.2	0.21	1.07	
		16ER200ISO	●	●	2.0		9.525	3.44	1.0	1.3	0.31	1.23	
		16ER250ISO	●	●	2.5		9.525	3.44	1.1	1.5	0.32	1.53	
		16ER300ISO	●	●	3.0		9.525	3.44	1.2	1.6	0.46	1.84	
		22ER350ISO	●		3.5		12.7	4.64	1.6	2.3	0.45	2.15	
		22ER400ISO	●		4.0		12.7	4.64	1.6	2.3	0.52	2.45	
		22ER450ISO	●		4.5		12.7	4.64	1.7	2.4	0.58	2.76	
		22ER500ISO	●		5.0		12.7	4.64	1.7	2.5	0.63	3.07	







IDENTIFICATION

MMT | **16** | **E** | **R** | **050** | **ISO**

Designation

Diameter of Inscribed Circle (mm)

11	6.35
16	9.525
22	12.7

Application

E	External
I	Internal

Hand of Tool

R	Right

Pitch

050	0.5mm	A	0.5—1.5mm or 48—16 thread/inch
075	0.75mm		
100	1.0mm		
125	1.25mm	G	1.75—3.0mm or 14—8 thread/inch
150	1.5mm		
175	1.75mm		
200	2.0mm	AG	0.5—3.0mm or 48—8 thread/inch
250	2.5mm		
300	3.0mm		
350	3.5mm	N	3.5—5.0mm or 7—5 thread/inch
400	4.0mm		
450	4.5mm		
500	5.0mm		

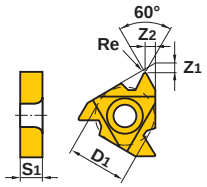
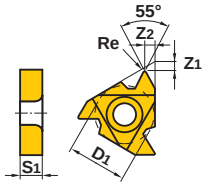
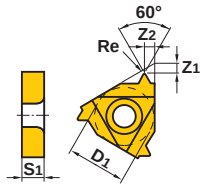
Threading Type

60	Partial Profile 60°
55	Partial Profile 55°
ISO	ISO Metric
W	Whitworth for BSW, BSP
BSPT	BSPT
UN	American UN
RD	Round DIN 405
TR	ISO Trapezoidal 30°
ACME	American ACME
UNJ	UNJ
APBU	API Buttress Casing
APRD	API Round Casing & Tubing
NPT	NPT
NPTF	NPTF

● : Inventory maintained in Japan. (5 inserts in one case)

CUTTING DEPTH GUIDE A420

INTERNAL THREADING INSERTS

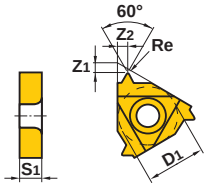
Type	Thread Tolerance	Order Number	Coated VP10MF	Coated VP15TF	Pitch mm	Pitch thread/inch	Dimensions (mm) D1	S1	Z1	Z2	Re	Total Cutting Depth (mm)	Geometry
Partial Profile 60°	—	MMT11IRA60	●	●	0.5—1.5	48—16	6.35	3.04	0.8	0.9	0.05	—	Partial form 
		16IRA60	●	●	0.5—1.5	48—16	9.525	3.44	0.8	0.9	0.05	—	
		16IRG60	●	●	1.75—3.0	14—8	9.525	3.44	1.2	1.7	0.16	—	
		16IRAG60	●		0.5—3.0	48—8	9.525	3.44	1.2	1.7	0.05	—	
		22IRN60	●		3.5—5.0	7—5	12.7	4.64	1.7	2.5	0.30	—	
Partial Profile 55°	—	MMT11IRA55	●	●		48—16	6.35	3.04	0.8	0.9	0.05	—	Partial form 
		16IRA55	●	●		48—16	9.525	3.44	0.8	0.9	0.05	—	
		16IRG55	●	●		14—8	9.525	3.44	1.2	1.7	0.21	—	
		16IRAG55	●			48—8	9.525	3.44	1.2	1.7	0.07	—	
		22IRN55	●			7—5	12.7	4.64	1.7	2.5	0.44	—	
ISO Metric	6H	MMT11IR050ISO	●		0.5		6.35	3.04	0.6	0.4	0.03	0.29	Full form 
		11IR075ISO	●		0.75		6.35	3.04	0.6	0.6	0.04	0.43	
		11IR100ISO	●	●	1.0		6.35	3.04	0.6	0.7	0.10	0.58	
		11IR125ISO	●	●	1.25		6.35	3.04	0.8	0.9	0.12	0.72	
		11IR150ISO	●	●	1.5		6.35	3.04	0.8	1.0	0.14	0.87	
		11IR175ISO	●		1.75		6.35	3.04	0.9	1.1	0.10	1.01	
		11IR200ISO	●		2.0		6.35	3.04	0.9	1.1	0.18	1.15	
		16IR050ISO	●		0.5		9.525	3.44	0.6	0.4	0.03	0.29	
		16IR075ISO	●		0.75		9.525	3.44	0.6	0.6	0.04	0.43	
		16IR100ISO	●	●	1.0		9.525	3.44	0.6	0.7	0.10	0.58	
		16IR125ISO	●	●	1.25		9.525	3.44	0.8	0.9	0.12	0.72	
		16IR150ISO	●	●	1.5		9.525	3.44	0.8	1.0	0.14	0.87	
		16IR175ISO	●	●	1.75		9.525	3.44	0.9	1.2	0.10	1.01	
		16IR200ISO	●	●	2.0		9.525	3.44	1.0	1.3	0.18	1.15	
		16IR250ISO	●	●	2.5		9.525	3.44	1.1	1.5	0.15	1.44	
		16IR300ISO	●	●	3.0		9.525	3.44	1.1	1.5	0.26	1.73	
		22IR350ISO	●		3.5		12.7	4.64	1.6	2.3	0.22	2.02	
		22IR400ISO	●		4.0		12.7	4.64	1.6	2.3	0.25	2.31	
		22IR450ISO	●		4.5		12.7	4.64	1.6	2.4	0.28	2.60	
		22IR500ISO	●		5.0		12.7	4.64	1.6	2.3	0.32	2.89	

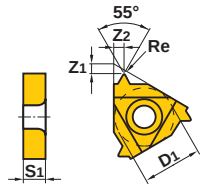
CUTTING DEPTH GUIDE A422

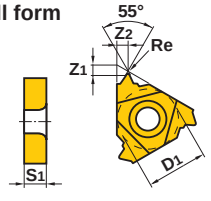
MMT G-CLASS GROUND INSERTS

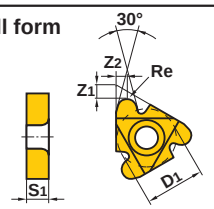
EXTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated VP10MF	Coated VP15TF	Pitch mm	Pitch thread/inch	D1	S1	Z1	Z2	Re	Total Cutting Depth (mm)	Geometry
American UN	2A	MMT16ER320UN	●			32	9.525	3.44	0.6	0.6	0.09	0.49	Full form
		16ER280UN	●			28	9.525	3.44	0.6	0.7	0.10	0.56	
		16ER240UN	●			24	9.525	3.44	0.7	0.8	0.16	0.65	
		16ER200UN	●			20	9.525	3.44	0.8	0.9	0.19	0.78	
		16ER180UN	●			18	9.525	3.44	0.8	1.0	0.21	0.87	
		16ER160UN	●	●		16	9.525	3.44	0.9	1.1	0.24	0.97	
		16ER140UN	●	●		14	9.525	3.44	1.0	1.2	0.22	1.11	
		16ER130UN	●			13	9.525	3.44	1.0	1.3	0.24	1.20	
		16ER120UN	●	●		12	9.525	3.44	1.1	1.4	0.32	1.30	
		16ER110UN	●			11	9.525	3.44	1.1	1.5	0.29	1.42	
		16ER100UN	●			10	9.525	3.44	1.1	1.5	0.32	1.56	
		16ER090UN	●			9	9.525	3.44	1.2	1.7	0.35	1.73	
		16ER080UN	●			8	9.525	3.44	1.2	1.6	0.48	1.95	
		22ER070UN	●			7	12.7	4.64	1.6	2.3	0.47	2.22	
		22ER060UN	●			6	12.7	4.64	1.6	2.3	0.53	2.60	
		22ER050UN	●			5	12.7	4.64	1.7	2.5	0.64	3.12	
Whitworth for BSW, BSP	Medium Class A	MMT16ER280W	●			28	9.525	3.44	0.6	0.7	0.09	0.58	Full form
		16ER260W	●			26	9.525	3.44	0.7	0.8	0.10	0.63	
		16ER200W	●			20	9.525	3.44	0.8	0.9	0.18	0.81	
		16ER190W	●	●		19	9.525	3.44	0.8	1.0	0.19	0.86	
		16ER180W	●			18	9.525	3.44	0.8	1.0	0.20	0.90	
		16ER160W	●			16	9.525	3.44	0.9	1.1	0.23	1.02	
		16ER140W	●	●		14	9.525	3.44	1.0	1.2	0.26	1.16	
		16ER120W	●			12	9.525	3.44	1.1	1.4	0.30	1.36	
		16ER110W	●	●		11	9.525	3.44	1.1	1.5	0.33	1.48	
		16ER100W	●			10	9.525	3.44	1.1	1.5	0.37	1.63	
		16ER090W	●			9	9.525	3.44	1.2	1.7	0.34	1.81	
		16ER080W	●			8	9.525	3.44	1.2	1.5	0.39	2.03	
		22ER070W	●			7	12.7	4.64	1.6	2.3	0.46	2.32	
		22ER060W	●			6	12.7	4.64	1.6	2.3	0.53	2.71	
		22ER050W	●			5	12.7	4.64	1.7	2.4	0.66	3.25	
BSPT	Standard BSPT	MMT16ER280BSPT	●			28	9.525	3.44	0.6	0.6	0.09	0.58	Full form
		16ER190BSPT	●	●		19	9.525	3.44	0.8	0.9	0.14	0.86	
		16ER140BSPT	●	●		14	9.525	3.44	1.0	1.2	0.26	1.16	
		16ER110BSPT	●	●		11	9.525	3.44	1.1	1.5	0.33	1.48	
Round DIN 405	7h	MMT16ER100RD	●			10	9.525	3.44	1.1	1.2	0.60	1.27	Full form
		16ER080RD	●			8	9.525	3.44	1.4	1.3	0.75	1.59	
		16ER060RD	●			6	9.525	3.44	1.5	1.7	1.00	2.12	
		22ER040RD	●			4	9.525	3.44	2.2	2.3	1.51	3.18	









● : Inventory maintained in Japan. (5 inserts in one case)

CUTTING DEPTH GUIDE A420

INTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated VP10MF	Coated VP15TF	Pitch mm	Pitch thread/inch	D1	S1	Z1	Z2	Re	Total Cutting Depth (mm)	Geometry
American UN	2B	**MMT11IR320UN**	●			32	6.35	3.04	0.6	0.6	0.04	0.46	**Full form**
		11IR280UN	●			28	6.35	3.04	0.6	0.7	0.05	0.52	
		11IR240UN	●			24	6.35	3.04	0.7	0.8	0.09	0.61	
		11IR200UN	●			20	6.35	3.04	0.8	0.9	0.11	0.73	
		11IR180UN	●			18	6.35	3.04	0.8	1.0	0.12	0.81	
		11IR160UN	●			16	6.35	3.04	0.9	1.1	0.14	0.92	
		11IR140UN	●			14	6.35	3.04	0.9	1.1	0.11	1.05	
		16IR320UN	●			32	9.525	3.44	0.6	0.6	0.04	0.46	
		16IR280UN	●			28	9.525	3.44	0.6	0.7	0.05	0.52	
		16IR240UN	●			24	9.525	3.44	0.7	0.8	0.09	0.61	
		16IR200UN	●			20	9.525	3.44	0.8	0.9	0.11	0.73	
		16IR180UN	●			18	9.525	3.44	0.8	1.0	0.12	0.81	
		16IR160UN	●	●		16	9.525	3.44	0.9	1.1	0.14	0.92	
		16IR140UN	●	●		14	9.525	3.44	0.9	1.2	0.11	1.05	
		16IR130UN	●			13	9.525	3.44	1.0	1.3	0.10	1.13	
		16IR120UN	●	●		12	9.525	3.44	1.1	1.4	0.18	1.22	
		16IR110UN	●			11	9.525	3.44	1.1	1.5	0.13	1.33	
		16IR100UN	●			10	9.525	3.44	1.1	1.5	0.15	1.47	
		16IR090UN	●			9	9.525	3.44	1.2	1.7	0.17	1.63	
		16IR080UN	●			8	9.525	3.44	1.1	1.5	0.27	1.83	
		22IR070UN	●			7	12.7	4.64	1.6	2.3	0.23	2.09	
		22IR060UN	●			6	12.7	4.64	1.6	2.3	0.26	2.44	
		22IR050UN	●			5	12.7	4.64	1.6	2.3	0.32	2.93	
Whitworth for BSW, BSP	Medium Class A	**MMT11IR190W**	●			19	6.35	3.04	0.8	1.0	0.19	0.86	**Full form**
		11IR140W	●			14	6.35	3.04	0.9	1.1	0.26	1.16	
		16IR280W	●			28	9.525	3.44	0.6	0.7	0.09	0.58	
		16IR260W	●			26	9.525	3.44	0.7	0.8	0.10	0.63	
		16IR200W	●			20	9.525	3.44	0.8	0.9	0.18	0.81	
		16IR190W	●	●		19	9.525	3.44	0.8	1.0	0.19	0.86	
		16IR180W	●			18	9.525	3.44	0.8	1.0	0.20	0.90	
		16IR160W	●			16	9.525	3.44	0.9	1.1	0.23	1.02	
		16IR140W	●	●		14	9.525	3.44	1.0	1.2	0.26	1.16	
		16IR120W	●			12	9.525	3.44	1.1	1.4	0.30	1.36	
		16IR110W	●	●		11	9.525	3.44	1.1	1.5	0.33	1.48	
		16IR100W	●			10	9.525	3.44	1.1	1.5	0.37	1.63	
		16IR090W	●			9	9.525	3.44	1.2	1.7	0.34	1.81	
		16IR080W	●			8	9.525	3.44	1.2	1.5	0.39	2.03	
		22IR070W	●			7	12.7	4.64	1.6	2.3	0.46	2.32	
		22IR060W	●			6	12.7	4.64	1.6	2.3	0.53	2.71	
		22IR050W	●			5	12.7	4.64	1.7	2.4	0.66	3.25	
BSPT	Standard BSPT	**MMT11IR190BSPT**	●			19	6.35	3.04	0.8	0.9	0.14	0.86	**Full form**
		11IR140BSPT	●			14	6.35	3.04	0.9	1.0	0.26	1.16	
		16IR190BSPT	●	●		19	9.525	3.44	0.8	0.9	0.14	0.86	
		16IR140BSPT	●	●		14	9.525	3.44	1.0	1.2	0.26	1.16	
		16IR110BSPT	●	●		11	9.525	3.44	1.1	1.5	0.33	1.48	
Round DIN 405	7H	**MMT16IR100RD**	●			10	9.525	3.44	1.1	1.2	0.55	1.27	**Full form**
		16IR080RD	●			8	9.525	3.44	1.4	1.4	0.70	1.59	
		16IR060RD	●			6	9.525	3.44	1.4	1.5	0.93	2.12	
		22IR040RD	●			4	12.7	4.64	2.2	2.3	1.40	3.18	

CUTTING DEPTH GUIDE A422

MMT G-CLASS GROUND INSERTS

EXTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated VP10MF	Pitch mm	Pitch thread/inch	Dimensions (mm) D1	S1	Z1	Z2	Re	Total Cutting Depth (mm)	Geometry
ISO Trapezoidal 30°	7e	MMT16ER150TR	●	1.5		9.525	3.44	1.0	1.1	0.08	0.90	Semi-full form
		16ER200TR	●	2.0		9.525	3.44	1.1	1.3	0.15	1.25	
		16ER300TR	●	3.0		9.525	3.44	1.3	1.5	0.15	1.75	
		22ER400TR	●	4.0		12.7	4.64	1.7	1.9	0.15	2.25	
		22ER500TR	●	5.0		12.7	4.64	2.1	2.5	0.15	2.75	
American ACME	3G	MMT16ER120ACME	●		12	9.525	3.44	1.1	1.2	0.08	1.19	Semi-full form
		16ER100ACME	●		10	9.525	3.44	1.3	1.4	0.08	1.52	
		16ER080ACME	●		8	9.525	3.44	1.4	1.5	0.10	1.84	
		22ER060ACME	●		6	12.7	4.64	1.8	2.1	0.10	2.37	
		22ER050ACME	●		5	12.7	4.64	2.0	2.3	0.10	2.79	
UNJ	3A	MMT16ER320UNJ	●		32	9.525	3.44	0.6	0.7	0.13	0.46	Full form
		16ER280UNJ	●		28	9.525	3.44	0.7	0.7	0.14	0.52	
		16ER240UNJ	●		24	9.525	3.44	0.7	0.8	0.17	0.61	
		16ER200UNJ	●		20	9.525	3.44	0.8	0.9	0.20	0.73	
		16ER180UNJ	●		18	9.525	3.44	0.8	1.0	0.22	0.81	
		16ER160UNJ	●		16	9.525	3.44	0.9	1.1	0.25	0.92	
		16ER140UNJ	●		14	9.525	3.44	1.0	1.2	0.29	1.05	
		16ER120UNJ	●		12	9.525	3.44	1.1	1.3	0.33	1.22	
		16ER100UNJ	●		10	9.525	3.44	1.2	1.5	0.40	1.47	
		16ER080UNJ	●		8	9.525	3.44	1.2	1.6	0.51	1.83	
API Buttress Casing	Standard API	MMT22ER050APBU	●		5	12.7	4.64	3.1	1.9	0.18	1.55	Full form
API Round Casing&Tubing	Standard API RD	MMT16ER100APRD	●		10	9.525	3.44	1.2	1.4	0.34	1.41	Full form
		16ER080APRD	●		8	9.525	3.44	1.3	1.5	0.41	1.81	
American NPT	Standard NPT	MMT16ER270NPT	●		27	9.525	3.44	0.7	0.8	0.04	0.66	Full form
		16ER180NPT	●		18	9.525	3.44	0.8	1.0	0.08	1.01	
		16ER140NPT	●		14	9.525	3.44	0.9	1.2	0.09	1.33	
		16ER115NPT	●		11.5	9.525	3.44	1.1	1.5	0.11	1.64	
		16ER080NPT	●		8	9.525	3.44	1.3	1.8	0.14	2.42	
American NPTF	Class 2	MMT16ER270NPTF	●		27	9.525	3.44	0.7	0.8	0.04	0.64	Full form
		16ER180NPTF	●		18	9.525	3.44	0.8	1.0	0.04	1.00	
		16ER140NPTF	●		14	9.525	3.44	0.9	1.2	0.04	1.35	
		16ER115NPTF	●		11.5	9.525	3.44	1.1	1.5	0.04	1.63	
		16ER080NPTF	●		8	9.525	3.44	1.3	1.8	0.04	2.38	

● : Inventory maintained in Japan. (5 inserts in one case)

CUTTING DEPTH GUIDE A421

INTERNAL THREADING INSERTS

Type	Thread Tolerance	Order Number	Coated VP10MF	Pitch mm	Pitch thread/inch	D1	S1	Z1	Z2	Re	Total Cutting Depth (mm)	Geometry
ISO Trapezoidal 30°	7H	MMT16IR150TR	●	1.5		9.525	3.44	1.0	1.1	0.08	0.90	Semi-full form
		16IR200TR	●	2.0		9.525	3.44	1.1	1.3	0.15	1.25	
		16IR300TR	●	3.0		9.525	3.44	1.3	1.5	0.15	1.75	
		22IR400TR	●	4.0		12.7	4.64	1.7	1.9	0.15	2.25	
		22IR500TR	●	5.0		12.7	4.64	2.1	2.5	0.15	2.75	
American ACME	3G	MMT16IR120ACME	●		12	9.525	3.44	1.2	1.3	0.05	1.19	Semi-full form
		16IR100ACME	●		10	9.525	3.44	1.2	1.3	0.08	1.52	
		16IR080ACME	●		8	9.525	3.44	1.4	1.5	0.10	1.84	
		22IR060ACME	●		6	12.7	4.64	1.8	2.1	0.10	2.37	
		22IR050ACME	●		5	12.7	4.64	2.0	2.3	0.10	2.79	
UNJ		When machining an internal UNJ thread, cut an internal hole with the appropriate diameter. Then machine with 60° American UN. In this case, a full form type insert cannot be used.										
API Buttress Casing	Standard API	MMT22IR050APBU	●		5	12.7	4.64	2.8	1.9	0.18	1.55	Full form
API Round Casing&Tubing	Standard API RD	MMT16IR100APRD	●		10	9.525	3.44	1.2	1.4	0.34	1.41	Full form
		16IR080APRD	●		8	9.525	3.44	1.3	1.5	0.41	1.81	
American NPT	Standard NPT	MMT16IR270NPT	●		27	9.525	3.44	0.7	0.8	0.04	0.66	Full form
		16IR180NPT	●		18	9.525	3.44	0.8	1.0	0.08	1.01	
		16IR140NPT	●		14	9.525	3.44	0.9	1.2	0.09	1.33	
		16IR115NPT	●		11.5	9.525	3.44	1.1	1.5	0.11	1.64	
		16IR080NPT	●		8	9.525	3.44	1.3	1.8	0.14	2.42	
American NPTF	Class 2	MMT16IR140NPTF	●		14	9.525	3.44	0.9	1.2	0.04	1.35	Full form
		16IR115NPTF	●		11.5	9.525	3.44	1.1	1.5	0.04	1.63	
		16IR080NPTF	●		8	9.525	3.44	1.3	1.8	0.04	2.38	

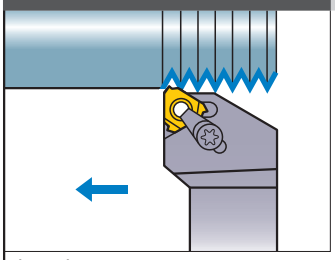
CUTTING DEPTH GUIDE A423

SET HOLDER

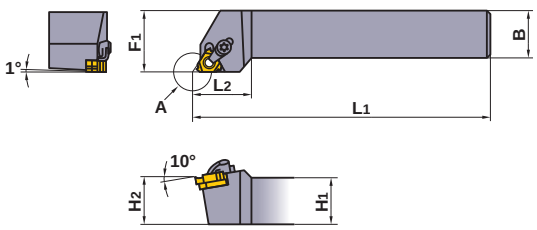
- Clamp-on type.
- Various insert types.
- Inserts with chip breaker give excellent chip control.
- Thread pitch ≤3mm.

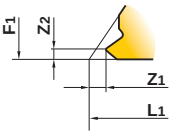
SETH

External threading



(Note) Cutting in the opposite direction is not possible.





Details of position **A** Refer to page A401 for size **Z1, Z2**.

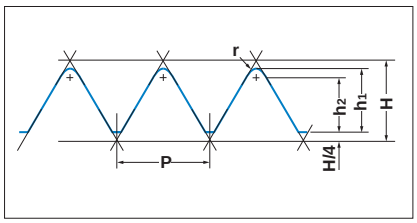
Right hand tool holder only.

Order Number	Stock R	Insert Number	Dimensions (mm) H1	B	L1	L2	H2	F1	Clamp Bridge	Clamp Screw *	Stop Ring	Shim Screw *	Shim	Wrench ①②
SETHR1616H16	●	SET○○○R3X○○	16	16	100	25	16	20	SETK51	SETS51	CR4	HFC03008	CT32T1	①TKY15F ②HKY20R
2020K16	●		20	20	125	25	20	25	SETK51	SETS51	CR4	HFC03008	CT32T1	①TKY15F ②HKY20R
2525M16	●		25	25	150	28	25	32	SETK51	SETS51	CR4	HFC03008	CT32T1	①TKY15F ②HKY20R

∗ Clamp Torque (N • m) : SETS51=3.5, HFC03008=1.5

STANDARD OF DEPTH OF CUT

- The chart on the right shows the cutting depths when machining external ISO metric screw threads.
- When you use cermet grades or cut stainless steel, please increase the number of passes by 2—3 times.



METRIC SCREW THREAD

P (Pitch)		0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00
h1		0.46	0.61	0.77	0.92	1.07	1.23	1.53	1.84
h2		0.35	0.47	0.59	0.70	0.82	0.94	1.17	1.41
r (Corner Radius)		0.11	0.14	0.18	0.22	0.25	0.29	0.36	0.43
Number of Passes	1	0.18	0.20	0.20	0.25	0.25	0.25	0.30	0.30
	2	0.13	0.15	0.18	0.20	0.20	0.25	0.25	0.25
	3	0.10	0.10	0.12	0.15	0.20	0.20	0.20	0.25
	4	0.05	0.10	0.12	0.15	0.15	0.15	0.20	0.20
	5		0.06	0.10	0.10	0.12	0.15	0.15	0.20
	6			0.05	0.07	0.10	0.10	0.10	0.15
	7					0.05	0.08	0.10	0.15
	8						0.05	0.10	0.10
	9							0.08	0.10
	10							0.05	0.09
	11								0.05

(Note) The first pass causes a high load on the cutting edge. In order to avoid damage, keep the depth of cut to 0.4—0.5mm maximum.

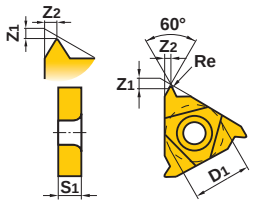
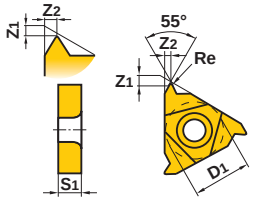
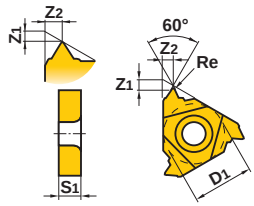
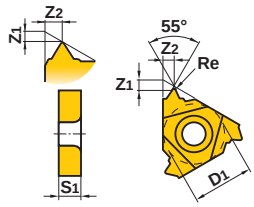
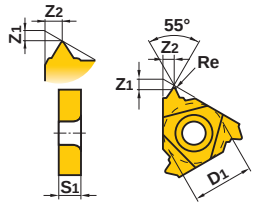
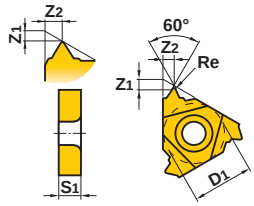
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**US735**	120 (80—150)
			NX55	200 (150—250)
			UTi20T	120 (100—150)
	Carbon Steel Alloy Steel	180—280HB	**US735**	100 (80—130)
			NX55	170 (150—200)
			UTi20T	100 (70—120)

	Work Material	Hardness	Grade	Cutting Speed (m/min)
M	Stainless Steel	≤200HB	**US735**	100 (70—130)
			UTi20T	100 (70—130)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**US735**	100 (80—120)
			UTi20T	80 (60—100)

● : **Inventory maintained in Japan. (10 inserts in one case)**

INSERTS

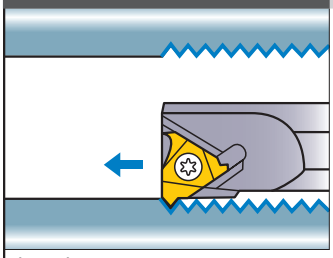
Type	Order Number	Class	Coated US735	Cermet NX55	Carbide UTi20T	ISO Pitch mm (thread/inch)	Dimensions (mm) D1	S1	Z1	Z2	Re	Geometry
Partial Profile 60°	SET6006R3XMM	M	●	●	●	Ⓐ 0.5—1.5(48—16)	9.525	3.65	0.7	0.9	0.06	SET(60°) Partial form 
	6022R3XMM	M	●	●	●	Ⓖ 1.75—3.0(14—8)	9.525	3.65	1.2	1.6	0.22	
Partial Profile 55°	SET5507R3XMP	M	●	●	●	Ⓐ (48—16)	9.525	3.65	0.7	0.9	0.07	SET(55°) Partial form 
	5525R3XMP	M	●	●	●	Ⓖ (14—8)	9.525	3.65	1.2	1.6	0.25	
ISO Metric	SET100R3XMM	M	●	●	●	1.0	9.525	3.65	0.7	0.9	0.13	SET(60°) Full form 
	125R3XMM	M	●	●	●	1.25	9.525	3.65	0.7	0.9	0.16	
	150R3XMM	M	●	●	●	1.5	9.525	3.65	0.7	0.9	0.20	
	175R3XMM	M	●	●	●	1.75	9.525	3.65	1.2	1.6	0.22	
	200R3XMM	M	●	●	●	2.0	9.525	3.65	1.2	1.6	0.25	
	250R3XMM	M	●	●	●	2.5	9.525	3.65	1.2	1.6	0.31	
	300R3XMM	M	●	●	●	3.0	9.525	3.65	1.2	1.6	0.38	
Whitworth for BSW, BSP	SET190R3XMP	M	●	●	●	(19)	9.525	3.65	0.7	0.9	0.17	SET(55°) Full form 
	140R3XMP	M	●	●	●	(14)	9.525	3.65	1.2	1.6	0.25	
	120R3XMP	M	●	●	●	(12)	9.525	3.65	1.2	1.6	0.29	
	110R3XMP	M	●	●	●	(11)	9.525	3.65	1.2	1.6	0.3	
BSPT	SET190R3XMPT	M	●	●	●	(19)	9.525	3.65	0.7	0.9	0.16	SET(55°) Full form 
	140R3XMPT	M	●	●	●	(14)	9.525	3.65	1.2	1.6	0.25	
	110R3XMPT	M	●	●	●	(11)	9.525	3.65	1.2	1.6	0.32	
American UN	SET240R3XMUN	M	●	●	●	(24)	9.525	3.65	0.7	0.9	0.13	SET(60°) Full form 
	200R3XMUN	M	●	●	●	(20)	9.525	3.65	0.7	0.9	0.16	
	160R3XMUN	M	●	●	●	(16)	9.525	3.65	0.7	0.9	0.20	
	140R3XMUN	M	●	●	●	(14)	9.525	3.65	1.2	1.6	0.23	
	120R3XMUN	M	●	●	●	(12)	9.525	3.65	1.2	1.6	0.27	

Ⓐ Pitch = 0.5—1.5(mm), thread / inch = 48—16 Ⓖ Pitch = 1.75—3.0(mm), thread / inch = 14—8

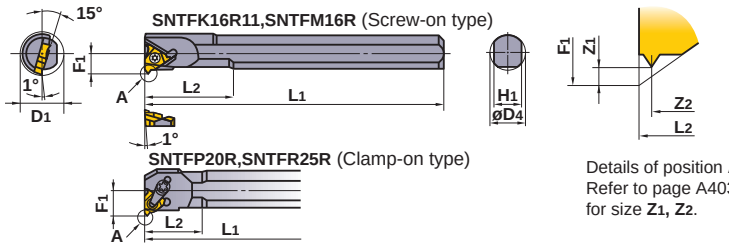
SNT TYPE BORING BARS

- Minimum cutting diameter 12mm.
- Screw-on / clamp-on type.
- Inserts with chip breaker give excellent chip control.
- Thread pitch 0.5—3mm.

SNTF — Internal threading



(Note) Cutting in the opposite direction is not possible.



Details of position **A** Refer to page A403 for size **Z1, Z2**.

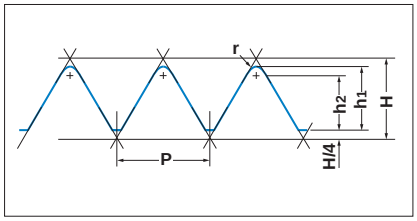
Right hand tool holder only.

Order Number	Thread Pitch (mm) (thread/inch)	Stock R	Insert Number	Dimensions (mm) D4	L1	L2	F1	H1	Min. Cutting Diameter D1 (mm)	Clamp Bridge	Clamp Screw	Stop Ring	Shim Screw	Shim	Wrench
SNTFK16R11	0.5—1.5(48—16)	●	SNT○○○R22○○	16	125	25	6.6	15	**12**	—	①TS25	—	—	—	①TKY08F
M16R	0.5—3.0(48—8)	●	SNT○○○R3X○○	16	150	40	10.6	14	**19**	—	①CS350 860T	—	—	—	①TKY15F
P20R	0.5—3.0(48—8)	●		20	170	30	14.0	18	**24**	SETK51	② SETS51	CR4	HFC 03008	CT32T1	①TKY15F ②HKY20R
R25R	0.5—3.0(48—8)	●		25	200	38	16.5	23	**29**	SETK51	② SETS51	CR4	HFC 03008	CT32T1	①TKY15F ②HKY20R

∗ Clamp Torque (N • m) : TS25=1.0, CS350860T=3.5, SETS51=3.5, HFC03008=1.5

STANDARD OF DEPTH OF CUT

- The chart on the right shows the cutting depths when machining internal ISO metric screw threads.
- When you use cermet grades or cut stainless steel, please increase the number of passes by 2—3 times.



METRIC SCREW THREAD

P (Pitch)		0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00
h1		0.43	0.58	0.72	0.87	1.01	1.15	1.44	1.73
h2		0.38	0.51	0.63	0.76	0.88	1.01	1.21	1.51
r (Corner Radius)		0.05	0.07	0.09	0.11	0.13	0.14	0.18	0.22
Number of Passes	1	0.10	0.15	0.18	0.20	0.23	0.25	0.25	0.25
	2	0.10	0.13	0.15	0.20	0.20	0.20	0.22	0.25
	3	0.10	0.10	0.12	0.15	0.20	0.15	0.20	0.22
	4	0.08	0.10	0.12	0.15	0.15	0.15	0.20	0.20
	5	0.05	0.05	0.10	0.10	0.10	0.15	0.15	0.20
	6		0.05	0.05	0.07	0.08	0.10	0.10	0.15
	7					0.05	0.10	0.10	0.12
	8						0.05	0.10	0.10
	9							0.07	0.10
	10							0.05	0.09
	11								0.05

(Note) The first pass causes a high load on the cutting edge. In order to avoid damage, keep the depth of cut to 0.4—0.5mm maximum.

RECOMMENDED CUTTING CONDITIONS

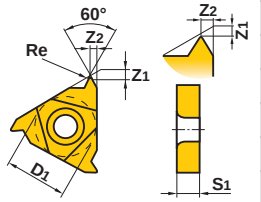
Work Material		Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**US735**	120 (80—150)
			NX55	200 (150—250)
			UTi20T	120 (100—150)
	Carbon Steel Alloy Steel	180—280HB	**US735**	100 (80—130)
			NX55	170 (150—200)
			UTi20T	100 (70—120)

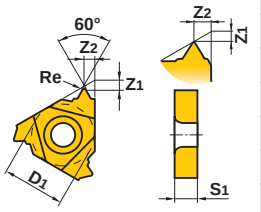
Work Material		Hardness	Grade	Cutting Speed (m/min)
M	Stainless Steel	≤200HB	**US735**	100 (70—130)
			UTi20T	100 (70—130)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**US735**	100 (80—120)
			UTi20T	80 (60—100)

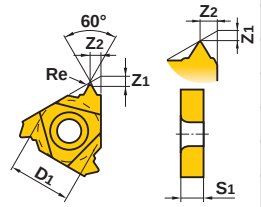
● : **Inventory maintained in Japan. (10 inserts in one case)**

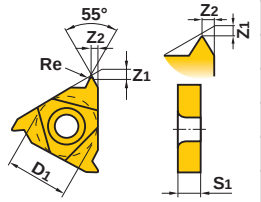
INSERTS

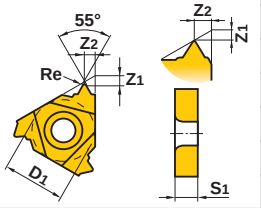
Type	Order Number	Class	Coated	Cermet	Carbide	ISO Pitch mm (thread/inch)	Dimensions (mm)					Geometry
			US735	NX55	UTi20T		D_1	S_1	Z_1	Z_2	Re	
Partial Profile 60°	SNT6004R22MM	M	●	●	●	0.5—1.5(48—16)	6.35	3.18	0.7	0.9	0.04	SNT(60°) Partial form
	6004R3XMM	M	●	●	●	0.5—1.5(48—16)	9.525	3.65	0.7	0.9	0.04	
	6012R3XMM	M	●	●	●	1.75—3.0(14—8)	9.525	3.65	1.2	1.6	0.12	
ISO Metric	SNT100R22MM	M		●	●	1	6.35	3.18	0.7	0.9	0.07	SNT(60°) Full form
	125R22MM	M		●	●	1.25	6.35	3.18	0.7	0.9	0.09	
	150R22MM	M		●	●	1.5	6.35	3.18	0.7	0.9	0.11	
	100R3XMM	M	●	●	●	1	9.525	3.65	0.7	0.9	0.07	
	125R3XMM	M	●	●	●	1.25	9.525	3.65	0.7	0.9	0.09	
	150R3XMM	M	●	●	●	1.5	9.525	3.65	0.7	0.9	0.12	
	175R3XMM	M	●	●	●	1.75	9.525	3.65	1.2	1.6	0.12	
	200R3XMM	M	●	●	●	2	9.525	3.65	1.2	1.6	0.14	
	250R3XMM	M	●	●	●	2.5	9.525	3.65	1.2	1.6	0.18	
	300R3XMM	M	●	●	●	3	9.525	3.65	1.2	1.6	0.21	
American UN	SNT240R3XMUN	M	●	●	●	(24)	9.525	3.65	0.7	0.9	0.07	SNT(60°) Full form
	200R3XMUN	M	●	●	●	(20)	9.525	3.65	0.7	0.9	0.09	
	160R3XMUN	M	●	●	●	(16)	9.525	3.65	0.7	0.9	0.11	
	140R3XMUN	M	●	●	●	(14)	9.525	3.65	1.2	1.6	0.13	
	120R3XMUN	M	●	●	●	(12)	9.525	3.65	1.2	1.6	0.15	
Partial Profile 55°	SNT5507R22MP	M	●	●	●	(48—16)	6.35	3.18	0.7	0.8	0.07	SNT(55°) Partial form
	5507R3XMP	M	●	●	●	(48—16)	9.525	3.65	0.7	0.9	0.07	
	5525R3XMP	M	●	●	●	(14—8)	9.525	3.65	1.2	1.6	0.25	
Whitworth for BSW, BSP	SNT190R3XMP	M	●	●	●	(19)	9.525	3.65	0.7	0.8	0.17	SNT(55°) Full form
	140R3XMP	M	●	●	●	(14)	9.525	3.65	1.2	1.6	0.25	
	120R3XMP	M	●	●	●	(12)	9.525	3.65	1.2	1.6	0.29	
	110R3XMP	M	●	●	●	(11)	9.525	3.65	1.2	1.6	0.3	
BSPT	SNT190R3XMPT	M	●	●	●	(19)	9.525	3.65	0.7	0.9	0.18	SNT(55°) Full form
	140R3XMPT	M	●	●	●	(14)	9.525	3.65	1.2	1.6	0.25	
	110R3XMPT	M	●	●	●	(11)	9.525	3.65	1.2	1.6	0.32	

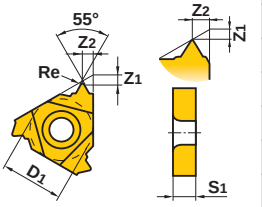










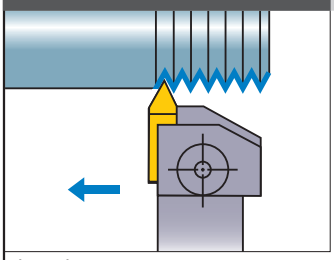


MT HOLDER

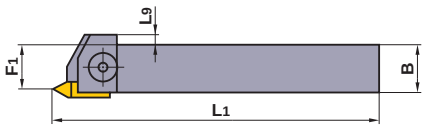
- Clamp-on type.
- Positive insert suffers from negligible chattering and thus produces good finished surfaces.
- Thread pitch ≤4.5mm.

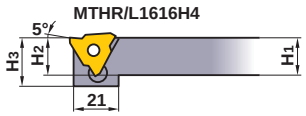
MTH

External threading



(Note) Cutting in the opposite direction is not possible.





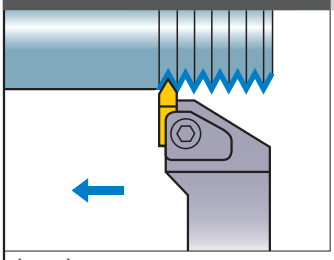
Right hand tool holder shown.

Order Number	Stock		Insert Number	Dimensions (mm)								*		
	R	L		H1	B	L1	H2	H3	F1	L9	Clamp Bridge	Clamp Screw	Spring	Wrench
MTHR/L1616H4	●	●	MTTR/L43□□□□	16	16	100	16	19	13.8	3	MTK1R/L	HBH06020	MES3	HKY40R
2020K4	●	●		20	20	125	20	—	17.8	—	MTK1R/L	HBH06020	MES3	HKY40R
2525M4	●	●		25	25	150	25	—	22.8	—	MTK1R/L	HBH06020	MES3	HKY40R

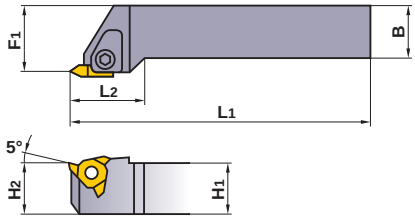
∗ Clamp Torque (N • m) : HBH06020=7.0

MT1

External threading



(Note) Cutting in the opposite direction is not possible.



Right hand tool holder shown.

Order Number	Stock		Insert Number	Dimensions (mm)							*		
	R	L		H1	B	L1	L2	H2	F1	Clamp Bridge	Clamp Screw	Spring	Wrench
MT1R/L2020K4	●	●	MTTR/L43□□□□	20	20	125	30	20	25	MTK1R/L	HBH06020	MES3	HKY40R
2525M4	●	●		25	25	150	30	25	32	MTK1R/L	HBH06020	MES3	HKY40R
3232P4	●	●		32	32	170	30	32	40	MTK1R/L	HBH06020	MES3	HKY40R

∗ Clamp Torque (N • m) : HBH06020=7.0

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**UP20M**	140 (100—180)
			NX55	200 (150—250)
			UTi20T	120 (100—150)
	Carbon Steel Alloy Steel	180—280HB	**UP20M**	120 (100—150)
			NX55	170 (150—200)
			UTi20T	100 (70—120)

Work Material		Hardness	Grade	Cutting Speed (m/min)
M	Stainless Steel	≤200HB	**UP20M**	120 (80—150)
			UTi20T	100 (70—130)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**UP20M**	80 (60—100)
			UTi20T	80 (60—100)
			HTi10	100 (70—130)

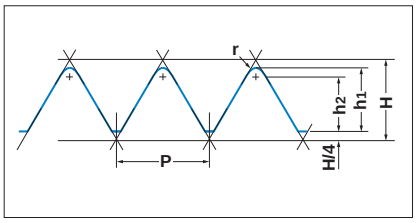
● : **Inventory maintained in Japan. (10 inserts in one case)**
□ : **Non stock, produced to order only.**

INSERTS

Type	Order Number	Class	Coated	Cermet	Carbide		ISO Pitch mm (thread/inch)	Dimensions (mm)			Geometry
			UP20M	NX55	UTi20T	HTi10		D1	S1	Re	
Partial Profile 60°	**MTTR436000**	G	□	●	●	□	−0.8	12.7	4.76	0	**MTTR/L(60°)**
	L436000	G	□	●	●	□	−0.8	12.7	4.76	0	
	R436001	G	●	●	●	●	1.0−1.75	12.7	4.76	0.1	
	L436001	G	□	●	●	●	1.0−1.75	12.7	4.76	0.1	
	R436002	G	●	●	●	●	2.0−2.5	12.7	4.76	0.2	
	L436002	G	□	●	●	●	2.0−2.5	12.7	4.76	0.2	
	R436003	G	□	●	●	●	3.0−3.5	12.7	4.76	0.3	
	L436003	G	□	●	●	□	3.0−3.5	12.7	4.76	0.3	
	R436004	G	□	●	●	□	4.0−4.5	12.7	4.76	0.4	
	L436004	G	□	●	●	□	4.0−4.5	12.7	4.76	0.4	Right hand insert shown.
Partial Profile 55°	**MTTR435501**	G	□	●	●	□	(28−10)	12.7	4.76	0.1	**MTTR/L(55°)**
	L435501	G	□	●	●	□	(28−10)	12.7	4.76	0.1	
	R435502	G	□	●	●	□	(16−8)	12.7	4.76	0.2	
	L435502	G	□	●	●	□	(16−8)	12.7	4.76	0.2	
	R435503	G	□	●	●	□	(11−8)	12.7	4.76	0.3	
	L435503	G	□	□	□	□	(11−8)	12.7	4.76	0.3	Right hand insert shown.

STANDARD OF DEPTH OF CUT

- The chart on the right shows the cutting depths when machining external ISO metric screw threads.
- When you use cermet grades or cut stainless steel, please increase the number of passes by 2−3 times.



METRIC SCREW THREAD

P (Pitch)		0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50
h1		0.46	0.61	0.77	0.92	1.07	1.23	1.53	1.84	2.15	2.45	2.76
h2		0.35	0.47	0.59	0.70	0.82	0.94	1.17	1.41	1.65	1.87	2.11
r (Corner Radius)		0.11	0.14	0.18	0.22	0.25	0.29	0.36	0.43	0.50	0.58	0.65
Number of Passes	1	0.18	0.20	0.20	0.25	0.25	0.25	0.30	0.30	0.35	0.35	0.40
	2	0.13	0.15	0.18	0.20	0.20	0.25	0.25	0.25	0.30	0.30	0.35
	3	0.10	0.10	0.12	0.15	0.20	0.20	0.20	0.25	0.25	0.25	0.30
	4	0.05	0.10	0.12	0.15	0.15	0.15	0.20	0.20	0.20	0.25	0.25
	5		0.06	0.10	0.10	0.12	0.15	0.15	0.20	0.20	0.25	0.25
	6			0.05	0.07	0.10	0.10	0.10	0.15	0.20	0.20	0.20
	7					0.05	0.08	0.10	0.15	0.15	0.20	0.20
	8						0.05	0.10	0.10	0.15	0.15	0.15
	9							0.08	0.10	0.10	0.15	0.15
	10							0.05	0.09	0.10	0.10	0.15
	11								0.05	0.10	0.10	0.10
	12									0.05	0.10	0.10
	13										0.05	0.10
	14											0.06

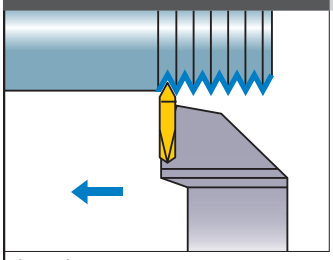
(Note) The first pass causes a high load on the cutting edge. In order to avoid damage, keep the depth of cut to 0.4−0.5mm maximum.

SMG HOLDER

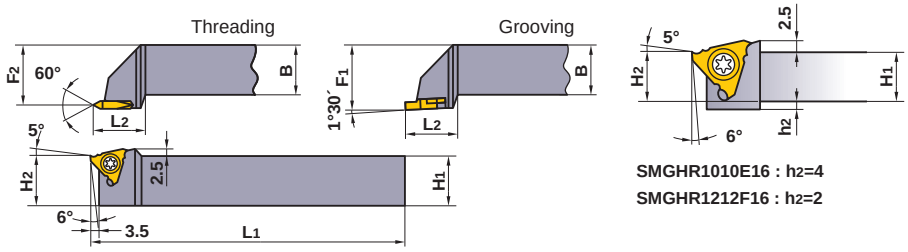
- Screw-on type.
- Positive insert suffers from negligible chattering.
- Suitable for narrow grooving and threading.
- Thread pitch ≤2.0 mm.

SMGH

External threading, Grooving



(Note) Cutting in the opposite direction is not possible.



SMGHR1010E16 : h2=4
SMGHR1212F16 : h2=2

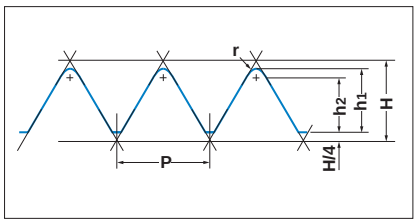
Right hand tool holder only.

Order Number	Stock	Insert Number		Dimensions (mm)							*	
	R	Threading	Grooving	H1	B	L1	L2	H2	F1	F2	Clamp Screw	Wrench
SMGHR1010E16	●	SMTTR160360○○	SMGTR16X2○○○ SMGTR16X2○○○C	10	10	70	16.5	10	12	11.7	FC400890T	TKY10F
1212F16	●			12	12	80	16.5	12	16	15.7	FC400890T	TKY10F
1616H16	●			16	16	100	20	16	20	19.7	FC400890T	TKY10F
2020K16	●			20	20	125	20	20	25	24.7	FC400890T	TKY10F
2525M16	●			25	25	150	20	25	32	31.7	FC400890T	TKY10F

* Clamp Torque (N • m) : FC400890T=2.5

STANDARD OF DEPTH OF CUT

- The chart on the right shows the cutting depths when machining external ISO metric screw threads.
- When you use cermet grades or cut stainless steel, please increase the number of passes by 2—3 times.



METRIC SCREW THREAD

P (Pitch)		0.75	1.00	1.25	1.50	1.75	2.00
h1		0.46	0.61	0.77	0.92	1.07	1.23
h2		0.35	0.47	0.59	0.70	0.82	0.94
r (Corner Radius)		0.11	0.14	0.18	0.22	0.25	0.29
Number of Passes	1	0.18	0.20	0.20	0.25	0.25	0.25
	2	0.13	0.15	0.18	0.20	0.20	0.25
	3	0.10	0.10	0.12	0.15	0.20	0.20
	4	0.05	0.10	0.12	0.15	0.15	0.15
	5		0.06	0.10	0.10	0.12	0.15
	6			0.05	0.07	0.10	0.10
	7					0.05	0.08
	8						0.05
	9						

(Note) The first pass causes a high load on the cutting edge. In order to avoid damage, keep the depth of cut to 0.4—0.5mm maximum.

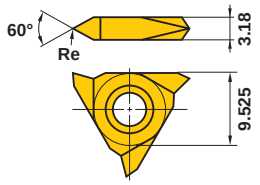
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**NX55**	200 (150—250)
			UTi20T	120 (100—150)
	Carbon Steel Alloy Steel	180—280HB	**NX55**	170 (150—200)
			UTi20T	100 (70—120)

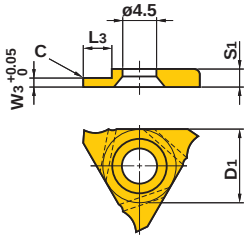
	Work Material	Hardness	Grade	Cutting Speed (m/min)
M	Stainless Steel	≤200HB	**UTi20T**	100 (70—130)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**UTi20T**	80 (60—100)
			HTi10	100 (70—130)

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

SMT INSERTS (Threading)

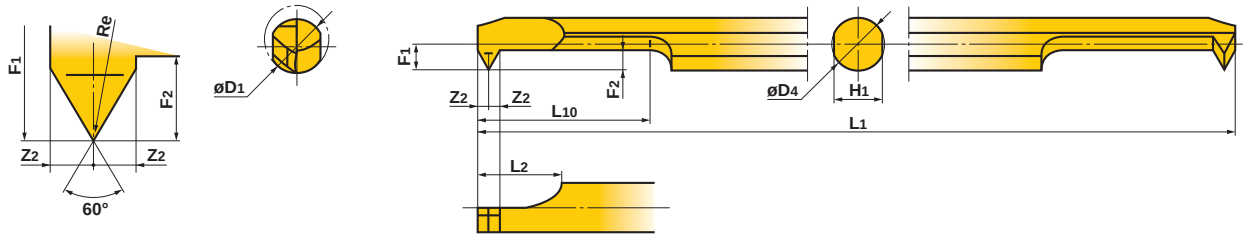
Order Number	Cermet	Carbide	Thread Pitch (mm)	Dimensions (mm)	Geometry
	NX55	UTi20T		Re	
SMTTR160360V5	●	●	−0.8	0.05	
16036001	●	●	1.0−1.5	0.1	
16036002	●	●	1.75−2.0	0.2	

SMG INSERTS (Grooving)

Order Number	Cermet		Carbide		Groove Width	Dimensions (mm)				Geometry
	NX2525	NX55	UTi20T	HTi10	W3 (mm)	L3	D1	S1	C	
SMGTR16X2030	●	▲	●	●	0.3	1	9.525	2	−	
16X2040	□		□	□	0.4	1	9.525	2	−	
16X2050	●	▲	●	●	0.5	1.5	9.525	2	−	
16X2060	□		□	□	0.6	1.5	9.525	2	−	
16X2070	●	▲	●	●	0.7	2	9.525	2	−	
16X2050C	●	▲	●	●	0.5	1.5	9.525	2	0.05	
16X2060C	□		□	□	0.6	1.5	9.525	2	0.05	
16X2070C	□		□	□	0.7	2	9.525	2	0.05	
16X2075C	●	▲	●	●	0.75	2	9.525	2	0.05	
16X2080C	●	▲	●	●	0.8	2	9.525	2	0.1	
16X2090C	□		□	□	0.9	2	9.525	2	0.1	
16X2095C	●	▲	●	●	0.95	2	9.525	2	0.1	
16X2100C	●	▲	●	●	1	2.5	9.525	2	0.1	
16X2110C	□		□	□	1.1	2.5	9.525	2	0.1	
16X2120C	●	▲	●	●	1.2	2.5	9.525	2	0.1	
16X2130C	□		□	□	1.3	2.5	9.525	2	0.1	

MICRO-MINI TWIN

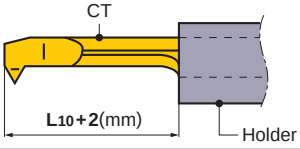
CT STANDARD



Order Number	Stock		Breaker	Threads				Min. Cutting Diameter	Dimensions (mm)								
	Micro Grain Carbide	Coated		Metric Screw		Unified Coarse Screw											
	TF15	VP15TF		Thread	Pitch (mm)	Thread	Pitch (thread/inch)	D1 (mm)	Re	D4	L1	L10	L2	F1	Z2	F2	H1
NEW CT0305RS-M4	●	●	Without	≥M4	0.5—1.0	≥NO.8-32UNC ≥NO.8-36UNF	36—24	3	0.03	3	50	5.2	6	1.3	0.6	1.2	2.7
03RS-M4	●	●	Without	≥M4	0.5—1.0		36—24	3	0.03	3	50	10.2	6	1.3	0.6	1.2	2.7
03RS-M4B	●	●	With	≥M4	0.5—1.0		36—24	3	0.03	3	50	10.2	6	1.3	0.6	1.2	2.7
NEW 0407RS-M6	●	●	Without	≥M6	0.75—1.25	≥1/4-20UNC ≥1/4-28UNF	28—20	4.5	0.05	4	60	7.6	7	1.8	0.8	1.7	3.6
04RS-M6	●	●	Without	≥M6	0.75—1.25		28—20	4.5	0.05	4	60	15.6	7	1.8	0.8	1.7	3.6
04RS-M6B	●	●	With	≥M6	0.75—1.25		28—20	4.5	0.05	4	60	15.6	7	1.8	0.8	1.7	3.6
NEW 0511RS-M8	●	●	Without	≥M8	0.75—1.5	≥5/16-18UNC ≥5/16-24UNF	24—18	6	0.05	5	70	11	8	2.3	1	2.2	4.5
05RS-M8	●	●	Without	≥M8	0.75—1.5		24—18	6	0.05	5	70	21	8	2.3	1	2.2	4.5
05RS-M8B	●	●	With	≥M8	0.75—1.5		24—18	6	0.05	5	70	21	8	2.3	1	2.2	4.5
NEW 0611RS-M10	●	●	Without	≥M10	0.75—1.75	≥3/8-16UNC ≥3/8-24UNF	24—16	7	0.05	6	75	11	8	2.8	1	2.2	5.4
06RS-M10	●	●	Without	≥M10	0.75—1.75		24—16	7	0.05	6	75	21	8	2.8	1	2.2	5.4
06RS-M10B	●	●	With	≥M10	0.75—1.75		24—16	7	0.05	6	75	21	8	2.8	1	2.2	5.4

● : Inventory maintained in Japan. (MICRO-MINI TWIN is available in 1 piece in one pack.)

RECOMMENDED CUTTING CONDITIONS

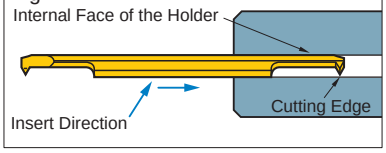
	Work Material	Cutting Speed (m/min)	Recommended Tool Overhang (mm)
P	Carbon Steel Alloy Steel	50 (30—80)	Micro-Mini Twin CT 
M	Stainless Steel	50 (30—80)	
K	Cast Iron	50 (30—80)	
N	Non-Ferrous Metal	80 (50—100)	

(Note 1) Wet cutting is recommended.
(Note 2) Pay special attention to machining of small diameters at high revolutions as the feed rate cannot keep up with the speed.

PRECAUTIONS WHEN USING THE MICRO-MINI TWIN

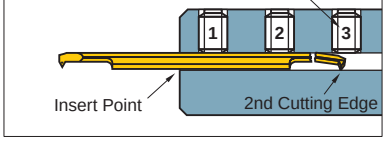
●When using a holder for general purpose / small automatic lathe:

1 To avoid chipping of the 2nd cutting edge take care when inserting the boring bar into the holder. Refer to fig.1. If the 2nd edge contacts the internal face of the holder there is a possibility that it may chip.

Fig.1


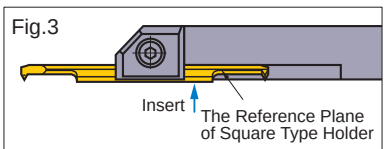
2 When using this type of holder, there is a possibility that damage to the shank and the 2nd cutting edge can occur. Make sure that the clamping screws are tightened to the set torque value. Additionally make sure that there is no clamping screw near the 2nd cutting edge as this can break the boring bar.

◎When using Mitsubishi holders
When using holders with a tool overhang of recommended quantity, ensure that the 3rd clamping screw is removed prior to machining. The set torque value for clamping screw is 2.0 N • m.

Fig.2


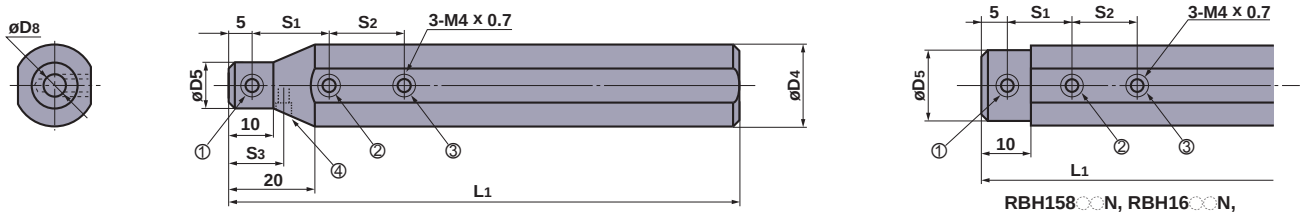
●When using a square type holder:

1 When installing the boring bar into the holder, tighten the clamp screws after ensuring the flats on the tool holder are parallel to the reference flats on the micro-mini bar. Refer to fig.3.
2 Make sure that the clamping screws are tightened to the recommended values.
3 Do not tighten the clamp screw without a bar in place, otherwise the bridge will be deformed.

Fig.3


Tighten the clamping screw ensuring making the micro-mini twin boring bars in contact with the reference plane of square type holder.

ROUND TYPE HOLDER



RBH22◌◌N has a temporary set screw for different machine specifications. (Represented by number 4)

RBH158◌◌N, RBH16◌◌N, RBH190◌◌N

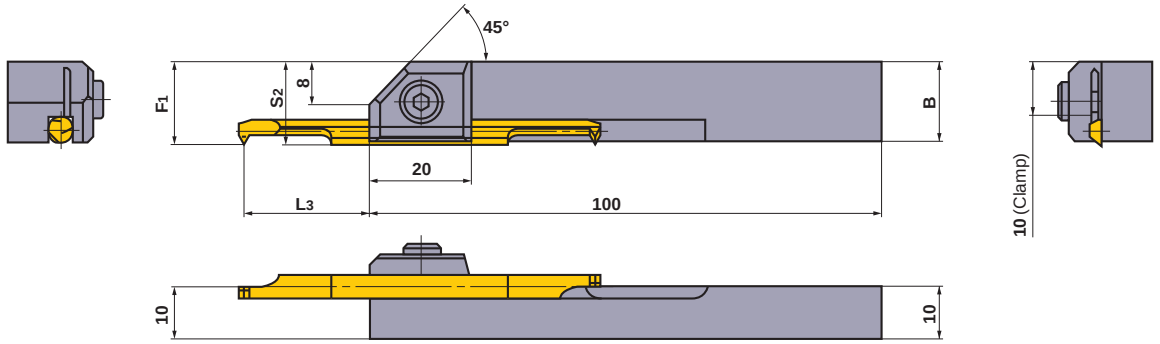
Order Number	Stock	Dimensions (mm)							Micro-Mini Twin CT	⁎1 Clamp Screw				Wrench	Torque (N•m)
		D4	D8	D5	L1	S1	S2	S3		①	②	③	④		
NEW RBH15830N	●	15.875	3	15	100	10	10	—	0305RS-M4, 03RS-M4(B)	A	A	A	—	HKY20F	2.0
NEW 15840N	●	15.875	4	15	100	15	15	—	0407RS-M6, 04RS-M6(B)	A	A	A	—	HKY20F	2.0
NEW 15850N	●	15.875	5	15	100	15	15	—	0511RS-M8, 05RS-M8(B)	A	A	A	—	HKY20F	2.0
NEW 15860N	●	15.875	6	15	100	15	15	—	0611RS-M10, 06RS-M10(B)	A	A	A	—	HKY20F	2.0
RBH1630N	●	16	3	15	100	10	10	—	0305RS-M4, 03RS-M4(B)	A	A	A	—	HKY20F	2.0
1640N	●	16	4	15	100	15	15	—	0407RS-M6, 04RS-M6(B)	A	A	A	—	HKY20F	2.0
1650N	●	16	5	15	100	15	15	—	0511RS-M8, 05RS-M8(B)	A	A	A	—	HKY20F	2.0
1660N	●	16	6	15	100	15	15	—	0611RS-M10, 06RS-M10(B)	A	A	A	—	HKY20F	2.0
⁎2 RBH19030N	●	19.05	3	18	125	10	10	—	0305RS-M4, 03RS-M4(B)	B	B	B	—	HKY20F	2.0
⁎2 19040N	●	19.05	4	18	125	15	15	—	0407RS-M6, 04RS-M6(B)	B	B	B	—	HKY20F	2.0
⁎2 19050N	●	19.05	5	18	125	15	15	—	0511RS-M8, 05RS-M8(B)	B	B	B	—	HKY20F	2.0
⁎2 19060N	●	19.05	6	18	125	15	15	—	0611RS-M10, 06RS-M10(B)	B	B	B	—	HKY20F	2.0
RBH2030N	●	20	3	12	125	10	10	—	0305RS-M4, 03RS-M4(B)	A	A	B	—	HKY20F	2.0
2040N	●	20	4	13	125	15	15	—	0407RS-M6, 04RS-M6(B)	A	B	B	—	HKY20F	2.0
2050N	●	20	5	14	125	15	15	—	0511RS-M8, 05RS-M8(B)	A	B	B	—	HKY20F	2.0
2060N	●	20	6	15	125	15	15	—	0611RS-M10, 06RS-M10(B)	A	B	B	—	HKY20F	2.0
RBH2230N	●	22	3	12	125	10	10	10	0305RS-M4, 03RS-M4(B)	A	B	C	A	HKY20F	2.0
2240N	●	22	4	13	125	15	15	12.5	0407RS-M6, 04RS-M6(B)	A	B	B	A	HKY20F	2.0
2250N	●	22	5	14	125	15	15	12.5	0511RS-M8, 05RS-M8(B)	A	B	B	A	HKY20F	2.0
2260N	●	22	6	15	125	15	15	15	0611RS-M10, 06RS-M10(B)	A	B	B	A	HKY20F	2.0
RBH2530N	●	25	3	12	150	10	10	—	0305RS-M4, 03RS-M4(B)	A	B	C	—	HKY20F	2.0
2540N	●	25	4	13	150	15	15	—	0407RS-M6, 04RS-M6(B)	A	C	C	—	HKY20F	2.0
2550N	●	25	5	14	150	15	15	—	0511RS-M8, 05RS-M8(B)	A	C	C	—	HKY20F	2.0
2560N	●	25	6	15	150	15	15	—	0611RS-M10, 06RS-M10(B)	A	C	C	—	HKY20F	2.0
NEW RBH25430N	●	25.4	3	12	150	10	10	—	0305RS-M4, 03RS-M4(B)	A	B	C	—	HKY20F	2.0
NEW 25440N	●	25.4	4	13	150	15	15	—	0407RS-M6, 04RS-M6(B)	A	C	C	—	HKY20F	2.0
NEW 25450N	●	25.4	5	14	150	15	15	—	0511RS-M8, 05RS-M8(B)	A	C	C	—	HKY20F	2.0
NEW 25460N	●	25.4	6	15	150	15	15	—	0611RS-M10, 06RS-M10(B)	A	C	C	—	HKY20F	2.0

⁎1 Order number of clamp screw A=HSS04004, B=HSS04006, C=HSS04008
⁎2 Revised order number.

Conventional Order Number	Revised Order Number
RBH1930N	RBH19030N
1940N	19040N
1950N	19050N
1960N	19060N

● : Inventory maintained in Japan.

SQUARE TYPE HOLDER



Order Number	Stock	Dimensions (mm) Micro-Mini Twin **CT**				Micro-Mini Twin **CT**	Clamp Screw	Wrench	Torque (N•m)
		B	**F_1**	**L_3** ⁎	**S_2**				
SBH1030R	●	13.8	13.8	13—17.5(14)	14	0305RS-M4, 03RS-M4(B)	HSC05012	HKY40R	9.5
1040R	●	14.7	14.8	18.5—22(19.5)	15	0407RS-M6, 04RS-M6(B)	HSC05012	HKY40R	9.5
1050R	●	15.6	15.8	24—26.5(25)	16	0511RS-M8, 05RS-M8(B)	HSC05012	HKY40R	9.5
1060R	●	16.5	16.8	24—31.5(25)	17	0611RS-M10, 06RS-M10(B)	HSC05012	HKY40R	9.5

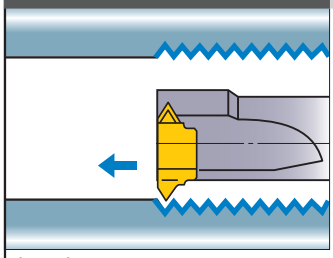
⁎ L_3 is the length of overhang for sufficient clamping, and ( ) is the recommended length for machining of carbon and alloy steel.

F TYPE BORING BARS

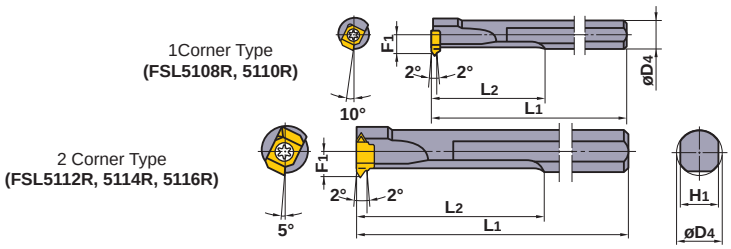
- Minimum cutting diameter 10mm.
- Screw-on type.
- Applicable to threading, grooving and boring.
- Thread pitch 1.5—3.5mm.

FSL51

Internal threading, Grooving, Boring



(Note) Cutting in the opposite direction is not possible.



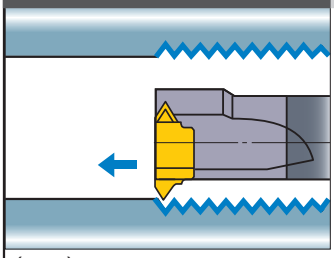
Right hand tool holder only.

Order Number	Stock	Insert Number			Dimensions (mm)					Min. Cutting Diameter (mm)	*	
	R	Threading	Grooving	Boring	D4	L1	L2	F1	H1		Clamp Screw	Wrench
FSL5108R	●	MLT1001L	MLG10□□L	MLP1004L	8	125	30	4.8	7	**10**	TS25	TKY08F
5110R	●	MLT1001L	MLG10□□L	MLP1004L	10	150	40	5.8	9	**12**	TS25	TKY08F
5112R	●	MLT1401L	MLG14□□L	MLP1404L	12	180	50	6.8	10.8	**14**	TS32	TKY08F
5114R	●	MLT1401L	MLG14□□L	MLP1404L	14	180	60	7.8	12.4	**16**	TS32	TKY08F
5116R	●	MLT2001L	MLG20□□L	MLP2004L	16	200	70	9.7	14	**20**	TS43	TKY15F

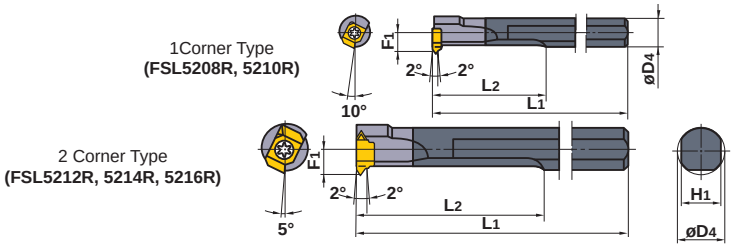
* Clamp Torque (N • m) : TS25=1.0, TS32=1.0, TS43=3.5

FSL52

(Carbide shank) Internal threading, Grooving, Boring



(Note) Cutting in the opposite direction is not possible.



Right hand tool holder only.

Order Number	Stock	Insert Number			Dimensions (mm)					Min. Cutting Diameter (mm)	*	
	R	Threading	Grooving	Boring	D4	L1	L2	F1	H1		Clamp Screw	Wrench
FSL5208R	●	MLT1001L	MLG10□□L	MLP1004L	8	125	60	4.8	7	**10**	TS25	TKY08F
5210R	●	MLT1001L	MLG10□□L	MLP1004L	10	150	70	5.8	9	**12**	TS25	TKY08F
5212R	●	MLT1401L	MLG14□□L	MLP1404L	12	180	80	6.8	11	**14**	TS32	TKY08F
5214R	●	MLT1401L	MLG14□□L	MLP1404L	14	180	85	7.8	12	**16**	TS32	TKY08F
5216R	●	MLT2001L	MLG20□□L	MLP2004L	16	200	115	9.7	14	**20**	TS43	TKY15F

* Clamp Torque (N • m) : TS25=1.0, TS32=1.0, TS43=3.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**UP20M**	140 (100—180)
			UTi20T	120 (100—150)
	Carbon Steel Alloy Steel	180—280HB	**UP20M**	120 (100—150)
			UTi20T	100 (70—120)

	Work Material	Hardness	Grade	Cutting Speed (m/min)
M	Stainless Steel	≤200HB	**UP20M**	120 (80—150)
			UTi20T	100 (70—130)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**UP20M**	80 (60—100)
			UTi20T	80 (60—100)

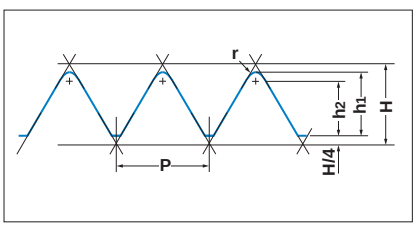
● : **Inventory maintained in Japan. (10 inserts in one case)**
□ : **Non stock, produced to order only.**

INSERTS

Application	Order Number	Coated UP20M	Carbide UTi20T	Thread Pitch, Groove Width W3 (mm)	Dimensions (mm) L1	L2	L3	S1	C	Re	Geometry
Threading	**MLT1001L**	●	●	Pitch 1.5—2.0	7	5	—	2.38	—	0.1	**MLT • MLP**
	1401L	●	●	Pitch 1.5—2.5	11.8	6.5	—	4.76	—	0.1	
	2001L	●	●	Pitch 1.5—3.5	16.8	9.03	—	6.35	—	0.1	
Boring	**MLP1004L**		●	—	7	5	1.0	2.38	—	0.4	
	1404L		●	—	11.8	6.5	2.0	4.76	—	0.4	
	2004L		●	—	16.8	9.03	3.0	6.35	—	0.4	
											MLT • MLP14,20
Grooving	**MLG1012L**	□	●	1.2	7	5	1.0	2.38	0.1	—	**MLG...L**
	1015L	□	●	1.5	7	5	1.0	2.38	0.1	—	
	1020L	□	●	2	7	5	1.0	2.38	0.1	—	
	MLG1415L		●	1.5	11.8	6.5	2.0	4.76	0.1	—	**MLG...L**
	1420L		●	2	11.8	6.5	2.0	4.76	0.1	—	
	1430L		●	3	11.8	6.5	2.0	4.76	0.1	—	
	2020L		●	2	16.8	9.03	3.0	6.35	0.1	—	
	2030L		●	3	16.8	9.03	3.0	6.35	0.1	—	
	2040L		●	4	16.8	9.03	3.0	6.35	0.1	—	

STANDARD OF DEPTH OF CUT

- The chart on the right shows the cutting depths when machining internal ISO metric screw threads.
- When you use cermet grades or cut stainless steel, please increase the number of passes by 2—3 times.



METRIC SCREW THREAD

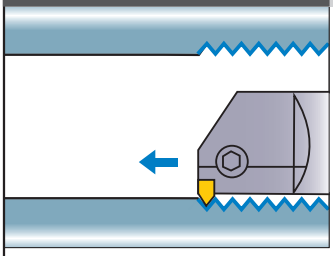
P (Pitch)		0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50
h1		0.43	0.58	0.72	0.87	1.01	1.15	1.44	1.73	2.02
h2		0.38	0.51	0.63	0.76	0.88	1.01	1.21	1.51	1.77
r (Corner Radius)		0.05	0.07	0.09	0.11	0.13	0.14	0.18	0.22	0.25
Number of Passes	1	0.10	0.15	0.18	0.20	0.23	0.25	0.25	0.25	0.30
	2	0.10	0.13	0.15	0.20	0.20	0.20	0.22	0.25	0.25
	3	0.10	0.10	0.12	0.15	0.20	0.15	0.20	0.22	0.22
	4	0.08	0.10	0.12	0.15	0.15	0.15	0.20	0.20	0.20
	5	0.05	0.05	0.10	0.10	0.10	0.15	0.15	0.20	0.20
	6		0.05	0.05	0.07	0.08	0.10	0.10	0.15	0.20
	7					0.05	0.10	0.10	0.12	0.15
	8						0.05	0.10	0.10	0.15
	9							0.07	0.10	0.10
	10							0.05	0.09	0.10
	11								0.05	0.10
	12									0.05

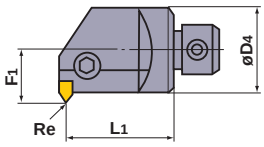
(Note) The first pass causes a high load on the cutting edge. In order to avoid damage, keep the depth of cut to 0.4—0.5mm maximum.

D TYPE BORING HEAD

- Minimum cutting diameter 40mm.
- Pin lock type.
- Exchangeable head type.
- Thread pitch ≤4.5mm.

DPT2 — Internal threading





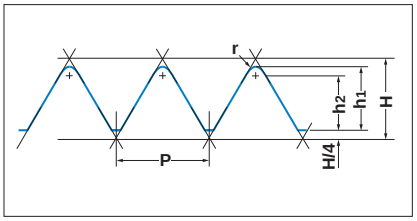
Right hand tool holder only.

Order Number	Stock R	Insert Number	Dimensions (mm) D4	L1	F1	Min. Cutting Diameter (mm)	Standard Corner Radius Re	Lock Pin	Lock Screw *	Stop Ring	Wrench
DPT2132R	●	MTTL4360○○	32	40	20	**40**	0.1	P21S	HSP08014	E01	HKY40R
2140R	●		40	50	25	**50**	0.1	P21S	HSP08014	E01	HKY40R

∗ Clamp Torque (N • m) : HSP08014=7.0

STANDARD OF DEPTH OF CUT

- The chart on the right shows the cutting depths when machining internal ISO metric screw threads.
- When you use cermet grades or cut stainless steel, please increase the number of passes by 2—3 times.



METRIC SCREW THREAD

P (Pitch)		0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50
h1		0.43	0.58	0.72	0.87	1.01	1.15	1.44	1.73	2.02	2.31	2.60
h2		0.38	0.51	0.63	0.76	0.88	1.01	1.21	1.51	1.77	2.02	2.28
r (Corner Radius)		0.05	0.07	0.09	0.11	0.13	0.14	0.18	0.22	0.25	0.29	0.32
Number of Passes	1	0.10	0.15	0.18	0.20	0.23	0.25	0.25	0.25	0.30	0.30	0.35
	2	0.10	0.13	0.15	0.20	0.20	0.20	0.22	0.25	0.25	0.25	0.30
	3	0.10	0.10	0.12	0.15	0.20	0.15	0.20	0.22	0.22	0.25	0.25
	4	0.08	0.10	0.12	0.15	0.15	0.15	0.20	0.20	0.20	0.25	0.25
	5	0.05	0.05	0.10	0.10	0.10	0.15	0.15	0.20	0.20	0.23	0.25
	6		0.05	0.05	0.07	0.08	0.10	0.10	0.15	0.20	0.20	0.20
	7					0.05	0.10	0.10	0.12	0.15	0.20	0.20
	8						0.05	0.10	0.10	0.15	0.15	0.15
	9							0.07	0.10	0.10	0.15	0.15
	10							0.05	0.09	0.10	0.10	0.15
	11								0.05	0.10	0.10	0.10
	12									0.05	0.08	0.10
	13										0.05	0.10
	14											0.05

(Note) The first pass causes a high load on the cutting edge. In order to avoid damage, keep the depth of cut to 0.4—0.5mm maximum.

RECOMMENDED CUTTING CONDITIONS

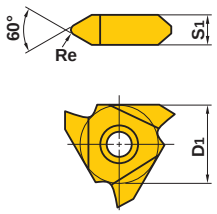
Work Material		Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**UP20M**	140 (100—180)
			NX55	200 (150—250)
			UTi20T	120 (100—150)
	Carbon Steel Alloy Steel	180—280HB	**UP20M**	120 (100—150)
			NX55	170 (150—200)
			UTi20T	100 (70—120)

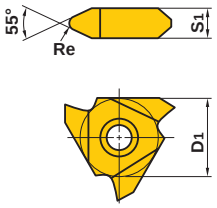
Work Material		Hardness	Grade	Cutting Speed (m/min)
M	Stainless Steel	≤200HB	**UP20M**	120 (80—150)
			UTi20T	100 (70—130)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**UP20M**	80 (60—100)
			UTi20T	80 (60—100)
			HTi10	100 (70—130)

● : **Inventory maintained in Japan. (10 inserts in one case)**
□ : **Non stock, produced to order only.**

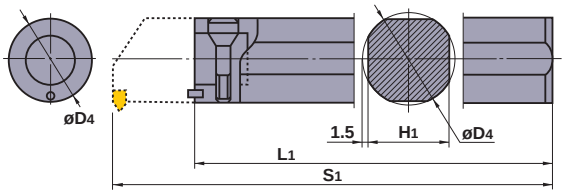
INSERTS

Type	Order Number	Class	Coated		Carbide		ISO Pitch mm (thread/inch)	Dimensions (mm)			Geometry
			UP20M	NX55	UTi20T	HTi10		D1	S1	Re	
Partial Profile 60°	MTTL436000	G	□	●	●	□	−0.75	12.7	4.76	0	MTTL(60°)
	L436001	G	□	●	●	●	1.0−1.75	12.7	4.76	0.1	
	L436002	G	□	●	●	●	2.0−2.5	12.7	4.76	0.2	
	L436003	G	□	●	●	□	3.0−3.5	12.7	4.76	0.3	
	L436004	G	□	●	●	□	4.0−4.5	12.7	4.76	0.4	
Partial Profile 55°	MTTL435501	G	□	●	●	□	(28−10)	12.7	4.76	0.1	MTTL(55°)
	L435502	G	□	●	●	□	(16−8)	12.7	4.76	0.2	
	L435503	G	□	□	□	□	(11−8)	12.7	4.76	0.3	



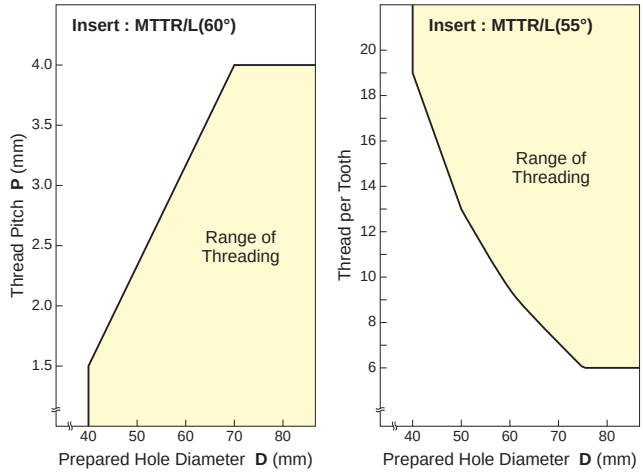


STANDARD ARBOR FOR D TYPE BORING HEAD

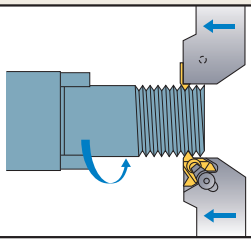
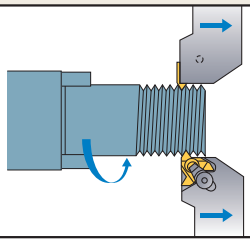
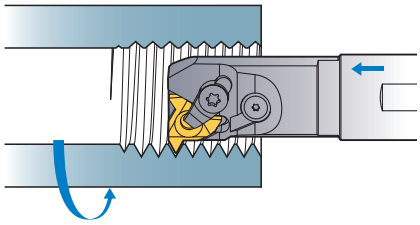
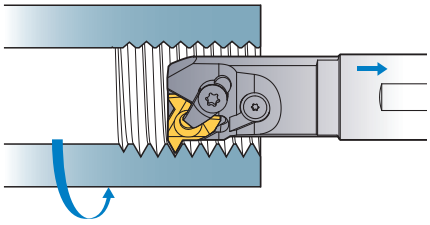


Order Number	Stock	Dimensions (mm)				Set Bolt	Wrench	Head
		D4	L1	H1	S1			
B13232	●	32	260	29	300	SD32	HKY60R	DPT2132R
B14040	●	40	310	37	360	SD40	HKY60R	DPT2140R

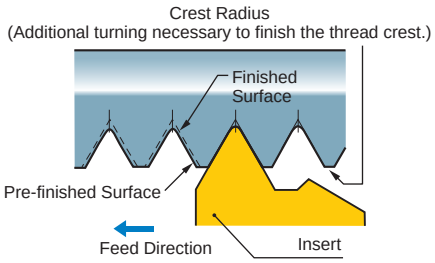
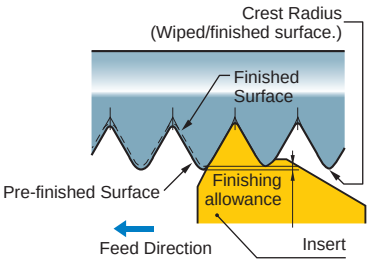
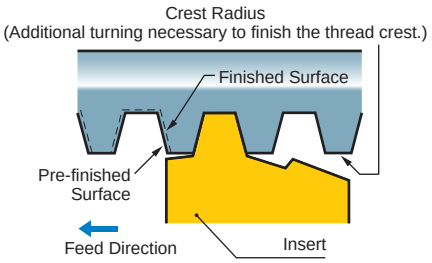
RANGE OF MACHINING



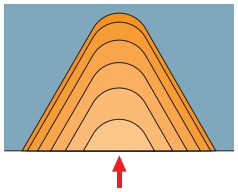
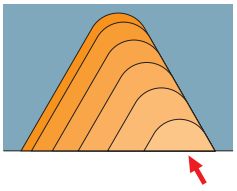
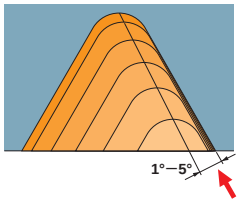
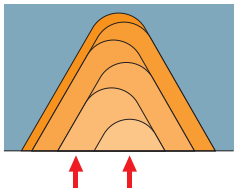
THREADING METHODS

	Right Hand Thread	Left Hand Thread
EXTERNAL	 Holder Reversed	 Holder Reversed
INTERNAL		

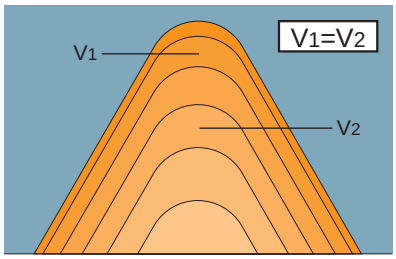
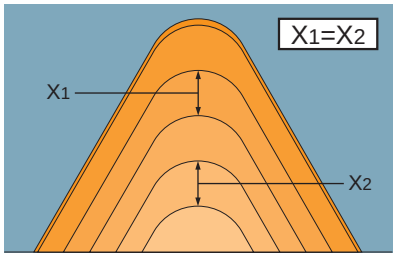
INSERT TYPES

Partial Form	Full Form	Semi-Full Form (Trapezoidal threads only)
● The same insert can be used for a range of pitches. ● Shorter tool life because the corner radius of the insert is smaller than that of the full form insert. ● Finishing with another operation is necessary.	● No deburring needed after threading. ● Requires different threading inserts.	● No deburring needed after threading. ● Requires different threading inserts. ● Finishing with another operation is necessary.
		

INFEED METHODS

Features	Radial Infeed	Flank Infeed	Modified Flank Infeed	Incremental Infeed
				
Advantages	● Easiest to use. (Standard programme for threading) ● Wide application. (Cutting conditions easy to change.) ● Uniform wear of the right and left sides of the cutting edge.	● Relatively easy to use. (Semi-standard program for threading.) ● Reduced cutting force. ● Suitable for large pitch threads or materials that peel easily. ● Good chip discharge.	● Preventing flank wear on the right side of the cutting edge. ● Reduced cutting force. ● Suitable for large pitch threads or materials that peel easily. ● Good chip discharge.	● Uniform flank wear of the right and left sides of the cutting edge. ● Reduced cutting force. ● Suitable for large pitch threads or materials that peel easily.
Disadvantages	● Difficult chip control. ● Subject to vibration in the later in stages of cutting. ● Ineffective for large pitch threading. ● Heavy load on the corner radius.	● Large flank wear on the right side of the cutting edge. ● Relatively difficult to change cutting depth. (Re-programming necessary)	● Complex machining programming. ● Difficult to change cutting depth. (Re-programming necessary)	● Complex machining programming. ● Difficult to change cutting depth. (Re-programming necessary) ● Difficult chip control.

THREADING DEPTH

	Features	
	Advantages	Disadvantages
 Fixed cut area	● Easy to use. (Standard programme for threading.) ● Superior resistance to vibration. (Constant cutting force.)	● Long chips generated during the final pass. ● Complex calculation of cutting depth when changing the number of passes.
 Fixed cutting depth	● Reduced load on corner radius during the first half of the passes. ● Easy chip control. (Optional setting of chip thickness) ● Easy to calculate cutting depth when changing the number of passes. ● Good chip control.	● Subject to vibration in the later stages of cutting. (Increased cutting force) ● In some cases, changing the NC programme is necessary.

∗It is recommended to set the depth of cut of the final pass to 0.05mm−0.025mm.
Large cutting depths can cause vibration, leading to a poor surface finish.

FORMULAE

Formulae to calculate infeed for each pass in a reduced series.

$$\triangle ap_n = \frac{ap}{\sqrt{n_{ap}-1}} \times \sqrt{b}$$

$\triangle ap_n$: Depth of cut
n : Actual pass
ap : Total depth of cut
n_{ap} : Number of passes
b : 1st pass 0.3
2nd pass 2−1 = 1
3rd pass 3−1 = 2
•
•
nth pass n−1

(Example)
External threading (ISO Metric)
Pitch : 1.0mm
ap : 0.6mm
n_{ap} : 5 passes

1st Pass $\triangle ap_1 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{0.3} = 0.16 \rightarrow$ **0.16** ($\triangle ap_1$)
2nd Pass $\triangle ap_2 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{2-1} = 0.3 \rightarrow$ **0.14** ($\triangle ap_2 - \triangle ap_1$)
3rd Pass $\triangle ap_3 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{3-1} = 0.42 \rightarrow$ **0.12** ($\triangle ap_3 - \triangle ap_2$)
4th Pass $\triangle ap_4 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{4-1} = 0.52 \rightarrow$ **0.1** ($\triangle ap_4 - \triangle ap_3$)
5th Pass $\triangle ap_5 = \frac{0.60}{\sqrt{5-1}} \times \sqrt{5-1} = 0.6 \rightarrow$ **0.08** ($\triangle ap_5 - \triangle ap_4$)

NC PROGRAMME FOR MODIFIED FLANK INFEED

Example) M12×1.0 5 passes modified 5°

External Threading	Internal Threading
G00 Z = 5.0 X = 14.0 G92 U−4.34 Z−13.0 F1.0 G00 W−0.07 G92 U−4.64 Z−13.0 F1.0 G00 W−0.06 G92 U−4.88 Z−13.0 F1.0 G00 W−0.05 G92 U−5.08 Z−13.0 F1.0 G00 W−0.03 G92 U−5.20 Z−13.0 F1.0 G00	G00 Z = 5.0 X = 10.0 G92 U4.34 Z−13.0 F1.0 G00 W−0.07 G92 U4.64 Z−13.0 F1.0 G00 W−0.05 G92 U4.84 Z−13.0 F1.0 G00 W−0.04 G92 U5.02 Z−13.0 F1.0 G00 W−0.03 G92 U5.14 Z−13.0 F1.0 G00

SELECTING CUTTING CONDITIONS

		Priority					
		Tool Life	Cutting Force	Surface Finish	Precision of Thread	Chips Discharge	Efficiency (Reduced Passes)
Threading Methods	Radial	○		○	○		○
	Flank	(△ : Modified)	○	(△ : Modified)		○	
Cutting Depth	Fixed Cutting Depth					○	
	Fixed Cut Area	○	○	○	○		○

* Tool life and surface finish accuracy can be increased by changing the threading method from flank infeed to modified flank infeed.
* Chip control can be improved by increasing the cutting depth in the later half of passes.

CUTTING DEPTH AND THE NUMBER OF PASSES

Selection of the appropriate cutting depth and the right number of passes is vital for threading.

- For most threading, use a "threading cycle program," which has originally been installed on machines, and specify "total cutting depth" and "cutting depth in the first or final pass."
- Cutting depth and the number of passes are easy to change for the radial infeed method, thus making it easy to determine the appropriate cutting conditions.

FEATURES AND BENEFITS OF MITSUBISHI PRODUCTS

- Insert grades with high wear and plastic deformation resistance, specially produced for threading tools, ensure highly efficient cutting by enabling high-speed machining and a reduced number of passes.

Machining Cost Reduction

ADVICE ON IMPROVED THREADING

Increasing tool life

- To prevent damage to the corner radius - *Recommended method - Modified flank infeed*
- To have uniform flank wear on both sides of a cutting edge - *Recommended method - Radial infeed*
- To prevent crater wear - *Recommended method - Flank infeed*

Preventing chip problems

- Change to flank or modified infeed.
- During radial infeed cutting, use an inverted holder and change the coolant supply to a downward direction.
- When using the radial infeed method, set the minimum cutting depth at around 0.2mm to make the chips thicker.

To achieve highly efficient machining

- Increase cutting speed. (Dependant on the maximum revolution and rigidity of the machine.)
- Reduce the number of passes. (Reduce by 30-40%.)
- A reduced number of passes can improve chip discharge because of the thicker chips generated.

Preventing vibration

- Change to flank or modified infeed.
- When using radial infeed, reduce cutting depth in the later half of passes and lower the cutting speed.

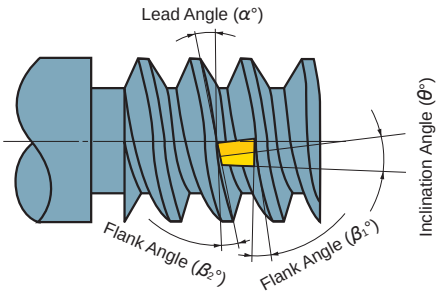
Increased surface finish accuracy

- A final wiping pass should be performed at the same depth of cut as the last regular pass.
- When using the flank infeed method, change to radial infeed only during the final pass.

SELECTING A SHIM FOR THE MMT SERIES

FLANK ANGLE AND LEAD ANGLE

Lead angle (α) depends on a combination of thread diameter and pitch. Select a shim so that the lead angle of the thread can coincide with the flank angles of the thread and insert (β_1, β_2). No need to change a shim for general threading with an MMT holder. When threading with a small diameter or large pitch, change the shim depending on the lead angle, referring to the table and graph below. When threading left hand threads, change to a shim with a negative inclination angle.



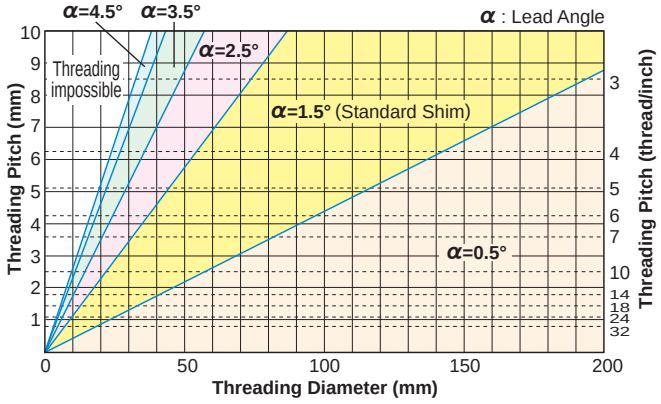
SHIM REFERENCE TABLE (THREADING DIAMETER)

Pitch (mm) \ Lead Angle	Right Hand Thread (mm)						Left Hand Thread (mm)		
	Threading impossible	4.5°	3.5°	2.5°	1.5°	0.5°	Threading impossible	−1.5°	−0.5°
0.5	≤ϕ1.9	ϕ1.9 − ϕ2.2	ϕ2.2 − ϕ2.8	ϕ2.8 − ϕ4.3	ϕ4.3 − ϕ11.4	≥ϕ11.4	≤ϕ4.3	ϕ4.3 − ϕ11.4	≥ϕ11.4
0.75	≤ϕ2.9	ϕ2.9 − ϕ3.2	ϕ3.2 − ϕ4.3	ϕ4.3 − ϕ6.5	ϕ6.5 − ϕ17.1	≥ϕ17.1	≤ϕ6.5	ϕ6.5 − ϕ17.1	≥ϕ17.1
1	≤ϕ3.8	ϕ3.8 − ϕ4.3	ϕ4.3 − ϕ5.7	ϕ5.7 − ϕ8.7	ϕ8.7 − ϕ22.8	≥ϕ22.8	≤ϕ8.7	ϕ8.7 − ϕ22.8	≥ϕ22.8
1.25	≤ϕ4.8	ϕ4.8 − ϕ5.4	ϕ5.4 − ϕ7.1	ϕ7.1 − ϕ10.9	ϕ10.9 − ϕ28.5	≥ϕ28.5	≤ϕ10.9	ϕ10.9 − ϕ28.5	≥ϕ28.5
1.5	≤ϕ5.7	ϕ5.7 − ϕ6.5	ϕ6.5 − ϕ8.5	ϕ8.5 − ϕ13.0	ϕ13.0 − ϕ34.2	≥ϕ34.2	≤ϕ13.0	ϕ13.0 − ϕ34.2	≥ϕ34.2
1.75	≤ϕ6.7	ϕ6.7 − ϕ7.6	ϕ7.6 − ϕ9.9	ϕ9.9 − ϕ15.2	ϕ15.2 − ϕ39.9	≥ϕ39.9	≤ϕ15.2	ϕ15.2 − ϕ39.9	≥ϕ39.9
2	≤ϕ7.6	ϕ7.6 − ϕ8.6	ϕ8.6 − ϕ11.4	ϕ11.4 − ϕ17.4	ϕ17.4 − ϕ45.6	≥ϕ45.6	≤ϕ17.4	ϕ17.4 − ϕ45.6	≥ϕ45.6
2.5	≤ϕ9.5	ϕ9.5 − ϕ10.8	ϕ10.8 − ϕ14.2	ϕ14.2 − ϕ21.7	ϕ21.7 − ϕ57.0	≥ϕ57.0	≤ϕ21.7	ϕ21.7 − ϕ57.0	≥ϕ57.0
3	≤ϕ11.4	ϕ11.4 − ϕ13.0	ϕ13.0 − ϕ17.0	ϕ17.0 − ϕ26.0	ϕ26.0 − ϕ68.4	≥ϕ68.4	≤ϕ26.0	ϕ26.0 − ϕ68.4	≥ϕ68.4
3.5	≤ϕ13.3	ϕ13.3 − ϕ15.1	ϕ15.1 − ϕ19.9	ϕ19.9 − ϕ30.4	ϕ30.4 − ϕ79.8	≥ϕ79.8	≤ϕ30.4	ϕ30.4 − ϕ79.8	≥ϕ79.8
4	≤ϕ15.2	ϕ15.2 − ϕ17.3	ϕ17.3 − ϕ22.7	ϕ22.7 − ϕ34.7	ϕ34.7 − ϕ91.2	≥ϕ91.2	≤ϕ34.7	ϕ34.7 − ϕ91.2	≥ϕ91.2
4.5	≤ϕ17.1	ϕ17.1 − ϕ19.4	ϕ19.4 − ϕ25.6	ϕ25.6 − ϕ39.1	ϕ39.1 − ϕ102.6	≥ϕ102.6	≤ϕ39.1	ϕ39.1 − ϕ102.6	≥ϕ102.6
5	≤ϕ19.0	ϕ19.0 − ϕ21.6	ϕ21.6 − ϕ28.4	ϕ28.4 − ϕ43.4	ϕ43.4 − ϕ114.0	≥ϕ114.0	≤ϕ43.4	ϕ43.4 − ϕ114.0	≥ϕ114.0

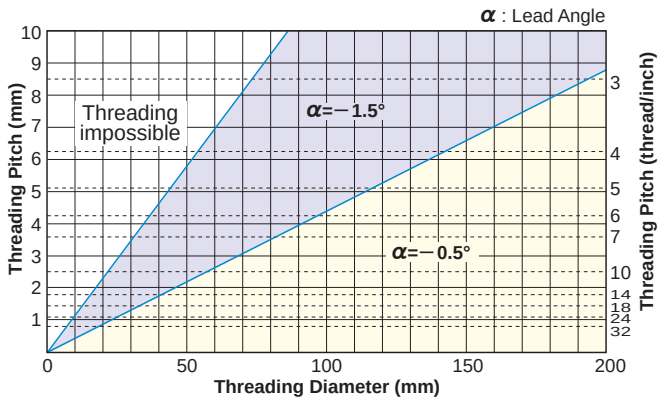
(Note) Back turning in the case of left hand threads.

SHIM REFERENCE GRAPH

Right Hand Thread



Left Hand Thread



(Note) When a thread lead angle ≤ the tool flank angle, change the shim to prevent side interference with the insert.
(Refer to the table below for the calculation of thread lead angle and tool flank angle.)

When replacing a shim, check if the difference between the thread lead angle and shim inclination angle is within:
2.5°−0.5° where thread helix angle is 60° (55°)
2°−1° where thread helix angle is 30° (29°)
✱ Inclination angle of a standard shim is 0°.
✱ The holder has a 1.5° lead angle.

CALCULATION OF THREAD LEAD ANGLE

$$\tan\alpha = \frac{l}{\pi d} = \frac{nP}{\pi d}$$

α: Lead angle
l : Lead
n : Number of threads
P : Pitch
d : Effective diameter of thread

EXAMPLE OF SELECTING A SHIM

• When the thread lead angle is 2.2°
①In the case when the thread helix angle is 60°
(2.2° lead angle) − (2.5−0.5°) = -0.3°−1.7° shim inclination angle is appropriate.
Threading with a standard shim (0° inclination angle) is possible. But, replacing with a shim with a 1° inclination angle is recommended, refer to Standard Shim List on pages A400 and A401.
②In the case when the thread helix angle is 30°
(2.2° lead angle) − (2−1°) = -0.2°−1.2° shim inclination angle is appropriate.
Replacing with a shim with a 1° inclination angle is recommended, referring to Standard Shim List on pages A400 and A401.

RELIEF ANGLE OF AN INSERT SET ON A HOLDER

Thread Helix Angle	Internal Relief Angle	External Relief Angle
60°	8.5°	6°
55°	7°	7°
30°	4°	2.5°
29°	4°	2.5°

• Relief angles (β_2, β_1) of an insert become small when the thread helix angle of a trapezoidal, round, or other thread is small. Take care when selecting a shim.

STANDARD OF DEPTH OF CUT EXTERNAL (RADIAL INFEED)

ISO Metric

Pitch (mm)	Total Cutting Depth	Number of Passes														Insert Type	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	M-class inserts with 3-D chip breakers
0.5	0.31	0.10	0.08	0.07	0.06											MMT16ER050ISO	–
0.75	0.46	0.16	0.14	0.10	0.06											16ER075ISO	–
1.0	0.61	0.18	0.15	0.12	0.10	0.06										16ER100ISO	MMT16ER100ISO-S
1.25	0.77	0.19	0.17	0.14	0.11	0.10	0.06									16ER125ISO	16ER125ISO-S
1.5	0.92	0.22	0.21	0.17	0.14	0.12	0.06									16ER150ISO	16ER150ISO-S
1.75	1.07	0.22	0.21	0.16	0.13	0.11	0.09	0.09	0.06							16ER175ISO	16ER175ISO-S
2.0	1.23	0.24	0.23	0.17	0.16	0.14	0.12	0.11	0.06							16ER200ISO	16ER200ISO-S
2.5	1.53	0.26	0.23	0.19	0.17	0.15	0.13	0.12	0.11	0.11	0.06					16ER250ISO	16ER250ISO-S
3.0	1.84	0.27	0.25	0.20	0.18	0.16	0.14	0.13	0.12	0.12	0.11	0.10	0.06			16ER300ISO	16ER300ISO-S
3.5	2.15	0.33	0.30	0.24	0.21	0.18	0.17	0.15	0.14	0.14	0.12	0.11	0.06			22ER350ISO	–
4.0	2.45	0.34	0.31	0.24	0.22	0.19	0.17	0.16	0.14	0.14	0.13	0.12	0.12	0.11	0.06	22ER400ISO	–
4.5	2.76	0.38	0.34	0.28	0.24	0.22	0.20	0.18	0.16	0.16	0.15	0.14	0.13	0.12	0.06	22ER450ISO	–
5.0	3.07	0.42	0.38	0.32	0.27	0.24	0.22	0.20	0.18	0.18	0.17	0.16	0.15	0.12	0.06	22ER500ISO	–

American UN

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	M-class inserts with 3-D chip breakers
32	0.49	0.17	0.15	0.11	0.06											MMT16ER320UN	–
28	0.56	0.17	0.14	0.10	0.09	0.06										16ER280UN	–
24	0.65	0.18	0.16	0.14	0.11	0.06										16ER240UN	–
20	0.78	0.20	0.18	0.13	0.11	0.10	0.06									16ER200UN	–
18	0.87	0.22	0.20	0.15	0.13	0.11	0.06									16ER180UN	–
16	0.97	0.22	0.20	0.15	0.12	0.11	0.11	0.06								16ER160UN	MMT16ER160UN-S
14	1.11	0.23	0.21	0.16	0.13	0.11	0.11	0.10	0.06							16ER140UN	16ER140UN-S
13	1.20	0.25	0.22	0.17	0.14	0.13	0.12	0.11	0.06							16ER130UN	–
12	1.30	0.28	0.23	0.18	0.16	0.14	0.13	0.12	0.06							16ER120UN	MMT16ER120UN-S
11	1.42	0.28	0.23	0.19	0.16	0.14	0.13	0.12	0.11	0.06						16ER110UN	–
10	1.56	0.28	0.24	0.19	0.16	0.14	0.13	0.13	0.12	0.11	0.06					16ER100UN	–
9	1.73	0.34	0.29	0.22	0.17	0.15	0.14	0.13	0.12	0.11	0.06					16ER090UN	–
8	1.95	0.35	0.30	0.24	0.19	0.16	0.15	0.14	0.13	0.12	0.11	0.06				16ER080UN	–
7	2.22	0.37	0.33	0.28	0.24	0.20	0.17	0.16	0.15	0.14	0.12	0.06				22ER070UN	–
6	2.60	0.42	0.35	0.29	0.25	0.21	0.18	0.17	0.16	0.15	0.13	0.12	0.11	0.06		22ER060UN	–
5	3.12	0.43	0.39	0.31	0.27	0.24	0.22	0.20	0.19	0.19	0.18	0.17	0.15	0.12	0.06	22ER050UN	–

Whitworth for BSW, BSP

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts	M-class inserts with 3-D chip breakers
28	0.58	0.17	0.14	0.11	0.10	0.06										MMT16ER280W	–
26	0.63	0.18	0.15	0.13	0.11	0.06										16ER260W	–
20	0.81	0.20	0.18	0.14	0.12	0.11	0.06									16ER200W	–
19	0.86	0.21	0.19	0.15	0.13	0.12	0.06									16ER190W	MMT16ER190W-S
18	0.90	0.25	0.19	0.15	0.13	0.12	0.06									16ER180W	–
16	1.02	0.21	0.18	0.15	0.13	0.11	0.09	0.09	0.06							16ER160W	–
14	1.16	0.23	0.21	0.17	0.14	0.12	0.12	0.11	0.06							16ER140W	MMT16ER140W-S
12	1.36	0.27	0.25	0.20	0.16	0.15	0.14	0.13	0.06							16ER120W	–
11	1.48	0.27	0.24	0.20	0.17	0.15	0.14	0.13	0.12	0.06						16ER110W	MMT16ER110W-S
10	1.63	0.27	0.25	0.20	0.17	0.15	0.15	0.13	0.13	0.12	0.06					16ER100W	–
9	1.81	0.28	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06				16ER090W	–
8	2.03	0.30	0.27	0.22	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.06			16ER080W	–
7	2.32	0.34	0.32	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.06			22ER070W	–
6	2.71	0.35	0.33	0.27	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.06	22ER060W	–
5	3.25	0.42	0.40	0.35	0.29	0.26	0.24	0.22	0.20	0.19	0.18	0.17	0.15	0.12	0.06	22ER050W	–

BSPT

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type	
		1	2	3	4	5	6	7	8	9						G-class ground inserts	M-class inserts with 3-D chip breakers
28	0.58	0.17	0.14	0.11	0.10	0.06										MMT16ER280BSPT	–
19	0.86	0.22	0.19	0.15	0.12	0.12	0.06									16ER190BSPT	MMT16ER190BSPT-S
14	1.16	0.24	0.20	0.17	0.14	0.12	0.12	0.11	0.06							16ER140BSPT	16ER140BSPT-S
11	1.48	0.25	0.23	0.21	0.18	0.16	0.14	0.13	0.12	0.06						16ER110BSPT	16ER110BSPT-S

(Note) • Set the finishing allowance on a diameter at approx. 0.1mm when using a full form insert.
• Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert nose.
• Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

Round DIN 405

Pitch (thread/inch)	Total Cutting Depth	Number of Passes 1	2	3	4	5	6	7	8	9	10	11	12	13	14		Insert Type
10	1.27	0.23	0.21	0.20	0.19	0.16	0.12	0.10	0.06								MMT16ER100RD
8	1.59	0.23	0.21	0.20	0.19	0.18	0.16	0.14	0.12	0.10	0.06						16ER080RD
6	2.12	0.26	0.25	0.24	0.22	0.21	0.19	0.17	0.16	0.14	0.12	0.10	0.06				16ER060RD
4	3.18	0.34	0.33	0.32	0.30	0.28	0.26	0.24	0.22	0.20	0.19	0.17	0.15	0.12	0.06		22ER040RD

ISO Trapezoidal 30°

Pitch (mm)	Total Cutting Depth	Number of Passes 1	2	3	4	5	6	7	8	9	10	11	12	13	14		Insert Type
1.5	0.90	0.23	0.21	0.16	0.13	0.11	0.06										MMT16ER150TR
2.0	1.25	0.29	0.26	0.21	0.17	0.14	0.12	0.06									16ER200TR
3.0	1.75	0.32	0.31	0.24	0.19	0.18	0.17	0.15	0.13	0.06							16ER300TR
4.0	2.25	0.33	0.32	0.24	0.22	0.21	0.17	0.16	0.15	0.14	0.13	0.12	0.16				22ER400TR
5.0	2.75	0.35	0.32	0.26	0.24	0.22	0.21	0.19	0.19	0.17	0.15	0.14	0.13	0.12	0.06		22ER500TR

American ACME

Pitch (thread/inch)	Total Cutting Depth	Number of Passes 1	2	3	4	5	6	7	8	9	10	11	12	13	14		Insert Type
12	1.19	0.27	0.23	0.20	0.17	0.14	0.12	0.06									MMT16ER120ACME
10	1.52	0.29	0.25	0.21	0.18	0.16	0.14	0.12	0.11	0.06							16ER100ACME
8	1.84	0.30	0.26	0.22	0.19	0.16	0.15	0.14	0.13	0.12	0.11	0.06					16ER080ACME
6	2.37	0.34	0.30	0.27	0.24	0.21	0.19	0.16	0.14	0.12	0.12	0.11	0.11	0.06			22ER060ACME
5	2.79	0.36	0.33	0.30	0.26	0.23	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.06		22ER050ACME

UNJ

Pitch (thread/inch)	Total Cutting Depth	Number of Passes 1	2	3	4	5	6	7	8	9	10	11					Insert Type
32	0.46	0.16	0.14	0.10	0.06												MMT16ER320UNJ
28	0.52	0.16	0.12	0.09	0.09	0.06											16ER280UNJ
24	0.61	0.17	0.14	0.14	0.10	0.06											16ER240UNJ
20	0.73	0.19	0.16	0.13	0.10	0.09	0.06										16ER200UNJ
18	0.81	0.23	0.18	0.14	0.10	0.10	0.06										16ER180UNJ
16	0.92	0.26	0.21	0.14	0.12	0.10	0.09										16ER160UNJ
14	1.05	0.26	0.23	0.17	0.12	0.11	0.10	0.06									16ER140UNJ
12	1.22	0.28	0.27	0.20	0.17	0.13	0.11	0.06									16ER120UNJ
10	1.47	0.30	0.29	0.21	0.15	0.13	0.12	0.11	0.10	0.06							16ER100UNJ
8	1.83	0.31	0.30	0.23	0.18	0.15	0.14	0.13	0.12	0.11	0.10	0.06					16ER080UNJ

API Buttress Casing

Pitch (thread/inch)	Total Cutting Depth	Number of Passes 1	2	3	4	5	6	7	8	9	10	11					Insert Type
5	1.55	0.25	0.23	0.17	0.15	0.13	0.12	0.12	0.11	0.11	0.10	0.06					MMT22ER050APBU

API Round Casing&Tubing

Pitch (thread/inch)	Total Cutting Depth	Number of Passes 1	2	3	4	5	6	7	8	9	10	11	12				Insert Type
10	1.41	0.25	0.23	0.16	0.14	0.12	0.12	0.12	0.11	0.10	0.06						MMT16ER100APRD
8	1.81	0.25	0.24	0.19	0.16	0.14	0.14	0.13	0.13	0.13	0.13	0.11	0.06				16ER080APRD

American NPT

Pitch (thread/inch)	Total Cutting Depth	Number of Passes 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Insert Type
27	0.66	0.15	0.13	0.12	0.11	0.09	0.06										MMT16ER270NPT
18	1.01	0.20	0.16	0.14	0.13	0.12	0.11	0.09	0.06								16ER180NPT
14	1.33	0.23	0.19	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06						16ER140NPT
11.5	1.64	0.24	0.19	0.17	0.15	0.15	0.13	0.13	0.12	0.11	0.10	0.09	0.06				16ER115NPT
8	2.42	0.33	0.28	0.23	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06	16ER080NPT

American NPTF

Pitch (thread/inch)	Total Cutting Depth	Number of Passes 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Insert Type
27	0.64	0.16	0.14	0.11	0.09	0.08	0.06										MMT16ER270NPTF
18	1.00	0.19	0.16	0.14	0.13	0.12	0.11	0.09	0.06								16ER180NPTF
14	1.35	0.23	0.21	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06						16ER140NPTF
11.5	1.63	0.24	0.23	0.19	0.15	0.13	0.11	0.11	0.11	0.10	0.10	0.10	0.06				16ER115NPTF
8	2.38	0.32	0.27	0.23	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06	16ER080NPTF

(Note) • Set the finishing allowance on a diameter at approx. 0.1mm when using a full form insert.
• Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
• Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

STANDARD OF DEPTH OF CUT INTERNAL (RADIAL INFEED)

ISO Metric

Pitch (mm)	Total Cutting Depth	Number of Passes														Insert Type			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts		M-class inserts with 3-D chip breakers	
0.5	0.29	0.09	0.07	0.07	0.06											MMT11IR050ISO	MMT16IR050ISO	—	—
0.75	0.43	0.15	0.13	0.09	0.06											11IR075ISO	16IR075ISO	—	—
1.0	0.58	0.17	0.15	0.11	0.09	0.06										11IR100ISO	16IR100ISO	MMT11IR100ISO-S	MMT16IR100ISO-S
1.25	0.72	0.18	0.16	0.12	0.11	0.09	0.06									11IR125ISO	16IR125ISO	11IR125ISO-S	16IR125ISO-S
1.5	0.87	0.21	0.20	0.16	0.13	0.11	0.06									11IR150ISO	16IR150ISO	11IR150ISO-S	16IR150ISO-S
1.75	1.01	0.21	0.20	0.15	0.12	0.10	0.09	0.08	0.06							11IR175ISO	16IR175ISO	—	16IR175ISO-S
2.0	1.15	0.24	0.22	0.18	0.14	0.12	0.10	0.09	0.06							11IR200ISO	16IR200ISO	—	16IR200ISO-S
2.5	1.44	0.25	0.24	0.21	0.15	0.13	0.12	0.10	0.09	0.09	0.06					—	16IR250ISO	—	16IR250ISO-S
3.0	1.73	0.26	0.25	0.22	0.17	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.06			—	16IR300ISO	—	16IR300ISO-S
3.5	2.02	0.32	0.30	0.23	0.19	0.17	0.15	0.14	0.13	0.12	0.11	0.10	0.06			—	22IR350ISO	—	—
4.0	2.31	0.33	0.31	0.24	0.22	0.18	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.10	0.06	—	22IR400ISO	—	—
4.5	2.60	0.36	0.33	0.28	0.24	0.21	0.19	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.06	—	22IR450ISO	—	—
5.0	2.89	0.41	0.38	0.32	0.27	0.24	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06	—	22IR500ISO	—	—

American UN

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts		M-class inserts with 3-D chip breakers
32	0.46	0.16	0.14	0.10	0.06											MMT11IR320UN	MMT16IR320UN	—
28	0.52	0.16	0.13	0.09	0.08	0.06										11IR280UN	16IR280UN	—
24	0.61	0.17	0.15	0.13	0.10	0.06										11IR240UN	16IR240UN	—
20	0.73	0.18	0.15	0.13	0.11	0.10	0.06									11IR200UN	16IR200UN	—
18	0.81	0.20	0.18	0.14	0.12	0.11	0.06									11IR180UN	16IR180UN	—
16	0.92	0.20	0.18	0.15	0.12	0.11	0.10	0.06								11IR160UN	16IR160UN	MMT16IR160UN-S
14	1.05	0.21	0.18	0.15	0.13	0.11	0.11	0.10	0.06							11IR140UN	16IR140UN	16IR140UN-S
13	1.13	0.22	0.19	0.16	0.14	0.13	0.12	0.11	0.06							—	16IR130UN	—
12	1.22	0.24	0.22	0.18	0.16	0.13	0.12	0.11	0.06							—	16IR120UN	MMT16IR120UN-S
11	1.33	0.24	0.22	0.20	0.15	0.12	0.12	0.11	0.11	0.06						—	16IR110UN	—
10	1.47	0.25	0.22	0.21	0.14	0.13	0.12	0.12	0.11	0.11	0.06					—	16IR100UN	—
9	1.63	0.31	0.23	0.21	0.17	0.15	0.14	0.13	0.12	0.11	0.06					—	16IR090UN	—
8	1.83	0.31	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.11	0.06				—	16IR080UN	—
7	2.09	0.36	0.30	0.24	0.21	0.18	0.17	0.16	0.15	0.14	0.12	0.06				—	22IR070UN	—
6	2.44	0.40	0.33	0.25	0.23	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.11	0.06		—	22IR060UN	—
5	2.93	0.41	0.35	0.31	0.26	0.23	0.21	0.20	0.19	0.17	0.15	0.14	0.13	0.12	0.06	—	22IR050UN	—

Whitworth for BSW, BSP

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	G-class ground inserts		M-class inserts with 3-D chip breakers
28	0.58	0.17	0.14	0.11	0.10	0.06										—	MMT16IR280W	—
26	0.63	0.18	0.15	0.13	0.11	0.06										—	16IR260W	—
20	0.81	0.20	0.18	0.14	0.12	0.11	0.06									—	16IR200W	—
19	0.86	0.21	0.19	0.15	0.13	0.12	0.06									MMT11IR190W	16IR190W	MMT16IR190W-S
18	0.90	0.25	0.19	0.15	0.13	0.12	0.06									—	16IR180W	—
16	1.02	0.21	0.18	0.15	0.13	0.11	0.09	0.09	0.06							—	16IR160W	—
14	1.16	0.23	0.21	0.17	0.14	0.12	0.12	0.11	0.06							MMT11IR140W	16IR140W	MMT16IR140W-S
12	1.36	0.27	0.25	0.20	0.16	0.15	0.14	0.13	0.06							—	16IR120W	16IR120W-S
11	1.48	0.27	0.24	0.20	0.17	0.15	0.14	0.13	0.12	0.06						—	16IR110W	—
10	1.63	0.27	0.25	0.20	0.17	0.15	0.15	0.13	0.13	0.12	0.06					—	16IR100W	—
9	1.81	0.28	0.26	0.21	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.06				—	16IR090W	—
8	2.03	0.30	0.27	0.22	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.06			—	16IR080W	—
7	2.32	0.34	0.32	0.26	0.22	0.20	0.18	0.17	0.16	0.15	0.14	0.12	0.06			—	22IR070W	—
6	2.71	0.35	0.33	0.27	0.23	0.21	0.20	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.06	—	22IR060W	—
5	3.25	0.42	0.40	0.35	0.29	0.26	0.24	0.22	0.20	0.19	0.18	0.17	0.15	0.12	0.06	—	22IR050W	—

(Note) • Set the finishing allowance on a diameter at approx. 0.1mm when using a full form insert.
• Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
• Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

BSPT

Pitch (thread/inch)	Total Cutting Depth	Number of Passes										Insert Type		
		1	2	3	4	5	6	7	8	9		G-class ground inserts		M-class inserts with 3-D chip breakers
19	0.86	0.22	0.19	0.15	0.12	0.12	0.06					MMT11IR190BSPT	MMT16IR190BSPT	MMT16IR190BSPT-S
14	1.16	0.24	0.20	0.17	0.14	0.12	0.12	0.11	0.06			11IR140BSPT	16IR140BSPT	16IR140BSPT-S
11	1.48	0.25	0.23	0.21	0.18	0.16	0.14	0.13	0.12	0.06		—	16IR110BSPT	16IR110BSPT-S

Round DIN 405

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
10	1.27	0.23	0.21	0.20	0.19	0.16	0.12	0.10	0.06							MMT16IR100RD
8	1.59	0.23	0.21	0.20	0.19	0.18	0.16	0.14	0.12	0.10	0.06					16IR080RD
6	2.12	0.26	0.25	0.24	0.22	0.21	0.19	0.17	0.16	0.14	0.12	0.10	0.06			16IR060RD
4	3.18	0.34	0.33	0.32	0.30	0.28	0.26	0.24	0.22	0.20	0.19	0.17	0.15	0.12	0.06	22IR040RD

ISO Trapezoidal 30°

Pitch (mm)	Total Cutting Depth	Number of Passes														Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1.5	0.90	0.23	0.21	0.16	0.13	0.11	0.06									MMT16IR150TR
2	1.25	0.29	0.26	0.21	0.17	0.14	0.12	0.06								16IR200TR
3	1.75	0.32	0.31	0.24	0.19	0.18	0.17	0.15	0.13	0.06						16IR300TR
4	2.25	0.33	0.32	0.24	0.22	0.21	0.17	0.16	0.15	0.14	0.13	0.12	0.06			22IR400TR
5	2.75	0.35	0.32	0.26	0.24	0.22	0.21	0.19	0.19	0.17	0.15	0.14	0.13	0.12	0.06	22IR500TR

American ACME

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
12	1.19	0.27	0.23	0.20	0.17	0.14	0.12	0.06								MMT16IR120ACME
10	1.52	0.29	0.25	0.21	0.18	0.16	0.14	0.12	0.11	0.06						16IR100ACME
8	1.84	0.30	0.26	0.22	0.19	0.16	0.15	0.14	0.13	0.12	0.11	0.06				16IR080ACME
6	2.37	0.34	0.30	0.27	0.24	0.21	0.19	0.16	0.14	0.12	0.12	0.11	0.11	0.06		22IR060ACME
5	2.79	0.36	0.33	0.30	0.26	0.23	0.20	0.18	0.17	0.16	0.15	0.14	0.13	0.12	0.06	22IR050ACME

API Buttress Casing

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type
		1	2	3	4	5	6	7	8	9	10	11				
5	1.55	0.25	0.23	0.17	0.15	0.13	0.12	0.12	0.11	0.11	0.10	0.06				MMT22IR050APBU

API Round Casing&Tubing

Pitch (thread/inch)	Total Cutting Depth	Number of Passes														Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12			
10	1.41	0.25	0.23	0.16	0.14	0.12	0.12	0.12	0.11	0.10	0.06					MMT16IR100APRD
8	1.81	0.25	0.24	0.19	0.16	0.14	0.14	0.13	0.13	0.13	0.13	0.11	0.06			16IR080APRD

American NPT

Pitch (thread/inch)	Total Cutting Depth	Number of Passes															Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
27	0.66	0.15	0.13	0.12	0.11	0.09	0.06										MMT16IR270NPT
18	1.01	0.20	0.16	0.14	0.13	0.12	0.11	0.09	0.06								16IR180NPT
14	1.33	0.23	0.19	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06						16IR140NPT
11.5	1.64	0.24	0.19	0.17	0.15	0.15	0.13	0.13	0.12	0.11	0.10	0.09	0.06				16IR115NPT
8	2.42	0.33	0.28	0.23	0.20	0.18	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06	16IR080NPT

American NPTF

Pitch (thread/inch)	Total Cutting Depth	Number of Passes															Insert Type
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
14	1.35	0.23	0.21	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.06						MMT16IR140NPTF
11.5	1.63	0.24	0.23	0.19	0.15	0.13	0.11	0.11	0.11	0.10	0.10	0.10	0.06				16IR115NPTF
8	2.38	0.32	0.27	0.23	0.19	0.17	0.16	0.15	0.14	0.13	0.12	0.12	0.11	0.11	0.10	0.06	16IR080NPTF

(Note) • Set the finishing allowance on a diameter at approx. 0.1mm when using a full form insert.
• Please note the cutting depth and the number of passes when a corner radius of a partial form insert or of an internal threading insert is small to prevent damage to the insert corner.
• Please set the cutting depth sufficiently deep enough on materials such as hardened steel or austenitic stainless steel to help prevent premature wear and chipping caused by the outer layer of the material.

TROUBLE SHOOTING

Problems	Observation	Causes	Solutions
Low thread precision.	Threads do not mesh with each other.	Incorrect tool installation.	Set the insert centre height at 0mm.
			Check holder inclination (Lateral).
	Shallow thread.	Incorrect depth of cut.	Modify the depth of cut.
		Lack of insert wear or plastic deformation resistance.	Refer to "Quickly generated flank wear." and "Large plastic deformation." below.
Poor surface finish.	Surface damage.	Chips wrap around or clog the work pieces.	Change to flank infeed and control the chip discharge direction.
			Change to an M-class insert with a 3-D chip breaker.
		The side of the insert cutting edge interferes with the workpiece.	Check the lead angle and select an appropriate shim.
	Surface tears.	Built-up edge (Welding).	Increase cutting speed.
			Increase coolant pressure and volume.
		Cutting resistance too high.	Decrease depth of cut per pass.
	Surface vibrations.	Cutting speed too high.	Decrease the cutting speed.
		Insufficient work piece or tool clamping.	Re-check work piece and tool clamping. (Chuck pressure, clamping allowance)
		Incorrect tool installation.	Set the insert centre height at 0mm.
Short tool life.	Flank wear quickly generated.	Cutting speed too high.	Decrease the cutting speed.
		Too many passes causes abrasive wear.	Reduce the number of passes.
		Small depth of cut for the finishing pass.	Do not re-cut at 0mm depth of cut, larger than 0.05mm depth of cut is recommended.
	Non-uniform wear of the right and left sides of the cutting edge.	The work piece lead angle and the tool lead angle do not match.	Check the work piece lead angle and select an appropriate shim.
	Chipping and fracture.	Cutting speed too low.	Increase cutting speed.
		Cutting resistance too high.	Increase the number of passes and decrease the cutting resistance per pass.
		Unstable clamping.	Check work piece deflection.
			Shorten tool overhang.
			Recheck work piece and tool clamping. (Chuck pressure, clamping allowance)
		Chip packing.	Increase coolant pressure to blow away chips.
			Change the tool pass to control chips. (Lengthen each pass to allow the coolant to clear the chips.
			Change from standard internal cutting to back turning to prevent chip jamming.
		Non-chamfered work pieces causes high resistance at the start of each pass.	Chamfer the workpiece entry and exit faces.
	Large plastic deformation.	High cutting speed and large heat generation.	Decrease the cutting speed.
		Lack of coolant supply.	Check coolant is supply is sufficient.
			Increase coolant pressure and volume.
		Cutting resistance too high.	Increase the number of passes and decrease the cutting resistance per pass.

Memo

HOW TO READ THE STANDARD OF HSK TOOLS

●How this section page is organized

①Organized by application. (Refer to the index on the next page.)

PRODUCT TYPE
indicates the first four letters of the order number, as well as cutting applications.

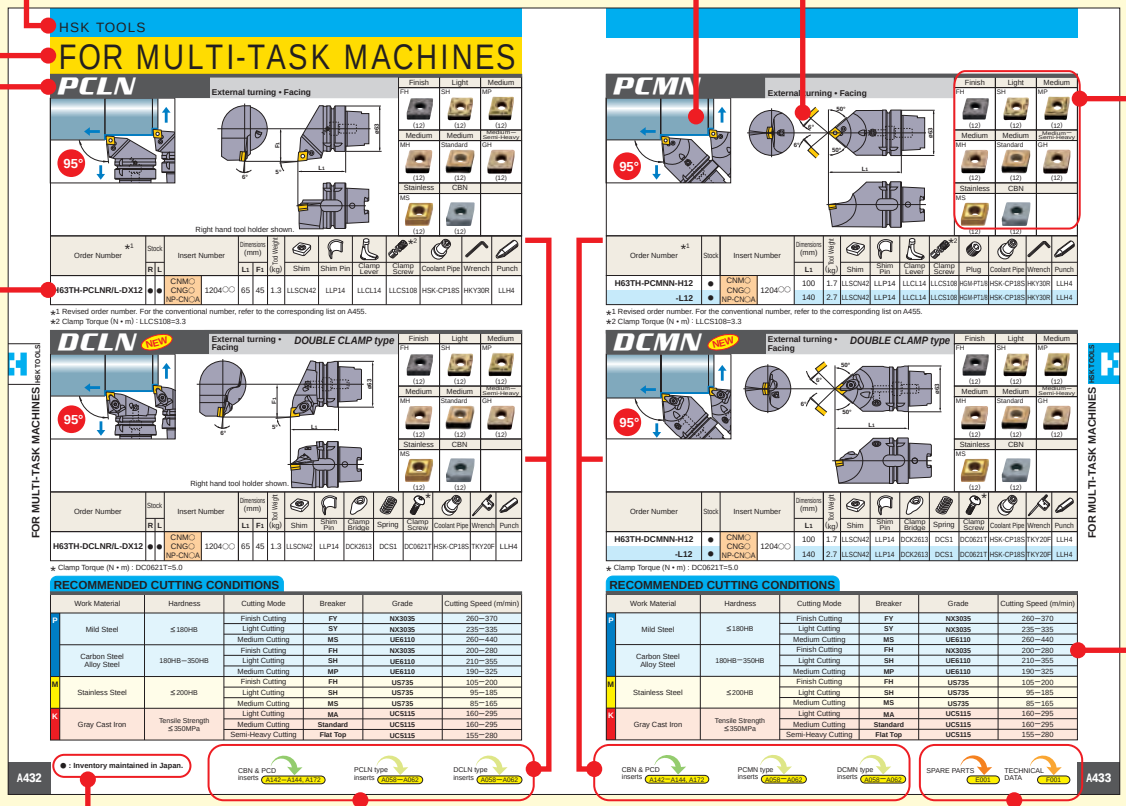
TITLE OF PRODUCT SERIES

PRODUCT SECTION

FIGURE SHOWING THE TOOLING APPLICATION
uses illustrations and arrows to depict available machining applications along with cutting edge lead angles.

GEOMETRY

CHIP BREAKER BY CUTTING APPLICATION



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

REFERENCE PAGE FOR APPLICABLE INSERTS
indicates reference pages for details of inserts that are applicable to the title product.

PAGE REFERENCE
·SPARE PARTS
·TECHNICAL DATA
indicates reference pages, including the above, on the right hand page of each double-page spread.

PRODUCT STANDARDS
Indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, and spare parts.

RECOMMENDED CUTTING CONDITIONS
for each work material classification, indicates recommended cutting conditions according to the ISO categories for cutting grades, P, M, and K.

●To Order : Please specify
①order number and hand of tool (right/left).

HSK TOOLS

OVERVIEW OF HSK TOOLS ····· A428
CLASSIFICATION OF HSK TOOLS ····· A430
HSK TOOL STANDARDS

EXTERNAL TURNING • FACING
CN○○ INSERTS TOOL HOLDERS ····· A432
DN○○ INSERTS TOOL HOLDERS ····· A437

EXTERNAL TURNING • FACING • BORING
CN○○ INSERTS TOOL HOLDERS ····· A434

EXTERNAL TURNING • COPYING
DN○○ INSERTS TOOL HOLDERS ····· A435

EXTERNAL TURNING • FACING • COPYING
RC○○ INSERTS TOOL HOLDERS ····· A438

FACING • COPYING
VB○○ INSERTS TOOL HOLDERS ····· A439

CUTTING OFF • GROOVING • COPYING
DG INSERTS TOOL HOLDERS ····· A440

RECESSING • COPYING
DG INSERTS TOOL HOLDERS ····· A441

FACE GROOVING
DG INSERTS TOOL HOLDERS ····· A442,A444

FACE GROOVING • COPYING
DG INSERTS TOOL HOLDERS ····· A443,A445

GROOVING
MG INSERTS TOOL HOLDERS ····· A446

THREADING
MMT INSERTS TOOL HOLDERS ····· A448
MT INSERTS TOOL HOLDERS ····· A449

EXTERNAL TURNING TOOL HOLDERS ····· A451
BORING BAR HOLDERS ····· A453
BORING BAR SLEEVES ····· A454
CROSS REFERENCE TABLE FOR OLD AND NEW PARTS ··· A455

★Arranged by Alphabetical order

A454 **H100TH-B○○-○○○**
A452 **H100TH-EN3232R/L-130**
A451 **H100TH-EV3232R/L-180**
A434 **H63TH-A○○○DCLNR/L12**
A453 **H63TH-B○○-○○**
A440 **H63TH-C○○○○R/L (DG Pack)**
A440 **H63TH-D○○○○R/L (DG Pack)**
A434 **H63TH-DCLNL-L12-3**
A432 **H63TH-DCLNR/L-DX12**
A433 **H63TH-DCMNN-H/L12**
A437 **H63TH-DDJNL-L15-3**
A435 **H63TH-DDJNR/L-DX15**
A436 **H63TH-DDNNN-H/L15**
A452 **H63TH-EN2525R/L-115**
A453 **H63TH-EV2020R/L-105-3**
A451 **H63TH-EV2525R/L-112**
A441 **H63TH-G○○○○NH/L (DG Pack)**
A442 **H63TH-M○○○○R/L (DG Pack)**
A443 **H63TH-M○○○○R/L (DG Pack)**
A446 **H63TH-MGHR/L-DX43○○**
A448 **H63TH-MMTENR-H/L16**
A448 **H63TH-MMTER-DX16**
A449 **H63TH-MTHR/L-DX43**
A444 **H63TH-N○○○○R/L (DG Pack)**
A445 **H63TH-N○○○○R/L (DG Pack)**
A443 **H63TH-P○○○○R/L (DG Pack)**
A432 **H63TH-PCLNR/L-DX12**
A433 **H63TH-PCMNN-H/L12**
A435 **H63TH-PDJNR/L-DX15**
A436 **H63TH-PDNNN-H/L15**
A438 **H63TH-PRDCN-H/L12**
A438 **H63TH-PRGCR/L-DX12**
A445 **H63TH-Q○○○○R/L (DG Pack)**
A439 **H63TH-SVPBR/L-DX16**
A439 **H63TH-SVVBN-H/L16**
A454 **SL32○○-90**

Tooling system for turning on multi-task machines

HSK TOOLS

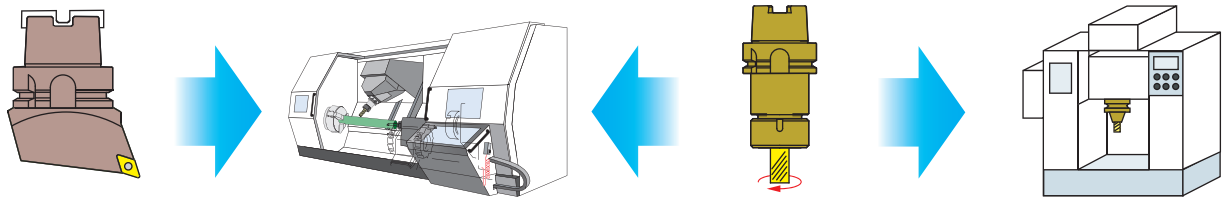
HSK-T System (ICTM standard)

HSK-T is a new HSK system designed for turning on multi-task machines that are compatible with HSK-A type (ISO standard: ISO12164-1:2001). It was jointly developed by a consortium of Japanese manufacturers and is now used worldwide as the ICTM standard. The HSK-T type was registered in the ISO standard in 2008. (ISO12164-3:2008)

High accuracy cutting edge positioning

The HSK-T type has a closer tolerance between the spindle key and tool holder keyway than the HSK-A type. This results in higher cutting edge positional accuracies. For milling, the conventional HSK-A type tools can be still used.

Compatible with both multi-task machines and machining centres



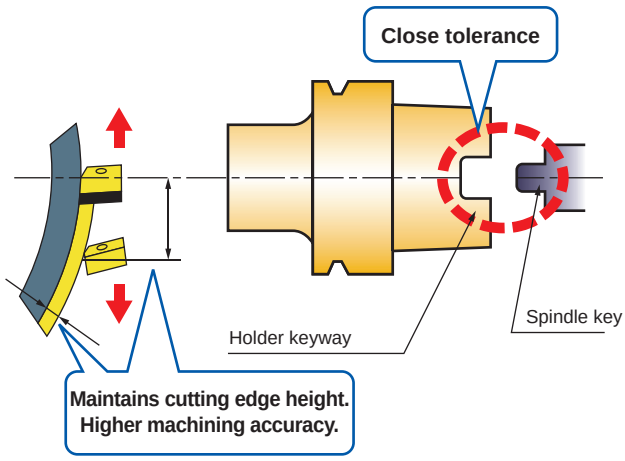
HSK-T (ISO standard)
Turning tool holder

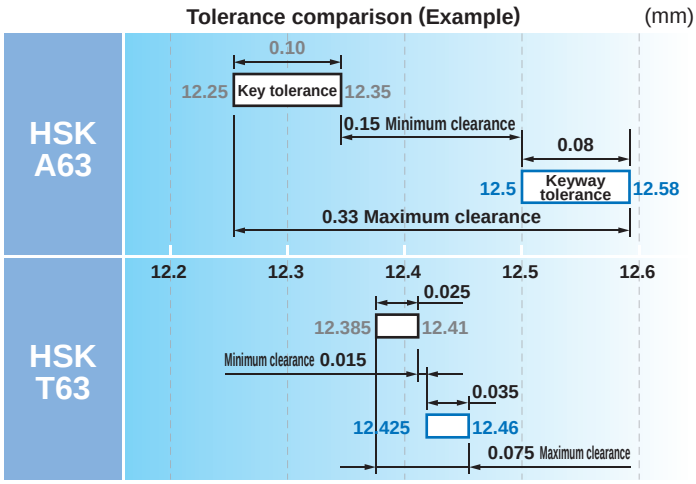
HSK-T spindle
Multi-task machines

HSK-A63 (ISO standard)
Rotating tool holder

HSK-A spindle
Machining centre

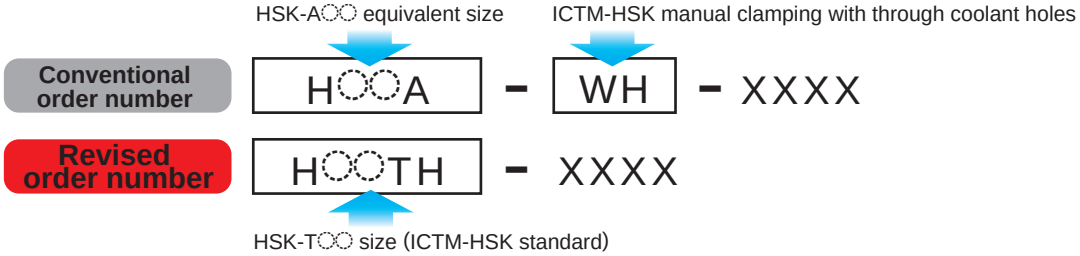
Improved keyway tolerance





From ICTM-HSK to HSK-T

The order numbers of the tool holders will be changed according to the global standardization.

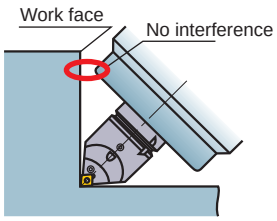


High accuracy and rigidity HSK-T type tooling system developed for use on multi-task machines.

Straight type tools suitable for use on multi-task machines

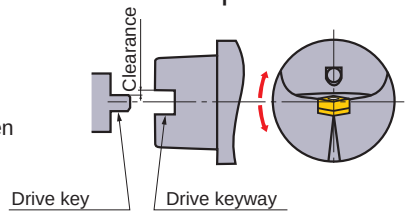
Avoid workpiece interference with improved tool accessibility.

By tilting the machines B spindle (main axis of the tool) at 45 deg, interference between the spindle, holder, workpiece and chuck can be avoided.



Improve centreline height by positioning the cutting edge at the centre of the spindle.

Increased stability and accuracy can be achieved because the cutting edge centreline height is not affected by the gap between the spindle and the key.



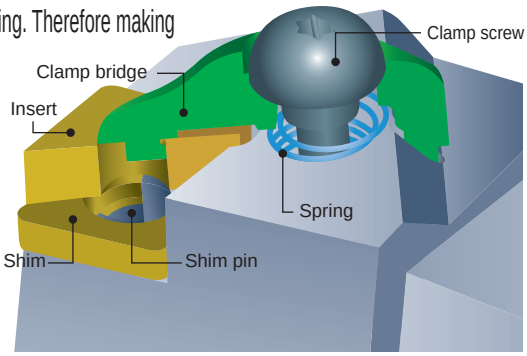
NEW New one-action type double clamp series

The double clamp mechanism offers high rigidity, accuracy, reliability that ensures secure insert clamping. Therefore making it suitable for turning of difficult to machine materials such as stainless and heat resistant alloys.

Handed type for turning and facing

Straight type for turning and facing

For turning, facing and boring



NEW 3 on 1 tool for process and tool consolidation

3 turning inserts of the same geometry can be installed on a single tool.

The same type of inserts can be installed for quick change with spare tools.

Different types of inserts can be installed for different applications (rough and semi finishing and finishing)

Inserts in different grade types can be installed to cover various kinds of workpieces.

NEW New HSK-T100 size for large workpieces

Larger tool holder sizes for high efficiency machining.

Square shank holder type

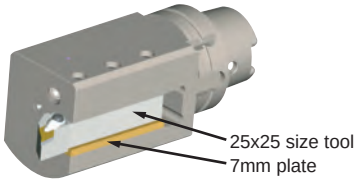
Boring bar / Drill type

Sleeve

A single tool can be used with different sized tool holders.

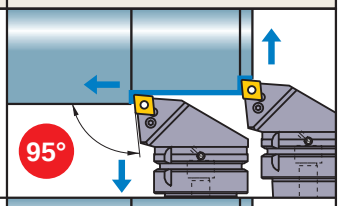
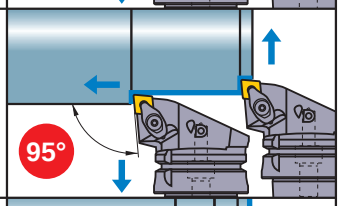
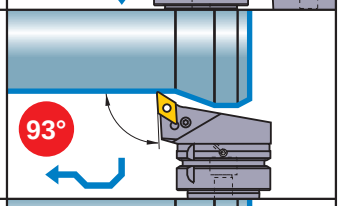
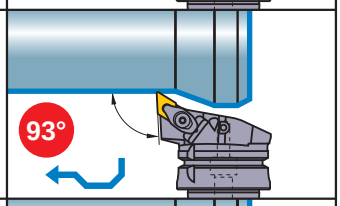
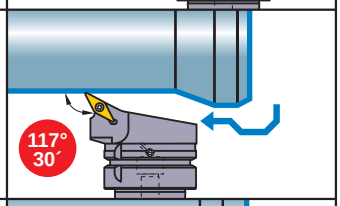
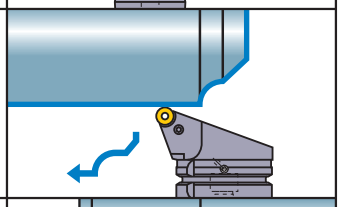
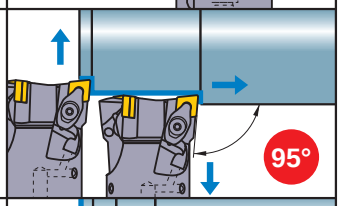
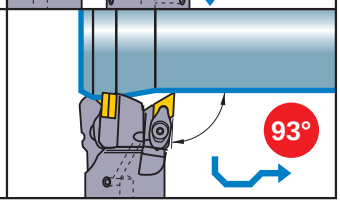
- Available for use with JIS B4126 (ISO 5610) 32x32 and 32x25 tools.
- Possible to fit a 25x25 tool by using a 7mm plate.

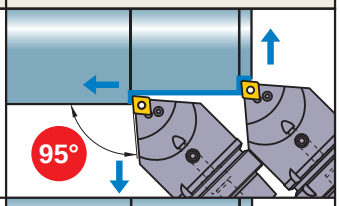
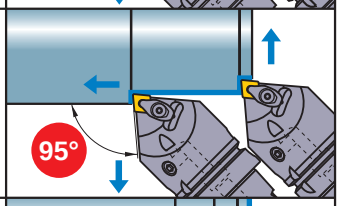
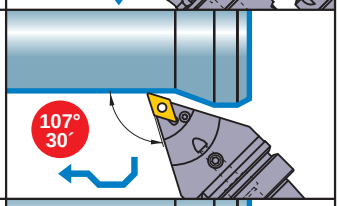
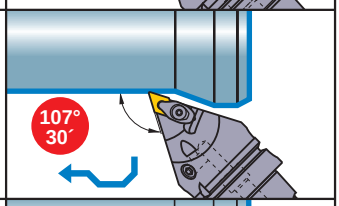
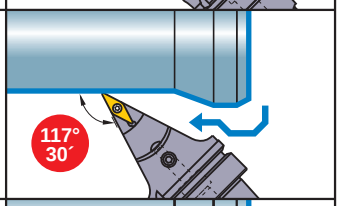
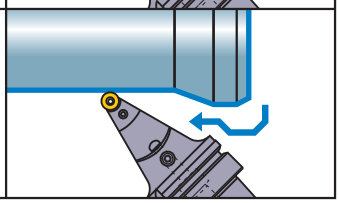
*Please prepare a plate on your own.



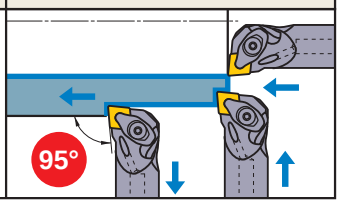
CLASSIFICATION OF HSK TOOLS

EXTERNAL TURNING • FACING • COPYING

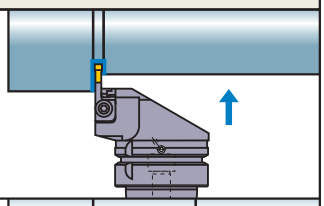
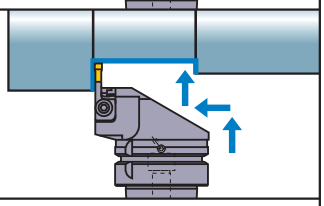
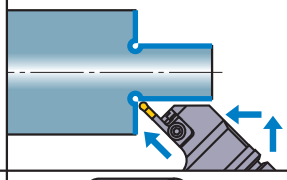
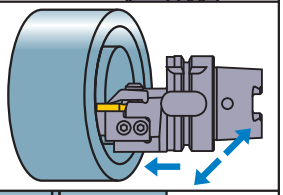
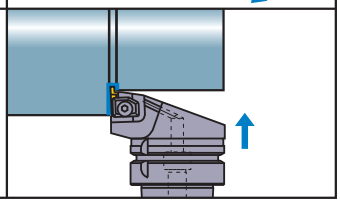
Order Number	Cutting Mode
H63TH-PCLNR/L-DX12 A432	
H63TH-DCLNR/L-DX12 NEW A432	
H63TH-PDJNR/L-DX15 A435	
H63TH-DDJNR/L-DX15 NEW A435	
H63TH-SVPBR/L-DX16 A439	
H63TH-PRGCR/L-DX12 A438	
H63TH-DCLNL-L12-3 NEW A434	
H63TH-DDJNL-L15-3 NEW A437	

Order Number	Cutting Mode
H63TH-PCMNN-H/L12 A433	
H63TH-DCMNN-H/L12 NEW A433	
H63TH-PDNNN-H/L15 A436	
H63TH-DDNNN-H/L15 NEW A436	
H63TH-SVVBN-H/L16 A439	
H63TH-PRDCN-H/L12 A438	

EXTERNAL TURNING • FACING • BORING

Order Number	Cutting Mode
H63TH-A25KDCLNR/L12 **H63TH-A32LDCLNR/L12** NEW A434	

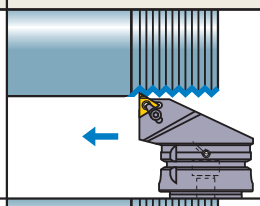
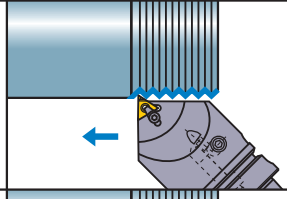
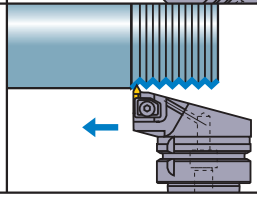
GROOVING

Order Number	Cutting Mode
H63TH-C○○○○R/L A440	
H63TH-C/D○○○○R/L A440	
H63TH-G○○○○NH/L A441	
H63TH-M/N/P/Q○○○○R/L A442–A445	
H63TH-MGHR/L-DX43○○ A446	

EXTERNAL TURNING TOOL HOLDERS

Order Number	Holder
H63TH-EV2525R/L-112 A451	
H100TH-EV3232R/L-180 NEW A451	
H63TH-EN2525R/L-115 NEW ★1 A452	
H100TH-EN3232R/L-130 NEW ★1 A452	
H63TH-EV2020R/L-105-3 A453	

THREADING

Order Number	Cutting Mode
H63TH-MMTER-DX16 A448	
H63TH-MMTENR-H/L16 A448	
H63TH-MTHR/L-DX43 A449	

BORING BAR HOLDERS

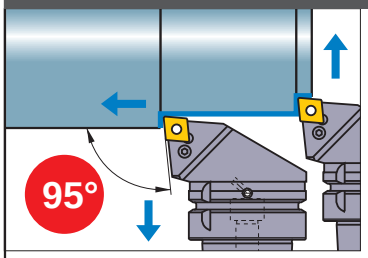
Order Number	Holder
H63TH-B○○-○○ A453	
H100TH-B○○-○○○ NEW A454	
SL32○○-90 (Sleeve) NEW ★2 A454	

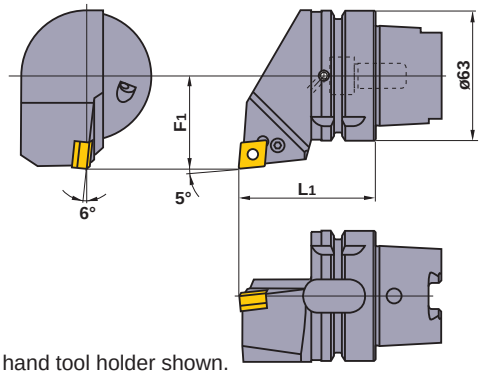
★1 Mitsubishi Materials is licensed for production and distribution of these tools from MORI SEIKI CO., LTD under Patent No.3720202.
★2 The SL32○○-90 sleeve is only for use with H100TH-B32-135.

FOR MULTI-TASK MACHINES

PCLN

External turning • Facing





Right hand tool holder shown.

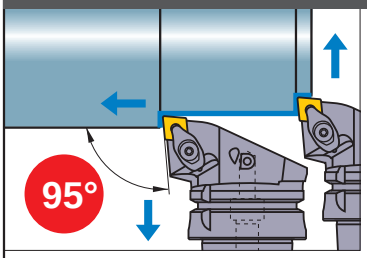
Finish	Light	Medium
FH (12)	SH (12)	MP (12)
Medium	**Medium**	**Medium—Semi-Heavy**
MH (12)	Standard (12)	GH (12)
Stainless	**CBN**	
MS (12)	(12)	

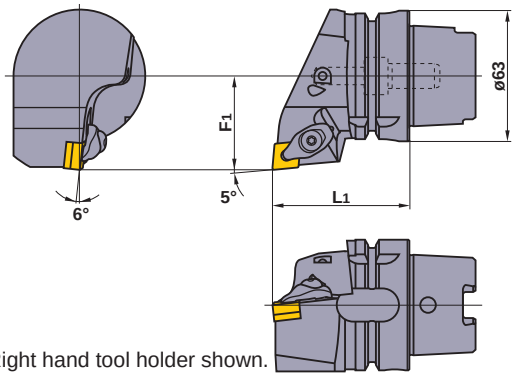
Order Number *1	Stock R	Stock L	Insert Number	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Shim	Shim Pin	Clamp Lever	Clamp Screw *2	Coolant Pipe	Wrench	Punch
H63TH-PCLNR/L-DX12	●	●	CNM○ CNG○ NP-CN○A 1204○○	65	45	1.3	LLSCN42	LLP14	LLCL14	LLCS108	HSK-CP18S	HKY30R	LLH4

*1 Revised order number. For the conventional number, refer to the corresponding list on A455.
*2 Clamp Torque (N • m) : LLCS108=3.3

DCLN NEW

External turning • Facing ***DOUBLE CLAMP type***





Right hand tool holder shown.

Finish	Light	Medium
FH (12)	SH (12)	MP (12)
Medium	**Medium**	**Medium—Semi-Heavy**
MH (12)	Standard (12)	GH (12)
Stainless	**CBN**	
MS (12)	(12)	

Order Number	Stock R	Stock L	Insert Number	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Coolant Pipe	Wrench	Punch
H63TH-DCLNR/L-DX12	●	●	CNM○ CNG○ NP-CN○A 1204○○	65	45	1.3	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	HSK-CP18S	TKY20F	LLH4

* Clamp Torque (N • m) : DC0621T=5.0

RECOMMENDED CUTTING CONDITIONS

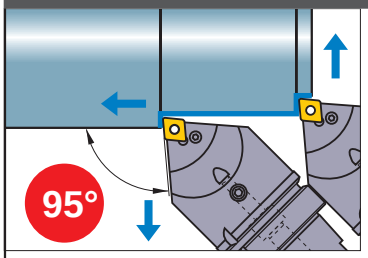
	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FY**	**NX3035**	260—370
			Light Cutting	**SY**	**NX3035**	235—335
			Medium Cutting	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel	180HB—350HB	Finish Cutting	**FH**	**NX3035**	200—280
			Light Cutting	**SH**	**UE6110**	210—355
			Medium Cutting	**MP**	**UE6110**	190—325
M	Stainless Steel	≤200HB	Finish Cutting	**FH**	**US735**	105—200
			Light Cutting	**SH**	**US735**	95—185
			Medium Cutting	**MS**	**US735**	85—165
K	Gray Cast Iron	Tensile Strength ≤350MPa	Light Cutting	**MA**	**UC5115**	160—295
			Medium Cutting	**Standard**	**UC5115**	160—295
			Semi-Heavy Cutting	**Flat Top**	**UC5115**	155—280

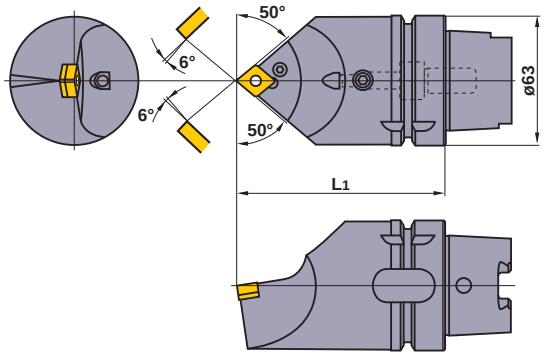
● : **Inventory maintained in Japan.**

CBN & PCD inserts A142—A144, A172
PCLN type inserts A058—A062
DCLN type inserts A058—A062

PCMN

External turning • Facing





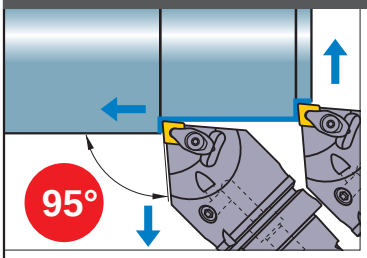
Finish	Light	Medium
FH	SH	MP
(12)	(12)	(12)
Medium	**Medium**	**Medium—Semi-Heavy**
MH	Standard	GH
(12)	(12)	(12)
Stainless	**CBN**	
MS		
(12)	(12)	

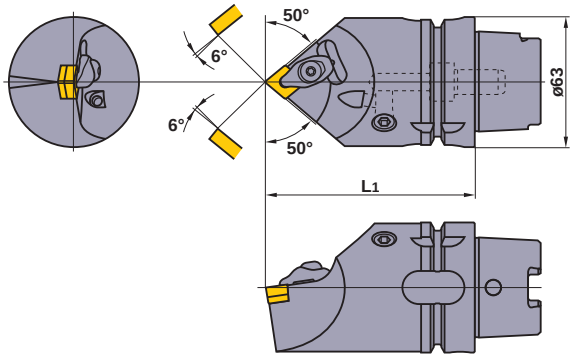
Order Number *1	Stock	Insert Number		Dimensions (mm) L1	Tool Weight (kg)	Shim	Shim Pin	Clamp Lever	Clamp Screw *2	Plug	Coolant Pipe	Wrench	Punch
H63TH-PCMNN-H12	●	CNM○ CNG○ NP-CN○A	1204○○	100	1.7	LLSCN42	LLP14	LLCL14	LLCS108	HGM-PT1/8	HSK-CP18S	HKY30R	LLH4
-L12	●			140	2.7	LLSCN42	LLP14	LLCL14	LLCS108	HGM-PT1/8	HSK-CP18S	HKY30R	LLH4

*1 Revised order number. For the conventional number, refer to the corresponding list on A455.
*2 Clamp Torque (N • m) : LLCS108=3.3

DCMN NEW

External turning • Facing ***DOUBLE CLAMP type***





Finish	Light	Medium
FH	SH	MP
(12)	(12)	(12)
Medium	**Medium**	**Medium—Semi-Heavy**
MH	Standard	GH
(12)	(12)	(12)
Stainless	**CBN**	
MS		
(12)	(12)	

Order Number	Stock	Insert Number		Dimensions (mm) L1	Tool Weight (kg)	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Coolant Pipe	Wrench	Punch
H63TH-DCMNN-H12	●	CNM○ CNG○ NP-CN○A	1204○○	100	1.7	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	HSK-CP18S	TKY20F	LLH4
-L12	●			140	2.7	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	HSK-CP18S	TKY20F	LLH4

* Clamp Torque (N • m) : DC0621T=5.0

RECOMMENDED CUTTING CONDITIONS

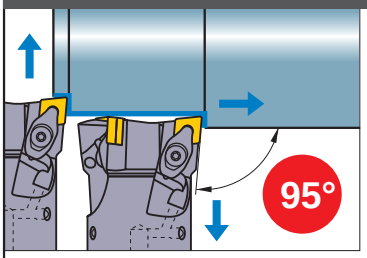
	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FY**	**NX3035**	260—370
			Light Cutting	**SY**	**NX3035**	235—335
			Medium Cutting	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel	180HB—350HB	Finish Cutting	**FH**	**NX3035**	200—280
			Light Cutting	**SH**	**UE6110**	210—355
			Medium Cutting	**MP**	**UE6110**	190—325
M	Stainless Steel	≤200HB	Finish Cutting	**FH**	**US735**	105—200
			Light Cutting	**SH**	**US735**	95—185
			Medium Cutting	**MS**	**US735**	85—165
K	Gray Cast Iron	Tensile Strength ≤350MPa	Light Cutting	**MA**	**UC5115**	160—295
			Medium Cutting	**Standard**	**UC5115**	160—295
			Semi-Heavy Cutting	**Flat Top**	**UC5115**	155—280

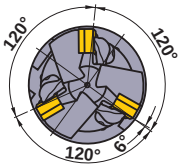
CBN & PCD inserts A142—A144, A172
PCMN type inserts A058—A062
DCMN type inserts A058—A062
SPARE PARTS E001
TECHNICAL DATA F001

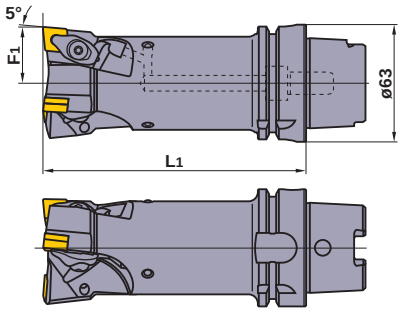
FOR MULTI-TASK MACHINES

DCLN NEW

External turning • Facing — ***DOUBLE CLAMP type***







Left hand tool holder only.

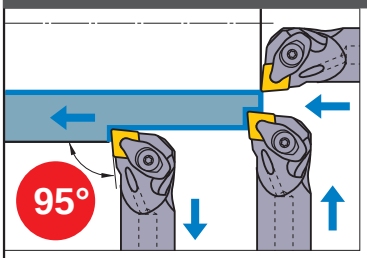
Finish	Light	Medium
FH	SH	MP
(12)	(12)	(12)
Medium	**Medium**	**Medium—Semi-Heavy**
MH	Standard	GH
(12)	(12)	(12)
Stainless	**CBN**	
MS		
(12)	(12)	

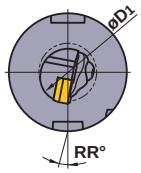
Order Number	Stock	Insert Number		Dimensions (mm)		Tool Weight	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Coolant Pipe	Wrench	Punch
	L			L_1	F_1	(kg)								
H63TH-DCLNL-L12-3	●	CNM○ CNG○ NP-CN○A	1204○○	140	30	2.2	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	HSK-CP18S	TKY20F	LLH4

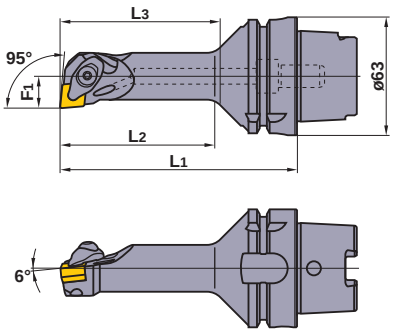
∗ Clamp Torque (N • m) : DC0621T=5.0

DCLN NEW

External turning • Facing • Boring — ***DOUBLE CLAMP type***







Right hand tool holder shown.

Finish	Light	Medium
FH	SH	MP
(12)	(12)	(12)
Medium	**Medium**	**Medium—Semi-Heavy**
MH	Standard	GH
(12)	(12)	(12)
Stainless	**CBN**	
MS		
(12)	(12)	

Order Number	Stock		Insert Number		Dimensions (mm)					Min. Cutting Diameter	Tool Weight	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw *	Wrench	Punch
	R	L			L_1	L_2	L_3	F_1	RR°	D_1 (mm)	(kg)							
H63TH-A25KDCLNR/L12	●	●	CNM○ CNG○ NP-CN○A	1204○○	125	82	84	17	11	32	1.1	LLSCP42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4
-A32LDCLNR/L12	●	●			140	100	102	22	13	40	1.4	LLSCN42	LLP14	DCK2613	DCS1	DC0621T	TKY20F	LLH4

∗ Clamp Torque (N • m) : DC0621T=5.0

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FY**	**NX3035**	260—370
			Light Cutting	**SY**	**NX3035**	235—335
			Medium Cutting	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel	180HB—350HB	Finish Cutting	**FH**	**NX3035**	200—280
			Light Cutting	**SH**	**UE6110**	210—355
			Medium Cutting	**MP**	**UE6110**	190—325
M	Stainless Steel	≤200HB	Finish Cutting	**FH**	**US735**	105—200
			Light Cutting	**SH**	**US735**	95—185
			Medium Cutting	**MS**	**US735**	85—165
K	Gray Cast Iron	Tensile Strength ≤350MPa	Light Cutting	**MA**	**UC5115**	160—295
			Medium Cutting	**Standard**	**UC5115**	160—295
			Semi-Heavy Cutting	**Flat Top**	**UC5115**	155—280

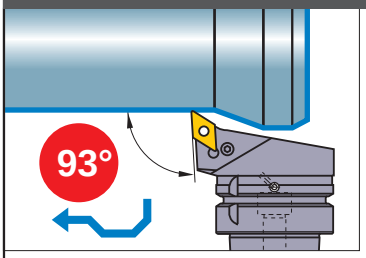
● : **Inventory maintained in Japan.**

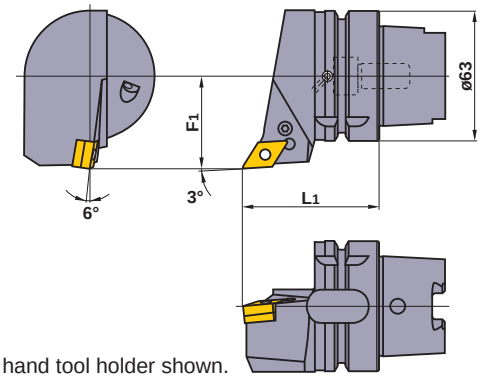
CBN & PCD inserts A142—A144, A172

DCLN type inserts A058—A062

PDJN

External turning • Copying





Right hand tool holder shown.

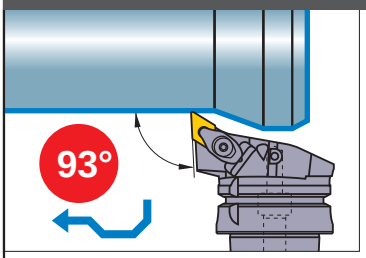
Finish	Light	Medium
FH (15)	SH (15)	MP (15)
Medium	**Medium—Semi-Heavy**	**Stainless**
MH (15)	GH (15)	MS (15)
G Class	**CBN**	
R/L (15)	(15)	

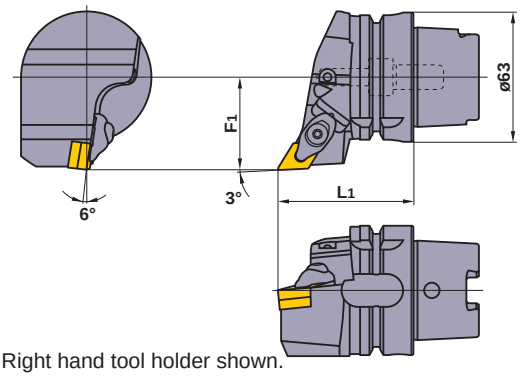
Order Number ★1	Stock R	Stock L	Insert Number	Dimensions (mm) L_1	Dimensions (mm) F_1	Tool Weight (kg)	★3 Shim	Shim Pin	Clamp Lever	★2 Clamp Screw	Coolant Pipe	Wrench	Punch
H63TH-PDJNR/L-DX15	●	●	DNM○ DNG○ NP-DN○A 1504○○	65	45	1.2	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HSK-CP18S	HKY30R	LLH4

★1 Revised order number. For the conventional number, refer to the corresponding list on A455.
★2 Clamp Torque (N • m) : LLCS108=3.3
★3 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

DDJN NEW

External turning • Copying ***DOUBLE CLAMP type***





Right hand tool holder shown.

Finish	Light	Medium
FH (15)	SH (15)	MP (15)
Medium	**Medium—Semi-Heavy**	**Stainless**
MH (15)	GH (15)	MS (15)
G Class	**CBN**	
R/L (15)	(15)	

Order Number	Stock R	Stock L	Insert Number	Dimensions (mm) L_1	Dimensions (mm) F_1	Tool Weight (kg)	★2 Shim	Shim Pin	Clamp Bridge	Spring	★1 Clamp Screw	Coolant Pipe	Wrench	Punch
H63TH-DDJNR/L-DX15	●	●	DNM○ DNG○ NP-DN○A 1504○○	65	45	1.2	LLSDN43 (LLSDN42)	LLP24	DCK2613	DCS1	DC0621T	HSK-CP18S	TKY20F	LLH4

★1 Clamp Torque (N • m) : DC0621T=5.0 ★2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

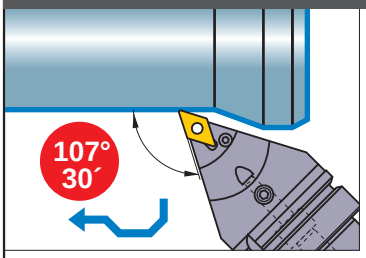
	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FY**	**NX3035**	260—370
			Light Cutting	**SY**	**NX3035**	235—335
			Medium Cutting	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel	180HB—350HB	Finish Cutting	**FH**	**NX3035**	200—280
			Light Cutting	**SH**	**UE6110**	210—355
			Medium Cutting	**MP**	**UE6110**	190—325
M	Stainless Steel	≤200HB	Finish Cutting	**FH**	**US735**	105—200
			Light Cutting	**SH**	**US735**	95—185
			Medium Cutting	**MS**	**US735**	85—165
K	Gray Cast Iron	Tensile Strength ≤350MPa	Light Cutting	**MA**	**UC5115**	160—295
			Medium Cutting	**Standard**	**UC5115**	160—295
			Semi-Heavy Cutting	**Flat Top**	**UC5115**	155—280

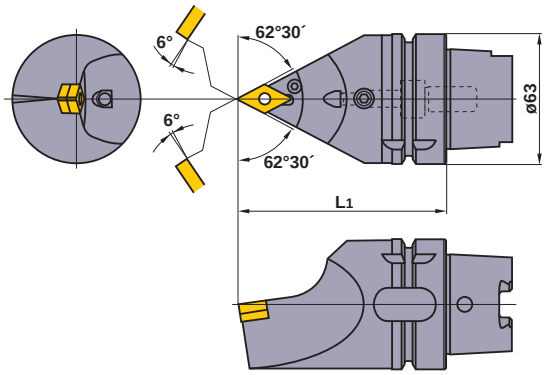
CBN & PCD inserts A145, A146, A172
PDJN type inserts A063—A067
DDJN type inserts A063—A067
SPARE PARTS E001
TECHNICAL DATA F001

FOR MULTI-TASK MACHINES

PDNN

External turning • Copying





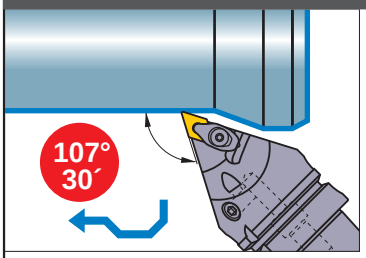
Finish	Light	Medium
FH (15)	SH (15)	MP (15)
Medium	**Medium—Semi-Heavy**	**Stainless**
MH (15)	GH (15)	MS (15)
G Class	**CBN**	
R/L (15)	(15)	

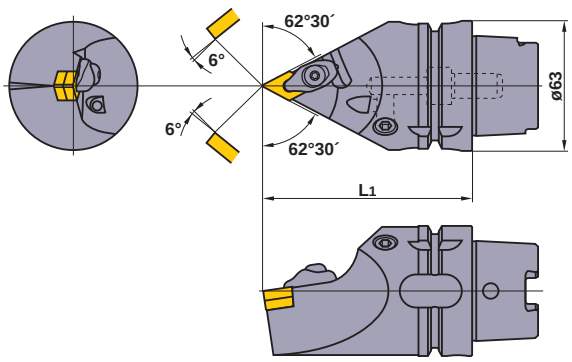
Order Number ✶1	Stock	Insert Number		Dimensions (mm) L1	Tool Weight (kg)	✶3 Shim	Shim Pin	Clamp Lever	✶2 Clamp Screw	Plug	Coolant Pipe	Wrench	Punch
H63TH-PDNNN-H15	●	DNM○ DNG○ NP-DN○A	1504○○	100	1.6	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HGM-PT1/8	HSK-CP18S	HKY30R	LLH4
-L15	●			140	2.5	LLSDN43 (LLSDN42)	LLP14	LLCL24	LLCS108	HGM-PT1/8	HSK-CP18S	HKY30R	LLH4

✶1 Revised order number. For the conventional number, refer to the corresponding list on A455.
✶2 Clamp Torque (N • m) : LLCS108=3.3
✶3 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

DDNN NEW

External turning • Copying — *DOUBLE CLAMP type*





Finish	Light	Medium
FH (15)	SH (15)	MP (15)
Medium	**Medium—Semi-Heavy**	**Stainless**
MH (15)	GH (15)	MS (15)
G Class	**CBN**	
R/L (15)	(15)	

Order Number	Stock	Insert Number		Dimensions (mm) L1	Tool Weight (kg)	✶2 Shim	Shim Pin	Clamp Bridge	Spring	✶1 Clamp Screw	Coolant Pipe	Wrench	Punch
H63TH-DDNNN-H15	●	DNM○ DNG○ NP-DN○A	1504○○	100	1.6	LLSDN43 (LLSDN42)	LLP24	DCK2613	DCS1	DC0621T	HSK-CP18S	TKY20F	LLH4
-L15	●			140	2.5	LLSDN43 (LLSDN42)	LLP24	DCK2613	DCS1	DC0621T	HSK-CP18S	TKY20F	LLH4

✶1 Clamp Torque (N • m) : DC0621T=5.0
✶2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FY**	**NX3035**	260—370
			Light Cutting	**SY**	**NX3035**	235—335
			Medium Cutting	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel	180HB—350HB	Finish Cutting	**FH**	**NX3035**	200—280
			Light Cutting	**SH**	**UE6110**	210—355
			Medium Cutting	**MP**	**UE6110**	190—325
M	Stainless Steel	≤200HB	Finish Cutting	**FH**	**US735**	105—200
			Light Cutting	**SH**	**US735**	95—185
			Medium Cutting	**MS**	**US735**	85—165
K	Gray Cast Iron	Tensile Strength ≤350MPa	Light Cutting	**MA**	**UC5115**	160—295
			Medium Cutting	**Standard**	**UC5115**	160—295
			Semi-Heavy Cutting	**Flat Top**	**UC5115**	155—280

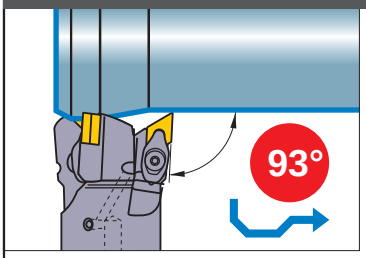
● : **Inventory maintained in Japan.**

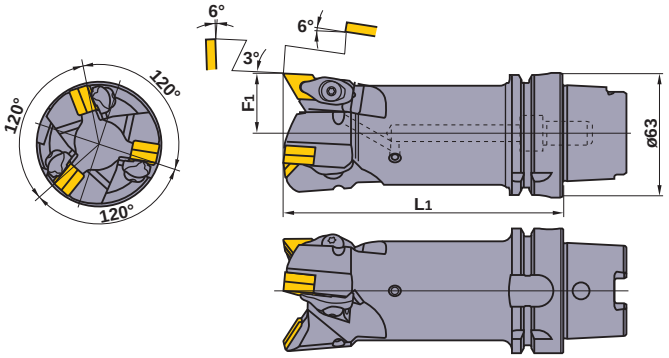
CBN & PCD inserts A145, A146, A172
PDNN type inserts A063—A067
DDNN type inserts A063—A067

DDJN NEW

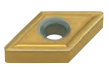
External turning • Facing

DOUBLE CLAMP type





Left hand tool holder only.

Finish	Light
FH (15)	SH (15)
Medium	**Medium**
MP (15)	MH (15)
Medium—Semi-Heavy	**Stainless**
GH (15)	MS  (15)

Order Number	Stock	Insert Number		Dimensions (mm)		Tool Weight	★2				★1			
	L			L_1	F_1	(kg)	Shim	Shim Pin	Clamp Bridge	Spring	Clamp Screw	Coolant Pipe	Wrench	Punch
H63TH-DDJNL-L15-3	●	DNM○ DNG○ NP-DN○A	1504○○	140	30	2.2	LLSDN43 (LLSDN42)	LLP24	DCK2613	DCS1	DC0621T	HSK-CP18S	TKY20F	LLH4

★1 Clamp Torque (N • m) : DC0621T=5.0

★2 Please use shim no. LLSDN42 with 6.35mm thick inserts. When using 6.35mm thick inserts, the shim should be ordered separately.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**FY**	**NX3035**	260—370
			Light Cutting	**SY**	**NX3035**	235—335
			Medium Cutting	**MS**	**UE6110**	260—440
	Carbon Steel Alloy Steel	180HB—350HB	Finish Cutting	**FH**	**NX3035**	200—280
			Light Cutting	**SH**	**UE6110**	210—355
			Medium Cutting	**MP**	**UE6110**	190—325
M	Stainless Steel	≤200HB	Finish Cutting	**FH**	**US735**	105—200
			Light Cutting	**SH**	**US735**	95—185
			Medium Cutting	**MS**	**US735**	85—165
K	Gray Cast Iron	Tensile Strength ≤350MPa	Light Cutting	**MA**	**UC5115**	160—295
			Medium Cutting	**Standard**	**UC5115**	160—295
			Semi-Heavy Cutting	**Flat Top**	**UC5115**	155—280

DDNN type inserts A063—A067

SPARE PARTS E001

TECHNICAL DATA F001

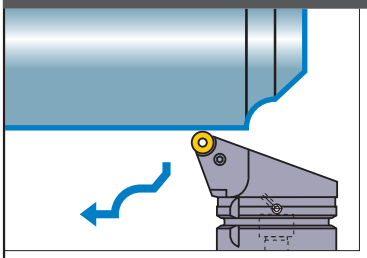
FOR MULTI-TASK MACHINES

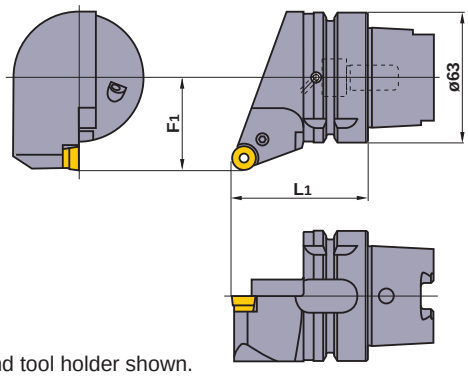
PRGC

External turning • Facing • Copying

Medium

(12)





Right hand tool holder shown.

Order Number *1	Stock R	Stock L	Insert Number		Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Shim	Shim Pin	Clamp Lever	Clamp Screw *2	Coolant Pipe	Wrench	Punch
H63TH-PRGCR/L-DX12	●	●	RCMX	1204M0	65	45	1.2	LLSRN123	LLP13	LLCL112	LLCS106	HSK-CP18S	HKY25R	LLH3

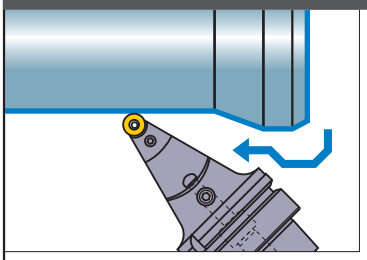
*1 Revised order number. For the conventional number, refer to the corresponding list on A455.
*2 Clamp Torque (N • m) : LLCS106=2.2

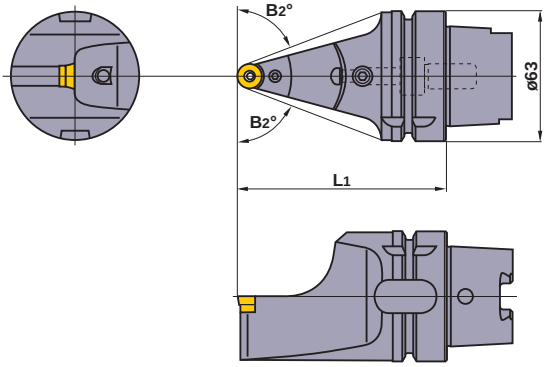
PRDC

External turning • Facing • Copying

Medium

(12)





Order Number *1	Stock	Insert Number		Dimensions (mm) L1	Dimensions (mm) B2°	Tool Weight (kg)	Shim	Shim Pin	Clamp Lever	Clamp Screw *2	Plug	Coolant Pipe	Wrench	Punch
H63TH-PRDCN-H12	●	RCMX	1204M0	100	69	1.4	LLSRN123	LLP13	LLCL112	LLCS106	HGM-PT1/8	HSK-CP18S	HKY25R	LLH3
-L12	●			140	75	2.3	LLSRN123	LLP13	LLCL112	LLCS106	HGM-PT1/8	HSK-CP18S	HKY25R	LLH3

*1 Revised order number. For the conventional number, refer to the corresponding list on A455.
*2 Clamp Torque (N • m) : LLCS106=2.2

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Medium Cutting	**Standard**	**UE6110**	205—350
	Carbon Steel • Alloy Steel	180HB—350HB	Medium Cutting	**Standard**	**UE6110**	150—260
M	Stainless Steel	≤200HB	Medium Cutting	**Standard**	**US735**	70—130

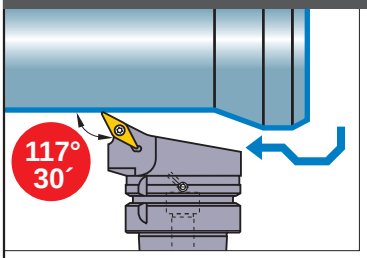
● : **Inventory maintained in Japan.**

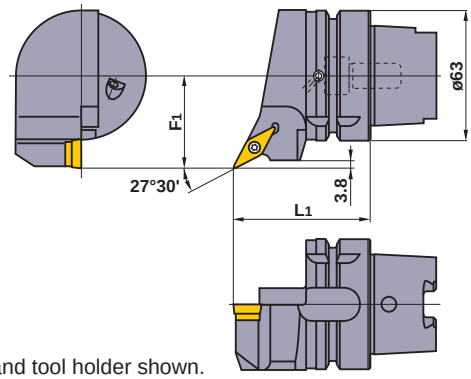
PRGC type inserts A099

PRDC type inserts A099

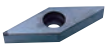
SVPB

Facing • Copying





Right hand tool holder shown.

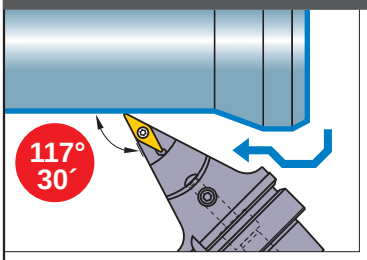
Finish	Light
R/L-F	SV
(16)	(16)
Medium	**Medium**
MV	Standard
(16)	(16)
CBN	
 (16)	

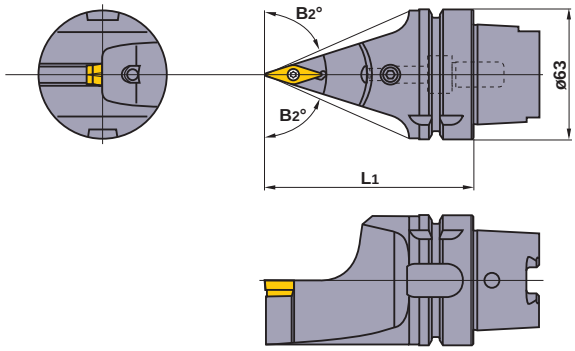
Order Number ✶1	Stock R	Stock L	Insert Number		Dimensions (mm) L_1	Dimensions (mm) F_1	Tool Weight (kg)	Shim	Shim Pin	✶2 Clamp Screw	Coolant Pipe	Wrench
H63TH-SVPBR/L-DX16	●	●	VBMT VBGT	1604○○	65	45	1.1	SPSVN32	BCP141	TS35D	HSK-CP18S	TKY15F

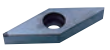
✶1 Revised order number. For the conventional number, refer to the corresponding list on A455.
✶2 Clamp Torque (N • m) : TS35D=3.5

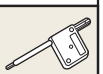
SVVB

Facing • Copying





Finish	Light
R/L-F	SV
(16)	(16)
Medium	**Medium**
MV	Standard
(16)	(16)
CBN	
 (16)	

Order Number ✶1	Stock	Insert Number		Dimensions (mm) L_1	Dimensions (mm) $B_2°$	Tool Weight (kg)	Shim	Shim Pin	✶2 Clamp Screw	Plug	Coolant Pipe	 Wrench
H63TH-SVVBN-H16	●	VBMT VBGT	1604○○	100	66°30'	1.3	SPSVN32	BCP141	TS35D	HGM-PT1/8	HSK-CP18S	TKY15F
-L16	●			140	72°30'	2.2	SPSVN32	BCP141	TS35D	HGM-PT1/8	HSK-CP18S	TKY15F

✶1 Revised order number. For the conventional number, refer to the corresponding list on A455.
✶2 Clamp Torque (N • m) : TS35D=3.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Cutting Mode	Breaker	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	Finish Cutting	**F**	**AP25N**	250 (150—300)
			Medium Cutting	**MV**	**UE6020**	200 (150—250)
	Carbon Steel Alloy Steel	180HB—350HB	Finish Cutting	**F**	**AP25N**	210 (150—260)
			Medium Cutting	**MV**	**UE6020**	170 (120—210)
M	Stainless Steel	≤200HB	Medium Cutting	**MV**	**US735**	100 (70—120)
K	Gray Cast Iron	Tensile Strength≤350MPa	Medium Cutting	**MV**	**UE6020**	170 (140—200)

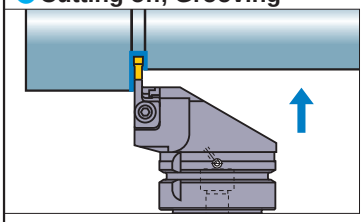
CBN inserts A165
SVPB type inserts A108
SVVB type inserts A108
SPARE PARTS E001
TECHNICAL DATA F001

FOR MULTI-TASK MACHINES

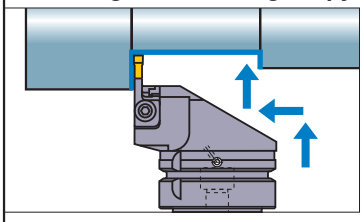
DG

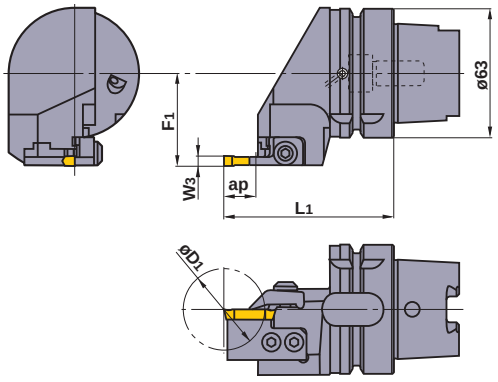
Cutting off • Grooving • Copying

● **Cutting off, Grooving**



● **Cutting off, Grooving, Copying**





Right hand tool holder shown.

● **Cutting off, Grooving**

Pack Order Number ✶1 ✶2	Stock R	Stock L	Component: Holder Number ✶1	Component: Locator	Component: Clamp Bridge	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Max. Cut Off Diameter D1 (mm)	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Insert Number	Insert Shape
H63TH-C5207R/L	●	●	H63TH-DGHR/L	EB2R/L	DGK2R/L	2	16	40	82.4	45	1.3	DGM20CE	DGM...CE
-C5307R/L	●	●	H63TH-DGHR/L	EB3R/L	DGK3R/L	3	16	40	82.4	45	1.3	DGM30CE DGJ30CE	
-C5407R/L	●	●	H63TH-DGHR/L	EB4R/L	DGK4R/L	4	16	40	82.4	45	1.3	DGJ40CE	
-C5507R/L	●	●	H63TH-DGHR/L	EB5R/L	DGK5R/L	5	16	40	82.4	45	1.3	DGJ50CE	DGJ...CE
-C5607R/L	●	●	H63TH-DGHR/L	EB6R/L	DGK6R/L	6	16	40	82.4	45	1.3	DGJ60CE	
-C5707R/L	●	●	H63TH-DGHR/L	EB7R/L	DGK7R/L	7	16	40	82.4	45	1.3	DGJ70CE	
-C5807R/L	●	●	H63TH-DGHR/L	EB8R/L	DGK8R/L	8	16	40	82.4	45	1.3	DGJ80CE	

● **Cutting off, Grooving, Copying**

Pack Order Number ✶1 ✶2	Stock R	Stock L	Component: Holder Number ✶1	Component: Locator	Component: Clamp Bridge	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Max. Cut Off Diameter D1 (mm)	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Insert Number	Insert Shape
H63TH-D5307R/L	●	●	H63TH-DGHR/LS	EB3R/LS	DGK3R/L	3	11	30	77.4	45	1.3	DGM30CT	DGM...CT
-D5407R/L	●	●	H63TH-DGHR/LS	EB4R/LS	DGK4R/L	4	11	30	77.4	45	1.3	DGM40CT	
-D5408R/L	●	●	H63TH-DGHR/LS	EB4R/LX	DGK4R/L	4	11	30	77.4	45	1.3	DGM40CTB	DGM...CTB
✶3 -C5507R/L	●	●	H63TH-DGHR/L	EB5R/L	DGK5R/L	5	16	40	82.4	45	1.3	DGM50CT DGJ50CT1	DGJ...CT1
-C5508R/L	●	●	H63TH-DGHR/L	EB5R/LX	DGK5R/L	5	16	40	82.4	45	1.3	DGM50CTB DGM50CTD DGM50CTR/L	DGM...CTD DGM...CTR/L
-C5608R/L	●	●	H63TH-DGHR/L	EB6R/LX	DGK6R/L	6	16	40	82.4	45	1.3	DGM60CTB	

✶1 Revised order number. For the conventional number, refer to the corresponding list on A455.
✶2 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.)
To order the parts separately, please refer to their description.
✶3 Compatible with standard type holder for cutting off and grooving.

SPARE PARTS

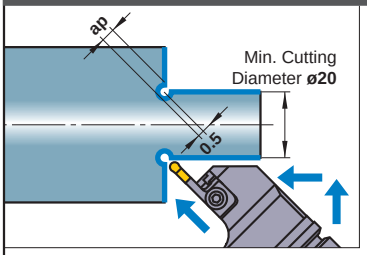
Holder Number ✶1	Locator Screw	Clamp Screw ✶2	Spring	Coolant Pipe	Wrench
H63TH-DGHR/LS -DGHR/L	HSC05012	DGS51	MES2	HSK-CP18S	HKY40R

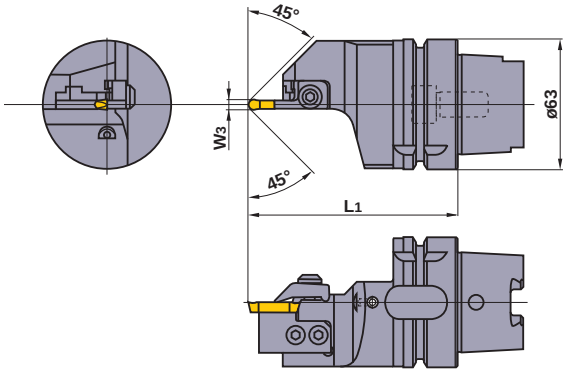
✶1 Revised order number. For the conventional number, refer to the corresponding list on A456.
✶2 Clamp Torque (N • m) : DGS51=7.0

● : **Inventory maintained in Japan.**

DG

Recessing • Copying





Pack Order Number ✶1 ✶2	Stock	Component: Holder Number ✶1	Component: Locator	Component: Clamp Bridge	Groove Width W3 (mm)	Max. Depth of Recess ap (mm)	Dimensions (mm) L1	Tool Weight (kg)	Insert Number	Insert Shape
H63TH-G5408NH	●	**H63TH-DGHN-H4**	**EB4RX**	**DGK4R**	4	2.5	100	1.4	DGM40CTB	DGM...CTB
-G5508NH	●	**H63TH-DGHN-H5**	**EB5RX**	**DGK5R**	5	3	100	1.3	DGM50CTB	
-G5608NH	●	**H63TH-DGHN-H6**	**EB6RX**	**DGK6R**	6	3.5	100	1.3	DGM60CTB	
-G5408NL	●	**H63TH-DGHN-L4**	**EB4RX**	**DGK4R**	4	2.5	140	2.3	DGM40CTB	
-G5508NL	●	**H63TH-DGHN-L5**	**EB5RX**	**DGK5R**	5	3	140	2.3	DGM50CTB	
-G5608NL	●	**H63TH-DGHN-L6**	**EB6RX**	**DGK6R**	6	3.5	140	2.3	DGM60CTB	

✶1 Revised order number. For the conventional number, refer to the corresponding list on A455.
✶2 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.)
To order the parts separately, please refer to their description.

SPARE PARTS

Holder Number ✶1	Locator Screw	Clamp Screw ✶2	Spring	Plug	Coolant Pipe	Wrench
H63TH-DGHN-H4	HSC05010	DGS51	MES2	–	HSK-CP18S	HKY40R
-DGHN-H5	HSC05012					
-DGHN-H6						
-DGHN-L4	HSC05010			HGM-PT1/8		
-DGHN-L5	HSC05012					
-DGHN-L6						

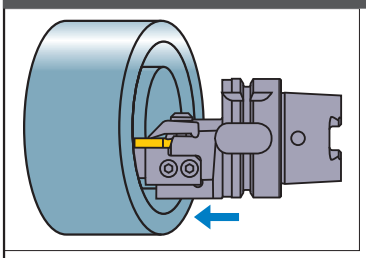
✶1 Revised order number. For the conventional number, refer to the corresponding list on A456.
✶2 Clamp Torque (N • m) : DGS51=7.0

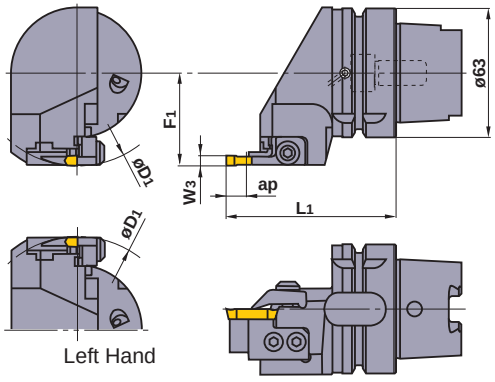
APPLICABLE INSERT A358 CUTTING CONDITIONS A359 SPARE PARTS E001 TECHNICAL DATA F001

FOR MULTI-TASK MACHINES

DG

Face grooving





Left Hand

Right hand tool holder shown.

✶1 ✶2 Pack Order Number	Stock R	Stock L	Component: ✶1 Holder Number	Component: Locator	Component: Clamp Bridge	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Range of Cutting Diameter D1 (mm)	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Insert Number	Insert Shape
H63TH-M5300R/L	●	●	**H63TH-DGHR/L**	**FB3R/L0**	**DGK5R/L**	3	6	20—50	82.4	44	1.3	DGJ30CFS	DGJ...CFS DGJ...CF
-M5302R/L	●	●	**H63TH-DGHR/L**	**FB3R/L2**	**DGK5R/L**	3	6	40—100	82.4	44	1.3	DGJ30CF	
-M5304R/L	●	●	**H63TH-DGHR/L**	**FB3R/L4**	**DGK5R/L**	3	6	100—250	82.4	44	1.3	DGJ30CF	
-M5400R/L	●	●	**H63TH-DGHR/L**	**FB4R/L0**	**DGK5R/L**	4	6	20—50	82.4	44.5	1.3	DGJ40CFS	
-M5402R/L	●	●	**H63TH-DGHR/L**	**FB4R/L2**	**DGK5R/L**	4	6	40—100	82.4	44.5	1.3	DGJ40CF	
-M5404R/L	●	●	**H63TH-DGHR/L**	**FB4R/L4**	**DGK5R/L**	4	6	100—250	82.4	44.5	1.3	DGJ40CF	
✶3 **-M5502R/L**	●	●	**H63TH-DGHR/L**	**FB5R/L2**	**DGK5R/L**	5	10	50—100	82.4	45	1.3	DGJ50CF	DGJ...CF
✶3 **-M5504R/L**	●	●	**H63TH-DGHR/L**	**FB5R/L4**	**DGK5R/L**	5	10	100—∞	82.4	45	1.3	DGJ50CF	
✶3 **-M6502R/L**	●	●	**H63TH-DGHR/L**	**FB5R/L2D**	**DGK5R/L**	5	16	50—100	82.4	45	1.3	DGJ50CF	
✶3 **-M6504R/L**	●	●	**H63TH-DGHR/L**	**FB5R/L4D**	**DGK5R/L**	5	16	100—∞	82.4	45	1.3	DGJ50CF	
✶3 **-M5602R/L**	●	●	**H63TH-DGHR/L**	**FB6R/L2**	**DGK6R/L**	6	10	50—100	82.4	45	1.3	DGJ60CF	
✶3 **-M5604R/L**	●	●	**H63TH-DGHR/L**	**FB6R/L4**	**DGK6R/L**	6	10	100—∞	82.4	45	1.3	DGJ60CF	
✶3 **-M6602R/L**	●	●	**H63TH-DGHR/L**	**FB6R/L2D**	**DGK6R/L**	6	16	50—100	82.4	45	1.3	DGJ60CF	
✶3 **-M6604R/L**	●	●	**H63TH-DGHR/L**	**FB6R/L4D**	**DGK6R/L**	6	16	100—∞	82.4	45	1.3	DGJ60CF	
-M5702R/L	●	●	**H63TH-DGHR/L**	**FB7R/L2**	**DGK7R/L**	7	10	50—100	82.4	45	1.3	DGJ70CF	
-M5704R/L	●	●	**H63TH-DGHR/L**	**FB7R/L4**	**DGK7R/L**	7	10	100—∞	82.4	45	1.3	DGJ70CF	
-M6702R/L	●	●	**H63TH-DGHR/L**	**FB7R/L2D**	**DGK7R/L**	7	16	50—100	82.4	45	1.3	DGJ70CF	
-M6704R/L	●	●	**H63TH-DGHR/L**	**FB7R/L4D**	**DGK7R/L**	7	16	100—∞	82.4	45	1.3	DGJ70CF	
-M5802R/L	●	●	**H63TH-DGHR/L**	**FB8R/L2**	**DGK8R/L**	8	10	50—100	82.4	45	1.3	DGJ80CF	
-M5804R/L	●	●	**H63TH-DGHR/L**	**FB8R/L4**	**DGK8R/L**	8	10	100—∞	82.4	45	1.3	DGJ80CF	
-M6802R/L	●	●	**H63TH-DGHR/L**	**FB8R/L2D**	**DGK8R/L**	8	16	50—100	82.4	45	1.3	DGJ80CF	
-M6804R/L	●	●	**H63TH-DGHR/L**	**FB8R/L4D**	**DGK8R/L**	8	16	100—∞	82.4	45	1.3	DGJ80CF	

✶1 Revised order number. For the conventional number, refer to the corresponding list on A455.
✶2 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.)
To order the parts separately, please refer to their description.
✶3 Compatible with standard type holder for face grooving and copying.

SPARE PARTS

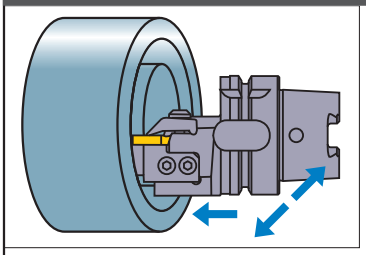
✶1 Holder Number	Locator Screw	✶2 Clamp Screw	Spring	Coolant Pipe	Wrench
H63TH-DGHR/L	HSC05012	DGS51	MES2	HSK-CP18S	HKY40R

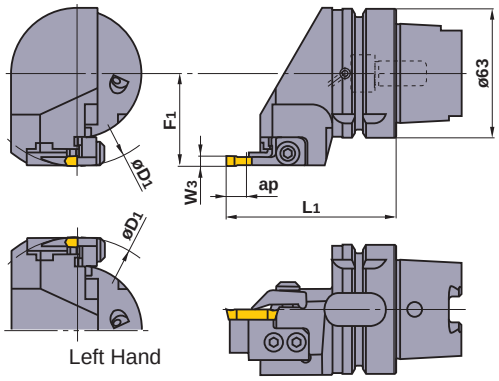
✶1 Revised order number. For the conventional number, refer to the corresponding list on A456.
✶2 Clamp Torque (N • m) : DGS51=7.0

● : **Inventory maintained in Japan.**

DG

Face grooving • Copying





Left Hand

Right hand tool holder shown.

⋆1 ⋆2 Pack Order Number	Stock R	Stock L	Component: ⋆1 Holder Number	Component: Locator	Component: Clamp Bridge	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Range of Cutting Diameter D1 (mm)	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Insert Number	Insert Shape
H63TH-P5302R/L	●	●	**H63TH-DGHR/LS**	**FB3R/L2S**	**DGK3R/L**	3	6	40—100	77.4	45	1.3	DGM30CTF	DGM...CTF
-P5304R/L	●	●	**H63TH-DGHR/LS**	**FB3R/L4S**	**DGK3R/L**	3	6	100—250	77.4	45	1.3	DGM30CTF	
-P5402R/L	●	●	**H63TH-DGHR/LS**	**FB4R/L2S**	**DGK4R/L**	4	6	40—100	77.4	45	1.3	DGM40CTF	
-P5404R/L	●	●	**H63TH-DGHR/LS**	**FB4R/L4S**	**DGK4R/L**	4	6	100—250	77.4	45	1.3	DGM40CTF	
⋆3 **-M5502R/L**	●	●	**H63TH-DGHR/L**	**FB5R/L2**	**DGK5R/L**	5	10	50—100	82.4	45	1.3	DGM50CTF	
⋆3 **-M5504R/L**	●	●	**H63TH-DGHR/L**	**FB5R/L4**	**DGK5R/L**	5	10	100—∞	82.4	45	1.3	DGM50CTF	
⋆3 **-M6502R/L**	●	●	**H63TH-DGHR/L**	**FB5R/L2D**	**DGK5R/L**	5	16	50—100	82.4	45	1.3	DGM50CTF	
⋆3 **-M6504R/L**	●	●	**H63TH-DGHR/L**	**FB5R/L4D**	**DGK5R/L**	5	16	100—∞	82.4	45	1.3	DGM50CTF	
⋆3 **-M5602R/L**	●	●	**H63TH-DGHR/L**	**FB6R/L2**	**DGK6R/L**	6	10	50—100	82.4	45	1.3	DGM60CTF	
⋆3 **-M5604R/L**	●	●	**H63TH-DGHR/L**	**FB6R/L4**	**DGK6R/L**	6	10	100—∞	82.4	45	1.3	DGM60CTF	
⋆3 **-M6602R/L**	●	●	**H63TH-DGHR/L**	**FB6R/L2D**	**DGK6R/L**	6	16	50—100	82.4	45	1.3	DGM60CTF	
⋆3 **-M6604R/L**	●	●	**H63TH-DGHR/L**	**FB6R/L4D**	**DGK6R/L**	6	16	100—∞	82.4	45	1.3	DGM60CTF	

⋆1 Revised order number. For the conventional number, refer to the corresponding list on A455.
⋆2 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.)
To order the parts separately, please refer to their description.
⋆3 Compatible with standard type holder for face grooving.

SPARE PARTS

⋆1 Holder Number	Locator Screw	⋆2 Clamp Screw	Spring	Coolant Pipe	Wrench
H63TH-DGHR/LS **-DGHR/L**	HSC05012	DGS51	MES2	HSK-CP18S	HKY40R

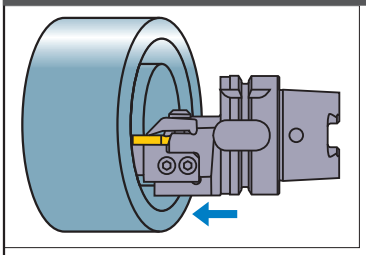
⋆1 Revised order number. For the conventional number, refer to the corresponding list on A456.
⋆2 Clamp Torque (N • m) : DGS51=7.0

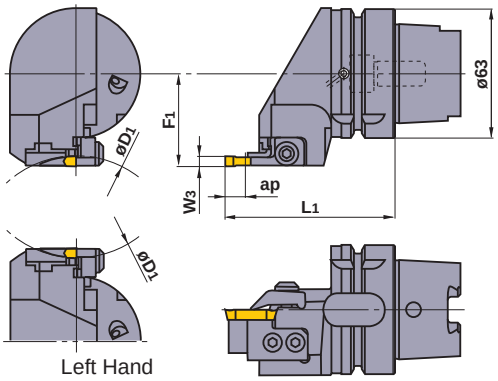
APPLICABLE INSERT A359 CUTTING CONDITIONS A359 SPARE PARTS E001 TECHNICAL DATA F001

FOR MULTI-TASK MACHINES

DG

Face grooving





Left Hand

Right hand tool holder shown.

Pack Order Number ★1 ★2	Stock R	Stock L	Component: Holder Number ★1	Component: Locator	Component: Clamp Bridge	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Range of Cutting Diameter D1 (mm)	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Insert Number	Insert Shape
H63TH-N5300R/L	●	●	**H63TH-DGHR/L**	**FD3R/L0**	**DGK5R/L**	3	6	20—50	82.4	44	1.3	DGJ30CFS	DGJ...CFS DGJ...CF
-N5302R/L	●	●	**H63TH-DGHR/L**	**FD3R/L2**	**DGK5R/L**	3	6	40—100	82.4	44	1.3	DGJ30CF	
-N5304R/L	●	●	**H63TH-DGHR/L**	**FD3R/L4**	**DGK5R/L**	3	6	100—250	82.4	44	1.3	DGJ30CF	
-N5400R/L	●	●	**H63TH-DGHR/L**	**FD4R/L0**	**DGK5R/L**	4	6	20—50	82.4	44.5	1.3	DGJ40CFS	
-N5402R/L	●	●	**H63TH-DGHR/L**	**FD4R/L2**	**DGK5R/L**	4	6	40—100	82.4	44.5	1.3	DGJ40CF	
-N5404R/L	●	●	**H63TH-DGHR/L**	**FD4R/L4**	**DGK5R/L**	4	6	100—250	82.4	44.5	1.3	DGJ40CF	
★3 **-N5502R/L**	●	●	**H63TH-DGHR/L**	**FD5R/L2**	**DGK5R/L**	5	10	50—100	82.4	45	1.3	DGJ50CF	DGJ...CF
★3 **-N5504R/L**	●	●	**H63TH-DGHR/L**	**FD5R/L4**	**DGK5R/L**	5	10	100—∞	82.4	45	1.3	DGJ50CF	
★3 **-N6502R/L**	●	●	**H63TH-DGHR/L**	**FD5R/L2D**	**DGK5R/L**	5	16	50—100	82.4	45	1.3	DGJ50CF	
★3 **-N6504R/L**	●	●	**H63TH-DGHR/L**	**FD5R/L4D**	**DGK5R/L**	5	16	100—∞	82.4	45	1.3	DGJ50CF	
★3 **-N5602R/L**	●	●	**H63TH-DGHR/L**	**FD6R/L2**	**DGK6R/L**	6	10	50—100	82.4	45	1.3	DGJ60CF	
★3 **-N5604R/L**	●	●	**H63TH-DGHR/L**	**FD6R/L4**	**DGK6R/L**	6	10	100—∞	82.4	45	1.3	DGJ60CF	
★3 **-N6602R/L**	●	●	**H63TH-DGHR/L**	**FD6R/L2D**	**DGK6R/L**	6	16	50—100	82.4	45	1.3	DGJ60CF	
★3 **-N6604R/L**	●	●	**H63TH-DGHR/L**	**FD6R/L4D**	**DGK6R/L**	6	16	100—∞	82.4	45	1.3	DGJ60CF	
-N5702R/L	●	●	**H63TH-DGHR/L**	**FD7R/L2**	**DGK7R/L**	7	10	50—100	82.4	45	1.3	DGJ70CF	
-N5704R/L	●	●	**H63TH-DGHR/L**	**FD7R/L4**	**DGK7R/L**	7	10	100—∞	82.4	45	1.3	DGJ70CF	
-N6702R/L	●	●	**H63TH-DGHR/L**	**FD7R/L2D**	**DGK7R/L**	7	16	50—100	82.4	45	1.3	DGJ70CF	
-N6704R/L	●	●	**H63TH-DGHR/L**	**FD7R/L4D**	**DGK7R/L**	7	16	100—∞	82.4	45	1.3	DGJ70CF	
-N5802R/L	●	●	**H63TH-DGHR/L**	**FD8R/L2**	**DGK8R/L**	8	10	50—100	82.4	45	1.3	DGJ80CF	
-N5804R/L	●	●	**H63TH-DGHR/L**	**FD8R/L4**	**DGK8R/L**	8	10	100—∞	82.4	45	1.3	DGJ80CF	
-N6802R/L	●	●	**H63TH-DGHR/L**	**FD8R/L2D**	**DGK8R/L**	8	16	50—100	82.4	45	1.3	DGJ80CF	
-N6804R/L	●	●	**H63TH-DGHR/L**	**FD8R/L4D**	**DGK8R/L**	8	16	100—∞	82.4	45	1.3	DGJ80CF	

★1 Revised order number. For the conventional number, refer to the corresponding list on A456.
★2 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.)
To order the parts separately, please refer to their description.
★3 Compatible with standard type holder for face grooving and copying.

SPARE PARTS

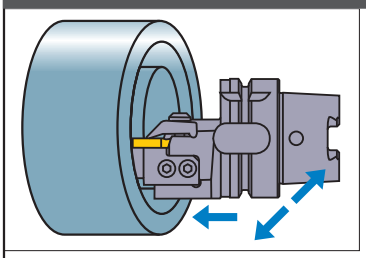
Holder Number ★1	Locator Screw	Clamp Screw ★2	Spring	Coolant Pipe	Wrench
H63TH-DGHR/L	HSC05012	DGS51	MES2	HSK-CP18S	HKY40R

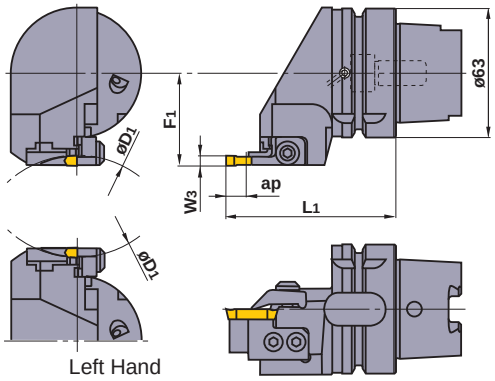
★1 Revised order number. For the conventional number, refer to the corresponding list on A456.
★2 Clamp Torque (N • m) : DGS51=7.0

● : **Inventory maintained in Japan.**

DG

Face grooving • Copying





Left Hand

Right hand tool holder shown.

★1 ★2 Pack Order Number	Stock R	Stock L	Component: Holder Number ★1	Component: Locator	Component: Clamp Bridge	Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Range of Cutting Diameter D1 (mm)	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Insert Number	Insert Shape
H63TH-Q5302R/L	●	●	**H63TH-DGHR/LS**	**FD3R/L2S**	**DGK3R/L**	3	6	40—100	77.4	45	1.3	DGM30CTF	DGM...CTF
-Q5304R/L	●	●	**H63TH-DGHR/LS**	**FD3R/L4S**	**DGK3R/L**	3	6	100—250	77.4	45	1.3	DGM30CTF	
-Q5402R/L	●	●	**H63TH-DGHR/LS**	**FD4R/L2S**	**DGK4R/L**	4	6	40—100	77.4	45	1.3	DGM40CTF	
-Q5404R/L	●	●	**H63TH-DGHR/LS**	**FD4R/L4S**	**DGK4R/L**	4	6	100—250	77.4	45	1.3	DGM40CTF	
★3 **-N5502R/L**	●	●	**H63TH-DGHR/L**	**FD5R/L2**	**DGK5R/L**	5	10	50—100	82.4	45	1.3	DGM50CTF	
★3 **-N5504R/L**	●	●	**H63TH-DGHR/L**	**FD5R/L4**	**DGK5R/L**	5	10	100—∞	82.4	45	1.3	DGM50CTF	
★3 **-N6502R/L**	●	●	**H63TH-DGHR/L**	**FD5R/L2D**	**DGK5R/L**	5	16	50—100	82.4	45	1.3	DGM50CTF	
★3 **-N6504R/L**	●	●	**H63TH-DGHR/L**	**FD5R/L4D**	**DGK5R/L**	5	16	100—∞	82.4	45	1.3	DGM50CTF	
★3 **-N5602R/L**	●	●	**H63TH-DGHR/L**	**FD6R/L2**	**DGK6R/L**	6	10	50—100	82.4	45	1.3	DGM60CTF	
★3 **-N5604R/L**	●	●	**H63TH-DGHR/L**	**FD6R/L4**	**DGK6R/L**	6	10	100—∞	82.4	45	1.3	DGM60CTF	
★3 **-N6602R/L**	●	●	**H63TH-DGHR/L**	**FD6R/L2D**	**DGK6R/L**	6	16	50—100	82.4	45	1.3	DGM60CTF	
★3 **-N6604R/L**	●	●	**H63TH-DGHR/L**	**FD6R/L4D**	**DGK5R/L**	6	16	100—∞	82.4	45	1.3	DGM60CTF	

★1 Revised order number. For the conventional number, refer to the corresponding list on A456.
★2 The order pack number includes a holder, locators and clamp screws. (Refer to the list below.)
To order the parts separately, please refer to their description.
★3 Compatible with standard type holder for face grooving.

SPARE PARTS

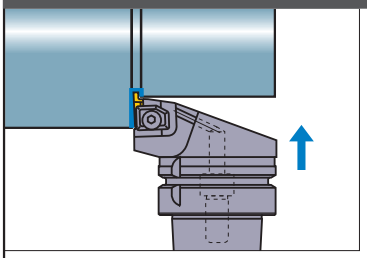
★1 Holder Number	Locator Screw	★2 Clamp Screw	Spring	Coolant Pipe	Wrench
H63TH-DGHR/LS **-DGHR/L**	HSC05012	DGS51	MES2	HSK-CP18S	HKY40R

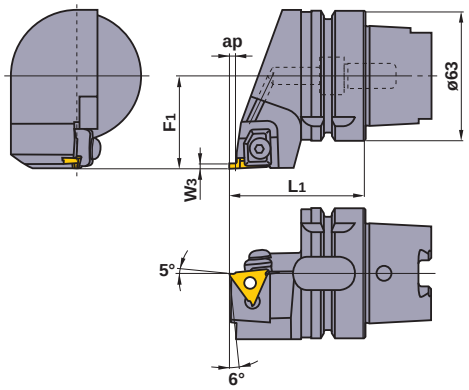
★1 Revised order number. For the conventional number, refer to the corresponding list on A456.
★2 Clamp Torque (N • m) : DGS51=7.0

APPLICABLE INSERT A359 CUTTING CONDITIONS A359 SPARE PARTS E001 TECHNICAL DATA F001

MG

Grooving





Right hand tool holder shown.

Order Number ✶1	Stock R	Stock L	Insert Number		Groove Width W3 (mm)	Max. Groove Depth ap (mm)	Dimensions (mm) L1	Dimensions (mm) F1	Tool Weight (kg)	Clamp Bridge	Clamp Screw ✶2	Spring	Coolant Pipe	Wrench
H63TH-MGHR/L-DX4315	●	●	MGTR/L	43125 I 43470	1.25	1.2	65	45	1.2	MTK1R/L	HBH06020	MES3	HSK-CP18S	HKY40R
					1.45	1.5								
					1.5≤W3≤2.3	3								
-DX4323	●	●			2.3<W3≤3.3	4.5								
-DX4333	●	●			3.3<W3≤4.7	4.5								

✶1 Revised order number. For the conventional number, refer to the corresponding list on A456.
✶2 Clamp Torque (N • m) : HBH06020=7.0

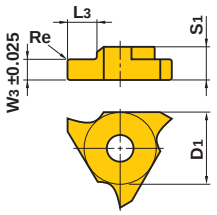
RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)
P	Carbon Steel Alloy Steel	180−280HB	VP20MF	120 (100−140)	0.10 (0.03−0.18)
			NX2525	130 (100−160)	0.12 (0.03−0.2)
M	Stainless Steel	≤200HB	VP20MF	120 (100−140)	0.10 (0.03−0.18)
K	Gray Cast Iron	Tensile Strength≤350MPa	VP20MF	120 (100−140)	0.10 (0.03−0.18)

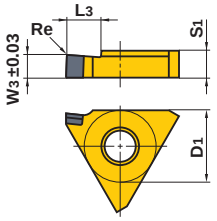
● : Inventory maintained in Japan. (10 inserts in one case) (CBN inserts are available in 1 piece in one case.)
□ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

INSERTS FOR MG TYPE

Order Number	Stock									Groove Width W_3 (mm)	Dimensions (mm)				Geometry
	Coated		Cermet				Carbide		CBN						
	VP20MF		NX2525		NX55		UTi20T		MB8025						
	R	L	R	L	R	L	R	L	R		L_3	D_1	S_1	Re	
MGTR/L43125	●	●	●	□	▲	▲	●	●	●	1.25	1.2	12.7	4.76	0.2	**MGTR/L...**
43145	●	□	□	□	▲		●	□		1.45	1.5	12.7	4.76	0.2	
43150	●	●	●	●	▲	▲	●	●	●	1.5	3	12.7	4.76	0.2	
43175	●	●	●	□	▲		●	●		1.75	3	12.7	4.76	0.2	
43200	●	●	●	●	▲	▲	●	●	●	2	3	12.7	4.76	0.2	
43230	●	●	●	●	▲	▲	●	●		2.3	3	12.7	4.76	0.2	
43250	●	●	●	●	▲	▲	●	●	●	2.5	4.5	12.7	4.76	0.3	
43260	●	□	□				●	●		2.6	4.5	12.7	4.76	0.3	
43270	●	□					●	□		2.7	4.5	12.7	4.76	0.3	
43280	●	●	●	□	▲	▲	●	●		2.8	4.5	12.7	4.76	0.3	
43300	●	●	●	●	▲	▲	●	●	●	3	4.5	12.7	4.76	0.3	
43320	●	●	□		▲	▲	●	●		3.2	4.5	12.7	4.76	0.3	
43330	●	●	●	□	▲	▲	●	●		3.3	4.5	12.7	4.76	0.3	
43350	●	□	●	□	▲	▲	●	●	●	3.5	4.5	12.7	4.76	0.3	
43400	●	●	●		▲	▲	●	●	●	4	4.5	12.7	4.76	0.3	
43420	●	□	□				●	□		4.2	4.5	12.7	4.76	0.4	
43430	●	□	□		▲	▲	●	●		4.3	4.5	12.7	4.76	0.4	
43450	●	●	●	●	▲	▲	●	●		4.5	4.5	12.7	4.76	0.4	
43470	●	□	□	□			●	□		4.7	4.5	12.7	4.76	0.4	



CBN Insert

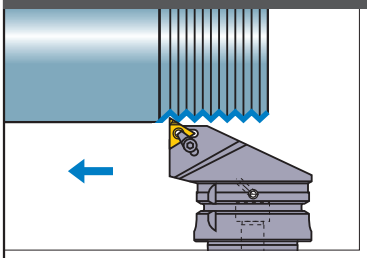


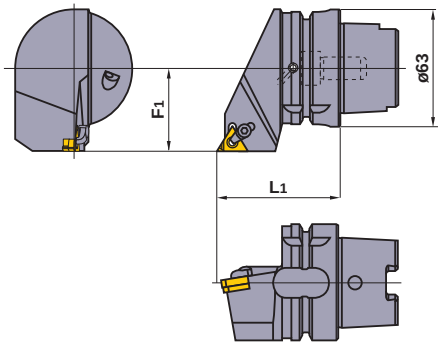
Right hand insert shown.

FOR MULTI-TASK MACHINES

MMTE

Threading





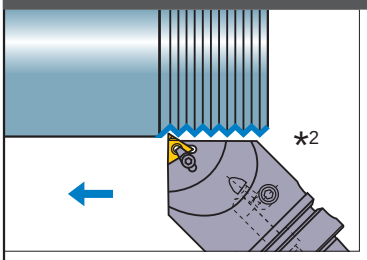
Right hand tool holder only.

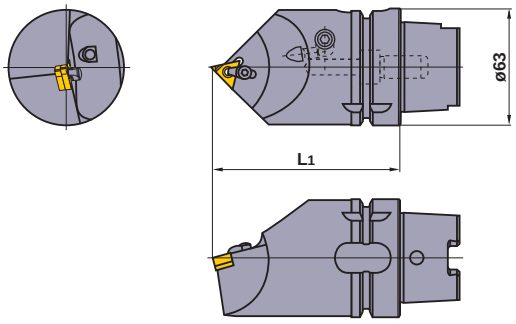
Order Number ✶1	Stock	Insert Number		Dimensions (mm)		Tool Weight	Clamp Bridge	Clamp Screw ✶2	Stop Ring	Shim	Shim Screw ✶2	Coolant Pipe	Wrench
	R			L1	F1	(kg)							
H63TH-MMTER-DX16	●	MMT16ER	○○○○○	65	45	1.2	SETK51	SETS51	CR4	CTE32TP15	HFC03008	HSK-CP18S	①TKY15F ②HKY20R

✶1 Revised order number. For the conventional number, refer to the corresponding list on A456.
✶2 Clamp Torque (N • m) : SETS51=3.5, HFC03008=1.5

MMTEN

Threading





Tool holder for right hand insert only.

Order Number ✶1	Stock	Insert Number		Dimensions (mm)	Tool Weight	Clamp Bridge	Clamp Screw ✶3	Stop Ring	Shim	Shim Screw ✶3	Plug	Coolant Pipe	Wrench
				L1	(kg)								
H63TH-MMTENR-H16	●	MMT16ER	○○○○○	100	1.7	SETK51	SETS51	CR4	CTE32TP15	HFC03008	HGM-PT1/8	HSK-CP18S	①TKY15F ②HKY20R
-L16	●			140	2.7	SETK51	SETS51	CR4	CTE32TP15	HFC03008	HGM-PT1/8	HSK-CP18S	①TKY15F ②HKY20R

✶1 Revised order number. For the conventional number, refer to the corresponding list on A456.
✶2 For use with B axis tilted at 45 degrees.
✶3 Clamp Torque (N • m) : SETS51=3.5, HFC03008=1.5

RECOMMENDED CUTTING CONDITIONS

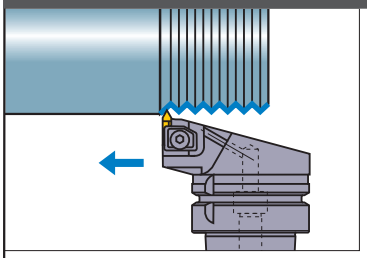
	Work Material	Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**VP10MF**	150 (70—230)
			VP15TF	100 (60—140)
	Carbon Steel Alloy Steel	180—280HB	**VP10MF**	140 (80—200)
			VP15TF	100 (60—140)
M	Stainless Steel	≤200HB	**VP10MF**	130 (80—180)
			VP15TF	80 (40—120)
K	Gray Cast Iron	Tensile Strength≤350MPa	**VP10MF**	140 (80—200)
			VP15TF	90 (60—120)

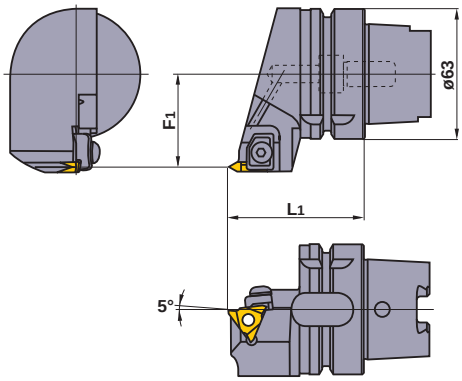
● : **Inventory maintained in Japan. (5 inserts in one case)**

APPLICABLE INSERT A392, A394, A396, A398

MT

Threading





Right hand tool holder shown.

Order Number *1	Stock		Insert Number		Dimensions (mm)		Tool Weight		*2			
	R	L			L1	F1	(kg)	Clamp Bridge	Clamp Screw	Spring	Coolant Pipe	Wrench
H63TH-MTHR/L-DX43	●	●	MTTR/L	43○○○○	65	45	1.2	MTK1R/L	HBH06020	MES3	HSK-CP18S	HKY40R

*1 Revised order number. For the conventional number, refer to the corresponding list on A456.
*2 Clamp Torque (N • m) : HBH06020=7.0

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)
P	Mild Steel	≤180HB	**UP20M**	140 (100–180)
			NX55	200 (150–250)
			UTi20T	120 (100–150)
	Carbon Steel Alloy Steel	180HB–350HB	**UP20M**	120 (100–150)
			NX55	170 (150–200)
			UTi20T	100 (70–120)
M	Stainless Steel	≤200HB	**UP20M**	120 (80–150)
			UTi20T	100 (70–130)
K	Gray Cast Iron	Tensile Strength≤350MPa	**UP20M**	80 (60–100)
			UTi20T	80 (60–100)
			HTi10	100 (70–130)

● : **Inventory maintained in Japan. (10 inserts in one case)**

APPLICABLE INSERT A450
SPARE PARTS E001
TECHNICAL DATA F001

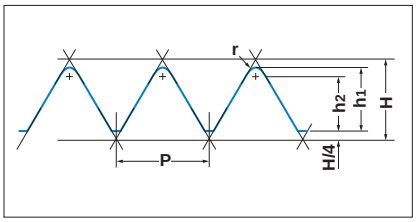
FOR MULTI-TASK MACHINES

INSERTS FOR MT TYPE

Type	Order Number	Class	Coated	Cermet	Carbide		ISO Pitch mm (thread/inch)	Dimensions (mm)			Geometry
			UP20M	NX55	UTi20T	HTi10		D1	S1	Re	
General • 60°	**MTTR436000**	G	□	●	●	□	−0.8	12.7	4.76	0	**MTTR/L(60°)** (G Class)
	L436000	G	□	●	●	□	−0.8	12.7	4.76	0	
	R436001	G	●	●	●	●	1.0−1.75	12.7	4.76	0.1	
	L436001	G	□	●	●	●	1.0−1.75	12.7	4.76	0.1	
	R436002	G	●	●	●	●	2.0−2.5	12.7	4.76	0.2	
	L436002	G	□	●	●	●	2.0−2.5	12.7	4.76	0.2	
	R436003	G	□	●	●	●	3.0−3.5	12.7	4.76	0.3	
	L436003	G	□	●	●	□	3.0−3.5	12.7	4.76	0.3	
	R436004	G	□	●	●	□	4.0−4.5	12.7	4.76	0.4	
	L436004	G	□	●	●	□	4.0−4.5	12.7	4.76	0.4	Right hand insert shown.
General • 55°	**MTTR435501**	G	□	●	●	□	(28−10)	12.7	4.76	0.1	**MTTR/L(55°)** (G Class)
	L435501	G	□	●	●	□	(28−10)	12.7	4.76	0.1	
	R435502	G	□	●	●	□	(16−8)	12.7	4.76	0.2	
	L435502	G	□	●	●	□	(16−8)	12.7	4.76	0.2	
	R435503	G	□	●	●	□	(11−8)	12.7	4.76	0.3	
	L435503	G	□	□	□	□	(11−8)	12.7	4.76	0.3	
											Right hand insert shown.

STANDARD DEPTH OF CUT

- The chart on the right shows the cutting depths when machining external ISO metric screw threads.
- When you use cermet grades or cut stainless steel, please increase the number of passes by 2−3 times.



METRIC THREAD

Unit : mm

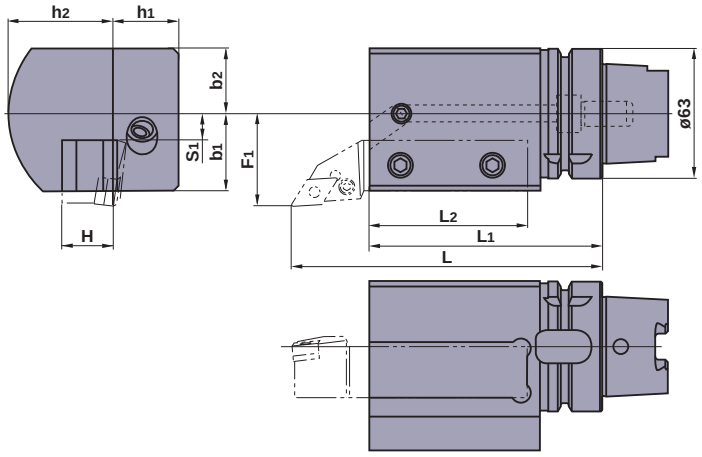
P (Pitch)		0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00	4.50
h1		0.46	0.61	0.77	0.92	1.07	1.23	1.53	1.84	2.15	2.45	2.76
h2		0.35	0.47	0.59	0.70	0.82	0.94	1.17	1.41	1.65	1.87	2.11
r (Corner Radius)		0.11	0.14	0.18	0.22	0.25	0.29	0.36	0.43	0.50	0.58	0.65
Number of Passes	1	0.18	0.20	0.20	0.25	0.25	0.25	0.30	0.30	0.35	0.35	0.40
	2	0.13	0.15	0.18	0.20	0.20	0.25	0.25	0.25	0.30	0.30	0.35
	3	0.10	0.10	0.12	0.15	0.20	0.20	0.20	0.25	0.25	0.25	0.30
	4	0.05	0.10	0.12	0.15	0.15	0.15	0.20	0.20	0.20	0.25	0.25
	5		0.06	0.10	0.10	0.12	0.15	0.15	0.20	0.20	0.25	0.25
	6			0.05	0.07	0.10	0.10	0.10	0.15	0.20	0.20	0.20
	7					0.05	0.08	0.10	0.15	0.15	0.20	0.20
	8						0.05	0.10	0.10	0.15	0.15	0.15
	9							0.08	0.10	0.10	0.15	0.15
	10							0.05	0.09	0.10	0.10	0.15
	11								0.05	0.10	0.10	0.10
	12									0.05	0.10	0.10
	13										0.05	0.10
	14											0.06

(Note) The first pass causes a high load on the cutting edge.
In order to avoid damage, keep the depth of cut to 0.4−0.5mm maximum.

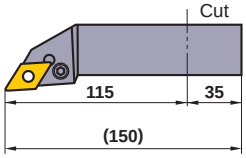
● : Inventory maintained in Japan. (10 inserts in one case)
□ : Non stock, produced to order only.

EXTERNAL TURNING TOOL HOLDERS

External turning • Facing



■This holder is for 25 x 25 size tools.
Please shorten the tool as shown below before use.



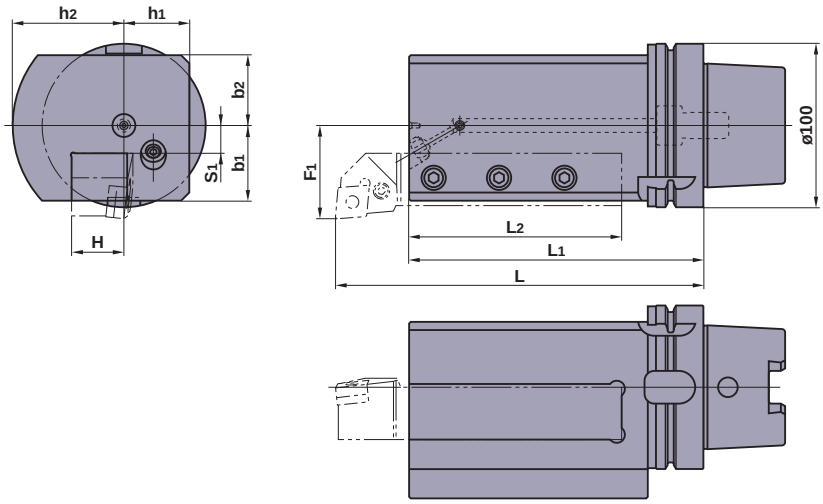
Right hand tool holder shown.

Order Number *	Stock		Dimensions (mm)										Tool Weight			
	R	L	L	L1	L2	H	h1	h2	F1	S1	b1	b2	(kg)	Clamp Screw	Plug	Coolant Pipe
H63TH-EV2525R/L-112	●	●	150	112	77	25	32	53	45	13	38	32	3.9	HSS12025	HGM-PT1/8	HSK-CP18S

* Revised order number. For the conventional number, refer to the corresponding list on A456.

EXTERNAL TURNING TOOL HOLDERS NEW

External turning • Facing



■This holder is for 32 × 32 and 32 x 25 size tools.

Right hand tool holder shown.

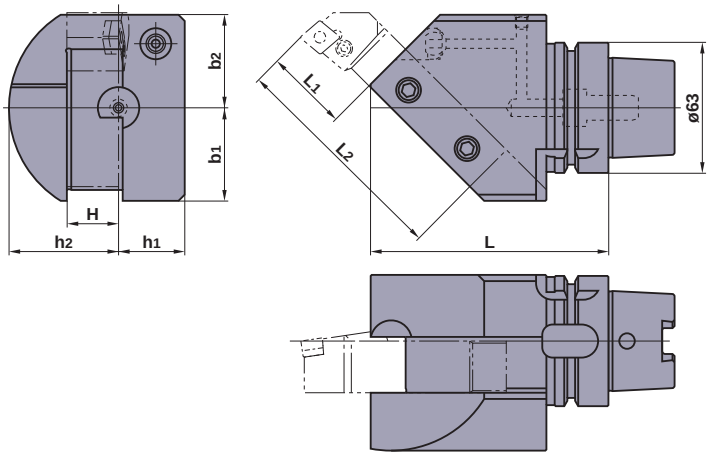
Order Number	Stock		Dimensions (mm)										Tool Weight				
	R	L	L	L1	L2	H	h1	h2	F1	S1	b1	b2	(kg)	Clamp Screw	Nozzle Plug	Plug	Coolant Pipe
H100TH-EV3232R/L-180	●	●	220	180	130	32	40	68	57	17	46	43	11.7	HSS14035	SNA4	HSS06006	HSK-CP24S

(Note) Possible to fit a 25 x 25 tool by using a 7mm plate.

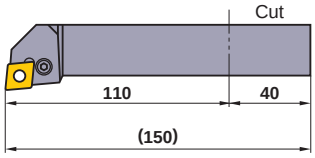
FOR MULTI-TASK MACHINES

EXTERNAL TURNING TOOL HOLDERS NEW

External turning • Facing



■This holder is for 25 x 25 size tools.
Please shorten the tool as shown below before use.



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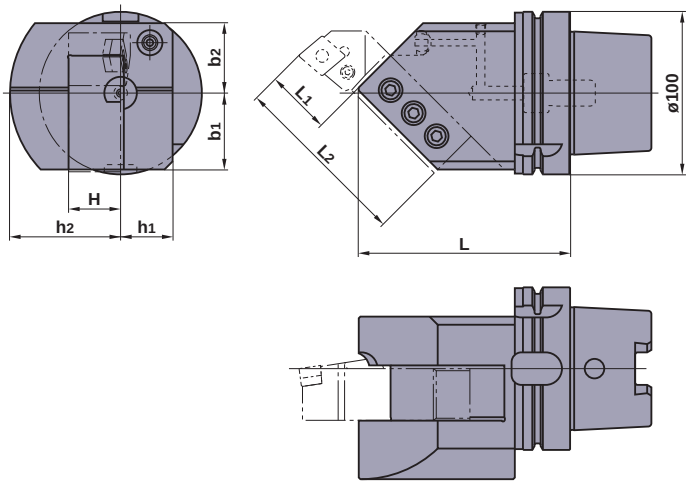
Right hand tool holder shown.

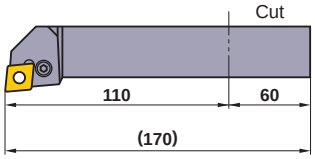
Order Number	Stock		Dimensions (mm)								Tool Weight				
	R	L	L	L1	L2	H	h1	h2	b1	b2	(kg)	Clamp Screw	Nozzle Plug	Plug	Coolant Pipe
H63TH-EN2525R/L-115	●	●	115	40	110	25	32	53	45	45	3.7	HSS12030	SNA4	HSS06006	HSK-CP18S

EXTERNAL TURNING TOOL HOLDERS NEW

External turning • Facing



■This holder is for 32 × 32 and 32 x 25 size tools.
Please shorten the tool as shown below before use.



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Right hand tool holder shown.

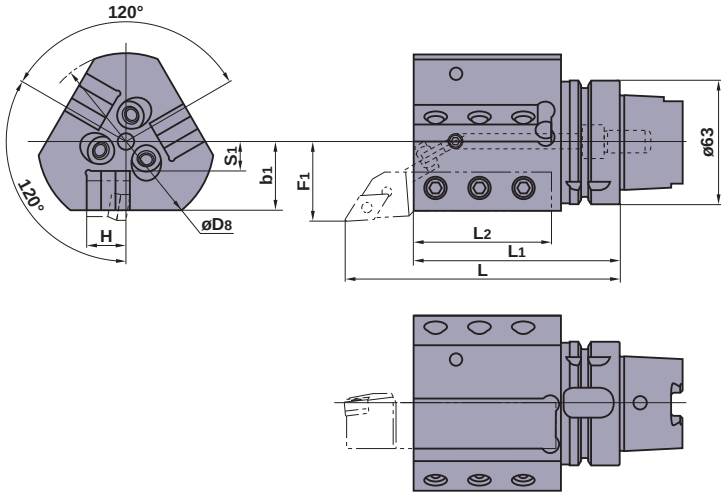
Order Number	Stock		Dimensions (mm)								Tool Weight				
	R	L	L	L1	L2	H	h1	h2	b1	b2	(kg)	Clamp Screw	Nozzle Plug	Plug	Coolant Pipe
H100TH-EN3232R/L-130	●	●	130	40	110	32	32	68	47	43	6.6	HSS14030	SNA4	HSS06006	HSK-CP24S

(Note) Possible to fit a 25 x 25 tool by using a 7mm plate.

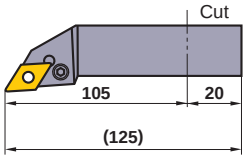
● : **Inventory maintained in Japan.**

EXTERNAL TURNING TOOL HOLDERS

External turning • Facing



■This holder is for 20 x 20 size tools.
Please shorten the tool as shown below before use.



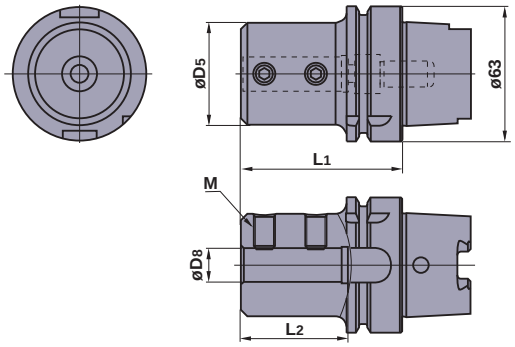
Right hand tool holder shown.

Order Number *	Stock		Dimensions (mm)								Tool Weight				
	R	L	L	L1	L2	H	D8	F1	S1	b1	(kg)	Clamp Screw	Nozzle Plug	Plug	Coolant Pipe
H63TH-EV2020R/L-105-3	●	●	140	105	70	20	90	40	15	35	2.9	HSS12030	HSS05012	HSS06006	HSK-CP18S

* Revised order number. For the conventional number, refer to the corresponding list on A456.

BORING BAR HOLDERS

Boring



Order Number *	Stock	Dimensions (mm)					Tool Weight		
		D5	D8	L1	L2	M	(kg)	Clamp Screw	Coolant Pipe
H63TH-B08-65	●	28	8	65	40	M8	0.9	HSS08010	HSK-CP18S
-B10-70	●	35	10	70	45	M8	1.0	HSS08012	
-B12-70	●	42	12	70	45	M8	1.1	HSS08012	
-B16-75	●	48	16	75	50	M10	1.3	HSS10016	
-B20-75	●	52	20	75	50	M10	1.4	HSS10016	
-B25-83	●	62	25	83	58	M12	1.7	HSS12016	
-B32-87	●	62	32	87	62	M12	1.7	HSS12016	
-B40-97	●	65	40	97	72	M16	1.8	HSS16012	

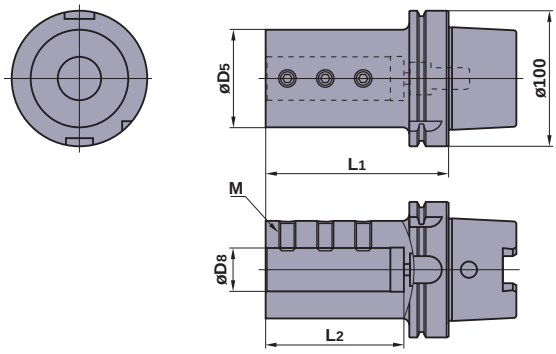
* Revised order number. For the conventional number, refer to the corresponding list on A456.
(Note) Please shorten a boring bar to the required shank length. This holder is for boring bars and indexable type drills.

FOR MULTI-TASK MACHINES

BORING BAR HOLDERS

NEW

Boring

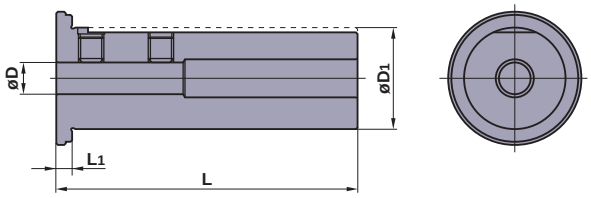


Order Number	Stock	Dimensions (mm)					Tool Weight (kg)	Clamp Screw	Coolant Pipe
		D5	D8	L1	L2	M			
H100TH-B25-120	●	62	25	120	88	12	3.9	HSS12016	HSK-CP24S
-B32-135	●	72	32	135	102	12	4.8	HSS12018	
-B40-150	●	82	40	150	117	16	5.9	HSS16020	
-B50-180	●	92	50	180	147	16	7.7	HSS16020	

(Note) Please shorten a boring bar to the required shank length. This holder is for boring bars and indexable type drills.

BORING BAR SLEEVES FOR H100TH-B32-135

NEW



Order Number	Stock	Dimensions (mm)				Tool Weight (kg)	Clamp Screw
		D	D1	L	L1		
SL3208-90	●	8	32	95	5	0.6	HSS06008
3210-90	●	10	32	95	5	0.5	HSS08008
3212-90	●	12	32	95	5	0.5	HSS08008
3216-90	●	16	32	95	5	0.5	HSS08006
3220-90	●	20	32	95	5	0.4	HSS08005

(Note) These sleeves are only compatible with H100TH-B32-135 holder.

● : Inventory maintained in Japan.

SPARE PARTS E001
TECHNICAL DATA F001

CROSS REFERENCE TABLE FOR OLD AND NEW PARTS

Conventional Order Number	**Revised Order Number**	Page
PCLN (External turning, Facing)		
H63A-WH-PCLNR-DX12	H63TH-PCLNR-DX12	**A432**
H63A-WH-PCLNL-DX12	H63TH-PCLNL-DX12	
PCMN (External turning, Facing)		
H63A-WH-PCMNN-H12	H63TH-PCMNN-H12	**A433**
H63A-WH-PCMNN-L12	H63TH-PCMNN-L12	
PDJN (External turning, Copying)		
H63A-WH-PDJNR-DX15	H63TH-PDJNR-DX15	**A435**
H63A-WH-PDJNL-DX15	H63TH-PDJNL-DX15	
PDNN (External turning, Copying)		
H63A-WH-PDNNN-H15	H63TH-PDNNN-H15	**A436**
H63A-WH-PDNNN-L15	H63TH-PDNNN-L15	
PRGC (External turning, Facing, Copying)		
H63A-WH-PRGCR-DX12	H63TH-PRGCR-DX12	**A438**
H63A-WH-PRGCL-DX12	H63TH-PRGCL-DX12	
PRDC (External turning, Facing, Copying)		
H63A-WH-PRDCN-H12	H63TH-PRDCN-H12	**A438**
H63A-WH-PRDCN-L12	H63TH-PRDCN-L12	
SVPB (Copying)		
H63A-WH-SVPBR-DX16	H63TH-SVPBR-DX16	**A439**
H63A-WH-SVPBL-DX16	H63TH-SVPBL-DX16	
SVVB (Copying)		
H63A-WH-SVVBN-H16	H63TH-SVVBN-H16	**A439**
H63A-WH-SVVBN-L16	H63TH-SVVBN-L16	
DG Pack (Cutting off, Grooving)		
H63A-WH-C5207R	H63TH-C5207R	**A440**
H63A-WH-C5207L	H63TH-C5207L	
H63A-WH-C5307R	H63TH-C5307R	
H63A-WH-C5307L	H63TH-C5307L	
H63A-WH-C5407R	H63TH-C5407R	
H63A-WH-C5407L	H63TH-C5407L	
H63A-WH-C5507R	H63TH-C5507R	
H63A-WH-C5507L	H63TH-C5507L	
H63A-WH-C5607R	H63TH-C5607R	
H63A-WH-C5607L	H63TH-C5607L	
H63A-WH-C5707R	H63TH-C5707R	
H63A-WH-C5707L	H63TH-C5707L	
H63A-WH-C5807R	H63TH-C5807R	
H63A-WH-C5807L	H63TH-C5807L	
DG Pack (Cutting off, Grooving, Copying)		
H63A-WH-D5307R	H63TH-D5307R	**A440**
H63A-WH-D5307L	H63TH-D5307L	
H63A-WH-D5407R	H63TH-D5407R	
H63A-WH-D5407L	H63TH-D5407L	
H63A-WH-D5408R	H63TH-D5408R	
H63A-WH-D5408L	H63TH-D5408L	
H63A-WH-C5507R	H63TH-C5507R	
H63A-WH-C5507L	H63TH-C5507L	
H63A-WH-C5508R	H63TH-C5508R	
H63A-WH-C5508L	H63TH-C5508L	
H63A-WH-C5608R	H63TH-C5608R	
H63A-WH-C5608L	H63TH-C5608L	
DG Pack (Recessing, Copying)		
H63A-WH-G5408NH	H63TH-G5408NH	**A441**
H63A-WH-G5508NH	H63TH-G5508NH	
H63A-WH-G5608NH	H63TH-G5608NH	
H63A-WH-G5408NL	H63TH-G5408NL	
H63A-WH-G5508NL	H63TH-G5508NL	
H63A-WH-G5608NL	H63TH-G5608NL	

Conventional Order Number	**Revised Order Number**	Page
DG Pack (Face grooving)		
H63A-WH-M5300R	H63TH-M5300R	**A442**
H63A-WH-M5300L	H63TH-M5300L	
H63A-WH-M5302R	H63TH-M5302R	
H63A-WH-M5302L	H63TH-M5302L	
H63A-WH-M5304R	H63TH-M5304R	
H63A-WH-M5304L	H63TH-M5304L	
H63A-WH-M5400R	H63TH-M5400R	
H63A-WH-M5400L	H63TH-M5400L	
H63A-WH-M5402R	H63TH-M5402R	
H63A-WH-M5402L	H63TH-M5402L	
H63A-WH-M5404R	H63TH-M5404R	
H63A-WH-M5404L	H63TH-M5404L	
H63A-WH-M5502R	H63TH-M5502R	
H63A-WH-M5502L	H63TH-M5502L	
H63A-WH-M5504R	H63TH-M5504R	
H63A-WH-M5504L	H63TH-M5504L	
H63A-WH-M6502R	H63TH-M6502R	
H63A-WH-M6502L	H63TH-M6502L	
H63A-WH-M6504R	H63TH-M6504R	
H63A-WH-M6504L	H63TH-M6504L	
H63A-WH-M5602R	H63TH-M5602R	
H63A-WH-M5602L	H63TH-M5602L	
H63A-WH-M5604R	H63TH-M5604R	
H63A-WH-M5604L	H63TH-M5604L	
H63A-WH-M6602R	H63TH-M6602R	
H63A-WH-M6602L	H63TH-M6602L	
H63A-WH-M6604R	H63TH-M6604R	
H63A-WH-M6604L	H63TH-M6604L	
H63A-WH-M5702R	H63TH-M5702R	
H63A-WH-M5702L	H63TH-M5702L	
H63A-WH-M5704R	H63TH-M5704R	
H63A-WH-M5704L	H63TH-M5704L	
H63A-WH-M6702R	H63TH-M6702R	
H63A-WH-M6702L	H63TH-M6702L	
H63A-WH-M6704R	H63TH-M6704R	
H63A-WH-M6704L	H63TH-M6704L	
H63A-WH-M5802R	H63TH-M5802R	
H63A-WH-M5802L	H63TH-M5802L	
H63A-WH-M5804R	H63TH-M5804R	
H63A-WH-M5804L	H63TH-M5804L	
H63A-WH-M6802R	H63TH-M6802R	
H63A-WH-M6802L	H63TH-M6802L	
H63A-WH-M6804R	H63TH-M6804R	
H63A-WH-M6804L	H63TH-M6804L	
DG Pack (Face grooving, Copying)		
H63A-WH-P5302R	H63TH-P5302R	**A443**
H63A-WH-P5302L	H63TH-P5302L	
H63A-WH-P5304R	H63TH-P5304R	
H63A-WH-P5304L	H63TH-P5304L	
H63A-WH-P5402R	H63TH-P5402R	
H63A-WH-P5402L	H63TH-P5402L	
H63A-WH-P5404R	H63TH-P5404R	
H63A-WH-P5404L	H63TH-P5404L	
H63A-WH-M5502R	H63TH-M5502R	
H63A-WH-M5502L	H63TH-M5502L	
H63A-WH-M5504R	H63TH-M5504R	
H63A-WH-M5504L	H63TH-M5504L	
H63A-WH-M6502R	H63TH-M6502R	

CROSS REFERENCE TABLE FOR OLD AND NEW PARTS

Conventional Order Number	**Revised Order Number**	Page
H63A-WH-M6502L	H63TH-M6502L	
H63A-WH-M6504R	H63TH-M6504R	
H63A-WH-M6504L	H63TH-M6504L	
H63A-WH-M5602R	H63TH-M5602R	
H63A-WH-M5602L	H63TH-M5602L	
H63A-WH-M5604R	H63TH-M5604R	**A443**
H63A-WH-M5604L	H63TH-M5604L	
H63A-WH-M6602R	H63TH-M6602R	
H63A-WH-M6602L	H63TH-M6602L	
H63A-WH-M6604R	H63TH-M6604R	
H63A-WH-M6604L	H63TH-M6604L	
DG Pack (Face grooving)		
H63A-WH-N5300R	H63TH-N5300R	
H63A-WH-N5300L	H63TH-N5300L	
H63A-WH-N5302R	H63TH-N5302R	
H63A-WH-N5302L	H63TH-N5302L	
H63A-WH-N5304R	H63TH-N5304R	
H63A-WH-N5304L	H63TH-N5304L	
H63A-WH-N5400R	H63TH-N5400R	
H63A-WH-N5400L	H63TH-N5400L	
H63A-WH-N5402R	H63TH-N5402R	
H63A-WH-N5402L	H63TH-N5402L	
H63A-WH-N5404R	H63TH-N5404R	
H63A-WH-N5404L	H63TH-N5404L	
H63A-WH-N5502R	H63TH-N5502R	
H63A-WH-N5502L	H63TH-N5502L	
H63A-WH-N5504R	H63TH-N5504R	
H63A-WH-N5504L	H63TH-N5504L	
H63A-WH-N6502R	H63TH-N6502R	
H63A-WH-N6502L	H63TH-N6502L	
H63A-WH-N6504R	H63TH-N6504R	
H63A-WH-N6504L	H63TH-N6504L	
H63A-WH-N5602R	H63TH-N5602R	
H63A-WH-N5602L	H63TH-N5602L	
H63A-WH-N5604R	H63TH-N5604R	**A444**
H63A-WH-N5604L	H63TH-N5604L	
H63A-WH-N6602R	H63TH-N6602R	
H63A-WH-N6602L	H63TH-N6602L	
H63A-WH-N6604R	H63TH-N6604R	
H63A-WH-N6604L	H63TH-N6604L	
H63A-WH-N5702R	H63TH-N5702R	
H63A-WH-N5702L	H63TH-N5702L	
H63A-WH-N5704R	H63TH-N5704R	
H63A-WH-N5704L	H63TH-N5704L	
H63A-WH-N6702R	H63TH-N6702R	
H63A-WH-N6702L	H63TH-N6702L	
H63A-WH-N6704R	H63TH-N6704R	
H63A-WH-N6704L	H63TH-N6704L	
H63A-WH-N5802R	H63TH-N5802R	
H63A-WH-N5802L	H63TH-N5802L	
H63A-WH-N5804R	H63TH-N5804R	
H63A-WH-N5804L	H63TH-N5804L	
H63A-WH-N6802R	H63TH-N6802R	
H63A-WH-N6802L	H63TH-N6802L	
H63A-WH-N6804R	H63TH-N6804R	
H63A-WH-N6804L	H63TH-N6804L	
DG Pack (Face grooving, Copying)		
H63A-WH-Q5302R	H63TH-Q5302R	
H63A-WH-Q5302L	H63TH-Q5302L	**A445**
H63A-WH-Q5304R	H63TH-Q5304R	
H63A-WH-Q5304L	H63TH-Q5304L	

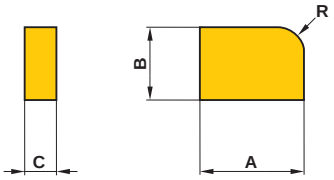
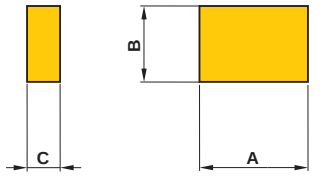
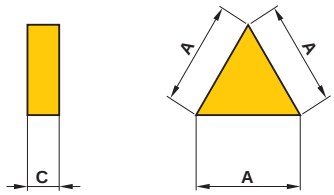
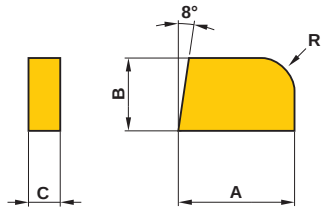
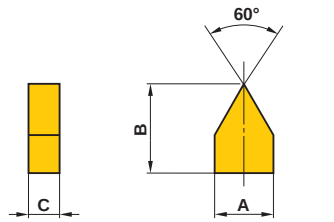
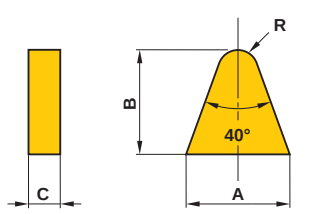
Conventional Order Number	**Revised Order Number**	Page
H63A-WH-Q5402R	H63TH-Q5402R	
H63A-WH-Q5402L	H63TH-Q5402L	
H63A-WH-Q5404R	H63TH-Q5404R	
H63A-WH-Q5404L	H63TH-Q5404L	
H63A-WH-N5502R	H63TH-N5502R	
H63A-WH-N5502L	H63TH-N5502L	
H63A-WH-N5504R	H63TH-N5504R	
H63A-WH-N5504L	H63TH-N5504L	
H63A-WH-N6502R	H63TH-N6502R	
H63A-WH-N6502L	H63TH-N6502L	
H63A-WH-N6504R	H63TH-N6504R	**A445**
H63A-WH-N6504L	H63TH-N6504L	
H63A-WH-N5602R	H63TH-N5602R	
H63A-WH-N5602L	H63TH-N5602L	
H63A-WH-N5604R	H63TH-N5604R	
H63A-WH-N5604L	H63TH-N5604L	
H63A-WH-N6602R	H63TH-N6602R	
H63A-WH-N6602L	H63TH-N6602L	
H63A-WH-N6604R	H63TH-N6604R	
H63A-WH-N6604L	H63TH-N6604L	
DG Holder		
H63A-WH-DGHR	H63TH-DGHR	
H63A-WH-DGHL	H63TH-DGHL	
H63A-WH-DGHRS	H63TH-DGHRS	
H63A-WH-DGHLS	H63TH-DGHLS	
H63A-WH-DGHN-H4	H63TH-DGHN-H4	**A440** | **A445**
H63A-WH-DGHN-H5	H63TH-DGHN-H5	
H63A-WH-DGHN-H6	H63TH-DGHN-H6	
H63A-WH-DGHN-L4	H63TH-DGHN-L4	
H63A-WH-DGHN-L5	H63TH-DGHN-L5	
H63A-WH-DGHN-L6	H63TH-DGHN-L6	
MG (Grooving)		
H63A-WH-MGHR-DX4315	H63TH-MGHR-DX4315	
H63A-WH-MGHL-DX4315	H63TH-MGHL-DX4315	
H63A-WH-MGHR-DX4323	H63TH-MGHR-DX4323	**A446**
H63A-WH-MGHL-DX4323	H63TH-MGHL-DX4323	
H63A-WH-MGHR-DX4333	H63TH-MGHR-DX4333	
H63A-WH-MGHL-DX4333	H63TH-MGHL-DX4333	
MMTE (Threading)		
H63A-WH-MMTER-DX16	H63TH-MMTER-DX16	**A448**
MMTEN (Threading)		
H63A-WH-MMTENR-H16	H63TH-MMTENR-H16	**A448**
H63A-WH-MMTENR-L16	H63TH-MMTENR-L16	
MT (Threading)		
H63A-WH-MTHR-DX43	H63TH-MTHR-DX43	**A449**
H63A-WH-MTHL-DX43	H63TH-MTHL-DX43	
EXTERNAL TURNING TOOL HOLDERS		
H63A-WH-E2525R-112	H63TH-EV2525R-112	**A451**
H63A-WH-E2525L-112	H63TH-EV2525L-112	
H63A-WH-E2020R-105-3	H63TH-EV2020R-105-3	**A453**
H63A-WH-E2020L-105-3	H63TH-EV2020L-105-3	
BORING BAR HOLDERS		
H63A-WH-B08-65	H63TH-B08-65	
H63A-WH-B10-70	H63TH-B10-70	
H63A-WH-B12-70	H63TH-B12-70	
H63A-WH-B16-75	H63TH-B16-75	**A453**
H63A-WH-B20-75	H63TH-B20-75	
H63A-WH-B25-83	H63TH-B25-83	
H63A-WH-B32-87	H63TH-B32-87	
H63A-WH-B40-97	H63TH-B40-97	

TURNING TOOLS

BRAZED TOOLS

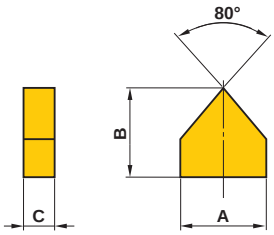
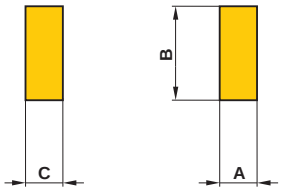
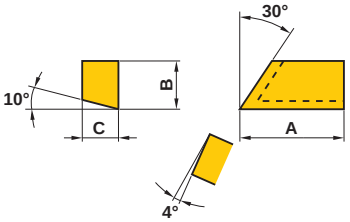
CARBIDE BLANK FOR TURNING TOOLS ····· A458
CARBIDE BLANK FOR FORMER TURNING TOOLS ····· A460
CARBIDE RODS (MITSUBISHI STANDARD) ····· A460
BRAZED TOOL HOLDERS ····· A461
BRAZED TOOLS WITH SINTERED PCD ····· A464
BRAZED BORING TOOLS WITH SINTERED PCD ····· A465

CARBIDE BLANK FOR TURNING TOOLS

Type	Geometry	Order Number	Stock								Dimensions (mm)			
			P			M	K							
			STi10 (HW-P10) *	STi20 (HW-P20) *	STi40T (HW-P40) *	UTi20T (HW-M20) *	HTi03A (HW-K01) *	HTi05T (HW-K01) *	HTi10 (HW-K10) *	HTi20 (HW-K20) *	A	B	C	R
01 Type		01-0	●	●	□	●	●	●	●	□	10	6	3	4
		01-1	●	●	●	●	●	●	●	●	13	9	3	5
		01-2	●	●	●	●	●	●	●	●	16	11	4	5
		01-3	●	●	●	●	□	□	●	●	19	13	5	5
		01-4	□	●	●	●	□	□	□	□	22	15	6	8
		01-5	□	□	□	●	□	□	□	□	25	17	7	8
For 31,32 Type		01-6	□	□	□	□	□	□	□	□	30	20	8	8
02 Type		02-0	●	●	●	●	●	●	●	●	10	6	3	—
		02-1	●	●	●	●	●	●	●	●	13	9	3	—
		02-2	●	●	●	●	●	●	●	●	16	11	4	—
		02-3	●	●	●	●	●	●	●	●	19	13	5	—
		02-4	●	●	●	●	□	●	●	●	22	15	6	—
		02-5	□	●	●	●	□	●	●	●	25	17	7	—
For 41,42 Type		02-6	□	●	●	●	□	●	●	●	30	20	8	—
03 Type		03-0	□	●	□	●	□	□	□	□	10	—	3	—
		03-1	□	●	□	●	●	□	●	□	12	—	3	—
		03-2	□	●	□	●	●	□	●	□	15	—	4	—
		03-3	□	●	□	●	□	●	●	●	18	—	5	—
		03-4	□	□	□	□	□	□	□	□	24	—	6	—
		03-5	□	□	□	□	□	□	□	□	24	—	7	—
For 37,38,47 Type		03-6	□	□	□	□	□	□	□	□	28	—	8	—
04 Type		04-0	●	●	□	●	●	●	●	●	10	6	3	4
		04-1	●	●	□	●	●	●	●	●	13	9	3	5
		04-2	●	●	●	●	●	●	●	●	16	11	4	5
		04-3	●	●	●	●	●	●	●	●	19	13	5	5
		04-4	□	●	□	●	□	□	●	□	22	15	6	8
		04-5	□	□	□	□	□	□	□	□	25	17	7	8
For 33,34 Type		04-6	□	□	□	□	□	□	□	□	30	20	8	8
05 Type		05-1	□	●	□	●	□	□	●	□	5	8	3	—
		05-2	●	●	□	●	□	□	●	□	6	10	4	—
		05-3	●	●	□	●	□	□	●	□	7	12	5	—
		05-4	□	●	□	●	□	□	□	□	9	16	6	—
		05-5	□	□	□	□	□	□	□	□	10	18	7	—
		05-6	□	□	□	□	□	□	□	□	11	20	8	—
For 49,51 Type														
06 Type		06-0	●	●	●	●	●	●	●	●	10	10	3	2
		06-1	●	●	●	●	●	●	●	●	13	13	3	2.5
		06-2	●	●	●	●	●	●	●	●	16	16	4	3
		06-3	●	●	●	●	●	●	●	●	19	19	5	4
		06-4	□	●	□	●	□	●	●	●	22	22	6	4
		06-5	□	□	□	□	□	□	□	□	25	25	7	5
		06-6	□	□	□	□	□	□	□	□	30	30	8	6
For 36,39,40 Type														

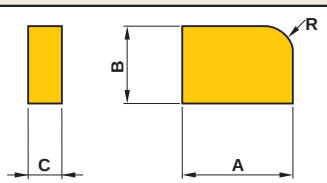
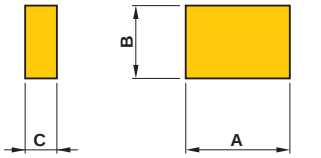
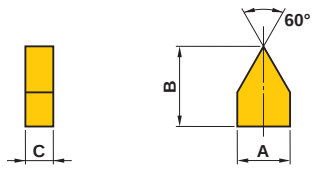
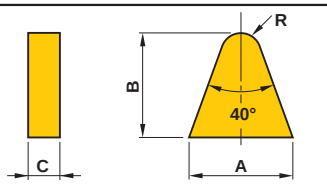
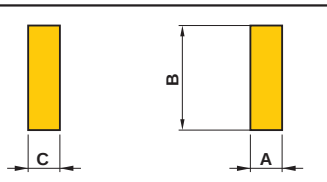
*( ) : Materials for cemented carbide tools and the classification for usage.

● : Inventory maintained in Japan. (10 inserts in one case)
□ : Non stock, produced to order only.

Type	Geometry	Order Number	Stock								Dimensions (mm)			
			P			M	K							
			STi10 (HW-P10) *	STi20 (HW-P20) *	STi40T (HW-P40) *	UTi20T (HW-M20) *	HTi03A (HW-K01) *	HTi05T (HW-K01) *	HTi10 (HW-K10) *	HTi20 (HW-K20) *	A	B	C	R
07 Type For 35 Type		**07-0**	●	●	□	●	□	●	●	□	10	10	3	–
		07-1	□	●	□	●	□	□	●	□	13	13	3	–
		07-2	□	●	□	●	□	□	●	□	16	16	4	–
		07-3	□	●	□	●	□	□	●	□	19	19	5	–
		07-4	□	□	□	□	□	□	□	□	25	20	6	–
		07-5	□	□	□	□	□	□	□	□	25	22	7	–
		07-6	□	□	□	□	□	□	□	□	30	25	8	–
08 Type For 43 Type		**08-1**	●	●	●	●	●	●	●	●	3	8	3	–
		08-3	●	●	●	●	●	●	●	●	4	13	4	–
		08-4	●	●	●	●	●	●	●	●	5	15	5	–
		08-5	●	●	●	●	□	●	●	●	6	17	6	–
		08-6	●	●	□	●	□	□	●	●	8	20	8	–
09E Type For 95 Type		**09E1**	●	●	□	□	□	□	□	□	20	10	7	–

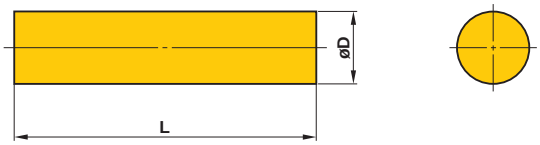
*( ) : Materials for cemented carbide tools and the classification for usage.

CARBIDE BLANK FOR FORMER TURNING TOOLS

Type	Geometry	Order Number	Stock P STi10 (HW-P10) *	STi20 (HW-P20) *	STi40T (HW-P40) *	M UTi20T (HW-M20) *	K HTi03A (HW-K01) *	HTi05T (HW-K01) *	HTi10 (HW-K10) *	HTi20 (HW-K20) *	Dimensions (mm) A	B	C	R
I Type		I −1	□	●	□	□	□	□	□	●	13	9	4	5
		I −2	□	●	□	●	□	□	□	□	16	11	5	5
		I −3	□	□	□	□	□	□	□	□	19	13	6	5
		I −4	□	□	□	□	□	□	□	□	22	15	8	8
		I −5	□	□	□	□	□	□	□	□	25	17	9	8
		I −6	□	□	□	□	□	□	□	□	30	20	10	8
HA Type		HA−1	●	●	□	●	□	●	●	●	13	9	4	—
		HA−2	●	●	□	●	□	●	●	●	16	11	5	—
		HA−3	●	●	□	●	□	●	□	□	19	13	6	—
		HA−4	□	●	□	●	□	□	□	□	22	15	8	—
		HA−5	□	□	□	□	□	●	□	□	25	17	9	—
		HA−6	□	□	□	□	□	□	□	□	30	20	10	—
TO Type		TO−1	●	●	□	●	●	□	□	□	5	13	4	—
		TO−2	●	●	□	●	□	□	□	□	6	16	5	—
		TO−3	●	●	□	●	□	□	□	□	7	19	6	—
		TO−4	□	□	□	□	□	□	□	□	9	22	8	—
		TO−5	□	□	□	□	□	□	□	□	10	25	9	—
		TO−6	□	□	□	□	□	□	□	□	11	30	10	—
RI Type		RI−1	□	●	□	●	□	□	□	□	13	13	4	2.5
		RI−2	□	●	□	●	□	□	□	●	16	16	5	3
		RI−3	□	●	□	●	□	□	□	□	19	19	6	4
		RI−4	□	□	□	□	□	□	□	□	22	22	8	4
		RI−5	□	□	□	□	□	□	□	□	25	25	9	5
		RI−6	□	□	□	□	□	□	□	□	30	30	10	6
RU Type		RU−1	●	●	●	●	●	●	●	●	3	13	4	—
		RU−2	●	●	●	●	●	●	●	●	4	15	5	—
		RU−3	●	●	●	●	●	●	●	●	5	17	6	—
		RU−4	●	●	□	●	●	□	●	□	6	20	8	—
		RU−5	□	□	□	□	□	□	□	□	8	25	9	—
		RU−6	□	□	□	□	□	□	□	□	10	30	10	—

∗( ) : Materials for cemented carbide tools and the classification for usage.

CARBIDE RODS



LRB SERIES

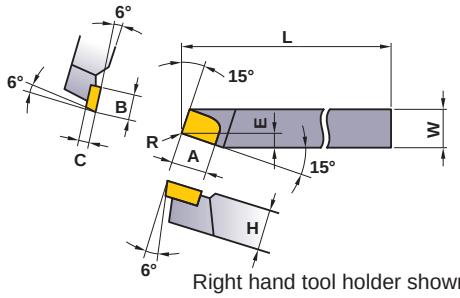
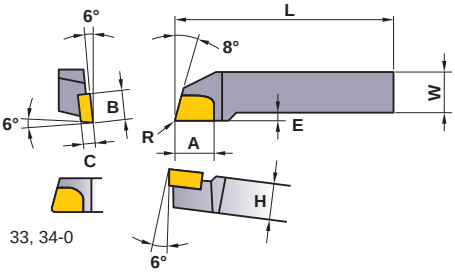
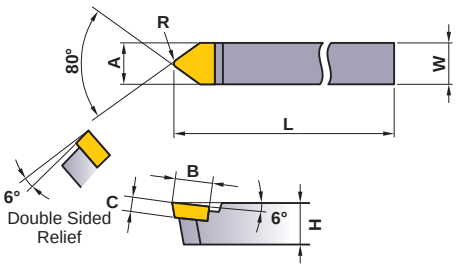
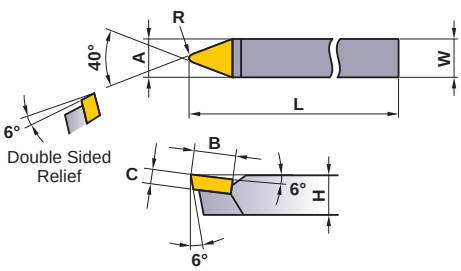
Order Number	Stock HTi10	TF15	MF10	Dimensions (mm) D	L
LRB030	●	●	●	3	330
040	●	●	●	4	330
050	●	●	●	5	330
060	●	●	●	6	330
070	●	●	●	7	330
080	●	●	●	8	330
100	●	●	●	10	330
120	●	●	●	12	330

Symbol	Dimensions (mm)	Tolerance (mm)
D	0.5 − 2.5	+0.5 +0.2
	3 − 8	+0.5 +0.3
	10 − 12	+0.6 +0.3

Symbol	Dimensions (mm)	Tolerance (mm)	Bend (mm)
L	240	+10 0	0.15
	330	+10 0	0.3

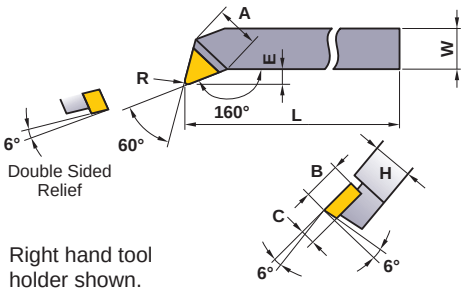
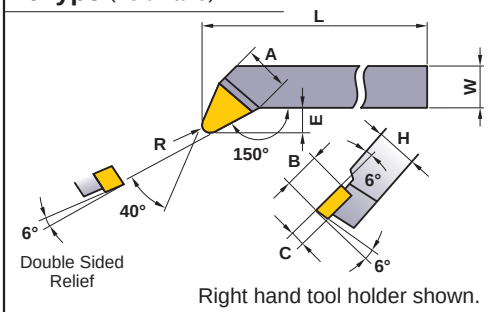
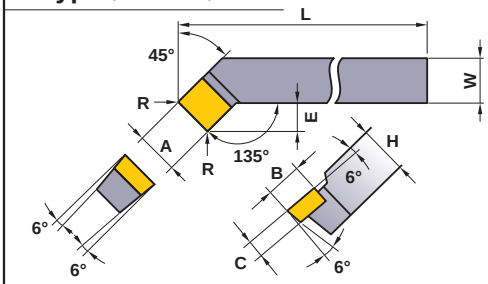
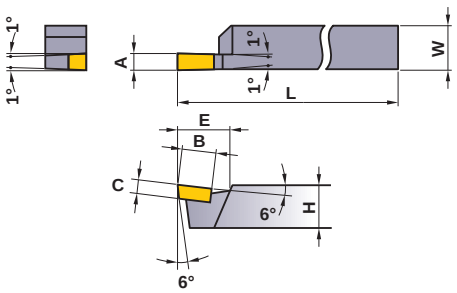
● : Inventory maintained in Japan. (10 inserts in one case)
□ : Non stock, produced to order only.

BRAZED TOOL HOLDERS

Geometry	Order Number	R/L	Stock P STi10	P STi20	P STi40T	M UTi20T	K HTi05T	K HTi10	K HTi20	Dimensions (mm) Shank W	Shank H	Shank L	Shank E	Carbide A	Carbide B	Carbide C	Carbide R	Blank No.
31Type (Right Hand) **32Type** (Left Hand)  Right hand tool holder shown.	**31-0**	R		●		●				10	10	80	2.7	10	6	3	0.3	01-0
	32-0	L		●						10	10	80	2.7	10	6	3	0.3	01-0
	31-1	R		●		●		●		13	13	100	4	13	9	3	0.5	01-1
	32-1	L		●		●		●		13	13	100	4	13	9	3	0.5	01-1
	31-2	R		●		●		●		16	16	120	4.5	16	11	4	0.5	01-2
	32-2	L		●		●		●		16	16	120	4.5	16	11	4	0.5	01-2
	31-3	R	●	●		●	●	●	●	19	19	140	5.5	19	13	5	0.5	01-3
	32-3	L		●		●				19	19	140	5.5	19	13	5	0.5	01-3
	31-4	R	●	●		●	●	●		25	25	160	6.5	22	15	6	1	01-4
	32-4	L		●	●	●		●		25	25	160	6.5	22	15	6	1	01-4
33Type (Right Hand) **34Type** (Left Hand)  33, 34-0 Right hand tool holder shown.	**33-0**	R	●	●		●	●	●	●	10	10	80	—	10	6	3	0.3	04-0
	34-0	L	●	●		●	●	●	●	10	10	80	—	10	6	3	0.3	04-0
	33-1	R	●	●	●	●	●	●	●	13	13	100	4	13	9	3	0.5	04-1
	34-1	L	●	●		●	●	●	●	13	13	100	4	13	9	3	0.5	04-1
	33-2	R	●	●	●	●	●	●	●	16	16	120	4	16	11	4	0.5	04-2
	34-2	L	●	●		●	●	●	●	16	16	120	4	16	11	4	0.5	04-2
	33-3	R	●	●	●	●	●	●	●	19	19	140	5	19	13	5	0.5	04-3
	34-3	L	●	●	●	●	●	●	●	19	19	140	5	19	13	5	0.5	04-3
	33-4	R	●	●	●	●	●	●	●	25	25	160	5	22	15	6	1	04-4
	34-4	L	●	●	●	●	●	●	●	25	25	160	5	22	15	6	1	04-4
	33-5	R		●		●				25	30	180	6	25	17	7	1	04-5
	34-5	L		●						25	30	180	6	25	17	7	1	04-5
	33-6	R		●		●				30	35	200	6	30	20	8	1	04-6
	34-6	L		●		●				30	35	200	6	30	20	8	1	04-6
35Type  Double Sided Relief	**35-0**	—	●	●		●	●	●	●	10	10	80	—	10	10	3	0.3	07-0
	35-1	—	●	●		●	●	●	●	13	13	100	—	13	13	3	0.5	07-1
	35-2	—	●	●		●	●	●	●	16	16	120	—	16	16	4	0.5	07-2
	35-3	—	●	●		●	●	●	●	19	19	140	—	19	19	5	0.5	07-3
	35-4	—		●		●	●	●		25	25	160	—	25	20	6	1	07-4
36Type  Double Sided Relief	**36-0**	—	●	●		●	●	●	●	10	10	80	—	10	10	3	2	06-0
	36-1	—	●	●		●	●	●	●	13	13	100	—	13	13	3	2.5	06-1
	36-2	—	●	●		●	●	●	●	16	16	120	—	16	16	4	3	06-2
	36-3	—	●	●	●	●	●	●	●	19	19	140	—	19	19	5	4	06-3
	36-4	—	●	●	●	●	●	●	●	25	25	160	—	22	22	6	4	06-4
	36-5	—		●				●		25	30	180	—	25	25	7	5	06-5
	36-6	—		●		●	●	●		30	35	200	—	30	30	8	6	06-6

● : Inventory maintained in Japan.

BRAZED TOOL HOLDERS

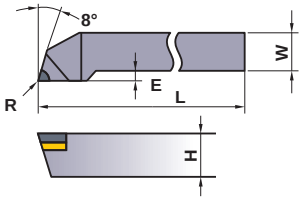
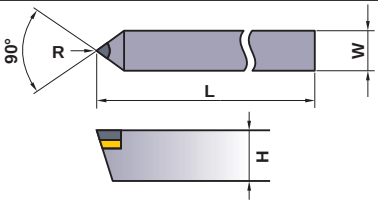
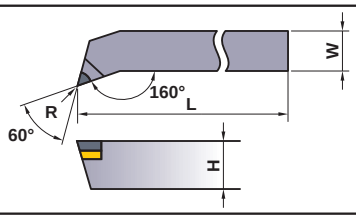
Geometry	Order Number	R/L	Stock P STi10	Stock P STi20	Stock P STi40T	Stock M UTi20T	Stock K HTi05T	Stock K HTi10	Stock K HTi20	Dimensions (mm) Shank W	Shank H	Shank L	Shank E	Carbide A	Carbide B	Carbide C	Carbide R	Blank No.
37Type (Right Hand) **38Type** (Left Hand)	**37-1**	R	●	●		●	●	●		13	13	100	5	12	—	3	0.5	03-1
	38-1	L		●				●		13	13	100	5	12	—	3	0.5	03-1
	37-2	R	●	●		●	●	●		16	16	120	6	15	—	4	0.5	03-2
	38-2	L		●		●		●		16	16	120	6	15	—	4	0.5	03-2
	37-3	R	●	●		●	●	●		19	19	140	7	18	—	5	0.5	03-3
	38-3	L		●		●	●	●	●	19	19	140	7	18	—	5	0.5	03-3
	37-4	R	●	●		●	●	●		25	25	160	10	24	—	6	1	03-4
	38-4	L		●				●		25	25	160	10	24	—	6	1	03-4
 Right hand tool holder shown.																		
39Type (Right Hand) **40Type** (Left Hand)	**39-0**	R	●	●		●	●	●	●	10	10	80	5	10	10	3	2	06-0
	40-0	L		●		●	●	●	●	10	10	80	5	10	10	3	2	06-0
	39-1	R	●	●		●	●	●	●	13	13	100	7	13	13	3	2.5	06-1
	40-1	L	●	●		●	●	●	●	13	13	100	7	13	13	3	2.5	06-1
	39-2	R	●	●	●	●	●	●	●	16	16	120	10	16	16	4	3	06-2
	40-2	L	●	●		●	●	●	●	16	16	120	10	16	16	4	3	06-2
	39-3	R	●	●	●	●	●	●	●	19	19	140	12	19	19	5	4	06-3
	40-3	L	●	●	●	●	●	●	●	19	19	140	12	19	19	5	4	06-3
	39-4	R	●	●	●	●	●	●	●	25	25	160	13	22	22	6	4	06-4
	40-4	L		●		●	●	●	●	25	25	160	13	22	22	6	4	06-4
 Right hand tool holder shown.																		
41Type (Right Hand) **42Type** (Left Hand)	**41-0**	R		●		●				10	10	80	6	10	6	3	0.3	02-0
	41-1	R	●	●		●		●	●	13	13	100	7	13	9	3	0.5	02-1
	42-1	L		●		●		●		13	13	100	7	13	9	3	0.5	02-1
	41-2	R	●	●		●	●	●		16	16	120	10	16	11	4	0.5	02-2
	42-2	L		●		●		●		16	16	120	10	16	11	4	0.5	02-2
	41-3	R	●	●		●	●	●	●	19	19	140	12	19	13	5	0.5	02-3
	42-3	L	●	●		●	●	●		19	19	140	12	19	13	5	0.5	02-3
	41-4	R	●	●		●	●	●		25	25	160	13	22	15	6	1	02-4
	42-4	L		●		●		●		25	25	160	13	22	15	6	1	02-4
 Right hand tool holder shown.																		
43Type	**43-1**	—	●	●		●	●	●	●	10	16	100	13	3	8	3	—	08-1
	43-2	—	●	●		●	●	●	●	13	19	120	16	3	8	3	—	08-1
	43-3	—	●	●	●	●	●	●	●	16	22	140	20	4	13	4	—	08-3
	43-4	—	●	●		●	●	●	●	19	25	160	25	5	15	5	—	08-4
	43-5	—		●		●				22	32	180	30	6	17	6	—	08-5
																		

● : Inventory maintained in Japan.

Geometry	Order Number	R/L	Stock					Dimensions (mm)										Blank No.
			P		M	K		Shank						Carbide				
			STi10	STi20	UTi20T	HTi05T	HTi10	W	H	L	d	E	l	A	B	C	R	
47Type (Right Hand)	**47-1**	R	●	●	●	●	●	13	13	140	12	7	50	10	–	3	0.5	03-0
	47-2	R	●	●	●	●	●	16	16	160	15	8	60	12	–	3	0.5	03-1
	47-3	R	●	●	●	●	●	19	19	190	18	9	80	15	–	4	0.5	03-2
	47-4	R		●	●			25	25	230	22	10	100	18	–	5	1	03-3
49Type (Right Hand)	**49-1**	R			●			13	13	100	–	–	–	5	8	3	–	05-1
	49-2	R	●	●	●		●	16	16	120	–	–	–	6	10	4	–	05-2
	49-3	R	●	●	●	●		19	19	140	–	–	–	7	12	5	–	05-3
	49-4	R	●	●	●			25	25	160	–	–	–	9	16	6	–	05-4
51Type (Right Hand)	**51-1**	R		●	●			13	13	140	12	8	50	5	8	3	–	05-1
	51-2	R		●	●			16	16	160	15	10	60	6	10	4	–	05-2
	51-3	R		●	●			19	19	190	18	12	80	7	12	5	–	05-3
95Type	**95-1**	R	●	●				25	25	160	–	5	–	20	10	7	1	09E1

BRAZED TOOLS WITH SINTERED PCD

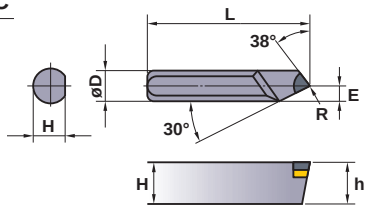
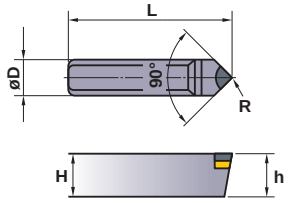
HOLDER WITH PCD

Geometry	Order Number	Stock				Dimensions (mm)				
		PCD								
		MD220				W	H	L	E	R
33-.C 	33-0C	●				10	10	80	0	0.2
	-1C	●				13	13	100	4	0.4
	-2C	●				16	16	120	4	0.4
	-3C	□				19	19	140	5	0.4
35-.C 	35-0C	●				10	10	80	—	0.2
	-1C	●				13	13	100	—	0.4
	-2C	●				16	16	120	—	0.4
	-3C	□				19	19	140	—	0.4
37-.C 	37-0C	□				10	10	80	4.5	0.2
	-1C	●				13	13	100	5.2	0.4
	-2C	●				16	16	120	6.5	0.4
	-3C	●				19	19	120	7.5	0.4

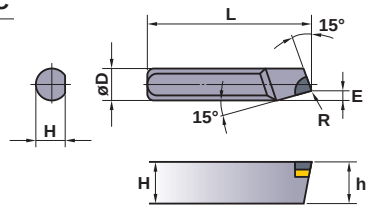
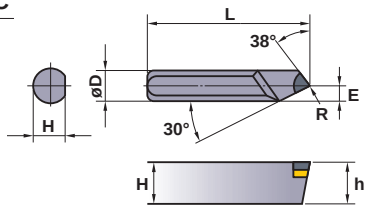
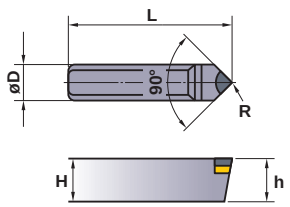
● : Inventory maintained in Japan. □ : Non stock, produced to order only.

BORING BARS WITH PCD

Standard type

Geometry	Order Number	Stock PCD MD220	Stock PCD	Stock	Stock	D	H	L	h	E	R
BR 3..C 	∗ **BR305C**	●				5	4	20	3.5	2.5	0.2
	306C	●				6	5	25	4	3	0.2
	308C	●				8	7	35	6	4	0.4
BR 5..C 	**BR506C**	●				6	5	25	4	–	0.2
	508C	●				8	7	35	6	–	0.4

Special designed shape

Geometry	Order Number	D	H	L	h	E	R
BR 2..C 	∗ **BR203C**	3	2.5	13	2.5	0.5	0.2
	∗ **204C**	4	3.5	16	3	0.7	0.2
	∗ **205C**	5	4	20	3.5	1	0.2
	206C	6	5	25	4	1.5	0.2
	208C	8	7	35	6	2	0.4
	210C	10	9	50	7	3	0.4
BR 3..C 	∗ **BR303C**	3	2.5	13	2.5	1.5	0.2
	∗ **304C**	4	3.5	16	3	2	0.2
	310C	10	9	50	7	5	0.4
BR 5..C 	∗ **BR503C**	3	2.5	13	2.5	–	0.2
	∗ **504C**	4	3.5	16	3	–	0.2
	∗ **505C**	5	4	20	3.5	–	0.2
	510C	10	9	50	7	–	0.4

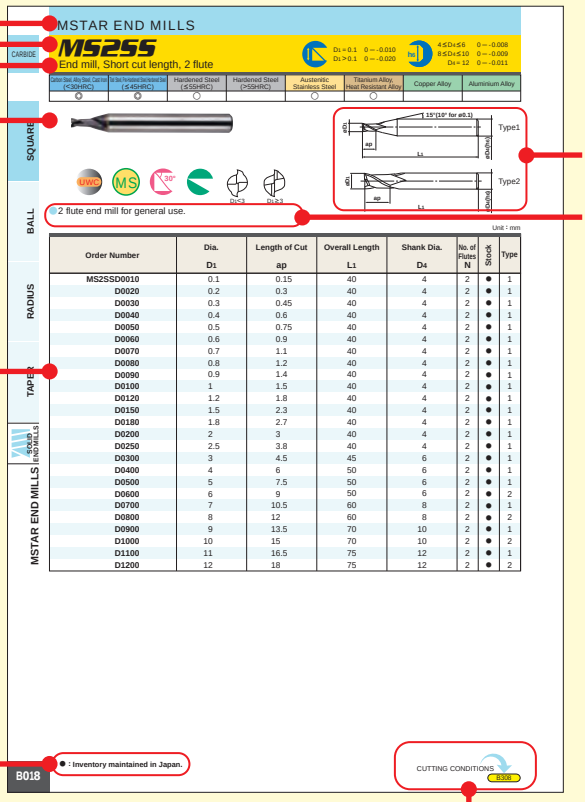
∗Carbide shank

HOW TO READ THE STANDARD OF SOLID END MILLS

●How this section page is organized

①Organized according to cutting mode for milling. (Refer to END MILL LIST.)

PHOTO OF PRODUCT
PRODUCT TITLE
ITEM NUMBER
PRODUCT BLOCK



GEOMETRY
PRODUCT FEATURES

LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

PAGE REFERENCE
• CUTTING CONDITIONS
indicates the reference pages, including the above, on the right hand page of each double-spread page.

PRODUCT STANDARDS
indicates order numbers, dimensions, and stock status.

●To Order:
For solid-carbide drill or brazed drill, please specify ①order number.

MILLING TOOLS

SOLID END MILLS

IDENTIFICATION ····· B002
SYMBOL DESCRIPTIONS ····· B003
COATING TECHNOLOGY ····· B004
END MILLS SELECTION CHART ····· B006

SOLID END MILLS STANDARD

MSTAR END MILLS ····· B018
IMPACT MIRACLE END MILLS ··· B076
MIRACLE END MILLS ····· B104
CRN COATED END MILLS ····· B162
DLC COATED END MILLS ····· B174
DIAMOND COATED END MILLS ··· B176
CBN END MILLS ····· B182
BRAZED TYPE END MILLS ····· B184
BALL NOSE, SINTERED CBN ··· B185
MS END MILLS ····· B186
CARBIDE END MILLS ····· B191
VIOLET END MILLS ····· B217
TWO-FLUTE END MILLS ····· B228
THREE-FLUTE END MILLS ····· B248
FOUR-FLUTE END MILLS ····· B249
BALL NOSE END MILLS ····· B257
ROUGHING END MILLS ····· B260
SEMI-FINISHING END MILLS ··· B267
HIGH HELIX END MILLS ····· B270
LIGHT ALLOY STEEL END MILLS ··· B272
DEEP SLOTTING END MILLS ··· B276
CORNER RADIUS END MILLS ··· B281

RECOMMENDED CUTTING CONDITONS FOR END MILLS ····· B284

*Arranged by Alphabetical order

B185 BEM
B188 BZD2SG
B195 C-2JS
B198 C-2LA
B196 C-2LS
B197 C-2MA
B202 C-2MB
B206 C-2MHA
B192 C-2MS
B204 C-2SA
B191 C-2SS
B205 C-3SA
B209 C-3SARB
B200 C-4JC
B201 C-4LC
B199 C-4MC
B182 CBN-2XLB
B183 CBN-2XLRB
B203 C-MH
B208 C-MRA
B166 CRN-2MB
B170 CRN-2MRB
B162 CRN-2MS
B163 CRN-2XL
B167 CRN-2XLB
B171 CRN-2XLRB
B165 CRN-4JC
B207 C-SRA
B210 C-SRARB
B179 DC-2LB
B178 DC-2MB
B177 DC-2MB-NF
B176 DC-2MS-3
B180 DC-2XLB
B181 DC-XB
B174 DLC-2MA
B175 DLC-2MB
B238 G-2MS
B228 G-2SS
B255 G-4LC
B251 G-4MC
B184 GBE
B184 GDE
B262 G-MR
B267 G-MSF
B261 G-SFPR
B264 JR
B247 K-2SL
B276 K-2XL
B259 K-4MB
B271 K-LH
B270 K-MH
B265 LR
B263 MR
B266 MRB
B040 MS2ES
B022 MS2JS
B023 MS2LS
B044 MS2MB
B021 MS2MD
B055 MS2MRB
B019 MS2MS
B062 MS2MT
B075 MS2MTB
B043 MS2SB
B018 MS2SS
B051 MS2XB
B024 MS2XL
B027 MS2XL6
B045 MS2XLB
B057 MS2XLRB
B041 MS3ES
B042 MS4EC
B036 MS4JC
B066 MS4LT
B072 MS4LTB
B035 MS4MC
B058 MS4MRB
B034 MS4SC
B037 MS4XL
B269 MSF
B032 MSJHD
B030 MSMHD
B060 MSMHDRB
B033 MSMHZD
B029 MSSHD
B281 RB
B282 RC
B242 S-2JS
B257 S-2MB
B234 S-2MD
B274 S-2SDA
B254 S-4JC
B249 S-4MD
B187 SED2KMG
B186 SED2KPG
B212 SEE2L
B211 SEE2S
B189 SEE2SG
B213 SEE4L
B215 SEG2SA
B216 SEG4SA
B260 SR
B214 SZE4S
B220 VA-2MB
B218 VA-2MS
B217 VA-2SS
B219 VA-4MC
B224 VA-JR
B227 VA-LH
B225 VA-LR
B222 VA-MFPR
B226 VA-MH
B223 VA-MR
B221 VA-SFPR
B158 VC-2C
B114 VC-2ESB
B136 VC-2JRB
B109 VC-2JS
B123 VC-2LB
B119 VC-2MB
B121 VC-2MB-OH
B120 VC-2MB-SS
B122 VC-2MDB
B106 VC-2MS
B108 VC-2MS-SS
B153 VC-2MT
B117 VC-2PSB
B118 VC-2PSB-P
B116 VC-2SB
B104 VC-2SS
B115 VC-2SSB
B110 VC-2XL
B124 VC-2XLB
B125 VC-2XLB-6
B129 VC-3LB
B128 VC-3MB
B113 VC-4JC
B138 VC-4JRB
B130 VC-4MB
B111 VC-4MC
B112 VC-4MC-SS
B154 VC-4MT
B137 VC-4SRB
B156 VC-4STB
B150 VC-6MH
B151 VC-8MH
B139 VC-HFRB
B144 VC-LD
B141 VC-MD
B143 VC-MDL
B146 VC-MDRB
B142 VC-MD-SC
B149 VC-MH
B147 VC-MHDRB
B131 VC-PSRB
B159 VC-RC
B145 VC-SDRB
B152 VC-SFPR
B126 VC-XB
B076 VF-2MD
B086 VF-2SB
B087 VF-2SDB
B088 VF-2SDBL
B085 VF-2SSB
B084 VF-2WB
B077 VF-2XL
B090 VF-2XLB
B089 VF-2XLBS
B095 VF-3XB
B098 VF-4MB
B078 VF-4MD
B100 VF-6MHVRB
B081 VF-MD
B102 VF-MDRB
B083 VF-MFPR
B079 VF-MHV
B099 VF-MHVRB
B080 VF-SD
B101 VF-SDRB
B082 VF-SFPR
B160 VJ-2MS
B161 VJ-4MS
B273 1LA
B272 1MA
B258 2FB
B243 2LS
B275 2MA
B245 2MK
B277 2ML
B240 2MS
B229 2SS
B248 3MS
B256 4LC
B252 4MC
B278 4ML
B280 4MX
B279 4SX

IDENTIFICATION

ORDER NUMBER OF END MILLS

MS 2 M S D0100 *

End mill names

MS : Mstar end mills
VF : Impact Miracle end mills
VC : Miracle end mills
VJ : Miracle jumbo end mills
CRN : CRN coated end mills
DLC : DLC coated end mills
DC : Diamond coated end mills
CBN : CBN end mills
C : Carbide end mills
VA : Violet end mills
G : TiN coated end mills
S : KHAS end mills
(High-grade powder high-speed steel)
K : KHA end mills
(Powder metallurgy HSS)
None : Cobalt high-speed steel

Number of flutes

1 : 1flute
2 : 2flute
3 : 3flute
4 : 4flute
• • •

Flute length

ES : Extra short
S : Short
M : Medium
J : Semi long
L : Long
XL : Long neck
X : Taper neck
SX : Extra long
MX : Extra long

Features

S : General-use
U : For stainless steel
K : For keyway
A : For light alloy
C : Center cut
D : For deep cut
V : Irregular spiral helix angle
B : Ball nose
R : Roughing
FPR : Fine roughing
H : High helix
T : Taper
TB : Taper ball nose
RB : Corner radius
3 : 3mm shank
6 : 6mm shank

Dimensions

D★★★★ : Diameter
ex.
D0050 →ϕ0.5
D0500 →ϕ5

R★★★★ : Radius of ball nose
ex.
R0050 → R0.5
R0500 → R5

Others

S★★ : Shank diameter
N★★★ : Neck length
T★★★★ : Taper angle one side
L★★ : Flute length
A★★★ : Overall Length

★Other types are available by special order.

SE E 2 040 S G

End mill names

SZ : Super square
BZ : Super ball
SE : Square end mill

Helix angle

D : 30°
E : 45°
G : Irregular spiral helix angle (38°/41°)

Number of flutes

2 : 2flute
4 : 4flute

Diameter

ex.
010 →ϕ1
050 →ϕ5

Shape

S : Short
M : Standard
L : Long
KP : For key way (+)
KM : For key way (-)

Coating

G : (Al, Ti)N Coating

★Other types are available by special order.

SYMBOL DESCRIPTIONS

Tool material

Ultra micro grain carbide
Ultra micro grain carbide is used as the substrate material.

Cubic boron nitride
Mitsubishi's original CBN is used.

High hardness powder metallurgy HSS
High hardness powder metallurgy HSS is used as the substrate material.

Powder metallurgy HSS
Powder metallurgy HSS is used as the substrate material.

Ultra micro grain carbide
Cobalt high speed steel is used as the substrate material.

High speed steel
High speed steel is used as the substrate material.

Tolerances

Outside diameter tolerance
Indicates diameter tolerance of end mill.

R tolerance
Indicates the radial tolerance of a ball nose end mill.

R tolerance
Indicates the radial tolerance of an end mill with a corner radius.

Tolerance of Taper angle
Indicates the tolerance of the taper angle.

Tolerance of Point angle
Indicates the tolerance of the point angle.

R tolerance
Indicates the radial tolerance of a corner radius end mill.

Shank diameter tolerance
Indicates the shank diameter tolerance of end mill.

Coating

(Al,Ti)N Coating
(Al,Ti)N offers higher versatility.

IMPACT MIRACLE Coating
Single phase nano crystal coating technology for higher film hardness and heat resistance.

MIRACLE Coating
The original Miracle (Al,Ti)N coating.
Also suitable for dry cutting.

CRN Coating
Newly developed CrN coating for Copper Electrodes machining.

DLC Coating
Hardness similar to that of CVD diamond coating achieved with high adhesion strength.
(Jointly developed with NAGATA SEIKI CO.,LTD.)

Diamond Coating
Pure Diamond high performance coating excelling in film adhesion to the substrate.

VIOLET Coating
Increased tool life of 2—3 times that of TiN coated products.

TiN Coating
Increased tool life of 2—3 times that of non coated products.

Angle, sharp corner edge and gash land

Helix angle
Indicates the helix angle of the end mill.

Sharp corner edge
Indicates the end mill has a sharp corner edge.

Gash land
Indicates the end mill cutting edge has a gash land.

COATING TECHNOLOGY

iMPACT MIRACLE Coating

For higher hardness, higher speed and longer tool life!

In comparison with the conventional coating single-phase nano crystal coating technology offers higher coating hardness and heat resistance.
When machining hardened steels it can be seen that the IMPACT MIRACLE coating offers a lower friction of coefficient and as such prevents abnormal damage such as chipping.

FEATURES OF IMPACT MIRACLE COATING

	iMPACT MIRACLE Shingle phase nano coating (Al,Ti,Si)N	(Al,Ti,Si)N	(Al,Ti)N
Hardness (HV)	**3700**	3200	2800
Oxidation Temperature (℃)	**1300**	1100	840
Adhesion (N)[1)]	**100**	80	80
Wear Coefficient[2)](800℃)	**0.48**	0.53	0.58

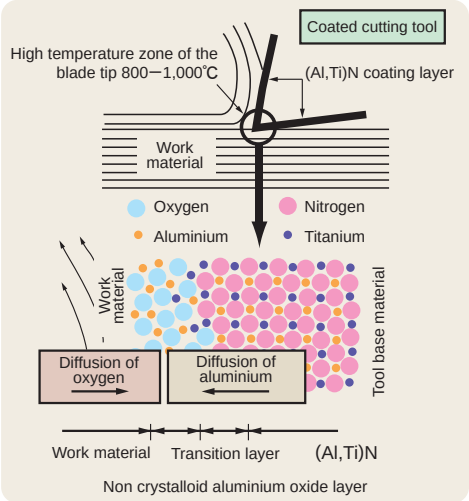
1) Adhesion : Measured by critical load scratch test.
2) Coefficient of friction : Measured by ball-on-disk method.
(Counter gear : AISI D2 60HRC)

MIRACLE Coating (Al,Ti)N

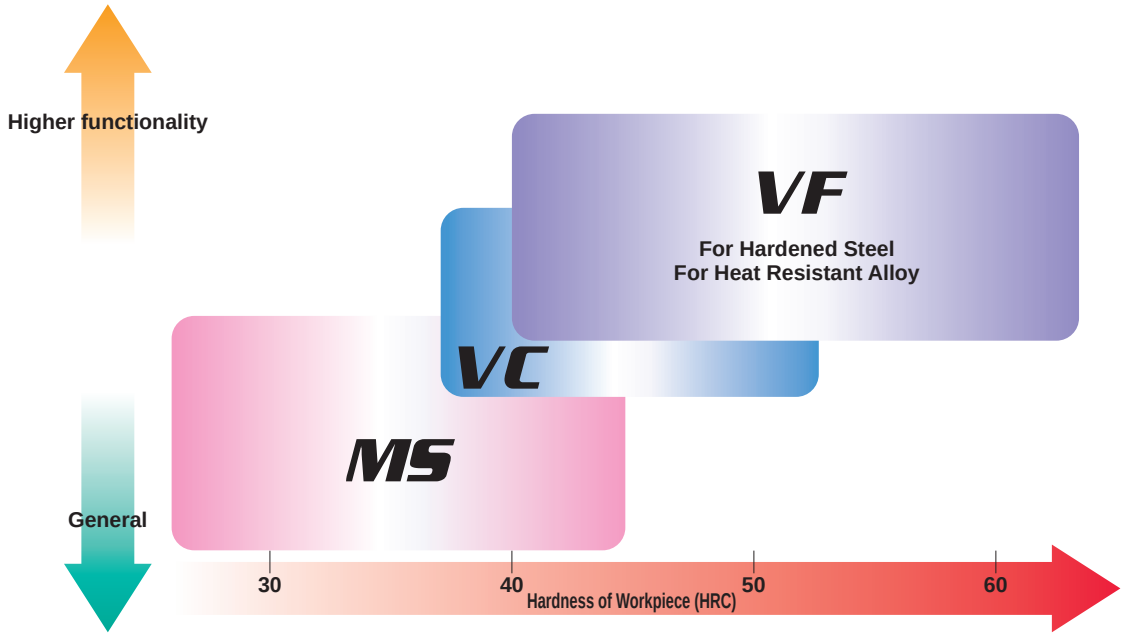
MIRACLE coating for high speed milling.

Miracle coating is produced by adding Al to an existing TiN coating.
This coating layer consists of a compound solid solution of (AlTi)N.
This coating has succeeded in improving heat resistance during cutting in addition to adding high hardness properties to the tool.
The result is improved performance for dry, high speed cutting of hardened materials.

Oxidation Behavior Concept Chart of (Al,Ti)N Coating Layer



Coating application range



CRN Coating

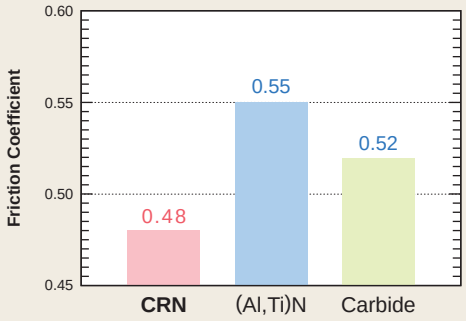
Specially designed for milling of copper electrode and copper alloy.

CRN coating has been developed for copper alloy milling. It has superior wear resistance and excellent adhesion strength by using Miracle coating technology. The excellent anti adhesion properties needed for copper machining has been achieved due to its low friction coefficient at high temperatures.

FEATURES OF CRN COATING

	CRN	(Al,Ti)N	Carbide
Hardness (HV)	**2000**	2800	1600
Adhesion (N)	**80**	80	—

Friction Coefficient against copper at the high temperature of 600℃



DLC Coating

Newly developed DLC coating. Hardness similar to that of CVD diamond coating achieved with high adhesion strength.

Mitsubishi Materials and NAGATA SEIKI have jointly developed a unique DLC coating that has substantially increased "adhesion strength" compared to previous DLC coatings.

FEATURES OF DLC COATING

	Mitsubishi's DLC	Competitor's DLC	Diamond	TiN
Hardness (HV)	**6000—7000**	1000—7000	7000—10000	2000
Friction Coefficient	**0.1**	0.1	0.4	0.4

Diamond Coating

Diamond coating for non-ferrous and new non-metal materials.

Owing to Mitsubishi's unique plasma chemical vapor deposition (CVD) coating technology, great combination of coating hardness similar to that of natural diamond has been combined with a good adhesion to carbide substrates.

VIOLET Coating

(Al,Ti)N coating, excellent adhesion strength for HSS tools.

Violet coating is the name of the technology of successfully applying a Miracle type coating to HSS substrate tools. The newly developed technology of applying (Al,Ti)N coating at the low temperatures required for HSS substrates, means that Violet coating has the same level of adhesion strength as Miracle coating. Additionally high film hardness and excellent oxidation resistance properties have also been realised.

FEATURES OF VIOLET COATING

	Violet Coating	TiN
Hardness (HV)	**2800**	1900
Adhesion (N)	**80**	60
Oxidation Temperature (℃)	**840**	620

CARBIDE

END MILLS SELECTION CHART CEMENTED CARBIDE

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
SQUARE	General Use	2	MS	MS2SS	End mill, Short cut length, 2 flute	ϕ0.1 –ϕ12	◎	◎	○		○	○			B018	B284
			MS	MS2MS	End mill, Medium cut length, 2 flute	ϕ0.2 –ϕ20	◎	◎	○		○	○			B019	B284
			MS	MS2MD NEW	End mill, Medium cut length, 2 flute, Strong geometry type	ϕ1 –ϕ12	◎	◎	○		○	○			B021	B285
			MS	MS2JS	End mill, Semi long cut length, 2 flute	ϕ0.1 –ϕ12	◎	◎	○		○	○			B022	B286
			MS	MS2LS	End mill, Long cut length, 2 flute	ϕ0.2 –ϕ12	◎	◎	○		○	○			B023	B287
			VC	VC-2SS	End mill, Extra short cut length, 2 flute	ϕ0.3 –ϕ16	○	◎	◎		○	○			B104	B323
			VC	VC-2MS	End mill, Medium cut length, 2 flute	ϕ0.3 –ϕ25	○	◎	◎		○	○			B106	B324
			VC	VC-2JS	End mill, Semi long cut length, 2 flute	ϕ1 –ϕ25	○	◎	◎		○	○			B109	B325
			–	C-2SS	End mill, Short cut length, 2 flute	ϕ0.4 –ϕ6	○	○			○	○	○	○	B191	B365
			–	C-2MS	End mill, Medium cut length, 2 flute	ϕ1 –ϕ20	○	○			○	○	○	○	B192	B365
			–	C-2JS	End mill, Semi long cut length, 2 flute	ϕ1 –ϕ25	○	○			○	○	○	○	B195	B365
			–	C-2LS	End mill, Long cut length, 2 flute	ϕ1 –ϕ20	○	○			○	○	○	○	B196	B365
		4	MS	MS4SC	End mill, Short cut length, 4 flute	ϕ1 –ϕ12	◎	◎	○		○	○			B034	B293
			MS	MS4MC	End mill, Medium cut length, 4 flute	ϕ1 –ϕ20	◎	◎	○		○	○			B035	B293
			MS	MS4JC	End mill, Semi long cut length, 4 flute	ϕ1 –ϕ12	◎	◎	○		○	○			B036	B294
			VC	VC-4MC	End mill, Medium cut length, 4 flute	ϕ2 –ϕ25	○	◎	◎	○	○	○			B111	B327
			VC	VC-4JC	End mill, Semi long cut length, 4 flute	ϕ3 –ϕ25	○	◎	◎	○	○	○			B113	B328
			–	C-4MC	End mill, Medium cut length, 4 flute, Center cutting	ϕ3 –ϕ20	○	○			○	○	○	○	B199	B367

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	Work Material P: Tool steel, Pre-Hardened Steel, Hardened Steel	Work Material H: Hardened Steel(-55HRC)	Work Material H: Hardened Steel(55HRC-)	Work Material M: Austenitic Stainless Steel	Work Material S: Titanium Alloy, Heat Resistant Alloy	Work Material N: Copper Alloy	Work Material N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
SQUARE	General Use	4	—	C-4JC	End mill, Semi long cut length, 4 flute, Center cutting	φ3 –φ25	○	○			○	○	○	○	B200	B367
			—	C-4LC	End mill, Long cut length, 4 flute, Center cutting	φ3 –φ20	○	○			○	○	○	○	B201	B367
	General Use Slim Shank	2	VC	VC-2MS-SS	End mill, Medium cut length, 2 flute, Slim shank	φ6 –φ12	○	◎			○	○			B108	—
		4	VC	VC-4MC-SS	End mill, Medium cut length, 4 flute, Slim shank	φ6 –φ12	○	◎	○		○	○			B112	—
	General Use High Helix	2	MS	SEE2SG	End mill, Short cut length, 2 flute, High helix	φ3 –φ25	◎	○			○	○	○	○	B189	B363
			—	SEE2S	End mill, Short cut length, 2 flute	φ3 –φ20	◎	○			○	○	○	○	B211	B373
			—	SEE2L	End mill, Long cut length, 2 flute	φ3 –φ20	◎	○			○	○	○	○	B212	B373
		3	MS	MSMHZD	Slotting, Medium cut length, 3 flute	φ1 –φ20	◎	◎	○		◎	○			B033	B292
		4	MS	MSSHD	High power, Short cut length, 4 flute	φ3 –φ20	◎	◎	○		◎	◎			B029	B290
			MS	MSMHD	High power, Medium cut length, 4 flute	φ2 –φ25	◎	◎	○		◎	◎			B030	B290
			MS	MSJHD	High power, Semi long cut length, 4 flute	φ2 –φ20	◎	◎	○		◎	◎			B032	B291
			—	SZE4S	End mill, Medium cut length, 4 flute, Super Square geometry	φ3 –φ25	◎	○			○	○		○	B214	—
			—	SEE4L	End mill, Long cut length, 4 flute	φ3 –φ25	◎	○			○	○		○	B213	B374
	For Machining of Hardened Steels	2	VF	VF-2MD (NEW)	End mill, Medium cut length, 2 flute, For hardened materials	φ0.5 –φ6	○	◎	◎	◎					B076	B306
		4	VF	VF-4MD (NEW)	End mill, Medium cut length, 4 flute, For hardened materials	φ1 –φ20	○	◎	◎	◎					B078	B308
		4 6	VF	VF-SD	End mill, Short cut length, For hardened materials	φ1 –φ12	○	◎	◎	◎					B080	B322
			VF	VF-MD	End mill, Medium cut length, For hardened materials	φ1 –φ25	○	◎	◎	◎					B081	B322
			VC	VC-MD-SC	End mill, Medium cut length, 4—6 flute	φ0.5 –φ3	○	◎	◎	◎					B142	B335

END MILLS SELECTION CHART CEMENTED CARBIDE

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
SQUARE	For Machining of Hardened Steels	4 6	VC	VC-MD	End mill, Medium cut length, 4—6 flute	φ1 —φ25	○	◎	◎	◎					B141	B335
		6	VC	VC-LD	End mill, Long cut length, 6 flute	φ6 —φ25	○	◎	◎	◎					B144	B336
			VC	VC-MDL	End mill, Medium cut length, 6 flute, Long shank	φ3 —φ25	○	◎	◎	◎					B143	B336
	For Machining of Copper Alloys	2	CRN	CRN-2MS	End mill, Medium cut length, 2 flute, For copper electrodes	φ0.2 —φ12							◎	○	B162	B351
		4	CRN	CRN-4JC	End mill, Semi long cut length, 4 flute, For copper electrodes	φ3 —φ12							◎	○	B165	B351
	For Difficult-to-cut Materials	3 4	VC	VC-MH	End mill, Medium cut length, 3—4 flute, High helix angle	φ3 —φ25	○	◎	○		◎	◎			B149	B337
		3	—	C-MH	End mill, Medium cut length, 3 flute	φ6 —φ16	○	◎			○	○		○	B203	—
		4	VF	VF-MHV (NEW)	End mill, Medium cut length, Irregular helix flutes	φ6 —φ20	○	○	○		◎	◎			B079	B309
		6	VC	VC-6MH	End mill, Medium cut length, 6 flute, High helix angle	φ6 —φ25	◎	◎	○		◎	◎			B150	B338
		8	VC	VC-8MH	End mill, Medium cut length, 8 flute, High helix angle	φ20 —φ25	◎	◎	○		◎	◎			B151	B338
	For Machining of Aluminium Alloys	2	DLC	DLC-2MA	Slot drill, Medium cut length, 2 flute	φ1 —φ20	GFRP, CFRP Suitable for graphite						○	◎	B174	B357
			—	C-2MA	End mill, Medium cut length, 2 flute, For aluminium alloy	φ1 —φ20								◎	B197	B366
			—	C-2LA	End mill, Long cut length, 2 flute, For aluminium alloy	φ1 —φ20								◎	B198	B366
			—	C-2MHA (NEW)	End mill, Medium cut length, 2 flute, For aluminium alloy	φ3 —φ25								◎	B206	B369
			—	C-2SA (NEW)	End mill, Short cut length, 2 flute, For aluminium alloy	φ3 —φ20							○	◎	B204	B369
			—	SEG2SA	End mill, Short cut length, 2 flute, Irregular spiral helix angle, For aluminium alloy	φ6 —φ25							○	◎	B215	B375
		3	—	C-3SA (NEW)	End mill, Short cut length, 3 flute, For aluminium alloy	φ10 —φ26							○	◎	B205	B370
		4	—	SEG4SA	End mill, Medium cut length, 4 flute, Irregular spiral helix angle, For aluminium alloy	φ6 —φ25							○	◎	B216	B375

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
SQUARE	For Small Automatic Lathes	2	MS	MS2ES	End mill, 2 flute, For small automatic lathes	ϕ3 –ϕ12	◎	◎	○		○	○			B040	B296
		3	MS	MS3ES	End mill, 3 flute, For small automatic lathes	ϕ3 –ϕ12	◎	◎	○		○	○			B041	B296
		4	MS	MS4EC	End mill, 4 flute, For small automatic lathes	ϕ3 –ϕ14	◎	◎	○		○	○			B042	B296
	For Key Way Slotting	2	MS	SED2KPG	End mill, Medium cut length, 2 flute, + Tolerance	ϕ2 –ϕ16	◎	◎			○	○			B186	B363
			MS	SED2KMG	End mill, Medium cut length, 2 flute, - Tolerance	ϕ2 –ϕ16	◎	◎			○	○			B187	B363
	Brazing		VC	VJ-2MS	End mill, Medium cut length, 2 flute	ϕ20 –ϕ50	◎	◎	◎	○	○	○			B160	B350
		4	VC	VJ-4MS	End mill, Medium cut length, 4 flute	ϕ20 –ϕ50	◎	◎	◎	○	○	○			B161	B350
	For Non-ferrous Metals	2	DC	DC-2MS-3	Medium cut length, 2 flute, 3mm shank, For non-ferrous metals	ϕ0.5 –ϕ3	GFRP, CFRP Suitable for graphite							○	B176	B359
LONG NECK SQUARE	For Rib Milling	2	MS	MS2XL	End mill, Short cut length, 2 flute, Long neck	ϕ0.2 –ϕ6	◎	◎	○		○	○			B024	B288
			MS	MS2XL6	End mill, Short cut length, 2 flute, 6mm shank	ϕ0.3 –ϕ2.5	◎	◎	○		○	○			B027	B289
		4	MS	MS4XL	End mill, Short cut length, 4 flute, Long neck	ϕ1 –ϕ10	◎	◎	○		○	○			B037	B295
		2	VC	VC-2XL	End mill, Medium cut length, 2 flute, Long neck	ϕ0.8 –ϕ3	◎	◎	○		○	○			B110	B326
	For Rib Milling of Hardened Steels		VF	VF-2XL NEW	End mill, 2 flute, Long neck	ϕ0.1 –ϕ3	○	◎	◎	◎					B077	B307
	For Rib Milling of Copper Alloys		CRN	CRN-2XL	End mill, Medium cut length, 2 flute, Long neck, For copper electrodes	ϕ0.2 –ϕ6							◎	○	B163	B352
BALL	For Profiling		MS	MS2SB	Ball nose end mill, Short cut length, 2 flute	R0.1 –R6	◎	◎	○		○	○			B043	B297
			MS	MS2MB	Ball nose end mill, Medium cut length, 2 flute	R0.25 –R6	◎	◎	○		○	○			B044	B297
	For Precision Profiling		MS	BZD2SG	Ball nose end mill, Medium cut length, 2 flute	R0.2 –R12.5	○	◎	○		○	○			B188	B364
	For Profiling		VC	VC-2ESB	Ball nose, Extra short cut length, 2 flute, Short shank	R0.15 –R6	○	◎	◎	○	○	○			B114	B331

CARBIDE

END MILLS SELECTION CHART CEMENTED CARBIDE

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
BALL	For Profiling	2	VC	VC-2SSB	Ball nose, Short cut length, 2 flute, Short shank	R0.5 –R6	○	◎	◎	○	○	○			B115	B331
			VC	VC-2MB	Ball nose end mill, Medium cut length, 2 flute	R0.2 –R12.5	○	◎	◎	○	○	○			B119	B331
			—	C-2MB	Ball nose end mill, Medium cut length, 2 flute	R0.5 –R10	◎	○			○	○	○	○	B202	B368
	For High Efficiency Profiling	3	VC	VC-3MB	Ball nose end mill, Medium cut length, 3 flute	R1 –R10	○	◎	◎	○	○	○			B128	B341
	For Profiling Strong Geometry Type	2	VF	VF-2SDB (NEW)	Ball nose, Short cut length, 2 flute, Strong geometry type	R0.5 –R10	○	◎	◎	○					B087	B314
			VC	VC-2MDB	Ball nose, Medium cut length, 2 flute, Strong geometry type	R1.5 –R12.5	○	◎	◎	○	○	○			B122	B331
	For Profiling of Hardened Steels		VF	VF-2SSB	Ball nose, Short cut length, 2 flute, Short shank	R0.5 –R6	○	◎	◎	◎	○	○			B085	B313
			VF	VF-2SB	Ball nose, Short cut length, 2 flute, For hardened materials	R0.1 –R10	○	◎	◎	◎	○	○			B086	B313
			VC	VC-2SB	Ball nose end mill, Short cut length, 2 flute, Relieved neck	R0.15 –R10	○	◎	◎	◎	○	○			B116	B329
		4	VF	VF-4MB (NEW)	Ball nose, Medium cut length, 4 flute	R0.5 –R6		◎	◎	◎	○	○			B098	B319
			VC	VC-4MB	Ball nose end mill, Medium cut length, 4 flute	R0.5 –R10	○	◎	◎	◎	○	○			B130	B342
	For Precision Profiling	2	VC	VC-2PSB	Ball nose end mill, Short cut length, 2 flute, High precision	R0.05 –R6	◎	◎	◎		○	○			B117	B330
			VC	VC-2PSB-P	Ball nose end mill, Short cut length, 2 flute, Ultra high precision	R0.02 –R6	◎	◎	◎		○	○			B118	B330
	For Profiling of Special Geometry		VF	VF-2WB (NEW)	Wide ball nose, Medium cut length, 2 flute	R1 –R3	○	◎	○		◎	◎			B084	B312
	Through Coolant For Profiling		VC	VC-2MB-OH	Ball nose end mill, Medium cut length, 2 flute, Through coolant holes	R3 –R8	○	◎	◎	○	○	○			B121	B331
	Long Shank		VC	VC-2LB	Ball nose end mill, Medium cut length, 2 flute, Long shank	R1 –R12.5	○	◎	◎	○	○	○			B123	—
		3	VC	VC-3LB	Ball nose, Medium cut length, 3 flute, Long shank	R2 –R10	○	◎	◎	○	○	○			B129	—
		2	VF	VF-2SDBL (NEW)	Ball nose, Short cut length, 2 flute, Strong geometry type, Long shank	R0.5 –R10	○	◎	◎	○					B088	B314

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material: P – Carbon Steel, Alloy Steel, Cast Iron	P – Tool steel, Pre-Hardened Steel, Hardened Steel	H – Hardened Steel(~55HRC)	H – Hardened Steel(55HRC~)	M – Austenitic Stainless Steel	S – Titanium Alloy, Heat Resistant Alloy	N – Copper Alloy	N – Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
BALL	Slim Shank	2	VC	VC-2MB-SS	Ball nose end mill, Medium cut length, 2 flute, Slim shank	R3 –R6	○	◎	◎	○	○	○			B120	—
	Taper Neck	3	VF	VF-3XB (NEW)	Ball nose, Medium cut length, 3 flute, Taper neck	R0.4 –R2.5	○	◎	◎	◎	○	○			B095	B317
		2	MS	MS2XB	Ball nose end mill, 2 flute, Taper neck	R0.1 –R2	◎	◎	○		○	○			B051	B299
			VC	VC-XB	Ball nose taper end mill, Medium cut length, Taper neck	R0.5 –R6	○	◎	◎	○	○	○			B126	B333
	For Profiling of Copper Alloys		CRN	CRN-2MB	Ball nose, Medium cut length, 2 flute, For copper electrodes	R0.2 –R6							◎	○	B166	B353
	For Profiling of Aluminium Alloys		DLC	DLC-2MB	Ball nose, Medium cut length, 2 flute	R0.1 –R10	GFRP, CFRP Suitable for graphite						○	◎	B175	B358
	For Profiling of Non-ferrous Metals		DC	DC-2MB-NF	Ball nose, Medium cut length, 2 flute, For non-ferrous metals	R0.3 –R6							◎	○	B177	B360
	For Profiling of Graphite		DC	DC-2MB	Ball nose, Medium cut length, 2 flute, For graphite	R0.5 –R6	Also suitable for GFRP and CFRP								B178	B359
			DC	DC-2LB	Ball nose, Long cut length, 2 flute, For graphite	R1 –R6									B179	B359
			DC	DC-XB	Ball nose, Medium cut length, 2 flute, Taper neck, For graphite	R0.2 –R3									B181	B361
LONG NECK BALL	For Deep Profiling		MS	MS2XLB	Ball nose end mill, Short cut length, 2 flute, Long neck	R0.1 –R3	◎	◎	○		○	○			B045	B298
			VC	VC-2XLB	Ball nose end mill, Medium cut length, 2 flute, Long neck	R0.3 –R3	○	◎	◎	○	○	○			B124	B332
			VC	VC-2XLB-6	Ball nose, Medium cut length, 2 flute, Long neck, 6mm shank	R0.3 –R1.25	○	◎	◎	○	○	○			B125	B332
	For Deep Profiling of Hardened Steels		VF	VF-2XLBS (NEW)	Ball nose, Medium cut length, 2 flute, Short shank	R0.2 –R1	○	◎	◎	◎		○			B089	B316
			VF	VF-2XLB	Ball nose, Long cut length, 2 flute, For hardened materials	R0.1 –R3	○	◎	◎	◎		○			B090	B316
	For Deep Profiling of Copper Alloys		CRN	CRN-2XLB	Ball nose, Medium cut length, 2 flute, Long neck, For copper electrodes	R0.1 –R3							◎	○	B167	B354
	For Profiling of Graphite		DC	DC-2XLB	Ball nose, Medium cut length, 2 flute, Long neck, For graphite	R0.2 –R3	Also suitable for GFRP and CFRP								B180	B361
RADIUS	For Corner Radius		MS	MS2MRB	Corner radius end mill, Medium cut length, 2 flute	ϕ1 –ϕ12	◎	◎	○		○	○			B055	B284

CARBIDE

END MILLS SELECTION CHART CEMENTED CARBIDE

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number Dimensions	Page Number Cutting Conditions
RADIUS	For Corner Radius	2	VC	VC-2JRB	Corner radius end mill, Semi long cut length, 2 flute	φ3 –φ20	○	◎	◎	○	○	○			B136	B325
		4	MS	MS4MRB	Corner radius end mill, Medium cut length, 4 flute	φ3 –φ20	◎	◎	○		○	○			B058	B301
			VC	VC-4SRB	Corner radius end mill, Short cut length, 4 flute	φ4 –φ12	○	◎	◎	○	○	○			B137	B327
			VC	VC-4JRB	Corner radius end mill, Semi long cut length, 4 flute	φ3 –φ20	○	◎	◎	○	○	○			B138	B328
			MS	MSMHDRB	High power, Corner radius, Medium cut length, 4 flute	φ2 –φ20	◎	◎	◎		◎	◎			B060	B302
			VC	VC-MHDRB	Corner radius end mill, Medium cut length, 4 flute, High helix angle	φ2 –φ25	○	◎	◎	○	◎	◎			B147	B334
	For Corner Radius Machining of Hardened Steels	6	VF	VF-5DRB	Corner radius, Extra short cut length, For hardened materials	φ3 –φ12	○	◎	◎	◎					B101	B322
			VF	VF-MDRB	Corner radius, Medium cut length, 6 flute, For hardened materials	φ3 –φ20	○	◎	◎	◎					B102	B322
			VC	VC-5DRB	Corner radius end mill, Short cut length	φ6 –φ12	○	◎	◎	◎					B145	B335
			VC	VC-MDRB	Corner radius end mill, Medium cut length	φ3 –φ22	○	◎	◎	◎					B146	B335
	For Precision Profiling	2 4	VC	VC-PSRB	Corner radius end mill, Short cut length, 2–4 flute, High precision	φ0.6 –φ12	◎	◎	◎	◎	○	○			B131	B347
	For High Feed Machining	4	VC	VC-HFRB	Corner radius, Short flute length, 4 flute, High feed machining	φ2 –φ16	◎	◎	◎	○		○			B139	B349
	For Corner Radius Machining of Copper Alloys	2	CRN	CRN-2MRB	Corner radius, Medium cut length, 2 flute, For copper electrodes	φ6 –φ12							◎	○	B170	B355
	For Difficult-to-cut Materials	4	VF	VF-MHVRB NEW	Corner radius, Medium cut length, Irregular helix flutes	φ6 –φ20	◎	○	○		◎	◎			B099	B320
		6	VF	VF-6MHVRB NEW	Corner radius, Medium cut length, 6 flute, Irregular helix flutes	φ6 –φ20	○	○	○		◎	◎			B100	B321
	For Corner Radius Machining of Aluminium Alloys	3	–	C-3SARB NEW	Corner radius, Short cut length, 3 flute, For aluminium alloy	φ12 –φ25							○	◎	B209	B370
LONG NECK CORNER RADIUS	For Profiling and Corner Radius Machining	2	MS	MS2XLRB	Corner radius end mill, Short cut length, 2 flute, Long neck	φ1 –φ6	◎	◎	○		○	○			B057	B300
	For Profiling and Corner Radius Machining of Copper Alloy		CRN	CRN-2XLRB	Corner radius, Medium cut length, 2 flute, For copper electrodes	φ0.5 –φ6							◎	○	B171	B356

SOLID END MILLS

END MILLS SELECTION CHART

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	Work Material P: Tool steel, Pre-Hardened Steel, Hardened Steel	Work Material H: Hardened Steel(-55HRC)	Work Material H: Hardened Steel(55HRC-)	Work Material M: Austenitic Stainless Steel	Work Material S: Titanium Alloy, Heat Resistant Alloy	Work Material N: Copper Alloy	Work Material N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
RIB TAPER	For Rib Milling	4	MS	MS4LT	Taper end mill, Long cut length, 4 flute	ϕ0.2 −ϕ3	◎	◎	○		○				B066	B304
RIB TAPER BALL NOSE	For Rib Milling	4	MS	MS4LTB	Ball nose, 4 flute, Taper, For rib milling	R0.3 −R1	◎	◎	○		○	○			B072	B305
TAPER	For Angled Face Machining	2	MS	MS2MT	Taper end mill, Medium cut length, 2 flute	ϕ0.2 −ϕ10	◎	◎	○		○	○			B062	B303
TAPER	For Angled Face Machining	2	VC	VC-2MT	Taper end mill, Medium cut length, 2 flute	ϕ1 −ϕ2.5	○	◎	◎	○	○	○			B153	B340
TAPER	For Angled Face Machining	4	VC	VC-4MT	Taper end mill, Medium cut length, 4 flute	ϕ3 −ϕ10	○	◎	◎	○	○	○			B154	B340
TAPER BALL	For Profiling and Angled Face Machining	2	MS	MS2MTB	Ball nose taper end mill, Medium cut length, 2 flute	R0.2 −R1.5	◎	◎	○		○	○			B075	B297
TAPER BALL	For Profiling and Angled Face Machining	4	VC	VC-4STB	Ball nose taper end mill, Short cut length, 4 flute	R0.3 −R4	○	◎	◎	◎	○	○			B156	B343
ROUGHING	For Roughing	3 4	VF	VF-5FPR (NEW)	Roughing end mill, Short cut length, 3−4 flute	ϕ3 −ϕ20	◎	◎	○		◎	◎			B082	B310
ROUGHING	For Roughing	4	VF	VF-MFPR (NEW)	Roughing end mill, Medium cut length, 4 flute	ϕ5 −ϕ20	◎	◎	○		◎	◎			B083	B311
ROUGHING	For Roughing	3 4	VC	VC-5FPR	Roughing end mill, Short cut length, 3−4 flute	ϕ3 −ϕ20	◎	◎	○		◎	◎			B152	B339
ROUGHING	For Roughing of Aluminium Alloys	3	—	C-5RA	Roughing end mill, Short cut length, 3 flute, For aluminium alloy	ϕ10 −ϕ25								◎	B207	B371
ROUGHING	For Roughing of Aluminium Alloys	3	—	C-MRA	Roughing end mill, Medium cut length, 3 flute, For aluminium alloy	ϕ3 −ϕ25								◎	B208	B372

END MILLS SELECTION CHART CEMENTED CARBIDE

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
ROUGHING	For Roughing of Aluminium Alloys	3	—	C-5RARB	Corner radius roughing end mill, Short cut length, 3 flute, For aluminium alloy	ϕ10 −ϕ25								◎	B210	B371
CHAMFERING	For Chamfering	2	VC	VC-2C	Chamfer cutter, 2 flute	ϕ2 −ϕ12	◎	◎	◎	○	◎	◎	○	○	B158	B345
CORNER RADIUS	For Radius Chamfering	3	VC	VC-RC NEW	Corner rounding cutter, 3 flute	R0.5 −R5	◎	◎	◎	○	○	○	○	○	B159	B346

END MILLS SELECTION CHART CBN/PCD

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
LONG NECK BALL	For High Precision Finishing	2	—	CBN-2XLB	Ball nose, Short cut length, 2 flute, Long neck	R0.2 −R1	○	◎	◎	◎					B182	B362
LONG NECK CORNER RADIUS	For Precision Profiling		—	CBN-2XLRB NEW	Corner radius end mill, Medium cut length, 2 flute, Long neck	ϕ0.5 −ϕ2	○	◎	◎	◎					B183	B362
BALL	For Profiling of Hardened Steels	1 2	—	BEM	Ball nose, Sintered CBN	R3 −R15			◎	◎					B185	B185
SQUARE	For Machining of Hardened Steels	1	—	GBE	End mill, 1 flute, Brazed type (CBN)	ϕ6 −ϕ12		○	◎	◎					B184	B184
	For Machining of Aluminium Alloys		—	GDE	End mill, 1 flute, Brazed type (PCD)	ϕ6 −ϕ12								◎	B184	B184

END MILLS SELECTION CHART HSS

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
SQUARE	General Use	2	V	VA-2SS	End mill, Short cut length, 2 flute	ϕ3 −ϕ20	◎	○			○	○			B217	B376
			V	VA-2MS	End mill, Medium cut length, 2 flute	ϕ3 −ϕ40	◎	○			○	○			B218	B376
			G	G-2SS	End mill, Short cut length, 2 flute	ϕ1 −ϕ20	◎	○			○	○		○	B228	B385
			G	G-2MS	End mill, Medium cut length, 2 flute	ϕ1 −ϕ40	◎	○			○	○		○	B238	B385
			—	S-2MD	End mill, Short cut length, 2 flute, KHA Super	ϕ0.4 −ϕ50	◎	○			○	○		○	B234	B386
			—	S-2JS	End mill, Semi long cut length, 2 flute, KHA Super	ϕ3 −ϕ40	◎	○			○	○		○	B242	B386
			—	2SS	End mill, Short cut length, 2 flute	ϕ0.5 −ϕ20	◎	○			○	○		○	B229	B384
			—	2MS	End mill, Medium cut length, 2 flute	ϕ1 −ϕ60	◎	○			○	○		○	B240	B387
			—	2LS	End mill, Long cut length, 2 flute	ϕ1 −ϕ40	◎	○			○	○		○	B243	B387
	For Key Way Slotting		—	2MK	End mill, Short cut length, 2 flute, For key ways	ϕ3 −ϕ20	◎	○			○			○	B245	—
	General Use	3	—	3MS	End mill, Medium cut length, 3 flute	ϕ3 −ϕ40	◎	○			○	○		○	B248	B388
		4	V	VA-4MC	End mill, Medium cut length, 4 flute	ϕ3 −ϕ30	◎	○			○	○			B219	B377
			G	G-4MC	End mill, Medium cut length, 4 flute	ϕ3 −ϕ30	◎	○			○	○		○	B251	B390
			G	G-4LC	End mill, Long cut length, 4 flute, Center cutting	ϕ3 −ϕ40	◎	○			○	○		○	B255	B390
			—	S-4MD	End mill, Medium cut length, 4 flute	ϕ2.5 −ϕ50	◎	○			○	○		○	B249	B389
			—	S-4JC	End mill, Semi long cut length, 4 flute	ϕ3 −ϕ40	◎	○			○	○		○	B254	B389
			—	4MC	End mill, Medium cut length, 4 flute, Center cutting	ϕ2.5 −ϕ40	◎	○			○	○		○	B252	B391
			—	4LC	End mill, Long cut length, 4 flute, Center cutting	ϕ3 −ϕ40	◎	○			○	○		○	B256	B391

HSS

END MILLS SELECTION CHART HSS

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	P: Tool steel, Pre-Hardened Steel, Hardened Steel	H: Hardened Steel(-55HRC)	H: Hardened Steel(55HRC-)	M: Austenitic Stainless Steel	S: Titanium Alloy, Heat Resistant Alloy	N: Copper Alloy	N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
SQUARE	For Difficult-to-cut Materials	2 3 4	V	VA-MH	End mill, Medium cut length, 2—4 flute	ϕ5 —ϕ30	◎	○			◎	○			B226	B383
			V	VA-LH	End mill, Long cut length, 2—4 flute, High helix	ϕ5 —ϕ30	◎	○			◎	○			B227	—
			—	K-MH	End mill, Medium cut length, 2—4 flute, High helix angle	ϕ5 —ϕ30	◎	○			○	○	○	○	B270	B398
		3 4	—	K-LH	End mill, Long cut length, 3—4 flute, High helix angle	ϕ6 —ϕ30	◎	○			○	○	○	○	B271	B398
	For Machining of Aluminium Sashes	1	—	1MA	End mill, Medium cut length, 1 flute	ϕ3 —ϕ8								◎	B272	—
			—	1LA	End mill, Long cut length, 1 flute	ϕ4 —ϕ12								◎	B273	—
	For Machining of Aluminium Alloys	2	—	S-2SDA	End mill, Short cut length, 2 flute, For aluminium alloy	ϕ3 —ϕ20							○	◎	B274	B398
			—	2MA	End mill, Medium cut length, 2 flute, For light alloy	ϕ3 —ϕ20							○	◎	B275	—
	For Deep Slotting		—	2ML	End mill, Medium cut length, 2 flute, Long shank	ϕ12 —ϕ35	◎	○			○	○	○	○	B277	—
		4	—	4ML	End mill, Medium cut length, 4 flute, Long shank	ϕ12 —ϕ35	◎	○			○	○	○	○	B278	—
			—	4SX	End mill, Long cut length, 4 flute	ϕ3 —ϕ50	◎	○			○	○		○	B279	—
			—	4MX	End mill, Extra long cut length, 4 flute	ϕ20 —ϕ50	◎	○			○	○		○	B280	—
LONG NECK SQUARE		2	—	K-2XL	End mill, Short cut length, 2 flute, Long neck	ϕ3 —ϕ10	◎	○			○	○	○	○	B276	—
BALL	For Profiling		V	VA-2MB	Ball nose end mill, Medium cut length, 2 flute	R6 —R15	◎	○			◎	○			B220	B378
			—	S-2MB	Ball nose end mill, Medium cut length, 2 flute	R0.5 —R25	◎	○			○	○		○	B257	B392
			—	2FB	Ball nose end mill, Medium cut length, 2 flute	R0.5 —R16	◎	○			○	○		○	B258	B393
		4	—	K-4MB	Ball nose end mill, Medium cut length, 4 flute	R3 —R20	◎	○			○	○		○	B259	B394
ROUGHING BALL NOSE	For Rough Profiling		—	MRB	Ball nose roughing end mill, Medium cut length, 4 flute	R4 —R25	◎	○			○	○		○	B266	—

Type	Applications, Features	No. of Flutes	Coating	Product Code	Shape	Size Range	Work Material P: Carbon Steel, Alloy Steel, Cast Iron	Work Material P: Tool steel, Pre-Hardened Steel, Hardened Steel	Work Material H: Hardened Steel(-55HRC)	Work Material H: Hardened Steel(55HRC-)	Work Material M: Austenitic Stainless Steel	Work Material S: Titanium Alloy, Heat Resistant Alloy	Work Material N: Copper Alloy	Work Material N: Aluminium Alloy	Page Number: Dimensions	Page Number: Cutting Conditions
RADIUS	General Use	2	—	RB	Corner radius end mill, Medium cut length, 2 flute	ϕ6 −ϕ32	◎	○			○	○		○	B281	—
ROUGHING	For Roughing	4 5 6	V	VA-SFPR	Roughing end mill, Short cut length, 4−6 flute, Fine pitch form	ϕ5 −ϕ50	◎	○			◎	○			B221	B379
			V	VA-MFPR	Roughing end mill, Medium cut length, 4−6 flute, Fine pitch form	ϕ5 −ϕ50	◎	○			◎	○			B222	B380
			V	VA-MR	Roughing end mill, Medium cut length, 4−6 flute	ϕ5 −ϕ50	◎	○			◎	○			B223	B381
			V	VA-JR	Roughing end mill, Semi long cut length, 4−6 flute	ϕ10 −ϕ50	◎	○			◎	○			B224	B382
			V	VA-LR	Roughing end mill, Long cut length, 4−6 flute	ϕ10 −ϕ50	◎	○			◎	○			B225	B382
		3 4 6	G	G-SFPR	Roughing end mill, Short cut length, 3−6 flute, Fine pitch form	ϕ5 −ϕ50	◎	○			○	○		○	B261	B396
		4 5 6	G	G-MR	Roughing end mill, Medium cut length, 4−6 flute	ϕ5 −ϕ50	◎	○			○	○		○	B262	B396
			—	SR	Roughing end mill, Short cut length, 4−6 flute	ϕ10 −ϕ40	◎	○			○	○		○	B260	B395
			—	MR	Roughing end mill, Medium cut length, 4−6 flute	ϕ5 −ϕ50	◎	○			○	○		○	B263	B395
			—	JR	Roughing end mill, Semi long cut length, 4−6 flute	ϕ10 −ϕ50	◎	○			○	○		○	B264	B395
			—	LR	Roughing end mill, Long cut length, 4−6 flute	ϕ10 −ϕ50	◎	○			○	○		○	B265	B395
	For Semi-finishing	4 6	G	G-MSF	Semi finish end mill, Medium cut length, 4−6 flute	ϕ3 −ϕ50	◎	○			○	○		○	B267	B397
			—	MSF	Semi finish end mill, Medium cut length, 4−6 flute	ϕ3 −ϕ50	◎	○			○	○		○	B269	B397
SLOTTING	For Moulding	2	—	K-2SL	End mill, Long cut length, 2 flute, Straight flute geometry	ϕ2 −ϕ20	○	○			○			○	B247	—
CORNER RADIUS	For Radius Chamfering	3 4	—	RC	Corner radius cutter, 3−4 flute	R0.5 −R16	◎	○						○	B282	B399

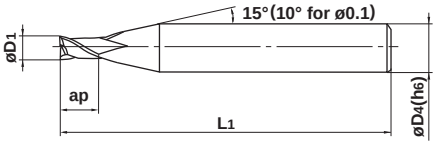
MS2SS

End mill, Short cut length, 2 flute

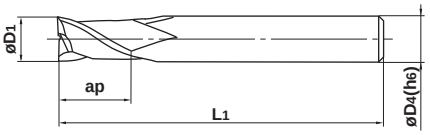
D1 = 0.1 0 −-0.010
D1 > 0.1 0 −-0.020

h6
4 ≤ D4 ≤ 6 0 −-0.008
8 ≤ D4 ≤ 10 0 −-0.009
D4 = 12 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

UWC MS 30°

D1<3

D1≥3

● 2 flute end mill for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2SSD0010	0.1	0.15	40	4	2	●	1
D0020	0.2	0.3	40	4	2	●	1
D0030	0.3	0.45	40	4	2	●	1
D0040	0.4	0.6	40	4	2	●	1
D0050	0.5	0.75	40	4	2	●	1
D0060	0.6	0.9	40	4	2	●	1
D0070	0.7	1.1	40	4	2	●	1
D0080	0.8	1.2	40	4	2	●	1
D0090	0.9	1.4	40	4	2	●	1
D0100	1	1.5	40	4	2	●	1
D0120	1.2	1.8	40	4	2	●	1
D0150	1.5	2.3	40	4	2	●	1
D0180	1.8	2.7	40	4	2	●	1
D0200	2	3	40	4	2	●	1
D0250	2.5	3.8	40	4	2	●	1
D0300	3	4.5	45	6	2	●	1
D0400	4	6	50	6	2	●	1
D0500	5	7.5	50	6	2	●	1
D0600	6	9	50	6	2	●	2
D0700	7	10.5	60	8	2	●	1
D0800	8	12	60	8	2	●	2
D0900	9	13.5	70	10	2	●	1
D1000	10	15	70	10	2	●	2
D1100	11	16.5	75	12	2	●	1
D1200	12	18	75	12	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B284

MS2MS

End mill, Medium cut length, 2 flute

D1≤12 0 -0.020
D1>12 0 -0.030

h6

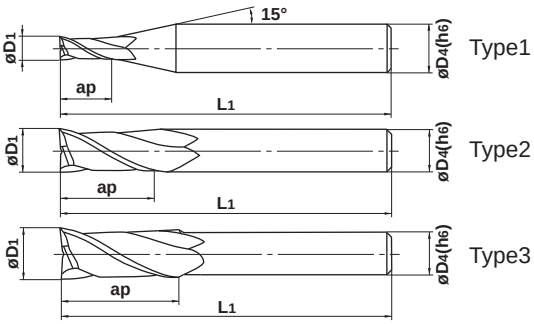
4≤D4≤6 0 -0.008
8≤D4≤10 0 -0.009
12≤D4≤16 0 -0.011
D4=20 0 -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		

UWC MS 30°

D1<3 D1≥3

● 2 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MSD0020	0.2	0.4	40	4	2	●	1
D0030	0.3	0.6	40	4	2	●	1
D0040	0.4	0.8	40	4	2	●	1
D0050	0.5	1	40	4	2	●	1
D0060	0.6	1.2	40	4	2	●	1
D0070	0.7	1.4	40	4	2	●	1
D0080	0.8	1.6	40	4	2	●	1
D0090	0.9	1.8	40	4	2	●	1
D0100	1	2	40	4	2	●	1
D0110	1.1	2.2	40	4	2	●	1
D0120	1.2	2.4	40	4	2	●	1
D0130	1.3	2.6	40	4	2	●	1
D0140	1.4	2.8	40	4	2	●	1
D0150	1.5	3	40	4	2	●	1
D0160	1.6	3.2	40	4	2	●	1
D0170	1.7	3.4	40	4	2	●	1
D0180	1.8	3.6	40	4	2	●	1
D0190	1.9	3.8	40	4	2	●	1
D0200	2	4	40	4	2	●	1
D0210	2.1	4.2	40	4	2	●	1
D0220	2.2	4.4	40	4	2	●	1
D0230	2.3	4.6	40	4	2	●	1
D0240	2.4	4.8	40	4	2	●	1
D0250	2.5	5	40	4	2	●	1
D0260	2.6	5.2	40	4	2	●	1
D0270	2.7	5.4	40	4	2	●	1
D0280	2.8	5.6	40	4	2	●	1
D0290	2.9	5.8	40	4	2	●	1
D0300	3	6	45	6	2	●	1
D0310	3.1	6.2	45	6	2	●	1
D0320	3.2	6.4	45	6	2	●	1
D0330	3.3	6.6	45	6	2	●	1
D0340	3.4	6.8	45	6	2	●	1
D0350	3.5	7	45	6	2	●	1
D0360	3.6	7.2	45	6	2	●	1
D0370	3.7	7.4	45	6	2	●	1
D0380	3.8	7.6	45	6	2	●	1
D0390	3.9	7.8	45	6	2	●	1

CUTTING CONDITIONS B284

MS2MS

End mill, Medium cut length, 2 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

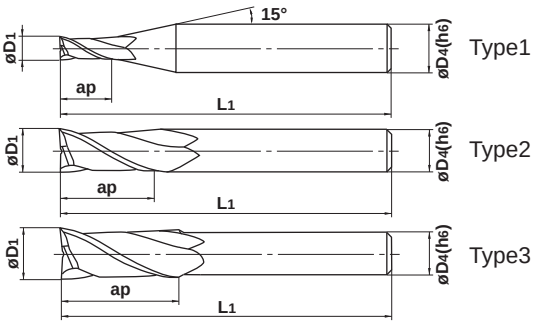
h6
4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		

UWC MS 30°

D1<3 D1≥3

● 2 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MSD0400	4	8	50	6	2	●	1
D0410	4.1	8.2	50	6	2	●	1
D0420	4.2	8.4	50	6	2	●	1
D0430	4.3	8.6	50	6	2	●	1
D0440	4.4	8.8	50	6	2	●	1
D0450	4.5	9	50	6	2	●	1
D0460	4.6	9.2	50	6	2	●	1
D0470	4.7	9.4	50	6	2	●	1
D0480	4.8	9.6	50	6	2	●	1
D0490	4.9	9.8	50	6	2	●	1
D0500	5	10	50	6	2	●	1
D0510	5.1	10.2	50	6	2	●	1
D0520	5.2	10.4	50	6	2	●	1
D0530	5.3	10.6	50	6	2	●	1
D0540	5.4	10.8	50	6	2	●	1
D0550	5.5	11	50	6	2	●	1
D0560	5.6	11.2	50	6	2	●	1
D0570	5.7	11.4	50	6	2	●	1
D0580	5.8	11.6	50	6	2	●	1
D0590	5.9	11.8	50	6	2	●	1
D0600	6	12	50	6	2	●	2
D0650	6.5	13	60	8	2	●	1
D0700	7	14	60	8	2	●	1
D0750	7.5	15	60	8	2	●	1
D0800	8	16	60	8	2	●	2
D0850	8.5	17	70	10	2	●	1
D0900	9	18	70	10	2	●	1
D0950	9.5	19	70	10	2	●	1
D1000	10	20	70	10	2	●	2
D1100	11	22	75	12	2	●	1
D1200	12	24	75	12	2	●	2
D1600	16	32	90	16	2	●	2
D1800	18	36	90	16	2	●	3
D2000	20	40	100	20	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B284

MS2MD NEW

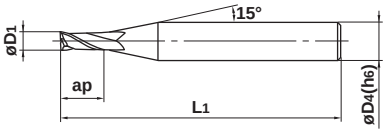
End mill, Medium cut length, 2 flute, Strong geometry type

0 −-0.020

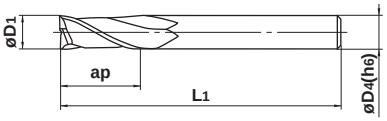
h6

4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
D4 = 12 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

UWC MS 30° D1<3 D1≥3

- Strong edge type, 2 flute end mill with high resistance to corner fracturing.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MDD0100	1	2.5	40	4	2	●	1
D0150	1.5	3.8	40	4	2	●	1
D0200	2	5	40	4	2	●	1
D0250	2.5	6.3	40	4	2	●	1
D0300	3	7.5	50	6	2	●	1
D0400	4	10	50	6	2	●	1
D0500	5	12.5	50	6	2	●	1
D0600	6	15	50	6	2	●	2
D0800	8	20	60	8	2	●	2
D1000	10	25	70	10	2	●	2
D1200	12	30	90	12	2	●	2

CUTTING CONDITIONS B285

MS2JS

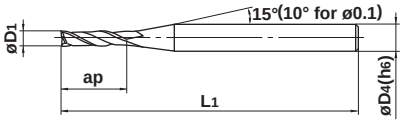
End mill, Semi long cut length, 2 flute

D1 = 0.1 0 −-0.010
D1 > 0.1 0 −-0.020

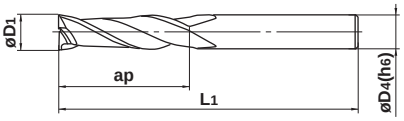
h6

4 ≤ D4 ≤ 6 0 −-0.008
8 ≤ D4 ≤ 10 0 −-0.009
D4 = 12 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

● 2 flute end mill for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2JSD0010	0.1	0.3	40	4	2	●	1
D0020	0.2	0.6	40	4	2	●	1
D0030	0.3	0.9	40	4	2	●	1
D0040	0.4	1.2	40	4	2	●	1
D0050	0.5	1.5	40	4	2	●	1
D0060	0.6	1.8	40	4	2	●	1
D0070	0.7	2.1	40	4	2	●	1
D0080	0.8	2.4	40	4	2	●	1
D0090	0.9	2.7	40	4	2	●	1
D0100	1	3	40	4	2	●	1
D0120	1.2	3.6	40	4	2	●	1
D0150	1.5	4.5	40	4	2	●	1
D0180	1.8	5.4	40	4	2	●	1
D0200	2	6	40	4	2	●	1
D0250	2.5	7.5	40	4	2	●	1
D0300	3	9	45	6	2	●	1
D0400	4	12	50	6	2	●	1
D0500	5	15	50	6	2	●	1
D0600	6	18	50	6	2	●	2
D0800	8	24	70	8	2	●	2
D1000	10	30	90	10	2	●	2
D1200	12	36	90	12	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B286

MS2LS

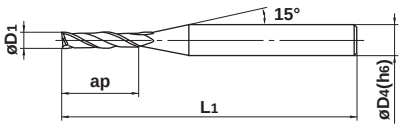
End mill, Long cut length, 2 flute

0 — -0.020

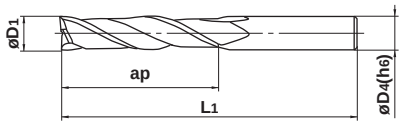
h6

4 ≤ D4 ≤ 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

● 2 flute end mill for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2LSD0020	0.2	0.8	40	4	2	●	1
D0030	0.3	1.2	40	4	2	●	1
D0040	0.4	1.6	40	4	2	●	1
D0050	0.5	2	40	4	2	●	1
D0060	0.6	2.4	40	4	2	●	1
D0070	0.7	2.8	40	4	2	●	1
D0080	0.8	3.2	40	4	2	●	1
D0090	0.9	3.6	40	4	2	●	1
D0100	1	4	40	4	2	●	1
D0150	1.5	6	40	4	2	●	1
D0200	2	8	40	4	2	●	1
D0250	2.5	10	50	4	2	●	1
D0300	3	12	50	6	2	●	1
D0400	4	16	50	6	2	●	1
D0500	5	20	60	6	2	●	1
D0600	6	24	60	6	2	●	2
D0800	8	32	70	8	2	●	2
D1000	10	40	90	10	2	●	2
D1200	12	48	110	12	2	●	2

CUTTING CONDITIONS B287

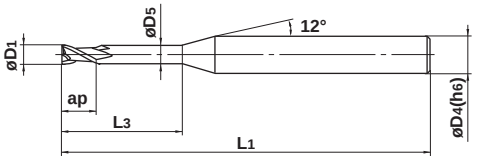
MS2XL

End mill, Short cut length, 2 flute, Long neck

D1<0.5 0 −-0.010
D1≥0.5 0 −-0.020

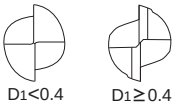
h6 4≤D4≤6 0 −-0.008

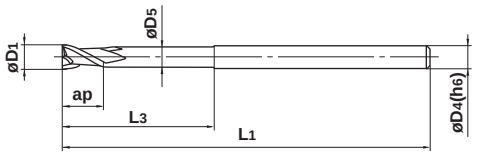
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1

UWC MS 30°





Type2

● 2 flute long neck end mill.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2XLD0020N005	0.2	0.3	0.5	0.18	45	4	2	●	1
D0020N010	0.2	0.3	1	0.18	45	4	2	●	1
D0020N015	0.2	0.3	1.5	0.18	45	4	2	●	1
D0030N010	0.3	0.4	1	0.28	45	4	2	●	1
D0030N020	0.3	0.4	2	0.28	45	4	2	●	1
D0030N030	0.3	0.4	3	0.28	45	4	2	●	1
D0030N060	0.3	0.4	6	0.28	45	4	2	●	1
D0030N090	0.3	0.4	9	0.28	45	4	2	●	1
D0040N020	0.4	0.6	2	0.37	45	4	2	●	1
D0040N030	0.4	0.6	3	0.37	45	4	2	●	1
D0040N040	0.4	0.6	4	0.37	45	4	2	●	1
D0040N080	0.4	0.6	8	0.37	45	4	2	●	1
D0040N120	0.4	0.6	12	0.37	45	4	2	●	1
D0050N020	0.5	0.7	2	0.46	45	4	2	●	1
D0050N040	0.5	0.7	4	0.46	45	4	2	●	1
D0050N060	0.5	0.7	6	0.46	45	4	2	●	1
D0050N080	0.5	0.7	8	0.46	50	4	2	●	1
D0050N100	0.5	0.7	10	0.46	50	4	2	●	1
D0050N150	0.5	0.7	15	0.46	50	4	2	●	1
D0060N020	0.6	0.9	2	0.56	45	4	2	●	1
D0060N040	0.6	0.9	4	0.56	45	4	2	●	1
D0060N060	0.6	0.9	6	0.56	45	4	2	●	1
D0060N080	0.6	0.9	8	0.56	50	4	2	●	1
D0060N100	0.6	0.9	10	0.56	50	4	2	●	1
D0060N120	0.6	0.9	12	0.56	50	4	2	●	1
D0060N180	0.6	0.9	18	0.56	50	4	2	●	1
D0070N020	0.7	1	2	0.66	45	4	2	●	1
D0070N040	0.7	1	4	0.66	45	4	2	●	1
D0070N060	0.7	1	6	0.66	45	4	2	●	1
D0070N080	0.7	1	8	0.66	50	4	2	●	1
D0070N100	0.7	1	10	0.66	50	4	2	●	1
D0080N040	0.8	1.2	4	0.76	45	4	2	●	1
D0080N060	0.8	1.2	6	0.76	45	4	2	●	1
D0080N080	0.8	1.2	8	0.76	50	4	2	●	1
D0080N100	0.8	1.2	10	0.76	50	4	2	●	1
D0080N120	0.8	1.2	12	0.76	50	4	2	●	1
D0080N160	0.8	1.2	16	0.76	50	4	2	●	1
D0080N240	0.8	1.2	24	0.76	60	4	2	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Neck Length L_3	Neck Dia. D_5	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS2XLD0090N060	0.9	1.4	6	0.86	45	4	2	●	1
D0090N080	0.9	1.4	8	0.86	50	4	2	●	1
D0090N100	0.9	1.4	10	0.86	50	4	2	●	1
D0090N150	0.9	1.4	15	0.86	60	4	2	●	1
D0100N040	1	1.5	4	0.95	50	4	2	●	1
D0100N060	1	1.5	6	0.95	50	4	2	●	1
D0100N080	1	1.5	8	0.95	50	4	2	●	1
D0100N100	1	1.5	10	0.95	50	4	2	●	1
D0100N120	1	1.5	12	0.95	50	4	2	●	1
D0100N160	1	1.5	16	0.95	60	4	2	●	1
D0100N200	1	1.5	20	0.95	60	4	2	●	1
D0100N250	1	1.5	25	0.95	70	4	2	●	1
D0100N300	1	1.5	30	0.95	70	4	2	●	1
D0120N060	1.2	1.8	6	1.15	50	4	2	●	1
D0120N080	1.2	1.8	8	1.15	50	4	2	●	1
D0120N100	1.2	1.8	10	1.15	50	4	2	●	1
D0120N120	1.2	1.8	12	1.15	50	4	2	●	1
D0120N160	1.2	1.8	16	1.15	60	4	2	●	1
D0120N200	1.2	1.8	20	1.15	60	4	2	●	1
D0150N060	1.5	2.3	6	1.45	50	4	2	●	1
D0150N080	1.5	2.3	8	1.45	50	4	2	●	1
D0150N100	1.5	2.3	10	1.45	50	4	2	●	1
D0150N120	1.5	2.3	12	1.45	50	4	2	●	1
D0150N140	1.5	2.3	14	1.45	60	4	2	●	1
D0150N160	1.5	2.3	16	1.45	60	4	2	●	1
D0150N180	1.5	2.3	18	1.45	60	4	2	●	1
D0150N200	1.5	2.3	20	1.45	60	4	2	●	1
D0150N250	1.5	2.3	25	1.45	70	4	2	●	1
D0150N300	1.5	2.3	30	1.45	70	4	2	●	1
D0150N380	1.5	2.3	38	1.45	80	4	2	●	1
D0150N450	1.5	2.3	45	1.45	80	4	2	●	1
D0200N060	2	3	6	1.94	50	4	2	●	1
D0200N080	2	3	8	1.94	50	4	2	●	1
D0200N100	2	3	10	1.94	50	4	2	●	1
D0200N120	2	3	12	1.94	50	4	2	●	1
D0200N140	2	3	14	1.94	60	4	2	●	1
D0200N160	2	3	16	1.94	60	4	2	●	1
D0200N180	2	3	18	1.94	60	4	2	●	1
D0200N200	2	3	20	1.94	60	4	2	●	1
D0200N250	2	3	25	1.94	70	4	2	●	1
D0200N300	2	3	30	1.94	70	4	2	●	1
D0200N350	2	3	35	1.94	80	4	2	●	1
D0200N400	2	3	40	1.94	90	4	2	●	1
D0200N500	2	3	50	1.94	100	4	2	●	1
D0200N600	2	3	60	1.94	110	4	2	●	1
D0250N080	2.5	3.7	8	2.4	50	4	2	●	1
D0250N120	2.5	3.7	12	2.4	50	4	2	●	1
D0250N160	2.5	3.7	16	2.4	60	4	2	●	1
D0250N200	2.5	3.7	20	2.4	60	4	2	●	1
D0250N250	2.5	3.7	25	2.4	70	4	2	●	1

CUTTING CONDITIONS
B288

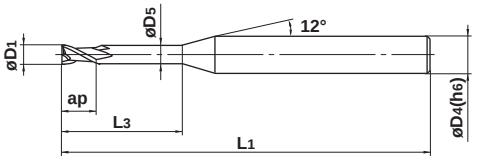
MS2XL

End mill, Short cut length, 2 flute, Long neck

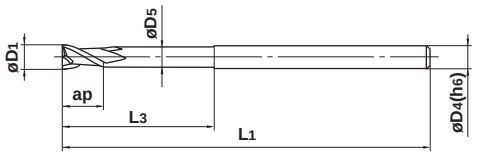
D1<0.5 0 −-0.010
D1≥0.5 0 −-0.020

h6 4≤D4≤6 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

UWC MS 30°

D1<0.4

D1≥0.4

● 2 flute long neck end mill.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2XLD0250N300	2.5	3.7	30	2.4	70	4	2	●	1
D0250N400	2.5	3.7	40	2.4	90	4	2	●	1
D0250N500	2.5	3.7	50	2.4	100	4	2	●	1
D0300N080	3	4.5	8	2.85	50	6	2	●	1
D0300N120	3	4.5	12	2.85	50	6	2	●	1
D0300N160	3	4.5	16	2.85	60	6	2	●	1
D0300N200	3	4.5	20	2.85	60	6	2	●	1
D0300N250	3	4.5	25	2.85	70	6	2	●	1
D0300N300	3	4.5	30	2.85	70	6	2	●	1
D0300N400	3	4.5	40	2.85	90	6	2	●	1
D0300N500	3	4.5	50	2.85	100	6	2	●	1
D0400N120	4	6	12	3.8	50	6	2	●	1
D0400N160	4	6	16	3.8	60	6	2	●	1
D0400N200	4	6	20	3.8	60	6	2	●	1
D0400N250	4	6	25	3.8	70	6	2	●	1
D0400N300	4	6	30	3.8	70	6	2	●	1
D0400N350	4	6	35	3.8	80	6	2	●	1
D0400N400	4	6	40	3.8	90	6	2	●	1
D0400N450	4	6	45	3.8	90	6	2	●	1
D0400N500	4	6	50	3.8	100	6	2	●	1
D0400N600	4	6	60	3.8	110	6	2	●	1
D0500N160	5	7.5	16	4.8	60	6	2	●	1
D0500N250	5	7.5	25	4.8	70	6	2	●	1
D0500N350	5	7.5	35	4.8	80	6	2	●	1
D0500N500	5	7.5	50	4.8	110	6	2	●	1
D0500N600	5	7.5	60	4.8	120	6	2	●	1
D0600N200	6	9	20	5.8	80	6	2	●	2
D0600N300	6	9	30	5.8	90	6	2	●	2
D0600N400	6	9	40	5.8	100	6	2	●	2
D0600N500	6	9	50	5.8	110	6	2	●	2
D0600N600	6	9	60	5.8	120	6	2	●	2

● : Inventory maintained in Japan.

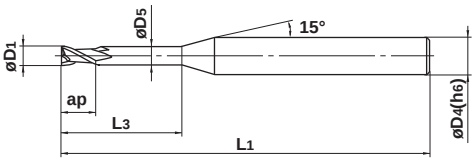
CUTTING CONDITIONS B288

MS2XL6

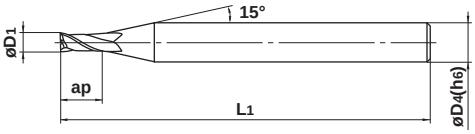
End mill, Short cut length, 2 flute, 6mm shank

0 — -0.020 | h6 | D4 = 6 | 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

UWC | MS | 30°

- 2 flute long neck end mill.
- ϕ6 shank type.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2XL6D0030N008	0.3	0.8	—	—	50	6	2	●	2
D0030N015	0.3	0.5	1.5	0.27	50	6	2	●	1
D0040N010	0.4	0.6	1	0.36	50	6	2	●	1
D0040N020	0.4	0.6	2	0.36	50	6	2	●	1
D0050N013	0.5	0.8	1.3	0.46	50	6	2	●	1
D0050N025	0.5	0.8	2.5	0.46	50	6	2	●	1
D0060N015	0.6	0.9	1.5	0.56	50	6	2	●	1
D0060N030	0.6	0.9	3	0.56	50	6	2	●	1
D0070N018	0.7	1.1	1.8	0.66	50	6	2	●	1
D0070N035	0.7	1.1	3.5	0.66	50	6	2	●	1
D0080N020	0.8	1.2	2	0.76	50	6	2	●	1
D0080N040	0.8	1.2	4	0.76	50	6	2	●	1
D0090N023	0.9	1.4	2.3	0.86	50	6	2	●	1
D0090N045	0.9	1.4	4.5	0.86	50	6	2	●	1
D0100N025	1	1.5	2.5	0.94	50	6	2	●	1
D0100N050	1	1.5	5	0.94	50	6	2	●	1
D0110N028	1.1	1.7	2.8	1.04	50	6	2	●	1
D0110N055	1.1	1.7	5.5	1.04	50	6	2	●	1
D0120N030	1.2	1.8	3	1.14	50	6	2	●	1
D0120N060	1.2	1.8	6	1.14	50	6	2	●	1
D0130N033	1.3	2	3.3	1.24	50	6	2	●	1
D0130N065	1.3	2	6.5	1.24	50	6	2	●	1
D0140N035	1.4	2.1	3.5	1.34	50	6	2	●	1
D0140N070	1.4	2.1	7	1.34	50	6	2	●	1
D0150N038	1.5	2.3	3.8	1.44	50	6	2	●	1
D0150N075	1.5	2.3	7.5	1.44	50	6	2	●	1
D0160N040	1.6	2.4	4	1.54	50	6	2	●	1
D0160N080	1.6	2.4	8	1.54	50	6	2	●	1
D0170N043	1.7	2.6	4.3	1.64	50	6	2	●	1
D0170N085	1.7	2.6	8.5	1.64	50	6	2	●	1
D0180N045	1.8	2.7	4.5	1.74	50	6	2	●	1
D0180N090	1.8	2.7	9	1.74	50	6	2	●	1
D0190N048	1.9	2.9	4.8	1.84	50	6	2	●	1
D0190N095	1.9	2.9	9.5	1.84	50	6	2	●	1
D0200N050	2	3	5	1.90	50	6	2	●	1
D0200N100	2	3	10	1.90	50	6	2	●	1
D0210N053	2.1	3.2	5.3	2.00	50	6	2	●	1
D0210N105	2.1	3.2	10.5	2.00	60	6	2	●	1

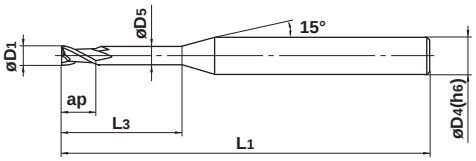
CUTTING CONDITIONS B289

MS2XL6

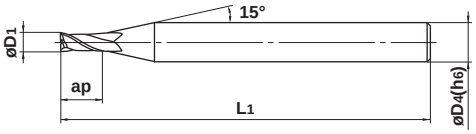
End mill, Short cut length, 2 flute, 6mm shank

0 — -0.020 h6 D4 = 6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

- 2 flute long neck end mill.
- φ6 shank type.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2XL6D0220N055	2.2	3.3	5.5	2.10	50	6	2	●	1
D0220N110	2.2	3.3	11	2.10	60	6	2	●	1
D0230N058	2.3	3.5	5.8	2.20	50	6	2	●	1
D0230N115	2.3	3.5	11.5	2.20	60	6	2	●	1
D0240N060	2.4	3.6	6	2.30	50	6	2	●	1
D0240N120	2.4	3.6	12	2.30	60	6	2	●	1
D0250N063	2.5	3.8	6.3	2.40	50	6	2	●	1
D0250N125	2.5	3.8	12.5	2.40	60	6	2	●	1

● : Inventory maintained in Japan.

CUTTING CONDITIONS B289

MSSHD

High power, Short cut length, 4 flute

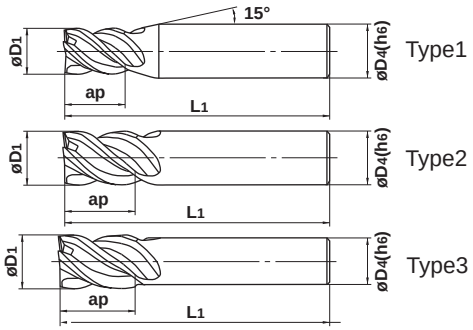
D1≤12	0 — -0.020
D1>12	0 — -0.030

h6

D4 = 6	0 — -0.008
8≤D4≤10	0 — -0.009
12≤D4≤16	0 — -0.011
D4 = 20	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	◎		

● 4 flute high power end mill.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSSHDD0300	3	4.5	45	6	4	●	1
D0350	3.5	5.3	45	6	4	●	1
D0400	4	6	45	6	4	●	1
D0450	4.5	6.8	45	6	4	●	1
D0500	5	7.5	50	6	4	●	1
D0550	5.5	8.3	50	6	4	●	1
D0600	6	9	50	6	4	●	2
D0650	6.5	9.8	60	8	4	●	1
D0700	7	10.5	60	8	4	●	1
D0750	7.5	11.3	60	8	4	●	1
D0800	8	12	60	8	4	●	2
D0850	8.5	12.8	70	10	4	●	1
D0900	9	13.5	70	10	4	●	1
D0950	9.5	14.3	70	10	4	●	1
D1000	10	15	70	10	4	●	2
D1100	11	16.5	75	12	4	●	1
D1200	12	18	75	12	4	●	2
D1300	13	19.5	75	12	4	●	3
D1400	14	21	90	16	4	●	1
D1500	15	22.5	90	16	4	●	1
D1600	16	24	90	16	4	●	2
D1700	17	25.5	100	16	4	●	3
D1800	18	27	100	16	4	●	3
D1900	19	28.5	110	20	4	●	1
D2000	20	30	110	20	4	●	2

MSMHD

High power, Medium cut length, 4 flute

D1≤12	0 — -0.020
D1>12	0 — -0.030

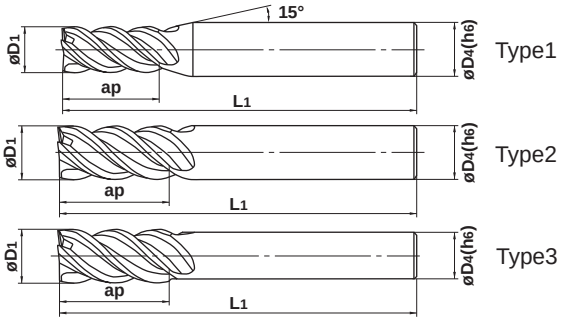
h6

4≤D4≤6	0 — -0.008
8≤D4≤10	0 — -0.009
12≤D4≤16	0 — -0.011
20≤D4≤25	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	◎		

UWC MS 45°

● 4 flute high power end mill.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSMHDD0200	2	4	45	4	4	●	1
D0210	2.1	5	45	4	4	●	1
D0220	2.2	5	45	4	4	●	1
D0230	2.3	5	45	4	4	●	1
D0240	2.4	5	45	4	4	●	1
D0250	2.5	5	45	4	4	●	1
D0260	2.6	6	45	4	4	●	1
D0270	2.7	6	45	4	4	●	1
D0280	2.8	6	45	4	4	●	1
D0290	2.9	6	45	4	4	●	1
D0300	3	8	45	6	4	●	1
D0310	3.1	8	45	6	4	●	1
D0320	3.2	8	45	6	4	●	1
D0330	3.3	8	45	6	4	●	1
D0340	3.4	8	45	6	4	●	1
D0350	3.5	8	45	6	4	●	1
D0360	3.6	11	45	6	4	●	1
D0370	3.7	11	45	6	4	●	1
D0380	3.8	11	45	6	4	●	1
D0390	3.9	11	45	6	4	●	1
D0400	4	11	45	6	4	●	1
D0410	4.1	12	45	6	4	●	1
D0420	4.2	12	45	6	4	●	1
D0430	4.3	12	45	6	4	●	1
D0440	4.4	12	45	6	4	●	1
D0450	4.5	12	45	6	4	●	1
D0460	4.6	13	50	6	4	●	1
D0470	4.7	13	50	6	4	●	1
D0480	4.8	13	50	6	4	●	1
D0490	4.9	13	50	6	4	●	1
D0500	5	13	50	6	4	●	1
D0510	5.1	13	50	6	4	●	1
D0520	5.2	13	50	6	4	●	1
D0530	5.3	13	50	6	4	●	1
D0540	5.4	13	50	6	4	●	1
D0550	5.5	13	50	6	4	●	1
D0560	5.6	13	50	6	4	●	1
D0570	5.7	13	50	6	4	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MSMHDD0580	5.8	13	50	6	4	●	1
D0590	5.9	13	50	6	4	●	1
D0600	6	13	50	6	4	●	2
D0650	6.5	16	60	8	4	●	1
D0700	7	19	60	8	4	●	1
D0750	7.5	19	60	8	4	●	1
D0800	8	19	60	8	4	●	2
D0850	8.5	19	70	10	4	●	1
D0900	9	22	70	10	4	●	1
D0950	9.5	22	70	10	4	●	1
D1000	10	22	70	10	4	●	2
D1100	11	26	75	12	4	●	1
D1200S10	12	26	75	10	4	●	3
D1200	12	26	75	12	4	●	2
D1300	13	26	75	12	4	●	3
D1400	14	30	90	16	4	●	1
D1500	15	35	90	16	4	●	1
D1600	16	35	90	16	4	●	2
D1700	17	35	100	16	4	●	3
D1800	18	40	100	16	4	●	3
D1900	19	40	110	20	4	●	1
D2000	20	45	110	20	4	●	2
D2200	22	50	125	20	4	●	3
D2500	25	55	125	25	4	●	2

CUTTING CONDITIONS B290

MSJHD

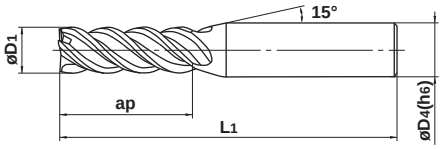
High power, Semi long cut length, 4 flute

D1≤12 0 — -0.020
D1>12 0 — -0.030

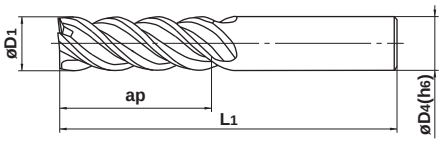
h6

D4 = 6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
D4 = 20 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	◎		



Type1



Type2

UWC MS 45°

● 4 flute high power end mill.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSJHDD0200	2	8	60	6	4	●	1
D0250	2.5	10	60	6	4	●	1
D0300	3	12	60	6	4	●	1
D0350	3.5	14	60	6	4	●	1
D0400	4	16	60	6	4	●	1
D0450	4.5	18	60	6	4	●	1
D0500	5	20	60	6	4	●	1
D0600	6	24	60	6	4	●	2
D0700	7	25	80	8	4	●	1
D0800	8	28	80	8	4	●	2
D0900	9	32	90	10	4	●	1
D1000	10	35	90	10	4	●	2
D1100	11	35	100	12	4	●	1
D1200	12	36	100	12	4	●	2
D1400	14	42	110	16	4	●	1
D1500	15	45	110	16	4	●	1
D1600	16	48	125	16	4	●	2
D2000	20	55	140	20	4	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B291

MSMHZD

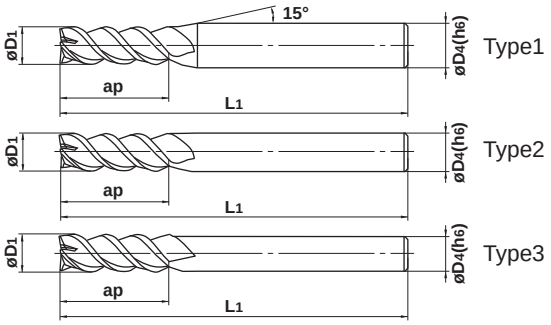
Slotting, Medium cut length, 3 flute

$D_1 \leq 12$	$0 -0.020$
$D_1 > 12$	$0 -0.030$

$4 \leq D_4 \leq 6$	$0 -0.008$
$8 \leq D_4 \leq 10$	$0 -0.009$
$12 \leq D_4 \leq 16$	$0 -0.011$
$D_4 = 20$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	○		

● A single end mill for both plunging and slotting.



Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MSMHZDD0100	1	2	45	4	3	●	1
D0150	1.5	3	45	4	3	●	1
D0200	2	4	50	6	3	●	1
D0250	2.5	5	50	6	3	●	1
D0300	3	6	50	6	3	●	1
D0350	3.5	8	50	6	3	●	1
D0400	4	8	50	6	3	●	1
D0450	4.5	10	50	6	3	●	1
D0500	5	10	50	6	3	●	1
D0550	5.5	13	50	6	3	●	1
D0600	6	13	60	6	3	●	2
D0650	6.5	16	60	8	3	●	1
D0700	7	16	60	8	3	●	1
D0750	7.5	16	60	8	3	●	1
D0800	8	19	70	8	3	●	2
D0850	8.5	19	70	10	3	●	1
D0900	9	19	70	10	3	●	1
D0950	9.5	19	70	10	3	●	1
D1000	10	22	80	10	3	●	2
D1100	11	22	80	12	3	●	1
D1200	12	26	90	12	3	●	2
D1300	13	26	90	12	3	●	3
D1400	14	26	90	12	3	●	3
D1500	15	26	110	16	3	●	1
D1600	16	30	110	16	3	●	2
D2000	20	32	140	20	3	●	2

CUTTING CONDITIONS B292

MS4SC

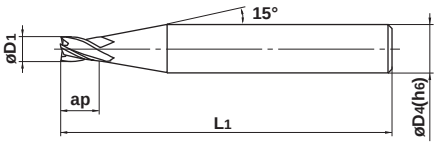
End mill, Short cut length, 4 flute

0 — -0.020

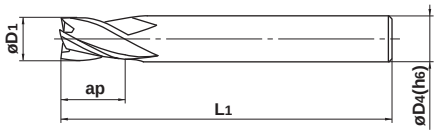
h6

4 ≤ D4 ≤ 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

● 4 flute end mill for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4SCD0100	1	1.5	40	4	4	●	1
D0150	1.5	2.3	40	4	4	●	1
D0200	2	3	40	4	4	●	1
D0250	2.5	3.8	40	4	4	●	1
D0300	3	4.5	50	6	4	●	1
D0400	4	6	50	6	4	●	1
D0500	5	7.5	50	6	4	●	1
D0600	6	9	50	6	4	●	2
D0800	8	12	60	8	4	●	2
D1000	10	15	70	10	4	●	2
D1200	12	18	75	12	4	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B293

MS4MC

End mill, Medium cut length, 4 flute

D1≤12	0 −-0.020
D1>12	0 −-0.030

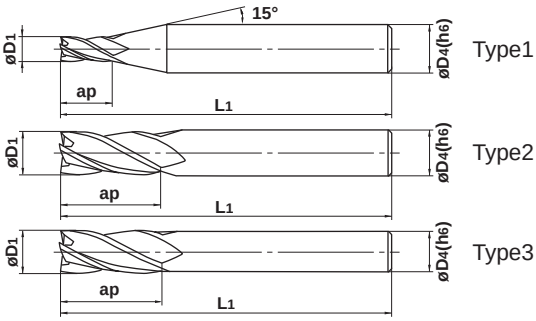
h6

4≤D4≤6	0 −-0.008
8≤D4≤10	0 −-0.009
12≤D4≤16	0 −-0.011
D4=20	0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		

UWC MS 30°

● 4 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4MCD0100	1	2.5	40	4	4	●	1
D0150	1.5	3.8	40	4	4	●	1
D0200	2	5	40	4	4	●	1
D0250	2.5	6.3	40	4	4	●	1
D0300	3	7.5	50	6	4	●	1
D0350	3.5	9	50	6	4	●	1
D0400	4	10	50	6	4	●	1
D0450	4.5	11.5	50	6	4	●	1
D0500	5	12.5	50	6	4	●	1
D0550	5.5	14	50	6	4	●	1
D0600	6	15	50	6	4	●	2
D0650	6.5	16.5	60	8	4	●	1
D0700	7	17.5	60	8	4	●	1
D0750	7.5	19	60	8	4	●	1
D0800	8	20	60	8	4	●	2
D0850	8.5	21.5	70	10	4	●	1
D0900	9	22.5	70	10	4	●	1
D0950	9.5	24	70	10	4	●	1
D1000	10	25	70	10	4	●	2
D1100	11	27.5	75	12	4	●	1
D1200	12	30	90	12	4	●	2
D1400	14	35	90	12	4	●	3
D1600	16	40	100	16	4	●	2
D1800	18	45	100	16	4	●	3
D2000	20	50	110	20	4	●	2

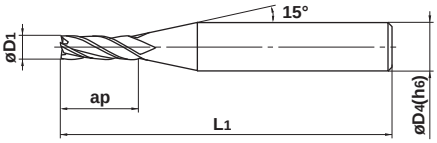
MS4JC

End mill, Semi long cut length, 4 flute

0 — -0.020

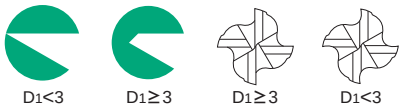
h6: 4≤D4≤6 0 — -0.008; 8≤D4≤10 0 — -0.009; D4 = 12 0 — -0.011

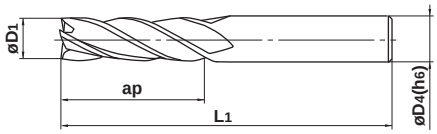
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1

UWC MS 30°





Type2

● 4 flute end mill for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4JCD0100	1	4	40	4	4	●	1
D0150	1.5	6	40	4	4	●	1
D0200	2	8	40	4	4	●	1
D0250	2.5	10	50	4	4	●	1
D0300	3	12	50	6	4	●	1
D0400	4	16	50	6	4	●	1
D0500	5	20	60	6	4	●	1
D0600	6	24	60	6	4	●	2
D0800	8	32	70	8	4	●	2
D1000	10	40	90	10	4	●	2
D1200	12	48	110	12	4	●	2

● : **Inventory maintained in Japan.**

CUTTING CONDITIONS B294

MS4XL

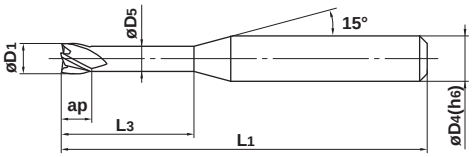
End mill, Short cut length, 4 flute, Long neck

0 – -0.020

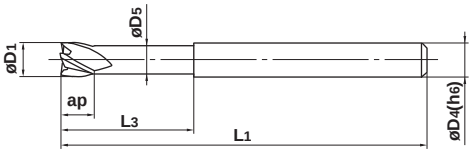
h6

4≤D4≤6 0 – -0.008
8≤D4≤10 0 – -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

● 4 flute long neck end mill.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4XLD0100N040	1	1	4	0.94	50	4	4	●	1
D0100N060	1	1	6	0.94	50	4	4	●	1
D0100N080	1	1	8	0.94	50	4	4	●	1
D0100N100	1	1	10	0.94	50	4	4	●	1
D0100N120	1	1	12	0.94	50	4	4	●	1
D0100N160	1	1	16	0.94	60	4	4	●	1
D0110N060	1.1	1.1	6	1.04	50	4	4	●	1
D0110N100	1.1	1.1	10	1.04	50	4	4	●	1
D0110N160	1.1	1.1	16	1.04	60	4	4	●	1
D0120N060	1.2	1.2	6	1.14	50	4	4	●	1
D0120N080	1.2	1.2	8	1.14	50	4	4	●	1
D0120N100	1.2	1.2	10	1.14	50	4	4	●	1
D0120N120	1.2	1.2	12	1.14	50	4	4	●	1
D0120N160	1.2	1.2	16	1.14	60	4	4	●	1
D0130N060	1.3	1.3	6	1.24	50	4	4	●	1
D0130N120	1.3	1.3	12	1.24	50	4	4	●	1
D0130N180	1.3	1.3	18	1.24	60	4	4	●	1
D0140N060	1.4	1.4	6	1.34	50	4	4	●	1
D0140N080	1.4	1.4	8	1.34	50	4	4	●	1
D0140N100	1.4	1.4	10	1.34	50	4	4	●	1
D0140N120	1.4	1.4	12	1.34	50	4	4	●	1
D0140N140	1.4	1.4	14	1.34	60	4	4	●	1
D0140N160	1.4	1.4	16	1.34	60	4	4	●	1
D0140N220	1.4	1.4	22	1.34	60	4	4	●	1
D0150N060	1.5	1.5	6	1.44	50	4	4	●	1
D0150N080	1.5	1.5	8	1.44	50	4	4	●	1
D0150N100	1.5	1.5	10	1.44	50	4	4	●	1
D0150N120	1.5	1.5	12	1.44	50	4	4	●	1
D0150N140	1.5	1.5	14	1.44	60	4	4	●	1
D0150N160	1.5	1.5	16	1.44	60	4	4	●	1
D0150N180	1.5	1.5	18	1.44	60	4	4	●	1
D0150N200	1.5	1.5	20	1.44	60	4	4	●	1
D0160N060	1.6	1.6	6	1.54	50	4	4	●	1
D0160N080	1.6	1.6	8	1.54	50	4	4	●	1
D0160N100	1.6	1.6	10	1.54	50	4	4	●	1
D0160N120	1.6	1.6	12	1.54	50	4	4	●	1
D0160N140	1.6	1.6	14	1.54	60	4	4	●	1
D0160N160	1.6	1.6	16	1.54	60	4	4	●	1

CUTTING CONDITIONS B295

MS4XL

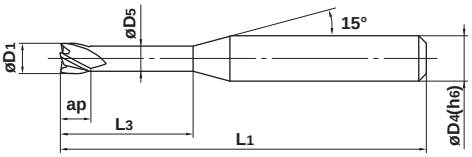
End mill, Short cut length, 4 flute, Long neck

0 — -0.020

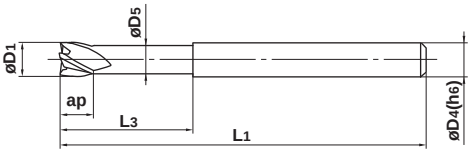
h6

4≤D4≤6 0 — -0.008
8≤D4≤10 0 — -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

● 4 flute long neck end mill.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4XLD0160N180	1.6	1.6	18	1.54	60	4	4	●	1
D0160N200	1.6	1.6	20	1.54	60	4	4	●	1
D0160N260	1.6	1.6	26	1.54	70	4	4	●	1
D0170N060	1.7	1.7	6	1.64	50	4	4	●	1
D0170N140	1.7	1.7	14	1.64	60	4	4	●	1
D0170N240	1.7	1.7	24	1.64	70	4	4	●	1
D0180N060	1.8	1.8	6	1.74	50	4	4	●	1
D0180N080	1.8	1.8	8	1.74	50	4	4	●	1
D0180N100	1.8	1.8	10	1.74	50	4	4	●	1
D0180N120	1.8	1.8	12	1.74	50	4	4	●	1
D0180N140	1.8	1.8	14	1.74	60	4	4	●	1
D0180N160	1.8	1.8	16	1.74	60	4	4	●	1
D0180N180	1.8	1.8	18	1.74	60	4	4	●	1
D0180N200	1.8	1.8	20	1.74	60	4	4	●	1
D0180N250	1.8	1.8	25	1.74	70	4	4	●	1
D0190N060	1.9	1.9	6	1.84	50	4	4	●	1
D0190N160	1.9	1.9	16	1.84	60	4	4	●	1
D0190N280	1.9	1.9	28	1.84	70	4	4	●	1
D0200N060	2	2	6	1.9	50	4	4	●	1
D0200N080	2	2	8	1.9	50	4	4	●	1
D0200N100	2	2	10	1.9	50	4	4	●	1
D0200N120	2	2	12	1.9	50	4	4	●	1
D0200N140	2	2	14	1.9	60	4	4	●	1
D0200N160	2	2	16	1.9	60	4	4	●	1
D0200N180	2	2	18	1.9	60	4	4	●	1
D0200N200	2	2	20	1.9	60	4	4	●	1
D0200N250	2	2	25	1.9	70	4	4	●	1
D0200N300	2	2	30	1.9	70	4	4	●	1
D0250N080	2.5	2.5	8	2.4	50	4	4	●	1
D0250N120	2.5	2.5	12	2.4	50	4	4	●	1
D0250N160	2.5	2.5	16	2.4	60	4	4	●	1
D0250N200	2.5	2.5	20	2.4	60	4	4	●	1
D0250N250	2.5	2.5	25	2.4	70	4	4	●	1
D0300N080	3	3	8	2.9	50	6	4	●	1
D0300N120	3	3	12	2.9	50	6	4	●	1
D0300N160	3	3	16	2.9	60	6	4	●	1
D0300N200	3	3	20	2.9	60	6	4	●	1
D0300N250	3	3	25	2.9	70	6	4	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Neck Length L_3	Neck Dia. D_5	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS4XLD0300N300	3	3	30	2.9	70	6	4	●	1
D0350N150	3.5	3.5	15	3.4	60	6	4	●	1
D0350N250	3.5	3.5	25	3.4	70	6	4	●	1
D0350N350	3.5	3.5	35	3.4	80	6	4	●	1
D0400N120	4	4	12	3.9	50	6	4	●	1
D0400N160	4	4	16	3.9	60	6	4	●	1
D0400N200	4	4	20	3.9	60	6	4	●	1
D0400N250	4	4	25	3.9	70	6	4	●	1
D0400N300	4	4	30	3.9	70	6	4	●	1
D0400N350	4	4	35	3.9	80	6	4	●	1
D0400N400	4	4	40	3.9	90	6	4	●	1
D0400N450	4	4	45	3.9	90	6	4	●	1
D0400N500	4	4	50	3.9	100	6	4	●	1
D0500N160	5	5	16	4.9	60	6	4	●	1
D0500N250	5	5	25	4.9	70	6	4	●	1
D0500N350	5	5	35	4.9	80	6	4	●	1
D0500N500	5	5	50	4.9	110	6	4	●	1
D0600N200	6	6	20	5.85	80	6	4	●	2
D0600N300	6	6	30	5.85	90	6	4	●	2
D0600N400	6	6	40	5.85	100	6	4	●	2
D0600N500	6	6	50	5.85	110	6	4	●	2
D0800N300	8	8	30	7.85	90	8	4	●	2
D0800N500	8	8	50	7.85	110	8	4	●	2
D0800N700	8	8	70	7.85	130	8	4	●	2
D1000N400	10	10	40	9.7	100	10	4	●	2
D1000N600	10	10	60	9.7	120	10	4	●	2
D1000N800	10	10	80	9.7	140	10	4	●	2

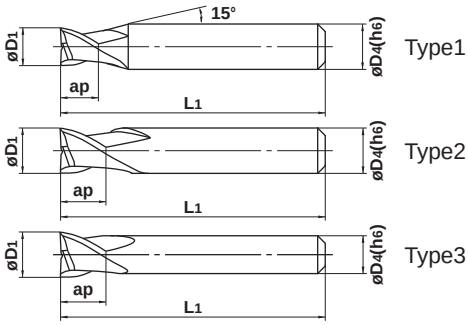
CUTTING CONDITIONS B295

MS2ES

End mill, 2 flute, For small automatic lathes

0 – -0.020 h6 4≤D4≤6 0 – -0.008 7≤D4≤10 0 – -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



● 2 flute end mill.

Overall length 35mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2ESD0300L35S04	3	3	35	4	2	●	1
D0350L35S04	3.5	3.5	35	4	2	●	1
D0400L35S04	4	4	35	4	2	●	2
D0500L35S05	5	5	35	5	2	●	2
D0500L35S06	5	5	35	6	2	●	1
D0600L35S05	6	6	35	5	2	●	3
D0600L35S06	6	6	35	6	2	●	2
D0700L35S07	7	6	35	7	2	●	2
D0800L35S07	8	6	35	7	2	●	3
D0800L35S08	8	6	35	8	2	●	2
D1000L35S07	10	6	35	7	2	●	3
D1000L35S10	10	6	35	10	2	●	2
D1200L35S10	12	6	35	10	2	●	3

Overall length 45mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2ESD0300L45S04	3	3	45	4	2	●	1
D0350L45S04	3.5	3.5	45	4	2	●	1
D0400L45S04	4	4	45	4	2	●	2
D0500L45S06	5	5	45	6	2	●	1
D0600L45S06	6	6	45	6	2	●	2
D0700L45S07	7	7	45	7	2	●	2
D0800L45S07	8	8	45	7	2	●	3
D0800L45S08	8	8	45	8	2	●	2
D1000L45S07	10	10	45	7	2	●	3
D1000L45S10	10	10	45	10	2	●	2
D1200L45S10	12	12	45	10	2	●	3

● : Inventory maintained in Japan.

CUTTING CONDITIONS B296

MS3ES

End mill, 3 flute, For small automatic lathes

0 – -0.020 h6 4≤D4≤6 0 – -0.008 7≤D4≤10 0 – -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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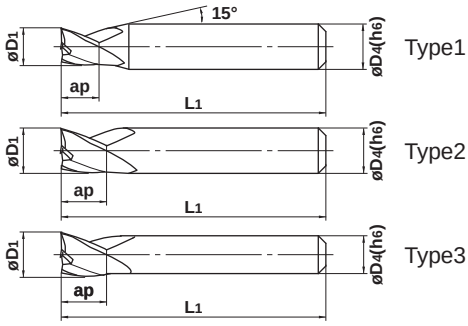

● 3 flute end mill.

Overall length 35mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS3ESD0300L35S04	3	3	35	4	3	●	1
D0350L35S04	3.5	3.5	35	4	3	●	1
D0400L35S04	4	4	35	4	3	●	2
D0500L35S05	5	5	35	5	3	●	2
D0500L35S06	5	5	35	6	3	●	1
D0600L35S05	6	6	35	5	3	●	3
D0600L35S06	6	6	35	6	3	●	2
D0700L35S07	7	6	35	7	3	●	2
D0800L35S07	8	6	35	7	3	●	3
D0800L35S08	8	6	35	8	3	●	2
D1000L35S07	10	6	35	7	3	●	3
D1000L35S10	10	6	35	10	3	●	2
D1200L35S10	12	6	35	10	3	●	3

Overall length 45mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS3ESD0300L45S04	3	3	45	4	3	●	1
D0350L45S04	3.5	3.5	45	4	3	●	1
D0400L45S04	4	4	45	4	3	●	2
D0500L45S06	5	5	45	6	3	●	1
D0600L45S06	6	6	45	6	3	●	2
D0700L45S07	7	7	45	7	3	●	2
D0800L45S07	8	8	45	7	3	●	3
D0800L45S08	8	8	45	8	3	●	2
D1000L45S07	10	10	45	7	3	●	3
D1000L45S10	10	10	45	10	3	●	2
D1200L45S10	12	12	45	10	3	●	3

CUTTING CONDITIONS B296

MS4EC

End mill, 4 flute, For small automatic lathes

D1≤12 0 — -0.020
D1>12 0 — -0.030

h6

4≤D4≤6 0 — -0.008
7≤D4≤10 0 — -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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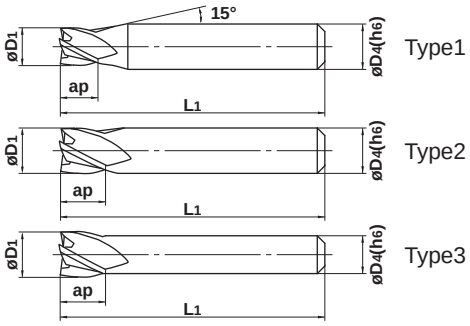


● 4 flute end mill.

Overall length 35mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4ECD0300L35S04	3	3	35	4	4	●	1
D0350L35S04	3.5	3.5	35	4	4	●	1
D0400L35S04	4	4	35	4	4	●	2
D0500L35S05	5	5	35	5	4	●	2
D0500L35S06	5	5	35	6	4	●	1
D0600L35S05	6	6	35	5	4	●	3
D0600L35S06	6	6	35	6	4	●	2
D0700L35S07	7	6	35	7	4	●	2
D0800L35S07	8	6	35	7	4	●	3
D0800L35S08	8	6	35	8	4	●	2
D1000L35S07	10	6	35	7	4	●	3
D1000L35S10	10	6	35	10	4	●	2
D1200L35S10	12	6	35	10	4	●	3

Overall length 45mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4ECD0300L45S04	3	3	45	4	4	●	1
D0350L45S04	3.5	3.5	45	4	4	●	1
D0400L45S04	4	4	45	4	4	●	2
D0500L45S06	5	5	45	6	4	●	1
D0600L45S06	6	6	45	6	4	●	2
D0700L45S07	7	7	45	7	4	●	2
D0800L45S07	8	8	45	7	4	●	3
D0800L45S08	8	8	45	8	4	●	2
D1000L45S07	10	10	45	7	4	●	3
D1000L45S10	10	10	45	10	4	●	2
D1200L45S10	12	12	45	10	4	●	3
D1400L45S10	14	14	45	10	4	●	3

● : Inventory maintained in Japan.

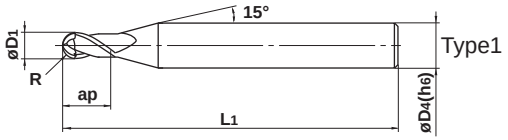
CUTTING CONDITIONS B296

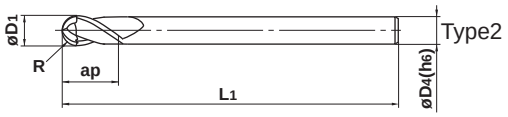
MS2SB

Ball nose end mill, Short cut length, 2 flute

R ±0.01 | 0 — -0.020 | h6 | 4≤D4≤6 0 — -0.008 | 8≤D4≤10 0 — -0.009 | D4=12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		





UWC MS 30°

● 2 flute ball nose end mill for general use.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2SBR0010S04	0.1	0.2	0.3	45	4	2	●	1
R0010S06	0.1	0.2	0.3	50	6	2	●	1
R0015S04	0.15	0.3	0.5	45	4	2	●	1
R0015S06	0.15	0.3	0.5	50	6	2	●	1
R0020S04	0.2	0.4	0.6	45	4	2	●	1
R0020S06	0.2	0.4	0.6	50	6	2	●	1
R0025S04	0.25	0.5	0.8	45	4	2	●	1
R0025S06	0.25	0.5	0.8	50	6	2	●	1
R0030S04	0.3	0.6	0.9	45	4	2	●	1
R0030S06	0.3	0.6	0.9	50	6	2	●	1
R0035S04	0.35	0.7	1.1	45	4	2	●	1
R0040S04	0.4	0.8	1.2	45	4	2	●	1
R0040S06	0.4	0.8	1.2	50	6	2	●	1
R0045S04	0.45	0.9	1.4	45	4	2	●	1
R0050S04	0.5	1	1.5	45	4	2	●	1
R0050S06	0.5	1	1.5	50	6	2	●	1
R0060S04	0.6	1.2	1.8	45	4	2	●	1
R0060S06	0.6	1.2	1.8	50	6	2	●	1
R0070S04	0.7	1.4	2.1	45	4	2	●	1
R0070S06	0.7	1.4	2.1	50	6	2	●	1
R0075S04	0.75	1.5	2.3	45	4	2	●	1
R0075S06	0.75	1.5	2.3	50	6	2	●	1
R0080S04	0.8	1.6	2.4	45	4	2	●	1
R0080S06	0.8	1.6	2.4	50	6	2	●	1
R0090S04	0.9	1.8	2.7	45	4	2	●	1
R0090S06	0.9	1.8	2.7	50	6	2	●	1
R0100S04	1	2	3	50	4	2	●	1
R0100S06	1	2	3	50	6	2	●	1
R0125S04	1.25	2.5	3.8	50	4	2	●	1
R0125S06	1.25	2.5	3.8	50	6	2	●	1
R0150S06	1.5	3	4.5	70	6	2	●	1
R0200S06	2	4	6	70	6	2	●	1
R0250S06	2.5	5	7.5	80	6	2	●	1
R0300S06	3	6	9	80	6	2	●	2
R0400S08	4	8	12	90	8	2	●	2
R0500S10	5	10	15	100	10	2	●	2
R0600S12	6	12	18	110	12	2	●	2

CUTTING CONDITIONS B297

MS2MB

Ball nose end mill, Medium cut length, 2 flute

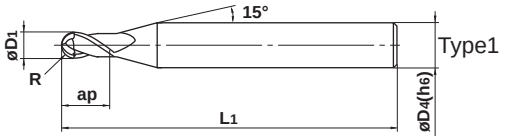
R ±0.01

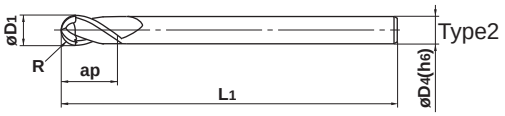
0 − -0.020

h6

D4 = 3	0 − -0.006
4 ≤ D4 ≤ 6	0 − -0.008
8 ≤ D4 ≤ 10	0 − -0.009
D4 = 12	0 − -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		





UWC MS 30°

● 2 flute ball nose end mill for general use.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MBR0025	0.25	0.5	1	45	4	2	●	1
R0030	0.3	0.6	1.2	45	4	2	●	1
R0040	0.4	0.8	1.6	45	4	2	●	1
R0050	0.5	1	2.5	45	4	2	●	1
R0060	0.6	1.2	2.5	45	4	2	●	1
R0070	0.7	1.4	3	45	4	2	●	1
R0075	0.75	1.5	4	45	4	2	●	1
R0080	0.8	1.6	4	45	4	2	●	1
R0090	0.9	1.8	5	45	4	2	●	1
R0100	1	2	6	50	4	2	●	1
R0125	1.25	2.5	6	50	4	2	●	1
R0150S03	1.5	3	8	70	3	2	●	2
R0150	1.5	3	8	70	6	2	●	1
R0175	1.75	3.5	8	70	6	2	●	1
R0200S04	2	4	8	70	4	2	●	2
R0200	2	4	8	70	6	2	●	1
R0250	2.5	5	12	80	6	2	●	1
R0300	3	6	12	80	6	2	●	2
R0400	4	8	14	90	8	2	●	2
R0500	5	10	18	100	10	2	●	2
R0600	6	12	22	110	12	2	●	2

● : Inventory maintained in Japan.

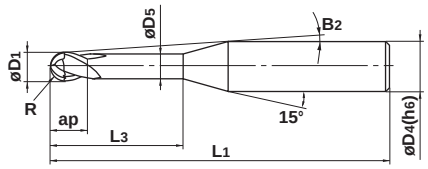
CUTTING CONDITIONS B297

MS2XLB

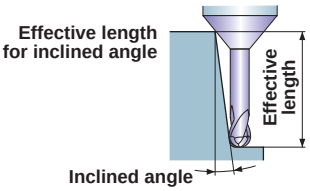
Ball nose end mill, Short cut length, 2 flute, Long neck

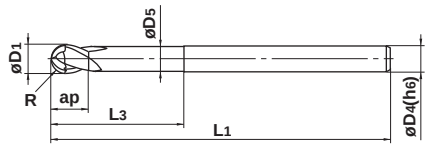
R ±0.01 | 0 — -0.020 | h6 | 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1





Type2

UWC MS 30°

● 2 flute long neck ball nose end mill.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XLBR0010N005	0.1	0.2	0.2	0.5	0.17	14.1°	50	4	2	●	1	0.5	0.5	0.6	0.6
R0010N005S06	0.1	0.2	0.2	0.5	0.17	14.4°	50	6	2	●	1	0.5	0.5	0.6	0.6
R0010N008S06	0.1	0.2	0.2	0.8	0.17	14.1°	50	6	2	●	1	0.8	0.8	0.9	1
R0010N010	0.1	0.2	0.2	1	0.17	13.3°	50	4	2	●	1	1	1.1	1.2	1.3
R0010N010S06	0.1	0.2	0.2	1	0.17	13.8°	50	6	2	●	1	1	1.1	1.2	1.3
R0010N013	0.1	0.2	0.2	1.25	0.17	12.9°	50	4	2	●	1	1.3	1.3	1.5	1.6
R0010N013S06	0.1	0.2	0.2	1.25	0.17	13.6°	50	6	2	●	1	1.3	1.3	1.5	1.6
R0010N015	0.1	0.2	0.2	1.5	0.17	12.5°	50	4	2	●	1	1.5	1.6	1.7	1.9
R0010N015S06	0.1	0.2	0.2	1.5	0.17	13.3°	50	6	2	●	1	1.5	1.6	1.7	1.9
R0010N018	0.1	0.2	0.2	1.75	0.17	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
R0010N018S06	0.1	0.2	0.2	1.75	0.17	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
R0010N020	0.1	0.2	0.2	2	0.17	11.9°	50	4	2	●	1	2.1	2.2	2.3	2.5
R0010N020S06	0.1	0.2	0.2	2	0.17	12.8°	50	6	2	●	1	2.1	2.2	2.3	2.5
R0010N025	0.1	0.2	0.2	2.5	0.17	11.3°	50	4	2	●	1	2.6	2.7	2.9	3.1
R0010N030	0.1	0.2	0.2	3	0.17	10.7°	50	4	2	●	1	3.1	3.2	3.5	3.7
R0015N008S06	0.15	0.3	0.3	0.8	0.27	14.1°	50	6	2	●	1	0.8	0.8	0.9	1
R0015N010	0.15	0.3	0.3	1	0.27	13.3°	50	4	2	●	1	1	1.1	1.2	1.3
R0015N010S06	0.15	0.3	0.3	1	0.27	13.9°	50	6	2	●	1	1	1.1	1.2	1.3
R0015N012S06	0.15	0.3	0.3	1.2	0.27	13.7°	50	6	2	●	1	1.2	1.3	1.4	1.5
R0015N015	0.15	0.3	0.3	1.5	0.27	12.5°	50	4	2	●	1	1.5	1.6	1.7	1.9
R0015N015S06	0.15	0.3	0.3	1.5	0.27	13.3°	50	6	2	●	1	1.5	1.6	1.7	1.9
R0015N020	0.15	0.3	0.3	2	0.27	11.9°	50	4	2	●	1	2.1	2.2	2.3	2.5
R0015N020S06	0.15	0.3	0.3	2	0.27	12.8°	50	6	2	●	1	2.1	2.2	2.3	2.5
R0015N025	0.15	0.3	0.3	2.5	0.27	11.2°	50	4	2	●	1	2.6	2.7	2.9	3.1
R0015N030	0.15	0.3	0.3	3	0.27	10.7°	50	4	2	●	1	3.1	3.2	3.5	3.7
R0015N040	0.15	0.3	0.3	4	0.27	9.7°	50	4	2	●	1	4.2	4.3	4.6	5
R0020N010	0.2	0.4	0.4	1	0.36	13.4°	50	4	2	●	1	1	1	1.1	1.2
R0020N010S06	0.2	0.4	0.4	1	0.36	13.9°	50	6	2	●	1	1	1	1.1	1.2
R0020N012S06	0.2	0.4	0.4	1.2	0.36	13.7°	50	6	2	●	1	1.2	1.3	1.4	1.5
R0020N015	0.2	0.4	0.4	1.5	0.36	12.6°	50	4	2	●	1	1.5	1.6	1.7	1.8
R0020N015S06	0.2	0.4	0.4	1.5	0.36	13.4°	50	6	2	●	1	1.5	1.6	1.7	1.8
R0020N020	0.2	0.4	0.4	2	0.36	11.9°	50	4	2	●	1	2	2.1	2.3	2.5
R0020N020S06	0.2	0.4	0.4	2	0.36	12.8°	50	6	2	●	1	2	2.1	2.3	2.5
R0020N025	0.2	0.4	0.4	2.5	0.36	11.2°	50	4	2	●	1	2.6	2.7	2.9	3.1
R0020N025S06	0.2	0.4	0.4	2.5	0.36	12.4°	50	6	2	●	1	2.6	2.7	2.9	3.1
R0020N030	0.2	0.4	0.4	3	0.36	10.7°	50	4	2	●	1	3.1	3.2	3.4	3.7
R0020N030S06	0.2	0.4	0.4	3	0.36	11.9°	50	6	2	●	1	3.1	3.2	3.4	3.7
R0020N035	0.2	0.4	0.4	3.5	0.36	10.2°	50	4	2	●	1	3.6	3.7	4	4.3

CUTTING CONDITIONS B298

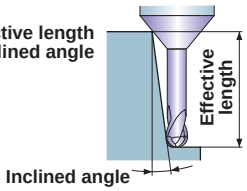
MS2XLB

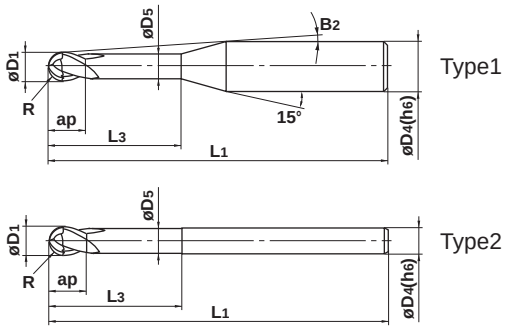
Ball nose end mill, Short cut length, 2 flute, Long neck

R ±0.01 | 0 − -0.020 | h6 | 4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		

● 2 flute long neck ball nose end mill.





Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XLBR0020N040	0.2	0.4	0.4	4	0.36	9.7°	50	4	2	●	1	4.1	4.3	4.6	4.9
R0020N045	0.2	0.4	0.4	4.5	0.36	9.3°	50	4	2	●	1	4.7	4.8	5.2	5.6
R0020N050	0.2	0.4	0.4	5	0.36	8.9°	50	4	2	●	1	5.2	5.3	5.7	6.2
R0020N055	0.2	0.4	0.4	5.5	0.36	8.5°	50	4	2	●	1	5.7	5.9	6.3	6.8
R0020N060	0.2	0.4	0.4	6	0.36	8.2°	50	4	2	●	1	6.2	6.4	6.9	7.4
R0025N015	0.25	0.5	0.5	1.5	0.46	12.6°	50	4	2	●	1	1.5	1.6	1.7	1.8
R0025N015S06	0.25	0.5	0.5	1.5	0.46	13.4°	50	6	2	●	1	1.5	1.6	1.7	1.8
R0025N020	0.25	0.5	0.5	2	0.46	11.9°	50	4	2	●	1	2	2.1	2.3	2.4
R0025N020S06	0.25	0.5	0.5	2	0.46	12.9°	50	6	2	●	1	2	2.1	2.3	2.4
R0025N025	0.25	0.5	0.5	2.5	0.46	11.2°	50	4	2	●	1	2.6	2.7	2.9	3.1
R0025N025S06	0.25	0.5	0.5	2.5	0.46	12.4°	50	6	2	●	1	2.6	2.7	2.9	3.1
R0025N030	0.25	0.5	0.5	3	0.46	10.6°	50	4	2	●	1	3.1	3.2	3.4	3.7
R0025N030S06	0.25	0.5	0.5	3	0.46	11.9°	50	6	2	●	1	3.1	3.2	3.4	3.7
R0025N035	0.25	0.5	0.5	3.5	0.46	10.1°	50	4	2	●	1	3.6	3.7	4	4.3
R0025N035S06	0.25	0.5	0.5	3.5	0.46	11.5°	50	6	2	●	1	3.6	3.7	4	4.3
R0025N040	0.25	0.5	0.5	4	0.46	9.6°	50	4	2	●	1	4.1	4.3	4.6	4.9
R0025N040S06	0.25	0.5	0.5	4	0.46	11.1°	50	6	2	●	1	4.1	4.3	4.6	4.9
R0025N045	0.25	0.5	0.5	4.5	0.46	9.2°	50	4	2	●	1	4.6	4.8	5.2	5.6
R0025N045S06	0.25	0.5	0.5	4.5	0.46	10.7°	50	6	2	●	1	4.6	4.8	5.2	5.6
R0025N050	0.25	0.5	0.5	5	0.46	8.8°	50	4	2	●	1	5.2	5.3	5.7	6.2
R0025N050S06	0.25	0.5	0.5	5	0.46	10.4°	50	6	2	●	1	5.2	5.3	5.7	6.2
R0025N055	0.25	0.5	0.5	5.5	0.46	8.4°	50	4	2	●	1	5.7	5.9	6.3	6.8
R0025N055S06	0.25	0.5	0.5	5.5	0.46	10.1°	50	6	2	●	1	5.7	5.9	6.3	6.8
R0025N060	0.25	0.5	0.5	6	0.46	8.1°	50	4	2	●	1	6.2	6.4	6.9	7.4
R0025N060S06	0.25	0.5	0.5	6	0.46	9.7°	50	6	2	●	1	6.2	6.4	6.9	7.4
R0025N070	0.25	0.5	0.5	7	0.46	7.5°	50	4	2	●	1	7.2	7.5	8	8.7
R0025N070S06	0.25	0.5	0.5	7	0.46	9.2°	50	6	2	●	1	7.2	7.5	8	8.7
R0025N080	0.25	0.5	0.5	8	0.46	7°	50	4	2	●	1	8.3	8.5	9.2	9.9
R0025N080S06	0.25	0.5	0.5	8	0.46	8.7°	50	6	2	●	1	8.3	8.5	9.2	9.9
R0025N100	0.25	0.5	0.5	10	0.46	6.2°	50	4	2	●	1	10.3	10.7	11.5	12.4
R0025N100S06	0.25	0.5	0.5	10	0.46	7.8°	50	6	2	●	1	10.3	10.7	11.5	12.4
R0030N018S06	0.3	0.6	0.6	1.8	0.56	13°	50	6	2	●	1	1.9	1.9	2.1	2.3
R0030N020	0.3	0.6	0.6	2	0.56	11.8°	50	4	2	●	1	2.1	2.2	2.3	2.5
R0030N020S06	0.3	0.6	0.6	2	0.56	12.8°	50	6	2	●	1	2.1	2.2	2.3	2.5
R0030N025	0.3	0.6	0.6	2.5	0.56	11.1°	50	4	2	●	1	2.6	2.7	2.9	3.1
R0030N025S06	0.3	0.6	0.6	2.5	0.56	12.3°	50	6	2	●	1	2.6	2.7	2.9	3.1
R0030N030	0.3	0.6	0.6	3	0.56	10.5°	50	4	2	●	1	3.1	3.3	3.5	3.8
R0030N030S06	0.3	0.6	0.6	3	0.56	11.8°	50	6	2	●	1	3.1	3.3	3.5	3.8

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XLBR0030N035	0.3	0.6	0.6	3.5	0.56	10°	50	4	2	●	1	3.6	3.8	4.1	4.4
R0030N035S06	0.3	0.6	0.6	3.5	0.56	11.4°	50	6	2	●	1	3.6	3.8	4.1	4.4
R0030N040	0.3	0.6	0.6	4	0.56	9.5°	50	4	2	●	1	4.2	4.3	4.6	5
R0030N040S06	0.3	0.6	0.6	4	0.56	11°	50	6	2	●	1	4.2	4.3	4.6	5
R0030N045	0.3	0.6	0.6	4.5	0.56	9.1°	50	4	2	●	1	4.7	4.9	5.2	5.6
R0030N045S06	0.3	0.6	0.6	4.5	0.56	10.6°	50	6	2	●	1	4.7	4.9	5.2	5.6
R0030N050	0.3	0.6	0.6	5	0.56	8.7°	50	4	2	●	1	5.2	5.4	5.8	6.2
R0030N050S06	0.3	0.6	0.6	5	0.56	10.3°	50	6	2	●	1	5.2	5.4	5.8	6.2
R0030N060	0.3	0.6	0.6	6	0.56	8°	50	4	2	●	1	6.3	6.5	6.9	7.5
R0030N060S06	0.3	0.6	0.6	6	0.56	9.7°	50	6	2	●	1	6.3	6.5	6.9	7.5
R0030N070	0.3	0.6	0.6	7	0.56	7.4°	50	4	2	●	1	7.3	7.5	8.1	8.7
R0030N080	0.3	0.6	0.6	8	0.56	6.9°	50	4	2	●	1	8.3	8.6	9.2	10
R0030N080S06	0.3	0.6	0.6	8	0.56	8.6°	50	6	2	●	1	8.3	8.6	9.2	10
R0030N090	0.3	0.6	0.6	9	0.56	6.4°	50	4	2	●	1	9.4	9.7	10.4	11.2
R0030N100	0.3	0.6	0.6	10	0.56	6°	50	4	2	●	1	10.4	10.8	11.5	12.5
R0030N100S06	0.3	0.6	0.6	10	0.56	7.8°	50	6	2	●	1	10.4	10.8	11.5	12.5
R0030N110	0.3	0.6	0.6	11	0.56	5.7°	50	4	2	●	1	11.4	11.8	12.7	13.7
R0030N120	0.3	0.6	0.6	12	0.56	5.4°	50	4	2	●	1	12.5	12.9	13.8	15
R0040N020	0.4	0.8	0.8	2	0.76	11.7°	50	4	2	●	1	2.1	2.2	2.3	2.5
R0040N020S06	0.4	0.8	0.8	2	0.76	12.8°	50	6	2	●	1	2.1	2.2	2.3	2.5
R0040N024S06	0.4	0.8	0.8	2.4	0.76	12.4°	50	6	2	●	1	2.5	2.6	2.8	3
R0040N030	0.4	0.8	0.8	3	0.76	10.4°	50	4	2	●	1	3.1	3.3	3.5	3.7
R0040N030S06	0.4	0.8	0.8	3	0.76	11.8°	50	6	2	●	1	3.1	3.3	3.5	3.7
R0040N040	0.4	0.8	0.8	4	0.76	9.4°	50	4	2	●	1	4.2	4.3	4.6	5
R0040N040S06	0.4	0.8	0.8	4	0.76	11°	50	6	2	●	1	4.2	4.3	4.6	5
R0040N050	0.4	0.8	0.8	5	0.76	8.5°	50	4	2	●	1	5.2	5.4	5.8	6.2
R0040N060	0.4	0.8	0.8	6	0.76	7.8°	50	4	2	●	1	6.3	6.5	6.9	7.5
R0040N060S06	0.4	0.8	0.8	6	0.76	9.6°	50	6	2	●	1	6.3	6.5	6.9	7.5
R0040N070	0.4	0.8	0.8	7	0.76	7.2°	50	4	2	●	1	7.3	7.5	8.1	8.7
R0040N080	0.4	0.8	0.8	8	0.76	6.7°	50	4	2	●	1	8.3	8.6	9.2	10
R0040N080S06	0.4	0.8	0.8	8	0.76	8.5°	50	6	2	●	1	8.3	8.6	9.2	10
R0040N100	0.4	0.8	0.8	10	0.76	5.9°	50	4	2	●	1	10.4	10.8	11.5	12.4
R0040N100S06	0.4	0.8	0.8	10	0.76	7.7°	50	6	2	●	1	10.4	10.8	11.5	12.4
R0040N120	0.4	0.8	0.8	12	0.76	5.2°	50	4	2	●	1	12.5	12.9	13.8	14.9
R0050N030	0.5	1	1	3	0.94	10.1°	50	4	2	●	1	3.2	3.3	3.6	3.9
R0050N030S06	0.5	1	1	3	0.94	11.6°	50	6	2	●	1	3.2	3.3	3.6	3.9
R0050N040	0.5	1	1	4	0.94	9.1°	50	4	2	●	1	4.2	4.4	4.8	5.2
R0050N040S06	0.5	1	1	4	0.94	10.8°	50	6	2	●	1	4.2	4.4	4.8	5.2
R0050N050	0.5	1	1	5	0.94	8.2°	50	4	2	●	1	5.3	5.5	6	6.4
R0050N050S06	0.5	1	1	5	0.94	10.1°	50	6	2	●	1	5.3	5.5	6	6.4
R0050N060	0.5	1	1	6	0.94	7.5°	50	4	2	●	1	6.3	6.6	7.1	7.7
R0050N060S06	0.5	1	1	6	0.94	9.4°	50	6	2	●	1	6.3	6.6	7.1	7.7
R0050N070	0.5	1	1	7	0.94	6.9°	50	4	2	●	1	7.4	7.7	8.3	8.9
R0050N080	0.5	1	1	8	0.94	6.4°	50	4	2	●	1	8.4	8.8	9.4	10.2
R0050N080S06	0.5	1	1	8	0.94	8.3°	50	6	2	●	1	8.4	8.8	9.4	10.2
R0050N090	0.5	1	1	9	0.94	6°	50	4	2	●	1	9.5	9.9	10.6	11.4
R0050N100	0.5	1	1	10	0.94	5.6°	50	4	2	●	1	10.5	10.9	11.7	12.6
R0050N100S06	0.5	1	1	10	0.94	7.5°	50	6	2	●	1	10.5	10.9	11.7	12.6
R0050N120	0.5	1	1	12	0.94	5°	50	4	2	●	1	12.6	13.1	14	15.1
R0050N120S06	0.5	1	1	12	0.94	6.8°	55	6	2	●	1	12.6	13.1	14	15.1

CUTTING CONDITIONS B298

MS2XLB

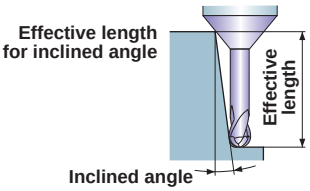
Ball nose end mill, Short cut length, 2 flute, Long neck

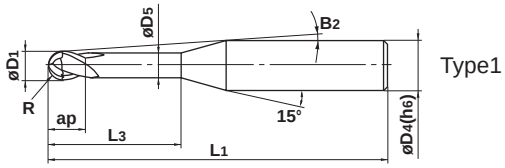
R ±0.01 | 0 − -0.020 | h6 4≤D4≤6 0 − -0.008

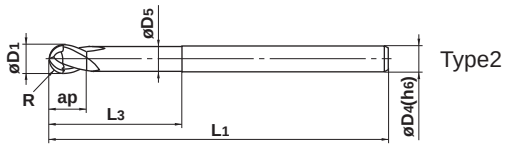
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		

UWC MS 30°

● 2 flute long neck ball nose end mill.







Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XLBR0050N140	0.5	1	1	14	0.94	4.5°	50	4	2	●	1	14.7	15.2	16.3	17.6
R0050N160	0.5	1	1	16	0.94	4.1°	55	4	2	●	1	16.8	17.4	18.6	20.1
R0050N160S06	0.5	1	1	16	0.94	5.7°	60	6	2	●	1	16.8	17.4	18.6	20.1
R0050N180	0.5	1	1	18	0.94	3.7°	55	4	2	●	1	18.9	19.5	20.9	22.6
R0050N200	0.5	1	1	20	0.94	3.4°	55	4	2	●	1	20.9	21.6	23.2	25.1
R0050N200S06	0.5	1	1	20	0.94	5°	60	6	2	●	1	20.9	21.6	23.2	25.1
R0060N036S06	0.6	1.2	1.2	3.6	1.14	11.1°	50	6	2	●	1	3.8	4	4.3	4.7
R0060N060	0.6	1.2	1.2	6	1.14	7.3°	50	4	2	●	1	6.3	6.6	7.1	7.6
R0060N060S06	0.6	1.2	1.2	6	1.14	9.3°	50	6	2	●	1	6.3	6.6	7.1	7.6
R0060N080	0.6	1.2	1.2	8	1.14	6.2°	50	4	2	●	1	8.4	8.8	9.4	10.1
R0060N080S06	0.6	1.2	1.2	8	1.14	8.2°	50	6	2	●	1	8.4	8.8	9.4	10.1
R0060N100	0.6	1.2	1.2	10	1.14	5.4°	50	4	2	●	1	10.5	10.9	11.7	12.6
R0060N100S06	0.6	1.2	1.2	10	1.14	7.4°	50	6	2	●	1	10.5	10.9	11.7	12.6
R0060N120	0.6	1.2	1.2	12	1.14	4.8°	50	4	2	●	1	12.6	13.1	14	15.1
R0060N120S06	0.6	1.2	1.2	12	1.14	6.7°	55	6	2	●	1	12.6	13.1	14	15.1
R0060N140	0.6	1.2	1.2	14	1.14	4.3°	50	4	2	●	1	14.7	15.2	16.3	17.6
R0060N160	0.6	1.2	1.2	16	1.14	3.9°	55	4	2	●	1	16.8	17.3	18.6	20.1
R0060N160S06	0.6	1.2	1.2	16	1.14	5.6°	60	6	2	●	1	16.8	17.3	18.6	20.1
R0060N180	0.6	1.2	1.2	18	1.14	3.5°	55	4	2	●	1	18.8	19.5	20.9	22.6
R0060N240	0.6	1.2	1.2	24	1.14	2.8°	65	4	2	●	1	25.1	25.9	27.8	No interference
R0070N080	0.7	1.4	1.4	8	1.34	6°	50	4	2	●	1	8.4	8.8	9.4	10.1
R0070N120	0.7	1.4	1.4	12	1.34	4.6°	50	4	2	●	1	12.6	13.1	14	15.1
R0070N160	0.7	1.4	1.4	16	1.34	3.7°	55	4	2	●	1	16.8	17.3	18.6	20.1
R0075N045S06	0.75	1.5	1.5	4.5	1.44	10.2°	50	6	2	●	1	4.7	5	5.4	5.7
R0075N060	0.75	1.5	1.5	6	1.44	7°	50	4	2	●	1	6.3	6.6	7.1	7.6
R0075N060S06	0.75	1.5	1.5	6	1.44	9.2°	50	6	2	●	1	6.3	6.6	7.1	7.6
R0075N075S06	0.75	1.5	1.5	7.5	1.44	8.3°	50	6	2	●	1	7.9	8.2	8.8	9.5
R0075N080	0.75	1.5	1.5	8	1.44	5.9°	50	4	2	●	1	8.4	8.8	9.4	10.1
R0075N080S06	0.75	1.5	1.5	8	1.44	8.1°	50	6	2	●	1	8.4	8.8	9.4	10.1
R0075N100	0.75	1.5	1.5	10	1.44	5.1°	50	4	2	●	1	10.5	10.9	11.7	12.6
R0075N100S06	0.75	1.5	1.5	10	1.44	7.2°	50	6	2	●	1	10.5	10.9	11.7	12.6
R0075N120	0.75	1.5	1.5	12	1.44	4.4°	50	4	2	●	1	12.6	13.1	14	15.1
R0075N120S06	0.75	1.5	1.5	12	1.44	6.5°	55	6	2	●	1	12.6	13.1	14	15.1
R0075N140	0.75	1.5	1.5	14	1.44	4°	50	4	2	●	1	14.7	15.2	16.3	17.6
R0075N140S06	0.75	1.5	1.5	14	1.44	5.9°	55	6	2	●	1	14.7	15.2	16.3	17.6
R0075N160	0.75	1.5	1.5	16	1.44	3.6°	55	4	2	●	1	16.8	17.3	18.6	20
R0075N160S06	0.75	1.5	1.5	16	1.44	5.4°	60	6	2	●	1	16.8	17.3	18.6	20
R0075N180	0.75	1.5	1.5	18	1.44	3.3°	55	4	2	●	1	18.8	19.5	20.9	22.5

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XLBR0075N200	0.75	1.5	1.5	20	1.44	3°	55	4	2	●	1	20.9	21.6	23.2	No interference
R0075N200S06	0.75	1.5	1.5	20	1.44	4.6°	60	6	2	●	1	20.9	21.6	23.2	25
R0075N220	0.75	1.5	1.5	22	1.44	2.8°	60	4	2	●	1	23	23.8	25.5	No interference
R0075N300	0.75	1.5	1.5	30	1.44	2.1°	70	4	2	●	1	31.2	32.3	34.7	No interference
R0080N080	0.8	1.6	1.6	8	1.54	5.8°	50	4	2	●	1	8.4	8.8	9.4	10.1
R0080N120	0.8	1.6	1.6	12	1.54	4.3°	50	4	2	●	1	12.6	13.1	14	15.1
R0080N160	0.8	1.6	1.6	16	1.54	3.5°	55	4	2	●	1	16.8	17.3	18.6	20
R0080N200	0.8	1.6	1.6	20	1.54	2.9°	55	4	2	●	1	20.9	21.6	23.2	No interference
R0090N080	0.9	1.8	1.8	8	1.74	5.5°	50	4	2	●	1	8.4	8.8	9.4	10.1
R0090N120	0.9	1.8	1.8	12	1.74	4.1°	50	4	2	●	1	12.6	13	14	15
R0090N160	0.9	1.8	1.8	16	1.74	3.3°	55	4	2	●	1	16.8	17.3	18.6	20
R0090N200	0.9	1.8	1.8	20	1.74	2.7°	55	4	2	●	1	20.9	21.6	23.2	No interference
R0100N040	1	2	2	4	1.9	8.2°	50	4	2	●	1	4.1	4.3	4.6	4.9
R0100N040S06	1	2	2	4	1.9	10.6°	50	6	2	●	1	4.1	4.3	4.6	4.9
R0100N060	1	2	2	6	1.9	6.4°	50	4	2	●	1	6.2	6.5	6.9	7.4
R0100N060S06	1	2	2	6	1.9	9°	50	6	2	●	1	6.2	6.5	6.9	7.4
R0100N080	1	2	2	8	1.9	5.3°	50	4	2	●	1	8.3	8.7	9.2	9.9
R0100N080S06	1	2	2	8	1.9	7.8°	50	6	2	●	1	8.3	8.7	9.2	9.9
R0100N100	1	2	2	10	1.9	4.5°	50	4	2	●	1	10.4	10.8	11.5	12.4
R0100N100S06	1	2	2	10	1.9	6.9°	50	6	2	●	1	10.4	10.8	11.5	12.4
R0100N120	1	2	2	12	1.9	3.9°	50	4	2	●	1	12.5	12.9	13.8	14.9
R0100N120S06	1	2	2	12	1.9	6.1°	55	6	2	●	1	12.5	12.9	13.8	14.9
R0100N140	1	2	2	14	1.9	3.4°	50	4	2	●	1	14.6	15.1	16.1	17.4
R0100N140S06	1	2	2	14	1.9	5.6°	55	6	2	●	1	14.6	15.1	16.1	17.4
R0100N160	1	2	2	16	1.9	3.1°	55	4	2	●	1	16.7	17.2	18.4	19.9
R0100N160S06	1	2	2	16	1.9	5.1°	60	6	2	●	1	16.7	17.2	18.4	19.9
R0100N180	1	2	2	18	1.9	2.8°	55	4	2	●	1	18.7	19.4	20.7	No interference
R0100N180S06	1	2	2	18	1.9	4.7°	60	6	2	●	1	18.7	19.4	20.7	22.3
R0100N200	1	2	2	20	1.9	2.5°	60	4	2	●	1	20.8	21.5	23	No interference
R0100N200S06	1	2	2	20	1.9	4.3°	60	6	2	●	1	20.8	21.5	23	24.8
R0100N220	1	2	2	22	1.9	2.3°	60	4	2	●	1	22.9	23.6	25.3	No interference
R0100N250	1	2	2	25	1.9	2.1°	65	4	2	●	1	26	26.8	28.8	No interference
R0100N250S06	1	2	2	25	1.9	3.7°	65	6	2	●	1	26	26.8	28.8	31
R0100N300	1	2	2	30	1.9	1.8°	70	4	2	●	1	31.1	32.2	No interference	No interference
R0100N300S06	1	2	2	30	1.9	3.2°	70	6	2	●	1	31.1	32.2	34.5	37.3
R0100N350	1	2	2	35	1.9	1.6°	70	4	2	●	1	36.3	37.5	No interference	No interference
R0100N350S06	1	2	2	35	1.9	2.8°	80	6	2	●	1	36.3	37.5	40.3	No interference
R0125N060S06	1.25	2.5	2.5	6	2.4	8.6°	50	6	2	●	1	6.2	6.5	6.9	7.4
R0125N075S06	1.25	2.5	2.5	7.5	2.4	7.7°	50	6	2	●	1	7.8	8.1	8.6	9.2
R0125N100S06	1.25	2.5	2.5	10	2.4	6.5°	50	6	2	●	1	10.4	10.8	11.5	12.3
R0125N125S06	1.25	2.5	2.5	12.5	2.4	5.6°	50	6	2	●	1	13	13.5	14.4	15.4
R0125N160S06	1.25	2.5	2.5	16	2.4	4.7°	60	6	2	●	1	16.7	17.2	18.4	19.8
R0125N200S06	1.25	2.5	2.5	20	2.4	4°	60	6	2	●	1	20.8	21.5	23	24.8
R0125N250S06	1.25	2.5	2.5	25	2.4	3.3°	65	6	2	●	1	26	26.8	28.7	31
R0125N300S06	1.25	2.5	2.5	30	2.4	2.9°	70	6	2	●	1	31.1	32.2	34.5	No interference
R0125N350S06	1.25	2.5	2.5	35	2.4	2.5°	80	6	2	●	1	36.3	37.5	40.2	No interference
R0150N080	1.5	3	3	8	2.9	7°	60	6	2	●	1	8.3	8.6	9.2	9.8
R0150N100	1.5	3	3	10	2.9	6°	60	6	2	●	1	10.4	10.8	11.5	12.3
R0150N120	1.5	3	3	12	2.9	5.3°	60	6	2	●	1	12.5	12.9	13.8	14.8
R0150N140	1.5	3	3	14	2.9	4.7°	60	6	2	●	1	14.6	15	16.1	17.3

CUTTING CONDITIONS B298

MS2XLB

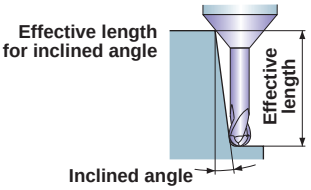
Ball nose end mill, Short cut length, 2 flute, Long neck

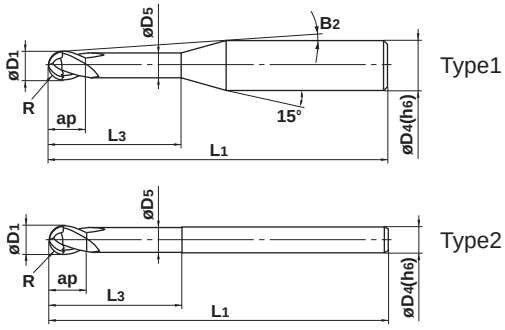
R ±0.01 | 0 — -0.020 | h6 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		

UWC MS 30°

● 2 flute long neck ball nose end mill.





Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XLBR0150N160	1.5	3	3	16	2.9	4.3°	60	6	2	●	1	16.6	17.2	18.4	19.7
R0150N200	1.5	3	3	20	2.9	3.6°	70	6	2	●	1	20.8	21.5	23	24.7
R0150N250	1.5	3	3	25	2.9	3°	70	6	2	●	1	26	26.8	28.7	No interference
R0150N300	1.5	3	3	30	2.9	2.6°	70	6	2	●	1	31.1	32.2	34.5	No interference
R0150N350	1.5	3	3	35	2.9	2.2°	80	6	2	●	1	36.3	37.5	40.2	No interference
R0150N400	1.5	3	3	40	2.9	2°	90	6	2	●	1	41.5	42.9	No interference	No interference
R0200N100	2	4	4	10	3.9	4.8°	70	6	2	●	1	10.4	10.7	11.4	12.2
R0200N120	2	4	4	12	3.9	4.1°	70	6	2	●	1	12.5	12.9	13.7	14.6
R0200N140	2	4	4	14	3.9	3.6°	70	6	2	●	1	14.6	15	16	17.1
R0200N160	2	4	4	16	3.9	3.2°	70	6	2	●	1	16.6	17.1	18.3	19.6
R0200N200	2	4	4	20	3.9	2.7°	70	6	2	●	1	20.8	21.4	22.9	No interference
R0200N250	2	4	4	25	3.9	2.2°	70	6	2	●	1	25.9	26.8	28.6	No interference
R0200N300	2	4	4	30	3.9	1.8°	70	6	2	●	1	31.1	32.1	No interference	No interference
R0200N350	2	4	4	35	3.9	1.6°	80	6	2	●	1	36.3	37.5	No interference	No interference
R0200N400	2	4	4	40	3.9	1.4°	90	6	2	●	1	41.4	42.8	No interference	No interference
R0200N450	2	4	4	45	3.9	1.3°	90	6	2	●	1	46.6	48.2	No interference	No interference
R0200N500	2	4	4	50	3.9	1.2°	100	6	2	●	1	51.8	53.5	No interference	No interference
R0250N200	2.5	5	5	20	4.9	1.5°	70	6	2	●	1	20.7	21.4	No interference	No interference
R0250N250	2.5	5	5	25	4.9	1.2°	70	6	2	●	1	25.9	26.7	No interference	No interference
R0250N300	2.5	5	5	30	4.9	1°	80	6	2	●	1	31.1	No interference	No interference	No interference
R0250N350	2.5	5	5	35	4.9	0.9°	80	6	2	●	1	36.3	No interference	No interference	No interference
R0300N300	3	6	6	30	5.85	—	80	6	2	●	2	No interference	No interference	No interference	No interference
R0300N500	3	6	6	50	5.85	—	120	6	2	●	2	No interference	No interference	No interference	No interference

● : Inventory maintained in Japan.

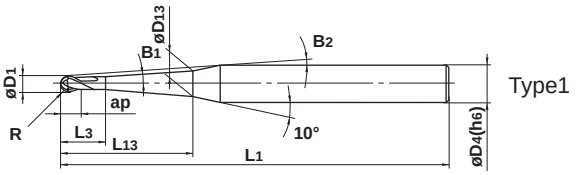
CUTTING CONDITIONS B298

MS2XB

Ball nose end mill, 2 flute, Taper neck

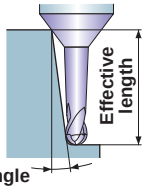
R ±0.01 | 0 — -0.020 | h6 | 4≤D4≤6 0 — -0.008 | D4 = 8 0 — -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1

UWC MS 30°



2 flute taper neck ball nose end mill.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L13	Length of Straight Neck L3	Cutting Edge to Shank Angle B2	Neck Dia. D13	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XBR0010T0030L015	0.1	0.2	30'	0.2	1.5	0.6	8.8°	0.19	50	4	2	●	1	1.7	1.8	2.0	2.3
R0010T0030L020	0.1	0.2	30'	0.2	2	0.6	8.5°	0.20	50	4	2	●	1	2.2	2.4	2.6	3.0
R0010T0100L015	0.1	0.2	1°	0.2	1.5	0.6	8.8°	0.21	50	4	2	●	1	—	1.8	2.0	2.2
R0010T0100L020	0.1	0.2	1°	0.2	2	0.6	8.5°	0.22	50	4	2	●	1	—	2.3	2.5	2.9
R0010T0130L015	0.1	0.2	1°30'	0.2	1.5	0.6	8.9°	0.22	50	4	2	●	1	—	—	1.9	2.2
R0010T0130L020	0.1	0.2	1°30'	0.2	2	0.6	8.6°	0.25	50	4	2	●	1	—	—	2.4	2.8
R0010T0200L015	0.1	0.2	2°	0.2	1.5	0.6	8.9°	0.24	50	4	2	●	1	—	—	1.8	2.1
R0010T0200L020	0.1	0.2	2°	0.2	2	0.6	8.6°	0.27	50	4	2	●	1	—	—	2.3	2.6
R0010T0300L015	0.1	0.2	3°	0.2	1.5	0.6	9.0°	0.27	50	4	2	●	1	—	—	—	1.9
R0010T0300L020	0.1	0.2	3°	0.2	2	0.6	8.7°	0.32	50	4	2	●	1	—	—	—	2.4
R0010T0500L020	0.1	0.2	5°	0.2	2	0.6	9.0°	0.42	50	4	2	●	1	—	—	—	—
R0015T0030L030	0.15	0.3	30'	0.3	3	0.7	7.9°	0.32	50	4	2	●	1	3.2	3.4	3.8	4.3
R0015T0100L030	0.15	0.3	1°	0.3	3	0.7	7.9°	0.36	50	4	2	●	1	—	3.3	3.7	4.2
R0015T0130L030	0.15	0.3	1°30'	0.3	3	0.7	8.0°	0.40	50	4	2	●	1	—	—	3.5	4.0
R0015T0200L030	0.15	0.3	2°	0.3	3	0.7	8.1°	0.44	50	4	2	●	1	—	—	3.3	3.8
R0015T0300L030	0.15	0.3	3°	0.3	3	0.7	8.2°	0.52	50	4	2	●	1	—	—	—	3.4
R0015T0500L030	0.15	0.3	5°	0.3	3	0.7	8.6°	0.68	50	4	2	●	1	—	—	—	—
R0020T0030L020	0.2	0.4	30'	0.4	2	1.2	8.4°	0.38	50	4	2	●	1	2.3	2.4	2.7	3.0
R0020T0030L030	0.2	0.4	30'	0.4	3	1.2	7.8°	0.40	50	4	2	●	1	3.3	3.5	3.9	4.4
R0020T0030L040	0.2	0.4	30'	0.4	4	1.2	7.3°	0.41	50	4	2	●	1	4.3	4.5	5.1	5.7
R0020T0030L050	0.2	0.4	30'	0.4	5	1.2	6.8°	0.43	50	4	2	●	1	5.3	5.6	6.2	7.1
R0020T0100L020	0.2	0.4	1°	0.4	2	1.2	8.4°	0.39	50	4	2	●	1	—	2.3	2.6	3.0
R0020T0100L030	0.2	0.4	1°	0.4	3	1.2	7.9°	0.43	50	4	2	●	1	—	3.3	3.7	4.2
R0020T0100L040	0.2	0.4	1°	0.4	4	1.2	7.4°	0.46	50	4	2	●	1	—	4.3	4.9	5.5
R0020T0100L050	0.2	0.4	1°	0.4	5	1.2	6.9°	0.50	50	4	2	●	1	—	5.3	6.0	6.8
R0020T0130L020	0.2	0.4	1°30'	0.4	2	1.2	8.5°	0.41	50	4	2	●	1	—	—	2.5	2.9
R0020T0130L030	0.2	0.4	1°30'	0.4	3	1.2	7.9°	0.46	50	4	2	●	1	—	—	3.6	4.1
R0020T0130L040	0.2	0.4	1°30'	0.4	4	1.2	7.5°	0.51	50	4	2	●	1	—	—	4.7	5.3
R0020T0130L050	0.2	0.4	1°30'	0.4	5	1.2	7.0°	0.56	50	4	2	●	1	—	—	5.7	6.5
R0020T0200L020	0.2	0.4	2°	0.4	2	1.2	8.5°	0.42	50	4	2	●	1	—	—	2.5	2.8
R0020T0200L030	0.2	0.4	2°	0.4	3	1.2	8.0°	0.49	50	4	2	●	1	—	—	3.5	4.0
R0020T0200L040	0.2	0.4	2°	0.4	4	1.2	7.5°	0.56	50	4	2	●	1	—	—	4.5	5.1
R0020T0200L050	0.2	0.4	2°	0.4	5	1.2	7.1°	0.63	50	4	2	●	1	—	—	5.5	6.2
R0025T0030L030	0.25	0.5	30'	0.5	3	1.5	7.8°	0.49	50	4	2	●	1	3.3	3.5	3.9	4.4
R0025T0030L050	0.25	0.5	30'	0.5	5	1.5	6.8°	0.53	50	4	2	●	1	5.3	5.6	6.2	7.1
R0025T0100L030	0.25	0.5	1°	0.5	3	1.5	7.8°	0.52	50	4	2	●	1	—	3.4	3.8	4.3
R0025T0100L050	0.25	0.5	1°	0.5	5	1.5	6.9°	0.59	50	4	2	●	1	—	5.4	6.0	6.8
R0025T0130L030	0.25	0.5	1°30'	0.5	3	1.5	7.9°	0.54	50	4	2	●	1	—	—	3.7	4.1

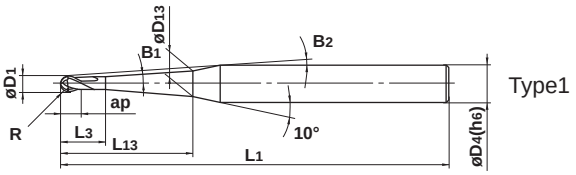
CUTTING CONDITIONS B299

MS2XB

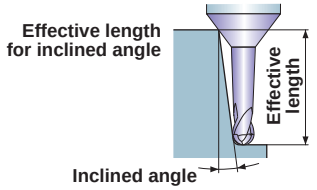
Ball nose end mill, 2 flute, Taper neck

R ±0.01 | 0 — -0.020 | h6 | 4≤D4≤6 0 — -0.008 | D4 = 8 0 — -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



● 2 flute taper neck ball nose end mill.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L13	Length of Straight Neck L3	Cutting Edge to Shank Angle B2	Neck Dia. D13	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XBR0025T0130L050	0.25	0.5	1°30'	0.5	5	1.5	7.0°	0.65	50	4	2	●	1	—	—	5.8	6.6
R0025T0200L030	0.25	0.5	2°	0.5	3	1.5	7.9°	0.57	50	4	2	●	1	—	—	3.5	4.0
R0025T0200L050	0.25	0.5	2°	0.5	5	1.5	7.1°	0.71	50	4	2	●	1	—	—	5.5	6.3
R0030T0030L050	0.3	0.6	30'	0.6	5	1.6	6.8°	0.62	50	4	2	●	1	5.3	5.6	6.2	7.1
R0030T0030L080	0.3	0.6	30'	0.6	8	1.6	5.7°	0.68	50	4	2	●	1	8.3	8.7	9.8	11.1
R0030T0100L050	0.3	0.6	1°	0.6	5	1.6	6.8°	0.68	50	4	2	●	1	—	5.4	6.0	6.8
R0030T0100L080	0.3	0.6	1°	0.6	8	1.6	5.8°	0.79	50	4	2	●	1	—	8.4	9.4	10.7
R0030T0100L100	0.3	0.6	1°	0.6	10	1.6	5.2°	0.86	50	4	2	●	1	—	10.4	11.6	13.2
R0030T0100L120	0.3	0.6	1°	0.6	12	1.6	4.8°	0.93	50	4	2	●	1	—	12.4	13.9	15.8
R0030T0100L150	0.3	0.6	1°	0.6	15	1.6	4.2°	1.03	50	4	2	●	1	—	15.4	17.2	19.6
R0030T0130L050	0.3	0.6	1°30'	0.6	5	1.6	6.9°	0.74	50	4	2	●	1	—	—	5.8	6.6
R0030T0130L080	0.3	0.6	1°30'	0.6	8	1.6	5.9°	0.90	50	4	2	●	1	—	—	9.0	10.2
R0030T0200L060	0.3	0.6	2°	0.6	6	1.6	6.6°	0.87	50	4	2	●	1	—	—	6.6	7.4
R0030T0200L080	0.3	0.6	2°	0.6	8	1.6	6.0°	1.01	50	4	2	●	1	—	—	8.6	9.7
R0040T0030L080	0.4	0.8	30'	0.8	8	1.8	5.5°	0.87	50	4	2	●	1	8.3	8.7	9.8	11.1
R0040T0030L120	0.4	0.8	30'	0.8	12	1.8	4.5°	0.94	60	4	2	●	1	12.3	13.0	14.5	16.5
R0040T0100L080	0.4	0.8	1°	0.8	8	1.8	5.6°	0.98	50	4	2	●	1	—	8.4	9.4	10.7
R0040T0100L120	0.4	0.8	1°	0.8	12	1.8	4.6°	1.12	60	4	2	●	1	—	12.4	13.9	15.8
R0040T0130L080	0.4	0.8	1°30'	0.8	8	1.8	5.8°	1.09	50	4	2	●	1	—	—	9.0	10.2
R0040T0130L120	0.4	0.8	1°30'	0.8	12	1.8	4.8°	1.30	60	4	2	●	1	—	—	13.2	15.0
R0040T0200L080	0.4	0.8	2°	0.8	8	1.8	5.9°	1.20	60	4	2	●	1	—	—	8.6	9.7
R0040T0300L120	0.4	0.8	3°	0.8	12	1.8	5.2°	1.83	60	4	2	●	1	—	—	—	12.8
R0050T0030L100	0.5	1	30'	1	10	2.5	6.1°	1.08	60	6	2	●	1	10.4	10.9	12.2	13.9
R0050T0030L150	0.5	1	30'	1	15	2.5	5.1°	1.16	60	6	2	●	1	15.4	16.2	18.2	20.7
R0050T0030L200	0.5	1	30'	1	20	2.5	4.4°	1.25	70	6	2	●	1	20.4	21.5	24.1	27.4
R0050T0030L250	0.5	1	30'	1	25	2.5	3.8°	1.34	70	6	2	●	1	25.4	26.8	30.0	34.2
R0050T0030L300	0.5	1	30'	1	30	2.5	3.4°	1.42	70	6	2	●	1	30.4	32.0	35.9	41.0
R0050T0100L100	0.5	1	1°	1	10	2.5	6.2°	1.21	60	6	2	●	1	—	10.5	11.8	13.4
R0050T0100L150	0.5	1	1°	1	15	2.5	5.2°	1.38	60	6	2	●	1	—	15.5	17.4	19.8
R0050T0100L200	0.5	1	1°	1	20	2.5	4.5°	1.56	70	6	2	●	1	—	20.5	23.0	26.2
R0050T0100L250	0.5	1	1°	1	25	2.5	3.9°	1.73	70	6	2	●	1	—	25.5	28.6	32.6
R0050T0100L300	0.5	1	1°	1	30	2.5	3.5°	1.91	70	6	2	●	1	—	30.5	34.2	39.0
R0050T0100L350	0.5	1	1°	1	35	2.5	3.2°	2.08	80	6	2	●	1	—	35.5	39.8	45.4
R0050T0130L100	0.5	1	1°30'	1	10	2.5	6.3°	1.34	60	6	2	●	1	—	—	11.3	12.8
R0050T0130L150	0.5	1	1°30'	1	15	2.5	5.3°	1.60	60	6	2	●	1	—	—	16.6	18.9
R0050T0130L200	0.5	1	1°30'	1	20	2.5	4.6°	1.86	70	6	2	●	1	—	—	21.9	24.9
R0050T0200L150	0.5	1	2°	1	15	2.5	5.4°	1.82	60	6	2	●	1	—	—	15.8	18.0
R0050T0200L200	0.5	1	2°	1	20	2.5	4.7°	2.17	70	6	2	●	1	—	—	20.8	23.7

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L13	Length of Straight Neck L3	Cutting Edge to Shank Angle B2	Neck Dia. D13	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XBR0050T0300L200	0.5	1	3°	1	20	2.5	5.0°	2.78	70	6	2	●	1	—	—	—	21.2
R0050T0300L400	0.5	1	3°	1	40	2.5	3.4°	4.88	80	6	2	●	1	—	—	—	41.2
R0050T0500L200	0.5	1	5°	1	20	2.5	5.7°	4.01	70	6	2	●	1	—	—	—	—
R0060T0030L120	0.6	1.2	30'	1.2	12	2.7	5.6°	1.31	60	6	2	●	1	12.4	13.1	14.6	16.6
R0060T0030L240	0.6	1.2	30'	1.2	24	2.7	3.8°	1.52	70	6	2	●	1	24.4	25.7	28.8	32.8
R0060T0100L120	0.6	1.2	1°	1.2	12	2.7	5.7°	1.47	60	6	2	●	1	—	12.5	14.0	15.9
R0060T0100L240	0.6	1.2	1°	1.2	24	2.7	3.9°	1.89	70	6	2	●	1	—	24.5	27.5	31.3
R0060T0130L120	0.6	1.2	1°30'	1.2	12	2.7	5.8°	1.63	60	6	2	●	1	—	—	13.4	15.2
R0060T0130L240	0.6	1.2	1°30'	1.2	24	2.7	4.1°	2.26	70	6	2	●	1	—	—	26.2	29.8
R0060T0200L120	0.6	1.2	2°	1.2	12	2.7	5.9°	1.79	60	6	2	●	1	—	—	12.8	14.6
R0060T0200L240	0.6	1.2	2°	1.2	24	2.7	4.2°	2.63	70	6	2	●	1	—	—	24.8	28.3
R0075T0030L100	0.75	1.5	30'	1.5	10	3	5.9°	1.57	60	6	2	●	1	10.4	10.9	12.2	13.8
R0075T0030L150	0.75	1.5	30'	1.5	15	3	4.9°	1.65	60	6	2	●	1	15.4	16.2	18.1	20.6
R0075T0030L300	0.75	1.5	30'	1.5	30	3	3.2°	1.92	70	6	2	●	1	30.4	32.0	35.9	40.9
R0075T0100L100	0.75	1.5	1°	1.5	10	3	6.0°	1.69	60	6	2	●	1	—	10.5	11.8	13.3
R0075T0100L150	0.75	1.5	1°	1.5	15	3	5.0°	1.86	60	6	2	●	1	—	15.5	17.4	19.7
R0075T0100L200	0.75	1.5	1°	1.5	20	3	4.2°	2.04	70	6	2	●	1	—	20.5	23.0	26.1
R0075T0100L300	0.75	1.5	1°	1.5	30	3	3.3°	2.39	70	6	2	●	1	—	30.5	34.2	39.0
R0075T0130L100	0.75	1.5	1°30'	1.5	10	3	6.1°	1.81	60	6	2	●	1	—	—	11.3	12.8
R0075T0130L150	0.75	1.5	1°30'	1.5	15	3	5.1°	2.07	60	6	2	●	1	—	—	16.6	18.9
R0075T0130L300	0.75	1.5	1°30'	1.5	30	3	3.4°	2.86	70	6	2	●	1	—	—	32.5	37.0
R0075T0200L100	0.75	1.5	2°	1.5	10	3	6.2°	1.93	60	6	2	●	1	—	—	10.9	12.3
R0075T0200L150	0.75	1.5	2°	1.5	15	3	5.2°	2.28	60	6	2	●	1	—	—	15.9	18.0
R0075T0200L300	0.75	1.5	2°	1.5	30	3	3.5°	3.33	70	6	2	●	1	—	—	30.9	35.1
R0100T0030L200	1	2	30'	2	20	4	3.9°	2.18	60	6	2	●	1	20.7	21.7	24.3	27.6
R0100T0030L300	1	2	30'	2	30	4	2.9°	2.36	70	6	2	●	1	30.7	32.3	36.2	No interference
R0100T0030L400	1	2	30'	2	40	4	2.4°	2.53	80	6	2	●	1	40.7	42.8	48.0	No interference
R0100T0100L200	1	2	1°	2	20	4	4.0°	2.46	60	6	2	●	1	—	20.8	23.3	26.4
R0100T0100L250	1	2	1°	2	25	4	3.4°	2.64	60	6	2	●	1	—	25.8	28.9	32.9
R0100T0100L300	1	2	1°	2	30	4	3.0°	2.81	70	6	2	●	1	—	30.8	34.5	39.3
R0100T0100L350	1	2	1°	2	35	4	2.7°	2.99	80	6	2	●	1	—	35.8	40.1	No interference
R0100T0100L400	1	2	1°	2	40	4	2.5°	3.16	80	6	2	●	1	—	40.8	45.8	No interference
R0100T0100L500	1	2	1°	2	50	4	2.1°	3.51	90	6	2	●	1	—	50.8	57.0	No interference
R0100T0130L200	1	2	1°30'	2	20	4	4.1°	2.74	60	6	2	●	1	—	—	22.3	25.3
R0100T0130L300	1	2	1°30'	2	30	4	3.1°	3.27	70	6	2	●	1	—	—	32.9	37.4
R0100T0130L400	1	2	1°30'	2	40	4	2.6°	3.79	80	6	2	●	1	—	—	43.5	No interference
R0100T0200L300	1	2	2°	2	30	4	3.3°	3.72	70	6	2	●	1	—	—	31.3	35.5
R0100T0200L400	1	2	2°	2	40	4	2.7°	4.42	80	6	2	●	1	—	—	41.3	No interference
R0100T0300L300	1	2	3°	2	30	4	3.5°	4.63	70	6	2	●	1	—	—	—	31.8
R0100T0300L400	1	2	3°	2	40	4	2.9°	5.68	80	6	2	●	1	—	—	—	No interference
R0100T0500L200	1	2	5°	2	20	4	5.1°	4.70	60	6	2	●	1	—	—	—	—
R0100T0500L380	1	2	5°	2	38	4	4.6°	7.85	80	8	2	●	1	—	—	—	—
R0150T0030L300	1.5	3	30'	3	30	6	2.4°	3.32	70	6	2	●	1	30.7	32.3	36.2	No interference
R0150T0030L400	1.5	3	30'	3	40	6	1.9°	3.50	80	6	2	●	1	40.7	42.9	No interference	No interference
R0150T0030L500	1.5	3	30'	3	50	6	1.6°	3.67	90	6	2	●	1	50.7	53.4	No interference	No interference
R0150T0100L300	1.5	3	1°	3	30	6	2.5°	3.74	70	6	2	●	1	—	31.0	34.7	No interference
R0150T0100L400	1.5	3	1°	3	40	6	2.0°	4.09	80	6	2	●	1	—	41.0	45.9	No interference
R0150T0100L500	1.5	3	1°	3	50	6	1.7°	4.44	90	6	2	●	1	—	51.0	No interference	No interference
R0150T0130L300	1.5	3	1°30'	3	30	6	2.6°	4.16	70	6	2	●	1	—	—	33.1	No interference
R0150T0130L400	1.5	3	1°30'	3	40	6	2.1°	4.69	80	6	2	●	1	—	—	43.8	No interference

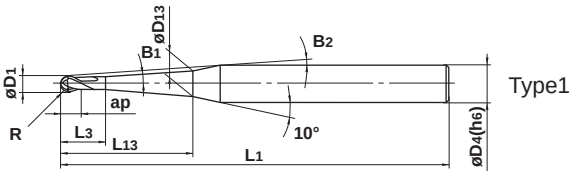
CUTTING CONDITIONS B299

MS2XB

Ball nose end mill, 2 flute, Taper neck

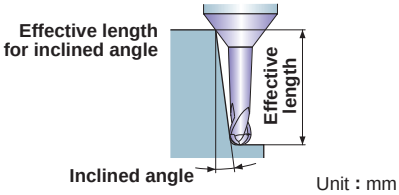
R ±0.01 | 0 — -0.020 | h6 | 4 ≤ D4 ≤ 6 0 — -0.008 | D4 = 8 0 — -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1

UWC MS 30°



● 2 flute taper neck ball nose end mill.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L13	Length of Straight Neck L3	Cutting Edge to Shank Angle B2	Neck Dia. D13	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XBR0150T0130L500	1.5	3	1°30'	3	50	6	1.7°	5.21	90	6	2	●	1	—	—	No interference	No interference
R0150T0200L300	1.5	3	2°	3	30	6	2.7°	4.58	70	6	2	●	1	—	—	31.6	No interference
R0150T0200L480	1.5	3	2°	3	48	6	1.9°	5.84	90	6	2	●	1	—	—	No interference	No interference
R0150T0300L300	1.5	3	3°	3	30	6	2.9°	5.42	70	6	2	●	1	—	—	—	No interference
R0150T0300L500	1.5	3	3°	3	50	6	2.9°	7.52	90	8	2	●	1	—	—	—	No interference
R0200T0030L600	2	4	30'	4	60	7	1.0°	4.83	110	6	2	●	1	60.8	64.0	No interference	No interference
R0200T0100L600	2	4	1°	4	60	7	1.0°	5.76	110	6	2	●	1	—	61.1	No interference	No interference

● : Inventory maintained in Japan.

CUTTING CONDITIONS B299

MS2MRB

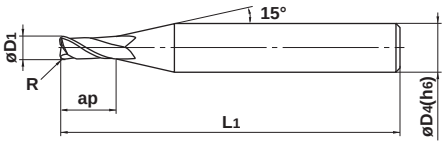
Corner radius end mill, Medium cut length, 2 flute

0 — -0.020

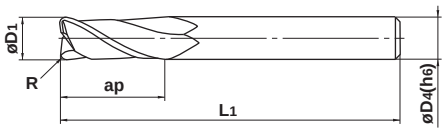
h6

4 ≤ D4 ≤ 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

UWC MS 30°

D1<3

D1≥3

● 2 flute corner radius end mill for general use.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
NEW MS2MRBD0100R010	1	0.1	2	40	4	2	●	1
D0100R020	1	0.2	2	40	4	2	●	1
D0100R030	1	0.3	2	40	4	2	●	1
NEW D0150R010	1.5	0.1	3	40	4	2	●	1
D0150R020	1.5	0.2	3	40	4	2	●	1
D0150R030	1.5	0.3	3	40	4	2	●	1
D0150R050	1.5	0.5	3	40	4	2	●	1
NEW D0200R010	2	0.1	4	40	4	2	●	1
D0200R020	2	0.2	4	40	4	2	●	1
D0200R030	2	0.3	4	40	4	2	●	1
D0200R050	2	0.5	4	40	4	2	●	1
NEW D0250R010	2.5	0.1	5	40	4	2	●	1
D0250R020	2.5	0.2	5	40	4	2	●	1
D0250R030	2.5	0.3	5	40	4	2	●	1
D0250R050	2.5	0.5	5	40	4	2	●	1
NEW D0300R010	3	0.1	6	50	6	2	●	1
D0300R020	3	0.2	6	50	6	2	●	1
D0300R030	3	0.3	6	50	6	2	●	1
D0300R050	3	0.5	6	50	6	2	●	1
D0300R100	3	1	6	50	6	2	●	1
NEW D0400R010	4	0.1	8	50	6	2	●	1
D0400R020	4	0.2	8	50	6	2	●	1
D0400R030	4	0.3	8	50	6	2	●	1
D0400R050	4	0.5	8	50	6	2	●	1
D0400R100	4	1	8	50	6	2	●	1
NEW D0500R010	5	0.1	10	50	6	2	●	1
D0500R020	5	0.2	10	50	6	2	●	1
D0500R030	5	0.3	10	50	6	2	●	1
D0500R050	5	0.5	10	50	6	2	●	1
D0500R100	5	1	10	50	6	2	●	1
NEW D0600R010	6	0.1	12	50	6	2	●	2
D0600R020	6	0.2	12	50	6	2	●	2
D0600R030	6	0.3	12	50	6	2	●	2
D0600R050	6	0.5	12	50	6	2	●	2
D0600R100	6	1	12	50	6	2	●	2
D0600R150	6	1.5	12	50	6	2	●	2
D0600R200	6	2	12	50	6	2	●	2
NEW D0800R020	8	0.2	16	60	8	2	●	2

CUTTING CONDITIONS B284

MS2MRB

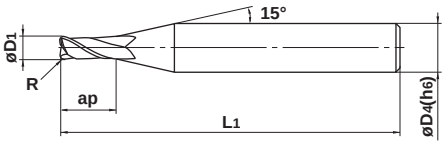
Corner radius end mill, Medium cut length, 2 flute

0 — -0.020

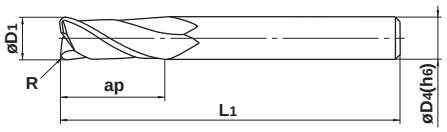
h6

4 ≤ D4 ≤ 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

● 2 flute corner radius end mill for general use.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
NEW MS2MRBD0800R030	8	0.3	16	60	8	2	●	2
NEW D0800R050	8	0.5	16	60	8	2	●	2
NEW D0800R100	8	1	16	60	8	2	●	2
NEW D0800R150	8	1.5	16	60	8	2	●	2
NEW D0800R200	8	2	16	60	8	2	●	2
NEW D0800R250	8	2.5	16	60	8	2	●	2
NEW D0800R300	8	3	16	60	8	2	●	2
NEW D1000R020	10	0.2	20	70	10	2	●	2
NEW D1000R030	10	0.3	20	70	10	2	●	2
NEW D1000R050	10	0.5	20	70	10	2	●	2
NEW D1000R100	10	1	20	70	10	2	●	2
NEW D1000R150	10	1.5	20	70	10	2	●	2
NEW D1000R200	10	2	20	70	10	2	●	2
NEW D1000R250	10	2.5	20	70	10	2	●	2
NEW D1000R300	10	3	20	70	10	2	●	2
NEW D1200R020	12	0.2	24	75	12	2	●	2
NEW D1200R030	12	0.3	24	75	12	2	●	2
NEW D1200R050	12	0.5	24	75	12	2	●	2
NEW D1200R100	12	1	24	75	12	2	●	2
NEW D1200R150	12	1.5	24	75	12	2	●	2
NEW D1200R200	12	2	24	75	12	2	●	2
NEW D1200R250	12	2.5	24	75	12	2	●	2
NEW D1200R300	12	3	24	75	12	2	●	2

● : Inventory maintained in Japan.

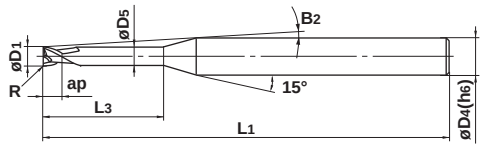
CUTTING CONDITIONS B284

MS2XLRB

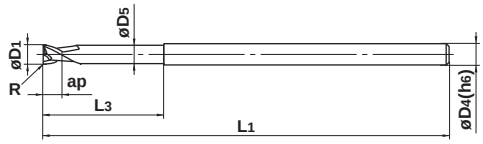
Corner radius end mill, Short cut length, 2 flute, Long neck

0 — -0.020 | h6 | D4 = 6 0 — -0.008

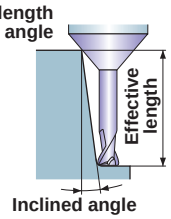
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2



● 2 flute long neck corner radius end mill.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
MS2XLRBD0100R010N020	1	0.1	1	2	0.94	12.3°	60	6	2	●	1	2.1	2.3	2.4	2.8
D0100R010N050	1	0.1	1	5	0.94	9.8°	60	6	2	●	1	5.3	5.6	6.0	6.5
D0200R010N040	2	0.1	2	4	1.90	9.9°	60	6	2	●	1	4.2	4.4	4.8	5.2
D0200R010N100	2	0.1	2	10	1.90	6.5°	60	6	2	●	1	10.5	10.9	11.7	12.6
D0200R030N040	2	0.3	2	4	1.90	10°	60	6	2	●	1	4.2	4.4	4.7	5.1
D0200R030N100	2	0.3	2	10	1.90	6.6°	60	6	2	●	1	10.5	10.8	11.6	12.6
D0300R010N060	3	0.1	3	6	2.90	7.4°	50	6	2	●	1	6.3	6.6	7.1	7.6
D0300R010N150	3	0.1	3	15	2.90	4.2°	60	6	2	●	1	15.7	16.2	17.4	18.8
D0300R030N060	3	0.3	3	6	2.90	7.5°	50	6	2	●	1	6.3	6.6	7.0	7.6
D0300R030N150	3	0.3	3	15	2.90	4.2°	60	6	2	●	1	15.7	16.2	17.4	18.8
D0400R010N080	4	0.1	4	8	3.90	4.9°	50	6	2	●	1	8.4	8.7	9.4	10.1
D0400R010N200	4	0.1	4	20	3.90	2.5°	60	6	2	●	1	20.8	21.6	23.2	No interference
D0400R030N080	4	0.3	4	8	3.90	5°	50	6	2	●	1	8.4	8.7	9.3	10.1
D0400R030N200	4	0.3	4	20	3.90	2.5°	60	6	2	●	1	20.8	21.5	23.1	No interference
D0400R050N080	4	0.5	4	8	3.90	5°	50	6	2	●	1	8.4	8.7	9.3	10.0
D0400R050N200	4	0.5	4	20	3.90	2.5°	60	6	2	●	1	20.8	21.5	23.1	No interference
D0600R010N120	6	0.1	6	12	5.85	—	50	6	2	●	1	No interference	No interference	No interference	No interference
D0600R010N300	6	0.1	6	30	5.85	—	70	6	2	●	1	No interference	No interference	No interference	No interference
D0600R030N120	6	0.3	6	12	5.85	—	50	6	2	●	1	No interference	No interference	No interference	No interference
D0600R030N300	6	0.3	6	30	5.85	—	70	6	2	●	1	No interference	No interference	No interference	No interference
D0600R050N120	6	0.5	6	12	5.85	—	50	6	2	●	2	No interference	No interference	No interference	No interference
D0600R050N300	6	0.5	6	30	5.85	—	70	6	2	●	2	No interference	No interference	No interference	No interference

MS4MRB

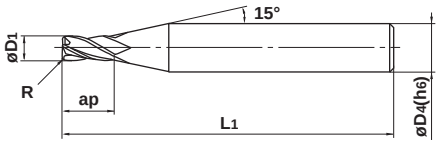
Corner radius end mill, Medium cut length, 4 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

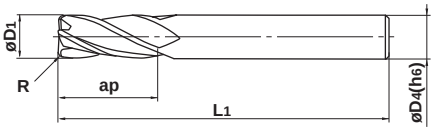
h6

D4=6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1



Type2

● 4 flute corner radius end mill for general use.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
NEW MS4MRBD0300R010	3	0.1	8	45	6	4	●	1
NEW D0300R020	3	0.2	8	45	6	4	●	1
D0300R030	3	0.3	8	45	6	4	●	1
D0300R050	3	0.5	8	45	6	4	●	1
D0300R100	3	1	8	45	6	4	●	1
NEW D0400R010	4	0.1	11	45	6	4	●	1
D0400R020	4	0.2	11	45	6	4	●	1
D0400R030	4	0.3	11	45	6	4	●	1
D0400R050	4	0.5	11	45	6	4	●	1
D0400R100	4	1	11	45	6	4	●	1
NEW D0500R010	5	0.1	13	50	6	4	●	1
D0500R020	5	0.2	13	50	6	4	●	1
D0500R030	5	0.3	13	50	6	4	●	1
D0500R050	5	0.5	13	50	6	4	●	1
D0500R100	5	1	13	50	6	4	●	1
NEW D0600R010	6	0.1	13	50	6	4	●	2
D0600R020	6	0.2	13	50	6	4	●	2
D0600R030	6	0.3	13	50	6	4	●	2
D0600R050	6	0.5	13	50	6	4	●	2
D0600R100	6	1	13	50	6	4	●	2
D0600R150	6	1.5	13	50	6	4	●	2
D0600R200	6	2	13	50	6	4	●	2
D0800R020	8	0.2	19	60	8	4	●	2
D0800R030	8	0.3	19	60	8	4	●	2
D0800R050	8	0.5	19	60	8	4	●	2
D0800R100	8	1	19	60	8	4	●	2
D0800R150	8	1.5	19	60	8	4	●	2
D0800R200	8	2	19	60	8	4	●	2
D0800R250	8	2.5	19	60	8	4	●	2
D0800R300	8	3	19	60	8	4	●	2
D1000R020	10	0.2	22	70	10	4	●	2
D1000R030	10	0.3	22	70	10	4	●	2
D1000R050	10	0.5	22	70	10	4	●	2
D1000R100	10	1	22	70	10	4	●	2
D1000R150	10	1.5	22	70	10	4	●	2
D1000R200	10	2	22	70	10	4	●	2
D1000R250	10	2.5	22	70	10	4	●	2
D1000R300	10	3	22	70	10	4	●	2

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Corner R R	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS4MRBD1200R020	12	0.2	26	75	12	4	●	2
D1200R030	12	0.3	26	75	12	4	●	2
D1200R050	12	0.5	26	75	12	4	●	2
D1200R100	12	1	26	75	12	4	●	2
D1200R150	12	1.5	26	75	12	4	●	2
D1200R200	12	2	26	75	12	4	●	2
D1200R250	12	2.5	26	75	12	4	●	2
D1200R300	12	3	26	75	12	4	●	2
D1600R050	16	0.5	32	90	16	4	●	2
D1600R100	16	1	32	90	16	4	●	2
D1600R150	16	1.5	32	90	16	4	●	2
D1600R200	16	2	32	90	16	4	●	2
D1600R250	16	2.5	32	90	16	4	●	2
D1600R300	16	3	32	90	16	4	●	2
D2000R050	20	0.5	38	100	20	4	●	2
D2000R100	20	1	38	100	20	4	●	2
D2000R150	20	1.5	38	100	20	4	●	2
D2000R200	20	2	38	100	20	4	●	2
D2000R250	20	2.5	38	100	20	4	●	2
D2000R300	20	3	38	100	20	4	●	2

CUTTING CONDITIONS B301

MSMHDRB

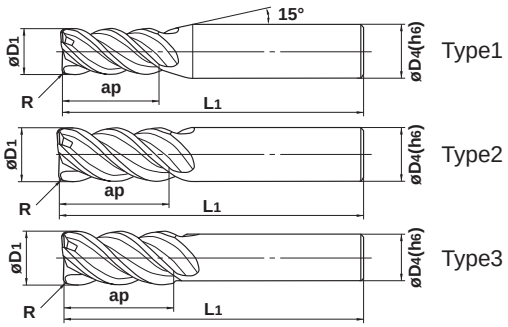
High power, Corner radius, Medium cut length, 4 flute

D1≤12	0 −-0.020	4≤D4≤6	0 −-0.008
D1>12	0 −-0.030	8≤D4≤10	0 −-0.009
		12≤D4≤16	0 −-0.011
		D4=20	0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎		◎	◎		

UWC MS 45°

- 4 flute high power corner radius end mill.



Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSMHDRBD0200R020	2	0.2	4	45	4	4	●	1
D0200R030	2	0.3	4	45	4	4	●	1
D0300R020	3	0.2	8	45	6	4	●	1
D0300R030	3	0.3	8	45	6	4	●	1
D0300R050	3	0.5	8	45	6	4	●	1
D0400R020	4	0.2	11	45	6	4	●	1
D0400R030	4	0.3	11	45	6	4	●	1
D0400R050	4	0.5	11	45	6	4	●	1
D0500R020	5	0.2	13	50	6	4	●	1
D0500R030	5	0.3	13	50	6	4	●	1
D0500R050	5	0.5	13	50	6	4	●	1
D0500R100	5	1	13	50	6	4	●	1
D0600R030	6	0.3	13	50	6	4	●	2
D0600R050	6	0.5	13	50	6	4	●	2
D0600R100	6	1	13	50	6	4	●	2
D0800R030	8	0.3	19	60	8	4	●	2
D0800R050	8	0.5	19	60	8	4	●	2
D0800R100	8	1	19	60	8	4	●	2
D0800R150	8	1.5	19	60	8	4	●	2
D1000R030	10	0.3	22	70	10	4	●	2
D1000R050	10	0.5	22	70	10	4	●	2
D1000R100	10	1	22	70	10	4	●	2
D1000R150	10	1.5	22	70	10	4	●	2
D1000R200	10	2	22	70	10	4	●	2
D1200R050S10	12	0.5	26	75	10	4	●	3
D1200R100S10	12	1	26	75	10	4	●	3
D1200R150S10	12	1.5	26	75	10	4	●	3
D1200R200S10	12	2	26	75	10	4	●	3
D1200R300S10	12	3	26	75	10	4	●	3
D1200R050	12	0.5	26	75	12	4	●	2
D1200R100	12	1	26	75	12	4	●	2
D1200R150	12	1.5	26	75	12	4	●	2
D1200R200	12	2	26	75	12	4	●	2
D1200R300	12	3	26	75	12	4	●	2
D1600R100	16	1	35	90	16	4	●	2
D1600R150	16	1.5	35	90	16	4	●	2
D1600R200	16	2	35	90	16	4	●	2
D1600R300	16	3	35	90	16	4	●	2

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Corner R R	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MSMHDRBD1800R100	18	1	40	100	16	4	●	3
D1800R150	18	1.5	40	100	16	4	●	3
D1800R200	18	2	40	100	16	4	●	3
D1800R300	18	3	40	100	16	4	●	3
D2000R100	20	1	45	110	20	4	●	2
D2000R150	20	1.5	45	110	20	4	●	2
D2000R200	20	2	45	110	20	4	●	2
D2000R300	20	3	45	110	20	4	●	2

CUTTING CONDITIONS B302

MS2MT

Taper end mill, Medium cut length, 2 flute

D1<0.5 0 −-0.020
D1≥0.5 0 −-0.030

±5'

h6

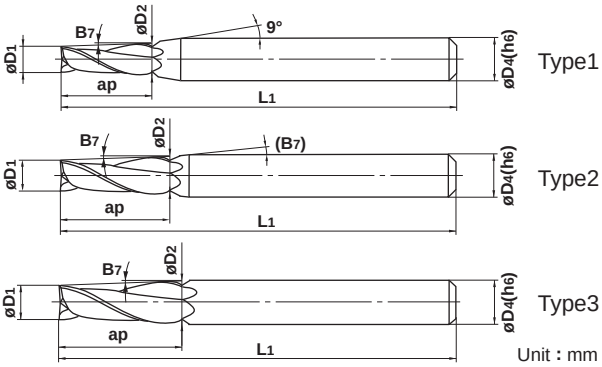
4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		

UWC MS 30°

D1<0.4 D1≥0.4

● 2 flute taper end mill for general use.



Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MTD0020T0030	0.2	30'	0.8	0.21	45	4	2	●	1
D0020T0100	0.2	1°	0.8	0.23	45	4	2	●	1
D0020T0130	0.2	1° 30'	0.8	0.24	45	4	2	●	1
D0020T0200	0.2	2°	0.8	0.26	45	4	2	●	1
D0020T0300	0.2	3°	0.8	0.28	45	4	2	●	1
D0020T0400	0.2	4°	0.8	0.31	45	4	2	●	1
D0020T0500	0.2	5°	0.8	0.34	45	4	2	●	1
D0020T0700	0.2	7°	0.8	0.4	45	4	2	●	1
D0020T1000	0.2	10°	0.8	0.48	45	4	2	●	2
D0030T0030	0.3	30'	1.2	0.32	45	4	2	●	1
D0030T0100	0.3	1°	1.2	0.34	45	4	2	●	1
D0030T0130	0.3	1° 30'	1.2	0.36	45	4	2	●	1
D0030T0200	0.3	2°	1.2	0.38	45	4	2	●	1
D0030T0300	0.3	3°	1.2	0.43	45	4	2	●	1
D0030T0400	0.3	4°	1.2	0.47	45	4	2	●	1
D0030T0500	0.3	5°	1.2	0.51	45	4	2	●	1
D0030T0700	0.3	7°	1.2	0.59	45	4	2	●	1
D0030T1000	0.3	10°	1.2	0.72	45	4	2	●	2
D0040T0030	0.4	30'	1.6	0.43	45	4	2	●	1
D0040T0100	0.4	1°	1.6	0.46	45	4	2	●	1
D0040T0130	0.4	1° 30'	1.6	0.48	45	4	2	●	1
D0040T0200	0.4	2°	1.6	0.51	45	4	2	●	1
D0040T0300	0.4	3°	1.6	0.57	45	4	2	●	1
D0040T0400	0.4	4°	1.6	0.62	45	4	2	●	1
D0040T0500	0.4	5°	1.6	0.68	45	4	2	●	1
D0040T0700	0.4	7°	1.6	0.79	45	4	2	●	1
D0040T1000	0.4	10°	1.6	0.96	45	4	2	●	2
D0050T0030	0.5	30'	2	0.53	45	4	2	●	1
D0050T0100	0.5	1°	2	0.57	45	4	2	●	1
D0050T0130	0.5	1° 30'	2	0.6	45	4	2	●	1
D0050T0200	0.5	2°	2	0.64	45	4	2	●	1
D0050T0300	0.5	3°	2	0.71	45	4	2	●	1
D0050T0400	0.5	4°	2	0.78	45	4	2	●	1
D0050T0500	0.5	5°	2	0.85	45	4	2	●	1
D0050T0700	0.5	7°	2	0.99	45	4	2	●	1
D0050T1000	0.5	10°	2	1.21	45	4	2	●	2
D0060T0030	0.6	30'	2	0.63	45	4	2	●	1
D0060T0100	0.6	1°	2	0.67	45	4	2	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Small Mill Dia. D_1	Taper Angle One Side B_7	Length of Cut ap	Large Mill Dia. D_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS2MTD0060T0130	0.6	1° 30'	2	0.7	45	4	2	●	1
D0060T0200	0.6	2°	2	0.74	45	4	2	●	1
D0060T0230	0.6	2° 30'	2	0.77	45	4	2	●	1
D0060T0300	0.6	3°	2	0.81	45	4	2	●	1
D0060T0400	0.6	4°	2	0.88	45	4	2	●	1
D0060T0500	0.6	5°	2	0.95	45	4	2	●	1
D0060T0700	0.6	7°	2	1.09	45	4	2	●	1
D0060T1000	0.6	10°	2	1.31	45	4	2	●	2
D0070T0030	0.7	30'	2	0.73	45	4	2	●	1
D0070T0100	0.7	1°	2	0.77	45	4	2	●	1
D0070T0130	0.7	1° 30'	2	0.8	45	4	2	●	1
D0070T0200	0.7	2°	2	0.84	45	4	2	●	1
D0070T0300	0.7	3°	2	0.91	45	4	2	●	1
D0070T0400	0.7	4°	2	0.98	45	4	2	●	1
D0070T0500	0.7	5°	2	1.05	45	4	2	●	1
D0070T0700	0.7	7°	2	1.19	45	4	2	●	1
D0070T1000	0.7	10°	2	1.41	45	4	2	●	2
D0080T0030	0.8	30'	3	0.85	45	4	2	●	1
D0080T0100	0.8	1°	3	0.9	45	4	2	●	1
D0080T0130	0.8	1° 30'	3	0.96	45	4	2	●	1
D0080T0200	0.8	2°	3	1.01	45	4	2	●	1
D0080T0230	0.8	2° 30'	3	1.06	45	4	2	●	1
D0080T0300	0.8	3°	3	1.11	45	4	2	●	1
D0080T0400	0.8	4°	3	1.22	45	4	2	●	1
D0080T0500	0.8	5°	3	1.32	45	4	2	●	1
D0080T0700	0.8	7°	3	1.54	45	4	2	●	1
D0080T1000	0.8	10°	3	1.86	45	4	2	●	2
D0090T0030	0.9	30'	3	0.95	45	4	2	●	1
D0090T0100	0.9	1°	3	1	45	4	2	●	1
D0090T0130	0.9	1° 30'	3	1.06	45	4	2	●	1
D0090T0200	0.9	2°	3	1.11	45	4	2	●	1
D0090T0300	0.9	3°	3	1.21	45	4	2	●	1
D0090T0400	0.9	4°	3	1.32	45	4	2	●	1
D0090T0500	0.9	5°	3	1.42	45	4	2	●	1
D0090T0700	0.9	7°	3	1.64	45	4	2	●	1
D0090T1000	0.9	10°	3	1.96	45	4	2	●	2
D0100T0030	1	30'	4	1.07	45	4	2	●	1
D0100T0100	1	1°	4	1.14	45	4	2	●	1
D0100T0130	1	1° 30'	4	1.21	45	4	2	●	1
D0100T0200	1	2°	4	1.28	45	4	2	●	1
D0100T0230	1	2° 30'	4	1.35	45	4	2	●	1
D0100T0300	1	3°	4	1.42	45	4	2	●	1
D0100T0400	1	4°	4	1.56	45	4	2	●	1
D0100T0500	1	5°	4	1.7	45	4	2	●	1
D0100T0700	1	7°	4	1.98	45	4	2	●	1
D0100T1000	1	10°	4	2.41	45	4	2	●	2
D0150T0030	1.5	30'	5	1.59	45	4	2	●	1
D0150T0100	1.5	1°	5	1.67	45	4	2	●	1
D0150T0130	1.5	1° 30'	5	1.76	45	4	2	●	1
D0150T0200	1.5	2°	5	1.85	45	4	2	●	1

SQUARE
BALL
RADIUS
TAPER
SOLID END MILLS
MSTAR END MILLS
CUTTING CONDITIONS
B303

MS2MT

Taper end mill, Medium cut length, 2 flute

D1<0.5 0 −-0.020
D1≥0.5 0 −-0.030

±5'

h6

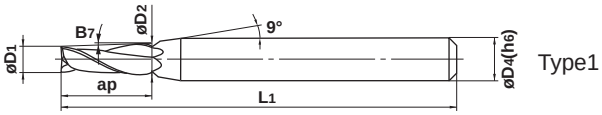
4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		

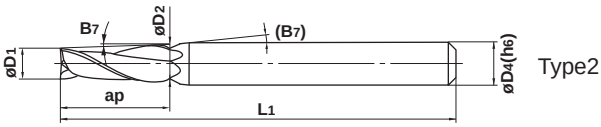
UWC MS 30°

D1<0.4 D1≥0.4

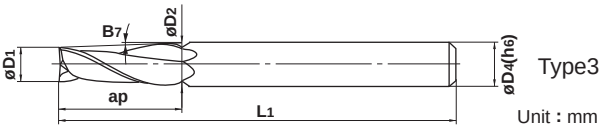
● 2 flute taper end mill for general use.



Type1



Type2



Type3

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MTD0150T0230	1.5	2° 30'	5	1.94	45	4	2	●	1
D0150T0300	1.5	3°	5	2.02	45	4	2	●	1
D0150T0400	1.5	4°	5	2.2	45	4	2	●	1
D0150T0500	1.5	5°	5	2.37	45	4	2	●	1
D0150T0700	1.5	7°	5	2.73	45	4	2	●	1
D0150T1000	1.5	10°	5	3.26	45	4	2	●	2
D0200T0030	2	30'	6	2.1	45	4	2	●	1
D0200T0100	2	1°	6	2.21	45	4	2	●	1
D0200T0130	2	1° 30'	6	2.31	45	4	2	●	1
D0200T0200	2	2°	6	2.42	45	4	2	●	1
D0200T0230	2	2° 30'	6	2.52	45	4	2	●	1
D0200T0300	2	3°	6	2.63	45	4	2	●	1
D0200T0400	2	4°	6	2.84	45	4	2	●	1
D0200T0500	2	5°	6	3.05	45	4	2	●	1
D0200T0700	2	7°	6	3.47	45	4	2	●	2
D0200T1000	2	10°	6	4.12	50	6	2	●	2
D0250T0030	2.5	30'	8	2.64	45	4	2	●	1
D0250T0100	2.5	1°	8	2.78	45	4	2	●	1
D0250T0130	2.5	1° 30'	8	2.92	45	4	2	●	1
D0250T0200	2.5	2°	8	3.06	45	4	2	●	1
D0250T0230	2.5	2° 30'	8	3.2	45	4	2	●	1
D0250T0300	2.5	3°	8	3.34	45	4	2	●	1
D0250T0400	2.5	4°	8	3.62	45	4	2	●	2
D0250T0500	2.5	5°	8	3.9	45	4	2	●	2
D0250T0700	2.5	7°	8	4.46	50	4	2	●	3
D0250T1000	2.5	10°	8	5.32	50	6	2	●	2
D0300T0030	3	30'	10	3.17	50	6	2	●	1
D0300T0100	3	1°	10	3.35	50	6	2	●	1
D0300T0130	3	1° 30'	10	3.52	50	6	2	●	1
D0300T0200	3	2°	10	3.7	50	6	2	●	1
D0300T0300	3	3°	10	4.05	50	6	2	●	1
D0300T0400	3	4°	10	4.4	50	6	2	●	1
D0300T0500	3	5°	10	4.75	50	6	2	●	1
D0300T0700	3	7°	10	5.46	50	6	2	●	2
D0300T1000	3	10°	10	6.53	50	6	2	●	3
D0400T0030	4	30'	15	4.26	50	6	2	●	1
D0400T0100	4	1°	15	4.52	50	6	2	●	1
D0400T0130	4	1° 30'	15	4.79	50	6	2	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Small Mill Dia. D_1	Taper Angle One Side B_7	Length of Cut ap	Large Mill Dia. D_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS2MTD0400T0200	4	2°	15	5.05	50	6	2	●	1
D0400T0300	4	3°	15	5.57	50	6	2	●	1
D0400T0400	4	4°	15	6.1	55	6	2	●	3
D0400T0500	4	5°	15	6.62	55	6	2	●	3
D0400T0700	4	7°	15	7.68	55	6	2	●	3
D0400T1000	4	10°	15	9.29	60	8	2	●	3
D0500T0030	5	30'	20	5.35	55	6	2	●	1
D0500T0100	5	1°	20	5.7	55	6	2	●	1
D0500T0130	5	1° 30'	20	6.05	55	6	2	●	3
D0500T0200	5	2°	20	6.4	55	6	2	●	3
D0500T0300	5	3°	20	7.1	55	6	2	●	3
D0500T0400	5	4°	20	7.8	60	6	2	●	3
D0500T0500	5	5°	20	8.5	60	8	2	●	3
D0500T0700	5	7°	20	9.91	70	10	2	●	2
D0500T1000	5	10°	20	12.05	80	12	2	●	3
D0600T0030	6	30'	20	6.35	60	6	2	●	3
D0600T0100	6	1°	20	6.7	60	6	2	●	3
D0600T0130	6	1° 30'	20	7.05	60	6	2	●	3
D0600T0200	6	2°	20	7.4	60	6	2	●	3
D0600T0300	6	3°	20	8.1	65	8	2	●	3
D0600T0500	6	5°	20	9.5	70	8	2	●	3
D0800T0030	8	30'	25	8.44	70	8	2	●	3
D0800T0100	8	1°	25	8.87	70	8	2	●	3
D0800T0130	8	1° 30'	25	9.31	70	8	2	●	3
D0800T0200	8	2°	25	9.75	70	8	2	●	3
D0800T0300	8	3°	25	10.62	75	10	2	●	3
D0800T0500	8	5°	25	12.37	95	12	2	●	3
D1000T0030	10	30'	35	10.61	90	10	2	●	3
D1000T0100	10	1°	35	11.22	90	10	2	●	3
D1000T0130	10	1° 30'	35	11.83	90	10	2	●	3
D1000T0200	10	2°	35	12.44	95	12	2	●	3
D1000T0300	10	3°	35	13.67	95	12	2	●	3
D1000T0500	10	5°	35	16.12	95	16	2	●	3

CUTTING CONDITIONS B303

MS4LT

Taper end mill, Long cut length, 4 flute

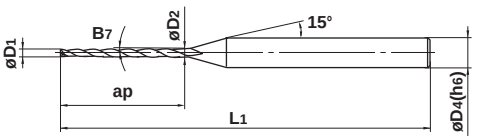
D1<0.5 0 − -0.020
D1≥0.5 0 − -0.040

±5'

h6

D4 = 3 0 − -0.006
4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○			



Type1

UWC MS 25° D1<3 D1≥3

● 4 flute taper end mill for rib milling.

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTD0020T0030L02	0.2	30'	2	0.23	40	3	4	●	1
D0020T0100L02	0.2	1°	2	0.27	40	3	4	●	1
D0020T0130L02	0.2	1° 30'	2	0.3	40	3	4	●	1
D0020T0200L02	0.2	2°	2	0.34	40	3	4	●	1
D0030T0030L03	0.3	30'	3	0.35	40	3	4	●	1
D0030T0100L03	0.3	1°	3	0.4	40	3	4	●	1
D0030T0130L03	0.3	1° 30'	3	0.46	40	3	4	●	1
D0030T0200L03	0.3	2°	3	0.51	40	3	4	●	1
D0040T0030L04	0.4	30'	4	0.47	40	3	4	●	1
D0040T0100L04	0.4	1°	4	0.54	40	3	4	●	1
D0040T0130L04	0.4	1° 30'	4	0.61	40	3	4	●	1
D0040T0200L04	0.4	2°	4	0.68	40	3	4	●	1
D0050T0030L04	0.5	30'	4	0.57	40	3	4	●	1
D0050T0030L06	0.5	30'	6	0.6	40	3	4	●	1
D0050T0100L04	0.5	1°	4	0.64	40	3	4	●	1
D0050T0100L06	0.5	1°	6	0.71	40	3	4	●	1
D0050T0130L04	0.5	1° 30'	4	0.71	40	3	4	●	1
D0050T0130L06	0.5	1° 30'	6	0.81	40	3	4	●	1
D0050T0200L04	0.5	2°	4	0.78	40	3	4	●	1
D0050T0200L06	0.5	2°	6	0.92	40	3	4	●	1
D0060T0030L04	0.6	30'	4	0.67	40	3	4	●	1
D0060T0030L06	0.6	30'	6	0.7	40	3	4	●	1
D0060T0100L04	0.6	1°	4	0.74	40	3	4	●	1
D0060T0100L06	0.6	1°	6	0.81	40	3	4	●	1
D0060T0130L04	0.6	1° 30'	4	0.81	40	3	4	●	1
D0060T0130L06	0.6	1° 30'	6	0.91	40	3	4	●	1
D0060T0200L04	0.6	2°	4	0.88	40	3	4	●	1
D0060T0200L06	0.6	2°	6	1.02	40	3	4	●	1
D0070T0030L06	0.7	30'	6	0.8	40	3	4	●	1
D0070T0030L08	0.7	30'	8	0.84	45	3	4	●	1
D0070T0100L06	0.7	1°	6	0.91	40	3	4	●	1
D0070T0100L08	0.7	1°	8	0.98	45	3	4	●	1
D0070T0130L06	0.7	1° 30'	6	1.01	40	3	4	●	1
D0070T0130L08	0.7	1° 30'	8	1.12	45	3	4	●	1
D0070T0200L06	0.7	2°	6	1.12	40	3	4	●	1
D0070T0200L08	0.7	2°	8	1.26	45	3	4	●	1
D0080T0015L04	0.8	15'	4	0.83	45	4	4	●	1
D0080T0015L06	0.8	15'	6	0.85	45	4	4	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Small Mill Dia. D_1	Taper Angle One Side B_7	Length of Cut ap	Large Mill Dia. D_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS4LTD0080T0015L08	0.8	15'	8	0.87	45	4	4	●	1
D0080T0015L10	0.8	15'	10	0.89	45	4	4	●	1
D0080T0030L04	0.8	30'	4	0.87	45	4	4	●	1
D0080T0030L06	0.8	30'	6	0.9	45	4	4	●	1
D0080T0030L08	0.8	30'	8	0.94	45	4	4	●	1
D0080T0030L10	0.8	30'	10	0.97	45	4	4	●	1
D0080T0030L12	0.8	30'	12	1.01	50	4	4	●	1
D0080T0100L04	0.8	1°	4	0.94	45	4	4	●	1
D0080T0100L06	0.8	1°	6	1.01	45	4	4	●	1
D0080T0100L08	0.8	1°	8	1.08	45	4	4	●	1
D0080T0100L10	0.8	1°	10	1.15	45	4	4	●	1
D0080T0100L12	0.8	1°	12	1.22	50	4	4	●	1
D0080T0130L04	0.8	1° 30'	4	1.01	45	4	4	●	1
D0080T0130L06	0.8	1° 30'	6	1.11	45	4	4	●	1
D0080T0130L08	0.8	1° 30'	8	1.22	45	4	4	●	1
D0080T0130L10	0.8	1° 30'	10	1.32	45	4	4	●	1
D0080T0130L12	0.8	1° 30'	12	1.43	50	4	4	●	1
D0080T0200L04	0.8	2°	4	1.08	45	4	4	●	1
D0080T0200L06	0.8	2°	6	1.22	45	4	4	●	1
D0080T0200L08	0.8	2°	8	1.36	45	4	4	●	1
D0080T0200L10	0.8	2°	10	1.5	45	4	4	●	1
D0080T0200L12	0.8	2°	12	1.64	50	4	4	●	1
D0100T0015L06	1	15'	6	1.05	45	4	4	●	1
D0100T0015L08	1	15'	8	1.07	45	4	4	●	1
D0100T0015L10	1	15'	10	1.09	45	4	4	●	1
D0100T0015L12	1	15'	12	1.1	50	4	4	●	1
D0100T0030L06	1	30'	6	1.1	45	4	4	●	1
D0100T0030L08	1	30'	8	1.14	45	4	4	●	1
D0100T0030L10	1	30'	10	1.17	45	4	4	●	1
D0100T0030L12	1	30'	12	1.21	50	4	4	●	1
D0100T0100L06	1	1°	6	1.21	45	4	4	●	1
D0100T0100L08	1	1°	8	1.28	45	4	4	●	1
D0100T0100L10	1	1°	10	1.35	45	4	4	●	1
D0100T0100L12	1	1°	12	1.42	50	4	4	●	1
D0100T0100L16	1	1°	16	1.56	55	4	4	●	1
D0100T0130L06	1	1° 30'	6	1.31	45	4	4	●	1
D0100T0130L08	1	1° 30'	8	1.42	45	4	4	●	1
D0100T0130L10	1	1° 30'	10	1.52	45	4	4	●	1
D0100T0130L12	1	1° 30'	12	1.63	50	4	4	●	1
D0100T0130L16	1	1° 30'	16	1.84	55	4	4	●	1
D0100T0200L06	1	2°	6	1.42	45	4	4	●	1
D0100T0200L08	1	2°	8	1.56	45	4	4	●	1
D0100T0200L10	1	2°	10	1.7	45	4	4	●	1
D0100T0200L12	1	2°	12	1.84	50	4	4	●	1
D0100T0200L16	1	2°	16	2.12	55	4	4	●	1
D0120T0015L06	1.2	15'	6	1.25	45	4	4	●	1
D0120T0015L10	1.2	15'	10	1.29	45	4	4	●	1
D0120T0015L12	1.2	15'	12	1.3	50	4	4	●	1
D0120T0015L16	1.2	15'	16	1.34	55	4	4	●	1
D0120T0030L06	1.2	30'	6	1.3	45	4	4	●	1

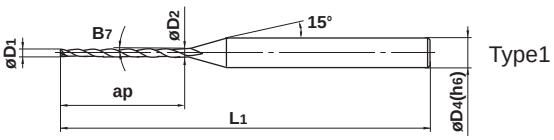
CUTTING CONDITIONS B304

MS4LT

Taper end mill, Long cut length, 4 flute

D1<0.5 0 − -0.020
D1≥0.5 0 − -0.040
±5'
h6
D4=3 0 − -0.006
4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○			



Type1

● 4 flute taper end mill for rib milling.

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTD0120T0030L10	1.2	30'	10	1.37	45	4	4	●	1
D0120T0030L12	1.2	30'	12	1.41	50	4	4	●	1
D0120T0030L16	1.2	30'	16	1.48	55	4	4	●	1
D0120T0100L06	1.2	1°	6	1.41	45	4	4	●	1
D0120T0100L10	1.2	1°	10	1.55	45	4	4	●	1
D0120T0100L12	1.2	1°	12	1.62	50	4	4	●	1
D0120T0100L16	1.2	1°	16	1.76	55	4	4	●	1
D0120T0100L20	1.2	1°	20	1.9	55	4	4	●	1
D0120T0130L06	1.2	1° 30'	6	1.51	45	4	4	●	1
D0120T0130L10	1.2	1° 30'	10	1.72	45	4	4	●	1
D0120T0130L12	1.2	1° 30'	12	1.83	50	4	4	●	1
D0120T0130L16	1.2	1° 30'	16	2.04	55	4	4	●	1
D0120T0130L20	1.2	1° 30'	20	2.25	55	4	4	●	1
D0120T0200L06	1.2	2°	6	1.62	45	4	4	●	1
D0120T0200L10	1.2	2°	10	1.9	45	4	4	●	1
D0120T0200L12	1.2	2°	12	2.04	50	4	4	●	1
D0120T0200L16	1.2	2°	16	2.32	55	4	4	●	1
D0120T0200L20	1.2	2°	20	2.6	55	4	4	●	1
D0130T0030L12	1.3	30'	12	1.51	50	4	4	●	1
D0130T0100L12	1.3	1°	12	1.72	50	4	4	●	1
D0130T0130L12	1.3	1° 30'	12	1.93	50	4	4	●	1
D0130T0200L12	1.3	2°	12	2.14	50	4	4	●	1
D0140T0030L12	1.4	30'	12	1.61	50	4	4	●	1
D0140T0100L12	1.4	1°	12	1.82	50	4	4	●	1
D0140T0130L12	1.4	1° 30'	12	2.03	50	4	4	●	1
D0140T0200L12	1.4	2°	12	2.24	50	4	4	●	1
D0150T0015L06	1.5	15'	6	1.55	45	4	4	●	1
D0150T0015L08	1.5	15'	8	1.57	45	4	4	●	1
D0150T0015L10	1.5	15'	10	1.59	45	4	4	●	1
D0150T0015L12	1.5	15'	12	1.6	50	4	4	●	1
D0150T0015L16	1.5	15'	16	1.64	55	4	4	●	1
D0150T0015L20	1.5	15'	20	1.67	55	4	4	●	1
D0150T0030L06	1.5	30'	6	1.6	45	4	4	●	1
D0150T0030L08	1.5	30'	8	1.64	45	4	4	●	1
D0150T0030L10	1.5	30'	10	1.67	45	4	4	●	1
D0150T0030L12	1.5	30'	12	1.71	50	4	4	●	1
D0150T0030L16	1.5	30'	16	1.78	55	4	4	●	1
D0150T0030L20	1.5	30'	20	1.85	55	4	4	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Small Mill Dia. D_1	Taper Angle One Side B_7	Length of Cut ap	Large Mill Dia. D_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS4LTD0150T0100L06	1.5	1°	6	1.71	45	4	4	●	1
D0150T0100L08	1.5	1°	8	1.78	45	4	4	●	1
D0150T0100L10	1.5	1°	10	1.85	45	4	4	●	1
D0150T0100L12	1.5	1°	12	1.92	50	4	4	●	1
D0150T0100L16	1.5	1°	16	2.06	55	4	4	●	1
D0150T0100L20	1.5	1°	20	2.2	55	4	4	●	1
D0150T0100L25	1.5	1°	25	2.37	60	4	4	●	1
D0150T0130L06	1.5	1° 30'	6	1.81	45	4	4	●	1
D0150T0130L08	1.5	1° 30'	8	1.92	45	4	4	●	1
D0150T0130L10	1.5	1° 30'	10	2.02	45	4	4	●	1
D0150T0130L12	1.5	1° 30'	12	2.13	50	4	4	●	1
D0150T0130L16	1.5	1° 30'	16	2.34	55	4	4	●	1
D0150T0130L20	1.5	1° 30'	20	2.55	55	4	4	●	1
D0150T0130L25	1.5	1° 30'	25	2.81	60	4	4	●	1
D0150T0200L06	1.5	2°	6	1.92	45	4	4	●	1
D0150T0200L08	1.5	2°	8	2.06	45	4	4	●	1
D0150T0200L10	1.5	2°	10	2.2	45	4	4	●	1
D0150T0200L12	1.5	2°	12	2.34	50	4	4	●	1
D0150T0200L16	1.5	2°	16	2.62	55	4	4	●	1
D0150T0200L20	1.5	2°	20	2.9	55	4	4	●	1
D0150T0200L25	1.5	2°	25	3.25	60	4	4	●	1
D0160T0030L08	1.6	30'	8	1.74	45	4	4	●	1
D0160T0030L12	1.6	30'	12	1.81	50	4	4	●	1
D0160T0030L16	1.6	30'	16	1.88	55	4	4	●	1
D0160T0030L20	1.6	30'	20	1.95	55	4	4	●	1
D0160T0100L08	1.6	1°	8	1.88	45	4	4	●	1
D0160T0100L12	1.6	1°	12	2.02	50	4	4	●	1
D0160T0100L16	1.6	1°	16	2.16	55	4	4	●	1
D0160T0100L20	1.6	1°	20	2.3	55	4	4	●	1
D0160T0130L08	1.6	1° 30'	8	2.02	45	4	4	●	1
D0160T0130L12	1.6	1° 30'	12	2.23	50	4	4	●	1
D0160T0130L16	1.6	1° 30'	16	2.44	55	4	4	●	1
D0160T0130L20	1.6	1° 30'	20	2.65	55	4	4	●	1
D0160T0200L08	1.6	2°	8	2.16	45	4	4	●	1
D0160T0200L12	1.6	2°	12	2.44	50	4	4	●	1
D0160T0200L16	1.6	2°	16	2.72	55	4	4	●	1
D0160T0200L20	1.6	2°	20	3	55	4	4	●	1
D0180T0015L08	1.8	15'	8	1.87	45	4	4	●	1
D0180T0015L16	1.8	15'	16	1.94	55	4	4	●	1
D0180T0015L24	1.8	15'	24	2.01	60	4	4	●	1
D0180T0030L08	1.8	30'	8	1.94	45	4	4	●	1
D0180T0030L16	1.8	30'	16	2.08	55	4	4	●	1
D0180T0030L24	1.8	30'	24	2.22	60	4	4	●	1
D0180T0100L08	1.8	1°	8	2.08	45	4	4	●	1
D0180T0100L16	1.8	1°	16	2.36	55	4	4	●	1
D0180T0100L24	1.8	1°	24	2.64	60	4	4	●	1
D0180T0130L08	1.8	1° 30'	8	2.22	45	4	4	●	1
D0180T0130L16	1.8	1° 30'	16	2.64	55	4	4	●	1
D0180T0130L24	1.8	1° 30'	24	3.06	60	4	4	●	1
D0180T0200L08	1.8	2°	8	2.36	45	4	4	●	1

CUTTING CONDITIONS B304

MS4LT

Taper end mill, Long cut length, 4 flute

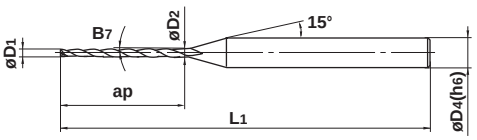
D1<0.5 0 − -0.020
D1≥0.5 0 − -0.040

±5'

h6

D4 = 3 0 − -0.006
4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○			



Type1

UWC MS 25° D1<3 D1≥3

● 4 flute taper end mill for rib milling.

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTD0180T0200L16	1.8	2°	16	2.92	55	4	4	●	1
D0180T0200L24	1.8	2°	24	3.48	60	4	4	●	1
D0200T0015L08	2	15'	8	2.07	45	4	4	●	1
D0200T0015L10	2	15'	10	2.09	45	4	4	●	1
D0200T0015L12	2	15'	12	2.1	50	4	4	●	1
D0200T0015L16	2	15'	16	2.14	55	4	4	●	1
D0200T0015L20	2	15'	20	2.17	55	4	4	●	1
D0200T0015L25	2	15'	25	2.22	60	4	4	●	1
D0200T0030L08	2	30'	8	2.14	45	4	4	●	1
D0200T0030L10	2	30'	10	2.17	45	4	4	●	1
D0200T0030L12	2	30'	12	2.21	50	4	4	●	1
D0200T0030L16	2	30'	16	2.28	55	4	4	●	1
D0200T0030L20	2	30'	20	2.35	55	4	4	●	1
D0200T0030L25	2	30'	25	2.44	60	4	4	●	1
D0200T0030L30	2	30'	30	2.52	65	4	4	●	1
D0200T0100L08	2	1°	8	2.28	45	4	4	●	1
D0200T0100L10	2	1°	10	2.35	45	4	4	●	1
D0200T0100L12	2	1°	12	2.42	50	4	4	●	1
D0200T0100L16	2	1°	16	2.56	55	4	4	●	1
D0200T0100L20	2	1°	20	2.7	55	4	4	●	1
D0200T0100L25	2	1°	25	2.87	60	4	4	●	1
D0200T0100L30	2	1°	30	3.05	65	4	4	●	1
D0200T0130L08	2	1° 30'	8	2.42	45	4	4	●	1
D0200T0130L10	2	1° 30'	10	2.52	45	4	4	●	1
D0200T0130L12	2	1° 30'	12	2.63	50	4	4	●	1
D0200T0130L16	2	1° 30'	16	2.84	55	4	4	●	1
D0200T0130L20	2	1° 30'	20	3.05	55	4	4	●	1
D0200T0130L25	2	1° 30'	25	3.31	60	4	4	●	1
D0200T0130L30	2	1° 30'	30	3.57	65	4	4	●	1
D0200T0200L08	2	2°	8	2.56	45	4	4	●	1
D0200T0200L10	2	2°	10	2.7	45	4	4	●	1
D0200T0200L12	2	2°	12	2.84	50	4	4	●	1
D0200T0200L16	2	2°	16	3.12	55	4	4	●	1
D0200T0200L20	2	2°	20	3.4	55	4	4	●	1
D0200T0200L25	2	2°	25	3.75	60	4	4	●	1
D0200T0200L30	2	2°	30	4.1	65	6	4	●	1
D0200T0300L12	2	3°	12	3.26	50	4	4	●	1
D0200T0300L16	2	3°	16	3.68	55	4	4	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Small Mill Dia. D_1	Taper Angle One Side B_7	Length of Cut ap	Large Mill Dia. D_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS4LTD0200T0300L20	2	3°	20	4.1	55	6	4	●	1
D0200T0300L25	2	3°	25	4.62	60	6	4	●	1
D0200T0300L30	2	3°	30	5.14	65	6	4	●	1
D0250T0030L10	2.5	30'	10	2.67	45	4	4	●	1
D0250T0030L16	2.5	30'	16	2.78	50	4	4	●	1
D0250T0030L20	2.5	30'	20	2.85	55	4	4	●	1
D0250T0030L25	2.5	30'	25	2.94	60	4	4	●	1
D0250T0030L30	2.5	30'	30	3.02	65	4	4	●	1
D0250T0100L10	2.5	1°	10	2.85	45	4	4	●	1
D0250T0100L16	2.5	1°	16	3.06	50	4	4	●	1
D0250T0100L20	2.5	1°	20	3.2	55	4	4	●	1
D0250T0100L25	2.5	1°	25	3.37	60	4	4	●	1
D0250T0100L30	2.5	1°	30	3.55	65	4	4	●	1
D0250T0130L10	2.5	1° 30'	10	3.02	45	4	4	●	1
D0250T0130L16	2.5	1° 30'	16	3.34	50	4	4	●	1
D0250T0130L20	2.5	1° 30'	20	3.55	55	4	4	●	1
D0250T0130L25	2.5	1° 30'	25	3.81	60	4	4	●	1
D0250T0130L30	2.5	1° 30'	30	4.07	65	6	4	●	1
D0250T0200L10	2.5	2°	10	3.2	45	4	4	●	1
D0250T0200L16	2.5	2°	16	3.62	50	4	4	●	1
D0250T0200L20	2.5	2°	20	3.9	55	4	4	●	1
D0250T0200L25	2.5	2°	25	4.25	60	6	4	●	1
D0250T0200L30	2.5	2°	30	4.6	65	6	4	●	1
D0300T0030L25	3	30'	25	3.44	65	6	4	●	1
D0300T0030L40	3	30'	40	3.7	80	6	4	●	1
D0300T0100L25	3	1°	25	3.87	65	6	4	●	1
D0300T0100L40	3	1°	40	4.4	80	6	4	●	1
D0300T0130L25	3	1° 30'	25	4.31	65	6	4	●	1
D0300T0130L40	3	1° 30'	40	5.09	80	6	4	●	1
D0300T0200L25	3	2°	25	4.75	65	6	4	●	1
D0300T0200L40	3	2°	40	5.79	80	6	4	●	1

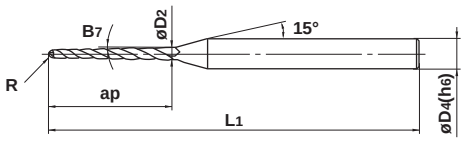
CUTTING CONDITIONS B304

MS4LTB

Ball nose, 4 flute, Taper, For rib milling

R ±0.03 ±5' h6 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1

● 4 flute taper ball nose end mill for rib milling.

Unit : mm

Order Number	Radius of Ball Nose R	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTBR0030T0030L04	0.3	30'	4	0.66	45	4	4	●	1
R0030T0030L06	0.3	30'	6	0.70	45	4	4	●	1
R0030T0100L04	0.3	1°	4	0.73	45	4	4	●	1
R0030T0100L06	0.3	1°	6	0.80	45	4	4	●	1
R0030T0130L04	0.3	1° 30'	4	0.79	45	4	4	●	1
R0030T0130L06	0.3	1° 30'	6	0.90	45	4	4	●	1
R0030T0200L04	0.3	2°	4	0.86	45	4	4	●	1
R0030T0200L06	0.3	2°	6	1.00	45	4	4	●	1
R0040T0030L06	0.4	30'	6	0.90	50	4	4	●	1
R0040T0030L08	0.4	30'	8	0.93	50	4	4	●	1
R0040T0030L10	0.4	30'	10	0.97	50	4	4	●	1
R0040T0100L06	0.4	1°	6	1.00	50	4	4	●	1
R0040T0100L08	0.4	1°	8	1.07	50	4	4	●	1
R0040T0100L10	0.4	1°	10	1.14	50	4	4	●	1
R0040T0130L06	0.4	1° 30'	6	1.09	50	4	4	●	1
R0040T0130L08	0.4	1° 30'	8	1.20	50	4	4	●	1
R0040T0130L10	0.4	1° 30'	10	1.30	50	4	4	●	1
R0040T0200L06	0.4	2°	6	1.19	50	4	4	●	1
R0040T0200L08	0.4	2°	8	1.33	50	4	4	●	1
R0040T0200L10	0.4	2°	10	1.47	50	4	4	●	1
R0050T0030L08	0.5	30'	8	1.13	50	4	4	●	1
R0050T0030L10	0.5	30'	10	1.17	50	4	4	●	1
R0050T0030L12	0.5	30'	12	1.20	50	4	4	●	1
R0050T0030L16	0.5	30'	16	1.27	55	4	4	●	1
R0050T0100L08	0.5	1°	8	1.26	50	4	4	●	1
R0050T0100L10	0.5	1°	10	1.33	50	4	4	●	1
R0050T0100L12	0.5	1°	12	1.40	50	4	4	●	1
R0050T0100L16	0.5	1°	16	1.54	55	4	4	●	1
R0050T0130L08	0.5	1° 30'	8	1.39	50	4	4	●	1
R0050T0130L10	0.5	1° 30'	10	1.50	50	4	4	●	1
R0050T0130L12	0.5	1° 30'	12	1.60	50	4	4	●	1
R0050T0130L16	0.5	1° 30'	16	1.81	55	4	4	●	1
R0050T0200L08	0.5	2°	8	1.52	50	4	4	●	1
R0050T0200L10	0.5	2°	10	1.66	50	4	4	●	1
R0050T0200L12	0.5	2°	12	1.80	50	4	4	●	1
R0050T0200L16	0.5	2°	16	2.08	55	4	4	●	1
R0060T0030L08	0.6	30'	8	1.33	50	4	4	●	1
R0060T0030L10	0.6	30'	10	1.36	50	4	4	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Taper Angle One Side B_7	Length of Cut ap	Large Mill Dia. D_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
MS4LTBR0060T0030L12	0.6	30'	12	1.40	50	4	4	●	1
R0060T0030L16	0.6	30'	16	1.47	55	4	4	●	1
R0060T0100L08	0.6	1°	8	1.46	50	4	4	●	1
R0060T0100L10	0.6	1°	10	1.53	50	4	4	●	1
R0060T0100L12	0.6	1°	12	1.60	50	4	4	●	1
R0060T0100L16	0.6	1°	16	1.74	55	4	4	●	1
R0060T0130L08	0.6	1° 30'	8	1.59	50	4	4	●	1
R0060T0130L10	0.6	1° 30'	10	1.69	50	4	4	●	1
R0060T0130L12	0.6	1° 30'	12	1.80	50	4	4	●	1
R0060T0130L16	0.6	1° 30'	16	2.01	55	4	4	●	1
R0060T0200L08	0.6	2°	8	1.72	50	4	4	●	1
R0060T0200L10	0.6	2°	10	1.86	50	4	4	●	1
R0060T0200L12	0.6	2°	12	2.00	50	4	4	●	1
R0060T0200L16	0.6	2°	16	2.28	55	4	4	●	1
R0075T0030L08	0.75	30'	8	1.63	50	4	4	●	1
R0075T0030L10	0.75	30'	10	1.66	50	4	4	●	1
R0075T0030L12	0.75	30'	12	1.70	50	4	4	●	1
R0075T0030L16	0.75	30'	16	1.77	55	4	4	●	1
R0075T0030L20	0.75	30'	20	1.84	60	4	4	●	1
R0075T0100L08	0.75	1°	8	1.75	50	4	4	●	1
R0075T0100L10	0.75	1°	10	1.82	50	4	4	●	1
R0075T0100L12	0.75	1°	12	1.89	50	4	4	●	1
R0075T0100L16	0.75	1°	16	2.03	55	4	4	●	1
R0075T0100L20	0.75	1°	20	2.17	60	4	4	●	1
R0075T0130L08	0.75	1° 30'	8	1.88	50	4	4	●	1
R0075T0130L10	0.75	1° 30'	10	1.98	50	4	4	●	1
R0075T0130L12	0.75	1° 30'	12	2.09	50	4	4	●	1
R0075T0130L16	0.75	1° 30'	16	2.30	55	4	4	●	1
R0075T0130L20	0.75	1° 30'	20	2.51	60	4	4	●	1
R0075T0200L08	0.75	2°	8	2.01	50	4	4	●	1
R0075T0200L10	0.75	2°	10	2.15	50	4	4	●	1
R0075T0200L12	0.75	2°	12	2.29	50	4	4	●	1
R0075T0200L16	0.75	2°	16	2.57	55	4	4	●	1
R0075T0200L20	0.75	2°	20	2.84	60	4	4	●	1
R0090T0030L08	0.9	30'	8	1.92	50	4	4	●	1
R0090T0030L10	0.9	30'	10	1.96	50	4	4	●	1
R0090T0030L12	0.9	30'	12	1.99	50	4	4	●	1
R0090T0030L16	0.9	30'	16	2.06	55	4	4	●	1
R0090T0030L20	0.9	30'	20	2.13	60	4	4	●	1
R0090T0100L08	0.9	1°	8	2.05	50	4	4	●	1
R0090T0100L10	0.9	1°	10	2.12	50	4	4	●	1
R0090T0100L12	0.9	1°	12	2.19	50	4	4	●	1
R0090T0100L16	0.9	1°	16	2.33	55	4	4	●	1
R0090T0100L20	0.9	1°	20	2.47	60	4	4	●	1
R0090T0130L08	0.9	1° 30'	8	2.17	50	4	4	●	1
R0090T0130L10	0.9	1° 30'	10	2.28	50	4	4	●	1
R0090T0130L12	0.9	1° 30'	12	2.38	50	4	4	●	1
R0090T0130L16	0.9	1° 30'	16	2.59	55	4	4	●	1
R0090T0130L20	0.9	1° 30'	20	2.80	60	4	4	●	1
R0090T0200L08	0.9	2°	8	2.30	50	4	4	●	1

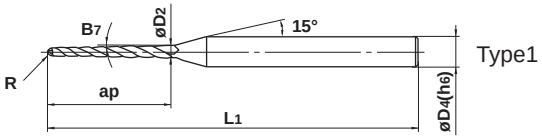
CUTTING CONDITIONS B305

MS4LTB

Ball nose, 4 flute, Taper, For rib milling

R ±0.03 ±5' h6 4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



Type1

● 4 flute taper ball nose end mill for rib milling.

Unit : mm

Order Number	Radius of Ball Nose R	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTBR0090T0200L10	0.9	2°	10	2.44	50	4	4	●	1
R0090T0200L12	0.9	2°	12	2.58	50	4	4	●	1
R0090T0200L16	0.9	2°	16	2.86	55	4	4	●	1
R0090T0200L20	0.9	2°	20	3.13	60	4	4	●	1
R0100T0030L10	1	30'	10	2.16	50	4	4	●	1
R0100T0030L12	1	30'	12	2.19	50	4	4	●	1
R0100T0030L16	1	30'	16	2.26	55	4	4	●	1
R0100T0030L20	1	30'	20	2.33	60	4	4	●	1
R0100T0030L25	1	30'	25	2.42	65	4	4	●	1
R0100T0030L30	1	30'	30	2.51	65	4	4	●	1
R0100T0100L10	1	1°	10	2.31	50	4	4	●	1
R0100T0100L12	1	1°	12	2.38	50	4	4	●	1
R0100T0100L16	1	1°	16	2.52	55	4	4	●	1
R0100T0100L20	1	1°	20	2.66	60	4	4	●	1
R0100T0100L25	1	1°	25	2.84	65	4	4	●	1
R0100T0100L30	1	1°	30	3.01	65	4	4	●	1
R0100T0130L10	1	1° 30'	10	2.47	50	4	4	●	1
R0100T0130L12	1	1° 30'	12	2.58	50	4	4	●	1
R0100T0130L16	1	1° 30'	16	2.79	55	4	4	●	1
R0100T0130L20	1	1° 30'	20	3.00	60	4	4	●	1
R0100T0130L25	1	1° 30'	25	3.26	65	6	4	●	1
R0100T0130L30	1	1° 30'	30	3.52	65	6	4	●	1
R0100T0200L10	1	2°	10	2.63	50	4	4	●	1
R0100T0200L12	1	2°	12	2.77	50	4	4	●	1
R0100T0200L16	1	2°	16	3.05	55	4	4	●	1
R0100T0200L20	1	2°	20	3.33	60	4	4	●	1
R0100T0200L25	1	2°	25	3.68	65	6	4	●	1
R0100T0200L30	1	2°	30	4.03	65	6	4	●	1

● : Inventory maintained in Japan.

CUTTING CONDITIONS B305

MS2MTB

Ball nose taper end mill, Medium cut length, 2 flute

R ±0.01 ±5' h6 4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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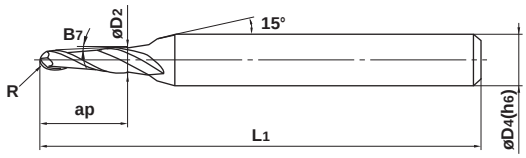
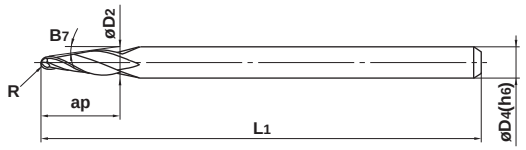


Type1



Type2

UWC MS 30°

● 2 flute taper ball nose end mill.

Unit : mm

Order Number	Radius of Ball Nose R	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MTBR0020T0300	0.2	3°	3	0.69	40	4	2	●	1
R0020T0500	0.2	5°	3	0.89	40	4	2	●	1
R0020T0700	0.2	7°	3	1.09	40	4	2	●	1
R0020T1000	0.2	10°	3	1.39	40	4	2	●	1
R0030T0300	0.3	3°	3	0.88	40	4	2	●	1
R0030T0500	0.3	5°	3	1.07	40	4	2	●	1
R0030T0700	0.3	7°	3	1.27	40	4	2	●	1
R0030T1000	0.3	10°	3	1.56	40	4	2	●	1
R0050T0030	0.5	30'	3	1.04	40	4	2	●	1
R0050T0100	0.5	1°	3	1.09	40	4	2	●	1
R0050T0130	0.5	1° 30'	3	1.13	40	4	2	●	1
R0050T0200	0.5	2°	3	1.18	40	4	2	●	1
R0050T0300	0.5	3°	3	1.26	40	4	2	●	1
R0050T0500	0.5	5°	3	1.44	40	4	2	●	1
R0050T0700	0.5	7°	6	2.36	45	4	2	●	1
R0075T0030	0.75	30'	6	1.59	40	4	2	●	1
R0075T0100	0.75	1°	6	1.68	40	4	2	●	1
R0075T0130	0.75	1° 30'	6	1.78	40	4	2	●	1
R0075T0200	0.75	2°	6	1.87	40	4	2	●	1
R0075T0300	0.75	3°	6	2.05	40	4	2	●	1
R0075T0700	0.75	7°	6	2.8	40	4	2	●	1
R0100T0030	1	30'	8	2.12	45	4	2	●	1
R0100T0100	1	1°	8	2.24	45	4	2	●	1
R0100T0130	1	1° 30'	8	2.37	45	4	2	●	1
R0100T0200	1	2°	8	2.49	45	4	2	●	1
R0100T0300	1	3°	8	2.74	45	4	2	●	1
R0100T0400	1	4°	8	2.98	45	4	2	●	1
R0100T0500	1	5°	8	3.23	45	4	2	●	1
R0100T0700	1	7°	8	3.73	50	6	2	●	1
R0125T0030	1.25	30'	10	2.65	45	4	2	●	1
R0125T0100	1.25	1°	10	2.81	45	4	2	●	1
R0125T0130	1.25	1° 30'	10	2.96	45	4	2	●	1
R0125T0200	1.25	2°	10	3.11	45	4	2	●	1
R0125T0300	1.25	3°	10	3.42	45	4	2	●	1
R0125T0400	1.25	4°	10	3.73	50	6	2	●	1
R0125T0500	1.25	5°	10	4.04	50	6	2	●	1
R0125T0700	1.25	7°	14.5	5.77	60	6	2	●	2
R0150T0700	1.5	7°	12.5	5.72	60	6	2	●	2

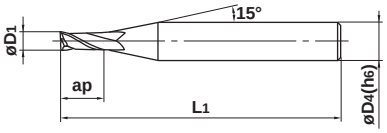
CUTTING CONDITIONS B297

VF-2MD NEW

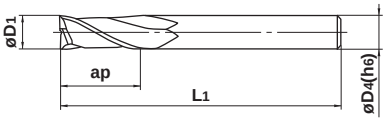
End mill, Medium cut length, 2 flute, For hardened materials

0 − -0.020 h6 4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1



Type2

UWC VF 35°

D1<3 D1≥3

● 2 flute end mill suitable for high-speed machining of hardened steel.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF2MDD0050	0.5	1.3	40	4	2	●	1
D0100	1	2.5	40	4	2	●	1
D0150	1.5	3.8	40	4	2	●	1
D0200	2	5	40	4	2	●	1
D0250	2.5	6.3	40	4	2	●	1
D0300	3	7.5	50	6	2	●	1
D0400	4	10	50	6	2	●	1
D0500	5	12.5	50	6	2	●	1
D0600	6	15	50	6	2	●	2

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)

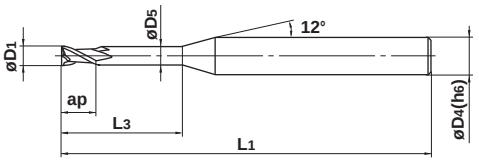
CUTTING CONDITIONS B306

VF-2XL NEW

End mill, 2 flute, Long neck

0 — -0.020 h6 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1

UWC VF 30°

D1<3

D1=3

● 2 flute long neck end mill for high-speed machining of hardened steels.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF2XLD0010N005	0.1	0.15	0.5	0.085	45	4	2	○	1
D0020N006	0.2	0.3	0.6	0.17	45	4	2	●	1
D0020N010	0.2	0.3	1	0.17	45	4	2	●	1
D0020N015	0.2	0.3	1.5	0.17	45	4	2	●	1
D0030N010	0.3	0.5	1	0.27	45	4	2	●	1
D0030N020	0.3	0.5	2	0.27	45	4	2	●	1
D0030N030	0.3	0.5	3	0.27	45	4	2	●	1
D0040N010	0.4	0.6	1	0.36	45	4	2	●	1
D0040N020	0.4	0.6	2	0.36	45	4	2	●	1
D0040N040	0.4	0.6	4	0.36	45	4	2	●	1
D0050N020	0.5	0.8	2	0.46	45	4	2	●	1
D0050N040	0.5	0.8	4	0.46	45	4	2	●	1
D0050N060	0.5	0.8	6	0.46	45	4	2	●	1
D0060N020	0.6	0.9	2	0.56	45	4	2	●	1
D0060N040	0.6	0.9	4	0.56	45	4	2	●	1
D0060N060	0.6	0.9	6	0.56	45	4	2	●	1
D0080N040	0.8	1.2	4	0.76	45	4	2	●	1
D0080N060	0.8	1.2	6	0.76	45	4	2	●	1
D0080N080	0.8	1.2	8	0.76	50	4	2	●	1
D0080N100	0.8	1.2	10	0.76	50	4	2	●	1
D0100N040	1	1.5	4	0.94	50	4	2	●	1
D0100N060	1	1.5	6	0.94	50	4	2	●	1
D0100N080	1	1.5	8	0.94	50	4	2	●	1
D0100N100	1	1.5	10	0.94	50	4	2	●	1
D0100N120	1	1.5	12	0.94	50	4	2	●	1
D0150N060	1.5	2.3	6	1.44	50	4	2	●	1
D0150N080	1.5	2.3	8	1.44	50	4	2	●	1
D0150N100	1.5	2.3	10	1.44	50	4	2	●	1
D0150N120	1.5	2.3	12	1.44	50	4	2	●	1
D0150N160	1.5	2.3	16	1.44	60	4	2	●	1
D0200N060	2	3	6	1.9	50	4	2	●	1
D0200N080	2	3	8	1.9	50	4	2	●	1
D0200N100	2	3	10	1.9	50	4	2	●	1
D0200N120	2	3	12	1.9	50	4	2	●	1
D0200N160	2	3	16	1.9	60	4	2	●	1
D0200N200	2	3	20	1.9	60	4	2	●	1
D0300N120	3	4.5	12	2.9	50	6	2	●	1
D0300N160	3	4.5	16	2.9	60	6	2	●	1
D0300N200	3	4.5	20	2.9	60	6	2	●	1

CUTTING CONDITIONS B307

VF-4MD NEW

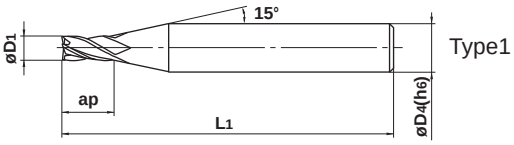
End mill, Medium cut length, 4 flute, For hardened materials

D1≦12 0 −-0.020
D1>12 0 −-0.030

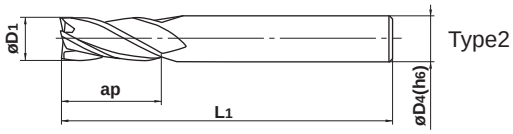
h6

4≦D4≦6 0 −-0.008
8≦D4≦10 0 −-0.009
12≦D4≦16 0 −-0.011
D4 = 20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≦45HRC)	Hardened Steel (≦55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1



Type2

UWC VF 35°

● 4 flute end mill suitable for high-speed machining of hardened steel.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF4MDD0100	1	2.5	40	4	4	●	1
D0150	1.5	3.8	40	4	4	●	1
D0200	2	5	40	4	4	●	1
D0250	2.5	6.3	40	4	4	●	1
D0300	3	7.5	50	6	4	●	1
D0400	4	10	50	6	4	●	1
D0500	5	12.5	50	6	4	●	1
D0600	6	15	50	6	4	●	2
D0800	8	20	60	8	4	●	2
D1000	10	25	70	10	4	●	2
D1200	12	30	90	12	4	●	2
D1600	16	40	100	16	4	●	2
D2000	20	50	110	20	4	●	2

● : Inventory maintained in Japan.

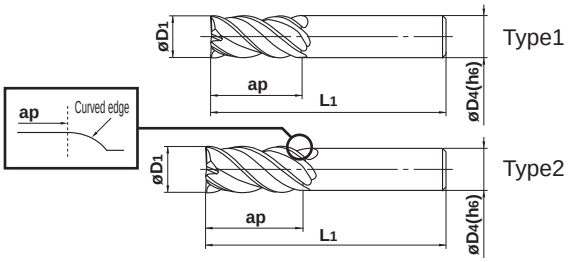
CUTTING CONDITIONS B308

VF-MHV NEW

End mill, Medium cut length, Irregular helix flutes

$D_1 \leq 12$	$0 -0.020$	h6	$D_4 = 6$	$0 -0.008$
$D_1 > 12$	$0 -0.030$		$8 \leq D_4 \leq 10$	$0 -0.009$
			$12 \leq D_4 \leq 16$	$0 -0.011$
			$D_4 = 20$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○	○		◎	◎		



- Impact Miracle end mills with irregular helix flutes ensures stable machining on difficult-to-cut materials and with long overhangs.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VFMHVD0600	6	13	50	6	4	●	1
D0600A070	6	13	70	6	4	●	1
D0800	8	19	60	8	4	●	1
D0800A080	8	19	80	8	4	●	1
D1000A100S08	10	22	100	8	4	●	2
D1000	10	22	70	10	4	●	1
D1000A100	10	22	100	10	4	●	1
D1100	11	26	100	10	4	●	2
D1200A110S10	12	26	110	10	4	●	2
D1200	12	26	75	12	4	●	1
D1200A110	12	26	110	12	4	●	1
D1300	13	26	110	12	4	●	2
D1400A130S12	14	32	130	12	4	●	2
D1600	16	35	90	16	4	●	1
D1800A150S16	18	42	150	16	4	●	2
D2000	20	45	110	20	4	●	1

CUTTING CONDITIONS B309

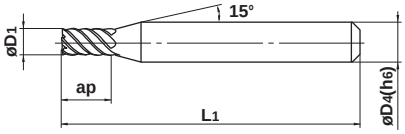
VF-SD

End mill, Short cut length, For hardened materials

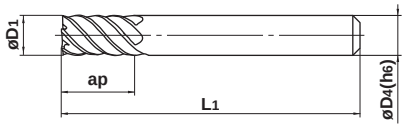
0 — -0.02 h6

D4 = 6	0 — -0.008
8 ≤ D4 ≤ 10	0 — -0.009
D4 = 12	0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1



Type2

UWC VF 30° 45°

D1<3 D1≥3

D1<3 D1≥3

- End mill with Impact Miracle coating for high hardened materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VFSDD0100	1	2	45	6	4	●	1
D0150	1.5	3	45	6	4	●	1
D0200	2	4	45	6	4	●	1
D0250	2.5	5	45	6	4	●	1
D0300	3	6	45	6	6	●	1
D0350	3.5	7	45	6	6	●	1
D0400	4	8	45	6	6	●	1
D0500	5	10	50	6	6	●	1
D0600	6	12	50	6	6	●	2
D0800	8	16	60	8	6	●	2
D1000	10	20	70	10	6	●	2
D1200	12	24	75	12	6	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B322

VF-MD

End mill, Medium cut length, For hardened materials

D1≤12 0 −-0.02
D1>12 0 −-0.03

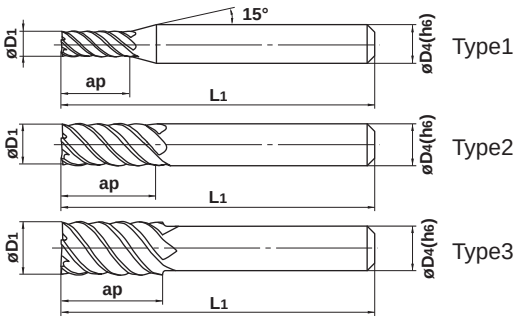
h6
D4 = 6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
20≤D4≤25 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				

UWC VF 30° 45°

D1<3 D1≥3

D1<3 D1≥3



- End mill with Impact Miracle coating for high hardened materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VFMDD0100	1	3.5	60	6	4	●	1
D0150	1.5	5	60	6	4	●	1
D0200	2	7	60	6	4	●	1
D0250	2.5	8	60	6	4	●	1
D0300	3	10	60	6	6	●	1
D0400	4	12	60	6	6	●	1
D0500	5	15	60	6	6	●	1
D0600	6	15	60	6	6	●	2
D0800	8	20	75	8	6	●	2
D1000	10	25	80	10	6	●	2
D1200	12	30	100	12	6	●	2
D1400	14	35	105	12	6	●	3
D1500	15	40	110	16	6	●	1
D1600	16	40	110	16	6	●	2
D1800	18	40	120	16	6	●	3
D2000	20	45	125	20	6	●	2
D2200	22	45	135	20	6	●	3
D2500	25	60	160	25	6	●	2

VF-SFPR NEW

Roughing end mill, Short cut length, 3—4 flute

h6

D4 = 6	0 — -0.008
8 ≤ D4 ≤ 10	0 — -0.009
12 ≤ D4 ≤ 16	0 — -0.011
D4 = 20	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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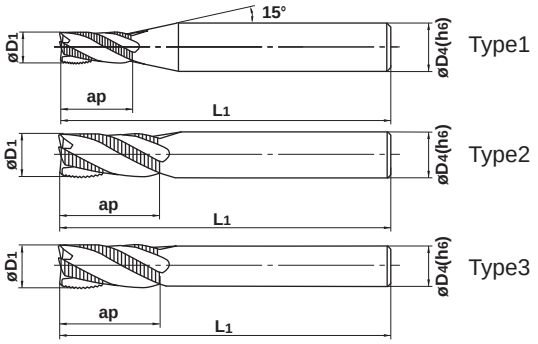
UWC VF 30°



● Impact Miracle roughing end mills for a wide range of work materials from carbon and alloy steel through to hardened steel and difficult-to-cut materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VFSFPRD0300	3	6	50	6	3	●	1
D0400	4	8	50	6	3	●	1
D0500	5	10	50	6	3	●	1
D0600	6	12	50	6	3	●	2
D0700	7	17	60	8	3	●	1
D0800	8	17	60	8	4	●	2
D0900	9	22	70	10	4	●	1
D1000S08	10	22	90	8	4	●	3
D1000	10	22	70	10	4	●	2
D1200S10	12	27	100	10	4	●	3
D1200	12	27	75	12	4	●	2
D1400	14	27	75	12	4	●	3
D1600	16	33	90	16	4	●	2
D1800	18	33	90	16	4	●	3
D2000	20	38	100	20	4	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B310

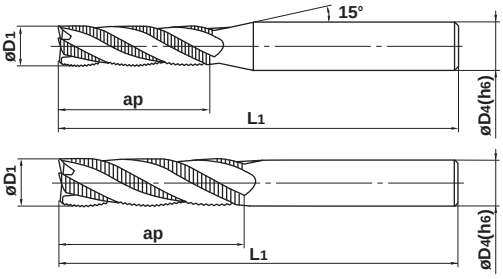
VF-MFPR NEW

Roughing end mill, Medium cut length, 4 flute

h6

$D_4 = 6$	$0 - -0.008$
$8 \leq D_4 \leq 10$	$0 - -0.009$
$12 \leq D_4 \leq 16$	$0 - -0.011$
$D_4 = 20$	$0 - -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	◎		



UWC VF 30°

- Impact Miracle roughing end mills suitable for the machining of deep walled components.

Unit : mm

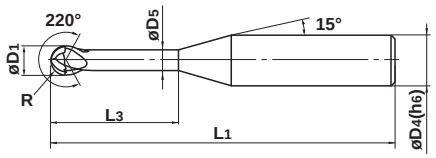
Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VFMFPRD0500	5	15	60	6	4	●	1
D0600	6	17	60	6	4	●	2
D0700	7	22	75	8	4	●	1
D0800	8	28	75	8	4	●	2
D0900	9	28	100	10	4	●	1
D1000	10	34	100	10	4	●	2
D1200	12	40	110	12	4	●	2
D1600	16	48	125	16	4	●	2
D2000	20	57	140	20	4	●	2

VF-2WB NEW

Wide ball nose, Medium cut length, 2 flute

R ±0.01 h6 D4 = 6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	○		◎	◎		



Type1

UWC VF

● Ball nose end mill suitable for machining of undercut geometries and complex geometries using a 5-axis machine.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF2WBR0100N060	1	2	6	1.6	60	6	2	●	1
R0150N080	1.5	3	8	2.4	60	6	2	●	1
R0200N100	2	4	10	3.2	60	6	2	●	1
R0300N120	3	6	12	4.8	80	6	2	●	1

● : Inventory maintained in Japan.

CUTTING CONDITIONS B312

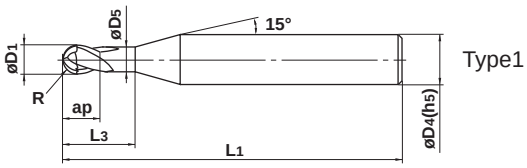
VF-2SSB

Ball nose, Short cut length, 2 flute, Short shank

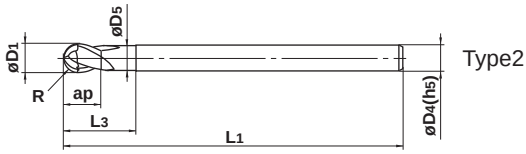
R ±0.005 | 0 −-0.01 | h5 | 4≤D4≤6 0 −-0.005 | 8≤D4≤10 0 −-0.006 | D4 = 12 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎	○	○		

UWC VF 30°



Type1



Type2

- 2 flute ball nose end mill with Impact Miracle coating for high hardened materials.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF2SSBR0050S04	0.5	1	1	2	0.94	40	4	2	●	1
R0050	0.5	1	1	2	0.94	40	6	2	●	1
R0075S04	0.75	1.5	1.5	3	1.44	40	4	2	●	1
R0075	0.75	1.5	1.5	3	1.44	40	6	2	●	1
R0100	1	2	2	4	1.9	45	6	2	●	1
R0150	1.5	3	3	6	2.9	45	6	2	●	1
R0200	2	4	4	8	3.9	45	6	2	●	1
R0250	2.5	5	5	10	4.9	50	6	2	●	1
R0300	3	6	6	12	5.85	50	6	2	●	2
R0400	4	8	8	14	7.85	60	8	2	●	2
R0500	5	10	10	18	9.7	70	10	2	●	2
R0600	6	12	12	22	11.7	75	12	2	●	2

CUTTING CONDITIONS B313

IMPACT MIRACLE END MILLS

VF-2SB

Ball nose, Short cut length, 2 flute, For hardened materials

R: R≤6 ±0.005; R>6 ±0.010

D1: D1≤12 0 −-0.01; D1>12 0 −-0.02

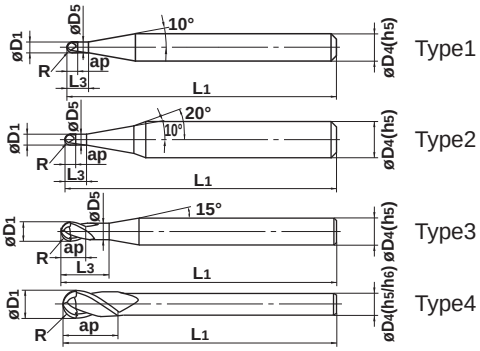
h5/h6: h5:D4≤12; h6:D4>12

D4 = 3 0 −-0.004
4≤D4≤6 0 −-0.005
8≤D4≤10 0 −-0.006
D4 = 12 0 −-0.008
D4 = 16 0 −-0.011
D4 = 20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎	○	○		

UWC VF 0° 30°

R<0.3 R≥0.3 R<0.3 R≥0.3



- 2 flute ball nose end mill with Impact Miracle coating for high hardened materials.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF2SBR0010S04	0.1	0.2	0.2	0.4	0.17	45	4	2	●	1
R0010S06	0.1	0.2	0.2	0.4	0.17	50	6	2	●	2
R0015S04	0.15	0.3	0.3	0.6	0.27	45	4	2	●	1
R0015S06	0.15	0.3	0.3	0.6	0.27	50	6	2	●	2
R0020S04	0.2	0.4	0.4	0.8	0.36	45	4	2	●	1
R0020S06	0.2	0.4	0.4	0.8	0.36	50	6	2	●	2
R0030S04	0.3	0.6	0.6	1.2	0.56	45	4	2	●	3
R0030S06	0.3	0.6	0.6	1.2	0.56	50	6	2	●	3
R0040S04	0.4	0.8	0.8	1.6	0.76	45	4	2	●	3
R0040S06	0.4	0.8	0.8	1.6	0.76	50	6	2	●	3
R0050S04	0.5	1	1	2	0.94	45	4	2	●	3
R0050S06	0.5	1	1	2	0.94	50	6	2	●	3
R0060S04	0.6	1.2	1.2	2.4	1.14	45	4	2	●	3
R0060S06	0.6	1.2	1.2	2.4	1.14	50	6	2	●	3
R0070S04	0.7	1.4	1.4	2.8	1.34	45	4	2	●	3
R0070S06	0.7	1.4	1.4	2.8	1.34	50	6	2	●	3
R0075S04	0.75	1.5	1.5	3	1.44	45	4	2	●	3
R0075S06	0.75	1.5	1.5	3	1.44	50	6	2	●	3
R0080S04	0.8	1.6	1.6	3.2	1.54	45	4	2	●	3
R0080S06	0.8	1.6	1.6	3.2	1.54	50	6	2	●	3
R0090S04	0.9	1.8	1.8	3.6	1.74	45	4	2	●	3
R0090S06	0.9	1.8	1.8	3.6	1.74	50	6	2	●	3
R0100S04	1	2	2	4	1.9	50	4	2	●	3
R0100S06	1	2	2	4	1.9	60	6	2	●	3
R0125S06	1.25	2.5	2.5	5	2.4	60	6	2	●	3
R0150S03	1.5	3	3	—	—	60	3	2	●	4
R0150S06	1.5	3	3	6	2.9	70	6	2	●	3
R0200S04	2	4	4	—	—	60	4	2	●	4
R0200S06	2	4	4	8	3.9	70	6	2	●	3
R0250S06	2.5	5	5	10	4.9	80	6	2	●	3
R0300S06	3	6	12	—	—	80	6	2	●	4
R0400S08	4	8	14	—	—	90	8	2	●	4
R0500S10	5	10	18	—	—	100	10	2	●	4
R0600S12	6	12	22	—	—	110	12	2	●	4
R0800S16	8	16	30	—	—	140	16	2	●	4
R1000S20	10	20	38	—	—	160	20	2	●	4

● : Inventory maintained in Japan.

CUTTING CONDITIONS B313

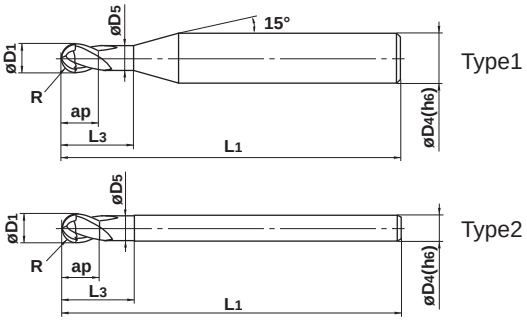
VF-2SDB NEW

Ball nose, Short cut length, 2 flute, Strong geometry type

R		D1		h6	
R≤6.5	±0.01	D1≤12	0 — -0.02	D4 = 3	0 — -0.006
R>6.5	±0.02	D1>12	0 — -0.03	4≤D4≤6	0 — -0.008
				8≤D4≤10	0 — -0.009
				12≤D4≤16	0 — -0.011
				D4 = 20	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○				

UWC VF 30°



● 2 flute ball nose end mill with Impact Miracle coating for high hardness materials and achieves excellent fracture resistance.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF2SDBR0050	0.5	1	1	2	0.94	45	4	2	●	1
R0100S04	1	2	2	4	1.9	50	4	2	●	1
R0100	1	2	2	4	1.9	60	6	2	●	1
R0150S03	1.5	3	3	6	2.9	60	3	2	●	2
R0150	1.5	3	3	6	2.9	70	6	2	●	1
R0200S04	2	4	4	8	3.9	60	4	2	●	2
R0200	2	4	4	8	3.9	70	6	2	●	1
R0250	2.5	5	5	10	4.9	80	6	2	●	1
R0300	3	6	12	22	5.85	80	6	2	●	2
R0400	4	8	14	27	7.85	90	8	2	●	2
R0500	5	10	18	31	9.7	100	10	2	●	2
R0600	6	12	22	35	11.7	110	12	2	●	2
R0800	8	16	30	50	15.5	140	16	2	●	2
R1000	10	20	38	58	19.5	160	20	2	●	2

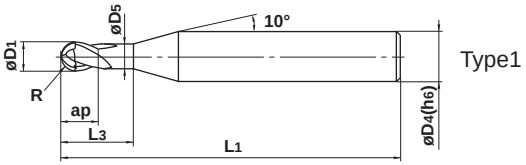
CUTTING CONDITIONS B314

VF-2SDBL NEW

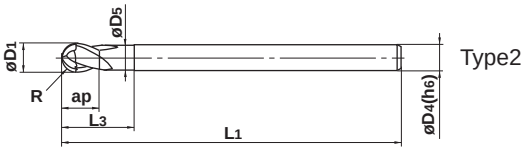
Ball nose, Short cut length, 2 flute, Strong geometry type, Long shank

R		D1		h6	
R≤6.5	±0.01	D1≤12	0 — -0.02	D4 = 6	0 — -0.008
R>6.5	±0.02	D1>12	0 — -0.03	8≤D4≤10	0 — -0.009
				12≤D4≤16	0 — -0.011
				D4 = 20	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○				



Type1



Type2

● 2 flute end mill with long shank for general use.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF2SDBLR0050	0.5	1	1	2	0.94	60	6	2	●	1
R0100	1	2	2	4	1.9	80	6	2	●	1
R0150	1.5	3	3	6	2.9	90	6	2	●	1
R0200	2	4	4	8	3.9	90	6	2	●	1
R0250	2.5	5	5	10	4.9	110	8	2	●	1
R0300	3	6	12	22	5.85	120	6	2	●	2
R0400	4	8	14	27	7.85	130	8	2	●	2
R0500	5	10	18	31	9.7	140	10	2	●	2
R0600	6	12	22	35	11.7	140	12	2	●	2
R0800	8	16	30	50	15.5	200	16	2	●	2
R1000	10	20	38	58	19.5	200	20	2	●	2

● : Inventory maintained in Japan.

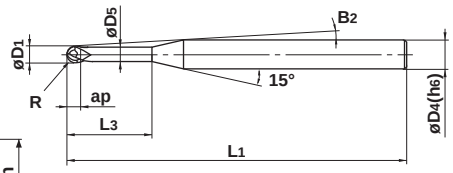
CUTTING CONDITIONS B314

VF-2XLBS NEW

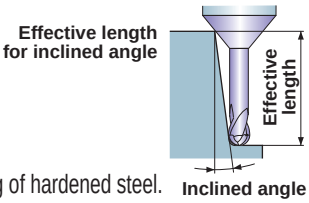
Ball nose, Medium cut length, 2 flute, Short shank

R ±0.007 | 0 −-0.02 | h6 | D4 = 4 | 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎		○		



Type1



UWC | VF | 30°

- 2 flute long neck ball nose end mill for high-speed machining of hardened steel.
- Short shank type suitable for use with a shrink fit holder.

Unit : mm

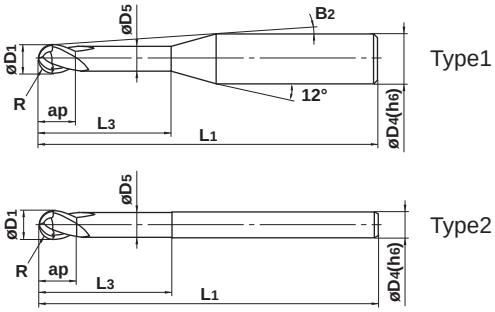
Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF2XLBSR0020N010	0.2	0.4	0.32	1	0.36	13.4°	40	4	2	●	1	1.0	1.0	1.1	1.2
R0020N020	0.2	0.4	0.32	2	0.36	11.9°	40	4	2	●	1	2.0	2.1	2.3	2.5
R0020N030	0.2	0.4	0.32	3	0.36	10.7°	40	4	2	●	1	3.1	3.2	3.4	3.7
R0020N040	0.2	0.4	0.32	4	0.36	9.7°	40	4	2	●	1	4.1	4.3	4.6	4.9
R0025N040	0.25	0.5	0.4	4	0.46	9.6°	40	4	2	●	1	4.1	4.3	4.6	4.9
R0025N060	0.25	0.5	0.4	6	0.46	8.1°	40	4	2	●	1	6.2	6.4	6.9	7.4
R0030N020	0.3	0.6	0.48	2	0.56	11.8°	40	4	2	●	1	2.1	2.2	2.3	2.5
R0030N030	0.3	0.6	0.48	3	0.56	10.5°	40	4	2	●	1	3.1	3.3	3.5	3.8
R0030N040	0.3	0.6	0.48	4	0.56	9.5°	40	4	2	●	1	4.2	4.3	4.6	5.0
R0030N060	0.3	0.6	0.48	6	0.56	8.0°	40	4	2	●	1	6.3	6.5	6.9	7.5
R0040N040	0.4	0.8	0.64	4	0.76	9.4°	40	4	2	●	1	4.2	4.3	4.6	5.0
R0040N060	0.4	0.8	0.64	6	0.76	7.8°	40	4	2	●	1	6.3	6.5	6.9	7.5
R0050N030	0.5	1	0.8	3	0.94	10.1°	40	4	2	●	1	3.2	3.3	3.6	3.9
R0050N040	0.5	1	0.8	4	0.94	9.1°	40	4	2	●	1	4.2	4.4	4.8	5.2
R0050N060	0.5	1	0.8	6	0.94	7.5°	40	4	2	●	1	6.3	6.6	7.1	7.7
R0050N080	0.5	1	0.8	8	0.94	6.4°	40	4	2	●	1	8.4	8.8	9.4	10.2
R0100N060	1	2	1.6	6	1.9	6.4°	40	4	2	●	1	6.2	6.5	6.9	7.4
R0100N080	1	2	1.6	8	1.9	5.3°	40	4	2	●	1	8.3	8.7	9.2	9.9
R0100N100	1	2	1.6	10	1.9	4.5°	40	4	2	●	1	10.4	10.8	11.5	12.4

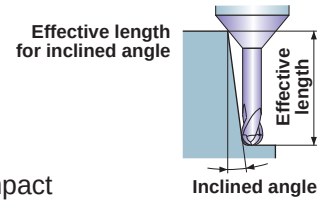
VF-2XLB

Ball nose, Long cut length, 2 flute, For hardened materials

R R≤1 ±0.007 R>1 ±0.010 | 0 −-0.02 | h6 4≤D4≤6 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎		○		





UWC VF 30°

● 2 flute long neck ball nose end mill with Impact Miracle coating for high hardened materials.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF2XLBR0010N005S04	0.1	0.2	0.16	0.5	0.17	11.5°	50	4	2	●	1	0.5	0.5	0.6	0.6
R0010N005S06	0.1	0.2	0.16	0.5	0.17	11.7°	50	6	2	●	1	0.5	0.5	0.6	0.6
R0010N008S04	0.1	0.2	0.16	0.75	0.17	11.2°	50	4	2	●	1	0.7	0.8	0.9	1.0
R0010N010S04	0.1	0.2	0.16	1	0.17	10.9°	50	4	2	●	1	1.0	1.1	1.2	1.3
R0010N010S06	0.1	0.2	0.16	1	0.17	11.3°	50	6	2	●	1	1.0	1.1	1.2	1.3
R0010N013S04	0.1	0.2	0.16	1.25	0.17	10.7°	50	4	2	●	1	1.3	1.3	1.5	1.6
R0010N015S04	0.1	0.2	0.16	1.5	0.17	10.4°	50	4	2	●	1	1.5	1.6	1.8	2.0
R0010N015S06	0.1	0.2	0.16	1.5	0.17	10.9°	50	6	2	●	1	1.5	1.6	1.8	2.0
R0010N018S04	0.1	0.2	0.16	1.75	0.17	10.2°	50	4	2	●	1	1.8	1.9	2.1	2.3
R0010N020S04	0.1	0.2	0.16	2	0.17	10°	50	4	2	●	1	2.1	2.2	2.4	2.6
R0010N025S04	0.1	0.2	0.16	2.5	0.17	9.5°	50	4	2	●	1	2.6	2.7	3.0	3.3
R0015N010S04	0.15	0.3	0.24	1	0.27	11°	50	4	2	●	1	1.0	1.1	1.2	1.3
R0015N010S06	0.15	0.3	0.24	1	0.27	11.3°	50	6	2	●	1	1.0	1.1	1.2	1.3
R0015N013S04	0.15	0.3	0.24	1.25	0.27	10.7°	50	4	2	●	1	1.3	1.3	1.5	1.6
R0015N015S04	0.15	0.3	0.24	1.5	0.27	10.4°	50	4	2	●	1	1.5	1.6	1.8	1.9
R0015N015S06	0.15	0.3	0.24	1.5	0.27	10.9°	50	6	2	●	1	1.5	1.6	1.8	1.9
R0015N018S04	0.15	0.3	0.24	1.75	0.27	10.2°	50	4	2	●	1	1.8	1.9	2.1	2.3
R0015N020S04	0.15	0.3	0.24	2	0.27	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
R0015N020S06	0.15	0.3	0.24	2	0.27	10.6°	50	6	2	●	1	2.1	2.2	2.4	2.6
R0015N025S04	0.15	0.3	0.24	2.5	0.27	9.5°	50	4	2	●	1	2.6	2.7	3.0	3.3
R0015N030S04	0.15	0.3	0.24	3	0.27	9.1°	50	4	2	●	1	3.1	3.2	3.6	3.9
R0015N040S04	0.15	0.3	0.24	4	0.27	8.4°	50	4	2	●	1	4.2	4.3	4.8	5.3
R0020N010S04	0.2	0.4	0.32	1	0.36	11°	50	4	2	●	1	1.0	1.0	1.1	1.2
R0020N010S06	0.2	0.4	0.32	1	0.36	11.3°	50	6	2	●	1	1.0	1.0	1.1	1.2
R0020N015S04	0.2	0.4	0.32	1.5	0.36	10.4°	50	4	2	●	1	1.5	1.6	1.7	1.9
R0020N015S06	0.2	0.4	0.32	1.5	0.36	11°	50	6	2	●	1	1.5	1.6	1.7	1.9
R0020N020S04	0.2	0.4	0.32	2	0.36	10°	50	4	2	●	1	2.0	2.1	2.3	2.6
R0020N020S06	0.2	0.4	0.32	2	0.36	10.6°	50	6	2	●	1	2.0	2.1	2.3	2.6
R0020N025S04	0.2	0.4	0.32	2.5	0.36	9.5°	50	4	2	●	1	2.6	2.7	2.9	3.2
R0020N025S06	0.2	0.4	0.32	2.5	0.36	10.3°	50	6	2	●	1	2.6	2.7	2.9	3.2
R0020N030S04	0.2	0.4	0.32	3	0.36	9.1°	50	4	2	●	1	3.1	3.2	3.5	3.9
R0020N030S06	0.2	0.4	0.32	3	0.36	10°	50	6	2	●	1	3.1	3.2	3.5	3.9
R0020N040S04	0.2	0.4	0.32	4	0.36	8.4°	50	4	2	●	1	4.1	4.3	4.7	5.2
R0020N050S04	0.2	0.4	0.32	5	0.36	7.8°	50	4	2	●	1	5.2	5.4	5.9	6.6
R0025N015S04	0.25	0.5	0.4	1.5	0.46	10.5°	50	4	2	●	1	1.5	1.6	1.7	1.9
R0025N015S06	0.25	0.5	0.4	1.5	0.46	11°	50	6	2	●	1	1.5	1.6	1.7	1.9
R0025N020S04	0.25	0.5	0.4	2	0.46	10°	50	4	2	●	1	2.0	2.1	2.3	2.6
R0025N020S06	0.25	0.5	0.4	2	0.46	10.6°	50	6	2	●	1	2.0	2.1	2.3	2.6

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D_1	Length of Cut ap	Neck Length L_3	Neck Dia. D_5	Cutting Edge to Shank Angle B_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF2XLBR0025N025S04	0.25	0.5	0.4	2.5	0.46	9.5°	50	4	2	●	1	2.6	2.7	2.9	3.2
R0025N030S04	0.25	0.5	0.4	3	0.46	9.1°	50	4	2	●	1	3.1	3.2	3.5	3.9
R0025N030S06	0.25	0.5	0.4	3	0.46	10°	50	6	2	●	1	3.1	3.2	3.5	3.9
R0025N035S04	0.25	0.5	0.4	3.5	0.46	8.7°	50	4	2	●	1	3.6	3.8	4.1	4.5
R0025N040S04	0.25	0.5	0.4	4	0.46	8.3°	50	4	2	●	1	4.1	4.3	4.7	5.2
R0025N040S06	0.25	0.5	0.4	4	0.46	9.4°	50	6	2	●	1	4.1	4.3	4.7	5.2
R0025N050S04	0.25	0.5	0.4	5	0.46	7.7°	50	4	2	●	1	5.2	5.4	5.9	6.5
R0025N050S06	0.25	0.5	0.4	5	0.46	8.9°	50	6	2	●	1	5.2	5.4	5.9	6.5
R0025N060S04	0.25	0.5	0.4	6	0.46	7.2°	50	4	2	●	1	6.2	6.5	7.1	7.9
R0025N060S06	0.25	0.5	0.4	6	0.46	8.4°	60	6	2	●	1	6.2	6.5	7.1	7.9
R0030N020S04	0.3	0.6	0.48	2	0.56	9.9°	50	4	2	●	1	2.1	2.2	2.4	2.6
R0030N020S06	0.3	0.6	0.48	2	0.56	10.6°	50	6	2	●	1	2.1	2.2	2.4	2.6
R0030N025S04	0.3	0.6	0.48	2.5	0.56	9.4°	50	4	2	●	1	2.6	2.7	3.0	3.3
R0030N030S04	0.3	0.6	0.48	3	0.56	9°	50	4	2	●	1	3.1	3.3	3.6	3.9
R0030N030S06	0.3	0.6	0.48	3	0.56	9.9°	50	6	2	●	1	3.1	3.3	3.6	3.9
R0030N035S04	0.3	0.6	0.48	3.5	0.56	8.6°	50	4	2	●	1	3.6	3.8	4.2	4.6
R0030N040S04	0.3	0.6	0.48	4	0.56	8.3°	50	4	2	●	1	4.2	4.4	4.8	5.2
R0030N040S06	0.3	0.6	0.48	4	0.56	9.3°	50	6	2	●	1	4.2	4.4	4.8	5.2
R0030N050S04	0.3	0.6	0.48	5	0.56	7.6°	50	4	2	●	1	5.2	5.4	6.0	6.6
R0030N050S06	0.3	0.6	0.48	5	0.56	8.8°	50	6	2	●	1	5.2	5.4	6.0	6.6
R0030N060S04	0.3	0.6	0.48	6	0.56	7.1°	50	4	2	●	1	6.3	6.5	7.1	7.9
R0030N060S06	0.3	0.6	0.48	6	0.56	8.4°	50	6	2	●	1	6.3	6.5	7.1	7.9
R0030N070S04	0.3	0.6	0.48	7	0.56	6.6°	50	4	2	●	1	7.3	7.6	8.3	9.2
R0030N080S04	0.3	0.6	0.48	8	0.56	6.2°	50	4	2	●	1	8.3	8.7	9.5	10.6
R0030N080S06	0.3	0.6	0.48	8	0.56	7.6°	60	6	2	●	1	8.3	8.7	9.5	10.6
R0040N020S04	0.4	0.8	0.64	2	0.76	9.9°	50	4	2	●	1	2.1	2.2	2.3	2.6
R0040N020S06	0.4	0.8	0.64	2	0.76	10.6°	50	6	2	●	1	2.1	2.2	2.3	2.6
R0040N030S04	0.4	0.8	0.64	3	0.76	8.9°	50	4	2	●	1	3.1	3.3	3.5	3.9
R0040N030S06	0.4	0.8	0.64	3	0.76	9.9°	50	6	2	●	1	3.1	3.3	3.5	3.9
R0040N040S04	0.4	0.8	0.64	4	0.76	8.2°	50	4	2	●	1	4.2	4.3	4.7	5.2
R0040N040S06	0.4	0.8	0.64	4	0.76	9.3°	50	6	2	●	1	4.2	4.3	4.7	5.2
R0040N050S04	0.4	0.8	0.64	5	0.76	7.5°	50	4	2	●	1	5.2	5.4	5.9	6.5
R0040N060S04	0.4	0.8	0.64	6	0.76	7°	50	4	2	●	1	6.3	6.5	7.1	7.9
R0040N060S06	0.4	0.8	0.64	6	0.76	8.3°	50	6	2	●	1	6.3	6.5	7.1	7.9
R0040N070S04	0.4	0.8	0.64	7	0.76	6.5°	50	4	2	●	1	7.3	7.6	8.3	9.2
R0040N080S04	0.4	0.8	0.64	8	0.76	6.1°	50	4	2	●	1	8.3	8.7	9.5	10.5
R0040N080S06	0.4	0.8	0.64	8	0.76	7.5°	50	6	2	●	1	8.3	8.7	9.5	10.5
R0040N100S04	0.4	0.8	0.64	10	0.76	5.4°	50	4	2	●	1	10.4	10.9	11.9	13.2
R0040N100S06	0.4	0.8	0.64	10	0.76	6.8°	60	6	2	●	1	10.4	10.9	11.9	13.2
R0050N030S04	0.5	1	0.8	3	0.94	8.8°	50	4	2	●	1	3.2	3.3	3.6	4.0
R0050N030S06	0.5	1	0.8	3	0.94	9.8°	50	6	2	●	1	3.2	3.3	3.6	4.0
R0050N040S04	0.5	1	0.8	4	0.94	8°	50	4	2	●	1	4.2	4.4	4.8	5.3
R0050N040S06	0.5	1	0.8	4	0.94	9.2°	50	6	2	●	1	4.2	4.4	4.8	5.3
R0050N050S04	0.5	1	0.8	5	0.94	7.3°	50	4	2	●	1	5.3	5.5	6.0	6.7
R0050N050S06	0.5	1	0.8	5	0.94	8.7°	50	6	2	●	1	5.3	5.5	6.0	6.7
R0050N060S04	0.5	1	0.8	6	0.94	6.8°	50	4	2	●	1	6.3	6.6	7.2	8.0
R0050N060S06	0.5	1	0.8	6	0.94	8.2°	50	6	2	●	1	6.3	6.6	7.2	8.0
R0050N070S04	0.5	1	0.8	7	0.94	6.3°	50	4	2	●	1	7.4	7.7	8.4	9.3
R0050N080S04	0.5	1	0.8	8	0.94	5.9°	50	4	2	●	1	8.4	8.8	9.6	10.6
R0050N080S06	0.5	1	0.8	8	0.94	7.4°	50	6	2	●	1	8.4	8.8	9.6	10.6

CUTTING CONDITIONS B316

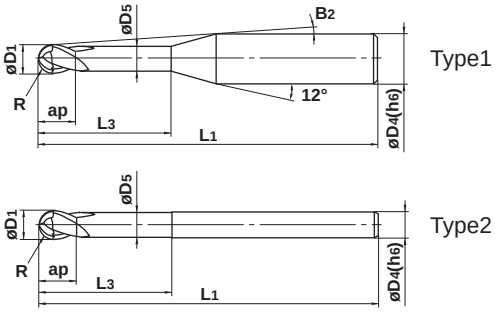
IMPACT MIRACLE END MILLS

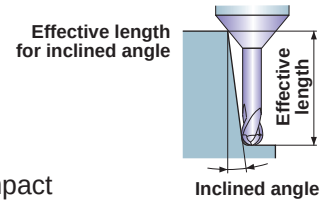
VF-2XLB

Ball nose, Long cut length, 2 flute, For hardened materials

R R≤1 ±0.007 R>1 ±0.010 | 0 −-0.02 | h6 4≤D4≤6 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎		○		





UWC VF 30°

● 2 flute long neck ball nose end mill with Impact Miracle coating for high hardened materials.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF2XLBR0050N090S04	0.5	1	0.8	9	0.94	5.5°	50	4	2	●	1	9.5	9.9	10.8	12.0
R0050N100S04	0.5	1	0.8	10	0.94	5.2°	50	4	2	●	1	10.5	11.0	12.0	13.3
R0050N100S06	0.5	1	0.8	10	0.94	6.7°	50	6	2	●	1	10.5	11.0	12.0	13.3
R0050N120S04	0.5	1	0.8	12	0.94	4.6°	50	4	2	●	1	12.6	13.2	14.4	15.9
R0050N120S06	0.5	1	0.8	12	0.94	6.1°	60	6	2	●	1	12.6	13.2	14.4	15.9
R0050N140S04	0.5	1	0.8	14	0.94	4.2°	60	4	2	●	1	14.7	15.3	16.8	18.6
R0050N160S04	0.5	1	0.8	16	0.94	3.8°	60	4	2	●	1	16.8	17.5	19.2	21.3
R0050N160S06	0.5	1	0.8	16	0.94	5.3°	70	6	2	●	1	16.8	17.5	19.2	21.3
R0050N180S04	0.5	1	0.8	18	0.94	3.5°	60	4	2	●	1	18.9	19.7	21.6	23.9
R0050N200S04	0.5	1	0.8	20	0.94	3.3°	60	4	2	●	1	21.0	21.9	24.0	26.6
R0050N200S06	0.5	1	0.8	20	0.94	4.6°	70	6	2	●	1	21.0	21.9	24.0	26.6
R0060N060S04	0.6	1.2	0.96	6	1.14	6.6°	50	4	2	●	1	6.3	6.6	7.2	8.0
R0060N060S06	0.6	1.2	0.96	6	1.14	8.1°	50	6	2	●	1	6.3	6.6	7.2	8.0
R0060N080S04	0.6	1.2	0.96	8	1.14	5.7°	50	4	2	●	1	8.4	8.8	9.6	10.6
R0060N080S06	0.6	1.2	0.96	8	1.14	7.3°	50	6	2	●	1	8.4	8.8	9.6	10.6
R0060N100S04	0.6	1.2	0.96	10	1.14	5°	50	4	2	●	1	10.5	11.0	12.0	13.3
R0060N100S06	0.6	1.2	0.96	10	1.14	6.6°	50	6	2	●	1	10.5	11.0	12.0	13.3
R0060N120S04	0.6	1.2	0.96	12	1.14	4.5°	50	4	2	●	1	12.6	13.2	14.4	15.9
R0060N120S06	0.6	1.2	0.96	12	1.14	6°	50	6	2	●	1	12.6	13.2	14.4	15.9
R0060N140S04	0.6	1.2	0.96	14	1.14	4°	60	4	2	●	1	14.7	15.3	16.8	18.6
R0060N160S04	0.6	1.2	0.96	16	1.14	3.7°	60	4	2	●	1	16.8	17.5	19.2	21.2
R0060N160S06	0.6	1.2	0.96	16	1.14	5.2°	70	6	2	●	1	16.8	17.5	19.2	21.2
R0070N080S04	0.7	1.4	1.12	8	1.34	5.5°	50	4	2	●	1	8.4	8.8	9.6	10.6
R0070N120S04	0.7	1.4	1.12	12	1.34	4.3°	50	4	2	●	1	12.6	13.1	14.4	15.9
R0070N160S04	0.7	1.4	1.12	16	1.34	3.5°	60	4	2	●	1	16.8	17.5	19.2	21.2
R0075N060S04	0.75	1.5	1.2	6	1.44	6.3°	50	4	2	●	1	6.3	6.6	7.2	7.9
R0075N060S06	0.75	1.5	1.2	6	1.44	8°	50	6	2	●	1	6.3	6.6	7.2	7.9
R0075N080S04	0.75	1.5	1.2	8	1.44	5.4°	50	4	2	●	1	8.4	8.8	9.6	10.6
R0075N080S06	0.75	1.5	1.2	8	1.44	7.2°	50	6	2	●	1	8.4	8.8	9.6	10.6
R0075N100S04	0.75	1.5	1.2	10	1.44	4.7°	50	4	2	●	1	10.5	11.0	12.0	13.2
R0075N100S06	0.75	1.5	1.2	10	1.44	6.5°	50	6	2	●	1	10.5	11.0	12.0	13.2
R0075N120S04	0.75	1.5	1.2	12	1.44	4.2°	50	4	2	●	1	12.6	13.1	14.4	15.9
R0075N120S06	0.75	1.5	1.2	12	1.44	5.9°	50	6	2	●	1	12.6	13.1	14.4	15.9
R0075N140S04	0.75	1.5	1.2	14	1.44	3.8°	50	4	2	●	1	14.7	15.3	16.8	18.5
R0075N140S06	0.75	1.5	1.2	14	1.44	5.4°	50	6	2	●	1	14.7	15.3	16.8	18.5
R0075N160S04	0.75	1.5	1.2	16	1.44	3.4°	60	4	2	●	1	16.8	17.5	19.2	21.2
R0075N160S06	0.75	1.5	1.2	16	1.44	5°	60	6	2	●	1	16.8	17.5	19.2	21.2
R0075N180S04	0.75	1.5	1.2	18	1.44	3.1°	60	4	2	●	1	18.9	19.7	21.6	23.8

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF2XLBR0075N200S04	0.75	1.5	1.2	20	1.44	2.9°	60	4	2	●	1	21.0	21.9	23.9	No interference
R0075N200S06	0.75	1.5	1.2	20	1.44	4.3°	70	6	2	●	1	21.0	21.9	23.9	26.5
R0080N080S04	0.8	1.6	1.28	8	1.54	5.3°	50	4	2	●	1	8.4	8.8	9.6	10.5
R0080N120S04	0.8	1.6	1.28	12	1.54	4.1°	50	4	2	●	1	12.6	13.1	14.4	15.9
R0080N160S04	0.8	1.6	1.28	16	1.54	3.3°	60	4	2	●	1	16.8	17.5	19.1	21.2
R0080N200S04	0.8	1.6	1.28	20	1.54	2.8°	60	4	2	●	1	21.0	21.9	23.9	No interference
R0090N080S04	0.9	1.8	1.44	8	1.74	5.1°	50	4	2	●	1	8.4	8.8	9.6	10.5
R0090N120S04	0.9	1.8	1.44	12	1.74	3.9°	50	4	2	●	1	12.6	13.1	14.3	15.8
R0090N160S04	0.9	1.8	1.44	16	1.74	3.1°	60	4	2	●	1	16.8	17.5	19.1	21.1
R0090N200S04	0.9	1.8	1.44	20	1.74	2.6°	60	4	2	●	1	20.9	21.8	23.9	No interference
R0100N060S04	1	2	1.6	6	1.9	5.8°	50	4	2	●	1	6.2	6.5	7.0	7.7
R0100N060S06	1	2	1.6	6	1.9	7.9°	50	6	2	●	1	6.2	6.5	7.0	7.7
R0100N080S04	1	2	1.6	8	1.9	4.9°	50	4	2	●	1	8.3	8.7	9.4	10.4
R0100N080S06	1	2	1.6	8	1.9	6.9°	50	6	2	●	1	8.3	8.7	9.4	10.4
R0100N100S04	1	2	1.6	10	1.9	4.2°	50	4	2	●	1	10.4	10.9	11.8	13.0
R0100N100S06	1	2	1.6	10	1.9	6.2°	50	6	2	●	1	10.4	10.9	11.8	13.0
R0100N120S04	1	2	1.6	12	1.9	3.7°	50	4	2	●	1	12.5	13.0	14.2	15.7
R0100N120S06	1	2	1.6	12	1.9	5.6°	50	6	2	●	1	12.5	13.0	14.2	15.7
R0100N140S04	1	2	1.6	14	1.9	3.3°	50	4	2	●	1	14.6	15.2	16.6	18.3
R0100N140S06	1	2	1.6	14	1.9	5.1°	50	6	2	●	1	14.6	15.2	16.6	18.3
R0100N160S04	1	2	1.6	16	1.9	2.9°	60	4	2	●	1	16.7	17.4	19.0	No interference
R0100N160S06	1	2	1.6	16	1.9	4.7°	60	6	2	●	1	16.7	17.4	19.0	21.0
R0100N180S04	1	2	1.6	18	1.9	2.7°	60	4	2	●	1	18.8	19.6	21.4	No interference
R0100N180S06	1	2	1.6	18	1.9	4.4°	60	6	2	●	1	18.8	19.6	21.4	23.6
R0100N200S04	1	2	1.6	20	1.9	2.5°	60	4	2	●	1	20.9	21.8	23.8	No interference
R0100N200S06	1	2	1.6	20	1.9	4.1°	60	6	2	●	1	20.9	21.8	23.8	26.3
R0100N220S04	1	2	1.6	22	1.9	2.3°	60	4	2	●	1	22.9	23.9	26.2	No interference
R0100N250S04	1	2	1.6	25	1.9	2°	70	4	2	●	1	26.1	27.2	No interference	No interference
R0100N250S06	1	2	1.6	25	1.9	3.5°	70	6	2	●	1	26.1	27.2	29.8	32.9
R0100N300S04	1	2	1.6	30	1.9	1.7°	70	4	2	●	1	31.3	32.6	No interference	No interference
R0100N300S06	1	2	1.6	30	1.9	3°	80	6	2	●	1	31.3	32.6	35.8	No interference
R0100N350S04	1	2	1.6	35	1.9	1.5°	80	4	2	●	1	36.5	38.1	No interference	No interference
R0125N100S06	1.25	2.5	2	10	2.4	5.9°	60	6	2	●	1	10.4	10.8	11.8	12.9
R0125N150S06	1.25	2.5	2	15	2.4	4.6°	60	6	2	●	1	15.6	16.3	17.8	19.6
R0125N200S06	1.25	2.5	2	20	2.4	3.7°	70	6	2	●	1	20.8	21.7	23.8	26.2
R0125N250S06	1.25	2.5	2	25	2.4	3.2°	70	6	2	●	1	26.1	27.2	29.7	32.9
R0125N300S06	1.25	2.5	2	30	2.4	2.8°	80	6	2	●	1	31.3	32.6	35.7	No interference
R0125N350S06	1.25	2.5	2	35	2.4	2.4°	80	6	2	●	1	36.5	38.1	41.7	No interference
R0150N080S06	1.5	3	2.4	8	2.9	6.3°	60	6	2	●	1	8.3	8.6	9.3	10.2
R0150N100S06	1.5	3	2.4	10	2.9	5.5°	60	6	2	●	1	10.4	10.8	11.7	12.9
R0150N120S06	1.5	3	2.4	12	2.9	4.9°	60	6	2	●	1	12.5	13.0	14.1	15.5
R0150N140S06	1.5	3	2.4	14	2.9	4.4°	60	6	2	●	1	14.6	15.2	16.5	18.2
R0150N160S06	1.5	3	2.4	16	2.9	4°	60	6	2	●	1	16.7	17.3	18.9	20.8
R0150N200S06	1.5	3	2.4	20	2.9	3.4°	70	6	2	●	1	20.8	21.7	23.7	26.1
R0150N250S06	1.5	3	2.4	25	2.9	2.8°	70	6	2	●	1	26.1	27.2	29.7	No interference
R0150N300S06	1.5	3	2.4	30	2.9	2.5°	70	6	2	●	1	31.3	32.6	35.7	No interference
R0150N350S06	1.5	3	2.4	35	2.9	2.2°	80	6	2	●	1	36.5	38.0	41.7	No interference
R0150N400S06	1.5	3	2.4	40	2.9	1.9°	90	6	2	●	1	41.7	43.5	No interference	No interference
R0175N160S06	1.75	3.5	2.8	16	3.4	3.6°	60	6	2	●	1	16.7	17.3	18.9	20.8
R0175N200S06	1.75	3.5	2.8	20	3.4	3°	70	6	2	●	1	20.8	21.7	23.7	No interference

CUTTING CONDITIONS B316

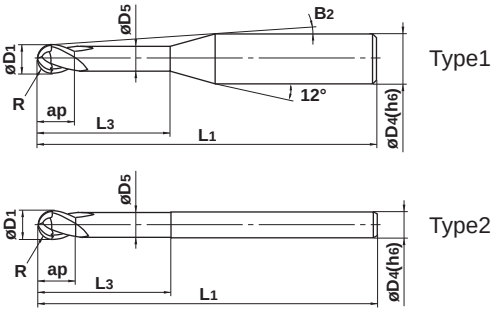
VF-2XLB

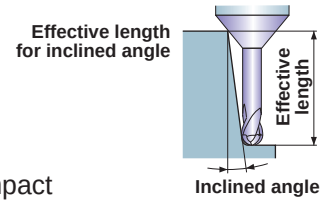
Ball nose, Long cut length, 2 flute, For hardened materials

R R≤1 ±0.007 R>1 ±0.010 | 0 — -0.02 | h6 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎		○		

UWC VF 30°





● 2 flute long neck ball nose end mill with Impact Miracle coating for high hardened materials.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF2XLBR0175N250S06	1.75	3.5	2.8	25	3.4	2.5°	70	6	2	●	1	26.0	27.1	29.6	No interference
R0175N300S06	1.75	3.5	2.8	30	3.4	2.1°	80	6	2	●	1	31.3	32.6	35.6	No interference
R0175N350S06	1.75	3.5	2.8	35	3.4	1.9°	80	6	2	●	1	36.5	38.0	No interference	No interference
R0175N400S06	1.75	3.5	2.8	40	3.4	1.7°	90	6	2	●	1	41.7	43.5	No interference	No interference
R0200N100S06	2	4	3.2	10	3.9	4.5°	70	6	2	●	1	10.4	10.8	11.6	12.7
R0200N120S06	2	4	3.2	12	3.9	3.9°	70	6	2	●	1	12.5	12.9	14.0	15.4
R0200N140S06	2	4	3.2	14	3.9	3.4°	70	6	2	●	1	14.6	15.1	16.4	18.0
R0200N160S06	2	4	3.2	16	3.9	3.1°	70	6	2	●	1	16.6	17.3	18.8	20.7
R0200N200S06	2	4	3.2	20	3.9	2.6°	70	6	2	●	1	20.8	21.7	23.6	No interference
R0200N250S06	2	4	3.2	25	3.9	2.1°	70	6	2	●	1	26.0	27.1	29.6	No interference
R0200N300S06	2	4	3.2	30	3.9	1.8°	70	6	2	●	1	31.2	32.6	No interference	No interference
R0200N350S06	2	4	3.2	35	3.9	1.6°	80	6	2	●	1	36.5	38.0	No interference	No interference
R0200N400S06	2	4	3.2	40	3.9	1.4°	90	6	2	●	1	41.7	43.5	No interference	No interference
R0200N450S06	2	4	3.2	45	3.9	1.2°	90	6	2	●	1	46.9	48.9	No interference	No interference
R0200N500S06	2	4	3.2	50	3.9	1.1°	100	6	2	●	1	52.1	54.3	No interference	No interference
R0250N200S06	2.5	5	4	20	4.9	1.5°	70	6	2	●	1	20.8	21.6	No interference	No interference
R0250N250S06	2.5	5	4	25	4.9	1.2°	70	6	2	●	1	26.0	27.1	No interference	No interference
R0250N300S06	2.5	5	4	30	4.9	1°	80	6	2	●	1	31.2	No interference	No interference	No interference
R0250N350S06	2.5	5	4	35	4.9	0.9°	80	6	2	●	1	36.4	No interference	No interference	No interference
R0300N300S06	3	6	4.8	30	5.85	—	80	6	2	●	2	No interference	No interference	No interference	No interference
R0300N400S06	3	6	4.8	40	5.85	—	90	6	2	●	2	No interference	No interference	No interference	No interference
R0300N500S06	3	6	4.8	50	5.85	—	100	6	2	●	2	No interference	No interference	No interference	No interference

● : Inventory maintained in Japan.

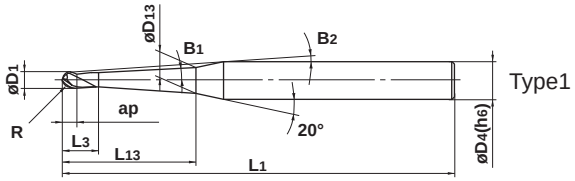
CUTTING CONDITIONS B316

VF-3XB NEW

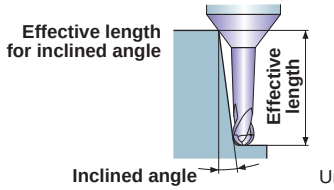
Ball nose, Medium cut length, 3 flute, Taper neck

R ±0.01 | 0 — -0.02 | h6 4≤D4≤6 0 — -0.008, D4 = 8 0 — -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎	○	○		



Type1



UWC | VF | 30°

● 3 flute ball end mill, high rigidity taper neck type.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L13	Length of Straight Neck L3	Cutting Edge to Shank Angle B2	Neck Dia. D13	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF3XBR0040T0024L006	0.4	0.8	0.4°	0.5	6	1.5	8.9°	0.82	60	4	3	●	1	6.3	6.6	6.9	7.3
R0040T0024L008	0.4	0.8	0.4°	0.5	8	1.5	7.5°	0.85	60	4	3	●	1	8.4	8.6	9.1	9.5
R0040T0024L012	0.4	0.8	0.4°	0.5	12	1.5	5.7°	0.91	60	4	3	●	1	12.4	12.7	13.4	14.1
R0040T0054L008	0.4	0.8	0.9°	0.5	8	1.5	7.6°	0.96	60	4	3	●	1	—	8.4	8.9	9.3
R0040T0054L012	0.4	0.8	0.9°	0.5	12	1.5	5.8°	1.09	60	4	3	●	1	—	12.4	13.1	13.8
R0040T0054L016	0.4	0.8	0.9°	0.5	16	1.5	4.7°	1.22	60	4	3	●	1	—	16.5	17.3	18.3
R0050T0024L008	0.5	1	0.4°	0.8	8	2.3	9.6°	1.02	60	6	3	●	1	8.5	8.8	9.3	9.8
R0050T0024L010	0.5	1	0.4°	0.8	10	2.3	8.5°	1.05	60	6	3	●	1	10.5	10.9	11.4	12.1
R0050T0024L012	0.5	1	0.4°	0.8	12	2.3	7.6°	1.08	60	6	3	●	1	12.6	13.0	13.6	14.4
R0050T0024L016	0.5	1	0.4°	0.8	16	2.3	6.3°	1.13	70	6	3	●	1	16.6	17.1	18.0	18.9
R0050T0024L020	0.5	1	0.4°	0.8	20	2.3	5.4°	1.19	70	6	3	●	1	20.6	21.2	22.3	23.5
R0050T0024L025	0.5	1	0.4°	0.8	25	2.3	4.6°	1.26	70	6	3	●	1	25.7	26.3	27.7	29.3
R0050T0024L030	0.5	1	0.4°	0.8	30	2.3	4.0°	1.33	80	6	3	●	1	30.7	31.5	33.1	35.0
R0050T0024L035	0.5	1	0.4°	0.8	35	2.3	3.5°	1.40	80	6	3	●	1	35.7	36.6	38.6	40.7
R0050T0054L008	0.5	1	0.9°	0.8	8	2.3	9.7°	1.12	60	6	3	●	1	—	8.6	9.1	9.6
R0050T0054L012	0.5	1	0.9°	0.8	12	2.3	7.7°	1.24	60	6	3	●	1	—	12.6	13.3	14.1
R0050T0054L016	0.5	1	0.9°	0.8	16	2.3	6.4°	1.37	70	6	3	●	1	—	16.7	17.6	18.5
R0050T0054L020	0.5	1	0.9°	0.8	20	2.3	5.5°	1.50	70	6	3	●	1	—	20.7	21.8	23.0
R0050T0054L025	0.5	1	0.9°	0.8	25	2.3	4.7°	1.65	70	6	3	●	1	—	25.7	27.1	28.6
R0050T0054L030	0.5	1	0.9°	0.8	30	2.3	4.0°	1.81	80	6	3	●	1	—	30.8	32.4	34.2
R0050T0054L035	0.5	1	0.9°	0.8	35	2.3	3.6°	1.97	80	6	3	●	1	—	35.8	37.7	39.8
R0050T0054L040	0.5	1	0.9°	0.8	40	2.3	3.2°	2.12	80	6	3	●	1	—	40.8	43.0	45.4
R0050T0054L050	0.5	1	0.9°	0.8	50	2.3	2.7°	2.44	110	6	3	●	1	—	50.9	53.6	No interference
R0050T0054L060	0.5	1	0.9°	0.8	60	2.3	2.3°	2.75	110	6	3	●	1	—	60.9	64.1	No interference
R0050T0054L070	0.5	1	0.9°	0.8	70	2.3	2.0°	3.07	110	6	3	●	1	—	71.0	74.7	No interference
R0050T0130L012	0.5	1	1.5°	0.8	12	2.3	7.9°	1.45	60	6	3	●	1	—	—	13.0	13.7
R0050T0130L016	0.5	1	1.5°	0.8	16	2.3	6.5°	1.66	70	6	3	●	1	—	—	17.1	18.0
R0050T0130L020	0.5	1	1.5°	0.8	20	2.3	5.6°	1.87	70	6	3	●	1	—	—	21.2	22.4
R0050T0130L025	0.5	1	1.5°	0.8	25	2.3	4.8°	2.13	70	6	3	●	1	—	—	26.3	27.8
R0050T0130L030	0.5	1	1.5°	0.8	30	2.3	4.1°	2.39	80	6	3	●	1	—	—	31.5	33.2
R0050T0130L035	0.5	1	1.5°	0.8	35	2.3	3.7°	2.65	80	6	3	●	1	—	—	36.6	38.6
R0075T0024L010	0.75	1.5	0.4°	1.3	10	2.8	8.1°	1.54	60	6	3	●	1	10.6	10.9	11.4	12.0
R0075T0024L015	0.75	1.5	0.4°	1.3	15	2.8	6.2°	1.61	60	6	3	●	1	15.6	16.0	16.9	17.8
R0075T0024L020	0.75	1.5	0.4°	1.3	20	2.8	5.0°	1.68	70	6	3	●	1	20.6	21.2	22.3	23.5
R0075T0024L030	0.75	1.5	0.4°	1.3	30	2.8	3.7°	1.82	80	6	3	●	1	30.7	31.5	33.1	35.0
R0075T0054L015	0.75	1.5	0.9°	1.3	15	2.8	6.3°	1.82	60	6	3	●	1	—	15.7	16.5	17.4
R0075T0054L020	0.75	1.5	0.9°	1.3	20	2.8	5.1°	1.98	70	6	3	●	1	—	20.7	21.8	23.0
R0075T0054L030	0.75	1.5	0.9°	1.3	30	2.8	3.7°	2.29	80	6	3	●	1	—	30.8	32.4	34.2

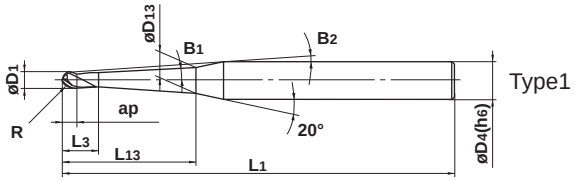
CUTTING CONDITIONS B317

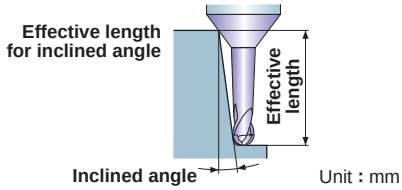
VF-3XB NEW

Ball nose, Medium cut length, 3 flute, Taper neck

R ±0.01 | 0 — -0.02 | h6 4≤D4≤6 0 — -0.008, D4 = 8 0 — -0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎	○	○		





UWC | VF | 30°

● 3 flute ball end mill, high rigidity taper neck type.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L13	Length of Straight Neck L3	Cutting Edge to Shank Angle B2	Neck Dia. D13	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF3XBR0075T0054L040	0.75	1.5	0.9°	1.3	40	2.8	3.0°	2.61	80	6	3	●	1	—	40.8	43.0	45.3
R0075T0130L015	0.75	1.5	1.5°	1.3	15	2.8	6.4°	2.08	60	6	3	●	1	—	—	16.1	17.0
R0075T0130L020	0.75	1.5	1.5°	1.3	20	2.8	5.2°	2.34	70	6	3	●	1	—	—	21.2	22.4
R0075T0130L030	0.75	1.5	1.5°	1.3	30	2.8	3.8°	2.86	80	6	3	●	1	—	—	31.5	33.2
R0100T0024L016	1	2	0.4°	1.6	16	3.6	5.5°	2.07	70	6	3	●	1	16.7	17.1	18.0	19.0
R0100T0024L020	1	2	0.4°	1.6	20	3.6	4.6°	2.13	70	6	3	●	1	20.7	21.3	22.3	23.5
R0100T0024L025	1	2	0.4°	1.6	25	3.6	3.9°	2.20	70	6	3	●	1	25.8	26.4	27.8	29.3
R0100T0024L030	1	2	0.4°	1.6	30	3.6	3.4°	2.27	80	6	3	●	1	30.8	31.6	33.2	35.0
R0100T0024L035	1	2	0.4°	1.6	35	3.6	2.9°	2.34	80	6	3	●	1	35.8	36.7	38.6	No interference
R0100T0024L040	1	2	0.4°	1.6	40	3.6	2.6°	2.41	80	6	3	●	1	40.8	41.9	44.0	No interference
R0100T0054L020	1	2	0.9°	1.6	20	3.6	4.7°	2.42	70	6	3	●	1	—	20.8	21.9	23.0
R0100T0054L025	1	2	0.9°	1.6	25	3.6	4.0°	2.57	70	6	3	●	1	—	25.8	27.2	28.6
R0100T0054L030	1	2	0.9°	1.6	30	3.6	3.4°	2.73	80	6	3	●	1	—	30.9	32.5	34.2
R0100T0054L035	1	2	0.9°	1.6	35	3.6	3.0°	2.89	80	6	3	●	1	—	35.9	37.7	39.8
R0100T0054L040	1	2	0.9°	1.6	40	3.6	2.7°	3.04	80	6	3	●	1	—	40.9	43.0	No interference
R0100T0054L050	1	2	0.9°	1.6	50	3.6	2.2°	3.36	110	6	3	●	1	—	51.0	53.6	No interference
R0100T0054L060	1	2	0.9°	1.6	60	3.6	1.9°	3.67	110	6	3	●	1	—	61.0	No interference	No interference
R0100T0054L070	1	2	0.9°	1.6	70	3.6	1.6°	3.99	110	6	3	●	1	—	71.1	No interference	No interference
R0100T0130L025	1	2	1.5°	1.6	25	3.6	4.1°	3.02	70	6	3	●	1	—	—	26.4	27.9
R0100T0130L030	1	2	1.5°	1.6	30	3.6	3.5°	3.28	80	6	3	●	1	—	—	31.6	33.3
R0100T0130L035	1	2	1.5°	1.6	35	3.6	3.1°	3.54	80	6	3	●	1	—	—	36.7	38.7
R0100T0130L040	1	2	1.5°	1.6	40	3.6	2.7°	3.81	80	6	3	●	1	—	—	41.8	No interference
R0125T0054L020	1.25	2.5	0.9°	2	20	4.5	4.3°	2.89	60	6	3	●	1	—	20.8	21.9	23.1
R0125T0054L030	1.25	2.5	0.9°	2	30	4.5	3.1°	3.20	80	6	3	●	1	—	30.9	32.5	34.2
R0125T0054L040	1.25	2.5	0.9°	2	40	4.5	2.4°	3.52	80	6	3	●	1	—	40.9	43.1	No interference
R0125T0130L020	1.25	2.5	1.5°	2	20	4.5	4.4°	3.21	60	6	3	●	1	—	—	21.4	22.5
R0125T0130L030	1.25	2.5	1.5°	2	30	4.5	3.1°	3.74	80	6	3	●	1	—	—	31.6	33.3
R0125T0130L040	1.25	2.5	1.5°	2	40	4.5	2.5°	4.26	80	6	3	●	1	—	—	41.9	No interference
R0150T0024L020	1.5	3	0.4°	2	20	5	3.8°	3.11	60	6	3	●	1	20.7	21.3	22.3	23.5
R0150T0024L025	1.5	3	0.4°	2	25	5	3.1°	3.18	80	6	3	●	1	25.8	26.4	27.7	29.2
R0150T0024L030	1.5	3	0.4°	2	30	5	2.7°	3.25	80	6	3	●	1	30.8	31.6	33.2	No interference
R0150T0024L040	1.5	3	0.4°	2	40	5	2.1°	3.39	80	6	3	●	1	40.9	41.9	44.0	No interference
R0150T0024L050	1.5	3	0.4°	2	50	5	1.7°	3.53	100	6	3	●	1	50.9	52.2	No interference	No interference
R0150T0054L020	1.5	3	0.9°	2	20	5	3.8°	3.37	60	6	3	●	1	—	20.9	21.9	23.0
R0150T0054L030	1.5	3	0.9°	2	30	5	2.7°	3.69	80	6	3	●	1	—	30.9	32.5	No interference
R0150T0054L040	1.5	3	0.9°	2	40	5	2.1°	4.00	80	6	3	●	1	—	41.0	43.1	No interference
R0150T0054L050	1.5	3	0.9°	2	50	5	1.7°	4.31	100	6	3	●	1	—	51.0	No interference	No interference
R0150T0054L060	1.5	3	0.9°	2	60	5	2.3°	4.63	110	8	3	●	1	—	61.1	64.2	No interference

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L13	Length of Straight Neck L3	Cutting Edge to Shank Angle B2	Neck Dia. D13	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VF3XBR0150T0054L070	1.5	3	0.9°	2	70	5	2.0°	4.94	120	8	3	●	1	—	71.1	74.8	No interference
R0150T0130L040	1.5	3	1.5°	2	40	5	2.2°	4.73	80	6	3	●	1	—	—	41.9	No interference
R0150T0130L050	1.5	3	1.5°	2	50	5	2.8°	5.26	110	8	3	●	1	—	—	52.2	No interference
R0150T0130L060	1.5	3	1.5°	2	60	5	2.4°	5.78	110	8	3	●	1	—	—	62.4	No interference
R0150T0130L070	1.5	3	1.5°	2	70	5	2.1°	6.30	120	8	3	●	1	—	—	72.7	No interference
R0200T0054L030	2	4	0.9°	3	30	6	3.5°	4.65	90	8	3	●	1	—	30.9	32.5	34.2
R0200T0054L040	2	4	0.9°	3	40	6	2.7°	4.97	90	8	3	●	1	—	41.0	43.0	No interference
R0200T0054L050	2	4	0.9°	3	50	6	2.2°	5.28	110	8	3	●	1	—	51.0	53.6	No interference
R0200T0054L060	2	4	0.9°	3	60	6	1.9°	5.60	110	8	3	●	1	—	61.1	No interference	No interference
R0250T0054L035	2.5	5	0.9°	3.5	35	6.5	2.4°	5.80	90	8	3	●	1	—	35.9	37.7	No interference
R0250T0054L040	2.5	5	0.9°	3.5	40	6.5	2.2°	5.95	90	8	3	●	1	—	41.0	43.0	No interference
R0250T0054L050	2.5	5	0.9°	3.5	50	6.5	1.8°	6.27	110	8	3	●	1	—	51.0	No interference	No interference
R0250T0054L060	2.5	5	0.9°	3.5	60	6.5	1.5°	6.58	110	8	3	●	1	—	61.1	No interference	No interference

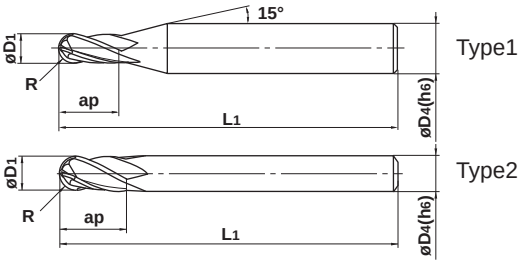
CUTTING CONDITIONS B317

VF-4MB NEW

Ball nose, Medium cut length, 4 flute

R ±0.01 | 0 — -0.020 | h6 | D4 = 6 0 — -0.008 | 8 ≤ D4 ≤ 10 0 — -0.009 | D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
	◎	◎	◎	○	○		



- 4 flute ball nose end mill for high-speed machining of hardened steel.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF4MBR0050	0.5	1	2.5	50	6	4	●	1
R0100	1	2	6	60	6	4	●	1
R0150	1.5	3	8	70	6	4	●	1
R0200	2	4	8	70	6	4	●	1
R0250	2.5	5	12	80	6	4	●	1
R0300	3	6	12	80	6	4	●	2
R0400	4	8	14	90	8	4	●	2
R0500	5	10	18	100	10	4	●	2
R0600	6	12	22	110	12	4	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B319

VF-MHVRB NEW

Corner radius, Medium cut length, Irregular helix flutes

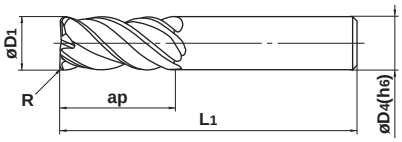
R ±0.015

D1≦12 0 − -0.020
D1＞12 0 − -0.030

h6

D4 = 6 0 − -0.008
8≦D4≦10 0 − -0.009
12≦D4≦16 0 − -0.011
D4 = 20 0 − -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≦45HRC)	Hardened Steel (≦55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○	○		◎	◎		



Type1

UWC VF 42° 45°

- Impact Miracle end mills with irregular helix flutes ensures stable machining on difficult-to-cut materials and with long overhangs.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VFMHVRBD0600R050	6	0.5	13	50	6	4	●	1
D0600R100	6	1	13	50	6	4	●	1
D0800R050	8	0.5	19	60	8	4	●	1
D0800R100	8	1	19	60	8	4	●	1
D1000R050	10	0.5	22	70	10	4	●	1
D1000R100	10	1	22	70	10	4	●	1
D1000R200	10	2	22	70	10	4	●	1
D1200R050	12	0.5	26	75	12	4	●	1
D1200R100	12	1	26	75	12	4	●	1
D1200R200	12	2	26	75	12	4	●	1
D1600R100	16	1	35	90	16	4	●	1
D1600R200	16	2	35	90	16	4	●	1
D1600R300	16	3	35	90	16	4	●	1
D2000R100	20	1	45	110	20	4	●	1
D2000R200	20	2	45	110	20	4	●	1
D2000R300	20	3	45	110	20	4	●	1

CUTTING CONDITIONS B320

VF-6MHVRB NEW

Corner radius, Medium cut length, 6 flute, Irregular helix flutes

R ±0.015

D1≤12 0 — -0.020
D1>12 0 — -0.030

h6

D4 = 6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
D4 = 20 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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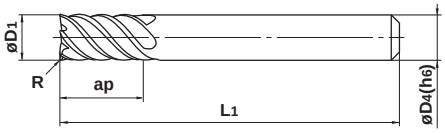


Type1

- Newly developed irregular helix 6 flute geometry reduces vibrations and achieves high efficiency machining.
- Suitable for machining of difficult-to-cut materials such as stainless steel, titanium alloy and inconel.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VF6MHVRBD0600R050	6	0.5	13	50	6	6	●	1
D0600R100	6	1	13	50	6	6	●	1
D0800R050	8	0.5	19	60	8	6	●	1
D0800R100	8	1	19	60	8	6	●	1
D1000R050	10	0.5	22	70	10	6	●	1
D1000R100	10	1	22	70	10	6	●	1
D1200R050	12	0.5	26	75	12	6	●	1
D1200R100	12	1	26	75	12	6	●	1
D1600R100	16	1	32	90	16	6	●	1
D1600R200	16	2	32	90	16	6	●	1
D2000R100	20	1	38	100	20	6	●	1
D2000R200	20	2	38	100	20	6	●	1

● : Inventory maintained in Japan.

CUTTING CONDITIONS B321

VF-SDRB

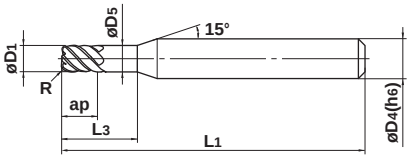
Corner radius, Extra short cut length, For hardened materials

0 − -0.02

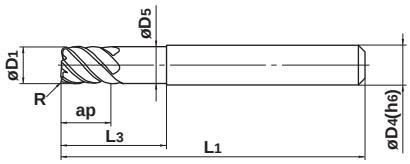
h6

D4 = 6 0 − -0.008
8 ≤ D4 ≤ 10 0 − -0.009
D4 = 12 0 − -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1



Type2

UWC VF 45°

● 6 flute end mill with Impact Miracle coating for high hardened materials.

Unit : mm

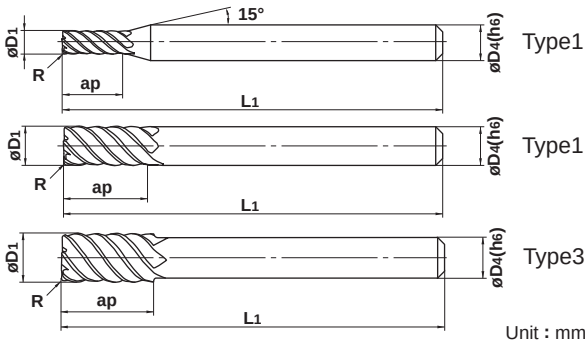
Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VFSDRBD0300R030	3	0.3	3	9	2.9	45	6	6	●	1
D0400R030	4	0.3	4	12	3.9	45	6	6	●	1
D0500R030	5	0.3	5	15	4.9	50	6	6	●	1
D0600R030	6	0.3	6	18	5.85	50	6	6	●	2
D0600R050	6	0.5	6	18	5.85	50	6	6	●	2
D0600R100	6	1	6	18	5.85	50	6	6	●	2
D0800R030	8	0.3	8	24	7.85	60	8	6	●	2
D0800R050	8	0.5	8	24	7.85	60	8	6	●	2
D0800R100	8	1	8	24	7.85	60	8	6	●	2
D1000R050	10	0.5	10	30	9.7	70	10	6	●	2
D1000R100	10	1	10	30	9.7	70	10	6	●	2
D1200R050	12	0.5	12	36	11.7	75	12	6	●	2
D1200R100	12	1	12	36	11.7	75	12	6	●	2

CUTTING CONDITIONS B322

VF-MDRB

Corner radius, Medium cut length, 6 flute, For hardened materials

D1≤12 0 −-0.02 D1>12 0 −-0.03							D4=6 0 −-0.008 8≤D4≤10 0 −-0.009 12≤D4≤16 0 −-0.011 D4=20 0 −-0.013
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



- 6 flute corner radius end mill with Impact Miracle coating for high hardened materials.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VFMDRBD0300R030	3	0.3	10	60	6	6	●	1
D0400R030	4	0.3	12	60	6	6	●	1
D0500R030	5	0.3	15	60	6	6	●	1
D0600R030	6	0.3	15	60	6	6	●	2
D0600R050	6	0.5	15	60	6	6	●	2
D0600R100	6	1	15	60	6	6	●	2
D0800R030	8	0.3	20	75	8	6	●	2
D0800R050	8	0.5	20	75	8	6	●	2
D0800R100	8	1	20	75	8	6	●	2
D1000R030	10	0.3	25	80	10	6	●	2
D1000R050	10	0.5	25	80	10	6	●	2
D1000R100	10	1	25	80	10	6	●	2
D1200R050	12	0.5	30	100	12	6	●	2
D1200R100	12	1	30	100	12	6	●	2
D1600R100	16	1	40	110	16	6	●	2
D1600R150	16	1.5	40	110	16	6	●	2
D1800R100	18	1	40	120	16	6	●	3
D1800R150	18	1.5	40	120	16	6	●	3
D2000R100	20	1	45	125	20	6	●	2
D2000R150	20	1.5	45	125	20	6	●	2
D2000R200	20	2	45	125	20	6	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B322

Memo

VC-2SS

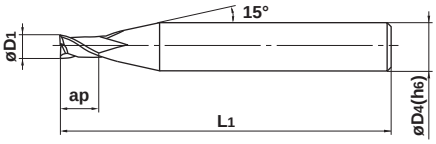
End mill, Extra short cut length, 2 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

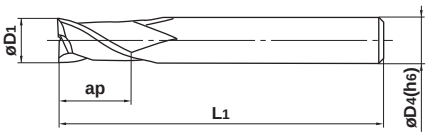
h6

D4 = 6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎		○	○		



Type1



Type2

UWC VC 30°

D1<3

D1≥3

● 2 flute end mill for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2SSD0030	0.3	0.6	50	6	2	●	1
D0040	0.4	0.8	50	6	2	●	1
D0050	0.5	0.8	50	6	2	●	1
D0060	0.6	1	50	6	2	●	1
D0070	0.7	1	50	6	2	●	1
D0080	0.8	1.3	50	6	2	●	1
D0090	0.9	1.3	50	6	2	●	1
D0100	1	1.5	50	6	2	●	1
D0110	1.1	1.5	50	6	2	●	1
D0120	1.2	2	50	6	2	●	1
D0130	1.3	2	50	6	2	●	1
D0140	1.4	2	50	6	2	●	1
D0150	1.5	2.5	50	6	2	●	1
D0160	1.6	2.5	50	6	2	●	1
D0170	1.7	2.5	50	6	2	●	1
D0180	1.8	3	50	6	2	●	1
D0190	1.9	3	50	6	2	●	1
D0200	2	3	50	6	2	●	1
D0210	2.1	3	50	6	2	●	1
D0220	2.2	3.5	50	6	2	●	1
D0230	2.3	3.5	50	6	2	●	1
D0240	2.4	3.5	50	6	2	●	1
D0250	2.5	4	50	6	2	●	1
D0260	2.6	4	50	6	2	●	1
D0270	2.7	4	50	6	2	●	1
D0280	2.8	4	50	6	2	●	1
D0290	2.9	4.5	50	6	2	●	1
D0300	3	4.5	50	6	2	●	1
D0350	3.5	5.5	50	6	2	●	1
D0400	4	6	50	6	2	●	1
D0450	4.5	7	50	6	2	●	1
D0500	5	7.5	50	6	2	●	1
D0550	5.5	8.5	50	6	2	●	1
D0600	6	9	50	6	2	●	2
D0800	8	12	60	8	2	●	2
D1000	10	15	70	10	2	●	2
D1200	12	18	75	12	2	●	2
D1400	14	21	75	16	2	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VC2SSD1500	15	23	80	16	2	●	1
D1600	16	24	90	16	2	●	2

CUTTING CONDITIONS B323

VC-2MS

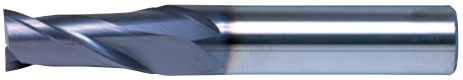
End mill, Medium cut length, 2 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

h6

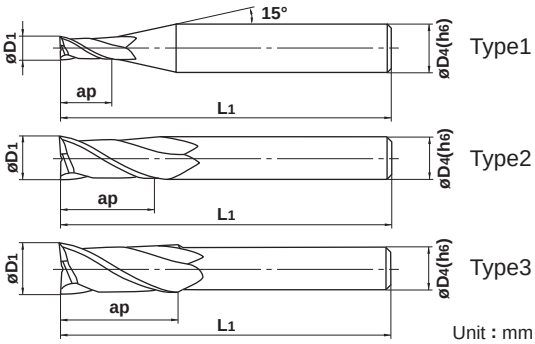
D4 = 3 0 −-0.006
4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
20≤D4≤25 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎		○	○		



UWC VC 30°

● 2 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2MSD0030	0.3	0.6	38	3	2	●	1
D0040	0.4	0.8	38	3	2	●	1
D0050	0.5	1	38	3	2	●	1
D0060	0.6	1.2	38	3	2	●	1
D0070	0.7	1.4	38	3	2	●	1
D0080	0.8	1.6	38	3	2	●	1
D0090	0.9	2	38	3	2	●	1
D0100	1	2.5	40	4	2	●	1
D0110	1.1	2.5	40	4	2	●	1
D0120	1.2	3	40	4	2	●	1
D0130	1.3	3	40	4	2	●	1
D0140	1.4	3	40	4	2	●	1
D0150	1.5	4	40	4	2	●	1
D0160	1.6	4	40	4	2	●	1
D0170	1.7	4	40	4	2	●	1
D0180	1.8	5	40	4	2	●	1
D0190	1.9	5	40	4	2	●	1
D0200	2	6	40	4	2	●	1
D0210	2.1	6	40	4	2	●	1
D0220	2.2	6	40	4	2	●	1
D0230	2.3	6	40	4	2	●	1
D0240	2.4	8	40	4	2	●	1
D0250	2.5	8	40	4	2	●	1
D0260	2.6	8	40	4	2	●	1
D0270	2.7	8	40	4	2	●	1
D0280	2.8	8	40	4	2	●	1
D0290	2.9	8	40	4	2	●	1
D0300	3	8	45	6	2	●	1
D0350	3.5	10	45	6	2	●	1
D0400	4	11	45	6	2	●	1
D0450	4.5	11	45	6	2	●	1
D0500	5	13	50	6	2	●	1
D0550	5.5	13	50	6	2	●	1
D0600	6	13	50	6	2	●	2
D0650	6.5	16	60	8	2	●	1
D0700	7	16	60	8	2	●	1
D0750	7.5	16	60	8	2	●	1
D0800	8	19	60	8	2	●	2

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VC2MSD0850	8.5	19	70	10	2	●	1
D0900	9	19	70	10	2	●	1
D0950	9.5	19	70	10	2	●	1
D1000	10	22	70	10	2	●	2
D1050	10.5	22	75	12	2	●	1
D1100	11	22	75	12	2	●	1
D1150	11.5	22	75	12	2	●	1
D1200	12	26	75	12	2	●	2
D1250	12.5	26	75	12	2	●	3
D1300	13	26	75	12	2	●	3
D1400	14	26	75	12	2	●	3
D1500	15	30	80	16	2	●	1
D1600	16	32	90	16	2	●	2
D1700	17	32	90	16	2	●	3
D1800	18	32	90	16	2	●	3
D1900	19	32	100	20	2	●	1
D2000	20	38	100	20	2	●	2
D2200	22	38	100	20	2	●	3
D2400	24	45	120	25	2	●	1
D2500	25	45	120	25	2	●	2

CUTTING CONDITIONS B324

VC-2MS-SS

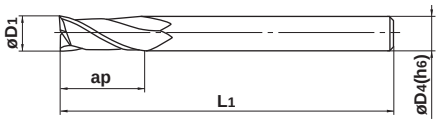
End mill, Medium cut length, 2 flute, Slim shank

0 — -0.020

h6

D4 = 5 0 — -0.008
7 ≤ D4 ≤ 9 0 — -0.009
D4 = 11 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎			○	○		



Type1

● 2 flute end mill with shank size smaller than cutting diameter.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2MSSSD0600	6	13	80	5	2	●	1
D0800	8	19	90	7	2	●	1
D1000	10	22	100	9	2	●	1
D1200	12	26	110	11	2	●	1

● : Inventory maintained in Japan.

VC-2JS

End mill, Semi long cut length, 2 flute

D1≤12 0 -0.020
D1>12 0 -0.030

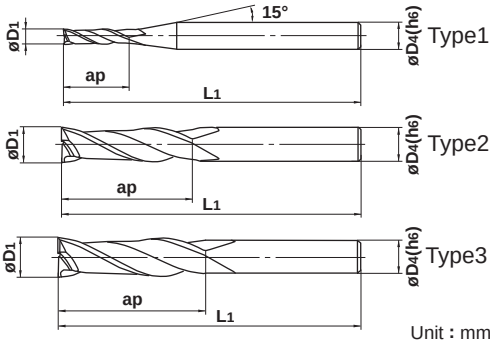
h6

4≤D4≤6 0 -0.008
8≤D4≤10 0 -0.009
12≤D4≤16 0 -0.011
20≤D4≤25 0 -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎		○	○		

UWC VC 30°

● 2 flute end mill with longer cut length than standard.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2JSD0100	1	3.5	40	4	2	●	1
D0150	1.5	5	40	4	2	●	1
D0200	2	8	40	4	2	●	1
D0250	2.5	10	40	4	2	●	1
D0300	3	12	50	6	2	●	1
D0350	3.5	15	50	6	2	●	1
D0400	4	15	50	6	2	●	1
D0450	4.5	15	50	6	2	●	1
D0500	5	20	60	6	2	●	1
D0550	5.5	20	60	6	2	●	1
D0600	6	20	60	6	2	●	2
D0650	6.5	25	70	8	2	●	1
D0700	7	25	70	8	2	●	1
D0750	7.5	25	70	8	2	●	1
D0800	8	25	70	8	2	●	2
D0850	8.5	25	90	10	2	●	1
D0900	9	25	90	10	2	●	1
D0950	9.5	25	90	10	2	●	1
D1000	10	30	90	10	2	●	2
D1050	10.5	30	90	12	2	●	1
D1100	11	30	90	12	2	●	1
D1150	11.5	30	90	12	2	●	1
D1200	12	30	90	12	2	●	2
D1300	13	35	90	12	2	●	3
D1400	14	40	110	16	2	●	1
D1500	15	40	110	16	2	●	1
D1600	16	50	110	16	2	●	2
D1700	17	50	110	20	2	●	1
D1800	18	50	110	20	2	●	1
D1900	19	55	110	20	2	●	1
D2000	20	55	110	20	2	●	2
D2200	22	65	140	25	2	●	1
D2400	24	75	140	25	2	●	1
D2500	25	75	140	25	2	●	2

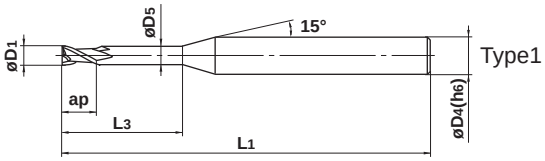
CUTTING CONDITIONS B325

VC-2XL

End mill, Medium cut length, 2 flute, Long neck

0 −-0.020 h6 D4 = 4 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		○	○		



● 2 flute end mill for rib milling.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2XLD0080N060	0.8	1.2	6	0.76	40	4	2	●	1
D0080N080	0.8	1.2	8	0.76	40	4	2	●	1
D0100N060	1	1.5	6	0.94	40	4	2	●	1
D0100N080	1	1.5	8	0.94	40	4	2	●	1
D0100N120	1	1.5	12	0.94	40	4	2	●	1
D0120N080	1.2	1.5	8	1.14	40	4	2	●	1
D0120N120	1.2	1.5	12	1.14	40	4	2	●	1
D0140N120	1.4	1.5	12	1.34	40	4	2	●	1
D0150N080	1.5	1.5	8	1.44	40	4	2	●	1
D0150N100	1.5	1.5	10	1.44	40	4	2	●	1
D0150N120	1.5	1.5	12	1.44	40	4	2	●	1
D0150N155	1.5	1.5	15.5	1.44	50	4	2	●	1
D0160N125	1.6	2	12.5	1.54	40	4	2	●	1
D0180N125	1.8	2	12.5	1.74	40	4	2	●	1
D0200N125	2	2	12.5	1.9	40	4	2	●	1
D0200N160	2	2	16	1.9	50	4	2	●	1
D0250N130	2.5	2.5	13	2.4	40	4	2	●	1
D0250N165	2.5	2.5	16.5	2.4	50	4	2	●	1
D0300N135	3	3	13.5	2.9	40	4	2	●	1
D0300N170	3	3	17	2.9	50	4	2	●	1

● : Inventory maintained in Japan.

CUTTING CONDITIONS B326

VC-4MC

End mill, Medium cut length, 4 flute

D1≤12	0 — -0.020
D1>12	0 — -0.030

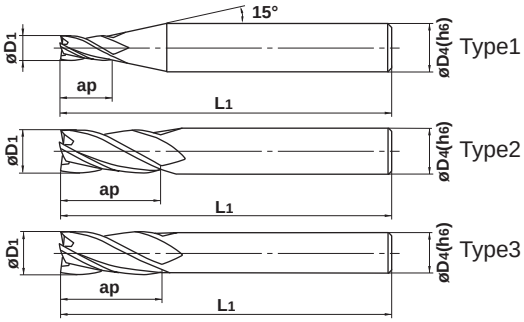
h6

4≤D4≤6	0 — -0.008
8≤D4≤10	0 — -0.009
12≤D4≤16	0 — -0.011
20≤D4≤25	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		

UWC VC 30°

● 4 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC4MCD0200	2	6	40	4	4	●	1
D0250	2.5	8	40	4	4	●	1
D0300	3	8	45	6	4	●	1
D0350	3.5	10	45	6	4	●	1
D0400	4	11	45	6	4	●	1
D0450	4.5	11	45	6	4	●	1
D0500	5	13	50	6	4	●	1
D0550	5.5	13	50	6	4	●	1
D0600	6	13	50	6	4	●	2
D0650	6.5	16	60	8	4	●	1
D0700	7	16	60	8	4	●	1
D0750	7.5	16	60	8	4	●	1
D0800	8	19	60	8	4	●	2
D0850	8.5	19	70	10	4	●	1
D0900	9	19	70	10	4	●	1
D0950	9.5	19	70	10	4	●	1
D1000	10	22	70	10	4	●	2
D1050	10.5	22	75	12	4	●	1
D1100	11	22	75	12	4	●	1
D1150	11.5	22	75	12	4	●	1
D1200	12	26	75	12	4	●	2
D1250	12.5	26	75	12	4	●	3
D1300	13	26	75	12	4	●	3
D1400	14	26	75	12	4	●	3
D1500	15	30	80	16	4	●	1
D1600	16	32	90	16	4	●	2
D1700	17	32	90	16	4	●	3
D1800	18	32	90	16	4	●	3
D1900	19	32	100	20	4	●	1
D2000	20	38	100	20	4	●	2
D2200	22	38	100	20	4	●	3
D2400	24	45	120	25	4	●	1
D2500	25	45	120	25	4	●	2

CUTTING CONDITIONS B327

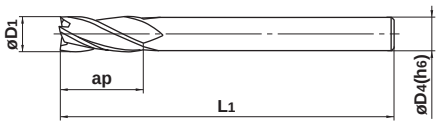
VC-4MC-SS

End mill, Medium cut length, 4 flute, Slim shank

0 — -0.020 (h6)

D4 = 5 : 0 — -0.008
7 ≤ D4 ≤ 9 : 0 — -0.009
D4 = 11 : 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	○		○	○		



Type1

● 4 flute end mill with shank size smaller than cutting diameter.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC4MCSSD0600	6	13	80	5	4	●	1
D0800	8	19	90	7	4	●	1
D1000	10	22	100	9	4	●	1
D1200	12	26	110	11	4	●	1

● : Inventory maintained in Japan.

VC-4JC

End mill, Semi long cut length, 4 flute

$D_1 \leq 12$	$0 -0.020$
$D_1 > 12$	$0 -0.030$

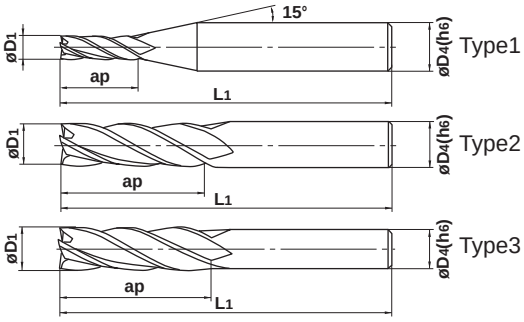
h6

$D_4 = 6$	$0 -0.008$
$8 \leq D_4 \leq 10$	$0 -0.009$
$12 \leq D_4 \leq 16$	$0 -0.011$
$20 \leq D_4 \leq 25$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		

UWC VC 30°

● 4 flute end mill for general use.



Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VC4JCD0300	3	12	50	6	4	●	1
D0350	3.5	15	50	6	4	●	1
D0400	4	15	50	6	4	●	1
D0450	4.5	15	50	6	4	●	1
D0500	5	20	60	6	4	●	1
D0550	5.5	20	60	6	4	●	1
D0600	6	20	60	6	4	●	2
D0650	6.5	25	70	8	4	●	1
D0700	7	25	70	8	4	●	1
D0750	7.5	25	70	8	4	●	1
D0800	8	25	70	8	4	●	2
D0850	8.5	25	90	10	4	●	1
D0900	9	25	90	10	4	●	1
D0950	9.5	25	90	10	4	●	1
D1000	10	30	90	10	4	●	2
D1050	10.5	30	90	12	4	●	1
D1100	11	30	90	12	4	●	1
D1150	11.5	30	90	12	4	●	1
D1200	12	30	90	12	4	●	2
D1300	13	35	90	12	4	●	3
D1400	14	40	110	16	4	●	1
D1500	15	40	110	16	4	●	1
D1600	16	50	110	16	4	●	2
D1700	17	50	110	20	4	●	1
D1800	18	50	110	20	4	●	1
D1900	19	55	110	20	4	●	1
D2000	20	55	110	20	4	●	2
D2200	22	65	140	25	4	●	1
D2400	24	75	140	25	4	●	1
D2500	25	75	140	25	4	●	2

CUTTING CONDITIONS B328

VC-2ESB

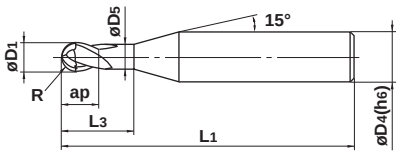
Ball nose, Extra short cut length, 2 flute, Short shank

R ±0.01 | 0 −-0.020 | h6: 4≤D4≤6 0 −-0.008; 8≤D4≤10 0 −-0.009; D4 = 12 0 −-0.011

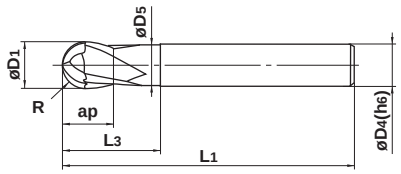
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		

UWC VC 30°

● 2 flute ball nose end mill for high rigidity.



Type1



Type2

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2ESBR0015N006	0.15	0.3	0.3	0.6	0.27	30	4	2	●	1
R0020N008	0.2	0.4	0.4	0.8	0.36	30	4	2	●	1
R0030N012	0.3	0.6	0.6	1.2	0.56	30	4	2	●	1
R0040N016	0.4	0.8	0.8	1.6	0.76	30	4	2	●	1
R0050	0.5	1	1	—	—	30	4	2	●	1
R0050N025	0.5	1	1	2.5	0.94	30	4	2	●	1
R0075	0.75	1.5	1.5	—	—	30	4	2	●	1
R0075N040	0.75	1.5	1.5	4	1.44	30	4	2	●	1
R0100	1	2	2	—	—	40	6	2	●	1
R0100N060	1	2	2	6	1.9	40	6	2	●	1
R0150	1.5	3	3	—	—	40	6	2	●	1
R0150N080	1.5	3	3	8	2.9	40	6	2	●	1
R0200	2	4	4	—	—	40	6	2	●	1
R0200N080	2	4	4	8	3.9	40	6	2	●	1
R0250	2.5	5	5	—	—	40	6	2	●	1
R0250N120	2.5	5	5	12	4.9	40	6	2	●	1
R0300	3	6	6	—	—	40	6	2	●	2
R0300N130	3	6	6	13	5.85	40	6	2	●	2
R0350	3.5	7	7	—	—	50	8	2	●	1
R0400	4	8	8	—	—	50	8	2	●	2
R0500	5	10	10	—	—	60	10	2	●	2
R0600	6	12	12	—	—	65	12	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B331

VC-2SSB

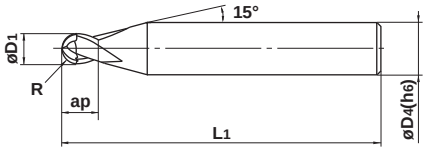
Ball nose, Short cut length, 2 flute, Short shank

R ±0.01 | 0 −-0.020 | h6 4≤D4≤6 0 −-0.008 | 8≤D4≤10 0 −-0.009 | D4 = 12 0 −-0.011

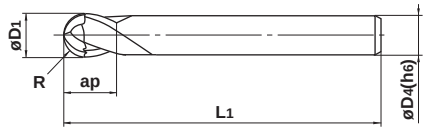
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		

UWC VC 30°

● 2 flute ball nose end mill for high rigidity.



Type1



Type2

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2SSBR0050	0.5	1	1	40	4	2	●	1
R0050S06	0.5	1	1	40	6	2	●	1
R0075	0.75	1.5	1.5	40	4	2	●	1
R0075S06	0.75	1.5	1.5	40	6	2	●	1
R0100	1	2	2	45	6	2	●	1
R0150	1.5	3	3	45	6	2	●	1
R0200	2	4	4	45	6	2	●	1
R0250	2.5	5	5	50	6	2	●	1
R0300	3	6	6	50	6	2	●	2
R0350	3.5	7	7	60	8	2	●	1
R0400	4	8	8	60	8	2	●	2
R0500	5	10	10	70	10	2	●	2
R0600	6	12	12	75	12	2	●	2

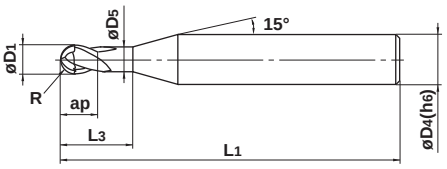
CUTTING CONDITIONS B331

VC-2SB

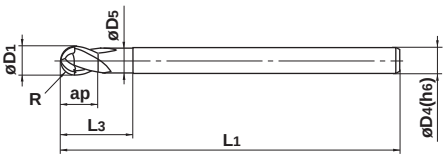
Ball nose end mill, Short cut length, 2 flute, Relieved neck

R	R≤6	±0.01	D1≤12	0 − -0.020	D4 = 6	0 − -0.008
	R>6	±0.02	D1>12	0 − -0.030	8≤D4≤10	0 − -0.009
					12≤D4≤16	0 − -0.011
h6					D4 = 20	0 − -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎	○	○		



Type1



Type2

- 2 flute ball nose end mill for high rigidity.
- 2 flute ball nose end mill with relieved neck diameter.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2SBR0015	0.15	0.3	0.3	0.6	0.27	50	6	2	●	1
R0020	0.2	0.4	0.4	0.8	0.36	50	6	2	●	1
R0030	0.3	0.6	0.6	1.2	0.56	50	6	2	●	1
R0040	0.4	0.8	0.8	1.6	0.76	50	6	2	●	1
R0050	0.5	1	1	2.5	0.94	50	6	2	●	1
R0060	0.6	1.2	1.2	3	1.14	50	6	2	●	1
R0070	0.7	1.4	1.4	3	1.34	50	6	2	●	1
R0075	0.75	1.5	1.5	4	1.44	50	6	2	●	1
R0080	0.8	1.6	1.6	4	1.54	50	6	2	●	1
R0090	0.9	1.8	1.8	5	1.74	50	6	2	●	1
R0100	1	2	2	6	1.9	60	6	2	●	1
R0125	1.25	2.5	2.5	6	2.4	60	6	2	●	1
R0150	1.5	3	3	8	2.9	60	6	2	●	1
R0175	1.75	3.5	3.5	8	3.4	60	6	2	●	1
R0200	2	4	4	8	3.9	60	6	2	●	1
R0225	2.25	4.5	4.5	10	4.4	60	6	2	●	1
R0250	2.5	5	5	12	4.9	60	6	2	●	1
R0275	2.75	5.5	5.5	12	5.4	60	6	2	●	1
R0300	3	6	6	13	5.85	60	6	2	●	2
R0400	4	8	8	14	7.85	90	8	2	●	2
R0500	5	10	10	18	9.7	100	10	2	●	2
R0600	6	12	12	22	11.7	110	12	2	●	2
R0800	8	16	16	30	15.5	140	16	2	●	2
R1000	10	20	20	38	19.5	160	20	2	●	2

● : Inventory maintained in Japan.

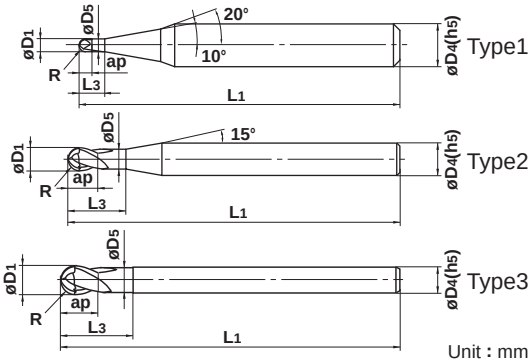
CUTTING CONDITIONS B329

VC-2PSB MIRACLE NOVA

Ball nose end mill, Short cut length, 2 flute, High precision

R ±0.005 | 0 −-0.01 h5 | D4 = 6 0 −-0.005 | 8 ≤ D4 ≤ 10 0 −-0.006 | D4 = 12 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎		○	○		



UWC VC 0° 30°

R<0.5 R≥0.5 R<0.5 R≥0.5

- 2 flute ball nose end mill with high precision radial tolerance ±0.005mm.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2PSBR0005	0.05	0.1	0.2	—	—	50	6	2	●	1
R0010	0.1	0.2	0.2	0.5	0.17	50	6	2	●	1
R0015	0.15	0.3	0.3	0.8	0.27	50	6	2	●	1
R0020	0.2	0.4	0.4	1	0.36	50	6	2	●	1
R0025	0.25	0.5	0.5	1.3	0.46	50	6	2	●	1
R0030	0.3	0.6	0.6	1.5	0.56	50	6	2	●	1
R0035	0.35	0.7	0.7	1.8	0.66	50	6	2	●	1
R0040	0.4	0.8	0.8	2	0.76	50	6	2	●	1
R0045	0.45	0.9	0.9	2.3	0.86	50	6	2	●	1
R0050	0.5	1	1.5	2.5	0.94	50	6	2	●	2
R0060	0.6	1.2	1.8	3	1.14	50	6	2	●	2
R0070	0.7	1.4	2.1	3.5	1.34	50	6	2	●	2
R0075	0.75	1.5	2.3	3.8	1.44	50	6	2	●	2
R0080	0.8	1.6	2.4	4	1.54	50	6	2	●	2
R0090	0.9	1.8	2.7	4.5	1.74	50	6	2	●	2
R0100	1	2	3	5	1.90	50	6	2	●	2
R0150	1.5	3	4.5	7.5	2.90	70	6	2	●	2
R0200	2	4	6	10	3.90	70	6	2	●	2
R0250	2.5	5	7.5	12.5	4.90	80	6	2	●	2
R0300	3	6	9	15	5.85	80	6	2	●	3
R0400	4	8	12	20	7.85	90	8	2	●	3
R0500	5	10	15	25	9.70	100	10	2	●	3
R0600	6	12	18	30	11.70	110	12	2	●	3

CUTTING CONDITIONS B330

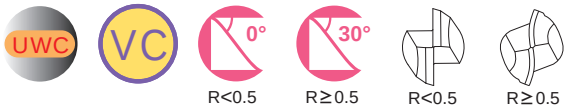
VC-2PSB-P MIRACLE NOVA

Ball nose end mill, Short cut length, 2 flute, Ultra high precision

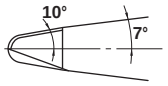
R ±0.002 | 0 − -0.01 h5 | D4 = 6 0 − -0.005 | 8 ≤ D4 ≤ 10 0 − -0.006 | D4 = 12 0 − -0.008

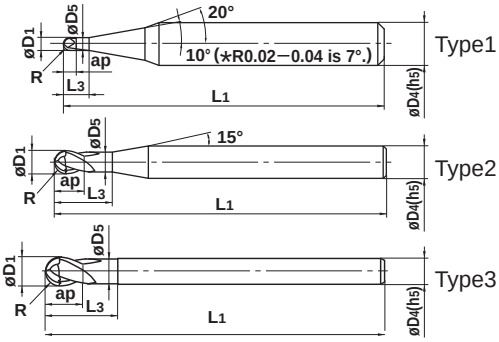
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎		○	○		

Inspection reports regarding the R accuracy of the VC-2PSB-P are supplied with the tool.



R0.02−0.04
Top edge geometry





- 2 flute ball nose end mill with ultra high precision radial tolerance ±0.002mm.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2PSBPR0002	0.02	—	0.06	—	—	50	6	2	□	1
R0003	0.03	—	0.09	—	—	50	6	2	□	1
R0004	0.04	—	0.12	—	—	50	6	2	□	1
R0005	0.05	0.1	0.2	—	—	50	6	2	●	1
R0010	0.1	0.2	0.2	0.5	0.17	50	6	2	●	1
R0015	0.15	0.3	0.3	0.8	0.27	50	6	2	●	1
R0020	0.2	0.4	0.4	1	0.36	50	6	2	●	1
R0025	0.25	0.5	0.5	1.3	0.46	50	6	2	●	1
R0030	0.3	0.6	0.6	1.5	0.56	50	6	2	●	1
R0035	0.35	0.7	0.7	1.8	0.66	50	6	2	●	1
R0040	0.4	0.8	0.8	2	0.76	50	6	2	●	1
R0045	0.45	0.9	0.9	2.3	0.86	50	6	2	●	1
R0050	0.5	1	1.5	2.5	0.94	50	6	2	●	2
R0060	0.6	1.2	1.8	3	1.14	50	6	2	●	2
R0070	0.7	1.4	2.1	3.5	1.34	50	6	2	●	2
R0075	0.75	1.5	2.3	3.8	1.44	50	6	2	●	2
R0080	0.8	1.6	2.4	4	1.54	50	6	2	●	2
R0090	0.9	1.8	2.7	4.5	1.74	50	6	2	●	2
R0100	1	2	3	5	1.9	50	6	2	●	2
R0150	1.5	3	4.5	7.5	2.9	70	6	2	●	2
R0200	2	4	6	10	3.9	70	6	2	●	2
R0250	2.5	5	7.5	12.5	4.9	80	6	2	●	2
R0300	3	6	9	15	5.85	80	6	2	●	3
R0400	4	8	12	20	7.85	90	8	2	●	3
R0500	5	10	15	25	9.7	100	10	2	●	3
R0600	6	12	18	30	11.7	110	12	2	●	3

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

CUTTING CONDITIONS B330

VC-2MB

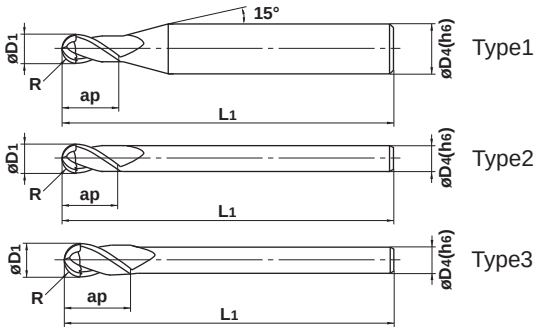
Ball nose end mill, Medium cut length, 2 flute

R		D1		h6	
R≤6.5	±0.01	D1≤12	0 −-0.020	D4 = 3	0 −-0.006
R>6.5	±0.02	D1>12	0 −-0.030	4≤D4≤6	0 −-0.008
				8≤D4≤10	0 −-0.009
				12≤D4≤16	0 −-0.011
				20≤D4≤25	0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		

UWC VC 30°

● 2 flute end mill for general use.



Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2MBR0020	0.2	0.4	0.8	38	3	2	●	1
R0025	0.25	0.5	1	38	3	2	●	1
R0030	0.3	0.6	1.2	38	3	2	●	1
R0040	0.4	0.8	1.6	38	3	2	●	1
R0050	0.5	1	2.5	40	4	2	●	1
R0060	0.6	1.2	3	40	4	2	●	1
R0070	0.7	1.4	3	40	4	2	●	1
R0075	0.75	1.5	4	40	4	2	●	1
R0080	0.8	1.6	4	40	4	2	●	1
R0090	0.9	1.8	5	40	4	2	●	1
R0100	1	2	6	60	6	2	●	1
R0150	1.5	3	8	70	6	2	●	1
R0200	2	4	8	70	6	2	●	1
R0250	2.5	5	12	80	6	2	●	1
R0300	3	6	12	80	6	2	●	2
R0350	3.5	7	14	90	8	2	●	1
R0400	4	8	14	90	8	2	●	2
R0450	4.5	9	18	100	10	2	●	1
R0500	5	10	18	100	10	2	●	2
R0600	6	12	22	110	12	2	●	2
R0700	7	14	26	120	12	2	●	3
R0750	7.5	15	30	140	16	2	●	1
R0800	8	16	30	140	16	2	●	2
R0900	9	18	34	140	16	2	●	3
R1000	10	20	38	160	20	2	●	2
R1250	12.5	25	55	180	25	2	●	2

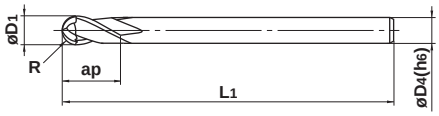
CUTTING CONDITIONS B331

VC-2MB-SS

Ball nose end mill, Medium cut length, 2 flute, Slim shank

R ±0.01 | 0 −-0.020 | h6 | D4 = 5 0 −-0.008 | 7 ≤ D4 ≤ 9 0 −-0.009 | D4 = 11 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1

UWC VC 30°

● 2 flute ball nose end mill with shank size smaller than cutting diameter.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2MBSSR0300	3	6	12	120	5	2	●	1
R0400	4	8	14	130	7	2	●	1
R0500	5	10	18	140	9	2	●	1
R0600	6	12	22	160	11	2	●	1

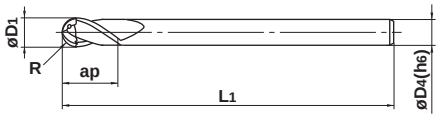
● : Inventory maintained in Japan.

VC-2MB-OH

Ball nose end mill, Medium cut length, 2 flute, Through coolant holes

R		D1		h6	
R≤6	±0.01	D1≤12	0 — -0.020	D4 = 6	0 — -0.008
R = 8	±0.02	D1 >12	0 — -0.030	8≤D4≤10	0 — -0.009
				12≤D4≤16	0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1

UWC VC 30°

● 2 flute ball nose end mill ideal for use with through coolant machines.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2MBOHR0300	3	6	12	80	6	2	●	1
R0400	4	8	14	90	8	2	●	1
R0500	5	10	18	100	10	2	●	1
R0600	6	12	22	110	12	2	●	1
R0800	8	16	30	140	16	2	●	1

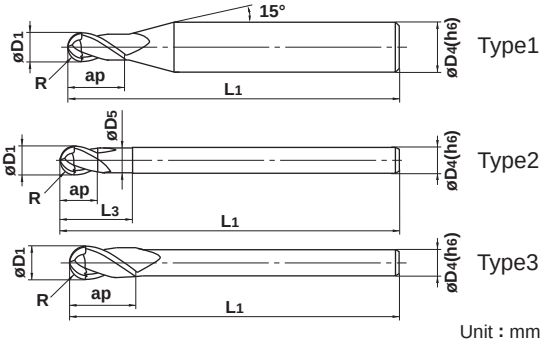
CUTTING CONDITIONS B331

VC-2MDB

Ball nose, Medium cut length, 2 flute, Strong geometry type

R		D1		h6	
R≤6.5	±0.01	D1≤12	0 — -0.020	D4 = 3	0 — -0.006
R>6.5	±0.02	D1>12	0 — -0.030	4≤D4≤6	0 — -0.008
				8≤D4≤10	0 — -0.009
				12≤D4≤16	0 — -0.011
				20≤D4≤25	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



- 2 flute ball nose end mill with high edge strength resistant to chipping.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2MDBR0150S03	1.5	3	8	14	2.9	70	3	2	●	2
R0150	1.5	3	8	—	—	70	6	2	●	1
R0200S04	2	4	8	14	3.9	70	4	2	●	2
R0200	2	4	8	—	—	70	6	2	●	1
R0250	2.5	5	12	—	—	80	6	2	●	1
R0300	3	6	12	22	5.85	80	6	2	●	2
R0350	3.5	7	14	—	—	90	8	2	●	1
R0400	4	8	14	27	7.85	90	8	2	●	2
R0500	5	10	18	31	9.7	100	10	2	●	2
R0600	6	12	22	35	11.7	110	12	2	●	2
R0700	7	14	26	—	—	120	12	2	●	3
R0800	8	16	30	50	15.5	140	16	2	●	2
R0900	9	18	34	—	—	140	16	2	●	3
R1000	10	20	38	58	19.5	160	20	2	●	2
R1250	12.5	25	55	75	24.5	180	25	2	●	2

● : Inventory maintained in Japan.

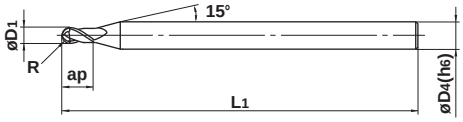
CUTTING CONDITIONS B331

VC-2LB

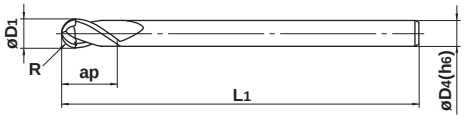
Ball nose end mill, Medium cut length, 2 flute, Long shank

R		D1		h6	
R≤6	±0.01	D1≤12	0 — -0.020	D4 = 3	0 — -0.006
R≥8	±0.02	D1>12	0 — -0.030	4≤D4≤6	0 — -0.008
				8≤D4≤10	0 — -0.009
				12≤D4≤16	0 — -0.011
				20≤D4≤25	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1



Type2

● 2 flute ball nose end mill with long shank for general use.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2LBR0800	8	16	30	200	16	2	●	2
R1000	10	20	38	200	20	2	●	2
R1250	12.5	25	55	220	25	2	●	2

VC-2XLB

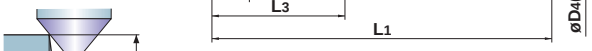
Ball nose end mill, Medium cut length, 2 flute, Long neck

R ±0.01 | 0 −-0.020 | h6 4≤D4≤6 0 −-0.008

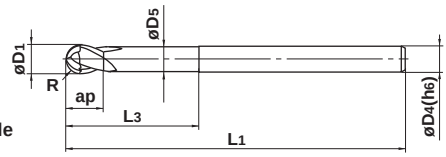
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		

UWC VC 30°

2 flute ball nose end mill with long neck for general use.



Type1



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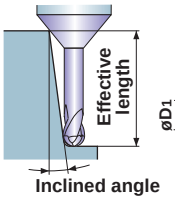


Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VC2XLBR0030N040	0.3	0.6	0.9	4	0.56	9.5°	50	4	2	●	1	4.2	4.3	4.6	5
R0030N060	0.3	0.6	0.9	6	0.56	8°	50	4	2	●	1	6.3	6.5	6.9	7.5
R0040N040	0.4	0.8	1.2	4	0.76	9.4°	50	4	2	●	1	4.2	4.3	4.6	5
R0040N060	0.4	0.8	1.2	6	0.76	7.8°	50	4	2	●	1	6.3	6.5	6.9	7.5
R0040N080	0.4	0.8	1.2	8	0.76	6.7°	50	4	2	●	1	8.3	8.6	9.2	10
R0050N040	0.5	1	1.5	4	0.94	9.1°	50	4	2	●	1	4.2	4.4	4.8	5.2
R0050N060	0.5	1	1.5	6	0.94	7.5°	50	4	2	●	1	6.3	6.6	7.1	7.7
R0050N080	0.5	1	1.5	8	0.94	6.4°	50	4	2	●	1	8.4	8.8	9.4	10.2
R0050N120	0.5	1	1.5	12	0.94	5°	50	4	2	●	1	12.6	13.1	14	15.1
R0060N080	0.6	1.2	1.2	8	1.14	6.2°	50	4	2	●	1	8.4	8.8	9.4	10.1
R0060N120	0.6	1.2	1.2	12	1.14	4.8°	50	4	2	●	1	12.6	13.1	14	15.1
R0070N120	0.7	1.4	1.4	12	1.34	4.6°	50	4	2	●	1	12.6	13.1	14	15.1
R0075N060	0.75	1.5	1.5	6	1.44	7°	50	4	2	●	1	6.3	6.6	7.1	7.6
R0075N080	0.75	1.5	1.5	8	1.44	5.9°	50	4	2	●	1	8.4	8.8	9.4	10.1
R0075N120	0.75	1.5	1.5	12	1.44	4.4°	50	4	2	●	1	12.6	13.1	14	15.1
R0075N160	0.75	1.5	1.5	16	1.44	3.6°	55	4	2	●	1	16.8	17.3	18.6	20
R0080N160	0.8	1.6	2	16	1.54	3.5°	55	4	2	●	1	16.8	17.3	18.6	20
R0090N160	0.9	1.8	2	16	1.74	3.3°	55	4	2	●	1	16.8	17.3	18.6	20
R0100N080	1	2	2	8	1.9	5.3°	50	4	2	●	1	8.3	8.7	9.2	9.9
R0100N100	1	2	2	10	1.9	4.5°	50	4	2	●	1	10.4	10.8	11.5	12.4
R0100N160	1	2	2	16	1.9	3.1°	55	4	2	●	1	16.7	17.2	18.4	19.9
R0100N200	1	2	2	20	1.9	2.5°	60	4	2	●	1	20.8	21.5	23	No interference
R0150N080	1.5	3	3	8	2.9	3.4°	50	4	2	●	1	8.3	8.6	9.2	9.8
R0150N160	1.5	3	3	16	2.9	4.3°	60	6	2	●	1	16.6	17.2	18.4	19.7
R0150N200	1.5	3	3	20	2.9	3.6°	65	6	2	●	1	20.8	21.5	23	24.7
R0175N160	1.75	3.5	3.5	16	3.4	3.8°	60	6	2	●	1	16.6	17.2	18.3	19.7
R0200N080	2	4	4	8	3.9	5.7°	50	6	2	●	1	8.3	8.6	9.1	9.7
R0200N120	2	4	4	12	3.9	4.1°	55	6	2	●	1	12.5	12.9	13.7	14.6
R0200N160	2	4	4	16	3.9	3.2°	60	6	2	●	1	16.6	17.1	18.3	19.6
R0200N200	2	4	4	20	3.9	2.7°	65	6	2	●	1	20.8	21.4	22.9	No interference
R0250N200	2.5	5	5	20	4.9	1.5°	65	6	2	●	1	20.7	21.4	No interference	No interference
R0250N250	2.5	5	5	25	4.9	1.2°	70	6	2	●	1	25.9	26.7	No interference	No interference
R0300N300	3	6	6	30	5.85	—	80	6	2	●	2	No interference	No interference	No interference	No interference

● : Inventory maintained in Japan.

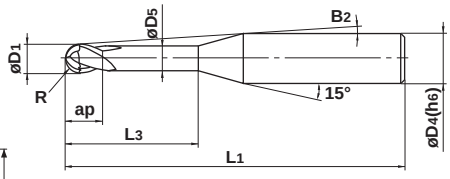
CUTTING CONDITIONS B332

VC-2XLB-6

Ball nose, Medium cut length, 2 flute, Long neck, 6mm shank

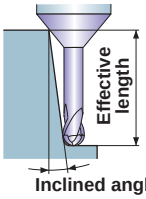
R ±0.01 | 0 −-0.020 | h6 D4 = 6 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1

UWC VC 30°



● 2 flute ball nose end mill with long neck and 6mm shank for general use.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VC2XLB6R0030N030	0.3	0.6	0.6	3	0.56	11.8°	55	6	2	●	1	3.1	3.3	3.5	3.8
R0040N040	0.4	0.8	0.8	4	0.76	11°	55	6	2	●	1	4.2	4.3	4.6	5
R0050N050	0.5	1	1	5	0.94	10.1°	55	6	2	●	1	5.3	5.5	6	6.4
R0060N060	0.6	1.2	1.2	6	1.14	9.3°	55	6	2	●	1	6.3	6.6	7.1	7.6
R0070N070	0.7	1.4	1.4	7	1.34	8.6°	55	6	2	●	1	7.4	7.7	8.2	8.9
R0075N075	0.75	1.5	1.5	7.5	1.44	8.3°	55	6	2	●	1	7.9	8.2	8.8	9.5
R0080N080	0.8	1.6	1.6	8	1.54	8°	55	6	2	●	1	8.4	8.8	9.4	10.1
R0090N090	0.9	1.8	1.8	9	1.74	7.4°	55	6	2	●	1	9.5	9.8	10.5	11.3
R0100N100	1	2	2	10	1.9	6.9°	60	6	2	●	1	10.4	10.8	11.5	12.4
R0125N125	1.25	2.5	2.5	12.5	2.4	5.6°	60	6	2	●	1	13	13.5	14.4	15.4

CUTTING CONDITIONS B332

VC-XB

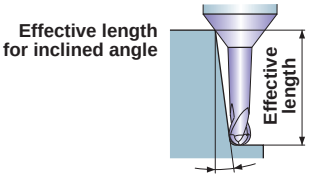
Ball nose taper end mill, Medium cut length, Taper neck

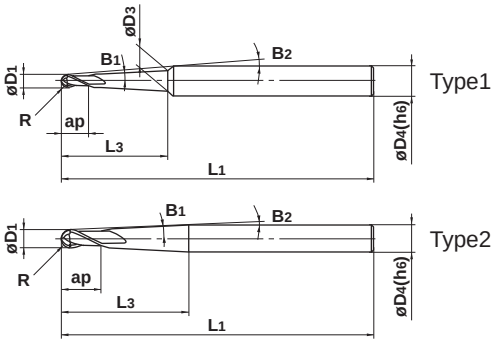
R ±0.01 | 0 −-0.020 | h6 | D4 = 6 0 −-0.008 | 8 ≤ D4 ≤ 10 0 −-0.009 | 12 ≤ D4 ≤ 16 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		

UWC VC 30°

● 2 flute taper end mill with taper neck.





Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L3	Cutting Edge to Shank Angle B2	Neck Dia. D3	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 1°	2°	3°
VCXBR0050T0100L016	0.5	1	1°	2	16	6.6°	1.38	50	6	2	●	1	16.2	17	18
R0050T0100L021	0.5	1	1°	2	21	5.4°	1.56	60	6	2	●	1	21.2	22.3	23.5
R0050T0100L026	0.5	1	1°	2	26	4.6°	1.73	70	6	2	●	1	26.2	27.6	29.1
R0050T0130	0.5	1	1°30'	2	23	5.1°	1.97	60	6	2	●	1	—	23.9	25.2
R0050T0300	0.5	1	3°	2	42	3.4°	5.08	80	6	2	●	1	—	—	42.4
R0050T0500	0.5	1	5°	2	23	5.8°	4.46	60	6	2	●	1	—	—	—
R0100T0100L021	1	2	1°	4	21	4.6°	2.43	50	6	2	●	1	21.3	22.4	23.6
R0100T0100L031	1	2	1°	4	31	3.4°	2.78	60	6	2	●	1	31.3	33	34.8
R0100T0100L041	1	2	1°	4	41	2.7°	3.13	70	6	2	●	1	41.3	43.5	No interference
R0100T0130	1	2	1°30'	4	23	4.4°	2.8	60	6	2	●	1	—	24.1	25.4
R0100T0300	1	2	3°	4	41	2.9°	5.71	80	6	2	●	1	—	—	No interference
R0100T0500	1	2	5°	4	23	4.9°	5.02	60	6	2	●	1	—	—	—
R0150T0100L031	1.5	3	1°	6	31	2.7°	3.71	60	6	2	●	1	31.4	33	No interference
R0150T0100L041	1.5	3	1°	6	41	2.1°	4.06	70	6	2	●	1	41.4	43.5	No interference
R0150T0100L051	1.5	3	1°	6	51	1.7°	4.41	80	6	2	●	1	51.4	No interference	No interference
R0150T0130	1.5	3	1°30'	6	52	1.7°	5.21	90	6	2	●	1	—	No interference	No interference
R0150T0300	1.5	3	3°	6	32	2.8°	5.56	70	6	2	●	1	—	—	No interference
R0200T0100L036	2	4	1°	8	36	1.7°	4.81	70	6	2	●	1	36.5	No interference	No interference
R0200T0100L046	2	4	1°	8	46	1.3°	5.16	80	6	2	●	1	46.5	No interference	No interference
R0200T0100L060	2	4	1°	8	60	1°	5.65	90	6	2	●	1	60.5	No interference	No interference
R0200T0130	2	4	1°30'	8	49	1.3°	5.95	90	6	2	●	1	—	No interference	No interference
R0200T0300	2	4	3°	8	28	2.2°	—	70	6	2	●	2	—	—	No interference
R0250T0100L036	2.5	5	1°	10	36	0.9°	5.71	80	6	2	●	1	No interference	No interference	No interference
R0250T0100L065	2.5	5	1°	10	65	1.4°	6.72	110	8	2	●	1	65.6	No interference	No interference
R0250T0130	2.5	5	1°30'	10	61	1.5°	7.42	110	8	2	●	1	—	No interference	No interference
R0250T0300	2.5	5	3°	10	41	2.3°	—	90	8	2	●	2	—	—	No interference
R0300T0100L051	3	6	1°	12	51	1.2°	7.11	90	8	2	●	1	51.8	No interference	No interference
R0300T0100L065	3	6	1°	12	65	1°	7.6	110	8	2	●	1	65.8	No interference	No interference
R0300T0100L092	3	6	1°	12	92	1.3°	8.54	140	10	2	●	1	92.8	No interference	No interference
R0300T0130	3	6	1°30'	12	53	1.2°	7.85	110	8	2	●	1	—	No interference	No interference
R0300T0300	3	6	3°	12	34	1.9°	—	90	8	2	●	2	—	—	No interference
R0400T0100L068	4	8	1°	14	68	0.9°	9.64	110	10	2	●	1	No interference	No interference	No interference
R0400T0100L092	4	8	1°	14	92	1.3°	10.47	140	12	2	●	1	92.8	No interference	No interference
R0400T0130	4	8	1°30'	14	55	1.2°	9.85	120	10	2	●	1	—	No interference	No interference
R0400T0300	4	8	3°	14	36	1.8°	—	100	10	2	●	2	—	—	No interference
R0500T0100L070	5	10	1°	18	70	0.9°	11.76	130	12	2	●	1	No interference	No interference	No interference
R0500T0100L100	5	10	1°	18	100	1.8°	12.8	160	16	2	●	1	100.7	No interference	No interference
R0500T0130	5	10	1°30'	18	59	1.1°	—	130	12	2	●	2	—	No interference	No interference

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D_1	Taper Angle One Side B_1	Length of Cut ap	Neck Length L_3	Cutting Edge to Shank Angle B_2	Neck Dia. D_3	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type	Effective length for inclined angle 1°	2°	3°
VCXBR0500T0300	5	10	3°	18	40	1.7°	—	110	12	2	●	2	—	—	No interference
R0600T0100L070	6	12	1°	22	70	1.8°	13.62	140	16	2	●	1	70.9	No interference	No interference
R0600T0100L100	6	12	1°	22	100	1.2°	14.66	160	16	2	●	1	100.9	No interference	No interference
R0600T0130	6	12	1°30'	22	83	1.5°	15.08	160	16	2	●	1	—	No interference	No interference
R0600T0300	6	12	3°	22	63	2.1°	—	140	16	2	●	2	—	—	No interference

CUTTING CONDITIONS B333

VC-3MB

Ball nose end mill, Medium cut length, 3 flute

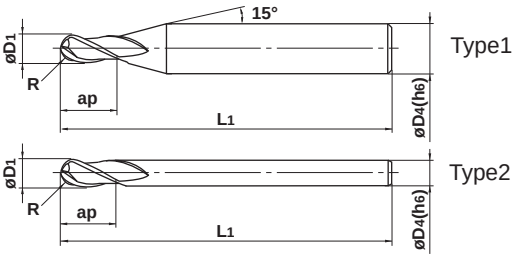
R ≤ 6 ±0.01
R ≥ 8 ±0.02

D1 ≤ 12 0 − -0.020
D1 > 12 0 − -0.030

h6

D4 = 6 0 − -0.008
8 ≤ D4 ≤ 10 0 − -0.009
12 ≤ D4 ≤ 16 0 − -0.011
D4 = 20 0 − -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



● 3 flute ball nose end mill for efficient machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC3MBR0100	1	2	6	60	6	3	●	1
R0150	1.5	3	8	70	6	3	●	1
R0200	2	4	8	70	6	3	●	1
R0250	2.5	5	12	80	6	3	●	1
R0300	3	6	12	80	6	3	●	2
R0400	4	8	14	90	8	3	●	2
R0500	5	10	18	100	10	3	●	2
R0600	6	12	22	110	12	3	●	2
R0800	8	16	30	140	16	3	●	2
R1000	10	20	38	160	20	3	●	2

● : Inventory maintained in Japan.

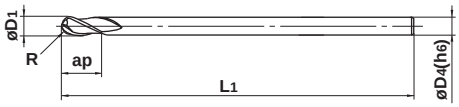
CUTTING CONDITIONS B341

VC-3LB

Ball nose, Medium cut length, 3 flute, Long shank

R		D1		h6	
R≤6	±0.01	D1≤12	0 — -0.020	4≤D4≤6	0 — -0.008
R≥8	±0.02	D1>12	0 — -0.030	8≤D4≤10	0 — -0.009
				12≤D4≤16	0 — -0.011
				D4=20	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1

UWC VC 30°

● 3 flute ball nose end mill with long shank for efficient machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC3LBR0200	2	4	8	120	4	3	●	1
R0300	3	6	12	140	6	3	●	1
R0400	4	8	14	150	8	3	●	1
R0500	5	10	18	180	10	3	●	1
R0600	6	12	22	200	12	3	●	1
R0800	8	16	30	230	16	3	●	1
R1000	10	20	38	250	20	3	●	1

VC-4MB

Ball nose end mill, Medium cut length, 4 flute

R ≤ 6 ±0.01
R ≥ 7 ±0.02

D1 ≤ 12 0 − -0.020
D1 > 12 0 − -0.030

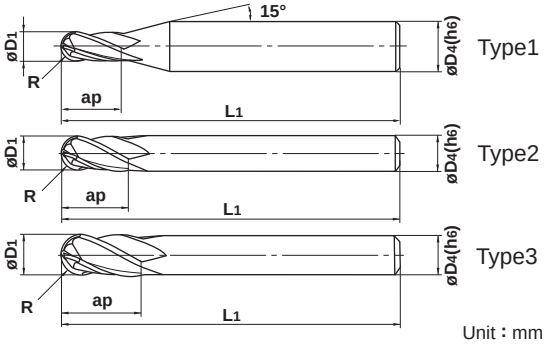
h6

D4 = 6 0 − -0.008
8 ≤ D4 ≤ 10 0 − -0.009
12 ≤ D4 ≤ 16 0 − -0.011
D4 = 20 0 − -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎	○	○		

UWC VC 20° (R<3) 30° (R≥3)

- 4 flute ball nose end mill with high durability for hardened steels.



Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC4MBR0050	0.5	1	2.5	50	6	4	●	1
R0075	0.75	1.5	4	50	6	4	●	1
R0100	1	2	6	60	6	4	●	1
R0150	1.5	3	8	70	6	4	●	1
R0200	2	4	8	70	6	4	●	1
R0250	2.5	5	12	80	6	4	●	1
R0300	3	6	12	80	6	4	●	2
R0400	4	8	14	90	8	4	●	2
R0500	5	10	18	100	10	4	●	2
R0600	6	12	22	110	12	4	●	2
R0700	7	14	26	120	12	4	●	3
R0800	8	16	30	140	16	4	●	2
R0900	9	18	34	140	16	4	●	3
R1000	10	20	38	160	20	4	●	2

● : Inventory maintained in Japan.

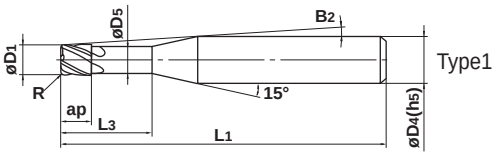
CUTTING CONDITIONS B342

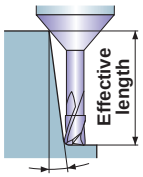
VC-PSRB MIRACLE ORBIT

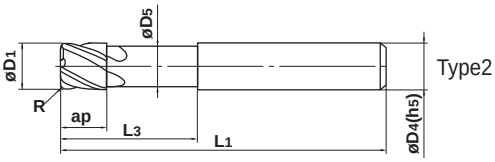
Corner radius end mill, Short cut length, 2–4 flute, High precision

R ±0.01 | 0 −-0.01 | h5 | D4 = 6 0 −-0.005 | 8 ≤ D4 ≤ 10 0 −-0.006 | D4 = 12 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	◎	○	○		







D1≤1.5

D1≥2

● ±0.01mm corner radius tolerance, 0−-0.01mm outer diameter tolerance.
End mill with corner radius for precise and efficient machining.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VCPSRBD0060N02R005	0.6	0.05	0.6	2	0.56	12.6°	50	6	2	●	1	2.1	2.2	2.4	2.6
D0060N02R01	0.6	0.1	0.6	2	0.56	12.6°	50	6	2	●	1	2.1	2.2	2.3	2.6
D0060N02R02	0.6	0.2	0.6	2	0.56	12.7°	50	6	2	●	1	2.1	2.2	2.2	2.5
D0060N04R01	0.6	0.1	0.6	4	0.56	10.9°	50	6	2	●	1	4.2	4.4	4.7	5.1
D0060N04R02	0.6	0.2	0.6	4	0.56	11°	50	6	2	●	1	4.2	4.3	4.7	5
D0080N04R005	0.8	0.05	0.8	4	0.76	10.7°	50	6	2	●	1	4.2	4.4	4.7	5.1
D0080N04R01	0.8	0.1	0.8	4	0.76	10.8°	50	6	2	●	1	4.2	4.4	4.7	5.1
D0080N04R02	0.8	0.2	0.8	4	0.76	10.8°	50	6	2	●	1	4.2	4.3	4.7	5
D0080N04R03	0.8	0.3	0.8	4	0.76	10.9°	50	6	2	●	1	4.2	4.3	4.6	5
D0080N06R01	0.8	0.1	0.8	6	0.76	9.4°	50	6	2	●	1	6.3	6.5	7	7.5
D0080N06R02	0.8	0.2	0.8	6	0.76	9.5°	50	6	2	●	1	6.3	6.5	7	7.5
D0080N06R03	0.8	0.3	0.8	6	0.76	9.5°	50	6	2	●	1	6.3	6.5	6.9	7.5
D0080N08R03	0.8	0.3	0.8	8	0.76	8.5°	50	6	2	●	1	8.3	8.6	9.2	10
D0100N04R005	1	0.05	1	4	0.94	10.5°	50	6	2	●	1	4.2	4.5	4.8	5.3
D0100N04R01	1	0.1	1	4	0.94	10.5°	50	6	2	●	1	4.2	4.5	4.8	5.3
D0100N04R02	1	0.2	1	4	0.94	10.6°	50	6	2	●	1	4.2	4.5	4.7	5.3
D0100N04R03	1	0.3	1	4	0.94	10.6°	50	6	2	●	1	4.2	4.5	4.6	5.2
D0100N04R04	1	0.4	1	4	0.94	10.7°	50	6	2	●	1	4.2	4.5	4.4	5.2
D0100N06R01	1	0.1	1	6	0.94	9.2°	50	6	2	●	1	6.4	6.7	7.2	7.8
D0100N06R02	1	0.2	1	6	0.94	9.2°	50	6	2	●	1	6.4	6.7	7.2	7.7
D0100N06R03	1	0.3	1	6	0.94	9.3°	50	6	2	●	1	6.3	6.6	7.2	7.7
D0100N06R04	1	0.4	1	6	0.94	9.4°	50	6	2	●	1	6.3	6.6	7.1	7.7
D0100N10R03	1	0.3	1	10	0.94	7.4°	50	6	2	●	1	10.5	10.9	11.8	12.7
D0100N10R04	1	0.4	1	10	0.94	7.4°	50	6	2	●	1	10.5	10.9	11.7	12.7
D0120N06R05	1.2	0.5	1.2	6	1.14	9.3°	50	6	2	●	1	6.3	6.6	7.1	7.7
D0120N10R05	1.2	0.5	1.2	10	1.14	7.3°	50	6	2	●	1	10.5	10.9	11.7	12.6
D0120N15R05	1.2	0.5	1.2	15	1.14	5.8°	50	6	2	●	1	15.7	16.3	17.5	18.9
D0150N04R01	1.5	0.1	1.5	4	1.44	10.2°	50	6	2	●	1	4.2	4.5	4.8	5.3
D0150N04R02	1.5	0.2	1.5	4	1.44	10.2°	50	6	2	●	1	4.2	4.5	4.7	5.3
D0150N04R03	1.5	0.3	1.5	4	1.44	10.3°	50	6	2	●	1	4.2	4.5	4.6	5.2
D0150N04R05	1.5	0.5	1.5	4	1.44	10.5°	50	6	2	●	1	4.2	4.4	4.3	5.2
D0150N06R01	1.5	0.1	1.5	6	1.44	8.8°	50	6	2	●	1	6.4	6.7	7.2	7.8
D0150N06R02	1.5	0.2	1.5	6	1.44	8.9°	50	6	2	●	1	6.4	6.7	7.2	7.7
D0150N06R03	1.5	0.3	1.5	6	1.44	8.9°	50	6	2	●	1	6.3	6.6	7.2	7.7
D0150N06R05	1.5	0.5	1.5	6	1.44	9°	50	6	2	●	1	6.3	6.6	7.1	7.7
D0150N10R01	1.5	0.1	1.5	10	1.44	6.9°	50	6	2	●	1	10.6	11	11.8	12.7
D0150N10R02	1.5	0.2	1.5	10	1.44	7°	50	6	2	●	1	10.5	11	11.8	12.7
D0150N10R03	1.5	0.3	1.5	10	1.44	7°	50	6	2	●	1	10.5	10.9	11.8	12.7

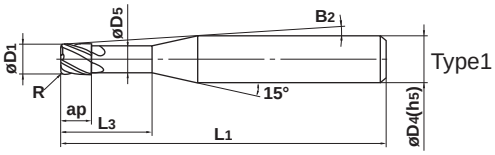
CARBIDE
SQUARE
BALL
RADIUS
TAPER
SOLID END MILLS
MIRACLE END MILLS
CUTTING CONDITIONS B347

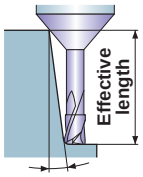
VC-PSRB MIRACLE ORBIT

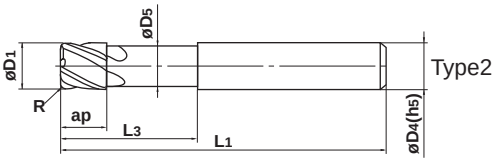
Corner radius end mill, Short cut length, 2–4 flute, High precision

R ±0.01 | 0 −-0.01 | h5 | D4 = 6 0 −-0.005 | 8 ≤ D4 ≤ 10 0 −-0.006 | D4 = 12 0 −-0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	◎	○	○		







●±0.01mm corner radius tolerance, 0−-0.01mm outer diameter tolerance.
End mill with corner radius for precise and efficient machining.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VCPSRBD0150N10R05	1.5	0.5	1.5	10	1.44	7.1°	50	6	2	●	1	10.5	10.9	11.7	12.6
D0150N15R01	1.5	0.1	1.5	15	1.44	5.5°	50	6	2	●	1	15.8	16.3	17.5	18.9
D0150N15R02	1.5	0.2	1.5	15	1.44	5.5°	50	6	2	●	1	15.8	16.3	17.5	18.9
D0150N15R03	1.5	0.3	1.5	15	1.44	5.5°	50	6	2	●	1	15.7	16.3	17.5	18.9
D0150N15R05	1.5	0.5	1.5	15	1.44	5.7°	50	6	2	●	1	15.7	16.3	17.4	18.6
D0150N20R03	1.5	0.3	1.5	20	1.44	4.7°	60	6	2	●	1	20.9	21.6	22.9	24.5
D0150N20R05	1.5	0.5	1.5	20	1.44	4.8°	60	6	2	●	1	20.9	21.5	22.8	24.2
D0200N06R01	2	0.1	2	6	1.9	9.4°	50	6	4	●	1	6.3	6.6	6.9	7.5
D0200N06R02	2	0.2	2	6	1.9	9.7°	50	6	4	●	1	6.3	6.6	6.8	7.4
D0200N06R03	2	0.3	2	6	1.9	10°	50	6	4	●	1	6.3	6.6	6.7	7.4
D0200N06R05	2	0.5	2	6	1.9	10.3°	50	6	4	●	1	6.3	6.5	6.5	7.4
D0200N10R01	2	0.1	2	10	1.9	7.6°	50	6	4	●	1	10.5	10.9	11.4	12
D0200N10R02	2	0.2	2	10	1.9	7.7°	50	6	4	●	1	10.5	10.8	11.2	12
D0200N10R03	2	0.3	2	10	1.9	7.8°	50	6	4	●	1	10.5	10.8	11.1	11.9
D0200N10R05	2	0.5	2	10	1.9	8°	50	6	4	●	1	10.5	10.8	10.9	11.9
D0200N15R01	2	0.1	2	15	1.9	5.9°	50	6	4	●	1	15.7	16.1	16.8	17.5
D0200N15R02	2	0.2	2	15	1.9	5.9°	50	6	4	●	1	15.7	16.1	16.7	17.5
D0200N15R03	2	0.3	2	15	1.9	6°	50	6	4	●	1	15.7	16.1	16.6	17.4
D0200N15R05	2	0.5	2	15	1.9	6.1°	50	6	4	●	1	15.6	16.1	16.3	17.4
D0200N20R03	2	0.3	2	20	1.9	4.8°	60	6	4	●	1	20.8	21.4	21.9	22.9
D0200N20R05	2	0.5	2	20	1.9	4.9°	60	6	4	●	1	20.8	21.4	21.7	22.9
D0200N25R03	2	0.3	2	25	1.9	4°	60	6	4	●	1	26	26.6	27.5	28.3
D0200N25R05	2	0.5	2	25	1.9	4°	60	6	4	●	1	26	26.6	27	28.2
D0250N08R01	2.5	0.1	2.5	8	2.4	8.6°	50	6	4	●	1	8.4	8.7	9.2	9.9
D0250N08R02	2.5	0.2	2.5	8	2.4	8.7°	50	6	4	●	1	8.4	8.7	9	9.9
D0250N08R03	2.5	0.3	2.5	8	2.4	8.8°	50	6	4	●	1	8.4	8.7	8.9	9.9
D0250N08R05	2.5	0.5	2.5	8	2.4	9°	50	6	4	●	1	8.4	8.7	8.7	9.9
D0250N08R10	2.5	1	2.5	8	2.4	9.4°	50	6	4	●	1	8.3	8.7	8.2	9.9
D0250N15R03	2.5	0.3	2.5	15	2.4	5.5°	50	6	4	●	1	15.7	16.1	16.6	17.5
D0250N15R05	2.5	0.5	2.5	15	2.4	5.6°	50	6	4	●	1	15.6	16.1	16.3	17.5
D0250N15R10	2.5	1	2.5	15	2.4	5.7°	50	6	4	●	1	15.6	16.1	15.8	17.5
D0300N10R01	3	0.1	3	10	2.9	6.6°	60	6	4	●	1	10.5	10.9	11.4	12.3
D0300N10R02	3	0.2	3	10	2.9	6.6°	60	6	4	●	1	10.5	10.8	11.2	12.3
D0300N10R03	3	0.3	3	10	2.9	6.6°	60	6	4	●	1	10.5	10.8	11.1	12.3
D0300N10R05	3	0.5	3	10	2.9	6.7°	60	6	4	●	1	10.5	10.8	10.9	12.4
D0300N10R10	3	1	3	10	2.9	7°	60	6	4	●	1	10.4	10.8	10.4	12.4
D0300N15R01	3	0.1	3	15	2.9	4.8°	60	6	4	●	1	15.7	16.1	16.8	17.7
D0300N15R02	3	0.2	3	15	2.9	4.8°	60	6	4	●	1	15.7	16.1	16.7	17.8

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Corner R R	Length of Cut ap	Neck Length L_3	Neck Dia. D_5	Cutting Edge to Shank Angle B_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VCPSRBD0300N15R03	3	0.3	3	15	2.9	4.8°	60	6	4	●	1	15.7	16.1	16.6	17.8
D0300N15R05	3	0.5	3	15	2.9	4.8°	60	6	4	●	1	15.6	16.1	16.3	17.8
D0300N15R10	3	1	3	15	2.9	5°	60	6	4	●	1	15.6	16.1	15.8	17.8
D0300N20R01	3	0.1	3	20	2.9	3.7°	60	6	4	●	1	20.8	21.4	22.1	23.1
D0300N20R02	3	0.2	3	20	2.9	3.7°	60	6	4	●	1	20.8	21.4	22	23.1
D0300N20R03	3	0.3	3	20	2.9	3.8°	60	6	4	●	1	20.8	21.4	21.9	23.2
D0300N20R05	3	0.5	3	20	2.9	3.8°	60	6	4	●	1	20.8	21.4	21.7	23.2
D0300N20R10	3	1	3	20	2.9	3.9°	60	6	4	●	1	20.8	21.3	21.2	23.2
D0300N30R03	3	0.3	3	30	2.9	2.6°	70	6	4	●	1	31.1	31.8	32.5	No interference
D0300N30R05	3	0.5	3	30	2.9	2.6°	70	6	4	●	1	31.1	31.8	32.2	No interference
D0400N12R01	4	0.1	4	12	3.9	3.8°	60	6	4	●	1	12.5	13	13.5	15.1
D0400N12R02	4	0.2	4	12	3.9	3.8°	60	6	4	●	1	12.5	13	13.4	15.2
D0400N12R03	4	0.3	4	12	3.9	3.8°	60	6	4	●	1	12.5	13	13.3	15.2
D0400N12R05	4	0.5	4	12	3.9	3.9°	60	6	4	●	1	12.5	13	13.1	15.3
D0400N12R10	4	1	4	12	3.9	4°	60	6	4	●	1	12.5	12.9	12.6	15.3
D0400N20R01	4	0.1	4	20	3.9	2.5°	60	6	4	●	1	20.8	21.4	22.1	No interference
D0400N20R02	4	0.2	4	20	3.9	2.5°	60	6	4	●	1	20.8	21.4	22	No interference
D0400N20R03	4	0.3	4	20	3.9	2.5°	60	6	4	●	1	20.8	21.4	21.9	No interference
D0400N20R05	4	0.5	4	20	3.9	2.5°	60	6	4	●	1	20.8	21.4	21.7	No interference
D0400N20R10	4	1	4	20	3.9	2.6°	60	6	4	●	1	20.8	21.3	21.2	No interference
D0400N30R03	4	0.3	4	30	3.9	1.8°	70	6	4	●	1	31.1	31.8	No interference	No interference
D0400N30R05	4	0.5	4	30	3.9	1.8°	70	6	4	●	1	31.1	31.8	No interference	No interference
D0400N30R10	4	1	4	30	3.9	1.8°	70	6	4	●	1	31.1	31.8	No interference	No interference
D0500N15R05	5	0.5	5	15	4.9	1.6°	60	6	4	●	1	15.6	16.1	No interference	No interference
D0500N15R10	5	1	5	15	4.9	1.6°	60	6	4	●	1	15.6	16.1	No interference	No interference
D0500N30R05	5	0.5	5	30	4.9	0.9°	70	6	4	●	1	31.1	No interference	No interference	No interference
D0500N30R10	5	1	5	30	4.9	0.9°	70	6	4	●	1	31.1	No interference	No interference	No interference
D0600N18R01	6	0.1	6	18	5.85	—	70	6	4	●	2	No interference	No interference	No interference	No interference
D0600N18R02	6	0.2	6	18	5.85	—	70	6	4	●	2	No interference	No interference	No interference	No interference
D0600N18R03	6	0.3	6	18	5.85	—	70	6	4	●	2	No interference	No interference	No interference	No interference
D0600N18R05	6	0.5	6	18	5.85	—	70	6	4	●	2	No interference	No interference	No interference	No interference
D0600N18R10	6	1	6	18	5.85	—	70	6	4	●	2	No interference	No interference	No interference	No interference
D0600N18R20	6	2	6	18	5.85	—	70	6	4	●	2	No interference	No interference	No interference	No interference
D0600N41R05	6	0.5	6	41	5.85	—	90	6	4	●	2	No interference	No interference	No interference	No interference
D0600N50R10	6	1	6	50	5.85	—	90	6	4	●	2	No interference	No interference	No interference	No interference
D0800N24R01	8	0.1	8	24	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0800N24R02	8	0.2	8	24	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0800N24R03	8	0.3	8	24	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0800N24R05	8	0.5	8	24	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0800N24R10	8	1	8	24	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0800N24R20	8	2	8	24	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0800N24R30	8	3	8	24	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0800N50R10	8	1	8	50	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0800N50R30	8	3	8	50	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D1000N30R03	10	0.3	10	30	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference
D1000N30R05	10	0.5	10	30	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference
D1000N30R10	10	1	10	30	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference
D1000N30R20	10	2	10	30	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference
D1000N30R30	10	3	10	30	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference
D1000N30R40	10	4	10	30	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference

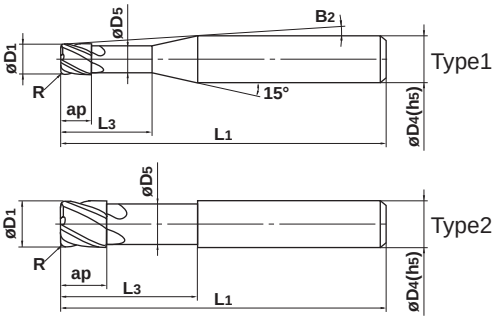
CUTTING CONDITIONS B347

VC-PSRB MIRACLE ORBIT

Corner radius end mill, Short cut length, 2–4 flute, High precision

R ±0.01 | 0 — -0.01 | h5 | D4 = 6 0 — -0.005 | 8 ≤ D4 ≤ 10 0 — -0.006 | D4 = 12 0 — -0.008

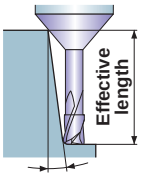
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	◎	○	○		



UWC VC 30°

D1≤1.5

D1≥2



●±0.01mm corner radius tolerance, 0—-0.01mm outer diameter tolerance.
End mill with corner radius for precise and efficient machining.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VCPSRBD1000N50R10	10	1	10	50	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference
D1000N50R30	10	3	10	50	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference
D1200N36R03	12	0.3	12	36	11.7	—	110	12	4	●	2	No interference	No interference	No interference	No interference
D1200N36R05	12	0.5	12	36	11.7	—	110	12	4	●	2	No interference	No interference	No interference	No interference
D1200N36R10	12	1	12	36	11.7	—	110	12	4	●	2	No interference	No interference	No interference	No interference
D1200N36R20	12	2	12	36	11.7	—	110	12	4	●	2	No interference	No interference	No interference	No interference
D1200N36R30	12	3	12	36	11.7	—	110	12	4	●	2	No interference	No interference	No interference	No interference
D1200N36R40	12	4	12	36	11.7	—	110	12	4	●	2	No interference	No interference	No interference	No interference
D1200N36R50	12	5	12	36	11.7	—	110	12	4	●	2	No interference	No interference	No interference	No interference

● : Inventory maintained in Japan.

CUTTING CONDITIONS B347

VC-PSRB MIRACLE ORBIT

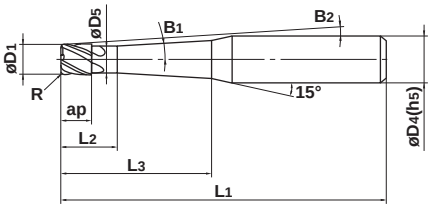
Corner radius end mill, Short cut length, 2–4 flute, High precision

R ±0.01 | 0 – -0.01 | h5

D4 = 6 0 – -0.005
8 ≤ D4 ≤ 10 0 – -0.006
12 ≤ D4 ≤ 16 0 – -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	◎	○	○		

(Taper neck type)



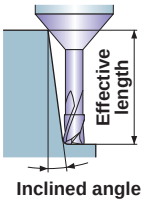
Type3

UWC VC 30°

D1=1.5

D1≥2

Effective length for inclined angle



●±0.01mm corner radius tolerance, 0–-0.01mm outer diameter tolerance.
End mill with corner radius for precise and efficient machining.

Unit : mm

Order Number	Dia. D1	Corner R R	Taper Angle One Side B1	Length of Cut ap	Neck Length L3	Length of Straight Neck L2	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 1°	2°	3°
VCPSRBD0150N03L06R05	1.5	0.5	1° 30'	1.5	6	3	1.44	9°	50	6	2	●	3	–	7.1	7.7
D0150N03L10R05	1.5	0.5	1° 30'	1.5	10	3	1.44	7.2°	50	6	2	●	3	–	11.3	12.2
D0200N04L10R05	2	0.5	1° 30'	2	10	4	1.9	6.7°	60	6	4	●	3	–	11.5	12.4
D0200N04L15R05	2	0.5	1° 30'	2	15	4	1.9	5.3°	60	6	4	●	3	–	16.7	18
D0250N05L12R10	2.5	1	1° 30'	2.5	12	5	2.4	5.6°	60	6	4	●	3	–	14.2	15.3
D0250N05L20R10	2.5	1	1° 30'	2.5	20	5	2.4	4°	60	6	4	●	3	–	22.5	24.2
D0300N06L15R05	3	0.5	1° 30'	3	15	6	2.9	4.4°	60	6	4	●	3	–	16.9	18.2
D0300N06L20R05	3	0.5	1° 30'	3	20	6	2.9	3.6°	60	6	4	●	3	–	22.1	23.8
D0300N06L15R10	3	1	1° 30'	3	15	6	2.9	4.4°	60	6	4	●	3	–	17.4	18.7
D0300N06L20R10	3	1	1° 30'	3	20	6	2.9	3.6°	60	6	4	●	3	–	22.6	24.4
D0400N08L20R10	4	1	1° 30'	4	20	8	3.9	2.6°	60	6	4	●	3	–	22.8	No interference
D0400N08L30R10	4	1	1° 30'	4	30	8	3.9	1.9°	70	6	4	●	3	–	No interference	No interference
D0500N08L40R05	5	0.5	1°	5	40	8	4.9	2°	90	8	4	●	3	41.2	No interference	No interference
D0500N08L60R05	5	0.5	1°	5	60	8	4.9	1.4°	110	8	4	●	3	61.2	No interference	No interference
D0500N08L40R10	5	1	1°	5	40	8	4.9	2°	90	8	4	●	3	41.7	No interference	No interference
D0500N08L60R10	5	1	1°	5	60	8	4.9	1.4°	110	8	4	●	3	61.7	No interference	No interference
D0600N08L40R20	6	2	1°	6	40	8	5.85	1.4°	70	8	4	●	3	42.8	No interference	No interference
D0600N08L60R20	6	2	1°	6	60	8	5.85	1°	100	8	4	●	3	No interference	No interference	No interference
D0800N10L53R20	8	2	1°	8	53	10	7.85	1.1°	90	10	4	●	3	55.9	No interference	No interference
D0800N10L70R20	8	2	1°	8	70	10	7.85	1.6°	130	12	4	●	3	72.9	No interference	No interference
D1000N12L55R30	10	3	1°	10	55	12	9.7	1.1°	100	12	4	●	3	59.4	No interference	No interference
D1000N12L70R30	10	3	1°	10	70	12	9.7	0.9°	130	12	4	●	3	No interference	No interference	No interference
D1200N24L70R30	12	3	1°	12	70	24	11.7	1.6°	130	16	4	●	3	75.2	No interference	No interference

CUTTING CONDITIONS B347

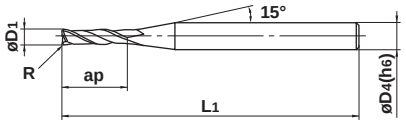
VC-2JRB

Corner radius end mill, Semi long cut length, 2 flute

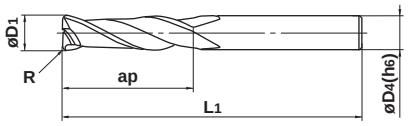
D1≤12 0 −-0.020
D1>12 0 −-0.030

h6
D4=6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1



Type2

UWC VC 30°

● 2 flute corner radius end mill for general use.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2JRBD0300R0030	3	0.3	12	50	6	2	●	1
D0400R0030	4	0.3	15	50	6	2	●	1
D0400R0050	4	0.5	15	50	6	2	●	1
D0500R0030	5	0.3	20	60	6	2	●	1
D0500R0050	5	0.5	20	60	6	2	●	1
D0600R0030	6	0.3	20	60	6	2	●	2
D0600R0050	6	0.5	20	60	6	2	●	2
D0600R0100	6	1	20	60	6	2	●	2
D0800R0030	8	0.3	25	70	8	2	●	2
D0800R0050	8	0.5	25	70	8	2	●	2
D0800R0100	8	1	25	70	8	2	●	2
D0800R0150	8	1.5	25	70	8	2	●	2
D0800R0200	8	2	25	70	8	2	●	2
D1000R0030	10	0.3	30	90	10	2	●	2
D1000R0050	10	0.5	30	90	10	2	●	2
D1000R0100	10	1	30	90	10	2	●	2
D1000R0150	10	1.5	30	90	10	2	●	2
D1000R0200	10	2	30	90	10	2	●	2
D1200R0050	12	0.5	30	90	12	2	●	2
D1200R0100	12	1	30	90	12	2	●	2
D1200R0150	12	1.5	30	90	12	2	●	2
D1200R0200	12	2	30	90	12	2	●	2
D1600R0050	16	0.5	50	110	16	2	●	2
D1600R0100	16	1	50	110	16	2	●	2
D1600R0150	16	1.5	50	110	16	2	●	2
D1600R0200	16	2	50	110	16	2	●	2
D2000R0050	20	0.5	55	110	20	2	●	2
D2000R0100	20	1	55	110	20	2	●	2
D2000R0150	20	1.5	55	110	20	2	●	2
D2000R0200	20	2	55	110	20	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B325

VC-4SRB

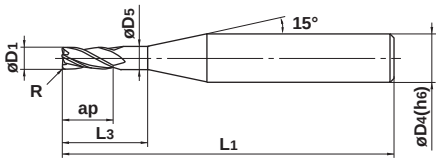
Corner radius end mill, Short cut length, 4 flute

0 — -0.020

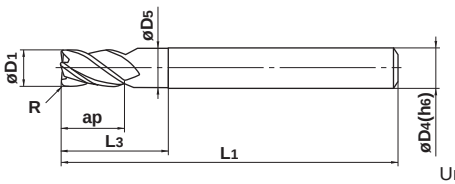
h6

D4 = 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1



Type2

- 4 flute corner radius end mill with relieved neck for 3×D length of reach.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC4SRBD0400R0050	4	0.5	4	12	3.8	45	6	4	●	1
D0600R0050	6	0.5	6	18	5.8	50	6	4	●	2
D0600R0100	6	1	6	18	5.8	50	6	4	●	2
D0800R0050	8	0.5	8	24	7.8	60	8	4	●	2
D0800R0100	8	1	8	24	7.8	60	8	4	●	2
D1000R0100	10	1	10	30	9.7	70	10	4	●	2
D1000R0200	10	2	10	30	9.7	70	10	4	●	2
D1200R0100	12	1	12	36	11.7	75	12	4	●	2
D1200R0200	12	2	12	36	11.7	75	12	4	●	2

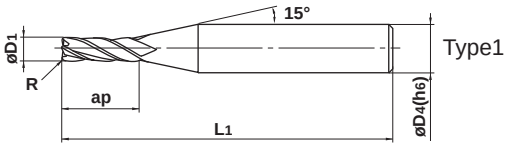
VC-4JRB

Corner radius end mill, Semi long cut length, 4 flute

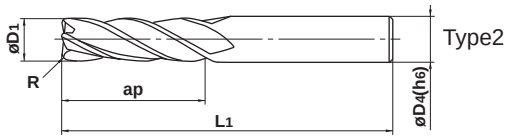
D1≤12 0 −-0.020
D1>12 0 −-0.030

h6
D4=6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1



Type2

- 4 flute corner radius end mill for general use.
- 4 flute corner radius end mill for longer reach applications.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC4JRBD0300R0030	3	0.3	12	50	6	4	●	1
D0400R0030	4	0.3	15	50	6	4	●	1
D0400R0050	4	0.5	15	50	6	4	●	1
D0500R0030	5	0.3	20	60	6	4	●	1
D0500R0050	5	0.5	20	60	6	4	●	1
D0600R0030	6	0.3	20	60	6	4	●	2
D0600R0050	6	0.5	20	60	6	4	●	2
D0600R0100	6	1	20	60	6	4	●	2
D0800R0030	8	0.3	25	70	8	4	●	2
D0800R0050	8	0.5	25	70	8	4	●	2
D0800R0100	8	1	25	70	8	4	●	2
D0800R0150	8	1.5	25	70	8	4	●	2
D0800R0200	8	2	25	70	8	4	●	2
D1000R0030	10	0.3	30	90	10	4	●	2
D1000R0050	10	0.5	30	90	10	4	●	2
D1000R0100	10	1	30	90	10	4	●	2
D1000R0150	10	1.5	30	90	10	4	●	2
D1000R0200	10	2	30	90	10	4	●	2
D1200R0050	12	0.5	30	90	12	4	●	2
D1200R0100	12	1	30	90	12	4	●	2
D1200R0150	12	1.5	30	90	12	4	●	2
D1200R0200	12	2	30	90	12	4	●	2
D1600R0050	16	0.5	50	110	16	4	●	2
D1600R0100	16	1	50	110	16	4	●	2
D1600R0150	16	1.5	50	110	16	4	●	2
D1600R0200	16	2	50	110	16	4	●	2
D2000R0050	20	0.5	55	110	20	4	●	2
D2000R0100	20	1	55	110	20	4	●	2
D2000R0150	20	1.5	55	110	20	4	●	2
D2000R0200	20	2	55	110	20	4	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B328

VC-HFRB

Corner radius, Short flute length, 4 flute, High feed machining

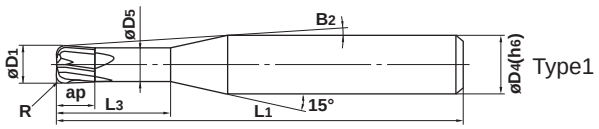
R ±0.015

D1≤12 0 −-0.02
D1>12 0 −-0.03

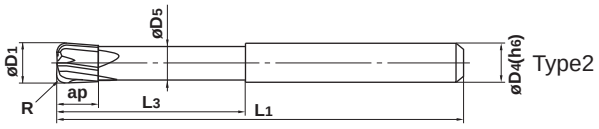
h6

D4 = 6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011

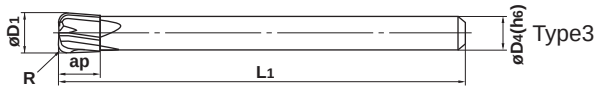
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	○		○		



Type1



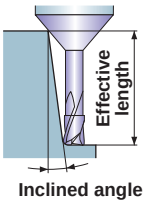
Type2



Type3

UWC VC 20° 10°

D1≤5 D1≥6



- Suitable for high feed and efficient machining of die & mould.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
VCHFRBD0200R050N06	2	0.5	2	6	1.9	8.7°	50	6	4	●	1	6.2	6.5	6.9	7.5
D0200R050N10	2	0.5	2	10	1.9	6.7°	70	6	4	●	1	10.4	10.8	11.5	12.4
D0300R075N09	3	0.75	3	9	2.9	6.2°	50	6	4	●	1	9.4	9.7	10.4	11.1
D0300R075N15	3	0.75	3	15	2.9	4.3°	70	6	4	●	1	15.6	16.1	17.3	18.6
D0400R100N12	4	1	4	12	3.9	3.9°	50	6	4	●	1	12.4	12.8	13.7	14.7
D0400R100N20	4	1	4	20	3.9	2.6°	70	6	4	●	1	20.7	21.4	22.9	No interference
D0500R120N15	5	1.2	5	15	4.9	1.9°	70	6	4	●	1	15.5	16	No interference	No interference
D0600R150N18	6	1.5	6	18	5.85	—	50	6	4	●	2	No interference	No interference	No interference	No interference
D0600R150N30	6	1.5	6	30	5.85	—	90	6	4	●	2	No interference	No interference	No interference	No interference
D0700R150A050	7	1.5	7	—	—	—	50	6	4	●	3	No interference	No interference	No interference	No interference
D0700R150A080	7	1.5	7	—	—	—	80	6	4	●	3	No interference	No interference	No interference	No interference
D0800R200N24	8	2	8	24	7.85	—	60	8	4	●	2	No interference	No interference	No interference	No interference
D0800R200N40	8	2	8	40	7.85	—	90	8	4	●	2	No interference	No interference	No interference	No interference
D0900R200A065	9	2	9	—	—	—	65	8	4	●	3	No interference	No interference	No interference	No interference
D0900R200A100	9	2	9	—	—	—	100	8	4	●	3	No interference	No interference	No interference	No interference
D1000R200N30	10	2	10	30	9.7	—	70	10	4	●	2	No interference	No interference	No interference	No interference
D1000R200N50	10	2	10	50	9.7	—	100	10	4	●	2	No interference	No interference	No interference	No interference
D1100R200A070	11	2	11	—	—	—	70	10	4	●	3	No interference	No interference	No interference	No interference
D1100R200A110	11	2	11	—	—	—	110	10	4	●	3	No interference	No interference	No interference	No interference
D1200R300N36	12	3	12	36	11.7	—	75	12	4	●	2	No interference	No interference	No interference	No interference
D1200R300N60	12	3	12	60	11.7	—	110	12	4	●	2	No interference	No interference	No interference	No interference
D1300R300A075	13	3	13	—	—	—	75	12	4	●	3	No interference	No interference	No interference	No interference
D1300R300A120	13	3	13	—	—	—	120	12	4	●	3	No interference	No interference	No interference	No interference
D1600R300N80	16	3	16	80	15.5	—	140	16	4	●	2	No interference	No interference	No interference	No interference

VC-HFRB

Corner radius, Short flute length, 4 flute, High feed machining

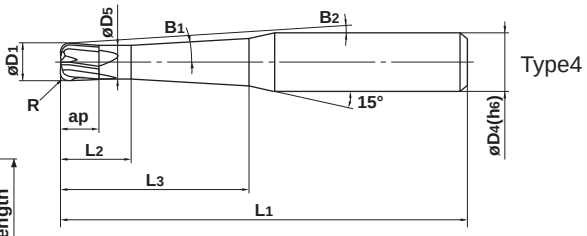
R ±0.015

D1≤12 0 −-0.02
D1>12 0 −-0.03

h6
D4 = 6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	○		○		

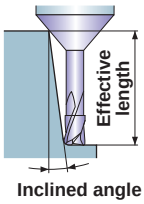
(Taper neck type)



Type4

UWC VC 20° 10°

D1≤5 D1≥6



- Suitable for high feed and efficient machining of die & mould.

Unit : mm

Order Number	Dia. D1	Corner R R	Taper Angle One Side B1	Length of Cut ap	Neck Length L3	Length of Straight Neck L2	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 1°	2°	3°
VCHFRBD0200R050N12	2	0.5	1°	2	12	4	1.9	6°	70	6	4	●	4	12.9	13.9	15
D0200R050N16	2	0.5	1°	2	16	4	1.9	5°	70	6	4	●	4	16.9	18.2	19.6
D0200R050N20	2	0.5	1°	2	20	4	1.9	4.3°	70	6	4	●	4	20.9	22.5	24.3
D0300R075N18	3	0.75	1°	3	18	6	2.9	3.8°	80	6	4	●	4	19.3	20.7	22.3
D0300R075N24	3	0.75	1°	3	24	6	2.9	3°	80	6	4	●	4	25.3	27.2	No interference
D0300R075N30	3	0.75	1°	3	30	6	2.9	2.6°	80	6	4	●	4	31.3	33.6	No interference
D0400R100N24	4	1	1°	4	24	8	3.9	2.2°	90	6	4	●	4	25.7	27.6	No interference
D0400R100N32	4	1	1°	4	32	8	3.9	1.7°	90	6	4	●	4	33.7	No interference	No interference
D0400R100N40	4	1	1°	4	40	8	3.9	1.4°	90	6	4	●	4	41.7	No interference	No interference
D0500R120N30	5	1.2	1°	5	30	8	4.9	1°	90	6	4	●	4	No interference	No interference	No interference
D0500R120N40	5	1.2	1°	5	40	8	4.9	2°	90	8	4	●	4	41.9	No interference	No interference
D0500R120N50	5	1.2	1°	5	50	8	4.9	1.7°	110	8	4	●	4	51.9	No interference	No interference
D0600R150N50	6	1.5	1°	6	50	16	5.85	1.2°	110	8	4	●	4	52.9	No interference	No interference
D0600R150N67	6	1.5	1°	6	67	16	5.85	0.9°	130	8	4	●	4	No interference	No interference	No interference
D0800R200N70	8	2	1°	8	70	18	7.85	0.9°	120	10	4	●	4	No interference	No interference	No interference
D0800R200N90	8	2	1°	8	90	18	7.85	1.3°	150	12	4	●	4	93.5	No interference	No interference
D1000R200N80	10	2	1°	10	80	20	9.7	2°	140	16	4	●	4	83.9	No interference	No interference
D1000R200N110	10	2	1°	10	110	20	9.7	1.5°	160	16	4	●	4	113.9	No interference	No interference
D1200R300N110	12	3	1°	12	110	24	11.7	1.1°	160	16	4	●	4	115.2	No interference	No interference

● : Inventory maintained in Japan.

CUTTING CONDITIONS B349

VC-MD

End mill, Medium cut length, 4—6 flute

D1≤12 0 — -0.020
D1>12 0 — -0.030

h6

D4 = 6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
20≤D4≤25 0 — -0.013

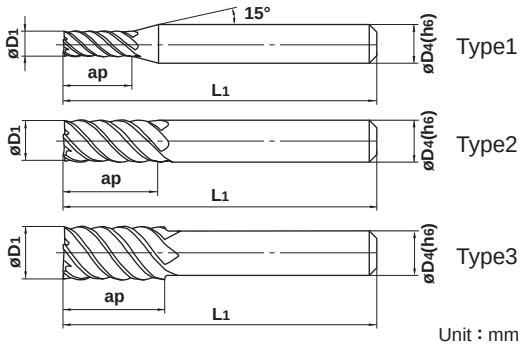
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				

UWC VC 30° 45°

D1<3 D1≥3

D1<3 D1≥3

● 4—6 flute end mill for hardened steel milling.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VCMDD0100	1	2.5	45	6	4	●	1
D0150	1.5	4	45	6	4	●	1
D0200	2	6	45	6	4	●	1
D0250	2.5	8	45	6	4	●	1
D0300	3	8	45	6	6	●	1
D0350	3.5	10	45	6	6	●	1
D0400	4	11	45	6	6	●	1
D0450	4.5	11	50	6	6	●	1
D0500	5	13	50	6	6	●	1
D0550	5.5	13	50	6	6	●	1
D0600	6	13	50	6	6	●	2
D0800	8	19	60	8	6	●	2
D1000	10	22	70	10	6	●	2
D1200	12	26	75	12	6	●	2
D1400	14	26	75	12	6	●	3
D1500	15	30	80	16	6	●	1
D1600	16	32	90	16	6	●	2
D1800	18	32	90	16	6	●	3
D2000	20	38	100	20	6	●	2
D2200	22	38	100	20	6	●	3
D2500	25	60	160	25	6	●	2

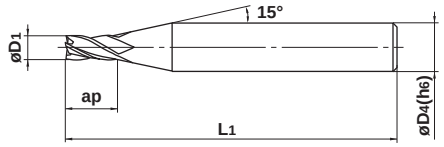
CUTTING CONDITIONS B335

VC-MD-SC

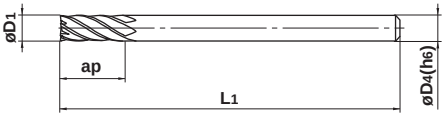
End mill, Medium cut length, 4—6 flute

0 — -0.020 h6 D4 = 6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1



Type2

● 4—6 flute end mill with sharp corner geometry for hardened steel milling.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VCMDSCD0050	0.5	1	45	6	4	●	1
D0100	1	2.5	45	6	4	●	1
D0150	1.5	4	45	6	4	●	1
D0200	2	6	45	6	4	●	1
D0250	2.5	8	45	6	4	●	1
D0300	3	8	45	6	6	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B335

VC-MDL

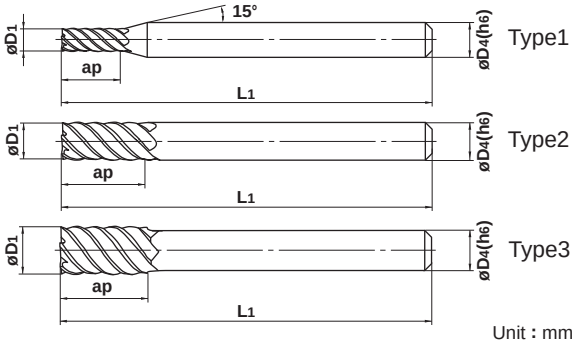
End mill, Medium cut length, 6 flute, Long shank

$D_1 \leq 12$	$0 -0.020$
$D_1 > 12$	$0 -0.030$

h6

$D_4 = 6$	$0 -0.008$
$8 \leq D_4 \leq 10$	$0 -0.009$
$12 \leq D_4 \leq 16$	$0 -0.011$
$20 \leq D_4 \leq 25$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



● 6 flute end mill with long shank for hardened steel milling.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VCMDLD0300S06	3	8	60	6	6	●	1
D0400S06	4	11	60	6	6	●	1
D0500S06	5	13	70	6	6	●	1
D0600S06	6	13	70	6	6	●	2
D0800S08	8	19	90	8	6	●	2
D1000S08	10	22	100	8	6	●	3
D1000S10	10	22	100	10	6	●	2
D1200S10	12	26	110	10	6	●	3
D1200S12	12	26	110	12	6	●	2
D1600S16	16	32	130	16	6	●	2
D1800S16	18	32	130	16	6	●	3
D2000S20	20	38	140	20	6	●	2
D2200S20	22	38	140	20	6	●	3
D2500S25	25	60	180	25	6	●	2

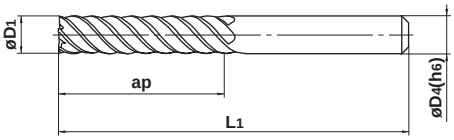
VC-LD

End mill, Long cut length, 6 flute

D1≤12 0 — -0.020
D1>12 0 — -0.030

h6
D4 = 6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
20≤D4≤25 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1

UWC VC 45°

● 6 flute end mill with long cutting length for hardened steel milling.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VCLDD0600	6	26	70	6	6	●	1
D0800	8	36	90	8	6	●	1
D1000	10	46	100	10	6	●	1
D1200	12	56	110	12	6	●	1
D1600	16	66	130	16	6	●	1
D2000	20	76	140	20	6	●	1
D2500	25	92	180	25	6	●	1

● : Inventory maintained in Japan.

CUTTING CONDITIONS B336

VC-SDRB

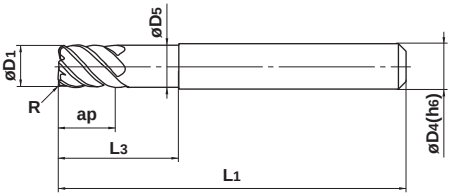
Corner radius end mill, Short cut length

0 －-0.020

h6

D4 = 6　0 －-0.008
8 ≤ D4 ≤ 10　0 －-0.009
D4 = 12　0 －-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1

UWC　VC　45°

● 6 flute end mill with relieved neck for extra reach applications that require rigidity.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VCSDRBD0600R0050	6	0.5	6	18	5.8	50	6	6	●	1
D0800R0050	8	0.5	8	24	7.8	60	8	6	●	1
D1000R0100	10	1	10	30	9.7	70	10	6	●	1
D1200R0100	12	1	12	36	11.7	75	12	6	●	1

VC-MDRB

Corner radius end mill, Medium cut length

D1≦12 0 −-0.020
D1>12 0 −-0.030

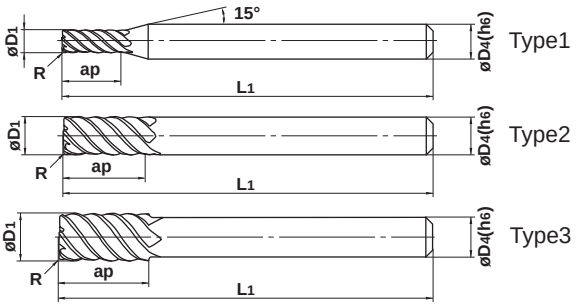
h6

D4 = 6 0 −-0.008
8≦D4≦10 0 −-0.009
12≦D4≦16 0 −-0.011
D4 = 20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≦45HRC)	Hardened Steel (≦55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				

UWC VC 45°

● 6 flute end mill with corner radius for hardened steel milling.



Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VCMDRBD0300R0030	3	0.3	8	60	6	6	●	1
D0400R0030	4	0.3	11	60	6	6	●	1
D0500R0030	5	0.3	13	70	6	6	●	1
D0600R0030	6	0.3	13	70	6	6	●	2
D0600R0050	6	0.5	13	70	6	6	●	2
D0700R0030	7	0.3	16	70	6	6	●	3
D0700R0050	7	0.5	16	70	6	6	●	3
D0800R0030	8	0.3	19	90	8	6	●	2
D0800R0050	8	0.5	19	90	8	6	●	2
D0900R0030	9	0.3	19	90	8	6	●	3
D0900R0050	9	0.5	19	90	8	6	●	3
D1000R0030	10	0.3	22	100	10	6	●	2
D1000R0050	10	0.5	22	100	10	6	●	2
D1000R0100	10	1	22	100	10	6	●	2
D1100R0050	11	0.5	22	100	10	6	●	3
D1100R0100	11	1	22	100	10	6	●	3
D1200R0050	12	0.5	26	110	12	6	●	2
D1200R0100	12	1	26	110	12	6	●	2
D1300R0050	13	0.5	26	110	12	6	●	3
D1300R0100	13	1	26	110	12	6	●	3
D1600R0100	16	1	32	130	16	6	●	2
D1600R0150	16	1.5	32	130	16	6	●	2
D1800R0100	18	1	32	130	16	6	●	3
D1800R0150	18	1.5	32	130	16	6	●	3
D2000R0100	20	1	38	140	20	6	●	2
D2000R0150	20	1.5	38	140	20	6	●	2
D2000R0200	20	2	38	140	20	6	●	2
D2200R0100	22	1	38	140	20	6	●	3
D2200R0150	22	1.5	38	140	20	6	●	3
D2200R0200	22	2	38	140	20	6	●	3

● : Inventory maintained in Japan.

CUTTING CONDITIONS B335

VC-MHDRB

Corner radius end mill, Medium cut length, 4 flute, High helix angle

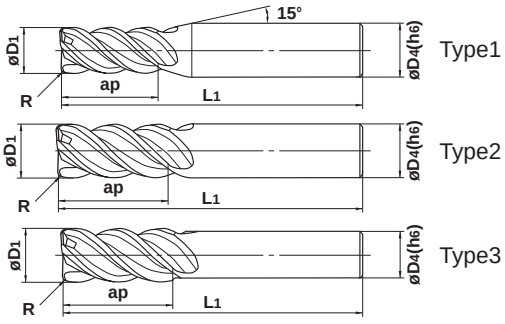
$D_1 \leq 12$	$0 -0.02$
$D_1 > 12$	$0 -0.03$

h6

$4 \leq D_4 \leq 6$	$0 -0.008$
$8 \leq D_4 \leq 10$	$0 -0.009$
$12 \leq D_4 \leq 16$	$0 -0.011$
$20 \leq D_4 \leq 25$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	◎	◎		

UWC VC 45°



- 4 flute corner radius end mill with high helix angle and newly designed corner radius, for milling difficult-to-cut materials.

Unit : mm

Order Number	Dia. D_1	Corner R R	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VCMHDRB D0200R020S04	2	0.2	6	40	4	4	●	1
D0200R030S04	2	0.3	6	40	4	4	●	1
D0300R020S06	3	0.2	8	50	6	4	●	1
D0300R030S06	3	0.3	8	50	6	4	●	1
D0300R050S06	3	0.5	8	50	6	4	●	1
D0400R020S06	4	0.2	11	50	6	4	●	1
D0400R030S06	4	0.3	11	50	6	4	●	1
D0400R050S06	4	0.5	11	50	6	4	●	1
D0500R020S06	5	0.2	13	60	6	4	●	1
D0500R030S06	5	0.3	13	60	6	4	●	1
D0500R050S06	5	0.5	13	60	6	4	●	1
D0500R100S06	5	1	13	60	6	4	●	1
D0600R030S06	6	0.3	13	60	6	4	●	2
D0600R050S06	6	0.5	13	60	6	4	●	2
D0600R100S06	6	1	13	60	6	4	●	2
D0800R030S08	8	0.3	19	70	8	4	●	2
D0800R050S08	8	0.5	19	70	8	4	●	2
D0800R100S08	8	1	19	70	8	4	●	2
D0800R150S08	8	1.5	19	70	8	4	●	2
D1000R030S08	10	0.3	22	90	8	4	●	3
D1000R050S08	10	0.5	22	90	8	4	●	3
D1000R100S08	10	1	22	90	8	4	●	3
D1000R150S08	10	1.5	22	90	8	4	●	3
D1000R200S08	10	2	22	90	8	4	●	3
D1000R030S10	10	0.3	22	90	10	4	●	2
D1000R050S10	10	0.5	22	90	10	4	●	2
D1000R100S10	10	1	22	90	10	4	●	2
D1000R150S10	10	1.5	22	90	10	4	●	2
D1000R200S10	10	2	22	90	10	4	●	2
D1200R050S10	12	0.5	26	90	10	4	●	3
D1200R100S10	12	1	26	90	10	4	●	3
D1200R150S10	12	1.5	26	90	10	4	●	3
D1200R200S10	12	2	26	90	10	4	●	3
D1200R300S10	12	3	26	90	10	4	●	3
D1200R050S12	12	0.5	26	90	12	4	●	2
D1200R100S12	12	1	26	90	12	4	●	2
D1200R150S12	12	1.5	26	90	12	4	●	2
D1200R200S12	12	2	26	90	12	4	●	2

CUTTING CONDITIONS B334

VC-MHDRB

Corner radius end mill, Medium cut length, 4 flute, High helix angle

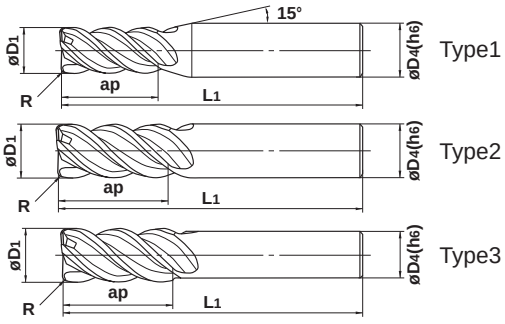
$D_1 \leq 12$	$0 -0.02$
$D_1 > 12$	$0 -0.03$

h6

$4 \leq D_4 \leq 6$	$0 -0.008$
$8 \leq D_4 \leq 10$	$0 -0.009$
$12 \leq D_4 \leq 16$	$0 -0.011$
$20 \leq D_4 \leq 25$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	◎	◎		

UWC VC 45°



- 4 flute corner radius end mill with high helix angle and newly designed corner radius, for milling difficult-to-cut materials.

Unit : mm

Order Number	Dia. D_1	Corner R R	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VCMHDRB D1200R300S12	12	3	26	90	12	4	●	2
D1600R100S16	16	1	32	110	16	4	●	2
D1600R150S16	16	1.5	32	110	16	4	●	2
D1600R200S16	16	2	32	110	16	4	●	2
D1600R300S16	16	3	32	110	16	4	●	2
D1800R100S16	18	1	32	110	16	4	●	3
D1800R150S16	18	1.5	32	110	16	4	●	3
D1800R200S16	18	2	32	110	16	4	●	3
D1800R300S16	18	3	32	110	16	4	●	3
D2000R100S20	20	1	38	110	20	4	●	2
D2000R150S20	20	1.5	38	110	20	4	●	2
D2000R200S20	20	2	38	110	20	4	●	2
D2000R300S20	20	3	38	110	20	4	●	2
D2200R100S20	22	1	38	140	20	4	●	3
D2200R150S20	22	1.5	38	140	20	4	●	3
D2200R200S20	22	2	38	140	20	4	●	3
D2200R300S20	22	3	38	140	20	4	●	3
D2500R100S25	25	1	45	140	25	4	●	2
D2500R150S25	25	1.5	45	140	25	4	●	2
D2500R200S25	25	2	45	140	25	4	●	2
D2500R300S25	25	3	45	140	25	4	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B334

VC-MH

End mill, Medium cut length, 3—4 flute, High helix angle

D1≤12 0 — -0.020
D1>12 0 — -0.030

h6

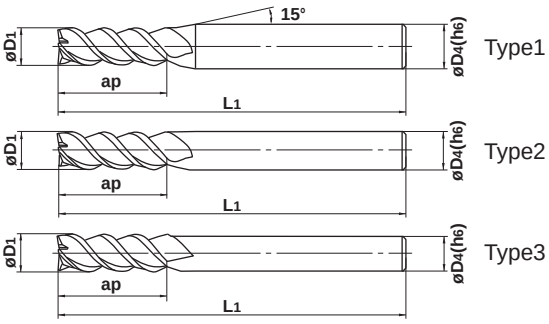
D4 = 6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
20≤D4≤25 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	○		◎	◎		

UWC VC 50°

D1≤18 D1≥20

● 3—4 flute end mill for milling difficult-to-cut and soft materials.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VCMHD0300	3	8	45	6	3	●	1
D0400	4	11	45	6	3	●	1
D0500	5	13	50	6	3	●	1
D0600	6	13	50	6	3	●	2
D0700	7	16	60	8	3	●	1
D0800	8	19	60	8	3	●	2
D0900	9	19	70	10	3	●	1
D1000	10	22	70	10	3	●	2
D1100	11	22	75	12	3	●	1
D1200	12	26	75	12	3	●	2
D1300	13	26	75	12	3	●	3
D1400	14	26	75	12	3	●	3
D1500	15	30	80	16	3	●	1
D1600	16	32	90	16	3	●	2
D1800	18	32	90	16	3	●	3
D2000	20	38	100	20	4	●	2
D2500	25	45	120	25	4	●	2

VC-6MH

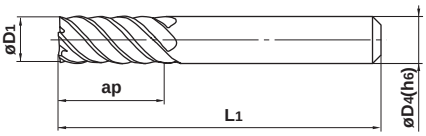
End mill, Medium cut length, 6 flute, High helix angle

D1≤12 0 — -0.02
D1>12 0 — -0.03

h6

D4=6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
20≤D4≤25 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	◎		



Type1

● 6 flute end mill for milling difficult-to-cut and soft materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC6MHD0600	6	13	50	6	6	●	1
D0800	8	19	60	8	6	●	1
D1000	10	22	70	10	6	●	1
D1200	12	26	75	12	6	●	1
D1600	16	32	90	16	6	●	1
D2000	20	38	100	20	6	●	1
D2500	25	45	120	25	6	●	1

● : Inventory maintained in Japan.

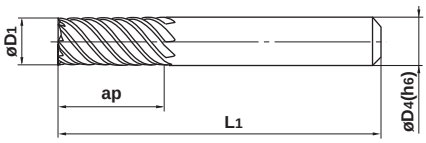
CUTTING CONDITIONS B338

VC-8MH

End mill, Medium cut length, 8 flute, High helix angle

0 — -0.03 | h6 | 20 ≤ D4 ≤ 25 | 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	◎		



Type1

UWC VC 45°

● 8 flute end mill for milling difficult-to-cut and soft materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC8MHD2000	20	38	100	20	8	●	1
D2500	25	45	120	25	8	●	1

CUTTING CONDITIONS B338

VC-SFPR

Roughing end mill, Short cut length, 3—4 flute

h6

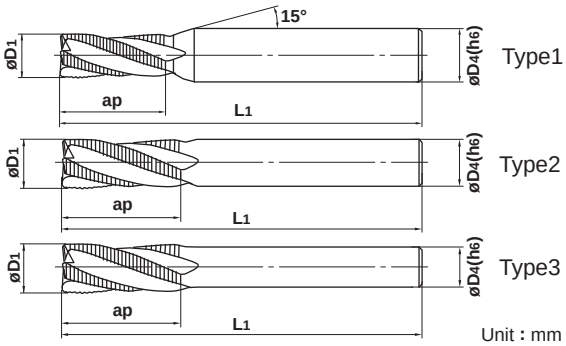
D4 = 6	0 — -0.008
8 ≤ D4 ≤ 10	0 — -0.009
12 ≤ D4 ≤ 16	0 — -0.011
D4 = 20	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	○		◎	◎		

UWC VC 20°

D1<8 D1≥8

- 3—4 flute roughing end mill for carbon and alloy steel through to difficult-to-cut and hardened materials.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VCSFPRD0300	3	6	50	6	3	●	1
D0400	4	8	50	6	3	●	1
D0500	5	10	50	6	3	●	1
D0600	6	12	50	6	3	●	2
D0700	7	17	60	8	3	●	1
D0800	8	17	60	8	4	●	2
D0900	9	22	70	10	4	●	1
NEW D1000S08	10	22	90	8	4	●	3
D1000	10	22	70	10	4	●	2
NEW D1200S10	12	27	100	10	4	●	3
D1200	12	27	75	12	4	●	2
D1400	14	27	75	12	4	●	3
D1600	16	33	90	16	4	●	2
D1800	18	33	90	16	4	●	3
D2000	20	38	100	20	4	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B339

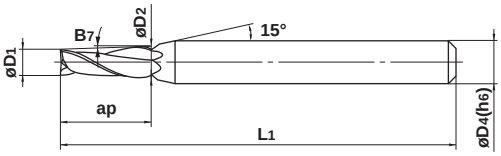
VC-2MT

Taper end mill, Medium cut length, 2 flute

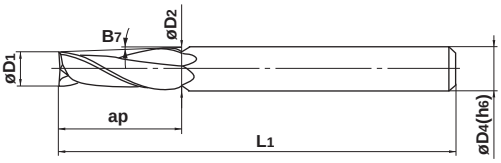
0 — -0.03 | ±5' | h6

4 ≤ D4 ≤ 6 : 0 — -0.008
8 ≤ D4 ≤ 10 : 0 — -0.009
12 ≤ D4 ≤ 16 : 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1



Type2

UWC VC 30° D1<3 D1≥3 D1<3 D1>3

● Suitable for machining of non-heat-treated steel through to hardened steel.

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2MTD0100T0030	1	30'	4	1.07	45	4	2	●	1
D0100T0100	1	1°	4	1.14	45	4	2	●	1
D0100T0130	1	1° 30'	4	1.21	45	4	2	●	1
D0100T0200	1	2°	4	1.28	45	4	2	●	1
D0100T0300	1	3°	4	1.42	45	4	2	●	1
D0100T0500	1	5°	4	1.7	45	4	2	●	1
D0150T0030	1.5	30'	5	1.59	45	4	2	●	1
D0150T0100	1.5	1°	5	1.67	45	4	2	●	1
D0150T0130	1.5	1° 30'	5	1.76	45	4	2	●	1
D0150T0200	1.5	2°	5	1.85	45	4	2	●	1
D0150T0300	1.5	3°	5	2.02	45	4	2	●	1
D0150T0500	1.5	5°	5	2.37	45	4	2	●	1
D0200T0030	2	30'	6	2.1	45	4	2	●	1
D0200T0100	2	1°	6	2.21	45	4	2	●	1
D0200T0130	2	1° 30'	6	2.31	45	4	2	●	1
D0200T0200	2	2°	6	2.42	45	4	2	●	1
D0200T0300	2	3°	6	2.63	45	4	2	●	1
D0200T0500	2	5°	6	3.05	45	4	2	●	1
D0200T1000	2	10°	6	4.12	50	6	2	●	1
D0250T0030	2.5	30'	8	2.64	45	4	2	●	1
D0250T0100	2.5	1°	8	2.78	45	4	2	●	1
D0250T0130	2.5	1° 30'	8	2.92	45	4	2	●	1
D0250T0200	2.5	2°	8	3.06	45	4	2	●	1
D0250T0300	2.5	3°	8	3.34	45	4	2	●	1
D0250T0500	2.5	5°	8	3.9	45	4	2	●	1
D0250T1000	2.5	10°	8	5.32	50	6	2	●	1

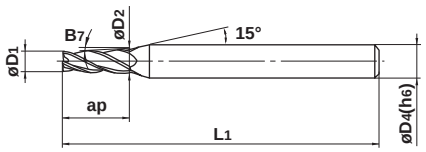
VC-4MT

Taper end mill, Medium cut length, 4 flute

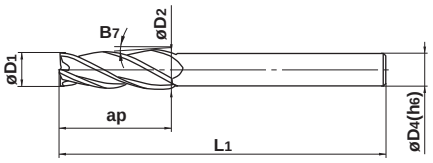
0 — -0.03 ±5' h6

D4 = 6	0 — -0.008
8 ≤ D4 ≤ 10	0 — -0.009
12 ≤ D4 ≤ 16	0 — -0.011
D4 = 20	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	○	○	○		



Type1



Type2

UWC VC 30°

● Suitable for machining of non-heat-treated steel through to hardened steel.

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Length of Cut ap	Large Mill Dia. D2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC4MTD0300T0030	3	30'	10	3.17	50	6	4	●	1
D0300T0100	3	1°	10	3.35	50	6	4	●	1
D0300T0130	3	1° 30'	10	3.52	50	6	4	●	1
D0300T0200	3	2°	10	3.7	50	6	4	●	1
D0300T0300	3	3°	10	4.05	50	6	4	●	1
D0300T0500	3	5°	10	4.75	50	6	4	●	1
D0300T1000	3	10°	10	6.53	50	6	4	●	2
D0400T0030	4	30'	15	4.26	55	6	4	●	1
D0400T0100	4	1°	15	4.52	55	6	4	●	1
D0400T0130	4	1° 30'	15	4.79	55	6	4	●	1
D0400T0200	4	2°	15	5.05	55	6	4	●	1
D0400T0300	4	3°	15	5.57	55	6	4	●	1
D0400T0500	4	5°	15	6.62	60	6	4	●	2
D0400T1000	4	10°	15	9.29	70	8	4	●	2
D0500T0030	5	30'	20	5.35	60	6	4	●	1
D0500T0100	5	1°	20	5.7	60	6	4	●	1
D0500T0130	5	1° 30'	20	6.05	60	6	4	●	2
D0500T0200	5	2°	20	6.4	60	6	4	●	2
D0500T0300	5	3°	20	7.1	60	6	4	●	2
D0500T0500	5	5°	20	8.5	70	8	4	●	2
D0500T1000	5	10°	20	12.05	90	12	4	●	2
D0600T0030	6	30'	20	6.35	60	6	4	●	2
D0600T0100	6	1°	20	6.7	60	6	4	●	2
D0600T0130	6	1° 30'	20	7.05	60	6	4	●	2
D0600T0200	6	2°	20	7.4	60	6	4	●	2
D0600T0300	6	3°	20	8.1	70	8	4	●	2
D0600T0500	6	5°	20	9.5	70	8	4	●	2
D0600T1000	6	10°	20	13.05	90	12	4	●	2
D0800T0030	8	30'	25	8.44	70	8	4	●	2
D0800T0100	8	1°	25	8.87	70	8	4	●	2
D0800T0130	8	1° 30'	25	9.31	70	8	4	●	2
D0800T0200	8	2°	25	9.75	70	8	4	●	2
D0800T0300	8	3°	25	10.62	70	10	4	●	2
D0800T0500	8	5°	25	12.37	75	12	4	●	2
D0800T1000	8	10°	25	16.82	90	16	4	●	2
D1000T0030	10	30'	35	10.61	90	10	4	●	2
D1000T0100	10	1°	35	11.22	90	10	4	●	2
D1000T0130	10	1° 30'	35	11.83	90	10	4	●	2

● : Inventory maintained in Japan.

Unit : mm

Order Number	Small Mill Dia. D_1	Taper Angle One Side B_7	Length of Cut ap	Large Mill Dia. D_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
VC4MTD1000T0200	10	2°	35	12.44	90	12	4	●	2
D1000T0300	10	3°	35	13.67	90	12	4	●	2
D1000T0500	10	5°	35	16.12	90	16	4	●	2
D1000T1000	10	10°	35	22.34	110	20	4	●	2

CUTTING CONDITIONS B340

VC-4STB

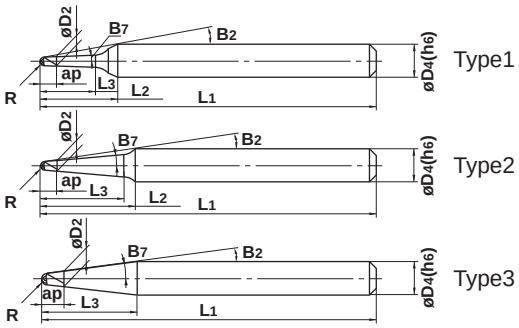
Ball nose taper end mill, Short cut length, 4 flute

R ±0.01 h6 D4 = 6 0 −-0.008 8≤D4≤10 0 −-0.009

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎	○	○		

UWC VC 30°

● 4 flute taper end mill with taper neck for maximum rigidity and high performance.



∗Relief Neck type.

Unit : mm

Order Number	Radius of Ball Nose R	Taper Angle One Side B7	Length of Cut ap	Neck Length L3	Under Shank Length L2	Large Mill Dia. D2	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC4STBR0030T0130N05	0.3	1° 30'	1	5	9.0	0.64	17.2°	60	6	4	●	1
R0030T0200N05	0.3	2°	1	5	9.0	0.65	17.2°	60	6	4	●	1
R0030T0500N05	0.3	5°	1	5	8.8	0.70	17.6°	60	6	4	●	1
R0030T1000N15	0.3	10°	1	15	—	0.90	10.4°	60	6	4	●	3
R0040T0130N10	0.4	1° 30'	2	10	14.0	0.88	10.8°	60	6	4	●	1
R0040T0130N15	0.4	1° 30'	2	15	19.0	0.88	8.0°	60	6	4	●	1
R0040T0200N10	0.4	2°	2	10	14.0	0.91	10.8°	60	6	4	●	1
R0040T0500N10	0.4	5°	2	10	13.5	1.08	11.2°	60	6	4	●	1
R0040T0700N10	0.4	7°	7	10	12.2	2.43	12.4°	60	6	4	●	2
R0040T1000N15	0.4	10°	3	15	—	1.73	10.1°	60	6	4	●	3
R0050T0130N10	0.5	1° 30'	2	10	14.0	1.08	10.5°	60	6	4	●	1
R0050T0130N15	0.5	1° 30'	2	15	19.0	1.08	7.7°	60	6	4	●	1
R0050T0130N20	0.5	1° 30'	2	20	24.0	1.08	6.1°	60	6	4	●	1
R0050T0200N10	0.5	2°	2	10	14.0	1.11	10.5°	60	6	4	●	1
R0050T0200N15	0.5	2°	2	15	18.9	1.11	7.8°	60	6	4	●	1
R0050T0200N20	0.5	2°	3	20	24.0	1.11	6.1°	60	6	4	●	1
R0050T0500N10	0.5	5°	3	10	13.6	1.44	10.8°	60	6	4	●	1
R0050T0500N15	0.5	5°	3	15	17.2	1.44	8.5°	60	6	4	●	2
R0050T0500N20	0.5	5°	3	20	21.8	1.44	6.7°	60	6	4	●	2
R0050T0700N10	0.5	7°	7	10	12.1	2.60	12.2°	60	6	4	●	2
R0050T0700N15	0.5	7°	7	15	16.6	2.60	8.9°	60	6	4	●	2
R0050T0700N20	0.5	7°	7	20	—	2.60	7.3°	60	6	4	●	3
R0050T1000N14	0.5	10°	3	14	—	1.90	10.5°	60	6	4	●	3
R0075T0200N10	0.75	2°	3	10	14.0	1.66	9.6°	60	6	4	●	1
R0075T0500N15	0.75	5°	3	15	17.0	1.90	7.9°	60	6	4	●	2
R0100T0130N10	1	1° 30'	4	10	13.5	2.16	9.1°	60	6	4	●	1
R0100T0130N15	1	1° 30'	4	15	18.5	2.16	6.5°	60	6	4	●	1
R0100T0130N20	1	1° 30'	4	20	23.5	2.16	5.1°	60	6	4	●	1
R0100T0200N06	1	2°	4	6	8.7	2.20	14.4°	60	6	4	●	2
R0100T0200N10	1	2°	4	10	13.8	2.20	8.9°	60	6	4	●	1
R0100T0200N15	1	2°	4	15	17.5	2.20	6.9°	60	6	4	●	2
R0100T0500N10	1	5°	4	10	12.2	2.50	10.1°	60	6	4	●	2
R0100T0500N15	1	5°	4	15	16.8	2.50	7.2°	60	6	4	●	2
R0100T0500N23	1	5°	4	23	—	2.50	5.2°	60	6	4	●	3
R0100T0700N17	1	7°	7	17	—	3.49	7.1°	60	6	4	●	3
R0100T1000N12	1	10°	4	12	—	3.10	10.3°	60	6	4	●	3
R0125T0500N15	1.25	5°	4	15	16.5	2.99	6.6°	60	6	4	●	2
R0150T0130N15	1.5	1° 30'	4	15	17.3	3.13	5.4°	60	6	4	●	2

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Taper Angle One Side B7	Length of Cut ap	Neck Length L3	Under Shank Length L2	Large Mill Dia. D2	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC4STBR0150T0130N20	1.5	1° 30'	4	20	22.2	3.13	4.2°	60	6	4	●	2
R0150T0300N15	1.5	3°	4	15	16.9	3.27	5.6°	60	6	4	●	2
R0150T0500N10	1.5	5°	4	10	11.7	3.50	8.3°	60	6	4	●	2
R0150T0500N18	1.5	5°	4	18	—	3.50	5.2°	60	6	4	●	3
R0175T0500N15	1.75	5°	4	15	—	3.91	5.4°	60	6	4	●	3
R0200T0130N15	2	1° 30'	5	15	16.8	4.16	3.9°	60	6	4	●	2
R0200T0130N20	2	1° 30'	5	20	21.6	4.16	3.0°	60	6	4	●	2
R0200T0300N21	2	3°	4	21	—	4.22	3.1°	60	6	4	●	3
R0200T0500N13	2	5°	4	13	—	4.40	5.2°	60	6	4	●	3
R0200T0700N18	2	7°	7	18	—	5.26	7.1°	60	8	4	●	3
R0300T0130N15	3	1° 30'	6	15	16.8	6.16	4.2°	90	8	4	●	2
R0300T0130N20	3	1° 30'	6	20	21.7	6.16	3.1°	90	8	4	●	2
R0300T0300N22	3	3°	6	22	—	6.32	3.1°	90	8	4	●	3
R0400T0130N15	4	1° 30'	8	15	16.9	8.21	4.4°	90	10	4	●	2
R0400T0300N22	4	3°	8	22	—	8.43	3.2°	90	10	4	●	3

CUTTING CONDITIONS B343

VC-2C

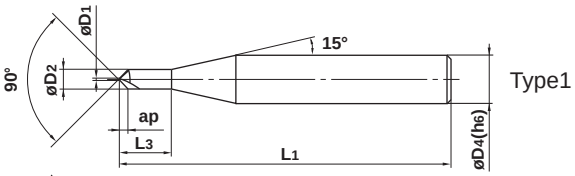
Chamfer cutter, 2 flute

±0.02

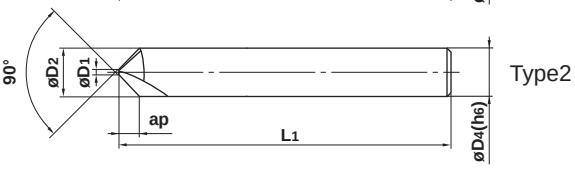
h6

D4 = 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	○	◎	◎	○	○



Type1



Type2

- Chamfering cutters for machining of hardened steel and difficult-to-cut materials.

Unit : mm

Order Number	Dia. D2	Small Mill Dia. D1	Length of Cut ap	Neck Length L3	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VC2CD0200	2	0.3	0.85	6	50	6	2	●	1
D0400	4	0.3	1.85	12	50	6	2	●	1
D0600	6	0.3	2.85	—	50	6	2	●	2
D0800	8	0.4	3.8	—	60	8	2	●	2
D1000	10	0.5	4.75	—	70	10	2	●	2
D1200	12	0.5	5.75	—	75	12	2	●	2

● : Inventory maintained in Japan.

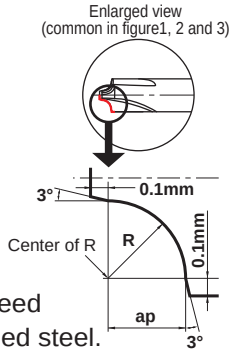
CUTTING CONDITIONS B345

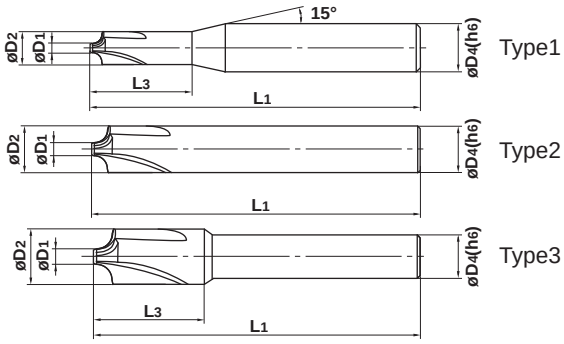
VC-RC NEW

Corner rounding cutter, 3 flute

R ±0.02 h6 D4 = 6 0 — -0.008 / 8 ≤ D4 ≤ 10 0 — -0.009 / D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	○	○	○	○	○





- Chamfering cutters for high efficiency, high feed machining of carbon steel through to hardened steel.

Unit : mm

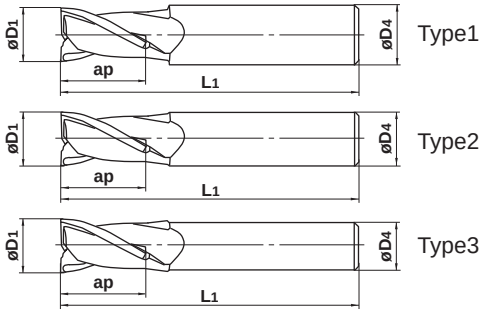
Order Number	Corner Radius R	Dia. D2	Overall Length L1	Tip Dia. D1	Length of Cut ap	Neck Length L3	Shank Dia. D4	No. of Flutes N	Stock	Type
VCRCR0050	0.5	4	50	2.8	0.5	12	6	3	●	1
R0100	1	5	50	2.8	1	15	6	3	●	1
R0150	1.5	6	50	2.8	1.5	—	6	3	●	2
R0200	2	8	60	3.8	2	—	8	3	●	2
R0250	2.5	9	70	3.8	2.5	27	10	3	●	1
R0300	3	10	70	3.8	3	—	10	3	●	2
R0400	4	12	75	3.8	4	—	12	3	●	2
R0500	5	14	75	3.8	5	26	12	3	●	3

VJ-2MS

End mill, Medium cut length, 2 flute

D1 = 20 0 — -0.03
D1 > 20 0 — -0.04

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	○	○	○		



● 2 flute end mill for general use finishing.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VJ2MSD2000	20	30	110	20	2	●	2
D2500	25	35	125	25	2	●	2
D3000	30	45	140	32	2	●	1
D3200	32	45	145	32	2	●	2
D3500	35	50	155	32	2	●	3
D4000	40	50	155	32	2	●	3
D5000	50	60	170	42	2	●	3

● : Inventory maintained in Japan.

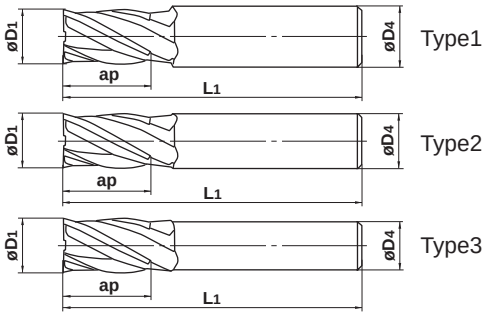
CUTTING CONDITIONS B350

VJ-4MS

End mill, Medium cut length, 4 flute

D1 = 20 0 −+0.03
D1 > 20 0 −+0.04

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎	◎	○	○	○		



● 4 flute end mill for general use finishing.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VJ4MSD2000	20	30	110	20	4	●	2
D2500	25	35	125	25	4	●	2
D3000	30	45	140	32	4	●	1
D3200	32	45	145	32	4	●	2
D3500	35	50	155	32	4	●	3
D4000	40	50	155	32	4	●	3
D5000	50	60	170	42	4	●	3

CUTTING CONDITIONS B350

CRN-2MS

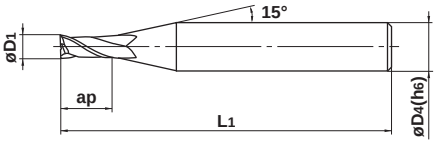
End mill, Medium cut length, 2 flute, For copper electrodes

0 − -0.02

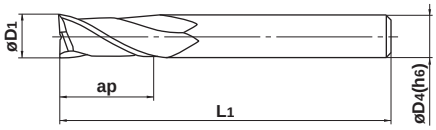
h6

4 ≤ D4 ≤ 6 0 − -0.008
8 ≤ D4 ≤ 10 0 − -0.009
D4 = 12 0 − -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○



Type1



Type2

UWC CRN 30°

D1<3 D1≥3

- 2 flute end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
CRN2MSD0020S04	0.2	0.4	40	4	2	●	1
D0020S06	0.2	0.4	45	6	2	●	1
D0030S04	0.3	0.6	40	4	2	●	1
D0030S06	0.3	0.6	45	6	2	●	1
D0040S04	0.4	0.8	40	4	2	●	1
D0040S06	0.4	0.8	45	6	2	●	1
D0050S04	0.5	1	40	4	2	●	1
D0050S06	0.5	1	45	6	2	●	1
D0060S04	0.6	1.2	40	4	2	●	1
D0070S04	0.7	1.4	40	4	2	●	1
D0080S04	0.8	1.6	40	4	2	●	1
D0080S06	0.8	1.6	45	6	2	●	1
D0090S04	0.9	2	40	4	2	●	1
D0100S04	1	2.5	40	4	2	●	1
D0100S06	1	2.5	45	6	2	●	1
D0110S04	1.1	2.5	40	4	2	●	1
D0120S04	1.2	3	40	4	2	●	1
D0120S06	1.2	3	45	6	2	●	1
D0130S04	1.3	3	40	4	2	●	1
D0140S04	1.4	3	40	4	2	●	1
D0150S04	1.5	4	40	4	2	●	1
D0150S06	1.5	4	45	6	2	●	1
D0160S04	1.6	4	40	4	2	●	1
D0170S04	1.7	4	40	4	2	●	1
D0180S04	1.8	5	40	4	2	●	1
D0190S04	1.9	5	40	4	2	●	1
D0200S06	2	6	45	6	2	●	1
D0250S06	2.5	8	45	6	2	●	1
D0300S06	3	8	45	6	2	●	1
D0400S06	4	11	45	6	2	●	1
D0500S06	5	13	50	6	2	●	1
D0600S06	6	13	50	6	2	●	2
D0800S08	8	19	60	8	2	●	2
D1000S10	10	22	70	10	2	●	2
D1200S12	12	26	75	12	2	●	2

● : Inventory maintained in Japan.

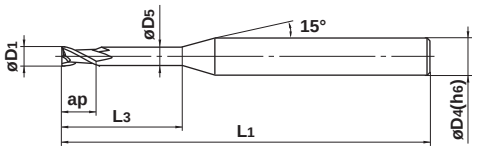
CUTTING CONDITIONS B351

CRN-2XL

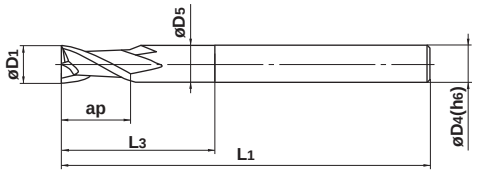
End mill, Medium cut length, 2 flute, Long neck, For copper electrodes

0 − -0.02 h6 4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○



Type1



Type2

UWC CRN 30° D1<3 D1≥3

- 2 flute long neck end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
CRN2XLD0020N005S04	0.2	0.3	0.5	0.17	50	4	2	●	1
D0020N005S06	0.2	0.3	0.5	0.17	50	6	2	●	1
D0020N010S04	0.2	0.3	1	0.17	50	4	2	●	1
D0020N010S06	0.2	0.3	1	0.17	50	6	2	●	1
D0020N015S04	0.2	0.3	1.5	0.17	50	4	2	●	1
D0020N015S06	0.2	0.3	1.5	0.17	50	6	2	●	1
D0030N010S04	0.3	0.5	1	0.27	50	4	2	●	1
D0030N010S06	0.3	0.5	1	0.27	50	6	2	●	1
D0030N030S04	0.3	0.5	3	0.27	50	4	2	●	1
D0030N030S06	0.3	0.5	3	0.27	50	6	2	●	1
D0040N020S04	0.4	0.6	2	0.36	50	4	2	●	1
D0040N020S06	0.4	0.6	2	0.36	50	6	2	●	1
D0040N040S04	0.4	0.6	4	0.36	50	4	2	●	1
D0040N040S06	0.4	0.6	4	0.36	50	6	2	●	1
D0040N060S04	0.4	0.6	6	0.36	50	4	2	●	1
D0040N060S06	0.4	0.6	6	0.36	50	6	2	●	1
D0050N020S04	0.5	0.8	2	0.46	50	4	2	●	1
D0050N020S06	0.5	0.8	2	0.46	50	6	2	●	1
D0050N040S04	0.5	0.8	4	0.46	50	4	2	●	1
D0050N040S06	0.5	0.8	4	0.46	50	6	2	●	1
D0050N060S04	0.5	0.8	6	0.46	50	4	2	●	1
D0050N060S06	0.5	0.8	6	0.46	50	6	2	●	1
D0050N080S04	0.5	0.8	8	0.46	50	4	2	●	1
D0050N080S06	0.5	0.8	8	0.46	50	6	2	●	1
D0080N040S04	0.8	1.2	4	0.76	50	4	2	●	1
D0080N040S06	0.8	1.2	4	0.76	50	6	2	●	1
D0080N060S04	0.8	1.2	6	0.76	50	4	2	●	1
D0080N060S06	0.8	1.2	6	0.76	50	6	2	●	1
D0080N080S04	0.8	1.2	8	0.76	50	4	2	●	1
D0080N080S06	0.8	1.2	8	0.76	50	6	2	●	1
D0080N100S04	0.8	1.2	10	0.76	50	4	2	●	1
D0080N100S06	0.8	1.2	10	0.76	50	6	2	●	1
D0100N060S04	1	1.5	6	0.94	50	4	2	●	1
D0100N060S06	1	1.5	6	0.94	50	6	2	●	1
D0100N080S04	1	1.5	8	0.94	50	4	2	●	1
D0100N080S06	1	1.5	8	0.94	50	6	2	●	1
D0100N100S04	1	1.5	10	0.94	50	4	2	●	1
D0100N100S06	1	1.5	10	0.94	50	6	2	●	1

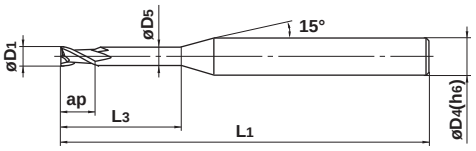
CUTTING CONDITIONS B352

CRN-2XL

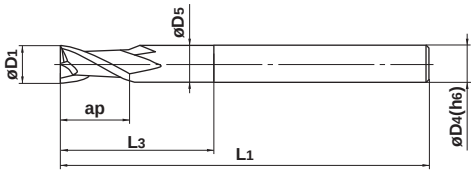
End mill, Medium cut length, 2 flute, Long neck, For copper electrodes

0 − -0.02 h6 4≤D4≤6 0 − -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○



Type1



Type2

UWC CRN 30° D1<3 D1≥3

- 2 flute long neck end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
CRN2XL D0100N120S04	1	1.5	12	0.94	50	4	2	●	1
D0100N120S06	1	1.5	12	0.94	50	6	2	●	1
D0100N160S04	1	1.5	16	0.94	55	4	2	●	1
D0100N160S06	1	1.5	16	0.94	55	6	2	●	1
D0150N060S04	1.5	2.3	6	1.44	50	4	2	●	1
D0150N060S06	1.5	2.3	6	1.44	50	6	2	●	1
D0150N080S04	1.5	2.3	8	1.44	50	4	2	●	1
D0150N080S06	1.5	2.3	8	1.44	50	6	2	●	1
D0150N100S04	1.5	2.3	10	1.44	50	4	2	●	1
D0150N100S06	1.5	2.3	10	1.44	50	6	2	●	1
D0150N120S04	1.5	2.3	12	1.44	50	4	2	●	1
D0150N120S06	1.5	2.3	12	1.44	50	6	2	●	1
D0150N160S04	1.5	2.3	16	1.44	55	4	2	●	1
D0150N160S06	1.5	2.3	16	1.44	55	6	2	●	1
D0150N200S04	1.5	2.3	20	1.44	60	4	2	●	1
D0150N200S06	1.5	2.3	20	1.44	60	6	2	●	1
D0200N060S06	2	3.0	6	1.90	50	6	2	●	1
D0200N080S06	2	3.0	8	1.90	50	6	2	●	1
D0200N100S06	2	3.0	10	1.90	50	6	2	●	1
D0200N120S06	2	3.0	12	1.90	50	6	2	●	1
D0200N160S06	2	3.0	16	1.90	55	6	2	●	1
D0200N200S06	2	3.0	20	1.90	60	6	2	●	1
D0250N080S06	2.5	3.8	8	2.40	50	6	2	●	1
D0250N120S06	2.5	3.8	12	2.40	55	6	2	●	1
D0250N160S06	2.5	3.8	16	2.40	60	6	2	●	1
D0250N200S06	2.5	3.8	20	2.40	65	6	2	●	1
D0300N200S06	3	4.5	20	2.90	65	6	2	●	1
D0400N200S06	4	6.0	20	3.90	65	6	2	●	1
D0500N250S06	5	7.5	25	4.90	70	6	2	●	1
D0600N300S06	6	9.0	30	5.85	70	6	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B352

CRN-4JC

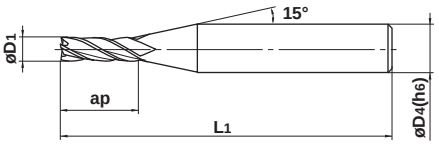
End mill, Semi long cut length, 4 flute, For copper electrodes

0 — -0.02

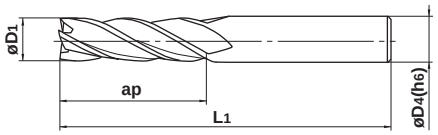
h6

D4 = 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○



Type1



Type2

UWC CRN 30°

- 4 flute end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
CRN4JCD0300	3	12	50	6	4	●	1
D0400	4	15	50	6	4	●	1
D0500	5	20	60	6	4	●	1
D0600	6	20	60	6	4	●	2
D0800	8	25	70	8	4	●	2
D1000	10	30	90	10	4	●	2
D1200	12	30	90	12	4	●	2

CUTTING CONDITIONS B351

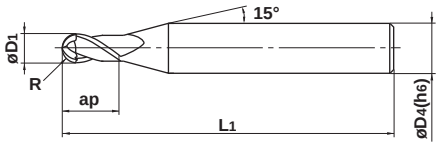
CRN-2MB

Ball nose, Medium cut length, 2 flute, For copper electrodes

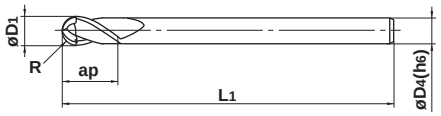
R ±0.01 | 0 −-0.02 | h6

D4 = 3	0 −-0.006
4 ≤ D4 ≤ 6	0 −-0.008
8 ≤ D4 ≤ 10	0 −-0.009
D4 = 12	0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○



Type1



Type2

- 2 flute ball nose end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
CRN2MBR0020S04	0.2	0.4	0.8	45	4	2	●	1
R0020S06	0.2	0.4	0.8	50	6	2	●	1
R0030S04	0.3	0.6	1.2	45	4	2	●	1
R0030S06	0.3	0.6	1.2	50	6	2	●	1
R0040S04	0.4	0.8	1.6	45	4	2	●	1
R0040S06	0.4	0.8	1.6	50	6	2	●	1
R0050S04	0.5	1	2.5	45	4	2	●	1
R0050S06	0.5	1	2.5	50	6	2	●	1
R0075S04	0.75	1.5	4	45	4	2	●	1
R0075S06	0.75	1.5	4	50	6	2	●	1
R0100S06	1	2	6	50	6	2	●	1
R0125S06	1.25	2.5	6	50	6	2	●	1
R0150S03	1.5	3	8	70	3	2	●	2
R0150S06	1.5	3	8	70	6	2	●	1
R0175S06	1.75	3.5	8	70	6	2	●	1
R0200S04	2	4	8	70	4	2	●	2
R0200S06	2	4	8	70	6	2	●	1
R0250S06	2.5	5	12	80	6	2	●	1
R0300S06	3	6	12	80	6	2	●	2
R0400S08	4	8	14	90	8	2	●	2
R0500S10	5	10	18	100	10	2	●	2
R0600S12	6	12	22	110	12	2	●	2

● : Inventory maintained in Japan.

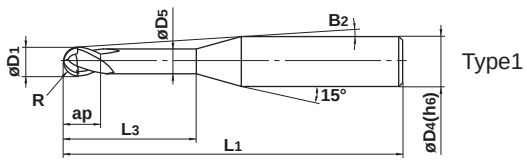
CUTTING CONDITIONS B353

CRN-2XLB

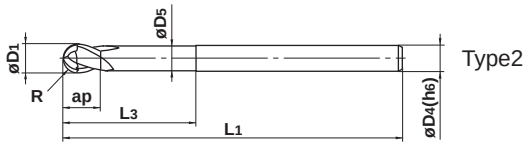
Ball nose, Medium cut length, 2 flute, Long neck, For copper electrodes

R ±0.01 | 0 — -0.02 | h6 4≤D4≤6 0 — -0.008

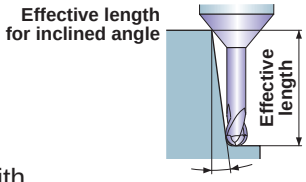
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○



Type1



Type2



UWC CRN 30°

- 2 flute long neck ball nose end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
CRN2XLBR0010N005S04	0.1	0.2	0.2	0.5	0.17	14.1°	50	4	2	●	1	0.5	0.5	0.6	0.6
R0010N005S06	0.1	0.2	0.2	0.5	0.17	14.4°	50	6	2	●	1	0.5	0.5	0.6	0.6
R0010N010S04	0.1	0.2	0.2	1	0.17	13.3°	50	4	2	●	1	1	1.1	1.2	1.3
R0010N010S06	0.1	0.2	0.2	1	0.17	13.8°	50	6	2	●	1	1	1.1	1.2	1.3
R0010N015S04	0.1	0.2	0.2	1.5	0.17	12.5°	50	4	2	●	1	1.5	1.6	1.7	1.9
R0010N015S06	0.1	0.2	0.2	1.5	0.17	13.3°	50	6	2	●	1	1.5	1.6	1.7	1.9
R0015N010S04	0.15	0.3	0.3	1	0.27	13.3°	50	4	2	●	1	1	1.1	1.2	1.3
R0015N010S06	0.15	0.3	0.3	1	0.27	13.9°	50	6	2	●	1	1	1.1	1.2	1.3
R0015N015S04	0.15	0.3	0.3	1.5	0.27	12.5°	50	4	2	●	1	1.5	1.6	1.7	1.9
R0015N015S06	0.15	0.3	0.3	1.5	0.27	13.3°	50	6	2	●	1	1.5	1.6	1.7	1.9
R0015N020S04	0.15	0.3	0.3	2	0.27	11.9°	50	4	2	●	1	2.1	2.2	2.3	2.5
R0015N020S06	0.15	0.3	0.3	2	0.27	12.8°	50	6	2	●	1	2.1	2.2	2.3	2.5
R0020N010S04	0.2	0.4	0.4	1	0.36	13.4°	50	4	2	●	1	1	1	1.1	1.2
R0020N010S06	0.2	0.4	0.4	1	0.36	13.9°	50	6	2	●	1	1	1	1.1	1.2
R0020N015S04	0.2	0.4	0.4	1.5	0.36	12.6°	50	4	2	●	1	1.5	1.6	1.7	1.8
R0020N015S06	0.2	0.4	0.4	1.5	0.36	13.4°	50	6	2	●	1	1.5	1.6	1.7	1.8
R0020N020S04	0.2	0.4	0.4	2	0.36	11.9°	50	4	2	●	1	2	2.1	2.3	2.5
R0020N020S06	0.2	0.4	0.4	2	0.36	12.8°	50	6	2	●	1	2	2.1	2.3	2.5
R0020N030S04	0.2	0.4	0.4	3	0.36	10.7°	50	4	2	●	1	3.1	3.2	3.4	3.7
R0020N030S06	0.2	0.4	0.4	3	0.36	11.9°	50	6	2	●	1	3.1	3.2	3.4	3.7
R0025N015S04	0.25	0.5	0.5	1.5	0.46	12.6°	50	4	2	●	1	1.5	1.6	1.7	1.8
R0025N015S06	0.25	0.5	0.5	1.5	0.46	13.4°	50	6	2	●	1	1.5	1.6	1.7	1.8
R0025N020S04	0.25	0.5	0.5	2	0.46	11.9°	50	4	2	●	1	2	2.1	2.3	2.4
R0025N020S06	0.25	0.5	0.5	2	0.46	12.9°	50	6	2	●	1	2	2.1	2.3	2.4
R0025N030S04	0.25	0.5	0.5	3	0.46	10.6°	50	4	2	●	1	3.1	3.2	3.4	3.7
R0025N030S06	0.25	0.5	0.5	3	0.46	11.9°	50	6	2	●	1	3.1	3.2	3.4	3.7
R0025N040S04	0.25	0.5	0.5	4	0.46	9.6°	50	4	2	●	1	4.1	4.3	4.6	4.9
R0025N040S06	0.25	0.5	0.5	4	0.46	11.1°	50	6	2	●	1	4.1	4.3	4.6	4.9
R0025N060S04	0.25	0.5	0.5	6	0.46	8.1°	50	4	2	●	1	6.2	6.4	6.9	7.4
R0025N060S06	0.25	0.5	0.5	6	0.46	9.7°	50	6	2	●	1	6.2	6.4	6.9	7.4
R0025N080S04	0.25	0.5	0.5	8	0.46	7°	50	4	2	●	1	8.3	8.5	9.2	9.9
R0025N080S06	0.25	0.5	0.5	8	0.46	8.7°	50	6	2	●	1	8.3	8.5	9.2	9.9
R0025N100S04	0.25	0.5	0.5	10	0.46	6.2°	50	4	2	●	1	10.3	10.7	11.5	12.4
R0025N100S06	0.25	0.5	0.5	10	0.46	7.8°	50	6	2	●	1	10.3	10.7	11.5	12.4
R0030N020S04	0.3	0.6	0.6	2	0.56	11.8°	50	4	2	●	1	2.1	2.2	2.3	2.5
R0030N020S06	0.3	0.6	0.6	2	0.56	12.8°	50	6	2	●	1	2.1	2.2	2.3	2.5
R0030N040S04	0.3	0.6	0.6	4	0.56	9.5°	50	4	2	●	1	4.2	4.3	4.6	5
R0030N040S06	0.3	0.6	0.6	4	0.56	11°	50	6	2	●	1	4.2	4.3	4.6	5

CUTTING CONDITIONS B354

CRN-2XLB

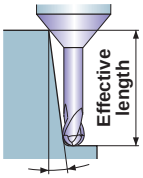
Ball nose, Medium cut length, 2 flute, Long neck, For copper electrodes

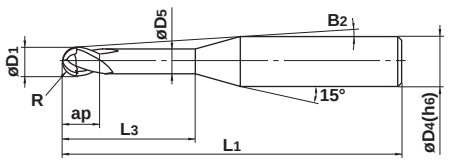
R ±0.01 | 0 — -0.02 | h6 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○

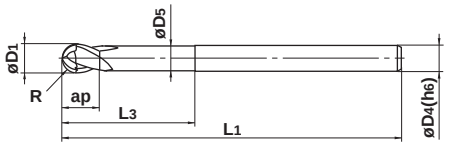
UWC CRN 30°

Effective length for inclined angle





Type1



Type2

2 flute long neck ball nose end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
CRN2XLBR0030N060S04	0.3	0.6	0.6	6	0.56	8°	50	4	2	●	1	6.3	6.5	6.9	7.5
R0030N060S06	0.3	0.6	0.6	6	0.56	9.7°	50	6	2	●	1	6.3	6.5	6.9	7.5
R0030N080S04	0.3	0.6	0.6	8	0.56	6.9°	50	4	2	●	1	8.3	8.6	9.2	10
R0030N080S06	0.3	0.6	0.6	8	0.56	8.6°	50	6	2	●	1	8.3	8.6	9.2	10
R0030N100S04	0.3	0.6	0.6	10	0.56	6°	50	4	2	●	1	10.4	10.8	11.5	12.5
R0030N100S06	0.3	0.6	0.6	10	0.56	7.8°	50	6	2	●	1	10.4	10.8	11.5	12.5
R0040N020S04	0.4	0.8	0.8	2	0.76	11.7°	50	4	2	●	1	2.1	2.2	2.3	2.5
R0040N020S06	0.4	0.8	0.8	2	0.76	12.8°	50	6	2	●	1	2.1	2.2	2.3	2.5
R0040N040S04	0.4	0.8	0.8	4	0.76	9.4°	50	4	2	●	1	4.2	4.3	4.6	5
R0040N040S06	0.4	0.8	0.8	4	0.76	11°	50	6	2	●	1	4.2	4.3	4.6	5
R0040N060S04	0.4	0.8	0.8	6	0.76	7.8°	50	4	2	●	1	6.3	6.5	6.9	7.5
R0040N060S06	0.4	0.8	0.8	6	0.76	9.6°	50	6	2	●	1	6.3	6.5	6.9	7.5
R0040N080S04	0.4	0.8	0.8	8	0.76	6.7°	50	4	2	●	1	8.3	8.6	9.2	10
R0040N080S06	0.4	0.8	0.8	8	0.76	8.5°	50	6	2	●	1	8.3	8.6	9.2	10
R0040N100S04	0.4	0.8	0.8	10	0.76	5.9°	50	4	2	●	1	10.4	10.8	11.5	12.4
R0040N100S06	0.4	0.8	0.8	10	0.76	7.7°	50	6	2	●	1	10.4	10.8	11.5	12.4
R0050N030S04	0.5	1	1	3	0.94	10.1°	50	4	2	●	1	3.2	3.3	3.6	3.9
R0050N030S06	0.5	1	1	3	0.94	11.6°	50	6	2	●	1	3.2	3.3	3.6	3.9
R0050N040S04	0.5	1	1	4	0.94	9.1°	50	4	2	●	1	4.2	4.4	4.8	5.2
R0050N040S06	0.5	1	1	4	0.94	10.8°	50	6	2	●	1	4.2	4.4	4.8	5.2
R0050N050S04	0.5	1	1	5	0.94	8.2°	50	4	2	●	1	5.3	5.5	6	6.4
R0050N050S06	0.5	1	1	5	0.94	10.1°	50	6	2	●	1	5.3	5.5	6	6.4
R0050N060S04	0.5	1	1	6	0.94	7.5°	50	4	2	●	1	6.3	6.6	7.1	7.7
R0050N060S06	0.5	1	1	6	0.94	9.4°	50	6	2	●	1	6.3	6.6	7.1	7.7
R0050N070S04	0.5	1	1	7	0.94	6.9°	50	4	2	●	1	7.4	7.7	8.3	8.9
R0050N070S06	0.5	1	1	7	0.94	8.8°	50	6	2	●	1	7.4	7.7	8.3	8.9
R0050N080S04	0.5	1	1	8	0.94	6.4°	50	4	2	●	1	8.4	8.8	9.4	10.2
R0050N080S06	0.5	1	1	8	0.94	8.3°	50	6	2	●	1	8.4	8.8	9.4	10.2
R0050N100S04	0.5	1	1	10	0.94	5.6°	50	4	2	●	1	10.5	10.9	11.7	12.6
R0050N100S06	0.5	1	1	10	0.94	7.5°	50	6	2	●	1	10.5	10.9	11.7	12.6
R0050N120S04	0.5	1	1	12	0.94	5°	50	4	2	●	1	12.6	13.1	14	15.1
R0050N120S06	0.5	1	1	12	0.94	6.8°	50	6	2	●	1	12.6	13.1	14	15.1
R0050N140S04	0.5	1	1	14	0.94	4.5°	50	4	2	●	1	14.7	15.2	16.3	17.6
R0050N140S06	0.5	1	1	14	0.94	6.2°	55	6	2	●	1	14.7	15.2	16.3	17.6
R0050N160S04	0.5	1	1	16	0.94	4.1°	55	4	2	●	1	16.8	17.4	18.6	20.1
R0050N160S06	0.5	1	1	16	0.94	5.7°	55	6	2	●	1	16.8	17.4	18.6	20.1
R0050N180S04	0.5	1	1	18	0.94	3.7°	55	4	2	●	1	18.9	19.5	20.9	22.6
R0050N180S06	0.5	1	1	18	0.94	5.3°	60	6	2	●	1	18.9	19.5	20.9	22.6

● : Inventory maintained in Japan.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D_1	Length of Cut ap	Neck Length L_3	Neck Dia. D_5	Cutting Edge to Shank Angle B_2	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
CRN2XLBR0050N200S04	0.5	1	1	20	0.94	3.4°	55	4	2	●	1	20.9	21.6	23.2	25.1
R0050N200S06	0.5	1	1	20	0.94	5°	60	6	2	●	1	20.9	21.6	23.2	25.1
R0075N080S04	0.75	1.5	1.5	8	1.44	5.9°	50	4	2	●	1	8.4	8.8	9.4	10.1
R0075N080S06	0.75	1.5	1.5	8	1.44	8.1°	50	6	2	●	1	8.4	8.8	9.4	10.1
R0075N100S04	0.75	1.5	1.5	10	1.44	5.1°	50	4	2	●	1	10.5	10.9	11.7	12.6
R0075N100S06	0.75	1.5	1.5	10	1.44	7.2°	50	6	2	●	1	10.5	10.9	11.7	12.6
R0075N120S04	0.75	1.5	1.5	12	1.44	4.4°	50	4	2	●	1	12.6	13.1	14	15.1
R0075N120S06	0.75	1.5	1.5	12	1.44	6.5°	50	6	2	●	1	12.6	13.1	14	15.1
R0075N140S04	0.75	1.5	1.5	14	1.44	4°	50	4	2	●	1	14.7	15.2	16.3	17.6
R0075N140S06	0.75	1.5	1.5	14	1.44	5.9°	55	6	2	●	1	14.7	15.2	16.3	17.6
R0075N160S04	0.75	1.5	1.5	16	1.44	3.6°	55	4	2	●	1	16.8	17.3	18.6	20
R0075N160S06	0.75	1.5	1.5	16	1.44	5.4°	55	6	2	●	1	16.8	17.3	18.6	20
R0075N180S04	0.75	1.5	1.5	18	1.44	3.3°	55	4	2	●	1	18.8	19.5	20.9	22.5
R0075N180S06	0.75	1.5	1.5	18	1.44	5°	60	6	2	●	1	18.8	19.5	20.9	22.5
R0075N200S04	0.75	1.5	1.5	20	1.44	3°	55	4	2	●	1	20.9	21.6	23.2	No interference
R0075N200S06	0.75	1.5	1.5	20	1.44	4.6°	60	6	2	●	1	20.9	21.6	23.2	25
R0100N080S04	1	2	2	8	1.90	5.3°	50	4	2	●	1	8.3	8.7	9.2	9.9
R0100N080S06	1	2	2	8	1.90	7.8°	50	6	2	●	1	8.3	8.7	9.2	9.9
R0100N100S04	1	2	2	10	1.90	4.5°	50	4	2	●	1	10.4	10.8	11.5	12.4
R0100N100S06	1	2	2	10	1.90	6.9°	50	6	2	●	1	10.4	10.8	11.5	12.4
R0100N120S04	1	2	2	12	1.90	3.9°	50	4	2	●	1	12.5	12.9	13.8	14.9
R0100N120S06	1	2	2	12	1.90	6.1°	50	6	2	●	1	12.5	12.9	13.8	14.9
R0100N140S04	1	2	2	14	1.90	3.4°	50	4	2	●	1	14.6	15.1	16.1	17.4
R0100N140S06	1	2	2	14	1.90	5.6°	55	6	2	●	1	14.6	15.1	16.1	17.4
R0100N160S04	1	2	2	16	1.90	3.1°	55	4	2	●	1	16.7	17.2	18.4	19.9
R0100N160S06	1	2	2	16	1.90	5.1°	55	6	2	●	1	16.7	17.2	18.4	19.9
R0100N200S04	1	2	2	20	1.90	2.5°	60	4	2	●	1	20.8	21.5	23	No interference
R0100N200S06	1	2	2	20	1.90	4.3°	60	6	2	●	1	20.8	21.5	23	24.8
R0100N250S06	1	2	2	25	1.90	3.7°	65	6	2	●	1	26	26.8	28.8	31
R0100N300S06	1	2	2	30	1.90	3.2°	70	6	2	●	1	31.1	32.2	34.5	37.3
R0150N160S06	1.5	3	3	16	2.90	4.3°	60	6	2	●	1	16.6	17.2	18.4	19.7
R0150N250S06	1.5	3	3	25	2.90	3°	70	6	2	●	1	26	26.8	28.7	No interference
R0150N350S06	1.5	3	3	35	2.90	2.2°	80	6	2	●	1	36.3	37.5	40.2	No interference
R0200N160S06	2	4	4	16	3.90	3.2°	70	6	2	●	1	16.6	17.1	18.3	19.6
R0200N200S06	2	4	4	20	3.90	2.7°	70	6	2	●	1	20.8	21.4	22.9	No interference
R0200N300S06	2	4	4	30	3.90	1.8°	70	6	2	●	1	31.1	32.1	No interference	No interference
R0200N400S06	2	4	4	40	3.90	1.4°	90	6	2	●	1	41.4	42.8	No interference	No interference
R0200N500S06	2	4	4	50	3.90	1.2°	100	6	2	●	1	51.8	53.5	No interference	No interference
R0250N200S06	2.5	5	5	20	4.90	1.5°	70	6	2	●	1	20.7	21.4	No interference	No interference
R0250N300S06	2.5	5	5	30	4.90	1°	80	6	2	●	1	31.1	No interference	No interference	No interference
R0300N300S06	3	6	6	30	5.85	—	80	6	2	●	1	No interference	No interference	No interference	No interference
R0300N500S06	3	6	6	50	5.85	—	100	6	2	●	1	No interference	No interference	No interference	No interference

CUTTING CONDITIONS B354

CRN-2MRB

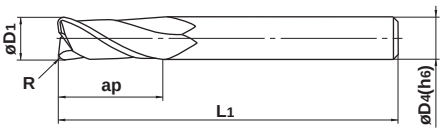
Corner radius, Medium cut length, 2 flute, For copper electrodes

0 — -0.02

h6

D4 = 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
D4 = 12 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○



Type1

UWC CRN 30°

● 2 flute corner radius end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
CRN2MRBD0600R020	6	0.2	13	50	6	2	●	1
D0600R030	6	0.3	13	50	6	2	●	1
D0600R050	6	0.5	13	50	6	2	●	1
D0600R100	6	1	13	50	6	2	●	1
D0800R030	8	0.3	19	60	8	2	●	1
D0800R050	8	0.5	19	60	8	2	●	1
D0800R100	8	1	19	60	8	2	●	1
D1000R030	10	0.3	22	70	10	2	●	1
D1000R050	10	0.5	22	70	10	2	●	1
D1000R100	10	1	22	70	10	2	●	1
D1200R030	12	0.3	26	75	12	2	●	1
D1200R050	12	0.5	26	75	12	2	●	1
D1200R100	12	1	26	75	12	2	●	1

● : Inventory maintained in Japan.

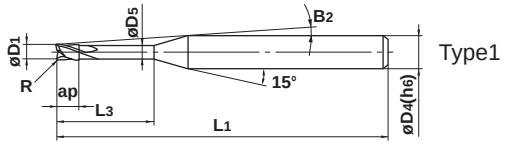
CUTTING CONDITIONS B355

CRN-2XLRB

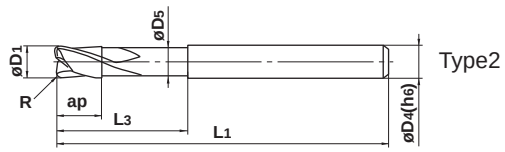
Corner radius, Medium cut length, 2 flute, For copper electrodes

0 — -0.02 h6 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○

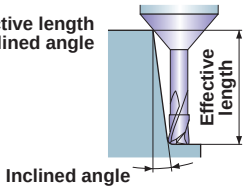


Type1



Type2

UWC CRN 30°



● 2 flute long neck corner radius end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
CRN2XLRB D0050R005N04	0.5	0.05	0.5	4	0.46	9.5°	50	4	2	●	1	4.1	4.3	4.6	5
D0050R010N04	0.5	0.1	0.5	4	0.46	9.5°	50	4	2	●	1	4.1	4.3	4.6	5
D0050R005N06	0.5	0.05	0.5	6	0.46	8°	50	4	2	●	1	6.2	6.4	6.9	7.5
D0050R010N06	0.5	0.1	0.5	6	0.46	8°	50	4	2	●	1	6.2	6.4	6.9	7.5
D0080R005N06	0.8	0.05	0.8	6	0.76	7.6°	50	4	2	●	1	6.3	6.5	7	7.6
D0080R010N06	0.8	0.1	0.8	6	0.76	7.6°	50	4	2	●	1	6.3	6.5	7	7.5
D0080R005N08	0.8	0.05	0.8	8	0.76	6.5°	50	4	2	●	1	8.3	8.6	9.3	10
D0080R010N08	0.8	0.1	0.8	8	0.76	6.6°	50	4	2	●	1	8.3	8.6	9.3	10
D0100R010N08	1	0.1	1	8	0.94	6.3°	50	4	2	●	1	8.5	8.8	9.5	10.2
D0100R030N08	1	0.3	1	8	0.94	6.3°	50	4	2	●	1	8.5	8.8	9.5	10.2
D0100R010N10	1	0.1	1	10	0.94	5.5°	55	4	2	●	1	10.6	11	11.8	12.7
D0100R030N10	1	0.3	1	10	0.94	5.5°	55	4	2	●	1	10.5	10.9	11.8	12.7
D0100R010N12	1	0.1	1	12	0.94	4.9°	55	4	2	●	1	12.6	13.1	14.1	15.2
D0100R030N12	1	0.3	1	12	0.94	4.9°	55	4	2	●	1	12.6	13.1	14.1	15.2
D0150R010N12	1.5	0.1	1.5	12	1.44	4.3°	55	4	2	●	1	12.6	13.1	14.1	15.2
D0150R020N12	1.5	0.2	1.5	12	1.44	4.3°	55	4	2	●	1	12.6	13.1	14.1	15.2
D0150R030N12	1.5	0.3	1.5	12	1.44	4.3°	55	4	2	●	1	12.6	13.1	14.1	15.2
D0150R010N20	1.5	0.1	1.5	20	1.44	2.9°	60	4	2	●	1	20.9	21.7	23.3	No interference
D0150R020N20	1.5	0.2	1.5	20	1.44	2.9°	60	4	2	●	1	20.9	21.7	23.3	No interference
D0150R030N20	1.5	0.3	1.5	20	1.44	3°	60	4	2	●	1	20.9	21.6	23.3	No interference
D0200R010N12	2	0.1	2	12	1.9	3.7°	55	4	2	●	1	12.5	13	14	15.1
D0200R020N12	2	0.2	2	12	1.9	3.7°	55	4	2	●	1	12.5	13	14	15.1
D0200R030N12	2	0.3	2	12	1.9	3.7°	55	4	2	●	1	12.5	13	13.9	15
D0200R050N12	2	0.5	2	12	1.9	3.8°	55	4	2	●	1	12.5	13	13.9	15
D0200R010N16	2	0.1	2	16	1.9	2.9°	55	4	2	●	1	16.7	17.3	18.6	No interference
D0200R020N16	2	0.2	2	16	1.9	2.9°	55	4	2	●	1	16.7	17.3	18.6	No interference
D0200R030N16	2	0.3	2	16	1.9	3°	55	4	2	●	1	16.7	17.3	18.5	No interference
D0200R050N16	2	0.5	2	16	1.9	3°	55	4	2	●	1	16.7	17.2	18.5	No interference
D0200R010N20	2	0.1	2	20	1.9	2.5°	60	4	2	●	1	20.8	21.6	23.2	No interference
D0200R020N20	2	0.2	2	20	1.9	2.5°	60	4	2	●	1	20.8	21.5	23.2	No interference
D0200R030N20	2	0.3	2	20	1.9	2.5°	60	4	2	●	1	20.8	21.5	23.1	No interference
D0200R050N20	2	0.5	2	20	1.9	2.5°	60	4	2	●	1	20.8	21.5	23.1	No interference
D0300R020N20	3	0.2	3	20	2.9	3.4°	65	6	2	●	1	20.8	21.5	23.2	25
D0300R030N20	3	0.3	3	20	2.9	3.4°	65	6	2	●	1	20.8	21.5	23.1	25
D0300R050N20	3	0.5	3	20	2.9	3.4°	65	6	2	●	1	20.8	21.5	23.1	24.9
D0400R020N20	4	0.2	4	20	3.9	2.5°	65	6	2	●	1	20.8	21.5	23.2	No interference
D0400R030N20	4	0.3	4	20	3.9	2.5°	65	6	2	●	1	20.8	21.5	23.1	No interference
D0400R050N20	4	0.5	4	20	3.9	2.5°	65	6	2	●	1	20.8	21.5	23.1	No interference

CUTTING CONDITIONS B356

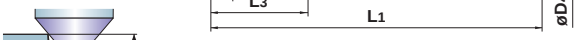
CRN-2XLRB

Corner radius, Medium cut length, 2 flute, For copper electrodes

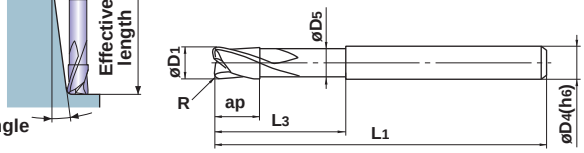
0 — -0.02 h6 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						◎	○

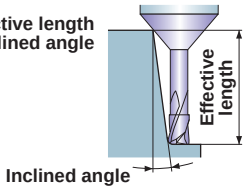
UWC CRN 30°



Type1



Type2



- 2 flute long neck corner radius end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
CRN2XLRB D0500R020N25	5	0.2	5	25	4.9	1.1°	65	6	2	●	1	26	26.9	No interference	No interference
D0500R030N25	5	0.3	5	25	4.9	1.1°	65	6	2	●	1	26	26.9	No interference	No interference
D0500R050N25	5	0.5	5	25	4.9	1.1°	65	6	2	●	1	26	26.9	No interference	No interference
D0600R020N30	6	0.2	6	30	5.85	—	70	6	2	●	2	No interference	No interference	No interference	No interference
D0600R030N30	6	0.3	6	30	5.85	—	70	6	2	●	2	No interference	No interference	No interference	No interference
D0600R050N30	6	0.5	6	30	5.85	—	70	6	2	●	2	No interference	No interference	No interference	No interference
D0600R100N30	6	1	6	30	5.85	—	70	6	2	●	2	No interference	No interference	No interference	No interference

● : Inventory maintained in Japan.

CUTTING CONDITIONS B356

Memo

DLC-2MA

Slot drill, Medium cut length, 2 flute

$D_1 \leq 12$	$0 -0.020$
$D_1 > 12$	$0 -0.030$

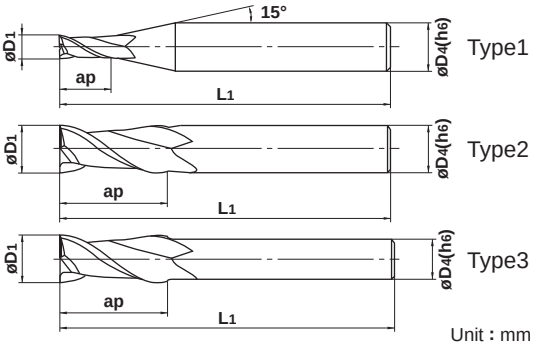
h6

$4 \leq D_4 \leq 6$	$0 -0.008$
$8 \leq D_4 \leq 16$	$0 -0.009$
$12 \leq D_4 \leq 16$	$0 -0.011$
$D_4 = 20$	$0 -0.013$

Copper Alloy	Aluminium Alloy	Graphite	GFRP CFRP	Machineable Ceramics
○	◎	○	○	

UWC DLC 30° 37.5°

$D_1<3$ $D_1\geq3$ $D_1<3$ $D_1\geq3$



- 2 flute end mill with new high welding resistance DLC coating, ideal for machining non-ferrous materials.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
DLC2MAD0100	1	2.5	40	4	2	●	1
D0150	1.5	4	40	4	2	●	1
D0200	2	6	40	4	2	●	1
D0250	2.5	8	40	4	2	●	1
D0300	3	8	45	6	2	●	1
D0350	3.5	10	45	6	2	●	1
D0400	4	11	45	6	2	●	1
D0450	4.5	11	45	6	2	●	1
D0500	5	13	50	6	2	●	1
D0600	6	13	50	6	2	●	2
D0800	8	19	60	8	2	●	2
D1000	10	22	70	10	2	●	2
D1200	12	26	75	12	2	●	2
D1400	14	26	75	12	2	●	3
D1500	15	30	80	16	2	●	1
D1600	16	32	90	16	2	●	2
D1800	18	32	90	16	2	●	3
D2000	20	38	100	20	2	●	2

● : **Inventory maintained in Japan.**

CUTTING CONDITIONS B357

DLC-2MB

Ball nose, Medium cut length, 2 flute

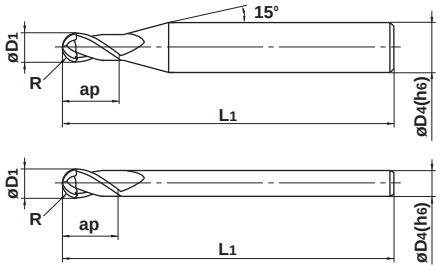
R ≤ 6 ±0.01
R > 6 ±0.02

D1 ≤ 12 0 — -0.020
D1 > 12 0 — -0.030

h6

4 ≤ D4 ≤ 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
12 ≤ D4 ≤ 16 0 — -0.011
D4 = 20 0 — -0.013

Copper Alloy	Aluminium Alloy	Graphite	GFRP CFRP	Machineable Ceramics
○	◎	○	○	



UWC DLC 30°

● 2 flute ball nose end mill with new high welding resistance DLC coating, ideal for machining non-ferrous materials.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
DLC2MBR0010	0.1	0.2	0.4	40	4	2	●	1
R0015	0.15	0.3	0.6	40	4	2	●	1
R0020	0.2	0.4	0.8	40	4	2	●	1
R0025	0.25	0.5	1	40	4	2	●	1
R0030	0.3	0.6	1.2	40	4	2	●	1
R0040	0.4	0.8	1.6	40	4	2	●	1
R0050	0.5	1	2.5	40	4	2	●	1
R0075	0.75	1.5	4	40	4	2	●	1
R0100	1	2	6	60	6	2	●	1
R0125	1.25	2.5	6	60	6	2	●	1
R0150	1.5	3	8	70	6	2	●	1
R0200	2	4	8	70	6	2	●	1
R0250	2.5	5	12	80	6	2	●	1
R0300	3	6	12	80	6	2	●	2
R0400	4	8	14	90	8	2	●	2
R0500	5	10	18	100	10	2	●	2
R0600	6	12	22	110	12	2	●	2
R0800	8	16	30	140	16	2	●	2
R1000	10	20	38	160	20	2	●	2

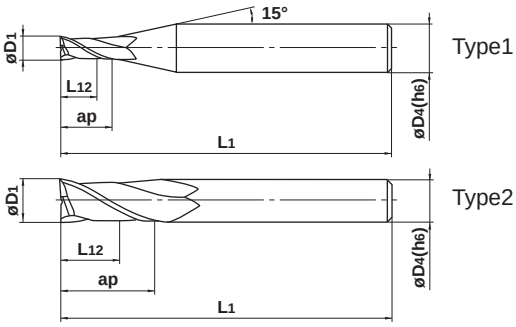
CUTTING CONDITIONS B358

DC-2MS-3

Medium cut length, 2 flute, 3mm shank, For non-ferrous metals

-0.005 ─ -0.028 h6 D4 = 3 0 ─ -0.006

Aluminium Alloy	Graphite	GFRP CFRP	Machineable Ceramics
○	◎	◎	◎



- 2 flute end mill for machining high silicone aluminium alloy, graphite and other non-ferrous materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Effective Coating Length L12	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
DC2MS3D0050	0.5	1	1	38	3	2	●	1
D0100	1	2.5	1.5	38	3	2	●	1
D0150	1.5	4	2.5	38	3	2	●	1
D0200	2	6	3	45	3	2	●	1
D0250	2.5	8	4	45	3	2	●	1
D0300	3	8	4.5	45	3	2	●	2

● : Inventory maintained in Japan.

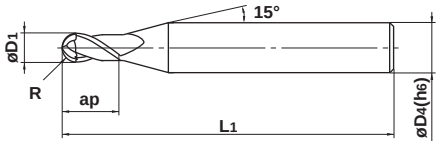
CUTTING CONDITIONS B359

DC-2MB-NF

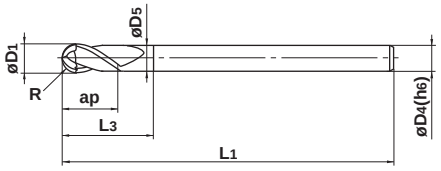
Ball nose, Medium cut length, 2 flute, For non-ferrous metals

$D_1 < 6$	0 — -0.028	$D_4 = 3$	0 — -0.006
$D_1 \geq 6$	0 — -0.038	$4 \leq D_4 \leq 6$	0 — -0.008
		$8 \leq D_4 \leq 10$	0 — -0.009
		$D_4 = 12$	0 — -0.011

Copper Alloy	Aluminium Alloy	Graphite	GFRP CFRP	Machineable Ceramics
◎	○	◎	◎	◎



Type1



Type2

- 2 flute end mill for long life precision machining of non-ferrous metals.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D_1	Length of Cut ap	Neck Length L_3	Neck Dia. D_5	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
DC2MBNFR0030	0.3	0.6	1.2	—	—	38	3	2	●	1
R0050	0.5	1	2.5	—	—	40	4	2	●	1
R0100	1	2	6	—	—	60	6	2	●	1
R0150	1.5	3	8	—	—	70	6	2	●	1
R0200	2	4	8	—	—	70	6	2	●	1
R0250	2.5	5	12	—	—	80	6	2	●	1
R0300	3	6	12	22	5.80	80	6	2	●	2
R0400	4	8	14	27	7.80	90	8	2	●	2
R0500	5	10	18	31	9.80	100	10	2	●	2
R0600	6	12	22	35	11.80	110	12	2	●	2

(Effective Coating Length : 1-1.5D_1)

CUTTING CONDITIONS B360

DC-2MB

Ball nose, Medium cut length, 2 flute, For graphite

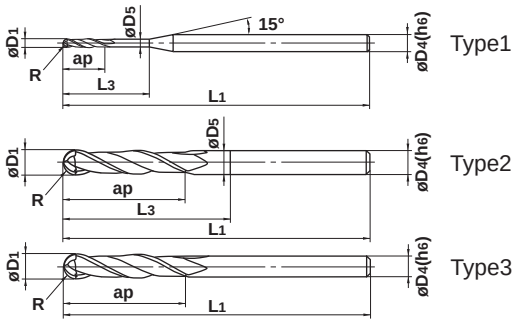
D1<6 0 −-0.028
D1≥6 0 −-0.038

h6
4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
D4=12 0 −-0.011

Aluminium Alloy	Graphite	GFRP CFRP	Machineable Ceramics
○	◎	◎	○

UWC DC 30°

● 2 flute end mill with original diamond coating technology with excellent coating adhesion strength to prevent flaking and chipping during graphite machining.



Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
DC2MBR0050	0.5	1.0	3	10	0.96	60	4	2	●	1
R0100	1	2.0	10	20	1.96	80	4	2	●	1
R0150	1.5	3.0	15	25	2.96	80	4	2	●	1
R0200	2	4.0	20	30	3.96	80	4	2	●	2
R0250	2.5	5.0	30	50	4.96	100	6	2	●	1
R0300	3	6.0	30	50	5.85	100	6	2	●	2
R0350	3.5	7.0	30	—	—	100	6	2	●	3
R0400	4	8.0	40	60	7.85	110	8	2	●	2
R0450	4.5	9.0	40	—	—	110	8	2	●	3
R0500	5	10.0	50	70	9.85	120	10	2	●	2
R0600	6	12.0	55	75	11.85	130	12	2	●	2

(Effective Coating Length : 1-1.5D1)

● : Inventory maintained in Japan.

CUTTING CONDITIONS B359

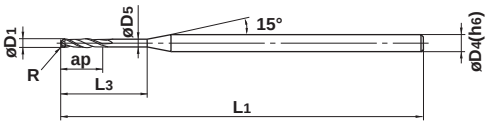
DC-2LB

Ball nose, Long cut length, 2 flute, For graphite

D_1	Tolerance
$D_1 < 6$	0 −-0.028
$D_1 \geq 6$	0 −-0.038

D_4	Tolerance
$4 \leq D_4 \leq 6$	0 −-0.008
$8 \leq D_4 \leq 10$	0 −-0.009
$D_4 = 12$	0 −-0.011

Aluminium Alloy	Graphite	GFRP CFRP	Machineable Ceramics
○	◎	◎	○



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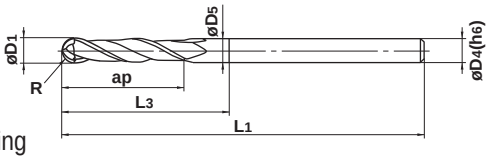


Type2

UWC DC 30°

- 2 flute end mill with original diamond coating technology with excellent coating adhesion strength to prevent flaking and chipping during graphite machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D_1	Length of Cut ap	Neck Length L_3	Neck Dia. D_5	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
DC2LBR0100	1	2.0	10	20	1.96	100	4	2	●	1
R0150	1.5	3.0	15	25	2.96	100	4	2	●	1
R0200	2	4.0	20	30	3.96	100	4	2	●	2
R0300	3	6.0	30	50	5.85	150	6	2	●	2
R0400	4	8.0	40	60	7.85	150	8	2	●	2
R0500	5	10.0	50	70	9.85	180	10	2	●	2
R0600	6	12.0	55	75	11.85	200	12	2	●	2

(Effective Coating Length : 1-1.5D_1)

CUTTING CONDITIONS B359

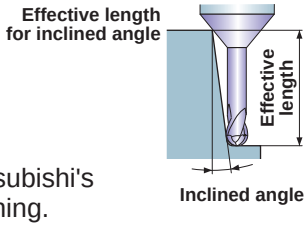
DC-2XLB

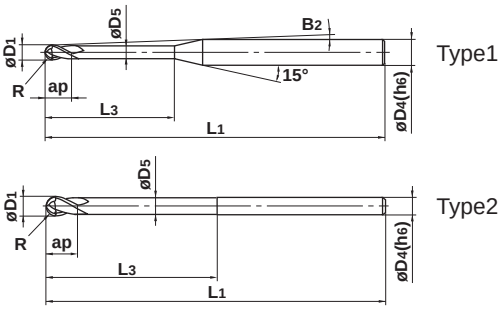
Ball nose, Medium cut length, 2 flute, Long neck, For graphite

D1 < 6 0 −-0.028
D1 = 6 0 −-0.038
h6 D4 = 6 0 −-0.008

Aluminium Alloy	Graphite	GFRP CFRP	Machineable Ceramics
○	◎	◎	○

UWC DC 30°





- 2 flute long neck ball nose end mill with Mitsubishi's unique diamond coating for graphite machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
DC2XLBR0020N040	0.2	0.4	0.6	4	0.36	11.1°	50	6	2	●	1	4.1	4.3	4.6	4.9
R0020N060	0.2	0.4	0.6	6	0.36	9.8°	50	6	2	●	1	6.2	6.4	6.9	7.4
R0025N050	0.25	0.5	0.8	5	0.46	10.4°	50	6	2	●	1	5.2	5.3	5.7	6.2
R0025N075	0.25	0.5	0.8	7.5	0.46	8.9°	50	6	2	●	1	7.8	8	8.6	9.3
R0030N060	0.3	0.6	1	6	0.56	9.7°	50	6	2	●	1	6.3	6.5	6.9	7.5
R0030N090	0.3	0.6	1	9	0.56	8.2°	50	6	2	●	1	9.4	9.7	10.4	11.2
R0040N080	0.4	0.8	1.2	8	0.76	8.5°	50	6	2	●	1	8.3	8.6	9.2	10
R0040N120	0.4	0.8	1.2	12	0.76	7°	50	6	2	●	1	12.5	12.9	13.8	14.9
R0050N120	0.5	1	1.5	12	0.94	6.8°	60	6	2	●	1	12.6	13.1	14	15.1
R0050N160	0.5	1	1.5	16	0.94	5.7°	60	6	2	●	1	16.8	17.4	18.6	20.1
R0060N120	0.6	1.2	1.8	12	1.14	6.7°	60	6	2	●	1	12.6	13.1	14	15.1
R0060N180	0.6	1.2	1.8	18	1.14	5.2°	60	6	2	●	1	18.8	19.5	20.9	22.6
R0075N150	0.75	1.5	2.3	15	1.44	5.6°	60	6	2	●	1	15.7	16.3	17.4	18.8
R0075N230	0.75	1.5	2.3	23	1.44	4.2°	60	6	2	●	1	24	24.8	26.6	28.7
R0100N160	1	2	3	16	1.90	5.1°	70	6	2	●	1	16.7	17.2	18.4	19.9
R0100N200	1	2	3	20	1.90	4.3°	70	6	2	●	1	20.8	21.5	23	24.8
R0100N250	1	2	3	25	1.90	3.7°	70	6	2	●	1	26	26.8	28.8	31
R0100N300	1	2	3	30	1.90	3.2°	70	6	2	●	1	31.1	32.2	34.5	37.3
R0150N300	1.5	3	4.5	30	2.90	2.6°	80	6	2	●	1	31.1	32.2	34.5	No interference
R0150N400	1.5	3	4.5	40	2.90	2°	80	6	2	●	1	41.5	42.9	No interference	No interference
R0200N300	2	4	6	30	3.90	1.8°	100	6	2	●	1	31.1	32.1	No interference	No interference
R0200N500	2	4	6	50	3.90	1.2°	100	6	2	●	1	51.8	53.5	No interference	No interference
R0250N400	2.5	5	7.5	40	4.90	0.8°	100	6	2	●	1	41.4	No interference	No interference	No interference
R0250N600	2.5	5	7.5	60	4.90	0.5°	100	6	2	●	1	No interference	No interference	No interference	No interference
R0300N600	3	6	9	60	5.85	—	120	6	2	●	2	No interference	No interference	No interference	No interference
R0300N900	3	6	9	90	5.85	—	120	6	2	●	2	No interference	No interference	No interference	No interference

● : Inventory maintained in Japan.

CUTTING CONDITIONS B361

DC-XB

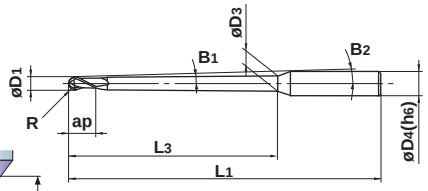
Ball nose, Medium cut length, 2 flute, Taper neck, For graphite

D1 < 6 0 −-0.028
D1 = 6 0 −-0.038

h6

D4 = 6 0 −-0.008
8 ≤ D4 ≤ 10 0 −-0.009

Aluminium Alloy	Graphite	GFRP CFRP	Machineable Ceramics
○	◎	◎	○



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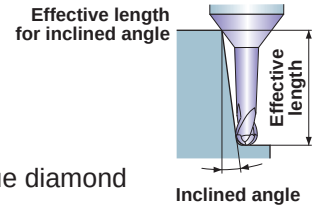


UWC DC 30°

- Ball nose taper end mill with Mitsubishi's unique diamond coating for graphite machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Taper Angle One Side B1	Length of Cut ap	Neck Length L3	Cutting Edge to Shank Angle B2	Neck Dia. D3	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 1°	2°	3°
DCXBR0020T0100L008	0.2	0.4	1°	0.8	8	8.9°	0.6	50	6	2	●	1	8.1	8.7	9.4
R0025T0100L010	0.25	0.5	1°	1	10	8°	0.74	50	6	2	●	1	10.2	10.9	11.8
R0030T0100L012	0.3	0.6	1°	1.2	12	7.3°	0.91	50	6	2	●	1	12.2	13.1	14.1
R0040T0100L016	0.4	0.8	1°	1.6	16	6.1°	1.23	50	6	2	●	1	16.2	17.4	18.8
R0050T0100L020	0.5	1	1°	2	20	5.2°	1.52	60	6	2	●	1	20.3	21.8	23.5
R0060T0100L024	0.6	1.2	1°	2.4	24	4.5°	1.85	60	6	2	●	1	24.3	26.1	28.2
R0075T0100L030	0.75	1.5	1°	3	30	3.6°	2.34	60	6	2	●	1	30.3	32.6	35.1
R0100T0100L040	1	2	1°	4	40	2.6°	3.09	80	6	2	●	1	40.5	43.5	No interference
R0150T0100L060	1.5	3	1°	6	60	1.4°	4.44	100	6	2	●	1	61.2	No interference	No interference
R0200T0100L080	2	4	1°	8	80	1.5°	6.07	130	8	2	●	1	81.3	No interference	No interference
R0250T0100L100	2.5	5	1°	10	100	1.5°	7.7	150	10	2	●	1	101.4	No interference	No interference
R0300T0100L120	3	6	1°	12	120	1°	9.28	180	10	2	●	1	121.6	No interference	No interference

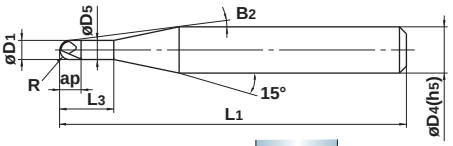
CUTTING CONDITIONS B361

CBN-2XLB

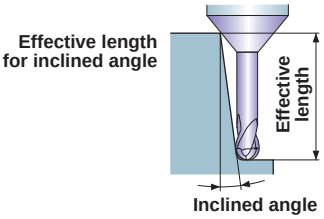
Ball nose, Short cut length, 2 flute, Long neck

R ±0.005 | 0 −-0.010 | h5 4≤D4≤6 0 −-0.005

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1



● Solid CBN ball nose. A wide variation of neck lengths available.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle 30'	1°	2°	3°
CBN2XLBR0020N010S04	0.2	0.4	0.3	1	0.36	13.4°	51	4	2	●	1	1	1	1.1	1.2
R0020N010S06	0.2	0.4	0.3	1	0.36	13.9°	51	6	2	●	1	1	1	1.1	1.2
R0020N016S04	0.2	0.4	0.3	1.6	0.36	12.4°	51	4	2	●	1	1.6	1.7	1.8	2
R0020N016S06	0.2	0.4	0.3	1.6	0.36	13.3°	51	6	2	●	1	1.6	1.7	1.8	2
NEW R0030N009S06	0.3	0.6	0.4	0.9	0.56	14.1°	62	6	2	○	1	0.9	0.9	1	1.1
R0030N015S04	0.3	0.6	0.5	1.5	0.56	12.6°	51	4	2	●	1	1.5	1.6	1.7	1.8
R0030N015S06	0.3	0.6	0.5	1.5	0.56	13.4°	51	6	2	●	1	1.5	1.6	1.7	1.8
R0030N024S04	0.3	0.6	0.5	2.4	0.56	11.3°	51	4	2	●	1	2.5	2.6	2.7	2.9
R0030N024S06	0.3	0.6	0.5	2.4	0.56	12.5°	51	6	2	●	1	2.5	2.6	2.7	2.9
NEW ＊ R0040N010S06	0.4	0.8	0.5	1	0.76	14.1°	62	6	2	●	1	1	1	1.1	1.2
R0040N020S04	0.4	0.8	0.6	2	0.76	11.8°	51	4	2	●	1	2	2.1	2.3	2.4
R0040N020S06	0.4	0.8	0.6	2	0.76	12.9°	51	6	2	●	1	2	2.1	2.3	2.4
R0040N032S04	0.4	0.8	0.6	3.2	0.76	10.3°	51	4	2	●	1	3.3	3.4	3.6	3.9
R0040N032S06	0.4	0.8	0.6	3.2	0.76	11.7°	51	6	2	●	1	3.3	3.4	3.6	3.9
NEW ＊ R0050N011S06	0.5	1	0.6	1.1	0.94	14.1°	62	6	2	●	1	1.1	1.1	1.2	1.2
R0050N025S04	0.5	1	0.8	2.5	0.94	11°	51	4	2	●	1	2.6	2.7	2.8	3
R0050N025S06	0.5	1	0.8	2.5	0.94	12.3°	51	6	2	●	1	2.6	2.7	2.8	3
R0050N040S04	0.5	1	0.8	4	0.94	9.3°	51	4	2	●	1	4.1	4.3	4.6	4.9
R0050N040S06	0.5	1	0.8	4	0.94	11°	51	6	2	●	1	4.1	4.3	4.6	4.9
R0075N038S04	0.75	1.5	1.1	3.8	1.44	9.1°	52	4	2	●	1	3.9	4.1	4.3	4.6
R0075N038S06	0.75	1.5	1.1	3.8	1.44	11°	52	6	2	●	1	3.9	4.1	4.3	4.6
R0075N060S04	0.75	1.5	1.1	6	1.44	7.1°	52	4	2	●	1	6.2	6.4	6.8	7.3
R0075N060S06	0.75	1.5	1.1	6	1.44	9.3°	52	6	2	●	1	6.2	6.4	6.8	7.3
NEW R0100N017S06	1	2	1.2	1.7	1.9	13.6°	62	6	2	○	1	1.7	1.7	1.8	1.9
R0100N050S04	1	2	1.5	5	1.9	7.3°	52	4	2	●	1	5.1	5.3	5.6	6
R0100N050S06	1	2	1.5	5	1.9	9.8°	52	6	2	●	1	5.1	5.3	5.6	6
R0100N080S04	1	2	1.5	8	1.9	5.3°	52	4	2	●	1	8.2	8.5	9	9.7
R0100N080S06	1	2	1.5	8	1.9	7.9°	52	6	2	●	1	8.2	8.5	9	9.7

＊ Designed with short cutting edge and neck lengths for high rigidity.

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)

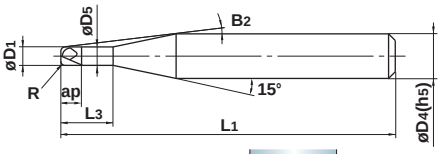
CUTTING CONDITIONS B362

CBN-2XLRB NEW

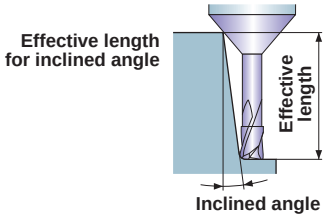
Corner radius end mill, Medium cut length, 2 flute, Long neck

R ±0.005 | 0 −-0.010 | h5 D4 = 4 0 −-0.005

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	◎	◎				



Type1



- CBN long neck radius end mill. A wide variation of neck lengths available.

Unit : mm

Order Number	Corner R	Dia.	Length of Cut	Neck Length	Neck Dia.	Cutting Edge to Shank Angle	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	ap	L3	D5	B2	L1	D4	N			30'	1°	2°	3°
CBN2XLRBD0050R005N02	0.05	0.5	0.3	2	0.46	11.6°	51	4	2	●	1	2.1	2.1	2.3	2.5
D0050R005N03	0.05	0.5	0.3	3	0.46	10.4°	51	4	2	●	1	3.1	3.2	3.5	3.7
D0050R010N02	0.1	0.5	0.3	2	0.46	11.7°	51	4	2	●	1	2.1	2.1	2.3	2.5
D0050R010N03	0.1	0.5	0.3	3	0.46	10.5°	51	4	2	●	1	3.1	3.2	3.4	3.7
D0100R005N03	0.05	1	0.6	3	0.94	9.7°	51	4	2	●	1	3.2	3.4	3.7	4
D0100R005N05	0.05	1	0.6	5	0.94	7.9°	51	4	2	●	1	5.3	5.6	6	6.5
D0100R010N03	0.1	1	0.6	3	0.94	9.7°	51	4	2	●	1	3.2	3.4	3.6	4
D0100R010N05	0.1	1	0.6	5	0.94	8°	51	4	2	●	1	5.3	5.6	6	6.5
D0100R020N03	0.2	1	0.6	3	0.94	9.8°	51	4	2	●	1	3.2	3.4	3.5	4
D0100R020N05	0.2	1	0.6	5	0.94	8°	51	4	2	●	1	5.3	5.6	6	6.5
D0100R030N03	0.3	1	0.6	3	0.94	9.9°	51	4	2	●	1	3.2	3.4	3.4	4
D0100R030N05	0.3	1	0.6	5	0.94	8.1°	51	4	2	●	1	5.3	5.6	6	6.5
D0150R010N05	0.1	1.5	0.9	5	1.44	7.3°	52	4	2	●	1	5.3	5.6	6	6.5
D0150R010N08	0.1	1.5	0.9	8	1.44	5.6°	52	4	2	●	1	8.5	8.8	9.5	10.2
D0150R020N05	0.2	1.5	0.9	5	1.44	7.3°	52	4	2	●	1	5.3	5.6	6	6.5
D0150R020N08	0.2	1.5	0.9	8	1.44	5.6°	52	4	2	●	1	8.5	8.8	9.5	10.2
D0150R030N05	0.3	1.5	0.9	5	1.44	7.4°	52	4	2	●	1	5.3	5.6	6	6.5
D0150R030N08	0.3	1.5	0.9	8	1.44	5.7°	52	4	2	●	1	8.5	8.8	9.5	10.2
D0200R010N06	0.1	2	1.2	6	1.9	5.9°	52	4	2	●	1	6.3	6.6	7.1	7.6
D0200R010N10	0.1	2	1.2	10	1.9	4.2°	52	4	2	●	1	10.5	10.9	11.7	12.6
D0200R020N06	0.2	2	1.2	6	1.9	5.9°	52	4	2	●	1	6.3	6.6	7.1	7.6
D0200R020N10	0.2	2	1.2	10	1.9	4.2°	52	4	2	●	1	10.5	10.9	11.7	12.6
D0200R030N06	0.3	2	1.2	6	1.9	6°	52	4	2	●	1	6.3	6.6	7	7.6
D0200R030N10	0.3	2	1.2	10	1.9	4.2°	52	4	2	●	1	10.5	10.8	11.6	12.6
D0200R050N06	0.5	2	1.2	6	1.9	6.1°	52	4	2	●	1	6.3	6.5	7	7.5
D0200R050N10	0.5	2	1.2	10	1.9	4.3°	52	4	2	●	1	10.5	10.8	11.6	12.5

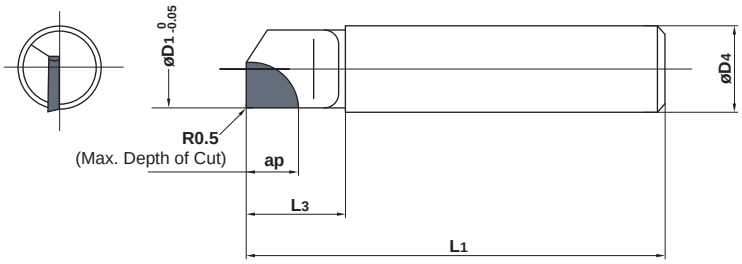
CUTTING CONDITIONS B362

END MILL

Polycrystalline cutting tools

GBE,GDE

- Suitable for shoulder milling and die machining.
- Suitable for re-grinding.
- Carbide shank.



Light Alloy	Cast Iron	Carbon Steel • Alloy Steel	Stainless Steel	Hardened Steel
▬				▬

Right hand tool holder only.

Order Number	Number of Flutes	Stock		Dimensions (mm)				
		MB730	MD220	D1	L1	D4	L3	ap
GBE06S0640	1	●		6	40	6	8	3.5
08S0845	1	●		8	45	8	13	6.0
10S1050	1	●		10	50	10	13	6.0
12S1255	1	●		12	55	12	13	6.0
GDE06S0650	1		●	6	50	6	8	3.5
08S0855	1		●	8	55	8	10	6.0
10S1065	1		●	10	65	10	10	6.0
12S1265	1		●	12	65	12	10	6.0

RECOMMENDED CUTTING CONDITIONS FOR GBE TYPE

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed (mm/rev)	Depth of Cut (mm)
H	Hardened Steel	45 – 68HRC	**MB730**	140 (80 – 200)	0.08 (0.02 – 0.15)	≤0.5
	Hardened Steel	45 – 68HRC	**MB730**	100 (60 – 150)	0.06 (0.02 – 0.10)	≤0.5

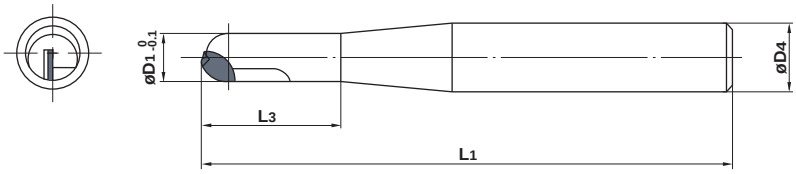
RECOMMENDED CUTTING CONDITIONS FOR GDE TYPE

	Work Material	Grade	Cutting Speed (m/min)	Feed (mm/rev)
N	Aluminium Alloy	**MD220**	200 (100 – 300)	0.075 (0.05 – 0.10)

● : **Inventory maintained in Japan.**

BALL NOSE END MILL
Sintered CBN

SMALL TYPE



SHORT TYPE
Carbide Shank

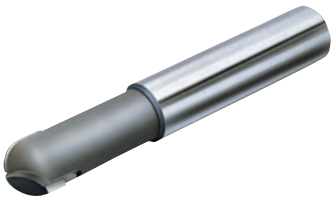
Order Number	CBN		Dimensions (mm)			
	MB730	MB825	D1	L1	L3	D4
BEM0600S	●		6	112	15	16
1000S	●		10	120	20	16
1600S	●		16	125	35	16

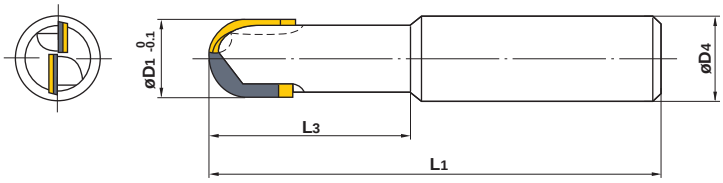
LONG TYPE (SPECIAL)
Carbide Shank

Order Number ✱	Dimensions (mm)			
	D1	L1	L3	D4
BEM0600L	6	162	15	16
1000L	10	170	20	16
1600L	16	175	35	16

✱ Non stock, produced to order only. Grade is MB730 or MB825.

LARGE TYPE





SHORT TYPE

Order Number	CBN	Dimensions (mm)			
	MB730	D1	L1	L3	D4
BEM2000S	●	20	150	40	25
2500S	●	25	180	60	32
3000S	●	30	200	81	32

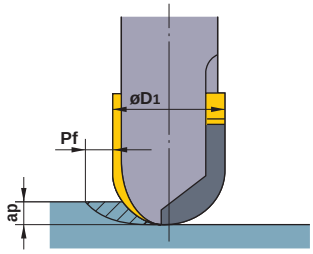
LONG TYPE (SPECIAL)

Order Number ✱	Dimensions (mm)			
	D1	L1	L3	D4
BEM2000L	20	250	40	25
2500L	25	300	60	32
3000L	30	350	81	32

✱ Non stock, produced to order only. Grade is MB730.

RECOMMENDED CUTTING CONDITIONS

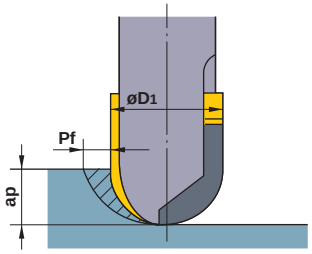
Cutting Mode : Ⓐ



●Pick Feed (Pf : mm)

Cutting Mode	Ⓐ	Ⓑ
D.O.C (ap : mm)	0.5—1.5	0.8D1—1D1
Pick Feed (Pf : mm)	0.5—1.5	0.3—0.8

Cutting Mode : Ⓑ



Tool Number	Work Material / Grade / Cutting Mode / Cutting Conditions	H Hardened Steel (45—60HRC) MB825 Ⓐ	H Hardened Steel (45—60HRC) MB825 Ⓑ	K Cast Iron (FC, FCD) MB730 Ⓐ	K Cast Iron (FC, FCD) MB730 Ⓑ
BEM0600S/L 1000S/L 1600S/L	Spindle Speed (min-1)	4000 (2000 — 6000)	1500 (1000 — 2000)	4000 (2000 — 6000)	3000 (2000 — 4000)
	Table Feed (mm/min)	1200 (500 — 2000)	700 (500 — 1000)	2500 (1000 — 4000)	1500 (1000 — 2000)
BEM2000S/L 2500S/L 3000S/L	Spindle Speed (min-1)	—	—	6000 (4000 — 8000)	6000 (4000 — 8000)
	Table Feed (mm/min)	—	—	6000 (4000 — 8000)	4500 (3000 — 6000)

SED2KPG

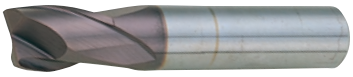
End mill, Medium cut length, 2 flute, + Tolerance

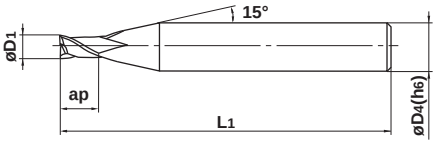
0 − +0.02

h6

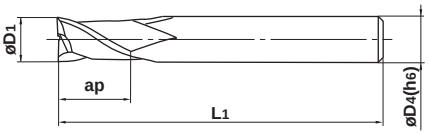
4≤D4≤6 0 − -0.008
8≤D4≤10 0 − -0.009
12≤D4≤16 0 − -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎			○	○		





Type1



Type2

UWC MS 30° D1≤10 D1>10 D1<3 3≤D1≤10 D1≥11

● 2 flute end mill for key way slotting with plus tolerance cutting diameter.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SED2020KPG	2	3	45	4	2	●	1
2030KPG	3	5	45	6	2	●	1
2040KPG	4	6	45	6	2	●	1
2050KPG	5	8	50	6	2	●	1
2060KPG	6	9	50	6	2	●	2
2070KPG	7	10	60	8	2	●	1
2080KPG	8	12	60	8	2	●	2
2100KPG	10	15	65	10	2	●	2
2120KPG	12	15	65	12	2	●	2
2140KPG	14	15	70	16	2	●	1
2150KPG	15	15	70	16	2	●	1
2160KPG	16	15	70	16	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B363

SED2KMG

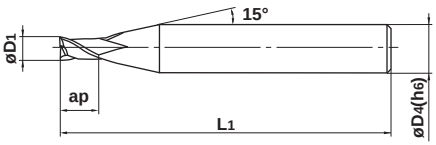
End mill, Medium cut length, 2 flute, - Tolerance

0 — -0.02

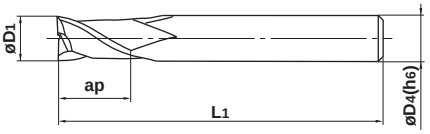
h6

4≤D4≤6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	◎			○	○		



Type1



Type2

UWC MS 30°

- 2 flute end mill for key way slotting with minus tolerance cutting diameter.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SED2020KMG	2	3	45	4	2	●	1
2030KMG	3	5	45	6	2	●	1
2040KMG	4	6	45	6	2	●	1
2050KMG	5	8	50	6	2	●	1
2060KMG	6	9	50	6	2	●	2
2070KMG	7	10	60	8	2	●	1
2080KMG	8	12	60	8	2	●	2
2100KMG	10	15	65	10	2	●	2
2120KMG	12	15	65	12	2	●	2
2140KMG	14	15	70	16	2	●	1
2150KMG	15	15	70	16	2	●	1
2160KMG	16	15	70	16	2	●	2

CUTTING CONDITIONS B363

BZD2SG

Ball nose end mill, Medium cut length, 2 flute

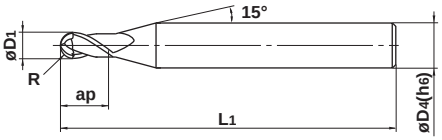
R ≤ 6.5 ±0.01
R > 6.5 ±0.02

D1 ≤ 12 0 − -0.020
D1 > 12 0 − -0.030

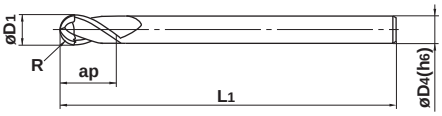
h6

D4 = 3 0 − -0.006
4 ≤ D4 ≤ 6 0 − -0.008
8 ≤ D4 ≤ 10 0 − -0.009
12 ≤ D4 ≤ 16 0 − -0.011
20 ≤ D4 ≤ 25 0 − -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎	○		○	○		



Type1



Type2

UWC MS 30°

● 2 flute ball nose end mill with (Al,Ti)N coating for general use.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
BZD2004SG	0.2	0.4	0.8	40	3	2	●	1
2005SG	0.25	0.5	1	40	3	2	●	1
2006SG	0.3	0.6	1.2	40	3	2	●	1
2008SG	0.4	0.8	1.6	40	3	2	●	1
2010SG	0.5	1	2.5	45	4	2	●	1
2015SG	0.75	1.5	4	45	4	2	●	1
2020SG	1	2	6	60	6	2	●	1
2025SG	1.25	2.5	6	60	6	2	●	1
2030SG	1.5	3	8	60	6	2	●	1
2040SG	2	4	8	60	6	2	●	1
2050SG	2.5	5	12	60	6	2	●	1
2060SG	3	6	12	80	6	2	●	2
2070SG	3.5	7	14	90	8	2	●	1
2080SG	4	8	14	90	8	2	●	2
2090SG	4.5	9	18	100	10	2	●	1
2100SG	5	10	18	100	10	2	●	2
2110SG	5.5	11	22	110	12	2	●	1
2120SG	6	12	22	110	12	2	●	2
2130SG	6.5	13	26	160	16	2	●	1
2140SG	7	14	26	160	16	2	●	1
2150SG	7.5	15	30	160	16	2	●	1
2160SG	8	16	30	160	16	2	●	2
2180SG	9	18	34	170	20	2	●	1
2200SG	10	20	38	170	20	2	●	2
2250SG	12.5	25	55	180	25	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B364

SEE2SG

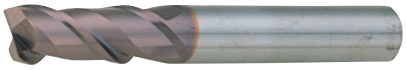
End mill, Short cut length, 2 flute, High helix

D1≤12 0 −-0.020
D1>12 0 −-0.030

h6

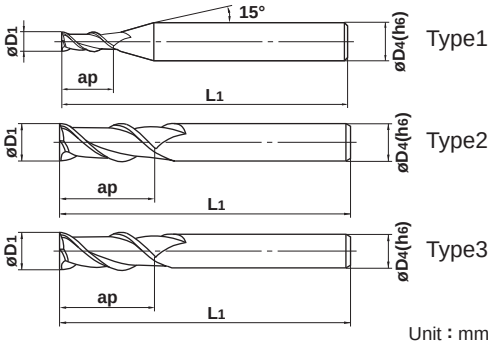
D4 = 6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
20≤D4≤25 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



UWC MS 45°

● 2 flute end mill with high helix for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SEE2030SG	3	8	45	6	2	●	1
2031SG	3.1	8	45	6	2	●	1
2032SG	3.2	8	45	6	2	●	1
2033SG	3.3	8	45	6	2	●	1
2034SG	3.4	8	45	6	2	●	1
2035SG	3.5	8	45	6	2	●	1
2036SG	3.6	11	45	6	2	●	1
2037SG	3.7	11	45	6	2	●	1
2038SG	3.8	11	45	6	2	●	1
2039SG	3.9	11	45	6	2	●	1
2040SG	4	11	45	6	2	●	1
2041SG	4.1	12	45	6	2	●	1
2042SG	4.2	12	45	6	2	●	1
2043SG	4.3	12	45	6	2	●	1
2044SG	4.4	12	45	6	2	●	1
2045SG	4.5	12	45	6	2	●	1
2046SG	4.6	13	50	6	2	●	1
2047SG	4.7	13	50	6	2	●	1
2048SG	4.8	13	50	6	2	●	1
2049SG	4.9	13	50	6	2	●	1
2050SG	5	13	50	6	2	●	1
2051SG	5.1	13	50	6	2	●	1
2052SG	5.2	13	50	6	2	●	1
2053SG	5.3	13	50	6	2	●	1
2054SG	5.4	13	50	6	2	●	1
2055SG	5.5	13	50	6	2	●	1
2056SG	5.6	13	50	6	2	●	1
2057SG	5.7	13	50	6	2	●	1
2058SG	5.8	13	50	6	2	●	1
2059SG	5.9	13	50	6	2	●	1
2060SG	6	13	50	6	2	●	2
2065SG	6.5	13	50	6	2	●	3
2070SG	7	19	60	8	2	●	1
2075SG	7.5	19	60	8	2	●	1
2080SG	8	19	60	8	2	●	2
2085SG	8.5	19	60	8	2	●	3
2090SG	9	22	70	10	2	●	1
2095SG	9.5	22	70	10	2	●	1

CUTTING CONDITIONS B363

SEE2SG

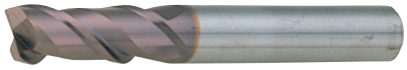
End mill, Short cut length, 2 flute, High helix

D1 ≤ 12 0 — -0.020
D1 > 12 0 — -0.030

h6

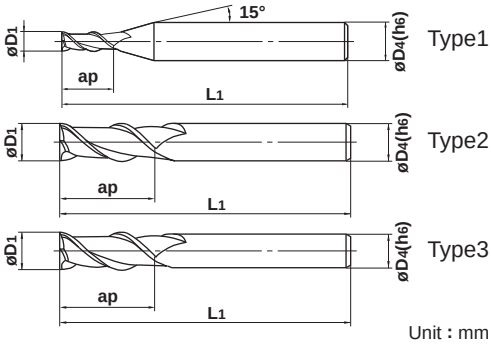
D4 = 6 0 — -0.008
8 ≤ D4 ≤ 10 0 — -0.009
12 ≤ D4 ≤ 16 0 — -0.011
20 ≤ D4 ≤ 25 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



UWC MS 45°

● 2 flute end mill with high helix for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SEE2100SG	10	22	70	10	2	●	2
2110SG	11	26	75	12	2	●	1
2120SG	12	26	75	12	2	●	2
2130SG	13	26	75	12	2	●	3
2140SG	14	30	90	16	2	●	1
2150SG	15	35	90	16	2	●	1
2160SG	16	35	90	16	2	●	2
2170SG	17	35	105	20	2	●	1
2180SG	18	40	105	20	2	●	1
2190SG	19	40	110	20	2	●	1
2200SG	20	45	110	20	2	●	2
2250SG	25	55	125	25	2	●	2

● : Inventory maintained in Japan.

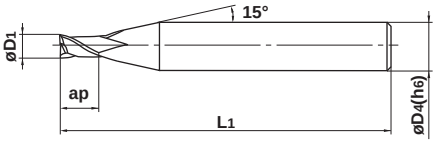
CUTTING CONDITIONS B363

C-2SS

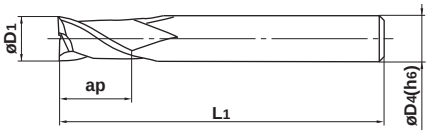
End mill, Short cut length, 2 flute

0 — -0.020 h6 4≤D4≤6 0 — -0.008

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○	○	○	○



Type1



Type2

UWC 30° D1<3 D1≥3

● 2 flute end mill with short rigid geometry.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2SSD0040	0.4	0.8	40	4	2	●	1
D0050	0.5	0.8	40	4	2	●	1
D0060	0.6	1	40	4	2	●	1
D0070	0.7	1	40	4	2	●	1
D0080	0.8	1.3	40	4	2	●	1
D0090	0.9	1.3	40	4	2	●	1
D0100	1	1.5	40	4	2	●	1
D0110	1.1	1.5	40	4	2	●	1
D0120	1.2	2	40	4	2	●	1
D0130	1.3	2	40	4	2	●	1
D0140	1.4	2	40	4	2	●	1
D0150	1.5	2.5	40	4	2	●	1
D0160	1.6	2.5	40	4	2	●	1
D0170	1.7	2.5	40	4	2	●	1
D0180	1.8	3	40	4	2	●	1
D0190	1.9	3	40	4	2	●	1
D0200	2	3	40	4	2	●	1
D0210	2.1	3	40	4	2	●	1
D0220	2.2	3.5	40	4	2	●	1
D0230	2.3	3.5	40	4	2	●	1
D0240	2.4	3.5	40	4	2	●	1
D0250	2.5	4	40	4	2	●	1
D0260	2.6	4	40	4	2	●	1
D0270	2.7	4	40	4	2	●	1
D0280	2.8	4	40	4	2	●	1
D0290	2.9	4.5	40	4	2	●	1
D0300	3	4.5	45	6	2	●	1
D0350	3.5	5.5	45	6	2	●	1
D0400	4	6	45	6	2	●	1
D0450	4.5	7	45	6	2	●	1
D0500	5	7.5	50	6	2	●	1
D0550	5.5	8.5	50	6	2	●	1
D0600	6	9	50	6	2	●	2

CUTTING CONDITIONS B365

C-2MS

End mill, Medium cut length, 2 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

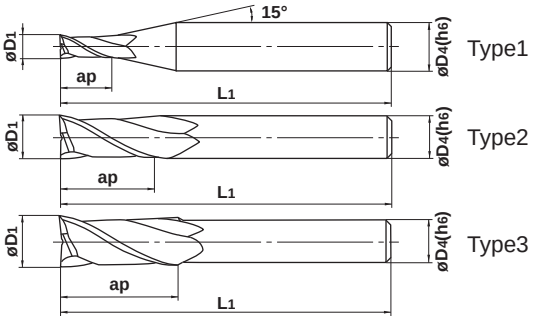
h6

4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○	○	○	○

UWC 30° D1<3 D1≥3

● 2 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2MSD0100	1	2.5	40	4	2	●	1
D0110	1.1	2.5	40	4	2	●	1
D0120	1.2	3	40	4	2	●	1
D0130	1.3	3	40	4	2	●	1
D0140	1.4	3	40	4	2	●	1
D0150	1.5	4	40	4	2	●	1
D0160	1.6	4	40	4	2	●	1
D0170	1.7	4	40	4	2	●	1
D0180	1.8	5	40	4	2	●	1
D0190	1.9	5	40	4	2	●	1
D0200	2	6	40	4	2	●	1
D0210	2.1	6	40	4	2	●	1
D0220	2.2	6	40	4	2	●	1
D0230	2.3	6	40	4	2	●	1
D0240	2.4	8	40	4	2	●	1
D0250	2.5	8	40	4	2	●	1
D0260	2.6	8	40	4	2	●	1
D0270	2.7	8	40	4	2	●	1
D0280	2.8	8	40	4	2	●	1
D0290	2.9	8	40	4	2	●	1
D0300	3	8	45	6	2	●	1
D0310	3.1	8	45	6	2	●	1
D0320	3.2	8	45	6	2	●	1
D0330	3.3	8	45	6	2	●	1
D0340	3.4	10	45	6	2	●	1
D0350	3.5	10	45	6	2	●	1
D0360	3.6	10	45	6	2	●	1
D0370	3.7	10	45	6	2	●	1
D0380	3.8	11	45	6	2	●	1
D0390	3.9	11	45	6	2	●	1
D0400	4	11	45	6	2	●	1
D0410	4.1	11	45	6	2	●	1
D0420	4.2	11	45	6	2	●	1
D0430	4.3	11	45	6	2	●	1
D0440	4.4	11	45	6	2	●	1
D0450	4.5	11	45	6	2	●	1
D0460	4.6	11	45	6	2	●	1
D0470	4.7	11	45	6	2	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2MSD0480	4.8	13	50	6	2	●	1
D0490	4.9	13	50	6	2	●	1
D0500	5	13	50	6	2	●	1
D0510	5.1	13	50	6	2	●	1
D0520	5.2	13	50	6	2	●	1
D0530	5.3	13	50	6	2	●	1
D0540	5.4	13	50	6	2	●	1
D0550	5.5	13	50	6	2	●	1
D0560	5.6	13	50	6	2	●	1
D0570	5.7	13	50	6	2	●	1
D0580	5.8	13	50	6	2	●	1
D0590	5.9	13	50	6	2	●	1
D0600	6	13	50	6	2	●	2
D0610	6.1	16	60	8	2	●	1
D0620	6.2	16	60	8	2	●	1
D0630	6.3	16	60	8	2	●	1
D0640	6.4	16	60	8	2	●	1
D0650	6.5	16	60	8	2	●	1
D0660	6.6	16	60	8	2	●	1
D0670	6.7	16	60	8	2	●	1
D0680	6.8	16	60	8	2	●	1
D0690	6.9	16	60	8	2	●	1
D0700	7	16	60	8	2	●	1
D0710	7.1	16	60	8	2	●	1
D0720	7.2	16	60	8	2	●	1
D0730	7.3	16	60	8	2	●	1
D0740	7.4	16	60	8	2	●	1
D0750	7.5	16	60	8	2	●	1
D0760	7.6	19	60	8	2	●	1
D0770	7.7	19	60	8	2	●	1
D0780	7.8	19	60	8	2	●	1
D0790	7.9	19	60	8	2	●	1
D0800	8	19	60	8	2	●	2
D0810	8.1	19	70	10	2	●	1
D0820	8.2	19	70	10	2	●	1
D0830	8.3	19	70	10	2	●	1
D0840	8.4	19	70	10	2	●	1
D0850	8.5	19	70	10	2	●	1
D0860	8.6	19	70	10	2	●	1
D0870	8.7	19	70	10	2	●	1
D0880	8.8	19	70	10	2	●	1
D0890	8.9	19	70	10	2	●	1
D0900	9	19	70	10	2	●	1
D0910	9.1	19	70	10	2	●	1
D0920	9.2	19	70	10	2	●	1
D0930	9.3	19	70	10	2	●	1
D0940	9.4	19	70	10	2	●	1
D0950	9.5	19	70	10	2	●	1
D0960	9.6	22	70	10	2	●	1
D0970	9.7	22	70	10	2	●	1

CUTTING CONDITIONS B365

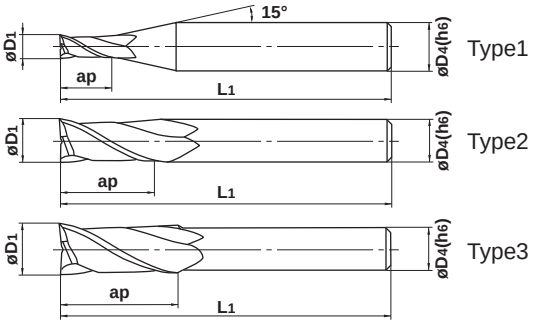
C-2MS

End mill, Medium cut length, 2 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

h6
4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○	○	○	○



● 2 flute end mill for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2MSD0980	9.8	22	70	10	2	●	1
D0990	9.9	22	70	10	2	●	1
D1000	10	22	70	10	2	●	2
D1100	11	22	75	12	2	●	1
D1200	12	26	75	12	2	●	2
D1300	13	26	75	12	2	●	3
D1400	14	26	75	12	2	●	3
D1500	15	30	80	16	2	●	1
D1600	16	32	90	16	2	●	2
D1700	17	32	90	16	2	●	3
D1800	18	32	90	16	2	●	3
D1900	19	32	100	20	2	●	1
D2000	20	38	100	20	2	●	2

● : **Inventory maintained in Japan.**

CUTTING CONDITIONS B365

C-2JS

End mill, Semi long cut length, 2 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

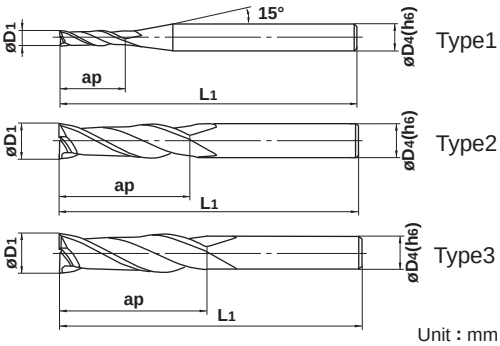
h6

4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
20≤D4≤25 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○	○	○	○

UWC 30° D1<3 D1≥3 D1<3 D1≥3

● 2 flute uncoated end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2JSD0100	1	3.5	40	4	2	●	1
D0150	1.5	5	40	4	2	●	1
D0200	2	8	40	4	2	●	1
D0250	2.5	10	40	4	2	●	1
D0300	3	12	50	6	2	●	1
D0350	3.5	15	50	6	2	●	1
D0400	4	15	50	6	2	●	1
D0450	4.5	15	50	6	2	●	1
D0500	5	20	60	6	2	●	1
D0550	5.5	20	60	6	2	●	1
D0600	6	20	60	6	2	●	2
D0650	6.5	25	70	8	2	●	1
D0700	7	25	70	8	2	●	1
D0750	7.5	25	70	8	2	●	1
D0800	8	25	70	8	2	●	2
D0850	8.5	25	90	10	2	●	1
D0900	9	25	90	10	2	●	1
D0950	9.5	25	90	10	2	●	1
D1000	10	30	90	10	2	●	2
D1050	10.5	30	90	12	2	●	1
D1100	11	30	90	12	2	●	1
D1150	11.5	30	90	12	2	●	1
D1200	12	30	90	12	2	●	2
D1300	13	35	90	12	2	●	3
D1400	14	40	110	16	2	●	1
D1500	15	40	110	16	2	●	1
D1600	16	50	110	16	2	●	2
D1700	17	50	110	20	2	●	1
D1800	18	50	110	20	2	●	1
D1900	19	55	110	20	2	●	1
D2000	20	55	110	20	2	●	2
D2200	22	65	140	25	2	●	1
D2400	24	75	140	25	2	●	1
D2500	25	75	140	25	2	●	2

CUTTING CONDITIONS B365

C-2LS

End mill, Long cut length, 2 flute

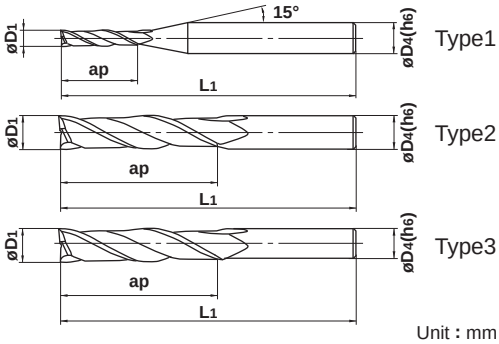
D1≤12 0 −-0.020
D1>12 0 −-0.030

h6
4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○	○	○	○

UWC 30°

● 2 flute end mill with longer cut length than standard.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2LSD0100	1	4	40	4	2	●	1
D0150	1.5	6	40	4	2	●	1
D0200	2	9	40	4	2	●	1
D0250	2.5	12	40	4	2	●	1
D0300	3	20	60	6	2	●	1
D0350	3.5	22	60	6	2	●	1
D0400	4	25	60	6	2	●	1
D0450	4.5	25	60	6	2	●	1
D0500	5	30	70	6	2	●	1
D0550	5.5	30	70	6	2	●	1
D0600	6	30	70	6	2	●	2
D0650	6.5	30	90	8	2	●	1
D0700	7	40	90	8	2	●	1
D0750	7.5	40	90	8	2	●	1
D0800	8	40	90	8	2	●	2
D0850	8.5	40	100	10	2	●	1
D0900	9	40	100	10	2	●	1
D0950	9.5	40	100	10	2	●	1
D1000	10	50	100	10	2	●	2
D1050	10.5	50	110	12	2	●	1
D1100	11	50	110	12	2	●	1
D1150	11.5	50	110	12	2	●	1
D1200	12	50	110	12	2	●	2
D1250	12.5	50	120	12	2	●	3
D1300	13	50	120	12	2	●	3
D1400	14	70	130	16	2	●	1
D1500	15	70	130	16	2	●	1
D1600	16	70	130	16	2	●	2
D1700	17	70	140	20	2	●	1
D1800	18	70	140	20	2	●	1
D1900	19	70	140	20	2	●	1
D2000	20	70	140	20	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B365

C-2MA

End mill, Medium cut length, 2 flute, For aluminium alloy

D1≤12 0 −-0.020
D1>12 0 −-0.030

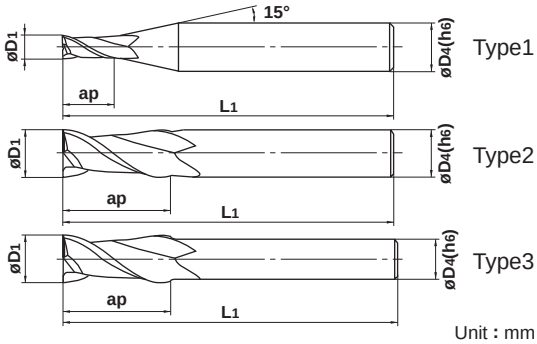
h6

4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
							◎

UWC 30° 37.5°

D1<3 D1≥3 D1<3 D1≥3



2 flute uncoated end mill designed especially for aluminium alloys.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2MAD0100	1	2.5	40	4	2	●	1
D0150	1.5	4	40	4	2	●	1
D0200	2	6	40	4	2	●	1
D0250	2.5	8	40	4	2	●	1
D0300	3	8	45	6	2	●	1
D0400	4	11	45	6	2	●	1
D0500	5	13	50	6	2	●	1
D0600	6	13	50	6	2	●	2
D0800	8	19	60	8	2	●	2
D1000	10	22	70	10	2	●	2
D1200	12	26	75	12	2	●	2
D1400	14	26	75	12	2	●	3
D1500	15	30	80	16	2	●	1
D1600	16	32	90	16	2	●	2
D1800	18	32	90	16	2	●	3
D2000	20	38	100	20	2	●	2

CUTTING CONDITIONS B366

C-2LA

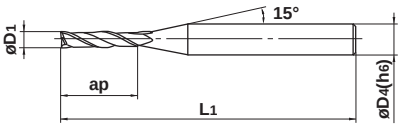
End mill, Long cut length, 2 flute, For aluminium alloy

D1≤12 0 −-0.020
D1>12 0 −-0.030

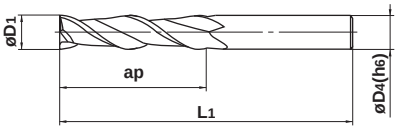
h6

4≤D4≤6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
							◎



Type1



Type2

UWC 30° 37.5°

D1<3 D1≥3 D1<3 D1≥3

● 2 flute uncoated end mill designed especially for aluminium alloys.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2LAD0100	1	4	40	4	2	●	1
D0150	1.5	6	40	4	2	●	1
D0200	2	9	40	4	2	●	1
D0250	2.5	12	40	4	2	●	1
D0300	3	20	60	6	2	●	1
D0400	4	25	60	6	2	●	1
D0500	5	30	70	6	2	●	1
D0600	6	30	70	6	2	●	2
D0800	8	40	90	8	2	●	2
D1000	10	50	100	10	2	●	2
D1200	12	50	110	12	2	●	2
D1400	14	70	130	16	2	●	1
D1500	15	70	130	16	2	●	1
D1600	16	70	130	16	2	●	2
D1800	18	70	140	20	2	●	1
D2000	20	70	140	20	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B366

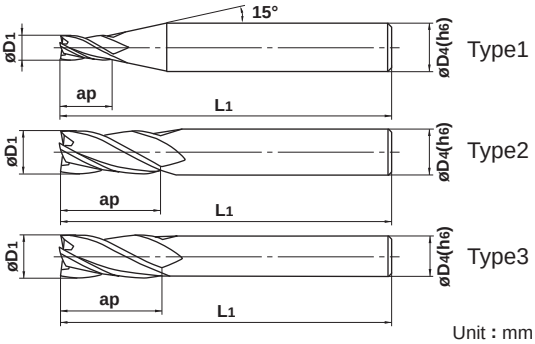
C-4MC

End mill, Medium cut length, 4 flute, Center cutting

D1≤12	0 — -0.020	D4 = 6	0 — -0.008
D1>12	0 — -0.030	8≤D4≤10	0 — -0.009
		12≤D4≤16	0 — -0.011
		D4 = 20	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○	○	○	○

● 4 flute uncoated center cutting end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C4MCD0300	3	8	45	6	4	●	1
D0350	3.5	10	45	6	4	●	1
D0400	4	11	45	6	4	●	1
D0450	4.5	11	45	6	4	●	1
D0500	5	13	50	6	4	●	1
D0550	5.5	13	50	6	4	●	1
D0600	6	13	50	6	4	●	2
D0650	6.5	16	60	8	4	●	1
D0700	7	16	60	8	4	●	1
D0750	7.5	16	60	8	4	●	1
D0800	8	19	60	8	4	●	2
D0850	8.5	19	70	10	4	●	1
D0900	9	19	70	10	4	●	1
D0950	9.5	19	70	10	4	●	1
D1000	10	22	70	10	4	●	2
D1050	10.5	22	75	12	4	●	1
D1100	11	22	75	12	4	●	1
D1150	11.5	22	75	12	4	●	1
D1200	12	26	75	12	4	●	2
D1250	12.5	26	75	12	4	●	3
D1300	13	26	75	12	4	●	3
D1400	14	26	75	12	4	●	3
D1500	15	30	80	16	4	●	1
D1600	16	32	90	16	4	●	2
D1700	17	32	90	16	4	●	3
D1800	18	32	90	16	4	●	3
D1900	19	32	100	20	4	●	1
D2000	20	38	100	20	4	●	2

CUTTING CONDITIONS B367

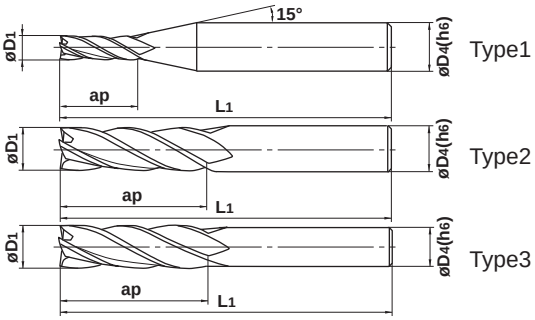
C-4JC

End mill, Semi long cut length, 4 flute, Center cutting

$D_1 \leq 12$	$0 -0.020$	$D_4 = 6$	$0 -0.008$
$D_1 > 12$	$0 -0.030$	$8 \leq D_4 \leq 10$	$0 -0.009$
		$12 \leq D_4 \leq 16$	$0 -0.011$
		$20 \leq D_4 \leq 25$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○	○	○	○

● 4 flute uncoated end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C4JCD0300	3	12	50	6	4	●	1
D0350	3.5	15	50	6	4	●	1
D0400	4	15	50	6	4	●	1
D0450	4.5	15	50	6	4	●	1
D0500	5	20	60	6	4	●	1
D0550	5.5	20	60	6	4	●	1
D0600	6	20	60	6	4	●	2
D0650	6.5	25	70	8	4	●	1
D0700	7	25	70	8	4	●	1
D0750	7.5	25	70	8	4	●	1
D0800	8	25	70	8	4	●	2
D0850	8.5	25	90	10	4	●	1
D0900	9	25	90	10	4	●	1
D0950	9.5	25	90	10	4	●	1
D1000	10	30	90	10	4	●	2
D1050	10.5	30	90	12	4	●	1
D1100	11	30	90	12	4	●	1
D1150	11.5	30	90	12	4	●	1
D1200	12	30	90	12	4	●	2
D1300	13	35	90	12	4	●	3
D1400	14	40	110	16	4	●	1
D1500	15	40	110	16	4	●	1
D1600	16	50	110	16	4	●	2
D1700	17	50	110	20	4	●	1
D1800	18	50	110	20	4	●	1
D1900	19	55	110	20	4	●	1
D2000	20	55	110	20	4	●	2
D2200	22	65	140	25	4	●	1
D2400	24	75	140	25	4	●	1
D2500	25	75	140	25	4	●	2

● : **Inventory maintained in Japan.**

CUTTING CONDITIONS B367

C-4LC

End mill, Long cut length, 4 flute, Center cutting

$D_1 \leq 12$	$0 -0.020$
$D_1 > 12$	$0 -0.030$

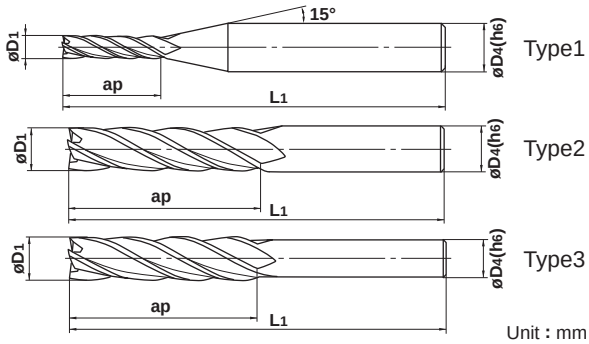
h6

$D_4 = 6$	$0 -0.008$
$8 \leq D_4 \leq 10$	$0 -0.009$
$12 \leq D_4 \leq 16$	$0 -0.011$
$D_4 = 20$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○	○	○	○

UWC 30°

4 flute end mill with longer cut length than standard.



Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
C4LCD0300	3	20	60	6	4	●	1
D0350	3.5	22	60	6	4	●	1
D0400	4	25	60	6	4	●	1
D0450	4.5	25	60	6	4	●	1
D0500	5	30	70	6	4	●	1
D0550	5.5	30	70	6	4	●	1
D0600	6	30	70	6	4	●	2
D0650	6.5	30	90	8	4	●	1
D0700	7	40	90	8	4	●	1
D0750	7.5	40	90	8	4	●	1
D0800	8	40	90	8	4	●	2
D0850	8.5	40	100	10	4	●	1
D0900	9	40	100	10	4	●	1
D0950	9.5	40	100	10	4	●	1
D1000	10	50	100	10	4	●	2
D1050	10.5	50	110	12	4	●	1
D1100	11	50	110	12	4	●	1
D1150	11.5	50	110	12	4	●	1
D1200	12	50	110	12	4	●	2
D1250	12.5	50	120	12	4	●	3
D1300	13	50	120	12	4	●	3
D1400	14	70	130	16	4	●	1
D1500	15	70	130	16	4	●	1
D1600	16	70	130	16	4	●	2
D1700	17	70	140	20	4	●	1
D1800	18	70	140	20	4	●	1
D1900	19	70	140	20	4	●	1
D2000	20	70	140	20	4	●	2

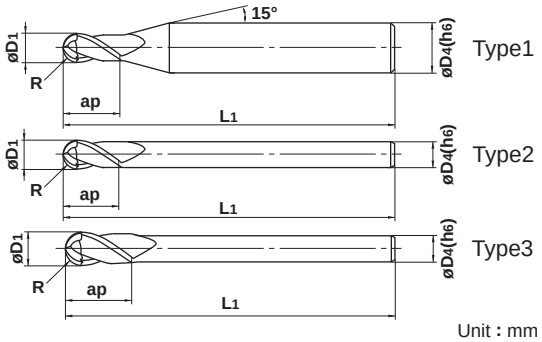
CUTTING CONDITIONS B367

C-2MB

Ball nose end mill, Medium cut length, 2 flute

R		D1		h6	
R≤6.5	±0.01	D1≤12	0 – -0.020	4≤D4≤6	0 – -0.008
R>6.5	±0.02	D1>12	0 – -0.030	8≤D4≤10	0 – -0.009
				12≤D4≤16	0 – -0.011
				D4=20	0 – -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



- 2 flute ultra micro-grain carbide end mill for contour milling of alloy and hardened steels.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2MBR0050	0.5	1	2.5	40	4	2	●	1
R0060	0.6	1.2	3	40	4	2	●	1
R0070	0.7	1.4	3	40	4	2	●	1
R0075	0.75	1.5	4	40	4	2	●	1
R0080	0.8	1.6	4	40	4	2	●	1
R0090	0.9	1.8	5	40	4	2	●	1
R0100	1	2	6	60	6	2	●	1
R0125	1.25	2.5	6	60	6	2	●	1
R0150	1.5	3	8	70	6	2	●	1
R0175	1.75	3.5	8	70	6	2	●	1
R0200	2	4	8	70	6	2	●	1
R0225	2.25	4.5	10	70	6	2	●	1
R0250	2.5	5	12	80	6	2	●	1
R0275	2.75	5.5	12	80	6	2	●	1
R0300	3	6	12	80	6	2	●	2
R0325	3.25	6.5	14	90	8	2	●	1
R0350	3.5	7	14	90	8	2	●	1
R0375	3.75	7.5	14	90	8	2	●	1
R0400	4	8	14	90	8	2	●	2
R0425	4.25	8.5	18	100	10	2	●	1
R0450	4.5	9	18	100	10	2	●	1
R0475	4.75	9.5	18	100	10	2	●	1
R0500	5	10	18	100	10	2	●	2
R0550	5.5	11	22	110	12	2	●	1
R0600	6	12	22	110	12	2	●	2
R0650	6.5	13	26	120	12	2	●	3
R0700	7	14	26	120	12	2	●	3
R0750	7.5	15	30	140	16	2	●	1
R0800	8	16	30	140	16	2	●	2
R0900	9	18	34	140	16	2	●	3
R1000	10	20	38	160	20	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B368

C-MH

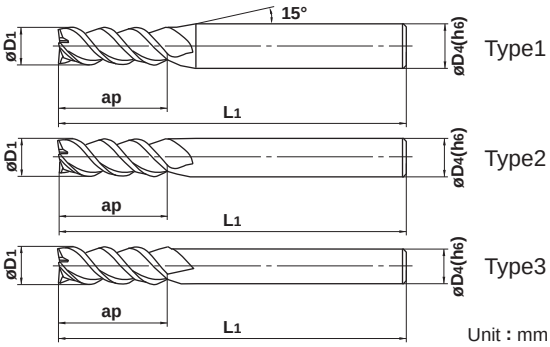
End mill, Medium cut length, 3 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

h6

D4 = 6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	◎			○	○		○



Unit : mm

- 3 flute ultra micro-grain uncoated carbide end mill for general use and cast iron milling.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
CMHD0600	6	13	50	6	3	●	2
D0700	7	16	60	8	3	●	1
D0800	8	19	60	8	3	●	2
D0900	9	19	70	10	3	●	1
D1000	10	22	70	10	3	●	2
D1100	11	22	75	12	3	●	1
D1200	12	26	75	12	3	●	2
D1300	13	26	75	12	3	●	3
D1400	14	26	75	12	3	●	3
D1500	15	30	80	16	3	●	1
D1600	16	32	90	16	3	●	2

C-2SA NEW

End mill, Short cut length, 2 flute, For aluminium alloy

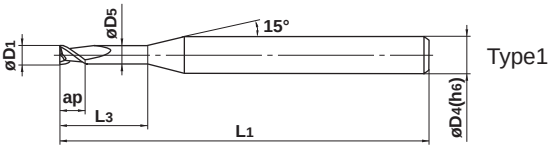
D1≤12 0 −-0.020
D1>12 0 −-0.030

h6

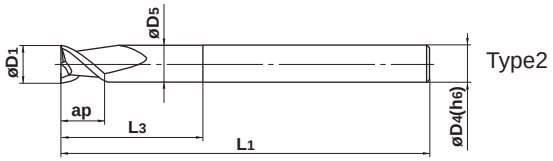
D4 = 6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4 = 20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						○	◎

UWC 37.5°



Type1



Type2

- High efficiency machining for aluminium alloys.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2SAD0300N120	3	6	12	2.7	60	6	2	●	1
D0400N120	4	6	12	3.7	60	6	2	●	1
D0500N150	5	8	15	4.7	60	6	2	●	1
D0600N160	6	8	16	5.7	75	6	2	●	2
D0800N200	8	10	20	7.4	75	8	2	●	2
D1000N300	10	12	30	9.4	75	10	2	●	2
D1000N350	10	12	35	9.4	100	10	2	●	2
D1200N300	12	15	30	11.4	75	12	2	●	2
D1200N350	12	15	35	11.4	100	12	2	●	2
D1200N400	12	15	40	11.4	125	12	2	●	2
D1600N300	16	15	30	15.4	75	16	2	●	2
D1600N400	16	15	40	15.4	100	16	2	●	2
D1600N450	16	15	45	15.4	125	16	2	●	2
D2000N400	20	20	40	19	100	20	2	●	2
D2000N500	20	20	50	19	125	20	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B369

C-3SA NEW

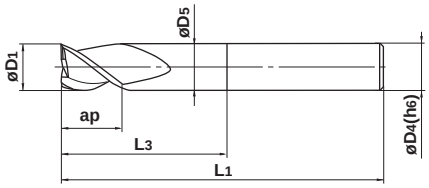
End mill, Short cut length, 3 flute, For aluminium alloy

D1≤12 0 −-0.020
D1>12 0 −-0.030

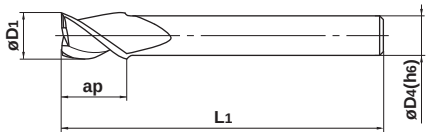
h6
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
20≤D4≤25 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						○	◎

● High efficiency machining for aluminium alloys.



Type1



Type2

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C3SAD1000A100S08	10	12	—	—	100	8	3	●	2
D1000N300	10	12	30	9.4	75	10	3	●	1
D1000N350	10	12	35	9.4	100	10	3	●	1
D1200A150S10	12	15	—	—	150	10	3	●	2
D1200N300	12	15	30	11.4	75	12	3	●	1
D1200N350	12	15	35	11.4	100	12	3	●	1
D1200N400	12	15	40	11.4	125	12	3	●	1
D1600A200S14	16	15	—	—	200	14	3	●	2
D1600N300	16	15	30	15.4	75	16	3	●	1
D1600N400	16	15	40	15.4	100	16	3	●	1
D1600N450	16	15	45	15.4	125	16	3	●	1
D1700A150S16	17	18	—	—	150	16	3	●	2
D1800A200S16	18	18	—	—	200	16	3	●	2
D2000A200S18	20	20	—	—	200	18	3	●	2
D2000N400	20	20	40	19	100	20	3	●	1
D2000N600	20	20	60	19	125	20	3	●	1
D2000N850	20	20	85	19	150	20	3	●	1
D2500N500	25	20	50	24	100	25	3	●	1
D2500N650	25	20	65	24	125	25	3	●	1
D2500N900	25	20	90	24	150	25	3	●	1
D2600A200S25	26	20	—	—	200	25	3	●	2

CUTTING CONDITIONS B370

C-2MHA NEW

End mill, Medium cut length, 2 flute, For aluminium alloy

D1≤12 0 — -0.020
D1>12 0 — -0.030

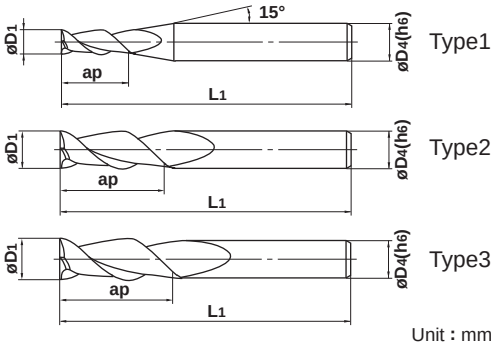
h6

D4 = 6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
20≤D4≤25 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
							◎

UWC 55°

● High efficiency machining for aluminium alloys.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C2MHAD0300	3	9	60	6	2	●	1
D0400	4	12	60	6	2	●	1
D0500	5	15	60	6	2	●	1
D0600	6	18	60	6	2	●	2
D0800	8	20	75	8	2	●	2
D1000	10	25	75	10	2	●	2
D1200	12	25	75	12	2	●	2
D1400	14	32	75	12	2	●	3
D1600	16	32	100	16	2	●	2
D2000	20	38	125	20	2	●	2
D2500	25	38	125	25	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B369

C-SRA

Roughing end mill, Short cut length, 3 flute, For aluminium alloy

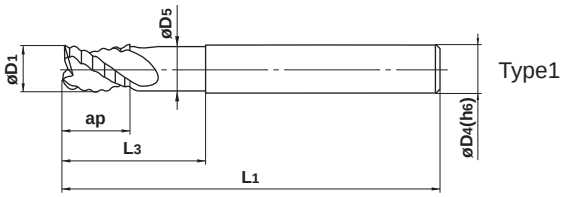
h6

$D_4 = 10$	$0 - -0.009$
$12 \leq D_4 \leq 16$	$0 - -0.011$
$20 \leq D_4 \leq 25$	$0 - -0.013$

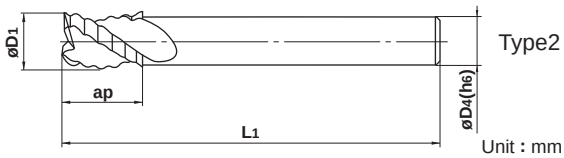
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
							◎

UWC

37.5°



Type1



Type2

Unit : mm

● 3 flute uncoated end mill for roughing aluminium alloy.

Order Number	Dia. D_1	Length of Cut ap	Neck Length L_3	Neck Dia. D_5	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
CSRAD1000	10	12	25	9.4	75	10	3	●	1
D1200	12	15	30	11.4	75	12	3	●	1
D1600	16	18	35	15.4	100	16	3	●	1
D1800	18	22	—	—	100	16	3	●	2
D2000	20	25	50	18.0	125	20	3	●	1
D2200	22	25	—	—	125	20	3	●	2
D2500	25	30	60	23.0	125	25	3	●	1

CUTTING CONDITIONS B371

C-MRA

Roughing end mill, Medium cut length, 3 flute, For aluminium alloy

h6

$D_4 = 6$	0 — -0.008
$8 \leq D_4 \leq 10$	0 — -0.009
$12 \leq D_4 \leq 16$	0 — -0.011
$20 \leq D_4 \leq 25$	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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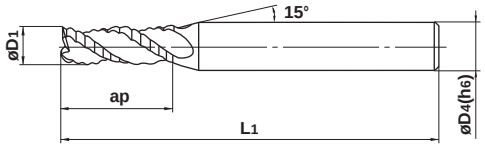
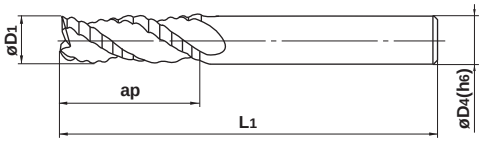


Type1



Type2

UWC

37.5°

● 3 flute uncoated end mill for roughing aluminium alloy.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
CMRAD0300	3	8	50	6	3	●	1
D0400	4	11	50	6	3	●	1
D0500	5	13	50	6	3	●	1
D0600	6	13	50	6	3	●	2
D0800	8	19	60	8	3	●	2
D1000	10	22	75	10	3	●	2
D1200	12	26	75	12	3	●	2
D1600	16	32	100	16	3	●	2
D2000	20	38	125	20	3	●	2
D2500	25	45	125	25	3	●	2

● : **Inventory maintained in Japan.**

CUTTING CONDITIONS B372

C-3SARB NEW

Corner radius, Short cut length, 3 flute, For aluminium alloy

D1≤12 0 −-0.020
D1>12 0 −-0.030

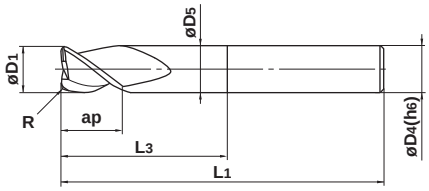
h6

12≤D4≤16 0 −-0.011
20≤D4≤25 0 −-0.013

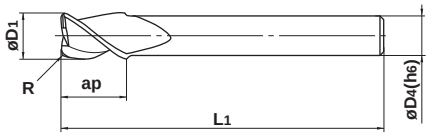
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						○	◎

UWC

37.5°



Type1



Type2

- High efficiency machining for aluminium alloys.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
C3SARBD1200N0300R100	12	1	15	30	11.4	75	12	3	●	1
D1200N0300R320	12	3.2	15	30	11.4	75	12	3	●	1
D1200N0400R100	12	1	15	40	11.4	125	12	3	●	1
D1200N0400R320	12	3.2	15	40	11.4	125	12	3	●	1
D1600N0450R100	16	1	15	45	15.4	125	16	3	●	1
D1600N0450R320	16	3.2	15	45	15.4	125	16	3	●	1
D1600N0700R100	16	1	15	70	15.4	150	16	3	●	1
D1600N0700R320	16	3.2	15	70	15.4	150	16	3	●	1
D1800R100	18	1	18	—	—	150	16	3	●	2
D1800R320	18	3.2	18	—	—	150	16	3	●	2
D2000N0600R100	20	1	20	60	18.0	125	20	3	●	1
D2000N0600R320	20	3.2	20	60	18.0	125	20	3	●	1
D2000N0600R400	20	4	20	60	18.0	125	20	3	●	1
D2000N0850R100	20	1	20	85	18.0	150	20	3	●	1
D2000N0850R320	20	3.2	20	85	18.0	150	20	3	●	1
D2000N0850R400	20	4	20	85	18.0	150	20	3	●	1
D2500N0650R320	25	3.2	20	65	23.0	125	25	3	●	1
D2500N0650R400	25	4	20	65	23.0	125	25	3	●	1
D2500N0650R500	25	5	20	65	23.0	125	25	3	●	1
D2500N0900R320	25	3.2	20	90	23.0	150	25	3	●	1
D2500N0900R400	25	4	20	90	23.0	150	25	3	●	1
D2500N0900R500	25	5	20	90	23.0	150	25	3	●	1

CUTTING CONDITIONS B370

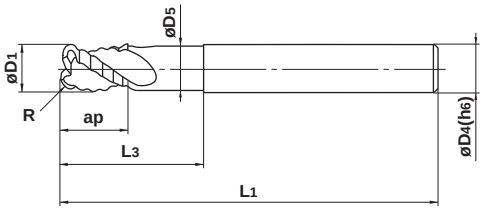
C-SRARB

Corner radius roughing end mill, Short cut length, 3 flute, For aluminium alloy

h6

D4 = 10 0 — -0.009
12 ≤ D4 ≤ 16 0 — -0.011
20 ≤ D4 ≤ 25 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
							◎



Type1

UWC

37.5°

● 3 flute uncoated end mill for roughing aluminium alloy.

Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
CSRARBD1000R100	10	1	12	25	9.4	75	10	3	●	1
D1000R200	10	2	12	25	9.4	75	10	3	●	1
D1200R100	12	1	15	30	11.4	75	12	3	●	1
D1200R200	12	2	15	30	11.4	75	12	3	●	1
D1600R200	16	2	18	35	15.4	100	16	3	●	1
D1600R300	16	3	18	35	15.4	100	16	3	●	1
D2000R200	20	2	25	50	18.0	125	20	3	●	1
D2000R300	20	3	25	50	18.0	125	20	3	●	1
D2500R300	25	3	30	60	23.0	125	25	3	●	1
D2500R400	25	4	30	60	23.0	125	25	3	●	1
D2500R500	25	5	30	60	23.0	125	25	3	●	1

● : Inventory maintained in Japan.

CUTTING CONDITIONS B371

SEE2S

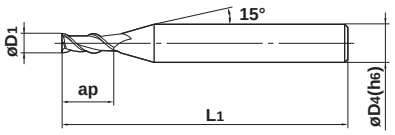
End mill, Short cut length, 2 flute

D1≤12 0 −-0.020
D1>12 0 −-0.030

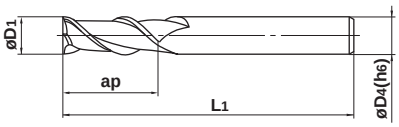
h6

D4=6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
D4=20 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



Type1



Type2

UWC 45°

● 2 flute uncoated high helix end mill.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SEE2030S	3	8	45	6	2	●	1
2031S	3.1	8	45	6	2	●	1
2032S	3.2	8	45	6	2	●	1
2033S	3.3	8	45	6	2	●	1
2034S	3.4	8	45	6	2	●	1
2035S	3.5	8	45	6	2	●	1
2036S	3.6	11	45	6	2	●	1
2037S	3.7	11	45	6	2	●	1
2038S	3.8	11	45	6	2	●	1
2039S	3.9	11	45	6	2	●	1
2040S	4	11	45	6	2	●	1
2041S	4.1	12	45	6	2	●	1
2042S	4.2	12	45	6	2	●	1
2043S	4.3	12	45	6	2	●	1
2044S	4.4	12	45	6	2	●	1
2045S	4.5	12	45	6	2	●	1
2046S	4.6	13	50	6	2	●	1
2047S	4.7	13	50	6	2	●	1
2048S	4.8	13	50	6	2	●	1
2049S	4.9	13	50	6	2	●	1
2050S	5	13	50	6	2	●	1
2055S	5.5	13	50	6	2	●	1
2058S	5.8	13	50	6	2	●	1
2059S	5.9	13	50	6	2	●	1
2060S	6	13	50	6	2	●	2
2070S	7	19	60	8	2	●	1
2080S	8	19	60	8	2	●	2
2090S	9	22	70	10	2	●	1
2100S	10	22	70	10	2	●	2
2120S	12	26	75	12	2	●	2
2150S	15	35	90	16	2	●	1
2160S	16	35	90	16	2	●	2
2200S	20	45	110	20	2	●	2

CUTTING CONDITIONS B373

SEE2L

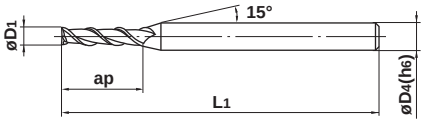
End mill, Long cut length, 2 flute

D1≤12 0 — -0.020
D1>12 0 — -0.030

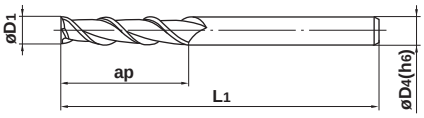
h6

D4 = 6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
D4 = 20 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



Type1



Type2

● 2 flute uncoated high helix end mill.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SEE2030L	3	15	55	6	2	●	1
2040L	4	20	60	6	2	●	1
2050L	5	25	65	6	2	●	1
2060L	6	25	65	6	2	●	2
2070L	7	35	80	8	2	●	1
2080L	8	35	80	8	2	●	2
2090L	9	45	90	10	2	●	1
2100L	10	45	95	10	2	●	2
2110L	11	55	105	12	2	●	1
2120L	12	55	105	12	2	●	2
2150L	15	70	125	16	2	●	1
2160L	16	70	125	16	2	●	2
2200L	20	75	140	20	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B373

SEE4L

End mill, Long cut length, 4 flute

$D_1 \leq 12$	$0 -0.020$
$D_1 > 12$	$0 -0.030$

h6

$D_4 = 6$	$0 -0.008$
$8 \leq D_4 \leq 10$	$0 -0.009$
$12 \leq D_4 \leq 16$	$0 -0.011$
$20 \leq D_4 \leq 25$	$0 -0.013$

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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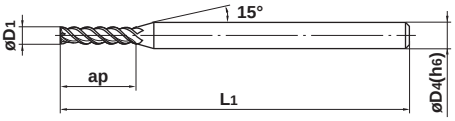
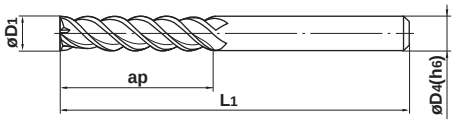


Type1



Type2

● 4 flute high helix end mill.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
SEE4030L	3	15	55	6	4	●	1
4040L	4	20	60	6	4	●	1
4050L	5	25	65	6	4	●	1
4060L	6	25	65	6	4	●	2
4070L	7	35	80	8	4	●	1
4080L	8	35	80	8	4	●	2
4090L	9	45	90	10	4	●	1
4100L	10	45	95	10	4	●	2
4110L	11	55	105	12	4	●	1
4120L	12	55	105	12	4	●	2
4140L	14	70	125	16	4	●	1
4150L	15	70	125	16	4	●	1
4160L	16	70	125	16	4	●	2
4180L	18	70	125	20	4	●	1
4200L	20	75	140	20	4	●	2
4250L	25	85	160	25	4	●	2

CUTTING CONDITIONS B374

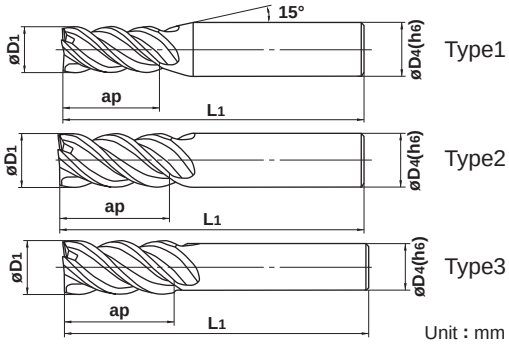
SZE4S

End mill, Medium cut length, 4 flute, Super Square geometry

D1≤12 0 — -0.020
D1>12 0 — -0.030

h6
D4 = 6 0 — -0.008
8≤D4≤10 0 — -0.009
12≤D4≤16 0 — -0.011
20≤D4≤25 0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



Unit : mm

● 4 flute uncoated Super Square end mill for general use and slotting.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SZE4030S	3	8	45	6	4	●	1
4040S	4	11	45	6	4	●	1
4050S	5	13	50	6	4	●	1
4060S	6	13	50	6	4	●	2
4070S	7	19	60	8	4	●	1
4080S	8	19	60	8	4	●	2
4090S	9	22	70	10	4	●	1
4100S	10	22	70	10	4	●	2
4110S	11	26	75	12	4	●	1
4120S	12	26	75	12	4	●	2
4130S	13	26	75	12	4	●	3
4140S	14	30	90	16	4	●	1
4150S	15	35	90	16	4	●	1
4160S	16	35	90	16	4	●	2
4180S	18	40	105	20	4	●	1
4190S	19	40	110	20	4	●	1
4200S	20	45	110	20	4	●	2
4250S	25	55	125	25	4	●	2

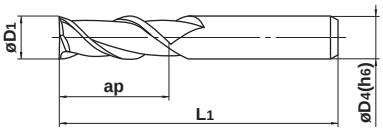
● : Inventory maintained in Japan.

SEG2SA

End mill, Short cut length, 2 flute, Irregular spiral helix angle, For aluminium alloy

$D_1 \leq 12$	0 — -0.020	h6	$D_4 = 6$	0 — -0.008
$D_1 > 12$	0 — -0.030		$8 \leq D_4 \leq 10$	0 — -0.009
			$12 \leq D_4 \leq 16$	0 — -0.011
			$20 \leq D_4 \leq 25$	0 — -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						○	◎



Type1

● 2 flute end mill with irregular helix angle for aluminium alloy.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
SEG2060SA	6	14	50	6	2	●	1
2080SA	8	19	60	8	2	●	1
2100SA	10	24	70	10	2	●	1
2120SA	12	29	75	12	2	●	1
2160SA	16	38	90	16	2	●	1
2200SA	20	48	110	20	2	●	1
2250SA	25	59	125	25	2	●	1

SEG4SA

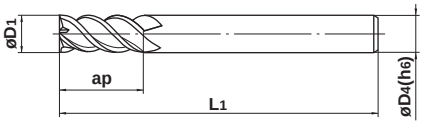
End mill, Medium cut length, 4 flute, Irregular spiral helix angle, For aluminium alloy

D1≤12 0 −-0.020
D1>12 0 −-0.030

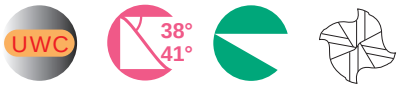
h6

D4 = 6 0 −-0.008
8≤D4≤10 0 −-0.009
12≤D4≤16 0 −-0.011
20≤D4≤25 0 −-0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						○	◎



Type1



● 4 flute end mill with irregular helix angle for aluminium alloy.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SEG4060SA	6	14	50	6	4	●	1
4080SA	8	19	60	8	4	●	1
4100SA	10	24	70	10	4	●	1
4120SA	12	29	75	12	4	●	1
4160SA	16	38	90	16	4	●	1
4200SA	20	48	110	20	4	●	1
4250SA	25	59	125	25	4	●	1

● : Inventory maintained in Japan.

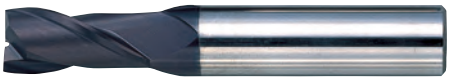
CUTTING CONDITIONS B375

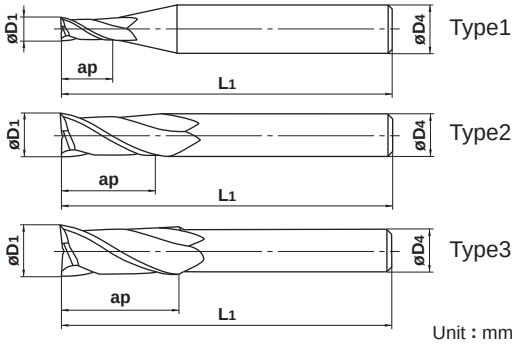
VA-2SS

End mill, Short cut length, 2 flute

0 ─ -0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		





Unit : mm

- 2 flute end mill with high grade HSS substrate and Violet coating for general use.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VA2SSD0300	3	8	50	6	2	●	1
D0400	4	8	60	8	2	●	1
D0500	5	10	60	8	2	●	1
D0600	6	12	60	8	2	●	1
D0700	7	15	65	10	2	●	1
D0800	8	15	65	10	2	●	1
D0900	9	20	75	10	2	●	1
D1000	10	20	75	12	2	●	1
D1100	11	22	85	12	2	●	1
D1200	12	22	85	12	2	●	2
D1300	13	26	90	12	2	●	3
D1400	14	26	95	16	2	●	1
D1500	15	30	100	16	2	●	1
D1600	16	32	100	16	2	●	2
D1700	17	34	100	16	2	●	3
D1800	18	34	100	16	2	●	3
D1900	19	38	120	20	2	●	1
D2000	20	38	120	20	2	●	2

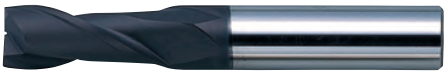
CUTTING CONDITIONS B376

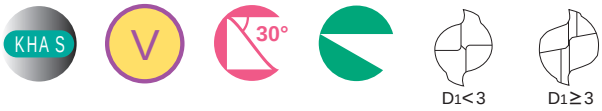
VA-2MS

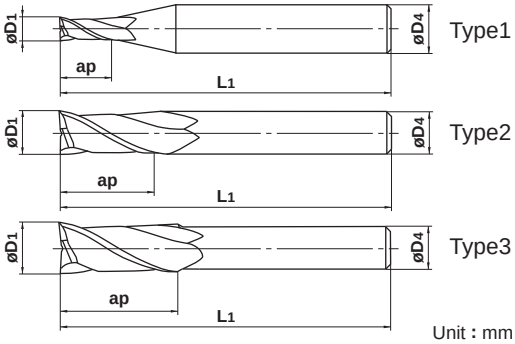
End mill, Medium cut length, 2 flute

D1≤20 0 −-0.030
D1>20 0 −-0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		







● 2 flute end mill with high grade HSS substrate and Violet coating for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VA2MSD0300	3	10	50	6	2	●	1
D0400	4	12	60	8	2	●	1
D0500	5	15	60	8	2	●	1
D0600	6	15	60	8	2	●	1
D0700	7	20	65	10	2	●	1
D0800	8	20	65	10	2	●	1
D0900	9	25	75	10	2	●	1
D1000	10	25	75	10	2	●	2
D1100	11	30	85	12	2	●	1
D1200	12	30	85	12	2	●	2
D1300	13	35	90	12	2	●	3
D1400	14	35	95	16	2	●	1
D1500	15	40	100	16	2	●	1
D1600	16	40	100	16	2	●	2
D1700	17	40	100	16	2	●	3
D1800	18	40	100	16	2	●	3
D1900	19	45	120	20	2	●	1
D2000	20	45	120	20	2	●	2
D2200	22	45	120	20	2	●	3
D2400	24	50	140	25	2	●	1
D2500	25	50	140	25	2	●	2
D2600	26	50	140	25	2	●	3
D2800	28	55	145	25	2	●	3
D3000	30	55	145	25	2	●	3
D3200	32	60	160	32	2	●	2
D3500	35	60	160	32	2	●	3
D4000	40	65	165	32	2	●	3

● : Inventory maintained in Japan.

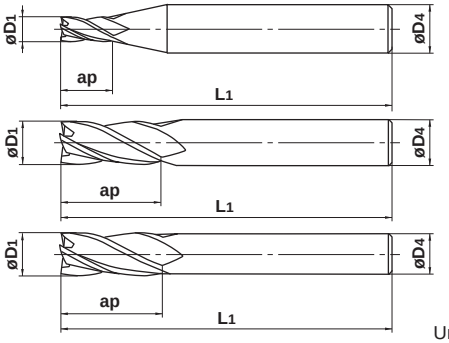
CUTTING CONDITIONS B376

VA-4MC

End mill, Medium cut length, 4 flute

D1≤20 0 −+0.030
D1>20 0 −+0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		



Unit : mm

- 4 flute end mill with high grade HSS substrate and Violet coating for general use.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VA4MCD0300	3	10	50	6	4	●	1
D0400	4	12	60	8	4	●	1
D0500	5	15	60	8	4	●	1
D0600	6	15	60	8	4	●	1
D0700	7	20	65	10	4	●	1
D0800	8	20	65	10	4	●	1
D0900	9	25	75	10	4	●	1
D1000	10	25	75	10	4	●	2
D1100	11	30	85	12	4	●	1
D1200	12	30	85	12	4	●	2
D1300	13	35	90	12	4	●	3
D1400	14	35	95	16	4	●	1
D1500	15	40	100	16	4	●	1
D1600	16	40	100	16	4	●	2
D1700	17	40	100	16	4	●	3
D1800	18	40	100	16	4	●	3
D1900	19	45	115	20	4	●	1
D2000	20	45	115	20	4	●	2
D2200	22	45	115	20	4	●	3
D2400	24	50	120	25	4	●	1
D2500	25	50	120	25	4	●	2
D2800	28	55	125	25	4	●	3
D3000	30	55	125	25	4	●	3

CUTTING CONDITIONS B377

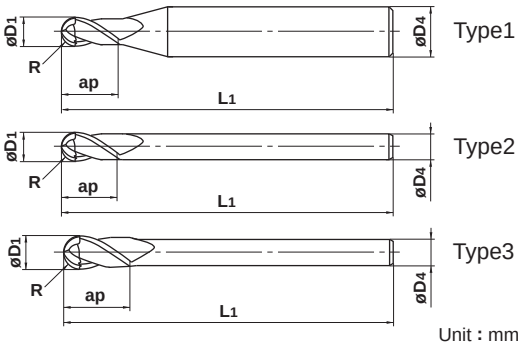
VA-2MB

Ball nose end mill, Medium cut length, 2 flute

R≤6.5 ±0.01
R>6.5 ±0.02

D1≤3 0 — -0.02
3<D1≤13 0 — -0.03
D1>13 0 — -0.04

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			◎	○		



Unit : mm

● 2 flute ball nose end mill with high grade HSS substrate and Violet coating for general use.

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VA2MBR0600	6	12	22	120	12	2	●	2
R0650	6.5	13	24	120	12	2	●	3
R0700	7	14	26	120	12	2	●	3
R0750	7.5	15	28	120	16	2	●	1
R0800	8	16	30	160	16	2	●	2
R0900	9	18	34	160	16	2	●	3
R1000	10	20	38	180	20	2	●	2
R1250	12.5	25	50	200	25	2	●	2
R1500	15	30	55	200	25	2	●	3

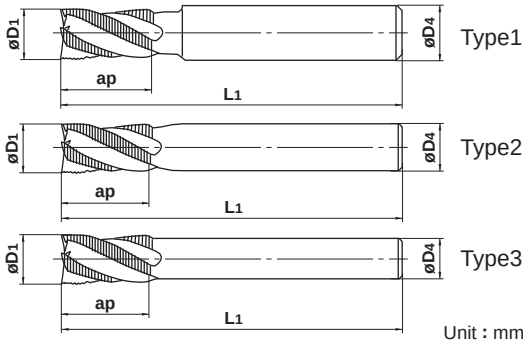
● : Inventory maintained in Japan.

CUTTING CONDITIONS B378

VA-SFPR

Roughing end mill, Short cut length, 4—6 flute, Fine pitch form

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			◎	○		



- Roughing 4—6 flute end mill with high grade HSS substrate and Violet coating for general use.

Unit : mm

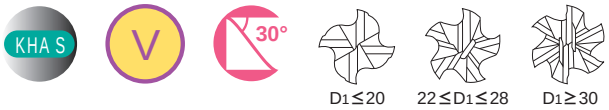
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VASFPRD0500	5	10	80	6	4	●	1
D0600	6	12	80	6	4	●	2
D0700	7	17	80	8	4	●	1
D0800	8	17	85	8	4	●	2
D0900	9	22	100	10	4	●	1
D1000	10	22	100	10	4	●	2
D1200	12	27	110	12	4	●	2
D1400	14	27	110	12	4	●	3
D1500	15	27	125	16	4	●	1
D1600	16	33	125	16	4	●	2
D1800	18	33	125	16	4	●	3
D2000	20	38	145	20	4	●	2
D2200	22	38	145	20	4	●	3
D2400	24	43	150	25	4	●	1
D2500	25	43	150	25	5	●	2
D2800	28	43	160	25	5	●	3
D3000	30	48	165	25	5	●	3
D3200	32	55	175	25	5	●	3
D3500	35	55	175	32	6	●	3
D4000	40	65	185	32	6	●	3
D4500	45	65	200	42	6	●	3
D5000	50	75	200	42	6	●	3

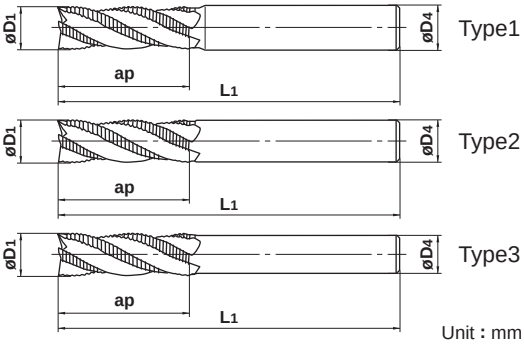
CUTTING CONDITIONS B379

VA-MFPR

Roughing end mill, Medium cut length, 4—6 flute, Fine pitch form

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			◎	○		





● 4—6 flute end mill with medium cut length.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VAMFPRD0500	5	15	80	6	4	●	1
D0600	6	17	80	6	4	●	2
D0700	7	22	80	8	4	●	1
D0800	8	28	85	8	4	●	2
D0900	9	28	95	10	4	●	1
D1000	10	34	100	10	4	●	2
D1200	12	40	110	12	4	●	2
D1400	14	40	110	12	4	●	3
D1500	15	40	120	16	4	●	1
D1600	16	48	125	16	4	●	2
D1800	18	48	125	16	4	●	3
D2000	20	57	145	20	4	●	2
D2200	22	57	145	20	5	●	3
D2400	24	68	150	25	5	●	1
D2500	25	68	150	25	5	●	2
D2800	28	68	160	25	5	●	3
D3000	30	68	165	25	6	●	3
D3200	32	80	175	32	6	●	2
D3500	35	80	175	32	6	●	3
D4000	40	94	185	32	6	●	3
D4500	45	94	200	42	6	●	3
D5000	50	113	200	42	6	●	3

● : Inventory maintained in Japan.

CUTTING CONDITIONS B380

VA-MR

Roughing end mill, Medium cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			◎	○		

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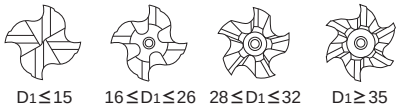
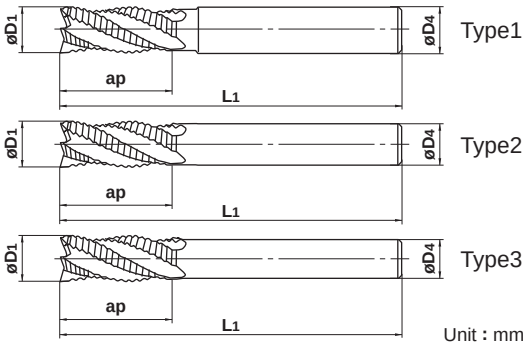




Unit : mm

- Roughing 4—6 flute end mill with high grade HSS substrate and Violet coating for general use.

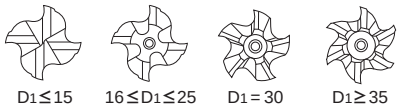
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VAMRD0500	5	15	60	6	4	●	1
D0600	6	15	60	6	4	●	2
D0700	7	20	70	8	4	●	1
D0800	8	20	70	8	4	●	2
D0900	9	25	80	10	4	●	1
D1000	10	25	80	10	4	●	2
D1100	11	30	110	12	4	●	1
D1200	12	30	110	12	4	●	2
D1300	13	35	115	12	4	●	3
D1400	14	35	135	16	4	●	1
D1500	15	40	140	16	4	●	1
D1600	16	40	140	16	4	●	2
D1700	17	40	140	16	4	●	3
D1800	18	40	140	16	4	●	3
D1900	19	45	145	20	4	●	1
D2000	20	45	145	20	4	●	2
D2200	22	45	145	20	4	●	3
D2400	24	50	150	25	4	●	1
D2500	25	50	150	25	4	●	2
D2600	26	50	150	25	4	●	3
D2800	28	55	160	25	5	●	3
D3000	30	55	165	25	5	●	3
D3200	32	60	175	32	5	●	2
D3500	35	60	175	32	6	●	3
D4000	40	65	185	32	6	●	3
D4500	45	70	200	42	6	●	3
D5000	50	70	200	42	6	●	3

CUTTING CONDITIONS B381

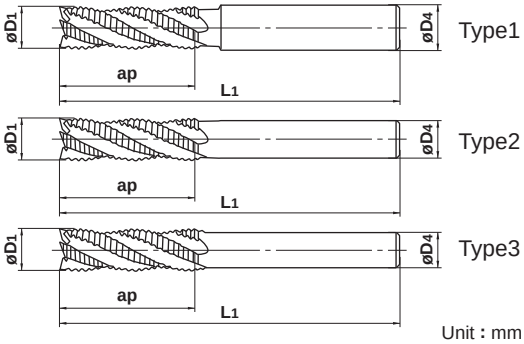
VA-JR

Roughing end mill, Semi long cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			◎	○		



● 4—6 flute end mill with longer cut length than standard.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VAJRD1000	10	35	90	10	4	●	2
D1200	12	45	125	12	4	●	2
D1400	14	45	145	16	4	●	1
D1500	15	55	155	16	4	●	1
D1600	16	55	155	16	4	●	2
D1800	18	55	155	16	4	●	3
D2000	20	65	165	20	4	●	2
D2500	25	75	175	25	4	●	2
D3000S25	30	75	185	25	5	●	3
D3000S32	30	75	185	32	5	●	1
D3500	35	85	200	32	6	●	3
D4000	40	85	205	42	6	●	1
D4500	45	105	235	42	6	●	3
D5000	50	105	235	42	6	●	3

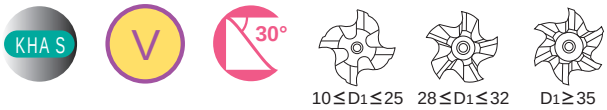
● : Inventory maintained in Japan.

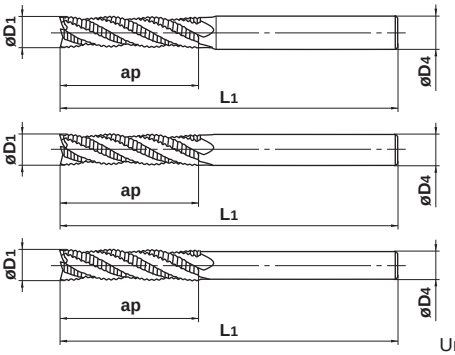
CUTTING CONDITIONS B382

VA-LR

Roughing end mill, Long cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			◎	○		





Unit : mm

● 4—6 flute end mill with long cut length.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VALRD1000	10	45	110	10	4	●	2
D1200	12	50	130	12	4	●	2
D1400	14	55	155	16	4	●	1
D1500	15	65	165	16	4	●	1
D1600	16	65	165	16	4	●	2
D1800	18	65	165	16	4	●	3
D2000	20	75	175	20	4	●	2
D2200	22	75	175	20	4	●	3
D2400	24	85	185	25	4	●	1
D2500	25	90	190	25	4	●	2
D2800	28	90	190	25	5	●	3
D3000	30	90	200	25	5	●	3
D3200	32	95	210	32	5	●	2
D3500	35	100	215	32	6	●	3
D4000	40	110	230	32	6	●	3
D4500	45	120	250	42	6	●	3
D5000	50	120	250	42	6	●	3

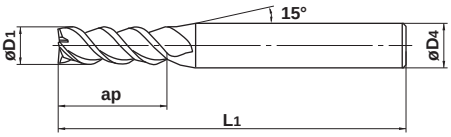
CUTTING CONDITIONS B382

VA-MH

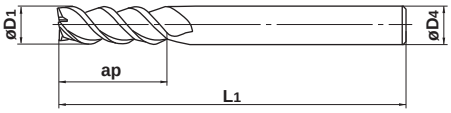
End mill, Medium cut length, 2—4 flute

0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			◎	○		



Type1



Type2

● 2—4 flute end mill with high grade HSS substrate and Violet coating for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VAMHD0500	5	12	65	8	2	●	1
D0600	6	15	65	8	3	●	1
D0700	7	20	75	10	3	●	1
D0800	8	20	75	10	3	●	1
D0900	9	25	90	10	3	●	1
D1000	10	25	90	12	3	●	1
D1100	11	30	95	12	3	●	1
D1200	12	30	95	12	3	●	2
D1300	13	35	105	16	3	●	1
D1400	14	35	105	16	3	●	1
D1500	15	40	115	16	3	●	1
D1600	16	40	115	16	3	●	2
D1800	18	40	125	20	3	●	1
D2000	20	45	130	20	3	●	2
D2100	21	45	135	25	4	●	1
D2200	22	45	135	25	4	●	1
D2300	23	50	140	25	4	●	1
D2400	24	50	140	25	4	●	1
D2500	25	50	140	25	4	●	2
D2800	28	55	150	32	4	●	1
D3000	30	55	150	32	4	●	1

● : Inventory maintained in Japan.

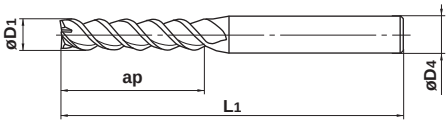
CUTTING CONDITIONS B383

VA-LH

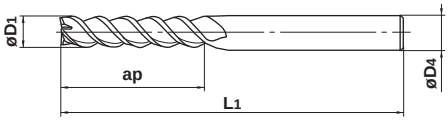
End mill, Long cut length, 2—4 flute, High helix

0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			◎	○		



Type1



Type2

● 2—4 flute end mill with long cut length.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
VALHD0500	5	15	75	8	2	●	1
D0600	6	25	75	8	3	●	1
D0700	7	35	90	10	3	●	1
D0800	8	35	90	10	3	●	1
D0900	9	45	110	10	3	●	1
D1000	10	45	110	12	3	●	1
D1100	11	55	115	12	3	●	1
D1200	12	55	115	12	3	●	2
D1300	13	65	125	16	3	●	1
D1400	14	65	125	16	3	●	1
D1500	15	65	140	16	3	●	1
D1600	16	65	140	16	3	●	2
D1800	18	75	150	20	3	●	1
D2000	20	85	160	20	3	●	2
D2100	21	85	175	25	4	●	1
D2200	22	85	175	25	4	●	1
D2300	23	105	180	25	4	●	1
D2400	24	105	180	25	4	●	1
D2500	25	105	180	25	4	●	2
D2800	28	105	180	32	4	●	1
D3000	30	105	185	32	4	●	1

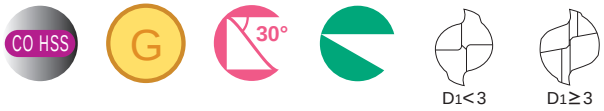
TWO-FLUTE END MILLS

G-2SS

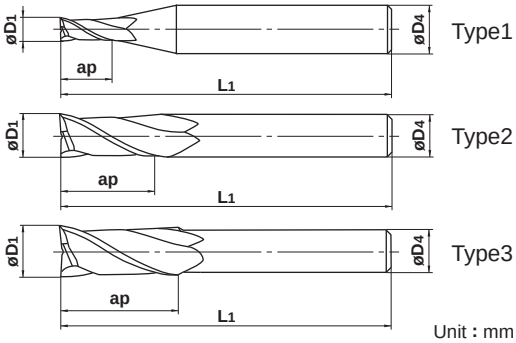
End mill, Short cut length, 2 flute

0 — -0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



● 2 flute end mill with TiN coating for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
G2SSD0100	1	2	50	6	2	●	1
D0150	1.5	3.5	50	6	2	●	1
D0200	2	5	50	6	2	●	1
D0250	2.5	6	50	6	2	●	1
D0300	3	8	50	6	2	●	1
D0350	3.5	8	60	8	2	●	1
D0400	4	8	60	8	2	●	1
D0450	4.5	10	60	8	2	●	1
D0500	5	10	60	8	2	●	1
D0550	5.5	12	60	8	2	●	1
D0600	6	12	60	8	2	●	1
D0650	6.5	15	65	10	2	●	1
D0700	7	15	65	10	2	●	1
D0750	7.5	15	65	10	2	●	1
D0800	8	15	65	10	2	●	1
D0850	8.5	20	75	10	2	●	1
D0900	9	20	75	10	2	●	1
D0950	9.5	20	75	12	2	●	1
D1000	10	20	75	12	2	●	1
D1100	11	22	85	12	2	●	1
D1200	12	22	85	12	2	●	2
D1300	13	26	90	12	2	●	3
D1400	14	26	90	16	2	●	1
D1500	15	30	100	16	2	●	1
D1600	16	32	100	16	2	●	2
D1700	17	34	100	16	2	●	3
D1800	18	34	100	16	2	●	3
D1900	19	38	115	20	2	●	1
D2000	20	38	115	20	2	●	2

● : Inventory maintained in Japan.

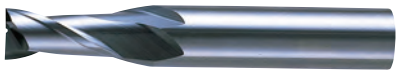
CUTTING CONDITIONS B385

2SS

End mill, Short cut length, 2 flute

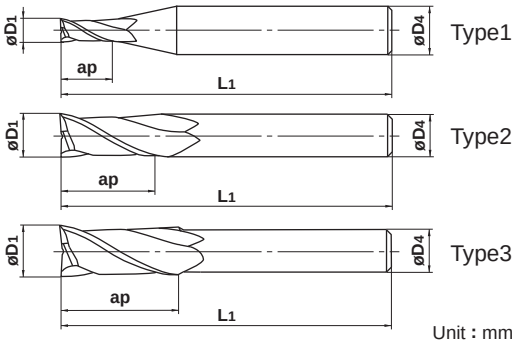
D1≤3 0 — -0.020
D1>3 0 — -0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



CO HSS | 30° | D1<3 | D1≥3

2 flute HSS end mill with rigid design.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2SSD0050	0.5	0.8	50	6	2	●	1
D0060	0.6	1	50	6	2	●	1
D0070	0.7	1	50	6	2	●	1
D0080	0.8	1.3	50	6	2	●	1
D0090	0.9	1.3	50	6	2	●	1
D0100	1	2	50	6	2	●	1
D0110	1.1	2	50	6	2	●	1
D0120	1.2	2	50	6	2	●	1
D0130	1.3	2	50	6	2	●	1
D0140	1.4	2	50	6	2	●	1
D0150	1.5	3.5	50	6	2	●	1
D0160	1.6	3.5	50	6	2	●	1
D0170	1.7	3.5	50	6	2	●	1
D0180	1.8	3.5	50	6	2	●	1
D0190	1.9	3.5	50	6	2	●	1
D0200	2	5	50	6	2	●	1
D0210	2.1	5	50	6	2	●	1
D0220	2.2	5	50	6	2	●	1
D0230	2.3	5	50	6	2	●	1
D0240	2.4	5	50	6	2	●	1
D0250	2.5	6	50	6	2	●	1
D0260	2.6	6	50	6	2	●	1
D0270	2.7	6	50	6	2	●	1
D0280	2.8	6	50	6	2	●	1
D0290	2.9	6	50	6	2	●	1
D0300	3	8	50	6	2	●	1
D0310	3.1	8	50	6	2	●	1
D0320	3.2	8	50	6	2	●	1
D0330	3.3	8	50	6	2	●	1
D0340	3.4	8	50	6	2	●	1
D0350	3.5	8	60	8	2	●	1
D0360	3.6	8	60	8	2	●	1
D0370	3.7	8	60	8	2	●	1
D0380	3.8	8	60	8	2	●	1
D0390	3.9	8	60	8	2	●	1
D0400	4	8	60	8	2	●	1
D0410	4.1	8	60	8	2	●	1
D0420	4.2	8	60	8	2	●	1

CUTTING CONDITIONS B384

TWO-FLUTE END MILLS

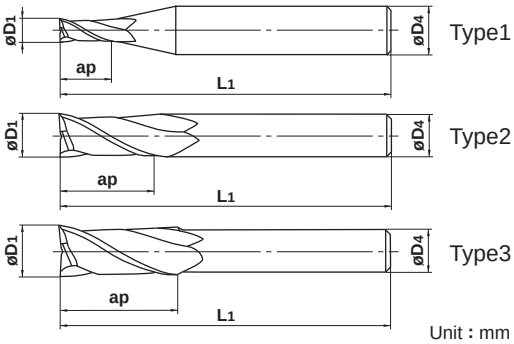
2SS

End mill, Short cut length, 2 flute

D1≤3 0 — -0.020
D1>3 0 — -0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

● 2 flute HSS end mill with rigid design.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2SSD0430	4.3	8	60	8	2	●	1
D0440	4.4	8	60	8	2	●	1
D0450	4.5	10	60	8	2	●	1
D0460	4.6	10	60	8	2	●	1
D0470	4.7	10	60	8	2	●	1
D0480	4.8	10	60	8	2	●	1
D0490	4.9	10	60	8	2	●	1
D0500	5	10	60	8	2	●	1
D0510	5.1	10	60	8	2	●	1
D0520	5.2	10	60	8	2	●	1
D0530	5.3	10	60	8	2	●	1
D0540	5.4	10	60	8	2	●	1
D0550	5.5	12	60	8	2	●	1
D0560	5.6	12	60	8	2	●	1
D0570	5.7	12	60	8	2	●	1
D0580	5.8	12	60	8	2	●	1
D0590	5.9	12	60	8	2	●	1
D0600	6	12	60	8	2	●	1
D0610	6.1	12	60	8	2	●	1
D0620	6.2	12	60	8	2	●	1
D0630	6.3	12	60	8	2	●	1
D0640	6.4	12	60	8	2	●	1
D0650	6.5	15	65	10	2	●	1
D0660	6.6	15	65	10	2	●	1
D0670	6.7	15	65	10	2	●	1
D0680	6.8	15	65	10	2	●	1
D0690	6.9	15	65	10	2	●	1
D0700	7	15	65	10	2	●	1
D0710	7.1	15	65	10	2	●	1
D0720	7.2	15	65	10	2	●	1
D0730	7.3	15	65	10	2	●	1
D0740	7.4	15	65	10	2	●	1
D0750	7.5	15	65	10	2	●	1
D0760	7.6	15	65	10	2	●	1
D0770	7.7	15	65	10	2	●	1
D0780	7.8	15	65	10	2	●	1
D0790	7.9	15	65	10	2	●	1
D0800	8	15	65	10	2	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
2SSD0810	8.1	15	65	10	2	●	1
D0820	8.2	15	65	10	2	●	1
D0830	8.3	15	65	10	2	●	1
D0840	8.4	15	65	10	2	●	1
D0850	8.5	20	75	10	2	●	1
D0860	8.6	20	75	10	2	●	1
D0870	8.7	20	75	10	2	●	1
D0880	8.8	20	75	10	2	●	1
D0890	8.9	20	75	10	2	●	1
D0900	9	20	75	10	2	●	1
D0910	9.1	20	75	10	2	●	1
D0920	9.2	20	75	10	2	●	1
D0930	9.3	20	75	10	2	●	1
D0940	9.4	20	75	10	2	●	1
D0950S10	9.5	20	75	10	2	●	1
D0950S12	9.5	20	75	12	2	●	1
D0960	9.6	20	75	10	2	●	1
D0970	9.7	20	75	10	2	●	1
D0980	9.8	20	75	10	2	●	1
D0990	9.9	20	75	10	2	●	1
D1000S10	10	20	75	10	2	●	2
D1000S12	10	20	75	12	2	●	1
D1010	10.1	20	75	12	2	●	1
D1020	10.2	20	75	12	2	●	1
D1030	10.3	20	75	12	2	●	1
D1040	10.4	20	75	12	2	●	1
D1050	10.5	22	85	12	2	●	1
D1060	10.6	22	85	12	2	●	1
D1070	10.7	22	85	12	2	●	1
D1080	10.8	22	85	12	2	●	1
D1090	10.9	22	85	12	2	●	1
D1100	11	22	85	12	2	●	1
D1110	11.1	22	85	12	2	●	1
D1120	11.2	22	85	12	2	●	1
D1130	11.3	22	85	12	2	●	1
D1140	11.4	22	85	12	2	●	1
D1150	11.5	22	85	12	2	●	1
D1160	11.6	22	85	12	2	●	1
D1170	11.7	22	85	12	2	●	1
D1180	11.8	22	85	12	2	●	1
D1190	11.9	22	85	12	2	●	1
D1200	12	22	85	12	2	●	2
D1210	12.1	22	85	12	2	●	3
D1220	12.2	22	85	12	2	●	3
D1230	12.3	22	85	12	2	●	3
D1240	12.4	22	85	12	2	●	3
D1250	12.5	26	90	12	2	●	3
D1260	12.6	26	90	12	2	●	3
D1270	12.7	26	90	12	2	●	3
D1280	12.8	26	90	12	2	●	3

CUTTING CONDITIONS B384

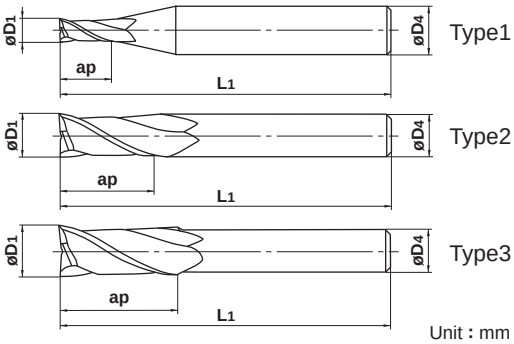
TWO-FLUTE END MILLS

2SS
End mill, Short cut length, 2 flute

D1≤3 0 — -0.020
D1>3 0 — -0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

● 2 flute HSS end mill with rigid design.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2SSD1290	12.9	26	90	12	2	●	3
D1300	13	26	90	12	2	●	3
D1310	13.1	26	90	12	2	●	3
D1320	13.2	26	90	12	2	●	3
D1330	13.3	26	90	12	2	●	3
D1340	13.4	26	90	12	2	●	3
D1350	13.5	26	90	16	2	●	1
D1360	13.6	26	90	16	2	●	1
D1370	13.7	26	90	16	2	●	1
D1380	13.8	26	90	16	2	●	1
D1390	13.9	26	90	16	2	●	1
D1400	14	26	90	16	2	●	1
D1410	14.1	26	90	16	2	●	1
D1420	14.2	26	90	16	2	●	1
D1430	14.3	26	90	16	2	●	1
D1440	14.4	26	90	16	2	●	1
D1450	14.5	26	100	16	2	●	1
D1460	14.6	26	100	16	2	●	1
D1470	14.7	26	100	16	2	●	1
D1480	14.8	26	100	16	2	●	1
D1490	14.9	26	100	16	2	●	1
D1500	15	30	100	16	2	●	1
D1510	15.1	30	100	16	2	●	1
D1520	15.2	30	100	16	2	●	1
D1530	15.3	30	100	16	2	●	1
D1540	15.4	30	100	16	2	●	1
D1550	15.5	32	100	16	2	●	1
D1560	15.6	32	100	16	2	●	1
D1570	15.7	32	100	16	2	●	1
D1580	15.8	32	100	16	2	●	1
D1590	15.9	32	100	16	2	●	1
D1600	16	32	100	16	2	●	2
D1610	16.1	32	100	16	2	●	3
D1620	16.2	32	100	16	2	●	3
D1630	16.3	32	100	16	2	●	3
D1640	16.4	32	100	16	2	●	3
D1650	16.5	32	100	16	2	●	3
D1660	16.6	32	100	16	2	●	3

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
2SSD1670	16.7	32	100	16	2	●	3
D1680	16.8	32	100	16	2	●	3
D1690	16.9	32	100	16	2	●	3
D1700	17	34	100	16	2	●	3
D1710	17.1	34	100	16	2	●	3
D1720	17.2	34	100	16	2	●	3
D1730	17.3	34	100	16	2	●	3
D1740	17.4	34	100	16	2	●	3
D1750	17.5	34	100	16	2	●	3
D1760	17.6	34	100	16	2	●	3
D1770	17.7	34	100	16	2	●	3
D1780	17.8	34	100	16	2	●	3
D1790	17.9	34	100	16	2	●	3
D1800	18	34	100	16	2	●	3
D1810	18.1	34	100	16	2	●	3
D1820	18.2	34	100	16	2	●	3
D1830	18.3	34	100	16	2	●	3
D1840	18.4	34	100	16	2	●	3
D1850	18.5	38	115	20	2	●	1
D1860	18.6	38	115	20	2	●	1
D1870	18.7	38	115	20	2	●	1
D1880	18.8	38	115	20	2	●	1
D1890	18.9	38	115	20	2	●	1
D1900	19	38	115	20	2	●	1
D1910	19.1	38	115	20	2	●	1
D1920	19.2	38	115	20	2	●	1
D1930	19.3	38	115	20	2	●	1
D1940	19.4	38	115	20	2	●	1
D1950	19.5	38	115	20	2	●	1
D1960	19.6	38	115	20	2	●	1
D1970	19.7	38	115	20	2	●	1
D1980	19.8	38	115	20	2	●	1
D1990	19.9	38	115	20	2	●	1
D2000	20	38	115	20	2	●	2

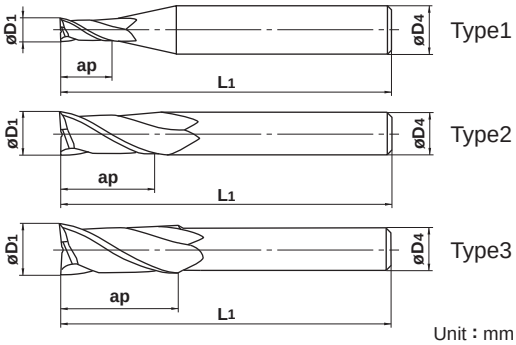
CUTTING CONDITIONS
B384

S-2MD

End mill, Short cut length, 2 flute, KHA Super

D1≤3 0 — -0.020
3<D1≤20 0 — -0.030
D1>20 0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



● 2 flute end mill with KHA Super substrate for high speed milling of difficult-to-cut and hard materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
S2MDD0040	0.4	0.6	50	6	2	●	1
D0050	0.5	0.8	50	6	2	●	1
D0060	0.6	1	50	6	2	●	1
D0070	0.7	1	50	6	2	●	1
D0080	0.8	1.3	50	6	2	●	1
D0090	0.9	1.3	50	6	2	●	1
D0100	1	2	50	6	2	●	1
D0110	1.1	2	50	6	2	●	1
D0120	1.2	2	50	6	2	●	1
D0130	1.3	2	50	6	2	●	1
D0140	1.4	2	50	6	2	●	1
D0150	1.5	3.5	50	6	2	●	1
D0160	1.6	3.5	50	6	2	●	1
D0170	1.7	3.5	50	6	2	●	1
D0180	1.8	3.5	50	6	2	●	1
D0190	1.9	3.5	50	6	2	●	1
D0200	2	5	50	6	2	●	1
D0210	2.1	5	50	6	2	●	1
D0220	2.2	5	50	6	2	●	1
D0230	2.3	5	50	6	2	●	1
D0240	2.4	5	50	6	2	●	1
D0250	2.5	6	50	6	2	●	1
D0260	2.6	6	50	6	2	●	1
D0270	2.7	6	50	6	2	●	1
D0280	2.8	6	50	6	2	●	1
D0290	2.9	6	50	6	2	●	1
D0300	3	8	50	6	2	●	1
D0310	3.1	8	50	6	2	●	1
D0320	3.2	8	50	6	2	●	1
D0330	3.3	8	50	6	2	●	1
D0340	3.4	8	50	6	2	●	1
D0350	3.5	8	60	8	2	●	1
D0360	3.6	8	60	8	2	●	1
D0370	3.7	8	60	8	2	●	1
D0380	3.8	8	60	8	2	●	1
D0390	3.9	8	60	8	2	●	1
D0400	4	8	60	8	2	●	1
D0410	4.1	8	60	8	2	●	1

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
S2MDD0420	4.2	8	60	8	2	●	1
D0430	4.3	8	60	8	2	●	1
D0440	4.4	8	60	8	2	●	1
D0450	4.5	10	60	8	2	●	1
D0460	4.6	10	60	8	2	●	1
D0470	4.7	10	60	8	2	●	1
D0480	4.8	10	60	8	2	●	1
D0490	4.9	10	60	8	2	●	1
D0500	5	10	60	8	2	●	1
D0510	5.1	10	60	8	2	●	1
D0520	5.2	10	60	8	2	●	1
D0530	5.3	10	60	8	2	●	1
D0540	5.4	10	60	8	2	●	1
D0550	5.5	12	60	8	2	●	1
D0560	5.6	12	60	8	2	●	1
D0570	5.7	12	60	8	2	●	1
D0580	5.8	12	60	8	2	●	1
D0590	5.9	12	60	8	2	●	1
D0600	6	12	60	8	2	●	1
D0610	6.1	12	60	8	2	●	1
D0620	6.2	12	60	8	2	●	1
D0630	6.3	12	60	8	2	●	1
D0640	6.4	12	60	8	2	●	1
D0650	6.5	15	65	10	2	●	1
D0660	6.6	15	65	10	2	●	1
D0670	6.7	15	65	10	2	●	1
D0680	6.8	15	65	10	2	●	1
D0690	6.9	15	65	10	2	●	1
D0700	7	15	65	10	2	●	1
D0710	7.1	15	65	10	2	●	1
D0720	7.2	15	65	10	2	●	1
D0730	7.3	15	65	10	2	●	1
D0740	7.4	15	65	10	2	●	1
D0750	7.5	15	65	10	2	●	1
D0760	7.6	15	65	10	2	●	1
D0770	7.7	15	65	10	2	●	1
D0780	7.8	15	65	10	2	●	1
D0790	7.9	15	65	10	2	●	1
D0800S08	8	15	65	8	2	●	2
D0800S10	8	15	65	10	2	●	1
D0810	8.1	15	65	10	2	●	1
D0820	8.2	15	65	10	2	●	1
D0830	8.3	15	65	10	2	●	1
D0840	8.4	15	65	10	2	●	1
D0850	8.5	20	75	10	2	●	1
D0860	8.6	20	75	10	2	●	1
D0870	8.7	20	75	10	2	●	1
D0880	8.8	20	75	10	2	●	1
D0890	8.9	20	75	10	2	●	1
D0900	9	20	75	10	2	●	1

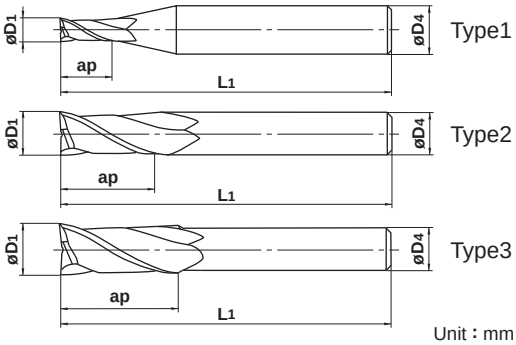
CUTTING CONDITIONS B386

S-2MD

End mill, Short cut length, 2 flute, KHA Super

D1≤3 0 — -0.020
3<D1≤20 0 — -0.030
D1>20 0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



● 2 flute end mill with KHA Super substrate for high speed milling of difficult-to-cut and hard materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
S2MDD0910	9.1	20	75	10	2	●	1
D0920	9.2	20	75	10	2	●	1
D0930	9.3	20	75	10	2	●	1
D0940	9.4	20	75	10	2	●	1
D0950	9.5	20	75	12	2	●	1
D0960	9.6	20	75	12	2	●	1
D0970	9.7	20	75	12	2	●	1
D0980	9.8	20	75	12	2	●	1
D0990	9.9	20	75	12	2	●	1
D1000S10	10	20	75	10	2	●	2
D1000S12	10	20	75	12	2	●	1
D1050	10.5	22	85	12	2	●	1
D1100	11	22	85	12	2	●	1
D1150	11.5	22	85	12	2	●	1
D1200	12	22	85	12	2	●	2
D1250	12.5	26	90	12	2	●	3
D1300	13	26	90	12	2	●	3
D1350	13.5	26	95	16	2	●	1
D1400	14	26	95	16	2	●	1
D1450	14.5	26	100	16	2	●	1
D1500	15	30	100	16	2	●	1
D1550	15.5	32	100	16	2	●	1
D1600	16	32	100	16	2	●	2
D1650	16.5	32	100	16	2	●	3
D1700	17	34	100	16	2	●	3
D1750	17.5	34	100	16	2	●	3
D1800	18	34	100	16	2	●	3
D1850	18.5	38	120	20	2	●	1
D1900	19	38	120	20	2	●	1
D1950	19.5	38	120	20	2	●	1
D2000	20	38	120	20	2	●	2
D2100	21	45	120	20	2	●	3
D2200	22	45	120	20	2	●	3
D2300	23	50	140	25	2	●	1
D2400	24	50	140	25	2	●	1
D2500	25	50	140	25	2	●	2
D2600	26	50	140	25	2	●	3
D2700	27	55	145	25	2	●	3

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
S2MDD2800	28	55	145	25	2	●	3
D2900	29	55	145	25	2	●	3
D3000	30	55	145	25	2	●	3
D3100	31	60	160	32	2	●	1
D3200	32	60	160	32	2	●	2
D3300	33	60	160	32	2	●	3
D3400	34	60	160	32	2	●	3
D3500	35	60	160	32	2	●	3
D3600	36	65	165	32	2	●	3
D3700	37	65	165	32	2	●	3
D3800	38	65	165	32	2	●	3
D3900	39	65	165	32	2	●	3
D4000	40	65	165	32	2	●	3
D4200	42	70	165	42	2	●	2
D4500	45	70	165	42	2	●	3
D4800	48	70	165	42	2	●	3
D5000	50	70	165	42	2	●	3

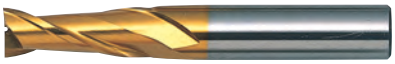
CUTTING CONDITIONS B386

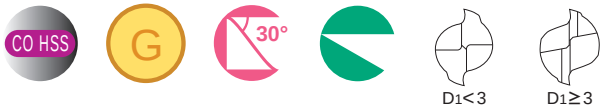
G-2MS

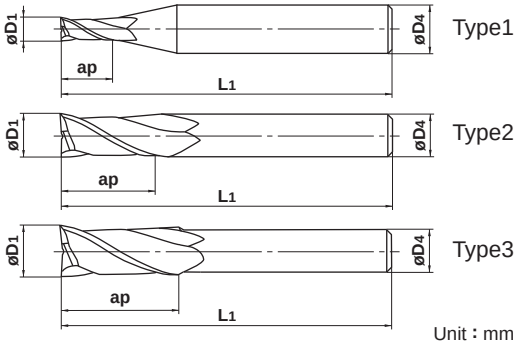
End mill, Medium cut length, 2 flute

D1≤20 0 — -0.030
D1>20 0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○







2 flute end mill with high grade HSS substrate and TiN coating for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
G2MSD0100	1	3	50	6	2	●	1
D0150	1.5	4.5	50	6	2	●	1
D0200	2	6	50	6	2	●	1
D0250	2.5	7.5	50	6	2	●	1
D0300	3	10	50	6	2	●	1
D0350	3.5	12	50	6	2	●	1
D0400	4	12	50	6	2	●	1
D0450	4.5	15	55	6	2	●	1
D0500	5	15	55	6	2	●	1
D0550	5.5	15	55	6	2	●	1
D0600	6	15	55	6	2	●	2
D0650	6.5	20	65	8	2	●	1
D0700	7	20	65	8	2	●	1
D0750	7.5	20	65	8	2	●	1
D0800	8	20	65	8	2	●	2
D0850	8.5	25	75	10	2	●	1
D0900	9	25	75	10	2	●	1
D0950	9.5	25	75	10	2	●	1
D1000	10	25	75	10	2	●	2
D1100	11	30	85	12	2	●	1
D1200	12	30	85	12	2	●	2
D1300	13	35	90	12	2	●	3
D1400	14	35	95	16	2	●	1
D1500	15	40	100	16	2	●	1
D1600	16	40	100	16	2	●	2
D1700	17	40	100	16	2	●	3
D1800	18	40	100	16	2	●	3
D1900	19	45	115	20	2	●	1
D2000	20	45	115	20	2	●	2
D2100	21	45	115	20	2	●	3
D2200	22	45	115	20	2	●	3
D2300	23	50	120	25	2	●	1
D2400	24	50	120	25	2	●	1
D2500	25	50	120	25	2	●	2
D2600	26	50	120	25	2	●	3
D2700	27	55	125	25	2	●	3
D2800	28	55	125	25	2	●	3
D2900	29	55	125	25	2	●	3

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
G2MSD3000	30	55	125	25	2	●	3
D3100	31	60	145	25	2	●	3
D3200	32	60	145	32	2	●	2
D3300	33	60	145	32	2	●	3
D3400	34	60	145	32	2	●	3
D3500	35	60	145	32	2	●	3
D3600	36	65	150	32	2	●	3
D3700	37	65	150	32	2	●	3
D3800	38	65	150	32	2	●	3
D3900	39	65	150	32	2	●	3
D4000	40	65	150	32	2	●	3

CUTTING CONDITIONS B385

TWO-FLUTE END MILLS

2MS

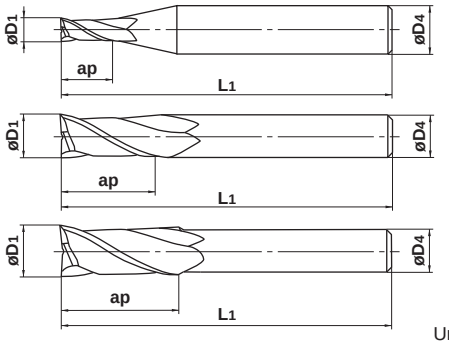
End mill, Medium cut length, 2 flute

D1≤3 0 — -0.020
3< D1≤20 0 — -0.030
D1 >20 0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

CO HSS | 30° | D1<3 | D1≥3

● 2 flute end mill with high grade HSS substrate for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2MSD0100	1	3	50	6	2	●	1
D0150	1.5	4.5	50	6	2	●	1
D0200	2	6	50	6	2	●	1
D0250	2.5	7.5	50	6	2	●	1
D0300	3	10	50	6	2	●	1
D0350	3.5	12	50	6	2	●	1
D0400	4	12	50	6	2	●	1
D0450	4.5	15	55	6	2	●	1
D0500	5	15	55	6	2	●	1
D0550	5.5	15	55	6	2	●	1
D0600	6	15	55	6	2	●	2
D0650	6.5	20	65	8	2	●	1
D0700	7	20	65	8	2	●	1
D0750	7.5	20	65	8	2	●	1
D0800	8	20	65	8	2	●	2
D0850	8.5	25	75	10	2	●	1
D0900	9	25	75	10	2	●	1
D0950	9.5	25	75	10	2	●	1
D1000	10	25	75	10	2	●	2
D1100	11	30	85	12	2	●	1
D1200	12	30	85	12	2	●	2
D1300	13	35	90	12	2	●	3
D1400	14	35	95	16	2	●	1
D1500	15	40	100	16	2	●	1
D1600	16	40	100	16	2	●	2
D1700	17	40	100	16	2	●	3
D1800	18	40	100	16	2	●	3
D1900	19	45	115	20	2	●	1
D2000	20	45	115	20	2	●	2
D2100	21	45	115	20	2	●	3
D2200	22	45	115	20	2	●	3
D2300	23	50	120	25	2	●	1
D2400	24	50	120	25	2	●	1
D2500	25	50	120	25	2	●	2
D2600	26	50	120	25	2	●	3
D2700	27	55	125	25	2	●	3
D2800	28	55	125	25	2	●	3
D2900	29	55	125	25	2	●	3

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
2MSD3000	30	55	125	25	2	●	3
D3100	31	60	145	25	2	●	3
D3200	32	60	145	32	2	●	2
D3300	33	60	145	32	2	●	3
D3400	34	60	145	32	2	●	3
D3500	35	60	145	32	2	●	3
D3600	36	65	150	32	2	●	3
D3700	37	65	150	32	2	●	3
D3800	38	65	150	32	2	●	3
D3900	39	65	150	32	2	●	3
D4000	40	65	150	32	2	●	3
D4100	41	70	155	32	2	●	3
D4200S32	42	70	155	32	2	●	3
D4200S42	42	70	155	42	2	●	2
D4500S32	45	70	155	32	2	●	3
D4500S42	45	70	155	42	2	●	3
D4600S32	46	70	155	32	2	●	3
D4600S42	46	70	155	42	2	●	3
D5000S32	50	70	155	32	2	●	3
D5000S42	50	70	155	42	2	●	3
D5500	55	80	175	42	2	●	3
D6000	60	85	185	42	2	●	3

CUTTING CONDITIONS B387

TWO-FLUTE END MILLS

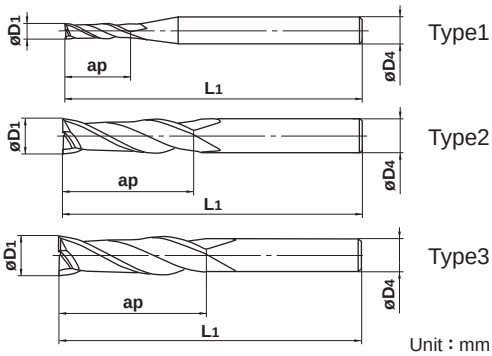
S-2JS

End mill, Semi long cut length, 2 flute, KHA Super

D1≤3 0 — -0.020
3<D1≤20 0 — -0.030
D1>20 0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

● 2 flute end mill with high grade HSS substrate for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
S2JSD0300	3	12	60	6	2	●	1
D0400	4	15	65	8	2	●	1
D0500	5	20	75	8	2	●	1
D0600	6	20	75	8	2	●	1
D0700	7	25	80	10	2	●	1
D0800	8	25	80	10	2	●	1
D0900	9	35	90	10	2	●	1
D1000	10	35	90	10	2	●	2
D1100	11	45	110	12	2	●	1
D1200	12	45	110	12	2	●	2
D1300	13	45	110	12	2	●	3
D1400	14	55	125	16	2	●	1
D1500	15	55	125	16	2	●	1
D1600	16	55	125	16	2	●	2
D1700	17	55	125	16	2	●	3
D1800	18	55	125	16	2	●	3
D1900	19	65	145	20	2	●	1
D2000	20	65	145	20	2	●	2
D2100	21	65	145	20	2	●	3
D2200	22	65	145	20	2	●	3
D2300	23	75	165	25	2	●	1
D2400	24	75	165	25	2	●	1
D2500	25	75	165	25	2	●	2
D2600	26	75	165	25	2	●	3
D2700	27	75	165	25	2	●	3
D2800	28	75	165	25	2	●	3
D2900	29	75	165	25	2	●	3
D3000	30	75	165	25	2	●	3
D3100	31	85	190	32	2	●	1
D3200	32	85	190	32	2	●	2
D3300	33	85	190	32	2	●	3
D3400	34	85	190	32	2	●	3
D3500	35	85	190	32	2	●	3
D3600	36	95	200	32	2	●	3
D3700	37	95	200	32	2	●	3
D3800	38	95	200	32	2	●	3
D3900	39	95	200	32	2	●	3
D4000	40	95	200	32	2	●	3

● : Inventory maintained in Japan.

CUTTING CONDITIONS B386

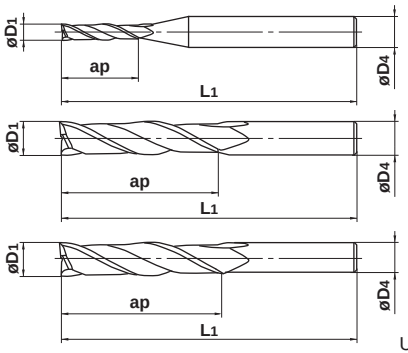
2LS

End mill, Long cut length, 2 flute

D1≤3 0 — -0.020
3<D1≤20 0 — -0.030
D1>20 0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

● 2 flute end mill with high grade HSS substrate for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2LSD0100	1	6	50	6	2	●	1
D0150	1.5	7.5	50	6	2	●	1
D0200	2	10	55	6	2	●	1
D0250	2.5	15	55	6	2	●	1
D0300	3	15	55	6	2	●	1
D0350	3.5	15	55	6	2	●	1
D0400	4	20	55	6	2	●	1
D0450	4.5	20	55	6	2	●	1
D0500	5	25	60	6	2	●	1
D0550	5.5	25	60	6	2	●	1
D0600	6	25	60	6	2	●	2
D0650	6.5	35	75	8	2	●	1
D0700	7	35	75	8	2	●	1
D0750	7.5	35	75	8	2	●	1
D0800	8	35	75	8	2	●	2
D0850	8.5	35	75	10	2	●	1
D0900	9	45	90	10	2	●	1
D0950	9.5	45	90	10	2	●	1
D1000	10	45	90	10	2	●	2
D1050	10.5	55	105	12	2	●	1
D1100	11	55	105	12	2	●	1
D1150	11.5	55	105	12	2	●	1
D1200	12	55	105	12	2	●	2
D1250	12.5	55	105	12	2	●	3
D1300	13	55	105	12	2	●	3
D1350	13.5	55	110	16	2	●	1
D1400	14	55	110	16	2	●	1
D1450	14.5	65	120	16	2	●	1
D1500	15	65	120	16	2	●	1
D1550	15.5	65	120	16	2	●	1
D1600	16	65	120	16	2	●	2
D1650	16.5	65	120	16	2	●	3
D1700	17	65	120	16	2	●	3
D1750	17.5	65	120	16	2	●	3
D1800	18	65	120	16	2	●	3
D1850	18.5	75	140	20	2	●	1
D1900	19	75	140	20	2	●	1
D1950	19.5	75	140	20	2	●	1

CUTTING CONDITIONS B387

2LS

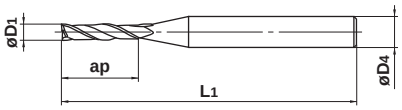
End mill, Long cut length, 2 flute

D1≤3 0 — -0.020
3<D1≤20 0 — -0.030
D1>20 0 — -0.040

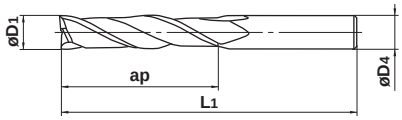
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

CO HSS | 30° | D1<3 | D1≥3

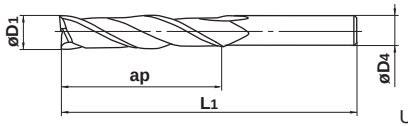
● 2 flute end mill with high grade HSS substrate for general use.



Type1



Type2



Type3

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2LSD2000	20	75	140	20	2	●	2
D2100	21	75	140	20	2	●	3
D2200	22	75	140	20	2	●	3
D2300	23	90	160	25	2	●	1
D2400	24	90	160	25	2	●	1
D2500	25	90	160	25	2	●	2
D2600	26	90	160	25	2	●	3
D2700	27	90	160	25	2	●	3
D2800	28	90	160	25	2	●	3
D2900	29	90	160	25	2	●	3
D3000	30	90	160	25	2	●	3
D3100	31	95	180	25	2	●	3
D3200	32	95	180	32	2	●	2
D3300	33	95	180	32	2	●	3
D3400	34	100	185	32	2	●	3
D3500	35	100	185	32	2	●	3
D3600	36	105	190	32	2	●	3
D3700	37	105	190	32	2	●	3
D3800	38	105	190	32	2	●	3
D3900	39	110	195	32	2	●	3
D4000	40	110	195	32	2	●	3

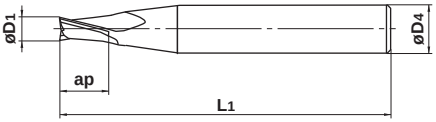
● : **Inventory maintained in Japan.**

CUTTING CONDITIONS B387

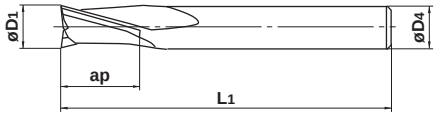
2MK

End mill, Short cut length, 2 flute, For key ways

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○			○



Type1



Type2

- 2 flute end mill for NN (JIS) standards and plus or minus tolerance diameters.

2MK-P($D_1{}^{+0.02}_{0}$)

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
2MKPD0300	3	5	50	6	2	●	1
D0400	4	6	60	8	2	●	1
D0500	5	8	60	8	2	●	1
D0600	6	8	60	8	2	●	1
D0700	7	10	65	10	2	●	1
D0800	8	10	65	10	2	●	1
D1000	10	15	75	12	2	●	1
D1200	12	18	75	12	2	●	2
D1500	15	22	75	16	2	●	1
D1800	18	22	80	20	2	●	1
D2000	20	22	85	20	2	●	2

2MK-N($D_1{}^{0}_{-0.02}$)

Unit : mm

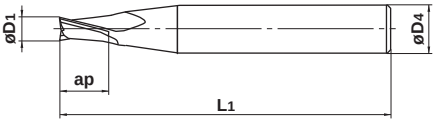
Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
2MKND0300	3	5	50	6	2	●	1
D0400	4	6	60	8	2	●	1
D0500	5	8	60	8	2	●	1
D0600	6	8	60	8	2	●	1
D0700	7	10	65	10	2	●	1
D0800	8	10	65	10	2	●	1
D1000	10	15	75	12	2	●	1
D1200	12	18	75	12	2	●	2
D1500	15	22	75	16	2	●	1

TWO-FLUTE END MILLS

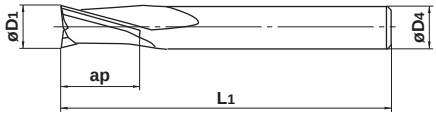
2MK

End mill, Short cut length, 2 flute, For key ways

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○			○



Type1



Type2

● 2 flute end mill for NN (JIS) standards and plus or minus tolerance diameters.

2MK-NN(D1 $^{-0.02}_{-0.04}$)

Unit : mm

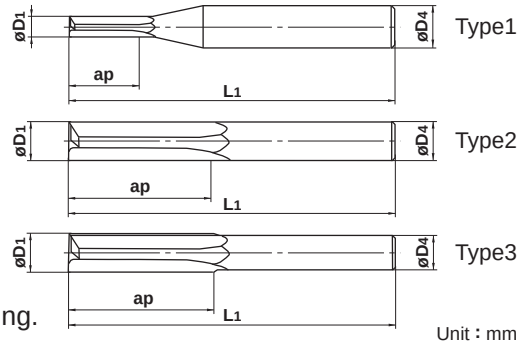
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2MKNND0300	3	5	50	6	2	●	1
D0400	4	6	60	8	2	●	1
D0500	5	8	60	8	2	●	1
D0600	6	8	60	8	2	●	1
D0700	7	10	65	10	2	●	1
D0800	8	10	65	10	2	●	1
D1000	10	15	75	12	2	●	1
D1200	12	18	75	12	2	●	2
D1500	15	22	75	16	2	●	1
D1800	18	22	80	20	2	●	1
D2000	20	22	85	20	2	●	2

● : **Inventory maintained in Japan.**

K-2SL

End mill, Long cut length, 2 flute, Straight flute geometry

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			○			○



- 2 flute end mill with a square sectional geometry for easy grinding for different applications such as difficult-to-cut material milling.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
K2SLD0200	2	10	60	6	2	●	1
D0250	2.5	10	60	6	2	●	1
D0300	3	15	70	8	2	●	1
D0350	3.5	15	70	8	2	●	1
D0400	4	15	70	8	2	●	1
D0500	5	20	75	8	2	●	1
D0600	6	25	80	8	2	●	1
D0700	7	25	80	10	2	●	1
D0800	8	25	80	10	2	●	1
D0900	9	35	85	10	2	●	1
D1000	10	35	85	10	2	●	2
D1100	11	40	90	12	2	●	1
D1200	12	40	90	12	2	●	2
D1300	13	40	90	12	2	●	3
D1400	14	45	120	16	2	●	1
D1500	15	45	120	16	2	●	1
D1600	16	45	120	16	2	●	2
D1700	17	45	120	16	2	●	3
D1800	18	45	120	16	2	●	3
D1900	19	55	135	20	2	●	1
D2000	20	55	135	20	2	●	2

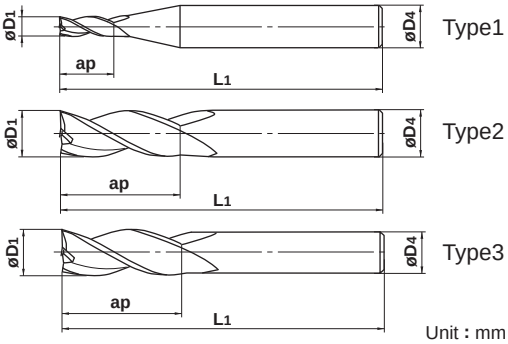
THREE-FLUTE END MILLS

3MS

End mill, Medium cut length, 3 flute

D1≤20 0 − -0.030
D1>20 0 − -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



● 3 flute end mill with large open flute geometry similar to that of a 2 flute design. It is suitable for heavy duty milling due to its high rigidity.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
3MSD0300	3	10	50	6	3	●	1
D0400	4	12	50	6	3	●	1
D0500	5	15	55	6	3	●	1
D0600	6	15	55	6	3	●	2
D0700	7	20	65	8	3	●	1
D0800	8	20	65	8	3	●	2
D0900	9	25	75	10	3	●	1
D1000	10	25	75	10	3	●	2
D1100	11	30	85	12	3	●	1
D1200	12	30	85	12	3	●	2
D1300	13	35	90	12	3	●	3
D1400	14	35	95	16	3	●	1
D1500	15	40	100	16	3	●	1
D1600	16	40	100	16	3	●	2
D1700	17	40	100	16	3	●	3
D1800	18	40	100	16	3	●	3
D1900	19	45	115	20	3	●	1
D2000	20	45	115	20	3	●	2
D2100	21	45	115	20	3	●	3
D2200	22	45	115	20	3	●	3
D2300	23	50	120	25	3	●	1
D2400	24	50	120	25	3	●	1
D2500	25	50	120	25	3	●	2
D2600	26	50	120	25	3	●	3
D2700	27	55	125	25	3	●	3
D2800	28	55	125	25	3	●	3
D2900	29	55	125	25	3	●	3
D3000	30	55	125	25	3	●	3
D3500	35	60	145	32	3	●	3
D4000	40	65	150	32	3	●	3

● : Inventory maintained in Japan.

CUTTING CONDITIONS B388

S-4MD

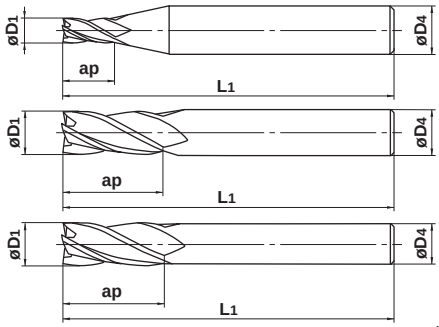
End mill, Medium cut length, 4 flute

D1≤20 0 −+0.020
D1>20 0 −+0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

KHA S

30°



- 4 flute end mill with high grade powder metallurgy HSS (KHA Super) substrate for high speed milling and cutting of high hardness difficult-to-cut materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
S4MDD0250	2.5	10	50	6	4	●	1
D0300	3	10	50	6	4	●	1
D0350	3.5	12	60	8	4	●	1
D0400	4	12	60	8	4	●	1
D0450	4.5	15	60	8	4	●	1
D0500	5	15	60	8	4	●	1
D0550	5.5	15	60	8	4	●	1
D0600	6	15	60	8	4	●	1
D0650	6.5	20	65	10	4	●	1
D0700	7	20	65	10	4	●	1
D0750	7.5	20	65	10	4	●	1
D0800	8	20	65	10	4	●	1
D0850	8.5	25	75	10	4	●	1
D0900	9	25	75	10	4	●	1
D0950	9.5	25	75	10	4	●	1
D1000S10	10	25	75	10	4	●	2
D1000S12	10	25	75	12	4	●	1
D1100	11	30	85	12	4	●	1
D1200	12	30	85	12	4	●	2
D1300	13	35	90	12	4	●	3
D1400	14	35	95	16	4	●	1
D1500	15	40	100	16	4	●	1
D1600	16	40	100	16	4	●	2
D1700	17	40	100	16	4	●	3
D1800	18	40	100	16	4	●	3
D1900	19	45	115	20	4	●	1
D2000	20	45	115	20	4	●	2
D2100	21	45	115	20	4	●	3
D2200	22	45	115	20	4	●	3
D2300	23	50	120	25	4	●	1
D2400	24	50	120	25	4	●	1
D2500	25	50	120	25	4	●	2
D2600	26	50	120	25	4	●	3
D2700	27	55	125	25	4	●	3
D2800	28	55	125	25	4	●	3
D2900	29	55	125	25	4	●	3
D3000	30	55	125	25	4	●	3
D3100	31	60	145	32	4	●	1

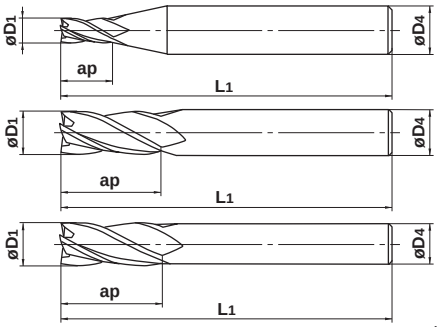
CUTTING CONDITIONS B389

S-4MD

End mill, Medium cut length, 4 flute

D1≤20 0 −+0.020
D1>20 0 −+0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



● 4 flute end mill with high grade powder metallurgy HSS (KHA Super) substrate for high speed milling and cutting of high hardness difficult-to-cut materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
S4MDD3200	32	60	145	32	4	●	2
D3300	33	60	145	32	4	●	3
D3400	34	60	145	32	4	●	3
D3500	35	60	145	32	4	●	3
D3600	36	65	150	32	4	●	3
D3700	37	65	150	32	4	●	3
D3800	38	65	150	32	4	●	3
D3900	39	65	150	32	4	●	3
D4000	40	65	150	32	4	●	3
D4200	42	70	155	42	4	●	2
D4500	45	70	155	42	4	●	3
D4800	48	70	155	42	4	●	3
D5000	50	70	155	42	4	●	3

● : Inventory maintained in Japan.

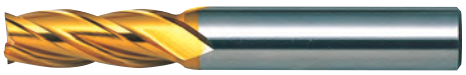
CUTTING CONDITIONS B389

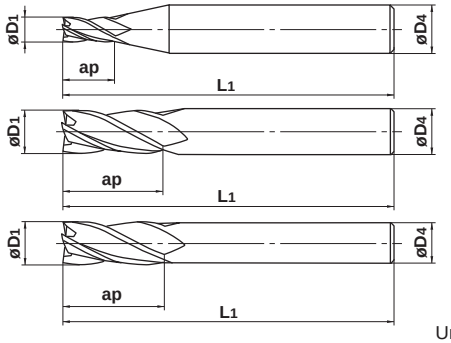
G-4MC

End mill, Medium cut length, 4 flute

D1≤20 0 −+0.030
D1>20 0 −+0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○





- 4 flute end mill for high speed continuous cutting.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
G4MCD0300	3	10	50	6	4	●	1
D0350	3.5	12	60	8	4	●	1
D0400	4	12	60	8	4	●	1
D0450	4.5	15	60	8	4	●	1
D0500	5	15	60	8	4	●	1
D0550	5.5	15	60	8	4	●	1
D0600	6	15	60	8	4	●	1
D0650	6.5	20	65	10	4	●	1
D0700	7	20	65	10	4	●	1
D0750	7.5	20	65	10	4	●	1
D0800	8	20	65	10	4	●	1
D0850	8.5	25	75	10	4	●	1
D0900	9	25	75	10	4	●	1
D0950	9.5	25	75	10	4	●	1
D1000	10	25	75	10	4	●	2
D1100	11	30	85	12	4	●	1
D1200	12	30	85	12	4	●	2
D1300	13	35	90	12	4	●	3
D1400	14	35	95	16	4	●	1
D1500	15	40	100	16	4	●	1
D1600	16	40	100	16	4	●	2
D1700	17	40	100	16	4	●	3
D1800	18	40	100	16	4	●	3
D1900	19	45	115	20	4	●	1
D2000	20	45	115	20	4	●	2
D2100	21	45	115	20	4	●	3
D2200	22	45	115	20	4	●	3
D2300	23	50	120	25	4	●	1
D2400	24	50	120	25	4	●	1
D2500	25	50	120	25	4	●	2
D2600	26	50	120	25	4	●	3
D2700	27	55	125	25	4	●	3
D2800	28	55	125	25	4	●	3
D2900	29	55	125	25	4	●	3
D3000	30	55	125	25	4	●	3

CUTTING CONDITIONS B390

FOUR-FLUTE END MILLS

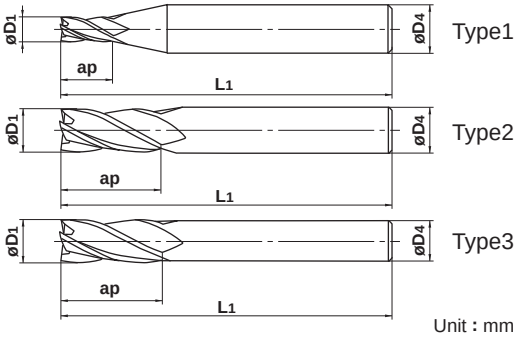
4MC

End mill, Medium cut length, 4 flute, Center cutting

D1 ≤ 20 0 −+0.020
D1 > 20 0 −+0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

● 4 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
4MCD0250	2.5	10	50	6	4	●	1
D0300	3	10	50	6	4	●	1
D0350	3.5	12	60	8	4	●	1
D0400	4	12	60	8	4	●	1
D0450	4.5	15	60	8	4	●	1
D0500	5	15	60	8	4	●	1
D0550	5.5	15	60	8	4	●	1
D0600	6	15	60	8	4	●	1
D0650	6.5	20	65	10	4	●	1
D0700	7	20	65	10	4	●	1
D0750	7.5	20	65	10	4	●	1
D0800	8	20	65	10	4	●	1
D0850	8.5	25	75	10	4	●	1
D0900	9	25	75	10	4	●	1
D0950	9.5	25	75	10	4	●	1
D1000	10	25	75	10	4	●	2
D1100	11	30	85	12	4	●	1
D1200	12	30	85	12	4	●	2
D1300	13	35	90	12	4	●	3
D1400	14	35	95	16	4	●	1
D1500	15	40	100	16	4	●	1
D1600	16	40	100	16	4	●	2
D1700	17	40	100	16	4	●	3
D1800	18	40	100	16	4	●	3
D1900	19	45	115	20	4	●	1
D2000	20	45	115	20	4	●	2
D2100	21	45	115	20	4	●	3
D2200	22	45	115	20	4	●	3
D2300	23	50	120	25	4	●	1
D2400	24	50	120	25	4	●	1
D2500	25	50	120	25	4	●	2
D2600	26	50	120	25	4	●	3
D2700	27	55	125	25	4	●	3
D2800	28	55	125	25	4	●	3
D2900	29	55	125	25	4	●	3
D3000	30	55	125	25	4	●	3
D3100	31	60	145	25	4	●	3
D3200	32	60	145	32	4	●	2

● : Inventory maintained in Japan.

Unit : mm

Order Number	Dia. D_1	Length of Cut ap	Overall Length L_1	Shank Dia. D_4	No. of Flutes N	Stock	Type
4MCD3300	33	60	145	32	4	●	3
D3400	34	60	145	32	4	●	3
D3500	35	60	145	32	4	●	3
D3600	36	65	150	32	4	●	3
D3700	37	65	150	32	4	●	3
D3800	38	65	150	32	4	●	3
D3900	39	65	150	32	4	●	3
D4000	40	65	150	32	4	●	3

CUTTING CONDITIONS B391

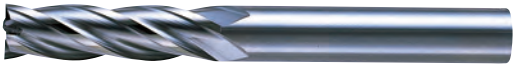
FOUR-FLUTE END MILLS

S-4JC

End mill, Semi long cut length, 4 flute

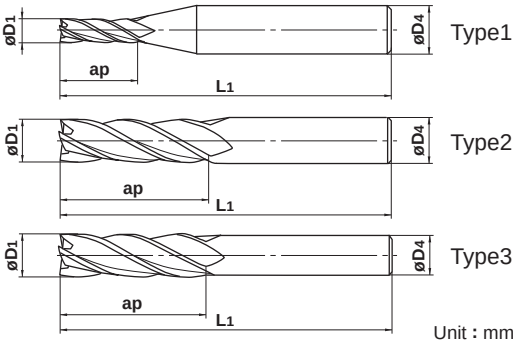
D1 ≤ 20 0 −+0.020
D1 > 20 0 −+0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



KHA S 30°

● 4 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
S4JCD0300	3	12	60	6	4	●	1
D0400	4	15	65	8	4	●	1
D0500	5	20	75	8	4	●	1
D0600	6	20	75	8	4	●	1
D0700	7	25	80	10	4	●	1
D0800	8	25	80	10	4	●	1
D0900	9	35	90	10	4	●	1
D1000	10	35	90	10	4	●	2
D1100	11	45	110	12	4	●	1
D1200	12	45	110	12	4	●	2
D1300	13	45	110	12	4	●	3
D1400	14	55	125	16	4	●	1
D1500	15	55	125	16	4	●	1
D1600	16	55	125	16	4	●	2
D1700	17	55	125	16	4	●	3
D1800	18	55	125	16	4	●	3
D1900	19	65	145	20	4	●	1
D2000	20	65	145	20	4	●	2
D2100	21	65	145	20	4	●	3
D2200	22	65	145	20	4	●	3
D2300	23	75	165	25	4	●	1
D2400	24	75	165	25	4	●	1
D2500	25	75	165	25	4	●	2
D2600	26	75	165	25	4	●	3
D2700	27	75	165	25	4	●	3
D2800	28	75	165	25	4	●	3
D2900	29	75	165	25	4	●	3
D3000	30	75	165	25	4	●	3
D3100	31	85	190	32	4	●	1
D3200	32	85	190	32	4	●	2
D3300	33	85	190	32	4	●	3
D3400	34	85	190	32	4	●	3
D3500	35	85	190	32	4	●	3
D3600	36	95	200	32	4	●	3
D3700	37	95	200	32	4	●	3
D3800	38	95	200	32	4	●	3
D3900	39	95	200	32	4	●	3
D4000	40	95	200	32	4	●	3

● : Inventory maintained in Japan.

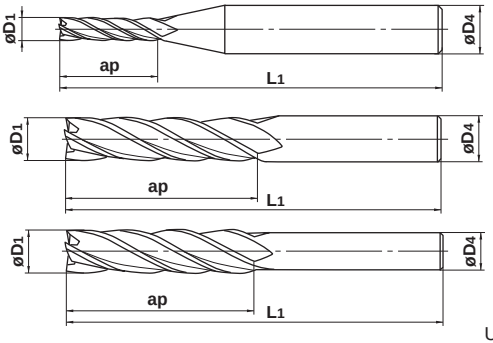
CUTTING CONDITIONS B389

G-4LC

End mill, Long cut length, 4 flute, Center cutting

D1≤20 0 −+0.030
D1>20 0 −+0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



4 flute end mill with long flute for deep cutting applications.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
G4LCD0300	3	15	55	6	4	●	1
D0400	4	20	55	8	4	●	1
D0500	5	25	60	8	4	●	1
D0600	6	25	60	8	4	●	1
D0700	7	35	75	10	4	●	1
D0800	8	35	75	10	4	●	1
D0900	9	45	90	10	4	●	1
D1000	10	45	90	10	4	●	2
D1100	11	55	105	12	4	●	1
D1200	12	55	105	12	4	●	2
D1300	13	55	105	12	4	●	3
D1400	14	55	110	16	4	●	1
D1500	15	65	120	16	4	●	1
D1600	16	65	120	16	4	●	2
D1700	17	65	120	16	4	●	3
D1800	18	65	120	16	4	●	3
D1900	19	75	140	20	4	●	1
D2000	20	75	140	20	4	●	2
D2100	21	75	140	20	4	●	3
D2200	22	75	140	20	4	●	3
D2300	23	90	160	25	4	●	1
D2400	24	90	160	25	4	●	1
D2500	25	90	160	25	4	●	2
D2600	26	90	160	25	4	●	3
D2700	27	90	160	25	4	●	3
D2800	28	90	160	25	4	●	3
D2900	29	90	160	25	4	●	3
D3000	30	90	160	25	4	●	3
D3100	31	95	180	25	4	●	3
D3200	32	95	180	32	4	●	2
D3300	33	95	180	32	4	●	3
D3400	34	100	185	32	4	●	3
D3500	35	100	185	32	4	●	3
D3600	36	105	190	32	4	●	3
D3700	37	105	190	32	4	●	3
D3800	38	105	190	32	4	●	3
D3900	39	110	195	32	4	●	3
D4000	40	110	195	32	4	●	3

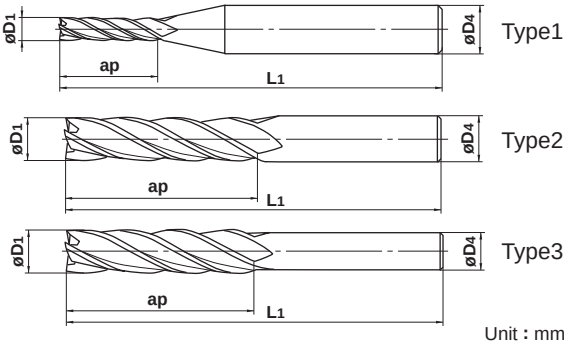
CUTTING CONDITIONS B390

4LC

End mill, Long cut length, 4 flute, Center cutting

D1 ≤ 20 0 −+0.020
D1 > 20 0 −+0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



● 4 flute end mill with long flute for deep cutting applications.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
4LCD0300	3	15	55	6	4	●	1
D0400	4	20	55	8	4	●	1
D0500	5	25	60	8	4	●	1
D0600	6	25	60	8	4	●	1
D0700	7	35	75	10	4	●	1
D0800	8	35	75	10	4	●	1
D0900	9	45	90	10	4	●	1
D1000	10	45	90	10	4	●	2
D1100	11	55	105	12	4	●	1
D1200	12	55	105	12	4	●	2
D1300	13	55	105	12	4	●	3
D1400	14	55	110	16	4	●	1
D1500	15	65	120	16	4	●	1
D1600	16	65	120	16	4	●	2
D1700	17	65	120	16	4	●	3
D1800	18	65	120	16	4	●	3
D1900	19	75	140	20	4	●	1
D2000	20	75	140	20	4	●	2
D2100	21	75	140	20	4	●	3
D2200	22	75	140	20	4	●	3
D2300	23	90	160	25	4	●	1
D2400	24	90	160	25	4	●	1
D2500	25	90	160	25	4	●	2
D2600	26	90	160	25	4	●	3
D2700	27	90	160	25	4	●	3
D2800	28	90	160	25	4	●	3
D2900	29	90	160	25	4	●	3
D3000	30	90	160	25	4	●	3
D3100	31	95	180	25	4	●	3
D3200	32	95	180	32	4	●	2
D3300	33	95	180	32	4	●	3
D3400	34	100	185	32	4	●	3
D3500	35	100	185	32	4	●	3
D3600	36	105	190	32	4	●	3
D3700	37	105	190	32	4	●	3
D3800	38	105	190	32	4	●	3
D3900	39	110	195	32	4	●	3
D4000	40	110	195	32	4	●	3

● : Inventory maintained in Japan.

CUTTING CONDITIONS B391

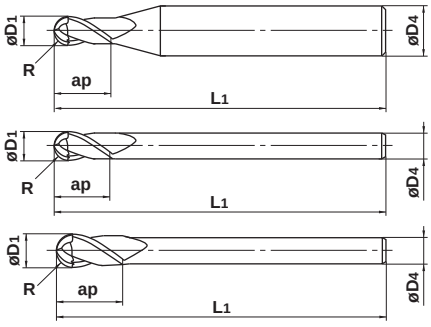
S-2MB

Ball nose end mill, Medium cut length, 2 flute

R≤6.5 ±0.01
R>6.5 ±0.02

D1≤3 0 — -0.02
3<D1≤13 0 — -0.03
D1>13 0 — -0.04

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



● 2 flute end mill with KHA Super substrate for general use.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
S2MBR0050	0.5	1	2	50	6	2	●	1
R0060	0.6	1.2	2	50	6	2	●	1
R0070	0.7	1.4	2	50	6	2	●	1
R0075	0.75	1.5	3.5	50	6	2	●	1
R0080	0.8	1.6	3.5	50	6	2	●	1
R0090	0.9	1.8	3.5	50	6	2	●	1
R0100	1	2	5	50	6	2	●	1
R0125	1.25	2.5	6	50	6	2	●	1
R0150	1.5	3	8	60	6	2	●	1
R0175	1.75	3.5	8	70	6	2	●	1
R0200	2	4	8	70	6	2	●	1
R0225	2.25	4.5	10	90	6	2	●	1
R0250	2.5	5	10	90	6	2	●	1
R0275	2.75	5.5	12	100	6	2	●	1
R0300	3	6	12	100	6	2	●	2
R0325	3.25	6.5	14	100	6	2	●	3
R0350	3.5	7	14	100	6	2	●	3
R0375	3.75	7.5	14	100	8	2	●	1
R0400	4	8	14	100	8	2	●	2
R0425	4.25	8.5	18	120	8	2	●	3
R0450	4.5	9	18	120	8	2	●	3
R0475	4.75	9.5	18	120	10	2	●	1
R0500	5	10	18	120	10	2	●	2
R0550	5.5	11	20	120	10	2	●	3
R0600	6	12	22	120	12	2	●	2
R0650	6.5	13	24	120	12	2	●	3
R0700	7	14	26	120	12	2	●	3
R0750	7.5	15	28	120	16	2	●	1
R0800	8	16	30	160	16	2	●	2
R0900	9	18	34	160	16	2	●	3
R1000	10	20	38	180	20	2	●	2
R1250	12.5	25	50	200	25	2	●	2
R1500	15	30	55	200	25	2	●	3
R1600	16	32	55	200	32	2	●	2
R1750	17.5	35	65	220	32	2	●	3
R2000	20	40	65	220	32	2	●	3
R2500	25	50	75	240	42	2	●	3

CUTTING CONDITIONS B392

2FB

Ball nose end mill, Medium cut length, 2 flute

R≤6.5 ±0.01
R>6.5 ±0.02

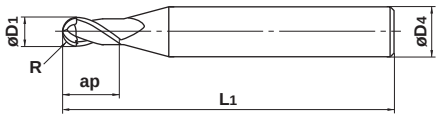
D1≤3 0 — -0.02
3<D1≤13 0 — -0.03
D1>13 0 — -0.04

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

CO HSS

30°

● 2 flute ball nose end mill for general use.



Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2FBR0050	0.5	1	2	50	6	2	●	1
R0075	0.75	1.5	3.5	50	6	2	●	1
R0100	1	2	5	50	6	2	●	1
R0125	1.25	2.5	6	50	6	2	●	1
R0150	1.5	3	8	60	6	2	●	1
R0200	2	4	8	70	6	2	●	1
R0250	2.5	5	10	90	6	2	●	1
R0300	3	6	12	100	6	2	●	2
R0350	3.5	7	14	100	6	2	●	3
R0400	4	8	14	100	8	2	●	2
R0450	4.5	9	18	120	8	2	●	3
R0500	5	10	18	120	10	2	●	2
R0600	6	12	22	120	12	2	●	2
R0700	7	14	26	120	12	2	●	3
R0800	8	16	30	160	16	2	●	2
R0900	9	18	34	160	16	2	●	3
R1000	10	20	38	180	20	2	●	2
R1250	12.5	25	50	200	25	2	●	2
R1500	15	30	55	200	25	2	●	3
R1600	16	32	55	200	32	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B393

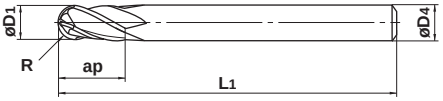
K-4MB

Ball nose end mill, Medium cut length, 4 flute

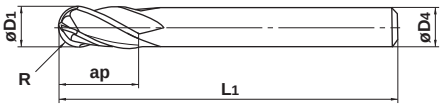
R≤6.5 ±0.01
R>6.5 ±0.02

D1≤13 0 — -0.03
D1>13 0 — -0.04

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



Type1



Type2

KHA

30°

● 4 flute ball nose end mill with high rigidity for general use.

Unit : mm

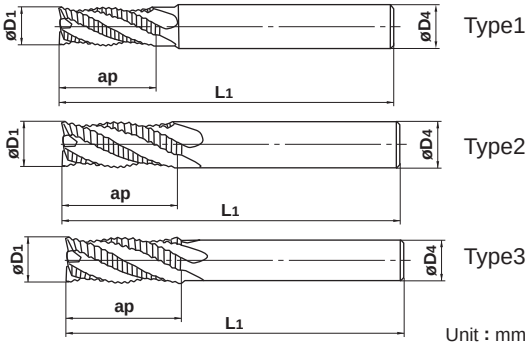
Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
K4MBR0300	3	6	12	100	6	4	●	1
R0400	4	8	14	100	8	4	●	1
R0500	5	10	18	120	10	4	●	1
R0600	6	12	22	120	12	4	●	1
R0700	7	14	26	120	12	4	●	2
R0800	8	16	30	160	16	4	●	1
R0900	9	18	34	160	16	4	●	2
R1000	10	20	38	180	20	4	●	1
R1250	12.5	25	50	200	25	4	●	1
R1500	15	30	55	200	25	4	●	2
R1600	16	32	55	200	32	4	●	1
R1800	18	36	65	220	32	4	●	2
R2000	20	40	65	220	32	4	●	2

CUTTING CONDITIONS B394

SR

Roughing end mill, Short cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



● 4—6 flute roughing end mill with full radius cutting edge profile for heavy cutting.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
SRD1000	10	22	75	10	4	●	2
D1200	12	27	85	12	4	●	2
D1300	13	27	85	12	4	●	3
D1400	14	27	90	16	4	●	1
D1500	15	27	95	16	4	●	1
D1600	16	33	100	16	4	●	2
D1800	18	33	100	16	4	●	3
D1900	19	38	110	20	4	●	1
D2000	20	38	110	20	4	●	2
D2200	22	38	110	20	4	●	3
D2500	25	43	125	25	4	●	2
D2800	28	43	125	25	5	●	3
D3000	30	48	130	25	5	●	3
D3200	32	55	145	32	5	●	2
D3500	35	55	145	32	6	●	3
D4000	40	65	165	32	6	●	3

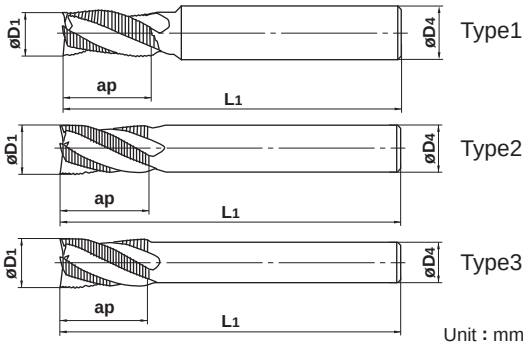
● : **Inventory maintained in Japan.**

CUTTING CONDITIONS B395

G-SFPR

Roughing end mill, Short cut length, 3—6 flute, Fine pitch form

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



Unit : mm

● 3—6 flute roughing end mill with good chip disposal properties for high feed milling.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
GSFPRD0500	5	10	80	6	3	●	1
D0600	6	12	80	6	3	●	2
D0700	7	17	80	8	3	●	1
D0800	8	17	85	8	3	●	2
D0900	9	22	100	10	3	●	1
D1000	10	22	100	10	3	●	2
D1200	12	27	110	12	3	●	2
D1300	13	27	110	12	3	●	3
D1400	14	27	135	12	3	●	3
D1500	15	27	140	16	3	●	1
D1600	16	33	140	16	3	●	2
D1800	18	33	140	16	3	●	3
D1900	19	38	145	20	3	●	1
D2000	20	38	145	20	3	●	2
D2200	22	38	145	20	3	●	3
D2400	24	43	150	25	4	●	1
D2500	25	43	150	25	4	●	2
D2800	28	43	160	25	4	●	3
D3000	30	48	165	25	4	●	3
D3200	32	55	175	25	4	●	3
D3500	35	55	175	32	6	●	3
D4000	40	65	185	32	6	●	3
D4500	45	65	200	42	6	●	3
D5000	50	75	200	42	6	●	3

CUTTING CONDITIONS B396

G-MR

Roughing end mill, Medium cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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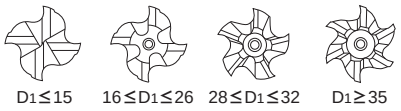

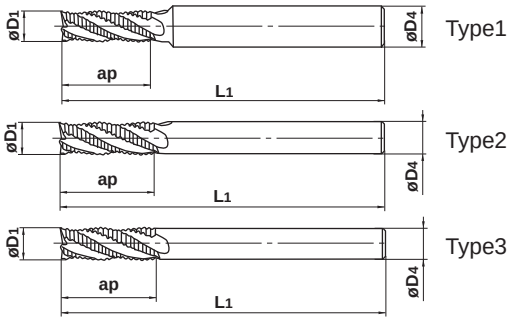

● 4—6 flute roughing end mill with TiN coating for general rough milling of steels through to difficult-to-cut materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
GMRD0500	5	15	60	6	4	●	1
D0600	6	15	60	6	4	●	2
D0700	7	20	70	8	4	●	1
D0800	8	20	70	8	4	●	2
D0900	9	25	80	10	4	●	1
D1000	10	25	80	10	4	●	2
D1100	11	30	110	12	4	●	1
D1200	12	30	110	12	4	●	2
D1300	13	35	115	12	4	●	3
D1400	14	35	135	16	4	●	1
D1500	15	40	140	16	4	●	1
D1600	16	40	140	16	4	●	2
D1700	17	40	140	16	4	●	3
D1800	18	40	140	16	4	●	3
D1900	19	45	145	20	4	●	1
D2000	20	45	145	20	4	●	2
D2200	22	45	145	20	4	●	3
D2400	24	50	150	25	4	●	1
D2500	25	50	150	25	4	●	2
D2600	26	50	150	25	4	●	3
D2800	28	55	160	25	5	●	3
D3000	30	55	165	25	5	●	3
D3200	32	60	175	32	5	●	2
D3500	35	60	175	32	6	●	3
D4000	40	65	185	32	6	●	3
D4500	45	70	200	42	6	●	3
D5000	50	70	200	42	6	●	3

● : Inventory maintained in Japan.

CUTTING CONDITIONS B396

MR

Roughing end mill, Medium cut length, 4−6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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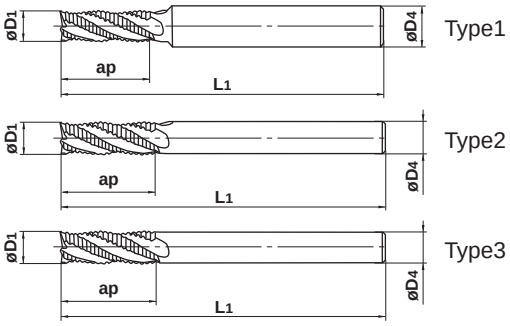


CO HSS

- 4−6 flute roughing end mill with full radius cutting edge profile for heavy cutting.

Unit : mm

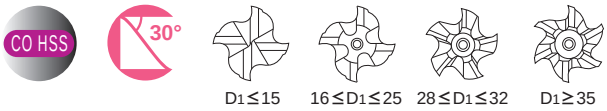
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MRD0500	5	15	60	6	4	●	1
D0600	6	15	60	6	4	●	2
D0700	7	20	70	8	4	●	1
D0800	8	20	70	8	4	●	2
D0900	9	25	80	10	4	●	1
D1000	10	25	80	10	4	●	2
D1100	11	30	110	12	4	●	1
D1200	12	30	110	12	4	●	2
D1300	13	35	115	12	4	●	3
D1400	14	35	135	16	4	●	1
D1500	15	40	140	16	4	●	1
D1600	16	40	140	16	4	●	2
D1700	17	40	140	16	4	●	3
D1800	18	40	140	16	4	●	3
D1900	19	45	145	20	4	●	1
D2000	20	45	145	20	4	●	2
D2200	22	45	145	20	4	●	3
D2400	24	50	150	25	4	●	1
D2500	25	50	150	25	4	●	2
D2600	26	50	150	25	4	●	3
D2800	28	55	160	25	5	●	3
D3000S25	30	55	165	25	5	●	3
D3000S32	30	55	165	32	5	●	1
D3200	32	60	175	32	5	●	2
D3500	35	60	175	32	6	●	3
D4000S32	40	65	185	32	6	●	3
D4000S42	40	65	185	42	6	●	1
D4500	45	70	200	42	6	●	3
D5000	50	70	200	42	6	●	3

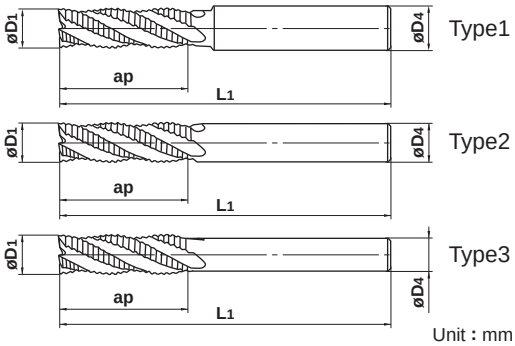
CUTTING CONDITIONS B395

JR

Roughing end mill, Semi long cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○





- 4—6 flute roughing end mill with full radius cutting edge profile for heavy cutting.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
JRD1000	10	35	90	10	4	●	2
D1200	12	45	125	12	4	●	2
D1400	14	45	145	16	4	●	1
D1500	15	55	155	16	4	●	1
D1600	16	55	155	16	4	●	2
D1800	18	55	155	16	4	●	3
D2000	20	65	165	20	4	●	2
D2200	22	65	165	20	4	●	3
D2400	24	65	165	25	4	●	1
D2500	25	75	175	25	4	●	2
D2800	28	75	180	25	5	●	3
D3000S25	30	75	185	25	5	●	3
D3000S32	30	75	185	32	5	●	1
D3200	32	75	190	32	5	●	2
D3500	35	85	200	32	6	●	3
D4000S32	40	85	205	32	6	●	3
D4000S42	40	85	205	42	6	●	1
D4500	45	105	235	42	6	●	3
D5000	50	105	235	42	6	●	3

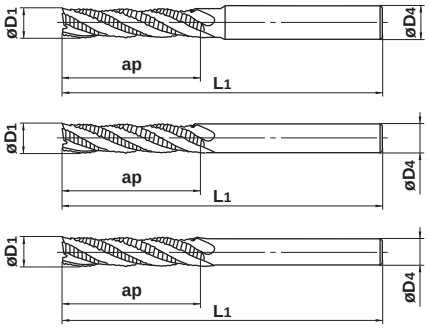
● : Inventory maintained in Japan.

CUTTING CONDITIONS B395

LR

Roughing end mill, Long cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



CO HSS

30°

D1≤25 28≤D1≤32 D1≥35

● 4—6 flute end mill with longer cut length and overall length than standard.

Unit : mm

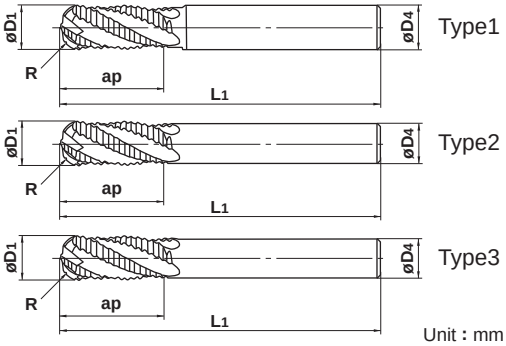
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
LRD1000	10	45	110	10	4	●	2
D1200	12	50	130	12	4	●	2
D1400	14	55	155	16	4	●	1
D1500	15	65	165	16	4	●	1
D1600	16	65	165	16	4	●	2
D1800	18	65	165	16	4	●	3
D2000	20	75	175	20	4	●	2
D2200	22	75	175	20	4	●	3
D2400	24	85	185	25	4	●	1
D2500	25	90	190	25	4	●	2
D2800	28	90	190	25	5	●	3
D3000S25	30	90	200	25	5	●	3
D3000S32	30	90	200	32	5	●	1
D3200	32	95	210	32	5	●	2
D3500	35	100	215	32	6	●	3
D4000S32	40	110	230	32	6	●	3
D4000S42	40	110	230	42	6	●	1
D4500	45	120	250	42	6	●	3
D5000	50	120	250	42	6	●	3

CUTTING CONDITIONS B395

MRB

Ball nose roughing end mill, Medium cut length, 4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



Unit : mm

● 4 flute ball nose roughing end mill for general use.

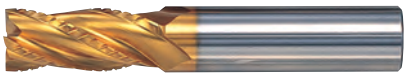
Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MRBR0400	4	8	20	70	8	4	●	2
R0500	5	10	25	80	10	4	●	2
R0600	6	12	30	110	12	4	●	2
R0700	7	14	35	135	16	4	●	1
R0800	8	16	40	140	16	4	●	2
R0900	9	18	40	140	16	4	●	3
R1000	10	20	45	145	20	4	●	2
R1250	12.5	25	50	150	25	4	●	2
R1500	15	30	55	165	25	4	●	3
R1600	16	32	60	175	32	4	●	2
R1750	17.5	35	60	175	32	4	●	3
R2000	20	40	65	185	32	4	●	3
R2250	22.5	45	70	200	42	4	●	3
R2500	25	50	70	200	42	4	●	3

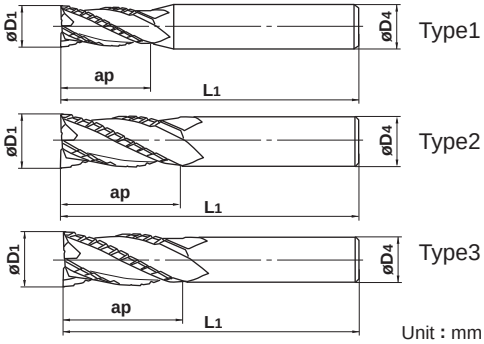
● : **Inventory maintained in Japan.**

G-MSF

Semi finish end mill, Medium cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○





- 4—6 flute semi finish end mill with specially notched cutting edge geometry for reduced cutting resistance.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
GMSFD0300	3	10	50	6	4	●	1
D0350	3.5	12	50	6	4	●	1
D0400	4	12	50	6	4	●	1
D0450	4.5	15	55	6	4	●	1
D0500	5	15	55	6	4	●	1
D0550	5.5	15	60	8	4	●	1
D0600	6	15	60	8	4	●	1
D0650	6.5	20	65	10	4	●	1
D0700	7	20	65	10	4	●	1
D0750	7.5	20	65	10	4	●	1
D0800	8	20	65	10	4	●	1
D0850	8.5	25	75	10	4	●	1
D0900	9	25	75	10	4	●	1
D0950	9.5	25	75	12	4	●	1
D1000	10	25	75	12	4	●	1
D1050	10.5	30	85	12	4	●	1
D1100	11	30	85	12	4	●	1
D1150	11.5	30	85	12	4	●	1
D1200	12	30	85	12	4	●	2
D1250	12.5	35	90	12	4	●	3
D1300	13	35	90	12	4	●	3
D1350	13.5	35	105	16	4	●	1
D1400	14	35	105	16	4	●	1
D1450	14.5	40	110	16	4	●	1
D1500	15	40	110	16	4	●	1
D1600	16	40	110	16	4	●	2
D1700	17	40	115	16	4	●	3
D1800	18	40	115	16	4	●	3
D1900	19	45	120	20	4	●	1
D2000	20	45	120	20	4	●	2
D2100	21	45	120	20	4	●	3
D2200	22	45	120	20	4	●	3
D2300	23	50	130	25	4	●	1
D2400	24	50	130	25	4	●	1
D2500	25	50	130	25	4	●	2
D2600	26	50	130	25	4	●	3
D2700	27	55	135	25	4	●	3
D2800	28	55	135	25	4	●	3

CUTTING CONDITIONS B397

G-MSF

Semi finish end mill, Medium cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
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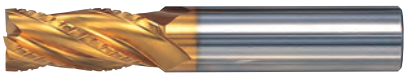
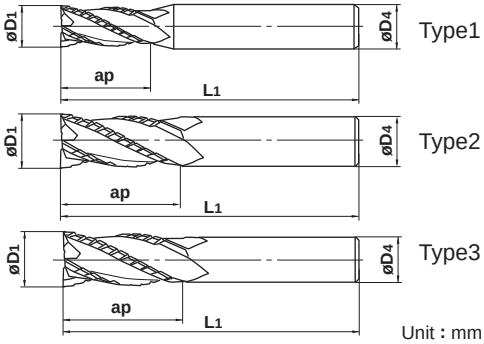




- 4—6 flute semi finish end mill with specially notched cutting edge geometry for reduced cutting resistance.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
GMSFD2900	29	55	135	25	4	●	3
D3000	30	55	135	25	4	●	3
D3200	32	60	150	32	4	●	2
D3400	34	60	150	32	4	●	3
D3500	35	60	150	32	4	●	3
D3600	36	65	155	32	4	●	3
D3800	38	65	155	32	4	●	3
D4000	40	65	155	32	6	●	3
D4200	42	70	170	42	6	●	2
D4500	45	70	170	42	6	●	3
D4600	46	70	170	42	6	●	3
D4800	48	70	170	42	6	●	3
D5000	50	70	170	42	6	●	3

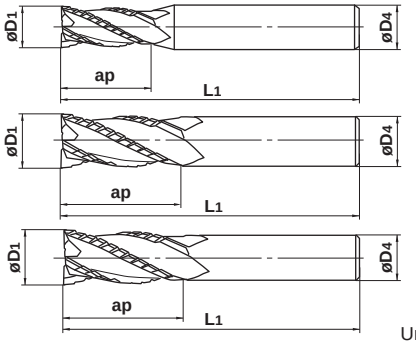
● : Inventory maintained in Japan.

CUTTING CONDITIONS B397

MSF

Semi finish end mill, Medium cut length, 4—6 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



Unit : mm

- 4—6 flute semi finish end mill with specially notched cutting edge geometry for reduced cutting resistance.

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSFD0300	3	10	50	6	4	●	1
D0400	4	12	50	6	4	●	1
D0500	5	15	55	6	4	●	1
D0600	6	15	60	8	4	●	1
D0700	7	20	65	10	4	●	1
D0800	8	20	65	10	4	●	1
D0900	9	25	75	10	4	●	1
D1000	10	25	75	12	4	●	1
D1100	11	30	85	12	4	●	1
D1200	12	30	85	12	4	●	2
D1300	13	35	90	12	4	●	3
D1400	14	35	105	16	4	●	1
D1500	15	40	110	16	4	●	1
D1600	16	40	110	16	4	●	2
D1700	17	40	115	16	4	●	3
D1800	18	40	115	16	4	●	3
D1900	19	45	120	20	4	●	1
D2000	20	45	120	20	4	●	2
D2100	21	45	120	20	4	●	3
D2200	22	45	120	20	4	●	3
D2300	23	50	130	25	4	●	1
D2400	24	50	130	25	4	●	1
D2500	25	50	130	25	4	●	2
D2600	26	50	130	25	4	●	3
D2700	27	55	135	25	4	●	3
D2800	28	55	135	25	4	●	3
D2900	29	55	135	25	4	●	3
D3000	30	55	135	25	4	●	3
D3200	32	60	150	32	4	●	2
D3400	34	60	150	32	4	●	3
D3500	35	60	150	32	4	●	3
D3600	36	65	155	32	4	●	3
D3800	38	65	155	32	4	●	3
D4000	40	65	155	32	6	●	3
D4200	42	70	170	42	6	●	2
D4500	45	70	170	42	6	●	3
D5000	50	70	170	42	6	●	3

CUTTING CONDITIONS B397

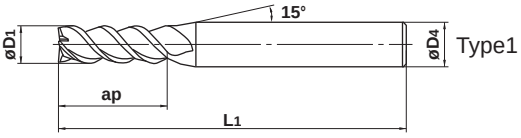
HIGH HELIX END MILLS

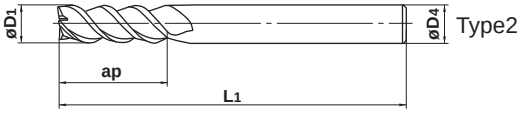
K-MH

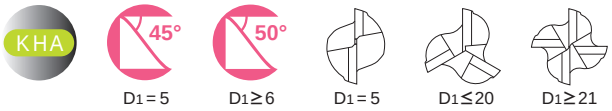
End mill, Medium cut length, 2—4 flute, High helix angle

0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○







● 2—4 flute end mill for general use on mild steel through to difficult-to-cut materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
KMHD0500	5	12	65	8	2	●	1
D0600	6	15	65	8	3	●	1
D0700	7	20	75	10	3	●	1
D0800	8	20	75	10	3	●	1
D0900	9	25	90	10	3	●	1
D1000	10	25	90	12	3	●	1
D1100	11	30	95	12	3	●	1
D1200	12	30	95	12	3	●	2
D1300	13	35	105	16	3	●	1
D1400	14	35	105	16	3	●	1
D1500	15	40	115	16	3	●	1
D1600	16	40	115	16	3	●	2
D1800	18	40	125	20	3	●	1
D2000	20	45	130	20	3	●	2
D2100	21	45	135	25	4	●	1
D2200	22	45	135	25	4	●	1
D2300	23	50	140	25	4	●	1
D2400	24	50	140	25	4	●	1
D2500	25	50	140	25	4	●	2
D3000	30	55	150	32	4	●	1

● : Inventory maintained in Japan.

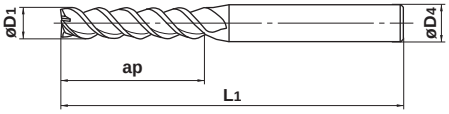
CUTTING CONDITIONS B398

K-LH

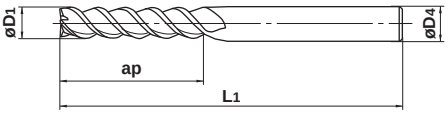
End mill, Long cut length, 3—4 flute, High helix angle

0 — -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



Type1



Type2

KHA

50°

D1≤20

D1≥25

● 3—4 flute end mill with longer cut length and overall length than standard for deeper machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
KLHD0600	6	25	75	8	3	●	1
D0800	8	35	85	10	3	●	1
D1000	10	45	110	12	3	●	1
D1200	12	55	115	12	3	●	2
D1400	14	65	125	16	3	●	1
D1500	15	65	140	16	3	●	1
D1600	16	65	140	16	3	●	2
D1800	18	75	150	20	3	●	1
D2000	20	85	160	20	3	●	2
D2500	25	105	180	25	4	●	2
D3000	30	105	185	32	4	●	1

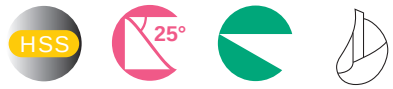
CUTTING CONDITIONS B398

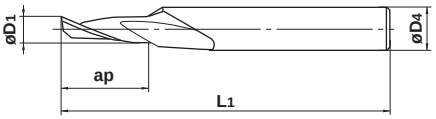
1MA

End mill, Medium cut length, 1 flute

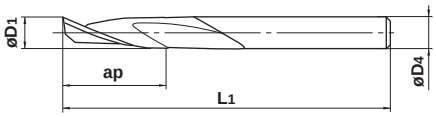
0 ー -0.050

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≦45HRC)	Hardened Steel (≦55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
							◎





Type1



Type2

● Single flute end mill for aluminium channel and wood working.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
1MA D0300	3	10	60	8	1	●	1
D0400	4	12	60	8	1	●	1
D0500	5	15	65	8	1	●	1
D0600	6	15	65	8	1	●	1
D0800	8	20	75	8	1	●	2

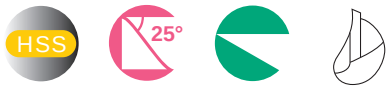
● : Inventory maintained in Japan.

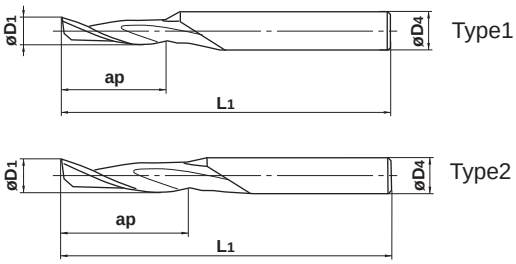
1LA

End mill, Long cut length, 1 flute

0 — -0.050

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
							◎





- Single flute end mill with longer cut length and overall length than standard for deeper machining.

Unit : mm

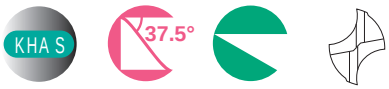
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
1LA D0400	4	18	70	8	1	●	1
D0500	5	20	70	8	1	●	1
D0600	6	20	70	8	1	●	1
D0800	8	30	80	8	1	●	2
D1000	10	35	90	10	1	●	2
D1200	12	45	100	12	1	●	2

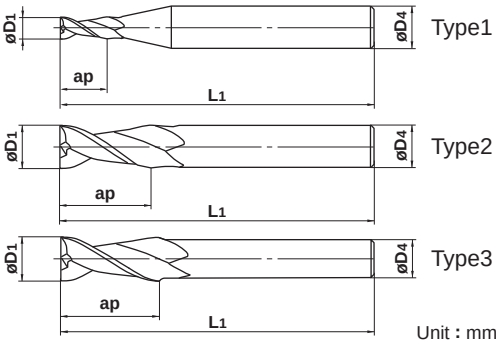
S-2SDA

End mill, Short cut length, 2 flute, For aluminium alloy

D1=3 0 −-0.020
D1>3 0 −-0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						○	◎





● 2 flute end mill for aluminium alloy and soft materials.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
S2SDAD0300	3	8	50	6	2	●	1
D0400	4	8	60	8	2	●	1
D0500	5	10	60	8	2	●	1
D0600	6	12	60	8	2	●	1
D0700	7	15	65	10	2	●	1
D0800	8	15	65	10	2	●	1
D0900	9	20	75	10	2	●	1
D1000	10	20	75	10	2	●	2
D1100	11	22	85	12	2	●	1
D1200	12	22	85	12	2	●	2
D1300	13	26	90	12	2	●	3
D1400	14	26	90	16	2	●	1
D1500	15	30	100	16	2	●	1
D1600	16	32	100	16	2	●	2
D1700	17	34	100	16	2	●	3
D1800	18	34	100	16	2	●	3
D1900	19	38	115	20	2	●	1
D2000	20	38	115	20	2	●	2

● : Inventory maintained in Japan.

CUTTING CONDITIONS B398

2MA

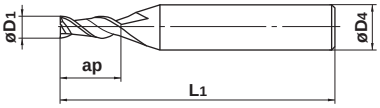
End mill, Medium cut length, 2 flute, For light alloy

0 — -0.030

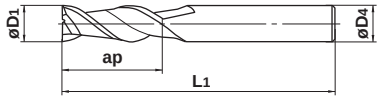
Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
						○	◎

CO HSS

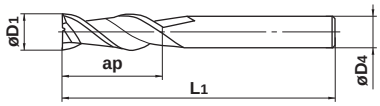
40°



Type1



Type2



Type3

● 2 flute end mill with high helix angle for aluminium alloy machining.

Unit : mm

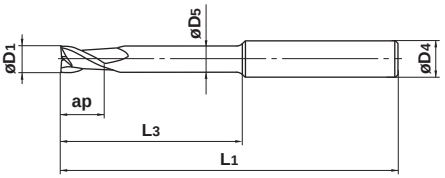
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2MAD0300	3	10	50	6	2	●	1
D0400	4	12	50	6	2	●	1
D0500	5	15	55	6	2	●	1
D0600	6	15	55	6	2	●	2
D0700	7	20	65	8	2	●	1
D0800	8	20	65	8	2	●	2
D0900	9	25	75	10	2	●	1
D1000	10	25	75	10	2	●	2
D1100	11	30	85	12	2	●	1
D1200	12	30	85	12	2	●	2
D1300	13	35	90	12	2	●	3
D1400	14	35	95	16	2	●	1
D1500	15	40	100	16	2	●	1
D1600	16	40	100	16	2	●	2
D1700	17	40	100	16	2	●	3
D1800	18	40	100	16	2	●	3
D1900	19	45	115	20	2	●	1
D2000	20	45	115	20	2	●	2

K-2XL

End mill, Short cut length, 2 flute, Long neck

0 — -0.030

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



Type1

● 2 flute end mill with long neck for long reach applications.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
K2XLD0300	3	4.5	22	2.96	60	6	2	●	1
D0350	3.5	5	27	3.46	65	8	2	●	1
D0400	4	6	30	3.96	70	8	2	●	1
D0450	4.5	7	35	4.46	75	8	2	●	1
D0500	5	7.5	40	4.96	80	8	2	●	1
D0600	6	9	45	5.93	85	8	2	●	1
D0700	7	10.5	50	6.93	90	10	2	●	1
D0800	8	12	60	7.93	105	10	2	●	1
D0900	9	13.5	65	8.93	115	10	2	●	1
D1000	10	15	75	9.93	125	12	2	●	1

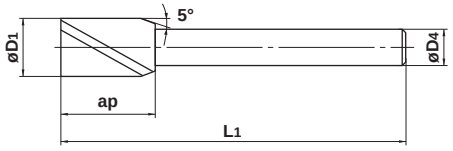
● : Inventory maintained in Japan.

2ML

End mill, Medium cut length, 2 flute, Long shank

D1≤20 0 −-0.030
D1>20 0 −-0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



Type1

● 2 flute end mill for efficient slotting.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
2MLD1200A112	12	25	112	10	2	●	1
D1200A140	12	25	140	10	2	●	1
D1400A112	14	35	112	12	2	●	1
D1400A140	14	35	140	12	2	●	1
D1400A180	14	30	180	12	2	●	1
D1800A125	18	45	125	16	2	●	1
D1800A160	18	45	160	16	2	●	1
D1800A200	18	40	200	16	2	●	1
D1800A250	18	35	250	16	2	●	1
D2200A140	22	45	140	20	2	●	1
D2200A180	22	45	180	20	2	●	1
D2200A224	22	40	224	20	2	●	1
D2200A280	22	35	280	20	2	●	1
D2800A160	28	55	160	25	2	●	1
D2800A200	28	55	200	25	2	●	1
D2800A250	28	50	250	25	2	●	1
D2800A315	28	45	315	25	2	●	1
D3500A180	35	65	180	32	2	●	1
D3500A224	35	65	224	32	2	●	1
D3500A280	35	60	280	32	2	●	1
D3500A355	35	55	355	32	2	●	1

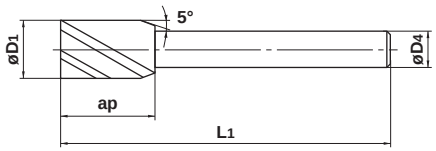
DEEP SLOTTING END MILLS

4ML

End mill, Medium cut length, 4 flute, Long shank

D1 ≤ 20 0 − +0.030
D1 > 20 0 − +0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○	○	○



Type1

CO HSS

30°

● 4 flute end mill for efficient general use machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
4MLD1200A112	12	25	112	10	4	●	1
D1200A140	12	25	140	10	4	●	1
D1400A112	14	35	112	12	4	●	1
D1400A140	14	35	140	12	4	●	1
D1400A180	14	30	180	12	4	●	1
D1800A125	18	45	125	16	4	●	1
D1800A160	18	45	160	16	4	●	1
D1800A200	18	40	200	16	4	●	1
D1800A250	18	35	250	16	4	●	1
D2200A140	22	45	140	20	4	●	1
D2200A180	22	45	180	20	4	●	1
D2200A224	22	40	224	20	4	●	1
D2200A280	22	35	280	20	4	●	1
D2800A160	28	55	160	25	4	●	1
D2800A200	28	55	200	25	4	●	1
D2800A250	28	50	250	25	4	●	1
D2800A315	28	45	315	25	4	●	1
D3500A180	35	65	180	32	4	●	1
D3500A224	35	65	224	32	4	●	1
D3500A280	35	60	280	32	4	●	1
D3500A355	35	55	355	32	4	●	1

● : Inventory maintained in Japan.

4SX

End mill, Long cut length, 4 flute

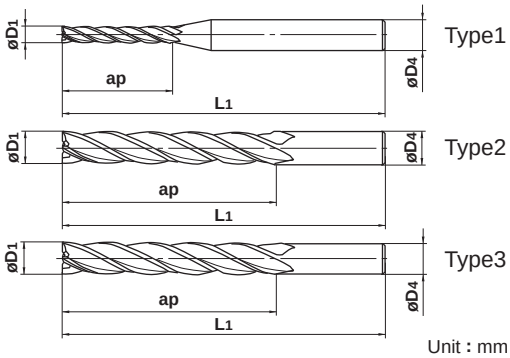
D1 = 3 0 −+0.020
3< D1 ≤20 0 −+0.030
D1 >20 0 −+0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○

CO HSS

30°

4 flute end mill for long reach finishing applications.



Unit : mm

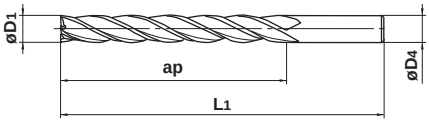
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
4SXD0300	3	30	75	6	4	●	1
D0400	4	30	75	6	4	●	1
D0500	5	30	75	6	4	●	1
D0600	6	50	95	6	4	●	2
D0700	7	50	95	8	4	●	1
D0800	8	50	95	8	4	●	2
D0900	9	60	110	10	4	●	1
D1000	10	60	110	10	4	●	2
D1100	11	80	140	12	4	●	1
D1200	12	80	140	12	4	●	2
D1300	13	80	140	12	4	●	3
D1400	14	100	160	16	4	●	1
D1500	15	100	160	16	4	●	1
D1600	16	100	160	16	4	●	2
D1800	18	100	160	16	4	●	3
D2000	20	130	205	20	4	●	2
D2200	22	130	205	20	4	●	3
D2500	25	130	210	25	4	●	2
D2600	26	130	210	25	4	●	3
D3000	30	130	210	25	4	●	3
D3200	32	130	215	32	4	●	2
D3500	35	130	215	32	4	●	3
D4000	40	130	215	32	4	●	3
D4500S32	45	130	220	32	4	●	3
D4500S42	45	130	220	42	4	●	3
D5000S32	50	130	225	32	4	●	3
D5000S42	50	130	225	42	4	●	3

4MX

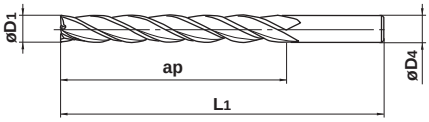
End mill, Extra long cut length, 4 flute

D1=20 0 − +0.030
D1>20 0 − +0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



Type1



Type2

● 4 flute end mill with longer cut length and overall length than standard.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
4MXD2000	20	160	235	20	4	●	1
D2500	25	160	240	25	4	●	1
D2600	26	160	240	25	4	●	2
D3000	30	160	240	25	4	●	2
D3200	32	160	245	32	4	●	1
D3500	35	160	245	32	4	●	2
D4000	40	160	245	32	4	●	2
D4500S32	45	160	250	32	4	●	2
D4500S42	45	160	250	42	4	●	2
D5000S32	50	160	255	32	4	●	2
D5000S42	50	160	255	42	4	●	2

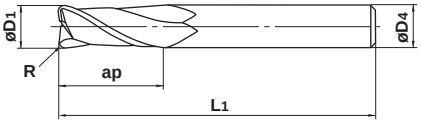
● : Inventory maintained in Japan.

RB

Corner radius end mill, Medium cut length, 2 flute

D1≤20 0 − -0.030
D1>20 0 − -0.040

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○			○	○		○



Type1

CO HSS 30°

● 2 corner radius end mill.

Unit : mm

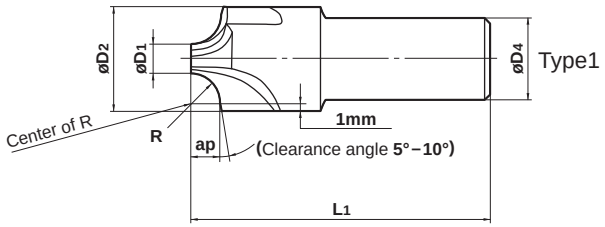
Order Number	Dia. D1	Corner R R	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
RBD0600R0050	6	0.5	15	55	6	2	●	1
D0600R0100	6	1	15	55	6	2	●	1
D0600R0150	6	1.5	15	55	6	2	●	1
D0600R0200	6	2	15	55	6	2	●	1
D0800R0050	8	0.5	20	65	8	2	●	1
D0800R0100	8	1	20	65	8	2	●	1
D0800R0150	8	1.5	20	65	8	2	●	1
D0800R0200	8	2	20	65	8	2	●	1
D0800R0250	8	2.5	20	65	8	2	●	1
D0800R0300	8	3	20	65	8	2	●	1
D1000R0050	10	0.5	25	75	10	2	●	1
D1000R0100	10	1	25	75	10	2	●	1
D1000R0150	10	1.5	25	75	10	2	●	1
D1000R0200	10	2	25	75	10	2	●	1
D1000R0250	10	2.5	25	75	10	2	●	1
D1000R0300	10	3	25	75	10	2	●	1
D1200R0050	12	0.5	30	85	12	2	●	1
D1200R0100	12	1	30	85	12	2	●	1
D1200R0150	12	1.5	30	85	12	2	●	1
D1200R0200	12	2	30	85	12	2	●	1
D1200R0250	12	2.5	30	85	12	2	●	1
D1200R0300	12	3	30	85	12	2	●	1
D1200R0400	12	4	30	85	12	2	●	1
D1200R0500	12	5	30	85	12	2	●	1
D1600R0400	16	4	40	100	16	2	●	1
D1600R0500	16	5	40	100	16	2	●	1
D2000R0600	20	6	45	115	20	2	●	1
D2500R0800	25	8	50	120	25	2	●	1
D3200R1000	32	10	60	145	32	2	●	1

CORNER RADIUS END MILLS

RC

Corner radius cutter, 3—4 flute

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel,Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
◎	○						○



● Corner radius cutter with straight flutes for easy regrinding.

Unit : mm

Order Number	Corner Radius R	Dia. D2	Tip Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
RCR0050	0.5	9	6	0.5	60	10	3	●	1
R0075	0.75	9.5	6	0.75	60	10	3	●	1
R0100	1	10	6	1	60	10	3	●	1
R0125	1.25	10.5	6	1.25	60	10	3	●	1
R0150	1.5	11	6	1.5	60	10	3	●	1
R0200	2	12	6	2	65	12	3	●	1
R0250	2.5	13	6	2.5	65	12	3	●	1
R0300	3	14	6	3	65	12	3	●	1
R0350	3.5	15	6	3.5	70	12	3	●	1
R0400	4	16	6	4	70	12	3	●	1
R0450	4.5	18	7	4.5	75	16	4	●	1
R0500	5	19	7	5	75	16	4	●	1
R0600	6	22	8	6	75	16	4	●	1
R0700	7	24	8	7	75	16	4	●	1
R0800	8	27	9	8	90	20	4	●	1
R0900	9	29	9	9	90	20	4	●	1
R1000	10	32	10	10	90	25	4	●	1
R1200	12	38	12	12	110	32	4	●	1
R1250	12.5	39	12	12.5	110	32	4	●	1
R1500	15	45	13	15	110	32	4	●	1
R1600	16	48	14	16	110	32	4	●	1

● : Inventory maintained in Japan.

CUTTING CONDITIONS B399

Memo

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

End mill, Short cut length, 2 flute **MS2SS**

End mill, Medium cut length, 2 flute **MS2MS** Corner radius end mill, Medium cut length, 2 flute **MS2MRB**

Work material	Carbon steel, Alloy steel Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI 4140, AISI H13			Hardened steel (45−55HRC) AISI H13, AISI 420		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.1	40000	40	0.001	40000	40	0.001
0.2	40000	100	0.002	40000	100	0.002
0.3	40000	200	0.005	40000	200	0.005
0.4	40000	600	0.01	40000	600	0.01
0.5	40000	1000	0.015	40000	960	0.015
0.6	40000	1200	0.02	40000	1200	0.02
0.7	40000	1400	0.02	40000	1400	0.02
0.8	40000	1600	0.03	40000	1600	0.03
0.9	40000	1800	0.04	40000	1600	0.04
1	40000	2000	0.06	32000	1600	0.06
1.5	40000	3000	0.12	32000	1900	0.08
2	30000	3000	0.18	24000	1900	0.10
2.5	24000	2600	0.25	19000	1600	0.13
3	20000	2300	0.30	16000	1400	0.15
4	15000	2000	0.40	12000	1200	0.20
5	12000	1600	0.50	9000	900	0.25
6	10000	1400	0.60	7000	700	0.30
8	8000	1000	0.80	5600	550	0.40
10	6400	900	1.00	4500	500	0.50
12	5400	820	1.00	3800	450	0.50
16	2400	380	≤3	1200	100	≤0.8
20	1900	320	≤4	1000	80	≤1
Depth of cut	≤Please refer to the list above for depth of cut. ≤1D			D ≤Please refer to the list above for depth of cut. D:Dia.		

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) When slotting with end mills with ϕ3 or larger, reduce the revolution to 50−70% and the feed rate to 40−60%.
3) When drilling, please set the feed rate at 1/3 or below the values above.

MS2MD

End mill, Medium cut length, 2 flute, Strong geometry type

Work material	Carbon steel, Alloy steel Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI 4140, AISI H13			Hardened steel (45−55HRC) AISI H13, AISI 420		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
1	40000	2000	0.06	32000	1600	0.06
1.5	40000	3000	0.12	32000	1900	0.08
2	30000	3000	0.18	24000	1900	0.10
2.5	24000	2600	0.25	19000	1600	0.13
3	20000	2300	0.30	16000	1400	0.15
4	15000	2000	0.40	12000	1200	0.20
5	12000	1600	0.50	9000	900	0.25
6	10000	1400	0.60	7000	700	0.30
8	8000	1000	0.80	5600	550	0.40
10	6400	900	1.00	4500	500	0.50
12	5400	820	1.00	3800	450	0.50
Depth of cut	≤Please refer to the list above for depth of cut. ≤1D			D ≤Please refer to the list above for depth of cut.		

D:Dia.

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) When slotting with end mills with ϕ3 or larger, reduce the revolution to 50−70% and the feed rate to 40−60%.
3) When drilling, please set the feed rate at 1/3 or below the values above.

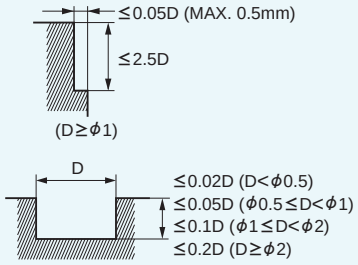
RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

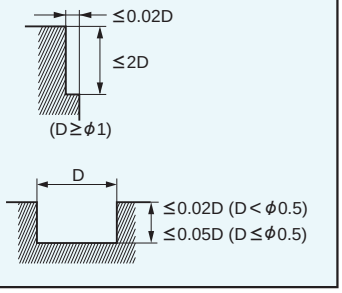
MS2JS

End mill, Semi long cut length, 2 flute

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
0.1	40000	— (40)	40000	— (40)	40000	— (35)	40000	— (25)
0.2	40000	— (45)	40000	— (45)	40000	— (35)	32000	— (25)
0.3	40000	— (55)	32000	— (45)	27000	— (35)	21000	— (25)
0.4	32000	— (60)	24000	— (45)	20000	— (35)	16000	— (25)
0.5	25000	— (60)	19000	— (45)	16000	— (35)	13000	— (25)
0.6	21000	— (60)	16000	— (45)	13000	— (35)	11000	— (25)
0.7	18000	— (60)	14000	— (45)	11000	— (35)	9100	— (25)
0.8	16000	— (60)	12000	— (45)	9900	— (35)	8000	— (25)
0.9	14000	— (60)	11000	— (45)	8800	— (35)	7100	— (25)
1	13000	60 (60)	9500	45 (45)	8000	35 (35)	6400	25 (25)
1.5	8500	60 (60)	6400	45 (45)	5300	35 (35)	4200	25 (25)
2	6400	60 (60)	4800	45 (45)	4000	35 (35)	3200	25 (25)
2.5	5100	60 (60)	3800	45 (45)	3200	40 (40)	2500	25 (25)
3	4200	65 (60)	3400	55 (45)	2600	40 (40)	2100	25 (25)
4	3400	80 (60)	2700	65 (45)	2100 (1600)	50 (30)	1700	35 (25)
5	2900	100 (60)	2300	80 (45)	1800 (1350)	60 (30)	1500	40 (25)
6	2500	120 (60)	2000	100 (50)	1500 (1100)	75 (30)	1300	50 (25)
8	1900	130 (60)	1500	100 (50)	1200 (900)	80 (30)	1000	50 (25)
10	1600	130 (60)	1300	100 (50)	950 (710)	75 (30)	800	50 (25)
12	1300	120 (60)	1100	100 (50)	800 (600)	75 (30)	670	50 (25)

Depth of cut





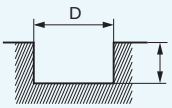
( ) : Indicates standard revolution and feed rate for slotting.

D:Dia.

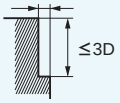
1) Please use 4 fluted end mills for workpiece of 55−60HRC.
2) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below the values above.

MS2LS
End mill, Long cut length, 2 flute

Slotting

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35			Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.2	40000	400	0.001	30000	250	0.001
0.3	40000	600	0.005	35000	420	0.005
0.4	40000	700	0.007	30000	420	0.007
0.5	40000	800	0.01	24000	380	0.01
0.6	33000	800	0.015	21000	480	0.01
0.7	28000	800	0.015	18000	480	0.015
0.8	25000	800	0.02	16000	480	0.02
0.9	22000	800	0.03	15000	500	0.03
1	20000	800	0.04	13000	500	0.04
1.5	13000	800	0.10	9000	500	0.10
2	10000	800	0.15	6700	500	0.15
2.5	9000	800	0.20	6000	500	0.20
3	8000	800	0.20	5200	460	0.20
4	6000	600	0.20	4000	340	0.20
5	4800	480	0.30	3200	280	0.20
6	4000	400	0.30	2600	210	0.20
8	3000	300	0.30	2000	170	0.30
10	2400	240	0.30	1600	140	0.30
12	2000	200	0.30	1300	110	0.30
Depth of cut	 ≤Please refer to the list above for depth of cut. D:Dia.					

Side milling

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35			Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
3	3500	370	0.05	2600	250	0.03
4	2800	370	0.06	2100	200	0.03
5	2200	330	0.06	1700	160	0.03
6	1800	300	0.06	1500	140	0.03
8	1600	270	0.08	1100	140	0.04
10	1400	240	0.10	900	140	0.05
12	1200	200	0.10	750	120	0.06
Depth of cut	≤Please refer to the list above for depth of cut.  ≤3D D:Dia.					

1) Please use VC-LD for workpiece of 45HRC or above.
2) Vibration is liable to occur in the initial stages of machining, but after machining 1−2m the machining becomes stable and vibration could disappear.
3) Side milling with large depth of cuts with end mills less than ϕ3 is not recommended. When side milling, divide the cutting depth into several times paths.
4) If chattering and noise occur, reduce the revolution and the feed rate proportionately and also reduce the depth of cut.
5) When drilling, please set the feed rate at 1/3 or below the values above.

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

MS2XL

End mill, Short cut length, 2 flute, Long neck

Work material		Carbon steel AISI 1055 Pre-hardened steel AISI H13 (—HRC45)		
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)
0.2	0.5	40000	600	0.004
	1	40000	400	0.001
0.3	1	40000	650	0.007
	3	40000	500	0.002
	9	22000	150	0.001
0.4	2	40000	800	0.007
	4	40000	800	0.003
	12	17000	150	0.001
0.5	2	40000	950	0.01
	6	40000	700	0.003
	10	25000	400	0.002
	15	14000	150	0.001
0.6	2	40000	950	0.01
	6	40000	800	0.005
	10	25000	450	0.003
	18	12000	150	0.001
0.7	2	40000	1000	0.02
	6	40000	900	0.01
	8	30000	700	0.005
	10	11000	300	0.005
0.8	4	40000	1200	0.02
	8	40000	1000	0.01
	12	25000	400	0.003
	24	10000	150	0.001
0.9	6	40000	1300	0.02
	10	35000	1000	0.01
	15	9000	400	0.003
1	6	40000	1600	0.04
	8	40000	1600	0.03
	12	30000	1000	0.02
	20	15000	400	0.005
	30	8000	150	0.001
1.2	6	40000	1900	0.06
	8	40000	1900	0.04
	12	25000	1000	0.03
	20	6500	150	0.01

Work material		Carbon steel AISI 1055 Pre-hardened steel AISI H13 (—HRC45)		
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)
1.5	6	40000	2400	0.10
	10	30000	1800	0.05
	20	15000	600	0.02
	30	7500	300	0.005
	45	5000	150	0.001
1.6	6	40000	2400	0.12
	10	30000	1800	0.07
	16	20000	1000	0.04
2	6	40000	2400	0.18
	10	30000	1800	0.10
	16	20000	1000	0.06
	30	8000	500	0.04
	40	6000	250	0.01
	60	4200	150	0.003
2.5	8	25000	2500	0.20
	16	18000	1700	0.10
	20	12000	1000	0.08
	40	8000	400	0.03
	50	4000	150	0.015
3	8	20000	2000	0.30
	16	15000	1400	0.15
	20	10000	800	0.10
	40	5000	250	0.02
	50	3700	150	0.010
4	12	15000	3000	0.30
	20	11000	2200	0.22
	30	6400	1200	0.12
	40	4500	400	0.05
	50	2800	150	0.018
5	16	12000	2500	0.35
	35	5100	750	0.15
	60	2200	150	0.02
6	20	10000	2000	0.40
	40	4200	800	0.20
	60	1900	150	0.10

1) The above table shows the revolution and feed rate for each neck length. Please reduce the feed rate when using end mills with a longer neck length.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.

MS2XL6

End mill, Short cut length, 2 flute, 6mm shank

Work material		Structural steel, Carbon steel AISI 1049, AISI 1055 Alloy steel AISI P20, Tool steel AISI W1-10 Pre-hardened steel AISI H13			Pre-hardened steel AISI H13, AISI 420 (40—45HRC)		
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)
0.3	0.8	40000	500—1000	0.01	30000	300—800	0.01
	1.5			0.007			0.007
0.4	1	40000	500—1000	0.015	30000	300—800	0.015
	2			0.01			0.01
0.5	1.3	40000	500—1000	0.02	30000	300—800	0.02
	2.5			0.013			0.013
0.6	1.5	33000	500—1000	0.03	25000	300—800	0.03
	3			0.018			0.018
0.7	1.8	29000	500—1000	0.04	22000	300—800	0.04
	3.5			0.025			0.025
0.8	2	25000	500—1000	0.06	20000	300—800	0.06
	4			0.03			0.03
0.9	2.3	22000	500—1000	0.08	18000	300—800	0.08
	4.5			0.05			0.05
1	2.5	20000	500—1000	0.1	16000	300—800	0.1
	5			0.07			0.07
1.1	2.8	18000	500—1000	0.12	14000	300—800	0.12
	5.5			0.08			0.08
1.2	3	16000	500—1000	0.12	13000	300—800	0.12
	6			0.08			0.08
1.3	3.3	15000	500—1000	0.12	12000	300—800	0.12
	6.5			0.08			0.08
1.4	3.5	14000	500—1000	0.12	11000	300—800	0.12
	7			0.08			0.08
1.5	3.8	13000	500—1000	0.15	10000	300—800	0.15
	7.5			0.1			0.1
1.6	4	12000	500—1000	0.15	10000	300—800	0.15
	8			0.1			0.1
1.7	4.3	12000	500—1000	0.17	9500	300—800	0.17
	8.5			0.12			0.12
1.8	4.5	11000	500—1000	0.17	9000	300—800	0.17
	9			0.12			0.12
1.9	4.8	10000	500—1000	0.17	9000	300—800	0.17
	9.5			0.12			0.12
2	5	10000	500—1000	0.2	9000	300—800	0.2
	10			0.15			0.15
2.1	5.3	9800	500—1000	0.2	9000	300—800	0.2
	10.5			0.15			0.15
2.2	5.5	9600	500—1000	0.2	9000	300—800	0.2
	11			0.15			0.15
2.3	5.8	9400	500—1000	0.2	8800	300—800	0.2
	11.5			0.15			0.15
2.4	6	9200	500—1000	0.25	8700	300—800	0.25
	12			0.2			0.2
2.5	6.3	9000	500—1000	0.25	8500	300—800	0.25
	12.5			0.2			0.2

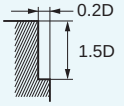
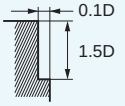
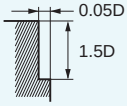
1) The above table shows the revolution and feed rate for each neck length. Please reduce the feed rate when using end mills with a longer neck length.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) If the depth of cut is shallow or when rib milling, the revolution and feed rate can be increased.

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

MSSHD
High power, Short cut length, 4 flute

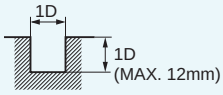
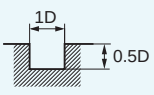
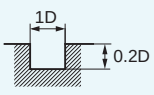
MSMHD
High power, Medium cut length, 4 flute

Side milling

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI 4140 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P20		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Hardened steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	15000	550	10000	340	10000	320	6400	160	4800	100
3	11000	800	7400	500	7400	480	4800	250	4000	170
4	8000	900	5600	540	5600	520	3600	270	3200	240
5	6400	1000	4500	600	4500	580	2900	300	2600	240
6	5800	1100	3700	640	3700	600	2400	320	2100	230
8	4400	1100	2800	660	2800	600	1800	330	1600	220
10	3500	1000	2200	640	2200	560	1400	320	1300	200
12	2900	1000	1900	640	1900	530	1200	320	1100	170
16	2200	800	1400	500	1400	450	900	250	800	130
20	1800	750	1100	460	1100	440	720	230	640	100
25	1400	600	900	400	900	380	570	200	510	80
Depth of cut										

D:Dia.

Slotting

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI 4140 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P20		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Hardened steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	12000	400	7000	200	7000	100	4200	80	2300	40
3	9000	600	5300	300	5300	150	3200	130	1900	70
4	7200	720	4000	360	4000	180	2400	140	1400	95
5	5800	720	3200	360	3200	180	1900	150	1100	95
6	5000	800	2700	400	2700	200	1600	160	950	95
8	3700	800	2000	400	2000	200	1200	170	720	90
10	3000	720	1600	360	1600	180	960	160	570	80
12	2500	720	1300	360	1300	180	800	160	480	70
16	2000	600	1000	280	1000	150	600	130	360	50
20	1600	540	800	250	800	130	480	120	290	40
25	1300	480	640	220	640	120	380	100	230	35
Depth of cut										

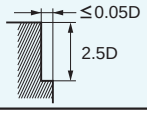
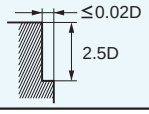
D:Dia.

1) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
4) Climb cutting is recommended for side milling.

MSJHD

High power, Semi long cut length, 4 flute

Side milling

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Hardened steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	11000	370	7000	230	7000	210	5000	100	3800	55
3	8000	550	5100	320	5100	300	3800	190	2500	80
4	6200	620	4000	350	4000	340	3000	210	1900	110
5	5000	670	3200	370	3200	360	2400	220	1500	110
6	4200	750	2600	400	2600	390	2000	220	1300	110
8	3200	780	2000	420	2000	400	1500	230	960	100
10	2500	690	1600	410	1600	380	1200	210	760	100
12	2100	670	1300	380	1300	340	1000	190	640	80
16	1600	570	1000	320	1000	280	750	170	480	65
20	1200	470	800	290	800	260	600	150	380	50
Depth of cut										

D:Dia.

1) When cutting austenitic stainless steels and heatproof alloys, the use of non-water-soluble cutting fluid is especially effective.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) Climb cutting is recommended.

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

MSMHZD

Slotting, Medium cut length, 3 flute

Side milling

Work material	Structural steel Carbon steel Alloy steel (−30HRC) AISI 1049, AISI P20		Hardened steel (30−45HRC) AISI H13		Stainless steel AISI 304, AISI 316 Titanium alloy		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	19000	600	13000	310	10000	200	9500	65
1.5	14000	600	9000	310	7500	210	6400	75
2	11000	600	7200	310	6000	210	4800	75
3	8500	770	5300	380	4400	220	3200	100
4	7200	850	4400	480	3700	250	2400	130
6	5300	940	3200	490	2700	270	1600	130
8	4000	1010	2400	560	2000	280	1200	120
10	3200	1000	1900	480	1600	300	950	110
12	2700	950	1600	440	1300	300	800	90
16	2000	720	1200	350	1000	260	600	70
20	1600	600	1000	290	800	240	480	60
Depth of cut	≤0.2D (D>ϕ3) ≤0.1D (D≤ϕ3) ≤1.5D		≤0.2D (D>ϕ3) ≤0.1D (D≤ϕ3) ≤1.5D		0.05D 1.5D			

D:Dia.

Plunging

Work material	Structural steel Carbon steel Alloy steel (−30HRC) AISI 1049, AISI P20		Hardened steel (30−45HRC) AISI H13		Stainless steel AISI 304, AISI 316 Titanium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	13000	80	10000	50	6000	10
1.5	12000	120	8000	80	6000	20
2	11000	200	7200	140	6000	30
3	8500	250	5300	180	4200	50
4	7200	300	4400	210	3300	60
6	5300	300	3200	210	2200	70
8	4000	320	2400	220	1600	80
10	3200	340	1900	240	1300	70
12	2700	320	1600	220	1100	70
16	2000	250	1200	180	800	55
20	1600	200	1000	140	640	55
Depth of cut	≤1D (D≥ϕ2) ≤0.5D (D<ϕ2)		≤0.5D (D≥ϕ2) ≤0.2D (D<ϕ2)			

D:Dia.

Slotting

Work material	Structural steel Carbon steel Alloy steel (−30HRC) AISI 1049, AISI P20		Hardened steel (30−45HRC) AISI H13		Stainless steel AISI 304, AISI 316 Titanium alloy		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	13000	130	10000	80	6000	30	5700	25
1.5	12000	250	8000	150	6000	60	3800	30
2	11000	500	7200	260	6000	130	2800	35
3	8500	640	5300	320	4200	130	1900	50
4	7200	650	4400	370	3300	140	1400	70
6	5300	720	3200	380	2200	140	950	70
8	4000	780	2400	430	1600	140	720	60
10	3200	770	1900	370	1300	150	570	50
12	2700	730	1600	340	1100	150	480	40
16	2000	600	1200	290	800	130	360	30
20	1600	500	1000	240	640	120	290	25
Depth of cut	D ≤1D (D≥ϕ2) ≤0.5D (D<ϕ2)		D ≤0.5D (D≥ϕ2) ≤0.2D (D<ϕ2)		D 0.2D			

D:Dia.

1) The above table shows the standard recommended cutting conditions. Adjustments maybe needed according to the condition of the machine.
2) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
3) When plunging of materials such as austenitic stainless steels and titanium alloys, it is recommended to peck feed. (0.1D)

MS4SC
End mill, Short cut length, 4 flute

MS4MC
End mill, Medium cut length, 4 flute

Work material	Carbon steel, Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI 1049, AISI H13, AISI P20			Alloy steel, Tool steel (45−55HRC) AISI H13, AISI 420		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
1	40000	3000	0.06	32000	2400	0.06
1.5	40000	4500	0.12	32000	3600	0.08
2	30000	4500	0.18	24000	3600	0.10
2.5	24000	3900	0.25	19000	3000	0.13
3	20000	3500	0.30	16000	2700	0.15
4	15000	3000	0.40	12000	2400	0.20
5	12000	2400	0.50	9000	1800	0.25
6	10000	2100	0.60	7000	1500	0.30
8	8000	1500	0.80	5600	1100	0.40
10	6400	1400	1.00	4500	950	0.50
12	5400	1200	1.00	3800	860	0.50
16	2400	550	≤3	1200	120	≤0.8
20	1900	480	≤4	1000	100	≤1
Depth of cut	≤Please refer to the list above for depth of cut. ≤1D			D ≤Please refer to the list above for depth of cut. D:Dia.		

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) When slotting with end mills with ϕ3 or larger, reduce the revolution to 50−70% and the feed rate to 40−60%.
3) When drilling, please set the feed rate at 1/3 or below the values above.

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

MS4JC

End mill, Semi long cut length, 4 flute

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	11100	85	9500	65	8000	50	6400	35
1.5	7400	85	6400	90	5300	50	4200	35
2	5600	85	4800	90	4000	50	3200	35
2.5	4500	85	3800	90	3200	55	2500	35
3	3700	90	3400	90	2600	60	2100	35
4	3000	110	2700	90	2100	70	1700	50
5	2600	140	2300	110	1800	85	1500	55
6	2300	170	2000	140	1500	110	1300	70
8	1700	180	1500	140	1200	110	1000	70
10	1400	180	1300	140	950	110	800	70
12	1200	170	1100	140	800	110	670	70
Depth of cut	≤0.05D (MAX. 0.5mm) ≤2.5D D ≤0.1D (D<ϕ2) ≤0.2D (D≥ϕ2)						≤0.02D ≤2D D ≤0.05D	

D:Dia.

1) The above table shows cutting conditions for standard side milling. For slotting, please reduce the feed rate only to 50% of the table figure. Please set the revolution rate at 80% and the feed rate at 40% when slotting austenitic stainless steels.
2) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below the values above.

MS4XL

End mill, Short cut length, 4 flute, Long neck

Work material		Structural steel, Carbon steel AISI 1049, AISI 1055 Alloy steel AISI P20, Tool steel AISI W1-10 Pre-hardened steel AISI P21		
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
1	4	40000	3000	0.04
	8	36000	2400	0.03
	12	20000	1000	0.02
	16	10000	500	0.005
1.2	6	40000	3000	0.05
	10	36000	2400	0.04
	12	20000	1200	0.03
	16	12000	600	0.01
1.5	6	40000	3200	0.06
	12	32000	2400	0.05
	16	16000	1100	0.03
	20	10000	600	0.01
1.8	6	40000	3600	0.08
	12	32000	2800	0.06
	20	12000	1000	0.02
	25	7000	600	0.01
2	6	40000	4000	0.1
	12	32000	3200	0.07
	16	24000	2400	0.05
	20	12000	1200	0.03
	30	5000	500	0.01
2.5	8	32000	4000	0.2
	25	9000	1100	0.04
	50	2500	300	0.005
3	8	25000	3600	0.4
	16	18000	2500	0.2
	25	12000	1700	0.1
	30	7000	800	0.05

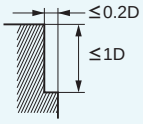
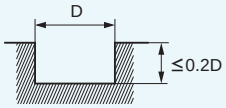
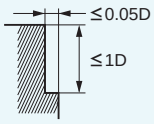
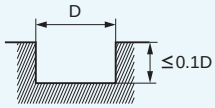
Work material		Structural steel, Carbon steel AISI 1049, AISI 1055 Alloy steel AISI P20, Tool steel AISI W1-10 Pre-hardened steel AISI P21		
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
3.5	15	20000	3000	0.6
	25	11000	1600	0.15
	35	5500	800	0.06
4	12	18000	3000	1
	20	12000	2000	0.5
	30	8000	1300	0.2
	40	4200	700	0.08
	50	2400	400	0.03
5	16	14000	2700	1
	25	9500	1800	0.5
	35	6400	1200	0.2
	50	3200	600	0.05
6	20	11000	2200	1.2
	30	8000	1600	0.6
	40	5400	1100	0.25
	50	3200	640	0.15
8	30	8000	1600	1.6
	50	4000	800	0.5
	70	2000	400	0.2
10	40	6400	1300	2
	60	3200	640	0.6
	80	1600	320	0.3

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

MS2ES
End mill, 2 flute, For small automatic lathes

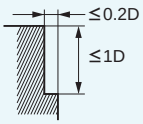
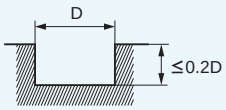
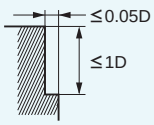
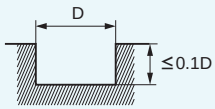
MS3ES
End mill, 3 flute, For small automatic lathes

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35, Brass		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI P20, AISI H13		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	10000	600	7000	400	6000	300	5000	120
4	7500	600	5200	400	4500	300	4000	120
5	6000	600	4200	400	3600	300	3200	120
6	5000	600	3500	400	3000	300	2700	120
7	4500	560	3000	360	2700	280	2300	110
8	4000	520	2800	350	2400	260	2000	110
10	3200	450	2200	300	1900	230	1600	100
12	2700	410	1900	270	1600	210	1300	100
Depth of cut	 				 			

D:Dia.

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) When drilling, please set the feed rate at 1/3 or below the values above.

MS4EC
End mill, 4 flute, For small automatic lathes

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35, Brass		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI P20, AISI H13		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	10000	900	7000	600	6000	450	5000	180
4	7500	900	5200	600	4500	450	4000	180
5	6000	900	4200	600	3600	450	3200	180
6	5000	900	3500	600	3000	450	2700	180
7	4500	840	3000	540	2700	420	2300	160
8	4000	780	2800	520	2400	390	2000	160
10	3200	680	2200	450	1900	340	1600	140
12	2700	620	1900	410	1600	310	1300	120
14	2300	550	1600	350	1400	280	1200	120
Depth of cut	 				 			

D:Dia.

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) When drilling, please set the feed rate at 1/3 or below the values above.

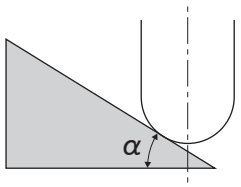
Ball nose end mill, Short cut length, 2 flute **MS2SB**

Ball nose end mill, Medium cut length, 2 flute **MS2MB**

Ball nose taper end mill, Medium cut length, 2 flute **MS2MTB**

Work material	Carbon steel, Alloy steel, Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI H13					Hardened steel (45−55HRC) AISI H13				
R (mm)	α≤15°		α>15°		Depth of cut (mm)	α≤15°		α>15°		Depth of cut (mm)
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	
R 0.1	40000	300	40000	250	0.003	40000	300	40000	250	0.003
R 0.15	40000	500	40000	350	0.007	40000	500	40000	350	0.007
R 0.2	40000	1600	40000	1200	0.02	40000	1300	40000	950	0.015
R 0.25	40000	2400	40000	1400	0.025	40000	1900	40000	1100	0.020
R 0.3	40000	3200	40000	1600	0.03	40000	2500	40000	1300	0.025
R 0.4	40000	4800	40000	2400	0.05	40000	4000	40000	1900	0.04
R 0.5	40000	5600	40000	3200	0.06	40000	5600	40000	3000	0.05
R 0.75	40000	6500	40000	4000	0.09	40000	6500	32000	3200	0.08
R 1	40000	6500	39000	4700	0.11	40000	6500	31000	3500	0.11
R 1.25	40000	7000	33000	4500	0.12	36000	6500	26000	3500	0.12
R 1.5	40000	7500	27000	4300	0.13	32000	6000	22000	3400	0.13
R 2	32000	7500	20000	3600	0.15	25000	6000	16000	2700	0.15
R 2.5	25000	6000	16000	2900	0.20	20000	5400	13000	2300	0.20
R 3	21000	5800	13000	2600	0.25	17000	4700	10000	2000	0.25
R 4	16000	4500	10000	2000	0.30	13000	3600	8000	1500	0.30
R 5	13000	3600	8000	1700	0.50	10000	2900	6400	1200	0.50
R 6	9000	2500	6000	1300	0.50	7200	2000	4800	1000	0.50
Depth of cut	≤0.2R ≤Please refer to the list above for depth of cut. R:Radius									

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
4) If the depth of cut is shallow, the revolution and feed rate can be increased.



RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

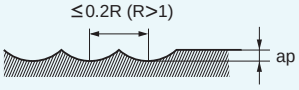
MS2XLB

Ball nose end mill, Short cut length, 2 flute, Long neck

Work material		Carbon steel, Alloy steel Pre-hardened steel Hardened steel (−45HRC) AISI 1049, AISI 4140, AISI H13			Hardened steel (45−55HRC) AISI H13, AISI 420		
R (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)
R 0.1	0.5	50000	400	0.003	50000	320	0.003
	1	50000	400	0.002	50000	320	0.002
	1.5	40000	300	0.001	40000	240	0.001
	2	40000	200	0.001	40000	160	0.001
	2.5	40000	100	0.001	40000	80	0.001
	3	30000	50	0.001	30000	40	0.001
R 0.15	1	50000	600	0.007	50000	480	0.007
	1.5	50000	600	0.005	50000	480	0.005
	2	50000	600	0.003	50000	480	0.003
	2.5	40000	400	0.003	40000	320	0.003
	3	40000	300	0.002	40000	240	0.002
	4	30000	200	0.002	30000	160	0.002
R 0.2	1	50000	1800	0.015	50000	1400	0.015
	2	50000	1300	0.01	50000	1000	0.01
	3	50000	900	0.005	50000	700	0.005
	4	40000	600	0.004	40000	480	0.004
	5	40000	400	0.003	40000	320	0.003
	6	30000	200	0.002	30000	160	0.002
R 0.25	2	50000	2500	0.02	50000	2000	0.02
	3	50000	1500	0.015	50000	1200	0.015
	4	45000	1200	0.01	45000	950	0.01
	5	45000	900	0.007	45000	700	0.007
	6	36000	600	0.006	36000	480	0.006
	7	32000	400	0.005	32000	320	0.005
	8	32000	300	0.003	32000	240	0.003
	10	26000	200	0.002	26000	160	0.002
R 0.3	2	50000	3500	0.03	50000	2800	0.03
	3	50000	3500	0.03	50000	2800	0.03
	4	44000	2500	0.02	44000	2000	0.02
	5	37000	1200	0.01	37000	950	0.01
	6	37000	1000	0.008	37000	800	0.008
	7	35000	750	0.008	35000	600	0.008
	8	35000	600	0.006	35000	480	0.006
	9	30000	500	0.004	30000	400	0.004
	10	30000	500	0.003	30000	400	0.003
	11	22000	300	0.002	22000	240	0.002
	12	22000	200	0.002	22000	160	0.002
R 0.4	2	50000	4400	0.04	50000	3500	0.04
	3	50000	4000	0.04	50000	3200	0.04
	4	50000	4000	0.02	50000	3200	0.02
	5	35000	2400	0.02	35000	1900	0.02
	6	35000	2400	0.02	35000	1900	0.02
	7	30000	1500	0.015	30000	1200	0.015
	8	30000	1500	0.01	30000	1200	0.01
	10	30000	700	0.008	30000	560	0.008
	12	22000	500	0.006	22000	400	0.006
R 0.5	3	40000	4000	0.05	40000	3200	0.05
	4	40000	4000	0.05	40000	3200	0.05
	6	35000	3000	0.03	35000	2400	0.03
	8	30000	2000	0.02	30000	1600	0.02

Work material		Carbon steel, Alloy steel Pre-hardened steel Hardened steel (−45HRC) AISI 1049, AISI 4140, AISI H13			Hardened steel (45−55HRC) AISI H13, AISI 420		
R (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)
R 0.5	10	20000	1000	0.01	20000	800	0.01
	12	20000	1000	0.01	20000	800	0.01
	14	18000	600	0.008	18000	480	0.008
	16	18000	500	0.008	18000	400	0.008
	18	13000	300	0.005	13000	240	0.005
	20	13000	250	0.005	13000	200	0.005
R 0.6	3.6	40000	4400	0.06	40000	3500	0.06
	6	40000	4400	0.04	40000	3500	0.04
	8	40000	4000	0.04	40000	3200	0.04
	10	27000	1900	0.02	27000	1500	0.02
	12	16000	1400	0.02	16000	1100	0.02
	18	15000	700	0.008	15000	560	0.008
	24	11000	300	0.006	11000	240	0.006
R 0.75	6	40000	6000	0.07	36000	4300	0.07
	8	40000	6000	0.07	36000	4300	0.07
	10	40000	5000	0.06	36000	3600	0.06
	12	32000	3400	0.04	29000	2400	0.04
	16	15000	1400	0.03	15000	1100	0.03
	20	12000	900	0.02	12000	720	0.02
	30	9000	400	0.01	9000	320	0.01
R 1	4	40000	8000	0.1	32000	5000	0.1
	6	40000	8000	0.1	32000	5000	0.1
	8	40000	6000	0.1	32000	3800	0.1
	10	40000	5000	0.08	32000	3200	0.08
	12	40000	5000	0.08	32000	3200	0.08
	16	32000	3500	0.05	26000	2200	0.05
	20	10000	1000	0.04	10000	800	0.04
	25	10000	1000	0.04	10000	800	0.04
	30	10000	800	0.02	10000	640	0.02
	35	10000	600	0.02	10000	480	0.02
R 1.5	8	32000	7000	0.15	26000	4500	0.15
	10	32000	7000	0.15	26000	4500	0.15
	16	32000	5000	0.1	26000	3200	0.1
	20	27000	3800	0.1	22000	2400	0.1
	25	21000	2700	0.08	17000	1700	0.08
	30	6000	700	0.08	6000	560	0.08
	35	6000	700	0.06	6000	560	0.06
	40	6000	600	0.04	6000	480	0.04
R 2	10	24000	6000	0.2	19000	3800	0.2
	20	24000	3800	0.15	19000	2400	0.15
	30	20000	3000	0.1	16000	1900	0.1
	40	12000	1700	0.1	12000	1400	0.1
	50	8000	1000	0.05	8000	800	0.05
R 2.5	20	22000	6000	0.2	18000	3800	0.2
	25	22000	4400	0.2	18000	2800	0.2
	30	22000	3800	0.15	18000	2400	0.15
	35	22000	3600	0.1	18000	2300	0.1
R 3	30	20000	6000	0.2	16000	3800	0.2
	50	20000	3000	0.15	16000	1900	0.15

Depth of cut



R:Radius

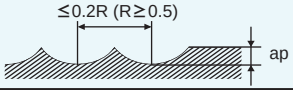
1) If the inclination of machining surface is very big, or cutting load is big, please reduce the revolution and the feed rate proportionately.
2) When using the smallest diameters, we recommended using mist coolant.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.
4) Please use VF-2XLB for work materials of 55 HRC or above.

MS2XB

Ball nose end mill, 2 flute, Taper neck

Work material				Carbon steel, Alloy steel Pre-hardened steel Hardened steel (−45HRC) AISI 1049, AISI 4140, AISI H13	
R (mm)	Taper angle one side	Neck length (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)
R0.1	30'	1.5	0.005	30000	300
	30'	2	0.005		
	1°	1.5	0.005		
	1°	2	0.005		
	2°	1.5	0.01		
	2°	2	0.01		
	3°	1.5	0.01		
	3°	2	0.01		
	5°	2	0.01		
R0.15	30'	3	0.005	30000	300
	1°	3	0.005		
	2°	3	0.01		
	3°	3	0.01		
	5°	3	0.01		
R0.2	30'	2	0.02	30000	300
	30'	5	0.01		
	1°	2	0.02		
	1°	5	0.01		
	1°	2	0.02		
	2°	5	0.01		
R0.25	30'	3	0.03	30000	300
	30'	5	0.02		
	1°	3	0.03		
	1°	5	0.02		
	2°	3	0.03		
	2°	5	0.02		
R0.3	30'	5	0.03	30000	400
	30'	8	0.02		
	1°	5	0.03		
	1°	10	0.02		
	1°	15	0.01		
	2°	6	0.03		
	2°	8	0.02		
R0.4	30'	8	0.05	30000	500
	30'	12	0.04		
	1°	8	0.05		
	1°	12	0.04		
	2°	8	0.08		
	3°	12	0.06		

Work material				Carbon steel, Alloy steel Pre-hardened steel Hardened steel (−45HRC) AISI 1049, AISI 4140, AISI H13	
R (mm)	Taper angle one side	Neck length (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)
R0.5	30'	10	0.05	22000	530
	30'	20	0.02		
	30'	30	0.005		
	1°	10	0.05		
	1°	20	0.02		
	1°	35	0.005		
	2°	20	0.03		
	3°	40	0.05		
	5°	20	0.05		
R0.6	30'	12	0.05	22000	600
	30'	24	0.02		
	1°	12	0.05		
	1°	24	0.02		
	2°	12	0.06		
	2°	24	0.03		
R0.75	30'	10	0.1	20000	700
	30'	30	0.02		
	1°	10	0.1		
	1°	30	0.05		
	2°	30	0.1		
R1	30'	20	0.05	18000	1000
	30'	30	0.03		
	30'	40	0.02		
	1°	20	0.05		
	1°	40	0.03		
	1°	50	0.02		
	2°	40	0.1		
	3°	40	0.1		
	5°	38.2	0.1		
R1.5	30'	30	0.1	16000	1300
	30'	50	0.03		
	1°	30	0.1		
	1°	50	0.03		
	2°	48.9	0.1		
	3°	50	0.1		
R2	30'	60	0.1	14000	1100
	1°	60	0.1		

Depth of cut	≤0.1R (R>0.5) ≤0.2R (R≥0.5)  	R:Radius

1) Please reduce the cutting depth (especially ap) if chattering and noise are generated, and reduce the feed rate proportionately when the surface finish is important.
2) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

MS2XLRB

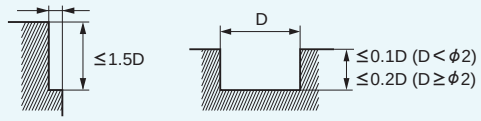
Corner radius end mill, Short cut length, 2 flute, Long neck

Work material			Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Neck length (mm)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	2	(2D)	30000	600	20000	400	18000	300	15000	120
2	4		15000	600	10000	400	9100	300	8000	120
3	6		10000	600	7000	400	6000	300	5000	120
4	8		7500	600	5200	400	4500	300	4000	120
6	12		5000	600	3500	400	3000	300	2700	120
1	5	(5D)	22000	350	17000	280	14000	200	12000	100
2	10		11000	350	8800	280	7200	200	6400	100
3	15		7400	350	5800	280	4800	200	4200	100
4	20		5600	350	4400	280	3600	200	3200	100
6	30		3700	350	2900	280	2400	200	2100	100

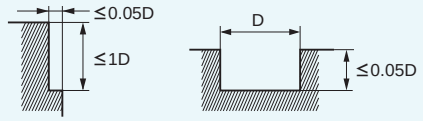
Depth of cut

(Neck length=2D)

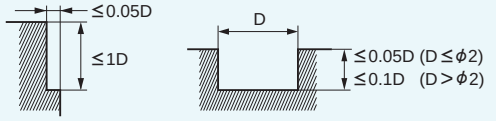
≤0.1D (D≤φ3)
≤0.2D (D>φ3)



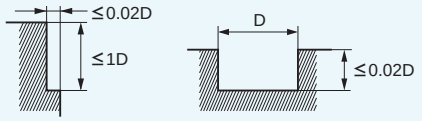
(Neck length=5D)



(Neck length=2D)



(Neck length=5D)

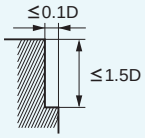
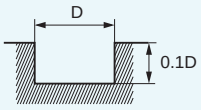
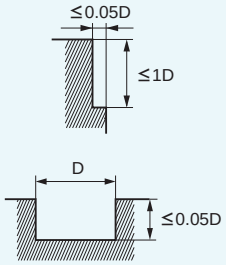


D:Dia.

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) Please reduce the feed rate when the surface finish is important.
3) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
4) If the depth of cut is shallow, the revolution and feed rate can be increased.

MS4MRB

Corner radius end mill, Medium cut length, 4 flute

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	40000	1500	30000	800	22000	480	24000	240
1.5	32000	1500	20000	800	15000	480	16000	240
2	24000	1500	15000	800	11000	480	12000	240
2.5	19000	1500	12000	800	8800	480	9600	240
3	16000	1500	10000	800	7400	480	8000	240
4	12000	1800	8000	1000	5600	600	6000	240
5	9600	1800	6400	1000	4400	600	4800	240
6	8000	1800	5300	1000	3700	600	4000	240
8	6000	1600	4000	900	2800	560	3000	240
10	4800	1400	3200	800	2200	500	2400	240
12	4000	1200	2700	700	1800	430	2000	230
16	3000	960	2000	560	1400	360	1500	190
20	2400	800	1600	480	1100	300	1200	170
Depth of cut	 							

D:Dia.

1) The above table shows cutting conditions for standard side milling. For slotting, please reduce the feed rate only to 80% of the table figure. Please set the revolution rate at 70% and the feed rate at 60% when slotting austenitic stainless steels.
2) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below the values above.

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

MSMHDRB

High power, Corner radius, Medium cut length, 4 flute

Side milling

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	15000	550	10000	340	10000	320	6400	160	4800	100
3	11000	800	7400	500	7400	480	4800	250	4000	170
4	8000	900	5600	540	5600	520	3600	270	3200	240
5	6400	1000	4500	600	4500	580	2900	300	2600	240
6	5900	1100	3700	640	3700	600	2400	320	2100	230
8	4400	1100	2800	660	2800	600	1800	330	1600	220
10	3500	1000	2300	640	2300	560	1400	320	1300	200
12	2900	1000	1900	640	1900	530	1200	320	1100	170
16	2200	800	1400	500	1400	450	900	250	800	130
18	2000	800	1250	480	1250	450	800	240	640	100
20	1800	750	1100	460	1100	440	720	230	510	80
Depth of cut	≤0.2D, ≤1.5D				≤0.1D, ≤1.5D		≤0.05D, ≤1.5D			

D:Dia.

Slotting

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	12000	400	7000	200	7000	100	4200	80	2300	40
3	9000	600	5300	300	5300	150	3200	130	1900	70
4	7200	720	4000	360	4000	180	2400	140	1400	95
5	5800	720	3200	360	3200	180	1900	150	1100	95
6	5000	800	2700	400	2700	200	1600	160	950	95
8	3700	800	2000	400	2000	200	1200	170	720	90
10	3000	720	1600	360	1600	180	960	160	570	80
12	2500	600	1300	290	1300	150	800	140	480	70
16	2000	480	1000	230	1000	120	600	110	360	50
18	1800	460	900	210	900	110	550	110	290	40
20	1600	430	800	200	800	100	480	100	230	35
Depth of cut	D, ≤1D (MAX. 12mm)				D, ≤0.5D		D, ≤0.2D			

D:Dia.

1) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
4) Climb cutting is recommended for side milling.

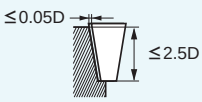
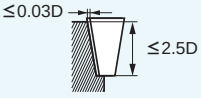
MS2MT

Taper end mill, Medium cut length, 2 flute

Slotting

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35			Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21			Hardened steel (45−55HRC) AISI H13		
Small Mill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.2	40000	320	0.005	40000	180	0.004	40000	100	0.002
0.3	40000	400	0.006	40000	220	0.005	35000	130	0.003
0.4	40000	450	0.008	40000	270	0.006	31000	150	0.004
0.5	37000	500	0.010	32000	320	0.008	25000	160	0.005
0.6	32000	530	0.013	26000	340	0.010	21000	170	0.006
0.7	27000	560	0.015	23000	380	0.011	18000	180	0.007
0.8	24000	610	0.018	20000	410	0.013	16000	210	0.008
0.9	21000	610	0.020	18000	450	0.015	14000	210	0.009
1	19000	610	0.025	16000	450	0.020	13000	210	0.010
1.5	13000	720	0.040	11000	540	0.030	8500	270	0.015
Depth of cut	Please refer to the list above for depth of cut.								

Side milling

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Hardened steel (45−55HRC) AISI H13	
Small Mill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	9500	720	8000	540	6400	300
2.5	7800	800	6300	540	5000	300
3	6400	800	5300	540	4200	300
4	4800	800	4000	540	3200	300
5	3800	800	3200	540	2500	300
6	3200	800	2600	540	2100	300
8	2400	700	2000	480	1600	270
10	1900	600	1600	410	1300	240
Depth of cut						

D:End point diameter

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
2) Cutting conditions may differ considerably due to the taper angle, depth of cut and machine tool condition. Please use the above table as a start reference point.
3) For slot milling, use of coolant is recommended.

RECOMMENDED CUTTING CONDITIONS FOR MSTAR END MILLS

MS4LT

Taper end mill, Long cut length, 4 flute

Work material		Carbon steel, Alloy steel, Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI H13, AISI P20			Hardened steel (45−55HRC) AISI H13, AISI 420		
Small mill dia. (mm)	Length of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)
0.2	2	20000−40000	200−500	0.001	20000−40000	150−300	0.001
0.3	3	20000−40000	200−500	0.002	20000−40000	150−300	0.001
0.4	4	20000−40000	200−500	0.003	20000−36000	150−300	0.002
0.5	4	20000−38000	200−500	0.01	16000−29000	200−400	0.005
	6			0.005			0.003
0.6	4	18000−32000	250−600	0.01	13000−24000	200−400	0.005
	6			0.007			0.004
0.7	6	16000−27000	250−600	0.015	11000−20000	200−400	0.008
	8			0.01			0.005
0.8	4	14000−24000	250−600	0.03	10000−18000	200−400	0.015
	8			0.02			0.01
	12			0.013			0.007
1.0	6	11000−19000	300−800	0.03	8000−14000	200−500	0.015
	10			0.02			0.01
	16			0.015			0.008
1.2	6	9200−16000	300−800	0.04	6600−12000	200−500	0.02
	10			0.03			0.015
	16			0.02			0.01
	20			0.01			0.007
1.3	12	8500−15000	300−800	0.03	6100−11000	200−500	0.015
1.4	12	8000−14000	300−800	0.035	5700−10000	200−500	0.018
1.5	6	7500−13000	300−800	0.06	5300−9500	200−500	0.03
	10			0.04			0.02
	16			0.03			0.015
	25			0.015			0.008
1.6	8	7000−12000	300−800	0.06	5000−9000	200−500	0.03
	12			0.045			0.025
	16			0.035			0.02
	20			0.025			0.015
1.8	8	6200−11000	300−800	0.08	4400−8000	200−500	0.04
	16			0.05			0.03
	24			0.03			0.015
2.0	8	5500−9500	300−800	0.1	4000−7200	200−500	0.05
	12			0.07			0.04
	20			0.04			0.02
	30			0.02			0.01
2.5	10	4400−7600	300−800	0.1	3200−5700	200−500	0.05
	20			0.06			0.03
	30			0.03			0.015
3.0	25	3700−6400	300−800	0.08	2700−4800	200−500	0.04
	40			0.04			0.02

1) The above table shows the revolution and feed rate for each neck length. Please reduce the feed rate when using end mills with a longer neck length.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.

MS4LTB

Ball nose, 4 flute, Taper, For rib milling

Work material		Carbon steel, Alloy steel, Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI H13, AISI P20			Hardened steel (45−55HRC) AISI H13, AISI 420		
R (mm)	Length of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)
R0.3	4	18000−32000	250−600	0.01	13000−24000	200−400	0.005
	6			0.007			0.004
R0.4	6	14000−24000	250−600	0.025	10000−18000	200−400	0.013
	8			0.02			0.01
	10			0.015			0.008
R0.5	8	11000−19000	300−800	0.025	8000−14000	200−500	0.013
	10			0.02			0.01
	12			0.018			0.009
	16			0.015			0.008
R0.6	8	9200−16000	300−800	0.035	6600−12000	200−500	0.018
	10			0.03			0.015
	12			0.027			0.013
	16			0.02			0.01
R0.75	8	7500−13000	300−800	0.05	5300−9500	200−500	0.025
	10			0.04			0.02
	12			0.035			0.018
	16			0.03			0.015
	20			0.02			0.01
R0.9	8	6200−11000	300−800	0.08	4400−8000	200−500	0.04
	10			0.07			0.035
	12			0.06			0.035
	16			0.05			0.03
	20			0.04			0.02
R1	10	5500−9500	300−800	0.08	4000−7200	200−500	0.045
	12			0.07			0.04
	16			0.05			0.03
	20			0.04			0.02
	25			0.03			0.015
	30			0.02			0.01

1) The above table shows the revolution and feed rate for each neck length. Please reduce the feed rate when using end mills with a longer neck length.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.

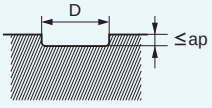
VF-2MD

End mill, Medium cut length, 2 flute, For hardened materials

Work material	Carbon steel, Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI H13, AISI P21			Hardened steel (45−55HRC) AISI H13, AISI 420			Hardened steel (55HRC−) AISI D2, High-speed tool steel		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.5	40000	1000	0.015	40000	960	0.015	30000	600	0.01
1	40000	2000	0.06	32000	1600	0.06	16000	550	0.05
1.5	40000	3000	0.12	32000	1900	0.08	10600	500	0.08
2	30000	3000	0.18	24000	1900	0.10	8100	400	0.1
2.5	24000	2600	0.25	19000	1600	0.13	6400	350	0.13
3	20000	2300	0.30	16000	1400	0.15	5400	300	0.15
4	15000	2000	0.40	12000	1200	0.20	4000	240	0.2
5	12000	1600	0.50	9000	900	0.25	3200	190	0.2
6	10000	1400	0.60	7000	700	0.30	2700	160	0.2
Depth of cut	≤Please refer to the list above for depth of cut. ≤1D D ≤Please refer to the list above for depth of cut. D:Dia.								

VF-2XL

End mill, 2 flute, Long neck

Work material		Hardened steel (40—55HRC) AISI P21, AISI H13, AISI 420			Hardened steel (55—65HRC) AISI D2, High-speed tool steel		
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass ap (mm)
0.1	0.5	40000	100	0.002	40000	80	0.001
0.2	0.6	40000	400	0.004	40000	360	0.004
	1	40000	300	0.003	40000	250	0.002
	1.5	40000	200	0.002	40000	150	0.001
0.3	1	40000	500	0.006	40000	450	0.004
	2	40000	400	0.003	38000	350	0.002
	3	38000	250	0.002	36000	200	0.001
0.4	1	40000	800	0.008	36000	500	0.006
	2	40000	500	0.007	30000	350	0.005
	4	36000	300	0.004	27000	200	0.003
0.5	2	40000	800	0.01	30000	600	0.009
	4	36000	600	0.008	27000	450	0.007
	6	30000	400	0.005	22000	300	0.004
0.6	2	40000	1000	0.015	30000	700	0.012
	4	36000	800	0.01	27000	500	0.01
	6	30000	600	0.006	22000	350	0.006
0.8	4	36000	1200	0.03	27000	900	0.02
	6	30000	900	0.02	22000	650	0.015
	8	24000	600	0.01	18000	450	0.008
	10	20000	400	0.008	15000	300	0.005
1	4	32000	1600	0.05	24000	1100	0.04
	6	32000	1400	0.04	24000	1000	0.03
	8	28000	1000	0.03	21000	750	0.02
	10	28000	800	0.02	21000	600	0.015
	12	24000	500	0.02	18000	370	0.01
1.5	6	22000	1200	0.08	16000	900	0.06
	8	22000	1100	0.07	16000	800	0.05
	10	22000	1000	0.06	16000	750	0.04
	12	20000	800	0.05	15000	600	0.03
	16	18000	500	0.03	13000	350	0.02
2	6	16000	1000	0.15	12000	750	0.15
	8	16000	1000	0.15	12000	750	0.1
	10	16000	800	0.1	12000	600	0.08
	12	16000	800	0.08	12000	600	0.06
	16	15000	600	0.06	11000	450	0.05
	20	14000	500	0.05	10000	350	0.04
3	12	11000	800	0.2	8200	600	0.15
	16	11000	600	0.15	8200	450	0.15
	20	11000	500	0.1	8200	350	0.1
Depth of cut		 D:Dia.					

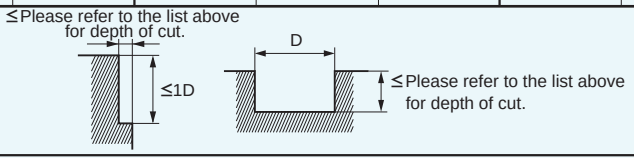
1) When using a reduced speed, the revolution and feed rate must be reduced proportionately.

VF-4MD

End mill, Medium cut length, 4 flute, For hardened materials

Work material	Carbon steel, Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI H13, AISI P21			Hardened steel (45−55HRC) AISI H13, AISI 420			Hardened steel (55HRC−) AISI D2, High-speed tool steel		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
1	40000	3000	0.06	32000	2400	0.06	16000	710	0.05
1.5	40000	4500	0.12	32000	3600	0.08	10600	650	0.08
2	30000	4500	0.18	24000	3600	0.10	8100	520	0.10
2.5	24000	3900	0.25	19000	3000	0.13	6400	450	0.13
3	20000	3500	0.30	16000	2700	0.15	5400	390	0.15
4	15000	3000	0.40	12000	2400	0.20	4000	450	0.20
5	12000	2400	0.50	9000	1800	0.25	3200	380	0.20
6	10000	2100	0.60	7000	1400	0.30	2700	320	0.20
8	8000	1500	0.80	5600	1100	0.40	2000	240	0.20
10	6400	1400	1.00	4500	950	0.50	1600	210	0.30
12	5400	1200	1.00	3800	860	0.50	1300	160	0.30
16	2400	550	3.00	1200	280	0.80	1000	130	0.30
20	1900	480	4.00	1000	240	1.00	800	100	0.30

Depth of cut



D:Dia.

VF-MHV

End mill, Medium cut length, Irregular helix flutes

Side milling

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Hardened Steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	8000	2240	8000	2240	5300	1060	3700	440	2100	250
8	6000	1680	6000	1680	4000	960	2800	450	1600	260
10	4800	1440	4800	1440	3200	770	2200	440	1300	210
11	4400	1350	4400	1350	3000	760	2100	400	1200	180
12	4000	1200	4000	1200	2700	760	1900	380	1100	140
13	3700	1200	3700	1200	2500	700	1700	360	1000	130
16	3000	1140	3000	1140	2000	560	1400	340	800	110
20	2400	860	2400	860	1600	510	1100	350	600	100
Depth of cut	≤0.2D, ≤1.5D				≤0.1D, ≤1.5D		≤0.05D, ≤1.5D			

D:Dia.

Slotting

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Hardened Steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	6400	1280	3700	740	3700	440	1600	190	1300	160
8	4800	1150	2800	670	2800	340	1200	190	1000	120
10	3800	910	2200	530	2200	350	1000	160	800	130
11	3500	900	2100	530	2100	330	900	160	700	120
12	3200	900	1900	530	1900	300	800	160	700	110
13	3000	800	1700	500	1700	290	700	140	600	100
16	2400	670	1400	390	1400	280	600	120	500	80
20	1900	610	1100	350	1100	260	500	120	400	60
Depth of cut	D, ≤1D (MAX. 12mm)				D, ≤0.5D		D, ≤0.2D			

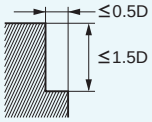
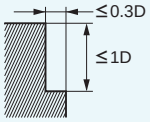
D:Dia.

1) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece installation is poor, vibration or abonrmal sound can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.
4) Climb cutting is recommended for side milling.

VF-SFPR

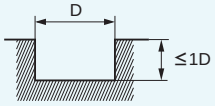
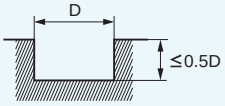
Roughing end mill, Short cut length, 3—4 flute

Side milling

Work material	Structural steel Carbon steel, Alloy steel (—30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30—45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy		Hardened Steel (45—55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	16000	960	13000	640	6400	260	5300	320	4200	70
4	12000	960	9500	640	4800	260	4000	320	3200	70
5	9500	960	7600	640	3800	260	3200	320	2500	70
6	8000	960	6400	680	3200	290	2700	340	2100	75
8	6000	1050	4800	760	2400	340	2000	400	1600	95
10	4800	1050	3800	760	1900	340	1600	400	1300	105
12	4000	960	3200	700	1600	320	1300	400	1100	110
16	3000	840	2400	620	1200	300	1000	360	800	110
20	2400	760	1900	560	1000	300	800	320	600	100
Depth of cut										

D:Dia.

Slotting

Work material	Structural steel Carbon steel, Alloy steel (—30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30—45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy		Hardened Steel (45—55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	13000	720	11000	480	4800	190	3200	190	2100	25
4	9500	720	8000	480	3600	190	2400	190	1600	25
5	7600	720	6400	480	3200	190	1900	190	1300	25
6	6400	720	5300	480	2700	200	1600	200	1100	30
8	4800	800	4000	520	2000	220	1200	220	800	35
10	3800	800	3200	520	1600	220	1000	220	600	35
12	3200	750	2700	520	1300	210	800	210	500	40
16	2400	620	2000	450	1000	180	600	180	400	45
20	1900	540	1600	400	800	160	500	160	300	40
Depth of cut										

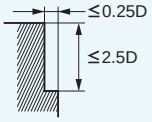
D:Dia.

1) When machining austenitic stainless steels, titanium and heat resistant alloys, the use of coolant is effective.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
4) Climb cutting is recommended for side milling.

VF-MFPR

Roughing end mill, Medium cut length, 4 flute

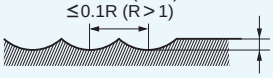
Side milling

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy		Hardened Steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	3800	360	3200	290	2500	150	2500	150	1900	50
6	3200	360	2700	290	2100	160	2100	160	1600	60
8	2400	450	2000	360	1600	160	1600	160	1200	70
10	1900	450	1600	360	1300	180	1300	180	1000	75
12	1600	400	1300	320	1100	180	1100	180	800	80
16	1200	360	1000	290	800	160	800	160	600	80
20	1000	340	800	270	600	150	600	150	500	80
Depth of cut	 D:Dia.									

1) When machining austenitic stainless steels, titanium and heat resistant alloys, the use of coolant is effective.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
4) Climb cutting is recommended.

VF-2WB

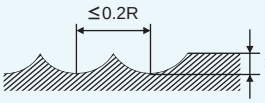
Wide ball nose, Medium cut length, 2 flute

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35			Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21			Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V			Hardened steel (45−55HRC) AISI H13		
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
R1	40000	5000	0.07	40000	5000	0.06	32000	2500	0.05	32000	3000	0.03
R1.5	32000	5000	0.12	32000	5000	0.11	26000	2500	0.10	26000	3000	0.07
R2	24000	3800	0.15	24000	3800	0.13	20000	2000	0.12	20000	2800	0.10
R3	16000	2800	0.20	16000	2800	0.18	13000	1500	0.15	13000	2100	0.12
Depth of cut	≤0.05R (R=1) ≤0.1R (R＞1)  ≤Please refer to the list above for depth of cut. R:Radius											

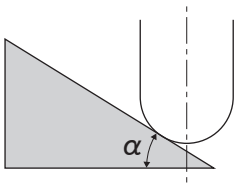
1) If the inclination of machining surface is very big, or cutting load is big, please reduce the revolution and the feed rate proportionately.
2) When using the smallest diameters, we recommended using mist coolant.
3) When machining undercut geometries, care should be taken to avoid neck interference.

VF-2SSB
Ball nose, Short cut length, 2 flute, Short shank

VF-2SB
Ball nose, Short cut length, 2 flute, For hardened materials

Work material	Hardened steel (—55HRC) AISI P21, AISI H13					Hardened steel (55—62HRC) AISI D2					Hardened steel (62—70HRC) AISI W1, AISI M2				
R (mm)	α≤15°		α>15°		Depth of cut (mm)	α≤15°		α>15°		Depth of cut (mm)	α≤15°		α>15°		Depth of cut (mm)
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	
R 0.1	40000	320	40000	240	0.003	40000	320	40000	160	0.003	40000	320	40000	160	0.002
R 0.15	40000	640	40000	560	0.01	40000	640	40000	400	0.007	40000	640	40000	400	0.005
R 0.2	40000	1600	40000	1200	0.02	40000	1400	40000	1000	0.015	40000	1200	40000	1000	0.01
R 0.3	40000	3200	40000	1600	0.03	40000	2800	40000	1200	0.025	40000	2000	40000	1200	0.02
R 0.4	40000	6400	40000	2400	0.05	40000	4000	40000	1600	0.04	40000	2800	40000	1600	0.03
R 0.5	40000	8000	40000	3200	0.06	40000	5600	40000	2400	0.05	40000	3600	32000	1300	0.04
R 0.75	40000	9600	40000	4000	0.09	40000	7200	32000	2500	0.075	32000	4500	21000	1200	0.05
R 1	40000	9600	39000	4700	0.11	40000	8000	24000	2400	0.1	24000	3800	16000	1000	0.07
R 1.25	40000	10400	32000	4500	0.12	37000	8100	19000	2300	0.11	19000	3400	13000	1000	0.08
R 1.5	40000	12000	27000	4300	0.13	32000	7700	16000	2200	0.12	16000	3200	11000	880	0.09
R 2	32000	10880	20000	3600	0.15	24000	6200	12000	1900	0.13	12000	2400	8000	800	0.1
R 2.5	25000	9000	16000	2900	0.2	19000	5300	9600	1700	0.15	9600	2100	6000	600	0.1
R 3	21000	8400	13000	2600	0.25	16000	4800	8000	1600	0.2	8000	1700	5000	600	0.11
R 4	16000	6400	10000	2000	0.3	12000	3600	6000	1200	0.2	6000	1400	4000	480	0.11
R 5	13000	5200	8000	1700	0.5	10000	3200	4800	960	0.2	4800	1100	3000	420	0.12
R 6	9000	3600	6000	1300	0.5	7000	2200	3600	720	0.3	3600	860	2200	310	0.12
R 8	6000	2400	4000	1000	0.5	5000	1600	2500	500	0.3	2500	650	1500	240	0.15
R10	4500	1800	3000	780	0.5	4000	1300	1800	360	0.3	1800	470	1000	160	0.15
Depth of cut	 ≤Please refer to the list above for depth of cut. R:Radius														

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.

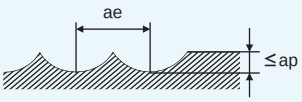


RECOMMENDED CUTTING CONDITIONS FOR IMPACT MIRACLE END MILLS

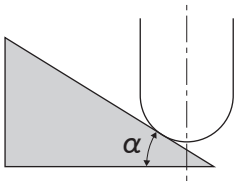
VF-2SDB
Ball nose, Short cut length, 2 flute, Strong geometry type

VF-2SDBL
Ball nose, Short cut length, 2 flute, Strong geometry type, Long shank

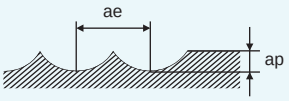
Overhang below 5D (D is end mill diameter)

Work material	Heat-treated steel, Pre-hardened steel (−45HRC) AISI P21						Hardened steel, Heat-treated steel (45−55HRC) AISI H13, AISI 420						Hardened steel (55−62HRC) AISI D2					
R (mm)	α≤15°		α>15°		Depth of cut ap (mm)	Depth of cut ae (mm)	α≤15°		α>15°		Depth of cut ap (mm)	Depth of cut ae (mm)	α≤15°		α>15°		Depth of cut ap (mm)	Depth of cut ae (mm)
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)			Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)			Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		
R 0.5	40000	5200	36000	2300	0.10	0.25	40000	5200	36000	2300	0.10	0.25	40000	5000	40000	2400	0.05	0.10
R 1	40000	6000	36000	3500	0.20	0.50	40000	6000	36000	3500	0.20	0.50	36000	5000	24000	2400	0.10	0.20
R 1.5x3	29000	4600	19000	2400	0.20	0.50	25000	4000	16000	2000	0.20	0.50	17000	2400	11000	1000	0.12	0.30
R 1.5	37000	7000	24000	3000	0.30	0.75	37000	7000	24000	3000	0.30	0.75	25000	6000	16000	2200	0.12	0.30
R 2x4	24000	4300	15000	2200	0.25	0.70	19000	3400	13000	1700	0.25	0.70	12000	1900	8200	900	0.13	0.40
R 2	30000	6500	19000	2800	0.40	1.00	28000	6000	19000	2600	0.40	1.00	18000	4800	12000	2000	0.13	0.40
R 2.5	25000	6000	16000	2600	0.50	1.30	22000	5000	16000	2300	0.50	1.25	15000	4200	9500	1700	0.15	0.50
R 3	22000	6000	14000	2400	0.60	1.80	18000	4500	12000	1900	0.60	1.50	12000	3500	8000	1600	0.20	0.60
R 4	19000	5200	12000	2200	0.80	2.40	15000	3800	9500	1700	0.80	2.00	9800	3000	6500	1300	0.20	0.80
R 5	15000	4300	9500	2000	1.00	3.00	11000	3000	7000	1500	1.00	2.50	7500	2400	5000	1000	0.20	1.00
R 6	12000	3400	8000	1800	1.20	3.60	9000	2400	6000	1400	1.20	3.00	6000	1900	4000	800	0.30	1.20
R 8	9000	2600	6000	1500	1.60	4.80	7000	1900	4500	1100	1.60	4.00	4500	1500	3000	600	0.30	1.60
R10	7500	2200	4800	1200	2.00	6.00	5500	1500	3600	900	2.00	5.00	3600	1200	2500	500	0.30	2.00
Depth of cut																		

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.



Overhang 7D (D is end mill diameter)

Work material	Heat-treated steel, Pre-hardened steel (—45HRC) AISI P21				Hardened steel, Heat-treated steel (45—55HRC) AISI H13, AISI 420			
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
R 1.5x3	16000	2000	0.10	0.30	13000	1500	0.10	0.30
R 2x4	13000	2000	0.15	0.50	10000	1500	0.15	0.50
R 3	10000	2000	0.20	1.00	8000	1600	0.20	0.80
R 4	8000	1800	0.30	1.50	6400	1400	0.40	1.20
R 5	6000	1600	0.40	2.00	4800	1200	0.40	1.60
R 6	5000	1300	0.45	2.40	4000	1000	0.45	2.00
R 8	3800	1000	0.60	3.00	3100	800	0.60	2.50
R10	3000	800	0.80	4.00	2500	650	0.80	3.00
Depth of cut								

1) The cutting conditions above are guide only for end mills whose cutting edge diameter is the same as shank diameter.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) The above table should not be applied to hardened steels (over 55 HRC hardness)

RECOMMENDED CUTTING CONDITIONS FOR IMPACT MIRACLE END MILLS

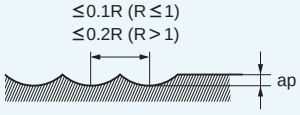
VF-2XLBS
Ball nose, Medium cut length, 2 flute, Short shank

Work material		Hardened steel (40−55HRC) AISI P21, AISI H13 AISI 420			Hardened steel (55−62HRC) AISI D2, HSS		
R (mm)	Neck length (mm)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)
R 0.1	0.5	40000	300	0.003	40000	300	0.002
	1	40000	300	0.002	40000	300	0.002
	1.5	40000	300	0.001	40000	200	0.001
	2	40000	200	0.001	40000	100	0.001
	2.5	40000	100	0.001	40000	60	0.001
R 0.15	1	40000	500	0.007	40000	500	0.005
	1.5	40000	500	0.005	40000	500	0.003
	2	40000	500	0.003	40000	500	0.002
	2.5	40000	400	0.003	40000	400	0.002
	3	40000	300	0.002	40000	300	0.001
	4	30000	200	0.002	30000	200	0.001
R 0.2	1	40000	1400	0.015	40000	1400	0.01
	1.5	40000	1000	0.01	40000	1000	0.006
	2	40000	1000	0.01	40000	1000	0.006
	2.5	40000	700	0.005	40000	700	0.003
	3	40000	700	0.005	40000	700	0.003
	4	40000	600	0.004	40000	500	0.003
	5	40000	400	0.003	40000	300	0.002
R 0.25	1.5	40000	2000	0.02	40000	2000	0.015
	2	40000	2000	0.02	40000	2000	0.015
	3	40000	1200	0.015	40000	1200	0.01
	4	36000	900	0.01	36000	900	0.007
	5	36000	700	0.007	36000	600	0.005
	6	36000	600	0.006	36000	500	0.004
R 0.3	2	40000	2800	0.03	40000	2800	0.02
	3	40000	2800	0.03	40000	2800	0.02
	4	35000	2000	0.02	35000	2000	0.015
	5	30000	1000	0.01	30000	1000	0.007
	6	30000	800	0.008	30000	800	0.005
	7	30000	600	0.008	30000	600	0.005
	8	25000	400	0.006	25000	400	0.004
R 0.4	2	40000	3500	0.04	40000	3500	0.03
	3	40000	3000	0.04	40000	3000	0.03
	4	40000	3000	0.02	40000	3000	0.015
	6	30000	1600	0.02	30000	1600	0.01
	8	25000	1000	0.01	25000	1000	0.007
	10	25000	600	0.008	25000	600	0.005
R 0.5	3	40000	4000	0.05	40000	4000	0.04
	4	40000	4000	0.05	40000	4000	0.04
	5	40000	3000	0.03	40000	3000	0.02
	6	35000	2000	0.03	35000	2000	0.02
	8	30000	1600	0.02	30000	1600	0.01
	10	20000	1000	0.01	20000	1000	0.01
	12	20000	1000	0.01	18000	800	0.008
	14	18000	600	0.008	18000	480	0.008
	16	18000	500	0.008	18000	400	0.006
	18	13000	300	0.005	13000	240	0.004
	20	13000	250	0.005	13000	200	0.004
R 0.6	6	40000	4000	0.05	35000	3500	0.04
	8	40000	3000	0.05	27000	2000	0.04
	10	27000	1900	0.03	24000	1700	0.02
	12	16000	1100	0.02	16000	1000	0.01
	14	16000	850	0.01	16000	780	0.01
	16	15000	500	0.01	14000	400	0.006
R 0.7	8	40000	4500	0.06	28000	3200	0.05
	12	32000	3000	0.03	19000	1800	0.02
	16	15000	1000	0.02	14000	800	0.01
R 0.75	6	40000	5000	0.07	32000	4000	0.06
	8	40000	5000	0.07	28000	3500	0.06
	10	40000	4500	0.06	21000	2400	0.04
	12	32000	3400	0.04	19000	2000	0.03
	14	16000	1500	0.04	13000	1200	0.03
	16	13000	1200	0.03	13000	1200	0.02

VF-2XLB
Ball nose, Long cut length, 2 flute, For hardened materials

Work material		Hardened steel (40−55HRC) AISI P21, AISI H13 AISI 420			Hardened steel (55−62HRC) AISI D2, HSS		
R (mm)	Neck length (mm)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)	Revolution (min^{-1})	Table feed (mm/min)	Depth of cut ap (mm)
R 0.75	18	13000	1100	0.02	10000	800	0.02
	20	12000	900	0.02	9000	700	0.01
R 0.8	8	40000	5000	0.08	26000	3200	0.07
	12	35000	3800	0.05	20000	2100	0.03
	16	13000	1200	0.04	12000	1100	0.02
	20	10000	750	0.02	8000	600	0.01
R 0.9	8	40000	5000	0.09	25000	3100	0.08
	12	36000	3800	0.06	18000	1900	0.04
	16	25000	2500	0.04	14000	1300	0.025
	20	10000	1000	0.03	8000	800	0.02
R 1	6	40000	6000	0.1	24000	3400	0.1
	8	40000	5000	0.1	24000	3000	0.1
	10	40000	5000	0.08	24000	3000	0.07
	12	40000	5000	0.08	24000	2600	0.05
	14	40000	5000	0.06	21000	2300	0.05
	16	32000	3500	0.05	16000	1700	0.03
	18	24000	2400	0.04	13000	1300	0.03
	20	10000	1000	0.04	10000	1000	0.03
	22	10000	1000	0.04	10000	1000	0.02
	25	10000	1000	0.04	8000	800	0.02
	30	10000	800	0.02	8000	800	0.015
	35	10000	500	0.02	8000	400	0.01
R 1.25	10	36000	5000	0.12	20000	2600	0.11
	15	36000	4600	0.08	18000	2000	0.075
	20	26000	3000	0.07	13000	1400	0.05
	25	10000	1100	0.06	8000	800	0.04
	30	8000	800	0.05	7000	700	0.03
	35	8000	500	0.03	5000	400	0.03
R 1.5	8	32000	6400	0.15	16000	3000	0.15
	10	32000	5100	0.15	16000	2200	0.15
	12	32000	5100	0.13	16000	2200	0.13
	14	32000	4500	0.13	16000	2200	0.1
	16	32000	4500	0.1	16000	1800	0.1
	20	27000	3800	0.1	14000	1600	0.06
	25	21000	2700	0.08	11000	1200	0.06
	30	9000	1000	0.08	7000	700	0.05
	35	6000	700	0.06	6000	600	0.04
	40	6000	600	0.04	5000	400	0.03
R 1.75	16	28000	4200	0.13	14000	1600	0.13
	20	26000	3800	0.13	13000	1600	0.11
	25	23000	3300	0.12	11000	1200	0.08
	30	13000	1900	0.09	9000	1000	0.07
	35	9000	1200	0.08	6000	600	0.06
	40	8500	1100	0.07	5500	500	0.04
R 2	10	24000	4800	0.2	12000	2200	0.2
	12	24000	4800	0.2	12000	2200	0.2
	14	24000	3800	0.15	12000	1500	0.15
	16	24000	3800	0.15	12000	1500	0.15
	20	24000	3800	0.15	12000	1500	0.15
	25	24000	3800	0.15	10000	1100	0.1
	30	20000	3000	0.1	10000	1100	0.08
	35	12000	1700	0.1	8000	900	0.08
	40	11000	1500	0.1	5000	500	0.06
	45	10000	1300	0.08	5000	500	0.05
	50	8000	1000	0.05	4000	400	0.04
R 2.5	20	19000	3400	0.2	10000	1400	0.2
	25	19000	3400	0.2	10000	1400	0.2
	30	19000	3200	0.15	8000	1000	0.15
	35	16000	2700	0.1	8000	900	0.1
R 3	30	16000	3500	0.2	8000	1000	0.2
	40	16000	3000	0.15	8000	800	0.15
	50	16000	2700	0.15	6000	500	0.15

Depth of cut



R:Radius

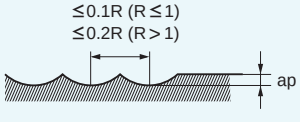
1) If the inclination of machining surface is very big, or cutting load is big, please reduce the revolution and the feed rate proportionately.
2) When using the smallest diameters, we recommended using mist coolant.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.

VF-3XB

Ball nose, Medium cut length, 3 flute, Taper neck

Work material			Carbon steel, Alloy steel (−30HRC) AISI 1055			Alloy steel Pre-hardened steel (30−45HRC) AISI P21			Hardened steel (45−55HRC) AISI H13, AISI 420			Hardened steel (55−62HRC) AISI D2		
R (mm)	Taper angle one side	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
R0.4	0.4°	6	34000	2700	0.03	31000	2200	0.025	24000	1700	0.02	19000	1400	0.015
		8	31000	2100	0.02	29000	1700	0.02	22000	1300	0.015	18000	1000	0.01
		12	28000	2000	0.015	26000	1600	0.01	20000	1200	0.01	16000	960	0.007
	0.9°	8	31000	2200	0.02	29000	1800	0.02	22000	1400	0.015	18000	1100	0.01
		12	28000	2100	0.015	26000	1700	0.01	20000	1300	0.01	16000	1000	0.007
		16	25000	1100	0.01	23000	910	0.01	18000	700	0.008	14000	560	0.006
R0.5	0.4°	8	27000	2700	0.04	25000	2200	0.04	19000	1700	0.03	15000	1400	0.02
		10	24000	2200	0.03	22000	1800	0.025	17000	1400	0.02	14000	1100	0.015
		12	24000	2200	0.03	22000	1800	0.025	17000	1400	0.02	14000	1100	0.015
		16	22000	2100	0.03	21000	1700	0.025	16000	1300	0.02	13000	1000	0.015
		20	20000	1400	0.015	18000	1200	0.01	14000	900	0.01	11000	720	0.007
		25	18000	1300	0.015	17000	1000	0.01	13000	800	0.009	10000	640	0.006
		30	15000	960	0.01	14000	780	0.01	11000	600	0.008	8800	480	0.006
		35	14000	800	0.008	13000	650	0.007	10000	500	0.006	8000	400	0.004
	0.9°	8	27000	2900	0.04	25000	2300	0.04	19000	1800	0.03	15000	1400	0.02
		12	24000	2400	0.03	22000	2000	0.025	17000	1500	0.02	14000	1200	0.015
		16	22000	2200	0.03	21000	1800	0.025	16000	1400	0.02	13000	1100	0.015
		20	20000	1600	0.015	18000	1300	0.01	14000	1000	0.01	11000	800	0.007
		25	18000	1400	0.015	17000	1200	0.01	13000	900	0.009	10000	720	0.006
		30	15000	1100	0.01	14000	910	0.009	11000	700	0.008	8800	560	0.006
		35	14000	960	0.008	13000	780	0.007	10000	600	0.006	8000	480	0.004
		40	11000	800	0.007	11000	650	0.006	8000	500	0.005	6400	400	0.003
		50	8400	610	0.006	7800	490	0.005	6000	380	0.004	4800	300	0.003
		60	7000	510	0.004	6500	400	0.004	5000	320	0.003	4000	260	0.002
		70	7000	480	0.003	6500	390	0.002	5000	300	0.002	4000	240	0.001
	1.5°	12	24000	2600	0.03	22000	2100	0.025	17000	1600	0.02	14000	1300	0.015
		16	22000	2400	0.03	21000	2000	0.025	16000	1500	0.02	13000	1200	0.015
		20	20000	1800	0.015	18000	1400	0.01	14000	1100	0.01	11000	880	0.007
		25	18000	1600	0.015	17000	1300	0.01	13000	1000	0.009	11000	800	0.006
		30	15000	1300	0.01	14000	1000	0.01	11000	800	0.008	8800	640	0.006
		35	14000	1100	0.008	13000	910	0.007	10000	700	0.006	8000	560	0.004
R0.75	0.4°	10	18000	2700	0.06	17000	2200	0.05	13000	1700	0.04	10000	1400	0.03
		15	17000	2200	0.04	16000	1800	0.04	12000	1400	0.03	9600	1100	0.02
		20	17000	2100	0.03	16000	1700	0.025	12000	1300	0.02	9600	1000	0.015
		30	14000	1600	0.015	13000	1300	0.01	10000	1000	0.01	8000	800	0.007
	0.9°	15	17000	2400	0.04	16000	2000	0.04	12000	1500	0.03	9600	1200	0.02
		20	17000	2200	0.03	16000	1800	0.025	12000	1400	0.02	9600	1100	0.015
		30	14000	1800	0.015	13000	1400	0.01	10000	1100	0.01	8000	880	0.007
		40	13000	1300	0.01	12000	1000	0.01	9000	800	0.008	7200	640	0.006
	1.5°	15	17000	2600	0.04	16000	2100	0.04	12000	1600	0.03	9600	1300	0.02
		20	17000	2400	0.03	16000	2000	0.025	12000	1500	0.02	9600	1200	0.015
		30	14000	2000	0.015	13000	1600	0.01	10000	1200	0.01	8000	960	0.007

Depth of cut



R:Radius

1) The above table shows depth of cut. Please control the pick feed (ae) according to machining conditions.
2) Please reduce the cutting depth if chattering and noise are generated, and reduce the feed rate proportionately when the surface finish is important.

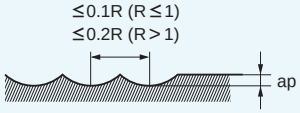
RECOMMENDED CUTTING CONDITIONS FOR IMPACT MIRACLE END MILLS

VF-3XB

Ball nose, Medium cut length, 3 flute, Taper neck

Work material			Carbon steel, Alloy steel (−30HRC) AISI 1055			Alloy steel Pre-hardened steel (30−45HRC) AISI P21			Hardened steel (45−55HRC) AISI H13, AISI 420			Hardened steel (55−62HRC) AISI D2		
R (mm)	Taper angle one side	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
R1	0.4°	16	15000	3200	0.07	14000	2600	0.06	11000	2000	0.05	8800	1600	0.03
		20	14000	2400	0.06	13000	2000	0.05	10000	1500	0.04	8000	1200	0.03
		25	14000	2100	0.04	13000	1700	0.04	10000	1300	0.03	8000	1000	0.02
		30	13000	1800	0.03	12000	1400	0.03	9000	1100	0.025	7200	880	0.02
		35	13000	1600	0.03	12000	1300	0.025	9000	1000	0.02	7200	800	0.015
		40	12000	1400	0.015	11000	1200	0.01	8500	900	0.01	6800	720	0.007
	0.9°	20	14000	2600	0.06	13000	2100	0.05	10000	1600	0.04	8000	1300	0.03
		25	14000	2200	0.05	13000	1800	0.04	10000	1400	0.03	8000	1100	0.025
		30	13000	1900	0.04	12000	1600	0.04	9000	1200	0.03	7200	960	0.02
		35	13000	1800	0.04	12000	1400	0.03	9000	1100	0.025	7200	880	0.02
		40	12000	1600	0.03	11000	1300	0.025	8500	1000	0.02	6800	800	0.015
		50	11000	1400	0.015	10000	1200	0.01	8000	900	0.01	6400	720	0.007
		60	9800	1100	0.007	9100	910	0.006	7000	700	0.005	5600	560	0.003
		70	8400	960	0.004	7800	780	0.004	6000	600	0.003	4800	480	0.002
	1.5°	25	14000	2400	0.05	13000	2000	0.04	10000	1500	0.03	8000	1200	0.025
		30	12600	2100	0.04	12000	1700	0.04	9000	1300	0.03	7200	1000	0.02
		35	13000	1900	0.04	12000	1600	0.03	9000	1200	0.025	7200	960	0.02
		40	12000	1800	0.03	11000	1400	0.025	8500	1100	0.02	6800	880	0.015
R1.25	0.9°	20	13000	2900	0.06	12000	2300	0.05	9000	1800	0.04	7200	1400	0.03
		30	12000	2600	0.05	11000	2100	0.04	8500	1600	0.03	6800	1300	0.025
		40	11000	2200	0.04	9800	1800	0.04	7500	1400	0.03	6000	1100	0.02
	1.5°	20	13000	3000	0.06	12000	2500	0.05	9000	1900	0.04	7200	1500	0.03
		30	12000	2700	0.05	11050	2200	0.04	8500	1700	0.03	6800	1400	0.025
		40	11000	2400	0.04	9800	2000	0.04	7500	1500	0.03	6000	1200	0.02
R1.5	0.4°	20	12000	3700	0.13	11000	3000	0.1	8500	2300	0.09	6800	1800	0.06
		30	11000	2900	0.07	10000	2300	0.06	8000	1800	0.05	6400	1400	0.03
		40	11000	2400	0.06	10000	2000	0.05	8000	1500	0.04	6400	1200	0.03
		50	11000	2000	0.04	9800	1600	0.04	7500	1200	0.03	6000	960	0.02
	0.9°	20	12000	3800	0.13	11000	3100	0.1	8500	2400	0.09	6800	1900	0.06
		30	11000	3000	0.07	10000	2500	0.06	8000	1900	0.05	6400	1500	0.03
		40	11000	2600	0.06	10000	2100	0.05	8000	1600	0.04	6400	1300	0.03
		50	11000	2100	0.04	9800	1700	0.04	7500	1300	0.03	6000	1000	0.02
		60	9800	2000	0.03	9100	1600	0.025	7000	1200	0.02	5600	960	0.015
		70	9800	1800	0.015	9100	1400	0.01	7000	1100	0.01	5600	880	0.007
	1.5°	50	11000	2200	0.04	9800	1800	0.04	7500	1400	0.03	6000	1100	0.02
		60	9800	2100	0.03	9100	1700	0.025	7000	1300	0.02	5600	1000	0.015
		70	9800	2000	0.015	9100	1600	0.01	7000	1200	0.01	5600	960	0.007
R2	0.9°	30	10000	3200	0.3	9400	2600	0.25	7200	2000	0.2	5800	1600	0.15
		40	9500	2400	0.15	8800	2000	0.12	6800	1500	0.1	5400	1200	0.07
		50	9500	2100	0.1	8800	1700	0.1	6800	1300	0.08	5400	1000	0.06
		60	9000	1900	0.07	8300	1600	0.06	6400	1200	0.05	5100	960	0.03
R2.5	0.9°	35	8000	3500	0.3	7400	2900	0.25	5700	2200	0.2	4600	1800	0.15
		40	8000	3200	0.2	7400	2600	0.18	5700	2000	0.15	4600	1600	0.1
		60	7600	2400	0.15	7000	2000	0.12	5400	1500	0.1	4300	1200	0.07

Depth of cut



R:Radius

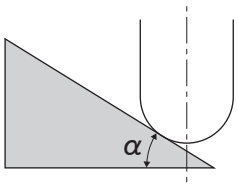
1) The above table shows depth of cut. Please control the pick feed (ae) according to machining conditions.
2) Please reduce the cutting depth if chattering and noise are generated, and reduce the feed rate proportionately when the surface finish is important.

VF-4MB

Ball nose, Medium cut length, 4 flute

Work material	Hardened steel (−55HRC) AISI P21, AISI D2, AISI H13					Hardened steel (55−62HRC) AISI D2, AISI 420					Hardened steel (62−70HRC) AISI W1, AISI M2				
R (mm)	α≤15°		α>15°		Depth of cut (mm)	α≤15°		α>15°		Depth of cut (mm)	α≤15°		α>15°		Depth of cut (mm)
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	
R0.5	40000	8000	40000	3800	0.06	40000	5600	40000	3100	0.05	40000	4700	32000	1700	0.03
R1	40000	9600	40000	5600	0.11	40000	8000	28000	3100	0.10	24000	5000	16000	1200	0.06
R1.5	40000	12000	32000	5600	0.13	32000	7700	19000	2900	0.12	16000	4200	11000	1100	0.07
R2	32000	11000	24000	4700	0.15	24000	6200	14000	2500	0.13	12000	3100	8000	1000	0.08
R2.5	25000	9000	19000	3800	0.20	19000	5300	12000	2200	0.15	9600	2700	6000	780	0.08
R3	21000	8400	15000	3400	0.25	16000	4800	9600	2000	0.20	8000	2300	5000	780	0.09
R4	16000	6400	12000	2600	0.30	12000	3600	7200	1600	0.20	6000	1900	4000	620	0.09
R5	13000	5200	9600	2200	0.50	10000	3200	5800	1300	0.20	4800	1500	3000	550	0.10
R6	9000	3600	7200	1700	0.50	7000	2200	4300	940	0.30	3600	1100	2200	400	0.10
Depth of cut	≤0.2R ≤Please refer to the list above for depth of cut. R:Radius														

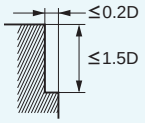
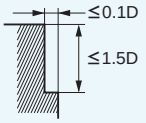
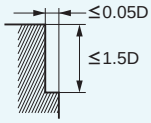
1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.



VF-MHVRB

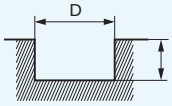
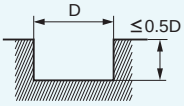
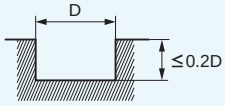
Corner radius, Medium cut length, Irregular helix flutes

Side milling

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Hardened Steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	5900	1100	3700	640	5,300	1060	2400	320	2100	230
8	4400	1100	2800	660	4,000	960	1800	330	1600	220
10	3500	1000	2300	640	3,200	770	1400	320	1300	200
12	2900	1000	1900	640	2,300	640	1200	320	1100	170
16	2200	800	1400	500	1,800	580	900	250	800	130
20	1800	750	1100	460	1,600	510	720	230	640	100
Depth of cut										

D:Dia.

Slotting

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened Steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	5000	800	2700	400	2700	200	1600	160	950	95
8	3700	800	2000	400	2000	200	1200	170	720	90
10	3000	720	1600	360	1600	180	960	160	570	80
12	2500	720	1300	360	1300	180	800	160	480	70
16	2000	600	1000	280	1000	150	600	130	360	50
20	1600	540	800	250	800	130	480	120	290	40
Depth of cut										

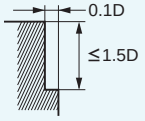
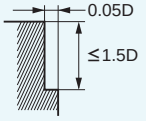
D:Dia.

1) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
4) Climb cutting is recommended for side milling.

VF-6MHVRB

Corner radius, Medium cut length, 6 flute, Irregular helix flutes

Side milling

Work material	Structural steel Carbon steel, Alloy steel (−45HRC) AISI 1049, AISI P20		Stainless steel AISI 304, AISI 316 Titanium alloy		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	10600	2900	8000	2000	2100	320
8	8000	2900	6000	2000	1600	300
10	6400	2700	4800	2000	1300	260
12	5300	2700	4000	2000	1100	230
16	4000	2200	3000	1600	800	180
20	3200	1900	2400	1400	640	150
Depth of cut						

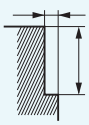
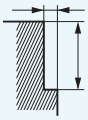
D:Dia.

1) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
4) Climb cutting is recommended for side milling.

RECOMMENDED CUTTING CONDITIONS FOR IMPACT MIRACLE END MILLS

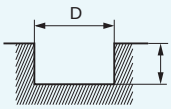
End mill, Short cut length, For hardened materials
Corner radius, Extra short cut length, For hardened materials
VF-SD
VF-SDRB

End mill, Medium cut length, For hardened materials
Corner radius, Medium cut length, 6 flute, For hardened materials
VF-MD
VF-MDRB

Work material	Alloy steel, Hardened steel (−55HRC) AISI P21, AISI H13			Hardened steel (55−62HRC) AISI D2			Hardened steel (62−70HRC) AISI M2		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
1	40000	1200	0.05	40000	800	0.03	32000	500	0.02
2	40000	2000	0.1	24000	1000	0.05	16000	600	0.05
3	32000	3800	0.2	16000	1900	0.1	11000	1200	0.05
4	24000	4400	0.2	12000	2200	0.1	8000	1300	0.05
6	16000	5800	0.3	8000	2900	0.2	5300	1800	0.1
8	12000	5800	0.4	6000	2900	0.2	4000	1800	0.1
10	9600	5800	0.5	4800	2900	0.3	3200	1800	0.2
12	8000	4800	0.6	4000	2400	0.3	2700	1500	0.2
16	6000	3600	0.8	3000	1800	0.5	2000	1100	0.3
20	4800	2900	1.0	2400	1400	0.5	1600	880	0.3
25	3800	2300	1.0	1900	1100	0.5	1300	720	0.3
Depth of cut	 Please refer to the list above for depth of cut. ≤1.5D			 Please refer to the list above for depth of cut. ≤1.0D					

D:Dia.

Slot milling with small diameter tools

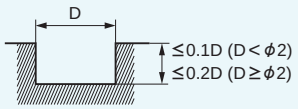
Work material	Alloy steel, Hardened steel (−55HRC) AISI P21, AISI H13			Hardened steel (55−65HRC) AISI D2, AISI M2		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
1	15000	300	0.1	9500	110	0.05
2	8000	320	0.2	4800	190	0.1
Depth of cut	 Please refer to the list above for depth of cut. D:Dia.					

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) Climb cutting is recommended for side milling.
3) Air blow recommended to disperse chips effectively.
4) For slot milling, use of coolant is recommended.

VC-2SS

End mill, Extra short cut length, 2 flute

Slotting

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
0.3	40000	190	40000	190	40000	100
0.5	40000	380	40000	380	30000	140
1	30000	720	20000	480	15000	180
1.5	20000	960	14000	670	10000	190
2	15000	1100	10000	720	8000	200
3	10000	1150	7000	800	5000	210
4	7500	900	5200	620	4000	200
5	6000	720	4200	500	3200	160
6	5000	600	3500	420	2700	140
8	4000	520	2800	350	2000	120
10	3200	450	2200	290	1600	110
12	2700	410	1900	260	1300	100
16	2000	340	1400	210	1000	90
Depth of cut	 D:Dia.					

1) When side milling with a ϕ4 or larger cutter it is possible to increase the feed rate by 20%.
2) When using a reduced speed, the revolution and feed rate must be reduced proportionately.
3) Non-water-soluble cutting fluid is recommended when cutting hardened steels.

VC-2MS

End mill, Medium cut length, 2 flute

Work material	Carbon steel, Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI 1049, AISI P20			Alloy steel, Tool steel (45−55HRC) AISI H13		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.3	40000	200	0.005	40000	200	0.005
0.5	40000	950	0.015	40000	950	0.015
1	40000	2000	0.06	32000	1600	0.06
1.5	40000	3000	0.12	32000	1900	0.08
2	30000	3000	0.18	24000	1900	0.10
2.5	24000	2600	0.25	19000	1600	0.13
3	20000	2300	0.30	16000	1400	0.15
4	15000	2000	0.40	12000	1200	0.20
5	12000	1600	0.50	9000	900	0.25
6	10000	1400	0.60	7000	700	0.30
8	8000	1000	0.80	5600	550	0.40
10	6400	900	1.00	4500	500	0.50
12	5400	820	1.00	3800	450	0.50
16	2400	380	≤3	1200	100	≤0.8
20	1900	320	≤4	1000	80	≤1
Depth of cut	≤Please refer to the list above for depth of cut. ≤D			D ≤Please refer to the list above for depth of cut. D:Dia.		

1) Please use VF-MD, VF-SDRB or VF-MDRB for workpiece of 55−60HRC.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) When slotting with end mills with ϕ3 or larger, reduce the revolution to 50−70% and the feed rate to 40−60%.
4) When drilling, please set the feed rate at 1/3 or below of the above value.

VC-2JS
End mill, Semi long cut length, 2 flute

VC-2JRB
Corner radius end mill, Semi long cut length, 2 flute

Work material	Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel, Pre-hardened steel (30−45HRC) AISI P20, AISI H13		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	13000	60 (60)	9000	35 (35)	6500 (6500)	20 (20)	5700	20 (15)
2	6400	60 (60)	4800	45 (45)	3500 (3500)	30 (30)	3000	25 (15)
3	4200	65 (60)	3400	55 (55)	2600 (2600)	40 (40)	2100	30 (20)
4	3400	80 (60)	2700	65 (30)	2100 (1600)	50 (20)	1700	35 (20)
5	2900	100 (60)	2300	80 (40)	1800 (1350)	60 (25)	1500	40 (20)
6	2500	120 (60)	2000	100 (50)	1500 (1100)	75 (30)	1300	50 (25)
8	1900	130 (60)	1500	100 (50)	1200 (900)	85 (35)	1000	50 (25)
10	1600	130 (60)	1300	100 (50)	950 (710)	75 (30)	800	50 (25)
12	1300	120 (60)	1100	90 (45)	800 (600)	60 (25)	670	40 (20)
16	1000	80 (40)	820	65 (30)	600 (450)	45 (20)	500	30 (15)
20	800	65 (30)	650	50 (25)	480 (360)	40 (15)	400	25 (13)
25	650	50 (25)	520	40 (20)	380 (280)	30 (12)	320	20 (10)
Depth of cut	≤0.05D (MAX. 0.5mm), ≤2.5D; D: ≤0.05D (D=φ1), ≤0.1D (φ1<D≤φ2), ≤0.15D (φ2<D≤φ3), ≤0.3D (D>φ3) (MAX. 3mm)						≤0.02D (MAX. 0.3mm), ≤2D; D: ≤0.05D (MAX. 0.5mm)	

D:Dia.

( ) : Indicates standard revolution and feed rates for slotting.

1) Please use VC-4JC or VC-4JRB for workpiece of 55−60HRC.
2) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below the values above.

VC-2XL

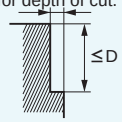
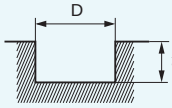
End mill, Medium cut length, 2 flute, Long neck

Work material		Carbon steel AISI 1055 Pre-hardened steel AISI P21, HAP		
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)
0.5	2	40000	800	0.01
	6	40000	700	0.005
0.6	2	40000	1000	0.01
	6	40000	800	0.005
0.7	2	40000	1000	0.02
	6	40000	900	0.01
0.8	4	40000	1200	0.03
	8	40000	1000	0.02
0.9	6	40000	1300	0.04
	10	35000	1000	0.03
1	6	40000	1600	0.06
	8	40000	1600	0.04
	12	30000	1000	0.02
1.2	6	40000	1900	0.08
	8	40000	1900	0.06
	12	25000	1000	0.03
1.4	6	40000	2200	0.1
	10	32000	1800	0.05
	16	22000	1000	0.02
1.5	6	40000	2400	0.12
	10	30000	1800	0.05
	16	20000	1000	0.02
	20	16000	800	0.01
1.6	6	40000	2400	0.12
	10	30000	1800	0.05
	16	20000	1000	0.02
	20	16000	800	0.01
1.8	6	40000	2400	0.15
	10	30000	1800	0.1
	16	20000	1000	0.05
	20	16000	800	0.03
2	6	40000	2400	0.18
	10	30000	1800	0.15
	16	20000	1000	0.08
	20	16000	800	0.05
2.5	8	30000	3000	0.25
	16	21000	2100	0.15
	20	12000	1000	0.1
3	8	30000	3000	0.3
	16	21000	2100	0.2
	20	12000	1000	0.15
	25	10000	800	0.1

1) When using a reduced speed, the revolution and feed rate must be reduced proportionately.

VC-4MC
End mill, Medium cut length, 4 flute

VC-4SRB
Corner radius end mill, Short cut length, 4 flute

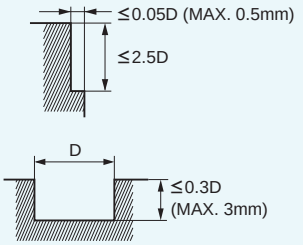
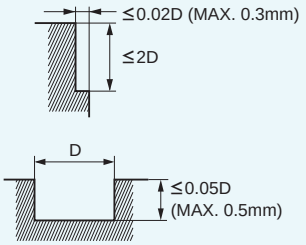
Work material	Aluminium alloy Except soft aluminium alloys			Carbon steel, Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI 1049, AISI P20			Alloy steel, Tool steel (45−55HRC) AISI H13, AISI 420		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
2	30000	5400	0.36	30000	4500	0.18	24000	3600	0.10
2.5	24000	4700	0.50	24000	3900	0.25	19000	3000	0.13
3	20000	4200	0.60	20000	3500	0.30	16000	2700	0.15
4	15000	3600	0.80	15000	3000	0.40	12000	2400	0.20
5	12000	2900	1.00	12000	2400	0.50	9000	1800	0.25
6	10000	2600	1.20	10000	2100	0.60	7000	1470	0.30
8	8000	1800	1.60	8000	1500	0.80	5600	1050	0.40
10	6400	1700	2.00	6400	1400	1.00	4500	950	0.50
12	5400	1500	2.00	5400	1200	1.00	3800	860	0.50
16	4800	1000	≤3	2400	550	≤2	1200	120	≤0.8
20	3800	800	≤4	1900	480	≤3	1000	100	≤1
Depth of cut	≤Please refer to the list above for depth of cut.   ≤Please refer to the list above for depth of cut. D:Dia.								

1) Please use VF-MD for workpiece of 55HRC or above.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) When slotting with end mills with ϕ3 or larger, reduce the revolution to 50−70% and the feed rate to 40−60%.
4) When drilling, please set the feed rate at 1/3 or below of the values above.

RECOMMENDED CUTTING CONDITIONS FOR MIRACLE END MILLS

VC-4JC
End mill, Semi long cut length, 4 flute

VC-4JRB
Corner radius end mill, Semi long cut length, 4 flute

Work material	Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13		Hardened steel (55−60HRC) AISI D2 Heat resistant alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	4200	110	3400	95	2600	70	2100	50	1800	30
4	3400	140	2700	110	2100	85	1700	60	1400	35
5	2900	170	2300	140	1800	100	1500	70	1200	40
6	2500	200	2000	170	1500	130	1300	85	1100	50
8	1900	220	1500	170	1200	150	1000	85	800	50
10	1600	220	1300	170	950	130	800	85	650	50
12	1300	170	1100	150	800	100	670	70	530	40
16	1000	140	820	110	600	80	500	50	400	30
20	800	110	650	85	480	70	400	40	320	25
25	650	85	520	70	380	50	320	35	250	20
Depth of cut										

D:Dia.

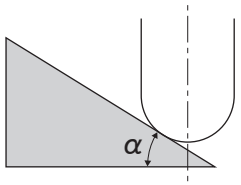
1) The above table shows cutting conditions for standard side milling. For slotting, please reduce the feed rate only to 50% of the table figure. Please set the revolution rate at 60% and the feed rate at 40% when slotting austenitic stainless steels.
2) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below of the values above.

VC-2SB

Ball nose end mill, Short cut length, 2 flute, Relieved neck

Work material	Alloy steel, Tool steel, Pre-hardened steel, Hardened steel (−55HRC) AISI H13, AISI D2, AISI P20					Hardened steel (55−62HRC) AISI D2, AISI M2				
R (mm)	α≤15°		α>15°		Depth of cut (mm)	α≤15°		α>15°		Depth of cut (mm)
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	
R 0.2	40000	1600	40000	1200	0.02	40000	1400	40000	1000	0.015
R 0.3	40000	3200	40000	1600	0.03	40000	2800	40000	1200	0.03
R 0.4	40000	6400	40000	2400	0.05	40000	4000	40000	1600	0.04
R 0.5	40000	8000	40000	3200	0.06	40000	5600	40000	2400	0.05
R 0.75	40000	9600	40000	4000	0.09	40000	7200	32000	2500	0.08
R 1	40000	9600	39000	4700	0.11	40000	8000	24000	2400	0.10
R 1.5	40000	12000	27000	4300	0.13	32000	7700	16000	2200	0.12
R 2	32000	11000	20000	3600	0.15	24000	6200	12000	1900	0.13
R 2.5	25000	9000	16000	2900	0.20	19000	5300	9600	1700	0.15
R 3	21000	8400	13000	2600	0.25	16000	4800	8000	1600	0.20
R 4	16000	6400	10000	2000	0.30	12000	3600	6000	1200	0.20
R 5	13000	5200	8000	1700	0.50	10000	3200	4800	960	0.20
R 6	9000	3600	6000	1300	0.50	7000	2200	3600	720	0.30
Depth of cut	≤0.2R ≤Please refer to the list above for depth of cut. R:Radius									

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the workpiece set up is very low, chattering and noise can occur. If the revolution cannot be increased, reduce the revolution and the feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.

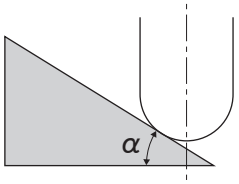


RECOMMENDED CUTTING CONDITIONS FOR MIRACLE END MILLS

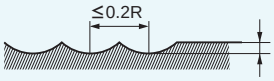
VC-2PSB-P MIRACLE NOVA
Ball nose end mill, Short cut length, 2 flute, Ultra high precision

VC-2PSB MIRACLE NOVA
Ball nose end mill, Short cut length, 2 flute, High precision

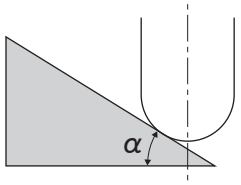
Work material	Alloy steel, Tool steel, Pre-hardened steel (−45HRC) AISI H13, AISI D2, AISI P20				Hardened steel (45−55HRC) AISI H13			
R (mm)	α≤15°		α>15°		α≤15°		α>15°	
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R0.05	40000	200	—	—	40000	170	—	—
R0.1	40000	600	40000	400	40000	600	40000	400
R0.15	40000	900	40000	600	40000	900	40000	600
R0.2	40000	1000	40000	700	40000	1000	40000	700
R0.25	40000	1500	40000	1000	40000	1500	40000	1000
R0.3	40000	2000	40000	1500	40000	2000	40000	1500
R0.35	40000	2800	40000	2100	40000	2800	37000	1800
R0.4	40000	2800	40000	2100	40000	2800	35000	1800
R0.45	40000	3200	38000	2200	38000	3000	32000	1800
R0.5	40000	3200	35000	2200	35000	3000	30000	1800
R0.75	40000	3600	30000	2300	32000	3000	25000	1800
R1	35000	3500	25000	2200	28000	2800	20000	1700
R1.5	30000	3400	23000	2200	24000	2600	16000	1500
R2	25000	3400	20000	2200	20000	2600	14000	1500
R2.5	23000	3400	17000	2200	18000	2600	12000	1500
R3	20000	3400	15000	2200	16000	2600	10000	1400
R4	15000	3000	12500	2000	10000	2000	7500	1200
R5	12000	3000	10000	2000	8000	2000	6000	1200
R6	10000	2600	8300	1800	6600	1700	5000	1100
Depth of cut	≤0.1R, ≤0.06R, R:Radius							



1) α is the inclination angle of the machined surface.
2) Please use VF-2SB for workpiece of 55HRC or above.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
4) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
5) If the depth of cut is shallow, the revolution and feed rate can be increased.
6) When using the smallest diameters, we recommended using mist coolant.

Work material	Carbon steel, Alloy steel, Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI P21, AISI H13					Hardened steel (45−55HRC) AISI H13				
R (mm)	α≤15°		α>15°		Depth of cut (mm)	α≤15°		α>15°		Depth of cut (mm)
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	
R 0.5	40000	5600	40000	3200	0.06	40000	5600	40000	3000	0.06
R 0.75	40000	6500	40000	3200	0.09	40000	6500	32000	3200	0.09
R 1	40000	6500	39000	3800	0.11	40000	6500	31000	3500	0.11
R 1.5	40000	7500	27000	4300	0.13	32000	6000	22000	3400	0.13
R 2	32000	7500	20000	3600	0.15	25000	6000	16000	2700	0.15
R 2.5	25000	6000	16000	2900	0.20	20000	5400	13000	2300	0.20
R 3	21000	5800	13000	2600	0.25	17000	4700	10000	2000	0.25
R 4	16000	4500	10000	2000	0.30	13000	3600	8000	1500	0.30
R 5	13000	3600	8000	1700	0.50	10000	2900	6400	1200	0.50
R 6	9000	2500	6000	1300	0.50	7200	2000	4800	1000	0.50
Depth of cut	 ≤Please refer to the list above for depth of cut. R:Radius									

1) α is the inclination angle of the machined surface.
2) Please use VF-2SB or VC-4MB for workpiece of 55HRC or above.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
4) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
5) If the depth of cut is shallow, the revolution and feed rate can be increased.



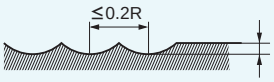
Using general machining center or NC milling machine.

	Roughing (Depth of cut ≤ 0.8R)			
Work material	Carbon steel, Alloy steel (−30HRC) AISI 1055, AISI P20		Carbon steel, Alloy steel Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI P21, AISI H13	
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 0.5	—	—	—	—
R 1	8800	150	7000	110
R 2	5800	280	4400	230
R 3	4200	340	3100	240
R 4	3200	360	2400	280
R 5	2500	340	1900	260
R 6	2100	300	1600	220
R 8	1500	210	1200	170
R10	1200	170	960	130
R12.5	950	130	770	110

RECOMMENDED CUTTING CONDITIONS FOR MIRACLE END MILLS

VC-2XLB
Ball nose end mill, Medium cut length, 2 flute, Long neck

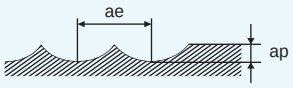
VC-2XLB-6
Ball nose, Medium cut length, 2 flute, Long neck, 6mm shank

Work material		Carbon steel, Alloy steel, Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI P21, AISI H13			Hardened steel (45−55HRC) AISI H13		
R (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut per pass (mm)
R0.3	6	40000	1000	0.008	30000	800	0.008
R0.4	6	40000	3000	0.02	30000	1600	0.02
	8	40000	1600	0.01	25000	1000	0.01
R0.5	6	40000	5600	0.03	40000	2400	0.03
	8	40000	4000	0.02	40000	2200	0.020
	12	33000	1000	0.015	33000	1000	0.010
R0.6	8	40000	8000	0.05	40000	4000	0.05
	12	25000	1600	0.03	16000	1000	0.03
R0.75	8	40000	9600	0.07	40000	5000	0.07
	12	35000	6000	0.04	30000	3400	0.04
	16	20000	2000	0.03	20000	1900	0.03
R1	10	40000	6400	0.08	40000	5000	0.06
	12	40000	5000	0.08	40000	5000	0.08
	16	30000	3500	0.05	30000	3500	0.05
	20	20000	2000	0.04	20000	2000	0.04
R1.5	8	40000	12000	0.15	32000	6400	0.15
	16, 20	30000	6000	0.10	27000	3800	0.10
R2	8, 12	32000	11000	0.20	25000	5000	0.20
	16, 20	32000	8000	0.15	25000	4000	0.15
R2.5	20, 25	25000	7000	0.20	20000	3600	0.20
R3	30	21000	7800	0.20	16000	3500	0.20
Depth of cut		 ≤Please refer to the list above for depth of cut. R:Radius					

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
2) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.

VC-XB

Ball nose taper end mill, Medium cut length, Taper neck

Work material					Carbon steel, Alloy steel Pre-hardened steel, Hardened steel (−45HRC) AISI 1049, AISI P21, AISI H13		Hardened steel (45−55HRC) AISI H13	
R (mm)	Taper angle one side	Neck length (mm)	Depth of cut ap (mm)	Depth of cut ae (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R0.5	1°	16	0.02	0.1	22000	530	12000	230
	1°	21	0.01					
	1°	26	0.01					
	1° 30'	23	0.02					
	3°	42	0.05					
	5°	23	0.05					
R1	1°	21	0.05	0.2	18000	570	10000	260
	1°	31	0.04					
	1°	41	0.03					
	1° 30'	23	0.1					
	3°	41	0.1					
	5°	23	0.1					
R2	1°	36	0.2	0.8	14000	670	6000	200
	1°	46	0.15					
	1°	60	0.1					
	1° 30'	49	0.2					
	3°	28	0.2					
R3	1°	51	0.3	1.2	10000	840	5000	220
	1°	65	0.2					
	1°	92	0.1					
	1° 30'	53	0.3					
	3°	34	0.3					
R4	1° 30'	55	0.4	1.6	8000	840	4000	270
	3°	36	0.4					
R5	1°	70	0.4	2	6000	840	3000	310
	1°	100	0.3					
	1° 30'	59	0.5					
	3°	40	0.5					
R6	1°	70	0.6	2.4	5000	900	2500	340
	1°	100	0.4					
	1° 30'	83	0.6					
	3°	63	0.6					
Depth of cut								

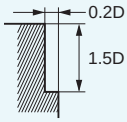
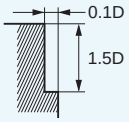
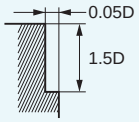
1) Please reduce the cutting depth (especially ap) if chattering and noise are generated, and reduce the feed rate proportionately.
2) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.

RECOMMENDED CUTTING CONDITIONS FOR MIRACLE END MILLS

VC-MHDRB

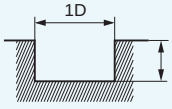
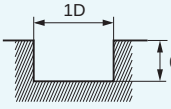
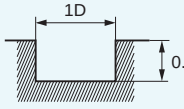
Corner radius end mill, Medium cut length, 4 flute, High helix angle

Side milling

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Hardened Steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	15000	550	10000	340	10000	320	6400	160	4800	100
3	11000	800	7400	500	7400	480	4800	250	4000	170
4	8000	900	5600	540	5600	520	3600	270	3200	240
5	6400	1000	4500	600	4500	580	2900	300	2600	240
6	5900	1100	3700	640	3700	600	2400	320	2100	230
8	4400	1100	2800	660	2800	600	1800	330	1600	220
10	3500	1000	2300	640	2300	560	1400	320	1300	200
12	2900	1000	1900	640	1900	530	1200	320	1100	170
16	2200	800	1400	500	1400	450	900	250	800	130
20	1800	750	1100	460	1100	440	720	230	640	100
25	1400	600	900	400	900	380	570	200	510	80
Depth of cut										

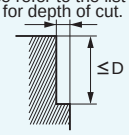
D:Dia.

Slotting

Work material	Structural steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened Steel (45−55HRC) AISI H13		Heat resistant alloys Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	12000	400	7000	200	7000	100	4200	80	2300	40
3	9000	600	5300	300	5300	150	3200	130	1900	70
4	7200	720	4000	360	4000	180	2400	140	1400	95
5	5800	720	3200	360	3200	180	1900	150	1100	95
6	5000	800	2700	400	2700	200	1600	160	950	95
8	3700	800	2000	400	2000	200	1200	170	720	90
10	3000	720	1600	360	1600	180	960	160	570	80
12	2500	720	1300	360	1300	180	800	160	480	70
16	2000	600	1000	280	1000	150	600	130	360	50
20	1600	540	800	250	800	130	480	120	290	40
25	1300	480	640	220	640	120	380	100	230	35
Depth of cut										

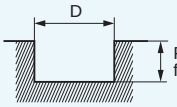
D:Dia.

1) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
4) Climb cutting is recommended for side milling.

Work material	Alloy steel, Tool steel, Pre-hardened steel, Hardened steel (—55HRC) AISI H13, AISI D2, AISI P20			Hardened steel (55—62HRC) AISI D2, AISI M2		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.5	40000	2000	0.03	30000	600	0.02
1	40000	3000	0.05	20000	900	0.03
1.5	40000	5000	0.08	18000	1100	0.05
2	40000	5600	0.10	16000	1300	0.06
3	34000	5600	0.15	13000	1600	0.09
4	26000	5600	0.2	10000	1800	0.12
5	22000	6200	0.25	8900	2100	0.15
6	20000	7200	0.3	8000	2900	0.18
8	15000	7200	0.4	6000	2900	0.24
10	12000	7100	0.5	4800	2900	0.3
12	10000	6000	0.6	4000	2400	0.3
16	6000	3600	0.6	3000	1800	0.3
20	4800	2900	0.6	2400	1400	0.3
25	3800	2300	0.6	1900	1100	0.3
Depth of cut	≤Please refer to the list above for depth of cut.  D:Dia.					

1) The above cutting conditions are designed for side milling. For slotting ϕ3 or larger diameters, set the revolution, feed rate and depth of cut at 20—40% of the table figures.
2) If the rigidity of the machine or the workpiece installation is very low, the overhang length is three times larger than the end mill diameter, or chattering and noise are generated, please reduce the revolution and the feed rate proportionally.
3) Climb cutting is recommended for side milling.
4) It is recommended to use high-pressure coolant or air blow to forcibly discharge the chips.
5) For slot milling, use of coolant is recommended.

Slot milling with small diameter tools

Work material	Alloy steel, Hardened steel (—55HRC) AISI P21, AISI H13			Hardened steel (55—65HRC) AISI D2, AISI M2		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.5	20000	200	0.05	15000	90	0.03
1	15000	300	0.1	11000	110	0.05
1.5	10000	280	0.15	7500	150	0.07
2	8000	320	0.2	6000	190	0.1
Depth of cut	 Please refer to the list above for depth of cut. D:Dia.					

1) It is recommended to use high-pressure coolant or air blow to forcibly discharge the chips.
2) For slot milling, use of coolant is recommended.

RECOMMENDED CUTTING CONDITIONS FOR MIRACLE END MILLS

VC-LD

End mill, Long cut length, 6 flute

Work material	Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI P20, AISI H13, AISI D2, AISI P21		Hardened steel (45−55HRC) AISI H13, AISI D2, AISI 420		Hardened steel (55−60HRC) AISI D2, AISI M2, AISI W1		Hardened steel (60−65HRC) AISI D2, AISI M2, AISI W1	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	2100	450	1600	330	1300	240	1100	190
8	1600	430	1200	310	1000	230	800	170
10	1300	420	960	290	800	220	640	150
12	1100	380	800	260	660	200	530	140
16	800	310	600	220	500	160	400	120
20	640	270	480	190	400	140	320	110
25	510	230	380	160	320	120	260	90
Depth of cut	≤0.01D 3D−4D				≤0.005D 3D−4D			

D:Dia.

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) Climb cutting is recommended.
3) Please reduce the depth of cut or feed rate when accuracy of the machined surface is important.
4) We recommend that you set the depth of cut as small as possible and divide the machining into several passes if the deflection is large.

VC-MDL

End mill, Medium cut length, 6 flute, Long shank

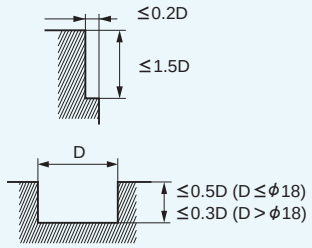
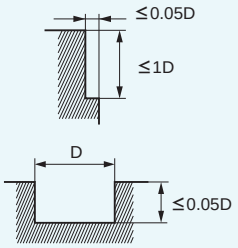
Work material	Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI P20, AISI H13, AISI D2, AISI P21		Hardened steel (45−55HRC) AISI H13, AISI D2, AISI 420		Hardened steel (55−60HRC) AISI D2, AISI M2, AISI W1		Hardened steel (60−65HRC) AISI D2, AISI M2, AISI W1	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	8500	700	6900	600	5800	500	5300	400
4	6400	900	5200	700	4400	600	4000	500
5	5100	900	4100	700	3500	600	3200	600
6	4200	1100	3400	800	2900	720	2700	670
8	3200	1000	2600	800	2200	680	2000	620
10	2500	900	2100	630	1800	540	1600	480
12	2100	870	1700	660	1500	590	1300	510
16	1600	750	1300	570	1090	480	990	440
20	1300	670	1000	490	880	430	800	390
25	1000	540	830	420	700	360	640	330
Depth of cut	≤0.03D ≤1D		≤0.02D ≤1D		≤0.015D ≤1D		≤0.01D ≤1D	

D:Dia.

1) The above table shows cutting conditions of approx. 5×d (d: shank length) depth.
2) If the overhang is shortened, the depth of cut, revolution and feed rate can be increased.
3) If using an end mill with a long overhang or the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please lessen the depth of cut and reduce the revolution and the feed rate proportionately.
4) Climb cutting, air blow and mist oil is recommended.

VC-MH

End mill, Medium cut length, 3—4 flute, High helix angle

Work material	Structural steel Carbon steel, Alloy steel (—45HRC) AISI 1049, AISI P20		Stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Hardened steel (45—55HRC) AISI H13		Heat resistant alloy Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	5300	130	4400	100	2400	50	1500	25
4	4400	220	3700	160	2000	80	1300	40
5	3600	260	3000	190	1700	100	1100	50
6	3200	280	2700	200	1500	100	1000	50
8	2400	300	2000	210	1200	110	800	45
10	1900	290	1600	210	960	115	640	45
12	1600	250	1300	170	800	95	530	40
16	1200	180	1000	130	600	70	400	30
18	1100	170	900	120	530	65	350	25
20	960	190	800	140	480	75	320	25
25	760	150	640	110	380	60	260	20
Depth of cut								

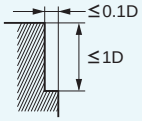
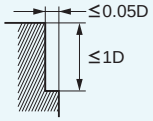
D:Dia.

1) The above table shows cutting conditions for side milling. For slotting, please set the revolution at 80—100% and the feed rate at 60—80% of the table figure. Please set the revolution rate at 60% and the feed rate at 40% when slotting austenitic stainless steels.
2) The revolution and the feed rate can be further raised in case of a small depth of cut when side milling.
3) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
4) Climb cutting is recommended for side milling.

RECOMMENDED CUTTING CONDITIONS FOR MIRACLE END MILLS

VC-6MH
End mill, Medium cut length, 6 flute, High helix angle

VC-8MH
End mill, Medium cut length, 8 flute, High helix angle

Work material	Structual steel Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21, AISI 630		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Heat resistant alloy Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	10600	2900	8000	2000	4200	900	2100	320
8	8000	2900	6000	2000	3200	900	1600	300
10	6400	2700	4800	2000	2500	870	1300	260
12	5300	2700	4000	2000	2100	830	1100	230
16	4000	2200	3000	1600	1600	740	800	180
20	3200	1900	2400	1400	1300	710	640	150
25	2500	1600	1900	1200	1000	560	510	120
Depth of cut								

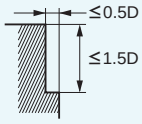
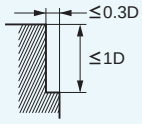
D:Dia.

1) For VC-8MH, increase the feed rates above by 20%.
2) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.
4) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
5) Climb cutting is recommended for side milling.

VC-SFPR

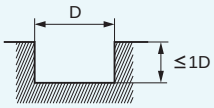
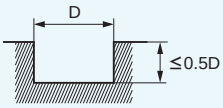
Roughing end mill, Short cut length, 3—4 flute

Side milling

Work material	Structural steel Carbon steel, Alloy steel (—30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30—45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45—55HRC) AISI H13		Heat resistant alloy Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	16000	960	13000	640	6400	260	5300	100	4200	70
4	12000	960	9500	640	4800	260	4000	100	3200	70
5	9500	960	7600	640	3800	260	3200	100	2500	70
6	8000	960	6400	680	3200	290	2700	110	2100	75
8	6000	1050	4800	760	2400	340	2000	140	1600	95
10	4800	1050	3800	760	1900	340	1600	150	1300	105
12	4000	960	3200	700	1600	320	1300	150	1100	110
16	3000	840	2400	620	1200	300	1000	150	800	110
20	2400	760	1900	560	1000	300	800	140	600	100
Depth of cut										

D:Dia.

Slotting

Work material	Structural steel Carbon steel, Alloy steel (—30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30—45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45—55HRC) AISI H13		Heat resistant alloy Inconel	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	13000	720	11000	480	4800	190	3200	50	2100	25
4	9500	720	8000	480	3600	190	2400	50	1600	25
5	7600	720	6400	480	3200	190	1900	50	1300	25
6	6400	720	5300	480	2700	200	1600	55	1100	30
8	4800	800	4000	520	2000	220	1200	70	800	35
10	3800	800	3200	520	1600	220	1000	70	600	35
12	3200	750	2700	520	1300	210	800	75	500	40
16	2400	620	2000	450	1000	180	600	75	400	45
20	1900	540	1600	400	800	160	500	70	300	40
Depth of cut										

D:Dia.

1) When machining austenitic stainless steel use water soluble cutting fluids. For machining heat resistant alloys use non-water soluble cutting fluids.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
4) Climb cutting is recommended for side milling.

VC-2MT

Taper end mill, Medium cut length, 2 flute

Slotting

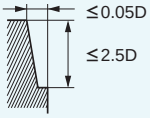
Work material	Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35			Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI D2, AISI P21			Hardened steel (45−55HRC) AISI H13		
Small Mill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
1	16000	400	0.03	12000	300	0.03	10000	100	0.02
1.5	10000	400	0.06	7500	300	0.06	6500	100	0.04
2	8000	400	0.08	6000	300	0.08	5000	100	0.06
2.5	6500	400	0.12	5000	300	0.12	4000	100	0.10

1) A high-speed spindle is recommended. When using a reduced speed, the revolution and feed rate must be reduced proportionately.
2) Non-water-soluble cutting fluid is recommended.

VC-4MT

Taper end mill, Medium cut length, 4 flute

Side milling

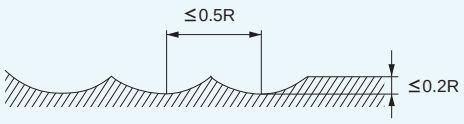
Work material	Carbon steel, Alloy steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI D2, AISI P21		Hardened steel (45−55HRC) AISI H13	
Small Mill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	4200	110	3400	95	2300	60
4	3400	135	2700	110	1800	70
5	2900	170	2300	135	1500	80
6	2500	200	2000	170	1300	100
8	1900	220	1500	170	1000	100
10	1600	220	1300	170	800	100
Depth of cut	 ≤0.05D ≤2.5D D:Dia.					

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

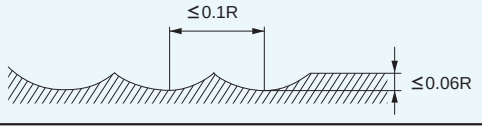
VC-3MB

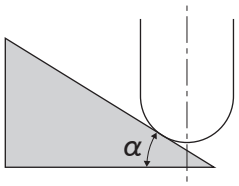
Ball nose end mill, Medium cut length, 3 flute

Roughing

Work material	Carbon steel, Alloy steel, Pre-hardened steel Hardened steel (−45HRC) AISI 1049, AISI P21, AISI H13				Hardened steel (45−55HRC) AISI H13			
R (mm)	α≤15°		α>15°		α≤15°		α>15°	
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 1	32000	3000	25000	1170	18000	1440	16000	640
R 2	18500	3700	14500	1460	11000	1760	9200	740
R 3	13000	4000	10000	1500	7700	1920	6400	800
R 4	10000	5000	8000	2000	6000	2300	4800	920
R 5	8000	5000	6500	2000	4800	2200	3800	870
R 6	6600	4600	5300	1800	4000	2100	3200	840
R 8	5000	4000	4000	1600	3000	1700	2400	680
R10	4000	3600	3200	1440	2400	1400	1900	550
Depth of cut	 R:Radius							

Finishing

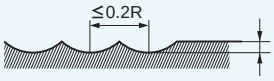
Work material	Carbon steel, Alloy steel, Pre-hardened steel Hardened steel (−45HRC) AISI 1049, AISI P21, AISI H13				Hardened steel (45−55HRC) AISI H13			
R (mm)	α≤15°		α>15°		α≤15°		α>15°	
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 1	32000	3200	32000	1500	25000	2000	20000	800
R 2	25500	5000	20000	2000	17000	2700	13000	1000
R 3	20000	6100	15000	2200	13000	3200	10000	1200
R 4	15000	7500	11000	2700	10000	3800	7500	1400
R 5	12000	7500	9000	2700	8000	3700	6000	1400
R 6	10000	7000	7500	2500	6600	3500	5000	1300
R 8	7500	6000	5600	2200	5000	2800	3700	1000
R10	6000	5400	4500	2000	4000	2300	3000	900
Depth of cut	 R:Radius							



1) α is the inclination angle of the machined surface.
2) Please use VF-2SB or VC-4MB for workpiece of 55HRC or above.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When machining accuracy is important, reducing the feed rate is recommended.
   Especially for finishing, lower the feed rates and/or pick feeds according to the required accuracy.
5) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
6) If the depth of cut is shallow, the revolution and feed rate can be increased.

VC-4MB

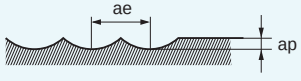
Ball nose end mill, Medium cut length, 4 flute

Work material	Alloy steel, Tool steel, Pre-hardened steel, Hardened steel (−55HRC) AISI H13, AISI P20					Hardened steel (55−62HRC) AISI D2, AISI M2				
R (mm)	α≤15°		α>15°		Depth of cut (mm)	α≤15°		α>15°		Depth of cut (mm)
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)		Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	
R 0.5	40000	8000	40000	3800	0.06	40000	5600	40000	3100	0.05
R 0.75	40000	9600	40000	4800	0.09	40000	7200	38000	4200	0.08
R 1	40000	9600	40000	5600	0.11	40000	8000	28000	3100	0.10
R 1.5	40000	12000	32000	5600	0.13	32000	7700	19000	2900	0.12
R 2	32000	11000	24000	4700	0.15	24000	6200	14000	2500	0.13
R 2.5	25000	9000	19000	3800	0.20	19000	5300	12000	2200	0.15
R 3	21000	8400	15000	3400	0.25	16000	4800	9600	2000	0.20
R 4	16000	6400	12000	2600	0.30	12000	3600	7200	1600	0.20
R 5	13000	5200	9600	2200	0.50	10000	3200	5800	1300	0.20
R 6	9000	3600	7200	1700	0.50	7000	2200	4300	940	0.30
Depth of cut	 ≤Please refer to the list above for depth of cut. R:Radius									

1) Please use a machine with high rigidity. If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.
2) The above table shows cutting conditions for side milling. For contour milling such as moulds, cutting conditions change considerably due to the machined shape, milling method and depth of cut (pick feed). The feed rate should be the upper limit of the range if the shape of the material is gentle, and reduced it large depths of cut are necessary.
3) When the overhang of the end mill (milling depth) is long, reduce the revolution and feed rate proportionally to prevent chattering.
4) It is recommended to use high-pressure coolant or air blow to forcibly discharge the chips.

VC-4STB

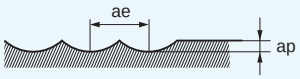
Ball nose taper end mill, Short cut length, 4 flute

Work material			Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI H13, AISI D2, AISI P20				Hardened steel (45−55HRC) AISI H13, AISI D2				Hardened steel (55−62HRC) AISI D2, AISI M2			
R (mm)	Taper angle one side	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ae (mm)
R 0.3	1°30'	5	40000	1600	0.08	0.12	40000	1200	0.06	0.10	40000	700	0.04	0.06
	2°	5	40000	1600	0.08	0.12	40000	1200	0.06	0.10	40000	700	0.04	0.06
	5°	5	40000	1600	0.08	0.12	40000	1200	0.06	0.10	40000	700	0.04	0.06
	10°	15	40000	1600	0.05	0.08	40000	1200	0.04	0.06	40000	700	0.03	0.04
R 0.4	1°30'	10	40000	2000	0.07	0.11	40000	1500	0.06	0.08	30000	700	0.04	0.05
	1°30'	15	40000	2000	0.05	0.08	40000	1500	0.04	0.06	30000	800	0.03	0.04
	2°	10	40000	2000	0.07	0.11	40000	1500	0.06	0.08	30000	800	0.04	0.05
	5°	10	40000	2000	0.07	0.11	40000	1500	0.06	0.08	30000	800	0.04	0.05
	7°	10	40000	2000	0.07	0.11	40000	1500	0.06	0.08	30000	800	0.04	0.05
	10°	15	40000	2000	0.06	0.09	40000	1500	0.05	0.07	30000	800	0.03	0.05
R 0.5	1°30	10	38000	2500	0.11	0.16	35000	1600	0.08	0.13	25000	800	0.05	0.08
	1°30'	15	38000	2500	0.09	0.14	35000	1600	0.07	0.11	25000	800	0.05	0.07
	1°30'	20	38000	2500	0.06	0.09	35000	1600	0.05	0.07	25000	800	0.03	0.05
	2°	10	38000	2500	0.11	0.16	35000	1600	0.08	0.13	25000	800	0.05	0.08
	2°	15	38000	2500	0.09	0.14	35000	1600	0.07	0.11	25000	800	0.05	0.07
	2°	20	38000	2500	0.06	0.09	35000	1600	0.05	0.07	25000	800	0.03	0.05
	5°	10	38000	2500	0.12	0.18	35000	1600	0.10	0.14	25000	800	0.06	0.09
	5°	15	38000	2500	0.09	0.14	35000	1600	0.07	0.11	25000	800	0.05	0.07
	5°	20	38000	2500	0.08	0.11	35000	1600	0.06	0.09	25000	800	0.04	0.06
	7°	10	38000	2500	0.12	0.18	35000	1600	0.10	0.14	25000	800	0.06	0.09
	7°	15	38000	2500	0.11	0.16	35000	1600	0.08	0.13	25000	800	0.05	0.08
	7°	20	38000	2500	0.08	0.11	35000	1600	0.06	0.09	25000	800	0.04	0.06
	10°	14	38000	2500	0.11	0.16	35000	1600	0.08	0.13	25000	800	0.05	0.08
R 0.75	2°	10	38000	2500	0.18	0.27	35000	1600	0.14	0.22	18000	800	0.09	0.14
	5°	15	38000	2500	0.16	0.24	35000	1600	0.13	0.19	18000	800	0.08	0.12
R 1	1°30'	10	35000	2800	0.18	0.27	30000	1800	0.14	0.22	15000	1000	0.09	0.14
	1°30'	15	35000	2800	0.16	0.24	30000	1800	0.13	0.19	15000	1000	0.08	0.12
	1°30'	20	35000	2800	0.14	0.21	30000	1800	0.11	0.17	15000	1000	0.07	0.11
	2°	6	35000	2800	0.20	0.30	30000	1800	0.16	0.24	15000	1000	0.10	0.15
	2°	10	35000	2800	0.18	0.27	30000	1800	0.14	0.22	15000	1000	0.09	0.14
	2°	15	35000	2800	0.16	0.24	30000	1800	0.13	0.19	15000	1000	0.08	0.12
	5°	10	35000	2800	0.18	0.27	30000	1800	0.14	0.22	15000	1000	0.09	0.14
	5°	15	35000	2800	0.18	0.27	30000	1800	0.14	0.22	15000	1000	0.09	0.14
	5°	23	35000	2800	0.14	0.21	30000	1800	0.11	0.17	15000	1000	0.07	0.11
	7°	17	35000	2800	0.16	0.24	30000	1800	0.13	0.19	15000	1000	0.08	0.12
	10°	12	35000	2800	0.18	0.27	30000	1800	0.14	0.22	15000	1000	0.09	0.14
R 1.25	5°	15	35000	2800	0.23	0.34	30000	1800	0.18	0.27	15000	1000	0.11	0.17
R 1.5	1°30'	15	32000	3000	0.23	0.34	27000	2000	0.18	0.27	16000	1200	0.11	0.17
	1°30'	20	32000	3000	0.23	0.34	27000	2000	0.18	0.27	16000	1200	0.11	0.17
	3°	15	32000	3000	0.23	0.34	27000	2000	0.18	0.27	16000	1200	0.11	0.17
	5°	10	32000	3000	0.25	0.38	27000	2000	0.20	0.30	16000	1200	0.13	0.19
	5°	18	32000	3000	0.23	0.34	27000	2000	0.18	0.27	16000	1200	0.11	0.17
R 1.75	5°	15	27500	3500	0.23	0.34	23000	2500	0.18	0.27	14000	1500	0.11	0.17
Depth of cut														

1) The above standard cutting conditions are applicable for a high-speed machining center only. If a high-speed machining center is not used, the revolution and feed rate should be adjusted proportionately.

VC-4STB

Ball nose taper end mill, Short cut length, 4 flute

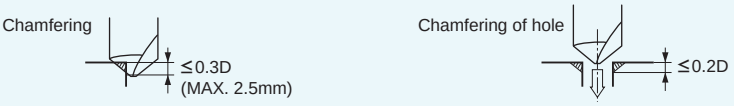
Work material			Alloy steel, Tool steel Pre-hardened steel (−45HRC) AISI H13, AISI D2, AISI P20				Hardened steel (45−55HRC) AISI H13, AISI D2				Hardened steel (55−62HRC) AISI D2, AISI M2			
R (mm)	Taper angle one side	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
R 2	1°30'	15	24000	3500	0.23	0.34	20000	2500	0.18	0.27	12000	1500	0.11	0.17
	1°30'	20	24000	3500	0.23	0.34	20000	2500	0.18	0.27	12000	1500	0.11	0.17
	3°	21	24000	3500	0.23	0.34	20000	2500	0.18	0.27	12000	1500	0.11	0.17
	5°	13	24000	3500	0.25	0.38	20000	2500	0.20	0.30	12000	1500	0.13	0.19
	7°	18	24000	3500	0.23	0.34	20000	2500	0.18	0.27	12000	1500	0.11	0.17
R 3	1°30'	15	16000	3500	0.30	0.45	13500	2500	0.24	0.36	8000	1500	0.15	0.23
	1°30'	20	16000	3500	0.30	0.45	13500	2500	0.24	0.36	8000	1500	0.15	0.23
	3°	22	16000	3500	0.30	0.45	13500	2500	0.24	0.36	8000	1500	0.15	0.23
R 4	1°30'	15	12000	3500	0.30	0.45	10000	2500	0.24	0.36	6000	1500	0.15	0.23
	3°	22	12000	3500	0.30	0.45	10000	2500	0.24	0.36	6000	1500	0.15	0.23
Depth of cut														

1) The above standard cutting conditions are applicable for a high-speed machining center only. If a high-speed machining center is not used, the revolution and feed rate should be adjusted proportionately.

VC-2C
Chamfer cutter, 2 flute

Work material	Carbon steel (−30HRC) AISI 1049, AISI P20 Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	16000	960	11000	590	9500	460	8000	320
4	8000	480	5600	300	4800	230	4000	160
6	5300	320	3700	200	3200	150	2700	110
8	4000	240	2800	150	2400	120	2000	80
10	3200	190	2200	120	1900	90	1600	60
12	2700	160	1900	100	1600	80	1300	50

Standard depth of cut

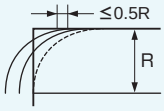
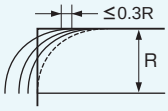
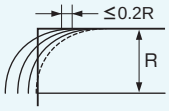


D:Dia.

1) The cutting conditions above are a guide only to chamfering within the standard depth of cut. When V slotting, reduce the feed rates by 70% or more. When center drilling, reduce the feed rates by 80% or more.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) For austenitic stainless steels and hardened steels, the use of non-water-soluble cutting fluid is recommended.

VC-RC

Corner rounding cutter, 3 flute

Work material	Structural steel, Carbon steel Cast iron (−30HRC) AISI 1049, AISI 35		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI P20, AISI H13, AISI D2		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45−55HRC) AISI H13	
Corner radius (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R0.5	8000	300	5600	200	4800	150	4800	120
R1	6400	300	4500	200	3800	150	3800	120
R1.5	5300	300	3700	200	3200	150	3200	120
R2	4000	300	2800	200	2400	150	2400	120
R2.5	3600	300	2500	200	2100	150	2100	120
R3	3200	300	2300	200	1900	150	1900	120
R4	2700	300	1900	200	1600	150	1600	120
R5	2300	300	1600	200	1400	150	1400	120
Depth of cut								

R:Corner radius

1) When roughing, the material should be removed in several passes.
   When finishing, a suitable minimum allowance should be removed to obtain the necessary finish.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) Coolant is recommended.

VC-PSRB MIRACLE ORBIT

Corner radius end mill, Short cut length, 2—4 flute, High precision

Work material		Alloy steel, Tool steel Pre-hardened steel (—45HRC) AISI P20, AISI H13, AISI D2, AISI P21		Hardened steel (45—55HRC) AISI H13, AISI D2, AISI 420		Hardened steel (55—62HRC) AISI D2, AISI M2, AISI W1	
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
0.6	2	48000	200 — 600	40000	160 — 500	22000	80 — 250
	4	48000	160 — 500	40000	100 — 300	22000	50 — 150
0.8	4	48000	240 — 750	32000	160 — 500	19000	80 — 250
	6	38000	190 — 600	26000	130 — 400	16000	70 — 200
	8	29000	150 — 450	19000	100 — 300	12000	50 — 150
1	4	48000	270 — 900	32000	180 — 600	19000	90 — 300
	6	38000	220 — 720	26000	150 — 480	16000	70 — 240
	10	29000	160 — 540	19000	110 — 360	12000	60 — 180
1.2	6	48000	300 — 900	32000	200 — 600	19000	100 — 300
	10	38000	240 — 720	26000	160 — 480	15000	80 — 240
	15	29000	180 — 540	19000	120 — 360	12000	60 — 180
1.5	4	41000	300 — 900	27000	200 — 600	16000	100 — 300
	6	32000	240 — 720	22000	160 — 480	13000	80 — 240
	10	24000	180 — 540	16000	120 — 360	10000	60 — 180
2	6	36000	600 — 2000	24000	400 — 1300	14000	200 — 650
	10	29000	480 — 1600	19000	320 — 1000	12000	160 — 520
	15	22000	360 — 1200	14000	240 — 780	9000	120 — 390
2.5	8	33000	750 — 2400	22000	500 — 1600	13000	250 — 800
	15	20000	450 — 1400	13000	300 — 960	8000	150 — 480
3	10	30000	900 — 3000	20000	600 — 2000	12000	300 — 1000
	15	24000	720 — 2400	16000	480 — 1600	10000	240 — 800
	20	18000	540 — 1800	12000	360 — 1200	7000	180 — 600
4	12	26000	1200 — 4500	17000	800 — 3000	10000	400 — 1500
	20	20000	960 — 2000	14000	640 — 2000	8000	320 — 2000
	30	15000	720 — 1000	10000	480 — 1000	6000	240 — 1000
5	15	20000	1200 — 4800	13000	780 — 3120	10000	520 — 2000
	30	12000	720 — 1900	8000	480 — 1600	7000	360 — 1120
6	18	20000	1600 — 7500	13000	1100 — 5000	8000	550 — 2500
	41	15000	900 — 2400	12000	720 — 1600	10000	600 — 1200
	50	10000	600 — 1200	8000	480 — 800	6000	360 — 530
8	24	15000	1900 — 7500	10000	1300 — 5000	6000	650 — 2500
	50	10000	1300 — 2400	8000	1000 — 2200	3000	320 — 600
10	30	12000	1600 — 7500	8000	1100 — 5000	5000	550 — 2500
	50	10000	1300 — 3200	7000	950 — 2200	2500	280 — 600
12	36	10000	1500 — 7500	7000	1000 — 5000	4000	500 — 2500
Depth of cut		≤0.2R (D≤ϕ2) ≤0.4R (D>ϕ2) ≤0.1mm (D≤ϕ1.5) ≤0.2mm (D≤ϕ4) ≤0.5mm (D≥ϕ6)				≤0.1R (D≤ϕ2) ≤0.2R (D>ϕ2) ≤0.05mm (D≤ϕ1.5) ≤0.1mm (D≤ϕ4) ≤0.3mm (D≥ϕ6)	

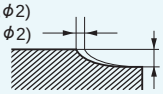
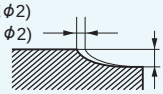
D:Dia.

1) The cutting conditions above are a guide only to machining with cutting edges with a corner radius. When machining with peripheral cutting edges, use the minimum feed rate as a guide.
2) Use a high rigidity machine.
3) When machining moulds, the cutting conditions change considerably according to the machined shape, milling method and the depth of cut.
4) When the overhang of the end mill (milling depth) is long, reduce the revolution and feed rate proportionally to prevent chattering.
5) Air blow or oil mist is recommended for good chip evacuation.

VC-PSRB MIRACLE ORBIT

Corner radius end mill, Short cut length, 2—4 flute, High precision

Taper neck type

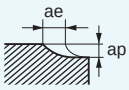
Work material			Alloy steel, Tool steel Pre-hardened steel (—45HRC) AISI P20, AISI H13 AISI D2, AISI P21		Hardened steel (45—55HRC) AISI H13, AISI D2, AISI 420		Hardened steel (55—62HRC) AISI D2, AISI M2, AISI W1	
Dia. (mm)	Taper angle one side	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1.5	1°30'	6	36000	270 — 810	24000	180 — 540	15000	90 — 270
	1°30'	10	28000	210 — 630	19000	140 — 420	11000	70 — 210
2	1°30'	10	32000	540 — 1800	22000	360 — 1200	13000	180 — 590
	1°30'	15	25000	420 — 1400	17000	280 — 910	10000	140 — 460
2.5	1°30'	12	26000	600 — 1900	18000	400 — 1300	11000	200 — 640
	1°30'	20	20000	450 — 140	13000	300 — 960	8000	150 — 480
3	1°30'	15	27000	810 — 2700	18000	540 — 1800	11000	270 — 900
	1°30'	20	21000	630 — 2100	14000	420 — 1400	8000	210 — 700
4	1°30'	20	23000	1080 — 3000	15000	720 — 3000	9000	360 — 3000
	1°30'	30	18000	840 — 1500	12000	560 — 1500	7000	280 — 1500
5	1°	40	10000	520 — 1400	7000	420 — 840	5000	260 — 600
	1°	60	7000	360 — 840	5000	300 — 500	4000	210 — 400
6	1°	40	20000	1650 — 4500	13000	1100 — 3000	8000	550 — 1500
8	1°	53	15000	1950 — 4500	10000	1300 — 3000	6000	650 — 1500
10	1°	55	12000	1650 — 4500	8000	1100 — 3000	5000	550 — 1500
Depth of cut			≤0.2R (D≤ϕ2) ≤0.4R (D>ϕ2)  ≤0.1mm (D≤ϕ1.5) ≤0.2mm (D≤ϕ4) ≤0.5mm (D≥ϕ6)		≤0.1R (D≤ϕ2) ≤0.2R (D>ϕ2)  ≤0.05mm (D≤ϕ1.5) ≤0.1mm (D≤ϕ4) ≤0.3mm (D≥ϕ6)			

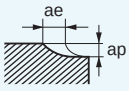
D:Dia.

1) The cutting conditions above are a guide only to machining with cutting edges with a corner radius. When machining with peripheral cutting edges, use the minimum feed rate as a guide.
2) Use a high rigidity machine.
3) When machining moulds, the cutting conditions change considerably according to the machined shape, milling method and the depth of cut.
4) When the overhang of the end mill (milling depth) is long, reduce the revolution and feed rate proportionally to prevent chattering.
5) Air blow or oil mist is recommended for good chip evacuation.

VC-HFRB

Corner radius, Short flute length, 4 flute, High feed machining

Work material		Carbon steel, Alloy steel, Cast iron (−30HRC) AISI 1049, AISI P20				Alloy steel, Tool steel, Pre-hardened steel (30−45HRC) AISI H13, AISI D2, AISI P21			
Dia. (mm)	Corner radius (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)
2	R 0.5	33000	10000	0.8	0.08	27000	8400	0.8	0.05
3	R 0.75	22000	11000	1.2	0.12	18000	9000	1.2	0.08
4	R 1	17000	12000	1.5	0.15	14000	9500	1.5	0.12
5	R 1.2	13000	13000	2.0	0.20	11000	11000	2.0	0.15
6	R 1.5	11000	13000	2.5	0.25	9000	11000	2.5	0.15
7	R 1.5	9400	13000	3.0	0.25	7800	11000	3.0	0.15
8	R 2	8200	13000	3.0	0.30	7000	11000	3.0	0.20
9	R 2	7300	13000	4.0	0.30	6000	11000	4.0	0.20
10	R 2	6500	13000	4.5	0.30	5500	11000	4.5	0.20
11	R 2	6000	12000	5.5	0.30	5000	10000	5.5	0.20
12	R 3	5500	12000	4.5	0.45	4600	10000	4.5	0.30
13	R 3	5000	12000	5.5	0.45	4200	10000	5.5	0.30
16	R 3	4100	10000	7.5	0.45	3400	8800	7.5	0.30
Depth of cut									

Work material		Hardened steel (45−55HRC) AISI H13, AISI 420				Hardened steel (55−60HRC) AISI D2, AISI M2			
Dia. (mm)	Corner radius (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)
2	R 0.5	24000	7500	0.8	0.04	16000	3000	0.8	0.03
3	R 0.75	16000	8500	1.2	0.06	11000	3300	1.2	0.05
4	R 1	12000	8800	1.5	0.08	8000	3500	1.5	0.07
5	R 1.2	9600	9500	2.0	0.10	6400	3800	2.0	0.08
6	R 1.5	8000	9600	2.5	0.10	5300	3800	2.5	0.10
7	R 1.5	6900	9600	3.0	0.10	4600	3800	3.0	0.10
8	R 2	6000	9600	3.0	0.15	4000	3800	3.0	0.13
9	R 2	5300	9500	4.0	0.15	3800	3800	4.0	0.13
10	R 2	4800	9500	4.5	0.15	3200	3800	4.5	0.13
11	R 2	4500	9000	5.5	0.15	2900	3500	5.5	0.13
12	R 3	4100	9000	4.5	0.25	2700	3500	4.5	0.20
13	R 3	3700	8900	5.5	0.25	2500	3500	5.5	0.20
16	R 3	3000	7800	7.5	0.25	2000	3200	7.5	0.20
Depth of cut									

Coefficients respective of tool overhang

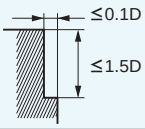
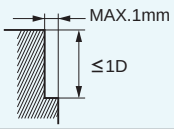
Type	Overhang	Revolution	Feed rate	Depth of cut ap
Straight	L/D≤5	100%	100%	100%
	L/D=6	90%	80%	80%
	L/D=7	80%	70%	70%
Taper neck	L/D=6	100%	100%	100%
	L/D=8	90%	80%	80%
	L/D≥10	80%	70%	70%

1) The above table shows cutting conditions when machining with the corner radius cutting edge.
2) This table shows the cutting conditions with less than 5D overhang length. In the case of longer overhangs, the revolution and the feed rate should be reduced proportionately.
3) For profile machining such as moulds, machining conditions may differ considerably depending on the workpiece geometry, machining methods and depth of cut. Reduce the feed rate especially when machining the corner sections of a workpiece.
4) When machining inclinations in the Z direction, set the inclination angle at 2° and reduce the feed rate by 50%.
5) Air blow or oil mist is recommended for good chip evacuation.

RECOMMENDED CUTTING CONDITIONS FOR MIRACLE END MILLS

VJ-2MS
End mill, Medium cut length, 2 flute

VJ-4MS
End mill, Medium cut length, 4 flute

Work material	Carbon steel, Alloy steel Cast iron (−30HRC) AISI 1049, AISI P20, FC		Alloy steel, Tool steel (30−45HRC) AISI H13, AISI D2		Hardened steel (45−55HRC) AISI H13	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
20	1600	190 (290)	950	110 (170)	560	55 (85)
25	1300	170 (260)	750	90 (140)	450	45 (70)
30	1100	150 (230)	650	80 (120)	370	40 (60)
40	800	120 (180)	500	70 (110)	280	30 (45)
50	650	110 (170)	400	60 (90)	220	25 (40)
Depth of cut						

D:Dia.

( ) is the standard feed rate of VJ-4MS.

1) As small a radial depth of cut as possible when side milling is recommended.
2) Use a rigid machine and tool holder.
3) If chattering occurs, revolution and feed rate must be reduced proportionately.
4) When a small depth of cut is used, the revolution and feed rate can be increased.
5) Climb cutting is recommended.
6) Air blow or dry cutting is recommended.

CRN-2MS

End mill, Medium cut length, 2 flute, For copper electrodes

Work material	Copper, Copper alloys		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.2	40000	600	0.01
0.3	40000	600	0.01
0.4	40000	800	0.01
0.5	40000	960	0.015
0.6	40000	1200	0.02
0.7	40000	1400	0.02
0.8	40000	1600	0.03
0.9	40000	1800	0.04
1	40000	2000	0.06
1.5	40000	3000	0.12
2	30000	3000	0.18
2.5	24000	2600	0.25
3	20000	2300	0.30
4	15000	2000	0.40
5	12000	1600	0.50
6	10000	1400	0.60
8	8000	1000	0.80
10	6400	900	1.00
12	5400	820	1.00
Depth of cut	≤Please refer to the list above for depth of cut. ≤D; D; ≤Please refer to the list above for depth of cut. D:Dia.		

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) When drilling, please set the feed rate at 1/3 or below of the table value.

CRN-4JC

End mill, Semi long cut length, 4 flute, For copper electrodes

Work material	Copper, Copper alloys	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)
3	10600	280
4	8000	330
5	6400	380
6	5300	420
8	4000	460
10	3200	460
12	2700	460
Depth of cut	≤0.05D (MAX. 0.5mm) ≤2.5D D:Dia.	

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) When cutting copper tungsten alloy, please set the revolution and the feed rate at under 70% of the table value.
4) Water-soluble cutting fluid is recommended.

CRN-2XL

End mill, Medium cut length, 2 flute, Long neck, For copper electrodes

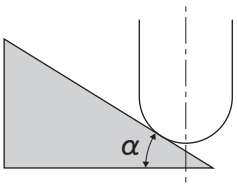
Work material		Copper, Copper alloys		
Dia. (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
0.2	0.5	40000	800	0.004
	1.0	40000	700	0.003
	1.5	40000	600	0.002
0.3	1	40000	800	0.007
	3	40000	600	0.002
0.4	2	40000	950	0.007
	4	40000	800	0.003
	6	40000	600	0.001
0.5	2	40000	950	0.01
	4	40000	800	0.005
	6	40000	700	0.002
0.8	4	40000	1200	0.02
	6	40000	1200	0.015
	8	40000	1000	0.01
1	6	40000	2000	0.04
	8	40000	2000	0.03
	10	30000	1200	0.02
	12	30000	1000	0.015
1.5	6	40000	2400	0.10
	8	40000	2200	0.09
	10	40000	2000	0.08
	12	30000	1800	0.05
	16	20000	1200	0.03
	20	15000	800	0.02
2	6	40000	2400	0.18
	8	40000	2200	0.15
	10	40000	2000	0.12
	12	30000	1500	0.10
	16	30000	1000	0.06
	20	15000	600	0.03
2.5	8	40000	3000	0.20
	12	40000	2800	0.15
	16	30000	2100	0.10
	20	20000	1000	0.08
3	20	20000	2000	0.12
4	20	15000	2000	0.30
5	25	12000	1500	0.35
6	30	10000	1200	0.40

1) If chattering and noise occur, reduce the revolution and the feed rate proportionately.
2) Please reduce the feed rate when the surface finish is important. Cutting conditions may differ considerably due to the overhang (milling depth and neck length), depth of cut, and machine tool conditions. Please see the above table as a standard starting point.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.
4) Water-soluble cutting fluid is recommended.

CRN-2MB

Ball nose, Medium cut length, 2 flute, For copper electrodes

Work material	Copper, Copper alloys				
R (mm)	α≤15°		α>15°		Depth of cut (mm)
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	
R0.2	40000	1600	40000	1200	0.02
R0.3	40000	3200	40000	1600	0.03
R0.4	40000	6400	40000	2400	0.05
R0.5	40000	8000	40000	3200	0.06
R0.75	40000	9600	40000	4000	0.09
R1	40000	9600	39000	4700	0.11
R1.25	40000	12000	30000	4500	0.12
R1.5	40000	12000	27000	4300	0.13
R2	32000	11000	20000	3600	0.15
R2.5	25000	9000	16000	2900	0.20
R3	21000	8400	13000	2600	0.25
R4	16000	6400	10000	2000	0.30
R5	13000	5200	8000	1700	0.50
R6	9000	3600	6000	1300	0.50
Depth of cut	≤0.2R ≤Please refer to the list above for depth of cut. R:Radius				



1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) When applying a lower revolution, reduce the revolution and the feed rate proportionately.
4) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.

CUTTING CONDITIONS FOR CRN COATED END MILLS

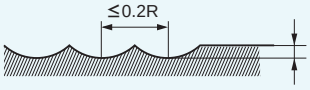
CRN-2XLB

Ball nose, Medium cut length, 2 flute, Long neck, For copper electrodes

Work material		Copper, Copper alloys		
R (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
R0.1	0.5	40000	800	0.003
	1.0	40000	600	0.002
	1.5	40000	400	0.001
R0.15	1	40000	1200	0.007
	2	40000	800	0.003
R0.2	1	40000	2000	0.015
	2	40000	1300	0.01
	3	40000	800	0.005
R0.25	2	40000	2000	0.02
	4	40000	1200	0.01
	6	36000	600	0.006
	10	26000	200	0.002
R0.3	2	40000	3200	0.03
	6	40000	1200	0.008
	10	30000	500	0.003
R0.4	4	40000	4000	0.02
	6	40000	2500	0.02
	10	30000	700	0.008
R0.5	4	40000	6400	0.05
	6	40000	4800	0.03
	8	40000	3000	0.02
	10	33000	2000	0.01
	16	18000	500	0.008
	20	13000	250	0.005

Work material		Copper, Copper alloys		
R (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut (mm)
R0.75	8	40000	8000	0.07
	12	35000	4500	0.04
	16	20000	2000	0.03
	20	12000	900	0.02
R1	8	40000	9600	0.10
	10	40000	6400	0.08
	12	40000	6000	0.08
	16	30000	3000	0.05
	20	20000	2000	0.04
	30	10000	800	0.02
R1.5	16	40000	12000	0.10
	25	25000	6000	0.08
	35	6000	700	0.06
R2	16	32000	11000	0.15
	20	32000	9000	0.15
	30	20000	4500	0.10
	40	15000	3000	0.08
	50	8000	1000	0.05
R2.5	20	25000	9500	0.20
	30	20000	3300	0.15
R3	30	21000	8400	0.20
	50	20000	3000	0.15

Depth of cut



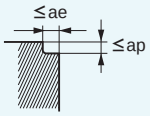
≤Please refer to the list above for depth of cut.

R:Radius

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
2) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.

CRN-2MRB

Corner radius, Medium cut length, 2 flute, For copper electrodes

Work material		Copper, Copper alloys			
Dia. (mm)	Corner radius (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
6	R0.2, R0.3, R0.5	10000	1400	6	0.6
	R1	10000	1700	6	0.6
8	R0.3, R0.5	8000	1000	8	0.8
	R1	8000	1200	8	0.8
10	R0.3, R0.5	6400	900	10	1.0
	R1	6400	1100	10	1.0
12	R0.3, R0.5	5400	800	12	1.0
	R1	5400	1000	12	1.0
Depth of cut					

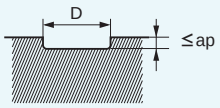
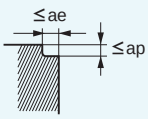
1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
2) When applying a lower revolution, reduce the revolution and the feed rate proportionately.
3) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.

CRN-2XLRB

Corner radius, Medium cut length, 2 flute, For copper electrodes

Slotting

Contour Cutting

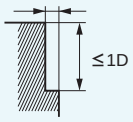
Work material			Copper, Copper alloys			Copper, Copper alloys			
Dia. (mm)	Corner radius (mm)	Neck length (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ap (mm)	Depth of cut ae (mm)
0.5	R0.05, R0.1	4	40000	800	0.005	40000	1500	0.01	0.1
		6	40000	700	0.003	40000	1000	0.005	0.1
0.8	R0.05, R0.1	6	40000	1200	0.02	40000	2500	0.02	0.15
		8	40000	1200	0.015	40000	1600	0.01	0.15
1	R0.1, R0.3	8	40000	2000	0.03	40000	3000	0.03	0.2
		10	35000	1600	0.025	35000	2000	0.025	0.2
		12	30000	1200	0.02	30000	1800	0.02	0.2
1.5	R0.1, R0.2, R0.3	12	30000	1500	0.05	40000	4500	0.04	0.3
		20	20000	1000	0.02	20000	2000	0.02	0.3
2	R0.1, R0.2 R0.3, R0.5	12	30000	1500	0.1	40000	4500	0.08	0.4
		16	30000	1000	0.06	30000	3000	0.05	0.4
		20	20000	600	0.04	20000	2000	0.04	0.4
3	R0.2, R0.3	20	20000	2000	0.12	35000	6000	0.1	0.6
	R0.5	20	20000	2200	0.12	35000	8000	0.1	0.6
4	R0.2, R0.3	20	15000	2000	0.25	32000	5000	0.15	0.8
	R0.5	20	15000	2200	0.25	32000	7000	0.15	0.8
5	R0.2, R0.3	25	12000	1500	0.3	22000	5000	0.2	1.0
	R0.5	25	12000	1700	0.3	22000	7000	0.2	1.0
6	R0.2, R0.3, R0.5	30	10000	1200	0.4	20000	5000	0.25	1.2
	R1	30	10000	1500	0.4	20000	7000	0.25	1.2
Depth of cut			 D:Dia.						

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
2) When applying a lower revolution, reduce the revolution and the feed rate proportionately.
3) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.

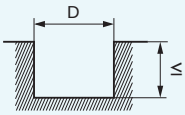
DLC-2MA

Slot drill, Medium cut length, 2 flute

Side milling

Work material	Aluminium alloy		Aluminium cast Copper, Copper alloys	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	40000	600	40000	460
2	40000	1100	38000	850
3	32000	1400	25000	950
4	24000	1500	19000	1000
5	19000	1600	15000	1000
6	16000	1900	13000	1100
8	12000	1900	9500	1200
10	9500	1900	7600	1200
12	8000	1900	6400	1200
16	6000	1900	4800	1200
20	4800	1500	3800	1000
Depth of cut	≤0.2D (D<ϕ3) ≤0.5D (D≥ϕ3)  ≤1D D:Dia.			

Slotting

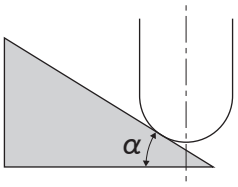
Work material	Aluminium alloy		Aluminium cast Copper, Copper alloys	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	40000	460	40000	350
2	38000	850	32000	550
3	25000	950	21000	600
4	19000	1000	16000	650
5	15000	1000	13000	700
6	13000	1100	11000	750
8	9500	1200	8000	800
10	7600	1200	6400	800
12	6400	1200	5300	800
16	4800	1000	4000	720
20	3800	970	3200	660
Depth of cut	 D ≤1D (MAX. 12mm) D:Dia.			

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) For milling of GFRP, please reduce the revolution and feed rate to 50% of the table figure of aluminium alloy.
   Please adjust the depth of cut according to the quality of GFRP. (GFRP=Glass Fibre Reinforced Plastic)
4) Water-soluble cutting fluid is recommended.
5) Climb cutting is recommended for side milling.

DLC-2MB

Ball nose, Medium cut length, 2 flute

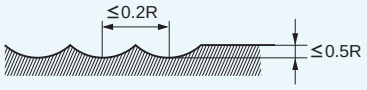
Work material	Aluminium alloy				Aluminium cast Copper, Copper alloys			
R (mm)	α≤15°		α>15°		α≤15°		α>15°	
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 0.1	40000	350	40000	260	40000	280	40000	210
R 0.15	40000	480	40000	360	40000	380	40000	290
R 0.2	40000	600	40000	450	40000	480	40000	360
R 0.25	40000	800	40000	600	40000	640	40000	480
R 0.3	40000	1000	40000	750	40000	800	40000	600
R 0.4	40000	1500	40000	1100	40000	1200	40000	880
R 0.5	40000	2000	40000	1500	40000	1600	40000	1200
R 0.75	40000	2200	40000	1600	40000	1800	40000	1300
R 1	40000	2800	40000	2200	40000	2200	32000	1400
R 1.25	40000	3200	38000	2200	32000	2000	30000	1400
R 1.5	40000	4000	32000	2600	32000	2600	26000	1700
R 2	30000	4200	24000	2800	24000	2700	19000	1800
R 2.5	24000	4400	19000	2800	19000	2800	15000	1800
R 3	20000	4000	16000	2800	16000	2600	13000	1800
R 4	15000	3600	12000	2400	12000	2300	9600	1500
R 5	12000	3600	9500	2000	9600	2300	7600	1300
R 6	10000	3200	8000	2200	8000	2000	6400	1400
R 8	7500	2800	6000	1800	6000	1800	4800	1200
R10	6000	2500	4800	1600	4800	1600	3800	1000
Depth of cut	≤0.2R (R<0.5) ≤0.4R (R≥0.5) ≤0.2R R:Radius							



1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.
4) For milling of GFRP, please reduce the revolution and feed rate to 50% of the table figure of aluminium alloy. Please adjust the depth of cut according to the quality of GFRP. (GFRP=Glass Fibre Reinforced Plastic)
5) Water-soluble cutting fluid is recommended.

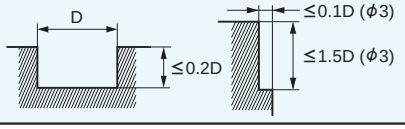
DC-2MB
Ball nose, Medium cut length, 2 flute, For graphite

DC-2LB
Ball nose, Long cut length, 2 flute, For graphite

Work material	Graphite (−65HS)		Graphite (65HS−)	
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R0.5	40000	2000	40000	1600
R1	40000	2200	40000	1800
R1.5	30000	2400	30000	1900
R2	24000	2600	24000	2100
R2.5	19000	2600	19000	2100
R3	16000	2600	16000	2100
R3.5	14000	2600	14000	2100
R4	12000	2800	12000	2200
R4.5	11000	2900	11000	2300
R5	10000	3000	10000	2400
R6	8000	2400	8000	1900
Depth of cut	 R:Radius			

1) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
2) Machining at high speeds and high feeds is preferred. But when chipping occurs, reduce the feed rate.

DC-2MS-3
Medium cut length, 2 flute, 3mm shank, For non-ferrous metals

Work material	Aluminium alloy		Pure Copper, Copper alloys Graphite Machineable ceramics	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
0.5	20000	60	20000	60
1	20000	120	20000	120
2	20000	320	11000	180
3	17000	380	8500	200
Depth of cut	 D:Dia.			

1) When cutting a very hard workpiece, reduce the feed rate.
2) The revolution can be increased by using a high speed spindle.
3) When drilling, please set the feed rate at 1/3 or below of the values above.

DC-2MB-NF

Ball nose, Medium cut length, 2 flute, For non-ferrous metals

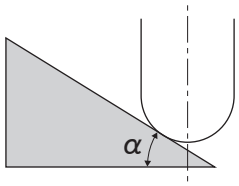
Work material	Graphite							
R (mm)	Roughing				Finishing			
	α≤15°		α>15°		α≤15°		α>15°	
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R0.5	20000	400	20000	380	20000	600	20000	520
R1	20000	480	20000	440	20000	700	20000	600
R2	18500	930	14500	640	20000	1400	20000	1200
R3	13000	1010	10000	700	20000	2200	15000	1500
R4	10000	1260	8000	800	15000	2700	11000	1500
R5	8000	1260	6500	820	13000	2900	9000	1500
R6	6600	1160	5300	740	10000	2500	7200	1500
Depth of cut	≤0.5R, ≤0.2R				≤0.1R, ≤0.06R			

R:Radius

Work material	Copper, Pure copper							
R (mm)	Roughing				Finishing			
	α≤15°		α>15°		α≤15°		α>15°	
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R0.5	20000	360	20000	320	20000	480	20000	400
R1	18000	360	16000	290	20000	600	20000	450
R2	11100	440	9200	330	17000	900	13000	550
R3	7700	480	6400	360	13000	1000	10000	600
R4	6000	600	4800	380	10000	1300	7500	700
R5	4800	600	3800	450	8000	1400	6000	800
R6	4000	560	3200	410	6600	1400	5000	800
Depth of cut	≤0.5R, ≤0.2R				≤0.1R, ≤0.06R			

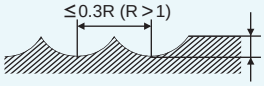
R:Radius

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Cutting conditions may be differ considerably due to the overhang (milling depth), cutting stock, and machine tool conditions. Please see the table value as a standard.
3) When cutting a very hard workpiece, reduce the feed rate.
4) If the depth of cut is shallow, the revolution and feed rate can be increased.



DC-2XLB
Ball nose, Medium cut length, 2 flute, Long neck, For graphite

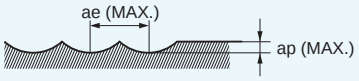
DC-XB
Ball nose, Medium cut length, 2 flute, Taper neck, For graphite

Work material				Graphite	
R (mm)		Neck length (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)
R0.2	DC-2XLB	4	0.1	40000	1300
		6	0.06		
	DC-XB	8	0.06		
R0.3	DC-2XLB	6	0.15	40000	1500
		9	0.1		
	DC-XB	12	0.1		
R0.4	DC-2XLB	8	0.15	40000	1100
		12	0.1		
	DC-XB	16	0.1		
R0.5	DC-2XLB	12	0.2	40000	2000
		16	0.12		
	DC-XB	20	0.12		
R0.75	DC-2XLB	15	0.2	35000	2000
		23	0.12		
	DC-XB	30	0.12		
R1	DC-2XLB	16	0.3	30000	2000
		30	0.15		
	DC-XB	40	0.15		
R1.5	DC-2XLB	30	0.35	20000	2000
		40	0.25		
	DC-XB	60	0.25		
R2	DC-2XLB	30	0.5	15000	2000
		50	0.3		
	DC-XB	80	0.3		
R2.5	DC-2XLB	40	0.6	12000	1800
		60	0.4		
	DC-XB	100	0.4		
R3	DC-2XLB	60	0.6	10000	1600
		90	0.4		
	DC-XB	120	0.4		
Depth of cut				≤0.2R (R≤1) ≤0.3R (R>1)  R:Radius	

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
2) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.

CBN-2XLB

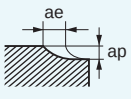
Ball nose, Short cut length, 2 flute, Long neck

Work material	Hardened steel (−55HRC) AISI P21, AISI H13, AISI 420				Hardened steel (55−62HRC) AISI D2, AISI M2, AISI W1				Hardened steel (62−70HRC) AISI M2, AISI W1 Powder high-speed steel etc.			
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)
R0.2	50000	1500	0.01	0.006	50000	1200	0.01	0.006	50000	1200	0.008	0.004
R0.3	50000	2000	0.02	0.01	50000	1500	0.02	0.01	50000	1500	0.015	0.008
R0.4	50000	3000	0.05	0.02	50000	2000	0.04	0.02	50000	2000	0.03	0.015
R0.5	50000	3000	0.06	0.03	50000	2000	0.05	0.03	50000	2000	0.03	0.02
R0.75	50000	3500	0.08	0.04	50000	2500	0.06	0.03	50000	2500	0.04	0.02
R1	50000	4000	0.1	0.05	50000	3000	0.07	0.04	50000	3000	0.05	0.03
Depth of cut												

1) The above table shows maximum cutting conditions. Please control the pick feed (ae) according to the surface finish required.
2) Oil mist coolant is recommended.
3) If the spindle speed is insufficient, the revolution and the feed rate should be reduced proportionately.

CBN-2XLRB

Corner radius end mill, Medium cut length, 2 flute, Long neck

Work material	Hardened steel (−55HRC) AISI P21, AISI H13, AISI 420				Hardened steel (55−62HRC) AISI D2, AISI M2, AISI W1				Hardened steel (62−70HRC) AISI M2, AISI W1 Powder high-speed steel etc.			
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Depth of cut ae (mm)	Depth of cut ap (mm)
0.5	50000	750	0.2	0.01	50000	600	0.1	0.01	40000	400	0.06	0.005
1	38000	1100	0.3	0.02	38000	760	0.2	0.01	25000	400	0.1	0.01
1.5	25000	900	0.5	0.03	25000	700	0.4	0.02	17000	340	0.2	0.02
2	20000	800	0.7	0.04	20000	600	0.6	0.03	12000	300	0.3	0.02
Depth of cut												

1) The above table shows maximum cutting conditions.
2) Oil mist coolant is recommended.
3) If the spindle speed is insufficient, the revolution and the feed rate should be reduced proportionately.

RECOMMENDED CUTTING CONDITIONS FOR MS END MILLS

End mill, Medium cut length, 2 flute, + Tolerance **SED2KPG**

End mill, Medium cut length, 2 flute, - Tolerance **SED2KMG**

End mill, Short cut length, 2 flute, High helix **SEE2SG**

Work material	Carbon steel, Alloy steel (180—280HB) AISI 1045, AISI P20		Carbon steel, Alloy steel (280—380HB) AISI 1045, AISI P20		Pre-hardened steel (35—45HRC)		Stainless steel (270HB≥) AISI 420		Cast iron (Tensile Strength 350MPa≥) AISI 35	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
2	13000	260 (260)	10300	200 (200)	8800	110 (110)	9800	170 (170)	21500	830 (830)
3	8500	340 (340)	6900	200 (200)	6400	110 (110)	6400	170 (170)	14300	850 (850)
4	6500	380 (380)	5200	250 (200)	4400	140 (110)	4800	200 (160)	10700	860 (860)
5	5100	400 (400)	4100	290 (230)	3500	140 (110)	3800	190 (150)	8600	850 (850)
6	4300	410 (410)	3400	290 (230)	2900	150 (120)	3200	180 (140)	7200	870 (870)
8	3200	410 (410)	2600	250 (200)	2200	140 (110)	2400	150 (120)	5400	880 (880)
10	2600	400 (400)	2070	240 (190)	1800	140 (110)	1900	140 (110)	4300	860 (860)
12	2200	360 (360)	1700	210 (170)	1500	130 (100)	1600	130 (105)	3600	860 (860)
14	1900	340 (340)	1500	200 (160)	1250	130 (100)	1400	130 (100)	3100	860 (860)
16	1600	320 (320)	1300	200 (160)	1100	130 (100)	1200	120 (95)	2700	870 (870)
18	1400	310 (310)	1150	190 (150)	950	130 (100)	1100	110 (90)	2400	870 (870)
20	1300	300 (300)	1050	180 (140)	900	130 (100)	950	110 (85)	2200	840 (840)
25	1100	290 (290)	850	160 (130)	700	110 (90)	750	100 (80)	1700	750 (750)
Depth of cut	≤0.1D ≤1.5D (SEE2SG) ≤1D (SED2KPG • SED2KMG)						D ≤0.25D (D≤ϕ3) ≤0.5D (D>ϕ3)			

D:Dia.

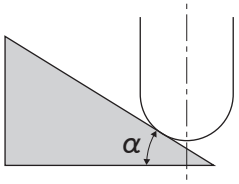
( ) : Indicates standard feed rate for slotting.

1) The cutting conditions above are a guide only to milling within the standard depth of cut.
2) Ductile cast iron milling has the same cutting conditions as carbon steel and alloy steel. (180—280HB)
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below of the values above.

BZD2SG

Ball nose end mill, Medium cut length, 2 flute

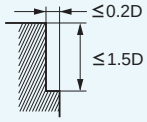
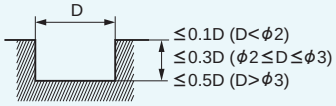
Work material	Carbon steel, Alloy steel, Pre-hardened steel Hardened steel (−45HRC) AISI 1049, AISI P21, AISI H13				Hardened steel (45−55HRC) AISI H13			
R (mm)	α≤15°		α>15°		α≤15°		α>15°	
	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 0.2	40000	600	40000	450	40000	500	40000	380
R 1	35000	2400	25000	1400	25000	1500	20000	900
R 2	25000	2600	20000	1500	17000	1500	13000	900
R 3	20000	2600	15000	1500	13000	1500	10000	900
R 4	15000	2700	11000	1500	10000	1500	7500	900
R 5	12000	2700	9000	1500	8000	1500	6000	900
R 6	10000	2500	7500	1400	6600	1400	5000	800
R 8	7500	2400	5600	1300	5000	1200	3700	680
R10	6000	2400	4500	1300	4000	1000	3000	580
R12.5	4800	2000	3600	1100	3200	800	2400	480
Depth of cut	≤0.1R, ≤0.06R R:Radius							



1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.

RECOMMENDED CUTTING CONDITIONS FOR CARBIDE END MILLS

End mill, Short cut length, 2 flute **C-2SS**
End mill, Medium cut length, 2 flute **C-2MS**
End mill, Semi long cut length, 2 flute **C-2JS** 1)
End mill, Long cut length, 2 flute **C-2LS** 2)

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1049, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—45HRC) AISI H13, AISI P21		Austenitic stainless steel AISI 304 Titanium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
0.5	17000	50 (50)	14000	45 (45)	11000	30 (30)	9000	30 (30)
1	10000	65 (65)	8500	55 (55)	6400	40 (40)	5200	35 (35)
2	5500	90 (90)	4800	80 (80)	3800	55 (55)	3100	50 (50)
3	4100	100 (100)	3500	85 (85)	2800	65 (65)	2300	60 (60)
4	3400	170 (135)	2900	140 (110)	2200	90 (70)	1900	80 (60)
5	2900	190 (150)	2400	150 (120)	1800	100 (80)	1500	90 (60)
6	2500	200 (160)	2100	170 (135)	1600	110 (90)	1300	95 (65)
8	1900	200 (160)	1600	170 (135)	1200	105 (85)	1000	100 (70)
10	1500	180 (145)	1250	150 (120)	950	95 (75)	800	90 (65)
12	1250	150 (120)	1050	130 (100)	800	80 (65)	660	75 (50)
16	940	110 (90)	800	95 (75)	600	60 (50)	500	55 (40)
20	750	90 (70)	640	80 (65)	480	50 (40)	400	45 (30)
Depth of cut	(C-2SS, C-2MS)   D:Dia.							

( ) : Indicates standard feed rate for slotting.

1) Decrease the feed rate by 20—30% for C-2JS.
2) Decrease the revolution by 20—30% and the feed rate by 40—50% for C-2LS.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

C-2MA

End mill, Medium cut length, 2 flute, For aluminium alloy

Side milling

Work material	Aluminium alloy		Aluminium cast	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	40000	600	40000	460
2	40000	1100	38000	850
3	32000	1400	25000	950
4	24000	1500	19000	1000
5	19000	1600	15000	1000
6	16000	1900	13000	1100
8	12000	1900	9500	1200
10	9500	1900	7600	1200
12	8000	1900	6400	1200
16	6000	1900	4800	1200
20	4800	1500	3800	1000
Depth of cut	≤0.2D (D＜φ3) ≤0.5D (D≥φ3) ≤1D D:Dia.			

Slotting

Work material	Aluminium alloy		Aluminium cast	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	40000	460	40000	350
2	38000	850	32000	550
3	25000	950	21000	600
4	19000	1000	16000	650
5	15000	1000	13000	700
6	13000	1100	11000	750
8	9500	1200	8000	800
10	7600	1200	6400	800
12	6400	1200	5300	800
16	4800	1000	4000	720
20	3800	970	3200	660
Depth of cut	D ≤1D (MAX. 12mm) D:Dia.			

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) Water-soluble cutting fluid is recommended.
4) Climb cutting is recommended for side milling.

C-2LA

End mill, Long cut length, 2 flute, For aluminium alloy

Side milling

Work material	Aluminium alloy		Aluminium cast	
Cutting speed	150m/min		120m/min	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	40000	320	38000	240
2	24000	380	19000	240
3	16000	510	13000	330
4	12000	580	9500	380
5	9500	640	7600	400
6	8000	640	6400	400
8	6000	770	4800	480
10	4800	770	3800	480
12	4000	770	3200	480
16	3000	670	2400	430
20	2400	610	1900	390
Depth of cut	≤0.05D (D＜φ3) ≤0.1D (D≥φ3) ≤2.5D D:Dia.			

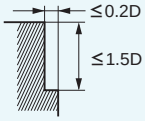
1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
2) If the depth of cut is shallow, the revolution and feed rate can be increased.
3) Water-soluble cutting fluid is recommended.
4) Climb cutting is recommended for side milling.

End mill, Medium cut length, 4 flute, Center cutting **C-4MC**

End mill, Semi long cut length, 4 flute, Center cutting **C-4JC** 1)

End mill, Long cut length, 4 flute, Center cutting **C-4LC** 2)

Side milling

Work material	Structural steel, Carbon steel (−20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20−30HRC) AISI 1049, AISI 1055		Alloy steel, Tool steel (30−45HRC) AISI P20, AISI H13 Pre-hardened steel AISI P21		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	4100	150	3500	130	2800	100	2300	90
4	3400	260	2900	210	2200	140	1900	120
5	2900	290	2400	230	1800	150	1500	135
6	2500	300	2100	260	1600	170	1300	140
8	1900	300	1600	260	1200	160	1000	150
10	1500	270	1250	230	950	140	800	135
12	1250	230	1050	200	800	120	660	110
16	940	170	800	140	600	90	500	80
20	750	140	640	120	480	75	400	70
Depth of cut	(C-4MC)  D:Dia.							

1) Decrease the feed rate by 20−30% for C-4JC.
2) Decrease the revolution by 20−30% and the feed rate by 40−50% for C-4LC.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

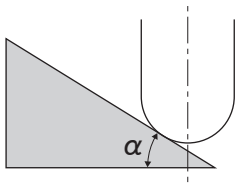
RECOMMENDED CUTTING CONDITIONS FOR CARBIDE END MILLS

C-2MB

Ball nose end mill, Medium cut length, 2 flute

Work material	Roughing (Large depth of cut ≤0.8R)				Finishing (Depth of cut 0.05R)							
	Carbon steel, Alloy steel (−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−45HRC) AISI H13, AISI P21		Carbon steel, Alloy steel (−30HRC) AISI 1055, AISI P20				Alloy steel, Tool steel, Pre-hardened steel (30−45HRC) AISI H13, AISI D2, AISI P21			
					α≤15°		α>15°		α≤15°		α>15°	
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 0.5	—	—	—	—	14000	180	10000	120	12000	150	7000	80
R 1	4100	70	2800	40	10500	350	7300	210	8400	220	5500	130
R 2	2600	120	1650	85	7200	500	5100	300	5900	360	4300	210
R 3	1900	150	1200	95	5200	560	3600	350	4200	410	2900	240
R 4	1400	160	900	105	4000	640	2700	380	3100	440	2200	240
R 5	1100	140	710	95	3200	700	2200	380	2500	460	1750	250
R 6	940	130	600	85	2600	640	1750	350	2100	430	1450	250
R 8	700	100	450	60	1900	620	1300	330	1550	430	1100	250
R10	560	80	360	50	1500	590	1000	310	1250	410	860	250

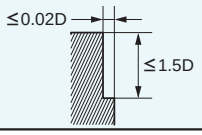
1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) Cutting conditions may differ considerably due to the overhang (milling depth and neck length), depth of cut, and machine tool conditions. Please see the above table as a standard starting point.
4) If the depth of cut is shallow, the revolution and feed rate can be increased.



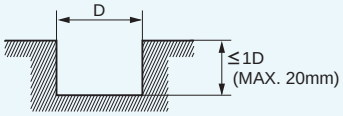
C-2MHA

End mill, Medium cut length, 2 flute, For aluminium alloy

Side milling

Work material	Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)
3	40000	2400
4	36000	2600
5	30000	4000
6	27000	4000
8	20000	4000
10	16000	4500
12	13000	4500
16	10000	4500
20	8000	4300
25	6000	3600
Depth of cut		

Slotting

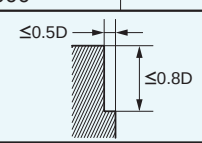
Work material	Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)
3	40000	1500
4	36000	1800
5	30000	2800
6	27000	2800
8	20000	2800
10	16000	3200
12	13000	3200
16	10000	3200
20	8000	3000
25	6000	2500
Depth of cut		

1) Water-soluble cutting fluid is recommended.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) Climb cutting is recommended for side milling.
4) If tool clamping is poor, the tool can be pulled out of the holder. Ensure that the tool is sufficiently clamped.

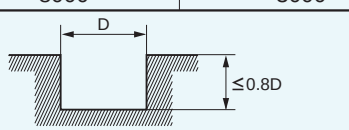
C-2SA

End mill, Short cut length, 2 flute, For aluminium alloy

Side milling

Work material	Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)
3	40000	1800
4	36000	2400
5	30000	3000
6	27000	3200
8	20000	3400
10	16000	3600
12	13000	3600
16	10000	3600
20	8000	3300
Depth of cut		

Slotting

Work material	Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)
3	40000	1600
4	36000	2100
5	30000	2700
6	27000	2800
8	20000	3000
10	16000	3200
12	13000	3200
16	10000	3200
20	8000	3000
Depth of cut		

1) Water-soluble cutting fluid is recommended.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) Climb cutting is recommended for side milling.
4) If tool clamping is poor, the tool can be pulled out of the holder. Ensure that the tool is sufficiently clamped.
5) This table shows the cutting condition with less than 4D overhang length. If more than 4D, spindle speed, feed rate and depth of cut should be reduced.

RECOMMENDED CUTTING CONDITIONS FOR CARBIDE END MILLS

C-3SA
End mill, Short cut length, 3 flute, For aluminium alloy

C-3SARB
Corner radius, Short cut length, 3 flute, For aluminium alloy

Side milling

Work material	Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)
12	13000	5400
16	10000	5400
18	9000	5000
20	8000	5000
25	6000	4500
Depth of cut	≤0.3D, ≤0.8D, D:Dia.	

Slotting

Work material	Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)
12	13000	3200
16	10000	3200
18	9000	3000
20	8000	3000
25	6000	2800
Depth of cut	D, ≤0.5D, D:Dia.	

1) Water-soluble cutting fluid is recommended.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
3) Climb cutting is recommended for side milling.
4) This table shows the cutting condition with less than 4D overhang length. If more than 4D, spindle speed, feed rate and depth of cut should be reduced.
5) These end mills do not have a centre cutting edge, therefore when entering a workpiece use a ramping process rather than vertical feed.

C-SRA

Roughing end mill, Short cut length, 3 flute, For aluminium alloy

C-SRARB

Corner radius roughing end mill, Short cut length, 3 flute, For aluminium alloy

Side milling

Work material	Aluminium alloy		Aluminium cast	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
10	19000	8600	9500	3400
12	16000	8200	8000	3200
16	12000	7600	6000	3100
18	10500	7200	5300	2900
20	9500	7100	4800	2900
22	8500	6900	4300	2800
25	7500	6800	3800	2700
Depth of cut	≤0.5D, ≤1D, D:Dia.			

Slotting

Work material	Aluminium alloy		Aluminium cast	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
10	19000	6800	9500	2700
12	16000	6500	8000	2600
16	12000	6100	6000	2400
18	10500	5800	5300	2400
20	9500	5700	4800	2300
22	8500	5500	4300	2200
25	7500	5400	3800	2200
Depth of cut	D, ≤1D, D:Dia.			

1) Water-soluble cutting fluid is recommended.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.
4) Climb cutting is recommended for side milling.
5) These end mills do not have a centre cutting edge, therefore when entering a workpiece use a ramping process rather than vertical feed.

Using a high-speed and high-rigidity machining center

Side milling

Work material	Aluminium alloy		Aluminium cast	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
10	30000	11000	19000	5400
12	30000	12000	16000	5300
16	24000	12000	12000	4900
18	21000	12000	10500	4700
20	19000	11000	9500	4600
22	17000	11000	8500	4300
25	15000	11000	7500	4300
Depth of cut	≤0.5D, ≤1D, D:Dia.			

Slotting

Work material	Aluminium alloy		Aluminium cast	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
10	30000	8600	19000	4300
12	30000	9900	16000	4300
16	24000	9700	12000	4000
18	21000	9500	10500	3800
20	19000	9100	9500	3700
22	17000	8700	8500	3400
25	15000	8600	7500	3400
Depth of cut	D, ≤0.75D, D:Dia.			

1) Water-soluble cutting fluid is recommended.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.
4) Climb cutting is recommended for side milling.
5) These end mills do not have a centre cutting edge, therefore when entering a workpiece use a ramping process rather than vertical feed.

RECOMMENDED CUTTING CONDITIONS FOR CARBIDE END MILLS

C-MRA

Roughing end mill, Medium cut length, 3 flute, For aluminium alloy

Side milling

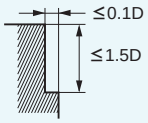
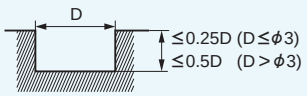
Work material	Aluminium alloy		Aluminium cast	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	40000	2700	25000	1100
4	36000	2700	20000	1100
5	30000	5400	16000	2200
6	27000	6100	13000	2300
8	20000	6000	10000	2400
10	16000	5800	8000	2300
12	13000	5300	6500	2100
16	10000	5100	5000	2000
20	8000	4800	4000	1900
25	6400	4600	3200	1800
Depth of cut	≤0.25D, ≤1.5D, D:Dia.			

Slotting

Work material	Aluminium alloy		Aluminium cast	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	30000	1800	16000	700
4	24000	2200	12000	900
5	19000	2300	10000	900
6	16000	2400	8000	1000
8	12000	2500	6000	1000
10	9500	2600	5000	1100
12	8000	2300	4000	900
16	6000	2100	3000	800
20	4800	2000	2400	800
25	3800	2000	1900	700
Depth of cut	D, ≤1D, D:Dia.			

1) Water-soluble cutting fluid is recommended.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
3) If the depth of cut is shallow, the revolution and feed rate can be increased.
4) Climb cutting is recommended for side milling.
5) These end mills do not have a centre cutting edge, therefore when entering a workpiece use a ramping process rather than vertical feed.

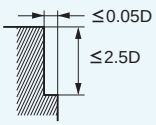
SEE2S
End mill, Short cut length, 2 flute

Work material	Carbon steel, Alloy steel (180—280HB) AISI 1045, AISI P20		Carbon steel, Alloy steel (280—380HB) AISI 1045, AISI P20		Pre-hardened steel (35—45HRC)		Stainless steel (270HB≥) AISI 420		Cast iron (Tensile Strength 350MPa≥) AISI 35	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	4200	160 (160)	3700	70 (70)	2600	30 (30)	3200	60 (60)	6900	270 (270)
4	3000	180 (180)	2800	100 (80)	2000	50 (40)	2400	90 (70)	5200	300 (300)
5	2500	200 (200)	2200	100 (80)	1600	60 (50)	1900	90 (70)	4100	330 (330)
6	2000	200 (200)	1900	100 (80)	1300	60 (50)	1600	90 (75)	3500	350 (350)
8	1500	180 (180)	1400	100 (80)	1000	60 (50)	1200	90 (75)	2600	350 (350)
10	1200	170 (170)	1100	100 (80)	800	60 (50)	950	90 (75)	2050	350 (350)
12	1000	160 (160)	950	110 (90)	650	60 (50)	800	100 (80)	1700	350 (350)
16	750	150 (150)	700	110 (90)	500	60 (50)	600	110 (85)	1300	360 (360)
18	700	150 (150)	600	130 (100)	450	60 (50)	550	110 (90)	1200	370 (370)
20	600	140 (140)	550	130 (100)	400	60 (50)	500	110 (90)	1050	380 (380)
Depth of cut	  D:Dia.									

( ) : Indicates standard feed rate for slotting.

1) The cutting conditions above are a guide only to milling within the standard depth of cut.
2) Ductile cast iron milling has the same cutting conditions as carbon steel and alloy steel. (180—280HB)
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below of the values above.

SEE2L
End mill, Long cut length, 2 flute

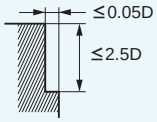
Work material	Carbon steel, Alloy steel (180—280HB) AISI 1045, AISI P20		Carbon steel, Alloy steel (280—380HB) AISI 1045, AISI P20		Pre-hardened steel (35—45HRC)		Stainless steel (270HB≥) AISI 420		Cast iron (Tensile Strength 350MPa≥) AISI 35	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	3400	100	3000	40	2100	20	2600	40	5500	160
4	2400	110	2200	60	1600	30	1900	50	4200	180
5	2000	120	1800	60	1300	40	1500	50	3300	200
6	1600	120	1500	60	1000	40	1300	50	2800	210
8	1200	110	1100	60	800	40	960	50	2100	210
10	1000	100	880	60	640	40	760	50	1600	210
12	800	100	760	70	520	40	640	60	1400	210
16	600	90	560	70	400	40	480	70	1000	220
20	480	80	440	80	320	40	400	70	840	230
Depth of cut	 D:Dia.									

1) The cutting conditions above are a guide only to milling within the standard depth of cut.
2) Ductile cast iron milling has the same cutting conditions as carbon steel and alloy steel. (180—280HB)
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below of the values above.

RECOMMENDED CUTTING CONDITIONS FOR CARBIDE END MILLS

SEE4L

End mill, Long cut length, 4 flute

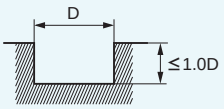
Work material	Carbon steel, Alloy steel (180—280HB) AISI 1045, AISI P20		Carbon steel, Alloy steel (280—380HB) AISI 1045, AISI P20		Pre-hardened steel (35—45HRC)		Stainless steel (270HB≥) AISI 420		Cast iron (Tensile Strength 350MPa≥) AISI 35	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	3400	150	3000	60	2100	30	2600	60	5500	240
4	2400	170	2200	90	1600	50	1900	80	4200	270
5	2000	180	1800	90	1300	60	1500	80	3300	300
6	1600	180	1500	90	1000	60	1300	80	2800	320
8	1200	170	1100	90	800	60	960	80	2100	320
10	1000	150	880	90	640	60	760	80	1600	320
12	800	150	760	110	520	60	640	90	1400	320
14	720	150	640	110	480	60	560	110	1200	320
16	600	140	560	110	400	60	480	110	1000	330
18	560	140	480	120	360	60	440	110	960	330
20	480	120	440	120	320	60	400	110	840	350
25	400	120	360	110	240	50	320	90	680	330
Depth of cut	 D:Dia.									

1) The cutting conditions above are a guide only to milling within the standard depth of cut.
2) Ductile cast iron milling has the same cutting conditions as carbon steel and alloy steel. (180—280HB)
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
4) When drilling, please set the feed rate at 1/3 or below of the values above.

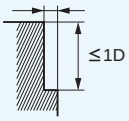
SEG2SA

End mill, Short cut length, 2 flute, Irregular spiral helix angle, For aluminium alloy

Slotting

Work material	Aluminium alloy Plastics		Pure copper	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	8000	500	4000	250
8	6000	500	3000	250
10	4800	530	2400	260
12	4000	530	2000	260
16	3000	540	1500	270
20	2400	540	1200	270
25	1900	540	950	270
Depth of cut	 D:Dia.			

Side milling

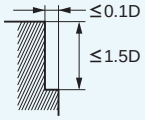
Work material	Aluminium alloy Plastics		Pure copper	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	9600	730	4800	360
8	7200	730	3600	360
10	5800	770	2900	380
12	4800	770	2400	380
16	3600	750	1800	370
20	2900	730	1400	350
25	2300	700	1100	330
Depth of cut	≤0.2D (D < ϕ3) ≤0.5D (D≥ϕ3)  D:Dia.			

1) The cutting conditions above are a guide only to milling within the standard depth of cut.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

SEG4SA

End mill, Medium cut length, 4 flute, Irregular spiral helix angle, For aluminium alloy

Side milling

Work material	Aluminium alloy Plastics		Pure copper	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
6	9600	1700	4800	840
8	7200	1800	3600	900
10	5800	1800	2900	910
12	4800	2000	2400	980
16	3600	2000	1800	980
20	2900	2400	1400	1100
25	2300	2400	1100	1100
Depth of cut	 D:Dia.			

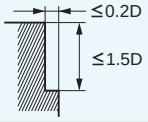
1) The cutting conditions above are a guide only to milling within the standard depth of cut.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

RECOMMENDED CUTTING CONDITIONS FOR VIOLET END MILLS

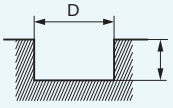
VA-2SS
End mill, Short cut length, 2 flute

VA-2MS
End mill, Medium cut length, 2 flute

Side milling

Work material	Structural steel, Carbon steel (−20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35−40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	5400	170	4000	125	2700	85	2200	65
4	4300	200	3200	150	2100	100	1800	75
5	3600	210	2700	160	1800	105	1500	80
6	3200	220	2400	165	1600	110	1300	85
8	2400	240	1800	180	1200	120	1000	90
10	1900	260	1400	190	950	130	800	100
12	1600	240	1200	180	800	120	660	90
16	1200	210	900	160	600	105	500	80
20	950	180	720	135	480	90	400	70
25	760	150	570	115	380	75	320	60
30	640	130	480	100	320	65	270	50
40	470	100	350	75	240	50	200	40
Depth of cut	 ≤0.2D ≤1.5D D:Dia.							

Slotting

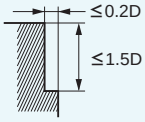
Work material	Structural steel, Carbon steel (−20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35−40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	3700	110	3000	95	2100	65	1600	50
4	3200	140	2800	130	1800	75	1400	60
5	2900	160	2400	145	1500	80	1200	60
6	2600	170	2100	150	1300	85	1000	70
8	2000	190	1600	160	1000	90	800	70
10	1600	210	1300	180	800	100	640	80
12	1300	190	1100	165	660	90	530	70
16	1000	170	800	140	500	80	400	65
20	720	130	640	120	400	70	320	55
25	570	110	450	90	320	60	230	40
30	480	90	370	75	270	50	190	35
40	360	70	280	60	200	40	140	25
Depth of cut	 D ≤0.5D (MAX. 10mm) D:Dia.							

1) Supply cutting fluid sufficiently during slotting. When dry cut, slotting decrease the revolution and feed rate by 20−30% proportionately.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) When drilling, please set the feed rate at 1/3 or below of the values above.

VA-4MC

End mill, Medium cut length, 4 flute

Side milling

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	5400	270	4000	200	2700	140	2200	100
4	4300	320	3200	240	2100	160	1800	120
5	3600	340	2700	250	1800	170	1500	130
6	3200	350	2400	260	1600	180	1300	140
8	2400	380	1800	290	1200	190	1000	145
10	1900	420	1400	300	950	210	800	160
12	1600	380	1200	290	800	190	660	145
16	1200	340	900	260	600	170	500	130
20	950	290	720	220	480	140	400	110
25	760	240	570	180	380	120	320	100
30	640	210	480	160	320	100	270	80
Depth of cut	 ≤0.2D ≤1.5D D:Dia.							

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

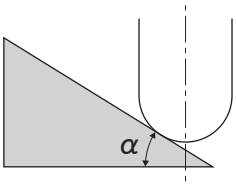
HSS

VA-2MB

Ball nose end mill, Medium cut length, 2 flute

Work material	Roughing (Depth of cut ≤ 0.8R)				Finishing (Depth of cut 0.05R)							
	Carbon steel, Alloy steel (−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−40HRC) AISI H13, AISI P21		Carbon steel, Alloy steel (−30HRC) AISI 1055, AISI P20				Alloy steel, Tool steel Pre-hardened steel (30−40HRC) AISI H13, AISI D2, AISI P21			
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	α≤15°		α>15°		α≤15°		α>15°	
					Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 6	1100	160	530	70	2300	750	1600	420	1900	590	1300	350
R 7	910	150	450	65	2000	780	1300	420	1600	650	1200	390
R 8	800	140	400	65	1700	820	1200	470	1400	700	1000	410
R 9	710	130	350	60	1550	840	1050	450	1300	700	910	390
R10	640	120	320	55	1400	800	940	440	1150	650	780	390
R12.5	450	90	230	40	1100	720	780	420	920	580	650	370
R15	370	75	190	35	950	700	650	390	780	560	570	360

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) Cutting conditions may differ considerably due to the overhang (milling depth and neck length), depth of cut, and machine tool conditions. Please see the above table as a standard starting point.
4) If the depth of cut is shallow, the revolution and feed rate can be increased.

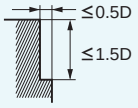


SOLID END MILLS

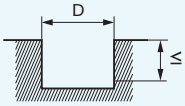
VA-SFPR

Roughing end mill, Short cut length, 4—6 flute, Fine pitch form

Side milling

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	2800	140	2200	120	1500	80	1300	70
6	2600	180	2000	140	1400	90	1200	80
8	2200	230	1700	180	1200	130	990	100
10	1750	330	1350	250	950	160	800	130
12	1450	330	1100	260	800	180	660	140
16	1100	330	850	260	600	180	500	140
20	880	340	680	260	480	180	400	140
25	700	330	540	250	380	170	320	140
30	580	300	450	230	320	170	270	140
40	350	210	270	170	190	120	160	100
50	250	170	190	130	130	90	110	75
Depth of cut	 ≤0.5D ≤1.5D D:Dia.							

Slotting

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	2100	100	1650	80	1150	50	960	35
6	2000	130	1550	100	1050	60	900	45
8	1600	160	1300	130	920	90	760	60
10	1300	220	1000	175	730	110	610	80
12	1050	230	850	190	610	130	500	85
16	800	230	640	190	460	130	380	85
20	640	230	510	180	370	130	300	85
25	510	200	410	160	290	110	240	80
30	420	190	320	140	210	90	180	75
40	280	140	210	110	140	70	120	60
50	190	110	150	90	95	55	85	45
Depth of cut	 D ≤1D (MAX. 30mm) D:Dia.							

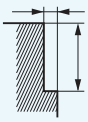
1) Supply cutting fluid sufficiently during cutting. For dry-cutting, decrease the revolution and feed rate proportionately by 20—50%.
2) For smaller depths and widths of cut, the revolution may be increased by 10—20% and the feed rate by 10—40%.
3) When drilling, please set the feed rate at 1/3 or below of the values above.
4) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

HSS

VA-MFPR

Roughing end mill, Medium cut length, 4—6 flute, Fine pitch form

Side milling

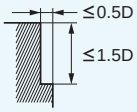
Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	2600	90	2000	70	1400	50	1200	40
6	2500	100	1900	90	1300	50	1100	50
8	2000	170	1600	130	1100	90	930	80
10	1650	220	1300	170	900	100	750	90
12	1400	260	1000	210	750	140	620	120
16	1000	290	800	230	560	160	470	130
20	830	300	640	230	450	160	380	130
25	660	290	510	220	360	160	300	130
30	550	270	420	210	300	140	250	130
40	330	180	250	140	180	100	150	90
50	240	160	180	120	120	80	100	70
Depth of cut	 ≤0.25D (MAX. 10mm) ≤2.5D (D≤ϕ25) ≤2D (D>ϕ25) D:Dia.							

1) Supply cutting fluid sufficiently during cutting. For dry-cutting, decrease the revolution and feed rate proportionately by 20—50%.
2) When the diameter exceeds 30 and the metal removal is less than the quantity shown in the table, the revolution and feed rate may be increased proportionately by 10—40%.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

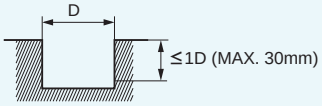
VA-MR

Roughing end mill, Medium cut length, 4—6 flute

Side milling

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	2400	120	1800	90	1200	60	1000	50
6	2200	155	1700	120	1100	70	930	65
8	1800	200	1400	140	950	100	780	85
10	1500	250	1100	200	810	125	680	100
12	1250	270	960	220	680	160	560	120
16	930	270	720	220	510	160	430	120
20	750	290	580	220	410	160	340	120
25	600	270	460	210	320	140	270	120
30	490	250	380	200	270	140	230	120
40	300	180	230	140	160	105	140	90
50	210	140	160	110	110	80	90	65
Depth of cut	 D:Dia.							

Slotting

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	1800	85	1350	60	920	40	740	25
6	1700	110	1300	85	830	45	700	35
8	1300	140	1050	100	730	70	600	50
10	1100	170	810	140	620	85	520	60
12	900	190	740	160	520	115	420	75
16	680	190	540	160	390	115	330	75
20	550	195	440	150	320	115	260	75
25	440	170	350	135	240	90	200	70
30	350	160	270	120	180	75	155	65
40	240	120	180	90	120	60	105	55
50	260	90	125	75	80	50	70	40
Depth of cut	 D:Dia.							

1) Supply cutting fluid sufficiently during cutting. For dry-cutting, decrease the revolution and feed rate proportionately by 20—50%.
2) When the diameter exceeds 30 and the metal removal is less than the quantity shown in the table, the revolution and feed rate may be increased proportionately by 10—40%.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

VA-JR

Roughing end mill, Semi long cut length, 4—6 flute

Side milling

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1049, AISI 1055		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) SCM, AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
10	1400	170	1100	130	760	80	640	65
12	1200	170	900	130	640	90	530	80
16	870	170	680	130	480	90	400	80
20	700	170	540	130	380	90	320	80
25	560	170	430	120	300	90	260	80
30	460	155	360	120	260	80	220	65
40	280	105	220	90	150	65	130	65
50	200	90	150	65	100	50	90	40
Depth of cut	≤0.25D (MAX. 10mm) ≤2.5D (D≤ϕ30) ≤2D (D＞ϕ30) D:Dia.							

VA-LR

Roughing end mill, Long cut length, 4—6 flute

Side milling

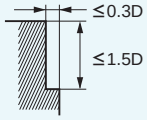
Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
10	1000	75	700	55	480	40	400	30
12	850	90	630	70	440	50	370	40
16	700	100	540	80	380	55	320	45
20	560	100	430	80	300	55	260	50
25	450	100	340	75	240	55	210	50
30	370	100	290	75	200	50	170	45
40	260	80	200	60	135	45	120	40
50	180	65	140	50	90	35	80	30
Depth of cut	≤0.1D ≤3D (D≤ϕ30) ≤2.5D (D＞ϕ30) (MAX. 100mm) D:Dia.							

1) Supply cutting fluid sufficiently during cutting. For dry-cutting, decrease the revolution and feed rate proportionately by 20—50%.
2) When the diameter exceeds 30 and the metal removal is less than the quantity shown in the table, the revolution and feed rate may be increased proportionately by 10—40%.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

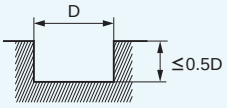
VA-MH

End mill, Medium cut length, 2—4 flute

Side milling

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	3600	140	2700	100	1800	70	1500	60
6	3200	200	2400	150	1600	100	1300	80
8	2400	220	1800	160	1200	110	1000	90
10	1900	230	1400	170	960	120	800	100
12	1600	240	1200	180	800	120	660	100
16	1200	220	900	160	600	110	500	90
20	950	200	720	150	480	100	400	85
25	760	220	570	170	380	110	320	95
30	640	200	480	150	320	100	270	85
Depth of cut	 D:Dia.							

Slotting

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Alloy steel, Tool steel (35—40HRC) Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	2900	105	2400	75	1500	50	1200	45
6	2600	150	2100	110	1300	75	1000	60
8	2000	165	1600	120	1000	80	800	70
10	1600	170	1300	130	800	90	640	75
12	1300	180	1100	135	660	90	530	75
16	1000	165	800	120	500	80	400	70
20	720	150	640	110	400	75	320	65
25	570	165	450	130	320	80	230	70
30	480	150	370	110	270	75	190	65
Depth of cut	 D:Dia.							

1) Supply cutting fluid sufficiently during slotting. When slotting with dry cut, decrease the revolution and feed rate proportionately by 20—30%.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

2SS
End mill, Short cut length, 2 flute

Work material	Structural steel Carbon steel (−20HRC) AISI 1045, AISI 1049		Carbon steel Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
0.5	8000	60 (50)	7000	40 (35)	4500	30 (25)	3500	25 (20)	7500	65 (55)	16000	120 (100)
1	5300	80 (65)	4200	50 (40)	3000	35 (30)	2400	27 (22)	4500	85 (70)	11000	170 (140)
2	3100	85 (70)	2600	60 (50)	1800	50 (40)	1400	30 (25)	2700	90 (75)	6800	190 (150)
3	2300	90 (75)	1800	65 (55)	1400	55 (45)	1100	35 (30)	2000	95 (80)	4800	240 (190)
4	1800	100 (85)	1400	70 (60)	1100	55 (45)	850	35 (30)	1600	110 (90)	3800	310 (250)
5	1600	110 (95)	1200	90 (75)	900	60 (50)	710	40 (35)	1300	120 (100)	3200	360 (290)
6	1400	120 (100)	1000	90 (75)	780	65 (55)	610	50 (40)	1100	130 (110)	2800	400 (320)
8	1100	130 (110)	800	95 (80)	580	65 (55)	470	50 (40)	850	140 (120)	2200	460 (370)
10	860	140 (120)	640	100 (80)	470	65 (55)	380	55 (45)	700	160 (130)	1800	440 (350)
12	720	130 (110)	530	95 (80)	390	60 (50)	310	50 (40)	580	140 (120)	1600	420 (340)
16	540	110 (95)	400	85 (70)	300	55 (45)	230	40 (35)	440	120 (100)	1200	350 (280)
20	430	100 (80)	320	70 (60)	240	45 (38)	190	35 (30)	350	100 (85)	960	300 (240)
Depth of cut	≤0.1D (D≤ϕ3) ≤0.2D (D>ϕ3) ≤1.5D						D ≤0.1D (D<ϕ2) ≤0.3D (ϕ2≤D≤ϕ3) ≤0.5D (D>ϕ3)				D:Dia.	

( ) : Indicates standard feed rate for slotting.

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

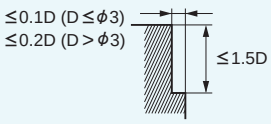
G-2SS 1)
End mill, Short cut length, 2 flute

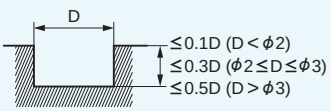
G-2MS
End mill, Medium cut length, 2 flute

Work material	Structural steel Carbon steel (−20HRC) AISI 1045, AISI 1049		Carbon steel Alloy steel (20−30HRC) AISI 1049, AISI 1055		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI P20, AISI H13 AISI D2		Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	6400	80 (65)	5000	50 (40)	3600	35 (30)	2900	25 (20)	5400	85 (70)	13000	170 (135)
2	3700	85 (70)	3100	60 (50)	2200	50 (40)	1700	30 (25)	3200	90 (70)	8200	190 (150)
3	2800	90 (70)	2200	65 (50)	1700	55 (45)	1300	35 (30)	2400	95 (75)	5800	240 (190)
4	2150	100 (80)	1700	70 (55)	1300	55 (45)	1000	35 (30)	1900	110 (90)	4600	310 (250)
5	1900	115 (90)	1450	90 (70)	1100	60 (50)	850	40 (30)	1600	120 (95)	3800	360 (290)
6	1700	120 (95)	1200	90 (70)	940	65 (50)	730	50 (40)	1300	130 (105)	3400	400 (320)
8	1300	130 (105)	960	95 (75)	700	65 (50)	560	50 (40)	1000	140 (110)	2600	460 (370)
10	1000	145 (115)	770	110 (90)	560	65 (50)	460	55 (45)	840	160 (130)	2200	430 (350)
12	860	130 (105)	640	95 (75)	470	60 (50)	370	50 (40)	700	140 (110)	1900	420 (340)
16	650	115 (90)	480	90 (70)	360	55 (45)	280	40 (30)	530	120 (95)	1450	350 (280)
20	520	95 (75)	380	70 (55)	290	45 (35)	230	35 (30)	420	100 (80)	1150	300 (240)
25	420	85 (70)	300	60 (50)	230	40 (30)	180	30 (25)	340	90 (70)	910	260 (210)
30	350	80 (65)	250	55 (45)	190	35 (30)	145	25 (20)	290	85 (70)	770	240 (190)
40	250	60 (50)	180	35 (30)	140	25 (20)	110	22 (18)	220	65 (50)	580	190 (150)

Depth of cut

(G-2MS)





D:Dia.

( ) : Indicates standard feed rate for slotting.

1) Increase the feed rate by 10−20% for G-2SS.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

RECOMMENDED CUTTING CONDITIONS FOR TWO-FLUTE END MILLS

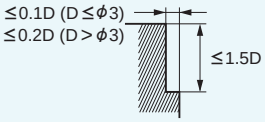
S-2MD
End mill, Short cut length, 2 flute, KHA Super

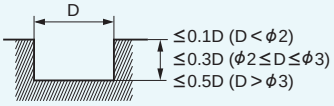
S-2JS 1)
End mill, Semi long cut length, 2 flute, KHA Super

Work material	Structural steel Carbon steel (−20HRC) AISI 1045, AISI 1049		Carbon steel Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Alloy steel, Tool steel (35−40HRC) Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
0.5	14000	100 (80)	12000	70 (55)	7700	50 (40)	6000	40 (30)	13000	110 (90)	20000	160 (130)
1	9000	140 (110)	7100	85 (70)	5100	60 (50)	4100	45 (35)	7700	145 (115)	19000	290 (230)
2	5300	145 (115)	4400	100 (80)	3100	85 (70)	2400	50 (40)	4600	150 (120)	12000	320 (260)
3	3900	150 (120)	3100	110 (90)	2400	95 (75)	1900	60 (50)	3400	160 (130)	8200	410 (330)
4	3100	170 (135)	2400	120 (95)	1850	95 (75)	1450	60 (50)	2700	190 (150)	6500	530 (420)
5	2700	190 (150)	2000	150 (120)	1500	100 (80)	1200	70 (55)	2200	200 (160)	5400	610 (490)
6	2400	200 (160)	1700	150 (120)	1300	110 (90)	1000	85 (70)	1900	220 (175)	4800	680 (540)
8	1900	220 (175)	1300	160 (130)	990	110 (90)	800	85 (70)	1450	240 (190)	3800	780 (620)
10	1500	240 (190)	1100	180 (145)	800	110 (90)	650	90 (70)	1200	270 (220)	3200	750 (600)
12	1250	220 (175)	900	160 (130)	670	100 (80)	540	85 (70)	990	240 (190)	2700	710 (570)
16	940	190 (150)	680	145 (115)	500	85 (70)	400	70 (55)	760	200 (160)	2000	600 (480)
20	750	170 (135)	540	120 (95)	400	75 (60)	320	60 (50)	600	170 (135)	1600	510 (410)
25	600	145 (115)	430	100 (80)	320	65 (50)	260	50 (40)	480	150 (120)	1300	440 (350)
30	500	130 (100)	360	90 (70)	270	60 (50)	210	45 (35)	410	145 (115)	1100	410 (330)
40	360	100 (80)	260	70 (55)	200	50 (40)	150	35 (30)	300	110 (90)	820	320 (260)
50	270	85 (70)	200	60 (50)	150	40 (30)	120	30 (25)	230	95 (75)	650	270 (220)

Depth of cut

(S-2MD)





D:Dia.

( ) : Indicates standard feed rate for slotting.

1) Decrease the feed rate by 20−30% for S-2JS.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

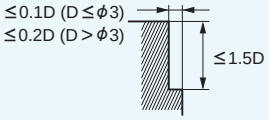
2MS
End mill, Medium cut length, 2 flute

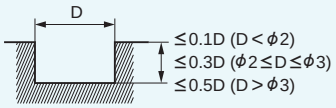
2LS 1)
End mill, Long cut length, 2 flute

Work material	Structural steel Carbon steel (−20HRC) AISI 1045, AISI 1049		Carbon steel Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
1	5300	65 (50)	4200	40 (30)	3000	30 (25)	2400	22 (18)	4500	70 (55)	11000	140 (110)
2	3100	70 (55)	2600	50 (40)	1800	40 (30)	1400	25 (20)	2700	75 (60)	6800	160 (130)
3	2300	75 (60)	1800	55 (45)	1400	45 (35)	1100	30 (25)	2000	80 (65)	4800	200 (160)
4	1800	85 (70)	1400	60 (50)	1100	45 (35)	850	30 (25)	1600	90 (70)	3800	260 (210)
5	1600	95 (75)	1200	75 (60)	900	50 (40)	710	35 (25)	1300	100 (80)	3200	300 (240)
6	1400	100 (80)	1000	75 (60)	780	55 (45)	610	40 (30)	1100	110 (90)	2800	330 (260)
8	1100	110 (90)	800	80 (65)	580	55 (45)	470	40 (30)	850	115 (90)	2200	380 (300)
10	860	120 (95)	640	85 (70)	470	55 (45)	380	45 (35)	700	130 (105)	1800	360 (290)
12	720	110 (90)	530	80 (65)	390	50 (40)	310	40 (30)	580	115 (90)	1600	350 (280)
16	540	95 (75)	400	75 (60)	300	45 (35)	230	35 (28)	440	100 (80)	1200	290 (230)
20	430	80 (65)	320	60 (50)	240	38 (30)	190	30 (25)	350	85 (70)	960	250 (200)
25	350	70 (55)	250	50 (40)	190	32 (25)	150	25 (20)	285	75 (60)	760	220 (180)
30	290	65 (50)	210	45 (35)	160	28 (22)	120	22 (18)	240	70 (55)	640	200 (160)
40	210	50 (40)	150	30 (25)	120	22 (18)	90	18 (15)	180	55 (45)	480	160 (130)
50	160	40 (30)	115	28 (22)	90	20 (15)	70	15 (12)	140	45 (35)	380	130 (105)
60	130	35 (28)	95	25 (20)	75	18 (15)	55	12 (10)	115	40 (30)	310	110 (90)

Depth of cut

(2MS)





D:Dia.

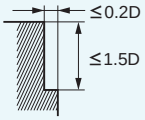
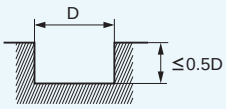
( ) : Indicates standard feed rate for slotting.

1) Decrease the revolution by 20−30% and the feed rate by 40−50% for 2LS.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

RECOMMENDED CUTTING CONDITIONS FOR THREE-FLUTE END MILLS

3MS

End mill, Medium cut length, 3 flute

Work material	Structural steel Carbon steel (−20HRC) AISI 1045, AISI 1049		Carbon steel Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	2300	75 (60)	1800	55 (45)	1400	45 (35)	1100	30 (25)	2000	80 (65)	4800	200 (160)
4	1800	85 (70)	1400	60 (50)	1100	45 (35)	850	30 (25)	1600	90 (70)	3800	260 (210)
5	1600	95 (75)	1200	75 (60)	900	50 (40)	710	35 (25)	1300	100 (80)	3200	300 (240)
6	1400	100 (80)	1000	75 (60)	780	55 (45)	610	40 (30)	1100	110 (90)	2800	330 (260)
8	1100	110 (90)	800	80 (65)	580	55 (45)	470	40 (30)	850	115 (90)	2200	380 (300)
10	860	120 (95)	640	85 (70)	470	55 (45)	380	45 (35)	700	130 (105)	1800	360 (290)
12	720	110 (90)	530	80 (65)	390	50 (40)	310	40 (30)	580	115 (90)	1600	350 (280)
16	540	95 (75)	400	75 (60)	300	45 (35)	230	35 (25)	440	100 (80)	1200	290 (230)
20	430	80 (65)	320	60 (50)	240	38 (30)	190	30 (25)	350	85 (70)	960	250 (200)
25	350	70 (55)	250	50 (40)	190	32 (25)	150	25 (20)	285	75 (60)	760	220 (180)
30	290	65 (50)	210	45 (35)	160	28 (22)	120	22 (18)	240	70 (55)	640	200 (160)
40	210	50 (40)	150	30 (25)	120	22 (18)	90	18 (15)	180	55 (45)	480	160 (130)
Depth of cut	  D:Dia.											

( ) : Indicates standard feed rate for slotting.

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

S-4MD
End mill, Medium cut length, 4 flute

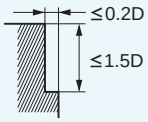
S-4JC 1)
End mill, Semi long cut length, 4 flute

Side milling

Work material	Structural steel Carbon steel (−20HRC) AISI 1045, AISI 1049		Carbon steel Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Alloy steel, Tool steel (35−40HRC) Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	3900	240	3100	175	2400	150	1900	95	3400	260	8200	660
4	3100	270	2400	190	1850	150	1450	95	2700	300	6500	850
5	2700	300	2000	240	1500	160	1200	110	2200	320	5400	980
6	2400	320	1700	240	1300	175	1000	135	1900	350	4800	1100
8	1900	350	1300	260	990	175	800	135	1450	380	3800	1250
10	1500	380	1100	290	800	175	650	145	1200	430	3200	1200
12	1250	350	900	260	670	160	540	135	990	380	2700	1100
16	940	300	680	230	500	135	400	110	760	320	2000	960
20	750	270	540	190	400	120	320	95	600	270	1600	810
25	600	230	430	160	320	105	260	80	480	240	1300	700
30	500	210	360	145	270	95	210	70	410	230	1100	660
40	360	160	260	110	200	80	150	55	300	175	820	510
50	270	135	200	95	150	65	120	50	230	150	650	430

Depth of cut

(S-4MD)



D:Dia.

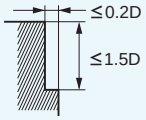
1) Decrease the feed rate by 20−30% for S-4JC.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

RECOMMENDED CUTTING CONDITIONS FOR FOUR-FLUTE END MILLS

G-4MC
End mill, Medium cut length, 4 flute

G-4LC 1)
End mill, Long cut length, 4 flute, Center cutting

Side milling

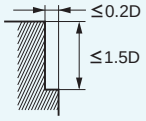
Work material	Structural steel Carbon steel (−20HRC) AISI 1045, AISI 1049		Carbon steel Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	2800	145	2200	105	1700	90	1300	55	2400	150	5800	380
4	2150	160	1700	110	1300	90	1000	55	1900	175	4600	500
5	1900	185	1450	145	1100	95	850	65	1600	190	3800	580
6	1700	190	1200	145	940	105	730	80	1300	210	3400	640
8	1300	210	960	150	700	105	560	80	1000	220	2600	740
10	1000	230	770	175	560	105	460	90	840	260	2200	690
12	860	210	640	150	470	95	370	80	700	220	1900	670
16	650	180	480	145	360	90	280	65	530	190	1450	560
20	520	150	380	110	290	70	230	55	420	160	1150	480
25	420	135	300	95	230	65	180	50	340	145	910	420
30	350	130	250	90	190	55	145	40	290	135	770	380
40	250	95	180	55	140	40	110	35	220	105	580	300
50	190	80	140	55	110	40	85	30	170	90	460	260
Depth of cut	(G-4MC)  D:Dia.											

1) Decrease the revolution by 20−30% and the feed rate by 40−50% for G-4LC.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

4MC
End mill, Medium cut length, 4 flute, Center cutting

4LC 1)
End mill, Long cut length, 4 flute, Center cutting

Side milling

Work material	Structural steel Carbon steel (−20HRC) AISI 1045, AISI 1049		Carbon steel Alloy steel (20−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
3	2300	105	1800	80	1400	65	1100	45	2000	110	4800	280
4	1800	120	1400	85	1100	65	850	45	1600	125	3800	370
5	1600	135	1200	105	900	70	710	50	1300	140	3200	420
6	1400	140	1000	105	780	80	610	55	1100	155	2800	460
8	1100	155	800	110	580	80	470	55	850	160	2200	530
10	860	170	640	120	470	80	380	65	700	180	1800	500
12	720	155	530	110	390	70	310	55	580	160	1600	490
16	540	135	400	105	300	65	230	50	440	140	1200	410
20	430	110	320	85	240	55	190	45	350	120	960	350
25	350	100	250	70	190	45	150	35	285	105	760	310
30	290	90	210	65	160	40	120	30	240	100	640	280
40	210	70	150	40	120	30	90	25	180	80	480	220
Depth of cut	(4MC)  D:Dia.											

1) Decrease the revolution by 20−30% and the feed rate by 40−50% for 4LC.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

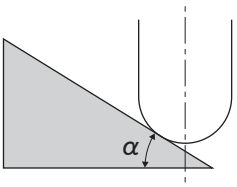
RECOMMENDED CUTTING CONDITIONS FOR BALL NOSE END MILLS

S-2MB

Ball nose end mill, Medium cut length, 2 flute

	Roughing (Large depth of cut ≤ 0.8R)				Finishing (Depth of cut 0.05R)							
Work material	Carbon steel Alloy steel (−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−40HRC) AISI H13, AISI P21		Carbon steel, Alloy steel (−30HRC) AISI 1055, AISI P20				Alloy steel, Tool steel Pre-hardened steel (30−40HRC) AISI H13, AISI D2, AISI P21			
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	α≤15°		α>15°		α≤15°		α>15°	
					Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 0.5	—	—	—	—	8000	260	6000	140	6800	160	4800	100
R 1	3400	55	2900	50	5700	340	4600	190	4900	210	3600	150
R 2	2300	75	1900	65	3800	420	3000	230	3200	250	2500	190
R 3	1800	115	1400	95	3000	440	2300	270	2500	300	1900	230
R 4	1400	135	1150	105	2300	460	1700	290	2000	380	1500	250
R 5	1100	140	910	115	1900	490	1400	300	1600	420	1200	270
R 6	950	135	760	105	1600	530	1100	300	1400	460	990	270
R 8	700	105	570	85	1200	570	860	340	1000	490	760	300
R10	570	95	460	75	950	570	680	320	800	460	610	290
R12.5	460	85	360	65	760	490	530	300	650	420	480	250
R15	380	75	300	60	640	470	450	280	530	380	400	230
R20	280	60	220	50	480	400	330	240	400	330	300	190

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) Cutting conditions may differ considerably due to the overhang (milling depth and neck length), depth of cut, and machine tool conditions. Please see the above table as a standard starting point.
4) If the depth of cut is shallow, the revolution and feed rate can be increased.

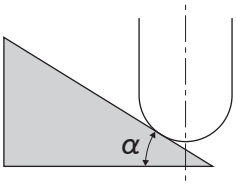


2FB

Ball nose end mill, Medium cut length, 2 flute

Work material	Roughing (Large depth of cut ≤ 0.8R)				Finishing (Depth of cut 0.05R)							
	Carbon steel Alloy steel (−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Carbon steel, Alloy steel (−30HRC) AISI 1055, AISI P20				Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13			
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	α≤15°		α>15°		α≤15°		α>15°	
					Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 3	950	60	750	50	1600	230	1200	140	1300	160	1000	120
R 4	730	70	600	55	1200	240	900	150	1050	200	800	130
R 5	600	75	480	60	1000	260	720	160	860	220	640	140
R 6	500	70	400	55	840	280	600	160	720	240	520	140
R 8	370	55	300	45	620	300	450	180	540	260	400	160
R10	300	50	240	40	500	300	360	170	420	240	320	150
R12.5	240	45	190	35	400	260	280	160	340	220	250	130
R15	200	40	160	35	340	250	240	150	280	200	210	120

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) Cutting conditions may differ considerably due to the overhang (milling depth and neck length), depth of cut, and machine tool conditions. Please see the above table as a standard starting point.
4) If the depth of cut is shallow, the revolution and feed rate can be increased.

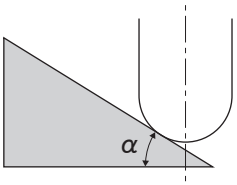


K-4MB

Ball nose end mill, Medium cut length, 4 flute

Work material	Roughing (Large depth of cut ≤ 0.8R)				Finishing (Depth of cut 0.05R)							
	Carbon steel Alloy steel (−30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13		Carbon steel, Alloy steel (−30HRC) AISI 1055, AISI P20				Alloy steel, Tool steel Pre-hardened steel (30−35HRC) AISI H13			
					α≤15°		α>15°		α≤15°		α>15°	
R (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R 3	1200	75	940	60	2000	290	1500	175	1600	200	1250	150
R 4	910	90	750	70	1500	300	1100	190	1300	250	1000	160
R 5	750	95	600	75	1250	330	900	200	1100	280	800	175
R 6	630	90	500	70	1050	350	750	200	900	300	650	175
R 8	460	70	380	55	780	380	560	230	680	330	500	200
R10	380	60	300	50	630	380	450	210	530	300	400	190
R12.5	300	55	240	45	500	330	350	200	430	280	310	160
R15	250	50	200	40	410	300	290	190	350	250	260	150
R20	180	40	140	30	300	240	210	150	260	200	190	120

1) α is the inclination angle of the machined surface.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately. Please reduce the feed rate when the surface finish is important.
3) Cutting conditions may differ considerably due to the overhang (milling depth and neck length), depth of cut, and machine tool conditions. Please see the above table as a standard starting point.
4) If the depth of cut is shallow, the revolution and feed rate can be increased.



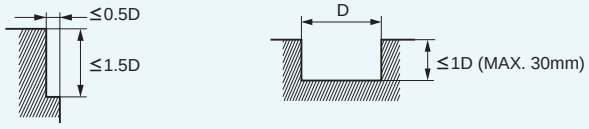
RECOMMENDED CUTTING CONDITIONS FOR ROUGHING END MILLS

Roughing end mill, Short cut length, 4—6 flute **SR**
Roughing end mill, Medium cut length, 4—6 flute **MR**
Roughing end mill, Semi long cut length, 4—6 flute **JR** 1)
Roughing end mill, Long cut length, 4—6 flute **LR** 2)

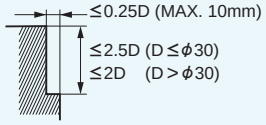
Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	1000 (750)	40 (30)	760 (570)	30 (25)	610 (460)	25 (20)	510 (380)	20 (15)
6	960 (720)	50 (40)	720 (540)	40 (30)	570 (430)	30 (25)	480 (360)	25 (20)
8	800 (600)	65 (50)	600 (450)	50 (40)	500 (380)	40 (30)	400 (300)	30 (25)
10	640 (480)	90 (70)	480 (360)	70 (55)	380 (290)	50 (40)	320 (240)	40 (30)
12	530 (400)	90 (70)	400 (300)	70 (55)	320 (240)	55 (40)	270 (200)	45 (35)
16	400 (300)	90 (70)	300 (230)	70 (55)	240 (180)	55 (40)	200 (150)	45 (35)
20	320 (240)	95 (70)	240 (180)	70 (55)	190 (140)	55 (40)	160 (120)	45 (35)
25	250 (190)	90 (70)	190 (140)	65 (50)	150 (110)	50 (40)	130 (100)	45 (35)
30	210 (160)	85 (65)	160 (120)	65 (50)	130 (100)	50 (40)	110 (85)	45 (35)
40	135 (100)	60 (45)	100 (75)	45 (40)	80 (60)	35 (26)	70 (55)	30 (25)
50	100 (75)	50 (40)	75 (55)	40 (30)	60 (45)	30 (23)	50 (40)	25 (20)

Depth of cut

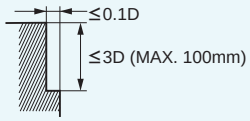
(SR, MR)



(JR)



(LR)



D:Dia.

( ) : Indicates standard revolution and feed rate for slotting with SR and MR.

1) Decrease the revolution shown above by 10—20% and the feed rate by 20—30% for JR.
2) Decrease the revolution shown above by 20—30% and the feed rate by 30—50% for LR.
3) Supply cutting fluid sufficiently during cutting.
4) When the diameter exceeds 30 and the metal removal is less than the quantity shown in the table, the revolution and feed rate may be increased by 10—40%.
5) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

RECOMMENDED CUTTING CONDITIONS FOR ROUGHING END MILLS

G-SFPR
Roughing end mill, Short cut length, 3—6 flute, Fine pitch form

G-MR
Roughing end mill, Medium cut length, 4—6 flute

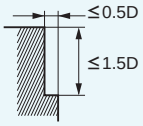
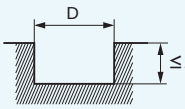
Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	1200 (900)	50 (40)	900 (680)	35 (25)	730 (550)	30 (23)	610 (460)	25 (20)
6	1150 (860)	60 (45)	860 (650)	50 (40)	680 (510)	35 (26)	580 (440)	30 (23)
8	960 (720)	80 (60)	720 (540)	60 (45)	600 (450)	50 (40)	480 (360)	35 (26)
10	770 (580)	110 (85)	580 (440)	85 (65)	460 (350)	60 (45)	380 (290)	50 (40)
12	640 (480)	110 (85)	480 (360)	85 (65)	380 (290)	65 (50)	320 (240)	55 (40)
16	480 (360)	110 (85)	360 (270)	85 (65)	290 (220)	65 (50)	240 (180)	55 (40)
20	380 (290)	115 (85)	290 (220)	85 (65)	230 (170)	65 (50)	190 (145)	55 (40)
25	300 (230)	110 (85)	230 (170)	80 (60)	180 (135)	60 (45)	160 (120)	55 (40)
30	250 (190)	100 (75)	190 (145)	80 (60)	160 (120)	60 (45)	130 (100)	55 (40)
40	160 (120)	70 (55)	120 (90)	55 (40)	95 (70)	40 (30)	85 (65)	35 (26)
50	120 (90)	60 (45)	90 (70)	50 (40)	70 (55)	35 (25)	60 (45)	30 (23)
Depth of cut	(G-SFPR, G-MR) ≤0.5D ≤1.5D D ≤1D (MAX. 30mm) D:Dia.							

( ) : Indicates standard revolution and feed rate for slotting with G-SFPR and G-MR.

1) Supply cutting fluid sufficiently during cutting.
2) When the diameter exceeds 30 and the metal removal is less than the quantity shown in the table, the revolution and feed rate may be increased by 10—40%.
3) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

G-MSF

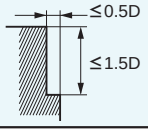
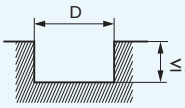
Semi finish end mill, Medium cut length, 4—6 flute

Work material	Structural steel Carbon steel (—20HRC) AISI 1045, AISI 1049		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Cast iron AISI 35, AISI SNG420112	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	1200	50	900	35	730	30	1080	60
6	1150	70	860	50	680	35	1030	75
8	960	80	720	60	600	50	860	90
10	770	100	580	70	480	60	700	115
12	640	90	480	70	400	60	580	115
16	480	90	360	70	300	60	430	110
20	380	90	290	70	240	60	350	110
25	310	80	230	60	190	50	270	95
30	255	70	190	55	160	40	230	85
40	160	60	120	45	100	35	140	65
50	120	50	90	35	70	30	110	60
Depth of cut	  D:Dia.							

1) Please reduce the both revolution and the feed rate by 20—30% when slotting.
2) If abnormal sounds occur when up cut milling, reduce the feed rate.

MSF

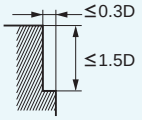
Semi finish end mill, Medium cut length, 4—6 flute

Work material	Structural steel Carbon steel (—20HRC) AISI 1045, AISI 1049		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Cast iron AISI 35, AISI SNG420112	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	1000	40	760	30	610	25	900	50
6	960	55	720	40	570	30	860	65
8	800	65	600	50	500	40	720	75
10	640	80	480	60	380	45	580	95
12	530	80	400	60	320	45	480	95
16	400	80	300	60	240	45	360	95
20	320	80	240	60	190	45	290	90
25	250	70	190	50	150	40	230	85
30	210	60	160	45	130	35	190	70
40	135	50	100	40	80	30	120	60
50	100	40	75	30	60	25	90	50
Depth of cut	  D:Dia.							

1) Please reduce the both revolution and the feed rate by 20—30% when slotting.
2) If abnormal sounds occur when up cut milling, reduce the feed rate.

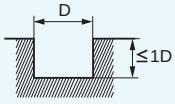
K-MH
End mill, Medium cut length, 2—4 flute, High helix angle

K-LH 1)
End mill, Long cut length, 3—4 flute, High helix angle

Work material	Structural steel, Carbon steel (—20HRC) AISI 1045, AISI 1049 Cast iron AISI 35		Carbon steel, Alloy steel (20—30HRC) AISI 1055, AISI P20		Alloy steel, Tool steel Pre-hardened steel (30—35HRC) AISI H13, AISI D2		Austenitic stainless steel AISI 304, AISI 316	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
5	1600	65	1200	50	900	30	710	25
6	1400	90	1000	65	780	45	610	35
8	1100	100	800	75	580	50	470	40
10	860	105	640	80	470	55	380	45
12	720	110	530	80	390	55	310	45
16	540	100	400	75	300	50	230	40
20	430	90	320	65	240	50	190	35
25	350	100	250	70	190	50	150	40
30	290	90	210	65	160	45	120	35
Depth of cut	(K-MH)  D:Dia.							

1) Decrease the revolution and feed rate according to the processing mode of K-LH.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

S-2SDA
End mill, Short cut length, 2 flute, For aluminium alloy

Work material	Cast aluminium AC, ADC Rolled aluminium A5052, A7075 Magnesium alloy resin	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/min)
3	8200	410
4	6500	530
6	4800	680
8	3800	780
10	3200	750
12	2700	710
16	2000	600
20	1600	510
Depth of cut	 D:Dia.	

1) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.

RC

Corner radius cutter, 3—4 flute

Work material		Structural steel Carbon steel (—20HRC) AISI 1045, AISI 1049		Alloy steel, Tool steel Pre-hardened steel (20—35HRC) AISI P20, AISI H13 AISI D2		Austenitic stainless steel AISI 304, AISI 316		Cast iron AISI 35		Aluminium alloy	
Corner radius (mm)	Depth of cut (mm)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)	Revolution (min^{-1})	Feed rate (mm/min)
R0.5—R1.5	≤ 0.5	1300	100	900	70	700	50	1400	150	2800	350
R2—R4	≤ 0.6	900	100	600	65	500	45	1000	130	2000	350
R4.5—R5	≤ 0.6	700	100	400	60	400	40	800	130	1600	350
R6—R7	≤ 0.8	550	100	300	60	350	40	650	130	1300	350
R8—R9	≤ 0.8	450	100	250	60	280	40	550	120	1100	300
R10	≤ 1	400	100	250	60	250	40	500	120	1000	300
R12—R12.5	≤ 1.2	350	90	230	60	200	35	400	120	800	250
R15	≤ 1.2	300	90	220	60	180	35	350	110	700	220
R16	≤ 1.4	300	90	200	60	170	35	330	110	650	200

1) Remove the machining allowance in several passes in reference to the above cutting depth.
2) If the rigidity of the machine or the work materials installation is very low, or chattering and noise are generated, reduce the revolution and feed rate proportionately.
3) Coolant is recommended.

HOW TO READ THE STANDARD OF ROTATING TOOL INSERTS

●How the section of milling inserts is organized

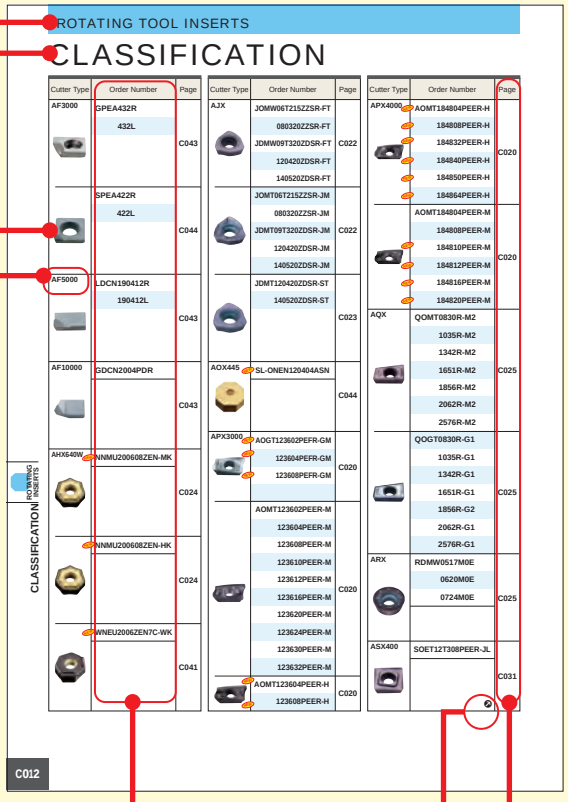
①Organized according to cutter type.
②Cutters are arranged in alphabetical order.

●How the standards for milling inserts are organized

①Classified into milling inserts, wiper inserts and drilling inserts.
②Arranged in order of alphabet of order number.

PAGE TITLE

PRODUCT SECTION



INSERT NUMBER

CUTTER TYPE

CONT. IN NEXT COLUMN
indicates that the description of a specific cutter is continued in the next column.

PHOTO OF INSERT

PAGE TO GO TO
indicates the reference pages for detailed standards of specific inserts.

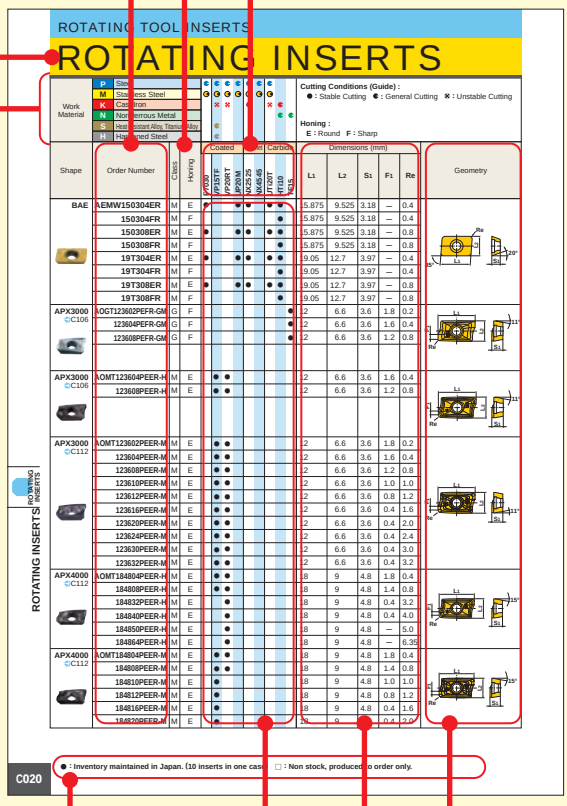
GRADE APPLICATION RECOMMENDED FOR EACH WORK MATERIAL
cutting conditions suitable for each work materials are shown as a general guide to select grade.
●:Stable Cutting ◐:General Cutting ✠:Unstable Cutting

PAGE TITLE BY TOOL APPLICATION

INSERT NUMBER

INSERT TOLERANCE ▪ HONING

INSERT GRADE



INSERT GEOMETRY

INSERT DIMENSIONS

STOCK STATUS

LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

●To Order : Please specify
①insert number and grade.

MILLING TOOLS

INSERT STANDARDS
CBN&PCD INSERT STANDARDS
INSERT GRADES

IDENTIFICATION ····· C002
GRADES FOR MILLING ····· C004
MILLING APPLICATION RANGE ····· C005
COATED CARBIDE(CVD and PVD) ····· C006
CERMET ····· C008
CEMENTED CARBIDE ····· C009
CBN(SINTERED CBN) ····· C010
PCD(SINTERED DIAMOND) ····· C011
CLASSIFICATION ····· C012

STANDARD MILLING INSERTS
- ROTATING INSERTS ····· C020
- WIPER INSERTS ····· C041
- CBN AND PCD ····· C043
- CBN AND PCD WITH WIPER ····· C046
- DRILLING INSERTS ····· C047

IDENTIFICATION

Symbol	Insert Shape	
O	Octagonal	
S	Square	
T	Triangular	
C	Rhombic80°	
M	Rhombic86°	
A	Parallelogram85°	
R	Round	
X	Special Desigh	—
W	Wiper	—

① Insert Shape

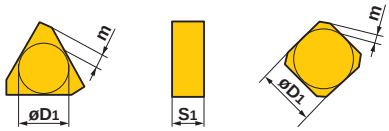
Symbol	Normal Clearance
C	7°
D	15°
E	20°
F	25°
G	30°
N	0°
P	11°
O	Other Normal Clearance
X	Other Normal Clearance

② Normal Clearance

① ② ③ ④

S **E** **E** **R**

③ Tolerance Class



Symbol	Tolerance of Nose Height **m** (mm)	Tolerance of Inscribed Circle **ϕD1** (mm)	Tolerance of Thickness **S1** (mm)
A	±0.005	±0.025	±0.025
C	±0.013	±0.025	±0.025
E	±0.025	±0.025	±0.025
K*	±0.013	±0.05—±0.15	±0.025
M*	±0.08—±0.18	±0.05—±0.15	±0.13
N*	±0.08—±0.18	±0.05—±0.15	±0.025

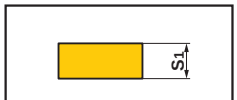
The surface of insert with ✱ mark is sintered.

④ Fixing and/or for Chip Breaker

Symbol	Hole	Hole Configuration	Chip Breaker	Figure
W	With Hole	Cylindrical Hole + One Countersink (40—60°)	No	
T	With Hole		One Sided	
B	With Hole	Cylindrical Hole + One Countersink (70—90°)	No	
N	Without Hole	—	No	
R	Without Hole	—	One Sided	
X	—	—	—	Special Design

Symbol				Diameter of Inscribed Circle
R	C	S	T	
	06	06	11	6.35
	08	07	13	7.94
	09	09	16	9.525
10				10.00
12				12.00
	12	12	22	12.70
	16	15	27	15.875
20				20.00

⑤ Insert Size



Symbol	Insert Thickness (mm)
03	3.18
T3	3.97
04	4.76

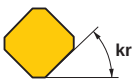
⑥ Insert Thickness

Symbol	Honing
E	Round
F	Sharp
T	Chamfer
S	Chamfer+Hone

⑨ Cutting Edge Condition

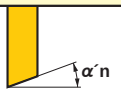
⑤	⑥	⑦	⑧	⑨	⑩	⑪		⑫
12	03	A	F	E	R	1	-	JS

⑦ Cutting Edge Angle



Symbol	Cutting Edge Angle
A	45°
E	75°
P	90°
Z	Other Angle

⑧ Clearance of Wiper Insert

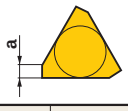


Symbol	Clearance Angle
D	15°
E	20°
F	25°
G	30°

⑩ Hand Tool Holder

Symbol	Hand Tool Holder
L	Left Hand Tool Holder
N	For Both Right and Left Hand Tool Holder
R	Right Hand Tool Holder

⑪ Width of Wiper Insert



Symbol	Width of Wiper Insert
1	1.4 (1.94 only for TEKN)

⑫ Chip Breaker

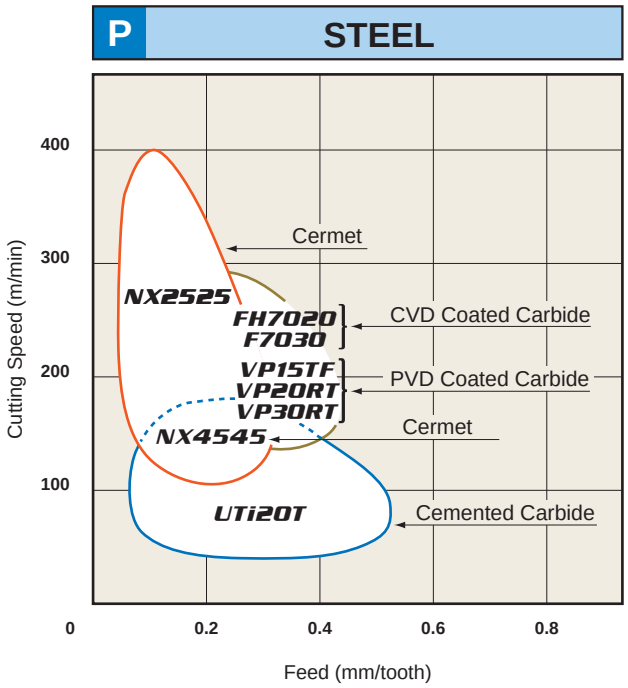
Symbol	Name
JS	JS Breaker
JH	JH Breaker
JL	JL Breaker
JM	JM Breaker
FT	FT Breaker
JP	JP Breaker

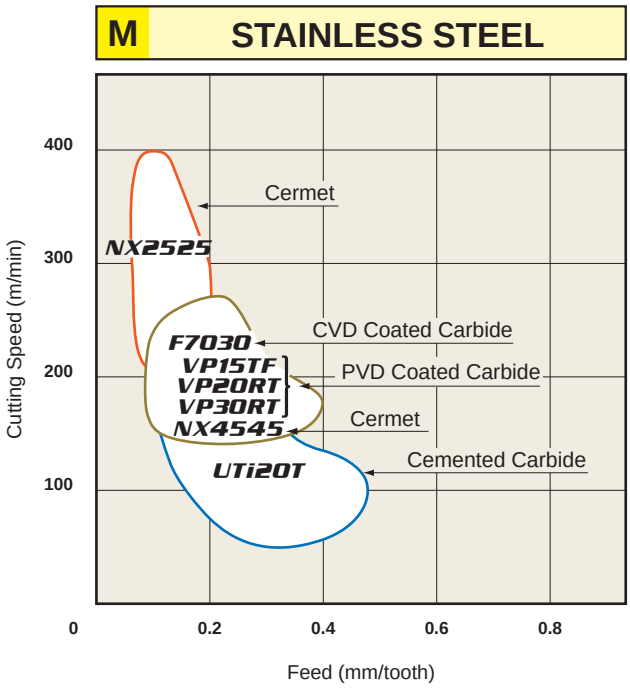
GRADES FOR MILLING

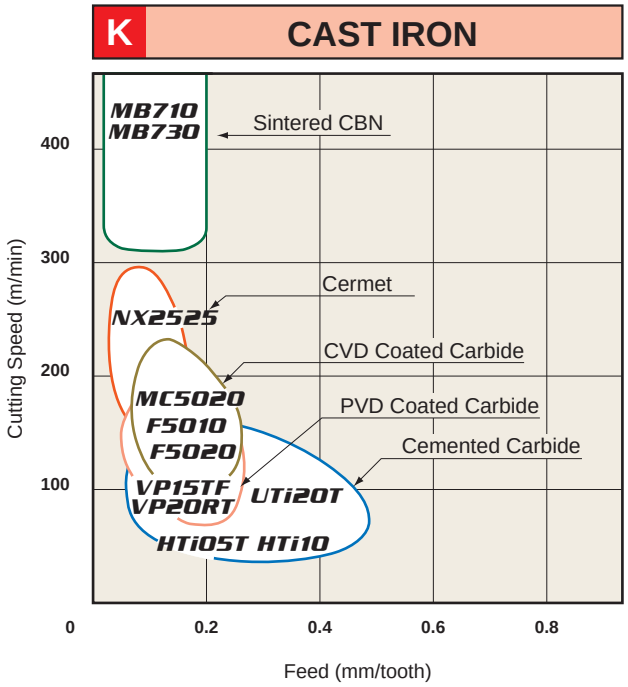
INDEXABLE INSERT GRADES FOR MILLING

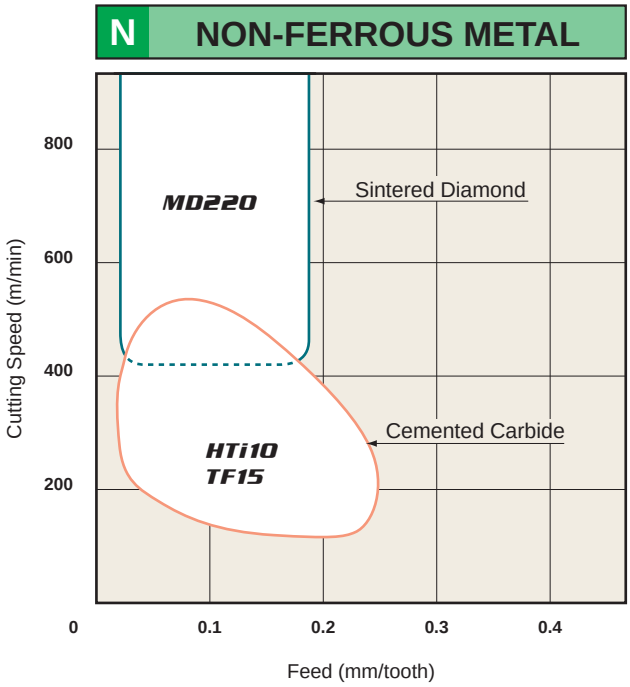
ISO		Coated Carbide		Cermet	Cemented Carbide	CBN (Sintered CBN)	PCD (Sintered Diamond)
		CVD	PVD				
P Steel	P01						
	P10	FH7020	VP15TF	NX2525			
	P20	F7030	AP20M, GP20M, UP20M, VP20RT	NX4545	UTi20T		
	P30		VP30RT				
	P40						
M Stainless Steel	M01						
	M10	F7030	VP15TF	NX2525			
	M20		AP20M, GP20M, UP20M, VP20RT	NX4545	UTi20T		
	M30		VP30RT				
	M40						
K Cast Iron	K01	NEW MC5020, F5010	VP10MF, VP15TF	NX2525	HTi05T	MB710, MB730	
	K10	F5020	AP20M, GP20M		HTi10		
	K20		VP20RT		UTi20T		
	K30						
N Non-Ferrous Metal	N01						MD205
	N10				HTi10		MD220
	N20		LC15TF		TF15		MD230
	N30						
S Heat Resistant Alloy • Ti Alloy	S01					MB730	
	S10		VP15TF				
	S20						
	S30						
H Hardened Materials	H01		VP10MF				
	H10		VP15TF, AP20M, GP20M				
	H20						
	H30						

MILLING APPLICATION RANGE

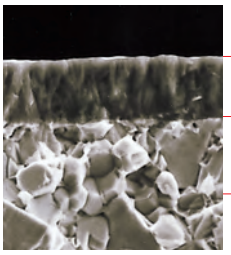








COATED CARBIDE (CVD&PVD)



<CVD>

- Special tough fibrous structure improves wear and fracture resistance.
- It covers a wide application range and reduces the number of tools required.

<PVD>

- PVD coating prolongs tool life when compared to cemented carbide under the same cutting conditions.
- Coating of tools with sharp edges is possible without softening or changing the quality of the subsrate.

SELECTION STANDARD

MILLING

Work Material		Recommended Grade	Recommended Cutting Speed (m/min)	ISO	Application Range
P	Steel	**F7030**	200 (150 — 250)	P10	FH7020, F7030, VP15TF, AP20M, GP20M, UP20M, VP20RT, VP30RT
		VP15TF	150 (100 — 200)	P20	
		VP30RT	150 (100 — 200)	P30	
		UP20M	120 (100 — 150)	P40	
M	Stainless Steel	**F7030**	200 (150 — 250)	M10	F7030, VP15TF, AP20M, GP20M, UP20M, VP20RT, VP30RT
		VP15TF	150 (100 — 200)	M20	
		VP30RT	150 (100 — 200)	M30	
		UP20M	120 (100 — 150)	M40	
K	Cast Iron	**MC5020**	180 (100 — 250)	K01	NEW MC5020, F5010, F5020, VP15TF, AP20M, GP20M, VP20RT
		F5010	200 (150 — 250)	K10	
		F5020	150 (100 — 200)	K20	
		VP15TF	150 (100 — 200)	K30	
N	Aluminium Alloy	**LC15TF**	1000 (200 — 3000)	N10	LC15TF
				N20	
				N30	
S	Heat Resistant Alloy Ti Alloy	**VP15TF**	30 (20 — 40)	S01	VP15TF
				S10	
				S20	
				S30	
H	Hardened Materials	**VP15TF**	80 (50 — 110)	H10	VP15TF, AP20M, GP20M
				H20	
				H30	

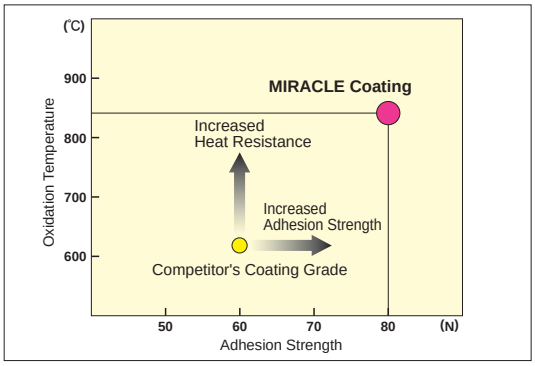
GRADE CHARACTERISTICS

Grade	Substrate		Coating Layer	
	Hardness (HRA)	T.R.S (GPa)	Composition	Thickness
MC5020	91.0	2.2	TiCN-Al_2O_3-Ti Compound	Thick
F5010	91.8	2.2	TiCN-Al_2O_3-TiN	Thin
F5020	91.2	2.4	TiCN-Al_2O_3-Ti Compound	Thick
FH7020	88.8	2.8	TiCN-Al_2O_3-Ti Compound	Thick
F7030	88.8	2.8	TiCN-Al_2O_3-TiN	Thin
VP15TF	91.5	2.5	(Al,Ti)N	Thin
VP20RT	90.5	2.5	(Al,Ti)N	Thin
VP30RT	88.8	2.8	(Al,Ti)N	Thin
UP20M	90.5	2.0	TiN	Thin

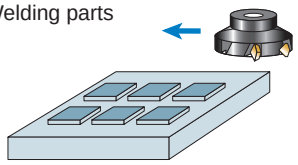
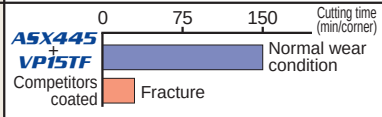
∗1GPa=102kg/mm^2

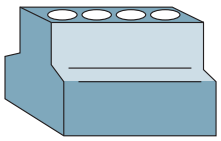
FEATURES OF VP (MIRACLE) COATING

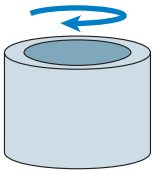
Compared to conventional coating technology, VP (MIRACLE) coating features (Al,Ti)N coating with highly increased heat resistance and adhesion strength.

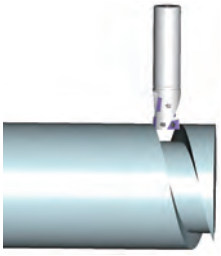


APPLICATION EXAMPLES

Tool	ASX445R16007F
Insert (Grade)	SEMT13T3AGSN-JM (VP15TF)
Workpiece	Welding parts 
Component	Machine parts
Cutting Conditions: Cutting Speed (m/min)	200
Cutting Conditions: Feed per Tooth (mm/rev)	0.27
Cutting Conditions: Depth of Cut (mm)	3
Cutting Conditions: Coolant	Dry Cutting
Results	

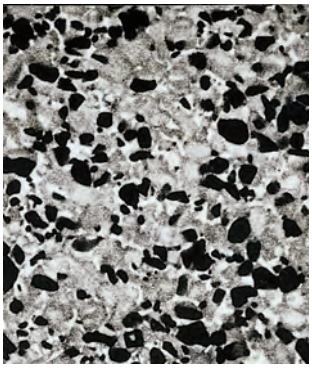
Tool	AHX640WR16016F
Insert (Grade)	NNMU200608ZEN-MK (MC5020)
Workpiece	JIS FC250 (scaled) 
Component	Cylinder block
Cutting Conditions: Cutting Speed (m/min)	155
Cutting Conditions: Feed per Tooth (mm/rev)	0.32
Cutting Conditions: Depth of Cut (mm)	3 — 5
Cutting Conditions: Coolant	Dry Cutting
Results	MC5020 showed 3 times longer tool life than the competitor's grade without chipping occurring.

Tool	BXD4000-063A05RA
Insert (Grade)	XDGT1550PDFR-G04 (LC15TF)
Workpiece	JIS A5078 
Cutting Conditions: Revolution (min^{-1})	5600
Cutting Conditions: Cutting Speed (m/min)	1108
Cutting Conditions: Depth of Cut (mm)	4
Cutting Conditions: Width of Cut (mm)	1.5
Cutting Conditions: Feed per Tooth (mm/tooth)	0.34
Cutting Conditions: Chip Discharge (cc/min)	57
Results	LC15TF produced a superior surface finish compared to the competitors non-coated carbide grade that generated a dull surface finish.

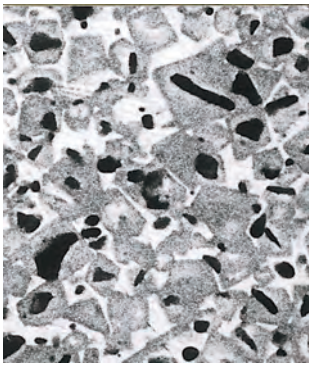
Tool	AQX204SA20L (VP30RT)
Workpiece	JIS S45C (Slotting) 
Component	Machine parts
Cutting Conditions: Cutting Speed (m/min)	80
Cutting Conditions: Feed (mm/rev)	0.1
Results	Tool life doubled.

CERMET

- **NX2525 for high speed milliing.**
- **NX4545 for general milling.**



Micro-Structure of **NX2525**



Micro-Structure of **NX4545**

- NX2525 has high hardened Ti compound particles within it's microstructure therefore the grade has both excellent wear and fracture resistance properties.
- NX4545 uses a special alloy for the binder material therefore the grade has high fracture resistance properties.

SELECTION STANDARD

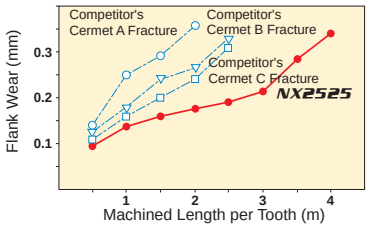
Milling

Work Material	Recommended Grade	Recommended Cutting Speed (m/min)	ISO	Application Range
P M Steel	**NX2525**	250 (150 ─ 350)	P10 M10	NX2525
			P20 M20	NX2525 / NX4545
	NX4545	150 (120 ─ 180)	P30 M30	NX4545
K Cast Iron	**NX2525**	200 (150 ─ 300)	K01	
			K10	NX2525
			K20	NX2525

(Note) In case of wet cutting, please use coated carbide F7030 for steel cutting and coated carbide F5010 for cast iron cutting.

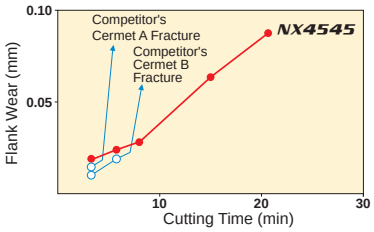
Cutting Performance

Cutting Speed : vc Depth of Cut : ap
Feed per Tooth : fz Width of Cut : ae



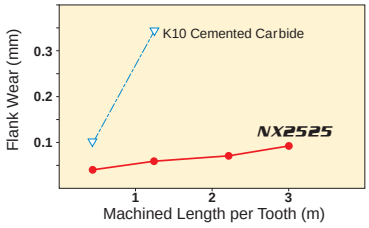
Steel High Speed Milling

<Cutting Conditions>
Workpiece : JIS SCM440 (97W×400L)
Cutter : SE445R0506E
Insert : SEEN1203AFTN1
vc=350m/min
ap=2.5mm
fz=0.2mm/tooth
Dry Cutting



Steel Shoulder Milling

<Cutting Conditions>
Workpiece : JIS SCM440 (220HB)
Cutter : NSE400R503S32
Insert : TEEN2204PETR1
vc=200m/min
fz=0.35mm/tooth
ae=25mm
ap=3.0mm
Down Cut Dry Cutting



Cast Iron Milling

<Cutting Conditions>
Workpiece : JIS FC300 (95W×400L)
Cutter : SE445R0506E
Insert : SEEN1203AFTN1
vc=180m/min
ap=2.5mm
fz=0.2mm/tooth
Dry Cutting

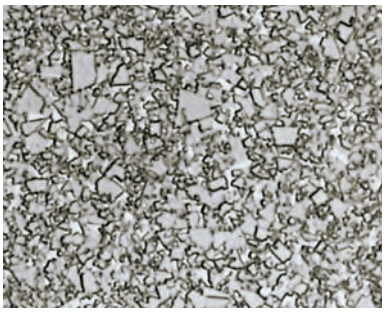
GRADE CHARACTERISTICS

Grade	Hardness (HRA)	T.R.S. (GPa)	Thermal Conductivity (W/m•K) ✶	Thermal Expansio (x10^{-6}/K)
NX2525	92.2	2.0	33	7.8
NX4545	90.0	2.2	33	7.8

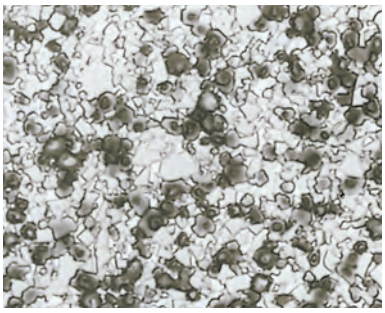
✶ 1GPa=102kg/mm^2, 1W/m•K=2.39×10^{-3}cal/cm•sec•℃

CEMENTED CARBIDE

● **Available grade series are UTi20T for steel and cast iron, and HTi10 for cast iron, non-ferrous metal and non-metal.**



K Series Grade (WC-Co) 10μm



P,M Series Grade (WC-TiC-TaC-Co) 10μm

SELECTION STANDARD

MILLING

Work Material		Recommended Grade	Recommended Cutting Speed (m/min)	ISO	Application Range
P	Steel	**UTi20T**	120 (50 — 180)	P10	
				P20	UTi20T
				P30	UTi20T
M	Stainless Steel	**UTi20T**	120 (50 — 180)	M10	
				M20	UTi20T
				M30	UTi20T
K	Cast Iron	**HTi10**	100 (50 — 150)	K10	HTi10
				K20	HTi10
		UTi20T	120 (50 — 180)	K30	UTi20T
N	Non-Ferrous Metal	**HTi10 TF15**	400 (300 — 500)	N01	HTi10
				N10	HTi10
				N20	TF15
				N30	TF15

MAIN COMPONENT AND APPLICATION

P series for steel cutting, K series for cast iron cutting and M series for general cutting.

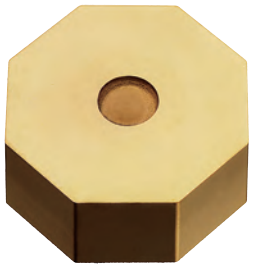
ISO	Main Component	Characteristics	Work Material
P M	WC-TiC-TaC-Co	Heat / Deformation resistance.	Carbon steel, Alloy steel, Stainless steel and Cast iron
K N	WC-Co	High rigidity and wear resistance.	Cast iron, Non-Ferrous metals and Non-metal

GRADE CHARACTERISTICS

ISO	Grade	Hardness (HRA)	Thermal Conductivity (W/m•K)*	Thermal Expansion ($x10^{-6}$/K)	Young's Modulus (GPa) *	T.R.S (GPa) *
P M	**UTi20T**	90.5	38	5.5	520	2.0
K N	**HTi05T**	92.5	79	4.5	600	1.5
K N	**HTi10**	92.0	79	4.6	630	2.0
N	**TF15**	91.5	71	5.3	580	2.5

*1GPa = 102kg/mm^2, 1W/m·K=2.39 x 10^{-3}cal/cm · sec ·℃

CBN (SINTERED CBN)



- MB710 and MB730 for cast iron cutting.

NEW

- CB5030 for high speed machining of cast irons now available.
- Due to the combination of the CB5030 insert geometry and the AOX allows the use of up to 16 corners per insert, enabling cost effective high efficiency machining.

SELECTION STANDARD / RECOMMENDED CUTTING CONDITION

FINISHING

Work Material		Structure	Cutting Speed (m/min) 250 500 750 1000 1250	Feed (mm/tooth)	Depth of Cut (mm)	Coolant
Gray Cast Iron	JIS FC250	Ferritic + Pearilitic	MB710 / MB730	−0.3	−0.5	Dry
	JIS FC300	Pearilitic				

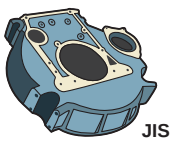
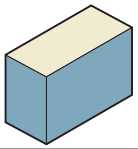
ROUGHING

Work Material		Structure	Cutting Speed (m/min) 250 500 1000 1500 2000	Feed (mm/tooth)	Depth of Cut (mm)	Coolant
Gray Cast Iron	JIS FC250	Pearilitic	CB5030	−0.15	−3.0	Dry

FEATURES AND BASE

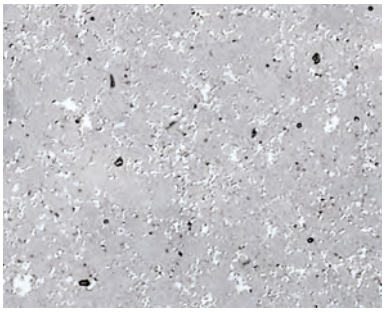
Grade	Application	Features	Main Component	Coating Layer
MB710	For General Cutting	General purpose grade with well balanced wear and fracture resistance.	CBN TiC Al_2O_3	—
MB730	For High Speed Cutting For interrupted cutting	Has the largest CBN content and therefore displays good thermal conductivity. It is suitable for the high temperatures that are generated in high speed cutting.	CBN(High Content) Co Base Alloy	—
NEW CB5030	For high-speed machining at large depths of cut High-speed interrupted machining at large depths of cut	High CBN content and high thermal conductivity.The whole insert is composed of sintered CBN. This enables high speed, high efficiency machining at larger depths of cut. The coated grade for easy recognition of used corners.	CBN AlN	TiN

APPLICATION EXAMPLES

Tool		AOX445R10008D	AF5000R0404D
Insert		SL-ONEN120404ASN (CB5030)	LDCN190412R (MB730)
Machine		Machining Center	Machining Center
Workpiece		 JIS FC250	 JIS FC250
Cutting Condition	Cutting Speed (m/min)	1200	1200
	Depth of Cut (mm)	2.8	0.3
	Width of Cut (mm)	70	75
	Table Feed (mm/min)	3057	5000
	Feed per Tooth (mm/tooth)	0.1	0.33
Result		10 times longer tool life and 4 times higher efficiency than ceramics. Excellent machining with a surface finish of Ra < 1.6μm.	When machining cast iron (FC250) it was possible to achieve a surface finish of Ra < 0.6μm.

PCD (SINTERED DIAMOND)

- **Suitable for non-ferrous metals cutting such as aluminium alloy.**
- **Suitable for extremely high speed finishing.**



Micro-Structure of **MD220**

GRADE FEATURES

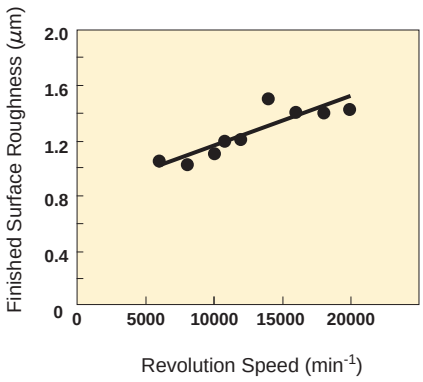
Grade	Features
MD205	Please use when there is insufficient resistance to wear with MD220.
MD220	Excellent in the balance between wear resistance and fracture resistance. For a wide range of tooling applications.
MD230	Please use when there is insufficient resistance to fracturing with MD220.

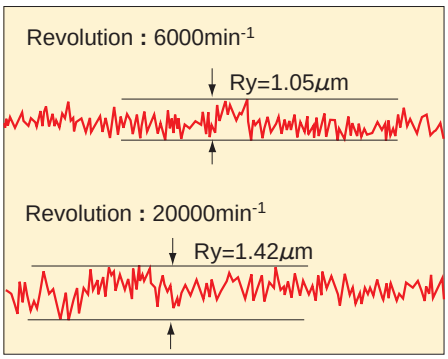
(Note) MD205 and MD230 for special grade materials.

RECOMMENDED CUTTING CONDITIONS

Work Material	Cutting Speed (m/min)	Grade	Feed per Tooth (mm/tooth)	Depth of Cut (mm)
Aluminium Alloy (Si≤12%)	1000—6000	**MD220**	—0.3	—0.5
Aluminium Alloy (Si≥13%)	200—800			

CUTTING PERFORMANCE

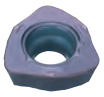




<Cutting Conditions>
Workpiece : JIS A7075-T6
Insert : NP-GDCW1240PDFR2
Grade : MD220
Tool : V10000R0406D
Feed : 0.2mm/tooth
Depth of Cut : 0.5mm
Width of Cut : 80mm
Dry Cutiing

CLASSIFICATION

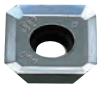
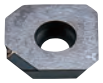
Cutter Type	Order Number	Page
AF3000	GPEA432R	C043
	432L	
	SPEA422R	C044
	422L	
AF5000	LDCN190412R	C043
	190412L	
AF10000	GDCN2004PDR	C043
AHX640W	NNMU200608ZEN-MK	C024
	NNMU200608ZEN-HK	C024
	WNEU2006ZEN7C-WK	C041

Cutter Type	Order Number	Page
AJX	JOMW06T215ZZSR-FT	C022
	080320ZZSR-FT	
	JDMW09T320ZDSR-FT	
	120420ZDSR-FT	
	140520ZDSR-FT	
	JOMT06T215ZZSR-JM	C022
	080320ZZSR-JM	
	JDMT09T320ZDSR-JM	
	120420ZDSR-JM	
	140520ZDSR-JM	
	JDMT120420ZDSR-ST	C023
	140520ZDSR-ST	
AOX445	NEW SL-ONEN120404ASN	C044
APX3000	NEW AOGT123602PEFR-GM	C020
	NEW 123604PEFR-GM	
	NEW 123608PEFR-GM	
	AOMT123602PEER-M	C020
	123604PEER-M	
	123608PEER-M	
	123610PEER-M	
	123612PEER-M	
	123616PEER-M	
	123620PEER-M	
	123624PEER-M	
	123630PEER-M	
	123632PEER-M	
	NEW AOMT123604PEER-H	C020
	NEW 123608PEER-H	

Cutter Type	Order Number	Page
APX4000	NEW AOMT184804PEER-H	C020
	NEW 184808PEER-H	
	NEW 184832PEER-H	
	NEW 184840PEER-H	
	NEW 184850PEER-H	
	NEW 184864PEER-H	
	AOMT184804PEER-M	C020
	184808PEER-M	
	NEW 184810PEER-M	
	NEW 184812PEER-M	
	NEW 184816PEER-M	
	NEW 184820PEER-M	
AQX	QOMT0830R-M2	C025
	1035R-M2	
	1342R-M2	
	1651R-M2	
	1856R-M2	
	2062R-M2	
	2576R-M2	
	QOGT0830R-G1	C025
	1035R-G1	
	1342R-G1	
	1651R-G1	
	1856R-G2	
	2062R-G1	
	2576R-G1	
ARX	RDMW0517M0E	C025
	0620M0E	
	0724M0E	
ASX400	SOET12T308PEER-JL	C031

ROTATING INSERTS
CLASSIFICATION

Cutter Type	Order Number	Page
ASX400	SOMT12T308PEER-JM	C031
	12T308PEEL-JM	
	SOMT12T308PEER-JH	C031
	SOMT12T320PEER-FT	C031
	SOGT12T308PEFR-JP	C031
	WOEW12T308PEER8C	C042
	12T308PETR8C	
ASX445	SEET13T3AGEN-JL	C029
	SEMT13T3AGSN-JM	C029
	SEMT13T3AGSN-JH	C029

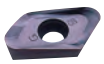
Cutter Type	Order Number	Page
ASX445	SEMT13T3AGSN-FT	C029
	SEGT13T3AGFN-JP	C029
	WEEW13T3AGER8C	C042
	13T3AGTR8C	
	WEEW13T3AGFR3C	C046
	13T3AGTR3C	
AXD7000	XDGX227008PDFR-GL	C039
	227016PDFR-GL	
	227020PDFR-GL	
	227030PDFR-GL	
	227032PDFR-GL	
	227040PDFR-GL	
	227050PDFR-GL	
BAE	AEMW150304ER	C020
	150304FR	
	150308ER	
	150308FR	
	19T304ER	
	19T304FR	
	19T308ER	
	19T308FR	

Cutter Type	Order Number	Page
BAP300 SRM2	APMT1135PDER-H1	C021
	1135PDER-H2	
	1135PDER-H3	
	1135PDER-H4	
	1135PDER-H6	
	APMT1135PDER-M0	C021
	1135PDER-M1	
	1135PDER-M2	
	APGT1135PDFR-G2	C021
BAP300 Under-cut Type	ZRM0603R-M3	C040
	0603R-M4	
	0603R-M5	
BAP3500	XPMT13T3PDER-M1	C040
	13T3PDER-M2	
	13T3PDER-M6	
	13T3PDER-M75	
	13T3PDER-M8	
	XPGT13T3PDFR-G1	C040
	13T3PDFR-G2	
	13T3PDFR-G6	
	13T3PDFR-G75	
	13T3PDFR-G8	
	XPGT13T3PDER-G1	C040
	13T3PDER-G2	
	13T3PDER-G6	
	13T3PDER-G75	
	13T3PDER-G8	

CLASSIFICATION

Cutter Type	Order Number	Page
BAP400 SRM2	APMT1604PDER-H1	C021
	1604PDER-H2	
	1604PDER-H4	
	1604PDER-H6	
	1604PDER-H8	
	APMT1604PDER-M2	C021
	APGT1604PDFR-G2	C021
BF407 QBF407	SFAN1203ZFFR2	C030
	1203ZFFL2	
	SFCN1203ZFFR2	
	1203ZFFL2	
	SFCN1203ZFFR2	C044
	WFC42ZFER2	C046
	42ZFEL2	
	NP-WFC42ZFER2	C046

Cutter Type	Order Number	Page
BN425 DN	SNC43B2G	C030
	43B2S	
	SNK43B2G	
	43B2S	
	SNKF43B2S	C030
	SNMF43B2G	
BRE	REMT2004M0	C025
	REMW2004M0	C026
BRP	RPMW08T2M0E	C026
	08T2M0T	
	10T3M0E	
	10T3M0T	
	1204M0E	
	1204M0T	
	1606M0E	
	1606M0T	
	RPMT08T2M0E-JS	C026
	10T3M0E-JS	
	1204M0E-JS	
	1606M0E-JS	

Cutter Type	Order Number	Page
BSP	SPMB1204APT	C032
BXD4000 	XDGT1550PDER-G04	C039
	1550PDER-G08	
	1550PDER-G12	
	1550PDER-G16	
	1550PDER-G20	
	1550PDER-G30	
	1550PDER-G32	
	1550PDER-G40	
	1550PDER-G50	
	XDGT1550PDFR-G04	C039
	1550PDFR-G08	
	1550PDFR-G12	
	1550PDFR-G16	
	1550PDFR-G20	
	1550PDFR-G30	
	1550PDFR-G32	
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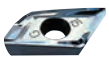
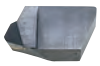
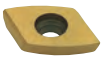
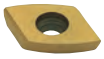
	1550PDFR-GL08	
BXD7000 	XDGT2206PDFR-G08	C039
	2206PDFR-G16	
	2206PDFR-G20	
	2206PDFR-G30	
	2206PDFR-G40	
	2206PDFR-G50	

Cutter Type	Order Number	Page
CBJP CBMP TAB	JPMT060204-C	
	060204-E	C023
	MPMT090308	
	120408	C024
CESP CFSP CGSP	SPMW090304	
	090308	
	120304	C033
	120308	
DCCC BZC	CCMX083508EN-A	
	09T308EN-A	C021
	CCMX09T308EN-B	C022
	ZCMX083508ER-A	
	09T308ER-A	C040
	ZCMX09T308ER-B	C040

Cutter Type	Order Number	Page
E404 FE404	SEA42C10GR	
	42C10GL	C027
	WEC42W11R	
	42W11L	C046
ECMP TAB	MPMT070308	
	090308	
	120408	C024
FBE2	UDC20F	
	25F	
	30F	C037
	UDC20F	
	25F	
	30F	C045
FBP415 QBP415	SPEN1203EEER1	
	1203EEEL1	
	SPNN1203EEER1	C032
	1203EEEL1	
	SPER1203EEER-JS	C032

Cutter Type	Order Number	Page
FBP415 QBP415	SPEN1203EETR1	
		C044
	WPC42EEER10C	
	42EEEL10C	C042
FF3000	SPCA53Z	C031
	SPCG53Z	C031
FMSD	SDEN1203AEN	
	1203AEZN	
	SDKN1203AEN	
	1203AETN	
	1203AEZN	C027
	1504AEN	
	1504AETN	
	1504AEZN	
FP490	SPEN424A	C032
FP590	SPEN535A	C032

CLASSIFICATION

Cutter Type	Order Number	Page
NF10000 QF10000 	GDCN2004PDFR3	C043
NR10000	GDCN2004ZDTR1	C043
MG200 	MGEEW1035PFTR	C023
MG300 	MGEEW1242PFTR	C023
MG400	MGEEW1650PFTR	C023
MG245	MGEEW1035AFTR	C023
MG345	MGEEW1242AFTR	C023

Cutter Type	Order Number	Page
MG445	MGEEW1650AFTR	C023
MSE445	SENN1203AFTN1	C030
NSE300 SE300	TEEN1603PEFR1	C036
	1603PEER1	
	1603PETR1	
	1603PESR1	
	TECN1603PEFR1W	C036
	1603PEER1W	
	1603PETR1W	
	TEER1603PEER-JS	C036
	TECN1603PEFR1	C044
SE300	WEC300PEER9C	C041

Cutter Type	Order Number	Page
NSE400 SE400	TECN2204PEFR1	C036
	2204PEER1	
	2204PETR1	
	TEEN2204PEFR1/L1	
	2204PEER1/L1	
	2204PETR1/L1	
	2204PESR1	
	TEKN2204PEER1	
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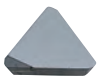
	2204PEZR	
	TEER2204PEER-JS	C036
	TECN2204PEFR1	C045
SE400	WEC400PEER10C	C041
	400PEEL10C	
OCTACUT BOE	OEEX1705ETR1	C025
	OEMX12T3ETR1	
	12T3ESR1	
	1705ESR1	
	1705ETR1	
	OEMX12T3ETR1	C043

Cutter Type	Order Number	Page
OCTACUT BOE	OEMX12T3EER1-JS	C025
	12T3ETR1-JS	
	1705EER1-JS	
	1705ETR1-JS	
	REMX12T3SN	C026
	12T3TN	
	1705SN	
	1705TN	
	REMX12T3EN-JS	C026
	12T3TN-JS	
	1705EN-JS	
	1705TN-JS	
PMF	TPEW1303ZPER2	C037
	TPEW1303ZPTR2	C045
PMR	CPMT1205ZPEN-M2	C022
	1205ZPEN-M3	
	1906ZPEN-M2	
	1906ZPEN-M3	
S300	SPMW090304	C033
	090308	
S400	SPMW120304	C033
	120308	
S400	SPMN120304	C033
	120304T	
	120308	
	120312	
	SPGN120304	
	120308	
	120312	

Cutter Type	Order Number	Page
S500	SPMN150408	C033
	150412	
	SPGN150404	
	150408	
SE415 QSE415	SECN1203EFFR1	C028
	1203EFER1	
	1203EFTR1/L1	
	SEEN1203EFFR1/L1	
	1203EFER1/L1	
	1203EFTR1/L1	
	1203EFSR1	
	1203EFZR1	
	SEKN1203EFER1	C028
	1203EFSR1	
	1203EFTR1	
	1203EFTR	
	1203EFZR	
	SEER1203EFER-JS	C029
	SECN1203EFFR1	C044
	WEC42EFFR5C	C041
	42EFFL5C	
	42EFER5C	
	42EFEL5C	
	42EFTR5C	
	WEC42EFFR10C	C042
	42EFFL10C	
	42EFER10C	
	42EFEL10C	

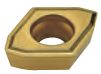
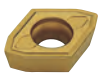
Cutter Type	Order Number	Page
SE445 LSE445	SECN1203AFFN1	C027
	1203AFEN1	
	1203AFTN1	
	SEEN1203AFFN1	
	1203AFEN1	
	1203AFTN1	
	1203AFSN1	
	1203AFZN1	
	SEKN1203AFEN1	
	1203AFSN1	
	1203AFTN1	
	1203AFTN	
	1203AFZN	
	SEER1203AFEN-JS	C028
	SECN1203AFFR1	C044
	WEC42AFFR5C	C041
	42AFFL5C	
	42AFER5C	
	42AFEL5C	
	42AFTR5C	
	WEC42AFER10C	C041
	42AFEL10C	

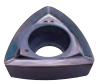
CLASSIFICATION

Cutter Type	Order Number	Page
SE515	SECN1504EFFR1	C028 C029
	1504EFER1	
	1504EFTR1	
	SEEN1504EFFR1	
	1504EFER1/L1	
	1504EFSR1	
	1504EFTR1/L1	
	SEKN1504EFER1	
	1504EFSR1	
	1504EFTR1	
	1504EFTR	
	1504EFZR	
	WEC53EFER5C	C042
	53EFEL5C	
	53EFTR5C	
SE545	SECN1504AFFN1	C027
	1504AFEN1	
	1504AFTN1	
	SEEN1504AFFN1	
	1504AFEN1	
	1504AFSN1	
	1504AFTN1	
	SEKN1504AFEN1	
	1504AFSN1	
	1504AFTN1	
	1504AFTN	
	1504AFZN	
	SEER1504AFEN-JS	C028
	WEC53AFER5C	C041
	53AFEL5C	
	53AFTR5C	

Cutter Type	Order Number	Page
SG20	RGEN2004M0SN	C026
SPX	NEW JPMX190412-JM	C023
	NEW 140412-JM	
	JPMX190412-WH	C023
	190416-WH	
	NEW MPMX120412-JM	C024
	MPMX120412-WH	C024
	NEW SPMX120408-JM	C033
	SPMX120408-WH	C033
SRB	NEW SRBT10	C034
	NEW 12	
	NEW 16	
	NEW 20	
	NEW 25	
	NEW 30	
	NEW 32	
SRE	SRE06R	C034
	07R	
	09R	
	SRE12R	C034

Cutter Type	Order Number	Page
SRF	SRFT10	C034
	12	
	16	
	20	
	25	
	30	
	32	
SRM2	SRM16C-M	C035
	20C-M	
	25C-M	
	30C-M	
	SRM16E-M	C035
	20E-M	
	25E-M	
	30E-M	
	SRG16C	C034
	20C	
	25C	
	30C	
	SRG16E	C034
	20E	
	25E	
	30E	
SRM2 ϕ40 ϕ50	SRG40C	C034
	50C	
	SRG40E	C035
	50E	
	APMT1135PDER-H2	C021
	1604PDER-H2	
	APMT1135PDER-M2	C021
	1604PDER-M2	

Cutter Type	Order Number	Page
STAW	STAWN○○○○TH	C052
STLG	SLG22120L	C030
	22150L	
	22200L	
	38200L	
	38300L	
	38400L	
TAF	GCMT040204-U1	C047
	GCMT040204-U2	C047
	GPMT060204-U1	C047
	070204-U1	
	090304-U1	
	11T308-U1	
	140408-U1	
	GPMT060204-U2	C047
	070204-U2	
	090304-U2	
	11T308-U2	
	140408-U2	
	GPMT060204-U3	C047
	070204-U3	
	090304-U3	
	11T308-U3	
	140408-U3	
TAW	TAWN○○○○T	C050
	TAWB○○○○T	C051

Cutter Type	Order Number	Page
TAW	TAWNH○○○○T	C048
	TAWBH○○○○T	C049
TBE1	UDK15	C037
	UDK10A	C037
	UDK15A	C038
	SPMT120408-A	C033
TRM4	UPM40	C038
	50	
	UPM40P1	C038
	50P1	
	UPM50P0	C038
TSMP	MPMW070308	C024
	090308	
	120408	

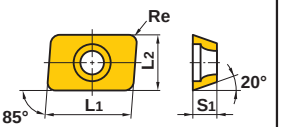
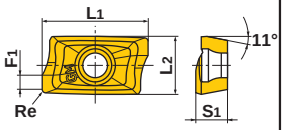
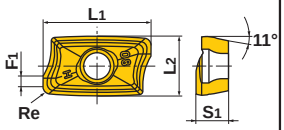
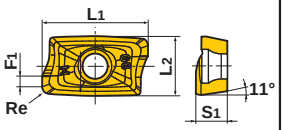
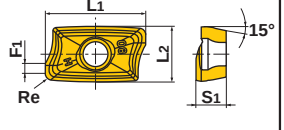
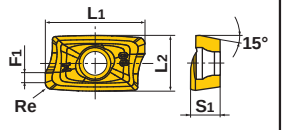
Cutter Type	Order Number	Page
V10000	NP-GDCW1240PDFR2	C043
VIPER	CPEX130512R	C022
	CPEX160512L	C022
	TPNX1605N	C037
Corner Angle 0° 11° Positive	TPEN1603PPR	C036
	2204PDR	
	TPKN1603PPR	
	2204PDR	
Corner Angle 15° 11° Positive	SPKN1203EDR	C032
	1504EDR	
	SPEN1203EDR	
	1504EDR	
Corner Angle 45° 20° Positive	SEKN1203AGTN	C030
Negative	SNMN120408	C030
	120412	
11° Positive	SPMN120408	C033
	120412	
11° Positive	TPMN160304	C037
	160308	
	160312	
	220404	
	220408	
	220412	

ROTATING INSERTS

Work Material		
	P	Steel
	M	Stainless Steel
	K	Cast Iron
	N	Non-ferrous Metal
	S	Heat-resistant Alloy, Titanium Alloy
	H	Hardened Steel

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **F :** Sharp

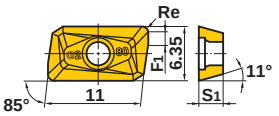
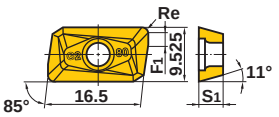
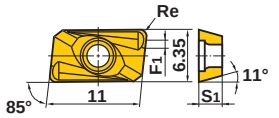
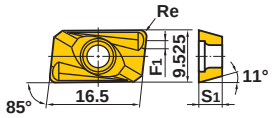
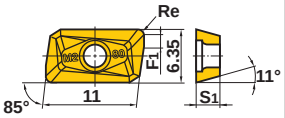
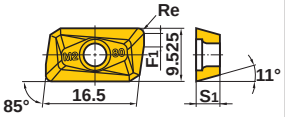
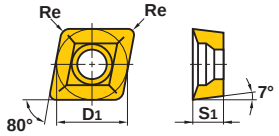
Shape	Order Number	Class	Honing	Coated				Cermet		Carbide			Dimensions (mm)					Geometry
				F7030	VP15TF	VP20RT	UP20M	NX2525	NX4545	UTi20T	HTi10	TF15	L_1	L_2	S_1	F_1	Re	
BAE	AEMW150304ER	M	E	●			●	●		●	●		15.875	9.525	3.18	–	0.4	
	150304FR	M	F								●		15.875	9.525	3.18	–	0.4	
	150308ER	M	E	●			●	●		●	●		15.875	9.525	3.18	–	0.8	
	150308FR	M	F								●		15.875	9.525	3.18	–	0.8	
	19T304ER	M	E	●			●	●		●	●		19.05	12.7	3.97	–	0.4	
	19T304FR	M	F								●		19.05	12.7	3.97	–	0.4	
	19T308ER	M	E	●			●	●		●	●		19.05	12.7	3.97	–	0.8	
	19T308FR	M	F								●		19.05	12.7	3.97	–	0.8	
APX3000 C106	AOGT123602PEFR-GM	G	F									●	12	6.6	3.6	1.8	0.2	
	123604PEFR-GM	G	F									●	12	6.6	3.6	1.6	0.4	
	123608PEFR-GM	G	F									●	12	6.6	3.6	1.2	0.8	
APX3000 C106	AOMT123604PEER-H	M	E		●	●							12	6.6	3.6	1.6	0.4	
	123608PEER-H	M	E		●	●							12	6.6	3.6	1.2	0.8	
APX3000 C112	AOMT123602PEER-M	M	E		●	●							12	6.6	3.6	1.8	0.2	
	123604PEER-M	M	E		●	●							12	6.6	3.6	1.6	0.4	
	123608PEER-M	M	E		●	●							12	6.6	3.6	1.2	0.8	
	123610PEER-M	M	E		●	●							12	6.6	3.6	1.0	1.0	
	123612PEER-M	M	E		●	●							12	6.6	3.6	0.8	1.2	
	123616PEER-M	M	E		●	●							12	6.6	3.6	0.4	1.6	
	123620PEER-M	M	E		●	●							12	6.6	3.6	0.4	2.0	
	123624PEER-M	M	E		●	●							12	6.6	3.6	0.4	2.4	
	123630PEER-M	M	E		●	●							12	6.6	3.6	0.4	3.0	
	123632PEER-M	M	E		●	●							12	6.6	3.6	0.4	3.2	
APX4000 C112	AOMT184804PEER-H	M	E		●	●							18	9	4.8	1.8	0.4	
	184808PEER-H	M	E		●	●							18	9	4.8	1.4	0.8	
	184832PEER-H	M	E			●							18	9	4.8	0.4	3.2	
	184840PEER-H	M	E			●							18	9	4.8	0.4	4.0	
	184850PEER-H	M	E			●							18	9	4.8	–	5.0	
	184864PEER-H	M	E			●							18	9	4.8	–	6.35	
APX4000 C112	AOMT184804PEER-M	M	E		●	●							18	9	4.8	1.8	0.4	
	184808PEER-M	M	E		●	●							18	9	4.8	1.4	0.8	
	184810PEER-M	M	E		●								18	9	4.8	1.0	1.0	
	184812PEER-M	M	E		●								18	9	4.8	0.8	1.2	
	184816PEER-M	M	E		●								18	9	4.8	0.4	1.6	
	184820PEER-M	M	E		●								18	9	4.8	0.4	2.0	

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **F :** Sharp

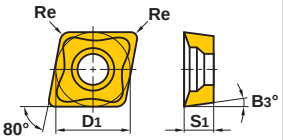
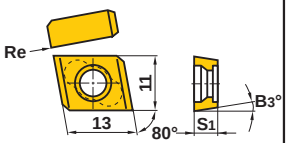
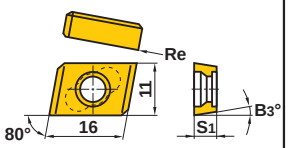
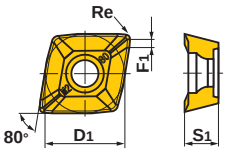
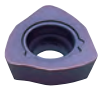
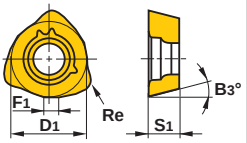
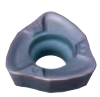
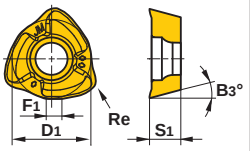
Shape	Order Number	Class	Honing	Coated			Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	VP15TF	UP20M	NX2525	NX4545	UTi20T	HTi10	D_1	S_1	F_1	Re	
BAP300 ➲C098	**APGT1135PDFR-G2**	G	F							●	—	3.5	1.2	0.8	
BAP400 ➲C096	**APGT1604PDFR-G2**	G	F							●	—	4.76	1.4	0.8	
BAP300 ➲C096 **SRM2** ➲C172	**APMT1135PDER-H1**	M	E	●	●	●	●	●	●	●	—	3.5	1.5	0.4	
	1135PDER-H2	M	E	●	●	●	●	●	●	●	—	3.5	1.2	0.8	
	1135PDER-H3	M	E	●		●			●		—	3.5	0.8	1.2	
	1135PDER-H4	M	E	●		●			●		—	3.5	0.4	1.6	
	1135PDER-H6	M	E	●		●			●		—	3.5	0.4	2.4	
BAP400 ➲C098 **SRM2** ➲C172	**APMT1604PDER-H1**	M	E	●		●			●		—	4.76	1.7	0.4	
	1604PDER-H2	M	E	●	●	●	●	●	●	●	—	4.76	1.4	0.8	
	1604PDER-H4	M	E	●					●		—	4.76	0.4	1.6	
	1604PDER-H6	M	E	●					□		—	4.76	0.4	2.4	
	1604PDER-H8	M	E	●					●		—	4.76	0.4	3.2	
BAP300 ➲C098 **SRM2** ➲C172	**APMT1135PDER-M0**	M	E	●							—	3.5	1.8	0.2	
	1135PDER-M1	M	E	●							—	3.5	1.5	0.4	
	1135PDER-M2	M	E	●	●			●			—	3.5	1.2	0.8	
BAP400 ➲C098 **SRM2** ➲C172	**APMT1604PDER-M2**	M	E	●	●			●			—	4.76	1.4	0.8	
DCCC ➲C166	**CCMX083508EN-A**	M	E	●		●			●		7.94	3.5	—	0.8	
	09T308EN-A	M	E	●		●			●		9.525	3.97	—	0.8	

ROTATING INSERTS

Work Material		
	P	Steel
	M	Stainless Steel
	K	Cast Iron
	N	Non-ferrous Metal
	S	Heat-resistant Alloy, Titanium Alloy
	H	Hardened Steel

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✲ : Unstable Cutting

Honing :
E : Round **S :** Chamfer + Hone

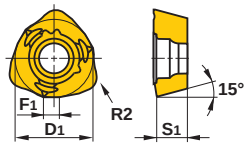
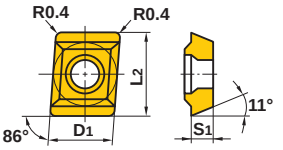
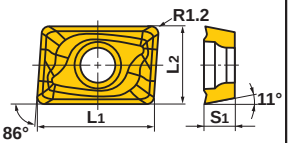
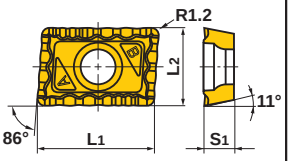
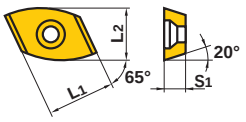
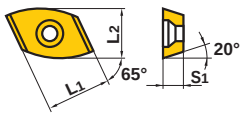
Shape	Order Number	Class	Honing	Coated F7030	Coated FH7020	Coated VP15TF	Coated VP20RT	Coated VP30RT	Carbide UTi20T	D_1	S_1	F_1	Re	B_3	Geometry
DCCC ➲C166	**CCMX09T308EN-B**	M	E	●					●	9.525	3.97	—	0.8	7°	
VIPER	**CPEX130512R**	E	E						●	—	5	—	1.2	11°	
VIPER	**CPEX160512L**	E	E						●	—	5	—	1.2	11°	
PMR ➲C190	**CPMT1205ZPEN-M2**	M	E	●		●				12.7	5.56	1.4	0.8	—	
	1205ZPEN-M3	M	E			●				12.7	5.56	1.4	1.2	—	
	1906ZPEN-M2	M	E	●		●				19.05	6.35	1.4	0.8	—	
	1906ZPEN-M3	M	E			●				19.05	6.35	1.4	1.2	—	
AJX ➲C136 	**JOMW06T215ZZSR-FT**	M	S		●	●		●		6.35	2.78	1.2	1.5	13°	
	080320ZZSR-FT	M	S		●	●		●		8	3.18	1.4	2	13°	
	JDMW09T320ZDSR-FT	M	S		●	●		●		9.525	3.97	1.8	2	15°	
	120420ZDSR-FT	M	S		●	●		●		12	4.76	2.5	2	15°	
	140520ZDSR-FT	M	S		●	●		●		14	5.56	2.8	2	15°	
AJX ➲C136 	**JOMT06T215ZZSR-JM**	M	S		●	●		●		6.35	2.78	1.2	1.5	13°	
	080320ZZSR-JM	M	S		●	●		●		8	3.18	1.4	2	13°	
	JDMT09T320ZDSR-JM	M	S		●	●		●		9.525	3.97	1.8	2	15°	
	120420ZDSR-JM	M	S		●	●		●		12	4.76	2.5	2	15°	
	140520ZDSR-JM	M	S		●	●		●		14	5.56	2.8	2	15°	

● : Inventory maintained in Japan. (10 inserts in one case)

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ Unstable Cutting

Honing :
E : Round **S :** Chamfer + Hone **T :** Chamfer

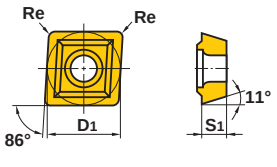
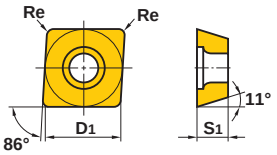
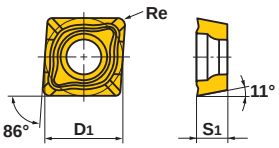
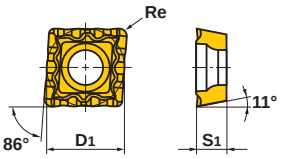
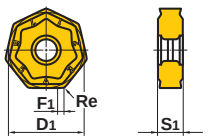
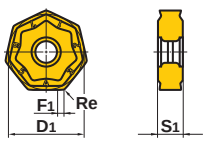
Shape	Order Number	Class	Honing	Coated					Cermet	Carbide		Dimensions (mm)					Geometry
				FH7020	VP15TF	VP20RT	VP30RT	UP20M	NX2525	UTi20T	HTi10	L_1	L_2	D_1	S_1	F_1	
AJX C136	**JDMT120420ZDSR-ST**	M	S	●	●		●					—	—	12	4.76	2.5	
	140520ZDSR-ST	M	S	●	●		●					—	—	14	5.56	2.8	
CBJP C185 **TAB**	**JPMT060204-C**	M	E					●		●		—	7.94	6.5	2.38	—	 Inner insert (C) shown.
	060204-E	M	E					●		●		—	7.94	6.5	2.38	—	
SPX C162	**JPMX140412-JM**	M	E		●	●						14.3	12.7	—	4.76	—	
	190412-JM	M	E		●	●						19.05	12.7	—	4.76	—	
SPX C162	**JPMX140412-WH**	M	E		●	●						14.3	12.7	—	4.76	—	
	190412-WH	M	E		●	●						19.05	12.7	—	4.76	—	
MG245 MG345 MG445	**MGEEW1035AFTR**	E	T					●	●	●	●	10	9	—	3.5	—	
	1242AFTR	E	T					●	●	●	●	12	10.5	—	4.2	—	
	1650AFTR	E	T					●	●	●	●	16	13	—	5	—	
MG200 MG300 MG400	**MGEEW1035PFTR**	E	T					●	●	●	●	10	9	—	3.5	—	
	1242PFTR	E	T					●	●	●	●	12	10.5	—	4.2	—	
	1650PFTR	E	T					●	□	●	●	16	13	—	5	—	

ROTATING INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round

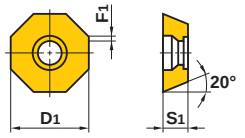
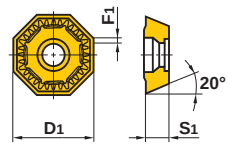
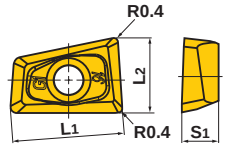
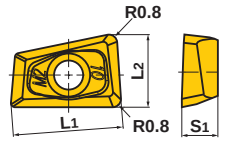
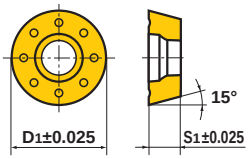
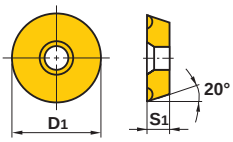
Shape	Order Number	Class	Honing	Coated				Carbide	Dimensions (mm)				Geometry
				MC5020	VP15TF	VP20RT	UP20M	UTi20T	D1	S1	F1	Re	
CBMP C185 **ECMP TAB**	**MPMT070308**	M	E				●	●	7.94	3.18	—	0.8	
	090308	M	E				●	●	9.525	3.18	—	0.8	
	120408	M	E				●	●	12.7	4.76	—	0.8	
TSMP C184	**MPMW070308**	M	E					●	7.94	3.18	—	0.8	
	090308	M	E					●	9.525	3.18	—	0.8	
	120408	M	E					●	12.7	4.76	—	0.8	
SPX C162	**MPMX120412-JM**	M	E		●	●			12.7	4.76	—	1.2	
SPX C162	**MPMX120412-WH**	M	E		●	●			12.7	4.76	—	1.2	
AHX640W C080	**NNMU200608ZEN-MK**	M	E	●					20	6.55	1	0.8	
AHX640W C080	**NNMU200608ZEN-HK**	M	E	○					20	6.55	1	0.8	

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
○ : Inventory maintained. (Available from spring 2009) (10 inserts in one case)
▲ : Inventory maintained. To be replaced by new products. (10 inserts in one case)

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Honing :
E : Round **S** : Chamfer + Hone **T** : Chamfer

Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)					Geometry
				F7030	F620	VP15TF	VP30RT	UP20M	AP20M	NX2525	NX4545	UTi20T	HTi10	L_1	L_2	D_1	S_1	F_1	
OCTACUT ⇒C148	OEMX12T3ETR1	M	T		▲						●	●		—	—	12.7	3.97	1	
	12T3ESR1	M	S	●										—	—	12.7	3.97	1	
	OEEX1705ETR1	E	T							●	●			—	—	17	5	1.4	
	OEMX1705ETR1	M	T		▲			●			●	●		—	—	17	5	1.4	
	1705ESR1	M	S	●										—	—	17	5	1.4	
OCTACUT ⇒C148	OEMX12T3EER1-JS	M	E	●										—	—	12.7	3.97	1	
	12T3ETR1-JS	M	T		▲				●			●		—	—	12.7	3.97	1	
	1705EER1-JS	M	E	●										—	—	17	5	1.4	
	1705ETR1-JS	M	T		▲				●			●		—	—	17	5	1.4	
AQX ⇒C128	QOGT0830R-G1	G	F ✱1			●							●	8.4	5.5	—	3	—	
	1035R-G1	G	F ✱1			●							●	10.6	7	—	3.5	—	
	1342R-G1	G	F ✱1			●							●	13.1	8.7	—	4.2	—	
	1651R-G1	G	F ✱1			●							●	16.5	11	—	5.1	—	
	1856R-G1	G	F ✱1			●							●	18	12	—	5.6	—	
	2062R-G1	G	F ✱1			●							●	20.4	13.6	—	6.2	—	
	2576R-G1	G	F ✱1			●							●	25.8	17.2	—	7.6	—	
AQX ⇒C128	QOMT0830R-M2	M	E			●	●							8.4	5.5	—	3	—	
	1035R-M2	M	E			●	●							10.6	7	—	3.5	—	
	1342R-M2	M	E			●	●							13.1	8.7	—	4.2	—	
	1651R-M2	M	E			●	●							16.5	11	—	5.1	—	
	1856R-M2	M	E			●	●							18	12	—	5.6	—	
	2062R-M2	M	E			●	●							20.4	13.6	—	6.2	—	
	2576R-M2	M	E			●	●							25.8	17.2	—	7.6	—	
ARX ⇒C152	RDMW0517M0E	M	E			●								—	—	5	1.70	—	
	0620M0E	M	E			●								—	—	6	1.99	—	
	0724M0E	M	E			●								—	—	7	2.38	—	
BRE ⇒C182	REMT2004M0	M	E					●				●		—	—	20	4.76	—	

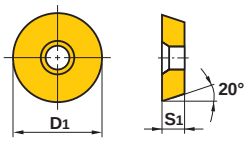
✱1 Grade VP15TF is "E".

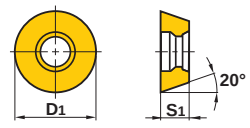
ROTATING INSERTS

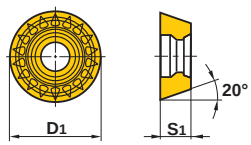
Work Material		
	P	Steel
	M	Stainless Steel
	K	Cast Iron
	N	Non-ferrous Metal
	S	Heat-resistant Alloy, Titanium Alloy
	H	Hardened Steel

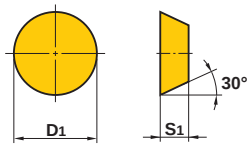
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

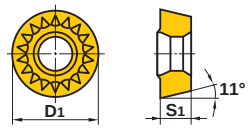
Honing :
E : Round **S** : Chamfer + Hone **T** : Chamfer

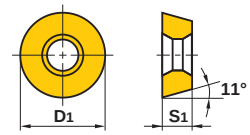
Shape	Order Number	Class	Honing	Coated					Cermet		Carbide		Dimensions (mm)		Geometry
				F7030	F620	VP15TF	UP20M	AP20M	NX2525	NX4545	UTi20T	HTi10	D1	S1	
BRE C182	**REMW2004M0**	M	E ✱1						□		●		20	4.76	
OCTACUT C148	**REMX12T3TN**	M	T		▲			●			●		12.95	4.17	
	12T3SN	M	S	●									12.95	4.17	
	1705TN	M	T		▲			●			●		17.25	5.2	
	1705SN	M	S	●									17.25	5.2	
OCTACUT C148	**REMX12T3EN-JS**	M	E	●									12.95	4.17	
	12T3TN-JS	M	T		▲			●			●		12.95	4.17	
	1705EN-JS	M	E	●									17.25	5.2	
	1705TN-JS	M	T		▲			●			●		17.25	5.2	
SG20 C085	**RGEN2004M0SN**	E	S	●			●		●		●	●	20	4.76	
BRP C156	**RPMT08T2M0E-JS**	M	E	●		●							8	2.78	
	10T3M0E-JS	M	E	●		●							10	3.97	
	1204M0E-JS	M	E	●		●					●		12	4.76	
	1606M0E-JS	M	E	●		●					●		16	6.35	
BRP C156	**RPMW08T2M0E**	M	E	●						●			8	2.78	
	08T2M0T	M	T			●							8	2.78	
	10T3M0E	M	E	●						●			10	3.97	
	10T3M0T	M	T			●							10	3.97	
	1204M0E	M	E	●						●	●		12	4.76	
	1204M0T	M	T			●							12	4.76	
	1606M0E	M	E	●						●	●		16	6.35	
	1606M0T	M	T			●							16	6.35	











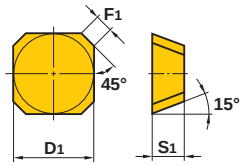
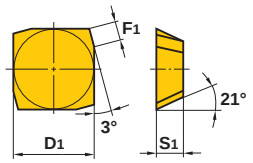
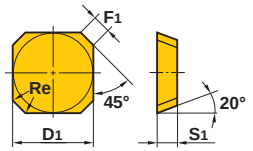
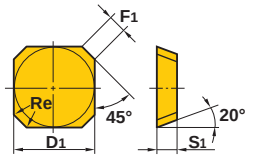
✱1 Grade NX2525 is "T".

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
○ : Inventory maintained. (Available from spring 2009) (10 inserts in one case)
▲ : Inventory maintained. To be replaced by new products. (10 inserts in one case)

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Honing :
E : Round **F** : Sharp **S** : Chamfer + Hone
T : Chamfer **Z** : Strong

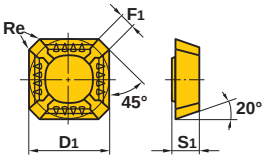
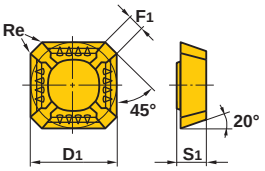
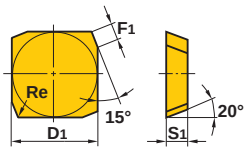
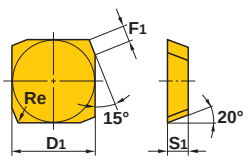
Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	UP20M	NX2525	NX4545	UTi20T	HTi10	D1	S1	F1	Re	
FMSD	**SDEN1203AEN**	E	T							▲	▲	▲		12.7	3.18	1.2	–	
	1203AEZN	E	Z							▲				12.7	3.18	1.2	–	
	SDKN1203AEN	K	T	▲					▲	▲		▲		12.7	3.18	1.2	–	
	1203AETN	K	T								▲			12.7	3.18	1.2	–	
	1203AEZN	K	Z							▲				12.7	3.18	1.2	–	
	1504AEN	K	T							▲		▲		15.875	4.76	1.2	–	
	1504AETN	K	T								▲			15.875	4.76	1.2	–	
	1504AEZN	K	Z							▲				15.875	4.76	1.2	–	
FE404 ⇒C199 **E404**	**SEA42C10GR**	A	F										▲	12.7	3.18	2.4	–	
	42C10GL	A	F										▲	12.7	3.18	2.4	–	
SE445 ⇒C070 **LSE445** ⇒C072	**SECN1203AFFN1**	C	F										●	12.7	3.18	1.4	1.0	
	1203AFEN1	C	E										●	12.7	3.18	1.4	1.0	
	1203AFTN1	C	T							●	●	●		12.7	3.18	1.4	1.0	
	SEEN1203AFFN1	E	F										●	12.7	3.18	1.4	1.0	
	1203AFEN1	E	E										●	12.7	3.18	1.4	1.0	
	1203AFTN1	E	T		▲				●	●	●	●		12.7	3.18	1.4	1.0	
	1203AFSN1	E	S	●		○	●	●						12.7	3.18	1.4	1.0	
	1203AFZN1	E	Z							●				12.7	3.18	1.4	1.0	
	SEKN1203AFEN1	K	E										●	12.7	3.18	1.4	–	
	1203AFSN1	K	S	●										12.7	3.18	1.4	–	
	1203AFTN1	K	T		▲				●	●		●		12.7	3.18	1.4	–	
	1203AFTN	K	T								●			12.7	3.18	1.7	1.0	
	1203AFZN	K	Z							●				12.7	3.18	1.7	1.0	
SE545 ⇒C074	**SECN1504AFFN1**	C	F										□	15.875	4.76	1.4	1.0	
	1504AFEN1	C	E										●	15.875	4.76	1.4	1.0	
	1504AFTN1	C	T							●	●	●		15.875	4.76	1.4	1.0	
	SEEN1504AFFN1	E	F										●	15.875	4.76	1.4	1.0	
	1504AFEN1	E	E										●	15.875	4.76	1.4	1.0	
	1504AFTN1	E	T		▲				●	●	●	●		15.875	4.76	1.4	1.0	
	1504AFSN1	E	S	●		○	●	●						15.875	4.76	1.4	1.0	
	SEKN1504AFEN1	K	E										●	15.875	4.76	1.4	–	
	1504AFSN1	K	S	●										15.875	4.76	1.4	–	
	1504AFTN1	K	T		▲				●	●		●		15.875	4.76	1.4	–	
	1504AFTN	K	T								●			15.875	4.76	1.7	1.0	
	1504AFZN	K	Z							●				15.875	4.76	1.7	1.0	

ROTATING INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **F** : Sharp **S** : Chamfer + Hone
T : Chamfer **Z** : Strong

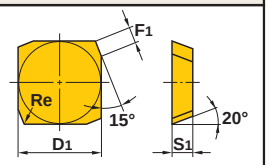
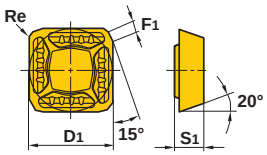
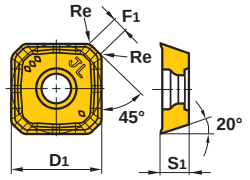
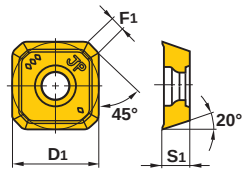
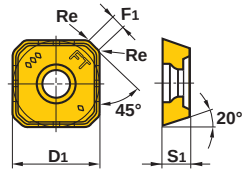
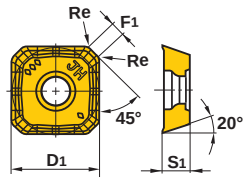
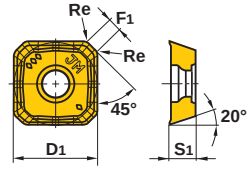
Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	UP20M	NX2525	NX4545	UTi20T	HTi10	D1	S1	F1	Re	
SE445 ➲C070 **LSE445** ➲C072	**SEER1203AFEN-JS**	E	E	●	▲	○	●	●	●	●		●		12.7	3.18	1.4	1.0	
SE545 ➲C074	**SEER1504AFEN-JS**	E	E	●	▲	○	●	●	●			●		15.875	4.76	1.4	1.0	
SE415 ➲C076 **QSE415**	**SECN1203EFFR1**	C	F										●	12.7	3.18	1.4	1.0	
	1203EFER1	C	E										●	12.7	3.18	1.4	1.0	
	1203EFTR1	C	T						●	●	●	●		12.7	3.18	1.4	1.0	
	1203EFTL1	C	T									●		12.7	3.18	1.4	1.0	
	SEEN1203EFFR1	E	F										●	12.7	3.18	1.4	1.0	
	1203EFFL1	E	F										□	12.7	3.18	1.4	1.0	
	1203EFER1	E	E										●	12.7	3.18	1.4	1.0	
	1203EFEL1	E	E										□	12.7	3.18	1.4	1.0	
	1203EFTR1	E	T		▲				●	●	●	●		12.7	3.18	1.4	1.0	
	1203EFTL1	E	T						●			●		12.7	3.18	1.4	1.0	
	1203EFSR1	E	S	●		○	●	●						12.7	3.18	1.4	1.0	
	1203EFZR1	E	Z							●				12.7	3.18	1.4	1.0	
	SEKN1203EFER1	K	E										●	12.7	3.18	1.4	—	
	1203EFSR1	K	S	●										12.7	3.18	1.4	—	
	1203EFTR1	K	T		▲				●	●		●		12.7	3.18	1.4	—	
	1203EFTR	K	T								●			12.7	3.18	1.8	1.0	
	1203EFZR	K	Z							●				12.7	3.18	1.8	1.0	Right hand insert shown.
SE515 ➲C078	**SECN1504EFFR1**	C	F										□	15.875	4.76	1.4	1.0	
	1504EFER1	C	E										●	15.875	4.76	1.4	1.0	
	1504EFTR1	C	T						□	●	●	●		15.875	4.76	1.4	1.0	
	SEEN1504EFFR1	E	F										●	15.875	4.76	1.4	1.0	
	1504EFER1	E	E										●	15.875	4.76	1.4	1.0	
	1504EFEL1	E	E										□	15.875	4.76	1.4	1.0	
	1504EFTR1	E	T		▲				□	●	●	●		15.875	4.76	1.4	1.0	
	1504EFTL1	E	T						□			□		15.875	4.76	1.4	1.0	
	1504EFSR1	E	S	●		○	●	●						15.875	4.76	1.4	1.0	Right hand insert shown.

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
○ : Inventory maintained. (Available from spring 2009) (10 inserts in one case)
▲ : Inventory maintained. To be replaced by new products. (10 inserts in one case)

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round **F :** Sharp **S :** Chamfer + Hone
T : Chamfer **Z :** Strong

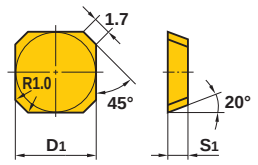
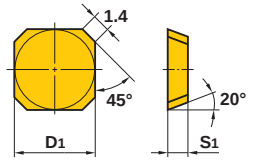
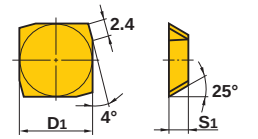
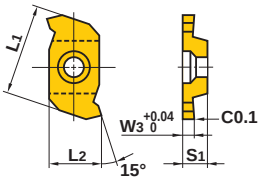
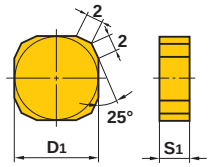
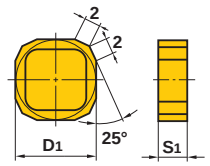
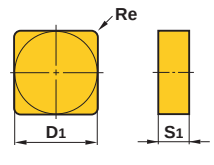
Shape	Order Number	Class	Honing	Coated								Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	VP15TF	VP30RT	UP20M	NX2525	NX4545	UTi20T	HTi10	D1	S1	F1	Re	
SE515 ➲C078	**SEKN1504EFER1**	K	E												●	15.875	4.76	1.4	—	
	1504EFSR1	K	S	●												15.875	4.76	1.4	—	
	1504EFTR1	K	T		▲						●	●		●		15.875	4.76	1.4	—	
	1504EFTR	K	T										●			15.875	4.76	1.8	1.0	
	1504EFZR	K	Z									●				15.875	4.76	1.8	1.0	Right hand insert shown.
SE415 ➲C076 **QSE415**	**SEER1203EFER-JS**	E	E	●	▲	○								●		12.7	3.18	1.4	1.0	
ASX445 ➲C064	**SEET13T3AGEN-JL**	E	E	●					●	●			●			13.4	3.97	1.9	1.5	
ASX445 ➲C064	**SEGT13T3AGFN-JP**	G	F												●	13.4	3.97	2.2	—	
ASX445 ➲C064	**SEMT13T3AGSN-FT**	M	S			○		●								13.4	3.97	1.9	1.5	
ASX445 ➲C064	**SEMT13T3AGSN-JH**	M	S	●		○	●		●	●						13.4	3.97	1.9	1.5	
ASX445 ➲C064	**SEMT13T3AGSN-JM**	M	S	●		○	●	●	●	●			●			13.4	3.97	1.9	1.5	

ROTATING INSERTS

Work Material			Coated				Cermet		Carbide	
	P	Steel	◐				●	◐	◐	
	M	Stainless Steel	◔				○	◔	◔	
	K	Cast Iron		◐	●	◐	●		✱	◐
	N	Non-ferrous Metal								◐
	S	Heat-resistant Alloy, Titanium Alloy								
	H	Hardened Steel								

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Honing :
E : Round **F :** Sharp **T :** Chamfer

Shape	Order Number	Class	Honing	Coated F620	Coated MC5020	Coated F5010	Coated F5020	Cermet NX2525	Cermet NX4545	Carbide UTi20T	Carbide HTi10	L1	L2	D1	S1	W3	Re	Geometry
Corner Angle 45°	SEKN1203AGTN	K	T						▲			—	—	12.7	3.18	—	—	
MSE445	SENN1203AFTN1	N	T	▲								—	—	12.7	3.18	—	—	
BF407 ⇒C084 QBF407	SFAN1203ZFFR2	A	F								●	—	—	12.7	3.175	—	—	
	1203ZFFL2	A	F								●	—	—	12.7	3.175	—	—	
	SFCN1203ZFFR2	C	F								●	—	—	12.7	3.175	—	—	
	1203ZFFL2	C	F								□	—	—	12.7	3.175	—	—	
STLG ⇒C188	SLG22120L	G	T							●		13	7	—	2.7	1.2	—	
	22150L	G	T							●		13	7	—	3	1.5	—	
	22200L	G	T							●		13	7	—	3.5	2	—	
	38200L	G	T							●		15.6	8	—	4	2	—	
	38300L	G	T							●		15.6	8	—	5	3	—	
	38400L	G	T							●		15.6	8	—	6	4	—	
BN425 DN	SNC43B2G	C	F							●	●	—	—	12.7	4.8	—	—	
	43B2S	C	T ✱1					●	●	●		—	—	12.7	4.8	—	—	
	SNK43B2G	K	F							●	●	—	—	12.7	4.8	—	—	
	43B2S	K	T ✱1					●	●	●		—	—	12.7	4.8	—	—	
BN425 DN	SNKF43B2S	K	T						●			—	—	12.7	4.8	—	—	
	SNMF43B2G	M	E		○	●	●					—	—	12.7	4.8	—	—	
	SNMN120408	M	E		○			●		●	●	—	—	12.7	4.78	—	0.8	
	120412	M	E		○			●		●	●	—	—	12.7	4.78	—	1.2	

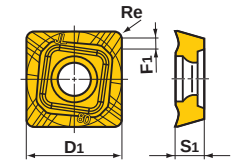
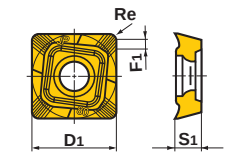
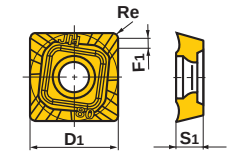
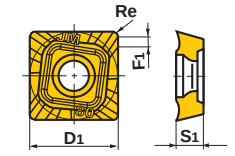
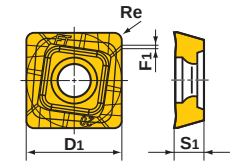
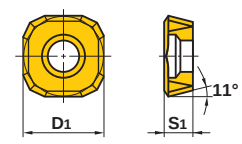
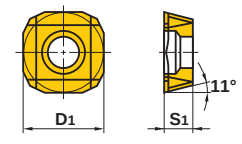
✱1 Grade UTi20T is "E".

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
○ : Inventory maintained. (Available from spring 2009) (10 inserts in one case)
▲ : Inventory maintained. To be replaced by new products. (10 inserts in one case)

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round **F :** Sharp

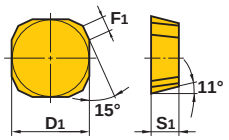
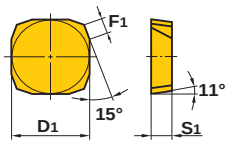
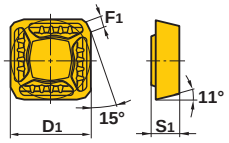
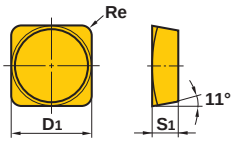
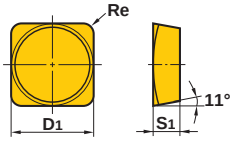
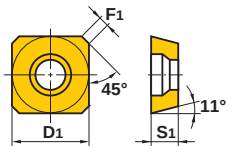
Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	MC5020	F5010	F5020	VP15TF	VP30RT	NX2525	NX4545	HTi10	HTi05T	D_1	S_1	F_1	Re	
ASX400 ⇒C086	**SOET12T308PEER-JL**	E	E	●				●	●		●			12.7	3.97	1.4	0.8	
ASX400 ⇒C086	**SOGT12T308PEFR-JP**	G	F									●		12.7	3.97	1.4	0.8	
ASX400 ⇒C086	**SOMT12T308PEER-JH**	M	E	●	○	●	●	●	●					12.7	3.97	1.4	0.8	
ASX400 ⇒C086	**SOMT12T308PEER-JM**	M	E	●	○	●	●	●	●		●			12.7	3.97	1.4	0.8	 Right hand insert shown.
	12T308PEEL-JM	M	E					●						12.7	3.97	1.4	0.8	
ASX400 ⇒C086	**SOMT12T320PEER-FT**	M	E		○		●	●						12.7	3.97	0.5	2.0	
FF3000 ⇒C196	**SPCA53Z**	C	E							●				15.88	4.8	—	—	
FF3000 ⇒C196	**SPCG53Z**	C	F							●			●	15.88	4.8	—	—	

ROTATING INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Honing :
E : Round **F** : Sharp **T** : Chamfer

Shape	Order Number	Class	Honing	Coated F7030	Coated MC5020	Coated F5010	Coated F5020	Coated UP20M	Cermet NX2525	Cermet NX4545	Carbide UTi20T	Carbide HTi10	Carbide HTi05T	D1	S1	F1	Re	Geometry
Corner Angle 15°	**SPEN1203EDR**	E	T	▲					▲	▲				12.7	3.18	1.4	—	
	SPKN1203EDR	K	T ✱1	▲	○	▲		▲	▲		▲	▲		12.7	3.18	1.4	—	
	SPEN1504EDR	E	T											15.875	4.76	1.4	—	
	SPKN1504EDR	K	T ✱1					▲	▲	▲	▲	▲		15.875	4.76	1.4	—	
FBP415 ➲C083	**SPEN1203EEER1**	E	E		○	●	●					●		12.7	3.175	1.4	—	
	1203EEEL1	E	E		○	●	●					●		12.7	3.175	1.4	—	
	SPNN1203EEER1	N	E		○	●	●					●		12.7	3.175	1.4	—	
	1203EEEL1	N	E									□		12.7	3.175	1.4	—	
FBP415 ➲C083	**SPER1203EEER-JS**	E	E		○	●	●							12.7	3.175	1.4	—	
FP490 ➲C197	**SPEN424A**	E	F									●	●	12.7	3.18	—	1.6	
FP590 ➲C198	**SPEN535A**	E	F										●	15.875	4.76	—	2.0	
BSP ➲C144	**SPMB1204APT**	M	T					●			●			12.7	4.76	1.4	—	

Right hand insert shown.

Right hand insert shown.

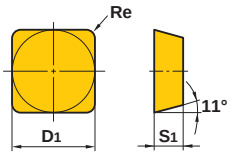
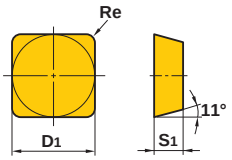
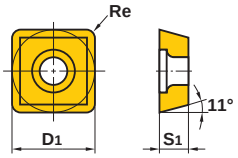
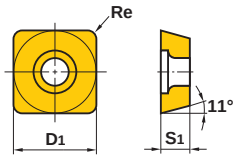
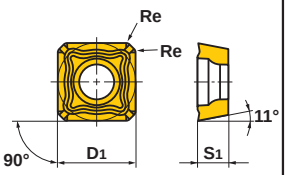
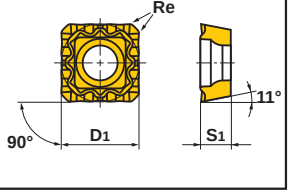
✱1 Grade HTi10 is "F".

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
○ : Inventory maintained. (Available from spring 2009) (10 inserts in one case)
▲ : Inventory maintained. To be replaced by new products. (10 inserts in one case)

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Honing :
E : Round **F :** Sharp **T :** Chamfer

Shape	Order Number	Class	Honing	Coated					Cermet		Carbide		Dimensions (mm)			Geometry
				F7030	MC5020	VP15TF	VP20RT	UP20M	NX2525	NX4545	UTi20T	HTi10	D1	S1	Re	
S400	SPMN120304	M	E ✱1								●	●	12.7	3.18	0.4	
	120304T	M	T						●				12.7	3.18	0.4	
	120308	M	E	●				●			●	●	12.7	3.18	0.8	
	120312	M	E ✱1	●							●	●	12.7	3.18	1.2	
	120408	M	E		○						●	●	12.7	4.76	0.8	
	120412	M	E		○						●		12.7	4.76	1.2	
	SPGN120304	G	E ✱1								●	●	12.7	3.18	0.4	
	120308	G	E ✱1					●			●	●	12.7	3.18	0.8	
	120312	G	F									●	12.7	3.18	1.2	
S500	SPMN150408	M	E								●		15.875	4.76	0.8	
	150412	M	E								●		15.875	4.76	1.2	
	SPGN150404	G	E								●		15.875	4.76	0.4	
	150408	G	E ✱1								●	●	15.875	4.76	0.8	
TBE1	SPMT120408-A	M	E					▲			▲		12.7	4.76	0.8	
CESP CFSP CGSP ➲C183	SPMW090304	M	E ✱2					●	●	●	●	●	9.525	3.18	0.4	
	090308	M	E ✱2					●	●	●	●	●	9.525	3.18	0.8	
	120304	M	E ✱2					●	●	●	●	●	12.7	3.18	0.4	
	120308	M	E ✱2					●	●	●	●	●	12.7	3.18	0.8	
SPX ➲C162	SPMX120408-JM	M	E			●	●						12.7	4.76	0.8	
SPX ➲C162	SPMX120408-WH	M	E			●	●						12.7	4.76	0.8	

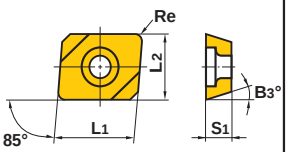
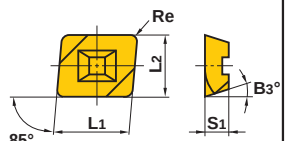
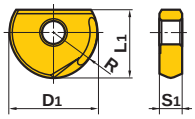
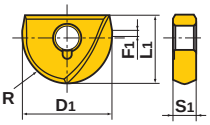
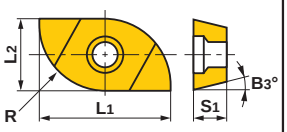
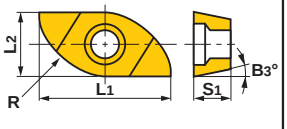
✱1 Grade HTi10 is "F".
✱2 Grade NX2525 and NX4545 are "T".

ROTATING INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round **F :** Sharp **S :** Chamfer + Hone

Shape	Order Number	Class	Honing	Coated F7030	Coated VP15TF	Coated VP20RT	Coated VP10MF	Coated VP30RT	Coated UP20M	Carbide UTi20T	L1	L2	D1	S1	F1	Re	R	B3	Geometry
SRE C146	**SRE06R**	E	E						●	●	8.5	6.35	—	2.3	—	0.4	—	15°	
	07R	E	E						●	●	10.6	7.94	—	2.8	—	0.4	—	15°	
	09R	E	E						●	●	12.7	9.525	—	3.5	—	0.4	—	15°	
SRE C146	**SRE12R**	E	S						●	●	12.7	9.525	—	4	—	0.8	—	20°	
SRB C169	**SRBT10**	—	F		○						8.5	—	10	2.6	—	—	5	—	
	12	—	F		○						10	—	12	3	—	—	6	—	
	16	—	F		○						12	—	16	4	—	—	8	—	
	20	—	F		○						15	—	20	5	—	—	10	—	
	25	—	F		○						18.5	—	25	6	—	—	12.5	—	
	30	—	F		○						22.5	—	30	7	—	—	15	—	
	32	—	F		○						23.5	—	32	7	—	—	16	—	
SRF C169	✱ **SRFT10**	—	F		●	●					8.5	—	10	2.6	0.5	—	5	—	
	✱ **12**	—	F		●	●					10	—	12	3	0.5	—	6	—	
	✱ **16**	—	F		●	●					12	—	16	4	0.5	—	8	—	
	✱ **20**	—	F		●	●					15	—	20	5	1	—	10	—	
	✱ **25**	—	F		●	●					18.5	—	25	6	1	—	12.5	—	
	✱ **30**	—	F		●	●					22.5	—	30	7	1	—	15	—	
	✱ **32**	—	F		●	●					23.5	—	32	7	1	—	16	—	
SRM2 C172	**SRG16C**	G	E		●						16	8.2	—	3.5	—	—	8	11°	
	20C	G	E	●	●						19	10.2	—	4.6	—	—	10	10°	
	25C	G	E	●	●						24	12.8	—	5.5	—	—	12.5	10°	
	30C	G	E	●	●						28	15.3	—	7	—	—	15	10°	
SRM2 C172	**SRG16E**	G	E		●						13.5	6.7	—	3.5	—	—	8	11°	
	20E	G	E	●	●						15.5	8.5	—	4.6	—	—	10	9°	
	25E	G	E	●	●						20.5	10.2	—	5.5	—	—	12.5	9°	
	30E	G	E	●	●						25.2	12.2	—	7	—	—	15	9°	

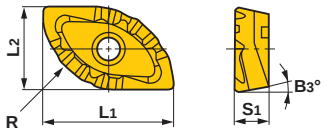
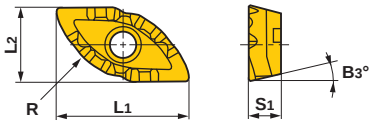
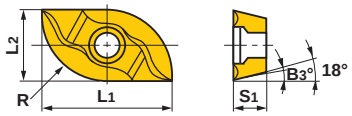
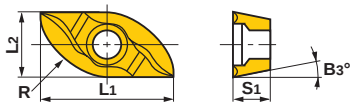
✱ 2 inserts in one case.

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained. (Available from spring 2009) (10 inserts in one case)

Work Material			
	P	Steel	
	M	Stainless Steel	
	K	Cast Iron	
	N	Non-ferrous Metal	
	S	Heat-resistant Alloy, Titanium Alloy	
	H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Honing :
E : Round

Shape	Order Number	Class	Honing	Coated			Dimensions (mm)					Geometry
				VP15TF	VP20RT	VP30RT	L_1	L_2	S_1	R	B_3	
SRM2ϕ40 ϕ50 ➲C178	✱ **SRG40C**	G	E	●	●	●	36	20.5	8.0	20	11°	
	✱ **50C**	G	E	●	●	●	40	26	8.5	25	11°	
SRM2ϕ40 ϕ50 ➲C178	✱ **SRG40E**	G	E	●	●	●	32	16.6	8.0	20	11°	
	✱ **50E**	G	E	●	●	●	35.8	20	8.5	25	11°	
SRM2 ➲C172	**SRM16C-M**	M	E	●			16	8.2	3.5	8	11°	
	20C-M	M	E	●			19	10.2	4.6	10	10°	
	25C-M	M	E	●			24	12.8	5.5	12.5	10°	
	30C-M	M	E	●			28	15.3	7	15	10°	
SRM2 ➲C172	**SRM16E-M**	M	E	●			13.5	6.7	3.5	8	11°	
	20E-M	M	E	●			15.5	8.5	4.6	10	9°	
	25E-M	M	E	●			20.5	10.2	5.5	12.5	9°	
	30E-M	M	E	●			25.2	12.2	7	15	9°	

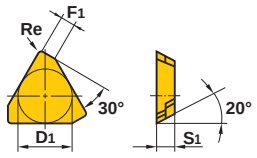
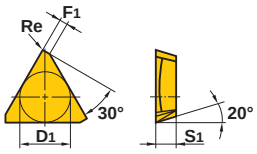
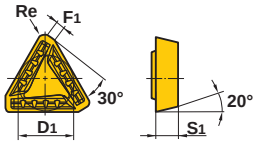
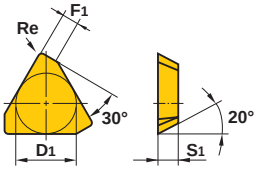
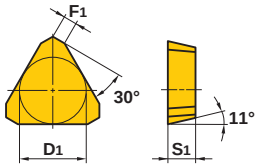
✱ 2 inserts in one case.

ROTATING INSERTS

Work Material		
	P	Steel
	M	Stainless Steel
	K	Cast Iron
	N	Non-ferrous Metal
	S	Heat-resistant Alloy, Titanium Alloy
	H	Hardened Steel

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round **F** : Sharp **S** : Chamfer + Hone
T : Chamfer **Z** : Strong

Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	UP20M	NX2525	NX4545	UTi20T	HTi10	D1	S1	F1	Re	
NSE300 ⇒C092 SE300	TEEN1603PEFR1	E	F										●	9.525	3.175	1.4	0.4	
	1603PEER1	E	E										●	9.525	3.175	1.4	0.4	
	1603PETR1	E	T		▲				●	●	●	●		9.525	3.175	1.4	0.4	
	1603PESR1	E	S	●		○	●	●						9.525	3.175	1.4	0.4	
NSE300 ⇒C092 SE300	TECN1603PEFR1W	C	F										●	9.525	3.175	1.4	0.4	Wall face finishing. 
	1603PEER1W	C	E										●	9.525	3.175	1.4	0.4	
	1603PETR1W	C	T							●	●	●		9.525	3.175	1.4	0.4	
NSE300 ⇒C092 NSE400 ⇒C094	TEER1603PEER-JS	E	E	●	▲							●		9.525	3.175	1.4	0.4	
	2204PEER-JS	E	E	●	▲							●		12.7	4.76	1.4	1.0	
NSE400 ⇒C094 SE400	TECN2204PEFR1	C	F										●	12.7	4.76	1.4	1.0	
	2204PEER1	C	E										●	12.7	4.76	1.4	1.0	
	2204PETR1	C	T							●	●	●		12.7	4.76	1.4	1.0	
	TEEN2204PEFR1	E	F										●	12.7	4.76	1.4	1.0	
	2204PEFL1	E	F										□	12.7	4.76	1.4	1.0	
	2204PEER1	E	E										●	12.7	4.76	1.4	1.0	
	2204PEEL1	E	E										□	12.7	4.76	1.4	1.0	
	2204PETR1	E	T		▲				●	●	●	●		12.7	4.76	1.4	1.0	
	2204PETL1	E	T						□			□		12.7	4.76	1.4	1.0	
	2204PESR1	E	S	●		○	●	●						12.7	4.76	1.4	1.0	
	TEKN2204PEER1	K	E										●	12.7	4.76	1.94	—	
	2204PESR1	K	S	●										12.7	4.76	1.94	—	
	2204PETR1	K	T		▲				●	●		●		12.7	4.76	1.94	—	
	2204PETR	K	T								●			12.7	4.76	1.94	—	
	2204PEZR	K	Z							●				12.7	4.76	1.94	—	Right hand insert shown.
Corner Angle 0°	TPEN1603PPR	E	T	▲						▲	▲			9.525	3.18	1.2	—	
	TPKN1603PPR	K	T ✱1	▲					▲	▲	▲	▲	▲	9.525	3.18	1.2	—	
	TPEN2204PDR	E	T ✱1	▲										12.7	4.76	1.4	—	
	TPKN2204PDR	K	T ✱1	▲					▲	▲	▲	▲	▲	12.7	4.76	1.4	—	

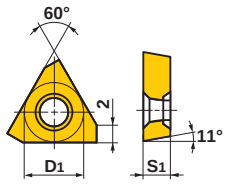
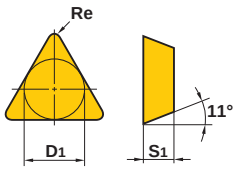
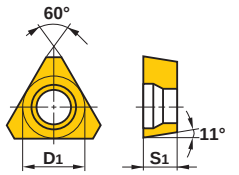
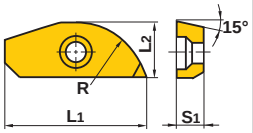
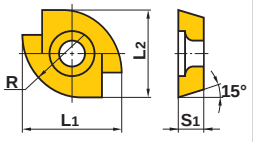
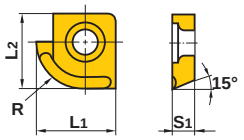
✱1 Grade F7030 and F620 are "E".

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
○ : Inventory maintained. (Available from spring 2009) (10 inserts in one case)
▲ : Inventory maintained. To be replaced by new products. (10 inserts in one case)

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting

Honing :
E : Round **F :** Sharp **T :** Chamfer

Shape	Order Number	Class	Honing	Coated				Cermet		Carbide			Dimensions (mm)						Geometry
				F7030	VP15TF	UP20M	AP10H	NX2525		UTi20T	HTi10	HTi05T	L1	L2	D1	S1	Re	R	
PMF ➲C189	**TPEW1303ZPER2**	E	E		●		●						—	—	7.94	3.18	—	—	
11°Positive	**TPMN160304**	M	E ✱1	●		□		●		●	●		—	—	9.525	3.18	0.4	—	
	160308	M	E ✱2	●		●		●		●	●	●	—	—	9.525	3.18	0.8	—	
	160312	M	E ✱1	□		●				●	□		—	—	9.525	3.18	1.2	—	
	220404	M	E							●			—	—	12.7	4.76	0.4	—	
	220408	M	E ✱1	□		●				●	●		—	—	12.7	4.76	0.8	—	
	220412	M	E ✱1	●						●	□		—	—	12.7	4.76	1.2	—	
VIPER	**TPNX1605N**	N	E							●			—	—	9.525	5	—	—	
FBE2	**UDC20F**	C	E		●			●		●			19.4	7.4	—	3.5	—	10	
	25F	C	E		●			●		●			24	9.3	—	4	—	12.5	
	30F	C	E		●			●		●			28.9	11.2	—	5	—	15	
TBE1	**UDK15**	K	E			□				●			13.6	11.5	—	3	—	7.5	
TBE1	**UDK10A**	K	E			□				●			8.5	7	—	2.5	—	5	

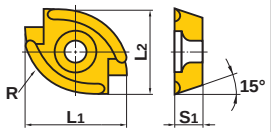
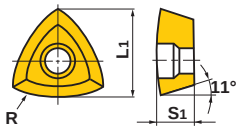
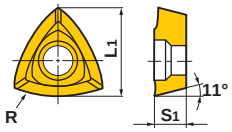
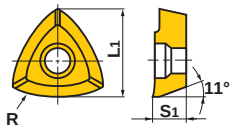
✱1 Grade HTi10 is "F".
✱2 Grade HTi10 and HTi05T are "F", Grade NX2525 is "T".

ROTATING INSERTS

Work Material		
	P	Steel
	M	Stainless Steel
	K	Cast Iron
	N	Non-ferrous Metal
	S	Heat-resistant Alloy, Titanium Alloy
	H	Hardened Steel

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round

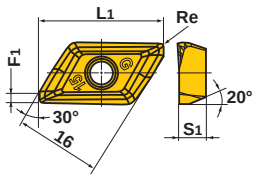
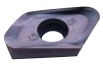
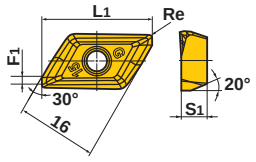
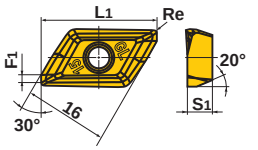
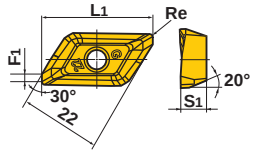
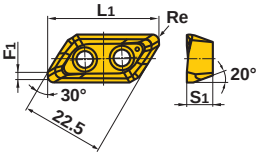
Shape	Order Number	Class	Honing	Coated			Carbide	Dimensions (mm)				Geometry
				VP15TF	UP20M	AP20M	UTi20T	L_1	L_2	S_1	R	
TBE1	**UDK15A**	K	E		□		●	13.6	11.5	3	7.5	
TRM4 ➲C180	**UPM40**	M	E	●		●		13.2	—	4.8	20	
	50	M	E	●		●		16.5	—	6	25	
TRM4 ➲C180	**UPM50P0**	M	E	●		□		16.5	—	5.5	25	
TRM4 ➲C180	**UPM40P1**	M	E	●		●		13.2	—	4.4	20	
	50P1	M	E	●		●		16.5	—	5.5	25	

● : Inventory maintained. (10 inserts in one case) □ : Non stock, produced to order only.

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round **F :** Sharp

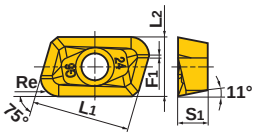
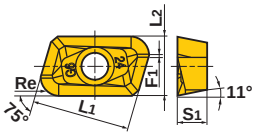
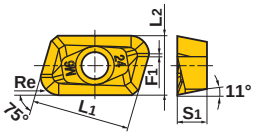
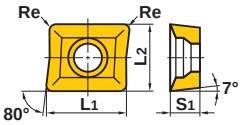
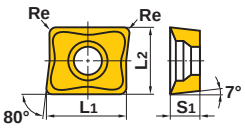
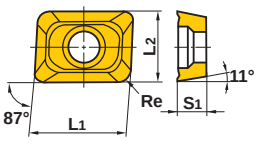
Shape	Order Number	Class	Honing	Coated		Carbide	Dimensions (mm)				Geometry
				VP15TF	LC15TF	TF15	L_1	S_1	F_1	Re	
BXD4000 ⇒C124	**XDGT1550PDER-G04**	G	E	●			22	5	1.5	0.4	
	1550PDER-G08	G	E	●			22	5	1.1	0.8	
	1550PDER-G12	G	E	●			22	5	0.7	1.2	
	1550PDER-G16	G	E	●			22	5	0.4	1.6	
	**1550PDER-G20**	G	E	●			21.7	5	0.2	2.0	
	1550PDER-G30	G	E	●			20	5	0.6	3.0	
	1550PDER-G32	G	E	●			20	5	0.4	3.2	
	1550PDER-G40	G	E	●			19	5	0.5	4.0	
	1550PDER-G50	G	E	●			18	5	0.4	5.0	
BXD4000 ⇒C124	**XDGT1550PDFR-G04**	G	F		●	●	22	5	1.5	0.4	
	1550PDFR-G08	G	F		●	●	22	5	1.1	0.8	
	1550PDFR-G12	G	F		●	●	22	5	0.7	1.2	
	1550PDFR-G16	G	F		●	●	22	5	0.4	1.6	
	1550PDFR-G20	G	F		●	●	21.7	5	0.2	2.0	
	1550PDFR-G30	G	F		●	●	20	5	0.6	3.0	
	1550PDFR-G32	G	F		●	●	20	5	0.4	3.2	
	1550PDFR-G40	G	F		●	●	19	5	0.5	4.0	
	1550PDFR-G50	G	F		●	●	18	5	0.4	5.0	
BXD4000 ⇒C124	**XDGT1550PDFR-GL04**	G	F			●	22	5	1.5	0.4	
	1550PDFR-GL08	G	F			●	22	5	1.1	0.8	
BXD7000	**XDGT2206PDFR-G08**	G	F		□	●	30	6.35	2.0	0.8	
	2206PDFR-G16	G	F		□	●	30	6.35	1.2	1.6	
	2206PDFR-G20	G	F		□	●	30	6.35	0.8	2.0	
	2206PDFR-G30	G	F		□	●	29	6.35	0.6	3.0	
	2206PDFR-G40	G	F		□	●	27.5	6.35	0.9	4.0	
	2206PDFR-G50	G	F		□	●	27	6.35	0.4	5.0	
AXD7000 ⇒C120	**XDGX227008PDFR-GL**	G	F		□	●	30	7	2.0	0.8	
	227016PDFR-GL	G	F		□	●	30	7	1.2	1.6	
	227020PDFR-GL	G	F		□	●	30	7	0.8	2.0	
	227030PDFR-GL	G	F		□	●	28.8	7	0.8	3.0	
	227032PDFR-GL	G	F		□	●	28.8	7	0.6	3.2	
	227040PDFR-GL	G	F		□	●	27.5	7	0.9	4.0	
	227050PDFR-GL	G	F		□	●	27	7	0.4	5.0	

ROTATING INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◕ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **F :** Sharp

Shape	Order Number	Class	Honing	Coated F7030	Coated VP15TF	Coated UP20M	Cermet NX2525	Carbide UTi20T	Carbide HTi10	L1	L2	S1	F1	Re	Geometry
BAP3500 ➲C096	**XPGT13T3PDER-G1**	G	E		●					13	7.9	3.97	1.6	0.4	
	13T3PDER-G2	G	E		●					13	7.9	3.97	1.2	0.8	
	13T3PDER-G6	G	E		●					13	7.9	3.97	0.4	2.4	
	13T3PDER-G75	G	E		●					13	7.9	3.97	0.4	3.0	
	13T3PDER-G8	G	E		●					13	7.9	3.97	0.4	3.2	
BAP3500 ➲C096	**XPGT13T3PDFR-G1**	G	F						●	13	7.9	3.97	1.6	0.4	
	13T3PDFR-G2	G	F						●	13	7.9	3.97	1.2	0.8	
	13T3PDFR-G6	G	F						●	13	7.9	3.97	0.4	2.4	
	13T3PDFR-G75	G	F						●	13	7.9	3.97	0.4	3.0	
	13T3PDFR-G8	G	F						●	13	7.9	3.97	0.4	3.2	
BAP3500 ➲C096	**XPMT13T3PDER-M1**	M	E	●	●					13	7.9	3.97	1.6	0.4	
	13T3PDER-M2	M	E	●	●					13	7.9	3.97	1.2	0.8	
	13T3PDER-M6	M	E	●	●					13	7.9	3.97	0.4	2.4	
	13T3PDER-M75	M	E	●	●					13	7.9	3.97	0.4	3.0	
	13T3PDER-M8	M	E	●	●					13	7.9	3.97	0.4	3.2	
DCCC ➲C166	**ZCMX083508ER-A**	M	E	□				●		10.4	7.94	3.5	–	0.8	
	09T308ER-A	M	E	●		●	□	●		12	9.525	3.97	–	0.8	
DCCC ➲C166	**ZCMX09T308ER-B**	M	E	□		□		●		12	9.525	3.97	–	0.8	
BAP300 Under-cut type ➲C105	**ZRM0603R-M3**	M	E		●					8.5	6.35	3.18	–	1.2	
	0603R-M4	M	E		●					8.5	6.35	3.18	–	1.6	
	0603R-M5	M	E		●					8.5	6.35	3.18	–	2.0	

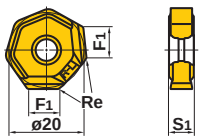
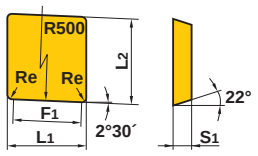
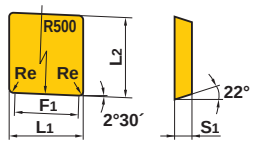
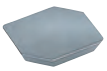
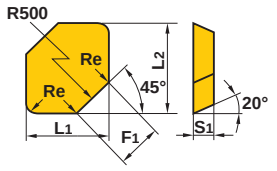
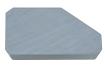
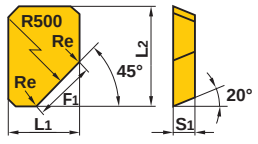
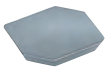
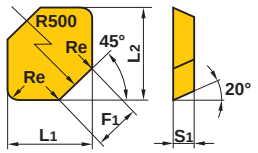
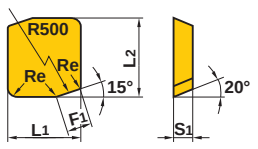
● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained. (Available from spring 2009) (10 inserts in one case)
□ : Non stock, produced to order only.

WIPER INSERTS

Work Material			MC5020	NX2525	HTi05T
	P	Steel		●	
	M	Stainless Steel		○	
	K	Cast Iron	◐	●	●
	N	Non-ferrous Metal			●
	S	Heat-resistant Alloy, Titanium Alloy			
	H	Hardened Steel			

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **F :** Sharp **T :** Chamfer

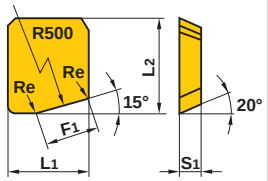
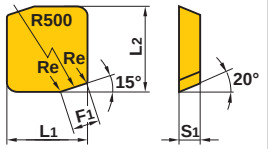
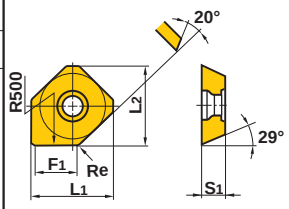
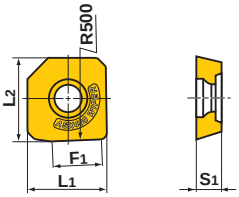
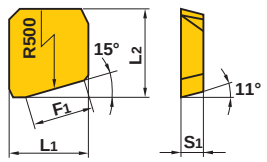
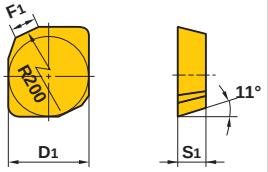
Shape	Order Number	Class	Honing	Coated MC5020	Cermet NX2525	Carbide HTi05T	Dimensions (mm) L_1	L_2	S_1	F_1	Re	Geometry
AHX640W ➲C080	**WNEU2006ZEN7C-WK**	E	E	○			—	—	6.55	7.4	0.8	
SE300	**WEC300PEER9C**	C	E			□	10.0	14.0	3.175	9.2	0.4	
SE400	**WEC400PEER10C**	C	E			□	12.0	17.5	4.76	10	0.4	
	400PEEL10C	C	E			□	12.0	17.5	4.76	10	0.4	Right hand insert shown.
SE445 ➲C070 **LSE445** ➲C072 	**WEC42AFFR5C**	C	F			●	12.7	15.33	3.18	5	1.0	
	42AFFL5C	C	F			□	12.7	15.33	3.18	5	1.0	
	42AFER5C	C	E			●	12.7	15.33	3.18	5	1.0	
	42AFEL5C	C	E			□	12.7	15.33	3.18	5	1.0	
	42AFTR5C	C	T		●		12.7	15.33	3.18	5	1.0	Right hand insert shown.
SE445 ➲C070 **LSE445** ➲C072 	**WEC42AFER10C**	C	E			●	12.7	18.816	3.18	10	1.0	
	42AFEL10C	C	E			□	12.7	18.816	3.18	10	1.0	Right hand insert shown.
SE545 ➲C074 	**WEC53AFER5C**	C	E			●	15.875	18.505	4.76	5	1.0	
	53AFEL5C	C	E			□	15.875	18.505	4.76	5	1.0	
	53AFTR5C	C	T		●		15.875	18.505	4.76	5	1.0	Right hand insert shown.
SE415 ➲C076	**WEC42EFFR5C**	C	F			□	12.7	13.728	3.18	5	1.0	
	42EFFL5C	C	F			□	12.7	13.728	3.18	5	1.0	
	42EFER5C	C	E			●	12.7	13.728	3.18	5	1.0	
	42EFEL5C	C	E			□	12.7	13.728	3.18	5	1.0	
	42EFTR5C	C	T		●		12.7	13.728	3.18	5	1.0	Right hand insert shown.

WIPER INSERTS

Work Material		
	P	Steel
	M	Stainless Steel
	K	Cast Iron
	N	Non-ferrous Metal
	S	Heat-resistant Alloy, Titanium Alloy
	H	Hardened Steel

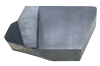
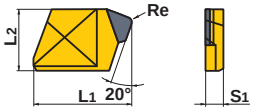
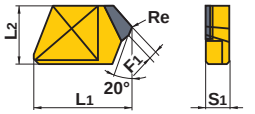
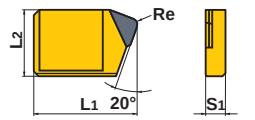
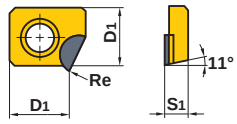
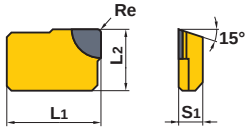
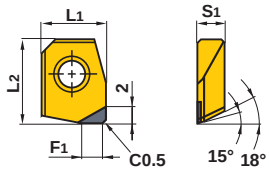
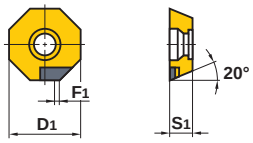
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting

Honing :
E : Round **F :** Sharp **T :** Chamfer

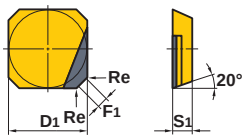
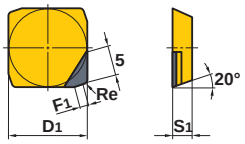
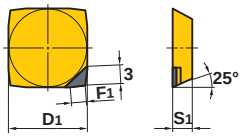
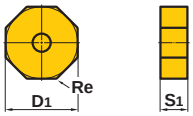
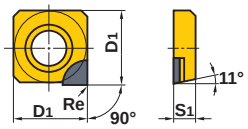
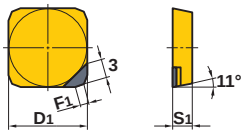
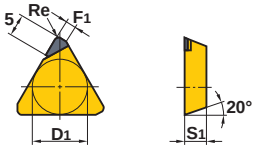
Shape	Order Number	Class	Honing	Cermet NX2525	Carbide HTi10T	Carbide HTi05T	L1	L2	D1	S1	F1	Re	Geometry
SE415 ➲C076	**WEC42EFFR10C**	C	F			□	12.7	14.99	—	3.18	10	1.0	
	42EFFL10C	C	F			□	12.7	14.99	—	3.18	10	1.0	
	42EFER10C	C	E			●	12.7	14.99	—	3.18	10	1.0	
	42EFEL10C	C	E			□	12.7	14.99	—	3.18	10	1.0	
													Right hand insert shown.
SE515 ➲C078	**WEC53EFER5C**	C	E			●	15.875	16.903	—	4.76	5	1.0	
	53EFEL5C	C	E			□	15.875	16.903	—	4.76	5	1.0	
	53EFTR5C	C	T	●			15.875	16.903	—	4.76	5	1.0	
													Right hand insert shown.
ASX445 ➲C064	**WEEW13T3AGER8C**	E	E			●	16.48	16.6	—	3.97	8.2	1.5	
	13T3AGTR8C	E	T	●			16.48	16.6	—	3.97	8.1	1.5	
ASX400 ➲C086	**WOEW12T308PEER8C**	E	E			●	12.5	13.2	—	3.97	8	0.8	
	12T308PETR8C	E	T	●			12.5	13.2	—	3.97	8	0.8	
FBP415 ➲C083 **QBP415**	**WPC42EEER10C**	C	E			●	12.7	15.163	—	3.175	10	—	
	42EEEL10C	C	E			●	12.7	15.163	—	3.175	10	—	
													Right hand insert shown.
P425	**WPC42W3GR**	C	F		▲		—	—	12.7	3.2	6	—	

● : Inventory maintained in Japan. (10 inserts in one case) (CBN and PCD inserts are available in 1 piece in one case)
□ : Non stock, produced to order only.
▲ : Inventory maintained. To be replaced by new products.
(10 inserts in one case) (CBN and PCD inserts are available in 1 piece in one case)

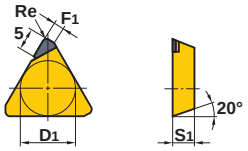
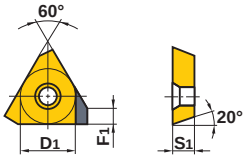
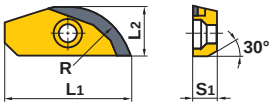
CBN AND PCD

Shape	Order Number	Class	CBN	PCD	Dimensions (mm)						Geometry
			MB730	MD220	L_1	L_2	D_1	S_1	F_1	Re	
NF10000 C195 **QF10000** 	**GDCN2004PDFR3**	C		●	20	12.7	–	4.76	–	1.2	
NR10000 C195	**GDCN2004ZDTR1**	C		●	20	12.7	–	4.76	1.4	0.8	
AF10000	**GDCN2004PDR**	C		●	20	12.7	–	4.76	–	1.2	
AF3000	**GPEA432R**	E		□	–	–	12.7	4.76	–	0.8	 Right hand insert shown.
	432L	E		□	–	–	12.7	4.76	–	0.8	
AF5000	**LDCN190412R**	C	●	●	19.05	12.7	–	4.76	–	1.2	 Right hand insert shown.
	190412L	C		●	19.05	12.7	–	4.76	–	1.2	
V10000 C194	**NP-GDCW1240PDFR2**	C		●	9.5	12	–	4	2	–	
OCTACUT C148	**OEMX12T3ETR1**	M	●		–	–	12.7	3.97	1	–	

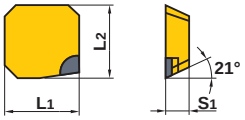
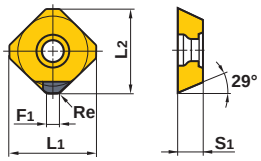
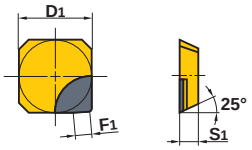
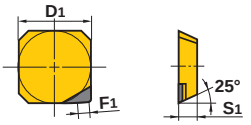
CBN AND PCD

Shape	Order Number	Class	CBN		PCD	Dimensions (mm)				Geometry
			MB710	CB5030	MD220	D1	S1	F1	Re	
SE445 C070	**SECN1203AFFR1**	C			●	12.7	3.18	1.4	1.0	
SE415 C076	**SECN1203EFFR1**	C			●	12.7	3.18	1.4	1.0	
BF407 C084	**SFCN1203ZFFR2**	C			●	12.7	3.175	2.4	–	
AOX445 C082	**SL-ONEN120404ASN**	E		○		12.7	4.76	–	0.4	
AF3000	**SPEA422R**	E			●	12.7	3.18	–	0.8	 Right hand insert shown.
	422L	E			●	12.7	3.18	–	0.8	
FBP415 C083	**SPEN1203EETR1**	E	●			12.7	3.175	1.4	–	
SE300	**TECN1603PEFR1**	C			●	9.525	3.175	1.4	0.4	

● : Inventory maintained in Japan. (1 insert in one case)
○ : Inventory maintained. (Available from spring 2009) (1 insert in one case)

Shape	Order Number	Class	CBN		PCD	Dimensions (mm)							Geometry
			MB710	MB730	MD220	L_1	L_2	D_1	S_1	F_1	R	Re	
SE400	**TECN2204PEFR1**	C			●	–	–	12.7	4.76	1.4	–	1.0	
PMF C189	**TPEW1303ZPTR2**	E	●			–	–	7.94	3.18	2	–	–	
FBE2	**UDC20F**	C		●		19.4	7.4	–	3.5	–	10.0	–	
	25F	C		●		24	9.3	–	4	–	12.5	–	
	30F	C		●		28.9	11.2	–	5	–	15.0	–	

CBN AND PCD WITH WIPER

Shape	Order Number	Class	CBN MB710	PCD MD220	L1	L2	D1	S1	F1	Re	Geometry
E404	WEC42W11R	C		●	12.4	12.806	—	3.18	—	—	 Right hand insert shown.
	42W11L	C		□	12.4	12.806	—	3.18	—	—	
ASX445 ➲C064	WEEW13T3AGFR3C	E		●	16.48	16.6	—	3.97	—	1.5	
	13T3AGTR3C	E	●		16.48	16.6	—	3.97	—	1.5	
BF407 ➲C084	WFC42ZFER2	C		●	—	—	12.4	3.175	2.4	—	
	42ZFEL2	C		□	—	—	12.4	3.175	2.4	—	
BF407 ➲C084	NP-WFC42ZFER2	C		●	—	—	12.4	3.175	2.4	—	 Right hand insert shown.

● : Inventory maintained in Japan. (1 insert in one case) □ : Non stock, produced to order only.

DRILLING INSERTS

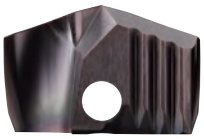
Shape	Order Number	Class	Coated						Dimensions (mm)			Geometry
			VP15TF	UP20M	GP20M	UE6020	US735	F5010	D_1	S_1	Re	
TAF D128	**GCMT040204-U1**	M		●					–	2.38	0.4	**U1** Breaker
	GPMT060204-U1	M		●		●	●	●	5.56	2.38	0.4	
	070204-U1	M		●		●	●	●	6.35	2.38	0.4	
	090304-U1	M		●		●	●	●	7.94	3.18	0.4	
	11T308-U1	M		●		●	●	●	9.525	3.97	0.8	
	140408-U1	M		●		●	●	●	12.7	4.76	0.8	
TAF D128	**GCMT040204-U2**	M	●		●				–	2.38	0.4	**U2** Breaker
	GPMT060204-U2	M	●	●		●	●	●	5.56	2.38	0.4	
	070204-U2	M	●	●		●	●	●	6.35	2.38	0.4	
	090304-U2	M	●	●		●	●	●	7.94	3.18	0.4	
	11T308-U2	M	●	●		●	●	●	9.525	3.97	0.8	
	140408-U2	M	●	●		●	●	●	12.7	4.76	0.8	
TAF D128	**GPMT060204-U3**	M		●		●	●	●	5.56	2.38	0.4	**U3** Breaker
	070204-U3	M		●		●	●	●	6.35	2.38	0.4	
	090304-U3	M		●		●	●	●	7.94	3.18	0.4	
	11T308-U3	M		●		●	●	●	9.525	3.97	0.8	
	140408-U3	M		●		●	●	●	12.7	4.76	0.8	

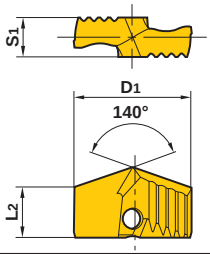
DRILLING INSERTS

Applicable Drill Shape Geometry

TAW H Type

D112





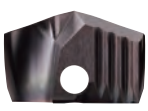
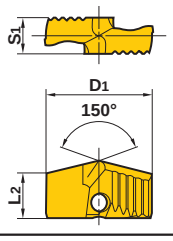
Order Number	Coated VP15TF	Coated VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWNH1400T	●	□	14.0	7.6	5.0	TAWSNH 1400S16
1410T	●	□	14.1	7.6	5.0	
1420T	●	□	14.2	7.6	5.0	TAWMNH 1400S16
1430T	●	□	14.3	7.6	5.0	
1440T	●	□	14.4	7.6	5.0	TAWLNH 1400S16
1450T	●	□	14.5	7.5	5.0	
1460T	●	□	14.6	7.5	5.0	
1470T	●	□	14.7	7.5	5.0	TAWSNH 1500S20
1480T	●	□	14.8	7.5	5.0	
1490T	●	□	14.9	7.5	5.0	TAWMNH 1500S20
1500T	●	□	15.0	7.4	5.0	
1510T	●	□	15.1	7.4	5.0	TAWLNH 1500S20
1520T	●	□	15.2	7.4	5.0	
1530T	●	□	15.3	7.4	5.0	
1540T	●	□	15.4	7.4	5.0	
1550T	●	□	15.5	7.9	6.0	
1560T	●	□	15.6	7.9	6.0	
1570T	●	□	15.7	7.9	6.0	TAWSN 1600S20
1580T	●	□	15.8	7.9	6.0	
1590T	●	□	15.9	7.9	6.0	TAWMN 1600S20
1600T	●	□	16.0	7.8	6.0	
1610T	●	□	16.1	7.8	6.0	TAWLN 1600S20
1620T	●	□	16.2	7.8	6.0	
1630T	●	□	16.3	7.8	6.0	
1640T	●	□	16.4	7.8	6.0	
1650T	●	□	16.5	7.7	6.0	
1660T	●	□	16.6	7.7	6.0	
1670T	●	□	16.7	7.7	6.0	TAWSN 1700S20
1680T	●	□	16.8	7.7	6.0	
1690T	●	□	16.9	7.7	6.0	TAWMN 1700S20
1700T	●	□	17.0	7.6	6.0	
1710T	●	□	17.1	7.6	6.0	TAWLN 1700S20
1720T	●	□	17.2	7.6	6.0	
1730T	●	□	17.3	7.6	6.0	
1740T	●	□	17.4	7.6	6.0	
1750T	●	□	17.5	7.5	6.0	
1760T	●	□	17.6	7.5	6.0	
1770T	●	□	17.7	7.5	6.0	TAWSN 1800S20
1780T	●	□	17.8	7.5	6.0	
1790T	●	□	17.9	7.5	6.0	TAWMN 1800S20
1800T	●	□	18.0	7.4	6.0	
1810T	●	□	18.1	7.4	6.0	TAWLN 1800S20
1820T	●	□	18.2	7.4	6.0	
1830T	●	□	18.3	7.4	6.0	
1840T	●	□	18.4	7.4	6.0	

Order Number	Coated VP15TF	Coated VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWNH1850T	●	□	18.5	9.3	7.0	
1860T	●	□	18.6	9.3	7.0	
1870T	●	□	18.7	9.3	7.0	TAWSN 1900S25
1880T	●	□	18.8	9.3	7.0	
1890T	●	□	18.9	9.3	7.0	TAWMN 1900S25
1900T	●	□	19.0	9.2	7.0	
1910T	●	□	19.1	9.2	7.0	TAWLN 1900S25
1920T	●	□	19.2	9.2	7.0	
1930T	●	□	19.3	9.2	7.0	
1940T	●	□	19.4	9.2	7.0	
1950T	●	□	19.5	9.1	7.0	
1960T	●	□	19.6	9.1	7.0	
1970T	●	□	19.7	9.1	7.0	TAWSN 2000S25
1980T	●	□	19.8	9.1	7.0	
1990T	●	□	19.9	9.1	7.0	TAWMN 2000S25
2000T	●	□	20.0	9.0	7.0	
2010T	□	□	20.1	9.0	7.0	TAWLN 2000S25
2020T	□	□	20.2	9.0	7.0	
2030T	□	□	20.3	9.0	7.0	
2040T	□	□	20.4	9.0	7.0	
2050T	●	□	20.5	8.9	7.0	
2060T	□	□	20.6	8.9	7.0	
2070T	□	□	20.7	8.9	7.0	TAWSN 2100S25
2080T	□	□	20.8	8.9	7.0	
2090T	□	□	20.9	8.9	7.0	TAWMN 2100S25
2100T	●	□	21.0	8.8	7.0	
2110T	□	□	21.1	8.8	7.0	TAWLN 2100S25
2120T	□	□	21.2	8.8	7.0	
2130T	□	□	21.3	8.8	7.0	
2140T	□	□	21.4	8.8	7.0	
2150T	●	□	21.5	10.6	8.0	
2160T	□	□	21.6	10.6	8.0	
2170T	□	□	21.7	10.6	8.0	TAWSN 2200S25
2180T	□	□	21.8	10.6	8.0	
2190T	□	□	21.9	10.6	8.0	TAWMN 2200S25
2200T	●	□	22.0	10.5	8.0	
2210T	□	□	22.1	10.5	8.0	TAWLN 2200S25
2220T	□	□	22.2	10.5	8.0	
2230T	□	□	22.3	10.5	8.0	
2240T	□	□	22.4	10.5	8.0	
2250T	●	□	22.5	10.4	8.0	TAWSN 2300S25
2260T	□	□	22.6	10.4	8.0	
2270T	□	□	22.7	10.4	8.0	TAWMN 2300S25
2280T	□	□	22.8	10.4	8.0	
2290T	□	□	22.9	10.4	8.0	TAWLN 2300S25

● : Inventory maintained in Japan. (2 inserts in one case) □ : Non stock, produced to order only.

Order Number	Coated VP15TF	Coated VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWNH2300T	●	□	23.0	10.3	8.0	TAWSN 2300S25
2310T	□	□	23.1	10.3	8.0	TAWMN 2300S25
2320T	□	□	23.2	10.3	8.0	TAWLN 2300S25
2330T	□	□	23.3	10.3	8.0	
2340T	□	□	23.4	10.3	8.0	
2350T	●	□	23.5	10.2	8.0	
2360T	□	□	23.6	10.2	8.0	
2370T	□	□	23.7	10.2	8.0	TAWSN 2400S32
2380T	□	□	23.8	10.2	8.0	
2390T	□	□	23.9	10.2	8.0	TAWMN 2400S32
2400T	●	□	24.0	10.1	8.0	
2410T	□	□	24.1	10.1	8.0	TAWLN 2400S32
2420T	□	□	24.2	10.1	8.0	
2430T	□	□	24.3	10.1	8.0	
2440T	□	□	24.4	10.1	8.0	
2450T	●	□	24.5	11.7	9.0	
2460T	□	□	24.6	11.7	9.0	
2470T	□	□	24.7	11.7	9.0	TAWSN 2500S32
2480T	□	□	24.8	11.7	9.0	
2490T	□	□	24.9	11.7	9.0	TAWMN 2500S32
2500T	●	□	25.0	11.6	9.0	
2510T	□	□	25.1	11.6	9.0	TAWLN 2500S32
2520T	□	□	25.2	11.6	9.0	
2530T	□	□	25.3	11.6	9.0	
2540T	□	□	25.4	11.6	9.0	
2550T	●	□	25.5	11.5	9.0	
2560T	□	□	25.6	11.5	9.0	
2570T	□	□	25.7	11.5	9.0	TAWSN 2600S32
2580T	□	□	25.8	11.5	9.0	
2590T	□	□	25.9	11.5	9.0	TAWMN 2600S32
2600T	●	□	26.0	11.4	9.0	
2610T	□	□	26.1	11.4	9.0	TAWLN 2600S32
2620T	□	□	26.2	11.4	9.0	
2630T	□	□	26.3	11.4	9.0	
2640T	□	□	26.4	11.4	9.0	

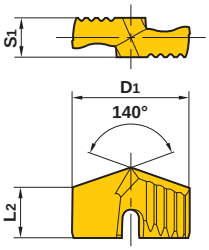
Order Number	Coated VP15TF	Coated VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWNH2650T	●	□	26.5	11.3	9.0	
2660T	□	□	26.6	11.3	9.0	
2670T	□	□	26.7	11.3	9.0	TAWSN 2700S32
2680T	□	□	26.8	11.3	9.0	
2690T	□	□	26.9	11.3	9.0	TAWMN 2700S32
2700T	●	□	27.0	11.2	9.0	
2710T	□	□	27.1	11.2	9.0	TAWLN 2700S32
2720T	□	□	27.2	11.2	9.0	
2730T	□	□	27.3	11.2	9.0	
2740T	□	□	27.4	11.2	9.0	
2750T	●	□	27.5	12.3	10.0	
2760T	□	□	27.6	12.3	10.0	
2770T	□	□	27.7	12.3	10.0	TAWSN 2800S32
2780T	□	□	27.8	12.3	10.0	
2790T	□	□	27.9	12.3	10.0	TAWMN 2800S32
2800T	●	□	28.0	12.2	10.0	
2810T	□	□	28.1	12.2	10.0	TAWLN 2800S32
2820T	□	□	28.2	12.2	10.0	
2830T	□	□	28.3	12.2	10.0	
2840T	□	□	28.4	12.2	10.0	
2850T	●	□	28.5	12.1	10.0	
2860T	□	□	28.6	12.1	10.0	
2870T	□	□	28.7	12.1	10.0	TAWSN 2900S32
2880T	□	□	28.8	12.1	10.0	
2890T	□	□	28.9	12.1	10.0	TAWMN 2900S32
2900T	●	□	29.0	12.0	10.0	
2910T	□	□	29.1	12.0	10.0	TAWLN 2900S32
2920T	□	□	29.2	12.0	10.0	
2930T	□	□	29.3	12.0	10.0	
2940T	□	□	29.4	12.0	10.0	
2950T	●	□	29.5	11.9	10.0	
2960T	□	□	29.6	11.9	10.0	
2970T	□	□	29.7	11.9	10.0	TAWSN 3000S32
2980T	□	□	29.8	11.9	10.0	
2990T	□	□	29.9	11.9	10.0	TAWMN 3000S32
3000T	●	□	30.0	11.8	10.0	
3010T	□	□	30.1	11.8	10.0	TAWLN 3000S32
3020T	□	□	30.2	11.8	10.0	
3030T	□	□	30.3	11.8	10.0	
3040T	□	□	30.4	11.8	10.0	

Applicable Drill Shape Geometry	Order Number	Coated VP15TF	Coated	Dimensions (mm) D1	L2	S1
TAW H Type D123  	**TAWBH2450T**	●		24.5	11.7	9.0
	2460T	□		24.6	11.7	9.0
	2470T	●		24.7	11.7	9.0
	2650T	□		26.5	11.3	9.0
	2670T	●		26.7	11.3	9.0

DRILLING INSERTS

Applicable Drill Shape Geometry

TAW U Type
➲D112



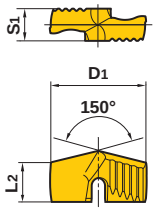
Order Number	Coated VP15TF	Coated VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWN1550T	●	□	15.5	7.9	6.0	
1560T	●	□	15.6	7.9	6.0	
1570T	●	□	15.7	7.9	6.0	TAWSN 1600S20
1580T	●	□	15.8	7.9	6.0	
1590T	●	□	15.9	7.9	6.0	TAWMN 1600S20
1600T	●	□	16.0	7.8	6.0	
1610T	●	□	16.1	7.8	6.0	TAWLN 1600S20
1620T	●	□	16.2	7.8	6.0	
1630T	●	□	16.3	7.8	6.0	
1640T	●	□	16.4	7.8	6.0	
1650T	●	□	16.5	7.7	6.0	
1660T	●	□	16.6	7.7	6.0	
1670T	●	□	16.7	7.7	6.0	TAWSN 1700S20
1680T	●	□	16.8	7.7	6.0	
1690T	●	□	16.9	7.7	6.0	TAWMN 1700S20
1700T	●	□	17.0	7.6	6.0	
1710T	●	□	17.1	7.6	6.0	TAWLN 1700S20
1720T	●	□	17.2	7.6	6.0	
1730T	●	□	17.3	7.6	6.0	
1740T	●	□	17.4	7.6	6.0	
1750T	●	□	17.5	7.5	6.0	
1760T	●	□	17.6	7.5	6.0	
1770T	●	□	17.7	7.5	6.0	TAWSN 1800S20
1780T	●	□	17.8	7.5	6.0	
1790T	●	□	17.9	7.5	6.0	TAWMN 1800S20
1800T	●	□	18.0	7.4	6.0	
1810T	●	□	18.1	7.4	6.0	TAWLN 1800S20
1820T	●	□	18.2	7.4	6.0	
1830T	●	□	18.3	7.4	6.0	
1840T	●	□	18.4	7.4	6.0	
1850T	●	□	18.5	9.3	7.0	
1860T	●	□	18.6	9.3	7.0	
1870T	●	□	18.7	9.3	7.0	TAWSN 1900S25
1880T	●	□	18.8	9.3	7.0	
1890T	●	□	18.9	9.3	7.0	TAWMN 1900S25
1900T	●	□	19.0	9.2	7.0	
1910T	●	□	19.1	9.2	7.0	TAWLN 1900S25
1920T	●	□	19.2	9.2	7.0	
1930T	●	□	19.3	9.2	7.0	
1940T	●	□	19.4	9.2	7.0	

Order Number	Coated VP15TF	Coated VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWN1950T	●	□	19.5	9.1	7.0	
1960T	●	□	19.6	9.1	7.0	
1970T	●	□	19.7	9.1	7.0	TAWSN 2000S25
1980T	●	□	19.8	9.1	7.0	
1990T	●	□	19.9	9.1	7.0	TAWMN 2000S25
2000T	●	□	20.0	9.0	7.0	
2010T	□	□	20.1	9.0	7.0	TAWLN 2000S25
2020T	□	□	20.2	9.0	7.0	
2030T	□	□	20.3	9.0	7.0	
2040T	□	□	20.4	9.0	7.0	
2050T	●	□	20.5	8.9	7.0	
2060T	□	□	20.6	8.9	7.0	
2070T	□	□	20.7	8.9	7.0	TAWSN 2100S25
2080T	□	□	20.8	8.9	7.0	
2090T	□	□	20.9	8.9	7.0	TAWMN 2100S25
2100T	●	□	21.0	8.8	7.0	
2110T	□	□	21.1	8.8	7.0	TAWLN 2100S25
2120T	□	□	21.2	8.8	7.0	
2130T	□	□	21.3	8.8	7.0	
2140T	□	□	21.4	8.8	7.0	
2150T	●	□	21.5	10.3	8.0	
2160T	□	□	21.6	10.3	8.0	
2170T	□	□	21.7	10.3	8.0	TAWSN 2200S25
2180T	□	□	21.8	10.3	8.0	
2190T	□	□	21.9	10.3	8.0	TAWMN 2200S25
2200T	●	□	22.0	10.2	8.0	
2210T	□	□	22.1	10.2	8.0	TAWLN 2200S25
2220T	□	□	22.2	10.2	8.0	
2230T	□	□	22.3	10.2	8.0	
2240T	□	□	22.4	10.2	8.0	
2250T	●	□	22.5	10.1	8.0	
2260T	□	□	22.6	10.1	8.0	
2270T	□	□	22.7	10.1	8.0	TAWSN 2300S25
2280T	□	□	22.8	10.1	8.0	
2290T	□	□	22.9	10.1	8.0	TAWMN 2300S25
2300T	●	□	23.0	10.0	8.0	
2310T	□	□	23.1	10.0	8.0	TAWLN 2300S25
2320T	□	□	23.2	10.0	8.0	
2330T	□	□	23.3	10.0	8.0	
2340T	□	□	23.4	10.0	8.0	

● : Inventory maintained in Japan. (2 inserts in one case) □ : Non stock, produced to order only.

Order Number	Coated VP15TF	Coated VP10H	Dimensions (mm) D_1	L_2	S_1	Applicable Holder
TAWN2350T	●	□	23.5	9.9	8.0	
2360T	□	□	23.6	9.9	8.0	
2370T	□	□	23.7	9.9	8.0	TAWSN 2400S32
2380T	□	□	23.8	9.9	8.0	
2390T	□	□	23.9	9.9	8.0	TAWMN 2400S32
2400T	●	□	24.0	9.8	8.0	
2410T	□	□	24.1	9.8	8.0	TAWLN 2400S32
2420T	□	□	24.2	9.8	8.0	
2430T	□	□	24.3	9.8	8.0	
2440T	□	□	24.4	9.8	8.0	
2450T	●	□	24.5	11.1	9.0	
2460T	□	□	24.6	11.1	9.0	
2470T	□	□	24.7	11.1	9.0	TAWSN 2500S32
2480T	□	□	24.8	11.1	9.0	
2490T	□	□	24.9	11.1	9.0	TAWMN 2500S32
2500T	●	□	25.0	11.0	9.0	
2510T	□	□	25.1	11.0	9.0	TAWLN 2500S32
2520T	□	□	25.2	11.0	9.0	
2530T	□	□	25.3	11.0	9.0	
2540T	□	□	25.4	11.0	9.0	
2550T	●	□	25.5	10.9	9.0	
2560T	□	□	25.6	10.9	9.0	
2570T	□	□	25.7	10.9	9.0	TAWSN 2600S32
2580T	□	□	25.8	10.9	9.0	
2590T	□	□	25.9	10.9	9.0	TAWMN 2600S32
2600T	●	□	26.0	10.8	9.0	
2610T	□	□	26.1	10.8	9.0	TAWLN 2600S32
2620T	□	□	26.2	10.8	9.0	
2630T	□	□	26.3	10.8	9.0	
2640T	□	□	26.4	10.8	9.0	
2650T	●	□	26.5	10.7	9.0	
2660T	□	□	26.6	10.7	9.0	
2670T	□	□	26.7	10.7	9.0	TAWSN 2700S32
2680T	□	□	26.8	10.7	9.0	
2690T	□	□	26.9	10.7	9.0	TAWMN 2700S32
2700T	●	□	27.0	10.6	9.0	
2710T	□	□	27.1	10.6	9.0	TAWLN 2700S32
2720T	□	□	27.2	10.6	9.0	
2730T	□	□	27.3	10.6	9.0	
2740T	□	□	27.4	10.6	9.0	

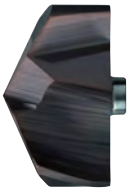
Order Number	Coated VP15TF	Coated VP10H	Dimensions (mm) D_1	L_2	S_1	Applicable Holder
TAWN2750T	●	□	27.5	12.1	10.0	
2760T	□	□	27.6	12.1	10.0	
2770T	□	□	27.7	12.1	10.0	TAWSN 2800S32
2780T	□	□	27.8	12.1	10.0	
2790T	□	□	27.9	12.1	10.0	TAWMN 2800S32
2800T	●	□	28.0	12.0	10.0	
2810T	□	□	28.1	12.0	10.0	TAWLN 2800S32
2820T	□	□	28.2	12.0	10.0	
2830T	□	□	28.3	12.0	10.0	
2840T	□	□	28.4	12.0	10.0	
2850T	●	□	28.5	11.9	10.0	
2860T	□	□	28.6	11.9	10.0	
2870T	□	□	28.7	11.9	10.0	TAWSN 2900S32
2880T	□	□	28.8	11.9	10.0	
2890T	□	□	28.9	11.9	10.0	TAWMN 2900S32
2900T	●	□	29.0	11.8	10.0	
2910T	□	□	29.1	11.8	10.0	TAWLN 2900S32
2920T	□	□	29.2	11.8	10.0	
2930T	□	□	29.3	11.8	10.0	
2940T	□	□	29.4	11.8	10.0	
2950T	●	□	29.5	11.7	10.0	
2960T	□	□	29.6	11.7	10.0	
2970T	□	□	29.7	11.7	10.0	TAWSN 3000S32
2980T	□	□	29.8	11.7	10.0	
2990T	□	□	29.9	11.7	10.0	TAWMN 3000S32
3000T	●	□	30.0	11.6	10.0	
3010T	□	□	30.1	11.6	10.0	TAWLN 3000S32
3020T	□	□	30.2	11.6	10.0	
3030T	□	□	30.3	11.6	10.0	
3040T	□	□	30.4	11.6	10.0	

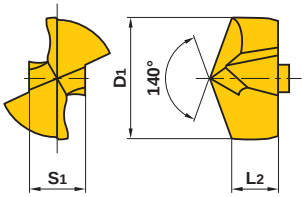
Applicable Drill Shape Geometry	Order Number	Coated VP15TF	Coated	Dimensions (mm) D_1	L_2	S_1
TAW U Type ➲D123 	**TAWB2450T**	●		24.5	11.1	9.0
	2460T	□		24.6	11.1	9.0
	2470T	●		24.7	11.1	9.0
	2650T	□		26.5	10.7	9.0
	2670T	●		26.7	10.7	9.0

DRILLING INSERTS

Applicable Drill Shape Geometry

STAW
➔D108





Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
STAWN1000TH	●	□	10.0	3.8	4.6	STAWSN1000S16 STAWMN1000S16
1010TH	●	□	10.1	3.8	4.6	
1020TH	●	□	10.2	3.8	4.6	
1030TH	●	□	10.3	3.8	4.6	
1040TH	●	□	10.4	3.8	4.6	
1050TH	●	□	10.5	4.0	4.8	STAWSN1050S16 STAWMN1050S16
1060TH	●	□	10.6	4.0	4.8	
1070TH	●	□	10.7	4.0	4.8	
1080TH	●	□	10.8	4.0	4.8	
1090TH	●	□	10.9	4.0	4.8	
1100TH	●	□	11.0	4.2	5.1	STAWSN1100S16 STAWMN1100S16
1110TH	●	□	11.1	4.2	5.1	
1120TH	●	□	11.2	4.2	5.1	
1130TH	●	□	11.3	4.2	5.1	
1140TH	●	□	11.4	4.2	5.1	
1150TH	●	□	11.5	4.4	5.3	STAWSN1150S16 STAWMN1150S16
1160TH	●	□	11.6	4.4	5.3	
1170TH	●	□	11.7	4.4	5.3	
1180TH	●	□	11.8	4.4	5.3	
1190TH	●	□	11.9	4.4	5.3	
1200TH	●	□	12.0	4.6	5.5	STAWSN1200S16 STAWMN1200S16
1210TH	●	□	12.1	4.6	5.5	
1220TH	●	□	12.2	4.6	5.5	
1230TH	●	□	12.3	4.6	5.5	
1240TH	●	□	12.4	4.6	5.5	
1250TH	●	□	12.5	4.8	5.8	STAWSN1250S16 STAWMN1250S16
1260TH	●	□	12.6	4.8	5.8	
1270TH	●	□	12.7	4.8	5.8	
1280TH	●	□	12.8	4.8	5.8	
1290TH	●	□	12.9	4.8	5.8	
1300TH	●	□	13.0	4.9	6.0	STAWSN1300S16 STAWMN1300S16
1310TH	●	□	13.1	4.9	6.0	
1320TH	●	□	13.2	4.9	6.0	
1330TH	●	□	13.3	4.9	6.0	
1340TH	●	□	13.4	4.9	6.0	
1350TH	●	□	13.5	5.1	6.2	STAWSN1350S16 STAWMN1350S16
1360TH	●	□	13.6	5.1	6.2	
1370TH	●	□	13.7	5.1	6.2	
1380TH	●	□	13.8	5.1	6.2	
1390TH	●	□	13.9	5.1	6.2	

● : Inventory maintained in Japan. (2 inserts in one case) □ : Non stock, produced to order only.

Memo

HOW TO READ THE STANDARD OF INDEXABLE MILLING

●How this section page is organized

①Organized according to the face milling cutting mode.
(Refer to the index on the next page.)

SCOPE OF AVAILABLE WORK MATERIAL
provides a graph depicting the scope of the available work material for machining.

PRODUCT FEATURES

CORNER ANGLE ICON

APPLICATION ICON
represents available machining applications, such as finishing and roughing.

TYPE/ NAME OF PRODUCT

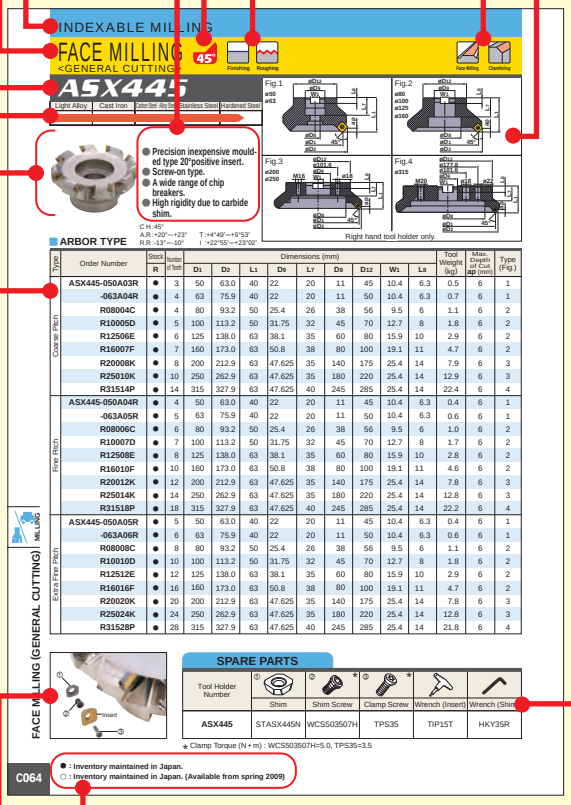
APPLICATION

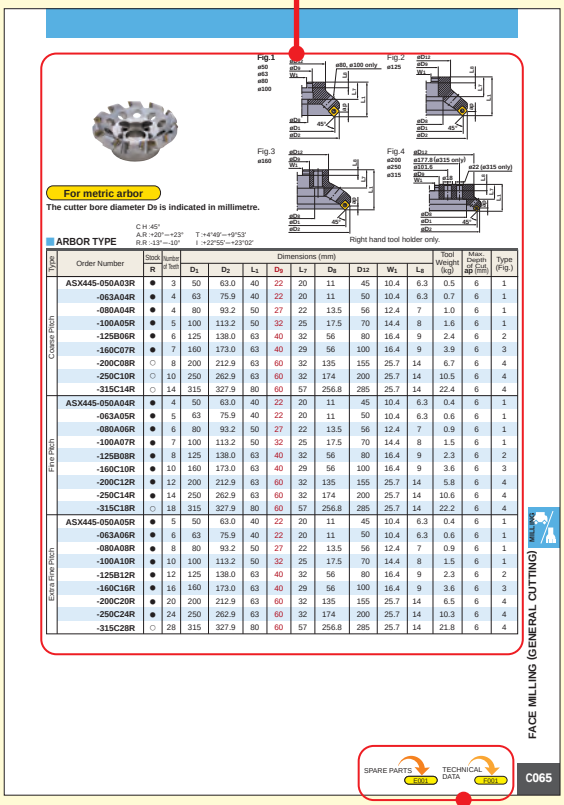
PRODUCT SECTION

CUTTING MODE ICON
represents available cutting modes, such as face milling and shoulder milling.

GEOMETRY

STANDARDS FOR APPLICABLE INSERTS
indicates stock status, dimensions, etc. for applicable inserts.





LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

INSERT SEAT LOCATION

PRODUCT STANDARDS
indicates tool types, order numbers, stock status (per right/left hand), dimensions, etc.

PHOTO OF PRODUCT

PAGE REFERENCE
·SPARE PARTS
·TECHNICAL DATA
indicates reference pages, including the above, on the right hand page of each double-page spread.

SPARE PARTS FOR MIILING TOOLS
indicates the names of the applicable spare parts.

●To Order : For title product, please specify ①order number and hand of tool (right/left).
For insert, please specify ①insert number and ②grade.

MILLING TOOLS

INDEXABLE MILLING

CLASSIFICATION ····· C056
CLASSIFICATION OF SCREW-IN TOOLS ··· C059
CLASSIFICATION OF END MILLS ··· C060
HOW TO SELECT AN END MILL ··· C062

STANDARD OF MILLING

FACE MILLING
ASX445 ····· C064
SE445 ····· C070
LSE445 ····· C072
SE545 ····· C074
SE415 ····· C076
SE515 ····· C078
AHX640W ····· C080
AOX445 ····· C082
FBP415 ····· C083
BF407 ····· C084
SG20 ····· C085

FACE MILLING (HIGH FEED)
V10000 ····· C194
NF10000 ····· C195
FF3000 ····· C196

SHOULDER MILLING
ASX400 ····· C086
NSE300,400 ····· C092
BAP300,400 ····· C098
BAP300UNDER-CUT TYPE ····· C105

MULTI FUNCTIONAL MILLING
APX3000 ····· C106
APX4000 ····· C112
BAP3500 ····· C096
AXD7000 ····· C120
BXD4000 ····· C124
AQX ····· C128
AJX ····· C136
BSP ····· C144
SRE ····· C146
OCTACUT ····· C148
ARX ····· C152
BRP ····· C156

DEEP SHOULDER MILLING
APX4000LONG CUTTING EDGE TYPE ·· C118
BAP300,400LONG CUTTING EDGE TYPE ·· C102
SPX ····· C162
DCCC ····· C166

BALL NOSE END MILLING
SRF,SRB ····· C169
SRM2 ····· C172
SRM2φ40,φ50 ····· C178
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RADIUS MILLING
BRE ····· C182

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T-SLOT MILLING
TSMP ····· C184

SPOT MILLING
CBJP,CBMP ····· C185

SLOT MILLING
KSMG ····· C186
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VERTICAL FEED MILLING
PMF ····· C189
PMR ····· C190

QUICK CHANGE TYPE
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FP590 ····· C198
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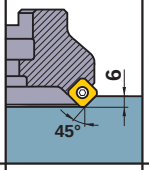
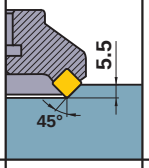
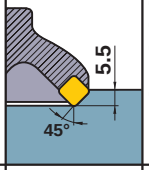
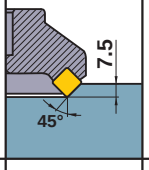
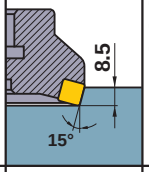
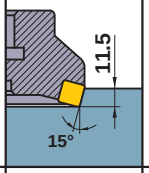
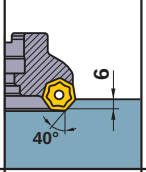
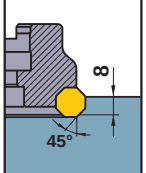
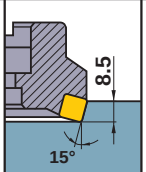
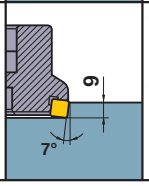
SETTING FIXTURE ····· C200

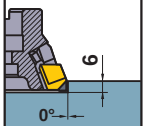
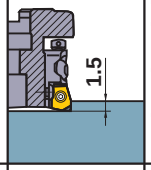
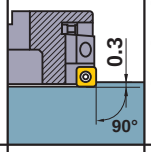
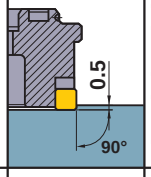
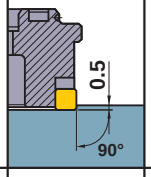
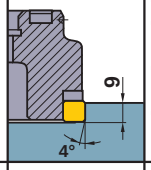
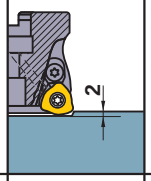
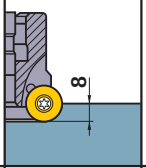
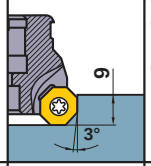
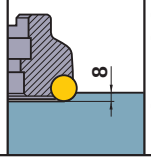
ARBOR STANDARDS
FOR PLUNGE MILLING ····· C191
FOR SCREW-IN TOOLS ····· C192
Qing SYSTEM ····· C201
MAXIMUM ALLOWABLE REVOLUTION FOR CUTTER ··· C202
LIST OF CUTTING EDGE DIAMETER TOLERANCES ··· C203

*Arranged by Alphabetical order

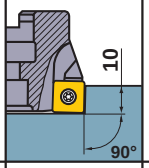
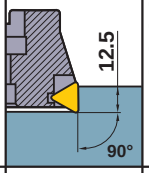
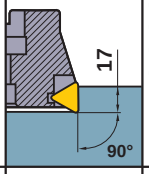
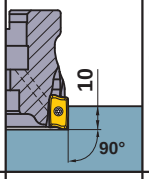
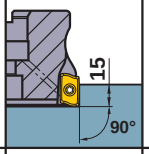
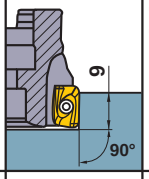
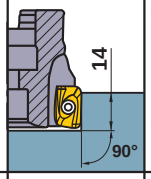
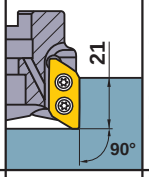
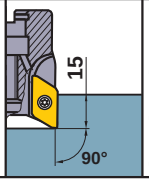
C080 AHX640W
C136 AJX
C082 AOX445
C106 APX3000
C112 APX4000
C118 APX4000 LONG CUTTING EDGE TYPE
C128 AQX
C152 ARX
C086 ASX400
C064 ASX445
C120 AXD7000
C098 BAP300,400
C102 BAP300,400 LONG CUTTING EDGE TYPE
C105 BAP300 UNDER-CUT TYPE
C096 BAP3500
C084 BF407
C182 BRE
C156 BRP
C144 BSP
C124 BXD4000
C185 CBJP,CBMP
C183 CESP,CFSP,CGSP
C166 DCCC
C083 FBP415
C199 FE404
C196 FF3000
C197 FP490
C198 FP590
C186 KSMG
C072 LSE445
C195 NF10000
C092 NSE300,400
C148 OCTACUT
C189 PMF
C190 PMR
C191 LONG ARBOR FOR PMR / PMF
C076 SE415
C070 SE445
C078 SE515
C074 SE545
C085 SG20
C162 SPX
C146 SRE
C169 SRF,SRB
C172 SRM2
C178 SRM2φ40,φ50
C188 STLG
C180 TRM4
C184 TSMP
C194 V10000
C192 ARBORS FOR SCREW-IN TOOLS
C200 SETTING FIXTURE

CLASSIFICATION

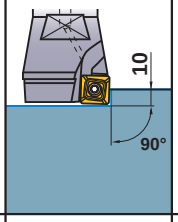
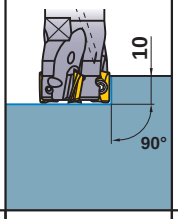
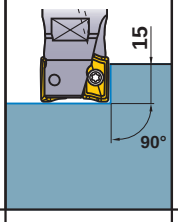
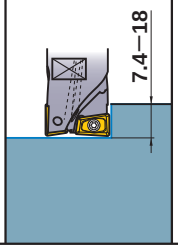
Cutting Mode	Corner Angle	Appli-cation	Product Name • Shape	Corner Angle, Max. Depth of Cut	Features	Cutter Dia.	Work Material: Light Alloy / Cast Iron / Carbon Steel, Alloy Steel / Stainless Steel / Hardened Steel
Face Milling	45°	General Cutting	**ASX445**		●Precision inexpensive moulded type 20°positive insert. ●Screw-on type. ●A wide range of chip breakers. ●High rigidity due to carbide shim.	·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125 ·Ø160 ·Ø200 ·Ø250 ·Ø315	**ASX445** (Max. Depth of Cut : 6mm) ➲ C064
	45°	General Cutting	**SE445**		●20°positive insert. ●High rake angle. ●High rigidity due to carbide shim.	·Ø80 ·Ø100 ·Ø125 ·Ø160 ·Ø200 ·Ø250 ·Ø315	**SE445** (Max. Depth of Cut : 5.5mm) ➲ C070
	45°	General Cutting	**LSE445**		●20°positive insert. ●High rake angle. ●High rigidity due to carbide shim. ●Extremely light body suitable for machining center.	·Ø125 ·Ø160 ·Ø200	**LSE445** (Max. Depth of Cut : 5.5mm) ➲ C072
	45°	Heavy Cutting	**SE545**		●20°positive insert. ●High rake angle. ●High rigidity due to carbide shim.	·Ø100 ·Ø125 ·Ø160 ·Ø200 ·Ø250	**SE545** (Max. Depth of Cut : 7.5mm) ➲ C074
	15°	General Cutting	**SE415**		●20°positive insert. ●High rake angle. ●High rigidity due to carbide shim.	·Ø80 ·Ø100 ·Ø125 ·Ø160	**SE415** (Max. Depth of Cut : 8.5mm) ➲ C076
	15°	Heavy Cutting	**SE515**		●20°positive insert. ●High rake angle. ●High rigidity due to carbide shim.	·Ø100 ·Ø125 ·Ø160	**SE515** (Max. Depth of Cut : 11.5mm) ➲ C078
	40°	High Feed Cutting for Cast Iron	**AHX640W** NEW		●Heptagonal double sided insert. ●Economical 14 cutting edge inserts. ●Multi insert design for high feed machining.	·Ø80 ·Ø100 ·Ø125 ·Ø160 ·Ø200 ·Ø250 ·Ø315	**AHX640W** (Max. Depth of Cut : 6mm) ➲ C080
	45°	High efficiency cutting for cast iron	**AOX445** NEW		●Solid CBN octagonal double sided insert. ●Economical 16 cutting edge inserts. (when the depth of cut is 3mm) ●For high efficiency roughing through to finishing. ●Easy operation and cleansing.	·Ø63 ·Ø80 ·Ø100 ·Ø125 ·Ø160 ·Ø200	**AOX445** (Max. Depth of Cut : 8mm) ➲ C082
	15°	High Feed Cutting for Cast Iron	**FBP415**		●11°positive insert. ●Large axial angle prevents chattering. ●Multi insert design. ●For high feed cast iron machining.	·Ø80 ·Ø100 ·Ø125 ·Ø160 ·Ø200 ·Ø250 ·Ø315	**FBP415** (Max. Depth of Cut : 8.5mm) ➲ C083
	7°	General Cutting for Aluminium Alloy	**BF407**		●25°positive insert. ●High rake and relief angle. ●Suitable for light alloy machining.	·Ø80 ·Ø100 ·Ø125 ·Ø160 ·Ø200 ·Ø250 ·Ø315	**BF407** (Max. Depth of Cut : 9mm) ➲ C084

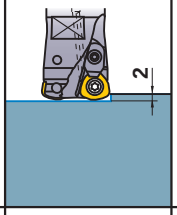
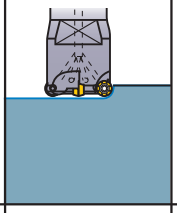
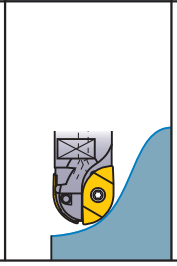
Cutting Mode	Corner Angle	Appli-cation	Product Name • Shape	Corner Angle, Max. Depth of Cut	Features	Cutter Dia.	Work Material				
							Light Alloy	Cast Iron	Carbon Steel, Alloy Steel	Stainless Steel	Hardened Steel
Face Milling	0°	High Feed Finishing for Aluminium Alloy	**NF10000**		●Insert with PCD. ●Suitable for high speed finishing of light alloys. ●Adjustable cutting edge run-out function.	·Ø80 ·Ø100 ·Ø125		**NF10000** (Max. Depth of Cut : 6mm) ➲ C195			
	0°	High Feed Finishing for Aluminium Alloy	**V10000**		●Insert with PCD. ●Light weight, strong aluminium alloy cutter body. ●Anti-Fly insert mechanism enables high speed milling. ●Adjustable cutting edge run-out function.	·Ø63 ·Ø80 ·Ø100 ·Ø125		**V10000** (Max. Depth of Cut : 1.5mm) ➲ C194			
	0°	High Feed Finishing	**FF3000**		●11°positive insert. ●1000—3000mm/min high feed machining. ●For finishing of steel machining. ●Adjustable cutting edge run-out function.	·Ø125 ·Ø160 ·Ø200 ·Ø250			**FF3000** (Max. Depth of Cut : 0.3mm) ➲ C196		
	0°	High Feed Cutting for Cast Iron	**FP490**		●11°positive insert. ●Suitable for cast iron finishing. ●Multi-insert design. ●For high feed cutting. ●Easy tool exchange.	·Ø80 I ·Ø500			**FP490** (Max. Depth of Cut : 0.5mm) ➲ C197		
	0°	High Feed Cutting for Cast Iron	**FP590**		●11°positive insert. ●Suitable for cast iron finishing. ●Multi-insert design. ●For high feed cutting. ●Easy tool exchange.	·Ø125 I ·Ø500			**FP590** (Max. Depth of Cut : 0.5mm) ➲ C198		
	4°	Finishing for Aluminium Alloy	**FE404**		●21°positive insert. ●High rake and relief angle. ●Suitable for light alloy machining. ●Easy tool exchange.	·Ø100 I ·Ø500		**FE404** (Max. Depth of Cut : 9mm) ➲ C199			
	—	Multi Functional Milling	**AJX**		●15°positive insert. ●High rigidity double clamp structure. ●Suitable for high feed machining. ●With through coolant holes. ●Special insert design with 3 cutting edges.	·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125 ·Ø160				**AJX** (Max. Depth of Cut : 2mm) ➲ C136	
	—	Multi Functional Milling	**BRP**		●11°positive insert. ●Round shape insert with a strong cutting edge. ●Wide range of tools available. ●Suitable for mould machining.	·Ø40 ·Ø50 ·Ø63 ·Ø80 ·Ø100				**BRP** (Max. Depth of Cut : 8mm) ➲ C158	
	—	Multi Functional Milling	**OCTACUT**		●20°positive insert. ●For octagonal and round type inserts. ●Multi-functional machining.	Small Insert Type ·Ø40 ·Ø50 ·Ø63 ·Ø80 Standard Insert Type ·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125 ·Ø160				**OCTACUT** (Max. Depth of Cut : 9mm) ➲ C149	
	—	Cutting for Difficult-to-cut Materials	**SG20**		●30°positive insert. ●High rake angle. ●Round shape insert with a strong cutting edge. ●Suitable for difficult-to-cut materials.	·Ø80 ·Ø100 ·Ø125 ·Ø160					**SG20** (Max. Depth of Cut : 8mm) ➲ C085

CLASSIFICATION

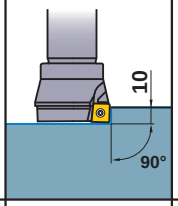
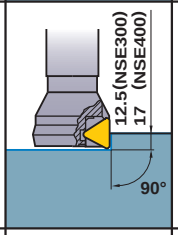
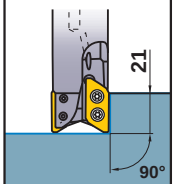
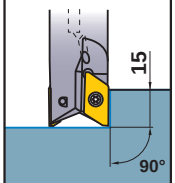
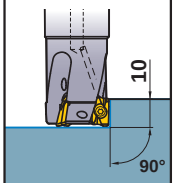
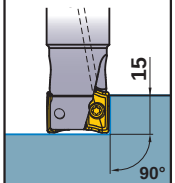
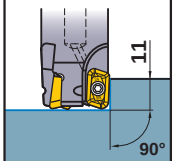
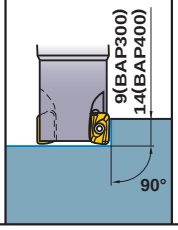
Cutting Mode	Corner Angle	Appli-cation	Product Name • Shape	Corner Angle, Max. Depth of Cut	Features	Cutter Dia.	Work Material: Light Alloy / Cast Iron / Carbon Steel, Alloy Steel / Stainless Steel / Hardened Steel
Shoulder Milling	0°	General Cutting	**ASX400**		●High tolerance M-class inserts. ●Economical 4 cutting edge inserts. ●Curved cutting edge and high rigidity holder. ●Screw-on type.	·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125 ·Ø160 ·Ø200 ·Ø250	**ASX400** (Max. Depth of Cut : 10mm) ➲ C086
	0°	General Cutting	**NSE300**		●20°positive insert. ●Multi-insert design. ●High rake angle. ●Enables highly efficient machining.	·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125 ·Ø160	**NSE300** (Max. Depth of Cut : 12.5mm) ➲ C092
	0°	Heavy Cutting	**NSE400**		●20°positive insert. ●Multi-insert design. ●High rake angle. ●Enables highly efficient machining.	·Ø80 ·Ø100 ·Ø125 ·Ø160	**NSE400** (Max. Depth of Cut : 17mm) ➲ C094
	0°	Multi Functional Cutting	**APX3000**		●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes.	·Ø32 ·Ø40 ·Ø50 ·Ø63 ·Ø80 ·Ø100	**APX3000** (Max. Depth of Cut : 10mm) ➲ C107
	0°	General Cutting	**APX4000**		●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes.	·Ø40 ·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125 ·Ø160	**APX4000** (Max. Depth of Cut : 15mm) ➲ C113
	0°	General Cutting	**BAP300**		●11° positive insert. ●Inserts with wiper edges produce optimal finished surface. ●Multi insert design for high feed machining.	·Ø32 ·Ø40 ·Ø50 ·Ø63 ·Ø80 ·Ø100	**BAP300** (Max. Depth of Cut : 9mm) ➲ C098
	0°	Heavy Cutting	**BAP400**		●11° positive insert. ●Inserts with wiper edges produce optimal finished surface. ●Multi insert design for high feed machining.	·Ø40 ·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125 ·Ø160	**BAP400** (Max. Depth of Cut : 14mm) ➲ C099
	0°	For Aluminium Alloy	**AXD7000** NEW		●Low resistance chipbreaker. ●Low resistance insert and high rigidity design for excellent performance. ●For high-speed machining. ●Multi-functional machining.	·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125	**AXD7000** (Max. Depth of Cut : 21mm) ➲ C120
	0°	Aluminium Alloy to Difficult-to-cut Material Cutting	**BXD4000**		●Curved cutting edge and high rigidity holder produce high wall accuracy. ●Low resistance insert and high rigidity design for excellent performance. ●With through coolant holes to ensure smooth chip discharge. ●For high-speed machining.	·Ø40 ·Ø50 ·Ø63 ·Ø80 ·Ø100 ·Ø125	**BXD4000** (Max. Depth of Cut : 15mm) ➲ C124

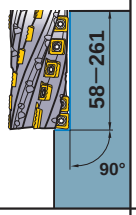
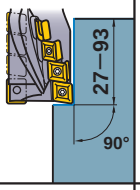
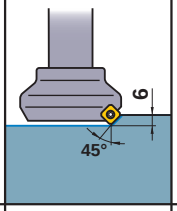
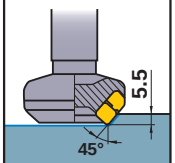
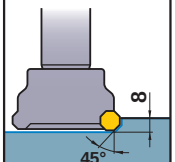
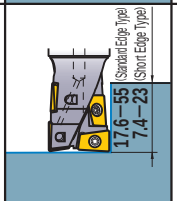
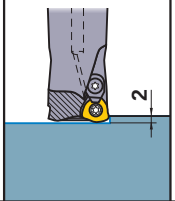
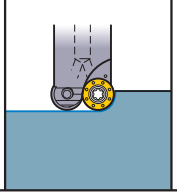
CLASSIFICATION OF SCREW-IN TOOLS

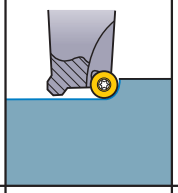
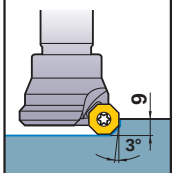
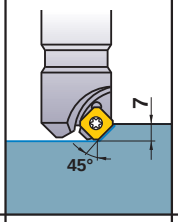
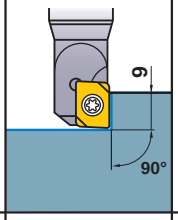
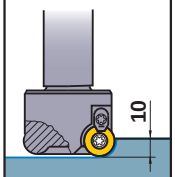
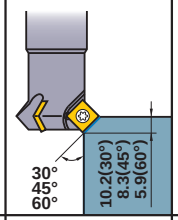
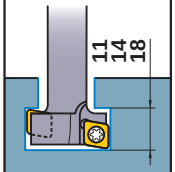
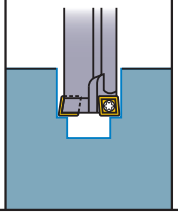
Product Name • Shape	Corner Angle, Max. Depth of Cut	Features
ASX400 NEW C088		●High tolerance M-class inserts. ●Economical 4 cutting edge inserts. ●Curved cutting edge and high rigidity holder. ●Screw-on type. ●Max. depth of cut 10mm. **ϕ32, ϕ40**
APX3000 NEW C108		●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes. ●Max. depth of cut 10mm. **ϕ16—ϕ40**
APX4000 NEW C114		●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes. ●Max. depth of cut 15mm. **ϕ25—ϕ40**
AQX NEW C130		●The center bottom cutting edge enables drilling without previously formed hole. ●With through coolant holes. ●Max. depth of cut 7.4—18mm **ϕ16—ϕ40**

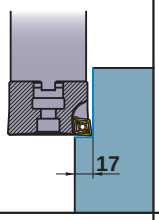
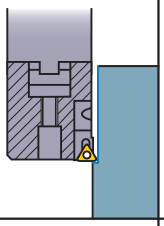
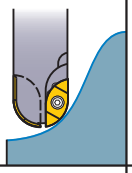
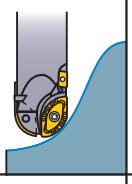
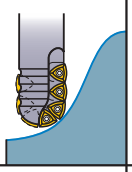
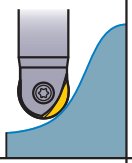
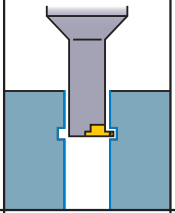
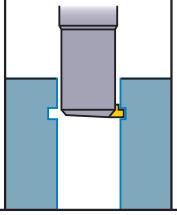
Product Name • Shape	Corner Angle, Max. Depth of Cut	Features
AJX NEW C140		●13° and 15° positive inserts. ●High rigidity double clamp structure. ●Suitable for high feed machining. ●With through coolant holes. ●Special insert design with 3 cutting edges. **ϕ16—ϕ40**
ARX NEW C153		●15°positive, high tolerance M-class insert. ●Effective for various machining applications. ●With through air & coolant holes. **ϕ16—ϕ25**
SRM2 NEW C174		●Suitable for roughing to semi-finishing of small and medium moulds. ●High rigidity body design. ●Low resistance chipbreaker. ●Through coolant hole type. **ϕ16—ϕ32**

CLASSIFICATION

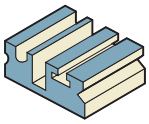
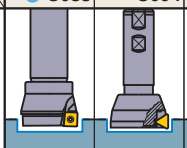
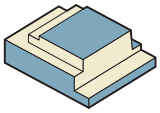
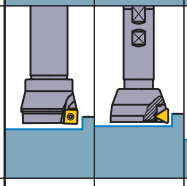
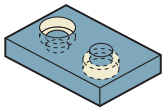
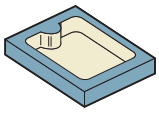
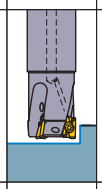
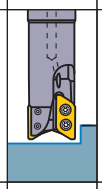
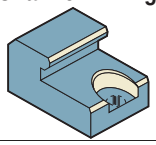
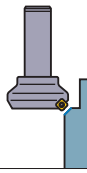
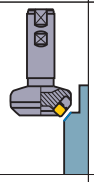
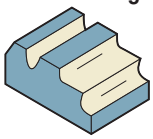
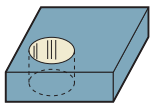
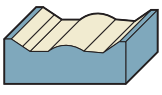
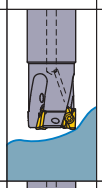
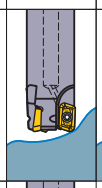
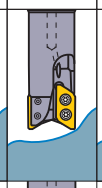
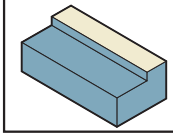
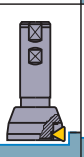
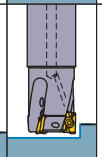
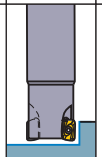
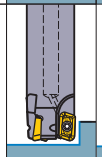
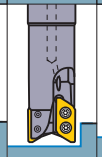
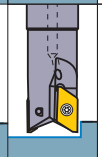
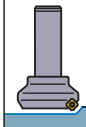
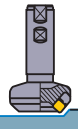
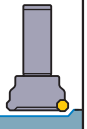
Product Name • Shape	Corner Angle, Max. Depth of Cut	Features
ASX400 C088		●High tolerance M-class inserts. ●Economical 4 cutting edge inserts. ●Curved cutting edge and high rigidity holder. ●Screw-on type. ●Max. depth of cut 10mm. **ϕ40—ϕ80**
NSE300 NSE400 C092 C094		●20°positive insert. ●Multi-insert design. ●High rake angle. ●Enables highly efficient machining. ●Max. depth of cut NSE300=12.5mm NSE400=17mm **ϕ50, ϕ63**
AXD7000 NEW C120		●Low resistance chipbreaker. ●Low resistance insert and high rigidity design for excellent performance. ●For high-speed machining. ●Multi-functional machining. ●Max. depth of cut 21mm **ϕ32, ϕ40**
BXD4000 C126		●Curved cutting edge and high rigidity holder produce high wall accuracy. ●Low resistance insert and high rigidity design for excellent performance. ●With through coolant holes to ensure smooth chip discharge. ●For high-speed machining. ●Max. depth of cut 15mm **ϕ20—ϕ40**
APX3000 C106		●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes. ●Max. depth of cut 10mm. **ϕ12—ϕ63**
APX4000 **APX4000** C112 C118		●High accuracy, high quality vertical wall. ●Low cutting force insert. ●With through air & coolant holes. ●Max. depth of cut 15mm. **ϕ25—ϕ63**
BAP3500 C096		●High rake angle. ●Contour machining is possible. ●Through coolant type. ●Max. depth of cut 11mm. **ϕ16—ϕ40**
BAP300 BAP400 **BAP300 • 400** **Long Cutting Edge** C098 C102		●11° positive insert. ●Inserts with wiper edges produce optimal finished surface. ●Multi insert design for high feed machining. BAP300 • 400 **ϕ10—ϕ63** BAP300 • 400 Long Cutting Edge **ϕ20—ϕ50** Arbor Type **ϕ63, ϕ80**

Product Name • Shape	Corner Angle, Max. Depth of Cut	Features
SPX C162		●Low cutting resistance due to the use of wavy inserts. ●Suitable for heavy cutting due to holder rigidity. **ϕ50**
DCCC C166		●Different helical flute angles prevents chattering. ●Suitable for heavy cutting due to holder rigidity. **ϕ25—ϕ50**
ASX445 C066		●Precision inexpensive moulded type 20°positive insert. ●Screw-on type. ●A wide range of chip breakers. ●High rigidity due to carbide shim. ●Max. depth of cut 6mm. **ϕ50—ϕ80**
SE445 C071		●20°positive insert. ●High rake angle. ●High rigidity due to carbide shim. ●Max. depth of cut 5.5mm. **ϕ50—ϕ80**
AOX445 NEW C082		●Solid CBN octagonal double sided insert. ●Economical 16 cutting edge inserts. (when the depth of cut is 3mm) ●For high efficiency roughing through to finishing. ●Easy operation and cleansing.
AQX C128		●The center bottom cutting edge enables drilling without previously formed hole. ●With through coolant holes. ●Max. depth of cut Standard Edge Type=55mm Short Edge Type=23mm **ϕ16—ϕ50**
AJX C138		●13° and 15° positive inserts. ●High rigidity double clamp structure. ●Suitable for high feed machining. ●With through coolant holes. ●Special insert design with 3 cutting edges. **ϕ16—ϕ63**
ARX C152		●15°positive, high tolerance M-class insert. ●Effective for various machining applications. ●With through air & coolant holes. **ϕ10—ϕ25**

Product Name • Shape	Corner Angle, Max. Depth of Cut	Features
BRP C156		●11°positive insert. ●Round shape insert with a strong cutting edge. ●Wide range of tools available. ●Suitable for mould machining. **ϕ12—ϕ63**
OCTACUT C148		●20°positive insert. ●For octagonal and round type inserts. ●Multi-functional machining. **ϕ32—ϕ63**
BSP C144		●For drilling, chamfering and copying. ●Multi-functional end mill ●Max. depth of cut 7mm. **ϕ10—ϕ40**
SRE C146		●For drilling without a previously formed hole and horizontal feed machining. ●Ground key way slot in the insert gives excellent rigidity. ●High rake insert gives excellent sharpness. **ϕ10—ϕ30**
BRE C182		●20°positive round shaped insert. ●High rake angle. ●Capable of machining of hardened steels and difficult-to-cut materials. ●The special insert prevents chattering. **ϕ50, ϕ63**
CESP•CFSP•CGSP C183		●Covers 5 cutting modes. ●Excellent sharpness with 11°positive inserts. ●30°, 45° and 60° chamfer series. **ϕ4—ϕ32**
TSMP C184		●T-groove order number 14, 18 and 22 are available. ●86° rhombic shape 11° positive insert. ●Shoulder milling and inversed spot facing are also possible. **ϕ25—ϕ40**
CBJP•CBMP C185		●Capable of spot facing machining, boring and interpolation. ●For seat machining of hexagon socket head bolt (M8-M30). ●86°rhombic shape 11°positive insert. **ϕ14—ϕ48**

Product Name • Shape	Corner Angle, Max. Depth of Cut	Features
PMR C190		●2 directional cutting with large overhang. ●Horizontal feed cutting and oblique cutting are also possible. ●Unique shape of curved edge gives high rigidity and low resistance. **ϕ50—ϕ80**
PMF C189		●2 directional cutting with large overhang. ●Excellent straightness. ●Excellent wall accuracy. **ϕ50—ϕ80**
SRM2 C172		●Suitable for roughing to semi-finishing of small and medium moulds. ●High rigidity body design. ●Low resistance chipbreaker. ●Through coolant hole type. **ϕ16—ϕ30**
SRM2ϕ40/ϕ50 C178		●Best for roughing of moulds. ●Low resistance chipbreaker. ●Highly rigid body. **ϕ40, ϕ50**
TRM4 C180		●Large ball-nose end mill suitable for roughing of large mould. ●Economical 3-corner-use inserts. ●Curved cutting edge and rigid holder are stable in heavy cutting. **ϕ40, ϕ50**
SRF, SRB NEW C169		●S-shaped cutting edge provides sharpness similar to that of solid ball nose end mills. ●Highly accurate corner radius tolerance allows for high precision finishing. ●Carbide shank type available. **ϕ10—ϕ32**
STLG C188		●Grooving cutter for machining centers. ●The minimum cutting diameter is ϕ22 for internal grooving. ●The minimum groove width is 1.2 mm and the maximum groove depth is 4.5 mm. **ϕ22, ϕ38**
KSMG C186		●Side face grooving tool for machining centers. ●The minimum cutting diameter is ϕ25mm for internal grooving. ●For groove widths of 1.25mm—6.3mm. **ϕ25, ϕ40**

CLASSIFICATION

Product Name / Cutting Mode	ASX400	NSE300 NSE400	APX3000 APX4000	APX4000 Long Cutting Edge	BAP300 BAP400	BAP300 Long Cutting Edge BAP400 Long Cutting Edge	BAP3500	AXD7000	BXD4000	SPX DCCC	ASX445	SE445	AOX445
	C088	C092 C094	C106 C112	C118	C098	C102	C096	C120	C126	C162 C166	C066	C071	C082
Slot Milling													
Shoulder Milling													
Spot Milling													
Pocket Milling													
Chamfer Milling													
Radius Milling													
Drilling													
Copy Milling													
Face Milling													

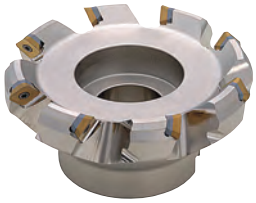
AQX	AJX MULTI FUNCTIONAL TYPE	ARX MULTI FUNCTIONAL TYPE	BRP MULTI FUNCTIONAL TYPE	OCTACUT MULTI FUNCTIONAL TYPE	BSP MULTI FUNCTIONAL TYPE	SRE	BRE	CESP CFSP CGSP	TSMP	CBJP CBMP	PMF PMR	SRM2 TRM4	SRF SRB NEW	KSMG STLG
C128	C138	C152	C156	C148	C144	C146	C182	C183	C184	C185	C189 C190	C172 C178 C180	C169	C186 C188

FACE MILLING <GENERAL CUTTING>

45° Finishing Roughing Face Milling Chamfering

ASX445

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel



- Precision inexpensive moulded type 20°positive insert.
- Screw-on type.
- A wide range of chip breakers.
- High rigidity due to carbide shim.

C H :45°
A.R :+20°—+23° T :+4°49′—+9°53′
R.R :-13°—-10° I :+22°55′—+23°02′

Fig.1 ø50 ø63

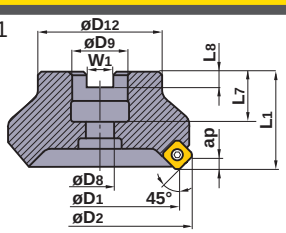


Fig.2 ø80 ø100 ø125 ø160

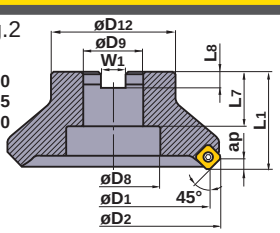


Fig.3 ø200 ø250

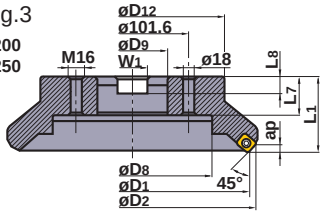
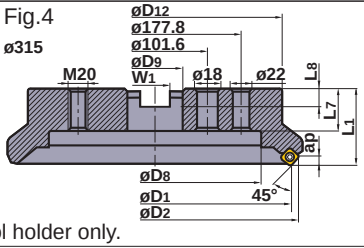


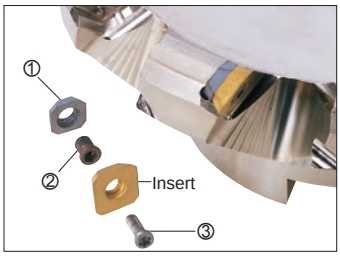
Fig.4 ø315



Right hand tool holder only.

ARBOR TYPE

Type	Order Number	Stock R	Number of Teeth	D1	D2	L1	D9	L7	D8	D12	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
Coarse Pitch	ASX445-050A03R	●	3	50	63.0	40	22	20	11	45	10.4	6.3	0.5	6	1
	-063A04R	●	4	63	75.9	40	22	20	11	50	10.4	6.3	0.7	6	1
	R08004C	●	4	80	93.2	50	25.4	26	38	56	9.5	6	1.1	6	2
	R10005D	●	5	100	113.2	50	31.75	32	45	70	12.7	8	1.8	6	2
	R12506E	●	6	125	138.0	63	38.1	35	60	80	15.9	10	2.9	6	2
	R16007F	●	7	160	173.0	63	50.8	38	80	100	19.1	11	4.7	6	2
	R20008K	●	8	200	212.9	63	47.625	35	140	175	25.4	14	7.9	6	3
	R25010K	●	10	250	262.9	63	47.625	35	180	220	25.4	14	12.9	6	3
	R31514P	●	14	315	327.9	63	47.625	40	245	285	25.4	14	22.4	6	4
Fine Pitch	ASX445-050A04R	●	4	50	63.0	40	22	20	11	45	10.4	6.3	0.4	6	1
	-063A05R	●	5	63	75.9	40	22	20	11	50	10.4	6.3	0.6	6	1
	R08006C	●	6	80	93.2	50	25.4	26	38	56	9.5	6	1.0	6	2
	R10007D	●	7	100	113.2	50	31.75	32	45	70	12.7	8	1.7	6	2
	R12508E	●	8	125	138.0	63	38.1	35	60	80	15.9	10	2.8	6	2
	R16010F	●	10	160	173.0	63	50.8	38	80	100	19.1	11	4.6	6	2
	R20012K	●	12	200	212.9	63	47.625	35	140	175	25.4	14	7.8	6	3
	R25014K	●	14	250	262.9	63	47.625	35	180	220	25.4	14	12.8	6	3
	R31518P	●	18	315	327.9	63	47.625	40	245	285	25.4	14	22.2	6	4
Extra Fine Pitch	ASX445-050A05R	●	5	50	63.0	40	22	20	11	45	10.4	6.3	0.4	6	1
	-063A06R	●	6	63	75.9	40	22	20	11	50	10.4	6.3	0.6	6	1
	R08008C	●	8	80	93.2	50	25.4	26	38	56	9.5	6	1.1	6	2
	R10010D	●	10	100	113.2	50	31.75	32	45	70	12.7	8	1.8	6	2
	R12512E	●	12	125	138.0	63	38.1	35	60	80	15.9	10	2.9	6	2
	R16016F	●	16	160	173.0	63	50.8	38	80	100	19.1	11	4.7	6	2
	R20020K	●	20	200	212.9	63	47.625	35	140	175	25.4	14	7.8	6	3
	R25024K	●	24	250	262.9	63	47.625	35	180	220	25.4	14	12.8	6	3
	R31528P	●	28	315	327.9	63	47.625	40	245	285	25.4	14	21.8	6	4



SPARE PARTS

Tool Holder Number	① Shim	② Shim Screw *	③ Clamp Screw *	Wrench (Insert)	Wrench (Shim)
ASX445	STASX445N	WCS503507H	TPS35	TIP15T	HKY35R

* Clamp Torque (N • m) : WCS503507H=5.0, TPS35=3.5

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)

Fig.1
ø50
ø63
ø80
ø100

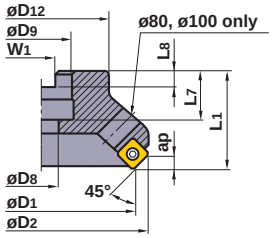


Fig.2
ø125

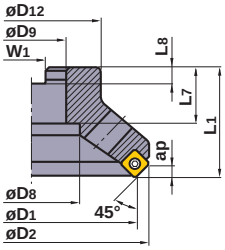


Fig.3
ø160

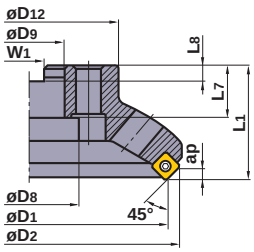
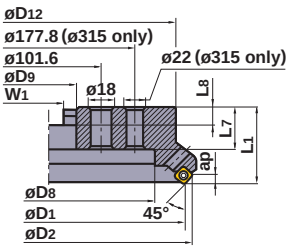


Fig.4
ø200
ø250
ø315



For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

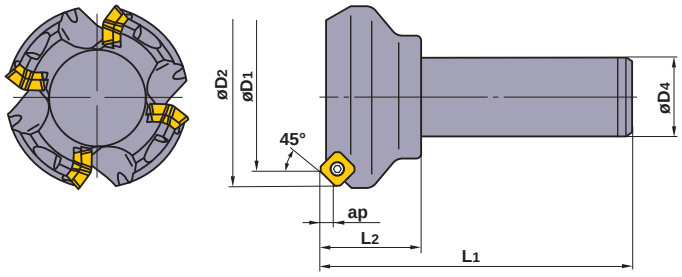
C H :45°
A.R :+20°—+23°
R.R :-13°—-10°
T :+4°49′—+9°53′
I :+22°55′—+23°02′

ARBOR TYPE

Right hand tool holder only.

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)									Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
		R		D1	D2	L1	D9	L7	D8	D12	W1	L8			
Coarse Pitch	ASX445-050A03R	●	3	50	63.0	40	22	20	11	45	10.4	6.3	0.5	6	1
	-063A04R	●	4	63	75.9	40	22	20	11	50	10.4	6.3	0.7	6	1
	-080A04R	●	4	80	93.2	50	27	22	13.5	56	12.4	7	1.0	6	1
	-100A05R	●	5	100	113.2	50	32	25	17.5	70	14.4	8	1.6	6	1
	-125B06R	●	6	125	138.0	63	40	32	56	80	16.4	9	2.4	6	2
	-160C07R	●	7	160	173.0	63	40	29	56	100	16.4	9	3.9	6	3
	-200C08R	○	8	200	212.9	63	60	32	135	155	25.7	14	6.7	6	4
	-250C10R	○	10	250	262.9	63	60	32	174	200	25.7	14	10.5	6	4
	-315C14R	○	14	315	327.9	80	60	57	256.8	285	25.7	14	22.4	6	4
Fine Pitch	ASX445-050A04R	●	4	50	63.0	40	22	20	11	45	10.4	6.3	0.4	6	1
	-063A05R	●	5	63	75.9	40	22	20	11	50	10.4	6.3	0.6	6	1
	-080A06R	●	6	80	93.2	50	27	22	13.5	56	12.4	7	0.9	6	1
	-100A07R	●	7	100	113.2	50	32	25	17.5	70	14.4	8	1.5	6	1
	-125B08R	●	8	125	138.0	63	40	32	56	80	16.4	9	2.3	6	2
	-160C10R	●	10	160	173.0	63	40	29	56	100	16.4	9	3.6	6	3
	-200C12R	●	12	200	212.9	63	60	32	135	155	25.7	14	5.8	6	4
	-250C14R	●	14	250	262.9	63	60	32	174	200	25.7	14	10.6	6	4
	-315C18R	○	18	315	327.9	80	60	57	256.8	285	25.7	14	22.2	6	4
Extra Fine Pitch	ASX445-050A05R	●	5	50	63.0	40	22	20	11	45	10.4	6.3	0.4	6	1
	-063A06R	●	6	63	75.9	40	22	20	11	50	10.4	6.3	0.6	6	1
	-080A08R	●	8	80	93.2	50	27	22	13.5	56	12.4	7	0.9	6	1
	-100A10R	●	10	100	113.2	50	32	25	17.5	70	14.4	8	1.5	6	1
	-125B12R	●	12	125	138.0	63	40	32	56	80	16.4	9	2.3	6	2
	-160C16R	●	16	160	173.0	63	40	29	56	100	16.4	9	3.6	6	3
	-200C20R	●	20	200	212.9	63	60	32	135	155	25.7	14	6.5	6	4
	-250C24R	●	24	250	262.9	63	60	32	174	200	25.7	14	10.3	6	4
	-315C28R	○	28	315	327.9	80	60	57	256.8	285	25.7	14	21.8	6	4

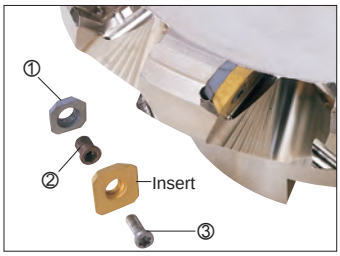
SPARE PARTS E001
TECHNICAL DATA F001



Right hand tool holder only.

SHANK TYPE

Order Number	Stock	Number of Teeth	Dimensions (mm)					Max. Depth of Cut
	R		D1	D2	L1	D4	L2	ap (mm)
ASX445R503S32	●	3	50	63.0	125	32	40	6
634S32	●	4	63	75.9	125	32	40	6
804S32	●	4	80	93.2	125	32	40	6



SPARE PARTS

Tool Holder Number	①	② *	③ *		
	Shim	Shim Screw	Clamp Screw	Wrench (Insert)	Wrench (Shim)
ASX445	STASX445N	WCS503507H	TPS35	TIP15T	HKY35R

* Clamp Torque (N • m) : WCS503507H=5.0, TPS35=3.5

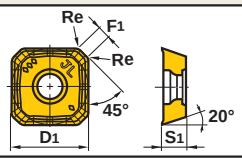
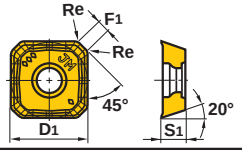
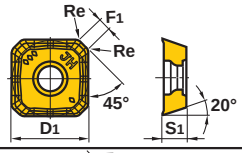
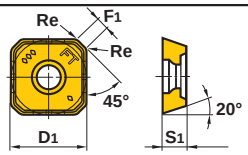
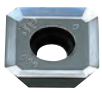
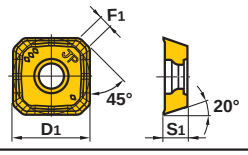
● : Inventory maintained in Japan. (10 inserts in one case) (CBN and PCD inserts are available in 1 piece in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case)

INSERTS WITH BREAKER

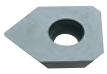
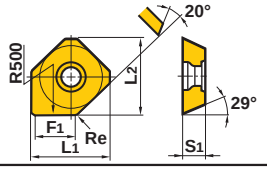
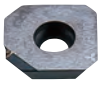
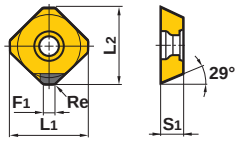
Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round **F** : Sharp **S** : Chamfer + Hone **T** : Chamfer

Application	Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)				Geometry
					F7030	MC5020	F5010	F5020	VP15TF	VP30RT	NX4545		HTi10		D_1	S_1	F_1	Re	
Finish–Light Cutting	**JL** Breaker	**SEET13T3AGEN-JL**	E	E	●				●	●	●				13.4	3.97	1.9	1.5	
Light–Semi-Heavy Cutting	**JM** Breaker	**SEMT13T3AGSN-JM**	M	S	●	○	●	●	●	●	●				13.4	3.97	1.9	1.5	
Medium–Heavy Cutting	**JH** Breaker	**SEMT13T3AGSN-JH**	M	S	●	○	●		●	●					13.4	3.97	1.9	1.5	
Roughing For Cast Iron	**FT** Breaker	**SEMT13T3AGSN-FT**	M	S		○		●							13.4	3.97	1.9	1.5	
For Aluminium Alloy	**JP** Breaker 	**SEGT13T3AGFN-JP**	G	F									●		13.4	3.97	2.2	–	

WIPER INSERTS

Shape	Order Number	Honing	Cermet		Carbide		CBN		PCD		Dimensions (mm)					Geometry
			NX2525		HTi05T		MB710		MD220		L_1	L_2	S_1	F_1	Re	
	**WEEW13T3AGER8C**	E			●						16.48	16.60	3.97	8.2	1.5	
	13T3AGTR8C	T	●								16.48	16.60	3.97	8.1	1.5	
	**WEEW13T3AGFR3C**	F							●		16.48	16.60	3.97	3.0	1.5	
	13T3AGTR3C	T					●				16.48	16.60	3.97	3.0	1.5	

SPARE PARTS E001
TECHNICAL DATA F001

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Finish—Light Cutting		Light—Semi-Heavy Cutting		Medium—Heavy Cutting	
					Feed per Tooth (mm/tooth)	Breaker	Feed per Tooth (mm/tooth)	Breaker	Feed per Tooth (mm/tooth)	Breaker
P	Mild Steel	≤180HB	**F7030**	280 (210—350)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP15TF	250 (200—300)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP30RT	230 (180—280)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			NX4545	180 (130—230)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
	Carbon Steel Alloy Steel	180—280HB	**F7030**	250 (200—300)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP15TF	220 (170—270)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP30RT	200 (150—250)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			NX4545	150 (120—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
		280—350HB	**F7030**	180 (130—230)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP15TF	140 (100—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP30RT	120 (80—160)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			NX4545	100 (80—120)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
M	Stainless Steel	≤270HB	**VP15TF**	220 (170—270)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			VP30RT	200 (150—250)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			NX4545	150 (120—180)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
K	Cast Iron Ductile Cast Iron	Tensile Strength ≤450MPa	**MC5020**	200 (150—250)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH FT**
			F5010	200 (150—250)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
			F5020	200 (150—250)	—	—	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**FT**
			VP15TF	180 (130—250)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	0.3 (0.2—0.4)	**JH**
N	Aluminium Alloy	—	**HTi10**	300—	0.15 (0.1—0.2)	**JP**	0.2 (0.1—0.3)	**JP**	0.3 (0.2—0.4)	**JP**
S	Heat Resistant Alloy (Inconel, Waspaloy etc.)	—	**VP15TF**	40 (20—50)	0.15 (0.1—0.2)	**JL**	0.2 (0.1—0.3)	**JM**	—	—
H	Hardened Steel	40—55HRC	**VP15TF**	80 (60—100)	0.1 (0.05—0.15)	**JL**	0.15 (0.1—0.2)	**JM**	0.2 (0.1—0.3)	**JH**

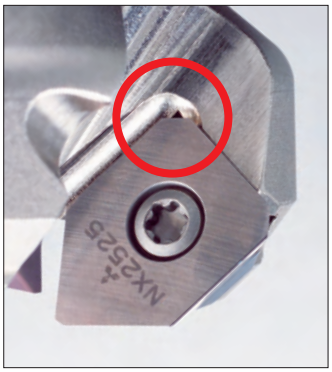
●Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD_1) ●Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

INSTRUCTIONS FOR USING INSERTS

Instructions for use of the JP breaker

- The JP breaker has sharp cutting edges. Wear gloves when handling.
- When machining aluminium alloy, welding to the cutting edge tends to occur, often leading to insert failure. To prevent this, wet cutting is recommended.

Instructions for use of wiper inserts

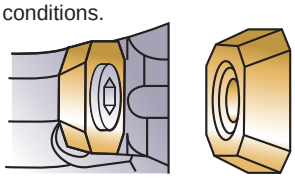


- Wiper inserts for the ASX445 are single-cornered.
- When installing the wiper insert, place the insert so that the small chamfer is located as shown.

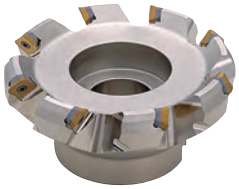
FEATURES

STABLE, LONG TOOL LIFE, HIGH ACCURACY BODY

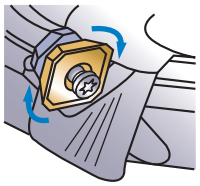
A carbide shim with Mitsubishi's proprietary Anti-Fly Insert (AFI) mechanism provides excellent insert location characteristics, permitting stable cutting even under high load conditions.



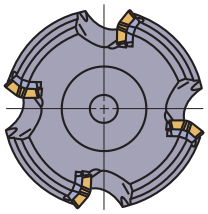
The cutter body is made from a special alloy that provides high strength at high temperature. A special surface treatment improves the corrosion resistance.



The ASX cutter uses screw-on type inserts that allow easy clamping of the inserts with high location precision. Indexing of the inserts can be performed without completely removing the screw.

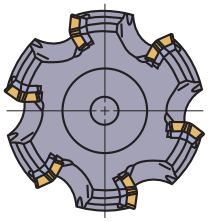


EFFECTIVE FOR VARIOUS MACHINING APPLICATIONS



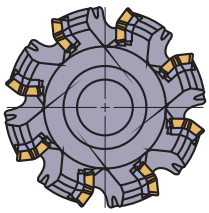
Coarse Pitch Type

1. The 1st recommendation for cutting steel and stainless steel.
2. For deep cutting and high feed rates with large-volume chip discharge.
3. Longer overhang possible for relatively low machining rigidity.



Fine Pitch Type

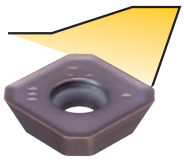
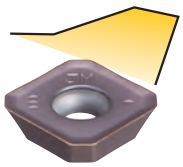
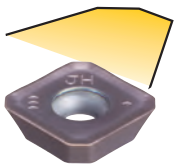
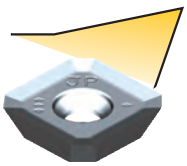
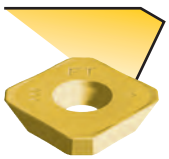
1. The 1st recommendation type for cast iron, hardened steel and heat-resistant alloys.
2. For shallow cutting with low feed rates and low-volume chip discharge.



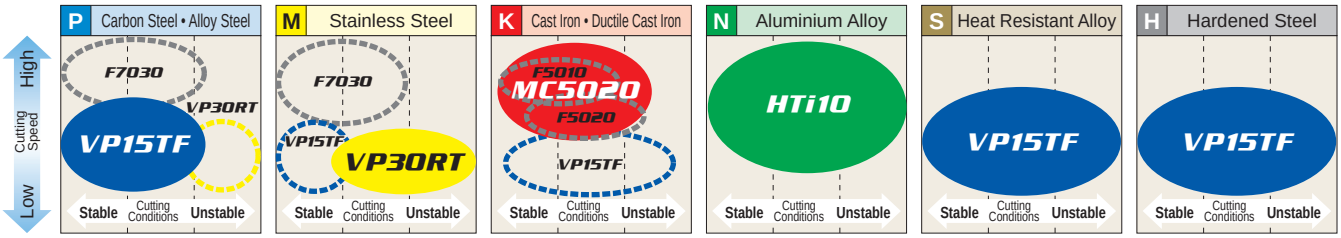
Extra Fine Pitch Type

1. The 1st recommendation for cast iron.
2. For cutting operations where chip dischange volume is small and high table feed is desired.

CHIPBREAKERS FOR A WIDE RANGE OF APPLICATIONS

JL Finish to Light cutting Breaker	JM Light to Semi-Heavy cutting Breaker	JH Medium to Heavy cutting Breaker	JP Aluminium alloy cutting Breaker	FT Rough cutting for cast iron Breaker
				
High accuracy insert with ground-finished periphery. Large rake angle leading to low cutting resistance.	High accuracy M class insert. For a wide range of workpiece materials and cutting conditions.	High accuracy M class insert. Strong cutting edge for high fracture resistance.	High accuracy insert with ground-finished periphery.Large rake angle and mirror-finished rake face for sharp cutting performance and high welding resistance.	High accurate M class inserts. Higher fracture-resistant flat-top inserts.
①Workpiece rigidity is low.	**①General cutting.**	**①Interrupted cutting. ②Scaling.**	**①General cutting of aluminium alloy. ②High feed cutting.**	**①For rough machining of scaled cast iron.**

INSERT GRADES FOR A WIDE RANGE OF MATERIALS



(Note) When machining steel or stainless steel where the emphasis is on surface finish, use cermet grade NX4545.
Stable Cutting : Continuous cutting, Constant depth of cut, Pre-machined securely clamped component cutting
Unstable Cutting : Heavy interrupted, Irregular depth of cut, Low clamping rigidity cutting

FACE MILLING <GENERAL CUTTING>

45° Finishing Roughing Face Milling Chamfering

SE445

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 20°positive insert.
- High rake angle.
- High rigidity due to carbide shim.

Fig.1 ø80 ø100

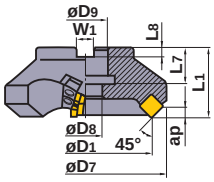


Fig.2 ø125 ø160

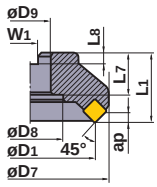


Fig.3 ø200 ø250

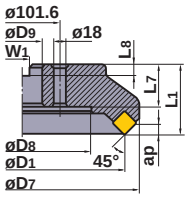
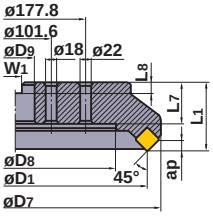


Fig.4 ø315

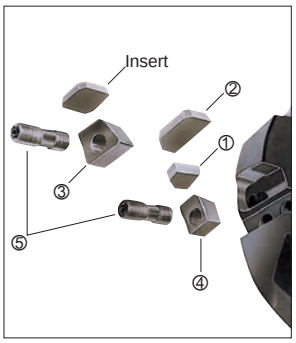


ARBOR TYPE

C H :45°
A.R :+19° T :+13°
R.R :-2° I :+15°

Right hand tool holder only.

Type	Order Number	Stock R	Stock L	Number of Teeth	Dimensions (mm) D1	D7	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
Coarse Pitch	**SE445R/L0304C**	●	□	4	80	102.2	50	25.4	26	13	9.5	6	1.6	5.5	1
	0405D	●	□	5	100	121.7	63	31.75	32	17	12.7	8	2.7	5.5	1
	0506E	●	□	6	125	146.2	63	38.1	38	60	15.9	10	3.5	5.5	2
	0608F	●	□	8	160	181.1	63	50.8	38	80	19.1	11	5.6	5.5	2
	0810K	●	□	10	200	222.4	63	47.625	35	140	25.4	14	7.8	5.5	3
	1012K	●	□	12	250	273.2	63	47.625	35	180	25.4	14	12.7	5.5	3
	1214P	●	□	14	315	338.9	63	47.625	40	245	25.4	14	22.3	5.5	4
Close Pitch	**SE445R/L0306C**	●	□	6	80	102.2	50	25.4	26	13	9.5	6	1.6	5.5	1
	0407D	●	□	7	100	121.7	63	31.75	32	17	12.7	8	2.7	5.5	1
	0509E	●	□	9	125	146.2	63	38.1	38	60	15.9	10	3.5	5.5	2
	0611F	●	□	11	160	181.1	63	50.8	38	80	19.1	11	5.6	5.5	2



SPARE PARTS

Tool Holder Number	① Locator	② Shim	③ Wedge-T	④ Wedge-S	⑤ Clamp Screw *	Wrench	Set Bolt
SE445R/L0304C 0306C	SPSE445R/L	STSE445R/L	CWSE445TR/L	CWSE445SN	LS15T	TKY25T	HSC12035
SE445R/L0405D 0407D							HSC16035
SE445R/L0506E – SE445R/L1214P							–

★ Clamp Torque (N • m) : LS15T=8.5

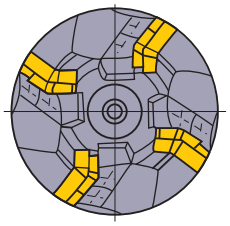
RECOMMENDED CUTTING CONDITIONS

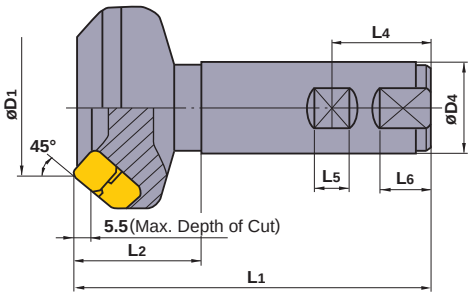
	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	**F7030**	200 (160–250)	0.2 (0.1–0.3)
			NX4545		
			UTi20T	160 (125–200)	
			UP20M		
	Carbon Steel Alloy Steel	180–280HB	**F7030**	160 (125–200)	0.2 (0.1–0.3)
			NX4545		
			UTi20T	130 (100–160)	
			UP20M		
		280–350HB	**UTi20T**	75 (50–100)	0.15 (0.1–0.2)

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
M	Stainless Steel	≤200HB	**UP20M**	160 (125–200)	0.2 (0.1–0.3)
			UTi20T		
K	Cast Iron	Tensile Strength ≤450MPa	**MC5020 F5010 • F5020**	175 (100–250)	0.2 (0.1–0.3)
			HTi10	100 (80–125)	
			UTi20T	80 (60–100)	
N	Aluminium Alloy	–	**MD220**	1000 (200–1500)	0.15 (0.05–0.25)
			HTi10	650 (300–1000)	0.12 (0.05–0.2)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min) =Feed per Tooth x Number of Teeth x Cutter Revolution

● : Inventory maintained in Japan. (10 inserts in one case) (PCD inserts are available in 1 piece in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)





SHANK TYPE

Right hand tool holder only.

Order Number	Stock	Number of Teeth	Dimensions (mm)							Locator	Wedge-T	Wedge-S	Shim	Clamp Screw *	Wrench	Insert
	R		D1	L1	D4	L2	L4	L5	L6							
SE445R504S32	●	4	50	125	32	45	36	14	19	SPSE445R	CWSE445TR	CWSE445SN	STSE445R	LS10T	TKY25T	SEC/E/KN 1203AF□N1
634S32	●	4	63	125	32	45	36	14	19	SPSE445R	CWSE445TR	CWSE445SN	STSE445R	LS10T	TKY25T	
804S42	●	4	80	145	42	45	40	14	19	SPSE445R	CWSE445TR	CWSE445SN	STSE445R	LS15T	TKY25T	

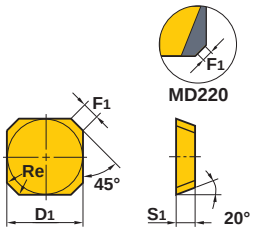
* Clamp Torque (N • m) : LS10T=8.5, LS15T=8.5

INSERTS

Work Material		
P	Steel	● ◐
M	Stainless Steel	◐ ◐
K	Cast Iron	◐ ● ◐
N	Non-ferrous Metal	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting
Honing : E : Round **F** : Sharp **S** : Chamfer + Hone **T** : Chamfer **Z** : Strong

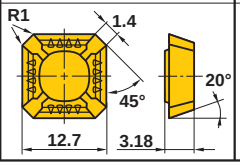
Shape	Order Number	Class	Honing	Coated F7030	Coated F620	Coated MC5020	Coated F5010	Coated F5020	Coated UP20M	Cermet NX2525	Cermet NX4545	Carbide UTi20T	Carbide HTi10	PCD MD220	Dimensions (mm) D1	S1	F1	Re	Geometry
	SECN1203AFFN1	C	F										●		12.7	3.18	1.4	1.0	
	1203AFEN1	C	E										●		12.7	3.18	1.4	1.0	
	1203AFTN1	C	T							●	●	●			12.7	3.18	1.4	1.0	
	1203AFFR1	C	F											●	12.7	3.18	1.4	1.0	
	SEEN1203AFFN1	E	F										●		12.7	3.18	1.4	1.0	
	1203AFEN1	E	E										●		12.7	3.18	1.4	1.0	
	1203AFTN1	E	T		▲				●	●	●	●			12.7	3.18	1.4	1.0	
	1203AFSN1	E	S	●		○	●	●							12.7	3.18	1.4	1.0	
	1203AFZN1	E	Z							●					12.7	3.18	1.4	1.0	
	SEKN1203AFEN1	K	E										●		12.7	3.18	1.4	—	
	1203AFSN1	K	S	●											12.7	3.18	1.4	—	
	1203AFTN1	K	T		▲				●	●		●			12.7	3.18	1.4	—	
	1203AFTN	K	T								●				12.7	3.18	1.7	1.0	
	1203AFZN	K	Z							●					12.7	3.18	1.7	1.0	



INSERTS WITH BREAKER

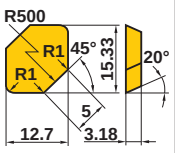
Work Material		
P	Steel	● ◐
M	Stainless Steel	◐ ◐
K	Cast Iron	◐ ● ◐

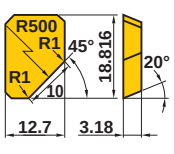
Shape	Order Number	Class	Coated F7030	Coated F620	Coated MC5020	Coated F5010	Coated F5020	Coated UP20M	Cermet NX2525	Carbide UTi20T
	SEER1203AFEN-JS	E	●	▲	○	●	●	●	●	●



WIPER INSERTS

Shape	Order Number	Class	Honing	Cermet NX2525	Carbide HTi05T	Geometry
	WEC42AFFR5C	C	F		●	
	42AFER5C	C	E		●	
	42AFTR5C	C	T	●		
	WEC42AFER10C	C	E		●	





SPARE PARTS E001
TECHNICAL DATA F001

FACE MILLING <GENERAL CUTTING>

45° Finishing Roughing Face Milling

LSE445

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 20°positive insert.
- High rake angle.
- High rigidity due to carbide shim.
- Extremely light body suitable for machining center.

Fig.1
ø125
ø160

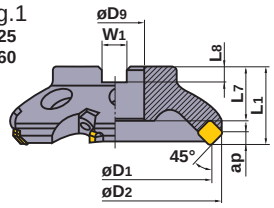
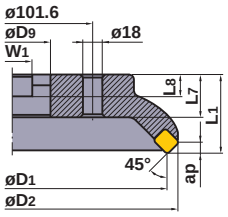


Fig.2
ø200

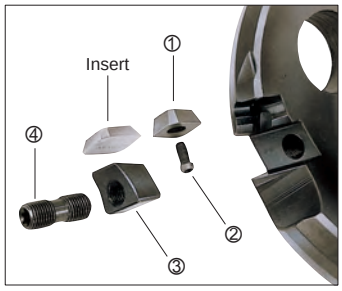


Right hand tool holder only.

C H :45°
A.R :+19° T :+13°
R.R :-2° I :+15°

Order Number	Stock	Number of Teeth	Dimensions (mm)							Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
	R		D1	D2	L1	D9	L7	W1	L8			
LSE445R0506E	●	6	125	138.5	50	38.1	35	15.9	10	2.0	5.5	1
R0608E	●	8	160	173.5	50	38.1	35	15.9	10	3.0	5.5	1
R0810K	●	10	200	213.4	50	47.625	27	25.4	14	5.0	5.5	2

(Note 1) Set height is different from the SE445 type, because of 35—45% reduced tool weight.
(Note 2) Location hole diameter of the ϕ160 type changed from the SE445 type from ϕ50.8 to ϕ38.1.



SPARE PARTS

Tool Holder Number	① ∗1	② ∗2	③	④ ∗2		
	Shim	Shim Screw	Wedge	Clamp Screw	Wrench (Clamp Screw)	Wrench (Sold Separately)
LSE445R0506E ı LSE445R0810K	STBE445NF	CS300890T	CWSE445TR	LS15T	TKY25T	TKY08F

∗1 The shim is not compatible with the SE445 type.
∗2 Clamp Torque (N • m) : LS15T=8.5, CS300890T=1.0

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	F7030	200 (160—250)	0.2 (0.1—0.3)
			NX4545		
			UTi20T	160 (125—200)	
			UP20M		
	Carbon Steel Alloy Steel	180—280HB	F7030	160 (125—200)	0.2 (0.1—0.3)
			NX4545		
			UTi20T	130 (100—160)	
			UP20M		
		280—350HB	UTi20T	75 (50—100)	0.15 (0.1—0.2)

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
M	Stainless Steel	≤200HB	UP20M	160 (125—200)	0.2 (0.1—0.3)
			UTi20T		
K	Cast Iron	Tensile Strength ≤450MPa	MC5020 F5010 • F5020	175 (100—250)	0.2 (0.1—0.3)
			HTi10	100 (80—125)	
			UTi20T	80 (60—100)	
N	Aluminium Alloy	—	MD220	1000 (200—1500)	0.15 (0.05—0.25)
			HTi10	650 (300—1000)	0.12 (0.05—0.2)

● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
● Table Feed (mm/min)
=Feed per Tooth x Number of Teeth x Cutter Revolution

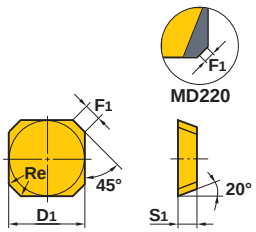
● : Inventory maintained in Japan. (10 inserts in one case) (PCD inserts are available in 1 piece in one case)
○ : Inventory maintained in Japan. (Available from spring 2009)
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

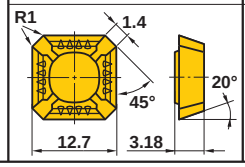
Honing : E : Round **F** : Sharp **S** : Chamfer + Hone
T : Chamfer **Z** : Strong

Shape	Order Number	Class	Honing	Coated F7030	Coated F620	Coated MC5020	Coated F5010	Coated F5020	Coated UP20M	Cermet NX2525	Cermet NX4545	Carbide UTi20T	Carbide HTi10	PCD MD220	D1	S1	F1	Re	Geometry
	SECN1203AFFN1	C	F										●		12.7	3.18	1.4	1.0	
	1203AFEN1	C	E										●		12.7	3.18	1.4	1.0	
	1203AFTN1	C	T							●	●	●			12.7	3.18	1.4	1.0	
	1203AFFR1	C	F											●	12.7	3.18	1.4	1.0	
	SEEN1203AFFN1	E	F										●		12.7	3.18	1.4	1.0	
	1203AFEN1	E	E										●		12.7	3.18	1.4	1.0	
	1203AFTN1	E	T		▲				●	●	●	●			12.7	3.18	1.4	1.0	
	1203AFSN1	E	S	●		○	●	●							12.7	3.18	1.4	1.0	
	1203AFZN1	E	Z							●					12.7	3.18	1.4	1.0	
	SEKN1203AFEN1	K	E										●		12.7	3.18	1.4	—	
	1203AFSN1	K	S	●											12.7	3.18	1.4	—	
	1203AFTN1	K	T		▲				●	●		●			12.7	3.18	1.4	—	
	1203AFTN	K	T								●				12.7	3.18	1.7	1.0	
	1203AFZN	K	Z							●					12.7	3.18	1.7	1.0	

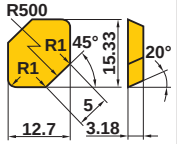
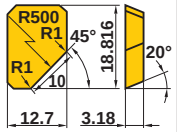
INSERTS WITH BREAKER

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	

Shape	Order Number	Class	Coated F7030	Coated F620	Coated MC5020	Coated F5010	Coated F5020	Coated UP20M	Cermet NX2525	Carbide UTi20T
	SEER1203AFEN-JS	E	●	▲	○	●	●	●	●	●



WIPER INSERTS

Shape	Order Number	Class	Honing	Cermet NX2525	Carbide HTi05T	Geometry
	WEC42AFFR5C	C	F		●	
	42AFER5C	C	E		●	
	42AFTR5C	C	T	●		
	WEC42AFER10C	C	E		●	

FACE MILLING <HEAVY CUTTING>

45° Finishing Roughing Face Milling

SE545

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 20°positive insert.
- High rake angle.
- High rigidity due to carbide shim.

C H :45°
A.R :+19° T :+13°
R.R :-2° I :+15°

Fig.1 ø100

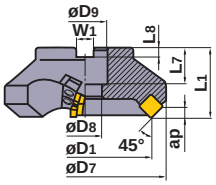


Fig.2 ø125 ø160

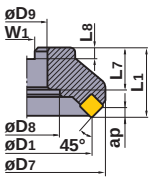
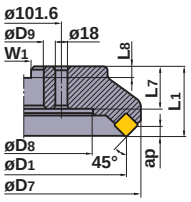
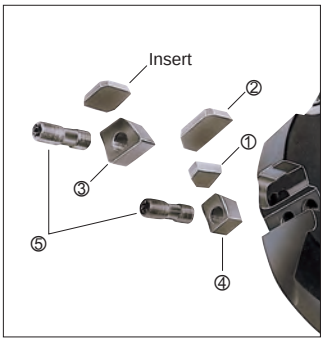


Fig.3 ø200 ø250



Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D7	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
Coarse Pitch	**SE545R0405D**	●	5	100	124.9	63	31.75	32	17	12.7	8	2.9	7.5	1
	0506E	●	6	125	149.8	63	38.1	38	60	15.9	10	3.7	7.5	2
	0608F	●	8	160	184.7	63	50.8	38	80	19.1	11	5.9	7.5	2
	0810K	●	10	200	225.7	63	47.625	35	140	25.4	14	8.2	7.5	3
	1012K	●	12	250	276.3	63	47.625	35	180	25.4	14	13.4	7.5	3



SPARE PARTS

Tool Holder Number	① Locator	② Shim	③ Wedge-T	④ Wedge-S	⑤* Clamp Screw	Wrench	Set Bolt
SE545R0405D	SPSE545R	STSE545R	CWSE545TR	CWSE545SN	LS15T	TKY25T	HSC16035
SE545R0506E ı SE545R1012K							—

* Clamp Torque (N • m) : LS15T=8.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	**F7030**	200 (160—250)	0.2 (0.1—0.3)
			NX4545		
			UTi20T	160 (125—200)	
			UP20M		
	Carbon Steel Alloy Steel	180—280HB	**F7030**	160 (125—200)	0.2 (0.1—0.3)
			NX4545		
			UTi20T	130 (100—160)	
			UP20M		
		280—350HB	**UTi20T**	75 (50—100)	0.15 (0.1—0.2)

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
M	Stainless Steel	≤200HB	**UP20M**	165 (125—200)	0.2 (0.1—0.3)
			UTi20T		
K	Cast Iron	Tensile Strength ≤450MPa	**MC5020 F5010 • F5020**	175 (100—250)	0.2 (0.1—0.3)
			HTi10	100 (80—125)	
			UTi20T	80 (60—100)	
N	Aluminium Alloy	—	**HTi10**	650 (300—1000)	0.12 (0.05—0.2)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD_1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution

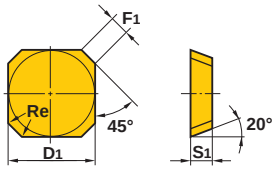
● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing : E : Round **F** : Sharp **S** : Chamfer + Hone **T** : Chamfer **Z** : Strong

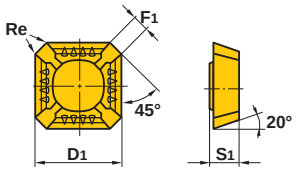
Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	UP20M	NX2525	NX4545	UTi20T	HTi10	D1	S1	F1	Re	
	SECN1504AFFN1	C	F										□	15.875	4.76	1.4	1.0	
	1504AFEN1	C	E										●	15.875	4.76	1.4	1.0	
	1504AFTN1	C	T							●	●	●		15.875	4.76	1.4	1.0	
	SEEN1504AFFN1	E	F										●	15.875	4.76	1.4	1.0	
	1504AFEN1	E	E										●	15.875	4.76	1.4	1.0	
	1504AFTN1	E	T		▲				●	●	●	●		15.875	4.76	1.4	1.0	
	1504AFSN1	E	S	●		○	●	●						15.875	4.76	1.4	1.0	
	SEKN1504AFEN1	K	E										●	15.875	4.76	1.4	–	
	1504AFTN1	K	T		▲				●	●		●		15.875	4.76	1.4	–	
	1504AFSN1	K	S	●										15.875	4.76	1.4	–	
	1504AFTN	K	T								●			15.875	4.76	1.7	1.0	
	1504AFZN	K	Z							●				15.875	4.76	1.7	1.0	

INSERTS WITH BREAKER

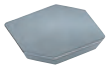
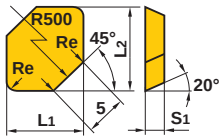
Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round

Shape	Order Number	Class	Honing	Coated						Carbide	Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	UP20M	UTi20T	D1	S1	F1	Re	
	SEER1504AFEN-JS	E	E	●	▲	○	●	●	●	●	15.875	4.76	1.4	1.0	

WIPER INSERTS

Shape	Order Number	Class	Honing	Cermet	Carbide	Dimensions (mm)				Geometry
				NX2525	HTi05T	L1	L2	S1	Re	
	WEC53AFER5C	C	E		●	15.875	18.505	4.76	1.0	
	53AFTR5C	C	T	●		15.875	18.505	4.76	1.0	

FACE MILLING <GENERAL CUTTING>

15° | Finishing | Roughing | Face Milling

SE415

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 20°positive insert.
- High rake angle.
- High rigidity due to carbide shim.

Fig.1

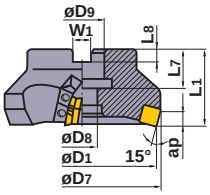
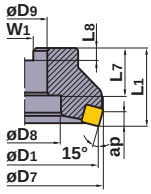


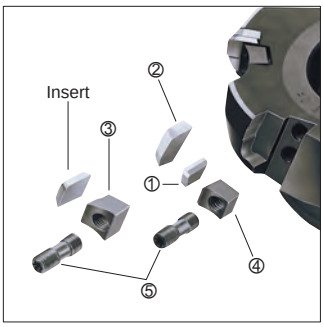
Fig.2



Right hand tool holder only.

C H :15°
A.R :+19° T :+11°
R.R :+5° I :+17°

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D7	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
Coarse Pitch	**SE415R0304C**	●	4	80	87.4	50	25.4	26	13	9.5	6	1.3	8.5	1
	0405D	●	5	100	107.2	63	31.75	32	17	12.7	8	2.5	8.5	1
	0506E	●	6	125	131.9	63	38.1	38	60	15.9	10	3.4	8.5	2
	0608F	●	8	160	166.7	63	50.8	38	80	19.1	11	5.6	8.5	2
Close Pitch	**SE415R0306C**	●	6	80	87.4	50	25.4	26	13	9.5	6	1.3	8.5	1
	0407D	●	7	100	107.2	63	31.75	32	17	12.7	8	2.5	8.5	1
	0509E	●	9	125	131.9	63	38.1	38	60	15.9	10	3.4	8.5	2
	0611F	●	11	160	166.7	63	50.8	38	80	19.1	11	5.6	8.5	2



SPARE PARTS

Tool Holder Number	① Locator	② Shim	③ Wedge-T	④ Wedge-S	⑤* Clamp Screw	Wrench	Set Bolt
SE415R0304C 0306C	SPSE415R	STSE415R	CWSE445TR	CWSE445SN	LS15T	TKY25T	HSC12035
SE415R0405D 0407D							HSC16035
SE415R0506E – SE415R0611F							–

* Clamp Torque (N • m) : LS15T=8.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	**F7030**	200 (160–250)	0.2 (0.1–0.3)
			NX4545		
			UTi20T	160 (125–200)	
			UP20M		
	Carbon Steel Alloy Steel	180–280HB	**F7030**	160 (125–200)	0.2 (0.1–0.3)
			NX4545		
			UTi20T	130 (100–160)	
			UP20M		
		280–350HB	**UTi20T**	75 (50–100)	0.15 (0.1–0.2)

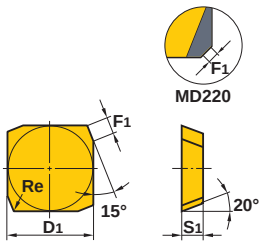
	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
M	Stainless Steel	≤200HB	**UP20M**	160 (125–200)	0.2 (0.1–0.3)
			UTi20T		
K	Cast Iron	Tensile Strength ≤450MPa	**MC5020 F5010 • F5020**	175 (100–250)	0.2 (0.1–0.3)
			HTi20T	100 (80–125)	
			UTi20T	80 (60–100)	
N	Aluminium Alloy	–	**MD220**	1000 (200–1500)	0.15 (0.05–0.25)
			HTi10	650 (300–1000)	0.12 (0.05–0.2)

● : Inventory maintained in Japan. (10 inserts in one case) (PCD inserts are available in 1 piece in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	

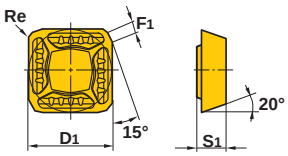
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting
Honing : E : Round **F** : Sharp **S** : Chamfer + Hone **T** : Chamfer **Z** : Strong

Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		PCD		Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	UP20M	NX2525	NX4545	UTi20T	HTi10	MD220		D_1	S_1	F_1	Re	
	SECN1203EFFR1	C	F										●	●		12.7	3.18	1.4	1.0	
	1203EFER1	C	E										●			12.7	3.18	1.4	1.0	
	1203EFTR1	C	T						●	●	●	●				12.7	3.18	1.4	1.0	
	SEEN1203EFFR1	E	F										●			12.7	3.18	1.4	1.0	
	1203EFER1	E	E										●			12.7	3.18	1.4	1.0	
	1203EFTR1	E	T		▲				●	●	●	●				12.7	3.18	1.4	1.0	
	1203EFSR1	E	S	●		○	●	●								12.7	3.18	1.4	1.0	
	1203EFZR1	E	Z							●						12.7	3.18	1.4	1.0	
	SEKN1203EFER1	K	E										●			12.7	3.18	1.4	—	
	1203EFTR1	K	T		▲				●	●		●				12.7	3.18	1.4	—	
	1203EFSR1	K	S	●												12.7	3.18	1.4	—	
	1203EFTR	K	T								●					12.7	3.18	1.8	1.0	
	1203EFZR	K	Z							●						12.7	3.18	1.8	1.0	

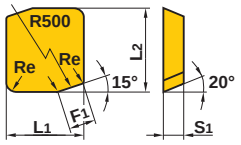
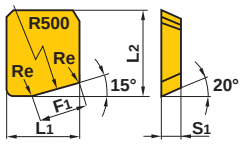
INSERTS WITH BREAKER

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting
Honing : E : Round

Shape	Order Number	Class	Honing	Coated				Carbide	Dimensions (mm)				Geometry
				F7030	F620	MC5020		UTi20T	D_1	S_1	F_1	Re	
	SEER1203EFER-JS	E	E	●	▲	○		●	12.7	3.18	1.4	1.0	

WIPER INSERTS

Shape	Order Number	Class	Honing	Cermet		Carbide		Dimensions (mm)					Geometry
				NX2525		HTi05T		L_1	L_2	S_1	F_1	Re	
	WEC42EFFR5C	C	F			□		12.7	13.728	3.18	5	1.0	
	42EFER5C	C	E			●		12.7	13.728	3.18	5	1.0	
	42EFTR5C	C	T	●				12.7	13.728	3.18	5	1.0	
	WEC42EFFR10C	C	F			□		12.7	14.99	3.18	10	1.0	
	42EFER10C	C	E			●		12.7	14.99	3.18	10	1.0	

SPARE PARTS E001
TECHNICAL DATA F001

FACE MILLING <HEAVY CUTTING>

15° Finishing Roughing Face Milling

SE515

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 20°positive insert.
- High rake angle.
- High rigidity due to carbide shim.

C H :15°
A.R :+19° T :+11°
R.R :+5° I :+17°

Fig.1
ø100

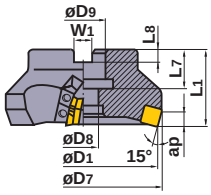
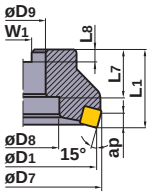
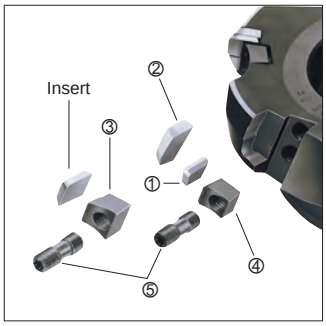


Fig.2
ø125
ø160



Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D7	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
Coarse Pitch	**SE515R0405D**	▲	5	100	108.9	63	31.75	32	17	12.7	8	2.3	11.5	1
	0506E	▲	6	125	133.6	63	38.1	38	60	15.9	10	3.5	11.5	2
	0608F	▲	8	160	168.3	63	50.8	38	80	19.1	11	5.6	11.5	2
Close Pitch	**SE515R0407D**	▲	7	100	108.9	63	31.75	32	17	12.7	8	2.3	11.5	1
	0509E	▲	9	125	133.6	63	38.1	38	60	15.9	10	3.5	11.5	2
	0611F	▲	11	160	168.3	63	50.8	38	80	19.1	11	5.6	11.5	2



SPARE PARTS

Tool Holder Number	① Locator	② Shim	③ Wedge-T	④ Wedge-S	⑤* Clamp Screw	Wrench	Set Bolt
SE515R0405D 0407D	SPSE515R	STSE515R	CWSE545TR	CWSE545SN	LS15T	TKY25T	HSC16035
SE515R0506E I SE515R0611F							–

* Clamp Torque (N • m) : LS15T=8.5

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	**F7030**	200 (160–250)	0.2 (0.1–0.3)
			NX4545		
			UTi20T	160 (125–200)	
			UP20M		
	Carbon Steel Alloy Steel	180–280HB	**F7030**	160 (125–200)	0.2 (0.1–0.3)
			NX4545		
			UTi20T	130 (100–160)	
			UP20M		
		280–350HB	**UTi20T**	75 (50–100)	0.15 (0.1–0.2)

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
M	Stainless Steel	≤200HB	**UP20M**	160 (125–200)	0.2 (0.1–0.3)
			UTi20T		
K	Cast Iron	Tensile Strength ≤450MPa	**MC5020 F5010 • F5020**	175 (100–250)	0.2 (0.1–0.3)
			HTi10	100 (80–125)	
			UTi20T	80 (60–100)	
N	Aluminium Alloy	–	**HTi10**	650 (300–1000)	0.12 (0.05–0.2)

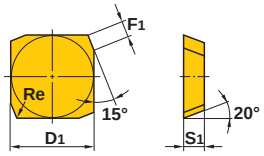
- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

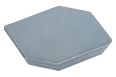
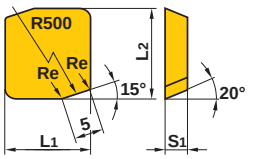
INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting
Honing : E : Round **F** : Sharp **S** : Chamfer + Hone **T** : Chamfer **Z** : Strong

Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	UP20M	NX2525	NX4545	UTi20T	HTi10	D_1	S_1	F_1	Re	
	SECN1504EFFR1	C	F										□	15.875	4.76	1.4	1.0	
	1504EFER1	C	E										●	15.875	4.76	1.4	1.0	
	1504EFTR1	C	T						□	●	●	●		15.875	4.76	1.4	1.0	
	SEEN1504EFFR1	E	F										●	15.875	4.76	1.4	1.0	
	1504EFER1	E	E										●	15.875	4.76	1.4	1.0	
	1504EFTR1	E	T		▲				□	●	●	●		15.875	4.76	1.4	1.0	
	1504EFSR1	E	S	●		○	●	●						15.875	4.76	1.4	1.0	
	SEKN1504EFER1	K	E										●	15.875	4.76	1.4	—	
	1504EFTR1	K	T		▲				●	●		●		15.875	4.76	1.4	—	
	1504EFSR1	K	S	●										15.875	4.76	1.4	—	
	1504EFTR	K	T								●			15.875	4.76	1.8	1.0	
	1504EFZR	K	Z							●				15.875	4.76	1.8	1.0	

WIPER INSERTS

Shape	Order Number	Class	Honing	Cermet		Carbide		Dimensions (mm)				Geometry
				NX2525		HTi05T		L_1	L_2	S_1	Re	
	WEC53EFER5C	C	E			●		15.875	16.903	4.76	1.0	
	53EFTR5C	C	T	●				15.875	16.903	4.76	1.0	

FACE MILLING

<HIGH FEED CUTTING FOR CAST IRON>

40° | Finishing | Roughing | Face Milling

AHX640W NEW

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	▬			

- Heptagonal double sided insert.
- Economical 14 cutting edge inserts.
- Multi insert design for high feed machining.

Fig.1 ø80

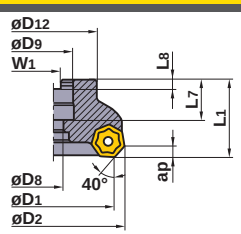


Fig.2 ø100 ø125 ø160

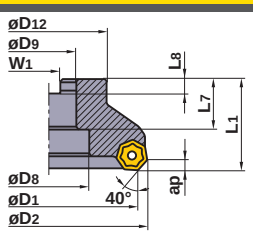


Fig.3 ø200 ø250

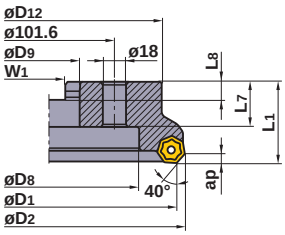
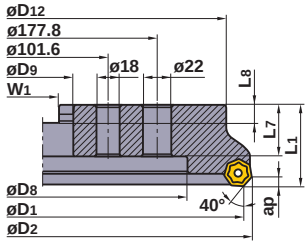


Fig.4 ø315

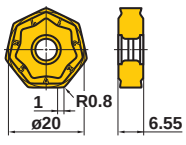
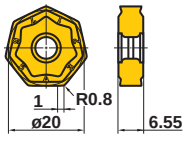
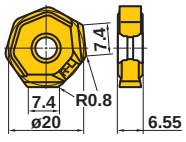


C H :40°
A.R :-6° T :+10°
R.R :-4° I :+9°—+10° (T,I : When using the MK breaker insert)

Right hand tool holder shown.

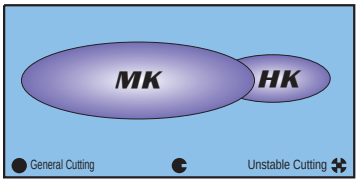
Type	Order Number	Stock R	Stock L	Number of Teeth	D1	D2	L1	D9	L7	D8	D12	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
Extra Fine Pitch Type	**AHX640WR/L08008C**	●	○	8	80	92.6	50	25.4	26	13	56	9.5	6	1.5	6	1
	10010D	●	○	10	100	112.6	50	31.75	32	45	70	12.7	8	2.1	6	2
	12512E	●	○	12	125	137.6	63	38.1	35	56	80	15.9	10	3.5	6	2
	16016F	●	○	16	160	172.6	63	50.8	38	72	100	19.1	11	5.6	6	2
	20020K	●	○	20	200	212.6	63	47.625	35	140	175	25.4	14.22	9.0	6	3
	25024K	○	○	24	250	262.6	63	47.625	35	180	220	25.4	14.22	14.4	6	3
	31528P	○	○	28	315	327.6	63	47.625	40	225	285	25.4	14.22	23.8	6	4
Super Extra Fine Pitch Type	**AHX640WR/L08010C**	●	○	10	80	92.6	50	25.4	26	13	56	9.5	6	1.5	6	1
	10014D	●	○	14	100	112.6	50	31.75	32	45	70	12.7	8	2.1	6	2
	12518E	●	○	18	125	137.6	63	38.1	35	56	80	15.9	10	3.5	6	2
	16022F	●	○	22	160	172.6	63	50.8	38	72	100	19.1	11	5.6	6	2
	20028K	●	○	28	200	212.6	63	47.625	35	140	175	25.4	14.22	9.0	6	3
	25036K	○	○	36	250	262.6	63	47.625	35	180	220	25.4	14.22	14.4	6	3
	31544P	○	○	44	315	327.6	63	47.625	40	225	285	25.4	14.22	23.8	6	4

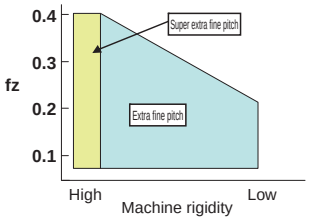
INSERTS

Shape	Order Number	Class	Honing	Coated MC5020	Geometry
MK Breaker	**NNMU200608ZEN-MK**	M	E	●	
HK Breaker	**NNMU200608ZEN-HK**	M	E	○	
Wiper	**WNEU2006ZEN7C-WK**	E	E	○	

RECOMMENDED CUTTING CONDITIONS

Work Material		Tensile Strength	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	MC5020	300 (250—350)	0.3 (0.2—0.4)
		250—350 MPa		220 (150—300)	0.3 (0.2—0.4)
	Ductile Cast Iron	≤450MPa		200 (150—250)	0.2 (0.1—0.3)
		500—800 MPa		170 (150—200)	0.2 (0.1—0.3)





(Note) When the workpiece has poor clamping rigidity and the tool overhang is long, reduce the cutting speed and feed by 20—30%.

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case)

Fig.1
ø80

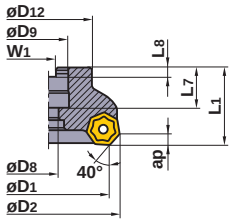


Fig.2
ø100
ø125

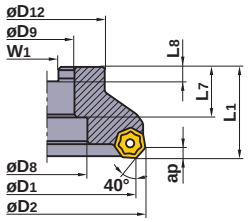


Fig.3
ø160

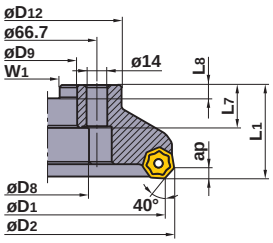
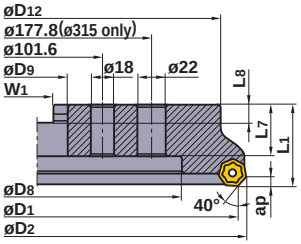


Fig.4
ø200
ø250
ø315



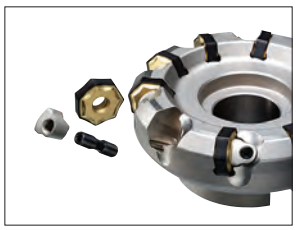
For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

C H :40°
A.R :-6° T :+10°
R.R :-4° I :+9°—+10° (T,I : When using the MK breaker insert)

Right hand tool holder shown.

Type	Order Number	Stock R	Stock L	Number of Teeth	D1	D2	L1	D9	L7	D8	D12	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
Extra Fine Pitch Type	**AHX640W-080A08R/L**	○	○	8	80	92.6	50	27	23	13	56	12.4	7	1.5	6	1
	-100B10R/L	○	○	10	100	112.6	50	32	32	45	70	14.4	8	2.1	6	2
	-125B12R/L	○	○	12	125	137.6	63	40	32	56	80	16.4	9	3.1	6	2
	-160C16R/L	○	○	16	160	172.6	63	40	29	56	100	16.4	9	5.6	6	3
	-200C20R/L	○	○	20	200	212.6	63	60	32	135	155	25.7	14	8.0	6	4
	-250C24R/L	○	○	24	250	262.6	63	60	32	180	200	25.7	14	12.6	6	4
	-315C28R/L	○	○	28	315	327.6	80	60	57	225	285	25.7	14	31.5	6	4
Super Extra Fine Pitch Type	**AHX640W-080A10R/L**	○	○	10	80	92.6	50	27	23	13	56	12.4	7	1.5	6	1
	-100B14R/L	○	○	14	100	112.6	50	32	32	45	70	14.4	8	2.1	6	2
	-125B18R/L	○	○	18	125	137.6	63	40	32	56	80	16.4	9	3.1	6	2
	-160C22R/L	○	○	22	160	172.6	63	40	29	56	100	16.4	9	5.6	6	3
	-200C28R/L	○	○	28	200	212.6	63	60	32	135	155	25.7	14	8.0	6	4
	-250C36R/L	○	○	36	250	262.6	63	60	32	180	200	25.7	14	12.6	6	4
	-315C44R/L	○	○	44	315	327.6	80	60	57	225	285	25.7	14	31.5	6	4



SPARE PARTS

Tool Holder Number	Wedge	* Clamp Screw	Wrench
AHX640W Type	CWAHX640WN	LS0622T	TKY15T

* Clamp Torque (N • m) : LS0622T=6.0

SPARE PARTS E001
TECHNICAL DATA F001

FACE MILLING

<HIGH EFFICIENCY CUTTING FOR CAST IRON>

45° | Finishing | Roughing | Face Milling

AOX445 NEW

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	▬			

Fig.1 ø63

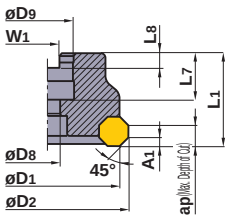


Fig.2 ø80 ø100 ø125 ø160

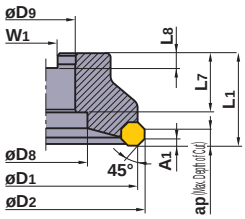
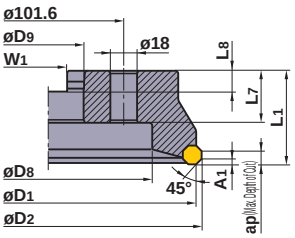


Fig.3 ø200



- **Solid CBN octagonal double sided insert.**
- **Economical 16 cutting edge inserts. (when the depth of cut is 3mm)**
- **For high efficiency roughing through to finishing.**
- **Easy operation and cleansing.**

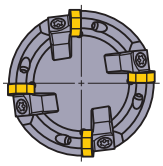
C H :45°
A.R :-5°
R.R :-9°—-6°
T :-9°—-6°
I :-5°

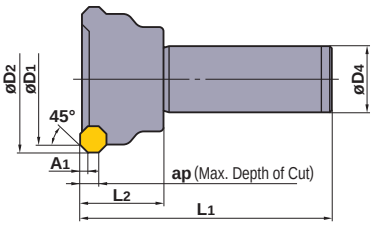
ARBOR TYPE

Right hand tool holder shown.

Type	Order Number	Stock R	Stock L	Number of Teeth	D1	D2	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut (mm) A1	Max. Depth of Cut (mm) ap	Max. Allowable Revolution (min-1)	Type (Fig.)
Coarse Pitch	**AOX445-063A04R/L**	○	◇	4	63	70.75	40	22	20	11	10.4	6.3	0.6	3	8	12000	1
	R/L08006C	○	◇	6	80	87.73	50	25.4	26	38	9.5	6	1.1	3	8	11000	2
	R/L10008D	○	◇	8	100	107.73	63	31.75	32	45	12.7	8	2.4	3	8	9300	2
	R/L12510E	○	◇	10	125	132.71	63	38.1	35	60	15.9	10	2.9	3	8	8300	2
	R/L16012F	○	◇	12	160	167.71	63	50.8	38	80	19.1	11	4.6	3	8	7200	2
	R/L20012K	◇	◇	12	200	207.71	63	47.625	35	140	25.4	14.22	8.3	3	8	6400	3

(Note) When machining with a depth of cut of 8mm, 16 corners cannot be used.





SHANK TYPE

Right hand tool holder shown.

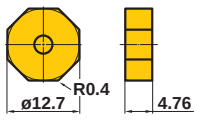
Type	Order Number	Stock R	Stock L	Number of Teeth	D1	D2	L1	D4	L2	Tool Weight (kg)	Max. Depth of Cut (mm) A1	Max. Depth of Cut (mm) ap	Max. Allowable Revolution (min-1)
Coarse Pitch	**AOX445R/L503S32**	○	◇	3	50	57.75	125	32	40	1.0	3	8	13000
	R/L634S32	○	◇	4	63	70.75	125	32	40	1.3	3	8	12000

SPARE PARTS

Tool Holder Number	Wedge	Clamp Screw *	Wrench
AOX445	CWAOX445N	LS15T	TKY25T

* Clamp Torque (N • m) : LS15T=8.0

INSERTS

Order Number	Class	CBN CB5030	Geometry
SL-ONEN120404ASN	E	○	

RECOMMENDED CUTTING CONDITIONS

Work Material		Tensile Strength	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤200MPa	CB5030	1000 (800—1500)	0.1 (0.05—0.15)
		250—350 MPa			

○ : Inventory maintained in Japan. (Available from spring 2009) (CBN inserts are available in 1 piece in one case.)
◇ : Non stock, produced to order only. (Available from spring 2009)

FACE MILLING
<HIGH FEED CUTTING FOR CAST IRON>

15° | Finishing | Roughing | Face Milling

FBP415

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	◆			

- 11°positive insert.
- Large axial angle prevents chattering.
- Multi insert design.
- For high feed cast iron machining.

■ϕ80—ϕ100
C H :15°
A.R :+13° T :+2°
R.R :-2° I :+13°

■ϕ125—ϕ315
C H :15°
A.R :+13° T :+4°
R.R :+1° I :+12°

Fig.1 ø80 ø100

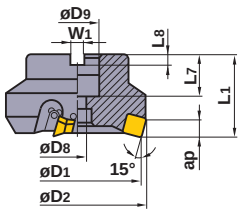


Fig.2 ø125 ø160

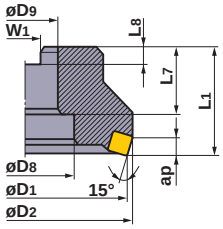


Fig.3 ø200 ø250

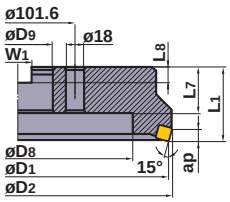
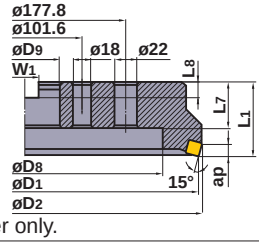


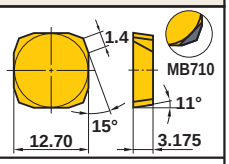
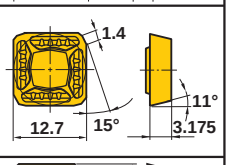
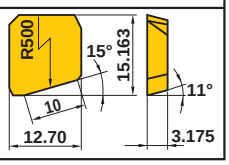
Fig.4 ø315



Right hand tool holder only.

Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D2	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
FBP415R0308C	●	8	80	85.2	50	25.4	26	13	9.5	6	1.5	8.5	1
0410D	●	10	100	105.2	63	31.75	32	17	12.7	8	2.7	8.5	1
0514E	●	14	125	130.4	63	38.1	38	60	15.9	10	3.6	8.5	2
0618F	●	18	160	165.3	63	50.8	38	80	19.1	11	5.8	8.5	2
0822K	●	22	200	205.3	63	47.625	35	140	25.4	14	8.6	8.5	3
1028K	●	28	250	255.3	63	47.625	35	180	25.4	14	14.0	8.5	3
1234P	●	34	315	320.3	63	47.625	40	245	25.4	14	23.0	8.5	4

INSERTS

Order Number	Class	Honing	Coated MC5020	Coated F5010	Coated F5020	Carbide HTi10	Carbide HTi05T	CBN MB710	Geometry
SPEN1203EEER1	E	E	○	●	●	●			
1203EETR1		T						●	
SPNN1203EEER1	N	E	○	●	●	●			
SPER1203EEER-JS	E	E	○	●	●				
WPC42EEER10C	C	E					●		

RECOMMENDED CUTTING CONDITIONS

Work Material			Tensile Strength	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron		≤200MPa	**HTi10**	100 (80—125)	0.2 (0.1—0.3)
			250—350 MPa	**MC5020 F5010 • F5020**	150 (100—200)	0.2 (0.1—0.3)
				MB710	500 (300—900)	0.15 (0.05—0.25)
	Ductile Cast Iron	≤ FCD450 (JIS)	≤450MPa	**HTi10**	80 (60—100)	0.15 (0.1—0.2)
				MC5020 F5010 • F5020	125 (100—150)	0.2 (0.1—0.3)
		≥ FCD500 (JIS)	500—800 MPa	**MC5020 F5010 • F5020**	110 (80—150)	0.2 (0.1—0.3)
				MB710	200 (100—300)	0.15 (0.05—0.25)

● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
● Table Feed (mm/min)
=Feed per Tooth x Number of Teeth x Cutter Revolution

SPARE PARTS

Tool Holder Number	Shim	Wedge-T	Clamp Screw *	Shim Screw *	Wrench (Clamp Screw)	Wrench (Shim)	Set Bolt
FBP415R0308C	STSP415R	CWSP415TR	LS10T	TS32	TKY25T	TKY08F	—
FBP415R0410D							HSC16035
FBP415R0514E — FBP415R1234P							—

* Clamp Torque (N • m) : LS10T=8.5, TS32=1.0

● : Inventory maintained in Japan.
(10 inserts in one case) (CBN inserts are available in 1 piece in one case.)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case)

SPARE PARTS E001 TECHNICAL DATA F001

FACE MILLING

<GENERAL CUTTING FOR ALUMINIUM ALLOY>

7° | Finishing | Roughing | Face Milling

BF407

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
●				

- 25°positive insert.
- High rake and relief angle.
- Suitable for light alloy machining.

C H :7°
A.R :+15° T :+14°
R.R :+12° I :+14°

Fig.1 ø80 ø100

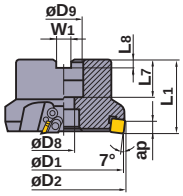


Fig.2 ø125 ø160

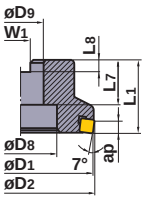


Fig.3 ø200 ø250

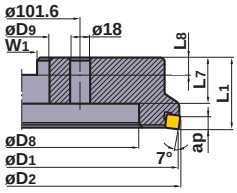
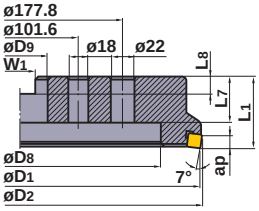


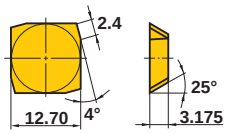
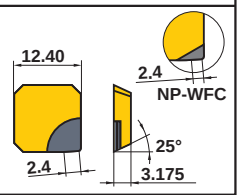
Fig.4 ø315



Right hand tool holder only.

Order Number	Stock	Number of Teeth	Dimensions (mm)								Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
	R		D1	D2	L1	D9	L7	D8	W1	L8			
BF407R0305C	●	5	80	82.8	50	25.4	26	13	9.5	6	1.1	9	1
0406D	●	6	100	102.8	63	31.75	32	17	12.7	8	2.3	9	1
0508E	●	8	125	127.7	63	38.1	38	60	15.9	10	2.8	9	2
0610F	●	10	160	162.7	63	50.8	38	80	19.1	11	5.0	9	2
0812K	●	12	200	202.4	63	47.625	35	140	25.4	14	8.0	9	3
1016K	●	16	250	252.4	63	47.625	35	180	25.4	14	13.1	9	3
1218P	□	18	315	317.7	63	47.625	40	245	25.4	14	24.3	9	4

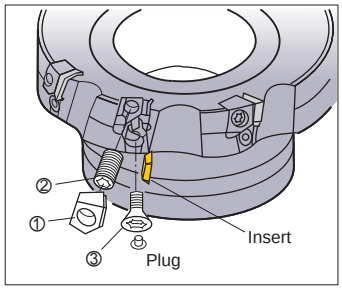
INSERTS

Order Number	Class	Honing	Carbide HTi10	PCD MD220	Geometry
SFAN1203ZFFR2	A	F	●		
SFCN1203ZFFR2	C	F	●	●	
WFC42ZFER2	C	E		●	
NP-WFC42ZFER2	C	E		●	

RECOMMENDED CUTTING CONDITIONS

Work Material		Silicon (%)	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
N	Aluminium Alloy (A1070, A6061)	<2	HTi10	700 (400—1000)	0.15 (0.1—0.25)
			MD220	1000 (800—1200)	0.15 (0.05—0.25)
	Aluminium Alloy (A4032)	10	HTi10	700 (400—1000)	0.1 (0.05—0.15)
			MD220	1000 (800—1200)	0.15 (0.05—0.25)
	Aluminium Alloy (A390)	15	HTi10	400 (200—600)	0.15 (0.05—0.25)
			MD220	600 (400—800)	

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution



SPARE PARTS

Tool Holder Number	① Wedge	② * Clamp Screw	③ Clamp Screw	Wrench	Set Bolt
BF407R0305C	CWSF407TR1	LS15T	CAS51T	TKY25T	—
BF407R0406D					HSC16035
BF407R0508E ~ BF407R1218P	CWSF407TR2	LS15T	CAS51T	TKY25T	—

* Clamp Torque (N • m) : LS15T=8.5

● : Inventory maintained in Japan. (10 inserts in one case) (PCD inserts are available in 1 piece in one case)
□ : Non stock, produced to order only.

FACE MILLING
<CUTTING FOR DIFFICULT-TO-CUT MATERIALS>

R10 | Finishing | Roughing | Shoulder Milling | Face Milling

SG20

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 30° positive insert.
- High rake angle.
- Round shape insert with a strong cutting edge.
- Suitable for difficult-to-cut materials.

Fig.1
ø80
ø100

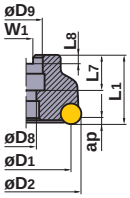
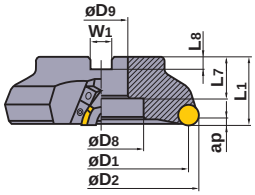


Fig.2
ø125
ø160

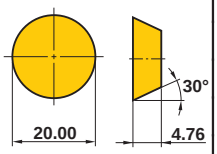


Right hand tool holder only.

A.R :+24° T :+23° (CH=45°)
R.R :+9°

Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D2	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
SG20R0304C	●	4	80	101.2	50	25.4	26	13	9.5	6	1.5	8	1
0405D	●	5	100	121.4	63	31.75	32	17	12.7	8	2.9	8	1
0506E	●	6	125	146.4	63	38.1	38	60	15.9	10	3.8	8	2
0608F	●	8	160	181.4	63	50.8	38	80	19.1	11	6.1	8	2

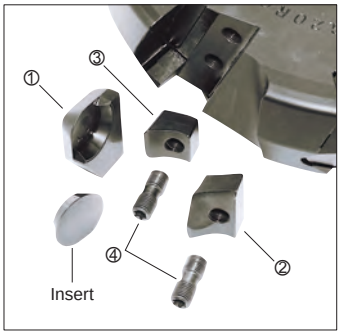
INSERTS

Order Number	Class	Coated F7030	Coated UP20M	Coated	Cermet NX2525	Cermet	Carbide UTi20T	Carbide HTi10	Geometry
RGEN2004M0SN	E	●	●		●		●	●	

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)	Recommended Max. Depth of Cut (mm)
P	Carbon Steel Alloy Steel	≤180HB	**UTi20T**	125 (100—150)	0.35 (0.2—0.5)	4.5
			NX2525	175 (150—200)	0.25 (0.2—0.3)	4.5
		280—350HB	**UTi20T**	110 (80—150)	0.3 (0.2—0.4)	4.5
			NX2525	165 (130—200)	0.25 (0.2—0.3)	4.5
M	Stainless Steel	≤200HB	**UTi20T**	140 (100—180)	0.35 (0.2—0.5)	3
K	Gray Cast Iron	Tensile Strength ≤350MPa	**HTi10**	125 (100—150)	0.4 (0.3—0.5)	4.5
H	Hardened Steel	40—60HRC	**HTi10**	30 (15—50)	0.2 (0.1—0.3)	2

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution



SPARE PARTS

Tool Holder Number	① Locator	② Wedge-T	③ Wedge-S	④ * Clamp Screw	Wrench	Set Bolt
SG20R0304C	SPSG20R	CWSG20TR	CWSG20SN	LS15T	TKY25T	—
SG20R0405D						HSC16035
SG20R0506E						—
0608F						

* Clamp Torque (N • m) : LS15T=8.5

● : Inventory maintained in Japan. (10 inserts in one case)

SPARE PARTS E001
TECHNICAL DATA F001

SHOULDER MILLING
<GENERAL CUTTING>

0° | Finishing | Roughing | Face Milling | Face Milling | Shoulder Milling

ASX400

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

Fig.1
ø50
ø63

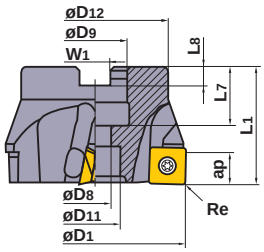
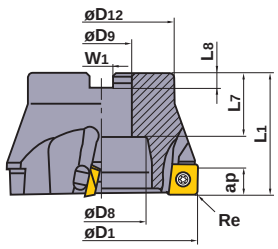
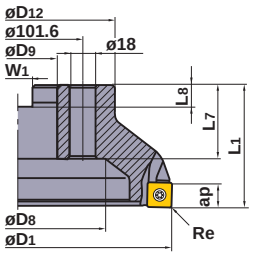


Fig.2
ø80
ø100
ø125
ø160



- **High tolerance M-class inserts.**
- **Economical 4 cutting edge inserts.**
- **Curved cutting edge and high rigidity holder.**
- **Screw-on type.**

Fig.3
ø200
ø250



ARBOR TYPE

C H :0°
A.R :+11° T :-9°—-11°
R.R :-9°—-11° I :+11°

Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D12	W1	L8	D11	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
Coarse Pitch	**ASX400-050A03R**	●	3	50	40	22	20	11	41	10.4	6.3	17	0.3	10	1
	-063A04R	●	4	63	40	22	20	11	50	10.4	6.3	17	0.5	10	1
	R08004C	●	4	80	50	25.4	26	38	60	9.5	6	—	1.0	10	2
	R10005D	●	5	100	50	31.75	32	45	70	12.7	8	—	1.5	10	2
	R12506E	●	6	125	63	38.1	35	60	80	15.9	10	—	2.5	10	2
	R16008F	●	8	160	63	50.8	38	90	100	19.1	11	—	4.0	10	2
	R20010K	●	10	200	63	47.625	35	135	160	25.4	14.22	—	7.0	10	3
	R25012K	●	12	250	63	47.625	35	180	210	25.4	14.22	—	12.0	10	3
Fine Pitch	**ASX400-050A04R**	●	4	50	40	22	20	11	41	10.4	6.3	17	0.3	10	1
	-063A05R	●	5	63	40	22	20	11	50	10.4	6.3	17	0.5	10	1
	R08006C	●	6	80	50	25.4	26	38	60	9.5	6	—	1.0	10	2
	R10007D	●	7	100	50	31.75	32	45	70	12.7	8	—	1.5	10	2
	R12508E	●	8	125	63	38.1	35	60	80	15.9	10	—	2.5	10	2
	R16012F	●	12	160	63	50.8	38	90	100	19.1	11	—	4.0	10	2
	R20016K	●	16	200	63	47.625	35	135	160	25.4	14.22	—	7.0	10	3
	R25018K	●	18	250	63	47.625	35	180	210	25.4	14.22	—	12.0	10	3

SPARE PARTS

Tool Holder Number	Shim	Shim Screw *	Clamp Screw *	Wrench (Insert)	Wrench (Shim)
ASX400	STASX400N	WCS503507H	TPS35	TIP15T	HKY35R

* Clamp Torque (N • m) : WCS503507H=5.0, TPS35=3.5

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)

Fig.1
ø50
ø63

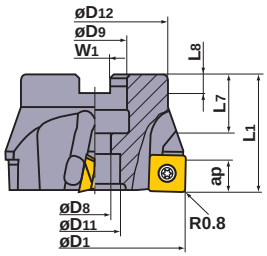


Fig.2
ø80
ø100
ø125

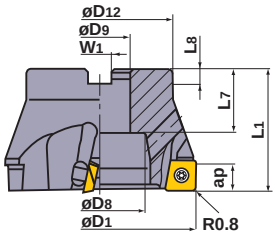


Fig.3
ø160

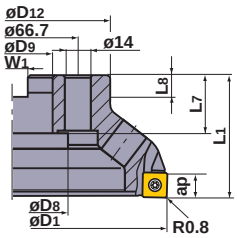
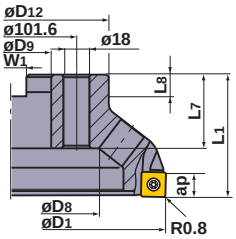


Fig.4
ø200
ø250



For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

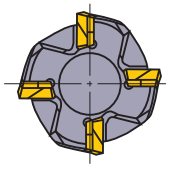
ARBOR TYPE

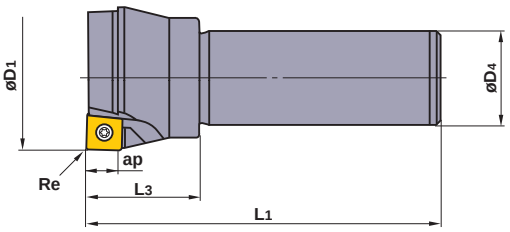
C H :0°
A.R :+11° T :-9°—-11°
R.R :-9°—-11° I :+11°

Right hand tool holder only.

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)									Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
		R		D1	L1	D9	L7	D8	D12	W1	L8	D11			
Coarse Pitch	ASX400-050A03R	●	3	50	40	22	20	11	41	10.4	6.3	17	0.3	10	1
	-063A04R	●	4	63	40	22	20	11	50	10.4	6.3	17	0.5	10	1
	-080B04R	●	4	80	50	27	29	38	60	12.4	7	—	0.9	10	2
	-100B05R	●	5	100	50	32	32	45	70	14.4	8	—	1.4	10	2
	-125B06R	●	6	125	63	40	32	60	80	16.4	9	—	2.3	10	2
	-160C08R	●	8	160	63	40	29	56	100	16.4	9	—	3.6	10	3
	-200C10R	○	10	200	63	60	32	135	160	25.7	14.22	—	6.3	10	4
	-250C12R	○	12	250	63	60	32	180	210	25.7	14.22	—	10.8	10	4
Fine Pitch	ASX400-050A04R	●	4	50	40	22	20	11	41	10.4	6.3	17	0.3	10	1
	-063A05R	●	5	63	40	22	20	11	50	10.4	6.3	17	0.5	10	1
	-080B06R	●	6	80	50	27	29	38	60	12.4	7	—	0.9	10	2
	-100B07R	●	7	100	50	32	32	45	70	14.4	8	—	1.4	10	2
	-125B08R	●	8	125	63	40	32	60	80	16.4	9	—	2.2	10	2
	-160C12R	●	12	160	63	40	29	56	100	16.4	9	—	3.5	10	3
	-200C16R	●	16	200	63	60	32	135	160	25.7	14.22	—	6.2	10	4
	-250C18R	●	18	250	63	60	32	180	210	25.7	14.22	—	10.7	10	4
Extra Fine Pitch	ASX400-050A05R	○	5	50	40	22	20	11	41	10.4	6.3	17	0.3	10	1
	-063A06R	○	6	63	40	22	20	11	50	10.4	6.3	17	0.5	10	1
	-080B08R	●	8	80	50	27	29	38	60	12.4	7	—	0.9	10	2
	-100B10R	●	10	100	50	32	32	45	70	14.4	8	—	1.4	10	2
	-125B12R	●	12	125	63	40	32	60	80	16.4	9	—	2.1	10	2
	-160C15R	●	15	160	63	40	29	56	100	16.4	9	—	3.4	10	3
	-200C19R	●	19	200	63	60	32	135	160	25.7	14.22	—	6.2	10	4
	-250C22R	●	22	250	63	60	32	180	210	25.7	14.22	—	10.5	10	4

SPARE PARTS E001
TECHNICAL DATA F001





SHANK TYPE

Right hand tool holder only.

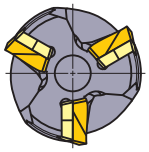
Type	Order Number	Stock	Number of Teeth	Dimensions (mm)				
		R		D1	L1	D4	L3	ap
Coarse Pitch	**ASX400R403S32**	●	3	40	125	32	40	10
	503S32	●	3	50	125	32	40	10
	634S32	●	4	63	125	32	40	10
	804S32	●	4	80	125	32	40	10
Fine Pitch	**504S32**	●	4	50	125	32	40	10
	635S32	●	5	63	125	32	40	10
	806S32	●	6	80	125	32	40	10

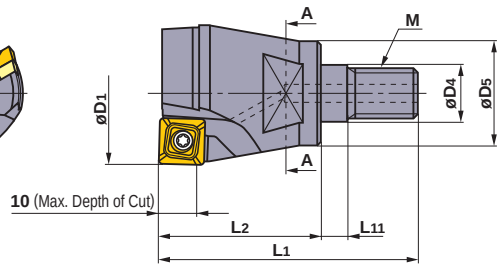
SPARE PARTS

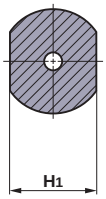
Tool Holder Number		*	*		
	Shim	Shim Screw	Clamp Screw	Wrench (Insert)	Wrench (Shim)
ASX400	STASX400N	WCS503507H	TPS35	TIP15T	HKY35R

* Clamp Torque (N • m) : WCS503507H=5.0, TPS35=3.5

NEW







SCREW-IN TYPE

Right hand tool holder only.

Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)								Tool Weight		*	*		
	R			D1	D4	D5	L1	L2	L11	H1	M	(kg)	Shim	Shim Screw	Clamp Screw	Wrench (Insert)	Wrench (Shim)
ASX400R322AM1640	●	○	2	32	17	29	63	40	6	24	M16	0.3	—	WCS503507H	TPS35	TIP15T	HKY35R
403AM1645	●	○	3	40	17	29	68	45	6	24	M16	0.3	STASX400N	WCS503507H	TPS35	TIP15T	HKY35R

* Clamp Torque (N • m) : WCS503507H=5.0, TPS35=3.5

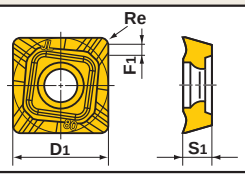
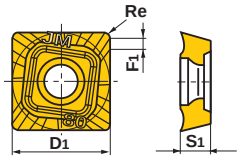
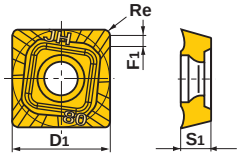
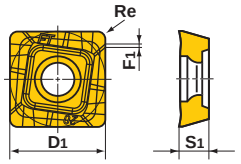
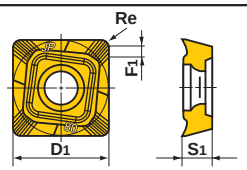
● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009)

INSERTS

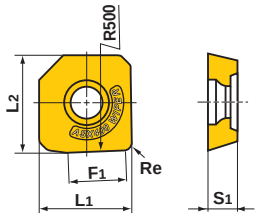
Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **F** : Sharp **T** : Chamfer

Application	Shape	Order Number	Class	Honing	Coated F7030	Coated MC5020	Coated F5010	Coated F5020	Coated VP15TF	Coated VP30RT	Cermet NX4545	Cermet	Carbide HTi10	Carbide	D1	S1	F1	Re	Geometry
Finish—Light Cutting	**JL** Breaker	**SOET12T308PEER-JL**	E	E	●				●	●	●				12.7	3.97	1.4	0.8	
Light—Semi-Heavy Cutting	**JM** Breaker	**SOMT12T308PEER-JM**	M	E	●	○	●	●	●	●	●				12.7	3.97	1.4	0.8	
Medium—Heavy Cutting	**JH** Breaker	**SOMT12T308PEER-JH**	M	E	●	○	●	●	●	●					12.7	3.97	1.4	0.8	
Heavy Interrupted Cutting	**FT** Breaker	**SOMT12T320PEER-FT**	M	E		○		●	●						12.7	3.97	0.5	2.0	
For Aluminium Alloy	**JP** Breaker	**SOGT12T308PEFR-JP**	G	F									●		12.7	3.97	1.4	0.8	

WIPER INSERTS

Shape	Order Number	Class	Honing	Cermet NX2525	Cermet	Carbide HTi05T	Carbide	L1	L2	S1	F1	Re	Geometry
	WOEW12T308PEER8C	E	E			●		12.5	13.2	3.97	8	0.8	
	12T308PETR8C	E	T	●				12.5	13.2	3.97	8	0.8	

SCREW-IN ARBORS C192
SPARE PARTS E001
TECHNICAL DATA F001

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Finish—Light Cutting		Light—Semi-Heavy Cutting		Medium—Heavy Cutting	
					Feed per Tooth (mm/tooth)	Breaker	Feed per Tooth (mm/tooth)	Breaker	Feed per Tooth (mm/tooth)	Breaker
P	Mild Steel	≤180HB	F7030	280 (210—350)	0.18 (0.08—0.28)	JL	0.2 (0.1—0.3)	JM	0.25 (0.1—0.35)	JH
			VP15TF	250 (200—300)	0.18 (0.08—0.28)	JL	0.2 (0.1—0.3)	JM	0.25 (0.1—0.35)	JH FT
			VP30RT	230 (180—280)	0.18 (0.08—0.28)	JL	0.2 (0.1—0.3)	JM	0.25 (0.1—0.35)	JH
			NX4545	180 (130—230)	0.15 (0.07—0.23)	JL	0.18 (0.1—0.28)	JM	—	—
	Carbon Steel Alloy Steel	180—280HB	F7030	250 (200—300)	0.15 (0.07—0.23)	JL	0.18 (0.1—0.28)	JM	0.2 (0.1—0.3)	JH
			VP15TF	220 (170—270)	0.15 (0.07—0.23)	JL	0.18 (0.1—0.28)	JM	0.2 (0.1—0.3)	JH FT
			VP30RT	200 (150—250)	0.15 (0.07—0.23)	JL	0.18 (0.1—0.28)	JM	0.2 (0.1—0.3)	JH
			NX4545	150 (120—180)	0.13 (0.06—0.2)	JL	0.15 (0.1—0.25)	JM	—	—
		280—350HB	F7030	180 (130—230)	0.13 (0.06—0.2)	JL	0.15 (0.1—0.25)	JM	0.18 (0.1—0.28)	JH
			VP15TF	140 (100—180)	0.13 (0.06—0.2)	JL	0.15 (0.1—0.25)	JM	0.18 (0.1—0.28)	JH FT
			VP30RT	120 (80—160)	0.13 (0.06—0.2)	JL	0.15 (0.1—0.25)	JM	0.18 (0.1—0.28)	JH
			NX4545	100 (80—120)	0.1 (0.05—0.15)	JL	0.13 (0.1—0.2)	JM	—	—
M	Stainless Steel	≤270HB	VP15TF	220 (170—270)	0.15 (0.07—0.23)	JL	0.18 (0.1—0.28)	JM	0.2 (0.1—0.3)	JH FT
			VP30RT	200 (150—250)	0.15 (0.07—0.23)	JL	0.18 (0.1—0.28)	JM	0.2 (0.1—0.3)	JH
			NX4545	150 (120—180)	0.15 (0.07—0.23)	JL	0.18 (0.1—0.28)	JM	—	—
K	Cast Iron Ductile Cast Iron	Tensile Strength ≤450MPa	MC5020	200 (150—250)	—	—	0.2 (0.1—0.3)	JM	0.25 (0.1—0.35)	JH FT
			F5010	200 (150—250)	—	—	0.2 (0.1—0.3)	JM	0.25 (0.1—0.35)	JH
			F5020	200 (150—250)	—	—	0.2 (0.1—0.3)	JM	0.25 (0.1—0.35)	JH FT
			VP15TF	180 (130—230)	0.18 (0.1—0.28)	JL	0.2 (0.1—0.3)	JM	0.25 (0.1—0.35)	JH FT
N	Aluminium Alloy	—	HTi10	300—	0.15 (0.1—0.2)	JP	0.2 (0.1—0.3)	JP	0.3 (0.2—0.4)	JP
S	Heat Resistant Alloy (Inconel, Waspaloy etc.)	—	VP15TF	40 (20—50)	0.15 (0.07—0.2)	JL	0.2 (0.1—0.3)	JM	—	—
H	Hardened Steel	40—55HRC	VP15TF	80 (60—100)	0.08 (0.04—0.13)	JL	0.1 (0.05—0.15)	JM	0.12 (0.07—0.17)	JH FT

●Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD_1) ●Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

INSTRUCTIONS FOR USING INSERTS

Instructions for use of the JP breaker

- The JP breaker has sharp cutting edges. Wear gloves when handling.
- When machining aluminium alloy, welding to the cutting edge tends to occur, often leading to insert failure. To prevent this, wet cutting is recommended.

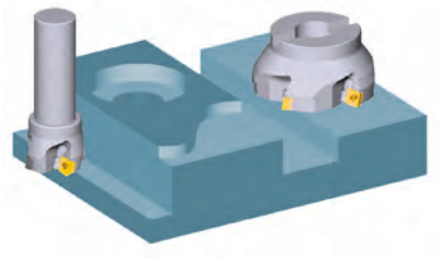
Instructions for use of wiper inserts

- Wiper inserts for the ASX400 are single-cornered.
- When installing the wiper insert, place the insert so that the small chamfer is located as shown.

FEATURES

ECONOMICAL

ASX400 is economical as it employs inserts that have 4 cutting edges. Additionally with one tool, it is possible to carry out face milling, shoulder milling, and slotting operations.

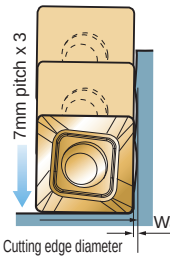


LOW RESISTANCE

Due to the 3D design of the cutting edge and a large rake angle, high cutting edge sharpness has been achieved with reduced cutting resistance.

HIGH ACCURACY

Due to the curved edge and high accuracy body and insert, high accuracy surface finish on walls and high quality surface finish on faces can be achieved.



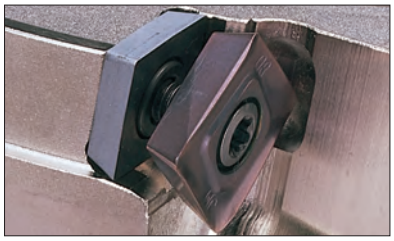
* JM breaker data

Tool	δ
ASX400	30
Competitor A	100
Competitor B	122

Values obtained under recommended cutting conditions.

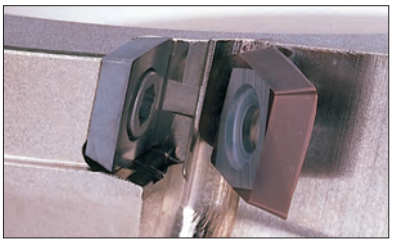
EASY TO USE

Employs a screw on type mechanism, therefore, the inserts can be easily set. Additionally when indexing the insert, it is not necessary to remove the screw completely.



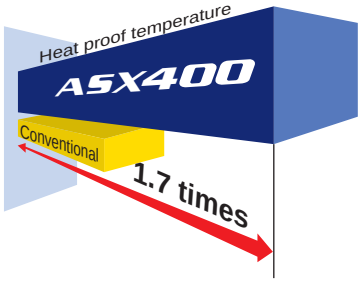
HIGH RELIABILITY

Uses a carbide shim and Mitsubishi's proprietary Anti-Fly-Insert (A.F.I) to prevent the inserts from moving when machining. Additionally the clamp screw uses TORXPLUS®, for high clamping force ensuring high reliability.

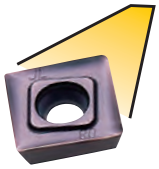
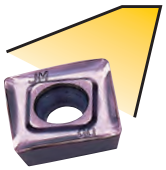
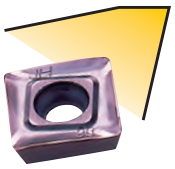
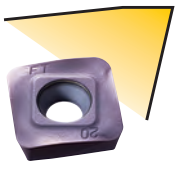
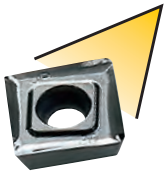


HIGH HEAT-RESISTANT BODY

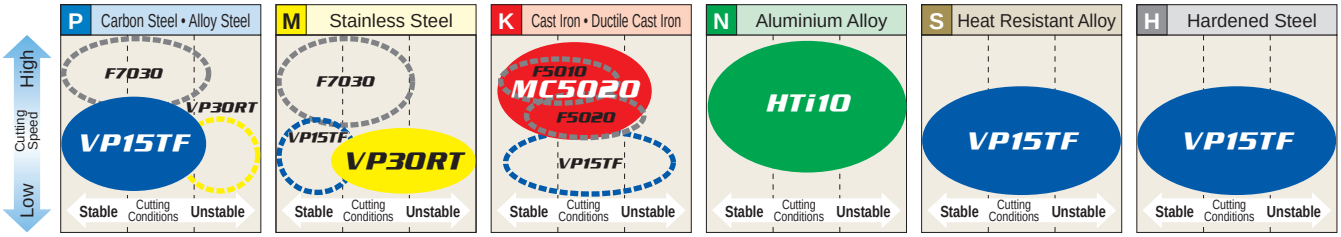
The cutter body is made from a special alloy that provides high strength at high temperatures. A special surface treatment improves the corrosion and friction resistance. The **ASX400** can be used for long hours even under harsh conditions.



CHIPBREAKERS FOR A WIDE RANGE OF APPLICATIONS

JL Finish to Light cutting Breaker	JM Light to Semi-Heavy cutting Breaker	JH Medium to Heavy cutting Breaker	FT Heavy cutting/ Heavy interrupted cutting Breaker	JP Aluminium alloy cutting Breaker
				
●High accuracy insert with ground-finished periphery. ●Large rake angle leading to low cutting resistance.	●High accuracy M class insert. ●For a wide range of workpiece materials and cutting conditions.	●High accuracy M class insert. ●Strong cutting edge for high fracture resistance.	●High accuracy M-class insert. ●Nose radius of 2.0mm has improved fracture resistance. Strong main cutting edge allows heavy cutting and heavy interrupted cutting. Stable cutting performance.	●High accuracy insert with ground-finished periphery. ●Large rake angle and mirror-finished rake face lead to sharp cutting performance and high welding resistance.

INSERT GRADES FOR A WIDE RANGE OF MATERIALS



(Note) When machining steel or stainless steel and the emphasis is on surface finish, use cermet grade NX4545.
Stable Cutting : Continuous cutting, Constant depth of cut, Pre-machined securely clamped component cutting
Unstable Cutting : Heavy interrupted, Irregular depth of cut, Low clamping rigidity cutting

SHOULDER MILLING

<GENERAL CUTTING>

Finishing Roughing Face Milling Face Milling Shoulder Milling

NSE300

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 20°positive insert.
- Multi insert design.
- High rake angle.
- Enables highly efficient machining.

Fig.1
ø50
ø63
ø80
ø100

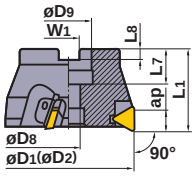
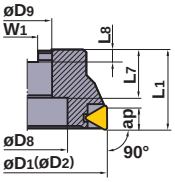


Fig.2
ø125
ø160



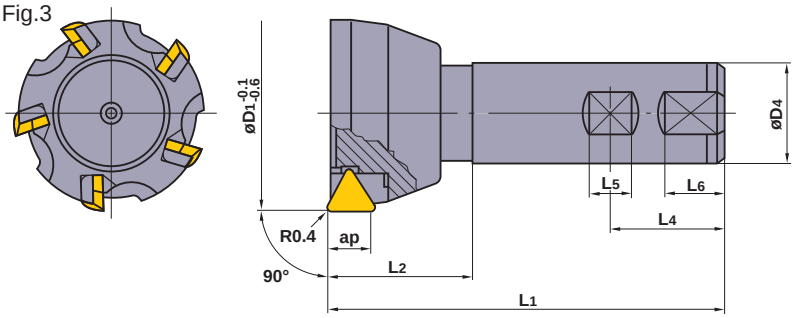
Right hand tool holder only.

ARBOR TYPE

C H :0°
A.R :+16°
R.R :+5°—+8°
T :+5°—+8°
I :+16°

Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D2	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
NSE300-050A04R	●	4	50	50	40	22	20	11	10.4	6.3	0.3	12.5	1
-063A05R	●	5	63	63	40	22	20	11	10.4	6.3	0.5	12.5	1
R0306C	●	6	80	80	50	25.4	26	13	9.5	6	1.1	12.5	1
R0408D	●	8	100	100	63	31.75	32	17	12.7	8	2.1	12.5	1
R0510E	●	10	125	125	63	38.1	38	60	15.9	10	3.2	12.5	2
R0612F	●	12	160	160	63	50.8	38	80	19.1	11	5.4	12.5	2

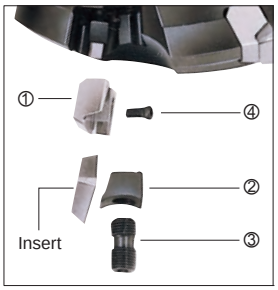
Fig.3



SHANK TYPE

Right hand tool holder only. Tolerance when setting with master inserts.

Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D4	L2	L4	L5	L6	Max. Depth of Cut ap (mm)	Type (Fig.)
NSE300R504S32	●	4	50	125	32	45	36	14	19	12.5	3
635S32	●	5	63	125	32	45	36	14	19	12.5	3



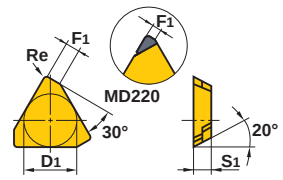
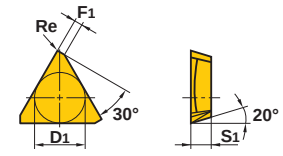
SPARE PARTS

Tool Holder Number	① Locator	② Wedge-T (CWNSE CWTSE)	③ Clamp Screw *	④ Locator Screw *	Wrench (Clamp Screw)	Wrench	Set Bolt	Insert
NSE300-050A04R -063A05R	SPTSE300R	CWTSE300TR	LS19T	TS32	TKY15T	TKY08F	—	TE□N 1603PE□R1
NSE300R0408D							HSC16035	
NSE300R0306C 0510E 0612F		CWNSE300TR	LS10T		TKY25T		—	
NSE300R504S32 635S32		CWTSE300TR	LS19T		TKY15T			

* Clamp Torque (N • m) : LS10T=8.5, LS19T=5.0, TS32=1.0

● : Inventory maintained in Japan. (10 inserts in one case) (PCD inserts are available in 1 piece in one case)
○ : Inventory maintained in Japan. (Available from spring 2009)
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

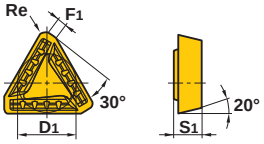
INSERTS

Work Material			Coated						Cermet		Carbide		PCD		Dimensions (mm)				Geometry
			F7030	F620	MC5020	F5010	F5020	UP20M	NX2525	NX4545	UTi20T	HTi10	MD220		D1	S1	F1	Re	
P	Steel	TECN1603PEFR1	C	F									●		9.525	3.175	1.4	0.4	
M	Stainless Steel	TEEN1603PEFR1	E	F									●		9.525	3.175	1.4	0.4	
K	Cast Iron	1603PEER1	E	E									●		9.525	3.175	1.4	0.4	
N	Non-ferrous Metal	1603PETR1	E	T		▲			●	●	●	●			9.525	3.175	1.4	0.4	
		1603PESR1	E	S	●		○	●	●						9.525	3.175	1.4	0.4	
Wall face finishing		TECN1603PEFR1W	C	F								●			9.525	3.175	1.4	0.4	
		1603PEER1W	C	E								●			9.525	3.175	1.4	0.4	
		1603PETR1W	C	T						●	●	●			9.525	3.175	1.4	0.4	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **F** : Sharp **S** : Chamfer + Hone **T** : Chamfer

INSERTS WITH BREAKER

Work Material			Coated				Carbide		Dimensions (mm)				Geometry
			F7030	F620			UTi20T		D1	S1	F1	Re	
P	Steel	TEER1603PEER-JS	E	E	●	▲			●	9.525	3.175	1.4	0.4	
M	Stainless Steel													
K	Cast Iron													

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing : E : Round

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	F7030	200 (160–250)	0.2 (0.1–0.3)
			NX4545		
			UTi20T	160 (125–200)	
			UP20M		
	Carbon Steel Alloy Steel	≤180–280HB	F7030	160 (125–250)	0.2 (0.1–0.3)
			NX4545		
			UTi20T	130 (100–160)	
			UP20M		
		280–350HB	UTi20T	75 (50–100)	0.15 (0.1–0.2)

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
M	Stainless Steel	≤200HB	UP20M	160 (125–200)	0.2 (0.1–0.3)
			UTi20T		
K	Cast Iron	Tensile Strength ≤350MPa	MC5020 F5010 • F5020	175 (100–250)	0.2 (0.1–0.3)
			HTi10	100 (80–125)	
			UTi20T	80 (60–100)	
N	Aluminium Alloy	–	MD220	1000 (200–1500)	0.15 (0.05–0.25)
			HTi10	650 (300–1000)	0.12 (0.05–0.2)

● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
● Table Feed (mm/min)
=Feed per Tooth x Number of Teeth x Cutter Revolution

SPARE PARTS E001
TECHNICAL DATA F001

SHOULDER MILLING
<HEAVY CUTTING>

0° | Finishing | Roughing | Face Milling | Face Milling | Shoulder Milling

NSE400

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 20°positive insert.
- Multi insert design.
- High rake angle.
- Enables highly efficient machining.

Fig.1
ø80
ø100

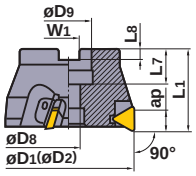
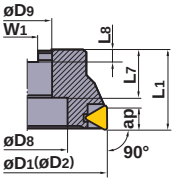


Fig.2
ø125
ø160



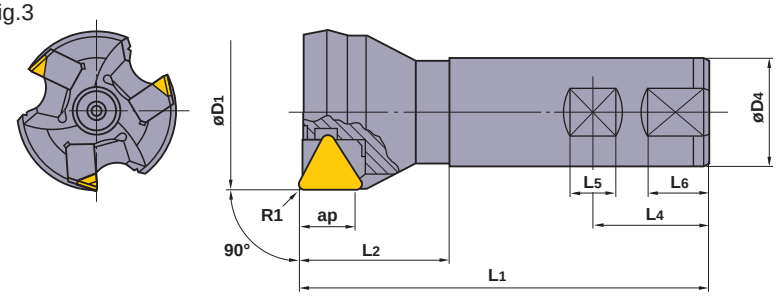
Right hand tool holder only.

ARBOR TYPE

C H :0°
A.R :+16°
R.R :+5°—+8°
T :+5°—+8°
I :+16°

Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D2	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
NSE400R0306C	●	6	80	80	50	25.4	26	13	9.5	6	1.1	17	1
0407D	●	7	100	100	63	31.75	32	17	12.7	8	2.1	17	1
0508E	●	8	125	125	63	38.1	38	60	15.9	10	3.2	17	2
0610F	●	10	160	160	63	50.8	38	80	19.1	11	5.4	17	2

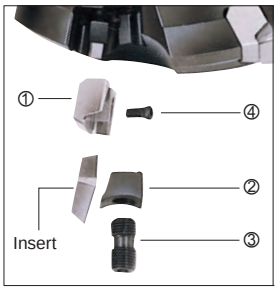
Fig.3



SHANK TYPE

Right hand tool holder only.

Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D4	L2	L4	L5	L6	Max. Depth of Cut ap (mm)	Type (Fig.)
NSE400R503S32	●	3	50	125	32	45	36	14	19	17	3
634S32	●	4	63	125	32	45	36	14	19	17	3



SPARE PARTS

Tool Holder Number	① Locator	② Wedge-T	③ Clamp Screw *	④ Locator Screw *	Wrench (Clamp Screw)	Wrench	Set Bolt	Insert
NSE400R0306C	SPTSE400R	CWSE300TR	LS10TS	TS32	TKY25T	TKY08F	—	TE□N 2204PE□R□
NSE400R0407D							HSC16035	
NSE400R0508E 0610F 503S32 634S32							—	

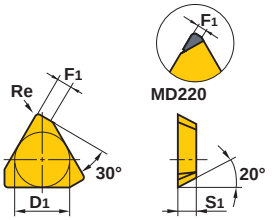
* Clamp Torque (N • m) : LS10TS=8.5, TS32=1.0

● : Inventory maintained in Japan. (10 inserts in one case) (PCD inserts are available in 1 piece in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case)
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	

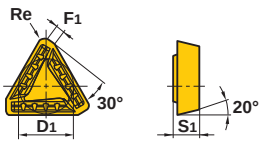
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting
Honing : E : Round **F** : Sharp **S** : Chamfer + Hone
T : Chamfer **Z** : Strong

Shape	Order Number	Class	Honing	Coated						Cermet		Carbide		PCD		Dimensions (mm)				Geometry
				F7030	F620	MC5020	F5010	F5020	UP20M	NX2525	NX4545	UTi20T	HTi10	MD220		D1	S1	F1	Re	
	TECN2204PEFR1	C	F										●	●		12.7	4.76	1.4	1.0	
	2204PEER1	C	E										●			12.7	4.76	1.4	1.0	
	2204PETR1	C	T							●	●	●				12.7	4.76	1.4	1.0	
	TEEN2204PEFR1	E	F										●			12.7	4.76	1.4	1.0	
	2204PEER1	E	E										●			12.7	4.76	1.4	1.0	
	2204PETR1	E	T		▲				●	●	●	●				12.7	4.76	1.4	1.0	
	2204PESR1	E	S	●		○	●	●								12.7	4.76	1.4	1.0	
	TEKN2204PEER1	K	E										●			12.7	4.76	1.94	—	
	2204PETR1	K	T		▲				●	●		●				12.7	4.76	1.94	—	
	2204PESR1	K	S	●												12.7	4.76	1.94	—	
	2204PETR	K	T								●					12.7	4.76	1.94	—	
	2204PEZR	K	Z							●						12.7	4.76	1.94	—	

INSERTS WITH BREAKER

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting
Honing : E : Round

Shape	Order Number	Class	Honing	Coated				Carbide		Dimensions (mm)				Geometry
				F7030	F620			UTi20T		D1	S1	F1	Re	
	TEER2204PEER-JS	E	E	●	▲			●		12.7	4.76	1.4	1.0	

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	F7030	200 (160—250)	0.2 (0.1—0.3)
			NX4545		
			UTi20T	160 (125—200)	
			UP20M		
	Carbon Steel Alloy Steel	≤180—280HB	F7030	160 (125—250)	0.2 (0.1—0.3)
			NX4545		
			UTi20T	130 (100—160)	
			UP20M		
		280—350HB	UTi20T	75 (50—100)	0.15 (0.1—0.2)

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
M	Stainless Steel	≤200HB	UP20M	160 (125—200)	0.2 (0.1—0.3)
			UTi20T		
K	Cast Iron	Tensile Strength ≤350MPa	MC5020 F5010 • F5020	175 (100—250)	0.2 (0.1—0.3)
			HTi10	100 (80—125)	
			UTi20T	80 (60—100)	
N	Aluminium Alloy	—	MD220	1000 (200—1500)	0.15 (0.05—0.25)
			HTi10	650 (300—1000)	0.12 (0.05—0.2)

● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
● Table Feed (mm/min)
=Feed per Tooth x Number of Teeth x Cutter Revolution

SPARE PARTS E001
TECHNICAL DATA F001

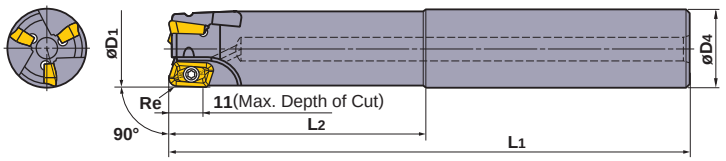
MULTI FUNCTIONAL MILLING

Roughing | Shoulder Milling | Face Milling | Side Milling | Copying (Including Flat faces) | Slotting

BAP3500

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- High rake angle.
- Contour machining is possible.
- Through coolant type.



Right hand tool holder only.

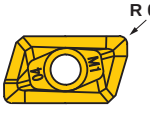
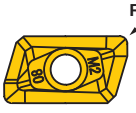
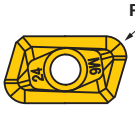
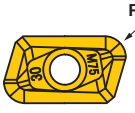
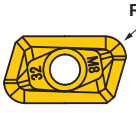
Type	Insert Corner Re	Order Number	Stock R	Coolant Hole	Number of Teeth	Dimensions (mm) D1	L1	L2	D4	* Clamp Screw	Wrench	Insert
BAP3500R○○○○○○○○A	0.4 0.8	**BAP3500R161SA16SA**	●	○	1	16	100	30	16	TS3	TKY08F	XPMT13T3PDER-M1/M2 XPGT13T3PDER-G1/G2 XPGT13T3PDFR-G1/G2
		161SN16SA	●	–	1	16	100	30	16	TS3	TKY08F	
		202SA20SA	●	○	2	20	110	35	20	TS32	TKY08F	
		202SN20SA	●	–	2	20	110	35	20	TS32	TKY08F	
		253SA25SA	●	○	3	25	120	40	25	TS32	TKY08F	
		253SN25SA	●	–	3	25	120	40	25	TS32	TKY08F	
		324SA32SA	●	○	4	32	130	50	32	TS32	TKY08F	
		324SN32SA	●	–	4	32	130	50	32	TS32	TKY08F	
		405SA32SA	●	○	5	40	170	55	32	TS32	TKY08F	
		405SN32SA	●	–	5	40	170	55	32	TS32	TKY08F	
BAP3500R○○○○○○○○B	2.4 3.0 3.2	**161SA16SB**	●	○	1	16	100	30	16	TS3	TKY08F	XPMT13T3PDER-M6/M75/M8 XPGT13T3PDER-G6/G75/G8 XPGT13T3PDFR-G6/G75/G8
		161SN16SB	●	–	1	16	100	30	16	TS3	TKY08F	
		202SA20SB	●	○	2	20	110	35	20	TS32	TKY08F	
		202SN20SB	●	–	2	20	110	35	20	TS32	TKY08F	
		253SA25SB	●	○	3	25	120	40	25	TS32	TKY08F	
		253SN25SB	●	–	3	25	120	40	25	TS32	TKY08F	
		324SA32SB	●	○	4	32	130	50	32	TS32	TKY08F	
		324SN32SB	●	–	4	32	130	50	32	TS32	TKY08F	
		405SA32SB	●	○	5	40	170	55	32	TS32	TKY08F	
		405SN32SB	●	–	5	40	170	55	32	TS32	TKY08F	
Long Shank	0.4 0.8	**202SA20LA**	●	○	2	20	170	80	20	TS32	TKY08F	XPMT13T3PDER-M1/M2 XPGT13T3PDER-G1/G2 XPGT13T3PDFR-G1/G2
		202SN20LA	●	–	2	20	170	80	20	TS32	TKY08F	
		253SA25LA	●	○	3	25	170	80	25	TS32	TKY08F	
		253SN25LA	●	–	3	25	170	80	25	TS32	TKY08F	
		323SA32LA	●	○	3	32	200	90	32	TS32	TKY08F	
		323SN32LA	●	–	3	32	200	90	32	TS32	TKY08F	
		403SA32LA	●	○	3	40	200	90	32	TS32	TKY08F	
		403SN32LA	●	–	3	40	200	90	32	TS32	TKY08F	

(Note 1) Please use insert corner R0.4 or R0.8 for A type holders, and insert corner R2.4, R3.0 or R3.2 for B type holders.

(Note 2) Please use insert corner R0.4 or R0.8 for long shank type holders.

* Clamp Torque (N • m) : TS3=1.0, TS32=1.0

COMBINATION OF HOLDER AND INSERT CORNER RADIUS

Holder	A Holder		B Holder		
	BAP3500R○○○○○○○○A		BAP3500R○○○○○○○○B		
Insert Corner Radius (Re)	R 0.4 	R 0.8 	R 2.4 	R 3.0 	R 3.2 
	XP○T.....-M1/G1	XP○T.....-M2/G2	XP○T.....-M6/G6	XP○T.....-M75/G75	XP○T.....-M8/G8

(Note) Other combinations of holder and insert corner R are not acceptable.

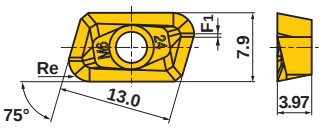
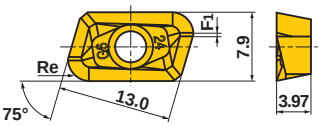
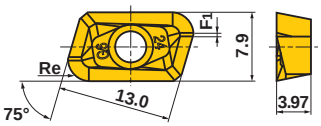
● : Inventory maintained in Japan. (10 inserts in one case)

INSERTS

Work Material		
P	Steel	● ◐
M	Stainless Steel	◐ ◐
K	Cast Iron	✣
N	Non-ferrous Metal	◐
S	Heat-resistant Alloy, Titanium Alloy	◐
H	Hardened Steel	◐

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round **F** : Sharp

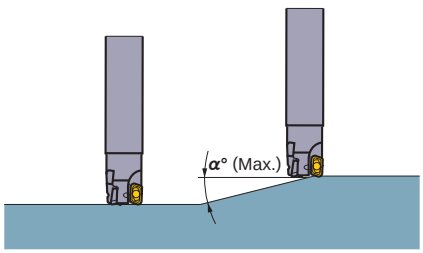
Shape	Order Number	Class	Honing	Coated F7030	Coated VP15TF	Carbide HTi10	Dimensions (mm) F1	Dimensions (mm) Re	Geometry
	XPMT13T3PDER-M1	M	E	●	●		1.6	0.4	
	13T3PDER-M2	M	E	●	●		1.2	0.8	
	13T3PDER-M6	M	E	●	●		0.4	2.4	
	13T3PDER-M75	M	E	●	●		0.4	3.0	
	13T3PDER-M8	M	E	●	●		0.4	3.2	
	XPGT13T3PDER-G1	G	E		●		1.6	0.4	
	13T3PDER-G2	G	E		●		1.2	0.8	
	13T3PDER-G6	G	E		●		0.4	2.4	
	13T3PDER-G75	G	E		●		0.4	3.0	
	13T3PDER-G8	G	E		●		0.4	3.2	
	XPGT13T3PDFR-G1	G	F			●	1.6	0.4	
	13T3PDFR-G2	G	F			●	1.2	0.8	
	13T3PDFR-G6	G	F			●	0.4	2.4	
	13T3PDFR-G75	G	F			●	0.4	3.0	
	13T3PDFR-G8	G	F			●	0.4	3.2	

RECOMMENDED CUTTING CONDITIONS

	Work Material		Hardness	Grade	Breaker	Cutting Mode	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel		≤180HB	F7030	M	General Cutting	180 (150–200)	0.15 (0.1–0.2)
	Carbon Steel Alloy Steel		180–280HB	F7030	M	General Cutting	150 (120–200)	0.15 (0.1–0.2)
				F7030	M	Unstable Cutting	120 (100–160)	0.15 (0.1–0.2)
			280–350HB	F7030	M	General Cutting	140 (120–160)	0.15 (0.1–0.2)
M	Stainless Steel		≤200HB	F7030	M	General Cutting	140 (120–160)	0.15 (0.1–0.2)
				F7030	M	Unstable Cutting	120 (80–140)	0.2 (0.1–0.25)
K	Gray Cast Iron		Tensile Strength ≤350MPa	VP15TF	M	General Cutting	140 (120–160)	0.15 (0.1–0.2)
	Ductile Cast Iron	≤FCD450 (JIS)	Tensile Strength ≤450MPa	VP15TF	M	General Cutting	120 (100–140)	0.15 (0.1–0.2)
		≥FCD500 (JIS)	Tensile Strength 500–800 MPa	VP15TF	M	General Cutting	100 (80–120)	0.1 (0.05–0.15)
N	Aluminium Alloy		–	HTi10	G	General Cutting	500 (200–1000)	0.2 (0.1–0.3)
S	Ti Alloy		≥350HB	HTi10	G	General Cutting	40 (30–60)	0.2 (0.1–0.3)
	Heat Resistant Alloy		–	VP15TF	M	General Cutting	30 (20–40)	0.15 (0.1–0.2)
H	Hardened Steel		≥40HRC	VP15TF	M	General Cutting	70 (50–100)	0.1 (0.05–0.15)

●The figures above are a guide for general cutting with a standard type tool.
●Please adjust accordingly dependant on application rigidity and tool overhang.

MAX. RAMPING ANGLE (α°)



Cutting Edge Diameter (mm)	Ramping Angle α°
16	13.3
20	9.0
25	6.0
32	4.1
40	2.9

SPARE PARTS E001
TECHNICAL DATA F001

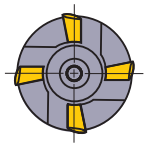
SHOULDER MILLING

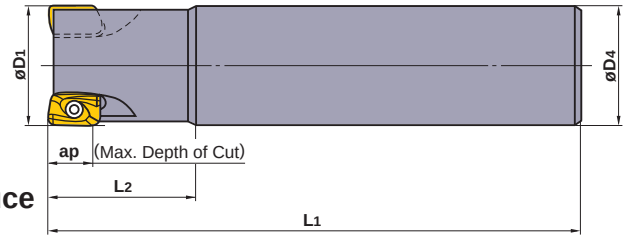
0° Roughing

Shoulder Milling | Face Milling | Side Milling | Slotting

BAP300,400

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel





- 11° positive insert.
- Inserts with wiper edges produce optimal finished surface.
- Multi insert design for high feed machining.

SHANK TYPE

Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D4	L2	ap	* Clamp Screw	Wrench	Insert
Standard	BAP300R101S16	●	1	10	85	16	25	9	TS25	TKY08F	APG/MT1135PD□R-□□
	121S16	●	1	12	85	16	25	9	TS25	TKY08F	
	141S16	●	1	14	85	16	25	9	TS25	TKY08F	
	162S16	●	2	16	85	16	25	9	TS25	TKY08F	
	182S16	●	2	18	85	16	25	9	TS25	TKY08F	
	203S20	●	3	20	100	20	30	9	TS25	TKY08F	
	223S20	●	3	22	100	20	30	9	TS25	TKY08F	
	254S25	●	4	25	115	25	35	9	TS25	TKY08F	
	284S25	●	4	28	115	25	35	9	TS25	TKY08F	
	304S32	●	4	30	125	32	45	9	TS25	TKY08F	
	325S32	●	5	32	125	32	45	9	TS25	TKY08F	
	406S32	●	6	40	125	32	45	9	TS25	TKY08F	
	507S32	●	7	50	125	32	45	9	TS25	TKY08F	
	638S32	●	8	63	125	32	45	9	TS25	TKY08F	
Long	BAP300R202LS20	●	2	20	150	20	60	9	TS25	TKY08F	APG/MT1135PD□R-□□
	253LS25	●	3	25	170	25	70	9	TS25	TKY08F	
	323LS32	●	3	32	190	32	90	9	TS25	TKY08F	
	403LS32	●	3	40	190	32	90	9	TS25	TKY08F	
Standard	BAP400R252S25	●	2	25	115	25	35	14	TS4	TKY15F	APG/MT1604PD□R-□□
	323S32	●	3	32	125	32	45	14	TS43	TKY15F	
	404S32	●	4	40	125	32	45	14	TS43	TKY15F	
	505S32	●	5	50	125	32	45	14	TS43	TKY15F	
	636S32	●	6	63	125	32	45	14	TS43	TKY15F	

* Clamp Torque (N • m) : TS25=1.0, TS4=3.5, TS43=3.5

● : Inventory maintained in Japan.

Fig.1
BAP300
ø32
ø40
ø50
ø63
BAP400
ø40
ø50
ø63

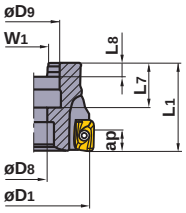


Fig.2
BAP300
ø80
ø100
BAP400
ø80
ø100

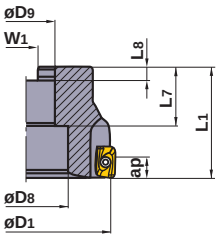
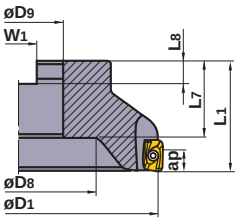


Fig.3
BAP400
ø125
ø160



C H :0°
A.R :+12°—+14°
R.R :+0°—+4°

ARBOR TYPE

Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Type (Fig.)
BAP300	BAP300-032A05R	●	5	32	40	16	18	9	8.4	5.6	0.2	9	1
	-040A06R	●	6	40	40	16	18	9	8.4	5.6	0.3	9	1
	-050A07R	●	7	50	40	22	20	11	10.4	6.3	0.4	9	1
	-063A08R	●	8	63	40	22	20	11	10.4	6.3	0.7	9	1
	R0309C	●	9	80	50	25.4	26	38	9.5	6.0	1.1	9	2
	R0411D	●	11	100	50	31.75	32	45	12.7	8.0	1.6	9	2
BAP400	BAP400-040A04R	●	4	40	40	16	18	9	8.4	5.6	0.3	14	1
	-050A05R	●	5	50	40	22	20	11	10.4	6.3	0.4	14	1
	-063A06R	●	6	63	40	22	20	11	10.4	6.3	0.6	14	1
	R0307C	●	7	80	50	25.4	26	38	9.5	6.0	1.0	14	2
	R0408D	●	8	100	50	31.75	32	45	12.7	8.0	1.6	14	2
	R0509E	●	9	125	50	38.1	35	68	15.9	10	2.3	14	3
	R0610E	●	10	160	50	38.1	35	72	15.9	10	4.0	14	3

SPARE PARTS

Tool Holder Number	✶2 Clamp Screw	Wrench	Set Bolt	Insert
BAP300-032A05R—R0411D	TS25	①TKY08F	HSC08030 ✶1	APG/MT1135PD□R-□□
BAP400-040A04R—R0408D	TS43	①TKY15F	HSC08030 ✶1	APG/MT1604PD□R-□□
BAP400R0509E—R0610E	TS43	②TKY15D	—	APG/MT1604PD□R-□□

✶1 BAP300-032A05R, BAP400-040A04R Cutter only.
✶2 Clamp Torque (N • m) : TS25=1.0, TS43=3.5

SPARE PARTS E001
TECHNICAL DATA F001

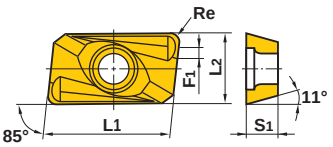
INSERTS

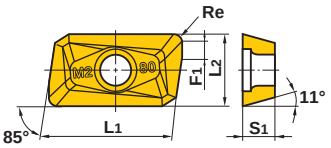
Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
N	Non-ferrous Metal	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

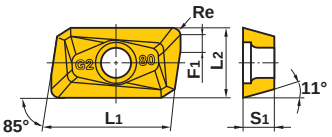
Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **F** : Sharp

Cutter Type	Shape	Order Number	Class	Honing	Coated F7030	Coated VP15TF	Coated UP20M	Cermet NX2525	Cermet NX4545	Carbide UTi20T	Carbide HTi10	Dimensions (mm) L1	L2	S1	F1	Re	Geometry
BAP300		APMT1135PDER-H1	M	E	●	●	●	●	●	●	●	11	6.35	3.5	1.5	0.4	
		1135PDER-H2	M	E	●	●	●	●	●	●	●	11	6.35	3.5	1.2	0.8	
		1135PDER-H3	M	E	●		●			●		11	6.35	3.5	0.8	1.2	
		1135PDER-H4	M	E	●		●			●		11	6.35	3.5	0.4	1.6	
		1135PDER-H6	M	E	●		●			●		11	6.35	3.5	0.4	2.4	
BAP400		APMT1604PDER-H1	M	E	●		●			●		16.5	9.525	4.76	1.7	0.4	
		1604PDER-H2	M	E	●	●	●	●	●	●	●	16.5	9.525	4.76	1.4	0.8	
		1604PDER-H4	M	E	●					●		16.5	9.525	4.76	0.4	1.6	
		1604PDER-H6	M	E	●					□		16.5	9.525	4.76	0.4	2.4	
		1604PDER-H8	M	E	●					●		16.5	9.525	4.76	0.4	3.2	
BAP300		APMT1135PDER-M0	M	E	●							11	6.35	3.5	1.8	0.2	
		1135PDER-M1	M	E	●							11	6.35	3.5	1.5	0.4	
		1135PDER-M2	M	E	●	●			●			11	6.35	3.5	1.2	0.8	
BAP400		APMT1604PDER-M2	M	E	●	●			●			16.5	9.525	4.76	1.4	0.8	
BAP300		APGT1135PDFR-G2	G	F							●	11	6.35	3.5	1.2	0.8	
BAP400		APGT1604PDFR-G2	G	F							●	16.5	9.525	4.76	1.4	0.8	







RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Breaker	Cutting Mode	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	NX4545	H	Finish Cutting	160 (120—180)	0.1 (0.05—0.15)
			F7030	M	General Cutting	180 (150—200)	0.15 (0.1—0.2)
	Carbon Steel Alloy Steel	180—280HB	NX4545	H	Finish Cutting	120 (100—160)	0.08 (0.05—0.1)
			F7030	M	General Cutting	150 (120—200)	0.15 (0.1—0.2)
			UTi20T • UP20M	H	General Cutting	120 (100—160)	0.2 (0.1—0.25)
			F7030	H	Unstable Cutting	120 (100—160)	0.15 (0.1—0.2)
		280—350HB	NX4545	H	Finish Cutting	100 (80—120)	0.08 (0.05—0.1)
			F7030	M	General Cutting	140 (120—160)	0.15 (0.1—0.2)
			F7030	H	Unstable Cutting	100 (80—120)	0.2 (0.1—0.25)
M	Stainless Steel	≤200HB	F7030	M	General Cutting	140 (120—160)	0.15 (0.1—0.2)
			UTi20T • UP20M	H	General Cutting	120 (80—140)	0.1 (0.05—0.15)
			F7030	H	Unstable Cutting	120 (80—140)	0.2 (0.1—0.25)
K	Gray Cast Iron	Tensile Strength ≤350MPa	VP15TF	M	General Cutting	140 (120—160)	0.15 (0.1—0.2)
			HTi10 • UTi20T	H	General Cutting	120 (100—140)	0.2 (0.1—0.25)
	Ductile Cast Iron (≤JIS FCD450)	Tensile Strength ≤450MPa	VP15TF	M	General Cutting	120 (100—140)	0.15 (0.1—0.2)
			HTi10 • UTi20T	H	General Cutting	100 (80—120)	0.2 (0.1—0.25)
	Ductile Cast Iron (≥JIS FCD500)	Tensile Strength 500—800MPa	VP15TF	M	General Cutting	100 (80—120)	0.1 (0.05—0.15)
			HTi10 • UTi20T	H	General Cutting	80 (60—100)	0.15 (0.1—0.2)
N	Aluminium Alloy	—	HTi10	G	General Cutting	500 (200—1000)	0.2 (0.1—0.3)
S	Ti Alloy	≥350HB	HTi10	G	General Cutting	40 (30—60)	0.2 (0.1—0.3)
	Heat Resistant Alloy	—	F7030	M	General Cutting	30 (20—40)	0.15 (0.1—0.2)
H	Hardened Steel	≥40HRC	VP15TF	M	General Cutting	70 (50—100)	0.1 (0.05—0.15)

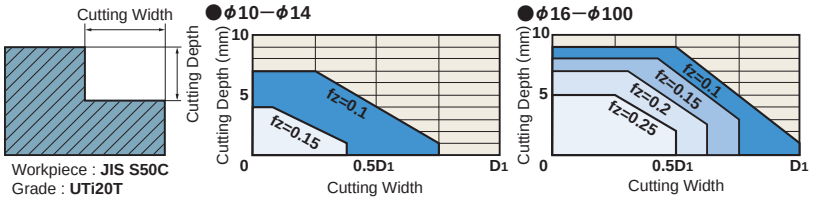
●Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
●Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.

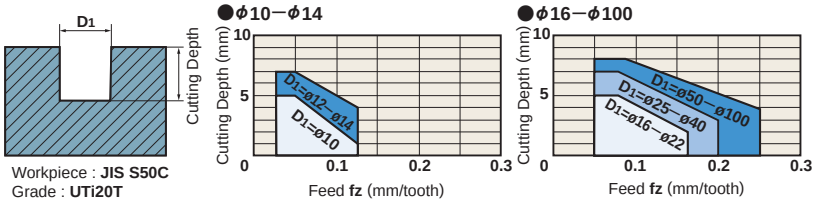
CUTTING PERFORMANCE AREA OF BAP300 TYPE

Cemented carbide/Coated carbide

Shoulder Milling

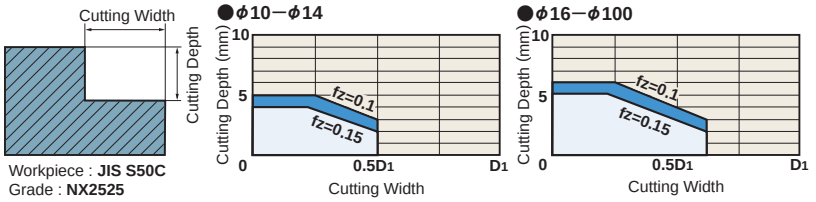


Slot Milling



Cermet

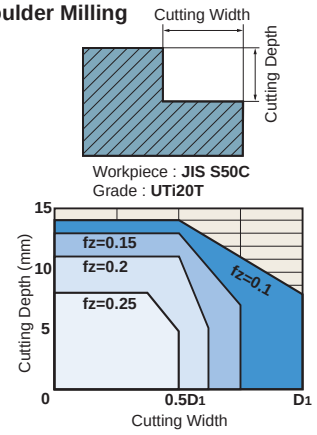
Shoulder Milling



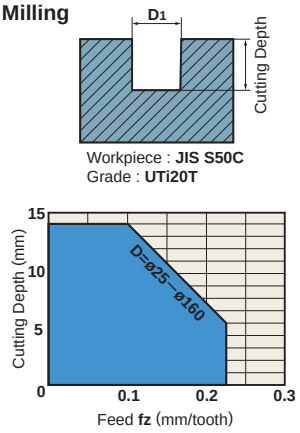
CUTTING PERFORMANCE AREA OF BAP400 TYPE

Cemented carbide/Coated carbide/Cermet

Shoulder Milling



Slot Milling



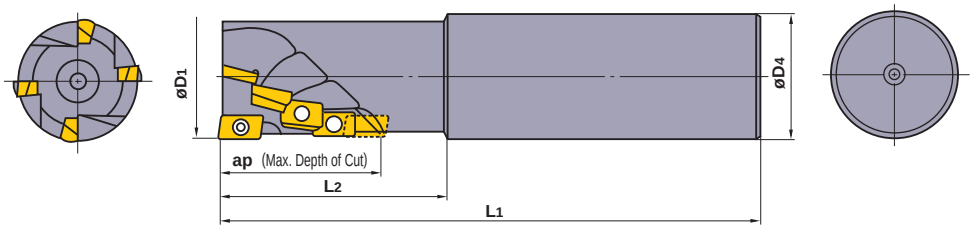
(Note 1) In each of the adove graphs cutting performance is shown for carbon steel (JIS S50C).
In case of alloy steels, reduce the conditions by 20−30%.
(Note 2) In the case of deep slot milling, air blow should be used.
(Note 3) The diameter "D1" is taken from the tools peripheral cutting edge.

DEEP SHOULDER MILLING

Roughing | Shoulder Milling | Side Milling

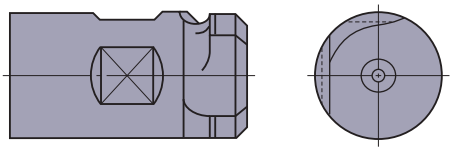
BAP300,400

LONG CUTTING EDGE



- 11° positive insert.
- Inserts with wiper edges produce optimal finished surface.
- Multi insert design for high feed machining.

∗1 Combination Shank



BAP400R5012ES58

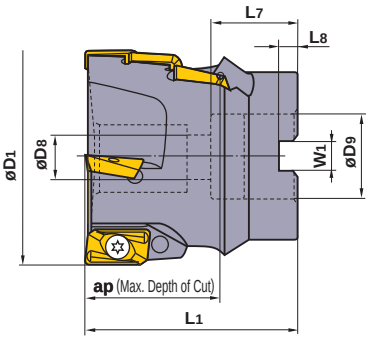
SHANK TYPE

Right hand tool holder only.

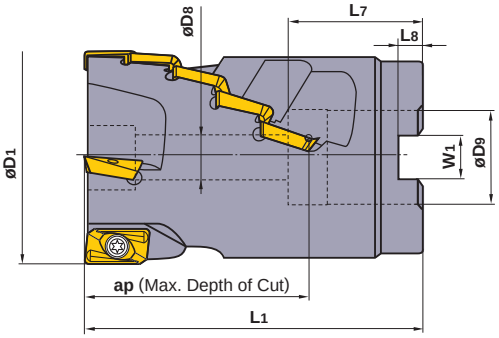
Order Number	Stock	Number of Flutes	Total	Dimensions (mm)					∗2		
	R			D1	L1	D4	L2	ap	Clamp Screw	Wrench	Insert
BAP300R2004ES20	●	1	4	20	120	20	40	25	TS25	TKY08F	APG/MT1135 PD○R-M0/○1/○2
2508ES25	●	2	8	25	130	25	50	34	TS25	TKY08F	
3212ES32	●	2	12	32	140	32	60	43	TS25	TKY08F	
4014ES42	●	2	14	40	150	42	70	51	TS25	TKY08F	
BAP400R4008ES42	●	2	8	40	150	42	70	53	TS43	TKY15F	APG/MT1604 PD○R-M0/○1/○2
∗1 5012ES58	●	2	12	50	175	50.8	90	66	TS43	TKY15F	

∗2 Clamp Torque (N • m) : TS25=1.0, TS43=3.5

Arbor Type



Shell Type



ARBOR/SHELL TYPE

Right hand tool holder only.

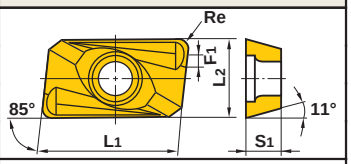
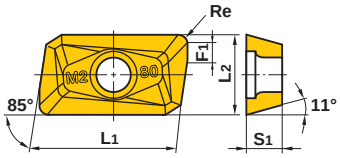
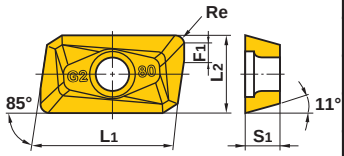
Type	Order Number	Stock	Number of Flutes	Total	Dimensions (mm)								∗			
		R			D1	L1	D9	L7	D8	W1	L8	ap	Clamp Screw	Wrench	Set Bolt	Insert
Arbor Type	BAP400R06308C	●	2	8	63	63	25.4	26	13	9.5	6	40	TS43	TKY15F	HSC12035	APG/MT1604 PD○R-○1/○2
	08012D	●	3	12	80	63	31.75	32	17	12.7	8	40	TS43	TKY15F	HSC16035	
Shell Type	BAP400R06312A27	□	2	12	63	100	27	40	13.5	12.4	7	66	TS43	TKY15F	–	
	08018A27	□	3	18	80	100	27	40	13.5	12.4	7	66	TS43	TKY15F	–	

(Note) For BAP400 Long Cutting Edge type, inserts with a corner radius of 0.2mm, 0.4mm, 0.8mm only are applicable.

∗ Clamp Torque (N • m) : TS43=3.5

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.

INSERTS

Cutter Type	Shape	Order Number	Class	Honing	Coated F7030	Coated VP15TF	Coated UP20M	Coated	Cermet NX2525	Cermet NX4545	Carbide UTi20T	Carbide HTi10	Dimensions (mm) L1	L2	S1	F1	Re	Geometry
BAP300		APMT1135PDER-H1	M	E	●	●	●		●	●	●	●	11	6.35	3.5	1.5	0.4	
		1135PDER-H2	M	E	●	●	●		●	●	●	●	11	6.35	3.5	1.2	0.8	
BAP400		APMT1604PDER-H1	M	E	●		●				●		16.5	9.525	4.76	1.7	0.4	
		1604PDER-H2	M	E	●	●	●		●	●	●	●	16.5	9.525	4.76	1.4	0.8	
BAP300		APMT1135PDER-M0	M	E	●								11	6.35	3.5	1.8	0.2	
		1135PDER-M1	M	E	●								11	6.35	3.5	1.5	0.4	
		1135PDER-M2	M	E	●	●				●			11	6.35	3.5	1.2	0.8	
BAP400		APMT1604PDER-M2	M	E	●	●				●			16.5	9.525	4.76	1.4	0.8	
BAP300		APGT1135PDFR-G2	G	F								●	11	6.35	3.5	1.2	0.8	
BAP400		APGT1604PDFR-G2	G	F								●	16.5	9.525	4.76	1.4	0.8	

RECOMMENDED CUTTING CONDITIONS

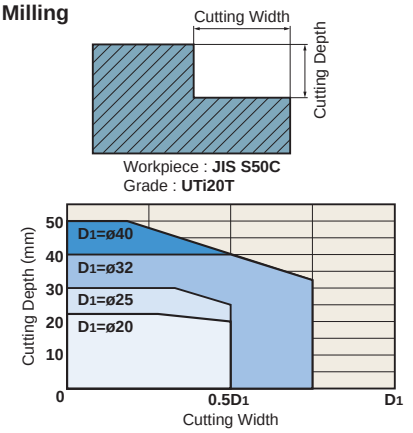
	Work Material	Hardness	Grade	Breaker	Cutting Mode	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	F7030	M	General Cutting	180 (150—200)	0.15 (0.08—0.2)
	Carbon Steel Alloy Steel	180—280HB	F7030	M	General Cutting	150 (120—280)	0.15 (0.08—0.2)
			UTi20T • UP20M	H	General Cutting	120 (100—160)	0.15 (0.08—0.2)
			F7030	H	Unstable Cutting	120 (100—160)	0.2 (0.1—0.25)
		280—350HB	F7030	M	General Cutting	140 (120—160)	0.1 (0.05—0.15)
			F7030	H	Unstable Cutting	100 (80—120)	0.15 (0.08—0.2)
M	Stainless Steel	≤200HB	F7030	M	General Cutting	140 (120—160)	0.1 (0.08—0.15)
			UTi20T • UP20M	H	General Cutting	120 (80—140)	0.1 (0.08—0.15)
			F7030	H	Unstable Cutting	120 (80—140)	0.15 (0.08—0.2)
K	Gray Cast Iron	Tensile Strength ≤350MPa	VP15TF	M	General Cutting	140 (120—160)	0.15 (0.08—0.2)
			HTi10 • UTi20T	H	General Cutting	120 (100—140)	0.1 (0.05—0.15)
	Ductile Cast Iron	Tensile Strength ≤450MPa	VP15TF	M	General Cutting	120 (100—140)	0.1 (0.05—0.15)
			UTi20T	H	General Cutting	100 (80—120)	0.15 (0.08—0.2)
	Ductile Cast Iron	Tensile Strength 500—800MPa	VP15TF	M	General Cutting	100 (80—120)	0.08 (0.05—0.1)
			HTi10 • UTi20T	H	General Cutting	80 (60—100)	0.1 (0.05—0.15)
N	Aluminium Alloy	—	HTi10	G	General Cutting	500 (200—1000)	0.15 (0.05—0.25)
S	Ti Alloy	≥350HB	HTi10	G	General Cutting	40 (30—60)	0.15 (0.05—0.25)
	Heat Resistant Alloy	—	F7030	M	General Cutting	30 (20—40)	0.1 (0.05—0.15)
H	Hardned Steel	≥40HRC	VP15TF	M	General Cutting	70 (50—100)	0.08 (0.05—0.1)

● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
● Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

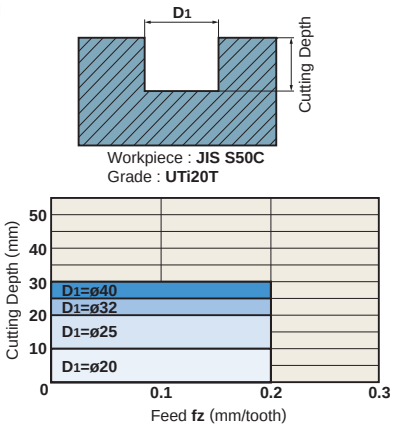
CUTTING PERFORMANCE AREA OF BAP300 LONG CUTTING EDGE TYPE

Cemented carbide/Coated carbide

Shoulder Milling



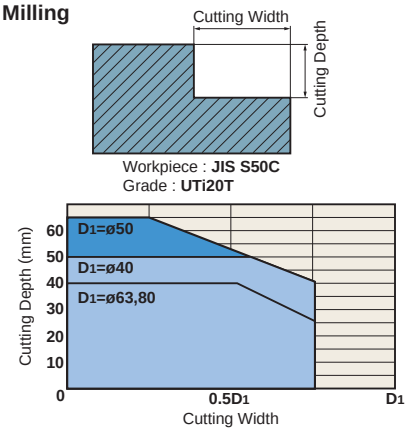
Slot Milling



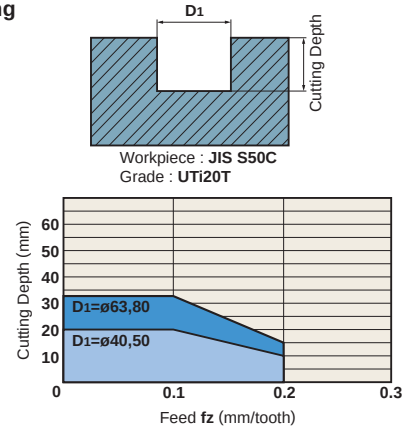
CUTTING PERFORMANCE AREA OF BAP400 LONG CUTTING EDGE TYPE

Cemented carbide/Coated carbide

Shoulder Milling



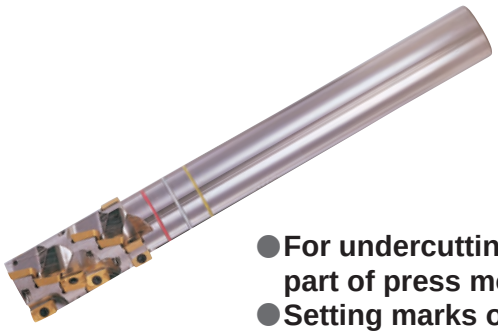
Slot Milling

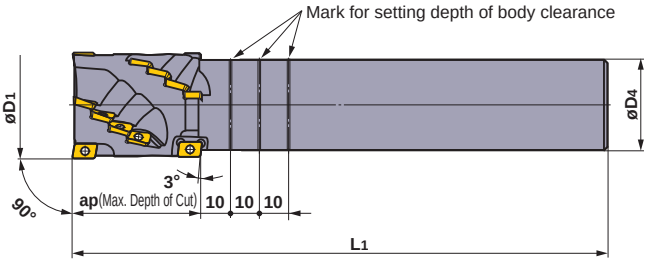


(Note 1) In each of the adove graphs cutting performance is shown for carbon steel (JIS S50C).
In case of alloy steels, reduce the conditions by 20−30%.
(Note 2) In the case of deep slot milling, air blow should be used.
(Note 3) The diameter "D1" is taken from the tools peripheral cutting edge.

BAP300

Under-cut Type





- For undercutting trimmed part of press mould.
- Setting marks on shank.

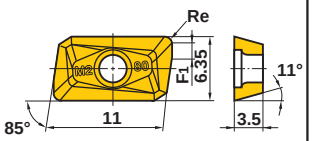
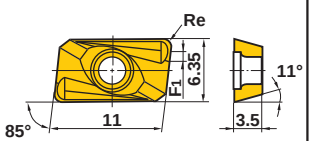
Right hand tool holder only.

Order Number	Stock	Number of Flutes	Bottom On-edge, Peripheral Cutting Edge	Back Cutting Edge	Dimensions (mm)				*		Insert	
	R				D1	L1	D4	ap	Clamp Screw	Wrench	Bottom On-edge, Peripheral Cutting Edge	Back Cutting Edge
BAP300R2204SN16SU	●	1	2	2	22	160	16	20	TS25	TKY08F	APMT1135 PDER-M2 APMT1135 PDER-H1/H2	ZRM0603R ZRM0608R
2207SN16SU	●	1	5	2	22	160	16	40	TS25	TKY08F		
2510SN20SU	●	1	8	2	25	160	20	40	TS25	TKY08F		
2512SN20LU	●	2	10	2	25	220	20	50	TS25	TKY08F		
3014SN25SU	●	2	10	4	30	160	25	40	TS25	TKY08F		
3018SN25LU	●	2	14	4	30	220	25	55	TS25	TKY08F		
3814SN32SU	●	2	10	4	38	160	32	40	TS25	TKY08F		
3818SN32LU	●	2	14	4	38	250	32	55	TS25	TKY08F		
5014SN42SU	●	2	10	4	50	160	42	40	TS25	TKY08F		
5020SN42LU	●	2	16	4	50	250	42	60	TS25	TKY08F		

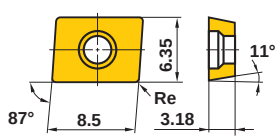
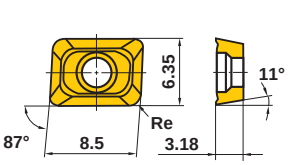
* Clamp Torque (N • m) : TS25=1.0

INSERTS

Bottom, Peripheral Cutting Edge

Shape	Order Number	Class	Coated VP15TF				Dimensions (mm) F1	Re
	APMT1135PDER-M2	M	●				1.4	0.8
								
	APMT1135PDER-H1	M	●				1.5	0.4
	H2	M	●				1.2	0.8
								

Back Cutting Edge

Shape	Order Number	Class	Coated VP15TF	UP20M			Dimensions (mm) Re	
	ZRM0608R	M		●			0.8	
								
	ZRM0603R-M3	M	●				1.2	
	M4	M	●				1.6	
	M5	M	●				2.0	
								

● : Inventory maintained in Japan. (10 inserts in one case)

SPARE PARTS E001
TECHNICAL DATA F001

MULTI FUNCTIONAL MILLING

0° | Finishing | Roughing | Shoulder Milling | Side Milling | Slotting | Copying (Including Flat faces) | Pocket Milling

APX3000

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- High accuracy, high quality vertical wall.
- Low cutting force insert.
- With through air & coolant holes.

Fig.1

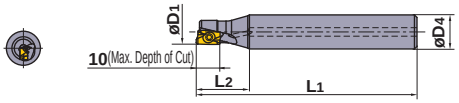


Fig.2

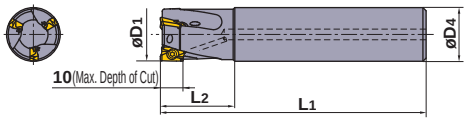
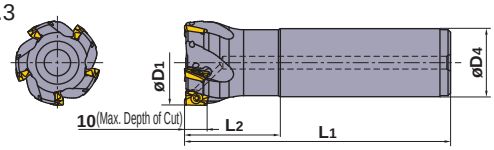


Fig.3



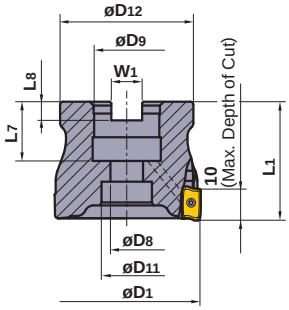
SHANK TYPE

Right hand tool holder only.

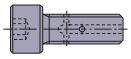
Type	Order Number	Stock	Number of Teeth	Dimensions (mm)				Max. Ramping Angle	Max. Allowable Revolution (min^{-1})	Type(Fig.)	* Clamp Screw	Wrench	Anti-seize Lubricant	Inserts
		R		D_1	D_4	L_1	L_2	α°						
Standard	APX3000R121SA16SA	●	1	12	16	85	25	6	10500	1	TPS25	TIP07F	MK1KS	
	141SA16SA	●	1	14	16	85	25	6	9000	1	TPS25	TIP07F	MK1KS	
	162SA16SA	●	2	16	16	85	25	15	20900	2	TPS25	TIP07F	MK1KS	
	182SA16SA	●	2	18	16	85	25	11	19600	3	TPS25	TIP07F	MK1KS	
	202SA20SA	●	2	20	20	100	30	9	18500	2	TPS25	TIP07F	MK1KS	
	203SA20SA	●	3	20	20	100	30	9	18500	2	TPS25	TIP07F	MK1KS	
	223SA20SA	●	3	22	20	115	30	7	17600	3	TPS25−1	TIP07F	MK1KS	
	252SA25SA	●	2	25	25	115	35	6	16400	2	TPS25−1	TIP07F	MK1KS	
	253SA25SA	●	3	25	25	115	35	6	16400	2	TPS25−1	TIP07F	MK1KS	
	254SA25SA	●	4	25	25	115	35	6	16400	2	TPS25−1	TIP07F	MK1KS	
	284SA25SA	●	4	28	25	115	35	4	15500	3	TPS25−1	TIP07F	MK1KS	
	304SA32SA	●	4	30	32	125	45	4	14900	2	TPS25−1	TIP07F	MK1KS	
	323SA32SA	●	3	32	32	125	45	3	14400	2	TPS25−1	TIP07F	MK1KS	
	324SA32SA	●	4	32	32	125	45	3	14400	2	TPS25−1	TIP07F	MK1KS	
	325SA32SA	●	5	32	32	125	45	3	14400	2	TPS25−1	TIP07F	MK1KS	
	403SA32SA	●	3	40	32	125	45	2	12800	3	TPS25−1	TIP07F	MK1KS	
	405SA32SA	●	5	40	32	125	45	2	12800	3	TPS25−1	TIP07F	MK1KS	
	406SA32SA	●	6	40	32	125	45	2	12800	3	TPS25−1	TIP07F	MK1KS	
	507SA32SA	●	7	50	32	125	45	1	11300	3	TPS25−1	TIP07F	MK1KS	AOMT 1236◌◌ PEER-◌
	638SA32SA	●	8	63	32	125	45	1	10000	3	TPS25−1	TIP07F	MK1KS	
Long	APX3000R182SA16LA	●	2	18	16	120	25	11	19600	3	TPS25	TIP07F	MK1KS	
	202SA20LA	●	2	20	20	150	60	9	18500	2	TPS25	TIP07F	MK1KS	AOGT 1236◌◌ PEFR-GM
	222SA20LA	●	2	22	20	150	30	7	17600	3	TPS25−1	TIP07F	MK1KS	
	252SA25LA	●	2	25	25	170	70	6	16400	2	TPS25−1	TIP07F	MK1KS	
	253SA25LA	●	3	25	25	170	70	6	16400	2	TPS25−1	TIP07F	MK1KS	
	282SA25LA	●	2	28	25	170	35	4	15500	3	TPS25−1	TIP07F	MK1KS	
	283SA25LA	●	3	28	25	170	35	4	15500	3	TPS25−1	TIP07F	MK1KS	
	322SA32LA	●	2	32	32	190	90	3	14400	2	TPS25−1	TIP07F	MK1KS	
	323SA32LA	●	3	32	32	190	90	3	14400	2	TPS25−1	TIP07F	MK1KS	
	352SA32LA	●	2	35	32	190	45	3	13700	3	TPS25−1	TIP07F	MK1KS	
	353SA32LA	●	3	35	32	190	45	3	13700	3	TPS25−1	TIP07F	MK1KS	
Extra Long	APX3000R182SA16ELA	●	2	18	16	180	25	11	19600	3	TPS25	TIP07F	MK1KS	
	202SA20ELA	●	2	20	20	200	70	9	18500	2	TPS25	TIP07F	MK1KS	
	222SA20ELA	●	2	22	20	200	30	7	17600	3	TPS25−1	TIP07F	MK1KS	
	252SA25ELA	●	2	25	25	220	80	6	16400	2	TPS25−1	TIP07F	MK1KS	
	253SA25ELA	●	3	25	25	220	80	6	16400	2	TPS25−1	TIP07F	MK1KS	
	282SA25ELA	●	2	28	25	220	35	4	15500	3	TPS25−1	TIP07F	MK1KS	
	283SA25ELA	●	3	28	25	220	35	4	15500	3	TPS25−1	TIP07F	MK1KS	
	322SA32ELA	●	2	32	32	260	100	3	14400	2	TPS25−1	TIP07F	MK1KS	
	323SA32ELA	●	3	32	32	260	100	3	14400	2	TPS25−1	TIP07F	MK1KS	
	352SA32ELA	●	2	35	32	260	45	3	13700	3	TPS25−1	TIP07F	MK1KS	
	353SA32ELA	●	3	35	32	260	45	3	13700	3	TPS25−1	TIP07F	MK1KS	

(Note 1) When using inserts with corner radius Re≥2.0, machining of the holder is required as shown page C109.
(Note 2) The maximum allowable revolutions are set to ensure tool and insert stability.
(Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* Clamp Torque (N • m) : TPS25=1.0, TPS25−1=1.0

● : Inventory maintained in Japan. ○ : Inventory maintained in Japan. (Available from spring 2009)



Right hand tool holder only.

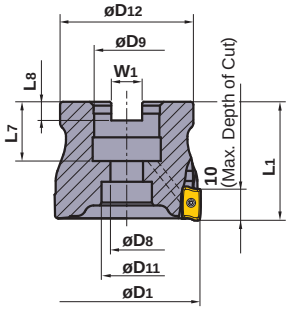
Cutter Diameter D1	Set Bolt	Geometry
ϕ32, ϕ40	HSC08030H	
ϕ50, ϕ63	10030H	
ϕ80	12035H	
ϕ100	16040H	

ARBOR TYPE

C H :0°
A.R :+7°—+21° T :+15°—+27°
R.R :+15°—+27° I :+7°—+21°

Order Number	Stock	Number of Teeth	Dimensions (mm)									Tool Weight	Max. Ramping Angle	Max. Allowable Revolution (min^{-1})	* Clamp Screw	Wrench	Anti-seize Lubricant	Inserts
	R		D1	L1	D9	L7	D8	D12	W1	L8	D11	(kg)	α°					
APX3000-032A05RA	●	5	32	40	16	18	9	30	8.4	5.6	14	0.2	3	14400	TPS25−1	TIP07F	MK1KS	AOMT 1236○○ PEER-○
-040A06RA	●	6	40	40	16	18	9	34	8.4	5.6	14	0.3	2	12800	TPS25−1	TIP07F	MK1KS	
-050A07RA	●	7	50	40	22	20	11	45	10.4	6.3	17	0.4	2	11300	TPS25−1	TIP07F	MK1KS	
-063A08RA	●	8	63	40	22	20	11	55	10.4	6.3	17	0.7	1	10000	TPS25−1	TIP07F	MK1KS	AOGT 1236○○ PEFR-GM
R08009CA	●	9	80	50	25.4	26	13	70	9.5	6	20	1.3	1	8800	TPS25−1	TIP07F	MK1KS	
R10011DA	●	11	100	63	31.75	32	17	80	12.7	8	26	2.2	0.5	7800	TPS25−1	TIP07F	MK1KS	

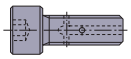
(Note 1) When using inserts with corner radius Re≥2.0, machining of the holder is required as shown page C109.
(Note 2) The maximum allowable revolutions are set to ensure tool and insert stability.
(Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* Clamp Torque (N • m) : TPS25−1=1.0



Right hand tool holder only.

For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

Cutter Diameter D1	Set Bolt	Geometry
ϕ32, ϕ40	HSC08030H	
ϕ50, ϕ63	10030H	
ϕ80	12035H	
ϕ100	16040H	

ARBOR TYPE

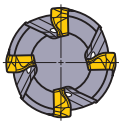
C H :0°
A.R :+7°—+21° T :+15°—+27°
R.R :+15°—+27° I :+7°—+21°

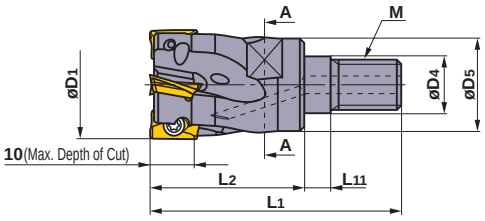
Order Number	Stock	Number of Teeth	Dimensions (mm)									Tool Weight	Max. Ramping Angle	Max. Allowable Revolution (min^{-1})	* Clamp Screw	Wrench	Anti-seize Lubricant	Inserts
	R		D1	L1	D9	L7	D8	D12	W1	L8	D11	(kg)	α°					
APX3000-032A05RA	●	5	32	40	16	18	9	30	8.4	5.6	14	0.2	3	14400	TPS25−1	TIP07F	MK1KS	AOMT 1236○○ PEER-○
-040A06RA	●	6	40	40	16	18	9	34	8.4	5.6	14	0.3	2	12800	TPS25−1	TIP07F	MK1KS	
-050A07RA	●	7	50	40	22	20	11	45	10.4	6.3	17	0.4	2	11300	TPS25−1	TIP07F	MK1KS	
-063A08RA	●	8	63	40	22	20	11	55	10.4	6.3	17	0.7	1	10000	TPS25−1	TIP07F	MK1KS	AOGT 1236○○ PEFR-GM
-080A09RA	○	9	80	50	27	23	13	70	12.4	7	20	1.3	1	8800	TPS25−1	TIP07F	MK1KS	
-100A11RA	○	11	100	63	32	26	17	80	14.4	8	26	2.2	0.5	7800	TPS25−1	TIP07F	MK1KS	

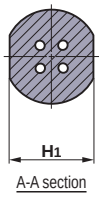
(Note 1) When using inserts with corner radius Re≥2.0, machining of the holder is required as shown page C109.
(Note 2) The maximum allowable revolutions are set to ensure tool and insert stability.
(Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* Clamp Torque (N • m) : TPS25−1=1.0

SPARE PARTS E001
TECHNICAL DATA F001

NEW







SCREW-IN TYPE

Right hand tool holder only.

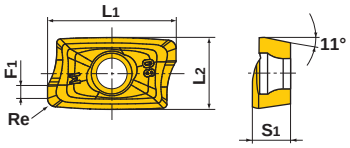
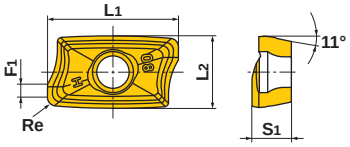
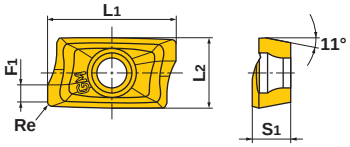
Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)								Tool Weight	Clamp Screw*	Wrench	Anti-seize Lubricant	Inserts
	R			D_1	D_4	D_5	L_1	L_2	L_{11}	H_1	M	(kg)				
APX3000R162M08A30	●	○	2	16	8.5	13	48	30	6	10	M8	0.1	TPS25	TIP07F	MK1KS	AOMT 1236○○ PEER-○ AOGT 1236○○ PEFR-GM
182M08A30	●	○	2	18	8.5	13	48	30	6	10	M8	0.1	TPS25	TIP07F	MK1KS	
203M10A30	●	○	3	20	10.5	18	49	30	6	14	M10	0.1	TPS25	TIP07F	MK1KS	
223M10A30	●	○	3	22	10.5	18	49	30	6	14	M10	0.1	TPS25−1	TIP07F	MK1KS	
254M12A35	●	○	4	25	12.5	21	57	35	6	19	M12	0.2	TPS25−1	TIP07F	MK1KS	
284M12A35	●	○	4	28	12.5	21	57	35	6	19	M12	0.2	TPS25−1	TIP07F	MK1KS	
304M16A40	●	○	4	30	17	29	63	40	6	24	M16	0.3	TPS25−1	TIP07F	MK1KS	
325M16A40	●	○	5	32	17	29	63	40	6	24	M16	0.3	TPS25−1	TIP07F	MK1KS	
355M16A40	●	○	5	35	17	29	63	40	6	24	M16	0.3	TPS25−1	TIP07F	MK1KS	
406M16A40	●	○	6	40	17	29	63	40	6	24	M16	0.3	TPS25−1	TIP07F	MK1KS	

(Note) When using inserts with corner radius Re≥2.0, machining of the holder is required as shown page C109.

* Clamp Torque (N • m) : TPS25=1.0, TPS25−1=1.0

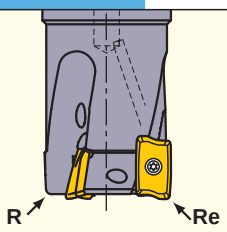
● : Inventory maintained in Japan. (10 inserts in one case)

INSERTS

Shape	Order Number	Stock: Coated VP15TF	Stock: Coated VP20RT	Stock: Coated	Stock: Coated	Stock: Carbide TF15	Stock: Carbide	L_1	L_2	S_1	F_1	Re	Geometry
General **M** Breaker	**AOMT123602PEER-M**	●	●					12	6.6	3.6	1.8	0.2	
	123604PEER-M	●	●					12	6.6	3.6	1.6	0.4	
	123608PEER-M	●	●					12	6.6	3.6	1.2	0.8	
	123610PEER-M	●	●					12	6.6	3.6	1.0	1.0	
	123612PEER-M	●	●					12	6.6	3.6	0.8	1.2	
	123616PEER-M	●	●					12	6.6	3.6	0.4	1.6	
	123620PEER-M	●	●					12	6.6	3.6	0.4	2.0	
	123624PEER-M	●	●					12	6.6	3.6	0.4	2.4	
	123630PEER-M	●	●					12	6.6	3.6	0.4	3.0	
	123632PEER-M	●	●					12	6.6	3.6	0.4	3.2	
Strong Cutting Edge Type **M** Breaker NEW	**AOMT123604PEER-H**	●	●					12	6.6	3.6	1.6	0.4	
	123608PEER-H	●	●					12	6.6	3.6	1.2	0.8	
For Machining of Aluminium Alloys **M** Breaker NEW	**AOGT123602PEFR-GM**					●		12	6.6	3.6	1.8	0.2	
	123604PEFR-GM					●		12	6.6	3.6	1.6	0.4	
	123608PEFR-GM					●		12	6.6	3.6	1.2	0.8	

NOTE ON USE OF INSERTS WITH LARGE CORNER RADII

When using inserts with corner radius Re≥R2.0, please machine the holder with a radius form as shown on the right.



R=Re−0.5mm

R : Holder end radius
Re : Insert corner radius

SCREW-IN ARBORS C192
SPARE PARTS E001
TECHNICAL DATA F001

RECOMMENDED CUTTING CONDITIONS

CUTTING CONDITIONS FOR SHOULDER MILLING

	Work Material	Hardness	Grade	Cutting Width **ae** (mm)	Cutting Speed **vc** (m/min)	ϕ12—ϕ16 Depth of Cut **ap** (mm)	ϕ12—ϕ16 Feed per Tooth **fz** (mm/tooth)	ϕ18—ϕ25 Depth of Cut **ap** (mm)	ϕ18—ϕ25 Feed per Tooth **fz** (mm/tooth)	ϕ28—ϕ100 Depth of Cut **ap** (mm)	ϕ28—ϕ100 Feed per Tooth **fz** (mm/tooth)
P	Mild Steel	≤180HB	VP15TF	—0.25D1	230 (180—270)	— 4	0.15	— 5	0.25	— 5	0.20
						4 — 7	0.10	5 — 7	0.20	5 — 7	0.15
								7 — 8.5	0.15	7 — 8.5	0.10
								8.5—10	0.10	8.5—10	0.07
				—0.5D1	220 (170—260)	— 2	0.15	— 3	0.25	— 3	0.20
						2 — 5	0.10	3 — 5.5	0.20	3 — 5.5	0.15
								5.5— 8	0.15	5.5— 8	0.10
								8 —10	0.10	8 —10	0.07
				—0.75D1	180 (140—210)	— 4	0.10	— 4	0.15	— 3	0.10
								4 —10	0.10	3 — 7	0.07
	Carbon Steel Alloy Steel	180—350HB	VP15TF	—0.25D1	180 (140—210)	— 4	0.15	— 5	0.25	— 5	0.20
						4 — 7	0.10	5 — 7	0.20	5 — 7	0.15
								7 — 8.5	0.15	7 — 8.5	0.10
								8.5—10	0.10	8.5—10	0.07
				—0.5D1	170 (130—200)	— 2	0.15	— 3	0.25	— 3	0.20
						2 — 5	0.10	3 — 5.5	0.20	3 — 5.5	0.15
								5.5— 8	0.15	5.5— 8	0.10
								8 —10	0.10	8 —10	0.07
				—0.75D1	140 (110—160)	— 4	0.10	— 4	0.15	— 3	0.10
								4 —10	0.10	3 — 7	0.07
M	Stainless Steel	≤270HB	VP20RT	—0.25D1	180 (140—210)	— 4	0.15	— 5	0.20	— 5	0.20
						4 — 7	0.10	5 — 7	0.15	5 — 7	0.15
								7 — 8.5	0.10	7 — 8.5	0.10
								8.5—10	0.07	8.5—10	0.07
				—0.5D1	170 (130—200)	— 2	0.15	— 3	0.20	— 3	0.20
						2 — 5	0.10	3 — 5.5	0.15	3 — 5.5	0.15
								5.5— 8	0.10	5.5— 8	0.10
								8 —10	0.07	8 —10	0.07
				—0.75D1	140 (110—160)	— 4	0.10	— 4	0.10	— 3	0.10
								4 —10	0.07	3 — 7	0.07
K	Gray Cast Iron	Tensile Strength ≤350MPa	VP15TF	—0.25D1	180 (140—210)	— 4	0.15	— 5	0.25	— 5	0.20
						4 — 7	0.10	5 — 7	0.20	5 — 7	0.15
								7 — 8.5	0.15	7 — 8.5	0.10
								8.5—10	0.10	8.5—10	0.07
				—0.5D1	170 (130—200)	— 2	0.15	— 3	0.25	— 3	0.20
						2 — 5	0.10	3 — 5.5	0.20	3 — 5.5	0.15
								5.5— 8	0.15	5.5— 8	0.10
								8 —10	0.10	8 —10	0.07
				—0.75D1	140 (110—160)	— 4	0.10	— 4	0.15	— 3	0.10
								4 —10	0.10	3 — 7	0.07
	Ductile Cast Iron	Tensile Strength ≤800MPa	VP15TF	—0.25D1	130 (100—150)	— 4	0.10	— 5	0.20	— 5	0.20
						4 — 7	0.07	5 — 7	0.15	5 — 7	0.15
								7 — 8.5	0.10	7 — 8.5	0.10
								8.5—10	0.07	8.5—10	0.07
				—0.5D1	120 (90—140)	— 2	0.10	— 3	0.20	— 3	0.20
						2 — 5	0.07	3 — 5.5	0.15	3 — 5.5	0.15
								5.5— 8	0.10	5.5— 8	0.10
								8 —10	0.07	8 —10	0.07
				—0.75D1	100 (80—120)	— 4	0.07	— 4	0.10	— 3	0.10
								4 —10	0.07	3 — 7	0.07
N	Aluminium Alloy	—	TF15	—0.25D1	500 (200—1000)	— 4	0.15	— 4	0.25	— 4	0.20
						4 — 7	0.10	4 — 7	0.15	4 — 7	0.10
				—0.5D1	500 (200—1000)	— 4	0.15	— 4	0.20	— 4	0.20
						4 — 7	0.10	4 — 7	0.10	4 — 7	0.10
				—0.75D1	500 (200—1000)	— 5	0.10	— 5	0.15	— 5	0.10
H	Hardened Steel	40—55HRC	VP15TF	—0.25D1	90 (70—100)	— 4	0.10	— 5	0.15	— 5	0.15
						4 — 7	0.07	5 — 7	0.10	5 — 7	0.10
								7 — 8.5	0.07		
				—0.5D1	85 (60—100)	— 2	0.10	— 3	0.15	— 3	0.15
						2 — 5	0.07	3 — 5.5	0.10		
				—0.75D1	70 (50—80)	— 4	0.07	— 4	0.07	— 3	0.07

(Note 1) These cutting conditions are a guide to the standard shank type and the arbor type.
Please make adjustments according to the machining conditions.
(Note 2) Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
- When using the long shank type and extra long shank type.
- When using long tool overhang with the standard or arbor type.
- When the application has poor clamping rigidity or when using a low rigidity machine.

(Note 3) In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
(Note 4) For heavy interrupted and unstable cutting, the H breaker is first recommendation.

CUTTING CONDITIONS FOR SLOT MILLING

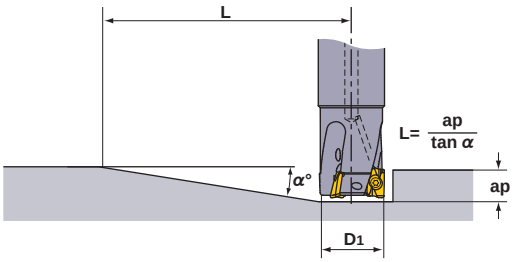
Work Material		Hardness	Grade	Cutting Width **ae** (mm)	Cutting Speed **vc** (m/min)	**ϕ12—ϕ16**		**ϕ18—ϕ25**		**ϕ28—ϕ100**	
						Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)
P	Mild Steel	≤180HB	**VP15TF**	D1	180 (140—210)	—3	0.10	— 4	0.10	— 3	0.10
								4 — 7	0.07	3 — 5	0.07
	Carbon Steel Alloy Steel	180—350HB	**VP15TF**	D1	140 (110—160)	—3	0.10	— 4	0.10	— 3	0.10
								4 — 7	0.07	3 — 5	0.07
M	Stainless Steel	≤270HB	**VP20RT**	D1	140 (110—160)	—3	0.10	— 4	0.10	— 3	0.10
								4 — 7	0.07	3 — 5	0.07
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP15TF**	D1	140 (110—160)	—3	0.10	— 4	0.10	— 3	0.10
								4 — 7	0.07	3 — 5	0.07
	Ductile Cast Iron	Tensile Strength ≤800MPa	**VP15TF**	D1	100 (80—120)	—3	0.07	— 4	0.10	— 3	0.10
								4 — 7	0.07	3 — 5	0.07
N	Aluminium Alloy	—	**TF15**	D1	500 (200—1000)	—5	0.10	— 5	0.20	— 5	0.15
H	Hardened Steel	40—55HRC	**VP15TF**	D1	70 (50—80)	—3	0.07	— 4	0.07	— 3	0.07

(Note 1) These cutting conditions are a guide to the standard shank type and the arbor type.
Please make adjustments according to the machining conditions.
(Note 2) Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
- When using the long shank type and extra long shank type.
- When using long tool overhang with the standard or arbor type
- When the application has poor clamping rigidity or when using a low rigidity machine.

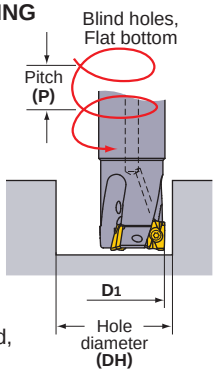
(Note 3) In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
(Note 4) For heavy interrupted and unstable cutting, the H breaker is first recommendation.

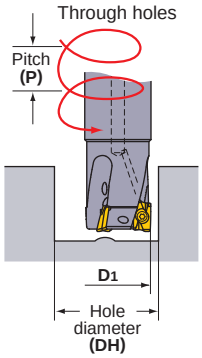
RAMPING/HELICAL CUTTING

RAMPING



HELICAL CUTTING





Refer to the table below for cutting conditions. For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

Cutting Edge Diameter **D1** (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
	Maximum Ramping Angle **α°**	Minimum Distance ✶1 **L** (mm)	Maximum Hole Diameter ✶2 **DH max.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)
12	6	95	22	2.5	20.5	2	14	0.5
14	6	95	26	2.5	24.5	2	18	1
16	15	37	30	9	28	7	21	2
18	11	51	34	5	32	4.5	25	2
20	9	63	38	5	36	4.5	29	2
22	7	81	42	5	40	4.5	33	2
25	6	95	48	6	46	5	39	3
28	4	143	54	4.5	52	4	45	2
30	4	143	58	4.5	56	4	49	2
32	3	190	62	4.5	60	4	53	2
35	3	190	68	4	66	3.5	59	2
40	2	286	78	4	76	3.5	69	2
50	1	572	98	2	96	2	89	2
63	1	572	124	2	122	2	115	2
80	1	572	158	2	156	2	149	2
100	0.5	1145	198	1	196	1	189	1

(Note) When machining highly ductile materials with ramping angles above, chips could be continuous.
In this case, decrease the ramping angle or feed per tooth.
✶1 L (=10 / tan α). Cutters' moving distance until depth of cut reaches 10mm at a maximum ramping angle.
✶2 In case corner radius of 0.8mm. Other than that, find with the below formula.
{(cutting edge diameter D1)—(corner radius)—0.2)}×2

MULTI FUNCTIONAL MILLING

0° | Finishing | Roughing | Shoulder Milling | Side Milling | Slotting | Copying (Including Flat faces) | Pocket Milling

APX4000

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	▬▬▬▬▬▬▬▬			

Fig.1

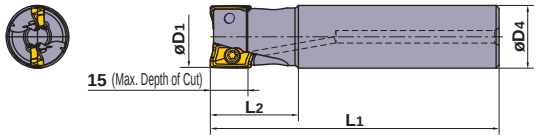
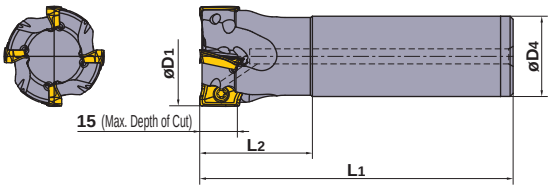


Fig.2



- **High accuracy, high quality vertical wall.**
- **Low cutting force insert.**
- **With through air & coolant holes.**

SHANK TYPE

Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D4	L1	L2	Max. Ramping Angle α°	Max. Allowable Revolution (min-1)	Type (Fig.)	Clamp Screw *	Wrench	Anti-seize Lubricant	Inserts
Standard	APX4000R252SA25SA	●	2	25	25	115	35	11	18900	1	TPS4	TIP15W	MK1KS	AOMT 1848□□ PEER-□
	322SA32SA	●	2	32	32	125	45	7	16300	1	TPS4	TIP15W	MK1KS	
	323SA32SA	●	3	32	32	125	45	7	16300	1	TPS4	TIP15W	MK1KS	
	403SA32SA	●	3	40	32	125	45	6	14200	2	TPS43	TIP15W	MK1KS	
	404SA32SA	●	4	40	32	125	45	6	14200	2	TPS43	TIP15W	MK1KS	
	504SA32SA	●	4	50	32	125	45	4	12400	2	TPS43	TIP15W	MK1KS	
	505SA32SA	●	5	50	32	125	45	4	12400	2	TPS43	TIP15W	MK1KS	
	634SA32SA	●	4	63	32	125	45	3	10800	2	TPS43	TIP15W	MK1KS	
	636SA32SA	●	6	63	32	125	45	3	10800	2	TPS43	TIP15W	MK1KS	
Long	APX4000R252SA25LA	●	2	25	25	170	35	11	18900	1	TPS4	TIP15W	MK1KS	
	282SA25LA	●	2	28	25	170	35	9	17700	2	TPS4	TIP15W	MK1KS	
	322SA32LA	●	2	32	32	190	45	7	16300	1	TPS4	TIP15W	MK1KS	
	323SA32LA	●	3	32	32	190	45	7	16300	1	TPS4	TIP15W	MK1KS	
	352SA32LA	●	2	35	32	190	45	6	15400	2	TPS4	TIP15W	MK1KS	
	353SA32LA	●	3	35	32	190	45	6	15400	2	TPS4	TIP15W	MK1KS	
	402SA32LA	●	2	40	32	190	45	6	14200	2	TPS43	TIP15W	MK1KS	
	403SA32LA	●	3	40	32	190	45	6	14200	2	TPS43	TIP15W	MK1KS	
	404SA32LA	●	4	40	32	190	45	6	14200	2	TPS43	TIP15W	MK1KS	
Extra Long	APX4000R252SA25ELA	●	2	25	25	220	80	11	18900	1	TPS4	TIP15W	MK1KS	
	282SA25ELA	●	2	28	25	220	35	9	17700	2	TPS4	TIP15W	MK1KS	
	322SA32ELA	●	2	32	32	260	100	7	16300	1	TPS4	TIP15W	MK1KS	
	323SA32ELA	●	3	32	32	260	100	7	16300	1	TPS4	TIP15W	MK1KS	
	352SA32ELA	●	2	35	32	260	45	6	15400	2	TPS4	TIP15W	MK1KS	
	353SA32ELA	●	3	35	32	260	45	6	15400	2	TPS4	TIP15W	MK1KS	
	402SA32ELA	●	2	40	32	260	45	6	14200	2	TPS43	TIP15W	MK1KS	
	403SA32ELA	●	3	40	32	260	45	6	14200	2	TPS43	TIP15W	MK1KS	
	404SA32ELA	●	4	40	32	260	45	6	14200	2	TPS43	TIP15W	MK1KS	

(Note 1) When using inserts with corner radius Re≥2.0, machining of the holder is required as shown page C115.
(Note 2) The maximum allowable revolutions are set to ensure tool and insert stability.
(Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* Clamp Torque (N • m) : TPS4=3.5, TPS43=3.5

● : **Inventory maintained in Japan.**
○ : **Inventory maintained in Japan. (Available from spring 2009)**

Fig.1

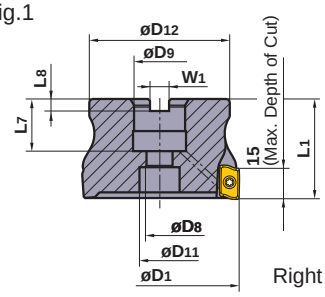
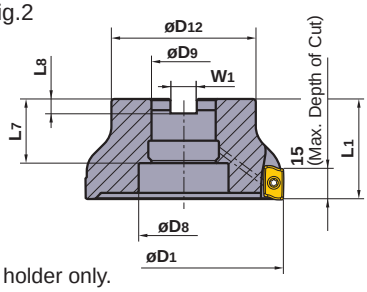
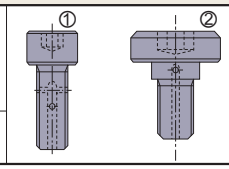


Fig.2



Right hand tool holder only.

Cutter Diameter D1	Set Bolt	Geometry
ϕ40	HSC08030H	①
ϕ50, ϕ63	10030H	①
ϕ80	12035H	①
ϕ100	16040H	①
ϕ125	MBA20040H	②
ϕ160	24045H	②



ARBOR TYPE

C H :0°
A.R :+15°—+22° T :+21°—+28°
R.R :+21°—+28° I :+15°—+22°

Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D12	W1	L8	D11	Tool Weight (kg)	Max. Ramping Angle α°	Max. Allowable Revolution (min-1)	Type (Fig.)	* Clamp Screw	Wrench	Anti-seize Lubricant	Insert
APX4000-040A04RA	●	4	40	40	16	18	9	34	8.4	5.6	14	0.2	6	14200	1	TPS43	TIP15W	MK1KS	AOMT 1848□□ PEER-□
-050A05RA	●	5	50	40	22	20	11	45	10.4	6.3	17	0.3	4	12400	1	TPS43	TIP15W	MK1KS	
-063A06RA	●	6	63	40	22	20	11	50	10.4	6.3	17	0.5	3	10800	1	TPS43	TIP15W	MK1KS	
R08007CA	●	7	80	50	25.4	26	13	70	9.5	6	20	1.2	2	9300	1	TPS43	TIP15W	MK1KS	
R10008DA	●	8	100	63	31.75	32	17	80	12.7	8	26	2.1	1.5	8100	1	TPS43	TIP15W	MK1KS	
R12509EA	●	9	125	63	38.1	40	56	100	15.9	10	—	3.3	1	7100	2	TPS43	TIP15W	MK1KS	
R16010FA	●	10	160	63	50.8	40	72	100	19.1	11	—	4.8	1	6100	2	TPS43	TIP15W	MK1KS	

(Note 1) When using inserts with corner radius Re≥2.0, machining of the holder is required as shown page C115.
(Note 2) The maximum allowable revolutions are set to ensure tool and insert stability.
(Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* Clamp Torque (N • m) : TPS43=3.5

Fig.1

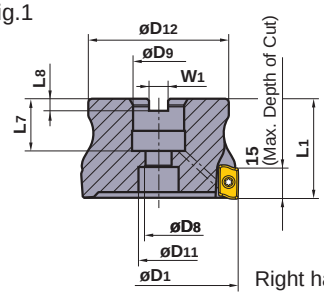
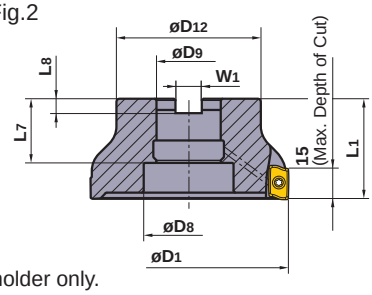
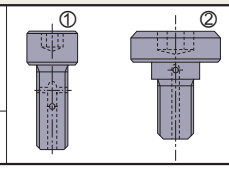


Fig.2



Right hand tool holder only.

Cutter Diameter D1	Set Bolt	Geometry
ϕ40	HSC08030H	①
ϕ50, ϕ63	10030H	①
ϕ80	12035H	①
ϕ100	16040H	①
ϕ125	MBA20040H	②
ϕ160	24045H	②



For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

ARBOR TYPE

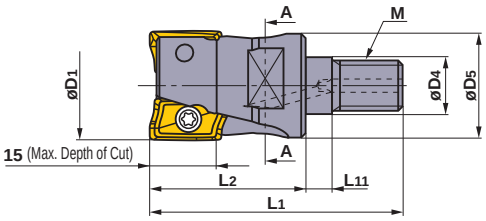
C H :0°
A.R :+15°—+22° T :+21°—+28°
R.R :+21°—+28° I :+15°—+22°

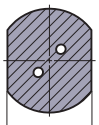
Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D12	W1	L8	D11	Tool Weight (kg)	Max. Ramping Angle α°	Max. Allowable Revolution (min-1)	Type (Fig.)	* Clamp Screw	Wrench	Anti-seize Lubricant	Insert
APX4000-040A04RA	●	4	40	40	16	18	9	34	8.4	5.6	14	0.2	6	14200	1	TPS43	TIP15W	MK1KS	AOMT 1848□□ PEER-□
-050A05RA	●	5	50	40	22	20	11	45	10.4	6.3	17	0.3	4	12400	1	TPS43	TIP15W	MK1KS	
-063A06RA	●	6	63	40	22	20	11	50	10.4	6.3	17	0.5	3	10800	1	TPS43	TIP15W	MK1KS	
-080A07RA	○	7	80	50	27	23	13	60	12.4	7	20	1.2	2	9300	1	TPS43	TIP15W	MK1KS	
-100A08RA	○	8	100	50	32	25	17	70	14.4	8	27	2.1	1.5	8100	1	TPS43	TIP15W	MK1KS	
-125A09RA	○	9	125	63	40	40	56	90	16.4	9	—	3.3	1	7100	2	TPS43	TIP15W	MK1KS	
-160A10RA	○	10	160	63	40	40	72	100	16.4	9	—	4.8	1	6100	2	TPS43	TIP15W	MK1KS	

(Note 1) When using inserts with corner radius Re≥2.0, machining of the holder is required as shown page C115.
(Note 2) The maximum allowable revolutions are set to ensure tool and insert stability.
(Note 3) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
* Clamp Torque (N • m) : TPS43=3.5

SPARE PARTS E001
TECHNICAL DATA F001

NEW





SCREW-IN TYPE

Right hand tool holder only.

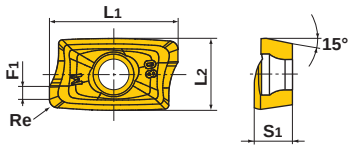
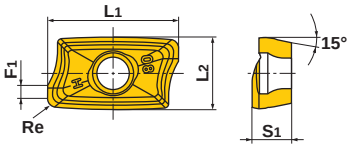
Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)								Tool Weight	Clamp Screw *	Wrench	Anti-seize Lubricant	Inserts
	R			D1	D4	D5	L1	L2	L11	H1	M	(kg)				
APX4000R252M12A35	●	○	2	25	12.5	23.5	57	35	6	19	M12	0.2	TPS4	TIP15W	MK1KS	AOMT 1848○○ PEER-○
282M12A35	●	○	2	28	12.5	23.5	57	35	6	19	M12	0.2	TPS4	TIP15W	MK1KS	
322M16A40	●	○	2	32	17	28.5	63	40	6	24	M16	0.3	TPS4	TIP15W	MK1KS	
323M16A40	●	○	3	32	17	28.5	63	40	6	24	M16	0.3	TPS4	TIP15W	MK1KS	
352M16A40	●	○	2	35	17	28.5	63	40	6	24	M16	0.3	TPS4	TIP15W	MK1KS	
353M16A40	●	○	3	35	17	28.5	63	40	6	24	M16	0.3	TPS4	TIP15W	MK1KS	
403M16A40	●	○	3	40	17	28.5	63	40	6	24	M16	0.3	TPS43	TIP15W	MK1KS	
404M16A40	●	○	4	40	17	28.5	63	40	6	24	M16	0.3	TPS43	TIP15W	MK1KS	

(Note) When using inserts with corner radius Re≥2.0, machining of the holder is required as shown page C115.

* Clamp Torque (N • m) : TPS4=3.5, TPS43=3.5

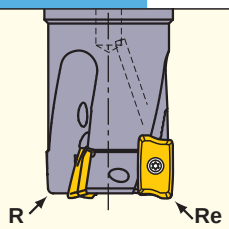
● : Inventory maintained in Japan. (10 inserts in one case)

INSERTS

Shape	Order Number	Stock Coated VP15TF	Stock Coated VP20RT			Dimensions (mm) L_1	L_2	S_1	F_1	Re	Geometry
General **M** Breaker	**AOMT184804PEER-M**	●	●			18	9	4.8	1.8	0.4	
	184808PEER-M	●	●			18	9	4.8	1.4	0.8	
	NEW **184810PEER-M**	●				18	9	4.8	1.0	1.0	
	NEW **184812PEER-M**	●				18	9	4.8	0.8	1.2	
	NEW **184816PEER-M**	●				18	9	4.8	0.4	1.6	
	NEW **184820PEER-M**	●				18	9	4.8	0.4	2.0	
Strong Cutting Edge Type **M** Breaker NEW	**AOMT184804PEER-H**	●	●			18	9	4.8	1.8	0.4	
	184808PEER-H	●	●			18	9	4.8	1.4	0.8	
	184832PEER-H		●			18	9	4.8	0.4	3.2	
	184840PEER-H		●			18	9	4.8	0.4	4.0	
	184850PEER-H		●			18	9	4.8	—	5.0	
	184864PEER-H		●			18	9	4.8	—	6.35	

NOTE ON USE OF INSERTS WITH LARGE CORNER RADII

When using inserts with corner radius Re≥R2.0, please machine the holder with a radius form as shown on the right.



R=Re−1.0mm

R : Holder end radius
Re : Insert corner radius

SCREW-IN ARBORS C192
SPARE PARTS E001
TECHNICAL DATA F001

RECOMMENDED CUTTING CONDITIONS

CUTTING CONDITIONS FOR SHOULDER MILLING

	Work Material	Hardness	Grade	Cutting Width ae (mm)	Cutting Speed vc (m/min)	Depth of Cut ap (mm)	Feed per Tooth fz (mm/tooth)		
							ϕ25—ϕ40	ϕ50—ϕ80	ϕ100—ϕ160
P	Mild Steel	≤180HB	VP15TF	—0.25D1	230 (180—270)	—5	0.3	0.3	0.25
						5—7.5	0.25	0.25	0.2
						7.5—10	0.2	0.2	0.15
						10—12.5	0.15	0.15	0.1
						12.5—15	0.1	0.1	0.07
				—0.5D1	220 (170—260)	—5	0.3	0.3	0.25
						5—7.5	0.25	0.25	0.2
						7.5—10	0.2	0.2	0.15
						10—12.5	0.15	0.15	0.1
						12.5—15	0.1	0.1	0.07
				—0.75D1	180 (140—210)	—5	0.2	0.2	0.15
						5—10	0.15	0.15	0.1
						10—15	0.1	0.1	0.07
	Carbon Steel Alloy Steel	180—350HB	VP15TF	—0.25D1	180 (140—210)	—5	0.3	0.3	0.25
						5—7.5	0.25	0.25	0.2
						7.5—10	0.2	0.2	0.15
						10—12.5	0.15	0.15	0.1
						12.5—15	0.1	0.1	0.07
				—0.5D1	170 (130—200)	—5	0.3	0.3	0.25
						5—7.5	0.25	0.25	0.2
						7.5—10	0.2	0.2	0.15
						10—12.5	0.15	0.15	0.1
						12.5—15	0.1	0.1	0.07
				—0.75D1	140 (110—160)	—5	0.2	0.2	0.15
						5—10	0.15	0.15	0.1
						10—15	0.1	0.1	0.07
M	Stainless Steel	≤270HB	VP20RT	—0.25D1	180 (140—210)	—5	0.3	0.25	0.25
						5—7.5	0.25	0.2	0.2
						7.5—10	0.2	0.15	0.15
						10—12.5	0.15	0.1	0.1
						12.5—15	0.1	0.07	0.07
				—0.5D1	170 (130—200)	—5	0.3	0.25	0.25
						5—7.5	0.25	0.2	0.2
						7.5—10	0.2	0.15	0.15
						10—12.5	0.15	0.1	0.1
						12.5—15	0.1	0.07	0.07
				—0.75D1	140 (110—160)	—5	0.2	0.15	0.15
						5—10	0.15	0.1	0.1
						10—15	0.1	0.07	0.07
K	Gray Cast Iron	Tensile Strength ≤350MPa	VP15TF	—0.25D1	180 (140—210)	—5	0.3	0.3	0.25
						5—7.5	0.25	0.25	0.2
						7.5—10	0.2	0.2	0.15
						10—12.5	0.15	0.15	0.1
						12.5—15	0.1	0.1	0.07
				—0.5D1	170 (130—200)	—5	0.3	0.3	0.25
						5—7.5	0.25	0.25	0.2
						7.5—10	0.2	0.2	0.15
						10—12.5	0.15	0.15	0.1
						12.5—15	0.1	0.1	0.07
				—0.75D1	140 (110—160)	—5	0.2	0.2	0.15
						5—10	0.15	0.15	0.1
						10—15	0.1	0.1	0.07
	Ductile Cast Iron	Tensile Strength ≤800MPa	VP15TF	—0.25D1	130 (100—150)	—5	0.25	0.25	0.25
						5—7.5	0.2	0.2	0.2
						7.5—10	0.15	0.15	0.15
						10—12.5	0.1	0.1	0.1
						12.5—15	0.07	0.07	0.07
				—0.5D1	120 (90—140)	—5	0.25	0.25	0.25
						5—7.5	0.2	0.2	0.2
						7.5—10	0.15	0.15	0.15
						10—12.5	0.1	0.1	0.1
						12.5—15	0.07	0.07	0.07
				—0.75D1	100 (80—120)	—5	0.2	0.2	0.15
						5—10	0.15	0.15	0.1
						10—15	0.1	0.1	0.07
S	Ti Alloy		VP20RT	—0.25D1	40 (30—60)	—5	0.15	0.1	0.1
						5—7.5	0.1	0.05	0.05
						7.5—10	0.05	—	—
	Heat Resistant Alloy	—	VP20RT	—0.25D1	30 (20—40)	—2	0.1	0.05	0.05
H	Hardened Steel	40—55HRC	VP15TF	—0.25D1	90 (70—100)	—5	0.15	0.15	0.15
						5—7.5	0.1	0.1	0.1
						7.5—10	0.07	0.07	0.07
				—0.5D1	85 (60—100)	—5	0.1	0.1	0.1
						5—7.5	0.07	0.07	0.07
				—0.75D1	70	—5	0.07	0.07	0.07

(Note 1) These cutting conditions are a guide to the standard shank type and the arbor type.
Please make adjustments according to the machining conditions.
(Note 2) Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
• When using the long shank type and extra long shank type.
• When using long tool overhang with the standard or arbor type.
• When the application has poor clamping rigidity or when using a low rigidity machine.
(Note 3) In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
(Note 4) For heavy interrupted and unstable cutting, the H breaker is first recommendation.

CUTTING CONDITIONS FOR SLOT MILLING

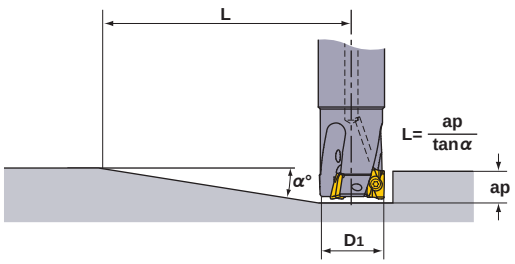
	Work Material	Hardness	Grade	Cutting Width **ae** (mm)	Cutting Speed **vc** (m/min)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)		
							ϕ25—ϕ40	**ϕ50—ϕ80**	**ϕ100—ϕ160**
P	Mild Steel	≤180HB	**VP15TF**	D1	180 (140—210)	—5	0.15	0.15	0.15
						5—7.5	0.1	0.1	0.1
						7.5—10	0.07	0.07	0.07
	Carbon Steel Alloy Steel	180—350HB	**VP15TF**	D1	140 (110—160)	—5	0.15	0.15	0.15
						5—7.5	0.1	0.1	0.1
						7.5—10	0.07	0.07	0.07
M	Stainless Steel	≤270HB	**VP20RT**	D1	140 (110—160)	—5	0.15	0.15	0.15
						5—7.5	0.1	0.1	0.1
						7.5—10	0.07	0.07	0.07
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP15TF**	D1	140 (110—160)	—5	0.15	0.15	0.15
						5—7.5	0.1	0.1	0.1
						7.5—10	0.07	0.07	0.07
	Ductile Cast Iron	Tensile Strength ≤800MPa	**VP15TF**	D1	100 (80—120)	—5	0.15	0.15	0.15
						5—7.5	0.1	0.1	0.1
						7.5—10	0.07	0.07	0.07
S	Ti Alloy	≦350HB	**VP20RT**	D1	40 (30—60)	—5	0.05	0.05	0.05
	Heat Resistant Alloy	—	**VP20RT**	D1	30 (20—40)	—1	0.05	0.05	0.05
H	Hardened Steel	40—55HRC	**VP15TF**	D1	70 (50—80)	—5	0.07	0.07	0.07

(Note 1) These cutting conditions are a guide to the standard shank type and the arbor type.
Please make adjustments according to the machining conditions.
(Note 2) Vibration is liable to occur in certain cases. Please reduce the depth of cut and / or reduce cutting conditions in the following cases.
- When using the long shank type and extra long shank type.
- When using long tool overhang with the standard or arbor type.
- When the application has poor clamping rigidity or when using a low rigidity machine.

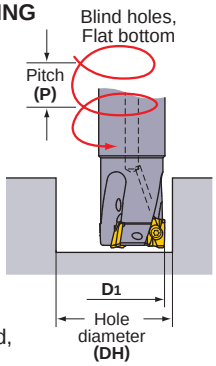
(Note 3) In case of coarse and fine pitch cutters, the coarse pitch type is recommended to prevent vibration.
(Note 4) For heavy interrupted and unstable cutting, the H breaker is first recommendation.

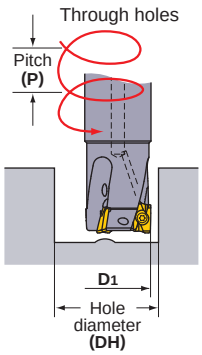
RAMPING/HELICAL CUTTING

RAMPING



HELICAL CUTTING





Refer to the table below for cutting conditions. For feed per tooth and cutting speed, follow the cutting conditions for slot milling.

Cutting Edge Diameter **D1** (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
	Maximum Ramping Angle **α°**	Minimum Distance✶1 **L** (mm)	Maximum Hole Diameter ✶2 **DH max.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)	Minimum Hole Diameter **DH min.** (mm)	Maximum Pitch **P max.** (mm)
25	11	85	48	14	45	12	32	4
28	9	105	54	12	51	11	38	4
32	7	135	62	11	59	10	46	5
35	6	158	68	10	65	9	52	5
40	6	158	78	12	75	11	62	7
50	4	238	98	10	95	9	82	7
63	3	318	124	10	121	9	108	7
80	2	477	158	8	155	8	142	6
100	1.5	636	198	8	195	7	182	6
125	1	954	248	6	245	6	232	5
160	1	954	318	8	315	8	302	7

(Note) When machining highly ductile materials with ramping angles above, chips could be continuous.
In this case, decrease the ramping angle or feed per tooth.
✶1 L (=15 / tan α). Cutters' moving distance until depth of cut reaches 15mm at a maximum ramping angle.
✶2 In case corner radius of 0.8mm. Other than that, find with the below formula.
{(cutting edge diameter D1)—(corner radius)—0.2}×2

DEEP SHOULDER MILLING

0° | Finishing | Roughing | Shoulder Milling | Side Milling | Slotting

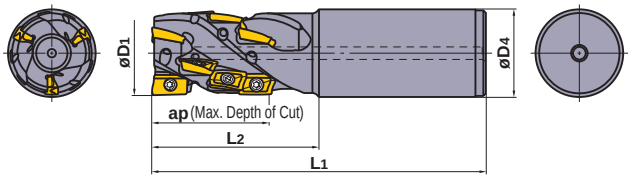
APX4000

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

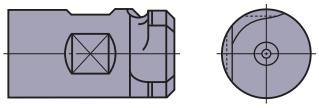
LONG CUTTING EDGE

NEW

- High accuracy, high quality vertical wall.
- Low cutting force insert.
- With through air & coolant holes.



⁎1 Combination Shank



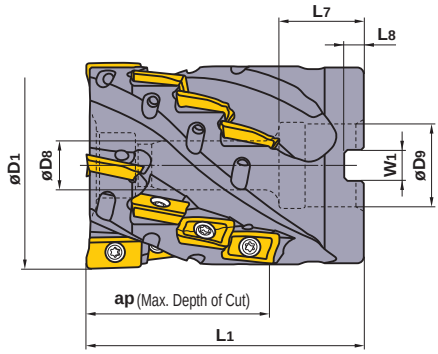
SHANK TYPE

Right hand tool holder only.

Order Number	Stock	Number of Flutes	Total	Dimensions (mm)					⁎2		
	R			D1	D4	L1	L2	ap	Clamp Screw	Wrench	Insert
APX4KR4008SA42S056A	○	2	8	40	42	160	80	56	TPS43	TIP15W	AOMT1848○○PEER-○
4012SA42S056A	○	3	12	40	42	160	80	56	TPS43	TIP15W	
⁎1 5012WA508S056A	○	3	12	50	50.8	160	80	56	TPS43	TIP15W	
⁎1 5018WA508M084A	○	3	18	50	50.8	190	110	84	TPS43	TIP15W	

⁎2 Clamp Torque (N • m) : TPS43=3.5

NEW



SHELL TYPE

Right hand tool holder only.

Order Number	Stock	Number of Flutes	Total	Dimensions (mm)								⁎		
	R			D1	L1	D9	L7	D8	W1	L8	ap	Clamp Screw	Wrench	Insert
APX4KR05009BA042A	○	3	9	50	70	22	22	11	10.4	6.3	42	TPS43	TIP15W	AOMT1848○○PEER-○
06316CA056A	○	4	16	63	85	25.4	26	13	9.5	6	56	TPS43	TIP15W	

⁎ Clamp Torque (N • m) : TPS43=3.5

○ : Inventory maintained in Japan. (Available from spring 2009)

RECOMMENDED CUTTING CONDITIONS

CUTTING CONDITIONS FOR SHOULDER MILLING

	Work Material	Hardness	Insert Grade, Type	Cutting Width **ae** (mm)	Cutting Speed **vc** (m/min)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)		
							ϕ40	**ϕ50** Length of cut 56mm	**ϕ50** Length of cut 84mm
P	Mild Steel	≤180HB	**VP15TF** Low Resistance Type	0.15D1	200 (160–250)	20	0.25	0.25	0.2
						50	0.2	0.2	0.15
						80	–	–	0.1
				0.3D1	160 (120–200)	20	0.25	0.25	0.2
						50	0.2	0.2	0.15
						80	–	–	0.1
	Carbon Steel Alloy Steel	180–350HB	**VP15TF** Low Resistance Type	0.15D1	160 (120–200)	20	0.25	0.25	0.2
						50	0.2	0.2	0.15
						80	–	–	0.1
				0.3D1	120 (100–140)	20	0.25	0.25	0.2
						50	0.2	0.2	0.15
						80	–	–	0.1
M	Stainless Steel	≤200HB	**VP20RT** Low Resistance Type	0.15D1	160 (120–200)	10	0.25	0.25	0.2
						50	0.2	0.2	0.15
						80	–	–	0.1
				0.3D1	120 (100–140)	10	0.25	0.25	0.2
						50	0.2	0.2	0.15
						80	–	–	0.1
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP15TF** Strong Cutting Edge Type	0.15D1	160 (120–200)	10	0.3	0.3	0.25
						50	0.25	0.25	0.2
						80	–	–	0.15
				0.3D1	120 (100–140)	10	0.25	0.25	0.2
						50	0.2	0.2	0.15
						80	–	–	0.1
	Ductile Cast Iron	Tensile Strength ≤800MPa	**VP15TF** Strong Cutting Edge Type	0.15D1	120 (100–140)	10	0.25	0.25	0.2
						50	0.2	0.2	0.15
						80	–	–	0.1
				0.3D1	100 (80–120)	10	0.2	0.2	0.15
						50	0.15	0.15	0.1
						80	–	–	0.07
S	Ti Alloy	≤350HB	**VP20RT**	0.15D1	40 (30–60)	20	0.15	0.1	–
						50	0.1	0.05	–
	Heat Resistant Alloy	–	**VP20RT**	0.15D1	30 (20–40)	10	0.1	0.05	–
						20	0.05	–	–
H	Hardened Steel	40–55HRC	**VP15TF** Strong Cutting Edge Type	0.15D1	80 (60–100)	10	0.15	0.15	0.1
						50	0.1	0.1	0.07
						80	–	–	–
				0.3D1	50 (40–60)	10	0.15	0.15	0.1
						50	0.1	0.1	0.07
						80	–	–	–

CUTTING CONDITIONS FOR SLOT MILLING

	Work Material	Hardness	Insert Grade, Type	Cutting Width **ae** (mm)	Cutting Speed **vc** (m/min)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)		
							ϕ40	**ϕ50** Length of cut 56mm	**ϕ50** Length of cut 84mm
P	Mild Steel	≤180HB	**VP15TF** Low Resistance Type	D1	140 (120–160)	20	0.2	0.2	0.15
						50	0.15	0.15	–
	Carbon Steel Alloy Steel	180–350HB	**VP15TF** Low Resistance Type	D1	100 (80–120)	20	0.15	0.15	0.1
						50	0.1	0.1	–
M	Stainless Steel	≤200HB	**VP20RT** Low Resistance Type	D1	100 (80–120)	10	0.1	0.1	0.07
						50	–	–	–
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP15TF** Strong Cutting Edge Type	D1	120 (100–140)	10	0.25	0.25	0.2
						50	0.2	0.2	0.15
	Ductile Cast Iron	Tensile Strength ≤800MPa	**VP15TF** Strong Cutting Edge Type	D1	100 (80–120)	10	0.15	0.15	0.1
						50	0.1	0.1	–
S	Ti Alloy	≤350HB	**VP20RT**	D1	40 (30–60)	–50	0.05	0.05	–
	Heat Resistant Alloy	–	**VP20RT**	D1	30 (20–40)	–20	0.05	0.05	–
H	Hardened Steel	40–55HRC	**VP15TF** Strong Cutting Edge Type	D1	50 (40–60)	10	0.07	0.07	–
						50	–	–	–

SPARE PARTS E001
TECHNICAL DATA F001

MULTI FUNCTIONAL MILLING
<FOR ALUMINIUM ALLOY>

0° | Finishing | Roughing | Face Milling | Face Milling | Shoulder Milling | Copying (Including Flat faces) | Slotting

AXD7000 NEW

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
▬				

- Low resistance chipbreaker.
- Low resistance insert and high rigidity design for excellent performance.
- For high-speed machining.
- Multi-functional machining.

Fig.1

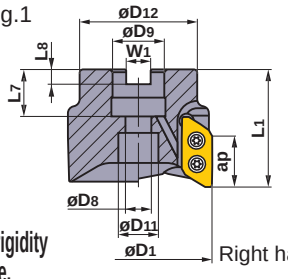
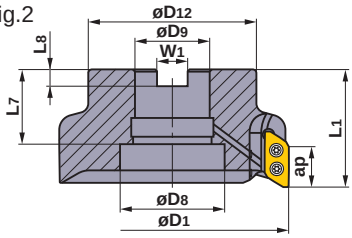
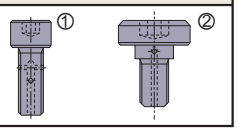


Fig.2



Right hand tool holder only.

Cutter Diameter D1	Set Bolt	Geometry
ϕ50, ϕ63	HSC10030H	①
ϕ80	12035H	①
ϕ100	16040H	①
ϕ125	MBA20040H	②

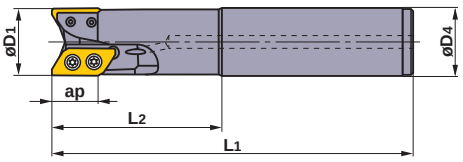


ARBOR TYPE

C H :0°
A.R :+11° T :+26°—+29°
R.R :+26°—+29° I :+11°

Type	Insert Radius Re	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D12	W1	L8	D11	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min-1)	Type (Fig.)	Clamp Screw *	Wrench	Anti-seize Lubricant	Insert
Type A	0.8 I 3.2	AXD7000-050A03RA	●	3	50	50	22	20	11	45	10.4	6.3	17	0.4	21	9	30000	1	TS4SBL	TKY15D	MK1KS	XDGX2270○○ PDFR-GL
		-063A03RA	●	3	63	50	22	20	11	50	10.4	6.3	17	0.5	21	7	25000	1	TS4SBL	TKY15D	MK1KS	
		R08004CA	●	4	80	63	25.4	26	13	63	9.5	6	20	1.2	21	5	23000	1	TS4SBL	TKY15D	MK1KS	
		R10005DA	●	5	100	63	31.75	32	17	70	12.7	8	26	1.8	21	4	19000	1	TS4SBL	TKY15D	MK1KS	
		R12506EA	●	6	125	63	38.1	40	56	90	15.9	10	—	2.7	21	3	16000	2	TS4SBL	TKY15D	MK1KS	
Type B	4.0 I 5.0	AXD7000-050A03RB	●	3	50	50	22	20	11	45	10.4	6.3	17	0.4	20.4	8	30000	1	TS4SBL	TKY15D	MK1KS	
		-063A03RB	●	3	63	50	22	20	11	50	10.4	6.3	17	0.5	20.4	6	25000	1	TS4SBL	TKY15D	MK1KS	
		R08004CB	●	4	80	63	25.4	26	13	63	9.5	6	20	1.2	20.4	4	23000	1	TS4SBL	TKY15D	MK1KS	
		R10005DB	●	5	100	63	31.75	32	17	70	12.7	8	26	1.8	20.4	3	19000	1	TS4SBL	TKY15D	MK1KS	
		R12506EB	●	6	125	63	38.1	40	56	90	15.9	10	—	2.7	20.4	2	16000	2	TS4SBL	TKY15D	MK1KS	

(Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on C123 page.
(Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
(Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the L1 dimension decreases.
* Clamp Torque (N • m) : TS4SBL=3.5



SHANK TYPE

Right hand tool holder only.

Type	Insert Radius Re	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	L2	D4	Max. Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min-1)	Clamp Screw *	Wrench	Anti-seize Lubricant	Insert
Type A	0.8 I 3.2	AXD7000R322SA32SA	●	2	32	170	80	32	21	19	41000	TS4SB	TKY15D	MK1KS	XDGX2270○○ PDFR-GL
		402SA42SA	●	2	40	170	80	42	21	13	36000	TS4SBL	TKY15D	MK1KS	
Type B	4.0 I 5.0	AXD7000R322SA32SB	●	2	32	170	80	32	20.4	18	41000	TS4SB	TKY15D	MK1KS	
		402SA42SB	●	2	40	170	80	42	20.4	11	36000	TS4SBL	TKY15D	MK1KS	

(Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
(Note 2) When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.
(Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the L1 and L2 dimensions decreases.
* Clamp Torque (N • m) : TS4SB=3.5, TS4SBL=3.5

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)

Fig.1

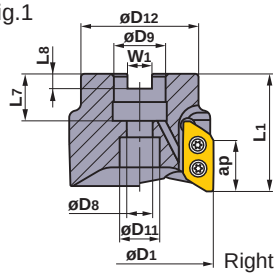
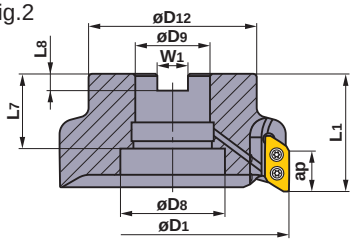


Fig.2

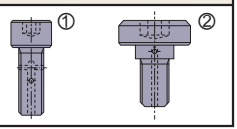


Right hand tool holder only.

For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

Cutter Diameter D1	Set Bolt	Geometry
ϕ50, ϕ63	HSC10030H	①
ϕ80	12035H	①
ϕ100	16040H	①
ϕ125	MBA20040H	②

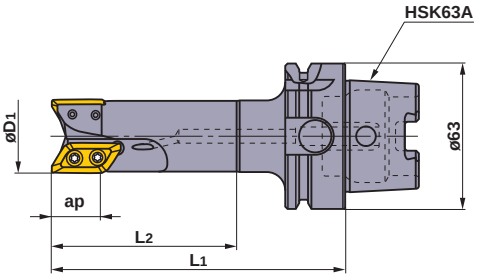


C H :0°
A.R :+11° T :+26°—+29°
R.R :+26°—+29° I :+11°

ARBOR TYPE

Type	Insert Corner Re	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D12	W1	L8	D11	Tool Weight (kg)	Max.Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min-1)	Type (Fig.)	Clamp Screw *	Wrench	Anti-seize Lubricant	Insert
A type	0.8 I 3.2	AXD7000-050A03RA	●	3	50	50	22	20	11	45	10.4	6.3	17	0.4	21	9	30000	1	TS4SBL	TKY15D	MK1KS	XDGX2270□□ PDFR-GL
		-063A03RA	●	3	63	50	22	20	11	45	10.4	6.3	17	0.5	21	7	25000	1	TS4SBL	TKY15D	MK1KS	
		-080A04RA	○	4	80	63	27	23	13	63	12.4	7	20	1.2	21	5	23000	1	TS4SBL	TKY15D	MK1KS	
		-100A05RA	○	5	100	63	32	26	17	70	14.4	8	26	1.8	21	4	19000	1	TS4SBL	TKY15D	MK1KS	
		-125B06RA	○	6	125	63	40	40	56	90	16.4	9	—	2.7	21	3	16000	2	TS4SBL	TKY15D	MK1KS	
B type	4.0 I 5.0	AXD7000-050A03RB	●	3	50	50	22	20	11	45	10.4	6.3	17	0.4	20.4	8	30000	1	TS4SBL	TKY15D	MK1KS	
		-063A03RB	●	3	63	50	22	20	11	45	10.4	6.3	17	0.5	20.4	6	25000	1	TS4SBL	TKY15D	MK1KS	
		-080A04RB	○	4	80	63	27	23	13	63	12.4	7	20	1.2	20.4	4	23000	1	TS4SBL	TKY15D	MK1KS	
		-100A05RB	○	5	100	63	32	26	17	70	14.4	8	26	1.8	20.4	3	19000	1	TS4SBL	TKY15D	MK1KS	
		-125B06RB	○	6	125	63	40	40	56	90	16.4	9	—	2.7	20.4	2	16000	2	TS4SBL	TKY15D	MK1KS	

(Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
Before operating the tool read the operational guidance on C123 page.
(Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
(Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the L1 dimension decreases.
* Clamp Torque (N • m) : TS4SBL=3.5



HSK63A SHANK TYPE

Right hand tool holder only.

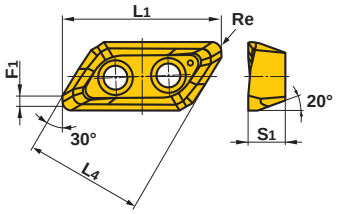
Type	Insert Corner Re	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	L2	Max.Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min-1)	Clamp Screw *	Wrench	Anti-seize Lubricant	Insert
A type	0.8 I 3.2	AXD7000R03202A-H63A	○	2	32	127	80	21	19	41000	TS4SB	TKY15D	MK1KS	XDGX2270□□ PDFR-GL
		04002A-H63A	○	2	40	132	85	21	13	36000	TS4SBL	TKY15D	MK1KS	
		05003A-H63A	○	3	50	137	90	21	9	30000	TS4SBL	TKY15D	MK1KS	

(Note 1) The maximum allowable revolutions are set to ensure tool and insert stability.
(Note 2) When using the tool at high spindle speeds, ensure that the tool and chuck are correctly balanced.
(Note 3) Note for inserts with a corner radius of 3.0 and above, as corner radius increases the L1 and L2 dimensions decreases.
* Clamp Torque (N • m) : TS4SB=3.5, TS4SBL=3.5

SPARE PARTS E001
TECHNICAL DATA F001

INSERTS

Work Material			Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ❖ : Unstable Cutting	Honing : F : Sharp
N	Aluminium Alloy	❖	◐	

Shape	Order Number	Class	Honing	Stock: Coated LC15TF	Stock: Carbide TF15	Dimensions (mm) L1	L4	S1	F1	Re	Geometry
	XDGX227008PDFR-GL	G	F	□	●	30	22.5	7	2.0	0.8	
	227016PDFR-GL	G	F	□	●	30	22.5	7	1.2	1.6	
	227020PDFR-GL	G	F	□	●	30	22.5	7	0.8	2.0	
	227030PDFR-GL	G	F	□	●	28.8	22.5	7	0.8	3.0	
	227032PDFR-GL	G	F	□	●	28.8	22.5	7	0.6	3.2	
	227040PDFR-GL	G	F	□	●	27.5	22.5	7	0.9	4.0	
	227050PDFR-GL	G	F	□	●	27	22.5	7	0.4	5.0	

HOLDER AND INSERT CORNER RADIUS COMBINATION

Holder	A Holder: AXD7000−○○○○○○○A / AXD7000R○○○○○○○A / AXD7000R○○○○A-H63A					B Holder: AXD7000−○○○○○○○B / AXD7000R○○○○○○○B	
Insert Corner Radius (Re)	R0.8	R1.6	R2.0	R3.0	R3.2	R4.0	R5.0
	XDGX 227008PDFR-GL	XDGX 227016PDFR-GL	XDGX 227020PDFR-GL	XDGX 227030PDFR-GL	XDGX 227032PDFR-GL	XDGX 227040PDFR-GL	XDGX 227050PDFR-GL

RECOMMENDED CUTTING CONDITIONS

CUTTING CONDITIONS FOR SHOULDER MILLING

Work Material	Grade	Cutting Width ae (mm)	Cutting Speed vc (m/min)	Cutting Depth ap (mm)	Feed per Tooth (mm/tooth) Cutting Edge Diameter D1 ϕ32	Cutting Edge Diameter D1 ϕ40	Cutting Edge Diameter D1 ϕ50−ϕ125
N Aluminium Alloy	LC15TF TF15	−0.25 D1	1000 (200−3000)	−5	0.35	0.40	0.40
				5−10	0.30	0.35	0.35
				10−15	0.25	0.30	0.30
				15−20	0.20	0.25	0.25
		−0.5 D1	1000 (200−3000)	−5	0.35	0.35	0.40
				5−10	0.30	0.30	0.35
				10−15	0.25	0.25	0.30
				15−20	0.20	0.20	0.25
		−0.75 D1	1000 (200−3000)	−5	0.30	0.30	0.35
				5−10	0.25	0.25	0.30
				10−15	0.20	0.20	0.25
				15−20	0.15	0.15	0.20

(Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibration occurred. If vibrations occur make adjustments according to the machining conditions.

(Note 2) Note, vibrations may occur in the following conditions.
- When using long tool overhang.
- When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low,vibrations can occur easily, if so, reduce the cutting conditions.
- When pocket machining corner radii.

CUTTING CONDITIONS FOR SLOT MILLING

Work Material	Grade	Cutting Width ae (mm)	Cutting Speed vc (m/min)	Cutting Depth ap (mm)	Feed per Tooth (mm/tooth) Cutting Edge Diameter D1 ϕ32	Cutting Edge Diameter D1 ϕ40	Cutting Edge Diameter D1 ϕ50−ϕ125
N Aluminium Alloy	LC15TF TF15	D1	1000 (200−3000)	−5	0.25	0.30	0.35
				5−10	0.20	0.25	0.30
				10−15	0.15	0.20	0.25
				15−20	0.10	0.15	0.20

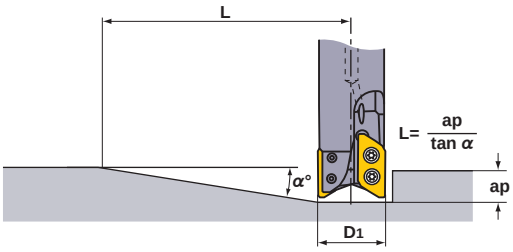
(Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibration occurred. If vibrations occur make adjustments according to the machining conditions.

(Note 2) Note, vibrations may occur in the following conditions.
- When using long tool overhang.
- When the workpiece has poor clamping rigidity or when the machine rigidity or workpiece rigidity is low,vibrations can occur easily, if so, reduce the cutting conditions.
- When pocket machining corner radii.

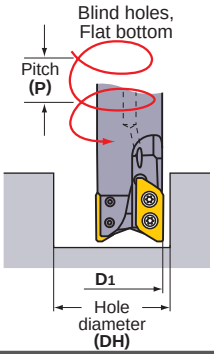
● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.

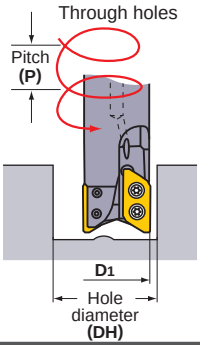
RAMPING/HELICAL CUTTING

RAMPING



HELICAL CUTTING





RAMPING/HELICAL CUTTING

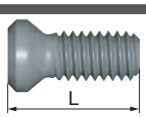
Type	Tool Diameter D1 (mm)	Ramping		Helical Cutting (Blind Hole, Flat Bottom)				Helical Cutting (Through Hole)	
		Maximum Ramping Angle α°	Minimum Distance L ✶1 (mm)	Maximum Hole Diameter DH max. ✶2 (mm)	Maximum Pitch P max. (mm)	Minimum Hole Diameter DH min. ✶3 (mm)	Maximum Pitch P max. (mm)	Minimum Hole Diameter DH max. (mm)	Maximum Pitch P max. (mm)
A type	32	19	61	61.8	21	58.2	20	41	7
	40	13	91	77.8	18	74.2	17	57	9
	50	9	133	97.8	16	94.2	16	77	10
	63	7	171	123.8	15	120.2	15	103	11
	80	5	240	157.8	16	154.2	15	137	12
	100	4	300	197.8	15	194.2	15	177	12
	125	3	401	247.8	12	244.2	12	227	11
B type	32	18	63	55.4	16	54.0	16	41	7
	40	11	105	71.4	14	70.0	14	57	8
	50	8	146	91.4	13	90.0	12	77	8
	63	6	195	117.4	11	116.0	11	103	8
	80	4	293	151.4	11	150.0	11	137	9
	100	3	391	191.4	9	190.0	9	177	8
	125	2	587	241.4	12	240.0	12	227	11

(Note) The recommended ramping feed is 0.05mm/tooth or under.
✶1 L (Max. Depth of Cut =15 / tan α). Cutters' moving distance until depth of cut reaches ap at a maximum ramping angle.
Maximum depth of cut A type is 21mm, B type is 20.4mm.
✶2 The maximum diameter when machining a blind hole with a flat face using a corner radius of 0.8mm for A type and 4mm for B type.
Other than that, find with the below formula.
{(cutting edge diameter D1)−(corner radius)−0.3)}×2
✶3 The minimum diameter when machining a blind hole with a flat face using a corner radius of 0.8mm for A type and 4mm for B type.
Other than that, find with the below formula.
{(cutting edge diameter D1)−(corner radius)−(Width of wiper edge F1)−0.1)}×2

CAUTION FOR USE

●Only use the inserts and parts provided by Mitsubishi Materials with this tool. Use of the correct insert clamp screws is especially important to ensure overall tool safety. Do not use damaged or worn clamp screws.

Cutting Edge Diameter D1(mm)	ø32	ø40−ø125
Clamp Screw Number	TS4SB	TS4SBL
Overall Length L(mm)	9	10.5



●When tightening the clamp screws, follow the order in Figure 1.
The recommended torque value is 3.5N•m.

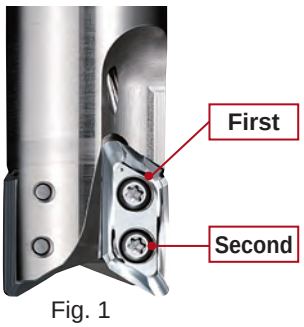


Fig. 1

●The maximum allowable spindle speeds are shown in Table 1. Ensure that the cutter operates under the maximum allowable spindle speed. The maximum allowable spindle speeds for safety purposes are determined in accordance with ISO15641 (Milling Cutters for high speed machining–Safety requirements).

Table 1 Max. Allowable Revolution

Cutting Edge Diameter D1(mm)	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Allowable Revolution (min-1)	41000	36000	30000	25000	23000	19000	16000

●Even when operating under the maximum allowable spindle speed, if the spindle speed is equal to or higher than the values shown in table 2, it is recommended that the balance quality (with the arbor or milling chuck) conforms to G6.3 or betterbased on ISO1940. It is also recommended to replace the clamp screws with new ones when changing inserts. Furthermore,ensure to use machines that are provided with safety measures in case of cutter breakage.

(Note) The balance quality of the holder (without inserts and clamp screws) is G6.3 or better at 10,000min-1.

Table 2 Maximum spindle speed when balancing with the arbor or milling chuck has not been achieved

Cutting Edge Diameter D1(mm)	ø32	ø40	ø50	ø63	ø80	ø100	ø125
Max. Allowable Revolution (min-1)	9500	7600	6000	4800	3800	3000	2400

●When setting the spindle speed, take into consideration the maximum allowable spindle speed of the arbor or milling chuck.
●Use the specified set bolt when using the arbor type with through coolant.
●The inserts have sharp cutting edges and handling them with bare hands may cause injuries.
Always wear safety gloves whenhandling the indexable inserts.

SPARE PARTS E001
TECHNICAL DATA F001

MULTI FUNCTIONAL MILLING

<ALUMINIUM ALLOY TO DIFFICULT-TO-CUT MATERIAL CUTTING>

0° | Finishing | Roughing | Face Milling | Shoulder Milling | Copying (Including Flat faces) | Slotting | Pocket Milling

BXD4000

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- Curved cutting edge and high rigidity holder produce high wall accuracy.
- Low resistance insert and high rigidity design for excellent performance.
- With through coolant holes to ensure smooth chip discharge.
- For high-speed machining.

Fig.1

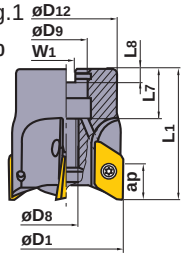
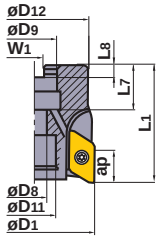
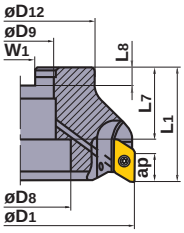


Fig.2

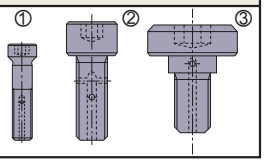


Right hand tool holder only.

Fig.3



Cutter Diameter D1	Set Bolt	Geometry
ϕ40	HFF08043H	①
ϕ50, ϕ63	HSC10030H	②
ϕ80	12035H	
ϕ100	16040H	
ϕ125	MBA20040H	③



● The set bolts in the right table are supplied with respective cutter.

ARBOR TYPE

C H :0°
A.R :+11°—+15°
R.R :+8°—+16°
T :+8°—+16°
I :+11°—+15°

Type	Insert Radius Re	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D12	W1	L8	D11	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min-1)	Type (Fig.)	* Clamp Screw	Wrench	Insert
A type	0.4 I 3.2	BXD4000-040A03RA	●	3	40	50	16	18	8.5	32	8.4	5.6	—	0.3	15	9	29000	1	TS4SL	TKY15W	XDGT1550 PD○R-G○○
		-050A04RA	●	4	50	50	22	20	11	41	10.4	6.5	17	0.4	15	6	24000	2	TS4SL	TKY15W	
		-063A05RA	●	5	63	50	22	20	11	50	10.4	6.5	17	0.7	15	5	21000	2	TS4SL	TKY15W	
		R08005CA	●	5	80	50	25.4	26	13	60	9.5	6	20	1.1	15	3	19000	2	TS4SL	TKY15W	XDGT1550 PD○R-GL○○
		R10006DA	●	6	100	63	31.75	32	17	70	12.7	8	26	2.0	15	3	16000	2	TS4SL	TKY15W	
		R12507EA	●	7	125	63	38.1	40	56	80	15.9	10	—	2.8	15	2	14000	3	TS4SL	TKY15W	
B type	4.0 I 5.0	BXD4000-040A03RB	●	3	40	50	16	18	8.5	32	8.4	5.6	—	0.3	15	9	29000	1	TS4SL	TKY15W	XDGT1550 PD○R-G○○
		-050A04RB	●	4	50	50	22	20	11	41	10.4	6.5	17	0.4	15	6	24000	2	TS4SL	TKY15W	
		-063A05RB	●	5	63	50	22	20	11	50	10.4	6.5	17	0.7	15	5	21000	2	TS4SL	TKY15W	
		R08005CB	●	5	80	50	25.4	26	13	60	9.5	6	20	1.1	15	3	19000	2	TS4SL	TKY15W	
		R10006DB	●	6	100	63	31.75	32	17	70	12.7	8	26	2.0	15	3	16000	2	TS4SL	TKY15W	
		R12507EB	●	7	125	63	38.1	40	56	80	15.9	10	—	2.8	15	2	14000	3	TS4SL	TKY15W	

* Clamp Torque (N • m) : TS4SL=4.0

(Note) Arbor types for attachment to the D9 cutter dimension.

Centering Location Diameter (D9)	ϕ16	ϕ22	ϕ25.4	ϕ31.75	ϕ38.1
Arbor Type	SM1, SMA	FMC, SM1	FMA, FMC	FMA, SMB	FMA, FMB SMB, SMC

(Note 1) The maximum allowed revolutions are set to ensure tool and insert stability.
(Note 2) When using the tool at high revolutions, ensure that the tool and arbor are correctly balanced.

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)

Fig.1 ø40

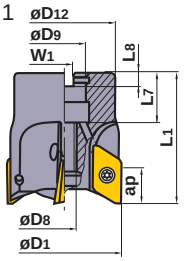


Fig.2 ø50 ø63 ø80 ø100

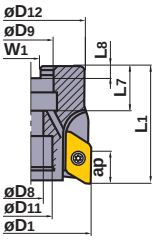
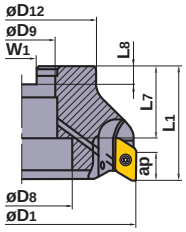


Fig.3 ø125

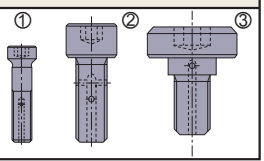


Right hand tool holder only.

For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

Cutter Diameter D1	Set Bolt	Geometry
ϕ40	HFF08043H	①
ϕ50, ϕ63	HSC10030H	②
ϕ80	12035H	
ϕ100	16040H	
ϕ125	MBA20040H	③



ARBOR TYPE

C H :0°
A.R :+11°—+15°
R.R :+8°—+16°
T :+8°—+16°
I :+11°—+15°

Type	Insert Radius Re	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D12	W1	L8	D11	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Ramping Angle α°	Max. Allowable Revolution (min-1)	Type (Fig.)	* Clamp Screw	Wrench	Insert
A type	0.4 I 3.2	**BXD4000-040A03RA**	●	3	40	50	16	18	8.5	32	8.4	5.6	—	0.3	15	9	29000	1	TS4SL	TKY15W	XDGT1550 PD○R-G○○
		-050A04RA	●	4	50	50	22	20	11	41	10.4	6.3	17	0.4	15	6	24000	2	TS4SL	TKY15W	
		-063A05RA	●	5	63	50	22	20	11	50	10.4	6.3	17	0.7	15	5	21000	2	TS4SL	TKY15W	
		-080A05RA	○	5	80	50	27	23	13	60	12.4	7	20	1.1	15	3	19000	2	TS4SL	TKY15W	
		-100A06RA	○	6	100	63	32	26	17	70	14.4	8	26	2.0	15	3	16000	2	TS4SL	TKY15W	
		-125B07RA	○	7	125	63	40	40	56	80	16.4	9	—	2.8	15	2	14000	3	TS4SL	TKY15W	
B type	4.0 I 5.0	**-040A03RB**	●	3	40	50	16	18	8.5	32	8.4	5.6	—	0.3	15	9	29000	1	TS4SL	TKY15W	XDGT1550 PD○R-G○○
		-050A04RB	●	4	50	50	22	20	11	41	10.4	6.3	17	0.4	15	6	24000	2	TS4SL	TKY15W	
		-063A05RB	●	5	63	50	22	20	11	50	10.4	6.3	17	0.7	15	5	21000	2	TS4SL	TKY15W	
		-080A05RB	○	5	80	50	27	23	13	60	12.4	7	20	1.1	15	3	19000	2	TS4SL	TKY15W	
		-100A06RB	○	6	100	63	32	26	17	70	14.4	8	26	2.0	15	3	16000	2	TS4SL	TKY15W	
		-125B07RB	○	7	125	63	40	40	56	80	16.4	9	—	2.8	15	2	14000	3	TS4SL	TKY15W	

* Clamp Torque (N • m) : TS4SL=4.0

(Note) Arbor types for attachment to the D9 cutter dimension.

Centering Location Diameter (D9)	ϕ16	ϕ22	ϕ27	ϕ32	ϕ40
Arbor Type	SM1, SMA	FMC, SM1	FMA, FMC	FMA, SMB	FMA, FMB SMB, SMC

(Note 1) The maximum allowed revolutions are set to ensure tool and insert stability.
(Note 2) When using the tool at high revolutions, ensure that the tool and arbor are correctly balanced.

SPARE PARTS E001
TECHNICAL DATA F001

Fig.1 Straight Shank

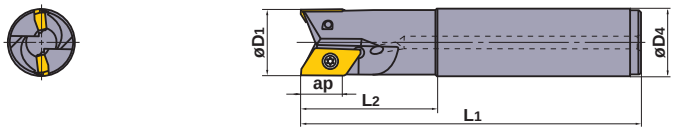
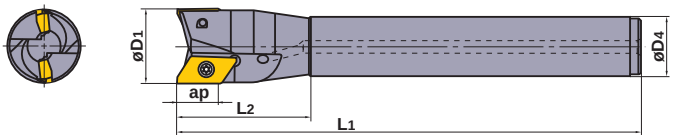


Fig.2 Offset Shank



SHANK TYPE

Right hand tool holder only.

Type	Insert Radius Re	Shank Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	ap	L1	L2	D4	Ramping Angle α°	Max. Allowable Revolution (min-1)	Type (Fig.)	Clamp Screw *	Wrench	Insert
Type A	0.4 – 3.2	Standard	**BXD4000R201SA20SA**	●	1	20	15	110	35	20	28	15000	1	TS4SL	TKY15W	XDGT1550 PD○R-G○○ / XDGT1550 PD○R-GL○○
			252SA25SA	●	2	25	15	125	50	25	20	38000	1	TS4SL	TKY15W	
			282SA25SA	●	2	28	15	125	50	25	17	35000	2	TS4SL	TKY15W	
			322SA32SA	●	2	32	15	150	50	32	13	33000	1	TS4SL	TKY15W	
			352SA32SA	●	2	35	15	150	50	32	11	31000	2	TS4SL	TKY15W	
			403SA32SA	●	3	40	15	170	80	32	9	29000	2	TS4SL	TKY15W	
			403SA42SA	●	3	40	15	170	80	42	9	29000	1	TS4SL	TKY15W	
		Long	**BXD4000R252SA25LA**	●	2	25	15	170	80	25	20	38000	1	TS4SL	TKY15W	
			322SA32LA	●	2	32	15	200	80	32	13	33000	1	TS4SL	TKY15W	
		Extra Long	**BXD4000R282SA25ELA**	●	2	28	15	220	50	25	17	35000	2	TS4SL	TKY15W	
			352SA32ELA	●	2	35	15	250	50	32	11	31000	2	TS4SL	TKY15W	
			403SA32ELA	●	3	40	15	250	65	32	9	29000	2	TS4SL	TKY15W	
Type B	4.0 – 5.0	Standard	**BXD4000R201SA20SB**	●	1	20	15	110	35	20	28	15000	1	TS4SL	TKY15W	XDGT1550 PD○R-G○○
			252SA25SB	●	2	25	15	125	50	25	20	38000	1	TS4SL	TKY15W	
			282SA25SB	●	2	28	15	125	50	25	17	35000	2	TS4SL	TKY15W	
			322SA32SB	●	2	32	15	150	50	32	13	33000	1	TS4SL	TKY15W	
			352SA32SB	●	2	35	15	150	50	32	11	31000	2	TS4SL	TKY15W	
			403SA32SB	●	3	40	15	170	80	32	9	29000	2	TS4SL	TKY15W	
			403SA42SB	●	3	40	15	170	80	42	9	29000	1	TS4SL	TKY15W	
		Long	**BXD4000R252SA25LB**	●	2	25	15	170	80	25	20	38000	1	TS4SL	TKY15W	
			322SA32LB	●	2	32	15	200	80	32	13	33000	1	TS4SL	TKY15W	
		Extra Long	**BXD4000R282SA25ELB**	●	2	28	15	220	50	25	17	35000	2	TS4SL	TKY15W	
			352SA32ELB	●	2	35	15	250	50	32	11	31000	2	TS4SL	TKY15W	
			403SA32ELB	●	3	40	15	250	65	32	9	29000	2	TS4SL	TKY15W	

(Note 1) The maximum allowed revolutions are set to ensure tool and insert stability.
(Note 2) When using the tool at high revolutions, ensure that the tool and arbor are correctly balanced.
* Clamp Torque (N • m) : TS4SL=4.0

HOLDER AND INSERT CORNER RADIUS COMBINATION

Holder	A Holder							B Holder	
	BXD4000R○○○○○○○○A							BXD4000R○○○○○○○○B	
Insert Corner Radius (Re)	R 0.4	R 0.8	R 1.2	R 1.6	R 2.0	R 3.0	R 3.2	R 4.0	R 5.0
	XDGT.....-G04 XDGT.....-GL04	XDGT.....-G08 XDGT.....-GL08	XDGT.....-G12	XDGT.....-G16	XDGT.....-G20	XDGT.....-G30	XDGT.....-G32	XDGT.....-G40	XDGT.....-G50

(Note 1) Please only use the holder and insert corner radius combinations shown above.
(Note 2) XDGT....-GL08 and -G12 inserts are compatible only with the BXD4000R○○○○○○○○A type holder.

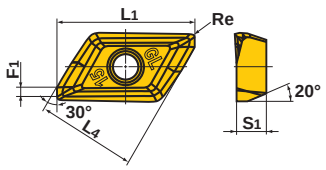
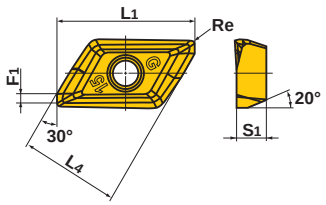
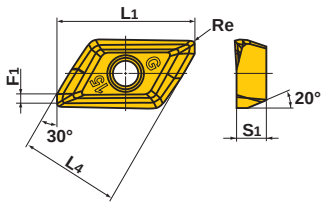
● : Inventory maintained in Japan. (10 inserts in one case)

INSERTS

Work Material			
	P	Steel	◔
	M	Stainless Steel	◔
	K	Cast Iron	✣
	N	Non-ferrous Metal	✣
	S	Heat-resistant Alloy, Titanium Alloy	◔
	H	Hardened Steel	◔

Cutting Conditions (Guide) :
● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

Honing :
E : Round **F** : Sharp

Shape	Order Number	Class	Honing	Stock: Coated VP15TF	Stock: Coated LC15TF	Stock: Coated	Stock: Coated	Stock: Carbide TF15	Stock: Carbide	L1	L4	S1	F1	Re	Geometry
Low Resistance Type	**XDGT1550PDFR-GL04**	G	F					●		22	16	5	1.5	0.4	
	1550PDFR-GL08	G	F					●		22	16	5	1.1	0.8	
	XDGT1550PDFR-G04	G	F		●			●		22	16	5	1.5	0.4	
	1550PDFR-G08	G	F		●			●		22	16	5	1.1	0.8	
	1550PDFR-G12	G	F		●			●		22	16	5	0.7	1.2	
	1550PDFR-G16	G	F		●			●		22	16	5	0.4	1.6	
	1550PDFR-G20	G	F		●			●		21.7	16	5	0.2	2.0	
	1550PDFR-G30	G	F		●			●		20	16	5	0.6	3.0	
	1550PDFR-G32	G	F		●			●		20	16	5	0.4	3.2	
	1550PDFR-G40	G	F		●			●		19	16	5	0.5	4.0	
	1550PDFR-G50	G	F		●			●		18	16	5	0.4	5.0	
	XDGT1550PDER-G04	G	E	●						22	16	5	1.5	0.4	
	1550PDER-G08	G	E	●						22	16	5	1.1	0.8	
	1550PDER-G12	G	E	●						22	16	5	0.7	1.2	
	1550PDER-G16	G	E	●						22	16	5	0.4	1.6	
	1550PDER-G20	G	E	●						21.7	16	5	0.2	2.0	
	1550PDER-G30	G	E	●						20	16	5	0.6	3.0	
	1550PDER-G32	G	E	●						20	16	5	0.4	3.2	
	1550PDER-G40	G	E	●						19	16	5	0.5	4.0	
	1550PDER-G50	G	E	●						18	16	5	0.4	5.0	

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	**VP15TF**	180 (150—200)	0.15 (0.1—0.2)
P	Carbon Steel Alloy Steel	≤280HB	**VP15TF**	150 (120—200)	0.15 (0.1—0.2)
P		280—350HB	**VP15TF**	140 (120—160)	0.15 (0.1—0.2)
M	Stainless Steel	≤270HB	**VP15TF**	140 (120—160)	0.2 (0.1—0.3)
N	Aluminium Alloy	—	**LC15TF TF15**	1000 (200—3000)	0.3 (0.1—0.5)
S	Ti Alloy	—	**VP15TF**	40 (30—60)	0.1 (0.1—0.3)
S	Heat Resistance Alloy (Inconel etc.)	—	**VP15TF**	30 (20—40)	0.15 (0.1—0.2)
H	Hardened Steel	40—60HRC	**VP15TF**	70 (50—100)	0.1 (0.05—0.15)

- Figures above are a guide lines for optimum general use. They may vary depending on machine rigidity, work clamping and length of tool overhang.
- When using ϕ20 shank type, set the table feed at under 0.05mm/tooth and maintain observation during cutting.
- Please adjust the table feed when using long- and extra-long-shank types.
- Please adjust the table feed when ramp machining (Recommended feed : 0.05 mm/tooth under).

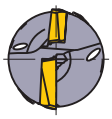
SPARE PARTS E001
TECHNICAL DATA F001

MULTI FUNCTIONAL MILLING

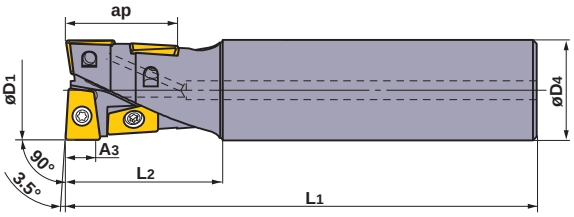
0° Roughing | Shoulder Milling | Side Milling | Slotting | Copying (Including Flat faces) | Pocket Milling

AQX

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel



Number of Teeth : **4**



- **The center bottom cutting edge enables drilling without previously formed hole.**
- **With through coolant holes.**

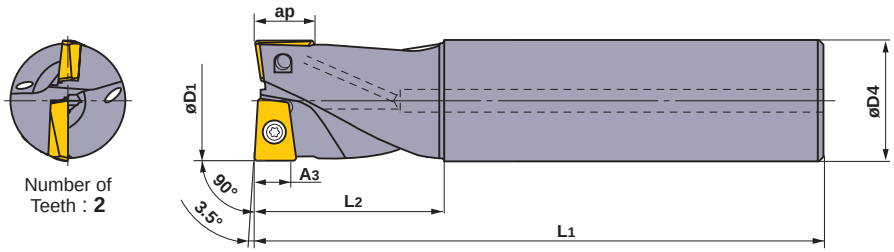
STANDARD EDGE TYPE

Right hand tool holder only.

Type	Order Number	Stock R	Coolant Hole	D1	L1	D4	L2	A3 ✶1	ap ✶2	✶3 Clamp Screw	Wrench	Insert
Standard	**AQXR164SA16S**	●	○	16	120	16	30	4.5	17.6	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	164SN16S	●	–	16	120	16	30	4.5	17.6	TS2A	①TKY06F	
	174SA16S	●	○	17	120	16	30	4.5	17.6	TS2A	①TKY06F	
	174SN16S	●	–	17	120	16	30	4.5	17.6	TS2A	①TKY06F	
	204SA20S	●	○	20	130	20	35	6	22	TS25	①TKY08F	QOG/MT1035R-G1/M2
	204SN20S	●	–	20	130	20	35	6	22	TS25	①TKY08F	
	214SA20S	●	○	21	130	20	35	6	22	TS25	①TKY08F	
	214SN20S	●	–	21	130	20	35	6	22	TS25	①TKY08F	
	254SA25S	●	○	25	140	25	40	7.5	27.5	TS33	②TKY08D	QOG/MT1342R-G1/M2
	254SN25S	●	–	25	140	25	40	7.5	27.5	TS33	②TKY08D	
	264SA25S	●	○	26	140	25	40	7.5	27.5	TS33	②TKY08D	
	264SN25S	●	–	26	140	25	40	7.5	27.5	TS33	②TKY08D	
	324SA32S	●	○	32	150	32	50	9.5	35.2	TS407	②TKY15D	QOG/MT1651R-G1/M2
	324SN32S	●	–	32	150	32	50	9.5	35.2	TS407	②TKY15D	
	334SA32S	●	○	33	150	32	50	9.5	35.2	TS407	②TKY15D	
	334SN32S	●	–	33	150	32	50	9.5	35.2	TS407	②TKY15D	
	354SA32S	●	○	35	150	32	50	11	40	TS407	②TKY15D	QOG/MT1856R-G1/M2
	354SN32S	●	–	35	150	32	50	11	40	TS407	②TKY15D	
	404SA32S	●	○	40	160	32	60	12	44	TS55	②TKY25D	QOG/MT2062R-G1/M2
	404SN32S	●	–	40	160	32	60	12	44	TS55	②TKY25D	
	504SA42S	●	○	50	170	42	70	15	55	TS6S	③TKY30T	QOG/MT2576R-G1/M2
	504SN42S	●	–	50	170	42	70	15	55	TS6S	③TKY30T	
Long	**AQXR164SA16L**	●	○	16	175	16	50	4.5	17.6	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	164SN16L	●	–	16	175	16	50	4.5	17.6	TS2A	①TKY06F	
	174SA16L	●	○	17	175	16	30	4.5	17.6	TS2A	①TKY06F	
	174SN16L	●	–	17	175	16	30	4.5	17.6	TS2A	①TKY06F	
	204SA20L	●	○	20	185	20	60	6	22	TS25	①TKY08F	QOG/MT1035R-G1/M2
	204SN20L	●	–	20	185	20	60	6	22	TS25	①TKY08F	
	214SA20L	●	○	21	185	20	35	6	22	TS25	①TKY08F	
	214SN20L	●	–	21	185	20	35	6	22	TS25	①TKY08F	
	254SA25L	●	○	25	220	25	75	7.5	27.5	TS33	②TKY08D	QOG/MT1342R-G1/M2
	254SN25L	●	–	25	220	25	75	7.5	27.5	TS33	②TKY08D	
	264SA25L	●	○	26	220	25	40	7.5	27.5	TS33	②TKY08D	
	264SN25L	●	–	26	220	25	40	7.5	27.5	TS33	②TKY08D	
	324SA32L	●	○	32	230	32	90	9.5	35.2	TS407	②TKY15D	QOG/MT1651R-G1/M2
	324SN32L	●	–	32	230	32	90	9.5	35.2	TS407	②TKY15D	
	334SA32L	●	○	33	230	32	50	9.5	35.2	TS407	②TKY15D	
	334SN32L	●	–	33	230	32	50	9.5	35.2	TS407	②TKY15D	
	354SA32L	●	○	35	230	32	50	11	40	TS407	②TKY15D	QOG/MT1856R-G1/M2
	354SN32L	●	–	35	230	32	50	11	40	TS407	②TKY15D	
	404SA32L	●	○	40	240	32	60	12	44	TS55	②TKY25D	QOG/MT2062R-G1/M2
	404SN32L	●	–	40	240	32	60	12	44	TS55	②TKY25D	
	504SA42L	●	○	50	250	42	70	15	55	TS6S	③TKY30T	QOG/MT2576R-G1/M2
	504SN42L	●	–	50	250	42	70	15	55	TS6S	③TKY30T	

✶1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts. ✶2 ap : Maximum depth of cut.
✶3 Clamp Torque (N • m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5, TS6S=10.0

● : **Inventory maintained in Japan.**



Number of Teeth : **2**

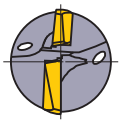
SHORT EDGE TYPE

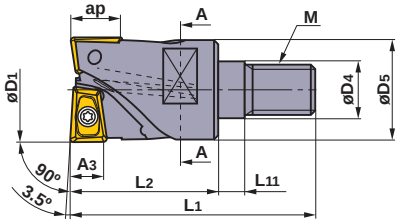
Right hand tool holder only.

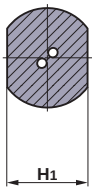
Type	Order Number	Stock	Coolant Hole	Dimensions (mm)						✶3	① ② ③	
		R		D1	L1	D4	L2	A3✶1	ap✶2	Clamp Screw	Wrench	Insert
Standard	**AQXR162SA16S**	●	○	16	120	16	30	4.5	7.4	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	162SN16S	●	–	16	120	16	30	4.5	7.4	TS2A	①TKY06F	
	172SA16S	●	○	17	120	16	30	4.5	7.4	TS2A	①TKY06F	
	172SN16S	●	–	17	120	16	30	4.5	7.4	TS2A	①TKY06F	
	202SA20S	●	○	20	130	20	35	6	9.2	TS25	①TKY08F	QOG/MT1035R-G1/M2
	202SN20S	●	–	20	130	20	35	6	9.2	TS25	①TKY08F	
	212SA20S	●	○	21	130	20	35	6	9.2	TS25	①TKY08F	
	212SN20S	●	–	21	130	20	35	6	9.2	TS25	①TKY08F	
	252SA25S	●	○	25	140	25	40	7.5	11.5	TS33	②TKY08D	QOG/MT1342R-G1/M2
	252SN25S	●	–	25	140	25	40	7.5	11.5	TS33	②TKY08D	
	262SA25S	●	○	26	140	25	40	7.5	11.5	TS33	②TKY08D	
	262SN25S	●	–	26	140	25	40	7.5	11.5	TS33	②TKY08D	
	322SA32S	●	○	32	150	32	50	9.5	14.5	TS407	②TKY15D	QOG/MT1651R-G1/M2
	322SN32S	●	–	32	150	32	50	9.5	14.5	TS407	②TKY15D	
	332SA32S	●	○	33	150	32	50	9.5	14.5	TS407	②TKY15D	
	332SN32S	●	–	33	150	32	50	9.5	14.5	TS407	②TKY15D	
	352SA32S	●	○	35	150	32	50	11	16	TS407	②TKY15D	QOG/MT1856R-G1/M2
	352SN32S	●	–	35	150	32	50	11	16	TS407	②TKY15D	
	402SA32S	●	○	40	160	32	60	12	18	TS55	②TKY25D	QOG/MT2062R-G1/M2
	402SN32S	●	–	40	160	32	60	12	18	TS55	②TKY25D	
	502SA42S	●	○	50	170	42	70	15	23	TS6S	③TKY30T	QOG/MT2576R-G1/M2
	502SN42S	●	–	50	170	42	70	15	23	TS6S	③TKY30T	
Long	**AQXR162SA16L**	●	○	16	175	16	50	4.5	7.4	TS2A	①TKY06F	QOG/MT0830R-G1/M2
	162SN16L	●	–	16	175	16	50	4.5	7.4	TS2A	①TKY06F	
	172SA16L	●	○	17	175	16	30	4.5	7.4	TS2A	①TKY06F	
	172SN16L	●	–	17	175	16	30	4.5	7.4	TS2A	①TKY06F	
	202SA20L	●	○	20	185	20	60	6	9.2	TS25	①TKY08F	QOG/MT1035R-G1/M2
	202SN20L	●	–	20	185	20	60	6	9.2	TS25	①TKY08F	
	212SA20L	●	○	21	185	20	35	6	9.2	TS25	①TKY08F	
	212SN20L	●	–	21	185	20	35	6	9.2	TS25	①TKY08F	
	252SA25L	●	○	25	220	25	75	7.5	11.5	TS33	②TKY08D	QOG/MT1342R-G1/M2
	252SN25L	●	–	25	220	25	75	7.5	11.5	TS33	②TKY08D	
	262SA25L	●	○	26	220	25	40	7.5	11.5	TS33	②TKY08D	
	262SN25L	●	–	26	220	25	40	7.5	11.5	TS33	②TKY08D	
	322SA32L	●	○	32	230	32	90	9.5	14.5	TS407	②TKY15D	QOG/MT1651R-G1/M2
	322SN32L	●	–	32	230	32	90	9.5	14.5	TS407	②TKY15D	
	332SA32L	●	○	33	230	32	50	9.5	14.5	TS407	②TKY15D	
	332SN32L	●	–	33	230	32	50	9.5	14.5	TS407	②TKY15D	
	352SA32L	●	○	35	230	32	50	11	16	TS407	②TKY15D	QOG/MT1856R-G1/M2
	352SN32L	●	–	35	230	32	50	11	16	TS407	②TKY15D	
	402SA32L	●	○	40	240	32	60	12	18	TS55	②TKY25D	QOG/MT2062R-G1/M2
	402SN32L	●	–	40	240	32	60	12	18	TS55	②TKY25D	
	502SA42L	●	○	50	250	42	70	15	23	TS6S	③TKY30T	QOG/MT2576R-G1/M2
	502SN42L	●	–	50	250	42	70	15	23	TS6S	③TKY30T	

✶1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts.
✶2 ap : Maximum depth of cut.
✶3 Clamp Torque (N • m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5, TS6S=10.0

NEW







A-A section

SCREW-IN TYPE

Right hand tool holder only.

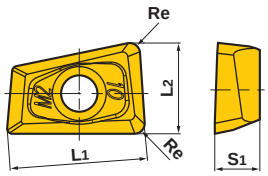
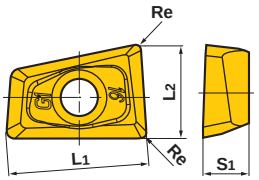
Order Number	Stock	Coolant Hole	Dimensions (mm)										Tool Weight	✶3	① ②	
	R		D1	D4	D5	L1	L2	L11	H1	M	A3 ✶1	ap ✶2	(kg)	Clamp Screw	Wrench	Insert
AQXR162M08A30	●	○	16	8.5	14.7	48	30	6	10	M8	4.5	7.4	0.1	TS2A	①TKY06F	QO○T0830R-○○
172M08A30	●	○	17	8.5	14.5	48	30	6	10	M8	4.5	7.4	0.1	TS2A	①TKY06F	
202M10A30	●	○	20	10.5	18.6	49	30	6	14	M10	6	9.2	0.2	TS25	①TKY08F	QO○T1035R-○○
212M10A30	●	○	21	10.5	18.5	49	30	6	14	M10	6	9.2	0.2	TS25	①TKY08F	
252M12A35	●	○	25	12.5	23.5	57	35	6	19	M12	7.5	11.5	0.2	TS33	②TKY08D	QO○T1342R-○○
262M12A35	●	○	26	12.5	23.5	57	35	6	19	M12	7.5	11.5	0.2	TS33	②TKY08D	
322M16A40	●	○	32	17	28.5	63	40	6	24	M16	9.5	14.5	0.3	TS407	②TKY15D	QO○T1651R-○○
332M16A40	●	○	33	17	28.5	63	40	6	24	M16	9.5	14.5	0.3	TS407	②TKY15D	
352M16A40	●	○	35	17	28.5	63	40	6	24	M16	11	16	0.3	TS407	②TKY15D	QO○T1856R-○○
402M16A45	●	○	40	17	28.5	68	45	6	24	M16	12	18	0.3	TS55	②TKY25D	QO○T2062R-○○

✶1 Dimension A3 represents the depth of cut when the cutting edge consists of 2 inserts.
✶2 ap : Maximum depth of cut.
✶3 Clamp Torque (N • m) : TS2A=0.6, TS25=1.0, TS33=1.0, TS407=3.5, TS55=7.5

● : Inventory maintained in Japan. (10 inserts in one case)

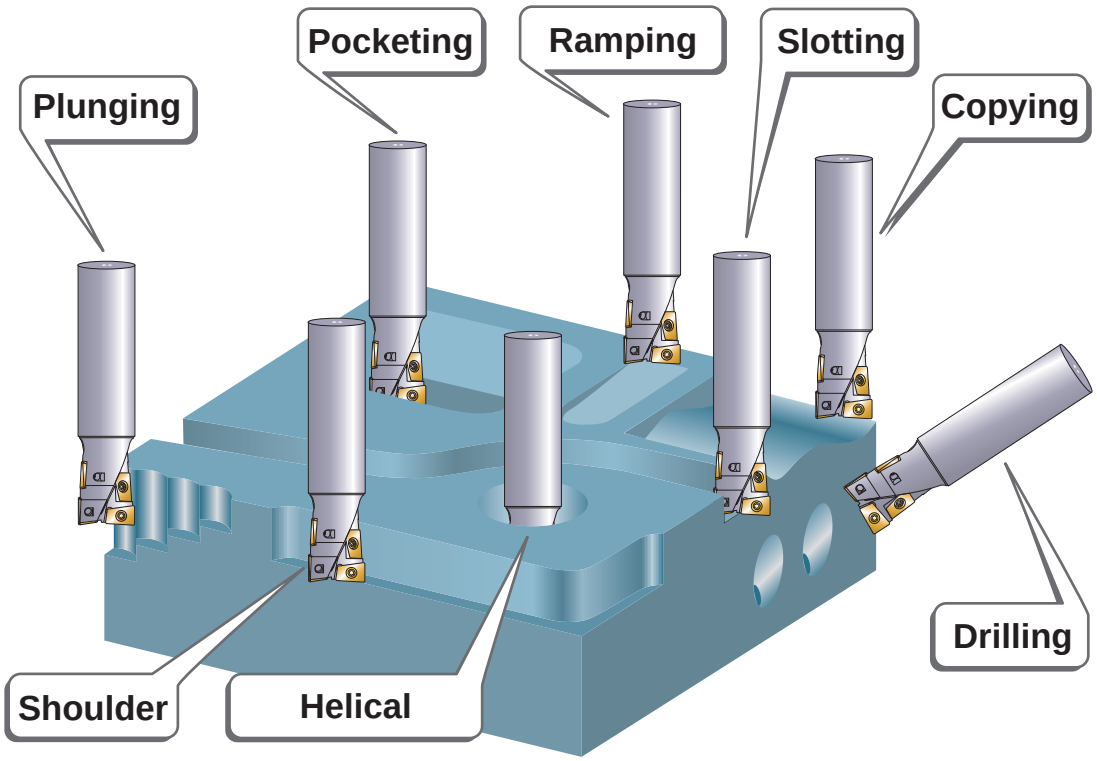
INSERTS

Work Material			Coated				Carbide		Cutting Conditions (Guide) : ● : Stable Cutting ◐ : General Cutting ✤ : Unstable Cutting Honing : E : Round
			VP15TF	VP30RT			HTi10		
	P	Steel	◐	✤					
	M	Stainless Steel	◔	✤					
	K	Cast Iron	✤				◐		
	N	Non-ferrous Metal							
	S	Heat-resistant Alloy, Titanium Alloy	◔						
	H	Hardened Steel	◔						

Shape	Order Number	Endmill Dia.	Class	Honing	VP15TF	VP30RT	HTi10	L1	L2	S1	Re	Geometry
	QOMT0830R-M2	ϕ16,17	M	E	●	●		8.4	5.5	3	0.8	
	1035R-M2	ϕ20,21	M	E	●	●		10.6	7	3.5	0.8	
	1342R-M2	ϕ25,26	M	E	●	●		13.1	8.7	4.2	0.8	
	1651R-M2	ϕ32,33	M	E	●	●		16.5	11	5.1	0.8	
	1856R-M2	ϕ35	M	E	●	●		18	12	5.6	0.8	
	2062R-M2	ϕ40	M	E	●	●		20.4	13.6	6.2	0.8	
	2576R-M2	ϕ50	M	E	●	●		25.8	17.2	7.6	0.8	
	QOGT0830R-G1	ϕ16,17	G	F*	●		●	8.4	5.5	3	0.4	
	1035R-G1	ϕ20,21	G	F*	●		●	10.6	7	3.5	0.4	
	1342R-G1	ϕ25,26	G	F*	●		●	13.1	8.7	4.2	0.4	
	1651R-G1	ϕ32,33	G	F*	●		●	16.5	11	5.1	0.4	
	1856R-G1	ϕ35	G	F*	●		●	18	12	5.6	0.4	
	2062R-G1	ϕ40	G	F*	●		●	20.4	13.6	6.2	0.4	
	2576R-G1	ϕ50	G	F*	●		●	25.8	17.2	7.6	0.4	

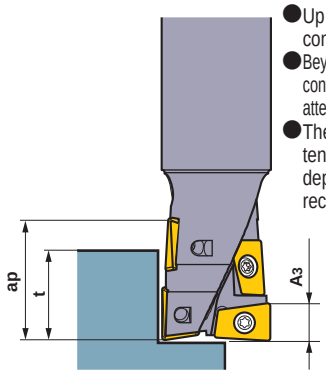
* VP15TF insert honing is "E" type.

CUTTING MODE



SCREW-IN ARBORS C192
SPARE PARTS E001
TECHNICAL DATA F001

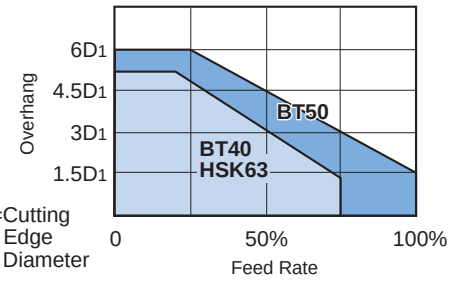
RECOMMENDED CUTTING CONDITIONS



∗ Figures for A3 and ap are shown in the standard holder tables on the previous pages.

- Up to A3 depth of cut, the two lower cutting edges maintain contact with the workpiece.
- Beyond the range of A3, there is an area where the cutting edge contact with the workpiece becomes single bladed. Please pay special attention to the relationship between depth of cut and feed in this area.
- The insert in contact with the top edge of the workpiece tends to suffer from damege. At large depths of cut, applying depth of cut (t), where there are 2 inserts in contact is recommended to reduce wear and damage to the inserts.

Diameter	Recommended depth of cut **t** (mm)
ϕ16,17	12 – 14
ϕ20,21	14 – 17
ϕ25,26	17 – 22
ϕ32,33	22 – 28
ϕ35	25 – 32
ϕ40	28 – 35
ϕ50	35 – 45



∗ D1=Cutting Edge Diameter

- Chatter, vibration and other operational problems tend to occur with a long tool overhang and/or low machine rigidity, resulting in unstable machining.
- Please reduce the feed accordingly in these conditions, using the chart above as a guideline.

FOR SHOULDER MILLING

	Work Material	Hardness	Grade	Cutting Speed (m/min)	ϕ16, ϕ17			ϕ20, ϕ21		
					Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)
P	Mild Steel	≤180HB	**VP15TF**	180 (150–220)	–4.5	–8	0.25	–6	–10	0.30
					4.5–12	–5	0.16	6–14	–7	0.25
					12–17	–3	0.10	14–22	–4	0.18
	Carbon Steel Alloy Steel	180–350HB	**VP15TF**	160 (120–200)	–4.5	–8	0.20	–6	–10	0.25
					4.5–12	–4	0.14	6–14	–6	0.20
					12–17	–2	0.08	14–22	–3	0.16
M	Stainless Steel	≤270HB	**VP30RT (VP15TF)**	150 (120–180)	–4.5	–8	0.20	–6	–10	0.25
					4.5–12	–4	0.14	6–14	–6	0.20
					12–17	–2	0.08	14–22	–3	0.16
K	Cast Iron	Tensile Strength ≤450MPa	**VP15TF**	180 (150–220)	–4.5	–8	0.25	–6	–10	0.30
					4.5–12	–5	0.16	6–14	–7	0.25
					12–17	–3	0.10	14–22	–4	0.18
N	Aluminium Alloy	–	**HTi10** (G1 Breaker)	500 (200–800)	–4.5	–11	0.30	–6	–14	0.35
					4.5–12	–8	0.21	6–14	–10	0.30
					12–17	–5	0.15	14–22	–6	0.23
H	Hardened Steel	40–55HRC	**VP15TF**	80 (50–120)	–4.5	–5	0.16	–6	–6	0.20
					4.5–12	–3	0.10	6–14	–4	0.16
					12–17	–1	0.06	14–22	–2	0.12

(Note 1) Please pay special attention to the depth of cut when using the short edge type.
(Note 2) When using the G1 breaker (VP15TF), reduce the feed rate by at least 20%.

FOR SLOTTING

	Work Material	Hardness	Grade	Cutting Speed (m/min)	ϕ16, ϕ17		ϕ20, ϕ21	
					Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)
P	Mild Steel	≤180HB	**VP15TF**	180 (150–220)	–4.5	0.16	–6	0.18
					4.5–12	0.10	6–14	0.14
					12–17	0.07	14–22	0.10
	Carbon Steel Alloy Steel	180–350HB	**VP15TF**	160 (120–200)	–4.5	0.14	–6	0.16
					4.5–12	0.09	6–14	0.12
					12–17	0.05	14–22	0.10
M	Stainless Steel	≤270HB	**VP30RT (VP15TF)**	150 (120–180)	–4.5	0.14	–6	0.16
					4.5–12	0.09	6–14	0.12
					12–17	0.05	14–22	0.10
K	Cast Iron	Tensile Strength ≤450MPa	**VP15TF**	180 (150–220)	–4.5	0.16	–6	0.18
					4.5–12	0.10	6–14	0.14
					12–17	0.07	14–22	0.10
N	Aluminium Alloy	–	**HTi10** (G1 Breaker)	500 (200–800)	–4.5	0.18	–6	0.20
					4.5–12	0.12	6–14	0.16
					12–17	0.09	14–22	0.12
H	Hardened Steel	40–55HRC	**VP15TF**	80 (50–120)	–4.5	0.10	–6	0.12
					4.5–12	0.07	6–14	0.10

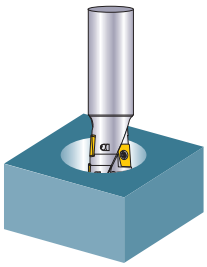
(Note 1) Please pay special attention to the depth of cut when using the short edge type.
(Note 2) When using the G1 breaker (VP15TF), reduce the feed rate by at least 20%.

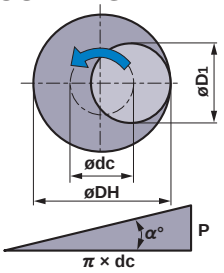
	ϕ25, ϕ26			ϕ32, ϕ33			ϕ35			ϕ40			ϕ50		
	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Width of Cut (mm)	Feed (mm/rev)
	−7.5	−12.5	0.35	−9.5	−16	0.40	−11	−17.5	0.45	−12	−20	0.50	−15	−25	0.60
	7.5−17	−8	0.28	9.5−22	−11	0.32	11−25	−12	0.35	12−28	−13	0.40	15−35	−16	0.50
	17−27	−5	0.20	22−35	−6	0.25	25−40	−6.5	0.28	28−44	−7	0.30	35−55	−10	0.35
	−7.5	−12.5	0.30	−9.5	−16	0.35	−11	−17.5	0.37	−12	−20	0.40	−15	−25	0.50
	7.5−17	−7	0.25	9.5−22	−10	0.28	11−25	−11	0.30	12−28	−12	0.32	15−35	−14	0.40
	17−27	−4	0.18	22−35	−5	0.20	25−40	−5.5	0.22	28−44	−6	0.25	35−55	−8	0.30
	−7.5	−12.5	0.30	−9.5	−16	0.35	−11	−17.5	0.37	−12	−20	0.40	−15	−25	0.50
	7.5−17	−7	0.25	9.5−22	−10	0.28	11−25	−12	0.30	12−28	−12	0.32	15−35	−14	0.40
	17−27	−4	0.18	22−35	−5	0.20	25−40	−6.5	0.22	28−44	−6	0.25	35−55	−8	0.30
	−7.5	−12.5	0.35	−9.5	−16	0.40	−11	−17.5	0.45	−12	−20	0.50	−15	−25	0.60
	7.5−17	−8	0.28	9.5−22	−11	0.32	11−25	−12	0.35	12−28	−13	0.40	15−35	−16	0.50
	17−27	−5	0.20	22−35	−6	0.25	25−40	−6.5	0.28	28−44	−7	0.30	35−55	−10	0.35
	−7.5	−17.5	0.40	−9.5	−23	0.45	−11	−24.5	0.50	−12	−28	0.55	−15	−35	0.65
	7.5−17	−12.5	0.33	9.5−22	−16	0.37	11−25	−17.5	0.40	12−28	−20	0.45	15−35	−25	0.55
	17−27	−7.5	0.25	22−35	−10	0.30	25−40	−10.5	0.32	28−44	−12	0.35	35−55	−15	0.40
	−7.5	−7	0.22	−9.5	−8	0.25	−11	−9	0.28	−12	−10	0.30	−15	−14	0.35
	7.5−17	−4	0.18	9.5−22	−5	0.20	11−25	−5.5	0.22	12−28	−6	0.24	15−35	−8	0.30
	17−27	−2	0.14	22−35	−2	0.16	25−40	−2	0.17	28−44	−2	0.18	35−55	−4	0.22

	ϕ25, ϕ26		ϕ32, ϕ33		ϕ35		ϕ40		ϕ50	
	Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)	Depth of Cut (mm)	Feed (mm/rev)
	−7.5	0.20	−9.5	0.25	−11	0.27	−12	0.30	−15	0.35
	7.5−17	0.16	9.5−22	0.20	11−25	0.22	12−28	0.25	15−35	0.30
	17−27	0.12	22−35	0.14	25−40	0.16	28−44	0.18	35−55	0.22
	−7.5	0.18	−9.5	0.20	−11	0.22	−12	0.25	−15	0.30
	7.5−17	0.14	9.5−22	0.16	11−25	0.18	12−28	0.20	15−35	0.25
	17−27	0.10	22−35	0.12	25−40	0.13	28−44	0.14	35−55	0.16
	−7.5	0.18	−9.5	0.20	−11	0.22	−12	0.25	−15	0.30
	7.5−17	0.14	9.5−22	0.16	11−25	0.18	12−28	0.20	15−35	0.25
	17−27	0.10	22−35	0.12	25−40	0.13	28−44	0.14	35−55	0.16
	−7.5	0.20	−9.5	0.25	−11	0.27	−12	0.30	−15	0.35
	7.5−17	0.16	9.5−22	0.20	11−25	0.22	12−28	0.25	15−35	0.30
	17−27	0.12	22−35	0.14	25−40	0.16	28−44	0.18	35−55	0.22
	−7.5	0.22	−9.5	0.27	−11	0.30	−12	0.32	−15	0.37
	7.5−17	0.18	9.5−22	0.22	11−25	0.25	12−28	0.27	15−35	0.32
	17−27	0.14	22−35	0.16	25−40	0.18	28−44	0.20	35−55	0.25
	−7.5	0.14	−9.5	0.16	−11	0.17	−12	0.18	−15	0.22
	7.5−17	0.12	9.5−22	0.12	11−25	0.13	12−28	0.14	15−35	0.16

RECOMMENDED CUTTING CONDITIONS

FOR HELICAL CUTTING





- How to derive a locus of the center of the tool.

$$\text{Ø dc (Locus of the center of the tool)} = \text{Ø DH (Desired hole diameter)} - \text{Ø D1 (Cutting edge diameter)}$$

- Depth of cut for each pass.

$$P = \pi \times dc \times \tan \alpha°$$

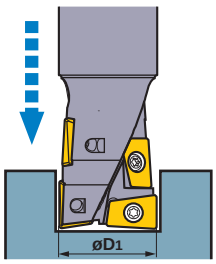
(Note) $\alpha° \leq 3°$

- Min. machined hole diameter for helical cutting : $1.2D_1$
  Max. machined hole diameter for helical cutting : $1.8D_1$
- For efficient chip discharge, always apply air blow.
- When using a G1 breaker insert (VP15TF), please reduce the feed rate by 20%.

	Work Material	Hardness	Grade	Cutting Speed (m/min)	ϕ16, ϕ17				ϕ20, ϕ21				ϕ25, ϕ26			
					Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)
P	Mild Steel	≤180HB	**VP15TF**	180 (150–220)	20	8	0.16	0.44	24	10	0.18	0.44	30	12.5	0.20	0.55
					25	12	0.14	0.99	30	15	0.16	1.10	38	19	0.18	1.43
					29	16	0.12	1.43	36	20	0.14	1.76	45	25	0.16	2.20
	Carbon Steel Alloy Steel	180–350HB	**VP15TF**	160 (120–200)	20	8	0.14	0.33	24	10	0.16	0.33	30	12.5	0.18	0.41
					25	12	0.12	0.74	30	15	0.14	0.82	38	19	0.16	1.07
					29	16	0.10	1.07	36	20	0.12	1.32	45	25	0.14	1.65
M	Stainless Steel	≤270HB	**VP30RT (VP15TF)**	150 (120–180)	20	3	0.14	0.22	24	4	0.16	0.22	30	5	0.18	0.27
					25	5	0.12	0.49	30	7	0.14	0.55	38	9	0.16	0.71
					29	8	0.10	0.71	36	10	0.12	0.88	45	12.5	0.14	1.10
K	Cast Iron	Tensile Strength ≤450MPa	**VP15TF**	180 (150–220)	20	10	0.16	0.55	24	14	0.18	0.55	30	18	0.20	0.69
					25	13	0.14	1.23	30	17	0.16	1.37	38	21	0.18	1.78
					29	16	0.12	1.78	36	20	0.14	2.19	45	25	0.16	2.74
N	Aluminium Alloy	–	**HTi10** (G1 Breaker)	500 (200–800)	20	10	0.18	0.44	24	14	0.20	0.44	30	18	0.22	0.55
					25	13	0.16	0.99	30	17	0.18	1.10	38	21	0.20	1.43
					29	16	0.14	1.43	36	20	0.16	1.76	45	25	0.18	2.20
H	Hardened Steel	40–55HRC	**VP15TF**	80 (50–120)	20	3	0.10	0.22	24	4	0.12	0.22	30	5	0.14	0.27
					25	5	0.08	0.49	30	7	0.10	0.55	38	9	0.12	0.71
					29	8	0.06	0.71	36	10	0.08	0.88	45	12.5	0.10	1.10

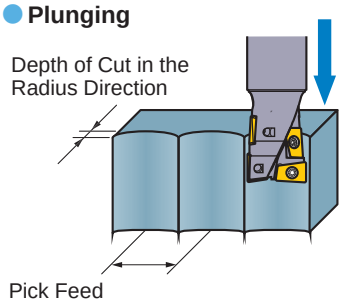
FOR DRILLING AND PLUNGING

Drilling



- The recommended drilling depth is less than $0.5D_1$.
- Use step feed when drilling (0.25–0.5mm) to ensure that the chips are effectively broken.
- Use internal or external cooling to ensure that the chips disposal is sufficiently achieved.
- The chips generated can dispel in any direction, so ensure that adequate safety precautions are taken.

Plunging



- The feed for plunging is the same as the feed for drilling.
- No step feed necessary.
- Please refer to the following table for the depth of cut at plunging operations.

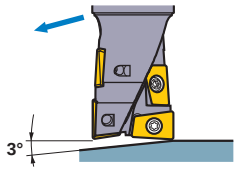
Depth of Cut in the Radius Direction	≤$0.4D_1$
Pick Feed	≤$0.5D_1$

	Work Material	Hardness	Grade	Cutting Speed (m/min)	ϕ16, ϕ17		ϕ20, ϕ21		ϕ25, ϕ26	
					Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)
P	Mild Steel	≤180HB	**VP15TF**	180 (150–220)	0.035	0.2	0.045	0.3	0.05	0.3
	Carbon Steel, Alloy Steel	180–350HB	**VP15TF**	160 (120–200)	0.03	0.2	0.04	0.3	0.045	0.3
M	Stainless Steel	≤270HB	**VP30RT (VP15TF)**	150 (120–180)	0.03	0.15	0.04	0.25	0.045	0.25
K	Cast Iron	Tensile Strength ≤450MPa	**VP15TF**	180 (150–220)	0.04	0.4	0.05	0.5	0.06	0.5
N	Aluminium Alloy	–	**HTi10** (G1 Breaker)	500 (200–800)	0.04	0.2	0.05	0.3	0.06	0.3
H	Hardened Steel	40–55HRC	**VP15TF**	80 (50–120)	0.02	0.15	0.03	0.25	0.035	0.25

(Note) Helical grooving is strongly recommended for machining of tempered steel.
✶ When using the G1 breaker (VP15TF), reduce the feed rate by at least 20%.

	ϕ32, ϕ33				ϕ35				ϕ40				ϕ50			
	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)	Machining Diameter (mm)	Max. Depth of Cut (mm)	Feed (mm/rev)	DOC/pass (mm/pass)
	38	16	0.25	0.66	42	18	0.28	0.77	48	20	0.30	0.88	60	25	0.35	1.10
	48	24	0.22	1.76	53	27	0.24	1.97	60	30	0.26	2.19	75	38	0.30	2.74
	58	32	0.20	2.85	63	35	0.21	3.07	72	40	0.22	3.51	90	50	0.26	4.39
	38	16	0.20	0.49	42	18	0.22	0.58	48	20	0.25	0.66	60	25	0.28	0.82
	48	24	0.18	1.32	53	27	0.2	1.48	60	30	0.22	1.65	75	38	0.26	2.06
	58	32	0.16	2.14	63	35	0.18	2.3	72	40	0.20	2.63	90	50	0.24	3.29
	38	6	0.20	0.33	42	7	0.22	0.38	48	8	0.25	0.44	60	10	0.28	0.55
	48	11	0.18	0.88	53	13	0.2	0.99	60	14	0.22	1.10	75	18	0.26	1.37
	58	16	0.16	1.43	63	18	0.18	1.53	72	20	0.20	1.75	90	25	0.24	2.19
	38	22	0.25	0.82	42	25	0.28	0.95	48	28	0.30	1.10	60	35	0.35	1.37
	48	27	0.22	2.19	53	30	0.24	2.47	60	34	0.26	2.74	75	43	0.30	3.43
	58	32	0.20	3.57	63	35	0.21	3.84	72	40	0.22	4.39	90	50	0.26	5.49
	38	22	0.27	0.66	42	25	0.3	0.77	48	28	0.32	0.88	60	35	0.37	1.10
	48	27	0.24	1.76	53	30	0.26	1.97	60	34	0.28	2.19	75	43	0.32	2.74
	58	32	0.22	2.85	63	35	0.21	3.07	72	40	0.24	3.51	90	50	0.27	4.39
	38	6	0.16	0.33	42	7	0.17	0.38	48	8	0.18	0.44	60	10	0.20	0.55
	48	11	0.14	0.88	53	13	0.15	0.99	60	14	0.16	1.10	75	18	0.18	1.37
	58	16	0.12	1.43	63	18	0.13	1.53	72	20	0.14	1.75	90	25	0.16	2.19

FOR RAMPING



- When machining steel the recommended ramping angle is 3°. If a ramping angle larger than 3° is used, then the chips may not be broken effectively resulting in chips wrapping around the tool.
- During ramping, it is recommended to reduce the feed rate by 40% from the cutting conditions on page C132.

	ϕ32, ϕ33, ϕ35		ϕ40		ϕ50	
	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)	Feed (mm/rev)	Step (mm)
	0.055	0.3	0.06	0.3	0.065	0.3
	0.05	0.3	0.055	0.3	0.06	0.3
	0.05	0.25	0.055	0.25	0.06	0.25
	0.065	0.5	0.07	0.5	0.075	0.5
	0.065	0.3	0.07	0.3	0.075	0.3
	0.04	0.25	0.045	0.25	0.05	0.25

MULTI FUNCTIONAL MILLING

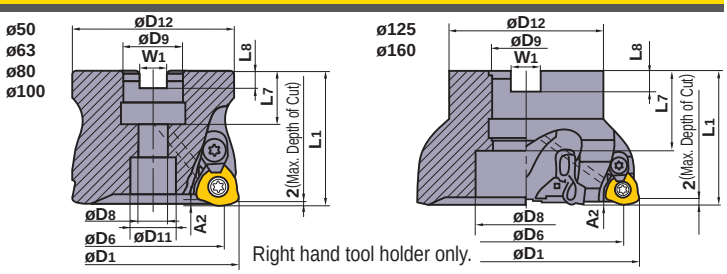
Roughing | Face Milling | Copying (Including Flat faces) | Pocket Milling

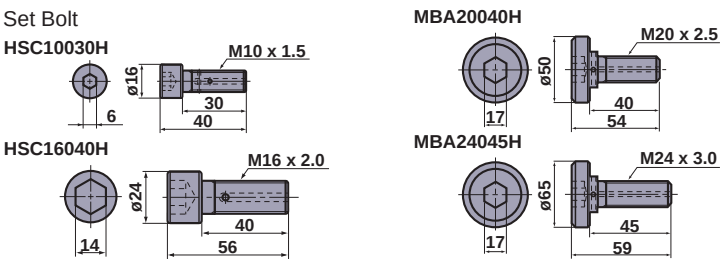
AJX

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 13° and 15° positive inserts.
- High rigidity double clamp structure.
- Suitable for high feed machining.
- With through coolant holes.
- Special insert design with 3 cutting edges.

AJX09	AJX12	AJX14
A.R :+8°	A.R :+8°	A.R :+8°
R.R :-6°	R.R :-5°– -4°	R.R :-3°





ARBOR TYPE

Type	Order Number	Stock R	Number of Teeth	D1	D6	L1	D9	L7	D8	D12	W1	L8	D11	A2	Tool Weight (kg)	Clamp Screw *	Clamp Bridge	Clamp Bridge Screw *	Spring	Wrench	Set Bolt	Insert
Coarse Pitch	AJX12-050A03R	●	3	50	38.3	50	22	20	11	47	10.4	6.3	17	1.5	0.4	TS43	AMS4	AJS40 12T15	ASS2	①TKY15T	HSC100 30H	JDM○ 120420 ZDSR-○○
	R05003B	●	3	50	38.3	50	22.225	19	11	47	8.4	5	17	1.5	0.4							
	AJX14-063A03R	●	3	63	51.1	50	22	20	11	60	10.4	6.3	17	2	0.7	TS54	AMS5	AJS50 14T25	ASS3	①TKY25T	HSC100 30H	JDM○ 140520 ZDSR-○○
	R06303B	●	3	63	51.1	50	22.225	19	11	60	8.4	5	17	2	0.7							
	R08004D	●	4	80	68.1	63	31.75	32	17	76	12.7	8	26	2	1.3						HSC160 40H	
	R10005D	●	5	100	88.1	63	31.75	32	17	96	12.7	8	26	2	2.4							
	R12505E	●	5	125	113.2	63	38.1	40	56	100	15.9	10	–	2	3.3						MBA200 40H	
	R16006F	●	6	160	148.2	63	50.8	43	72	100	19.1	11	–	2	5.0						MBA240 45H	
Fine Pitch	AJX12-050A04R	●	4	50	38.3	50	22	20	11	47	10.4	6.3	17	1.5	0.4	TS43	AMS4	AJS40 12T15	ASS2	①TKY15T	HSC100 30H	JDM○ 120420 ZDSR-○○
	R05004B	●	4	50	38.3	50	22.225	19	11	47	8.4	5	17	1.5	0.4							
	AJX14-063A04R	●	4	63	51.1	50	22	20	11	60	10.4	6.3	17	2	0.7	TS54	AMS5	AJS50 14T25	ASS3	①TKY25T	HSC100 30H	JDM○ 140520 ZDSR-○○
	R06304B	●	4	63	51.1	50	22.225	19	11	60	8.4	5	17	2	0.7							
	R08005D	●	5	80	68.1	63	31.75	32	17	76	12.7	8	26	2	1.3						HSC160 40H	
	R10006D	●	6	100	88.1	63	31.75	32	17	96	12.7	8	26	2	2.4							
	R12507E	●	7	125	113.2	63	38.1	40	56	100	15.9	10	–	2	3.3						MBA200 40H	
	R16008F	●	8	160	148.2	63	50.8	43	72	100	19.1	11	–	2	5.0						MBA240 45H	
Extra Fine Pitch NEW	AJX09-050A05R	●	5	50	40	50	22	20	11	47	10.4	6.3	17	1	0.5	TS351	AMS3	AJS30 10T10	ASS2	②TKY10D	HSC100 30H	JDM○ 09T320 ZDSR-○○
	R05005B	●	5	50	40	50	22.225	19	11	47	8.4	5	17	1	0.5							
	AJX12-063A05R	●	5	63	51.3	50	22	20	11	60	10.4	6.3	17	1.5	0.9	TS43	AMS4	AJS40 12T15	ASS2	①TKY15T	HSC100 30H	JDM○ 120420 ZDSR-○○
	R06305B	●	5	63	51.3	50	22.225	19	11	60	8.4	5	17	1.5	0.9							
	R08006D	●	6	80	68.3	63	31.75	32	17	76	12.7	8	26	1.5	1.7						HSC160 40H	
	R10007D	●	7	100	88.3	63	31.75	32	17	96	12.7	8	26	1.5	2.9							

* Clamp Torque (N • m) : TS351=2.5, TS43=3.5, TS54=7.5, AJS3010T10=2.5, AJS4012T15=3.5, AJS5014T25=7.5

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)

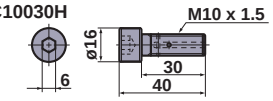
For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

AJX09	AJX12	AJX14
A.R :+8°	A.R :+8°	A.R :+8°
R.R :-6°	R.R :-5°─-4°	R.R :-3°

Set Bolt

HSC10030H



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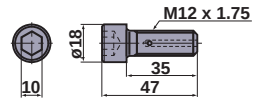

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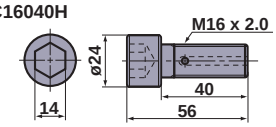

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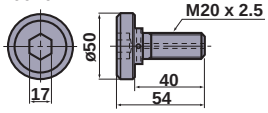
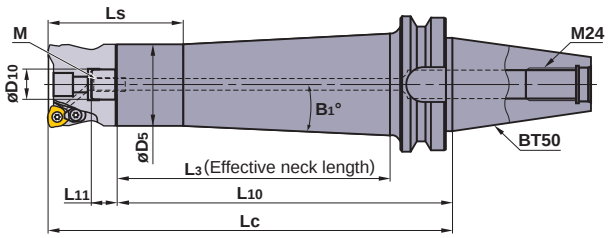


ARBOR TYPE

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)											Tool Weight	Clamp Screw *	Clamp Bridge	Clamp Bridge Screw *	Spring	Wrench ①②	Set Bolt	Insert
		R		D1	D6	L1	D9	L7	D8	D12	W1	L8	D11	A2	(kg)							
Coarse Pitch	AJX12-050A03R	●	3	50	38.3	50	22	20	11	47	10.4	6.3	17	1.5	0.4	TS43	AMS4	AJS40 12T15	ASS2	①TKY15T	HSC100 30H	JDM○ 120420 ZDSR-○○
	AJX14-063A03R	●	3	63	51.1	50	22	20	11	60	10.4	6.3	17	2.0	0.7	TS54	AMS5	AJS50 14T25	ASS3	①TKY25T	HSC100 30H / HSC120 35H / HSC160 40H / MBA200 40H	JDM○ 140520 ZDSR-○○
	-080A04R	○	4	80	68.1	50	27	23	13	76	12.4	7.0	19	2.0	1.2							
	-100A05R	○	5	100	88.1	63	32	26	17	96	14.4	8.0	26	2.0	2.4							
	-125B05R	○	5	125	113.2	63	40	40	56	100	16.4	9.0	—	2.0	3.3							
	-160B06R	○	6	160	148.2	63	40	40	56	100	16.4	9.0	—	2.0	5.0							
Fine Pitch	AJX12-050A04R	●	4	50	38.3	50	22	20	11	47	10.4	6.3	17	1.5	0.4	TS43	AMS4	AJS40 12T15	ASS2	①TKY15T	HSC100 30H / HSC120 35H / HSC160 40H	JDM○ 120420 ZDSR-○○
	-080A06R	○	6	80	68.3	50	27	23	13	76	12.4	7.0	19	1.5	1.2							
	-100A07R	○	7	100	88.3	63	32	26	17	96	14.4	8.0	26	1.5	2.6							
	AJX14-063A04R	●	4	63	51.1	50	22	20	11	60	10.4	6.3	17	2.0	0.7	TS54	AMS5	AJS50 14T25	ASS3	①TKY25T	HSC100 30H / HSC120 35H / HSC160 40H / MBA200 40H	JDM○ 140520 ZDSR-○○
	-080A05R	○	5	80	68.1	50	27	23	13	76	12.4	7.0	19	2.0	1.2							
	-100A06R	○	6	100	88.1	63	32	26	17	96	14.4	8.0	26	2.0	2.4							
	-125B07R	○	7	125	113.2	63	40	40	56	100	16.4	9.0	—	2.0	3.3							
	-160B08R	○	8	160	148.2	63	40	40	56	100	16.4	9.0	—	2.0	5.0							
NEW Extra Fine Pitch	AJX09-050A05R	●	5	50	40	50	22	20	11	47	10.4	6.3	17	1.0	0.4	TS351	AMS3	AJS30 10T10	ASS2	②TKY10D	HSC100 30H	JDM○ 09T320 ZDSR-○○
	AJX12-063A05R	●	5	63	51.3	50	22	20	11	60	10.4	6.3	17	1.5	0.7	TS43	AMS4	AJS40 12T15	ASS2	①TKY15T	HSC100 30H	JDM○ 120420 ZDSR-○○

* Clamp Torque (N • m) : TS351=2.5, TS43=3.5, TS54=7.5, AJS3010T10=2.5, AJS4012T15=3.5, AJS5014T25=7.5



BT50 ARBOR

Coolant hole standardized.

Order Number	Stock	Dimensions (mm)								Draft Angle B1°	Tool Weight (kg)	Set Screw	Cutter
		L10	L3	Lc	Ls	L11	D10	D5	M				
BT50-22-198-50TA	●	198	150	248	100	18	22	47	M10	3°	5.9	HSC10030H	AJX09-050A..R AJX12-050A..R
22-248-50TA	●	248	200	298	100	18	22	47	M10	2°30′	6.9	HSC10030H	AJX09-050A..R AJX12-050A..R
22-298-50TA	●	298	250	348	100	18	22	47	M10	2°	7.8	HSC10030H	AJX09-050A..R AJX12-050A..R
22.225-198-50TA	●	198	150	248	100	17	22.225	47	M10	3°	5.9	HSC10030H	AJX09R050..B AJX12R050..B
BT50-22-198-63TA	●	198	150	248	100	18	22	60	M10	3°	7.4	HSC10030H	AJX12-063A..R AJX14-063A..R
22-298-63TA	●	298	250	348	100	18	22	60	M10	2°	10.2	HSC10030H	AJX12-063A..R AJX14-063A..R
22-398-63TA	●	398	350	448	100	18	22	60	M10	2°	14.0	HSC10030H	AJX12-063A..R AJX14-063A..R
22.225-198-63TA	●	198	150	248	100	17	22.225	60	M10	3°	7.4	HSC10030H	AJX12R063..B AJX14R063..B
BT50-31.75-235-80TA	●	235	187	298	113	30	31.75	76	M16	2°30′	11.1	HSC16040H	AJX12R080..D AJX14R080..D
31.75-315-80TA	●	315	267	378	113	30	31.75	76	M16	2°	14.7	HSC16040H	AJX12R080..D AJX14R080..D
31.75-385-80TA	●	385	337	448	113	30	31.75	76	M16	2°	18.4	HSC16040H	AJX12R080..D AJX14R080..D
BT50-31.75-235-100SA	●	235	187	298	—	30	31.75	96	M16	—	14.4	HSC16040H	AJX12R100..D AJX14R100..D
31.75-315-100SA	●	315	267	378	—	30	31.75	96	M16	—	18.8	HSC16040H	AJX12R100..D AJX14R100..D
31.75-385-100SA	●	385	337	448	—	30	31.75	96	M16	—	22.6	HSC16040H	AJX12R100..D AJX14R100..D

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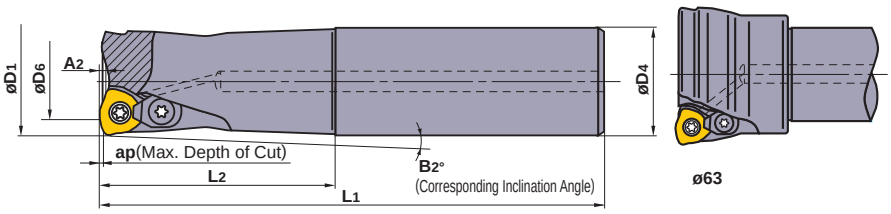


SHANK TYPE

Right hand tool holder only.

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)								Clamp Screw *	Clamp Bridge	Clamp Bridge Screw *	Spring	Wrench	Insert
		R		D1	D4	D6	L1	L2	ap	A2	B2°						
Short	AJX06R162SA16SS	●	2	16	16	8.9	70	20	1.0	0.3	3°30′	TS25	—	—	—	①TKY08F	JOM□06T215 ZZSR-□□
	172SA16SS	●	2	17	16	9.9	70	20	1.0	0.3	—	TS25	—	—	—	①TKY08F	
Standard	AJX06R162SA16S	●	2	16	16	8.9	110	30	1.0	0.3	2°15′	TS25	—	—	—	①TKY08F	JOM□ 06T215 ZZSR-□□
	172SA16S	●	2	17	16	9.9	110	20	1.0	0.3	—	TS25	—	—	—	①TKY08F	
	NEW 203SA20S	●	3	20	20	12.9	130	50	1.0	0.3	1°18′	TS25	—	—	—	①TKY08F	
	NEW 223SA20S	●	3	22	20	14.9	130	30	1.0	0.3	—	TS25	—	—	—	①TKY08F	
	AJX08R202SA20S	●	2	20	20	11.4	130	50	1.5	0.5	1°18′	TS33	—	—	—	②TKY08D	JOM□ 080320 ZZSR-□□
	222SA20S	●	2	22	20	13.4	130	30	1.5	0.5	—	TS33	—	—	—	②TKY08D	
	NEW 253SA25S	●	3	25	25	16.4	140	60	1.5	0.5	1°06′	TS33	—	—	—	②TKY08D	
	NEW 283SA25S	●	3	28	25	19.4	140	40	1.5	0.5	—	TS33	—	—	—	②TKY08D	
	AJX09R252SA25S	●	2	25	25	14.9	140	60	2.0	1.0	1°06′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	JDM□ 09T320 ZDSR-□□
	282SA25S	●	2	28	25	17.9	140	40	2.0	1.0	—	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 303SA32S	●	3	30	32	20.0	150	70	2.0	1.0	1°48′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 323SA32S	●	3	32	32	21.9	150	70	2.0	1.0	0°56′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 353SA32S	●	3	35	32	24.9	150	50	2.0	1.0	—	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 404SA32S	●	4	40	32	29.9	150	50	2.0	1.0	—	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 404SA42S	●	4	40	42	29.9	150	70	2.0	1.0	1°48′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	AJX12R302SA32S	●	2	30	32	18.3	150	70	2.0	1.5	1°48′	TS407	AMS4	AJS4012T15	ASS2	②TKY15D	JDM□ 120420 ZDSR-□□
	322SA32S	●	2	32	32	20.3	150	70	2.0	1.5	1°	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	352SA32S	●	2	35	32	23.3	150	50	2.0	1.5	—	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	403SA32S	●	3	40	32	28.3	150	50	2.0	1.5	—	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	403SA42S	●	3	40	42	28.3	150	70	2.0	1.5	1°48′	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	AJX14R503SA42S	●	3	50	42	38.2	150	50	2.0	2.0	—	TS54	AMS5	AJS5014T25	ASS3	②TKY25D	JDM□140520 ZDSR-□□
	634SA42S	●	4	63	42	51.2	150	50	2.0	2.0	—	TS54	AMS5	AJS5014T25	ASS3	②TKY25D	

* Clamp Torque (N • m) : TS25=1.0, TS33=1.0, TS351=2.5, TS407=3.5, TS43=3.5, TS54=7.5, AJS3010T10=2.5, AJS4012T15=3.5, AJS5014T25=7.5

● : Inventory maintained in Japan.

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)								Clamp Screw *	Clamp Bridge	Clamp Bridge Screw *	Spring	Wrench	Insert
		R		D_1	D_4	D_6	L_1	L_2	ap	A_2	$B_2°$						
Long	AJX06R162SA16L	●	2	16	16	8.9	150	70	1.0	0.3	0°56′	TS25	—	—	—	①TKY08F	JOM□ 06T215 ZZSR-□□
	172SA16L	●	2	17	16	9.9	150	20	1.0	0.3	—	TS25	—	—	—	①TKY08F	
	NEW 203SA20L	●	3	20	20	12.9	180	100	1.0	0.3	0°38′	TS25	—	—	—	①TKY08F	
	NEW 223SA20L	●	3	22	20	14.9	180	30	1.0	0.3	—	TS25	—	—	—	①TKY08F	
	AJX08R202SA20L	●	2	20	20	11.4	180	100	1.5	0.5	0°36′	TS33	—	—	—	②TKY08D	JOM□ 080320 ZZSR-□□
	222SA20L	●	2	22	20	13.4	180	30	1.5	0.5	—	TS33	—	—	—	②TKY08D	
	NEW 253SA25L	●	3	25	25	16.4	200	120	1.5	0.5	0°32′	TS33	—	—	—	②TKY08D	
	NEW 283SA25L	●	3	28	25	19.4	200	40	1.5	0.5	—	TS33	—	—	—	②TKY08D	
	AJX09R252SA25L	●	2	25	25	14.9	200	120	2.0	1.0	0°30′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	JDM□ 09T320 ZDSR-□□
	282SA25L	●	2	28	25	17.9	200	40	2.0	1.0	—	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 303SA32L	●	3	30	32	20.0	200	120	2.0	1.0	1°02′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 323SA32L	●	3	32	32	21.9	200	120	2.0	1.0	0°32′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 353SA32L	●	3	35	32	24.9	200	50	2.0	1.0	—	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 404SA32L	●	4	40	32	29.9	250	50	2.0	1.0	—	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	NEW 404SA42L	●	4	40	42	29.9	250	70	2.0	1.0	1°48′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	AJX12R302SA32L	●	2	30	32	18.3	200	120	2.0	1.5	1°	TS407	AMS4	AJS4012T15	ASS2	②TKY15D	JDM□ 120420 ZDSR-□□
	322SA32L	●	2	32	32	20.3	200	120	2.0	1.5	0°36′	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	352SA32L	●	2	35	32	23.3	200	50	2.0	1.5	—	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	403SA32L	●	3	40	32	28.3	250	50	2.0	1.5	—	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	403SA42L	●	3	40	42	28.3	250	70	2.0	1.5	1°48′	TS43	AMS4	AJS4012T15	ASS2	②TKY25D	
	AJX14R503SA42L	●	3	50	42	38.1	250	50	2.0	2.0	—	TS54	AMS5	AJS5014T25	ASS3	②TKY25D	JDM□140520 ZDSR-□□
	634SA42L	●	4	63	42	51.1	250	50	2.0	2.0	—	TS54	AMS5	AJS5014T25	ASS3	②TKY25D	
Extra Long	AJX06R162SA16EL	●	2	16	16	8.9	200	100	1.0	0.3	0°38′	TS25	—	—	—	①TKY08F	JOM□06T215 ZZSR-□□
	172SA16EL	●	2	17	16	9.9	200	20	1.0	0.3	—	TS25	—	—	—	①TKY08F	
	AJX08R202SA20EL	●	2	20	20	11.4	250	130	1.5	0.5	0°30′	TS33	—	—	—	②TKY08D	JOM□080320 ZZSR-□□
	222SA20EL	●	2	22	20	13.4	250	30	1.5	0.5	—	TS33	—	—	—	②TKY08D	
	AJX09R252SA25EL	●	2	25	25	14.9	300	180	2.0	1.0	0°18′	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	JDM□09T320 ZDSR-□□
	282SA25EL	●	2	28	25	17.9	300	40	2.0	1.0	—	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
	AJX12R302SA32EL	●	2	30	32	18.3	300	180	2.0	1.5	0°42′	TS407	AMS4	AJS4012T15	ASS2	②TKY15D	JDM□ 120420 ZDSR-□□
	322SA32EL	●	2	32	32	20.3	300	180	2.0	1.5	0°24′	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	352SA32EL	●	2	35	32	23.3	300	50	2.0	1.5	—	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	402SA32EL	●	2	40	32	28.3	350	50	2.0	1.5	—	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
	402SA42EL	●	2	40	42	28.3	350	70	2.0	1.5	1°48′	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	

* Clamp Torque (N • m) : TS25=1.0, TS33=1.0, TS351=2.5, TS407=3.5, TS43=3.5, TS54=7.5, AJS3010T10=2.5, AJS4012T15=3.5, AJS5014T25=7.5

SPARE PARTS E001
TECHNICAL DATA F001

NEW

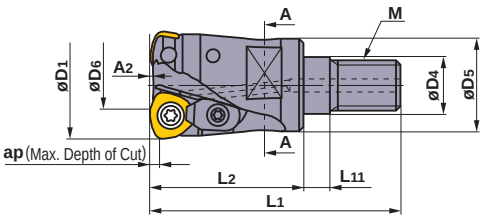


Fig.1

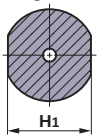


Fig.2

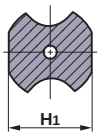


Fig.3

A-A section

SCREW-IN TYPE

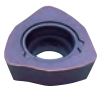
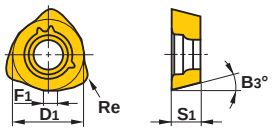
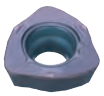
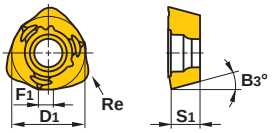
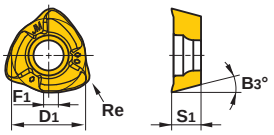
Right hand tool holder only.

Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)											Tool Weight	Type (Fig.)	Clamp Screw *	Clamp Bridge	Clamp Bridge Screw *	Spring	Wrench	Insert
	R			D1	D4	D5	D6	L1	L2	L11	H1	M	ap	A2	(kg)							
AJX06R162AM0830	●	○	2	16	8.5	13	8.9	48	30	6	10	M8	1	0.3	0.1	1	TS25	–	–	–	①TKY08F	
172AM0830	●	○	2	17	8.5	13	9.9	48	30	6	10	M8	1	0.3	0.1	1	TS25	–	–	–	①TKY08F	JOM○ 06T215 ZZSR-○○
203AM1030	●	○	3	20	10.5	18	12.9	49	30	6	14	M10	1	0.3	0.1	3	TS25	–	–	–	①TKY08F	
223AM1030	●	○	3	22	10.5	18	14.9	49	30	6	14	M10	1	0.3	0.1	3	TS25	–	–	–	①TKY08F	
AJX08R202AM1030	●	○	2	20	10.5	18	11.4	49	30	6	14	M10	1.5	0.5	0.1	2	TS33	–	–	–	①TKY08D	
222AM1030	●	○	2	22	10.5	18	13.4	49	30	6	14	M10	1.5	0.5	0.1	2	TS33	–	–	–	①TKY08D	JOM○ 080320 ZZSR-○○
253AM1235	●	○	3	25	12.5	21	16.4	57	35	6	19	M12	1.5	0.5	0.1	1	TS33	–	–	–	①TKY08D	
283AM1235	●	○	3	28	12.5	21	19.4	57	35	6	19	M12	1.5	0.5	0.1	1	TS33	–	–	–	①TKY08D	
AJX09R252AM1235	●	○	2	25	12.5	21	14.9	57	35	6	19	M12	2	1.0	0.2	2	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
282AM1235	●	○	2	28	12.5	21	17.9	57	35	6	19	M12	2	1.0	0.2	2	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
303AM1645	●	○	3	30	17	29	20.0	68	45	6	24	M16	2	1.0	0.2	1	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	JDM○ 09T320 ZDSR-○○
323AM1645	●	○	3	32	17	29	21.9	68	45	6	24	M16	2	1.0	0.2	1	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
353AM1645	●	○	3	35	17	29	24.9	68	45	6	24	M16	2	1.0	0.2	1	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
404AM1645	●	○	4	40	17	29	29.9	68	45	6	24	M16	2	1.0	0.2	1	TS351	AMS3	AJS3010T10	ASS2	②TKY10D	
AJX12R302AM1645	●	○	2	30	17	29	18.3	68	45	6	24	M16	2	1.5	0.3	2	TS407	AMS4	AJS4012T15	ASS2	②TKY15D	
322AM1645	●	○	2	32	17	29	20.3	68	45	6	24	M16	2	1.5	0.3	2	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	JDM○ 120420 ZDSR-○○
352AM1645	●	○	2	35	17	29	23.3	68	45	6	24	M16	2	1.5	0.3	2	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	
403AM1645	●	○	3	40	17	29	28.3	68	45	6	24	M16	2	1.5	0.3	2	TS43	AMS4	AJS4012T15	ASS2	②TKY15D	

* Clamp Torque (N • m) : TS25=1.0, TS33=1.0, TS351=2.5, TS407=3.5, TS43=3.5, AJS3010T10=2.5, AJS4012T15=3.5

● : Inventory maintained in Japan. (10 inserts in one case)

INSERTS

Shape	Order Number	Class	Coated				Dimensions (mm)					Geometry
			FH7020	VP15TF	VP30RT		B3°	D1	S1	F1	Re	
	JOMW06T215ZZSR-FT	M	●	●	●		13°	6.35	2.78	1.2	1.5	
	080320ZZSR-FT	M	●	●	●		13°	8	3.18	1.4	2	
	JDMW09T320ZDSR-FT	M	●	●	●		15°	9.525	3.97	1.8	2	
	120420ZDSR-FT	M	●	●	●		15°	12	4.76	2.5	2	
	140520ZDSR-FT	M	●	●	●		15°	14	5.56	2.8	2	
	JDMT120420ZDSR-ST	M	●	●	●		15°	12	4.76	2.5	2	
	140520ZDSR-ST	M	●	●	●		15°	14	5.56	2.8	2	
	JOMT06T215ZZSR-JM	M	●	●	●		13°	6.35	2.78	1.2	1.5	
	080320ZZSR-JM	M	●	●	●		13°	8	3.18	1.4	2	
	JDMT09T320ZDSR-JM	M	●	●	●		15°	9.525	3.97	1.8	2	
	120420ZDSR-JM	M	●	●	●		15°	12	4.76	2.5	2	
	140520ZDSR-JM	M	●	●	●		15°	14	5.56	2.8	2	

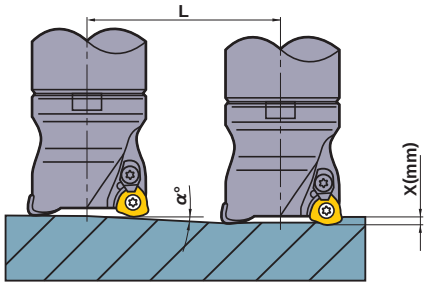
(Note) Setting height for ST chipbreaker is slightly different from that for other chipbreakers.
If you use ST chipbreaker, check the setting height.

RECOMMENDED CUTTING CONDITIONS

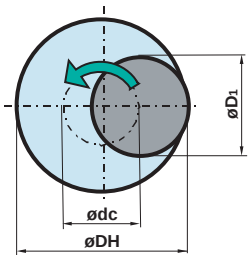
	Work Material	Hardness	Grade	Cutting Speed (m/min)	ϕ16/ϕ17 Over-hang (mm)	ϕ16/ϕ17 Axial Depth of Cut (mm)	ϕ16/ϕ17 Feed per Tooth (mm/tooth)	ϕ20/ϕ22 Over-hang (mm)	ϕ20/ϕ22 Axial Depth of Cut (mm)	ϕ20/ϕ22 Feed per Tooth (mm/tooth)	ϕ25/ϕ28 Over-hang (mm)	ϕ25/ϕ28 Axial Depth of Cut (mm)	ϕ25/ϕ28 Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	FH7020	170 (120–220)	140	0.8	0.8	160	1.0	1.0	170	1.0	1.2
					180	0.6	0.6	210	0.8	0.8	230	0.8	1.0
	Carbon Steel	180–280HB	FH7020	150 (100–200)	210	0.4	0.4	240	0.6	0.6	290	0.6	0.8
	Alloy Steel	280–350HB	FH7020	130 (80–180)	140	0.7	0.8	160	0.8	1.0	170	0.8	1.2
					180	0.5	0.6	210	0.6	0.8	230	0.6	1.0
	Alloy Tool Steel	≤350HB			210	0.3	0.4	240	0.4	0.6	290	0.4	0.8
	Pre-hardened Steel	≤35HRC	FH7020	120 (80–160)	140	0.7	0.7	160	0.8	0.8	170	0.8	1.0
					180	0.5	0.5	210	0.6	0.6	230	0.6	0.8
		35–43HRC	VP15TF	100 (70–130)	210	0.3	0.3	240	0.4	0.4	290	0.4	0.6
M	Stainless Steel	≤270HB	VP30RT	120 (80–160)	140	0.8	0.7	160	1.0	0.8	170	1.0	1.0
					180	0.6	0.5	210	0.8	0.6	230	0.8	0.8
					210	0.4	0.3	240	0.6	0.4	290	0.6	0.6
K	Gray Cast Iron	Tensile strength ≤350MPa	FH7020	150 (100–200)	140	0.8	1.0	160	1.0	1.2	170	1.0	1.4
					180	0.6	0.8	210	0.8	1.0	230	0.8	1.2
					210	0.4	0.6	240	0.6	0.8	290	0.6	1.0
	Ductile Cast Iron	Tensile strength ≤800MPa	VP15TF	120 (80–160)	140	0.7	0.8	160	0.8	1.0	170	0.8	1.2
					180	0.5	0.6	210	0.6	0.8	230	0.6	1.0
					210	0.3	0.4	240	0.4	0.6	290	0.4	0.8
H	Hardened Steel	43–55HRC	VP15TF	70 (50–90)	140	0.5	0.5	160	0.5	0.6	170	0.5	0.8
					180	0.4	0.3	210	0.4	0.4	230	0.4	0.6
					210	0.3	0.2	240	0.3	0.2	290	0.3	0.4

MAXIMUM CAPACITIES BY MODE

RAMPING



HELICAL DRILLING



- How to derive a locus of the center of the tool.

ødc = øDH - øD1

ødc: Locus of the center of the tool
øDH: Desired hole diameter
øD1: Cutting edge diameter

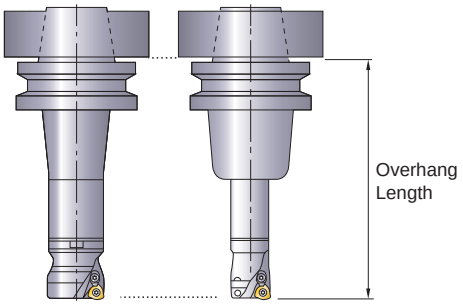
- For the depth of cut per pass, refer to the cutting conditions above for helical drilling.
- Set the machine spindle revolution so that the tool is rotating and cutting in a down cut direction.

- When ramping and helical cutting, please apply a lower feed (60% of the calculated feed rate or less).
- When drilling, please set the feed in the axial direction at 0.2mm/rev or less.
- The long chips generated can disperse, ensure that adequate safety precautions are taken.

Type	Order Number	Tool Diameter (mm)	Machined Face Diameter (mm)	Max. Depth of Cut ap (mm)	Ramping Max. Angle	Ramping L (mm) Required distance for X mm depth X=1	X=1.5	X=2	Helical Drilling Min. Hole Diameter DH min. (mm)	Helical Drilling Max. Hole Diameter DH max. (mm)	Max. Drilling Depth A2 (mm)
Shank type/Screw-in type	AJX06R162	16	8	1.0	3°	19.1	—	—	23	29	0.3
	06R172	17	9	1.0	2°30′	22.9	—	—	25	31	0.3
	06R203	20	12	1.0	1°30′	38.2	—	—	31	37	0.3
	06R223	22	14	1.0	1°	57.3	—	—	35	41	0.3
	08R202	20	11	1.5	3°30′	16.3	24.5	—	27	36	0.5
	08R222	22	13	1.5	3°	19.1	28.6	—	31	40	0.5
	08R253	25	16	1.5	2°	28.6	43.0	—	37	46	0.5
	08R283	28	19	1.5	1°42′	33.7	50.5	—	43	52	0.5
	09R252	25	14	2.0	4°	14.3	21.5	28.6	33	46	1.0
	09R282	28	17	2.0	3°	19.1	28.6	38.1	39	52	1.0
	09R303	30	19	2.0	2°42′	21.2	31.8	42.4	43	56	1.0
	09R323	32	21	2.0	2°30′	22.9	34.4	45.8	47	60	1.0
	09R353	35	24	2.0	2°	28.6	43.0	57.3	53	66	1.0
	09R404	40	29	2.0	1°30′	38.2	57.3	76.4	63	76	1.0
	12R302	30	18	2.0	4°30′	12.7	19.0	25.4	39	56	1.5
	12R322	32	20	2.0	4°	14.3	21.4	28.6	41	60	1.5
	12R352	35	23	2.0	3°30′	16.3	24.5	32.7	47	66	1.5
	12R402	40	28	2.0	3°	19.1	28.6	38.2	57	76	1.5
	12R403	40	28	2.0	3°	19.1	28.6	38.2	57	76	1.5
	14R503	50	38	2.0	4°12′	13.6	20.4	27.2	72	96	2.0
	14R634	63	51	2.0	2°48′	20.4	30.7	40.9	98	122	2.0
Arbor type	AJX09-050	50	40	2.0	1°06′	52.1	78.1	104.2	83	96	1.0
	09R05005B	50	40	2.0	1°06′	52.1	78.1	104.2	83	96	1.0
	12-050	50	38	2.0	2°	28.6	43.0	57.3	77	96	1.5
	R050	50	38	2.0	2°	28.6	43.0	57.3	77	96	1.5
	12-063	63	51	2.0	1°30′	38.2	57.3	76.4	103	122	1.5
	R063	63	51	2.0	1°30′	38.2	57.3	76.4	103	122	1.5
	R080	80	68	2.0	1°06′	52.1	78.1	104.2	137	156	1.5
	R100	100	88	2.0	0°48′	71.6	107.4	143.2	177	196	1.5
	AJX14-063	63	51	2.0	2°48′	20.4	30.7	40.9	98	122	2.0
	R063	63	51	2.0	2°48′	20.4	30.7	40.9	98	122	2.0
	R080	80	68	2.0	1°48′	31.8	47.7	63.6	132	156	2.0
	R100	100	88	2.0	1°12′	47.7	71.6	95.5	172	196	2.0
	R125	125	113	2.0	0°48′	71.6	107.4	143.2	222	246	2.0
	R160	160	148	2.0	0°30′	114.6	171.9	229.2	292	316	2.0

	φ30/φ32/φ35			φ40 (φ32 Shank)			φ40 (φ42 Shank)			φ50/φ63 (Shank type)			φ50/φ63 (Arbor type)			φ80/φ100/φ125/φ160 (Arbor type)		
	Over-hang (mm)	Axial Depth of Cut (mm)	Feed per Tooth (mm/tooth)	Over-hang (mm)	Axial Depth of Cut (mm)	Feed per Tooth (mm/tooth)	Over-hang (mm)	Axial Depth of Cut (mm)	Feed per Tooth (mm/tooth)	Over-hang (mm)	Axial Depth of Cut (mm)	Feed per Tooth (mm/tooth)	Over-hang (mm)	Axial Depth of Cut (mm)	Feed per Tooth (mm/tooth)	Over-hang (mm)	Axial Depth of Cut (mm)	Feed per Tooth (mm/tooth)
	180	1.2	1.4	180	1.2	1.4	180	1.2	1.5	180	1.4	1.5	150	1.5	1.5	170	1.5	1.5
	230	1.0	1.2	240	1.0	1.2	240	1.0	1.3	240	1.2	1.3	250	1.3	1.3	300	1.3	1.3
	290	0.8	1.0	300	0.8	1.0	300	0.8	1.1	–	–	–	350	1.1	1.1	450	1.0	1.0
	180	1.0	1.4	180	1.0	1.4	180	1.0	1.5	180	1.2	1.5	150	1.3	1.5	170	1.3	1.5
	230	0.8	1.2	240	0.8	1.2	240	0.8	1.3	240	1.0	1.3	250	1.1	1.3	300	1.1	1.3
	290	0.6	1.0	300	0.6	1.0	300	0.6	1.1	–	–	–	350	0.9	1.1	450	0.8	1.0
	180	1.0	1.2	180	1.0	1.2	180	1.0	1.3	180	1.2	1.3	150	1.3	1.3	170	1.3	1.3
	230	0.8	1.0	240	0.8	1.0	240	0.8	1.1	240	1.0	1.1	250	1.1	1.1	300	1.1	1.1
	290	0.6	0.8	300	0.6	0.8	300	0.6	0.9	–	–	–	350	0.9	0.9	450	0.8	0.8
	180	1.2	1.2	180	1.2	1.2	180	1.2	1.3	180	1.4	1.3	150	1.5	1.3	170	1.5	1.3
	230	1.0	1.0	240	1.0	1.0	240	1.0	1.1	240	1.2	1.1	250	1.3	1.1	300	1.3	1.1
	290	0.8	0.8	300	0.8	0.8	300	0.8	0.9	–	–	–	350	1.1	0.9	450	1.0	0.8
	180	1.2	1.6	180	1.2	1.6	180	1.2	1.7	180	1.4	1.7	150	1.5	1.7	170	1.5	1.7
	230	1.0	1.4	240	1.0	1.4	240	1.0	1.5	240	1.2	1.5	250	1.3	1.5	300	1.3	1.5
	290	0.8	1.2	300	0.8	1.2	300	0.8	1.3	–	–	–	350	1.1	1.3	450	1.0	1.2
	180	1.0	1.4	180	1.0	1.4	180	1.0	1.5	180	1.2	1.5	150	1.3	1.5	170	1.3	1.5
	230	0.8	1.2	240	0.8	1.2	240	0.8	1.3	240	1.0	1.3	250	1.1	1.3	300	1.1	1.3
	290	0.6	1.0	300	0.6	1.0	300	0.6	1.1	–	–	–	350	0.9	1.1	450	0.8	1.0
	180	0.6	1.0	180	0.6	1.0	180	0.6	1.1	180	0.8	1.1	150	0.9	1.1	170	0.9	1.1
	230	0.5	0.8	240	0.5	0.8	240	0.5	0.9	240	0.6	0.9	250	0.7	0.9	300	0.7	0.9
	290	0.4	0.6	300	0.4	0.6	300	0.4	0.7	–	–	–	–	–	–	–	–	–

①Overhang Length



②Main Spindle Revolution

$n(min^{-1})$=(Recommended Cutting Speed x 1000)÷(Outer Tool Diameter x 3.14)

③Table Feed Rate

vf(mm/min)=n x Feed per Tooth x Number of Teeth

④Recommended width of cut (ae) is more than 60% of the cutting edge diameter.

⑤The above cutting conditions are guides to cutting on a #50 BT machine. In case of #40 BT and #63 HSK machines, a cutting edge diameter of under 35mm is recommended. In this case, reduce the depth of cut and table feed rate.

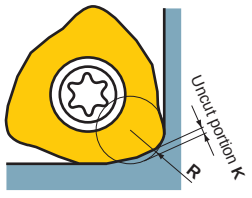
⑥Use of ***ST*** chipbreaker with tougher cutting edges is recommended for machining parts that require interrupted cutting. First recommended insert grade for non-standard 06/08/09 ***ST*** chipbreakers is ***VP30RT*** irrespective of the workpiece material.

⑦Cutter body with coarse pitch is recommended for the unstable cutting caused by the long tool overhang.

⑧Use the "sharp" ***JM*** chipbreaker to lower cutting forces or when long tool overhangs are used.

⑨Heavy chips are generated when machining with the ***AJX***. To avoid chip jamming-related problems, use air blow while machining to discharging chips effectively.

NOTE FOR PROGRAMMING

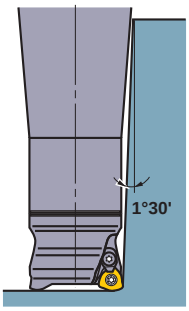


When using the ***AJX***, please programme as an R3 radius cutter. The approximate uncut portions for the programme are as follows.

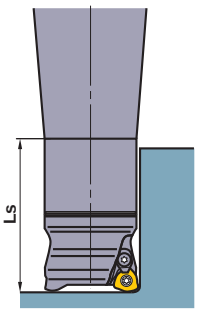
Insert	Approx. **R**(mm)	Uncut portion **K**(mm)
JOM○06T215ZZSR-○○	2.0	0.33
JOM○080320ZZSR-○○	2.5	0.46
JDM○09T320ZDSR-○○	3.0	0.47
JDM○120420ZDSR-○○	3.0	0.63
JDM○140520ZDSR-○○	3.0	0.64

(Note.) The uncut portion may change slightly depending on cutting conditions.

EFFECTIVE USE



The tapered body of the special arbor for the ***AJX*** enables machining without touching a finished wall with a 1°30' draft angle.



Vertical wall machining is possible within the range of Ls.

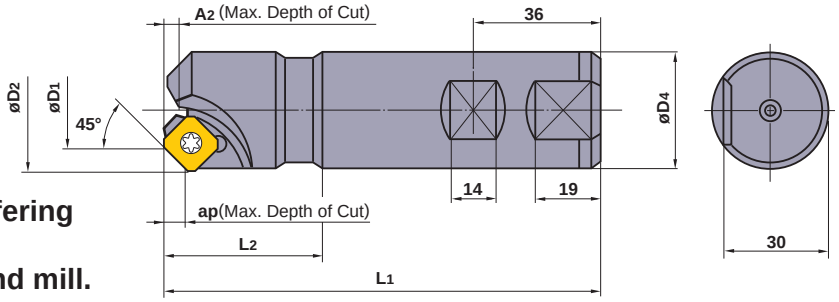
MULTI FUNCTIONAL MILLING

45° Roughing | Face Milling | Chamfering | Copying (Including Flat faces) | Pocket Milling

BSP

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	◀	◀	◀	

- For drilling, chamfering and copying.
- Multi-functional end mill.



Right hand tool holder only.

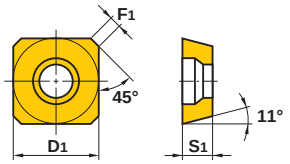
Order Number	Stock	Number of Teeth	Dimensions (mm)					Max. Depth of Cut (mm)		*		
								Outer	Inner			
	R		D1	D2	L1	D4	L2	ap	A2	Clamp Screw	Wrench	Insert
BSPR101S32S	●	1	10	25.3	125	32	45	7	2	CS451190T	TKY20F	SPMB1204AP◌
202S32S	●	2	20	35.1	125	32	45	7	5	CS451190T	TKY20F	
202S32L	●	2	20	35.1	180	32	100	7	5	CS451190T	TKY20F	
403S32S	●	3	40	55.2	125	32	45	7	5	CS451190T	TKY20F	
403S32L	●	3	40	55.2	180	32	100	7	5	CS451190T	TKY20F	

* Clamp Torque (N • m) : CS451190T=5.0

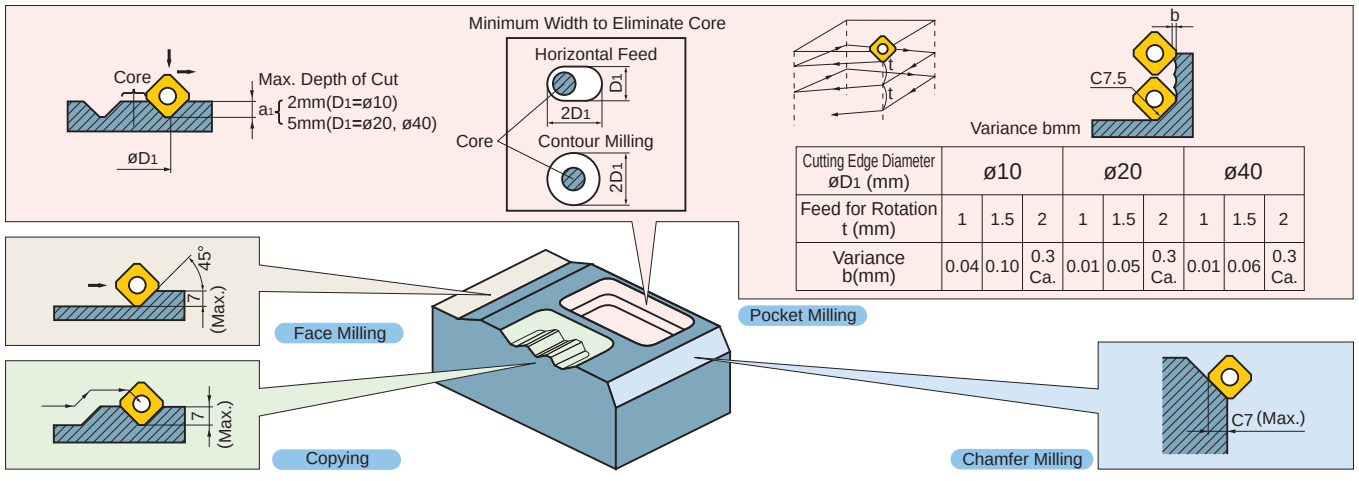
INSERTS

Work Material			Coated	Carbide
	P	Steel	◐	◐
	M	Stainless Steel	◐	
	K	Cast Iron		◐

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✥ : Unstable Cutting
Honing : T : Chamfer

Shape	Order Number	Class	Honing	Coated UP20M	Carbide UTi20T	Dimensions (mm) D1	S1	F1	Geometry
	SPMB1204APT	M	T	●	●	12.7	4.76	1.4	

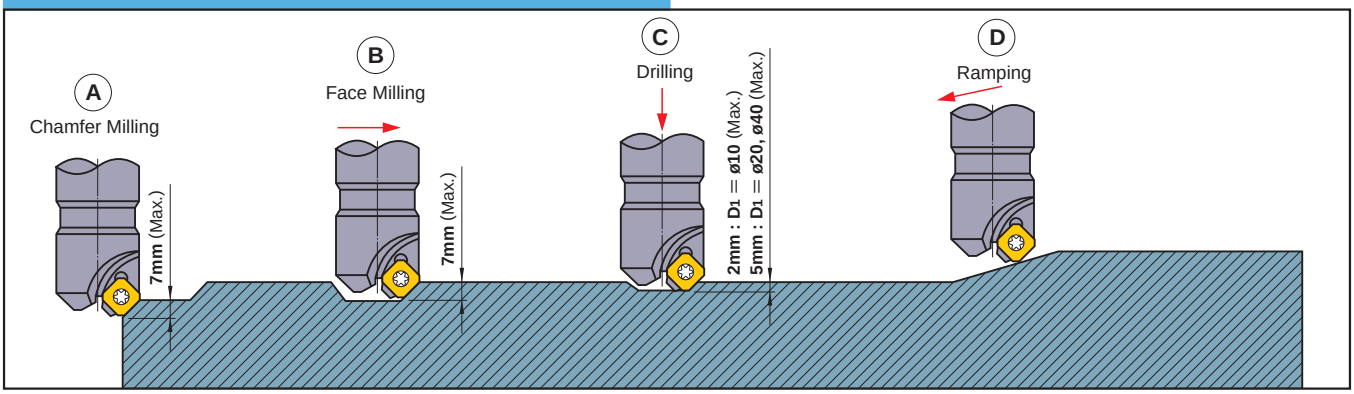
CUTTING MODE



Cutting Edge Diameter øD1 (mm)	ø10			ø20			ø40		
Feed for Rotation t (mm)	1	1.5	2	1	1.5	2	1	1.5	2
Variance b(mm)	0.04	0.10	0.3 Ca.	0.01	0.05	0.3 Ca.	0.01	0.06	0.3 Ca.

● : Inventory maintained in Japan. (10 inserts in one case)

RECOMMENDED CUTTING CONDITIONS



Work Material		Hardness	Grade	Cutting Mode	Cutting Speed (m/min)	Cutting Edge Diameter : **D1** (mm)		
						ϕ10 (Flute 1)	**ϕ20** (Flute 2)	**ϕ40** (Flute 3)
						Table Feed (mm/min)	Table Feed (mm/min)	Table Feed (mm/min)
P	Mild Steel	≤180HB	**UP20M**	A	270 (180—325)	900 (750—1000)	1300 (1100—1500)	1200 (1000—1350)
				B • D		650 (500—750)	950 (750—1100)	800 (620—1000)
				C	150 (120—200)	100 (60—130)	100 (60—130)	100 (60—130)
	Carbon Steel Alloy Steel	180—280 HB	**UP20M**	A	225 (155—270)	650 (500—750)	950 (750—1100)	800 (620—1000)
				B • D		500 (370—620)	750 (500—1000)	700 (500—880)
				C	150 (120—200)	100 (60—130)	100 (60—130)	100 (60—130)
	High Alloy Steel	200—280 HB	**UP20M**	A	160 (110—180)	190 (130—250)	250 (130—380)	250 (130—380)
				B • D		100 (60—130)	100 (60—130)	100 (60—130)
				C	80 (50—100)	40 (25—50)	50 (35—60)	40 (35—60)
M	Stainless Steel	≤200HB	**UP20M**	A	225 (155—270)	400 (250—500)	550 (380—750)	550 (380—750)
				B • D		300 (250—380)	500 (380—620)	450 (380—500)
				C	150 (120—200)	100(60—130)	100 (60—130)	100 (60—130)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**UTi20T**	A	120 (100—150)	500 (400—600)	750 (600—900)	750 (600—900)
				B • D		300 (200—400)	450 (300—600)	450 (300—600)
				C		100 (50—150)	150 (100—200)	150 (100—200)

●Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
●Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution
(Note) These values indicate the cutting speed for the periphery of the cutting edge.

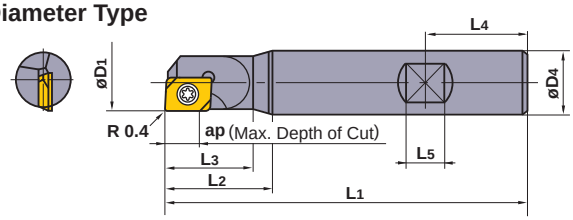
●Recommended cutting conditions are for maximum depth of cut.
●When using a long type (i.g. BSPR403S32L), table feed should be reduced by 30%,
if chattering occurs cutting speed should be reduced to 70—80% of the above recommendations.
●Chip packing can occur when drilling therefore step drilling is recommended. (Rec. step depth 0.5mm)

SRE

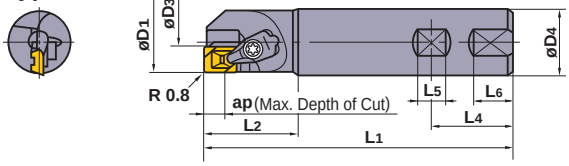
Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	◆	◆		◆

- For drilling without a previously formed hole and horizontal feed machining.
- Ground key way slot in the insert gives excellent rigidity.
- High rake insert gives excellent sharpness.

Small Diameter Type



General Type



Right hand tool holder only.

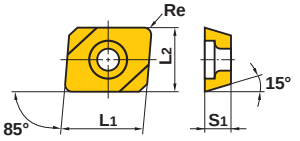
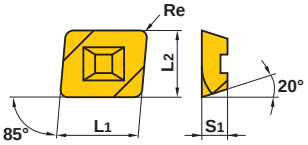
Type	Order Number	Stock	Number of Teeth	Dimensions (mm) D1	D3	L1	D4	L2	L3	L4	L5	L6	Max. Depth of Cut ap (mm)
Small Diameter	**SRER100SS16**	●	1	10	—	85	16	25	15	24	10	—	6
	120SS16	●	1	12	—	85	16	25	18	24	10	—	8
	140SS16	●	1	14	—	85	16	25	21	24	10	—	8
	160SS16	●	1	16	—	85	16	25	24	24	10	—	9
	180SS20	●	1	18	—	100	20	30	27	25	11	—	9
General	**SRER200SS20**	●	1	20	1.2	100	20	30	—	25	11	—	8
	200SL20	●	1	20	1.2	120	20	50	—	25	11	—	8
	250SS25	●	1	25	6.4	115	25	35	—	32	12	17	8
	250SL25	●	1	25	6.4	140	25	60	—	32	12	17	8
	300SS32	●	1	30	10.8	125	32	45	—	36	14	19	8
	300SL32	□	1	30	10.8	155	32	75	—	36	14	19	8

SPARE PARTS

Tool Holder Number	Clamp Bridge	Clamp Screw *	Clamp Screw *	Stop Ring	Wrench	Insert	Insert
SRER100SS16	—	TS253	—	—	TKY08F	SRE06R	—
120SS16	—	TS3	—	—	TKY08F	SRE07R	—
140SS16	—	TS3	—	—	TKY08F	SRE07R	—
160SS16	—	TS35	—	—	TKY10F	SRE09R	—
180SS20	—	TS35	—	—	TKY10F	SRE09R	—
SRER200SS20	SRK1R	—	SRS5	CR4	TKY20F	—	SRE12R
200SL20	SRK1R	—	SRS5	CR4	TKY20F	—	SRE12R
250SS25	SRK1R	—	SRS5	CR4	TKY20F	—	SRE12R
250SL25	SRK1R	—	SRS5	CR4	TKY20F	—	SRE12R
300SS32	SRK1R	—	SRS5	CR4	TKY20F	—	SRE12R
300SL32	SRK1R	—	SRS5	CR4	TKY20F	—	SRE12R

* Clamp Torque (N • m) : TS253=1.0, TS3=1.0, TS35=2.5, SRS5=5.0

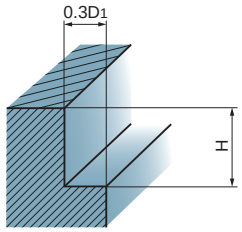
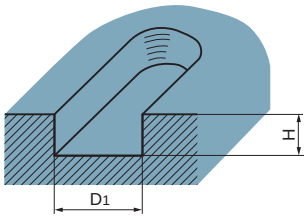
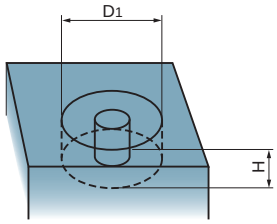
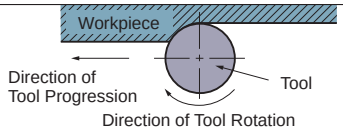
INSERTS

Shape	Order Number	Class	Coated UP20M				Carbide UTi20T		Dimensions (mm) L1	L2	S1	Re	Geometry
	SRE06R	E	●				●		8.5	6.35	2.3	0.4	
	07R	E	●				●		10.6	7.94	2.8	0.4	
	09R	E	●				●		12.7	9.525	3.5	0.4	
	SRE12R	E	●				●		12.7	9.525	4	0.8	

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.

RECOMMENDED CUTTING CONDITIONS

Cutting Mode

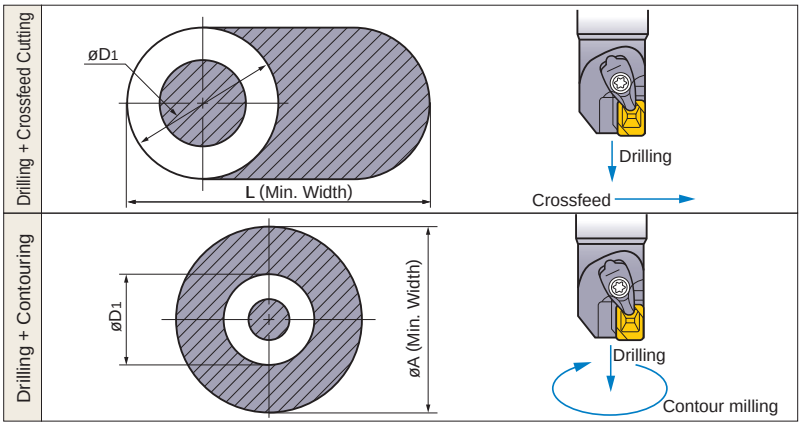
A : Shoulder Milling	B : Slot Milling	C : Drilling
		
 ●Down cutting is recommended in view of finished face and chip control.	●Blow away the chips by air while cutting. ●Minimize the overhang length of the holder from chuck.	●Use peck feed at 0.5mm intervals, to help break the chips. ●Wet cutting assures more stable cutting.

	Work Material	Hardness	Grade	Cutting Mode	Depth of Cut H	Cutting Speed (m/min)	Cutting Edge Diameter : D1 (mm) ϕ10—ϕ14 Feed per Tooth (mm/tooth)	ϕ16—ϕ18 Feed per Tooth (mm/tooth)	ϕ20—ϕ30 Feed per Tooth (mm/tooth)
P	Carbon Steel	180—280HB	**UTi20T**	A	5	110 (80—140)	0.075 (0.05—0.1)	0.115 (0.08—0.15)	0.15 (0.1—0.2)
				B	3				
				C			0.065 (0.05—0.08)	0.065 (0.05—0.08)	0.075 (0.05—0.1)
	Alloy Steel	180—280HB	**UTi20T**	A	5	110 (80—140)	0.065 (0.05—0.08)	0.095 (0.07—0.12)	0.125 (0.1—0.15)
				B	3				
				C			0.065 (0.05—0.08)	0.065 (0.05—0.08)	0.06 (0.02—0.1)
K	Cast Iron	Tensile Strength ≤450MPa	**UTi20T**	A	5	100 (80—120)	0.075 (0.05—0.1)	0.115 (0.08—0.15)	0.15 (0.1—0.2)
				B	3				
				C			0.065 (0.05—0.08)	0.065 (0.05—0.08)	0.075 (0.05—0.1)
H	Hardened Steel	40—60HRC	**UTi20T**	A	3	50 (40—60)	0.04 (0.03—0.05)	0.04 (0.03—0.05)	0.075 (0.05—0.1)
				B	2				
				C			0.04 (0.03—0.05)	0.065 (0.05—0.08)	0.065 (0.05—0.08)

●Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
●Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

CAUTION FOR USE

●Minimum width for finishing the bottom smoothly



D1 (Diameter)	Tool Holder Number	L (Min. Width)	A (Min. Diameter)
10	**SRER100**	20	
12	**SRER120**	24	
14	**SRER140**	28	
16	**SRER160**	32	
18	**SRER180**	36	
20	**SRER200**	40	
25	**SRER250**	50	
30	**SRER300**	60	

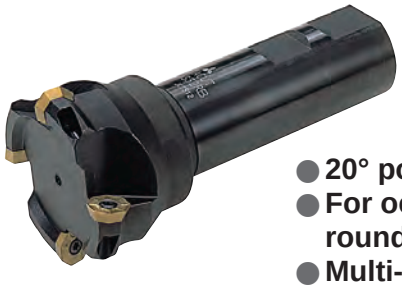
SPARE PARTS E001
TECHNICAL DATA F001

MULTI FUNCTIONAL MILLING

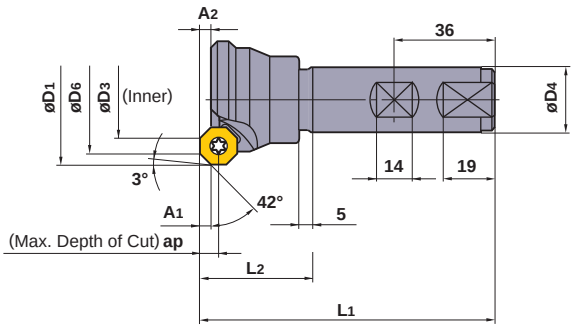
Roughing | Face Milling | Shoulder Milling | Shoulder Milling | Chamfering | Pocket Milling

OCTACUT

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	▬▬			



- 20° positive insert.
- For octagonal and round type inserts.
- Multi-functional machining.



SHANK TYPE

Right hand tool holder only.

Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D6	D3	L1	D4	L2	A1	ap	A2	✶ Clamp Screw	Wrench	Insert
OCTACUT322S32RB	●	2	32	23.6	13.1	125	32	45	2.5	7	3	CS350990T	①TKY10F	
403S32RB	●	3	40	31.7	21.2	125	32	45	2.5	7	3	CS350990T	①TKY10F	①OEMX12T3□□□□
504S32RB	●	4	50	41.9	31.4	125	32	45	2.5	7	3	CS350990T	①TKY10F	②REMX12T3□□□□
634S32RB	●	4	63	54.9	44.5	125	32	45	2.5	7	3	CS350990T	①TKY10F	
503S32R	●	3	50	38.3	24.5	125	32	45	3	9	4	CS501290T	②TKY25T	①OEMX1705□□□□
634S32R	●	4	63	51.4	37.6	125	32	45	3	9	4	CS501290T	②TKY25T	②REMX1705□□□□

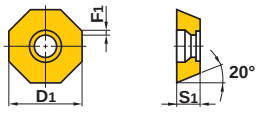
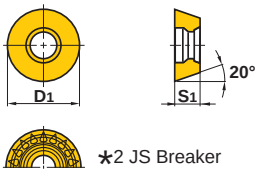
✶ Clamp Torque (N • m) : CS350990T=2.5, CS501290T=7.5

INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
H	Hardened Steel	

Cutting Conditions (Guide) :
●: Stable Cutting ◐: General Cutting ✠: Unstable Cutting

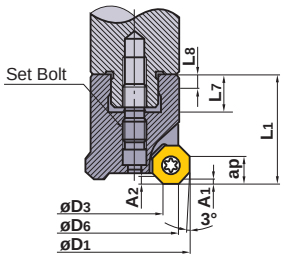
Honing :
E : Round **S** : Chamfer + Hone **T** : Chamfer

Shape	Order Number	Class	Honing	Coated F7030	Coated F620	Coated UP20M	Coated AP20M	Cermet NX2525	Cermet NX4545	Carbide UTi20T	CBN ✶1 MB730	Dimensions (mm) D1	S1	F1	Geometry
✶2 JS Breaker	OEMX12T3ETR1	M	T		▲				●	●	●	12.7	3.97	1.0	 ✶2 JS Breaker ✶1 CBN Insert
	12T3ESR1	M	S	●								12.7	3.97	1.0	
	✶2 12T3EER1-JS	M	E	●								12.7	3.97	1.0	
	✶2 12T3ETR1-JS	M	T		▲		●			●		12.7	3.97	1.0	
	OEEX1705ETR1	E	T					●	●			17.0	5.0	1.4	
	OEMX1705ETR1	M	T		▲	●			●	●		17.0	5.0	1.4	
	1705ESR1	M	S	●								17.0	5.0	1.4	
	✶2 1705EER1-JS	M	E	●								17.0	5.0	1.4	
	✶2 1705ETR1-JS	M	T		▲		●			●		17.0	5.0	1.4	
✶2 JS Breaker	REMX12T3TN	M	T		▲		●			●		12.95	4.17	—	 ✶2 JS Breaker
	12T3SN	M	S	●								12.95	4.17	—	
	✶2 12T3EN-JS	M	E	●								12.95	4.17	—	
	✶2 12T3TN-JS	M	T		▲		●			●		12.95	4.17	—	
	REMX1705TN	M	T		▲		●			●		17.25	5.2	—	
	1705SN	M	S	●								17.25	5.2	—	
	✶2 1705EN-JS	M	E	●								17.25	5.2	—	
	✶2 1705TN-JS	M	T		▲		●			●		17.25	5.2	—	

✶2 Insert with breaker.

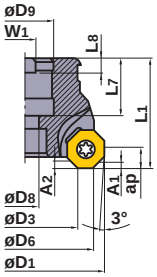
● : Inventory maintained in Japan. (10 inserts in one case) (CBN inserts are available in 1 piece in one case.)
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

Fig.1



Small Insert Type
ø40
Standard Insert Type
ø50

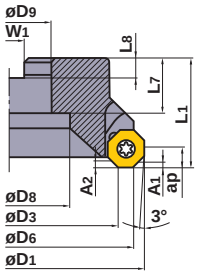
Fig.2



Small Insert Type
ø50
ø63
ø80

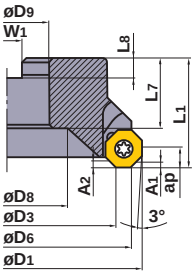
Standard Insert Type
ø63
ø80
ø100

Fig.3



Standard Insert Type
ø125

Fig.4



Standard Insert Type
ø160

C H :3°
A.R :+13°
R.R :-4°

ARBOR TYPE

Right hand tool holder only.

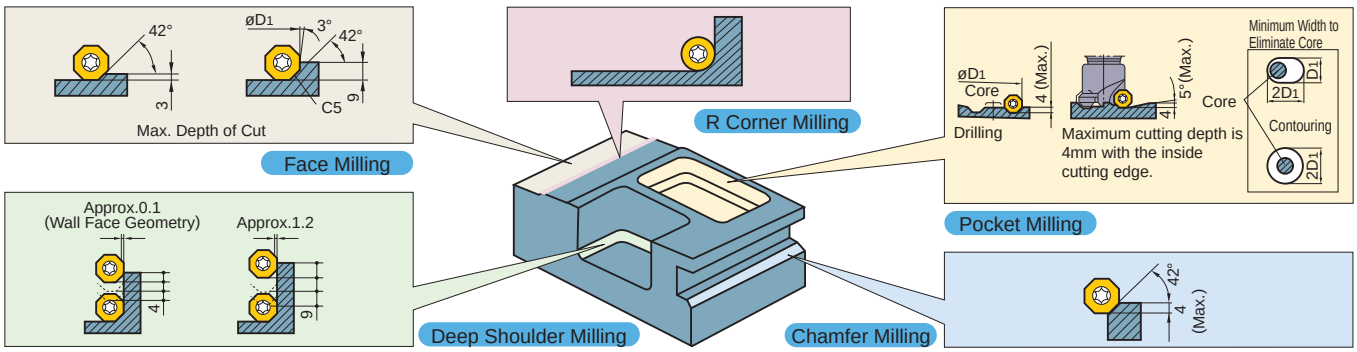
Order Number	Stock	Number of Teeth	Dimensions (mm)									Tool Weight	Max. Depth of Cut			Type (Fig.)
	R		D1	D6	D3	L1	D9	L7	D8	W1	L8	(kg)	A1	ap	A2	
OCTACUT0403ARB	●	3	40	31.7	21.2	40	16	18	—	8.4	5.6	0.4	2.5	7	3	1
0504ARB	●	4	50	41.9	31.4	50	22	20	11	10.4	6.3	0.5	2.5	7	3	2
0634ARB	●	4	63	54.9	44.5	50	22	20	11	10.4	6.3	0.7	2.5	7	3	2
0805CRB	●	5	80	71.9	61.5	50	25.4	26	13	9.5	6	1.2	2.5	7	3	2
OCTACUT0503AR	●	3	50	38.3	24.5	50	22	20	—	10.4	6.3	0.5	3	9	4	1
0634AR	●	4	63	51.4	37.6	50	22	20	11	10.4	6.3	0.7	3	9	4	2
0805CR	●	5	80	68.4	54.7	50	25.4	26	13	9.5	6	1.2	3	9	4	2
1006DR	●	6	100	88.5	74.7	63	31.75	32	17	12.7	8	1.6	3	9	4	2
1257ER	●	7	125	113.5	99.8	63	38.1	35	60	15.9	10	1.8	3	9	4	3
1608FR	●	8	160	148.5	134.8	63	50.8	38	80.9	19.1	11	3.6	3	9	4	4

SPARE PARTS

Tool Holder Number	✱ Clamp Screw	Wrench	Wrench	Set Bolt	Set Bolt	Insert
OCTACUT0403ARB	CS350990T	TKY10F	—	HDS08030	—	①OEMX12T3○○○○ ②REMX12T3○○○○
OCTACUT0504ARB				—	BOES101	
OCTACUT0634ARB					—	
0805CRB						
OCTACUT0503AR	CS501290T	—	TKY25T	HDS10031	—	①OEMX1705○○○○ ②REMX1705○○○○
OCTACUT0634AR				—	BOES101	
OCTACUT0805CR					—	
OCTACUT1006DR					HSC16035	
OCTACUT1257ER					—	
1608FR						

✱ Clamp Torque (N • m) : CS350990T=2.5, CS501290T=7.5

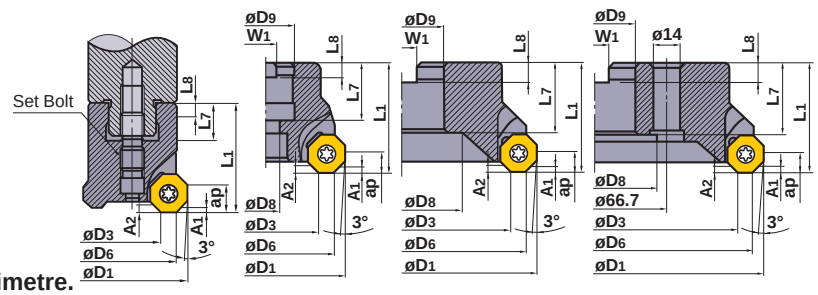
APPLICATION



Above sizes are for OEMX1705○○○○.

SPARE PARTS E001
TECHNICAL DATA F001

Fig.1 Fig.2 Fig.3 Fig.4



For metric arbor

The cutter bore diameter D9 is indicated in millimetre.

ARBOR TYPE

C H :3°
A.R :+13°
R.R :-4°

Right hand tool holder only.

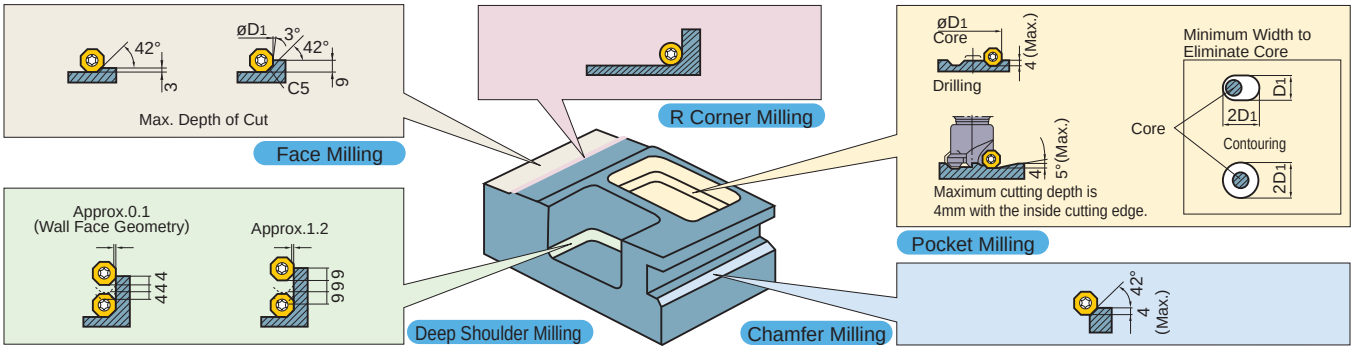
Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D6	D3	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut A1	ap	A2	Type (Fig.)
OCTACUT0403ARB	●	3	40	31.7	21.2	40	16	18	—	8.4	5.6	0.4	2.5	7	3	1
0504ARB	●	4	50	41.9	31.4	50	22	20	11	10.4	6.3	0.5	2.5	7	3	2
0634ARB	●	4	63	54.9	44.5	50	22	20	11	10.4	6.3	0.7	2.5	7	3	2
0805ARB	○	5	80	71.9	61.5	50	27	22	13.5	12.4	7	1.2	2.5	7	3	2
OCTACUT0503AR	●	3	50	38.3	24.5	50	22	20	—	10.4	6.3	0.5	3	9	4	1
0634AR	●	4	63	51.4	37.6	50	22	20	11	10.4	6.3	0.7	3	9	4	2
0805AR	○	5	80	68.4	54.7	50	27	22	13.5	12.4	7	1.2	3	9	4	2
1006AR	○	6	100	88.5	74.7	50	32	32	45	14.4	8	1.6	3	9	4	2
1257BR	○	7	125	113.5	99.8	50	40	32	56	16.4	9	1.8	3	9	4	3
1608CR	○	8	160	148.5	134.8	50	40	29	88.7	16.4	9	3.6	3	9	4	4

SPARE PARTS

Tool Holder Number	Clamp Screw *	Wrench	Wrench	Set Bolt	Set Bolt	Insert
OCTACUT0403ARB	CS350990T	TKY10F	—	HDS08030	—	①OEMX12T3○○○○ ②REMX12T3○○○○
OCTACUT0504ARB				—	BOES101	
OCTACUT0634ARB 0805ARB					—	
OCTACUT0503AR	CS501290T	—	TKY25T	HDS10031	—	①OEMX1705○○○○ ②REMX1705○○○○
OCTACUT0634AR				—	BOES101	
OCTACUT0805AR OCTACUT1608CR					—	

* Clamp Torque (N • m) : CS350990T=2.5, CS501290T=7.5

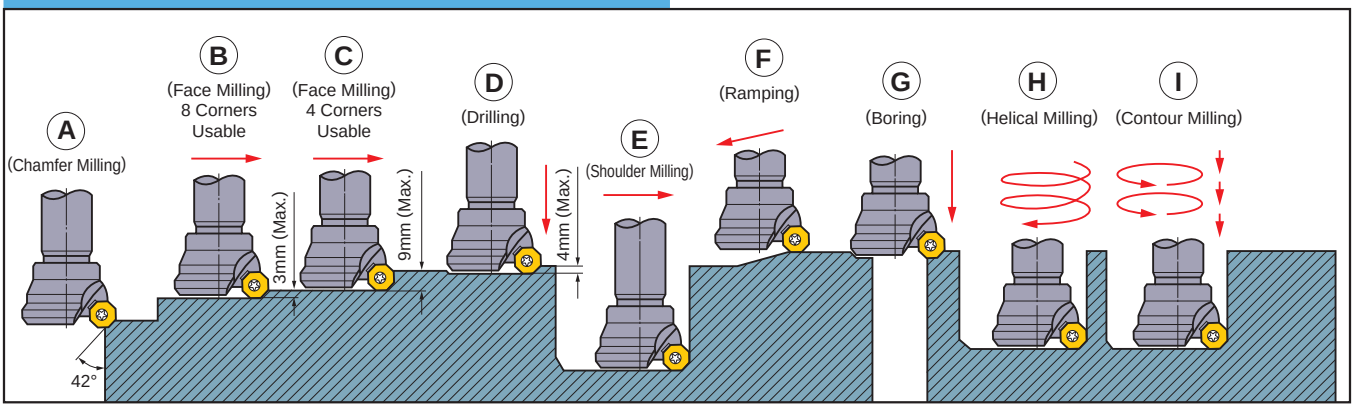
APPLICATION



Above sizes are for OEMX1705○○○○.

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)

RECOMMENDED CUTTING CONDITIONS



This list of recommended cutting conditions is for cutters with diameter≤ϕ80. For cutters with diameter>ϕ80 increase cutting speed by 10%.
Above sizes are for OEMX1705□□□□.

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Cutting Mode	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	**F7030**	240 (180—300)	A	0.2 (0.15—0.25)
					B	0.2 (0.15—0.25)
			AP20M	215 (145—250)	C,E,F	0.2 (0.15—0.25)
			UTi20T	190 (130—230)	D,G,H,I	0.075 (0.05—0.1)
	Carbon Steel Alloy Steel	180—280HB	**F7030**	200 (140—240)	A	0.2 (0.15—0.25)
					B	0.2 (0.15—0.25)
			AP20M	180 (120—210)	C,E,F	0.2 (0.15—0.25)
			UTi20T	160 (110—190)	D,G,H,I	0.075 (0.05—0.1)
		280—380HB	**F7030**	150 (100—170)	A	0.2 (0.15—0.25)
					B	0.2 (0.15—0.25)
			AP20M	130 (90—160)	C,E,F	0.2 (0.15—0.25)
			UTi20T	110 (80—140)	D,G,H,I	0.075 (0.05—0.1)
	Pre-Hardened Steel	35—45HRC	**F7030**	130 (90—160)	A	0.15 (0.1—0.2)
					B	0.15 (0.1—0.2)
			AP20M	110 (80—140)	C,E,F	0.1 (0.05—0.15)
			UTi20T	110 (70—130)	D,G,H,I	0.05 (0.025—0.075)
	High Alloy Steel	≤300HB	**F7030**	150 (100—170)	A	0.15 (0.1—0.2)
					B	0.15 (0.1—0.2)
			AP20M	130 (90—160)	C,E,F	0.1 (0.05—0.15)
			UTi20T	110 (80—140)	D,G,H,I	0.05 (0.025—0.075)
M	Stainless Steel	≤270HB	**F7030**	200 (140—240)	A	0.15 (0.1—0.2)
					B	0.15 (0.1—0.2)
			AP20M	180 (120—210)	C,E,F	0.1 (0.05—0.15)
			UTi20T	160 (110—190)	D,G,H,I	0.075 (0.05—0.1)
K	Gray Cast Iron	Tensile Strength ≤350MPa	**AP20M**	180 (120—210)	A	0.3 (0.25—0.35)
					B	0.25 (0.2—0.3)
			UTi20T	160 (110—190)	C,E,F	0.15 (0.1—0.2)
					D,G,H,I	0.075 (0.05—0.1)
			MB730	1500 (1000—3000)	B (D.O.C 0.1—0.5mm)	0.15 (0.1—0.2)
	Ductile Cast Iron	Tensile Strength 360—500MPa	**AP20M**	150 (100—170)	A	0.25 (0.2—0.3)
					B	0.2 (0.15—0.25)
			UTi20T	130 (90—160)	C,E,F	0.1 (0.05—0.15)
					D,G,H,I	0.05 (0.025—0.075)
	Ductile Cast Iron	Tensile Strength 500—800MPa	**AP20M**	110 (80—140)	A	0.25 (0.2—0.3)
					B	0.2 (0.15—0.25)
			UTi20T	110 (70—130)	C,E,F	0.1 (0.05—0.15)
					D,G,H,I	0.05 (0.025—0.075)
H	Hardened Steel	45—60HRC	**AP20M**	70 (50—90)	A	0.15 (0.1—0.2)
					B	0.15 (0.1—0.2)
			UTi20T	60 (50—80)	C,E,F	0.1 (0.05—0.12)
					D,G,H,I	0.05 (0.025—0.06)
			MB730	150 (100—200)	B (D.O.C 0.1—0.3mm)	0.15 (0.1—0.2)

● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD_1)
● Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution
(Note 1) This list of recommended cutting conditions is for flank wear of 0.3mm in 30 min. cutting time.
(Note 2) More than 50mm shank length should be clamped in the milling chuck.
(Note 3) Use step cutting when driling (0.5 mm steps are recommended).
(Note 4) When chattering occurs, reduce cutting speed by 20—30 %.
(Note 5) When using round inserts, make sure that the flat portion of the flank surface is secure against the insert seat wall.

SPARE PARTS E001
TECHNICAL DATA F001

MULTI FUNCTIONAL MILLING

Roughing | Shoulder Milling | Slotting | Copying (Including Flat faces) | Pocket Milling

ARX

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 15° positive, high tolerance M-class insert.
- Effective for various machining applications.
- With through air & coolant holes.

Fig.1 (Center Cutting Edge Type)

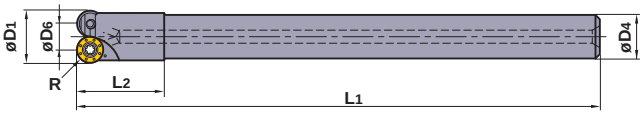
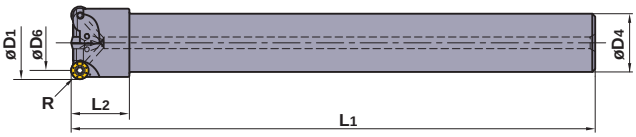


Fig.2 (Non-center Cutting Edge Type (Multi-tooth))



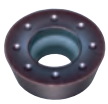
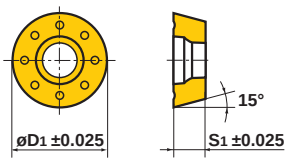
STEEL SHANK TYPE

Right hand tool holder only.

Type	Order Number	Stock R	Coolant Hole	Number of Teeth	Dimensions (mm) R	D1	D4	D6	L1	L2	Type (Fig.)	* Clamp Screw	Wrench	Insert
Center Cutting	ARX25R102SA10S	●	○	2	2.5	10	10	5	120	20	1	TPS20	TIP06F	RDMW0517M0E
	30R122SA10S	●	○	2	3.0	12	10	6	120	20	1	TPS22S	TIP07FS	RDMW0620M0E
	35R142SA12S	●	○	2	3.5	14	12	7	140	20	1	TPS22	TIP07FS	RDMW0724M0E
Non-center Cutting (Multi-tooth)	ARX25R122SA10S	●	○	2	2.5	12	10	7	120	20	2	TPS20	TIP06F	RDMW0517M0E
	25R163SA16S	●	○	3	2.5	16	16	11	180	20	2	TPS20	TIP06F	RDMW0517M0E
	30R163SA16S	●	○	3	3.0	16	16	10	180	20	2	TPS22	TIP07FS	RDMW0620M0E
	25R173SA16S	●	○	3	2.5	17	16	12	180	20	2	TPS20	TIP06F	RDMW0517M0E
	30R173SA16S	●	○	3	3.0	17	16	11	180	20	2	TPS22	TIP07FS	RDMW0620M0E
	25R204SA20S	●	○	4	2.5	20	20	15	180	20	2	TPS20	TIP06F	RDMW0517M0E
	30R203SA20S	●	○	3	3.0	20	20	14	180	20	2	TPS22	TIP07FS	RDMW0620M0E
	25R224SA20S	●	○	4	2.5	22	20	17	180	20	2	TPS20	TIP06F	RDMW0517M0E
	30R224SA20S	●	○	4	3.0	22	20	16	180	20	2	TPS22	TIP07FS	RDMW0620M0E
	25R255SA20S	●	○	5	2.5	25	20	20	180	20	2	TPS20	TIP06F	RDMW0517M0E
	30R254SA20S	●	○	4	3.0	25	20	19	180	20	2	TPS22	TIP07FS	RDMW0620M0E

* Clamp Torque (N • m) : TPS20=0.6, TPS22S=0.6, TPS22=0.6

INSERTS

Shape	Order Number	Coated VP15TF		Dimensions (mm) D1	S1	Geometry
	RDMW0517M0E	●		5.0	1.70	
	0620M0E	●		6.0	1.99	
	0724M0E	●		7.0	2.38	

● : Inventory maintained in Japan. (10 inserts in one case)

Fig.1

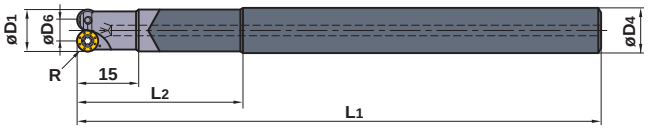


Fig.2

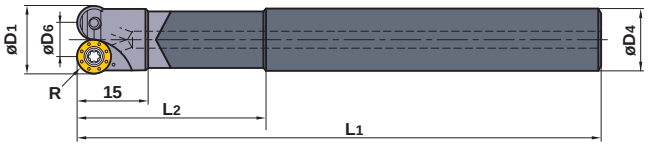
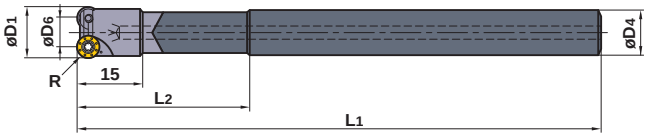


Fig.3



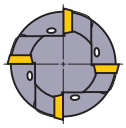
CARBIDE SHANK TYPE

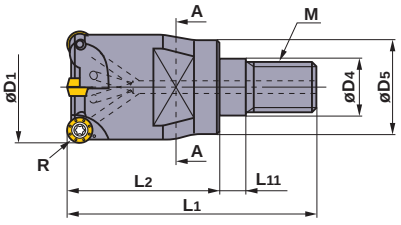
Right hand tool holder only.

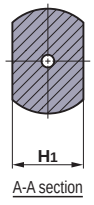
Type	Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)						Type (Fig.)	* Clamp Screw	Wrench	Insert
		R			R	D1	D4	D6	L1	L2				
Center Cutting	ARX25R102SA10LW	●	○	2	2.5	10	10	5	150	40	1	TPS20	TIP06F	RDMW0517M0E
	30R122SA10LW	●	○	2	3.0	12	10	6	150	40	1	TPS22S	TIP07FS	RDMW0620M0E
	35R142SA12LW	●	○	2	3.5	14	12	7	170	40	2	TPS22	TIP07FS	RDMW0724M0E
Non-center Cutting (Multi-tooth)	ARX25R122SA10LW	●	○	2	2.5	12	10	7	150	40	3	TPS20	TIP06F	RDMW0517M0E

* Clamp Torque (N • m) : TPS20=0.6, TPS22S=0.6, TPS22=0.6

NEW







SCREW-IN TYPE

Right hand tool holder only.

Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)									Tool Weight	* Clamp Screw	Wrench	Insert
	R			R	D1	D4	D5	L1	L2	L11	H1	M	(kg)			
ARX25R163M08A30	●	○	3	2.5	16	8.5	14.7	48	30	6	10	M8	0.1	TPS20	TIP06F	RDMW0517M0E
173M08A30	●	○	3	2.5	17	8.5	14.5	48	30	6	10	M8	0.1	TPS20	TIP06F	RDMW0517M0E
204M10A30	●	○	4	2.5	20	10.5	18.6	49	30	6	14	M10	0.2	TPS20	TIP06F	RDMW0517M0E
224M10A30	●	○	4	2.5	22	10.5	18.5	49	30	6	14	M10	0.2	TPS20	TIP06F	RDMW0517M0E
255M12A35	●	○	5	2.5	25	12.5	23.6	57	35	6	19	M12	0.2	TPS20	TIP06F	RDMW0517M0E
ARX30R163M08A30	●	○	3	3.0	16	8.5	14.6	48	30	6	10	M8	0.1	TPS22	TIP07FS	RDMW0620M0E
173M08A30	●	○	3	3.0	17	8.5	14.5	48	30	6	10	M8	0.1	TPS22	TIP07FS	RDMW0620M0E
203M10A30	●	○	3	3.0	20	10.5	18.5	49	30	6	14	M10	0.2	TPS22	TIP07FS	RDMW0620M0E
224M10A30	●	○	4	3.0	22	10.5	18.5	49	30	6	14	M10	0.2	TPS22	TIP07FS	RDMW0620M0E
254M12A35	●	○	4	3.0	25	12.5	23.4	57	35	6	19	M12	0.2	TPS22	TIP07FS	RDMW0620M0E

* Clamp Torque (N • m) : TPS20=0.6, TPS22=0.6

SCREW-IN ARBORS C192
SPARE PARTS E001
TECHNICAL DATA F001

RECOMMENDED CUTTING CONDITIONS

(Note) The cutting conditions below are a guide only.
Please make adjustments according to the machining conditions.

SHOULDER MILLING • POCKET MILLING • RAMPING • COPYING

	Work Material	Hardness	Grade	Cutting Speed **vc** (m/min)	ARX25R□□□SA□□S		ARX30R□□□SA□□S		ARX35R□□□SA□□S	
					Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)
P	Mild Steel	≤180HB	VP15TF	180 (150—220)	≤1.0	≤0.5	≤1.2	≤0.5	≤1.5	≤0.5
P	Carbon Steel • Alloy Steel	180—350HB	VP15TF	160 (120—200)	≤0.7	≤0.3	≤0.9	≤0.3	≤1.2	≤0.3
M	Stainless Steel	≤270HB	VP15TF	150 (120—180)	≤0.7	≤0.3	≤0.9	≤0.3	≤1.2	≤0.3
K	Cast Iron	Tensile Strength≤450MPa	VP15TF	180 (150—220)	≤1.0	≤0.5	≤1.2	≤0.5	≤1.5	≤0.5
H	Hardened Steel	45—55HRC	VP15TF	80 (50—120)	≤0.5	≤0.2	≤0.7	≤0.2	≤1.0	≤0.2

(Note) For ramping, refer to the maximum capacities on page C155.

SLOT MILLING

	Work Material	Hardness	Grade	Cutting Speed **vc** (m/min)	ARX25R□□□SA□□S		ARX30R□□□SA□□S		ARX35R□□□SA□□S	
					Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)	Depth of Cut **ap** (mm)	Feed per Tooth **fz** (mm/tooth)
P	Mild Steel	≤180HB	VP15TF	180 (150—220)	≤1.0	≤0.4	≤1.2	≤0.4	≤1.5	≤0.4
P	Carbon Steel • Alloy Steel	180—350HB	VP15TF	160 (120—200)	≤0.7	≤0.2	≤0.9	≤0.2	≤1.2	≤0.2
M	Stainless Steel	≤270HB	VP15TF	150 (120—180)	≤0.7	≤0.2	≤0.9	≤0.2	≤1.2	≤0.2
K	Cast Iron	Tensile Strength≤450MPa	VP15TF	180 (150—220)	≤1.0	≤0.4	≤1.2	≤0.4	≤1.5	≤0.4
H	Hardened Steel	45—55HRC	VP15TF	80 (50—120)	≤0.5	≤0.1	≤0.7	≤0.1	≤1.0	≤0.1

PLUNGING

	Work Material	Hardness	Grade	Cutting Speed **vc** (m/min)	ARX25R□□□SA□□S		ARX30R□□□SA□□S		ARX35R□□□SA□□S	
					Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/tooth)	Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/tooth)	Cutting Width **ae** (mm)	Feed per Tooth **fz** (mm/tooth)
P	Mild Steel	≤180HB	VP15TF	180 (150—220)	≤2.5	≤0.3	≤3.0	≤0.3	≤3.5	≤0.3
P	Carbon Steel • Alloy Steel	180—350HB	VP15TF	160 (120—200)	≤2.5	≤0.2	≤3.0	≤0.2	≤3.5	≤0.2
M	Stainless Steel	≤270HB	VP15TF	150 (120—180)	≤2.5	≤0.2	≤3.0	≤0.2	≤3.5	≤0.2
K	Cast Iron	Tensile Strength≤450MPa	VP15TF	180 (150—220)	≤2.5	≤0.3	≤3.0	≤0.3	≤3.5	≤0.3
H	Hardened Steel	45—55HRC	VP15TF	80 (50—120)	≤2.5	≤0.1	≤3.0	≤0.1	≤3.5	≤0.1

HELICAL DRILLING

	Work Material	Hardness	Grade	Cutting Speed **vc** (m/min)	ARX25R□□□SA□□S		ARX30R□□□SA□□S		ARX35R□□□SA□□S	
					DOC/pass **ap** (mm/pass)	Feed per Tooth **fz** (mm/tooth)	DOC/pass **ap** (mm/pass)	Feed per Tooth **fz** (mm/tooth)	DOC/pass **ap** (mm/pass)	Feed per Tooth **fz** (mm/tooth)
P	Mild Steel	≤180HB	VP15TF	180 (150—220)	≤1.0	≤0.3	≤1.0	≤0.3	≤1.0	≤0.3
P	Carbon Steel • Alloy Steel	180—350HB	VP15TF	160 (120—200)	≤0.7	≤0.2	≤0.9	≤0.2	≤1.0	≤0.2
M	Stainless Steel	≤270HB	VP15TF	150 (120—180)	≤0.7	≤0.2	≤0.9	≤0.2	≤1.0	≤0.2
K	Cast Iron	Tensile Strength≤450MPa	VP15TF	180 (150—220)	≤1.0	≤0.3	≤1.0	≤0.3	≤1.0	≤0.3
H	Hardened Steel	45—55HRC	VP15TF	80 (50—120)	≤0.5	≤0.1	≤0.7	≤0.1	≤1.0	≤0.1

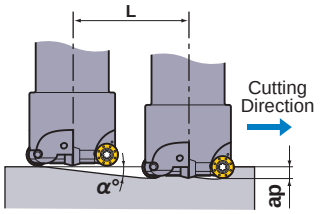
(Note) For helical drilling, refer to the maximum capacities on page C155.

CUTTING MODE MAXIMUM CAPACITIES

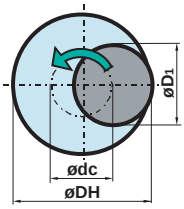
RAMPING

Finding a cutters' distance moved **"L"** when depth of cut reaches **"ap"** at a ramping angle of **"α°"**.

L=ap/tan α (mm)



HELICAL DRILLING



- How to derive a locus of the center of the tool.

ødc = øDH - øD1

Locus of the center of the tool | Desired hole diameter | Cutting edge diameter

- For the depth of cut per cycle, refer to the cutting conditions for helical drilling on C154.
- Set the machine spindle revolution so that the tool is rotating and cutting in a down cut direction.

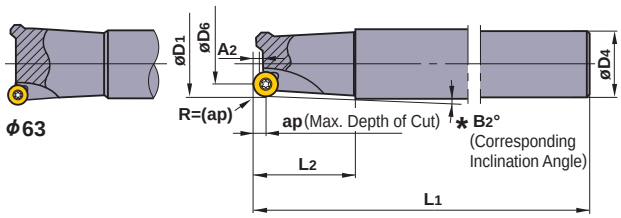
Type	Order Number	Tool Diameter **D1** (mm)	Corner **R** (mm)	Number of Teeth	Ramping			Helical Drilling	
					Max. Ramping Angle **α°**	Max. Depth of Cut **ap max.** (mm)	Distance L at Depth of Cut of **ap** L (mm)	Min. Hole Diameter **DH min.** (mm)	Max. Hole Diameter **DH max.** (mm)
Center Cutting	**ARX25R102SA10S**	10	2.5	2	90	2.5	0	15	19
	25R102SA10LW	10	2.5	2	90	2.5	0	15	19
	30R122SA10S	12	3.0	2	90	3.0	0	18	23
	30R122SA10LW	12	3.0	2	90	3.0	0	18	23
	35R142SA12S	14	3.5	2	90	3.5	0	21	27
	35R142SA12LW	14	3.5	2	90	3.5	0	21	27
Non-center Cutting (Multi-tooth)	**ARX25R122SA10S**	12	2.5	2	27.17	2.5	4.87	19	23
	25R122SA10LW	12	2.5	2	27.17	2.5	4.87	19	23
	30R163SA16S	16	3.0	3	21.25	3.0	7.71	26	31
	25R163SA16S	16	2.5	3	13.70	2.5	10.26	27	31
	30R173SA16S	17	3.0	3	18.42	3.0	9.01	28	33
	25R173SA16S	17	2.5	3	12.22	2.5	11.54	29	33
	30R203SA20S	20	3.0	3	13.21	3.0	12.78	34	39
	25R204SA20S	20	2.5	4	9.23	2.5	15.38	35	39
	30R224SA20S	22	3.0	4	11.13	3.0	15.25	38	43
	25R224SA20S	22	2.5	4	7.94	2.5	17.92	39	43
	30R254SA20S	25	3.0	4	9.01	3.0	18.92	44	49
	25R255SA20S	25	2.5	5	6.57	2.5	21.71	45	49

MULTI FUNCTIONAL MILLING

Roughing | Shoulder Milling | Face Milling | Copying (Including Flat faces) | Pocket Milling | Slotting

BRP

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	▬			



- **11°positive insert.**
- **Round shape insert with a strong cutting edge.**
- **Wide range of tools available.**
- **Suitable for mould machining.**

∗Please allow for an inclination angle of B2°+1°

SHANK TYPE

Right hand tool holder only.

Cutting Edge R (a)	Type	Order Number	Stock R	Number of Teeth	D1	D6	L1	D4	L2	A2	B2°	∗ Clamp Screw	Wrench	Insert
4	R	**BRP4NR121S12**	●	1	12	3.7	85	12	25	0.2	3°00′	CS250560T	TKY08F	①RPMW08T2M0◌ ②RPMT08T2M0E-JS
		161S16	●	1	16	7.7	85	16	25	1.0	3°00′	CS250560T	TKY08F	
		202S20	●	2	20	11.7	100	20	30	2.0	2°25′	CS250560T	TKY08F	
		253S25	●	3	25	16.7	115	25	35	2.0	2°02′	CS250560T	TKY08F	
	L	**121LS12**	●	1	12	3.7	150	12	70	0.2	0°57′	CS250560T	TKY08F	
		161LS16	●	1	16	7.7	150	16	70	1.0	0°57′	CS250560T	TKY08F	
		202LS20	●	2	20	11.7	180	20	100	2.0	0°39′	CS250560T	TKY08F	
		253LS25	●	3	25	16.7	180	25	100	2.0	0°39′	CS250560T	TKY08F	
	EL	**202ELS20**	●	2	20	11.7	250	20	130	2.0	0°30′	CS250560T	TKY08F	
		253ELS25	●	3	25	16.7	250	25	130	2.0	0°30′	CS250560T	TKY08F	
5	R	**BRP5NR161S16**	●	1	16	5.7	80	16	25	0.3	3°09′	CS350760T	TKY15F	①RPMW10T3M0◌ ②RPMT10T3M0E-JS
		201S20	●	1	20	9.7	100	20	30	1.2	2°31′	CS350760T	TKY15F	
		252S25	●	2	25	14.7	115	25	35	2.5	2°06′	CS350860T	TKY15F	
		323S32	●	3	32	21.7	125	32	45	2.5	1°34′	CS350860T	TKY15F	
	L	**161LS16**	●	1	16	5.7	150	16	70	0.3	0°58′	CS350760T	TKY15F	
		201LS20	●	1	20	9.7	180	20	100	1.2	0°40′	CS350760T	TKY15F	
		252LS25	●	2	25	14.7	180	25	100	2.5	0°40′	CS350860T	TKY15F	
		323LS32	●	3	32	21.7	200	32	120	2.5	0°33′	CS350860T	TKY15F	
	EL	**252ELS25**	●	2	25	14.7	250	25	130	2.5	0°30′	CS350860T	TKY15F	
		323ELS32	●	3	32	21.7	300	32	180	2.5	0°22′	CS350860T	TKY15F	

(Note) **R :** regular type **L :** long type **EL :** extra long type

∗ Clamp Torque (N • m) : CS250560T=1.0, CS350760T=3.5, CS350860T=3.5

● : **Inventory maintained in Japan.**

Cutting Edge R (a)	Type	Order Number	Stock	Number of Teeth	Dimensions (mm)							*		① ②
			R		D_1	D_6	L_1	D_4	L_2	A_2	B_2°	Clamp Screw	Wrench	Insert
6	R	**BRP6PR322S32**	●	2	32	19.7	125	32	45	4	1°37′	TS43	TKY15D	①RPMW1204M0◌ ②RPMT1204M0E-JS
		403S32	●	3	40	27.8	125	32	45	4	—	TS43	TKY15D	
		504S32	●	4	50	37.7	150	32	50	4	—	TS43	TKY15D	
		504S42	●	4	50	37.7	150	42	50	4	—	TS43	TKY15D	
	L	**322LS32**	●	2	32	19.7	200	32	120	4	0°33′	TS43	TKY15D	
		403LS32	●	3	40	27.8	200	32	120	4	—	TS43	TKY15D	
		504LS32	●	4	50	37.7	250	32	150	4	—	TS43	TKY15D	
		504LS42	●	4	50	37.7	250	42	150	4	—	TS43	TKY15D	
	EL	**322ELS32**	●	2	32	19.7	300	32	50	4	1°26′	TS43	TKY15D	
		403ELS32	●	3	40	27.8	300	32	120	4	—	TS43	TKY15D	
		403ELS42	●	3	40	27.8	300	42	50	4	2°44′	TS43	TKY15D	
		504ELS42	●	4	50	37.7	300	42	50	4	—	TS43	TKY15D	
8	R	**BRP8PR402S32**	●	2	40	23.7	125	32	45	5.5	—	TS54	TKY25D	①RPMW1606M0◌ ②RPMT1606M0E-JS
		503S32	●	3	50	33.7	150	32	50	5.5	—	TS54	TKY25D	
		503S42	●	3	50	33.7	150	42	50	5.5	—	TS54	TKY25D	
		634S32	●	4	63	46.7	150	32	50	5.5	—	TS54	TKY25D	
		634S42	●	4	63	46.7	150	42	50	5.5	—	TS54	TKY25D	
	L	**402LS32**	●	2	40	23.7	200	32	120	5.5	—	TS54	TKY25D	
		503LS32	●	3	50	33.7	250	32	150	5.5	—	TS54	TKY25D	
		503LS42	●	3	50	33.7	250	42	150	5.5	—	TS54	TKY25D	
		634LS32	●	4	63	46.7	250	32	150	5.5	—	TS54	TKY25D	
		634LS42	●	4	63	46.7	250	42	150	5.5	—	TS54	TKY25D	
	EL	**402ELS32**	●	2	40	23.7	300	32	50	5.5	—	TS54	TKY25D	
		402ELS42	●	2	40	23.7	300	42	50	5.5	2°52′	TS54	TKY25D	
		503ELS42	●	3	50	33.7	300	42	50	5.5	—	TS54	TKY25D	
		634ELS42	●	4	63	46.7	300	42	50	5.5	—	TS54	TKY25D	

(Note) **R :** regular type **L :** long type **EL :** extra long type

* Clamp Torque (N • m) : TS43=3.5, TS54=7.5

SPARE PARTS E001
TECHNICAL DATA F001

Fig.1
ø40

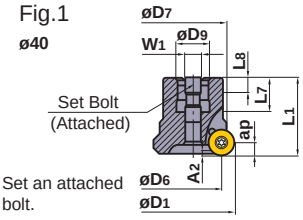


Fig.2
ø50
ø63
ø80

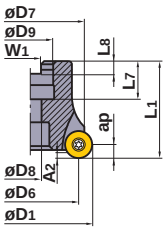
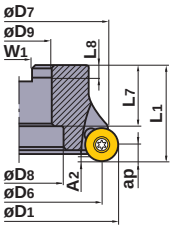


Fig.3
ø100



Right hand tool holder only.

ARBOR TYPE

A.R :-7°—+5°
R.R :-15°—0°

Cutting Edge R (a)	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	D6	D7	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut (mm) ap	A2	Type (Fig.)
6	**BRP6P-040A03R**	●	3	40	27.9	33.3	40	16	18	—	8.4	5.6	0.4	6	4	1
	-050A04R	●	4	50	37.8	43.1	50	22	20	11	10.4	6.3	0.5	6	4	2
	R05004B	●	4	50	37.8	43.1	63	22.225	29	11	8.4	5	0.5	6	4	2
	-063A05R	●	5	63	50.8	56.1	50	22	20	11	10.4	6.3	0.7	6	4	2
	R06305B	●	5	63	50.8	56.1	63	22.225	29	11	8.4	5	0.7	6	4	2
	R08006C	●	6	80	67.8	72.8	50	25.4	26	13	9.5	6	1.2	6	4	2
8	**BRP8P-063A04R**	●	4	63	46.8	54.5	50	22	20	11	10.4	6.3	0.7	8	5.5	2
	R06304B	●	4	63	46.8	54.5	63	22.225	29	11	8.4	5	0.7	8	5.5	2
	R08005C	●	5	80	63.8	70.9	50	25.4	26	13	9.5	6	1.2	8	5.5	2
	R10006D	●	6	100	83.8	90.6	50	31.75	32	45	12.7	8	1.6	8	5.5	3

SPARE PARTS

Tool Holder Number	Clamp Screw *	Wrench	Set Screw	Insert
BRP6P-040A03R	TS43	TKY15D	HDS08030	①RPMW1204M0○ ②RPMT1204M0E-JS
BRP6P-050A04R ı BRP6P-R08006C	TS43	TKY15D	—	
BRP8P	TS54	TKY25D	—	①RPMW1606M0○ ②RPMT1606M0E-JS

* Clamp Torque (N • m) : TS43=3.5, TS54=7.5

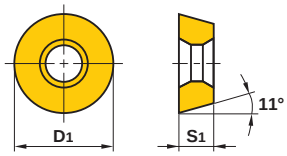
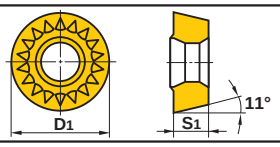
● : Inventory maintained in Japan. (10 inserts in one case)

INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	
S	Heat-resistant Alloy, Titanium Alloy	
H	Hardened Steel	

Cutting Conditions (Guide) :
● : Stable Cutting ◔ : General Cutting ✠ : Unstable Cutting

Honing :
E : Round **T** : Chamfer

Shape	Order Number	Class	Honing	Coated F7030	Coated VP15TF	Cermet NX4545	Carbide UTi20T	Dimensions (mm) D1	Dimensions (mm) S1	Geometry
	RPMW08T2M0E	M	E	●		●		8	2.78	
	08T2M0T	M	T		●			8	2.78	
	10T3M0E	M	E	●		●		10	3.97	
	10T3M0T	M	T		●			10	3.97	
	1204M0E	M	E	●		●	●	12	4.76	
	1204M0T	M	T		●			12	4.76	
	1606M0E	M	E	●		●	●	16	6.35	
	1606M0T	M	T		●			16	6.35	
	RPMT08T2M0E-JS	M	E	●	●			8	2.78	
	10T3M0E-JS	M	E	●	●			10	3.97	
	1204M0E-JS	M	E	●	●		●	12	4.76	
	1606M0E-JS	M	E	●	●		●	16	6.35	

SPARE PARTS E001
TECHNICAL DATA F001

RECOMMENDED CUTTING CONDITIONS

CUTTING SPEED (m/min)

	Work Material	Hardness	Coated		Carbide
			F7030	VP15TF	UTi20T
P	Mild Steel	≤180HB	**250 (200—300)**	250 (200—300)	150 (100—200)
P	Carbon Steel Alloy Steel	180—280HB	**180 (130—220)**	180 (130—220)	140 (100—170)
P	Carbon Steel Alloy Steel	280—380HB	**160 (110—190)**	160 (110—190)	100 (70—120)
P	Pre-Hardened Steel	35—45HRC	**120 (80—140)**	120 (80—140)	90 (60—100)
P	High Alloy Steel	300HB	**130 (90—160)**	130 (90—160)	100 (70—120)
M	Stainless Steel	≤260HB	**180 (130—220)**	180 (130—220)	140 (100—170)
K	Gray Cast Iron	Tensile Strength ≤350MPa	—	**170 (130—220)**	140 (100—170)
K	Ductile Cast Iron	Tensile Strength 360—500MPa	—	**140 (100—180)**	120 (80—140)
K	Ductile Cast Iron	Tensile Strength 500—800MPa	—	**110 (80—140)**	90 (70—110)
H	Hardened Steel	45—60HRC	—	**60 (50—100)**	60 (40—70)

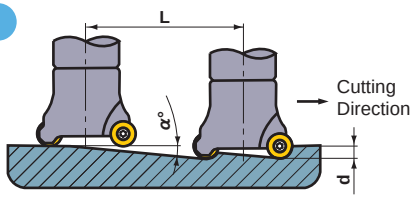
(Note) Cutting speeds shown in bold type are for the recommended first choice grades.

FEED PER TOOTH (mm/tooth)

Type	Depth of Cut (mm)							
	1	2	3	4	5	6	7	8
BRP4	0.40	0.30	0.20	0.10	—	—	—	—
BRP5	0.40	0.35	0.30	0.20	0.10	—	—	—
BRP6	0.50	0.40	0.30	0.25	0.23	0.20	—	—
BRP8	0.60	0.50	0.45	0.40	0.33	0.30	0.25	0.20

RAMPING

RAMPING ANGLE AND MACHINING LENGTH



Formula to find cutting length "L" at maximum ramping angle.

$$L = \frac{d}{\tan \alpha} \text{ (mm)}$$

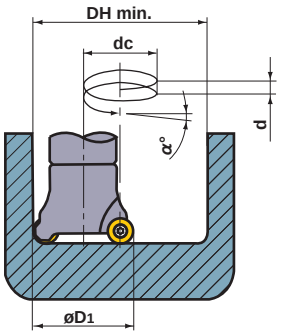
Type	Cutting Edge Diameter (ϕ)	Max. Ramping Angle α°max.	tan α	Cutting Length L at Max. Ramping Angle L(mm)*				
				d=2mm	d=4mm	d=5mm	d=6mm (max.)	d=8mm (max.)
BRP4	12	5.02	0.088	22	45	—	—	—
	16	12.2	0.216	9	18	—	—	—
	20	14.52	0.259	7	15	—	—	—
	25	8.8	0.155	12	25	—	—	—
BRP5	16	4.52	0.079	25	50	63	—	—
	20	11.4	0.202	9	19	24	—	—
	25	14.4	0.257	7	15	19	—	—
	32	8.37	0.147	13	27	33	—	—
BRP6	32	15.91	0.285	7	14	17	21	—
	40	10.29	0.181	11	22	27	33	—
	50	7.12	0.125	16	32	40	48	—
	63	5.08	0.089	22	44	56	67	—
	80	3.69	0.064	31	62	77	93	—
BRP8	40	18.86	0.342	5	11	14	17	23
	50	11.91	0.211	9	18	23	28	37
	63	8.01	0.141	14	28	35	42	56
	80	5.60	0.098	20	40	50	61	81
	100	4.13	0.072	27	55	69	83	110

* "L" value is approximate rounded value.

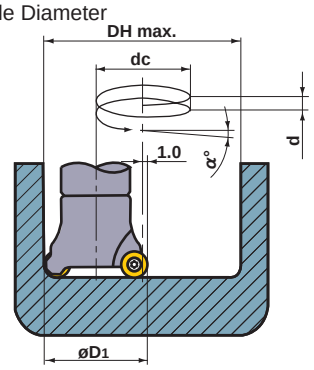
HELICAL DRILLING

RELATIONSHIP BETWEEN HOLE DIAMETER AND DEPTH OF CUT

Minimum Hole Diameter



Maximum Hole Diameter



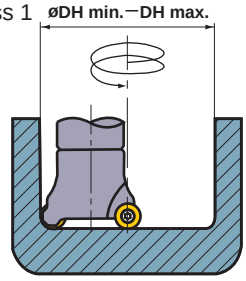
Type	Cutting Edge Diameter øD1 (mm)	✶1 øDH min.	✶2 ødc	Ramping Angle (α°) d=2mm	d=4mm	d=5mm	d=6mm	d=8mm	✶1 øDH max.	✶2 ødc	Ramping Angle (α°) d=2mm	d=4mm	d=5mm	d=6mm	d=8mm
BRP4	12	16	4	d=1mm,α°=4.55°					22	10	3.64	—	—	—	—
	16	24	8	4.55	9.10	—	—	—	30	14	2.60	5.20	—	—	—
	20	32	12	3.04	6.08	—	—	—	38	18	2.03	4.05	—	—	—
	25	42	17	2.15	4.29	—	—	—	48	23	1.59	3.17	—	—	—
BRP5	16	22	6	d=1mm,α°=3.04°					30	14	2.60	5.20	6.50	—	—
	20	30	10	3.64	7.26	9.10	—	—	38	18	2.03	4.05	5.08	—	—
	25	40	15	2.43	4.85	6.08	—	—	48	23	1.59	3.17	3.98	—	—
	32	54	22	1.66	3.31	4.15	—	—	62	30	1.22	2.43	3.04	—	—
BRP6	32	52	20	1.82	3.64	4.55	5.45	—	62	30	1.22	2.43	3.04	3.64	—
	40	68	28	1.30	2.60	3.25	3.90	—	78	38	0.96	1.92	2.40	2.88	—
	50	88	38	0.96	1.92	2.40	2.88	—	98	48	0.76	1.52	1.90	2.28	—
	63	114	51	0.72	1.43	1.79	2.14	—	124	61	0.60	1.20	1.49	1.79	—
	80	148	68	0.54	1.07	1.34	1.61	—	158	78	0.47	0.94	1.17	1.40	—
BRP8	40	64	24	1.52	3.04	3.79	4.55	6.06	78	38	0.96	1.92	2.40	2.88	3.38
	50	84	34	1.07	2.14	2.68	3.22	4.28	98	48	0.76	1.52	1.90	2.28	3.04
	63	110	47	0.78	1.55	1.94	2.33	3.10	124	61	0.60	1.20	1.49	1.79	2.39
	80	144	64	0.57	1.14	1.42	1.71	2.28	158	78	0.47	0.94	1.17	1.40	1.87
	100	184	84	0.43	0.87	1.09	1.30	1.74	198	98	0.37	0.74	0.93	1.12	1.49

✶1 DH=Hole Diameter : ϕ(mm) ✶2 dc=Tool Pass : ϕ(mm)

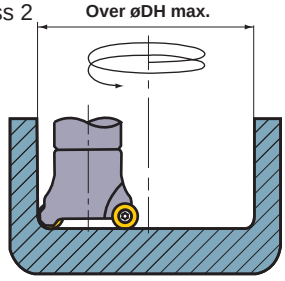
BRP4 DH min. (Minimum Hole Diameter)=(D1 - 4)×2, DH max. (Maximum Hole Diameter)=(D1 - 1)×2, d max. (Maximum Depth of Cut)=4(mm)
BRP5 DH min. (Minimum Hole Diameter)=(D1 - 5)×2, DH max. (Maximum Hole Diameter)=(D1 - 1)×2, d max. (Maximum Depth of Cut)=5(mm)
BRP6 DH min. (Minimum Hole Diameter)=(D1 - 6)×2, DH max. (Maximum Hole Diameter)=(D1 - 1)×2, d max. (Maximum Depth of Cut)=6(mm)
BRP8 DH min. (Minimum Hole Diameter)=(D1 - 8)×2, DH max. (Maximum Hole Diameter)=(D1 - 1)×2, d max. (Maximum Depth of Cut)=8(mm)
dc=(Tool Pass)**=DH-D**

◀Note▶ When machining a hole larger than DH max., first machine a pilot hole smaller than DH max. before enlarging to the required size as shown above.

Process 1 **øDH min.—DH max.**



Process 2 **Over øDH max.**



DEEP SHOULDER MILLING

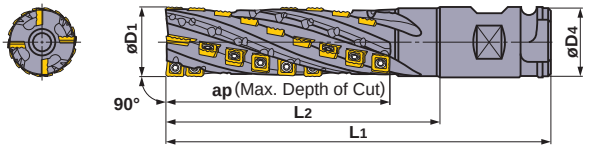
Roughing | Shoulder Milling | Side Milling

SPX

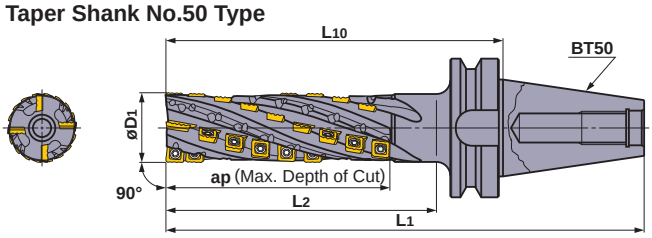
Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Alloy Tool Steel	Hardened Steel

- Low cutting resistance due to the use of wavy inserts.
- Suitable for heavy cutting due to holder rigidity.

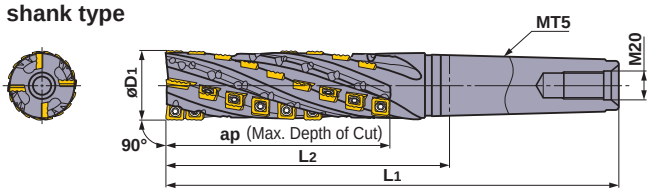
Straight Shank Type (Combination Shank)



7/24 Taper Shank No.50 Type



MT5 shank type



SHANK TYPE

Right hand tool holder only.

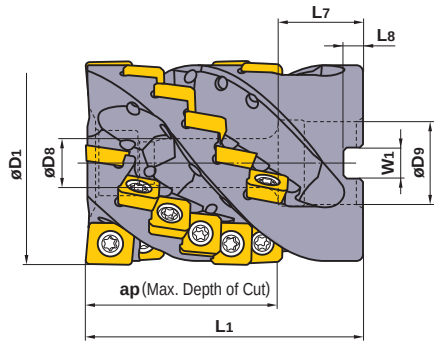
Type		Order Number	Stock	Number of Teeth			Dimensions (mm)						Number of Insert		
													Bottom On-edge A	Bottom On-edge B	Peripheral
			R	Flutes	Total	Bottom	D1	L1	D4	L2	L10	ap	JPMX 190412-○○	MPMX 120412-○○	SPMX 120408-○○
Straight Shank (Combination Shank)	Short Edge Type	NEW SPX4R05016WNES	●	2	16	4	50	180	50.8	100	—	72	2	2	12
	Coarse Pitch	SPX4R05024WNS	●	2	24	4	50	220	50.8	140	—	110	2	2	20
		4R05034WNM	●	2	34	4	50	270	50.8	190	—	157	2	2	30
		4R05044WNL	●	2	44	4	50	320	50.8	240	—	205	2	2	40
7/24 Taper Shank (No. 50)	Short Edge Type	NEW SPX4R05016BT50NES	●	2	16	4	50	249.8	—	100	148	72	2	2	12
	Coarse Pitch	SPX4R05024BT50NS	●	2	24	4	50	289.8	—	140	188	110	2	2	20
		4R05034BT50NM	●	2	34	4	50	339.8	—	190	238	157	2	2	30
		4R05044BT50NL	●	2	44	4	50	389.8	—	240	288	205	2	2	40
		NEW 4R06324BT50NS	●	2	24	4	63	289.8	—	140	188	110	2	2	20
		NEW 4R06334BT50NM	●	2	34	4	63	339.8	—	190	238	157	2	2	30
		NEW 4R06344BT50NL	●	2	44	4	63	389.8	—	240	288	205	2	2	40
		NEW 4R06356BT50NX	●	2	56	4	63	439.8	—	290	338	261	2	2	52
MT5 shank type		NEW SPX4R05024MT5NS	●	2	24	4	50	279.5	—	150	—	110	2	2	20
		NEW 4R05034MT5NM	●	2	34	4	50	329.5	—	200	—	157	2	2	30
		NEW 4R05044MT5NL	●	2	44	4	50	379.5	—	250	—	205	2	2	40

SPARE PARTS

Tool Holder Number	Clamp Screw *	Wrench	Insert		
			Bottom On-edge A	Bottom On-edge B	Peripheral
SPX	TS55	TKY25D	JPMX190412-WH	MPMX120412-WH	SPMX120408-WH
			JPMX190412-JM	MPMX120412-JM	SPMX120408-JM

* Clamp Torque (N • m) : TS55=7.5

● : Inventory maintained in Japan.
○ : Inventory maintained in Japan. (Available from spring 2009)



SHELL TYPE

Right hand tool holder only.

Order Number	Stock	Number of Teeth			Dimensions (mm)								Number of Insert		
													Bottom On-edge **A**	Bottom On-edge **B**	Peripheral
	R	Flutes	Total	Bottom	**D1**	**L1**	**D9**	**L7**	**D8**	**W1**	**L8**	**ap**	**JPMX 140412-○○**	**MPMX 120412-○○**	**SPMX 120408-○○**
SPX4R06324CA058A	○	4	24	4	63	85	25.4	26	13	9.5	6	58	2	2	20
4R08024DA058A	○	4	24	4	80	85	31.75	38	17	12.7	8	58	2	2	20

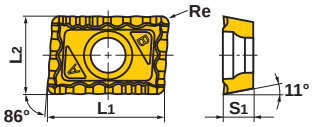
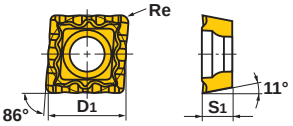
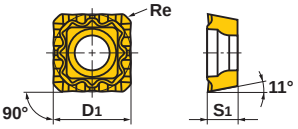
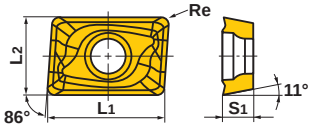
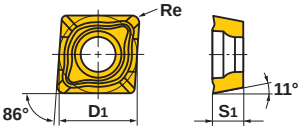
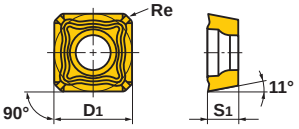
SPARE PARTS

Tool Holder Number	* Clamp Screw	Wrench	Insert		
			Bottom On-edge **A**	Bottom On-edge **B**	Peripheral
SPX	TS55	TKY25D	JPMX140412-WH	MPMX120412-WH	SPMX120408-WH
			JPMX140412-JM	MPMX120412-JM	SPMX120408-JM

* Clamp Torque (N • m) : TS55=7.5

SPARE PARTS E001
TECHNICAL DATA F001

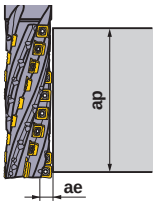
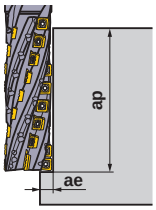
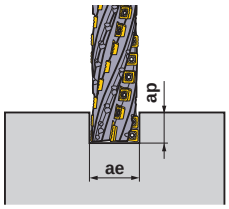
INSERTS

Type		Shape	Order Number	Class	Coated				Dimensions (mm)					Geometry
					VP15TF	VP20RT			L_1	L_2	D_1	S_1	Re	
Wavy cutting edge type (**WH** Breaker)	Bottom On-edge **A**		**JPMX190412-WH**	M	●	●			19.05	12.7	–	4.76	1.2	
			∗ **140412-WH**	M	○	○			14.3	12.7	–	4.76	1.2	
	Bottom On-edge **B**		**MPMX120412-WH**	M	●	●			–	–	12.7	4.76	1.2	
	Peripheral		**SPMX120408-WH**	M	●	●			–	–	12.7	4.76	0.8	
Straight cutting edge type (**JM** Breaker) NEW	Bottom On-edge **A**		**JPMX190412-JM**	M	●	●			19.05	12.7	–	4.76	1.2	
			∗ **140412-JM**	M	●	●			14.3	12.7	–	4.76	1.2	
	Bottom On-edge **B**		**MPMX120412-JM**	M	●	●			–	–	12.7	4.76	1.2	
	Peripheral		**SPMX120408-JM**	M	●	●			–	–	12.7	4.76	0.8	

∗ Only for use with a shell type holder.

● : Inventory maintained in Japan. (10 inserts in one case)
○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case)

RECOMMENDED CUTTING CONDITIONS

Cutting Mode	A : Side Milling	B : Shoulder Milling	C : Slot Milling
			

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Cutting Mode	Revolution (min^{-1})	Table Feed (mm/min)	**ap** (mm)	**ae** (mm)
P	Alloy Tool Steel	≤300HB	**VP20RT**	60 (50—80)	A	382	191	100—200	10
					B	382	191	100—200	10
					C	318	159	10	—
	Alloy Tool Steel	≤280HB	**VP20RT**	80 (60—100)	A	509	305	100—200	10
					B	509	305	100—200	10
					C	382	191	10	—
	Cast Tool Steel	≤250HB	**VP20RT**	80 (60—100)	A	509	356	100—200	10
					B	509	356	100—200	10
					C	382	191	10	—
K	Gray Cast Iron	Tensile Strength ≤300MPa	**VP15TF**	100 (50—140)	A	636	509	100—200	10
					B	636	509	100—200	10
					C	318	127	50	—
	Ductile Cast Iron	Tensile Strength ≤500MPa	**VP15TF**	100 (50—140)	A	636	509	100—200	10
					B	636	509	100—200	10
					C	318	127	40	—
	Ductile Cast Iron	Tensile Strength ≤800MPa	**VP15TF**	100 (40—140)	A	509	407	100—200	10
					B	509	407	100—200	10
					C	254	102	30	—

(Note 1) The above cutting conditions are determined based on high workpiece and machine rigidity, where no vibrations occurred. If vibrations occur make adjustments according to the machining conditions.

(Note 2) Vibration is liable to occur in certain cases. Please change the cutting conditions in the following cases.

- When using SPX4R05044WNL / BT50NL, SPX4R06356BT50NX
  For A: side milling or B: shoulder milling, reduce the cutting speed and table feed by 10—20% and ae by 50%.
- When slotting
  For C: slotting, use high rigidity holders such as SPX4R05016WNES / BT50NES.
- If the cutting angle between the tool and workpiece exceeds 90º when machining corners
  Reduce the cutting speed and table feed by 10—20% and ae by 50%. Also if possible, set a radius cutting path for corners.

SPARE PARTS E001
TECHNICAL DATA F001

DEEP SHOULDER MILLING

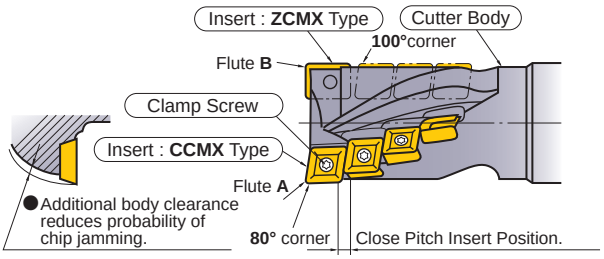
0° Roughing | Shoulder Milling | Side Milling | Slotting

DCCC

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

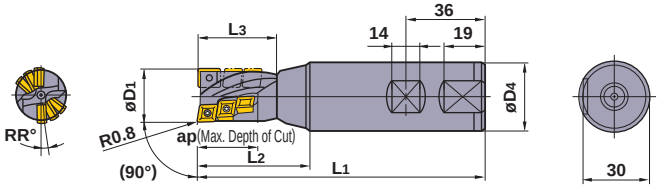
- Different helical flute angles prevents chattering.
- Suitable for heavy cutting due to holder rigidity.

DESIGN FEATURES OF DCCC TYPE END MILL

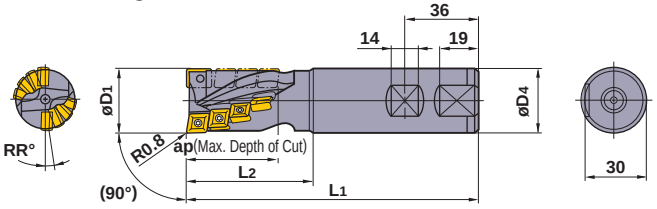


- All 4 cutting edges of CCMX insert are utilized, 80° corners in flute "A" and 100° corners on flute "B".

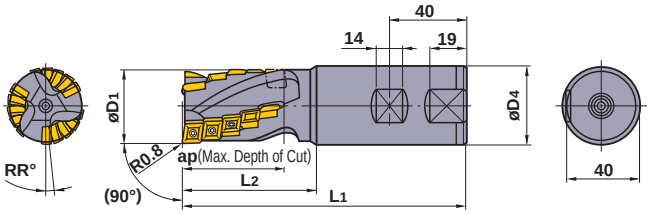
ϕ25 (Straight Shank)



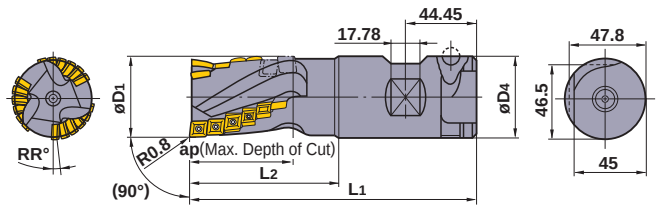
ϕ32 (Straight Shank)



ϕ40 (Straight Shank)



ϕ50 (Combination Shank)



Right hand tool holder only.

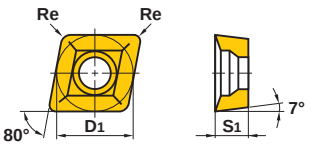
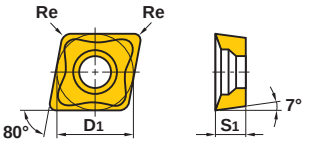
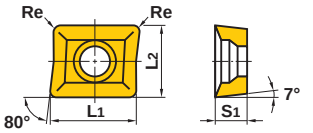
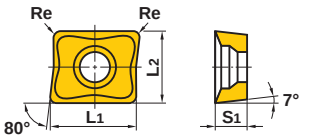
Diameter	Order Number	Stock	Number of Teeth			Dimensions (mm)							Number of Insert			
													Peripheral and Bottom Inserts		Bottom Insert (One pocket only)	
		R	Flutes	Total	Bottom	D1	L1	D4	L2	L3	ap	RR°	CCMX08 3508EN-A	CCMX09 T308EN-□	ZCMX08 3508ER-A	ZCMX09 T308ER-□
ϕ25	DCCCR2506S32	●	2	6	2	25	130	32	50	36	27	8°	5	—	1	—
	2510S32	●	2	10	2	25	150	32	70	56	44	8°	9	—	1	—
ϕ32	DCCCR3208S32	●	2	8	2	32	140	32	60	—	43	8°36′	—	7	—	1
	3212S32	●	2	12	2	32	160	32	80	—	63	8°36′	—	11	—	1
ϕ40	DCCCR4015S42	●	3	15	3	40	150	42	70	—	53	5°31′	—	14	—	1
	4024S42	●	3	24	3	40	180	42	100	—	83	5°31′	—	23	—	1
ϕ50	DCCCR5018S508	●	3	18	3	50	175	50.8	90	—	63	5°51′	—	17	—	1
	5027S508	●	3	27	3	50	205	50.8	120	—	93	5°51′	—	26	—	1

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.

INSERTS

Work Material		
P	Steel	
M	Stainless Steel	
K	Cast Iron	

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ✱ : Unstable Cutting
Honing : E : Round

Shape	Order Number	Class	Honing	Coated F7030	Coated UP20M	Cermet NX2525	Carbide UTi20T	L1	L2	D1	S1	Re	Geometry
	CCMX083508EN-A	M	E	●	●		●	–	–	7.94	3.5	0.8	
	09T308EN-A	M	E	●	●		●	–	–	9.525	3.97	0.8	
Strong Cutting Edge Type	**CCMX09T308EN-B**	M	E	●			●	–	–	9.525	3.97	0.8	
	ZCMX083508ER-A	M	E	□			●	10.4	7.94	–	3.5	0.8	
	09T308ER-A	M	E	●	●	□	●	12	9.525	–	3.97	0.8	
Strong Cutting Edge Type	**ZCMX09T308ER-B**	M	E	□	□		●	12	9.525	–	3.97	0.8	

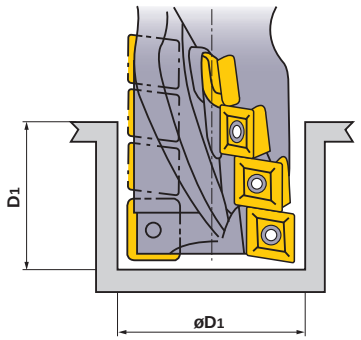
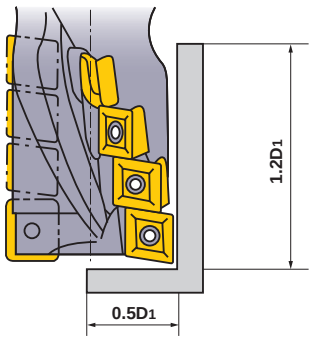
SPARE PARTS

Tool Holder Number	Clamp Screw *	Wrench	Wrench	Insert: Peripheral and Bottom Insert	Insert: Bottom Insert (One Pocket Only)
DCCCR2506S32	CS300890T	TKY08F	TKY08DS	①CCMX083508EN-A	①ZCMX083508ER-A
2510S32	CS300890T	TKY08F	TKY08DS		
DCCCR3208S32	CS350990T	TKY10F	TKY10DS	①CCMX09T308EN-A ②CCMX09T308EN-B	①ZCMX09T308ER-A ②ZCMX09T308ER-B
3212S32	CS350990T	TKY10F	TKY10DS		
DCCCR4015S42	CS350990T	TKY10F	TKY10DS	①CCMX09T308EN-A ②CCMX09T308EN-B	①ZCMX09T308ER-A ②ZCMX09T308ER-B
4024S42	CS350990T	TKY10F	TKY10DS		
DCCCR5018S508	CS350990T	TKY10F	TKY10DS	①CCMX09T308EN-A ②CCMX09T308EN-B	①ZCMX09T308ER-A ②ZCMX09T308ER-B
5027S508	CS350990T	TKY10F	TKY10DS		

* Clamp Torque (N • m) : CS300890T=1.0, CS350990T=2.5

SPARE PARTS E001
TECHNICAL DATA F001

RECOMMENDED CUTTING CONDITIONS

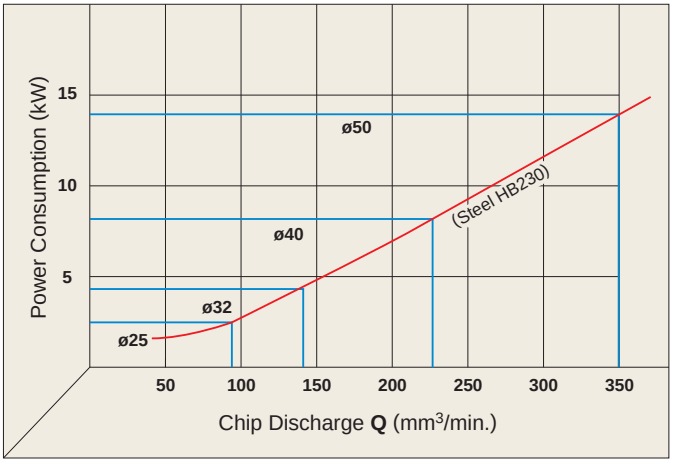
Cutting Mode	A : Slot Milling (Standard Cutting Length Type)	B : Shoulder Milling (Standard Cutting Length Type)
		

Work Material		Hardness	Grade	Cutting Mode	Cutting Speed (m/min)	Table Feed (mm/min) ϕ25	ϕ32	ϕ40	ϕ50
P	Mild Steel	≤180HB	UTi20T	A	150 (120—180)	120 (100—140)	120 (100—140)	120 (100—140)	120 (100—140)
			UTi20T	B	150 (120—180)	200 (180—220)	200 (180—220)	230 (200—250)	230 (200—250)
	Carbon Steel Alloy Steel	180—280HB	UTi20T	A	120 (100—140)	120 (100—140)	120 (100—140)	140 (120—150)	140 (120—150)
			UTi20T	B	120 (100—140)	150 (120—180)	150 (120—180)	180 (150—200)	180 (150—200)
		280—350HB	UTi20T	A	120 (100—140)	100 (80—120)	100 (80—120)	130 (100—150)	130 (100—150)
			UTi20T	B	120 (100—140)	120 (100—140)	120 (100—140)	150 (120—180)	150 (120—180)
	High Alloy Steel	200—280HB	UTi20T	A	100 (80—120)	100 (80—120)	100 (80—120)	130 (100—150)	130 (100—150)
			UTi20T	B	100 (80—120)	120 (100—140)	120 (100—140)	150 (120—180)	150 (120—180)
M	Stainless Steel	≤200HB	UTi20T	A	60 (50—80)	70 (50—90)	70 (50—90)	70 (50—90)	70 (50—90)
			UTi20T	B	100 (80—120)	100 (80—120)	100 (80—120)	120 (100—140)	120 (100—140)
K	Cast Iron	Tensile Strength ≤450MPa	UTi20T	A	120 (100—140)	200 (180—220)	200 (180—220)	230 (200—250)	230 (200—250)
			UTi20T	B	120 (100—140)	230 (200—250)	230 (200—250)	260 (240—280)	260 (240—280)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

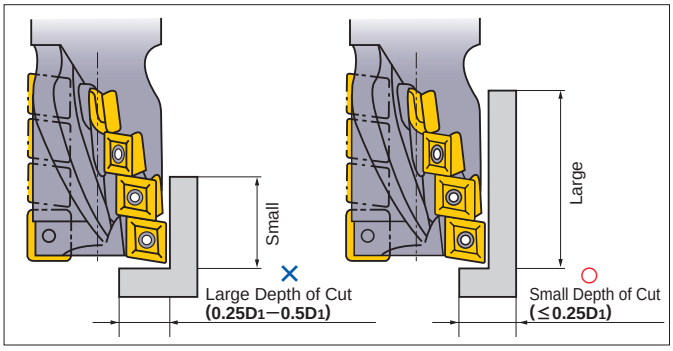
POWER CONSUMPTION

- Please use the chart below for reference, please select the conditions that suits the machines power.
- Chip Discharge Q (mm^3/min.)=Table Feed x Depth of Cut x Cutting Width÷1000



FOR USE OF LONG CUTTING LENGTH TYPE

- When the tool overhang is long, a large width of cut will cause chattering and possible tool breakage.
- Keep the width of cut small and the depth of cut in axial direction large. (See the illustration below.)
- For slot milling, keep the table feed at not more than half the value listed in the above table. (Use a standard cutting length type as much as possible.)



BALL NOSE END MILL

Finishing

Including curved faces
Copying

SRF, SRB

- S-shaped cutting edge provides sharpness similar to that of solid ball nose end mills.
- Highly accurate corner radius tolerance allows for high precision finishing.
- Carbide shank type available.

Fig.1

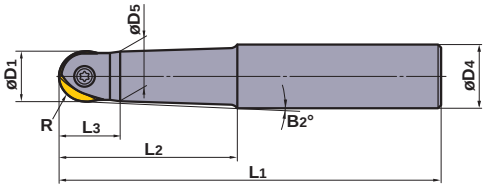


Fig.2

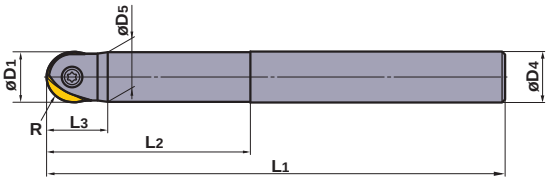
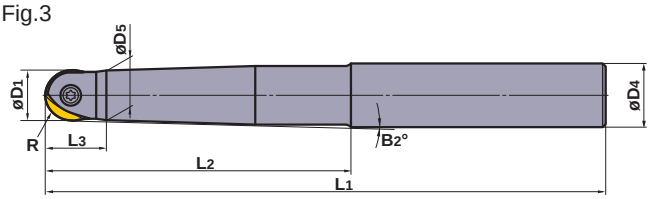


Fig.3



Right hand tool holder only.

STEEL SHANK TYPE

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)								Type (Fig.)	✶ Clamp Screw	①② Wrench	Insert
		R		R	D1	D4	L1	D5	L2	L3	B2°				
Standard	SRFH10S12M	●	1	5	10	12	110	9.5	40	13	1°30′	1	RS3008T	①TKY08D	SRFT10 SRBT10
	12S16M	●	1	6	12	16	120	11.5	50	15	1°30′	1	RS3510T	①TKY10D	SRFT12 SRBT12
	16S20M	●	1	8	16	20	130	15.5	50	20	1°30′	1	RS4015T	②TKY15T	SRFT16 SRBT16
	20S25M	●	1	10	20	25	150	19.5	70	24	1°30′	1	RS5020T	②TKY20T	SRFT20 SRBT20
	25S32M	●	1	12.5	25	32	180	24.5	80	30	1°30′	1	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32M	●	1	15	30	32	200	29.5	100	35	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
	32S32M	●	1	16	32	32	200	31.5	100	35	—	2	RS8030T	②TKY30T	SRFT32 SRBT32
Semi-long	SRFH10S12L	●	1	5	10	12	150	9.5	60	13	1°30′	1	RS3008T	①TKY08D	SRFT10 SRBT10
	12S16L	●	1	6	12	16	160	11.5	70	15	1°30′	1	RS3510T	①TKY10D	SRFT12 SRBT12
	16S20L	●	1	8	16	20	160	15.5	70	20	1°30′	1	RS4015T	②TKY15T	SRFT16 SRBT16
	20S25L	●	1	10	20	25	180	19.5	80	24	1°30′	1	RS5020T	②TKY20T	SRFT20 SRBT20
	20S20L80	●	1	10	20	20	180	19.5	80	24	—	2	RS5020T	②TKY20T	SRFT20 SRBT20
	25S32L	●	1	12.5	25	32	200	24.5	100	30	1°30′	1	RS6025T	②TKY25T	SRFT25 SRBT25
	25S25L100	●	1	12.5	25	25	200	24.5	100	30	—	2	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32L	●	1	15	30	32	230	29.5	130	35	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
Long	SRFH20S25E	●	1	10	20	25	220	19.5	120	24	1°30′	3	RS5020T	②TKY20T	SRFT20 SRBT20
	20S20E120	●	1	10	20	20	220	19.5	120	24	—	2	RS5020T	②TKY20T	SRFT20 SRBT20
	25S32E	●	1	12.5	25	32	250	24.5	150	30	1°30′	3	RS6025T	②TKY25T	SRFT25 SRBT25
	25S25E150	●	1	12.5	25	25	250	24.5	150	30	—	2	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32E	●	1	15	30	32	300	29.5	200	35	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
Extra Long	SRFH20S25X	●	1	10	20	25	250	19.5	150	24	1°30′	3	RS5020T	②TKY20T	SRFT20 SRBT20
	25S32X	●	1	12.5	25	32	300	24.5	200	30	1°30′	3	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32X	●	1	15	30	32	350	29.5	250	35	—	2	RS8030T	②TKY30T	SRFT30 SRBT30
	32S32X	●	1	16	32	32	350	31.5	250	35	—	2	RS8030T	②TKY30T	SRFT32 SRBT32

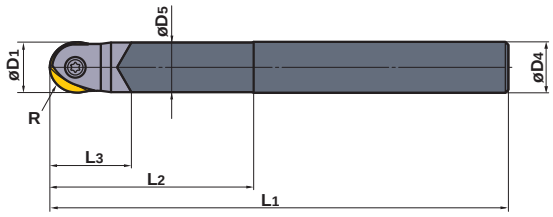
(Note) Ensure inserts are fitted in the correct way. (Refer to page C171.)

✶ Clamp Torque (N • m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

● : Inventory maintained in Japan.

SPARE PARTS E001
TECHNICAL DATA F001

Fig.1



Right hand tool holder only.

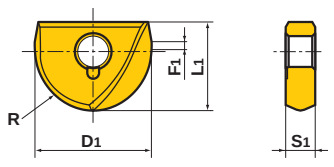
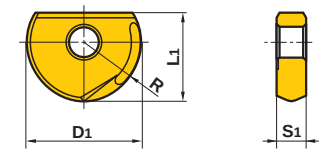
CARBIDE SHANK TYPE

Type	Order Number	Stock	Number of Teeth	Dimensions (mm)							Type (Fig.)	* Clamp Screw	①② Wrench	Insert
		R		R	D1	D4	L1	D5	L2	L3				
Standard	SRFH10S10MW	●	1	5	10	10	110	9.5	40	18	1	RS3008T	①TKY08D	SRFT10 SRBT10
	12S12MW	●	1	6	12	12	120	11.5	50	20	1	RS3510T	①TKY10D	SRFT12 SRBT12
	16S16MW	●	1	8	16	16	130	15.5	50	25	1	RS4015T	②TKY15T	SRFT16 SRBT16
	20S20MW	●	1	10	20	20	180	19.5	80	32	1	RS5020T	②TKY20T	SRFT20 SRBT20
	25S25MW	●	1	12.5	25	25	200	24.5	100	38	1	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32MW	●	1	15	30	32	230	29.5	130	35	1	RS8030T	②TKY30T	SRFT30 SRBT30
				16	32	32	231	29.5	131	36				SRFT32 SRBT32
Long	SRFH10S10LW	●	1	5	10	10	150	9.5	60	13	1	RS3008T	①TKY08D	SRFT10 SRBT10
	12S12LW	●	1	6	12	12	160	11.5	70	15	1	RS3510T	①TKY10D	SRFT12 SRBT12
	16S16LW	●	1	8	16	16	160	15.5	70	20	1	RS4015T	②TKY15T	SRFT16 SRBT16
	16S16EW	●	1	8	16	16	200	15.5	110	20	1	RS4015T	②TKY15T	SRFT16 SRBT16
	20S20LW	●	1	10	20	20	250	19.5	150	24	1	RS5020T	②TKY20T	SRFT20 SRBT20
	25S25LW	●	1	12.5	25	25	300	24.5	200	30	1	RS6025T	②TKY25T	SRFT25 SRBT25
	30S32LW	●	1	15	30	32	350	29.5	250	35	1	RS8030T	②TKY30T	SRFT30 SRBT30
				16	32	32	351	29.5	251	36				SRFT32 SRBT32

(Note) Ensure inserts are fitted in the correct way. (Refer to page C171.)

* Clamp Torque (N • m) : RS3008T=1.5, RS3510T=2.5, RS4015T=3.3, RS5020T=5.0, RS6025T=7.5, RS8030T=10.0

INSERTS

Shape	Order Number	Coated VP10MF	Coated VP15TF			Dimensions (mm) D1	R	L1	F1	S1	Geometry
	* SRFT10	●	●			10	5	8.5	0.5	2.6	
	* 12	●	●			12	6	10	0.5	3	
	* 16	●	●			16	8	12	0.5	4	
	* 20	●	●			20	10	15	1	5	
	* 25	●	●			25	12.5	18.5	1	6	
	* 30	●	●			30	15	22.5	1	7	
	* 32	●	●			32	16	23.5	1	7	
NEW	SRBT10		○			10	5	8.5	—	2.6	
	12		○			12	6	10	—	3	
	16		○			16	8	12	—	4	
	20		○			20	10	15	—	5	
	25		○			25	12.5	18.5	—	6	
	30		○			30	15	22.5	—	7	
	32		○			32	16	23.5	—	7	

* 2 inserts supplied per case.

● : Inventory maintained in Japan. (10 inserts in one case)

○ : Inventory maintained in Japan. (Available from spring 2009) (10 inserts in one case)

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)	Depth of Cut (mm)
P	Carbon Steel Alloy Steel	180—280HB	**VP15TF**	200 (80—300)	0.2 (0.1—0.3)	≤0.05D_1
	Pre-Hardened Steel	≤45HRC	**VP15TF**	150 (80—200)	0.2 (0.1—0.3)	≤0.05D_1
	Alloy Tools Steel	180—380HB	**VP15TF**	150 (80—200)	0.2 (0.1—0.3)	≤0.05D_1
K	Gray Cast Iron	Tensile Strength ≤350MPa	**VP10MF**	200 (80—300)	0.2 (0.1—0.3)	≤0.05D_1
	Ductile Cast Iron	Tensile Strength ≤800MPa	**VP10MF**	200 (80—300)	0.2 (0.1—0.3)	≤0.05D_1
H	Hardened Steel	45—55HRC	**VP10MF**	100 (60—120)	0.2 (0.1—0.3)	≤0.05D_1
	Hardened Steel	≥55HRC	**VP10MF**	80 (60—120)	0.2 (0.1—0.3)	≤0.01D_1

(Note 1) The above values are average condition values at actual cutting speeds. The values change slightly according to the state of a machine to be used and method of workholding. Adjust the values depending on an actual machine condition, referring to the above values.
(Note 2) For end mills with a carbide shank, you will be able to set about 20 percent higher cutting conditions.

CUTTING SPEED FORMULAE

1. Employing$\theta°$ ➡ Calculate cutting speed at point P.
(Cutting speed at the cutting depth border for oblique machining)

Formula : Cutting Speed = $\frac{\pi \cdot D_1 \cdot \sin\theta \cdot n}{1000}$ (m/min)

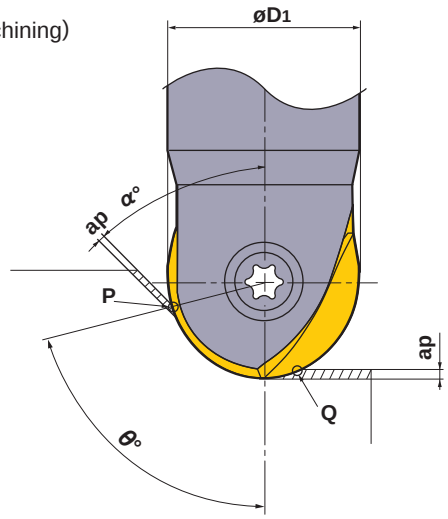
$\theta° = \cos^{-1}(\frac{D_1-2ap}{D_1}) + 90 - \alpha$

n : Spindle Speed (min^{-1})

2. Employing ap ➡ Calculate cutting speed at point Q.
(Cutting speed at the cutting depth border)

Formula : Cutting Speed = $\frac{2\pi n \sqrt{ap\,(D_1-ap)}}{1000}$ (m/min)

n : Spindle Speed (min^{-1})
D_1 : Cutting Edge Diameter (mm)
ap : Depth of Cut (mm)



FITTING INSERTS ON HOLDERS

1. Clean the insert seat

Clean the insert seat in the holder body by blowing air or using a brush.

2. Fit the insert

Place the concave mark of the insert into the clamp-screw-fastening part of the holder(only SRF type inserts). Fasten the clamp screw while firmly pressing the insert against the insert seat wall. You are recommended to use the special lubricant for preventing screw seizing, MK1KS, and to fasten with recommended torque.

BALL NOSE END MILL

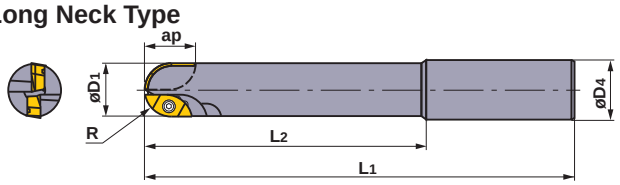
- Suitable for roughing to semi-finishing of small and medium moulds.
- High rigidity body design.
- Low resistance chipbreaker.
- Through coolant hole type.

Roughing | Copying (Including curved faces) | Slotting

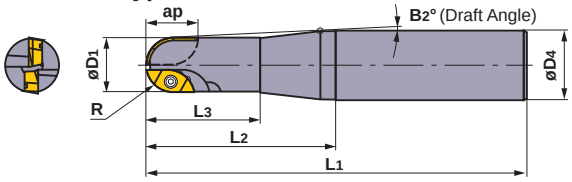
SRM2

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

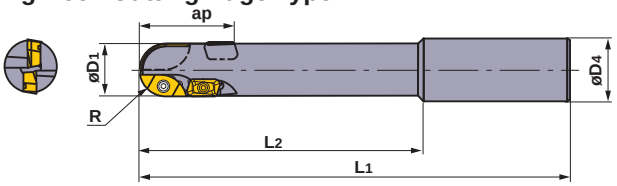
Long Neck Type



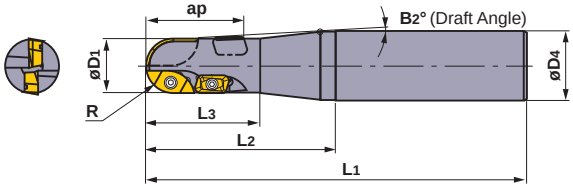
Standard Type



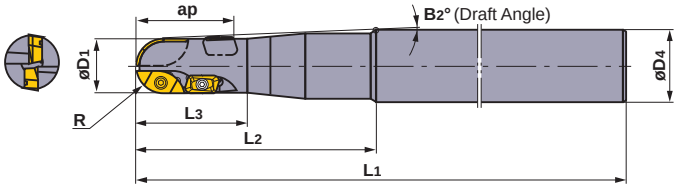
Long Neck Cutting Edge Type



Long Cutting Edge Type



Extra Long Cutting Edge Type



Right hand tool holder only.

Type	Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)								Clamp Screw		Wrench		Insert		
		R			R	D1	D4	L1	L2	L3	ap	B2°	Inner, Outer	Peripheral	Inner, Outer	Peripheral	Inner	Outer	Peripheral
Standard	SRM2160SNM	●	–	2	8	16	20	130	50	25	12	1°30′	TS25H	–	①TKY08D	–	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	2160SAM	●	○	2	8	16	20	130	50	25	12	1°30′	TS25H	–	①TKY08D	–	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	2200SNM	●	–	2	10	20	25	150	70	35	14	1°30′	TS32	–	①TKY08D	–	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	2200SAM	●	○	2	10	20	25	150	70	35	14	1°30′	TS32	–	①TKY08D	–	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	2250SNM	●	–	2	12.5	25	32	180	80	40	19	1°30′	TS43	–	②TKY15T	–	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	2250SAM	●	○	2	12.5	25	32	180	80	40	19	1°30′	TS43	–	②TKY15T	–	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	2300SNM	●	–	2	15	30	32	200	100	50	24	0°30′	TS55	–	②TKY25T	–	SRG30C SRM30C-M	SRG30E SRM30E-M	–
	2300SAM	●	○	2	15	30	32	200	100	50	24	0°30′	TS55	–	②TKY25T	–	SRG30C SRM30C-M	SRG30E SRM30E-M	–
Long Cutting Edge	SRM2200SNL	●	–	4	10	20	25	150	70	35	30	1°30′	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	2200SAL	●	○	4	10	20	25	150	70	35	30	1°30′	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-◌2
	2250SNL	●	–	4	12.5	25	32	180	80	40	37	1°30′	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	2250SAL	●	○	4	12.5	25	32	180	80	40	37	1°30′	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-◌2
	2300SNL	●	–	4	15	30	32	200	100	50	44	0°30′	TS55	TS43	②TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
	2300SAL	●	○	4	15	30	32	200	100	50	44	0°30′	TS55	TS43	②TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-◌2
Long Neck	SRM2160SNF	●	–	2	8	16	16	150	70	–	12	–	TS25H	–	①TKY08D	–	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	2160SAF	●	○	2	8	16	16	150	70	–	12	–	TS25H	–	①TKY08D	–	SRG16C SRM16C-M	SRG16E SRM16E-M	–
	2200SNF	●	–	2	10	20	20	180	100	–	14	–	TS32	–	①TKY08D	–	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	2200SAF	●	○	2	10	20	20	180	100	–	14	–	TS32	–	①TKY08D	–	SRG20C SRM20C-M	SRG20E SRM20E-M	–
	2250SNF	●	–	2	12.5	25	25	200	120	–	19	–	TS43	–	②TKY15T	–	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	2250SAF	●	○	2	12.5	25	25	200	120	–	19	–	TS43	–	②TKY15T	–	SRG25C SRM25C-M	SRG25E SRM25E-M	–
	2300SNF	●	–	2	15	30	32	230	150	–	24	–	TS55	–	②TKY25T	–	SRG30C SRM30C-M	SRG30E SRM30E-M	–
	2300SAF	●	○	2	15	30	32	230	150	–	24	–	TS55	–	②TKY25T	–	SRG30C SRM30C-M	SRG30E SRM30E-M	–

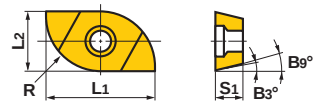
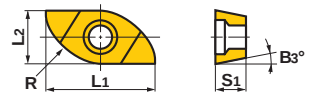
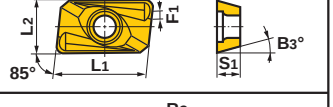
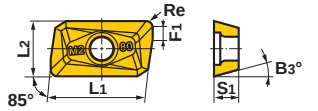
∗ Clamp Torque (N • m) : TS25H=1.0, TS25=1.0, TS32=1.0, TS43=3.5, TS55=7.5

● : Inventory maintained in Japan. (10 inserts in one case)

Type	Order Number	Stock	Coolant Hole	Number of Teeth	Dimensions (mm)								Clamp Screw		Wrench		Insert		
		R			R	D1	D4	L1	L2	L3	ap	B2°	Inner, Outer	Peripheral	Inner, Outer	Peripheral	Inner	Outer	Peripheral
Long Neck Cutting Edge	SRM2200SNLF	●	–	4	10	20	20	180	100	–	30	–	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-□2
	2200SALF	●	○	4	10	20	20	180	100	–	30	–	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-□2
	2250SNLF	●	–	4	12.5	25	25	200	120	–	37	–	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-□2
	2250SALF	●	○	4	12.5	25	25	200	120	–	37	–	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-□2
	2300SNLF	●	–	4	15	30	32	230	150	–	44	–	TS55	TS43	②TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-□2
	2300SALF	●	○	4	15	30	32	230	150	–	44	–	TS55	TS43	②TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-□2
Extra Long Cutting Edge	SRM2200SNLL	●	–	4	10	20	25	250	120	35	30	1°30′	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-□2
	2200SALL	●	○	4	10	20	25	250	120	35	30	1°30′	TS32	TS25	①TKY08D	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-□2
	2250SNLL	●	–	4	12.5	25	32	300	170	37	37	1°30′	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-□2
	2250SALL	●	○	4	12.5	25	32	300	170	37	37	1°30′	TS43	TS25	②TKY15T	③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-□2
	2300SNLL	●	–	4	15	30	32	350	100	50	44	1°30′	TS55	TS43	③TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-□2
	2300SALL	●	○	4	15	30	32	350	100	50	44	1°30′	TS55	TS43	③TKY25T	③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-□2

∗ Clamp Torque (N • m) : TS25H=1.0, TS25=1.0, TS32=1.0, TS43=3.5, TS55=7.5

INSERTS

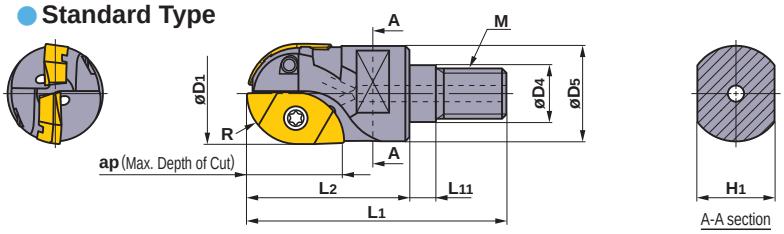
Application	Shape	Order Number	Class	Coated				Dimensions (mm)								Geometry
				F7030	VP15TF	VP20RT	VP30RT	R	L1	L2	S1	F1	Re	B3°	B9°	
Inner	Strong Cutting Edge Type	SRG16C	G		●			8	16	8.2	3.5	–	–	11°	–	
		20C	G	●	●			10	19	10.2	4.6	–	–	10°	18°	
		25C	G	●	●			12.5	24	12.8	5.5	–	–	10°	18°	
		30C	G	●	●			15	28	15.3	7	–	–	10°	18°	
		32C	G	●	●			16	28	16.3	7	–	–	10°	18°	
Outer	Strong Cutting Edge Type	SRG16E	G		●			8	13.5	6.7	3.5	–	–	11°	–	
		20E	G	●	●			10	15.5	8.5	4.6	–	–	9°	–	
		25E	G	●	●			12.5	20.5	10.2	5.5	–	–	9°	–	
		30E	G	●	●			15	25.2	12.2	7	–	–	9°	–	
		32E	G	●	●			16	26.1	13.1	7	–	–	9°	–	
Inner	Low Resistance Type	SRM16C-M	M		●			8	16	8.2	3.5	–	–	11°	–	
		20C-M	M		●			10	19	10.2	4.6	–	–	10°	18°	
		25C-M	M		●			12.5	24	12.8	5.5	–	–	10°	18°	
		30C-M	M		●			15	28	15.3	7	–	–	10°	18°	
		32C-M	M		●			16	28	16.3	7	–	–	10°	18°	
Outer	Low Resistance Type	SRM16E-M	M		●			8	13.5	6.7	3.5	–	–	11°	–	
		20E-M	M		●			10	15.5	8.5	4.6	–	–	9°	–	
		25E-M	M		●			12.5	20.5	10.2	5.5	–	–	9°	–	
		30E-M	M		●			15	25.2	12.2	7	–	–	9°	–	
		32E-M	M		●			16	26.1	13.1	7	–	–	9°	–	
∗ Peripheral	Strong Cutting Edge Type	APMT1135PDER-H2	M	●	●			–	11	6.35	3.5	1.2	0.8	11°	–	
		1604PDER-H2	M	●	●			–	16.5	9.525	4.76	1.4	0.8	11°	–	
	Low Resistance Type	APMT1135PDER-M2	M	●	●			–	11	6.35	3.5	1.2	0.8	11°	–	
		1604PDER-M2	M	●	●			–	16.5	9.525	4.76	1.4	0.8	11°	–	

(Low-resistance inner or outer inserts are precision M class type.)

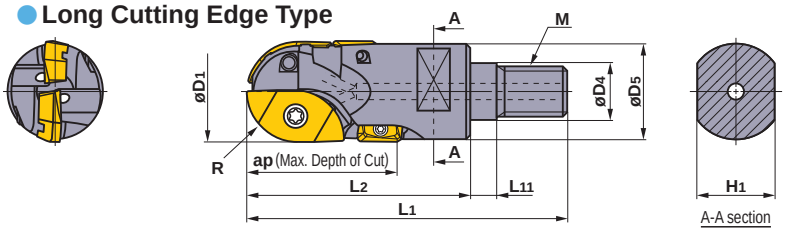
∗ Selection guide for peripheral cutting edges : The first recommendation is the super sharp M breaker (APMT....PDER-M2).
When cutting edge strength is particularly important, use the H breaker (APMT....PDER-H2).

NEW

Standard Type



Long Cutting Edge Type



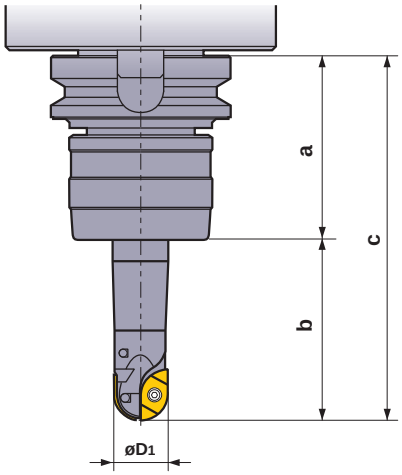
SCREW-IN TYPE

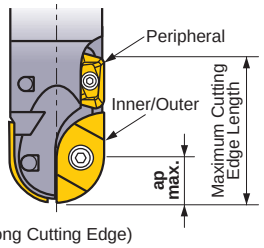
Right hand tool holder only.

Type	Order Number	Stock R	Coolant Hole	Dimensions (mm) R	D1	D4	D5	L1	L2	L11	H1	M	ap	Tool Weight (kg)	Clamp Screw: Inner, Outer *	Clamp Screw: Peripheral *	Wrench ①②③	Insert: Inner	Insert: Outer	Insert: Peripheral
Standard	**SRM2160AM08S30**	●	○	8	16	8.5	14.6	48	30	6	10	M8	12	0.1	TS25H	—	①TKY08D	SRG16C SRM16C-M	SRG16E SRM16E-M	—
	2200AM10S35	●	○	10	20	10.5	18.6	54	35	6	14	M10	14	0.1	TS32	—	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	—
	2250AM12S40	●	○	12.5	25	12.5	23.5	62	40	6	19	M12	19	0.2	TS43	TS25	②TKY15T	SRG25C SRM25C-M	SRG25E SRM25E-M	—
	2300AM16S45	●	○	15	30	17	28.3	68	45	6	24	M16	24	0.2	TS55	—	②TKY15T ③TKY08F	SRG30C SRM30C-M	SRG30E SRM30E-M	—
	2320AM16S45	●	○	16	32	17	30.0	68	45	6	24	M16	28	0.2	TS55	TS43	②TKY25T ③TKY15F	SRG32C SRM32C-M	SRG32E SRM32E-M	—
Long Cutting Edge	**SRM2200AM10L45**	●	○	10	20	10.5	18.6	64	45	6	14	M10	30	0.2	TS32	TS25	①TKY08D	SRG20C SRM20C-M	SRG20E SRM20E-M	APMT1135 PDER-□2
	2250AM12L55	●	○	12.5	25	12.5	23.5	77	55	6	19	M12	37	0.3	TS43	TS25	②TKY15T ③TKY08F	SRG25C SRM25C-M	SRG25E SRM25E-M	APMT1135 PDER-□2
	2300AM16L60	●	○	15	30	17	28.3	83	60	6	24	M16	44	0.3	TS55	TS43	②TKY25T ③TKY15F	SRG30C SRM30C-M	SRG30E SRM30E-M	APMT1604 PDER-□2
	2320AM16L60	●	○	16	32	17	29.0	83	60	6	24	M16	44	0.3	TS55	TS43	②TKY25T ③TKY15F	SRG32C SRM32C-M	SRG32E SRM32E-M	APMT1604 PDER-□2

* Clamp Torque (N • m) : TS25H=1.0, TS25=1.0, TS32=1.0, TS43=3.5, TS55=7.5

RECOMMENDED CUTTING CONDITIONS





(Long Cutting Edge)

Tool Overhang

The recommended cutting conditions are chosen based on deflection, vibration and surface finish when using a BT50 arbor under the conditions below -**"a"**, a length from a gauge line to the arbor end face and **"b"**, a neck length (tool overhang from the arbor).

Cutting Edge Diameter:**øD1**	Type	a	b	c
16	Standard	**105**	**50**	**155**
	Long Neck		**70**	**175**
	Extra Long		—	—
20	Standard		**70**	**175**
	Long Neck		**100**	**205**
	Extra Long		**150**	**255**
25	Standard		**80**	**185**
	Long Neck		**120**	**225**
	Extra Long		**200**	**305**
30	Standard		**100**	**205**
	Long Neck		**150**	**255**
	Extra Long		**250**	**355**

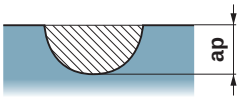
Recommended Depth of Cut for Long Cutting Edge Type

The maximum cutting edge length of the long cutting edge type with a peripheral insert is 1.4-1.5D1. The peripheral insert's main purpose is to remove the small un-machined portions of the pre-machined surface above the main cutting edge. Recommended depth of cut: **Maximum ap** is 0.5D1 or below.

● : **Inventory maintained in Japan.**

SLOT MILLING

Cutting Mode



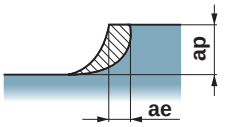
N : Revolution (min^{-1})
F : Table Feed (mm/min)

	Work Material	Hardness	Cutting Speed (m/min)	Insert Grade, Type	Holder Type	ϕ16			ϕ20			ϕ25			ϕ30		
						N	F	ap	N	F	ap	N	F	ap	N	F	ap
P	Carbon Steel Alloy Steel	180–280HB	160 (120–200)	**VP15TF** Low Resistance Type	Standard	3183	764	8	2546	611	10	2037	489	12.5	1698	407	15
					Long Neck	3183	764	4	2546	611	5	2037	489	6	1698	407	7.5
					Extra Long	–	–	–	2546	611	3	2037	489	4	1698	407	3
		280–350HB	140 (120–160)	**VP15TF** Low Resistance Type	Standard	2785	668	8	2228	535	10	1783	428	12.5	1485	357	15
					Long Neck	2785	668	4	2228	535	5	1783	428	6	1485	357	7.5
					Extra Long	–	–	–	2228	535	3	1783	428	4	1485	357	3
	Pre-Hardened Steel	35–45HRC	120 (100–160)	**VP15TF** Low Resistance Type	Standard	2387	573	6	1910	458	10	1528	367	12.5	1273	306	15
					Long Neck	2387	573	4	1910	458	5	1528	367	6	1273	306	7.5
					Extra Long	–	–	–	1910	458	3	1528	367	4	1273	306	3
	Alloy Tools Steel	≤350HB	140 (120–160)	**VP15TF** Low Resistance Type	Standard	2785	557	6	2228	535	8	1783	535	10	1485	594	12
					Long Neck	2785	557	4	2228	535	3	1783	535	5	1485	594	4.5
					Extra Long	–	–	–	2228	535	2	1783	535	2.5	1485	594	1.5
M	Stainless Steel	≤270HB	200 (100–250)	**VP15TF** Low Resistance Type	Standard	3979	796	4	3183	764	5	2546	764	6	2122	849	7.5
					Long Neck	3979	796	3	3183	764	3	2546	611	4	2122	637	4.5
					Extra Long	–	–	–	3183	509	2	2546	509	1.5	2122	509	1.5
K	Gray Cast Iron	≤350MPa	200 (150–300)	**VP15TF** Low Resistance Type	Standard	3979	1592	8	3183	1273	10	2546	1019	12.5	2122	849	15
					Long Neck	3979	1592	4	3183	1273	5	2546	1019	7.5	2122	849	4.5
					Extra Long	–	–	–	3183	1273	3	2546	1019	4	2122	849	3
	Ductile Cast Iron	≤500MPa	180 (150–240)	**VP15TF** Low Resistance Type	Standard	3581	1432	8	2865	1146	10	2292	917	12.5	1910	764	15
					Long Neck	3581	1432	4	2865	1146	5	2292	917	7.5	1910	764	4.5
					Extra Long	–	–	–	2865	1146	3	2292	917	4	1910	764	1.5
	Ductile Cast Iron	≤800MPa	160 (150–250)	**VP15TF** Low Resistance Type	Standard	3183	1273	8	2546	1019	10	2037	815	12.5	1698	679	15
					Long Neck	3183	1273	4	2546	1019	5	2037	815	7.5	1698	679	4.5
					Extra Long	–	–	–	2546	1019	3	2037	815	4	1698	679	1.5
H	Hardened Steel	45–50HRC	100 (60–120)	**VP15TF** Strong Cutting Edge Type	Standard	1989	398	6	1591	318	6	1273	255	6	1061	212	7.5
					Long Neck	1989	398	3	1591	318	4	1273	255	4	1061	212	3
					Extra Long	–	–	–	1591	318	2	1273	255	2.5	1061	212	1.5
	Hardened Steel	50–60HRC	60 (40–100)	**VP15TF** Strong Cutting Edge Type	Standard	1194	239	6	955	191	6	764	153	6	637	127	7.5
					Long Neck	1194	239	3	955	191	4	764	153	4	637	127	3
					Extra Long	–	–	–	955	191	2	764	153	2.5	637	127	1.5

SCREW-IN ARBORS C192
SPARE PARTS E001
TECHNICAL DATA F001

SHOULDER MILLING (Cutting Depth : Small)

Cutting Mode

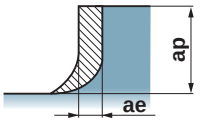


N : Revolution (min^{-1})
F : Table Feed (mm/min)

	Work Material	Hardness	Cutting Speed (m/min)	Insert Grade, Type	Holder Type	ϕ16				ϕ20				ϕ25				ϕ30			
						N	F	ap	ae	N	F	ap	ae	N	F	ap	ae	N	F	ap	ae
P	Carbon Steel Alloy Steel	180–280HB	200 (160–250)	VP15TF Low Resistance Type	Standard	3979	1592	4	6	3183	1273	5	8	2546	1273	6	10	2122	1273	7.5	10
					Long Neck	3979	1592	4	4	3183	1273	5	6	2546	1273	6	7.5	2122	1273	7.5	7.5
					Extra Long	—	—	—	—	3183	955	5	4	2546	1019	6	5	2122	637	7.5	3
		280–350HB	160 (120–200)	VP15TF Low Resistance Type	Standard	3183	955	4	6	2546	764	5	8	2037	815	6	10	1698	849	7.5	10
					Long Neck	3183	764	4	4	2546	611	5	6	2037	611	6	7.5	1698	509	7.5	7.5
					Extra Long	—	—	—	—	2546	509	5	4	2037	489	6	5	1698	407	7.5	3
	Pre-Hardened Steel	35–45HRC	160 (120–200)	VP15TF Low Resistance Type	Standard	3183	955	4	6	2546	764	5	8	2037	815	6	10	1698	849	7.5	10
					Long Neck	3183	764	4	4	2546	611	5	6	2037	611	6	7.5	1698	679	7.5	7.5
					Extra Long	—	—	—	—	2546	509	5	4	2037	489	6	5	1698	509	7.5	3
	Alloy Tools Steel	≤350HB	160 (120–200)	VP15TF Low Resistance Type	Standard	3183	1273	4	6	2546	764	5	6	2037	815	6	10	1698	849	7.5	10
					Long Neck	3183	955	4	4	2546	611	5	4	2037	611	6	7.5	1698	509	7.5	7.5
					Extra Long	—	—	—	—	2546	509	5	2	2037	489	6	2.5	1698	407	7.5	1.5
M	Stainless Steel	≤270HB	200 (100–250)	VP15TF Low Resistance Type	Standard	3979	796	4	8	3183	764	5	8	2546	764	6	10	2122	849	7.5	10
					Long Neck	3979	796	4	6	3183	764	5	4	2546	611	6	7.5	2122	849	7.5	7.5
					Extra Long	—	—	—	—	3183	637	5	2	2546	509	6	5	2122	424	7.5	1.5
K	Gray Cast Iron	≤350MPa	200 (150–300)	VP15TF Low Resistance Type	Standard	3979	1989	4	8	3183	1910	5	10	2546	1528	6	10	2122	1485	7.5	10
					Long Neck	3979	1989	4	6	3183	1910	5	8	2546	1528	6	10	2122	1485	7.5	6
					Extra Long	—	—	—	—	3183	1592	5	6	2546	1273	6	7.5	2122	1061	7.5	3
	Ductile Cast Iron	≤500MPa	200 (150–280)	VP15TF Low Resistance Type	Standard	3979	1989	4	8	3183	1910	5	10	2546	1528	6	10	2122	1273	7.5	10
					Long Neck	3979	1989	4	6	3183	1910	5	8	2546	1528	6	10	2122	1273	7.5	6
					Extra Long	—	—	—	—	3183	1592	5	6	2546	1273	6	7.5	2122	1061	7.5	3
	Ductile Cast Iron	≤800MPa	180 (150–250)	VP15TF Low Resistance Type	Standard	3581	1790	4	8	2865	1719	5	10	2292	1375	6	10	1910	1146	7.5	10
					Long Neck	3581	1790	4	6	2865	1719	5	8	2292	1375	6	10	1910	1146	7.5	6
					Extra Long	—	—	—	—	2865	1432	5	6	2292	1146	6	7.5	1910	955	7.5	3
H	Hardened Steel	45–50HRC	100 (60–120)	VP15TF Strong Cutting Edge Type	Standard	1989	398	4	4	1591	318	5	5	1273	255	6	7.5	1061	212	7.5	3
					Long Neck	1989	398	4	2	1591	318	5	3	1273	255	6	4	1061	212	7.5	1.5
					Extra Long	—	—	—	—	1591	318	5	2	1273	204	6	1.5	1061	170	7.5	1
	Hardened Steel	50–60HRC	60 (40–100)	VP15TF Strong Cutting Edge Type	Standard	1194	239	4	4	955	191	5	5	764	153	6	7.5	637	127	7.5	3
					Long Neck	1194	239	4	2	955	191	5	3	764	153	6	4	637	127	7.5	1.5
					Extra Long	—	—	—	—	955	191	5	2	764	122	6	1.5	637	102	7.5	1

SHOULDER MILLING (Cutting Depth : Large)

Cutting Mode



N : Revolution (min^{-1})
F : Table Feed (mm/min)

(Note) Machining Stainless Steels

When up-cut milling stainless steels at large depths and widths of cut, the machined surface is liable to burrs and welding due to chip jamming. For stainless steels, down-cutting (climb milling) is recommended.

	Work Material	Hardness	Cutting Speed (m/min)	Insert Grade, Type	Holder Type	ϕ16				ϕ20				ϕ25				ϕ30			
						N	F	ap	ae	N	F	ap	ae	N	F	ap	ae	N	F	ap	ae
P	Carbon Steel Alloy Steel	180–280HB	200 (160–250)	VP15TF Low Resistance Type	Standard	3979	1592	8	4	3183	1273	10	4	2546	1273	12.5	5	2122	1273	15	4.5
					Long Neck	3979	1194	8	3	3183	955	10	3	2546	1019	12.5	4	2122	849	15	3
					Extra Long	—	—	—	—	3183	955	10	2	2546	764	12.5	2.5	2122	849	15	1.5
		280–350HB	160 (120–200)	VP15TF Low Resistance Type	Standard	3183	955	8	4	2546	764	10	4	2037	815	12.5	5	1698	849	15	4.5
					Long Neck	3183	764	8	3	2546	611	10	3	2037	611	12.5	4	1698	509	15	3
					Extra Long	—	—	—	—	2546	611	10	2	2037	489	12.5	2.5	1698	407	15	1.5
	Pre-Hardened Steel	35–45HRC	160 (120–200)	VP15TF Low Resistance Type	Standard	3183	955	8	4	2546	764	10	4	2037	815	12.5	5	1698	849	15	4.5
					Long Neck	3183	764	8	3	2546	611	10	3	2037	611	12.5	4	1698	509	15	3
					Extra Long	—	—	—	—	2546	611	10	2	2037	489	12.5	2.5	1698	407	15	1.5
	Alloy Tools Steel	≤350HB	160 (120–200)	VP15TF Low Resistance Type	Standard	3183	955	8	4	2546	509	10	3	2037	815	12.5	5	1698	849	15	4.5
					Long Neck	3183	764	8	3	2546	509	10	2	2037	611	12.5	2.5	1698	509	15	3
					Extra Long	—	—	—	—	2546	407	10	1	2037	489	12.5	1.5	1698	407	15	1.5
M	Stainless Steel	≤270HB	200 (100–250)	VP15TF Low Resistance Type	Standard	3979	796	8	8	3183	764	10	8	2546	764	12.5	10	2122	849	15	10
					Long Neck	3979	796	8	3	3183	764	10	3	2546	611	12.5	4	2122	509	15	4.5
					Extra Long	—	—	—	—	3183	637	10	2	2546	489	12.5	1.5	2122	340	15	1.5
K	Gray Cast Iron	≤350MPa	200 (150–300)	VP15TF Low Resistance Type	Standard	3979	1989	8	8	3183	1592	10	8	2546	1273	12.5	10	2122	1485	15	10
					Long Neck	3979	1592	8	5	3183	1592	10	6	2546	1273	12.5	7.5	2122	1061	15	4.5
					Extra Long	—	—	—	—	3183	1273	10	4	2546	1019	12.5	1.5	2122	849	15	3
	Ductile Cast Iron	≤500MPa	200 (150–280)	VP15TF Low Resistance Type	Standard	3979	1989	8	8	3183	1592	10	8	2546	1273	12.5	10	2122	1273	15	10
					Long Neck	3979	1592	8	5	3183	1592	10	4	2546	1273	12.5	7.5	2122	849	15	4.5
					Extra Long	—	—	—	—	3183	1273	10	2	2546	1019	12.5	5	2122	849	15	1.5
	Ductile Cast Iron	≤800MPa	180 (150–250)	VP15TF Low Resistance Type	Standard	3581	1790	8	8	2865	1432	10	8	2292	1146	12.5	10	1910	1146	15	10
					Long Neck	3581	1432	8	5	2865	1432	10	4	2292	1146	12.5	7.5	1910	764	15	4.5
					Extra Long	—	—	—	—	2865	1146	10	2	2292	917	12.5	5	1910	764	15	1.5
H	Hardened Steel	45–50HRC	100 (60–120)	VP15TF Strong Cutting Edge Type	Standard	1989	398	8	2	1591	318	10	3	1273	255	12.5	4	1061	212	15	3
					Long Neck	1989	398	8	1	1591	318	10	2	1273	204	12.5	1.5	1061	106	15	1.5
					Extra Long	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Hardened Steel	50–60HRC	60 (40–100)	VP15TF Strong Cutting Edge Type	Standard	1194	239	8	2	955	191	10	3	764	153	12.5	4	637	127	15	3
					Long Neck	1194	239	8	1	955	191	10	2	764	122	12.5	1.5	637	64	15	1.5
					Extra Long	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

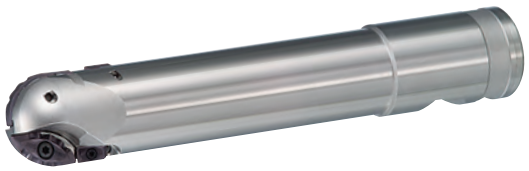
BALL NOSE END MILL

Roughing

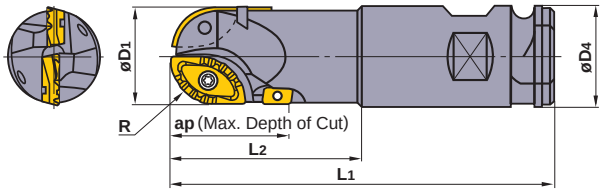
- Best for roughing of moulds.
- Low resistance chipbreaker.
- Highly rigid body.

Copying (including curved faces) Slotting

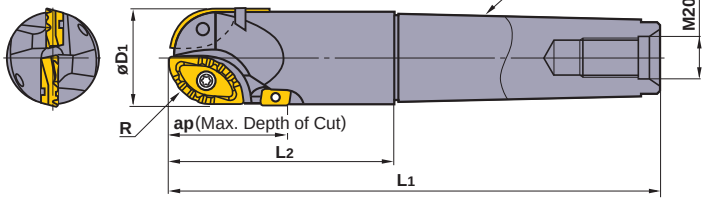
SRM2 ø40 ø50



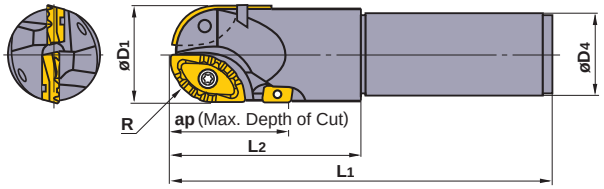
Combination Type



Morse Taper Type



Straight Type

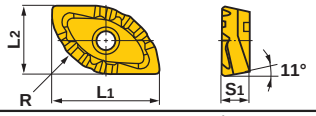
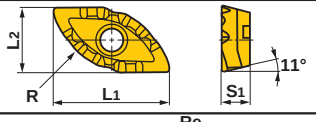
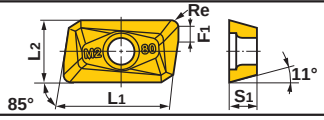
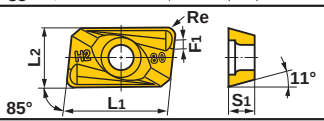


Right hand tool holder only.

Type		Order Number	Stock R	Number of Flutes	Dimensions (mm) R	D1	D4	L1	L2	ap	* Inner, Outer Clamp Screw	* Peripheral Clamp Screw	Inner, Outer Wrench	Peripheral Wrench	Inner Insert	Outer Insert	Peripheral Insert
Combination	Standard	SRM2400WNLS	●	2	20	40	50.8	200	120	54	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-□2
		2500WNLS	●	2	25	50	50.8	200	120	63	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-□2
	Long	2400WNLM	●	2	20	40	50.8	250	170	54	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-□2
		2500WNLM	●	2	25	50	50.8	250	170	63	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-□2
	Extra Long	2500WNLL	●	2	25	50	50.8	300	220	63	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-□2
		2500WNLX	●	2	25	50	50.8	350	270	63	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-□2
Straight	Standard	SRM2400SNLS	●	2	20	40	42	200	100	54	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-□2
		2500SNLS	●	2	25	50	42	200	100	63	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-□2
	Long	2400SNLM	●	2	20	40	42	250	150	54	TS6S	TS43	TKY30T	TKY15F	SRG40C	SRG40E	APMT1604 PDER-□2
		2500SNLM	●	2	25	50	42	250	100	63	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-□2
Morse Taper	Standard	SRM2500MNLS	●	2	25	50	—	256	120	63	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-□2
	Long	2500MNLM	●	2	25	50	—	286	150	63	TS6	TS43	TKY30T	TKY15F	SRG50C	SRG50E	APMT1604 PDER-□2

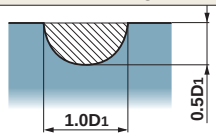
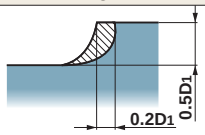
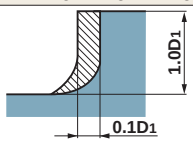
* Clamp Torque (N • m) : TS43=3.5, TS6=10.0, TS6S=10.0

INSERTS

Application	Shape	Order Number	Class	Coated VP15TF	VP20RT	VP30RT	R	L1	L2	S1	F1	Re	Geometry
Inner		* SRG40C	G	●	●	●	20	36	20.5	8.0	—	—	
		* 50C	G	●	●	●	25	40	26	8.5	—	—	
Outer		* SRG40E	G	●	●	●	20	32	16.6	8.0	—	—	
		* 50E	G	●	●	●	25	35.8	20	8.5	—	—	
Peripheral		APMT1604PDER-M2	M	●			—	16.5	9.525	4.76	1.4	0.8	
	Strong Cutting Edge Type	APMT1604PDER-H2	M	●			—	16.5	9.525	4.76	1.4	0.8	

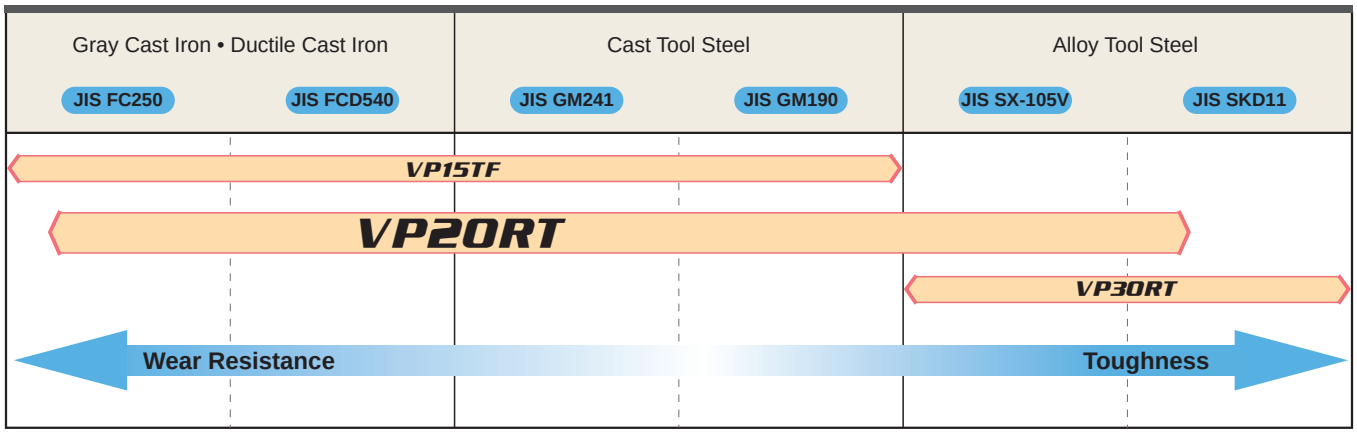
● : Inventory maintained in Japan. (10 inserts in one case) (Inserts with asterisk (*) are available in 2 piece in one case)

RECOMMENDED CUTTING CONDITIONS

Cutting Mode	A : Slot Milling	B : Shoulder Milling (Standard Type)	C : Shoulder Milling (Long Cutting Edge Type)
			

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)	Cutting Mode
P	Alloy Tool Steel	≤250HB	**VP20RT VP30RT**	160 (120—200)	0.12 (0.08—0.2)	A
					0.2 (0.1—0.4)	B
					0.15 (0.1—0.3)	C
	Alloy Tool Steel	≤250HB	**VP20RT VP30RT**	200 (160—250)	0.2 (0.1—0.3)	A
					0.2 (0.1—0.4)	B
					0.3 (0.1—0.4)	C
	Cast Tool Steel	≤235HB	**VP20RT**	200 (160—250)	0.2 (0.1—0.3)	A
					0.3 (0.1—0.4)	B
					0.2 (0.1—0.4)	C
	Cast Tool Steel	≤230HB	**VP15TF VP20RT**	200 (160—300)	0.2 (0.1—0.3)	A
					0.3 (0.1—0.45)	B
					0.2 (0.1—0.4)	C
K	Ductile Cast Iron	Tensile Strength ≤540MPa	**VP15TF VP20RT**	200 (160—300)	0.25 (0.1—0.4)	A
					0.25 (0.1—0.45)	B
					0.35 (0.1—0.45)	C
	Gray Cast Iron	Tensile Strength ≤250MPa	**VP15TF VP20RT**	200 (160—300)	0.25 (0.1—0.4)	A
					0.35 (0.1—0.45)	B
					0.25 (0.1—0.4)	C

GRADE APPLICATION GUIDE



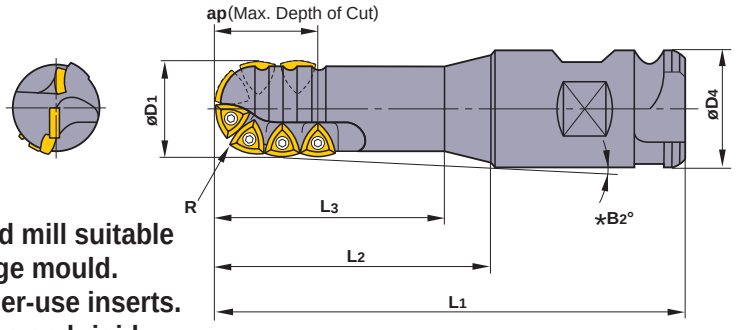
SPARE PARTS E001
TECHNICAL DATA F001

BALL NOSE END MILL

Roughing | Copying (Including curved faces) | Copying (Including Flat faces) | Slotting

TRM4

- Large ball-nose end mill suitable for roughing of large mould.
- Economical 3-corner-use inserts.
- Curved cutting edge and rigid holder are stable in heavy cutting.

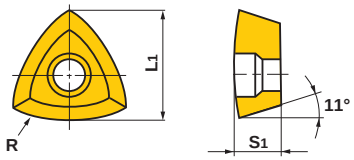
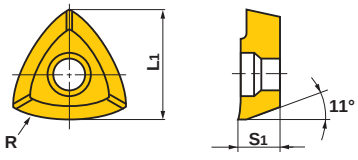
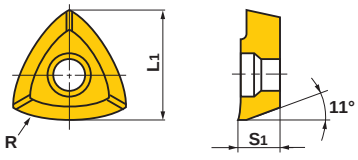


∗ Please allow for an inclination angle of B2°+1°.
Right hand tool holder only.

Order Number	Stock	Number of Teeth	Dimensions (mm)								∗ Clamp Screw	Wrench	Insert
	R		R	D1	L1	D4	L2	L3	ap	B2°			
TRM4400SL	●	7	20	40	200	50.8	120	100	45	3°05′	CS451190T	①TKY20R	UPE40 UPM40 UPM40P1
4500SL	●	7	25	50	200	50.8	120	—	56	0°15′	CS501290T	②TKY25T	UPE50 UPM50 UPM50P1
4400SF	●	7	20	40	250	50.8	170	150	45	2°05′	CS451190T	①TKY20R	UPE40 UPM40 UPM40P1
4500SF	●	7	25	50	250	50.8	170	—	56	1°	CS501290T	②TKY25T	UPE50 UPM50 UPM50P1

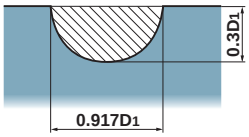
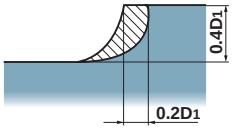
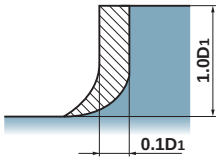
∗ Clamp Torque (N • m) : CS451190T=5.0, CS501290T=7.5

INSERTS

Shape	Order Number	Class	Honing	Coated VP15TF	Coated AP20M	Coated	Coated	Carbide UTi20T	Carbide	Dimensions (mm) L1	S1	R	Geometry
Strong Cutting Edge Type	UPM40	M	E	●	●					13.2	4.8	20	
	50	M	E	●	●					16.5	6	25	
General	UPM50P0	M	E	●	□					16.5	5.5	25	
Sharp Cutting Edge Type	UPM40P1	M	E	●	●					13.2	4.4	20	
	50P1	M	E	●	●					16.5	5.5	25	

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.

RECOMMENDED CUTTING CONDITIONS

Cutting Mode	A : Slot Milling	B : Shoulder Milling (Standard Type)	C : Shoulder Milling (Long Cutting Edge Type)
			

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Cutting Mode	Feed per Tooth (mm/tooth)
P	Carbon Steel Alloy Steel	180—280HB	**AP20M**	260 (180—310)	A	0.125 (0.1—0.15)
			GP20M		B	0.15 (0.1—0.2)
			VP15TF		C	0.1 (0.05—0.15)
			UTi20T	240 (160—290)		
		280—380HB	**AP20M**	190 (130—230)	A	0.1 (0.05—0.15)
			GP20M		B	0.15 (0.1—0.2)
			VP15TF		C	0.1 (0.05—0.15)
			UTi20T	170 (120—200)		
	Pre-Hardened Steel	35—45HRC	**AP20M**	170 (110—190)	A	0.1 (0.05—0.15)
			GP20M		B	0.15 (0.1—0.2)
			VP15TF		C	0.1 (0.05—0.15)
			UTi20T	160 (110—180)		
	High Alloy Steel	≤300HB	**VP15TF**	190 (130—230)	A	0.1 (0.05—0.15)
			AP20M		B	0.15 (0.1—0.2)
			UTi20T	170 (120—200)	C	0.1 (0.05—0.15)
M	Stainless Steel	≤260HB	**AP20M**	260 (180—310)	A	0.1 (0.05—0.15)
			GP20M		B	0.15 (0.1—0.2)
			VP15TF		C	0.1 (0.05—0.15)
			UTi20T	240 (160—290)		
K	Gray Cast Iron	Tensile Strength ≤350MPa	**AP20M**	260 (180—310)	A	0.15 (0.1—0.2)
			VP15TF		B	0.15 (0.1—0.2)
			UTi20T	240 (160—290)	C	0.1 (0.05—0.15)
	Ductile Cast Iron	Tensile Strength 360—500MPa	**AP20M**	200 (140—240)	A	0.1 (0.05—0.15)
			GP20M		B	0.15 (0.1—0.2)
			VP15TF		C	0.1 (0.05—0.15)
			UTi20T	190 (130—230)		
	Ductile Cast Iron	Tensile Strength 500—800MPa	**AP20M**	170 (100—200)	A	0.1 (0.05—0.15)
			GP20M		B	0.15 (0.1—0.2)
			VP15TF		C	0.1 (0.05—0.15)
			UTi20T	150 (110—180)		
H	Hardened Steel	45—60HRC	**AP20M**	110 (70—130)	A	0.15 (0.1—0.2)
			GP20M		B	0.15 (0.1—0.2)
			VP15TF		C	0.1 (0.05—0.15)
			UTi20T	100 (60—120)		

●Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1) ●Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

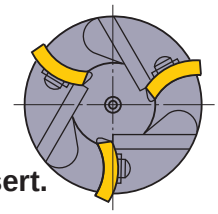
SPARE PARTS E001
TECHNICAL DATA F001

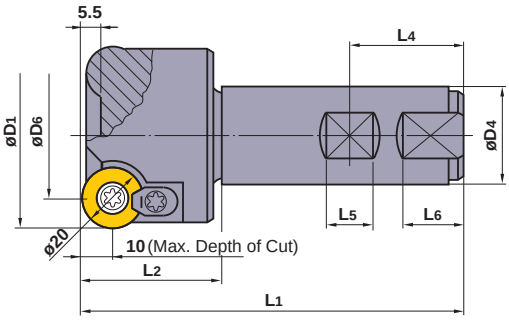
RADIUS MILLING

Roughing | Shoulder Milling | Face Milling | Copying (Including Flat faces) | Slotting

BRE

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	▬▬▬▬▬▬▬▬			





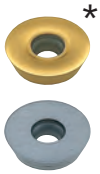
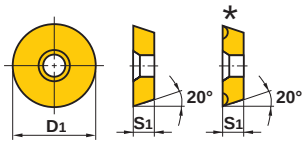
- 20°positive round shaped insert.
- High rake angle.
- Capable of machining of hardened steels and difficult-to-cut materials.
- The special insert prevents chattering.

Right hand tool holder only.

Order Number	Stock R	Number of Teeth	D1	D6	L1	D4	L2	L4	L5	L6	Clamp Screw *	Clamp Bridge	Clamp Bridge Screw *	Spring	Wrench	Insert
BRE20R503S32	●	3	50	30	125	32	45	36	14	19	TS5S	AMS5	BRS105	ASS3	TKY25R	REMT2004M0
20R633S32	●	3	63	43	125	32	45	36	14	19	TS5S	AMS5	BRS105		TKY25R	REMW2004M0

* Clamp Torque (N • m) : TS5S=7.5, BRS105=7.5

INSERTS

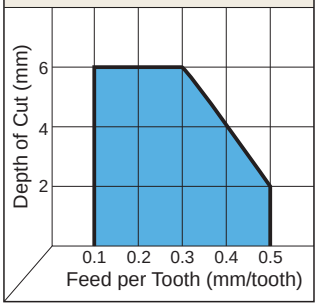
Shape	Order Number	Class	Honing	Coated UP20M				Carbide UTi20T		Dimensions (mm) D1	S1	Geometry
 *	* **REMT2004M0**	M	E	●				●		20	4.76	
	REMW2004M0	M	E					●		20	4.76	

* Insert with Breaker.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	BRE20R503S32 Main Spindle Revolution (min-1)	BRE20R503S32 Feed per Tooth (mm/tooth)	BRE20R633S32 Main Spindle Revolution (min-1)	BRE20R633S32 Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	UP20M UTi20T	820 (640−1000)	0.3 (0.1−0.5)	650 (500−800)	0.3 (0.1−0.5)
P	Carbon Steel Alloy Steel	180−280HB	UTi20T UP20M	510 (380−640)	0.2 (0.1−0.3)	400 (300−500)	0.2 (0.1−0.3)
P	Carbon Steel Alloy Steel	280−350HB	UTi20T UP20M	285 (190−380)	0.175 (0.1−0.25)	225 (150−300)	0.175 (0.1−0.25)
P	High Alloy Steel	200−280HB	UTi20T	510 (380−640)	0.2 (0.1−0.3)	400 (300−500)	0.2 (0.1−0.2)
M	Stainless Steel	≤200HB	UP20M	825 (700−950)	0.2 (0.1−0.3)	660 (560−760)	0.2 (0.1−0.2)
K	Cast Iron	Tensile Strength ≤450MPa	UTi20T UP20M	650 (500−800)	0.3 (0.1−0.5)	510 (400−630)	0.3 (0.1−0.5)

Figure of Cutting Conditions



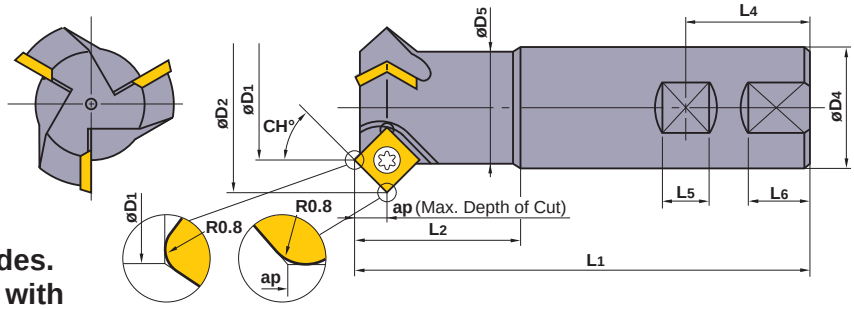
- Revolution (min-1)=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

(Note) When drilling please reduce the feed rate (feed per tooth) by 50%.

● : **Inventory maintained in Japan. (10 inserts in one case)**

SPARE PARTS E001 TECHNICAL DATA F001

CESP,CFSP,CGSP



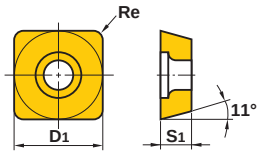
- Covers 5 cutting modes.
- Excellent sharpness with 11° positive inserts.
- 30°, 45° and 60°chamfer series.

Right hand tool holder only.

Order Number	Stock	Number of Teeth	Dimensions (mm)											*	① ②	
	R		CH°	D1	D2	L1	D4	D5	L2	L4	L5	L6	ap	Clamp Screw	Wrench	Insert
CESPR081S20	●	1	30°	8	19.6	110	20	19.5	40	25	11	—	10.2	TS52	①TKY25R	SPMW1203○○
161S20	●	1	30°	16	27.8	110	20	19.5	40	25	11	—	10.2	TS5	①TKY25R	SPMW1203○○
323S32	●	3	30°	32	43.8	125	32	31.5	45	36	14	19	10.2	TS5	①TKY25R	SPMW1203○○
CFSPR041S16S	●	1	45°	4	15.7	85	16	14.4	25	24	10	—	5.9	TS4	②TKY15F	SPMW0903○○
041S16L	●	1	45°	4	15.7	110	16	14.4	50	24	10	—	5.9	TS4	②TKY15F	SPMW0903○○
081S20	●	1	45°	8	24.6	110	20	19.5	40	25	11	—	8.3	TS5	①TKY25R	SPMW1203○○
161S20	●	1	45°	16	32.6	110	20	19.5	40	25	11	—	8.3	TS5	①TKY25R	SPMW1203○○
323S32	●	3	45°	32	48.6	125	32	31.5	45	36	14	19	8.3	TS5	①TKY25R	SPMW1203○○
CGSPR081S20	●	1	60°	8	28.4	110	20	19.5	40	25	11	—	5.9	TS5	①TKY25R	SPMW1203○○
161S20	●	1	60°	16	36.4	110	20	19.5	40	25	11	—	5.9	TS5	①TKY25R	SPMW1203○○
323S32	●	3	60°	32	52.4	125	32	31.5	45	36	14	19	5.9	TS5	①TKY25R	SPMW1203○○

* Clamp Torque (N • m) : TS4=3.5, TS5=7.5, TS52=7.5

INSERTS

Shape	Order Number	Class	Honing	Coated				Cermet		Carbide		Dimensions (mm)			Geometry
				UP20M				NX2525	NX4545	UTi20T	HTi10	D1	S1	Re	
	SPMW090304	M	E*	●				●	●	●	●	9.525	3.18	0.4	
	090308	M	E*	●				●	●	●	●	9.525	3.18	0.8	
	120304	M	E*	●				●	●	●	●	12.7	3.18	0.4	
	120308	M	E*	●				●	●	●	●	12.7	3.18	0.8	

* NX2525 and NX4545 insert honing is "T" type.

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)	
					Chamfer Milling	Face Milling
P	Carbon Steel Alloy Steel	180—280HB	UTi20T	80 (60—100)	0.4	0.15
			UP20M	130 (100—160)	0.4	0.2
			NX4545	130 (100—160)	0.4	0.2
		280—350HB	UTi20T	80 (60—100)	0.3	0.15
K	Cast Iron	Tensile Strength ≤450MPa	UTi20T	100 (85—120)	0.5	0.25
			HTi10	100 (85—120)	0.5	0.25

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

● : **Inventory maintained in Japan. (10 inserts in one case)**

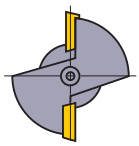
SPARE PARTS E001
TECHNICAL DATA F001

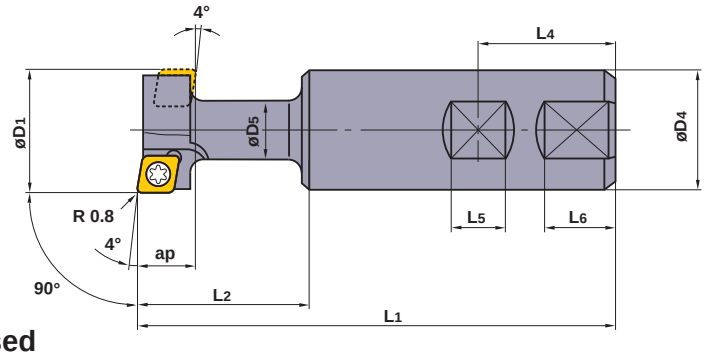
T-SLOT MILLING

Roughing

Slotting

TSMP





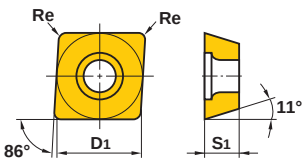
- **T-groove order number 14, 18 and 22 are available.**
- **86° rhombic shape 11° positive insert.**
- **Shoulder milling and inversed spot facing are also possible.**

Right hand tool holder only.

Order Number	T Slot Nomenclature	Stock	Number of Teeth	Dimensions (mm)									*	① ②	
		R		D1	L1	D4	D5	L2	L4	L5	L6	ap	Clamp Screw	Wrench	Insert
TSMPR252S25	14	●	2	25	112	25	12.5	33.2	32	12	17	11	TS3	①TKY08D	MPMW070308
322S32	18	●	2	32	120	32	16	41.2	36	14	19	14	TS4	②TKY15R	MPMW090308
402S32	22	●	2	40	130	32	20	51.2	36	14	19	18	TS5	②TKY25R	MPMW120408

∗ Clamp Torque (N • m) : TS3=1.0, TS4=3.5, TS5=7.5

INSERTS

Shape	Order Number	Class	Carbide UTi20T		Dimensions (mm) D1	S1	Re	Geometry
	MPMW070308	M	●		7.94	3.18	0.8	
	090308	M	●		9.525	3.18	0.8	
	120408	M	●		12.7	4.76	0.8	

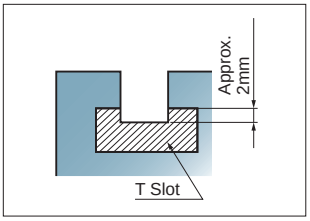
RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Carbon Steel Alloy Steel	180—280HB	**UTi20T**	130 (100—160)	0.15 (0.1—0.2)
		280—350HB	**UTi20T**	80 (60—100)	0.1 (0.05—0.15)
K	Cast Iron	Tensile Strength ≤450MPa	**UTi20T**	100 (80—120)	0.15 (0.1—0.2)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

CAUTION FOR USE

- When T slot machining steel, the workpiece must be machined as shown in the drawing to ensure smooth chip evacuation.
- Slots to be machined must be free from chips for smooth machining.



● : **Inventory maintained in Japan.**

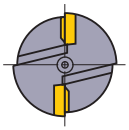
SPARE PARTS E001
TECHNICAL DATA F001

SPOT MILLING

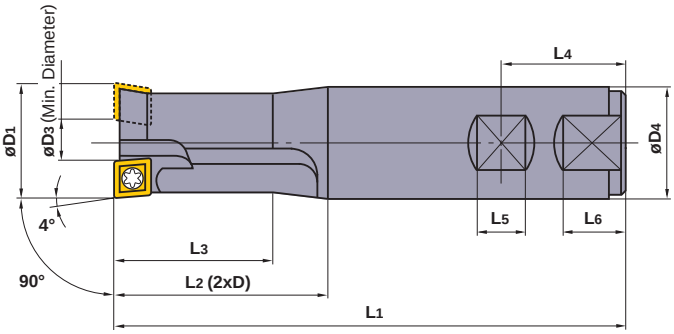
Roughing

Spot Milling

CBJP,CBMP



- Capable of spot facing machining, boring and interpolation.
- For seat machining of hexagon socket head bolt (M8-M30).
- 86°rhombic shape 11°positive insert.

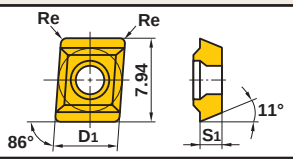
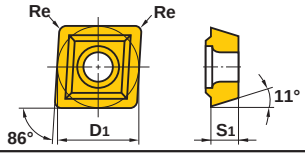


Right hand tool holder only.

Order Number	For bolt size	Stock R	Number of Teeth	Dimensions (mm) D1	D3	L1	D4	L2	L3	L4	L5	L6	* Clamp Screw	①② Wrench	Insert
CBJPR141S25	M8	●	1	14	2.9	108	25	28	21	32	12	17	TS3	①TKY08D	JPMT060204-E
172S25	M10	●	2	17.5	5.3	115	25	35	26	32	12	17	TS3	①TKY08D	JPMT060204-E
202S25	M12	●	2	20	7.8	120	25	40	30	32	12	17	TS3	①TKY08D	JPMT060204-E
232S25	M14	●	2	23	10.8	126	25	46	34.5	32	12	17	TS3	①TKY08D	JPMT060204-E
CBMPR262S32	M16	●	2	26	8.5	132	32	52	39	36	14	19	TS4	②TKY15R	MPMT090308
292S32	M18	●	2	29	11.5	138	32	58	43.5	36	14	19	TS4	②TKY15R	MPMT090308
322S32	M20	●	2	32	14.5	144	32	64	59	36	14	19	TS4	②TKY15R	MPMT090308
352S32	M22	●	2	35	17.5	150	32	70	70	36	14	19	TS4	②TKY15R	MPMT090308
392S32	M24	●	2	39	21.5	158	32	78	78	36	14	19	TS4	②TKY15R	MPMT090308
432S32	M27	●	2	43	25.5	166	32	86	86	36	14	19	TS4	②TKY15R	MPMT090308
482S32	M30	●	2	48	30.5	176	32	96	96	36	14	19	TS4	②TKY15R	MPMT090308

* Clamp Torque (N • m) : TS3=1.0, TS4=3.5

INSERTS

Cutter Type	Shape	Order Number	Class	Coated UP20M				Carbide UTi20T		Dimensions (mm) D1	S1	Re	Geometry
CBJP		**JPMT060204-E**	M	●				●		6.5	2.38	0.4	
CBMP		**MPMT090308**	M	●				●		9.525	3.18	0.8	

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	CBJP Cutting Speed (m/min)	CBJP Feed (mm/rev)	CBMP Cutting Speed (m/min)	CBMP Feed (mm/rev)
P	Mild Steel	≤180HB	**UP20M • UTi20T**	160 (120—200)	0.16 (0.12—0.2)	160 (125—200)	0.225 (0.15—0.3)
P	Carbon Steel Alloy Steel	180—280HB	**UP20M • UTi20T**	130 (100—160)	0.2 (0.15—0.25)	130 (100—160)	0.275 (0.2—0.35)
P	Carbon Steel Alloy Steel	280—350HB	**UTi20T**	100 (80—120)	0.16 (0.12—0.2)	100 (80—125)	0.225 (0.15—0.3)
M	Stainless Steel	≤200HB	**UTi20T**	130 (100—160)	0.16 (0.12—0.2)	130 (100—160)	0.225 (0.15—0.3)
K	Cast Iron	Tensile Strength ≤450MPa	**UTi20T**	100 (80—120)	0.3 (0.2—0.4)	100 (80—125)	0.35 (0.2—0.5)

● Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1) ● Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution
(Note) CBJPR141S25 use feed per revolution 50 % of this table, because only 1 insert on the body.

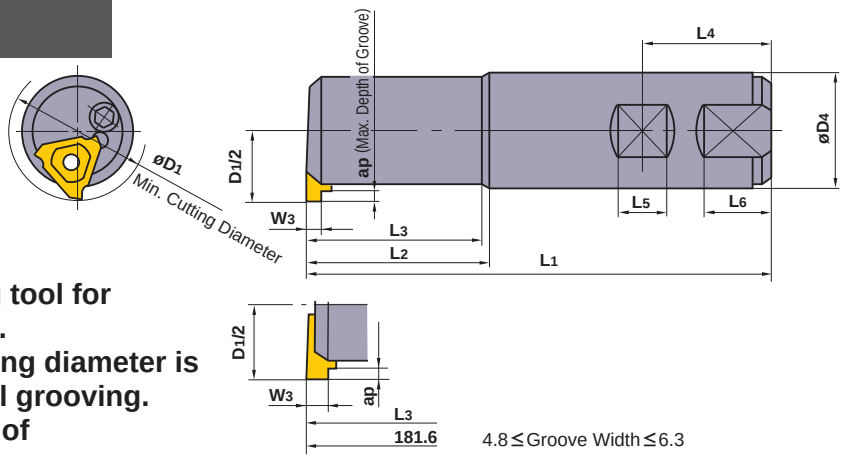
● : **Inventory maintained in Japan. (10 inserts in one case)**

SPARE PARTS E001
TECHNICAL DATA F001

SLOT MILLING

Roughing Slotting

KSMG



4.8≤Groove Width≤6.3

- Side face grooving tool for machining centers.
- The minimum cutting diameter is ϕ25mm for internal grooving.
- For groove widths of 1.25mm−6.30mm.

Right hand tool holder only.

Order Number	Stock	Number of Teeth	Dimensions (mm)							Geometry of Groove		Min. Cutting Diameter	Insert Number
	R		L1	D4	L2	L3	L4	L5	L6	W3	ap	D1	
KSMGR25S25	●	1	115	25	37	33.5	32	12	17	1.25	1.2	25	MGTL33◌◌◌
										1.45	1.5		
										1.5≤W3≤4.7	3.0		
KSMGR40S32	●	1	130	32	50	49	36	14	19	1.25	1.2	40	MGTL43◌◌◌
										1.45	1.5		
										1.5≤W3≤2.3	3.0		
										2.5≤W3≤4.7	4.5		
			131.6	32	51.6	49	36	14	19	4.8≤W3≤6.3	4.5	40	MGTL44◌◌◌
KSMGR40S32L	●	1	180	32	100	99	36	14	19	1.25	1.2	40	MGTL43◌◌
										1.45	1.5		
										1.5≤W3≤2.3	3.0		
										2.5≤W3≤4.7	4.5		
			181.6	32	101.6	99	36	14	19	4.8≤W3≤6.3	4.5	40	MGTL44◌◌◌

SPARE PARTS

Tool Holder Number	Clamp Lever	Spring	Lever Pin	Clamp Screw *	Wrench ①②
KSMGR25S25	LLCL13S	HLS2	—	LLCS105	①HKY20F
40S32	LLCL24	—	LLP14	LLCS108	②HKY30R
40S32L	LLCL24	—	LLP14	LLCS108	②HKY30R

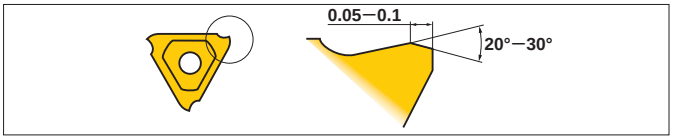
∗ Clamp Torque (N • m) : LLCS105=1.5, LLCS108=3.3

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	NX2525 UTi20T	130 (120−150)	0.225 (0.1−0.35)
			VP20MF	160 (120−200)	0.225 (0.1−0.35)
	Carbon Steel Alloy Steel	180−280HB	NX2525 UTi20T	110 (100−120)	0.2 (0.1−0.30)
			VP20MF	120 (100−140)	0.2 (0.1−0.30)
		280−350HB	UTi20T	110 (100−120)	0.175 (0.1−0.25)
K	Cast Iron	Tensile Strength ≤450MPa	UTi20T	100 (80−125)	0.225 (0.1−0.35)

HONING OF CUTTING EDGE

Supplementary honing when steel cutting gives longer tool life.
Use a diamond file for best results.

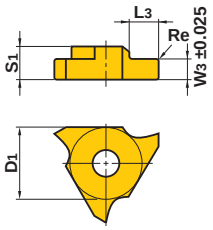


- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

● : Inventory maintained in Japan. (10 inserts in one case) □ : Non stock, produced to order only.
▲ : Inventory maintained in Japan. To be replaced by new products. (10 inserts in one case)

INSERTS

Order Number	Grooving Width	Stock				Dimensions (mm)				Geometry
		Coated	Cermet		Carbide					
		VP20MF	NX2525	NX55	UTi20T	D1	S1	Re	L3	
	W3	L	L	L	L					
MGTL33125	1.25	□			●	9.525	4.76	0.2	1.2	**MGTL...**
33145	1.45	□			□	9.525	4.76	0.2	1.5	
33150	1.5	●	□	▲	●	9.525	4.76	0.2	3	
33175	1.75	●	□		●	9.525	4.76	0.2	3	
33200	2	●	●	▲	●	9.525	4.76	0.2	3	
33230	2.3	□			●	9.525	4.76	0.2	3	
33250	2.5	●	□	▲	●	9.525	4.76	0.3	3	
33270	2.7	□			□	9.525	4.76	0.3	3	
33280	2.8	□			□	9.525	4.76	0.3	3	
33300	3	●	□	▲	●	9.525	4.76	0.3	3	
33320	3.2	□				9.525	4.76	0.3	3	
33330	3.3	□			□	9.525	4.76	0.3	3	
33350	3.5	□			●	9.525	4.76	0.3	3	
33400	4	□	□		●	9.525	4.76	0.3	3	
33470	4.7	□			□	9.525	4.76	0.4	3	
MGTL43125	1.25	●	□	▲	●	12.7	4.76	0.2	1.2	
43145	1.45	□	□		□	12.7	4.76	0.2	1.5	
43150	1.5	●	●	▲	●	12.7	4.76	0.2	3	
43175	1.75	●	□		●	12.7	4.76	0.2	3	
43200	2	●	●	▲	●	12.7	4.76	0.2	3	
43230	2.3	●	●	▲	●	12.7	4.76	0.2	3	
43250	2.5	●	●	▲	●	12.7	4.76	0.3	4.5	
43260	2.6	□			●	12.7	4.76	0.3	4.5	
43270	2.7	□			□	12.7	4.76	0.3	4.5	
43280	2.8	●	□	▲	●	12.7	4.76	0.3	4.5	
43300	3	●	●	▲	●	12.7	4.76	0.3	4.5	
43320	3.2	●		▲	●	12.7	4.76	0.3	4.5	
43330	3.3	●	□	▲	●	12.7	4.76	0.3	4.5	
43350	3.5	□	□	▲	●	12.7	4.76	0.3	4.5	
43400	4	●		▲	●	12.7	4.76	0.3	4.5	
43420	4.2	□			□	12.7	4.76	0.4	4.5	
43430	4.3	□		▲	●	12.7	4.76	0.4	4.5	
43450	4.5	●	●	▲	●	12.7	4.76	0.4	4.5	
43470	4.7	□	□		□	12.7	4.76	0.4	4.5	
MGTL44500	5	●			●	12.7	6.35	0.4	4.5	
44550	5.5	□			□	12.7	6.35	0.4	4.5	
44600	6	□			●	12.7	6.35	0.4	4.5	



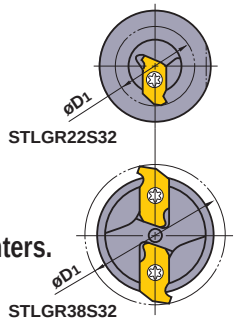
SPARE PARTS E001
TECHNICAL DATA F001

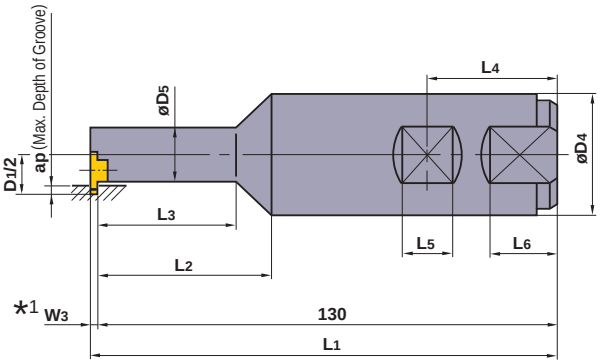
SLOT MILLING

Roughing

Slotting

STLG





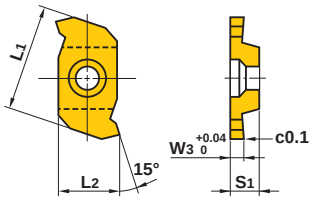
- Grooving cutter for machining centers.
- The minimum cutting diameter is ϕ22 for internal grooving.
- The minimum groove width is 1.2mm and the maximum groove depth is 4.5mm.

∗1 Please refer to insert standard for W3 dimension.
Right hand tool holder only.

Order Number	Stock	Number of Teeth	Dimensions (mm)										∗2		
	R		D1	L1	D4	D5	L2	L3	L4	L5	L6	ap	Clamp Screw	Wrench	Insert
STLGR22S32	●	1	22	131.2	32	15	50	40	36	14	19	3	CS300890T	TKY08F	SLG22120L
				131.5											SLG22150L
				132											SLG22200L
38S32	●	2	38	132	32	28	50	48	36	14	19	4.5	CS350990T	TKY10F	SLG38200L
				133											SLG38300L
				134											SLG38400L

∗2 Clamp Torque (N • m) : CS300890T=1.0, CS350990T=2.5

INSERTS

Shape	Order Number	Class	Carbide UTi20T		Dimensions (mm) L1	L2	W3	S1	Geometry
	SLG22120L	G	●		13	7	1.2	2.7	
	22150L	G	●		13	7	1.5	3	
	22200L	G	●		13	7	2	3.5	
	38200L	G	●		15.6	8	2	4	
	38300L	G	●		15.6	8	3	5	
	38400L	G	●		15.6	8	4	6	

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	UTi20T	130 (120—150)	0.225 (0.1—0.35)
P	Carbon Steel Alloy Steel	180—280HB	UTi20T	110 (100—120)	0.2 (0.1—0.30)
P		280—350HB	UTi20T	110 (100—120)	0.175 (0.1—0.25)
K	Cast Iron	Tensile Strength ≤450MPa	UTi20T	100 (80—125)	0.225 (0.1—0.35)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

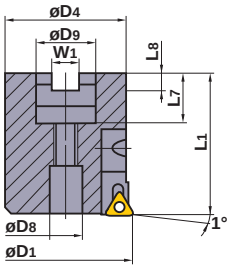
● : Inventory maintained in Japan. (10 inserts in one case)

SPARE PARTS E001
TECHNICAL DATA F001

PMF

- 2 directional cutting with large overhang.
- Excellent straightness.
- Excellent wall accuracy.

ø50



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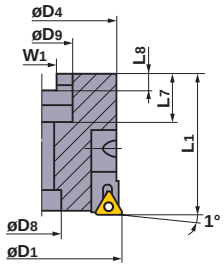

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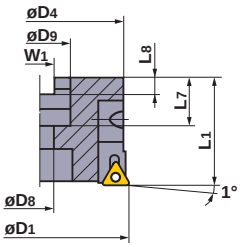


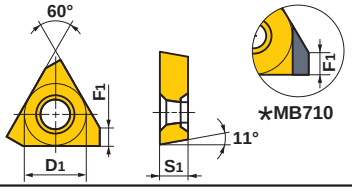
Right hand tool holder only.

Order Number	Stock	Number of Teeth	Dimensions (mm)								Cartridge	Clamp Screw *	Radial Screw	Set Bolt (Cartridge) *	Wrench	Wrench	Set Bolt ①②	Insert
	R		D1	L1	D9	L7	D8	W1	L8	D4								
PMF05004A22R	●	4	50	63	22	20	12	10.4	6.3	48	PMFA13R	TS254	TSS04005	HBH06012	TKY08F	HKY40R HKY50R	①HDS10031	TPEW 1303 ZP□R2
06306A22R	●	6	63	63	22	20	18	10.4	6.3	60	PMFA13R	TS254	TSS04005	HBH06012	TKY08F	HKY40R	②HSC10050	
08008A27R	●	8	80	50	27	23	13.5	12.4	7	75	PMFA13R	TS254	TSS04005	HBH06012	TKY08F	HKY40R	②HSC12035	

* Clamp Torque (N • m) : TS254=1.0, HBH06012=8.5

INSERTS

Shape	Order Number	Class	Coated VP15TF	Coated AP10H	CBN MB710	D1	S1	F1	Geometry
	TPEW1303ZPER2	E	●	●		7.94	3.18	2	
*	* 1303ZPTR2	E			●	7.94	3.18	2	



RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Carbon Steel Alloy Steel	180–280HB	VP15TF	250 (150–350)	0.1 (0.05–0.15)
		280–380HB	VP15TF	200 (100–300)	
K	Gray Cast Iron	Tensile Strength ≤350MPa	AP10H	350 (200–500)	0.1 (0.05–0.15)
			MB710	1500 (1000–2000)	

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
K	Ductile Cast Iron	Tensile Strength 360–500MPa	AP10H	250 (150–350)	0.1 (0.05–0.15)
			MB710	1000 (800–1200)	
	Ductile Cast Iron	Tensile Strength 500–800MPa	AP10H	200 (100–300)	0.1 (0.05–0.15)
			MB710	1000 (800–1200)	

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)=Feed per Tooth x Number of Teeth x Cutter Revolution

(Note 1) Recommended radial depth of cut is 0.1mm.
(Note 2) 2 directional vertical cutting is recommended for efficiency.
(Note 3) For crossfeed cutting, the feed per tooth should be reduced to less than 0.05(mm/tooth).

● : **Inventory maintained in Japan.**
(10 inserts in one case)
(CBN inserts are available in 1 piece in one case.)

ARBORS C191
SPARE PARTS E001
TECHNICAL DATA F001

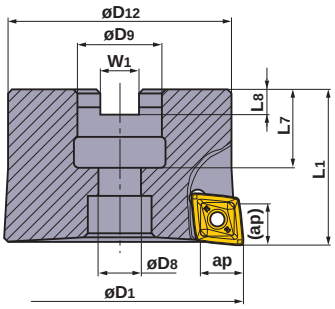
VERTICAL FEED MILLING

Roughing

Side Milling

PMR

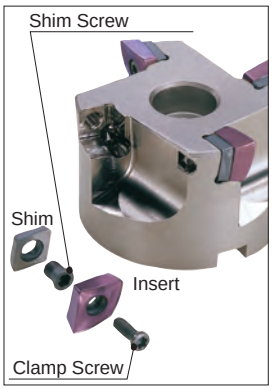
- 2 directional cutting with large overhang.
- Horizontal feed cutting and oblique cutting are also possible.
- Unique shape of curved edge gives high rigidity and low resistance.



Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	D12	W1	L8	ap	Insert
Metric	PMR405003A22R	●	3	50	40	22	20	11	45	10.4	6.3	11	CPMT1205ZPEN-M2/3
	406304A22R	●	4	63	40	22	20	11	57	10.4	6.3	11	CPMT1205ZPEN-M2/3
	408005A27R	●	5	80	50	27	23	13.5	73	12.4	7	11	CPMT1205ZPEN-M2/3
	608004A27R	●	4	80	50	27	23	13.5	72	12.4	7	17	CPMT1906ZPEN-M2/3
Inch	PMR405003BR	●	3	50	40	22.225	19	11	45	8.4	5	11	CPMT1205ZPEN-M2/3
	406304BR	●	4	63	40	22.225	19	11	57	8.4	5	11	CPMT1205ZPEN-M2/3
	408005DR	●	5	80	63	31.75	32	17	73	12.7	8	11	CPMT1205ZPEN-M2/3
	608004DR	●	4	80	63	31.75	32	17	72	12.7	8	17	CPMT1906ZPEN-M2/3

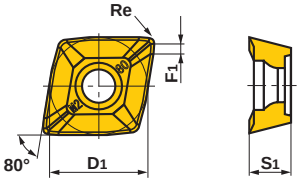
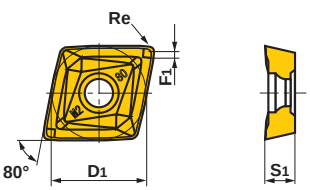
SPARE PARTS



Tool Holder Number	Shim	Shim Screw *	Clamp Screw *	Wrench (Insert)	Wrench (Shim)	Set Bolt
PMR405003A22R	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
406304A22R	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
408005A27R	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC12035
405003BR	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
406304BR	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC10035
408005DR	STPMR4N	WCS503507H	①TPS35	①TIP15T	HKY35R	HSC16040
PMR608004A27R	STPMR6N	WCS604010H	②CSF401260T	②TKY20D	HKY40R	HSC12035
608004DR	STPMR6N	WCS604010H	②CSF401260T	②TKY20D	HKY40R	HSC16040

* Clamp Torque (N • m) : TPS35=3.5, CSF401260T=5.0, WCS503507H=5.0, WCS604010H=7.0

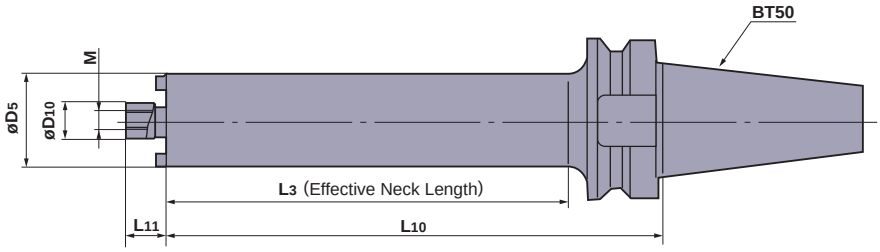
INSERTS

Shape	Order Number	Class	Coated F7030	Coated VP15TF			Dimensions (mm) D1	S1	F1	Re	Geometry
	CPMT1205ZPEN-M2	M	●	●			12.7	5.56	1.4	0.8	
	1205ZPEN-M3	M		●			12.7	5.56	1.4	1.2	
	CPMT1906ZPEN-M2	M	●	●			19.05	6.35	1.4	0.8	
	1906ZPEN-M3	M		●			19.05	6.35	1.4	1.2	

● : Inventory maintained in Japan. (10 inserts in one case)

ARBORS

LONG ARBOR FOR PMR



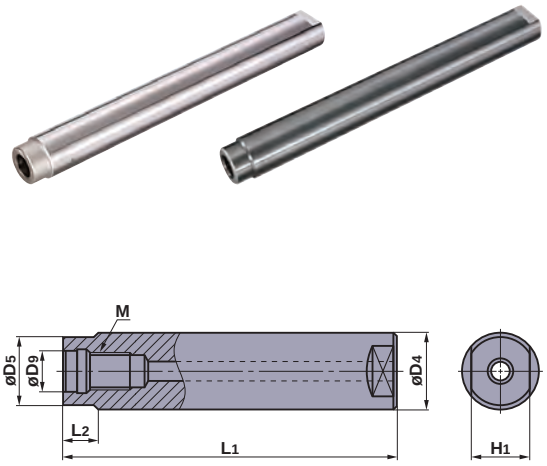
Type	Order Number	Stock	Dimensions (mm)						Tool Weight (kg)	Cutter
			D5	D10	L10	L11	L3	M		
Metric	**BT50-22-250-050**	●	47	22	250	18	202	M10	6.5	PMR405003A22R PMF05004A22R
	-22-250-063	●	60	22	250	18	202	M10	8.5	PMR406304A22R PMF06306A22R
	-27-300-080	●	75	27	300	22	252	M12	12.5	PMR408005A27R PMR608004A27R PMF08008A27R
Inch	**BT50-22.225-250-050**	●	47	22.225	250	17	202	M10	6.5	PMR405003BR
	-22.225-250-063	●	60	22.225	250	17	202	M10	8.5	PMR406304BR
	-31.75-300-080	●	75	31.75	300	30	252	M16	12.5	PMR408005DR PMR608004DR

SPARE PARTS E001
TECHNICAL DATA F001

ARBORS

ARBORS FOR SCREW-IN TOOLS NEW

STRAIGHT SHANK ARBOR



Type	Order Number	Stock	Dimensions (mm)						
			D9	D4	D5	L1	L2	H1	M
STEEL SHANK TYPE	**SC16M08S100S**	●	8.5	16	14.5	100	10	10	M8
	08S200L	●	8.5	16	14.5	200	10	10	M8
	SC20M10S120S	●	10.5	20	18.5	120	10	14	M10
	10S220L	●	10.5	20	18.5	220	10	14	M10
	SC25M12S125S	●	12.5	25	23.5	125	10	19	M12
	12S245L	●	12.5	25	23.5	245	10	19	M12
	SC32M16S140S	●	17	32	28.5	140	15	24	M16
	16S280L	●	17	32	28.5	280	15	24	M16
CARBIDE SHANK TYPE	**SC16M08S100SW**	●	8.5	16	14.5	100	10	10	M8
	08S200LW	●	8.5	16	14.5	200	10	10	M8
	SC20M10S120SW	●	10.5	20	18.5	120	10	14	M10
	10S220LW	●	10.5	20	18.5	220	10	14	M10
	SC25M12S125SW	●	12.5	25	23.5	125	10	19	M12
	12S245LW	●	12.5	25	23.5	245	10	19	M12
	SC32M16S140SW	●	17	32	28.5	140	15	24	M16
	16S280LW	●	17	32	28.5	280	15	24	M16

HOW TO INSTALL THE SCREW-IN HEAD

①Thoroughly clean the clamp section of the head and the arbor with an air blower or brush before installation.

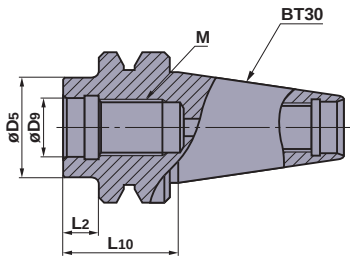
②Tighten the head at the recommended torque and ensure that there is no gap between the head and arbor.

Screw Size	Recommended Torque (N • m)	Wrench Size (mm)
M8	23	10
M10	46	14
M12	80	19
M16	90	24

●Cutting tools become extremely hot during cutting. Never touch them with bare hands after operation as this mayproduce risk of injuries or burns.
●Do not handle the cutting tools with bare hands as this may cause injuries.

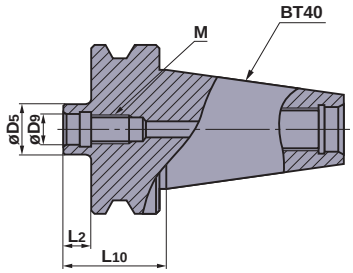
● : **Inventory maintained in Japan.**

BT30 SHANK ARBOR



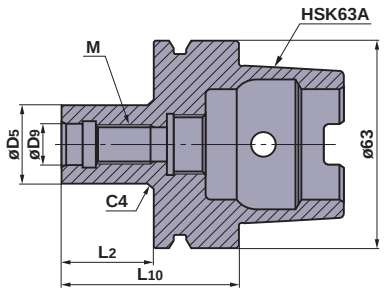
Order Number	Stock	Dimensions (mm)				
		D9	D5	L10	L2	M
SC16M08S10-BT30	●	8.5	14.5	32	10	M8
20M10S10-BT30	●	10.5	18.5	32	10	M10
25M12S10-BT30	●	12.5	23.5	32	10	M12
32M16S10-BT30	●	17.0	28.5	32	10	M16

BT40 SHANK ARBOR



Order Number	Stock	Dimensions (mm)				
		D9	D5	L10	L2	M
SC16M08S10-BT40	●	8.5	14.5	37	10	M8
20M10S10-BT40	●	10.5	18.5	37	10	M10
25M12S10-BT40	●	12.5	23.5	37	10	M12
32M16S10-BT40	●	17.0	28.5	37	10	M16

HSK63A SHANK ARBOR



Order Number	Stock	Dimensions (mm)				
		D9	D5	L10	L2	M
SC16M08S22-HSK63A	●	8.5	14.5	48	22	M8
20M10S24-HSK63A	●	10.5	18.5	50	24	M10
25M12S27-HSK63A	●	12.5	23.5	53	27	M12
32M16S28-HSK63A	●	17.0	28.5	54	28	M16

FACE MILLING

<HIGH SPEED FINISHING ALUMINIUM ALLOY >

Finishing

Face Milling

V10000

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
●				

- Insert with PCD.
- Light weight, strong aluminium alloy cutter body.
- Anti-Fly insert mechanism enables high speed milling.
- Adjustable cutting edge run-out function.

C H :0°
A.R :+8°
R.R :+8°

Fig.1
ø63

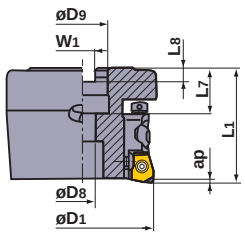
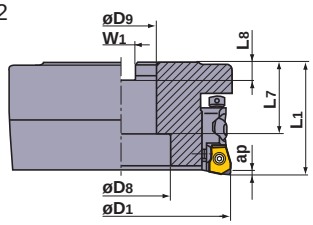


Fig.2
ø80
ø100
ø125



Right hand tool holder only.

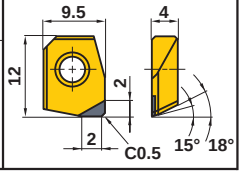
Order Number	Stock	Number of Teeth	Dimensions (mm)							Tool Weight	Max. Depth of Cut	Max. Allowable Revolution	Type (Fig.)
	R		D1	L1	D9	L7	D8	W1	L8	(kg)	ap (mm)	(min-1)	
V10000-063A04R	●	4	63	50	22	20	11	10.4	6.3	0.5	1.5	25000	1
R0305C	●	5	80	50	25.4	26	38	9.5	6	0.6	1.5	22300	2
R0406D	●	6	100	50	31.75	32	45	12.7	8	0.9	1.5	20000	2
R0508E	●	8	125	63	38.1	35	60	15.9	10	1.8	1.5	17800	2

SPARE PARTS

Tool Holder Number		*	*	*				
	Cartridge	Cartridge Clamp Screw-A	Cartridge Clamp Screw-B	Insert Clamp Screw	Run-out Adjust Screw	Balance Adjust Screw	Wrench	Wrench
V10000-063A04R ı V10000R0508E	VCT13R	HBH06016	HBH04008	CS350790T	KS1	HSS05005	HKY25R HKY40R	TKY10R

* Clamp Torque (N • m) : CS350790T=2.5, HBH06016=8.0, HBH04008=4.0

INSERTS

Order Number	Class	PCD MD220	Geometry
NP-GDCW1240PDFR2	C	●	

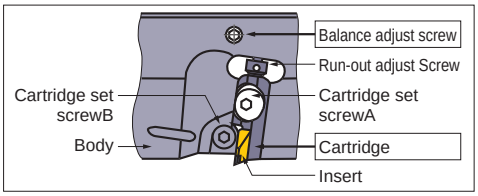
RECOMMENDED CUTTING CONDITIONS

Work Material		Silicon (%)	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)	Depth of Cut (mm)
N	Aluminium Alloy	≤16	−6500	−0.2	−0.5
		≥16	−1000		

NOTE ON ROTATIONAL BALANCE

- At the time of shipping, the cutter body is balanced by using a special high accuracy master insert in order that it will conform to balance quality G6.3 based on ISO 1940/1 (approximate value at the maximum revolution for each cutter diameter). In order to keep good rotational balance, do not adjust the balance screw (HSS05005) located on the outer surface of the body.
- Rotational balance will change after exchanging cartridges. If you use the cutter at the same revolution as that of the following table or higher, re-balancing is necessary after exchanging cartridges. Please contact Mitsubishi Materials to re-balance the cutter.

(Note 1) If the revolution is the same as or lower than the value indicated above, the cutter can be used with a standard arbor. (Do not use long shank type arbors or special arbors, as the overhang could make it dangerous to use.)
(Note 2) If the revolution is higher than the value indicated above, please set the balance as follows : (Arbor + cutter)≤G6.3



Diameter of cutter (mm)	Revolution requiring re-balancing (min-1)
63	17000
80	14500
100	14000
125	Re-balancing not necessary up to the max. revolution

● : Inventory maintained in Japan. (10 inserts in one case)

SPARE PARTS E001
TECHNICAL DATA F001

FACE MILLING
<HIGH FEED FINISHING FOR ALUMINIUM ALLOY>

Finishing

Face Milling

NF10000

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
▬				

- **Insert with PCD.**
- **Suitable for high speed finishing of light alloys.**
- **Adjustable cutting edge run-out function.**

C H :0°
A.R :+10°
R.R :+5°

Fig.1
ø80
ø100

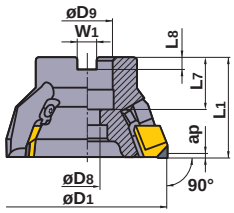
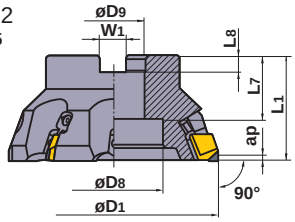


Fig.2
ø125

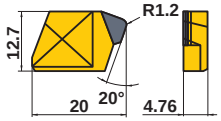


Right hand tool holder only.

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm) D1	L1	D9	L7	D8	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Max.* Allowable Revolution (min-1)	Type (Fig.)
Coarse Pitch	**NF10000R0305C**	●	5	80	50	25.4	26	13	9.5	6	1.0	6.0	16000	1
	0406D	●	6	100	63	31.75	32	17	12.7	8	1.8	6.0	14000	1
	0508E	●	8	125	63	38.1	38	60	15.9	10	2.7	6.0	12000	2
Fine Pitch	**0306C**	●	6	80	50	25.4	26	13	9.5	6	1.0	6.0	16000	1
	0408D	●	8	100	63	31.75	32	17	12.7	8	1.8	6.0	14000	1
	0510E	●	10	125	63	38.1	38	60	15.9	10	2.7	6.0	12000	2

* Ensure max. spindle speed is achieved under the conditions that the cutter is clamped by a machine clamping force of 18kN with a standard type arbor. (HSK 63A-FMA□□□-60) The figure varies in actual machining depending on cutting conditions, such as the length of overhang or the drawing force of the arbor is small.

INSERTS

Order Number	Class	PCD MD220	Geometry
GDCN2004PDFR3	C	●	

RECOMMENDED CUTTING CONDITIONS

Work Material	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
N Aluminium Alloy	**MD220**	3500 (1000—4500)	0.12 (0.05—0.20)

- Revolution (min-1)=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution

SPARE PARTS

Tool Holder Number	Wedge	Clamp Screw *	Wrench
NF10000R0305C ı NF10000R0510E	CWAF10R1	LS10T	TKY25T

* Clamp Torque (N • m) : LS10T=8.5

● : **Inventory maintained in Japan. (10 inserts in one case)**

SPARE PARTS E001
TECHNICAL DATA F001

FACE MILLING
<GENERAL HIGH FEED FINISHING>

Finishing

Face Milling

FF3000

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel

- 11°positive insert.
- 1000—3000mm/min high feed machining.
- For finishing of steel machining.
- Adjustable cutting edge run-out function.

Fig.1

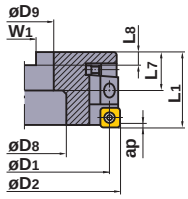
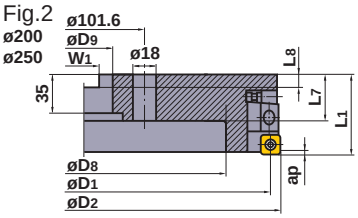


Fig.2

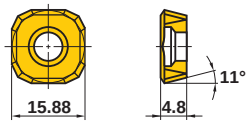
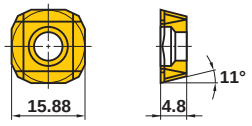


Right hand tool holder only.

C H :0°
A.R :+5° T :+15°
R.R :-15° I :+5°

Order Number	Stock	Number of Teeth	Dimensions (mm)								Tool Weight (kg)	Max.Depth of Cut ap (mm)	Type (Fig.)
	R		D1	D2	L1	D9	L7	D8	W1	L8			
FF3000R0502E	●	2	125	140.4	75	38.1	38	60	15.9	10	5.8	0.3	1
0602F	●	2	160	175.4	75	50.8	38	80	19.1	11	9.0	0.3	1
0802K	●	2	200	215.4	75	47.625	45	134	25.4	14	12.6	0.3	2
1002K	●	2	250	265.4	75	47.625	45	182	25.4	14	19.5	0.3	2

INSERTS

Geometry	Class	Order Number		Cermet NX2525		Carbide HTi05T	
	C	**SPCA53Z**		●			
		Work Material	Steel	○			
			Stainless Steel	◎			
			Cast Iron	○			
			Aluminium Alloy	–			
	C	**SPCG53Z**		●		●	
		Work Material	Steel	◎		–	
			Stainless Steel	○		–	
			Cast Iron	◎		◎	
			Aluminium Alloy	–		◎	

◎ : 1st Recommendation, ○ : 2nd Recommendation, — : No recommendations

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
P	Mild Steel	≤180HB	**NX2525 (SPCG)**	280 (250—300)	2.25 (2—2.5)
	Carbon Steel, Alloy Steel	180—280HB	**NX2525 (SPCG)**	180 (150—220)	2.25 (2—2.5)
	High Alloy Steel	200—280HB	**NX2525 (SPCA)**	120 (80—150)	2.25 (2—2.5)
M	Stainless Steel	≤200HB	**NX2525 (SPCA)**	250 (230—280)	3.0 (2.5—3.5)
K	Cast Iron	Tensile Strength ≤450MPa	**NX2525 (SPCG)**	180 (130—200)	2.25 (2—2.5)
			HTi05T	120 (100—150)	
N	Aluminium Alloy	—	**HTi05T**	≤500	0.85 (0.7—1.0)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution

SPARE PARTS

Tool Holder Number	Cartridge	Shim	Lock Pin *	Cartridge Clamp Screw *	Washer	Radial Spring
FF3000R0502E ı **FF3000R1002K**	FFCSR	FFSS	FFP	HBH08040	FFW	FFRP
Tool Holder Number	Adjusting Wedge	Adjusting Screw	Lever	Lever Screw	Axial Spring	Wrench
FF3000R0502E ı **FF3000R1002K**	FFAWR	LS3	FFL	FFLB	HP3	①HKY25L ②HKY40T

∗ Clamp Torque (N • m) : FFP=2.2, HBH08040=9.5

● : **Inventory maintained in Japan. (10 inserts in one case)**

SPARE PARTS E001
TECHNICAL DATA F001

QUICK CHANGE TYPE
<HIGH FEED CUTTING FOR CAST IRON>

0° | Finishing | Face Milling

FP490

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	◀			

- 11°positive insert.
- Suitable for cast iron finishing.
- Multi insert design.
- For high feed cutting.
- Easy tool exchange.

Fig.1
Q type (Small Diameter)
ø80
ø100
ø125
ø160

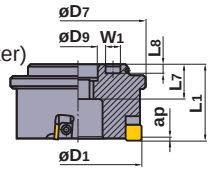


Fig.2
Q type (Large Diameter)
ø200
ø250
ø315
ø355
ø400
ø500

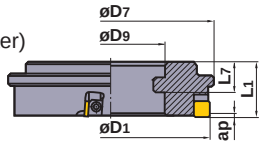
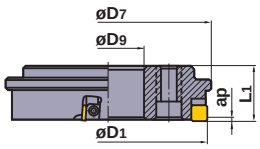


Fig.3
T type
ø250
ø315
ø355
ø400



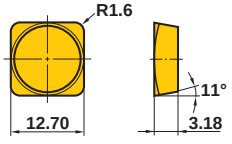
C H :0°
A.R :+5° T :+5°
R.R :+0° I :0°

Right hand tool holder shown.

Type	Order Number	Number of Teeth	Dimensions (mm) D1	D7	L1	D9	L7	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Installation Detail Dimensions	Type (Fig.)
Quick Change Q Type	**FP490R/L0308Q**	8	80	85	50	25.4	26	10.8	7	1.5	0.5	Refer to page C222. (Q Type ϕ80–ϕ160)	1
	0410Q	10	100	105	63	31.75	29	12.8	7	2.8	0.5		1
	0514Q	14	125	130	63	38.1	29	15.8	7	4.2	0.5		1
	0618Q	18	160	165	63	50.8	29	18.8	7	6.7	0.5		1
	0822Q	22	200	205	45	125	25	–	–	5.5	0.5	Refer to page C223. (Q Type ϕ200–ϕ500)	2
	1028Q	28	250	255	45	175	25	–	–	8.0	0.5		2
	1236Q	36	315	320	45	240	25	–	–	10.7	0.5		2
	1440Q	40	355	360	45	280	25	–	–	12.2	0.5		2
	1646Q	46	400	405	45	325	25	–	–	13.8	0.5		2
	2056Q	56	500	505	45	425	25	–	–	17.8	0.5		2
Quick Change T Type	**FP490R/L1028T**	28	250	260	45	110	–	–	–	9.8	0.5	Refer to page C223. (T Type ϕ250–ϕ400)	3
	1236T	36	315	325	45	175	–	–	–	12.1	0.5		3
	1440T	40	355	365	45	215	–	–	–	14.1	0.5		3
	1646T	46	400	410	45	260	–	–	–	15.4	0.5		3

(Note) These are produced to order only.

INSERTS

Order Number	Class	Carbide HTi10	Carbide HTi05T	Geometry
SPEN424A	E	●	●	

RECOMMENDED CUTTING CONDITIONS

	Work Material	Tensile Strength	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤350MPa	**HTi05T**	125 (100–150)	0.2 (0.1–0.3)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution

SPARE PARTS

Tool Holder Number	Wedge	Clamp Screw *	Wrench	Wrench (Sold Separately)	Hexagonal Head (Sold Separately)
FP490R/L0308Q – FP490R/L1646T	CWS42SPR/L	LS14	HKY40T	120QSPK×80 (KANONN-SEIKI CO.)	6.35□×4 (KYOKUTO MFG CO.)

* Clamp Torque (N • m) : LS14=8.2

● : Inventory maintained in Japan. (10 inserts in one case)

SPARE PARTS E001 TECHNICAL DATA F001

QUICK CHANGE TYPE

<HIGH FEED CUTTING FOR CAST IRON>

0° Finishing Face Milling

FP590

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
	◆			

- 11°positive insert.
- Suitable for cast iron finishing.
- Multi insert design.
- For high feed cutting.
- Easy tool exchange.

Fig.1
Q type (Small Diameter)
ø125
ø160

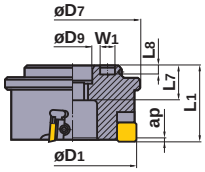


Fig.2
Q type (Large Diameter)
ø200
ø250
ø315
ø355
ø400
ø500

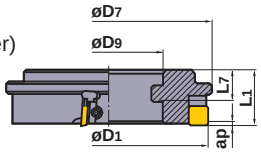
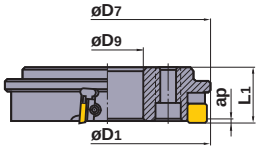


Fig.3
T type
ø250
ø315
ø355
ø400



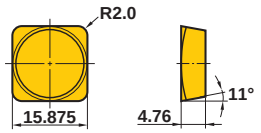
C H :0°
A.R :+5° T :+5°
R.R :+0° I :0°

Right hand tool holder shown.

Type	Order Number	Number of Teeth	Dimensions (mm) D1	D7	L1	D9	L7	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Installation Detail Dimensions	Type (Fig.)
Quick Change Q Type	**FP590R/L0514Q**	14	125	135	63	38.1	29	15.8	7	4.2	0.5	Refer to page C222. (Q Type ϕ125–ϕ160)	1
	0618Q	18	160	170	63	50.8	29	18.8	7	6.7	0.5		1
	0822Q	22	200	210	45	125	25	–	–	5.5	0.5	Refer to page C223. (Q Type ϕ200–ϕ500)	2
	1028Q	28	250	260	45	175	25	–	–	8.0	0.5		2
	1236Q	36	315	325	45	240	25	–	–	10.7	0.5		2
	1440Q	40	355	365	45	280	25	–	–	12.2	0.5		2
	1646Q	46	400	410	45	325	25	–	–	13.8	0.5		2
	2056Q	56	500	510	45	425	25	–	–	17.8	0.5		2
Quick Change T Type	**FP590R/L1028T**	28	250	260	45	110	–	–	–	9.8	0.5	Refer to page C223. (T Type ϕ250–ϕ400)	3
	1236T	36	315	325	45	175	–	–	–	12.1	0.5		3
	1440T	40	355	365	45	215	–	–	–	14.1	0.5		3
	1646T	46	400	410	45	260	–	–	–	15.4	0.5		3

(Note) These are produced to order only.

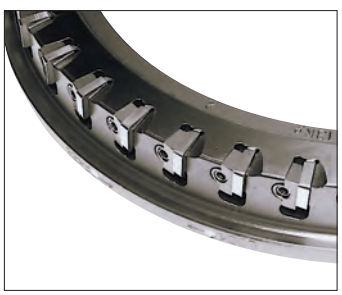
INSERTS

Order Number	Class	Carbide HTi05T	Geometry
SPEN535A	E	●	

RECOMMENDED CUTTING CONDITIONS

	Work Material	Tensile Strength	Grade	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
K	Gray Cast Iron	≤350MPa	**HTi05T**	125 (100–150)	0.2 (0.1–0.3)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution



SPARE PARTS

Tool Holder Number	Wedge	Clamp Screw *	Wrench	Wrench (Sold Separately)	Hexagonal Head (Sold Separately)
FP590R/L0514Q – FP590R/L1646T	CWS5	LS14	HKY40T	120QSPK×80 (KANONN-SEIKI CO.)	6.35□×4 (KYOKUTO MFG CO.)

* Clamp Torque (N • m) : LS14=8.2

● : Inventory maintained in Japan. (10 inserts in one case)

SPARE PARTS E001
TECHNICAL DATA F001

QUICK CHANGE TYPE
<FINISHING FOR ALUMINIUM ALLOY>

4° | Finishing | Face Milling

FE404

Light Alloy	Cast Iron	Carbon Steel · Alloy Steel	Stainless Steel	Hardened Steel
◀				

- 21°positive insert.
- High rake and relief angle.
- Suitable for light alloy machining.
- Easy tool exchange.

Fig.1
Q type (Small Diameter)
ø100
ø125
ø160

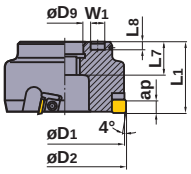


Fig.2
Q type (Large Diameter)
ø200
ø250
ø315
ø355
ø400
ø500

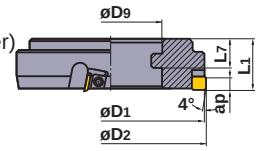
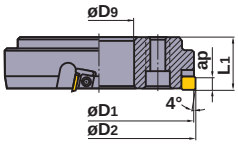


Fig.3
T type
ø250
ø315
ø355
ø400



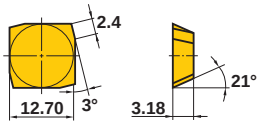
C H :4°
A.R :+11° T :+10°
R.R :+9° I :+10°

Right hand tool holder shown.

Type	Order Number	Number of Teeth	Dimensions (mm) D1	D2	L1	D9	L7	W1	L8	Tool Weight (kg)	Max. Depth of Cut ap (mm)	Installation Detail Dimensions	Type (Fig.)
Quick Change Q Type	**FE404R/L0408Q**	8	100	102	63	31.75	29	12.8	7	3.2	9	Refer to page C222. (Q Type ϕ100—ϕ160)	1
	0510Q	10	125	127	63	38.1	29	15.8	7	4.7	9		1
	0612Q	12	160	162	63	50.8	29	18.8	7	7.6	9		1
	0816Q	16	200	202	45	125	25	—	—	6.1	9	Refer to page C223. (Q Type ϕ200—ϕ500)	2
	1020Q	20	250	252	45	175	25	—	—	7.8	9		2
	1224Q	24	315	317	45	240	25	—	—	10.2	9		2
	1428Q	28	355	357	45	280	25	—	—	11.8	9		2
	1632Q	32	400	402	45	325	25	—	—	13.3	9		2
	2040Q	40	500	502	45	425	25	—	—	16.2	9		2
Quick Change T Type	**FE404R/L1020T**	20	250	251	45	110	—	—	—	9.9	9	Refer to page C223. (T Type ϕ250—ϕ400)	3
	1224T	24	315	316	45	175	—	—	—	12.2	9		3
	1428T	28	335	356	45	215	—	—	—	13.7	9		3
	1632T	32	400	401	45	260	—	—	—	16.2	9		3

(Note) These are produced to order only.

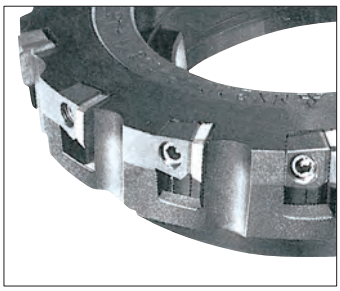
INSERTS

Order Number	Class	Carbide HTi10	Geometry
SEA42C10GR	A	▲	
42C10GL	A	▲	

RECOMMENDED CUTTING CONDITIONS

Work Material		Silicon (%)	Grades	Cutting Speed (m/min)	Feed per Tooth (mm/tooth)
N	Aluminium Alloy	≤10	**HTi10**	700 (400—1000)	0.15 (0.05—0.25)
		≤10	**HTi10**	400 (200—600)	0.15 (0.05—0.25)

- Revolution (min^{-1})=(1000 x Cutting Speed)÷(3.14 x ϕD1)
- Table Feed (mm/min)
  =Feed per Tooth x Number of Teeth x Cutter Revolution



SPARE PARTS

Tool Holder Number	Wedge	Clamp Screw *	Wrench	Wrench (Sold Separately)	Hexagonal Head (Sold Separately)
FE404R/L0408Q ~ **FE404R/L1632T**	CWS42SER/L	LS10	HKY40T	120QSPK×80 (KANONN-SEIKI CO.)	6.35□×4 (KYOKUTO MFG CO.)

* Clamp Torque (N • m) : LS10=8.2

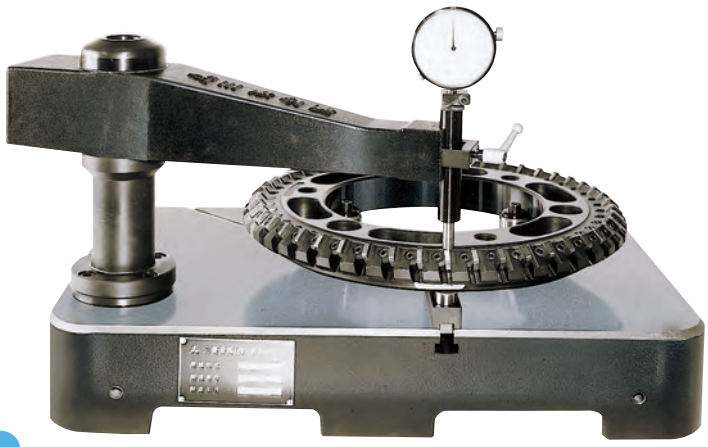
▲ : Inventory maintained in Japan. To be replaced by new products.
(10 inserts in one case)

SPARE PARTS E001 TECHNICAL DATA F001

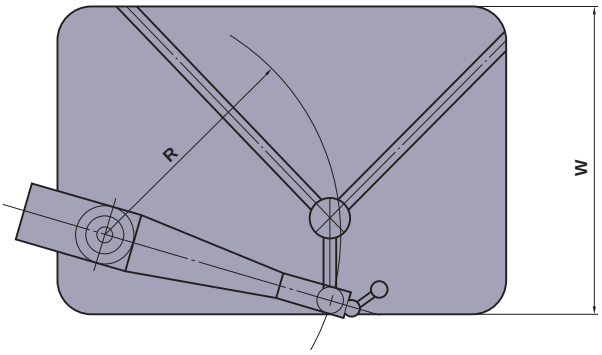
SETTING FIXTURE

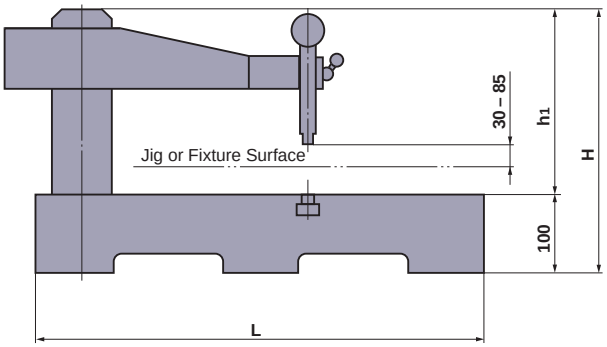
FEATURES OF SETTING FIXTURE

- **Compact design.**
- **Easy set up operation.**
- **Insert is adjusted from the cutting edge point therefore run-out accuracy is high.**



SETTING FIXTURE STANDARD

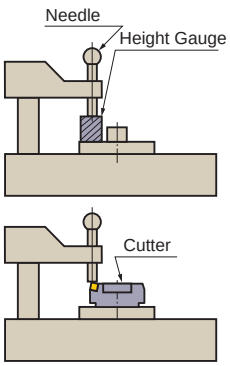




Order Number	R	L	W	H	h1	Cutter Diameter
SEF500	315	600	400	347	247	−ϕ500
SEF700	400	800	500	360	260	ϕ315−ϕ700

(Note 1) Please specify the order number when ordering.
(Note 2) Please contact us regarding special spare parts order.

Method of Insert Setting for One Piece Type.

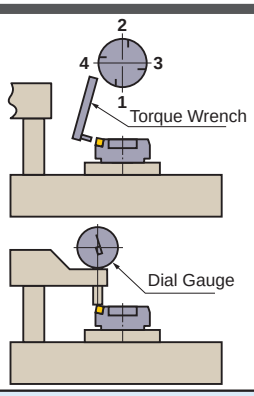


①Set the needle using a height gauge which is the same height as the cutter.

②Move the needle to an insert.

③Slide the insert to the point where it touches the needle Tighten all the inserts lightly. (Use torque wrench.) (1−2N • m)

∗Screwing the inserts too tightly results in lower accuracy.



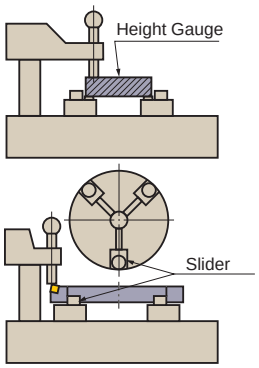
④After temporary tightening, use a torque wrench to tighten firmly. (Use torque wrench.) (8 N • m)

⑤Screw the inserts tightly according to the picture shown on the left.

⑥Check run-out of all the inserts with a dial gauge.

∗For general milling, ≤10μm is the standard. For finishing,set the insert run out at≤5μm.

Method of Insert Setting for Two Piece Type.



①Set the height gauge at the same height as the cutter on the liners of slider, then set the needle.

②Put the cutter on the liners of the slider and move the rollers of the slider to the installation holes.

③Make sure that the three rollers are free, then fix the sliders.

∗Process of tightening the inserts is the same as the one piece type.

● Note

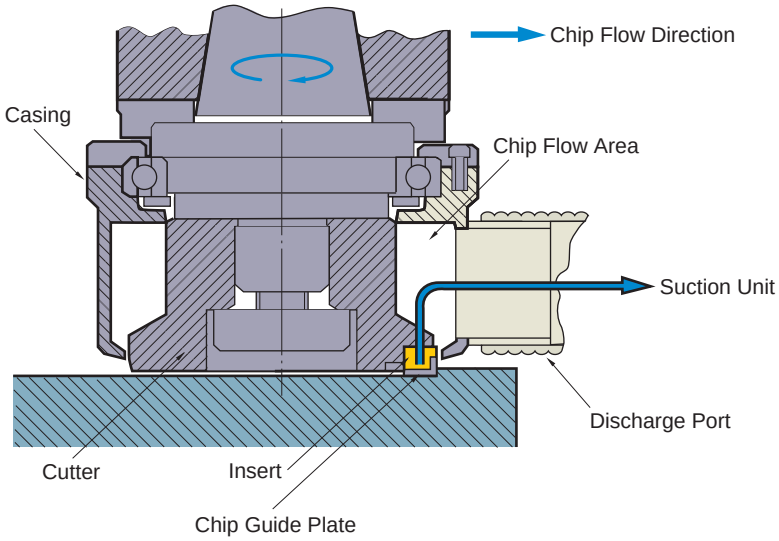
1. After machining, dust off chips on the cutter with air before loosening the wedge.
2. When loosening clamp screws, avoid using a damaged wrench.
3. Alien substances attached to inserts lowers run-out accuracy and damages the cutter body. Therefore, they need to be cleaned throughly.
4. After all the inserts are taken out, clean the cutter body with oil or strong air blow.
5. Use a torque wrench or special wrench for tightening the clamp screws.

Qing SYSTEM

STRUCTURE
CHIP COLLECTION METHOD

STRUCTURE

- **Automatic continuous intake of chips while machining.**
- **Eliminates chip handing problems.**



1
Cutting is performed by a face mill.

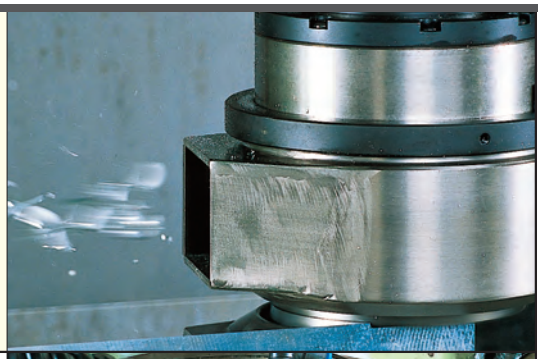
2
Chips are directed into the casing by way of the chip guide plate.

3
Chips are expelled via the discharge port.

CHIP COLLECTION METHOD

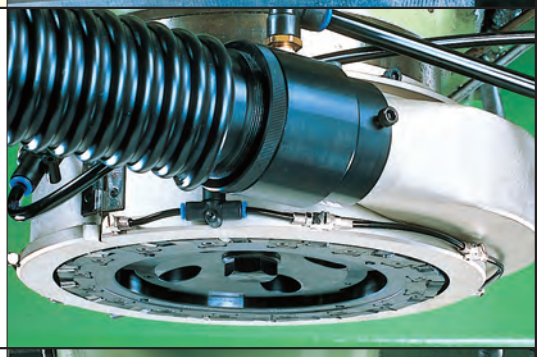
Self Expulsion Type QMC

①Chips are discharged towards the chip conveyor because of the centrifugal force created by the cutter.
②Installation with an ATC(auto tool changer) on machining centers is possible.
③Since there is no need for air or a dust collector, this method provides the lowest initial investment and running costs.
④Chips cannot be transported (carried) directly over long distances.
⑤High speed bearing required to suit high speed machining.



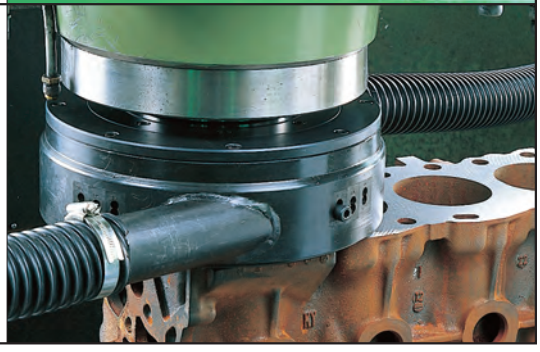
Double Air Type QWA

①Chip recovery using compressed air (factory air).
②Since air is also injected into the casing interior, wet cutting is also possible.
③Achieves the same suction capabilities as a dust collector, thereby enabling low equipment costs.
④Wet cutting is not recommended.



Vacuum Machine Type QSV

①Chip collection by use of a suction machine.
②Chip collection efficiency is high.
③Special equipment is required, such as a mist collector for wet cutting.



MAXIMUM ALLOWABLE REVOLUTION FOR CUTTER

Diameter (mm)	ASX445		SE445		LSE445		SE545		SE415		QSE415	
	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)
50	18000	3.5	–	–	–	–	–	–	–	–	–	–
63	16000	3.5	–	–	–	–	–	–	–	–	–	–
80	14000	3.5	13200	8	–	–	–	–	13200	8	15700	8
100	13000	3.5	11400	8	–	–	9300	8	11400	8	13500	8
125	12000	3.5	9900	8	12400	8	8100	8	9900	8	11800	8
160	10000	3.5	8600	8	10800	8	7000	8	8600	8	–	–
200	9000	3.5	7400	8	9300	8	6000	8	–	–	–	–
250	8000	3.5	6400	8	–	–	5200	8	–	–	–	–
315	6500	3.5	5600	8	–	–	–	–	–	–	–	–

Diameter (mm)	SE515		AHX640W		AOX445		FBP415		BF407		ASX400	
	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)
40	–	–	–	–	–	–	–	–	–	–	–	–
50	–	–	–	–	13000	8	–	–	–	–	18000	3.5
63	–	–	–	–	12000	8	–	–	–	–	16000	3.5
80	–	–	8900	6	11000	8	16600	8	15700	8	14000	3.5
100	9300	8	7800	6	9300	8	14300	8	13500	8	13000	3.5
125	8100	8	6600	6	8300	8	12400	8	11800	8	12000	3.5
160	7000	8	5300	6	7200	8	10800	8	10200	8	10000	3.5
200	–	–	4100	6	6400	8	9300	8	8800	8	9000	3.5
250	–	–	2900	6	–	–	8100	8	7600	8	8000	3.5
315	–	–	1700	6	–	–	7000	8	6600	8	–	–

Diameter (mm)	NSE300		NSE400		AXD7000		BXD4000		V10000		SG20	
	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)	Max. Allowable Revolution (min^{-1})	Clamp Torque (N • m)
20	–	–	–	–	–	–	15000	4	–	–	–	–
25	–	–	–	–	–	–	38000	4	–	–	–	–
32	–	–	–	–	41000	3.5	33000	4	–	–	–	–
35	–	–	–	–	–	–	31000	4	–	–	–	–
40	–	–	–	–	36000	3.5	29000	4	–	–	–	–
50	8900	5	–	–	30000	3.5	24000	4	–	–	–	–
63	7700	5	–	–	25000	3.5	21000	4	25000	3.5	–	–
80	13700	8	12000	8	23000	3.5	19000	4	22300	3.5	8200	8
100	11800	8	10300	8	19000	3.5	16000	4	20000	3.5	7000	8
125	10300	8	9000	8	16000	3.5	14000	4	17800	3.5	6100	8
160	8900	8	7800	8	–	–	–	–	–	–	5300	8

(Note) All values shown on this chart are based on the insert being properly seated in pocket and torqued to the recommended values.

LIST OF CUTTING EDGE DIAMETER TOLERANCES

Milling	Cutting edge diameter tolerance (mm)
ASX400	0 −0.3
AJX	−0.1 −0.4
AQX	−0.1 −0.3
SPX	−0.1 −0.3
OCTACUT	0 −0.3
BRP	−0.1 −0.3
ARX	−0.05 −0.15
SRM	−0.05 −0.15
SRF	0 −0.027
PMR	0 −0.3
PMF	0 −0.3

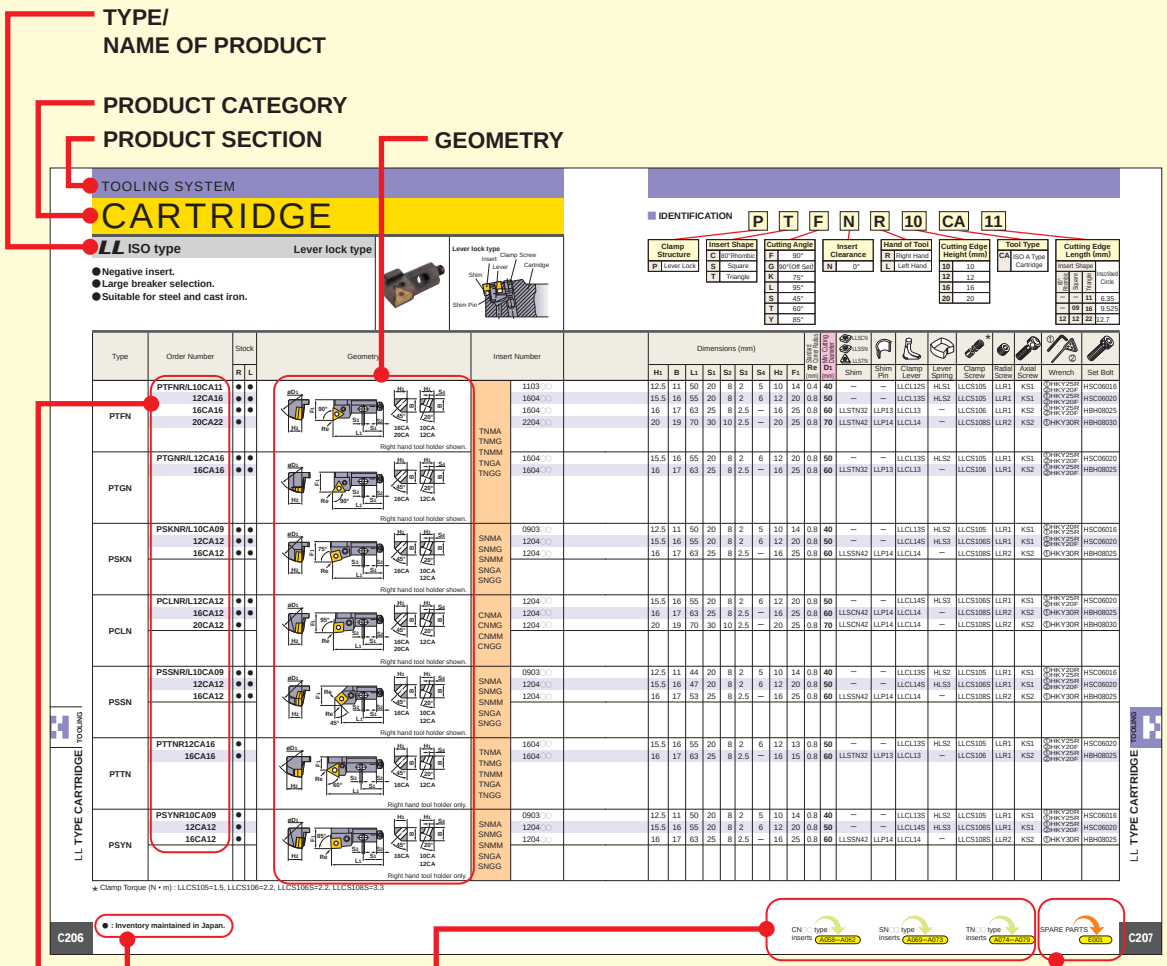
Milling	Cutting edge diameter tolerance (mm)
APX3000 Arbor Type	−0.1 −0.4
APX3000 Shank Type	−0.1 −0.2
APX4000 Arbor Type	−0.1 −0.4
APX4000 Shank Type	−0.1 −0.2
AXD7000 Arbor Type	−0.1 −0.4
AXD7000 Shank Type	−0.1 −0.2
BXD4000 Arbor Type	−0.1 −0.4
BXD4000 Shank Type	−0.1 −0.2

(Note 1) Cutting edge diameter tolerance when the gauge insert is set.
(Note 2) When setting the insert available, the insert tolerance is added to the above tolerance. (Tolerance when setting the insert for SRF.)

HOW TO READ THE STANDARD OF TOOLING SYSTEM

●How this section page is organized

①Organized by product series. (Refer to the index on the next page.)



LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

REFERENCE PAGE FOR APPLICABLE INSERTS
indicates reference pages for details of inserts that are applicable to the title product.

PAGE REFERENCE ·SPARE PARTS
indicates reference pages, including the above, on the right hand page of each double-page spread.

PRODUCT STANDARDS
indicates order numbers, stock status (per right/left hand), applicable inserts, dimensions, minimum cutting diameters, standard corner radius, and spare parts.

●To Order : Please specify
①order number and hand of tool (right/left).

MILLING TOOLS

TOOLING SYSTEM

CARTRIDGE

- **LL TYPE CARTRIDGE** ····· C206
- **BC TYPE CARTRIDGE** ····· C208
- **SS TYPE CARTRIDGE** ····· C210
- **SCREW-ON TYPE CARTRIDGE** ····· C212
- **CARTRIDGE FOR GROOVING AND THREADING** ····· C214

BORING UNIT ····· C216

MI TYPE BORING BARS ····· C219

QUICK CHANGE TOOLING SYSTEM

- **CLASSIFICATION OF QUICK CHANGE SYSTEM** ····· C220
- **FACE MILL** ····· C221
- **FACE MILLING ADAPTER** ····· C222
- **SIDE CUTTER** ····· C224
- **BORING TOOL** ····· C225

MODULAR TOOLING SYSTEM

- **ABS® License KOMET®** ····· C226
- **HSK SYSTEM** ····· C230

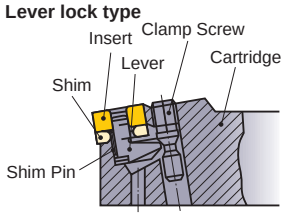
*Arranged by Alphabetical order

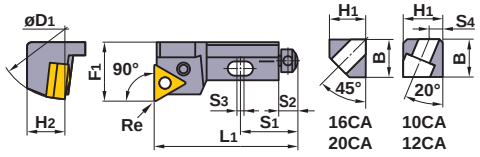
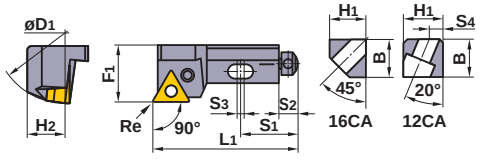
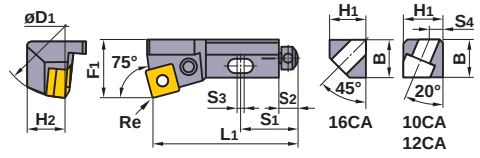
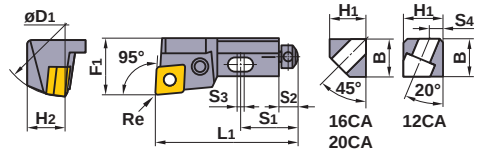
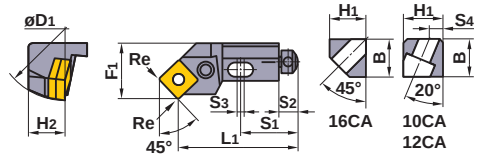
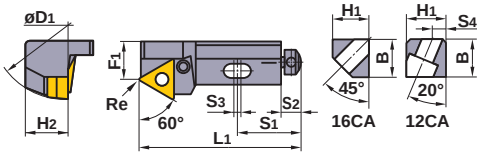
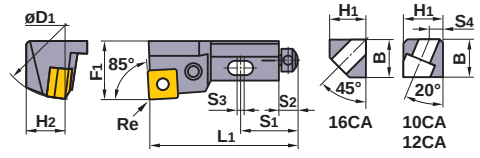
C228 **ABS○○○-ES-M**
C228 **ABS○○○-ES-M1**
C228 **ABS○○○-ES-M3**
C229 **ABS○○○-ES-M4**
C227 **ABS○○○-FS-W**
C228 **ABS○○-ES-M**
C228 **ABS○○-ES-M1**
C228 **ABS○○-ES-M3**
C229 **ABS○○-ES-M4**
C227 **ABS○○-FS-W**
C208 **CSKPR○○CA○○**
C208 **CSSPR○○CA○○**
C208 **CSYPR○○CA○○**
C208 **CTFPR/L○○CA○○**
C208 **CTGPR○○CA○○**
C208 **CTTPR○○CA○○**
C214 **DGHR○○CA○○**
C216 **FA○-FA○○○○**
C216 **FA○-FA○○○○S**
C216 **FV○-FV○○○○**
C216 **FV○-FV○○○○S**
C214 **MGHR○○CA○○○○**
C206 **PCLNR/L○○CA○○**
C206 **PSKNR/L○○CA○○**
C206 **PSSNR/L○○CA○○**
C206 **PSYNR○○CA○○**
C206 **PTFNR/L○○CA○○**
C206 **PTGNR/L○○CA○○**
C206 **PTTNR○○CA○○**
C229 **SBA○○○-ES-M**
C229 **SBA○○○-ES-M1**
C229 **SBA○○-ES-M**
C229 **SBA○○-ES-M1**
C219 **SBR○○○**
C212 **SCLCR○○CA○○**
C212 **SDJCR○○CA○○**
C212 **SDNCR○○CA○○**
C214 **SETHR○○CA○○**
C212 **SRDCR○○CA○○**
C210 **SSKPR○○CA○○**
C210 **SSSPR○○CA○○**
C210 **SSYPR○○CA○○**
C210 **STFPR/L○○CA○○**
C210 **STGPR○○CA○○**
C212 **STJPR○○CA○○**
C210 **STTPR○○CA○○**
C212 **SVJCR○○CA○○**
C212 **SVPCR○○CA○○**

CARTRIDGE

LL ISO type — Lever lock type

- Negative insert.
- Large breaker selection.
- Suitable for steel and cast iron.



Type	Order Number	Stock R	Stock L	Geometry	Insert Number	
PTFN	PTFNR/L10CA11	●	●	 Right hand tool holder shown.	TNMA TNMG TNMM TNGA TNGG	1103○○
	12CA16	●	●			1604○○
	16CA16	●	●			1604○○
	20CA22	●				2204○○
PTGN	PTGNR/L12CA16	●	●	 Right hand tool holder shown.		1604○○
	16CA16	●	●			1604○○
PSKN	PSKNR/L10CA09	●	●	 Right hand tool holder shown.	SNMA SNMG SNMM SNGA SNGG	0903○○
	12CA12	●	●			1204○○
	16CA12	●	●			1204○○
PCLN	PCLNR/L12CA12	●	●	 Right hand tool holder shown.	CNMA CNMG CNMM CNGG	1204○○
	16CA12	●	●			1204○○
	20CA12	●				1204○○
PSSN	PSSNR/L10CA09	●	●	 Right hand tool holder shown.	SNMA SNMG SNMM SNGA SNGG	0903○○
	12CA12	●	●			1204○○
	16CA12	●	●			1204○○
PTTN	PTTNR12CA16	●		 Right hand tool holder only.	TNMA TNMG TNMM TNGA TNGG	1604○○
	16CA16	●				1604○○
PSYN	PSYNR10CA09	●		 Right hand tool holder only.	SNMA SNMG SNMM SNGA SNGG	0903○○
	12CA12	●				1204○○
	16CA12	●				1204○○

∗ Clamp Torque (N • m) : LLCS105=1.5, LLCS106=2.2, LLCS106S=2.2, LLCS108S=3.3

● : Inventory maintained in Japan.

IDENTIFICATION

P T F N R 10 CA 11

Clamp Structure	
P	Lever Lock

Insert Shape	
C	80°Rhombic
S	Square
T	Triangle

Cutting Angle	
F	90°
G	90°(Off Set)
K	75°
L	95°
S	45°
T	60°
Y	85°

Insert Clearance	
N	0°

Hand of Tool	
R	Right Hand
L	Left Hand

Cutting Edge Height (mm)	
10	10
12	12
16	16
20	20

Tool Type	
CA	ISO A Type Cartridge

Cutting Edge Length (mm)			
Insert Shape			Inscribed Circle
80° Rhombic	Square	Triangle	
—	—	11	6.35
—	09	16	9.525
12	12	22	12.7

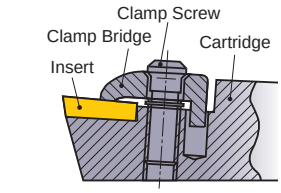
Dimensions (mm)									Standard Corner Radius	Min. Cutting Diameter	LLSCN LLSSN LLSTN				*		①②	
H_1	B	L_1	S_1	S_2	S_3	S_4	H_2	F_1	Re (mm)	D_1 (mm)	Shim	Shim Pin	Clamp Lever	Lever Spring	Clamp Screw	Radial Screw	Axial Screw	Wrench	Set Bolt
12.5	11	50	20	8	2	5	10	14	0.4	40	—	—	LLCL12S	HLS1	LLCS105	LLR1	KS1	①HKY25R ②HKY20F	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	—	—	LLCL13S	HLS2	LLCS105	LLR1	KS1	①HKY25R ②HKY20F	HSC06020
16	17	63	25	8	2.5	—	16	25	0.8	60	LLSTN32	LLP13	LLCL13	—	LLCS106	LLR1	KS2	①HKY25R ②HKY20F	HBH08025
20	19	70	30	10	2.5	—	20	25	0.8	70	LLSTN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	①HKY30R	HBH08030
15.5	16	55	20	8	2	6	12	20	0.8	50	—	—	LLCL13S	HLS2	LLCS105	LLR1	KS1	①HKY25R ②HKY20F	HSC06020
16	17	63	25	8	2.5	—	16	25	0.8	60	LLSTN32	LLP13	LLCL13	—	LLCS106	LLR1	KS2	①HKY25R ②HKY20F	HBH08025
12.5	11	50	20	8	2	5	10	14	0.8	40	—	—	LLCL13S	HLS2	LLCS105	LLR1	KS1	①HKY20R ①HKY25R	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	—	—	LLCL14S	HLS3	LLCS106S	LLR1	KS1	①HKY25R ②HKY20F	HSC06020
16	17	63	25	8	2.5	—	16	25	0.8	60	LLSSN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	①HKY30R	HBH08025
15.5	16	55	20	8	2	6	12	20	0.8	50	—	—	LLCL14S	HLS3	LLCS106S	LLR1	KS1	①HKY25R ②HKY20F	HSC06020
16	17	63	25	8	2.5	—	16	25	0.8	60	LLSCN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	①HKY30R	HBH08025
20	19	70	30	10	2.5	—	20	25	0.8	70	LLSCN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	①HKY30R	HBH08030
12.5	11	44	20	8	2	5	10	14	0.8	40	—	—	LLCL13S	HLS2	LLCS105	LLR1	KS1	①HKY20R ①HKY25R	HSC06016
15.5	16	47	20	8	2	6	12	20	0.8	50	—	—	LLCL14S	HLS3	LLCS106S	LLR1	KS1	①HKY25R ②HKY20F	HSC06020
16	17	53	25	8	2.5	—	16	25	0.8	60	LLSSN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	①HKY30R	HBH08025
15.5	16	55	20	8	2	6	12	13	0.8	50	—	—	LLCL13S	HLS2	LLCS105	LLR1	KS1	①HKY25R ②HKY20F	HSC06020
16	17	63	25	8	2.5	—	16	15	0.8	60	LLSTN32	LLP13	LLCL13	—	LLCS106	LLR1	KS2	①HKY25R ②HKY20F	HBH08025
12.5	11	50	20	8	2	5	10	14	0.8	40	—	—	LLCL13S	HLS2	LLCS105	LLR1	KS1	①HKY20R ①HKY25R	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	—	—	LLCL14S	HLS3	LLCS106S	LLR1	KS1	①HKY25R ②HKY20F	HSC06020
16	17	63	25	8	2.5	—	16	25	0.8	60	LLSSN42	LLP14	LLCL14	—	LLCS108S	LLR2	KS2	①HKY30R	HBH08025

CN□□ type inserts A058—A062
SN□□ type inserts A069—A073
TN□□ type inserts A074—A079
SPARE PARTS E001

CARTRIDGE

BC ISO type — Clamp on type

- 11°positive insert.
- Suitable for steel, cast iron, aluminium alloys and copper alloys.



Type	Order Number	Stock R	Stock L	Geometry	Insert Number	
CTFP	CTFPR/L10CA11	●	●	Right hand tool holder shown.	TPMN TPMR TPGN	1103○○
	12CA16	●	●			1603○○
	16CA16	●	●			1603○○
CTGP	CTGPR10CA11	●		Right hand tool holder only.		1103○○
	12CA16	●				1603○○
	16CA16	●				1603○○
CSKP	CSKPR10CA09	●		Right hand tool holder only.	SPMN SPMR SPGN	0903○○
	12CA12	●				1203○○
	16CA12	●				1203○○
CSSP	CSSPR10CA09	●		Right hand tool holder only.		0903○○
	12CA12	●				1203○○
	16CA12	●				1203○○
CTTP	CTTPR10CA11	●		Right hand tool holder only.	TPMN TPMR TPGN	1103○○
	12CA16	●				1603○○
	16CA16	●				1603○○
CSYP	CSYPR10CA09	●		Right hand tool holder only.	SPMN SPMR SPGN	0903○○
	12CA12	●				1203○○
	16CA12	●				1203○○

⁎ Clamp Torque (N • m) : BC4=2.5, BC4L=2.5, BC5=5.0, BC6=5.0

● : Inventory maintained in Japan.

IDENTIFICATION

C T F P R 10 CA 11

Clamp Structure	
C	Clamp On

Insert Shape	
S	Square
T	Triangle

Cutting Angle	
F	90°
G	90°(Off Set)
K	75°
S	45°
T	60°
Y	85°

Insert Clearance	
P	11°

Hand of Tool	
R	Right Hand
L	Left Hand

Cutting Edge Height (mm)	
10	10
12	12
16	16

Tool Type	
CA	ISO A Type Cartridge

Cutting Edge Length (mm)		
Insert Shape		Inscribed Circle
Square	Triangle	
–	11	6.35
09	16	9.525
12	22	12.7

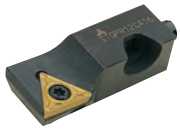
Dimensions (mm)									Standard Corner Radius	Min. Cutting Diameter	PS / PT				*		
H_1	B	L_1	S_1	S_2	S_3	S_4	H_2	F_1	Re (mm)	D_1 (mm)	Shim	Shim Pin	Radial Screw	Axial Screw	Clamp Set	Wrench	Set Bolt
12.5	11	50	20	8	2	5	10	14	0.4	38	–	–	TSS05006	KS1	BC4	TKY10R	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	–	–	TSS06010	KS1	BC5	TKY20R	HSC06020
16	17	63	25	8	2	–	16	25	0.8	55	PT32	BCP201	TSS06010	KS2	BC6	TKY20R	HBH08025
12.5	11	50	20	8	2	5	10	14	0.4	38	–	–	TSS05006	KS1	BC4	TKY10R	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	–	–	TSS06010	KS1	BC5	TKY20R	HSC06020
16	17	63	25	8	2	–	16	25	0.8	55	PT32	BCP201	TSS06010	KS2	BC6	TKY20R	HBH08025
12.5	11	50	20	8	2	5	10	14	0.8	38	–	–	TSS05006	KS1	BC4L	TKY10R	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	–	–	TSS06010	KS1	BC5	TKY20R	HSC06020
16	17	63	25	8	2	–	16	25	0.8	55	PS42	BCP251	TSS06010	KS2	BC6	TKY20R	HBH08025
12.5	11	44	20	8	2	5	10	14	0.8	38	–	–	TSS05006	KS1	BC4L	TKY10R	HSC06016
15.5	16	47	20	8	2	6	12	20	0.8	50	–	–	TSS06010	KS1	BC5	TKY20R	HSC06020
16	17	53	25	8	2	–	16	25	0.8	55	PS42	BCP251	TSS06010	KS2	BC6	TKY20R	HBH08025
12.5	11	50	20	8	2	5	10	9	0.4	38	–	–	TSS05006	KS1	BC4	TKY10R	HSC06016
15.5	16	55	20	8	2	6	12	13	0.8	50	–	–	TSS06010	KS1	BC5	TKY20R	HSC06020
16	17	63	25	8	2	–	16	15	0.8	55	PT32	BCP201	TSS06010	KS2	BC6	TKY20R	HBH08025
12.5	11	50	20	8	2	5	10	14	0.8	38	–	–	TSS05006	KS1	BC4L	TKY10R	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	–	–	TSS06010	KS1	BC5	TKY20R	HSC06020
16	17	63	25	8	2	–	16	25	0.8	55	PS42	BCP251	TSS06010	KS2	BC6	TKY20R	HBH08025

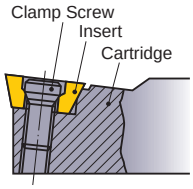
SP□□ type inserts A117, A118
TP□□ type inserts A120, A121
SPARE PARTS E001

CARTRIDGE

SS ISO type — Screw on type

- 11°positive insert.
- Suitable for steel, cast iron, aluminium alloys and copper alloys.





Type	Order Number	Stock R	Stock L	Geometry	Insert Number	
STFP	STFPR/L10CA11	●	●	Right hand tool holder shown.	TPMX TPGX	1103○○
	12CA16	●	●			1603○○
					TPMT TPGX	
STGP	STGPR10CA11	●		Right hand tool holder only.	TPMX TPGX	1103○○
	12CA16	●				1603○○
	16CA16	●				1603○○
					TPMT TPGX	
SSKP	SSKPR10CA09	●		Right hand tool holder only.	SPMT SPGX	0903○○
	12CA12	●				1203○○
SSSP	SSSPR10CA09	●		Right hand tool holder only.		0903○○
	12CA12	●				1203○○
STTP	STTPR10CA11	●		Right hand tool holder only.	TPMX TPGX	1103○○
	12CA16	●				1603○○
	16CA16	●				1603○○
					TPMT TPGX	
SSYP	SSYPR10CA09	●		Right hand tool holder only.	SPMT SPGX	0903○○
	12CA12	●				1203○○

∗ Clamp Torque (N • m) : CS300890T=1.0, TS4=3.5, TS5=7.5

● : Inventory maintained in Japan.

IDENTIFICATION

S T F P R 10 CA 11

Clamp Structure	
S	Screw On

Insert Shape	
S	Square
T	Triangle

Cutting Angle	
F	90°
G	90°(Off Set)
K	75°
S	45°
T	60°
Y	85°

Insert Clearance	
P	11°

Hand of Tool	
R	Right Hand
L	Left Hand

Cutting Edge Height (mm)	
10	10
12	12
16	16

Tool Type	
CA	ISO A Type Cartridge

Cutting Edge Length (mm)		
Insert Shape		Inscribed Circle
Square	Triangle	
–	11	6.35
09	16	9.525
12	22	12.7

Dimensions (mm)									Standard Corner Radius	Min. Cutting Diameter	*				
H_1	B	L_1	S_1	S_2	S_3	S_4	H_2	F_1	Re (mm)	D_1 (mm)	Clamp Screw	Radial Screw	Axial Screw	Wrench	Set Bolt
12.5	11	50	20	8	2	5	10	14	0.4	35	CS300890T	TSS05006	KS1	TKY08F TKY10F	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	TS4	TSS06010	KS1	TKY15F TKY20F	HSC06020
12.5	11	50	20	8	2	5	10	14	0.4	35	CS300890T	TSS05006	KS1	TKY08F TKY10F	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	TS4	TSS06010	KS1	TKY15F TKY20F	HSC06020
16	17	63	25	8	2	–	16	25	0.8	55	TS4	TSS06012	KS2	TKY15F TKY20F	HBH08025
12.5	11	50	20	8	2	5	10	14	0.8	35	TS4	TSS05006	KS1	TKY10F TKY15F	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	TS5	TSS06010	KS1	TKY20F TKY25F	HSC06020
12.5	11	44	20	8	2	5	10	14	0.8	35	TS4	TSS05006	KS1	TKY10F TKY15F	HSC06016
15.5	16	47	20	8	2	6	12	20	0.8	50	TS5	TSS06010	KS1	TKY20F TKY25F	HSC06020
12.5	11	50	20	8	2	5	10	9	0.4	35	CS300890T	TSS05006	KS1	TKY08F TKY10F	HSC06016
15.5	16	55	20	8	2	6	12	13	0.8	50	TS4	TSS06010	KS1	TKY15F TKY20F	HSC06020
16	17	63	25	8	2	–	16	15	0.8	55	TS4	TSS06012	KS2	TKY15F TKY20F	HBH08025
12.5	11	50	20	8	2	5	10	14	0.8	35	TS4	TSS05006	KS1	TKY10F TKY15F	HSC06016
15.5	16	55	20	8	2	6	12	20	0.8	50	TS5	TSS06010	KS1	TKY20F TKY25F	HSC06020

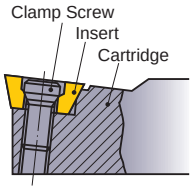
SP○○ type inserts A103
TP○○ type inserts A106, A107
SPARE PARTS E001

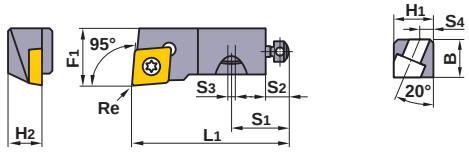
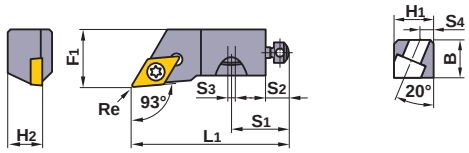
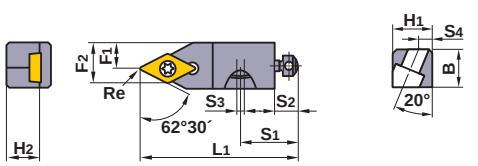
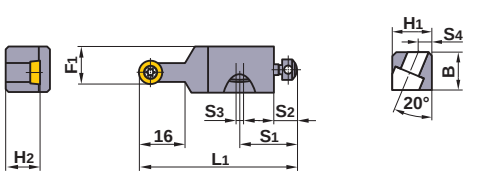
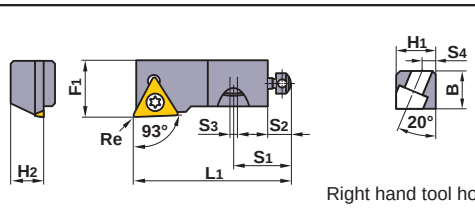
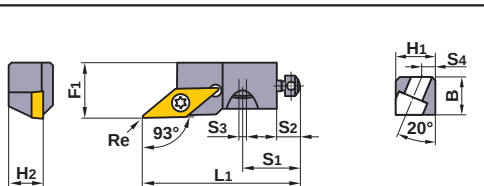
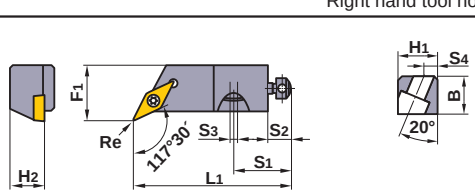
CARTRIDGE

Screw-on type cartridge ISO type

- 11°positive insert.
- Suitable for steel, cast iron, aluminium alloys and copper alloys.

Screw on type



Type	Order Number	Stock R	Geometry	Insert Number	
SCLC	SCLCR12CA12	●	 Right hand tool holder only.	CCMT CCMW	1204○○
SDJC	SDJCR12CA11	●	 Right hand tool holder only.	DCMT DCMW	11T3○○
SDNC	SDNCR12CA11	●	 Right hand tool holder only.	DCMT DCMW	11T3○○
SRDC	SRDCR12CA08	●	 Right hand tool holder only.	RCMT	0803M0
STJP	STJPR12CA16	●	 Right hand tool holder only.	TPGX	1603○○
SVJC	SVJCR12CA16	●	 Right hand tool holder only.	VCMT VCMW	1604○○
SVPC	SVPCR12CA11	●	 Right hand tool holder only.	VCMT VCMW	1103○○

∗ Clamp Torque (N • m) : TS25=1.0, TS3=1.0, TS4=3.5, TS43=3.5, TS5=7.5

● : Inventory maintained in Japan.

IDENTIFICATION

S C L C R 12 CA 12

Clamp Structure	
S	Screw On

Insert Shape	
C	80°Rhombic
D	55°Rhombic
R	Round
T	Triangle
V	35°Rhombic

Cutting Angle	
L	95°
J	93°
N	62°30′
P	117°30′
D	—

Insert Clearance	
C	7°
P	11°

Hand of Tool	
R	Right Hand
L	Left Hand

Cutting Edge Height (mm)	
12	12

Tool Type	
CA	ISO A Type Cartridge

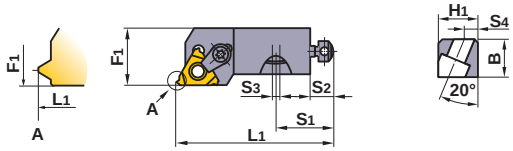
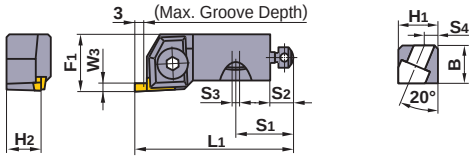
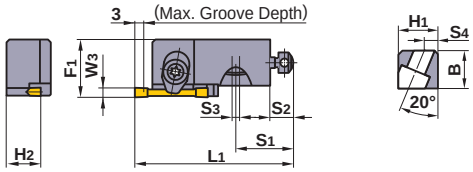
Cutting Edge Length (mm)					
Insert Shape					Inscribed Circle
Round	35° Rhombic	55° Rhombic	80° Rhombic	Triangle	
08	—	—	—	—	8.0
—	16	11	—	16	9.525
—	—	—	12	—	12.7

Dimensions (mm)									Standard Corner Radius	*					
H_1	B	L_1	S_1	S_2	S_3	S_4	H_2	F_1	Re (mm)	Clamp Screw	Radial Screw	Axial Screw	Insert Wrench	Adjust Screw Wrench	Set Bolt
15.5	16	55	20	8	2	6	12	20	0.8	TS5	TSS06010	KS1	TKY25R	TKY20F	HSC06020
15.5	16	55	20	8	2	6	12	20	0.8	TS43	TSS06010	KS1	TKY15R	TKY20F	HSC06020
15.5	16	55	20	8	2	6	12	20	0.8	TS43	TSS06010	KS1	TKY15R	TKY20F	HSC06020
15.5	16	55	20	8	2	6	12	13	0.8	TS3	TSS06010	KS1	TKY08R	TKY20F	HSC06020
15.5	16	55	20	8	2	6	12	20	0.8	TS4	TSS06010	KS1	TKY15R	TKY20F	HSC06020
15.5	16	55	20	8	2	6	12	20	0.4	TS43	TSS06010	KS1	TKY15R	TKY20F	HSC06020
15.5	16	55	20	8	2	6	12	20	0.4	TS25	TSS06010	KS1	TKY08R	TKY20F	HSC06020

CC○○ type inserts A089—A092
DC○○ type inserts A094—A097
RC○○ type inserts A099
VC○○ type inserts A110
TP○○ type inserts A106, A107
SPARE PARTS E001

CARTRIDGE

Cartridge for grooving and threading

Type	Order Number	Stock R	Geometry	Insert Number		
SETHR	SETHR12CA16	●		SET	○○○R3X○○	
MGHR	MGHR12CA3323	●		MGTR	33○○	
DGHR	DGHR12CA02	●		DGM DGJ	20CE	
	12CA03	●			30CE	
	12CA04	●			40CE	

⁎1 Please refer to the insert standard page for further information about thread pitches.
⁎2 Clamp Torque (N • m) : SETS51=3.5, HBH06018=7.0

● : Inventory maintained in Japan.

Dimensions (mm)									Thread Pitch *1	Insert Width	①*2 ② Clamp Screw	Clamp Set	① ② Clamp Bridge	Shim	Shim Screw	Axial Screw	Stop Ring	Spring	Set Screw	Wrench
H_1	B	L_1	S_1	S_2	S_3	S_4	H_2	F_1	(mm)	W_3 (mm)										
15.5	16	55	20	8	2	6	12	20	0.5 – 3.0	—	①SETS51	—	①SETK51	CT32T1	HFC 03008	KS1	CR4	MES3	HSC06020	TKY15R
15.5	16	55	20	8	2	6	12	20	—	2.3 – 3.3	②HBH 06018	—	②MTK1R	—	—	KS1	—	—	HSC06020	TKY10R
15.5	16	55	20	8	2	6	12	20	—	2	—	BC5	—	—	—	KS1	—	—	HSC06020	TKY10R
15.5	16	55	20	8	2	6	12	20	—	3	—	BC5	—	—	—	KS1	—	—	HSC06020	TKY10R
15.5	16	55	20	8	2	6	12	20	—	4	—	BC5	—	—	—	KS1	—	—	HSC06020	TKY10R

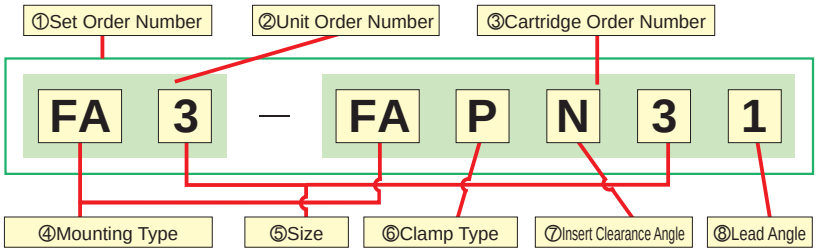
SET□□ type inserts A401
MG□□ type inserts A365
DG□□ type inserts A358
SPARE PARTS E001

BORING UNIT

FA,FV

- Precision finish boring unit.
- Facilitates precision adjustment.
- High accuracy.

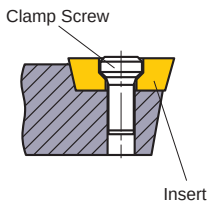
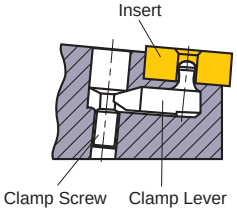
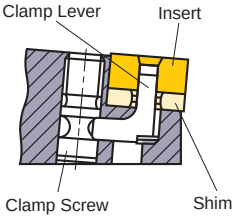
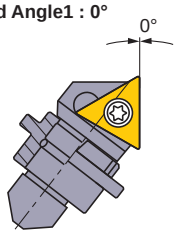
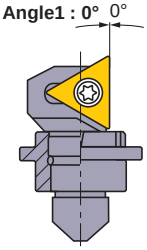
IDENTIFICATION



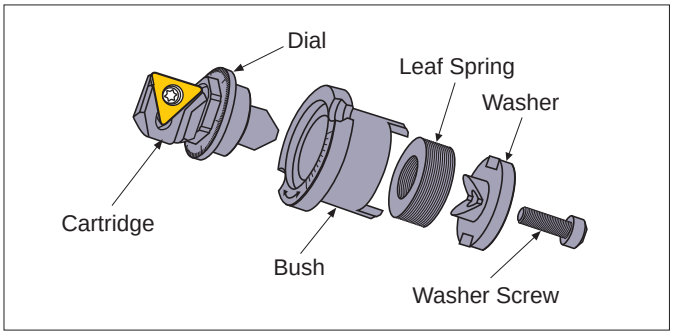
* Sets are delivered with unit and cartridge assembled.

④Mounting Type	Cutting Mode	①Set Order Number *	Stock	②Unit Order Number	Stock	③Cartridge Order Number	Stock	⑤Size Symbol	⑤Size Min. Cutting Diameter (mm)	⑥Clamp Type Symbol	⑥Clamp Type Type	⑦Insert Clearance Angle Symbol	⑦Insert Clearance Angle Angle
FA Type (Angular Type)		FA0-FASC01	●	FA0	●	FASC01	●	0	19	S	Screw On	C	7
		FA0-FASC01S	●	FA0	●	FASC01S	●	0	19	S	Screw On	C	7
		FA1-FASP11	●	FA1	●	FASP11	●	1	25	S	Screw On	P	11
		FA1-FASP11S	●	FA1	●	FASP11S	●	1	25	S	Screw On	P	11
		FA2-FASP21	●	FA2	●	FASP21	●	2	36	S	Screw On	P	11
		FA2-FASP21S	●	FA2	●	FASP21S	●	2	36	S	Screw On	P	11
		FA2-FAPN21	●	FA2	●	FAPN21	●	2	36	P	Lever Lock	N	0
		FA2-FAPN21S	●	FA2	●	FAPN21S	●	2	36	P	Lever Lock	N	0
		FA3-FASP31	●	FA3	●	FASP31	●	3	47	S	Screw On	P	11
		FA3-FASP31S	●	FA3	●	FASP31S	●	3	47	S	Screw On	P	11
		FA3-FAPN31	●	FA3	●	FAPN31	●	3	47	P	Lever Lock	N	0
		FA3-FAPN31S	●	FA3	●	FAPN31S	●	3	47	P	Lever Lock	N	0
		FA4-FAPN41	●	FA4	●	FAPN41	●	4	73	P	Lever Lock	N	0
		FA4-FAPN41S	●	FA4	●	FAPN41S	●	4	73	P	Lever Lock	N	0
FV Type (Vertical Type)		FV0-FVSC01	●	FV0	●	FVSC01	●	0	19	S	Screw On	C	7
		FV0-FVSC01S	●	FV0	●	FVSC01S	●	0	19	S	Screw On	C	7
		FV1-FVSP11	●	FV1	●	FVSP11	●	1	25	S	Screw On	P	11
		FV1-FVSP11S	●	FV1	●	FVSP11S	●	1	25	S	Screw On	P	11
		FV2-FVSP21	●	FV2	●	FVSP21	●	2	36	S	Screw On	P	11
		FV2-FVSP21S	●	FV2	●	FVSP21S	●	2	36	S	Screw On	P	11
		FV2-FVPN21	●	FV2	●	FVPN21	●	2	36	P	Lever Lock	N	0
		FV2-FVPN21S	●	FV2	●	FVPN21S	●	2	36	P	Lever Lock	N	0
		FV3-FVSP31	●	FV3	●	FVSP31	●	3	47	S	Screw On	P	11
		FV3-FVSP31S	●	FV3	●	FVSP31S	●	3	47	S	Screw On	P	11
		FV3-FVPN31	●	FV3	●	FVPN31	●	3	47	P	Lever Lock	N	0
		FV3-FVPN31S	●	FV3	●	FVPN31S	●	3	47	P	Lever Lock	N	0
		FV4-FVPN41	●	FV4	●	FVPN41	●	4	73	P	Lever Lock	N	0
		FV4-FVPN41S	●	FV4	●	FVPN41S	●	4	73	P	Lever Lock	N	0

* "S" at the end of the order number indicates left hand tool.

⑥Cartridge Clamp Structure			⑧Lead Angle	
S (Screw-on Type)	**P** (Lever Lock Type)	**P** (Lever Lock Type with Shim)	**FA**	**FV**
Applicable Size : 0,1,2,3	**Applicable Size : 2,3**	**Applicable Size : 4**	**Lead Angle1 : 0°**	**Lead Angle1 : 0°**
				

● : Inventory maintained in Japan.



BORING UNIT SPARE PARTS

Unit Order Number	Washer Screw	Unit Screw	Wrench	Bush	Washer	Leaf Spring
FA0	HSC02006	S1	HKY15R	The parts above are not sold separately as accuracy can only be guaranteed by having the complete set. Please contact us for questions about parts replacement.		
FV0	HSC02006	S1	HKY15R			
FA1	HSC02506	HY-A1	HKY20R			
FV1	HSC02506	HY-V1	HKY20R			
FA2	HSC03010	HY2	HKY20R,HKY25R			
FV2	HSC03010	HY2	HS-N2,HKY25R			
FA3	HSC04012	HY3	HKY20R,HKY30R			
FV3	HSC04012	HY3	HKY20R,HKY30R			
FA4	HSC05016	HY4	HKY30R,HKY40R			
FV4	HSC05016	HY4	HKY30R,HKY40R			

CARTRIDGE SPARE PARTS

Cartridge ⁎1	Clamp Lever	Clamp Screw ⁎3	Shim	Shim Pin	Spanner ⁎2	Wrench	Applicable Insert	
FASC01(S)	–	① TS2	–	–	HR00	① TKY06F	TCGT..L-F TCGW	060102 060104
FVSC01(S)	–	① TS2	–	–	HR00	① TKY06F		
FASP11(S)	–	① CS250T	–	–	HR12	① TKY08F	TPGX TPGX..L/R TPMX..L/R	090204
FVSP11(S)	–	① CS250T	–	–	HR12	① TKY08F		
FASP21(S)	–	① CS300890T	–	–	HR12	① TKY08F		110304 110308
FVSP21(S)	–	① CS300890T	–	–	HR12	① TKY08F		
FAPN21(S)	LLCL12S	② LLCS103	–	–	HR12	② HKY20F	TNGA TNGG..L/R	110304 110308
FVPN21(S)	LLCL12S	② LLCS103	–	–	HR12	② HKY20F		
FASP31(S)	–	① CS300890T	–	–	HR34	① TKY08F	TPGX TPGX..L/R TPMX..L/R	110304 110308
FVSP31(S)	–	① CS300890T	–	–	HR34	① TKY08F		
FAPN31(S)	LLCL12S	② LLCS103	–	–	HR34	② HKY20F	TNGA TNGG..L/R	110304 110308
FVPN31(S)	LLCL12S	② LLCS103	–	–	HR34	② HKY20F		
FAPN41(S)	LLCL13	② LLCS106	LLSTN32	LLP13	HR34	② HKY25F		160404 160408 160412
FVPN41(S)	LLCL13	② LLCS106	LLSTN32	LLP13	HR34	② HKY25F		

(Note) Use left hand inserts in the cartridge for right hand cutting and right hand inserts in the cartridge for left hand cutting.

⁎1 "S" at the end of the cartridge number indicates left hand.

⁎2 A spanner is only provided when ordered with a set.

⁎3 Clamp Torque (N • m) : TS2=0.6, CS250T=1.0, CS300890T=1.0, LLCS103=1.5, LLCS106=2.2

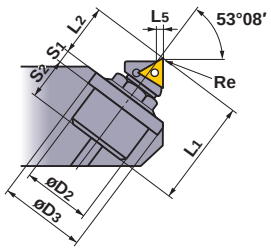
INSERTS

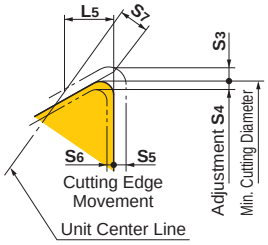
Finish Cutting			Medium Cutting	Flat Top	
TCGT..L/R-F	TPGX..L/R	TPMX..L	TNGG..L/R	TPGX	TNGA
(06) ➲A104	(09,11) ➲A106	(09,11) ➲A107	(11,16) ➲A078	(09,11) ➲A107	(11,16) ➲A079

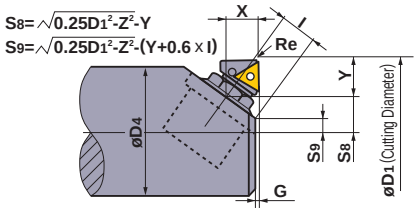
BORING UNIT

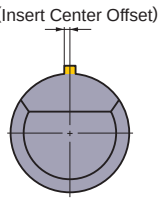
MAIN DIMENSIONS

●FA TYPE (ANGULAR TYPE)





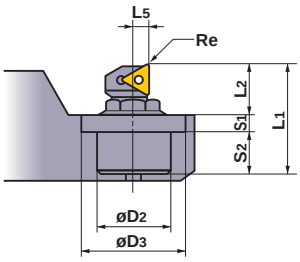


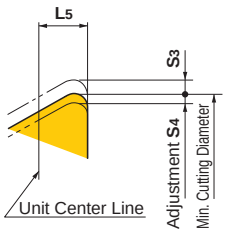


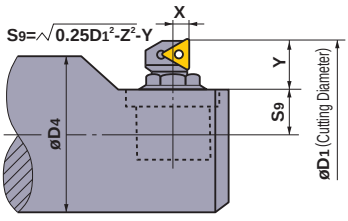
Clockwise (right hand) tool shown.
Minimum cutting diameters correspond to Re0.2 (0 type) and Re0.4 (1—4 type).
Unit : mm

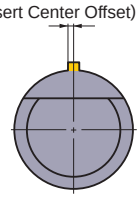
Set Order Number *	Re	Min. Cutting Diameter	Adjustment S3	Adjustment S4	L2	L1	S5	S6	L5	D2	D3	S1	S2	S7	Z	X	Y	G	I	D4 Max.
FA0-FASC01(S)	0.2	19	0.32	0.16	9.0	19.9	0.30	0.12	1.5	11.11	15.06	2.7	8.2	1.11	1.2	6.4	6.5	1.0	6.8	D1-2
	0.4	19	0.32	0.16	8.8	19.7	0.30	0.12	1.6	11.11	15.06	2.7	8.2	1.11	1.2	6.4	6.4	1.0	6.8	D1-2
FA1-FASP11(S)	0.4	25	0.5	0.3	11.7	23.9	0.38	0.23	0.8	15.08	19.05	3.2	9.0	0.46	1.0	7.6	9.1	0.9	8.4	D1-2
FA2-FASP21(S)	0.4	36	0.7	0.4	14.9	33.4	0.53	0.30	1.1	19.05	24.58	4.0	14.5	0.7	1.2	9.7	11.5	0.8	11.1	D1-2
	0.8	36	0.7	0.4	14.5	33.0	0.53	0.30	1.3	19.05	24.58	4.0	14.5	0.7	1.2	9.7	11.2	0.8	11.1	D1-2
FA2-FAPN21(S)	0.4	36	0.7	0.4	14.9	33.4	0.53	0.30	1.1	19.05	24.58	4.0	14.5	0.7	2.75	9.7	11.5	0.8	11.1	D1-2
	0.8	36	0.7	0.4	14.5	33.0	0.53	0.30	1.3	19.05	24.58	4.0	14.5	0.7	2.75	9.7	11.2	0.8	11.1	D1-2
FA3-FASP31(S)	0.4	47	1.0	0.6	18.35	42.85	0.75	0.45	0.9	22.225	31.75	4.8	19.7	0.54	1.9	11.7	14.4	1.2	13.1	D1-3
	0.8	47	1.0	0.6	17.95	42.45	0.75	0.45	1.1	22.225	31.75	4.8	19.7	0.54	1.9	11.7	14.1	1.2	13.1	D1-3
FA3-FAPN31(S)	0.4	47	1.0	0.6	18.35	42.85	0.75	0.45	0.9	22.225	31.75	4.8	19.7	0.54	3.21	11.7	14.4	1.2	13.1	D1-3
	0.8	47	1.0	0.6	17.95	42.45	0.75	0.45	1.1	22.225	31.75	4.8	19.7	0.54	3.21	11.7	14.1	1.2	13.1	D1-3
FA4-FAPN41(S)	0.4	73	1.5	0.7	28.0	65.4	1.13	0.53	1.3	31.75	46.02	6.4	31.0	0.86	5.2	17.7	21.9	1.3	20.5	D1-3
	0.8	73	1.5	0.7	27.6	65.0	1.13	0.53	1.5	31.75	46.02	6.4	31.0	0.86	5.2	17.7	21.6	1.3	20.5	D1-3
	1.2	73	1.5	0.7	27.2	64.6	1.13	0.53	1.7	31.75	46.02	6.4	31.0	0.86	5.2	17.7	21.3	1.3	20.5	D1-3

●FV TYPE (VERTICAL TYPE)









Clockwise (right hand) tool shown.
Minimum cutting diameters correspond to Re0.2 (0 type) and Re0.4 (1—4 type).
Unit : mm

Set Order Number *	Re	Min. Cutting Diameter	Adjustment S3	Adjustment S4	L2	L1	L5	D2	D3	S1	S2	Z	X	Y	D4 Max.
FV0-FVSC01(S)	0.2	19	0.4	0.2	7.6	18.5	2.6	11.11	15.06	2.7	8.2	1.2	2.6	7.6	D1-2
	0.4	19	0.4	0.2	7.4	18.3	2.6	11.11	15.06	2.7	8.2	1.2	2.6	7.4	D1-2
FV1-FVSP11(S)	0.4	25	0.7	0.3	10.8	23.0	3.6	15.08	20.62	3.2	9.0	1.0	3.6	10.8	D1-2
FV2-FVSP21(S)	0.4	36	0.8	0.6	13.8	32.3	4.0	19.05	24.58	4.0	14.5	1.2	4.0	13.8	D1-2
	0.8	36	0.8	0.6	13.5	32.0	4.0	19.05	24.58	4.0	14.5	1.2	4.0	13.5	D1-2
FV2-FVPN21(S)	0.4	36	0.8	0.6	13.8	32.3	4.0	19.05	24.58	4.0	14.5	2.1	4.0	13.8	D1-2
	0.8	36	0.8	0.6	13.5	32.0	4.0	19.05	24.58	4.0	14.5	2.1	4.0	13.5	D1-2
FV3-FVSP31(S)	0.4	47	1.3	0.7	16.7	41.2	4.8	22.225	31.75	4.8	19.7	1.9	4.8	16.7	D1-3
	0.8	47	1.3	0.7	16.4	40.9	4.8	22.225	31.75	4.8	19.7	1.9	4.8	16.4	D1-3
FV3-FVPN31(S)	0.4	47	1.3	0.7	16.7	41.2	4.8	22.225	31.75	4.8	19.7	3.21	4.8	16.7	D1-3
	0.8	47	1.3	0.7	16.4	40.9	4.8	22.225	31.75	4.8	19.7	3.21	4.8	16.4	D1-3
FV4-FVPN41(S)	0.4	73	1.8	1.0	25.0	62.4	7.1	31.75	46.02	6.4	31.0	5.2	7.1	25.0	D1-3
	0.8	73	1.8	1.0	24.7	62.1	7.1	31.75	46.02	6.4	31.0	5.2	7.1	24.7	D1-3
	1.2	73	1.8	1.0	24.4	61.8	7.1	31.75	46.02	6.4	31.0	5.2	7.1	24.4	D1-3

* "S" at the end of the order number indicates left hand tool.

MI TYPE BORING BARS

IDENTIFICATION

S	B	R	1	08
①	②	③	④	⑤

①Clamp Type

S	Screw On Type

②Boring Bar Name

③Shank Shape

R	Round Shank

④Lead Angle

1	0°
3	30°
4	45°
6	90°

⑤Shank Size (mm)

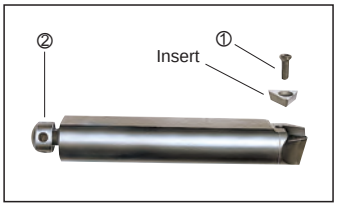
08	8
10	10
12	12
16	16

STANDARD HOLDER

Geometry	Order Number	Stock (For Clockwise)	∗ Insert Number		Dimensions (mm) H1	B	L1	L3	S2	H2	F1	Standard Corner Radius Re (mm)
SBR1	SBR108	●	TPGX TPGX...L TPMX...L	0802○○	7	8	35	9	–	7	3.5	0.4
	110	●		0902○○	9	10	50	11	–	8	4.5	0.4
	112	●		1103○○	10	12	60	12	7	10	5.0	0.4
SBR3	SBR308	●	TPGX TPGX...L TPMX...L	0802○○	7	8	35	10	–	7	0.7	0.4
	310	●		0902○○	9	10	50	12	–	8	1.0	0.4
	312	●		1103○○	10	12	60	13	7	10	1.0	0.4
SBR4	SBR408	●	TPGX TPGX...L TPMX...L	0802○○	7	8	35	10	–	7	0.5	0.4
	410	●		0902○○	9	10	50	12	–	8	1.0	0.4
	412	●		1103○○	10	12	60	13	7	10	1.0	0.4
	416	●		1103○○	14	16	80	13	9	14	0	0.8
SBR6	SBR608	●	TPGX TPGX...L TPMX...L	0802○○	7	8	35	8.5	–	7	–	0.4
	610	●		0902○○	8	10	50	10	–	8	–	0.4
	612	●		1103○○	10	12	60	11	7	10	–	0.4

(Note) When using an insert with a breaker, please use a left hand insert.

SPARE PARTS



Order Number		∗ ①Clamp Screw	②Pre-Set Screw	Wrench
SBR1 – SBR6	08	CS200T	–	TKY06F
	10	CS250T	–	TKY08F
	12	CS300890T	KS1S	TKY08F
	16	CS300890T	KS2S	TKY08F

∗ Clamp Torque (N • m) : CS200T=0.6, CS250T=1.0, CS300890T=1.0

● : Inventory maintained in Japan.

TP○○ type inserts A106, A107
SPARE PARTS E001

CLASSIFICATION OF QUICK CHANGE MODULAR TOOLING SYSTEM

Mitsubishi's quick change system is a must for improving efficiency in mass production lines.

- Shorten tool change times and increase machine efficiency.
- Reduce tool weight. Thus, tool change is safer and easier.
- Improve cutting edge accuracy.

QF1000 (Two Piece)

QF2000 (Small Diameter)

QF2000 (Large Diameter)

QC TYPE ADAPTER FOR PIN MILLING CUTTER

QS2000 (Arbor for Side Cutter)

Face Mill and Pin Milling Cutter

QB2000 • QB3000

QB4000

Boring Tool

MITSUBISHI's QUICK CHANGE SYSTEM

Connecting System

ABS License KOMET®

HSK

Special Tooling

SPQH (Spring)

SPQS (Spring+Oil pressure)

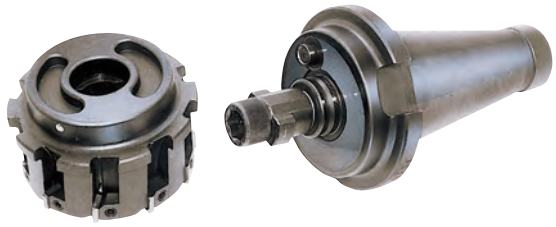
Setting Fixture

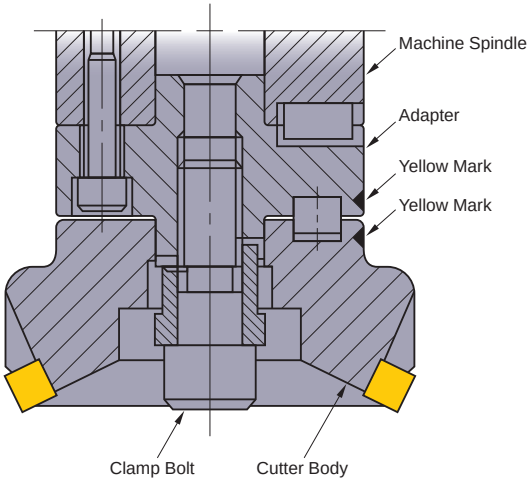
Setting Gauge

FACE MILL

QF2000 (SINGLE BOLT MOUNTING TYPE)

One Piece Type (≤ϕ160)

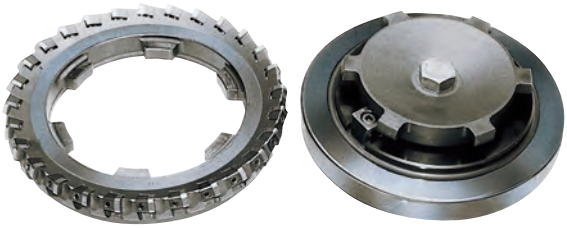


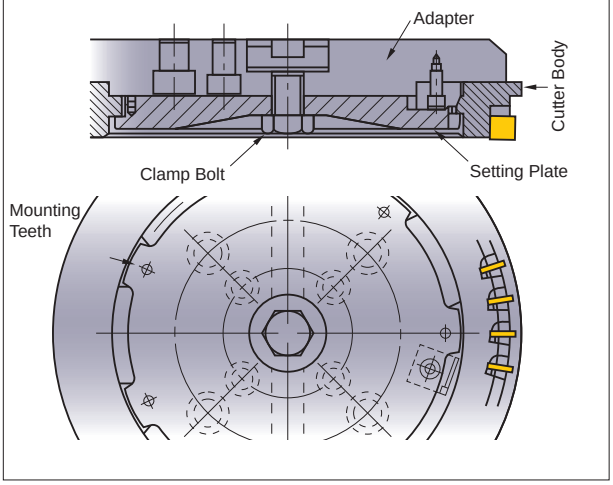


FEATURES

1. Simply turning a clamp bolt fixed to the adapter a few times enables cutter exchange.
2. The cutter needs to be turned 90° before removal. This prevents the cutter from falling free.
3. Applicable to both face milling and boring tools.
4. Cutter exchange time is less than 1 min.

Two Piece Type (≥ϕ200)





FEATURES

1. Internal diameter of the cutter body has 4—6 mounting teeth. The adapter has the same mounting teeth and a single clamp bolt for installation.
2. The cutter needs to be turned 15° before removal. This prevents the cutter from falling free.
3. Cutter exchange time is less than 1 min.

QF1000 (GOURD SHAPED HOLE TYPE)

One Piece Type (O Type ϕ200)

Two Piece Type (T Type ≥ϕ250)

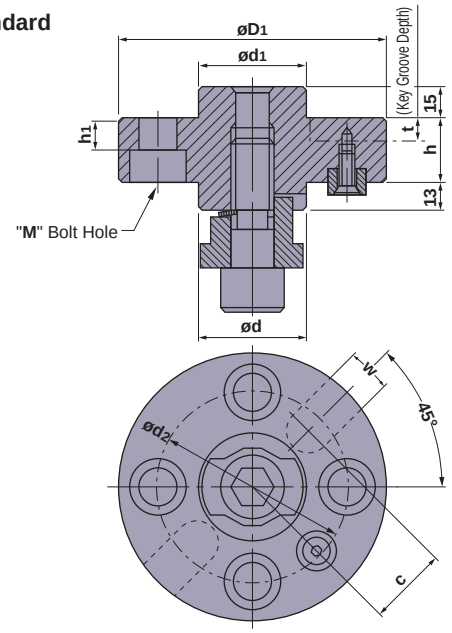
FEATURES

1. Gourd shaped hole type is employed. Turning 4—6 bolts enables cutter exchange.
2. The cutter needs to be turned 15° before removal. This prevents the cutter from falling free.
3. Cutters with ≥ϕ250 are made up of 2 parts. Thus, weight at the time of installation is reduced and safety is improved.
4. Standard adapters facilitate installation of cutters with the same diameter and different insert shapes.
5. Cutter exchange time is less than 3—5 min.

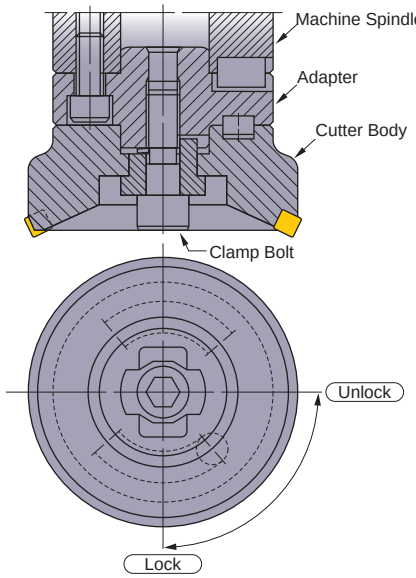
FACE MILLING ADAPTER

Q TYPE (SINGLE BOLT TYPE) ϕ80–ϕ160

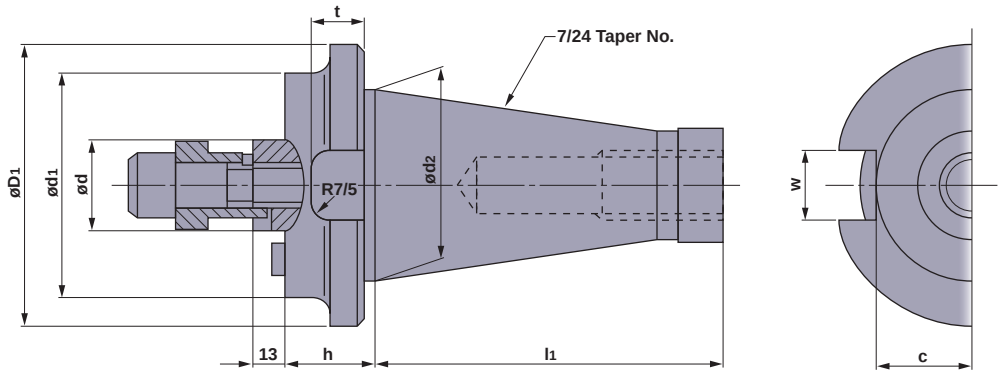
Standard



Installed Condition



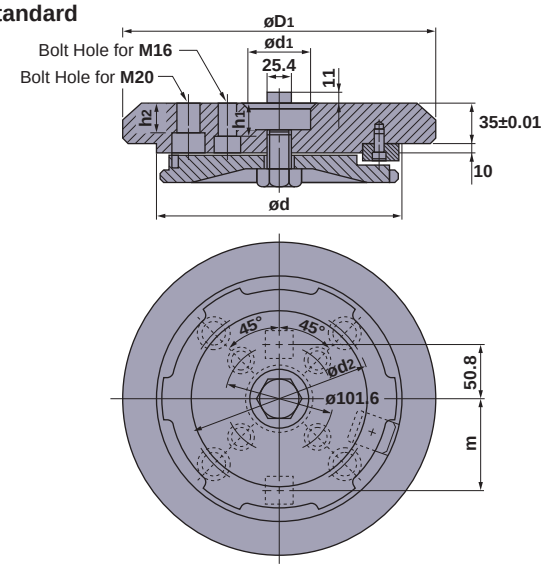
Order Number	Cutter Diameter (D)	Cutter Dimensions (mm)			Machine Dimensions (mm)							Tool Weight (kg)
		D1	d	h	d1	d2	h1	M	w	t	c	
QFA08025BCR/L	80	70	25.4	25	25.4	45	14	M12	9.5	7	18.4	0.8
10025BDR/L	100	80	31.75	25	31.75	55	14	M16	12.7	8	23.2	1.2
12530BER/L	125	100	38.1	30	38.1	70	17	M20	15.9	10	28	2.1
16030BFR/L	160	125	50.8	30	50.8	85	13	M20	19	11	36	3.2



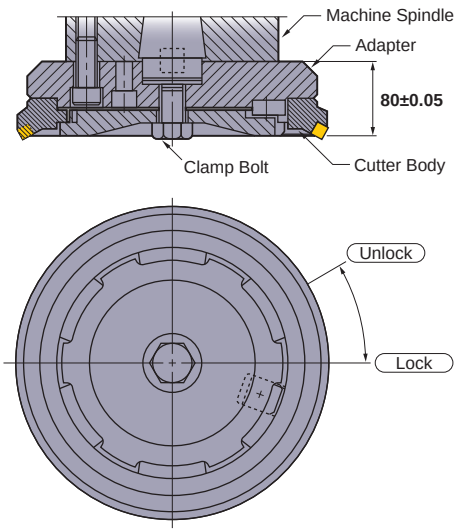
Order Number	Cutter Diameter (D)	Cutter Dimensions (mm)			Machine Dimensions (mm)							Tool Weight (kg)
		d1	d	h	D1	No.	d2	l1	w	t	c	
QFA08025N4R/L	80	70	25.4	25	70	40	44.45	93.4	16.1	16	22.5	1.4
10025N4R/L	100	80	31.75	25	80	40	44.45	93.4	16.1	16	22.5	1.7
12530N4R/L	125	100	38.1	30	100	40	44.45	93.4	16.1	16	22.5	2.7
16030N4R/L	160	125	50.8	30	125	40	44.45	93.4	16.1	16	22.5	3.8
QFA08025N5R/L	80	70	25.4	25	100	50	69.85	126.8	25.7	19	35.3	3.2
10025N5R/L	100	80	31.75	25	100	50	69.85	126.8	25.7	19	35.3	3.4
12530N5R/L	125	100	38.1	30	100	50	69.85	126.8	25.7	19	35.3	4.0
16030N5R/L	160	125	50.8	30	125	50	69.85	126.8	25.7	19	35.3	5.1

Q TYPE (SINGLE BOLT TYPE) ϕ200—ϕ500

Standard



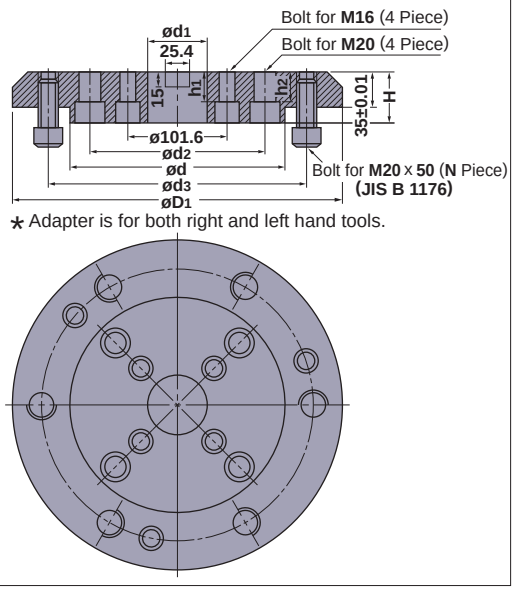
Installed Condition



Order Number	Cutter Diameter (D)	Cutter Dimensions (mm)		Machine Dimensions (mm)					Tool Weight (kg)
		d	D1	d1	d2	h1	h2	m	
QFB20035KR/L	200	125	190	47.625	—	18	—	—	9
25035KR/L	250	175	240	47.625	—	28	—	—	16
31535PR/L	315	240	305	47.625	177.8	28	24	88.9	28
35535PR/L	355	280	345	47.625	177.8	28	24	88.9	37
40035PR/L	400	325	390	47.625	177.8	28	24	88.9	49
50035PR/L	500	425	490	47.625	177.8	28	24	88.9	83

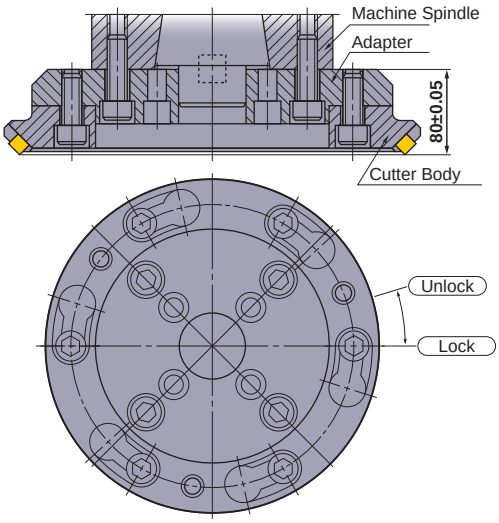
T TYPE (SIX BOLT TYPE) ϕ250—ϕ400

Standard



* Adapter is for both right and left hand tools.

Installed Condition



Order Number	Cutter Diameter (D)	Cutter Dimensions (mm)					Machine Dimensions (mm)				Tool Weight (kg)
		d	d3	D1	H	N	d1	d2	h1	h2	
QFA25035K	250	110	155	230	45	4	47.625	—	18	—	9
31535P	315	175	220	295	50	6	47.625	155	30	14	16
35535P	355	215	260	335	50	6	47.625	177.8	30	30	22
40035P	400	260	305	380	50	6	47.625	177.8	30	30	29

SIDE CUTTER

QC TYPE ADAPTER FOR PIN MILLING CUTTER

Cutter Body

Adapter Body

FEATURES

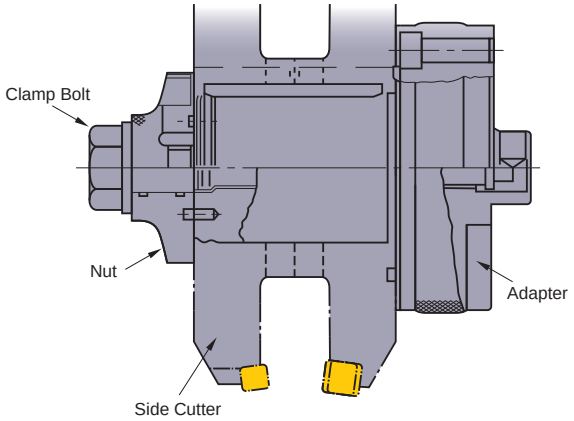
1. Makes installation of Pin millng cutter easy, quick, and accurate.
2. Clamping the entire periphery of the cutter body improves rigidity and lateral run-out of the cutting edges.
3. Facilitates stable heavy cutting such as counter weight cutting and prevents sudden insert fracture.

QS2000 (INSTALLATION METHOD FOR SIDE CUTTER)

Appearance

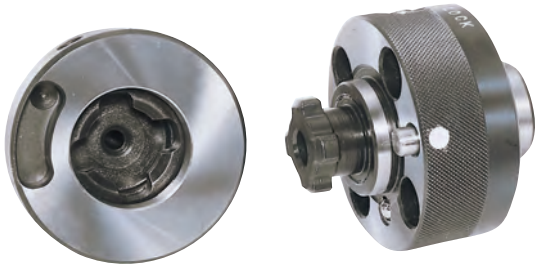
FEATURES

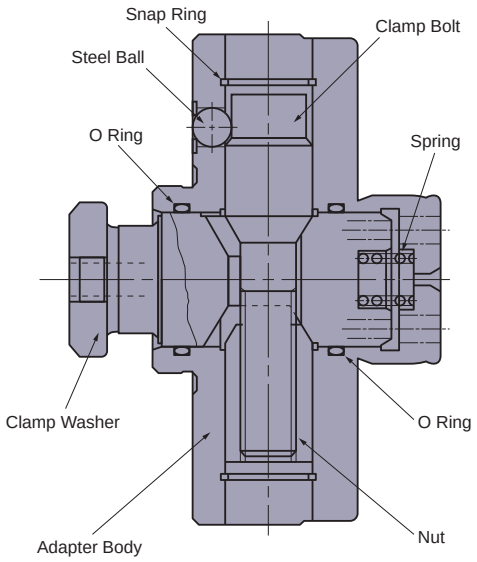
1. Turning the bolt a few times turns nut 45° and enables installation and detachment of the cutter.
2. Installation and detachment of the cutter is possible without taking the bolt and nut off the adapter.
3. The cutter is a solid type. Thus, the rigidity is high.
4. Cutter exchange time is less than 1 min.



BORING TOOL

QB4000 TYPE (SIDE CLAMP TYPE)

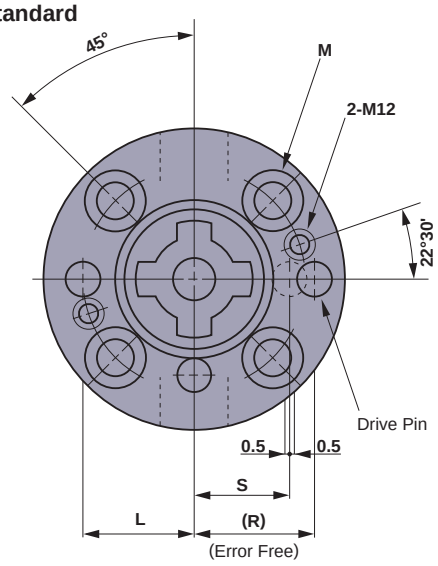


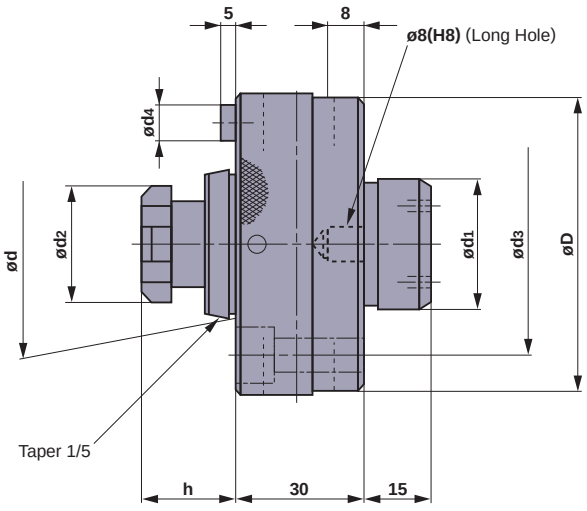


FEATURES

1. Tightening the clamp bolt (or clamp nut) draws the clamp washer in and securely holds the boring head.
2. The clamp washer has mounting teeth at the end. Turning the clamp washer 45° enables installation and detachment of the boring head.
3. Both 1/5 taper and cutter locating faces support the boring head. Thus, clamp rigidity and installation repeatability accuracy are high (2—3μm).
4. A side clamp structure is employed. Thus, a spindle turning stopper is unnecessary. This structure prevents the boring head from falling free.
5. Insert location close to the adapter body allows for convenient head exchange.
6. Suitable for a wide range of boring, from small to large diameters.
7. Head exchange time is less than 1 min.

Installation Standard





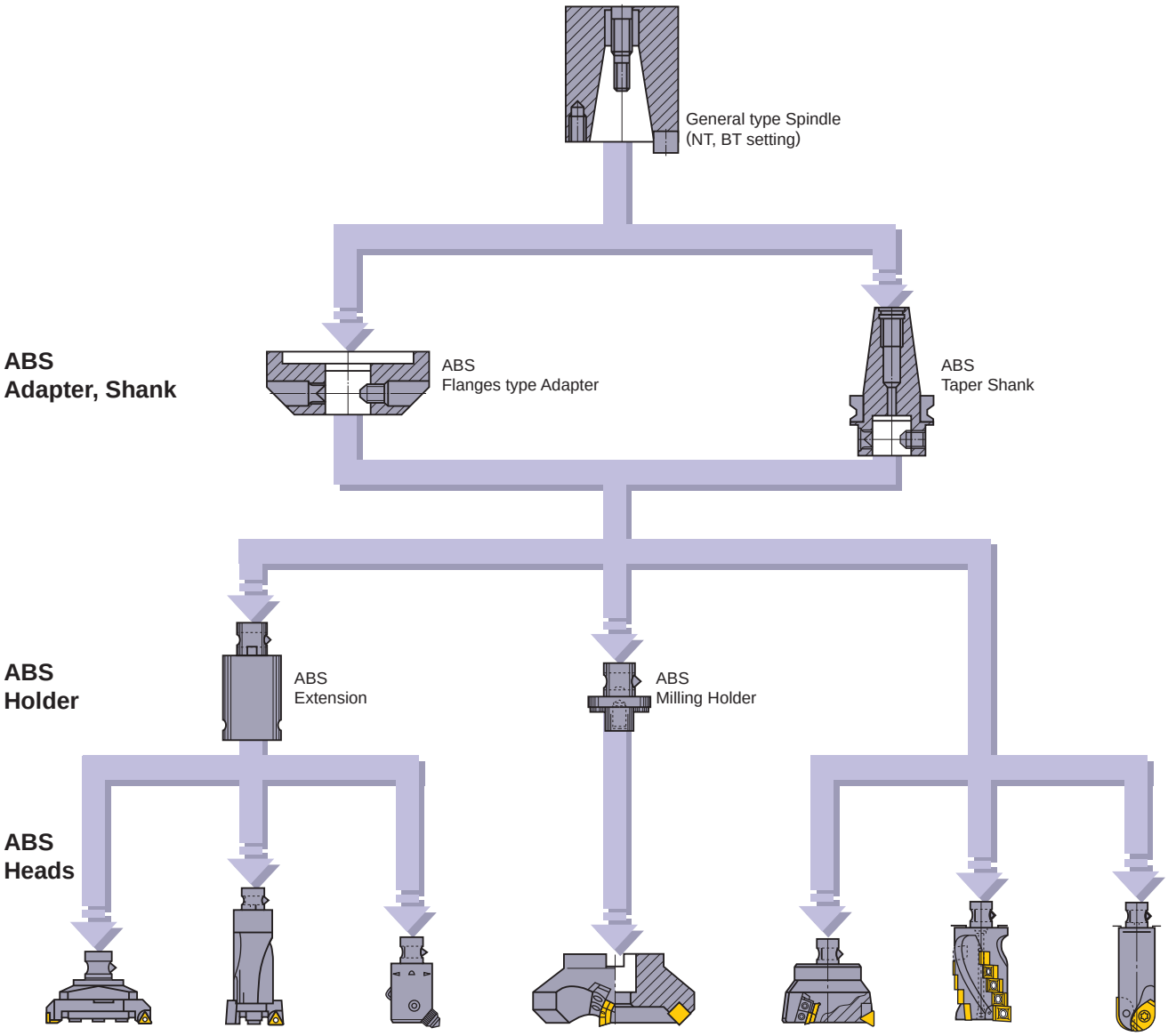
Order Number	d	d1	D	d2	d3	M	h	d4	(R)	L	S
QB4350070	35	30	70	28	52	M8	22	8	28	25	25
4350088	35	30	88	28	70	M8	22	8	35	32	35
4400098	40	30	98	34	80	M8	24	8	40	37	40
4400118	40	30	118	34	90	M10	24	10	45	42	45
4500138	50	40	138	42	110	M12	30	12	55	52	50

ABS® License KOMET®

ABS SYSTEM CHARACTERISTIC

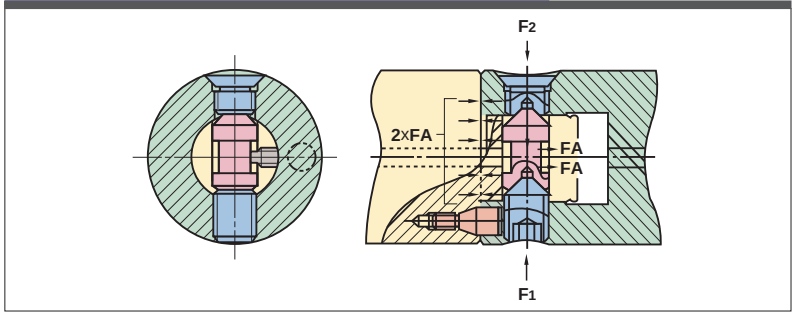
- High rigidity and high coupling strength.
  The taper wedge effects produced by the clamping screw, the taper screw, and the slide pin enable strong and firm coupling between the head and the adapter.
- As the cutting torque acts as torsion force on the axis, 50%—80% improvement is achieved for the clamping strength in the coupled portion axis direction.
- High accuracy is guaranteed.
  An attachment repeat accuracy of 2—3μm is constantly maintained in the coupled portion.
- From small (ϕ20) diameter to large diameter (ϕ200), a wide range of tooling is possible.
- Internal passage of the coolant (air) is possible without modifications to standard machinary.
- Tool head extensions are easy through the use of extension pieces.
- Through the use of reducers, tool head diameters are easily set.

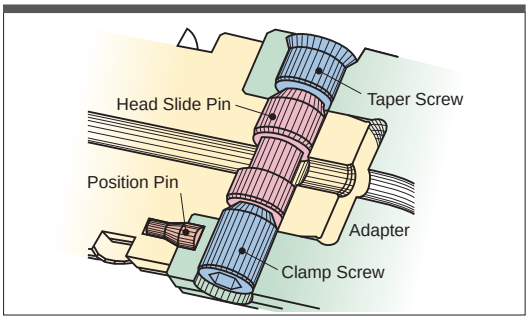
ABS SYSTEM MECHANISM



(Note) The above chart also indicates the KOMET® standard.

ABS SYSTEM COMPONENT



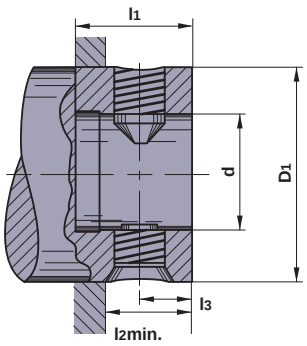


When the force F_1 presses on the clamping screw, the slide pin moves in the radial direction and impinges on the taper screw, generation the reaction force F_2. Since the centers of the clamping screw, the taper screw, and the slide pin are eccentric, a taper connection is made at sites separated by a 180° phase, with the clamping screw and the slide pin on the taper right impingement portion, and the slide pin and taper pin on the taper left impingement portion. The result is that, a vector analysis of those forces shows, as depicted in the diagram above, that the slides move in an identical direction, and the coupling force FA is doubled and transmitted accordingly. Further, cutting resistance generated during cutting becomes torsion stress and is transmitted accordingly. The forces F_1 and F_2 generated with the clamping screw and taper screw are expanded, and the coupling (jointing) force FA becomes as even greater force, and is generated accordingly.

∗ This system is licensed from KOMET® of Germany. (JP Patent NO.1328669)

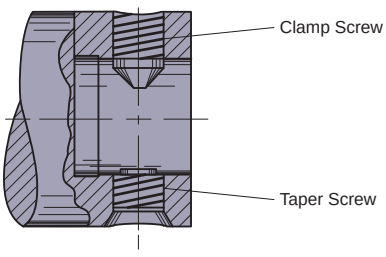
ABS SYSTEM SETTING STANDARDS

Adapter Dimensions



Order Number	Dimensions (mm)				
	D_1	d	l_1	l_2	l_3
ABS25W	25	13	22	13	8.3
32W	32	16	25	16	10.3
40W	40	20	30	18.5	11.3
50W	50	28	34	22	13.3
63W	63	34	41	28	17.4
80W	80	46	48	34	20.4
100W	100	56	58	40.5	24.4
125W	125	70	76	51	30.5

Parts for Adapter

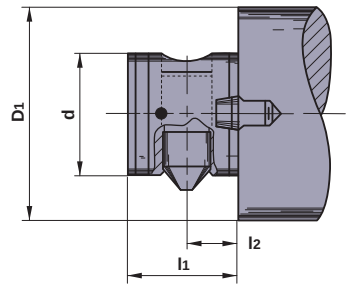


Pack Order Number ∗	Stock	Clamp Screw	Taper Screw
ABS25-FS-W	●	ABS25-F1	ABS25-F2
32-FS-W	●	32-F1	32-F2
40-FS-W	●	40-F1	40-F2
50-FS-W	●	50-F1	50-F2
63-FS-W	●	63-F1	63-F2
80-FS-W	●	80-F1	80-F2
100-FS-W	●	100-F1	100-F2
125-FS-W	●	125-F1	125-F2

∗ An order of the above type of screw and pin needs to be included in the set. Please use a "Pack Order Number" for your order.

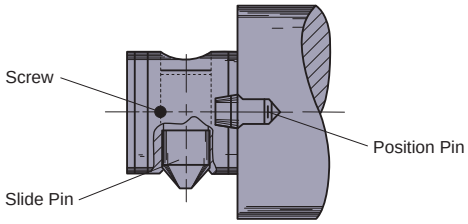
● : **Inventory maintained.**

Head Dimensions



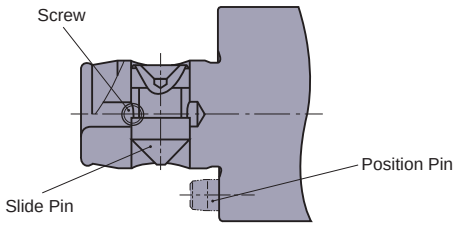
Order Number	Dimensions (mm)			
	D1	d	l1	l2
ABS25M	25	13	20	8
32M	32	16	23	10
40M	40	20	26	11
50M	50	28	31	13
63M	63	34	38	17
80M	80	46	43	20
100M	100	56	55	24
125M	125	70	70	30

Parts for Head



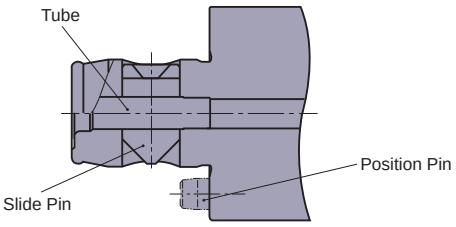
Pack Order Number ⁎	Stock	Slide Pin	Position Pin	Screw
ABS25-ES-M	●	ABS25-E3	ABS25-E4	ABS25-E5
32-ES-M	●	32-E3	32-E4	32-E5
40-ES-M	●	40-E3	40-E4	40-E5
50-ES-M	●	50-E3	50-E4	50-E5
63-ES-M	●	63-E3	63-E4	63-E5
80-ES-M	●	80-E3	80-E4	80-E5
100-ES-M	●	100-E3	100-E4	100-E5
125-ES-M	●	125-E3	125-E4	125-E5

Parts for Head [For Fine Boring]



Pack Order Number ⁎	Stock	Slide Pin	Position Pin	Screw
ABS25-ES-M1	●	ABS25-E3	ABS25-E4.1	ABS25-E5
32-ES-M1	●	32-E3	32-E4.1	32-E5
40-ES-M1	●	40-E3	40-E4.1	40-E5
50-ES-M1	●	50-E3	50-E4.1	50-E5
63-ES-M1	●	63-E3	63-E4.1	63-E5
80-ES-M1	●	80-E3	80-E4.1	80-E5
100-ES-M1	●	100-E3	100-E4.1	100-E5
125-ES-M1	●	125-E3	125-E4.1	125-E5

Parts for Head [For Coolant Hole Type]

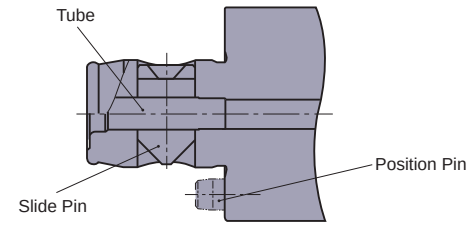


Pack Order Number ⁎	Stock	Slide Pin	Position Pin	Tube
ABS25-ES-M3	●	ABS25-E3.2	ABS25-E4	ABS25-E6
32-ES-M3	●	32-E3.2	32-E4	32-E6
40-ES-M3	●	40-E3.2	40-E4	40-E6
50-ES-M3	●	50-E3.2	50-E4	50-E6
63-ES-M3	●	63-E3.2	63-E4	63-E6
80-ES-M3	●	80-E3.2	80-E4	80-E6
100-ES-M3	●	100-E3.2	100-E4	100-E6
125-ES-M3	●	125-E3.2	125-E4	125-E6

⁎ An order of the above type of screw, pin and tube needs to be included in the set. Please use a "Pack Order Number" for your order.

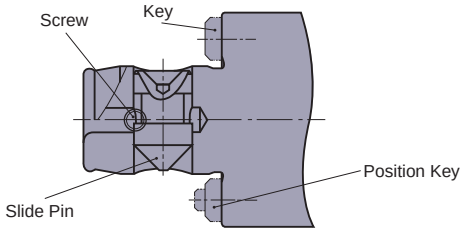
● : **Inventory maintained in Japan.**

Parts for Head [For Fine Boring with Coolant Hole]



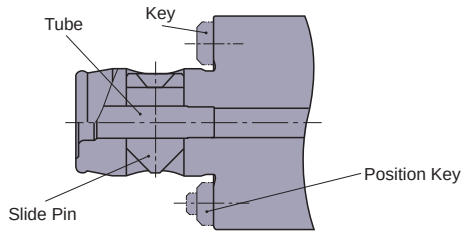
Pack Order Number *	Stock	Slide Pin	Position Pin	Tube
ABS25-ES-M4	●	ABS25-E3.2	ABS25-E4.1	ABS25-E6
32-ES-M4	●	32-E3.2	32-E4.1	32-E6
40-ES-M4	●	40-E3.2	40-E4.1	40-E6
50-ES-M4	●	50-E3.2	50-E4.1	50-E6
63-ES-M4	●	63-E3.2	63-E4.1	63-E6
80-ES-M4	●	80-E3.2	80-E4.1	80-E6
100-ES-M4	●	100-E3.2	100-E4.1	100-E6
125-ES-M4	●	125-E3.2	125-E4.1	125-E6

Parts for Head [For Key Type]



Pack Order Number *	Stock	Slide Pin	Key	Position Key	Screw
SBA25-ES-M	●	ABS25-E3	SBA25-E4	SBA25-E4.1	ABS25-E5
32-ES-M	●	32-E3	32-E4	32-E4.1	32-E5
40-ES-M	●	40-E3	40-E4	40-E4.1	40-E5
50-ES-M	●	50-E3	50-E4	50-E4.1	50-E5
63-ES-M	●	63-E3	63-E4	63-E4.1	63-E5
80-ES-M	●	80-E3	80-E4	80-E4.1	80-E5
100-ES-M	●	100-E3	100-E4	100-E4.1	100-E5
125-ES-M	●	125-E3	125-E4	125-E4.1	125-E5

Parts for Head [For Key Type with Coolant Hole]



Pack Order Number *	Stock	Slide Pin	Key	Position Key	Tube
SBA25-ES-M1	●	ABS25-E3.2	SBA25-E4	SBA25-E4.1	ABS25-E6
32-ES-M1	●	32-E3.2	32-E4	32-E4.1	32-E6
40-ES-M1	●	40-E3.2	40-E4	40-E4.1	40-E6
50-ES-M1	●	50-E3.2	50-E4	50-E4.1	50-E6
63-ES-M1	●	63-E3.2	63-E4	63-E4.1	63-E6
80-ES-M1	●	80-E3.2	80-E4	80-E4.1	80-E6
100-ES-M1	●	100-E3.2	100-E4	100-E4.1	100-E6
125-ES-M1	●	125-E3.2	125-E4	125-E4.1	125-E6

* An order of the above type of screw, pin and tube needs to be included in the set. Please use a "Pack Order Number" for your order.

HSK SYSTEM

FEATURES OF THE HSK SYSTEM

●Suitable for high speed machining.

When the taper hole is slightly seperated during high speed machining due to centrifugal force, the taper axis is continuously in contact with the taper hole because of elastic deformation. Thus, 2 face holding is maintained.

●Guaranteed high accuracy.

Installation repeatability of 2μm is guaranteed.

●High rigidity.

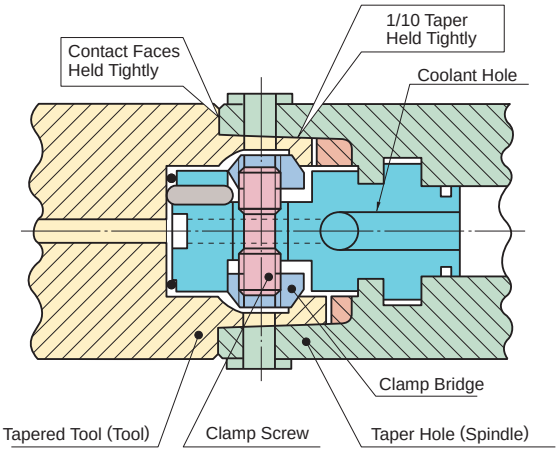
High rigidity in the radial and thrust direction due to the 2 face holding system.

●Easy installation.

Detachable support structure ensures separation of the tool even when the tool has undergone thermal expansion.

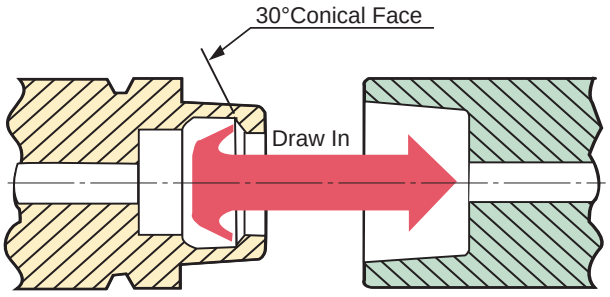
●Coolant system selection.

Center coolant and anglar flow coolant type.



* HSK stands for Hole (Hollow) Schaft (axis) Kegel (taper) in German.

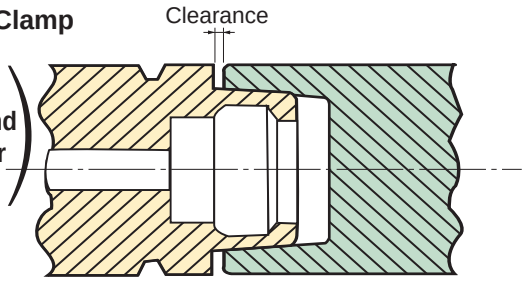
HSK CLAMPING METHOD



●The 30°conical face of the taper axis is pulled in the direction of the tapered hole to clamp.

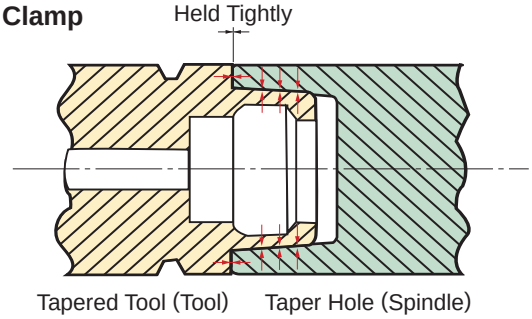
●Temporary Clamp Position

(The spindle taper face and the tool taper face contact.)



●Temporary clamp position has a clearance between the spindle and the tool contact faces.
●Taper clamping force increases as the diameter increases.

●Permanent Clamp Position



●Hollow thin taper axis holds the taper faces and the contact faces tightly due to pressurized elastic deformation.

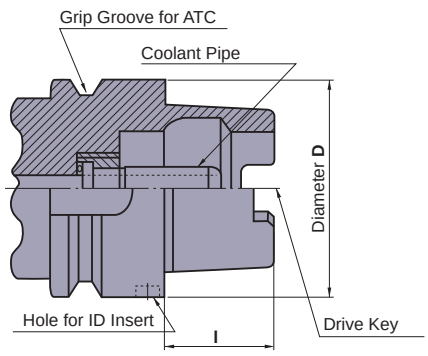
HSK SYSTEM FORM

There are various HSK types.
Mitsubishi Materials produces A, B, C, and D types of taper axis (tool size) and C and D types (manual operation) of taper hole (spindle side).

Type	Application	Tapered Tool (Tool)	Tapered Hole (Spindle)
A Type	Automatic tool change (ATC), center coolant (mainly milling tools)	□	
B Type	Automatic tool change (ATC), angular flow coolant (mainly turning tools)	□	
C Type	Manual tool change, center coolant (mainly milling tools)	□	□
D Type	Manual tool change, angular flow coolant (mainly turing tools)	□	□

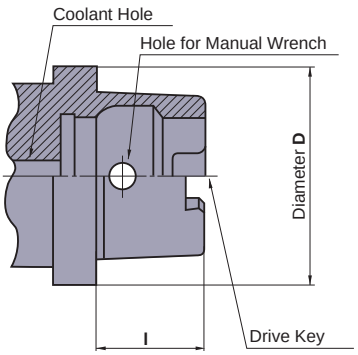
□ **: Non stock, produced to order only.**

Automatic Tool Change — **A Type** (Center Coolant Type) — Milling Tool



Order Number	Dimensions (mm)	
	D	**l**
HSK-A32M	32	16
-A40M	40	20
-A50M	50	25
-A63M	63	32
-A80M	80	40
-A100M	100	50

Manual Tool Change — **C Type** (Center Coolant Type) — Milling Tool



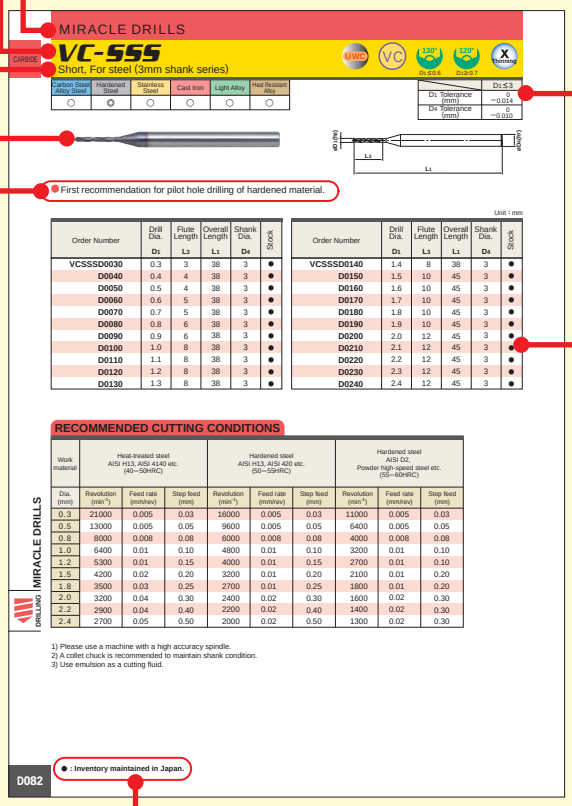
Order Number	Dimensions (mm)	
	D	**l**
HSK-C32M	32	16
-C40M	40	20
-C50M	50	25
-C63M	63	32
-C80M	80	40
-C100M	100	50

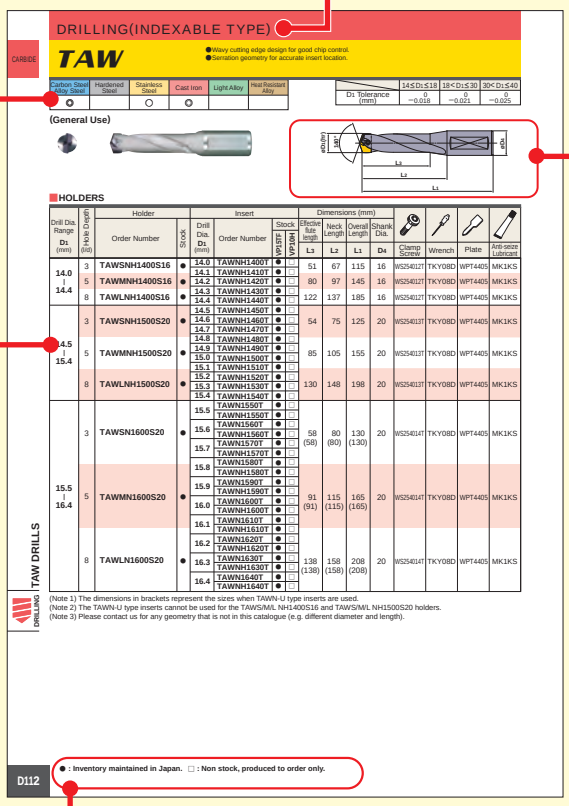
HOW TO READ THE STANDARD OF DRILLING TOOLS

●How this section page is organized

①Arranged in order of solid carbide drills, brazed type drills, indexable type drills and high-speed steel drills.

PHOTO OF PRODUCT
PRODUCT TITLE
PRODUCT CODE
PRODUCT SECTION
DIAMETER TOLERANCE GEOMETRY
SUITABLE WORK MATERIALS
PRODUCT TYPE


MIRACLE DRILLS
VC-5SS
Short, For steel (3mm shank series)
First recommendation for pilot hole drilling of hardened material.
Unit : mm
RECOMMENDED CUTTING CONDITIONS
1) Please use a machine with a high accuracy spindle.
2) A collet chuck is recommended to maintain shank condition.
3) Use emulsion as a cutting fluid.
● : Inventory maintained in Japan.
D082


DRILLING(INDEXABLE TYPE)
TAW
●Wavy cutting edge design for good chip control.
●Serration geometry for accurate insert location.
(General Use)
HOLDERS
(Note 1) The dimensions in brackets represent the sizes when TAWN-U type inserts are used.
(Note 2) The TAWN-U type inserts cannot be used for the TAWS/M/L NH1400S16 and TAWS/M/L NH1500S20 holders.
(Note 3) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).
● : Inventory maintained in Japan. □ : Non stock, produced to order only.
D112

PRODUCT FEATURES

PRODUCT STANDARDS
indicates diameters, order numbers, stock status,numbers of teeth, dimensions, and spare parts for the title product.

LEGEND FOR STOCK STATUS MARK
is shown on the left hand page of each double-page spread.

●To Order : For solid-carbide or brazed drills, please specify ①order number and ②grade.
For indexable type drills, please specify ①order number for the drill.
For indexable type drill inserts, please specify ①insert number and ②insert grade.

DRILLING

IDENTIFICATION ····· D002
SYMBOL DESCRIPTIONS ····· D003
DRILLS SELECTION CHART ····· D004

DRILL STANDARD

SOLID CARBIDE
WSTAR DRILLS ····· D012
WSTAR SUPER LONG DRILLS ··· D035
WSTAR DRILLS (FOR MACHINING OF ALUMINIUM ALLOYS) ··· D044
WSTAR DRILLS (FOR DIE & MOULD MACHINING) ··· D052
MZE/MZS DRILLS ····· D062
MSE DRILLS ····· D076
SOLID GUN DRILL ····· D080
MIRACLE DRILLS ····· D082
MAE/MAS DRILLS ····· D088

BRAZED TYPE
BRS/BRM/BRK DRILLS ····· D094
BRSB/BRB DRILLS (FOR BRIDGE CONSTRUCTION) ····· D100
BRA/BRL DRILLS ····· D102

INDEXABLE TYPE
TAW DRILLS ····· D108
TAF TYPE DRILLS ····· D126

GUN DRILL • GUN REAMER ····· D134
DIAMOND COATED DRILLS ····· D137
VIOLET DRILLS ····· D140
STRAIGHT SHANK DRILLS ····· D171
TAPER SHANK DRILLS ····· D192
TRIANGULAR SHANK DRILLS ··· D210

★Arranged by Alphabetical order

D210 **3KD**
D102 **BRA**
D101 **BRB**
D098 **BRK**
D104 **BRL**
D096 **BRM**
D100 **BRMB**
D094 **BRS**
D100 **BRSB**
D138 **DC-BSS**
D137 **DC-SSM**
D137 **DC-SSS**
D191 **E-PSS**
D178 **E-SS**
D201 **GE-UTM**
D171 **G-SD**
D192 **G-TD**
D208 **G-TTD**
D185 **G-WSL**
D183 **G-WSS**
D203 **G-WTS**
D182 **HSD**
D132 **JFS**
D180 **KSD**
D198 **KTD**
D187 **LSD**
D188 **LSD**
D205 **LTD**
D088 **MAE**
D088 **MAS**
D081 **MGD**
D080 **MGS**
D052 **MHS**
D044 **MNS**
D076 **MSE**
D078 **MSP**
D020 **MWE**
D020 **MWS**
D012 **MWS(SMALL DIAMETER)**
D035 **MWS_DB**
D062 **MZE**
D062 **MZS**
D173 **SD**
D108 **STAW**
D126 **TAF**
D112 **TAW**
D193 **TD**
D209 **TTD**
D145 **VA-PDM**
D155 **VA-PDM-SUS**
D140 **VA-PDS**
D162 **VA-PDS-CB**
D149 **VA-PDS-SUS**
D087 **VC-HSM**
D085 **VC-SSM**
D082 **VC-SSS**
D163 **VE-USM**
D166 **V-SD**
D169 **V-TDS**
D168 **V-TSD-OH**

IDENTIFICATION

PRODUCT CODE OF DRILLS

MW E 0300 S A

Product name	Coolant	Diameter	l/d	Type of shank
MW : MWE/MWS Drills **MZ** : MZE/MZS Drills **MA** : MAE/MAS Drills **MK** : MKE Drills **MS** : MSE Drills **MN** : For Machining of Aluminium Alloys **MH** : For die & mould machining	**E** : External Coolant **S** : Internal Coolant	**ex.** 0050 → ϕ0.5 0300 → ϕ3.0	**S** : 2D **M** : 3D **L** : 5D (MAE, MAS : 6D) **X** : 12D **X8DB** : 8D **X10DB** : 10D **X15DB** : 15D **X20DB** : 20D **X25DB** : 25D **X30DB** : 30D	**A** : Straight shank **B** : Integral shank

∗Other special types can be ordered.

VC S S S D0300 ∗∗∗

Product name	Applications	Type of shank	Flute length	Diameter	Others
VC : Miracle drills **DC** : Diamond coated drills **VA** : Violet coated precision drills (High Grade, High Speed Steel) **VE** : Violet coated drills (Cobalt High-Speed Steel) **V** : Violet drills **GE** : TiN coated drills (Cobalt High-Speed Steel) **G** : TiN coated drills (High-Speed Steel) **E** : Co-HSS drills **B** : Blister packed drills **None** : High-Speed Steel	**SD** : General-purpose straight drill **TD** : General-purpose taper drill **S** : For steel **H** : For high hardness **N** : For NC **PD** : For high-precision machining **U** : For stainless **T** : For steel frame **W** : For deep hole	**S** : Straight **T** : Taper **3K** : Triangular **6K** : Hexagonal	**S** : Short **M** : Medium **L** : Long	**ex.** D0050 → ϕ0.5 D0300 → ϕ3.0	**A∗∗∗** : Overall Length **S∗∗** : Shank Diameter **M∗** : M.T.No.

∗Other special types can be ordered.

SYMBOL DESCRIPTIONS

Tool material

Ultra micro grain carbide
Ultra micro grain carbide is used as the substrate material.

High grade high alloy HSS
High grade high alloy HSS is used as the substrate material.

Cobalt high speed steel
Cobalt high speed steel is used as the substrate material.

High speed steel
High speed steel is used as the substrate material.

Web thinning

X web thinning
X web thinning is used at the drill point.

XR web thinning
XR web thinning is used at the drill point.

C web thinning
C web thinning is used at the drill point.

S web thinning
S web thinning is used at the drill point.

N web thinning
N web thinning is used at the drill point.

Special subflute
Makes chamfering easier and breaks chips effectively.

Coating

Miracle Coating
The original Miracle (Al,Ti)N coating.
Also suitable for dry cutting.

Miracle Coating
The original Miracle (Al,Ti)N coating.
Also suitable for dry cutting.

GP Coating

UP Coating

Diamond Coating
Pure Diamond high performance coating excelling in film adhesion to the substrate.

Violet Coating
Increased tool life of 2—3 times that of TiN coated products.

TiN Coating
Increased tool life of 2—3 times that of non coated products.

Angle and sharp corner edge

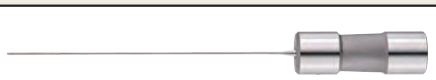
Point angle
Indicates drill point angle the tip.

DRILLS SELECTION CHART CEMENTED CARBIDE

Tool material	Drill Type (Series Title)	Applications	Product Code	Size Range	Effective Hole Depth (L/d)	Coolant	Coating	Work Material P Carbon Steel, Alloy Steel	Work Material H Hardened Steel	Work Material M Stainless Steel	Work Material K Cast Iron	Work Material N Light Alloy	Work Material S Heat Resistant Alloy	Shape	Page Number Dimensions	Page Number Cutting Conditions
Solid Carbide	WSTAR DRILLS	General Drilling (SMALL DIAMETER)	NEW MWS...SB	ϕ0.5 –ϕ2.95	1	Internal	VP	◎		◎	◎	○	○		D012	D017
			MWS...LB	ϕ0.5 –ϕ2.9	5	Internal	VP	◎		◎	◎	○	○			
			MWS...XB	ϕ0.5 –ϕ2.9	12	Internal	VP	◎		◎	◎	○	○			
			NEW MWS...X20DB	ϕ1.0 –ϕ2.95	20	Internal	VP	◎		◎	◎	○	○			
			NEW MWS...X25DB	ϕ1.0 –ϕ2.95	25	Internal	VP	◎		◎	◎	○	○			
			NEW MWS...X30DB	ϕ1.0 –ϕ2.95	30	Internal	VP	◎		◎	◎	○	○			
		General Drilling	MWE...SA/SB	ϕ3.0 –ϕ20.0	2	External	VP	◎	○	○	◎	○	○		D020	D033
			MWE...MA/MB	ϕ3.0 –ϕ20.0	3	External	VP	◎	○	○	◎	○	○			
			MWS...MB	ϕ3.0 –ϕ25.0	3	Internal	VP	◎		◎	◎	○	○		D020	D033
			MWS...LB	ϕ3.0 –ϕ25.0	5	Internal	VP	◎		◎	◎	○	○			
			MWS...X8DB	ϕ3.0 –ϕ16.0	8	Internal	VP	◎		◎	◎	○	○			
	WSTAR SUPER LONG DRILLS	Deep Hole Drilling	MWS...X10DB	ϕ3.0 –ϕ14.0	10	Internal	VP	◎		◎	◎	○	○		D035	D042
			MWS...X15DB	ϕ3.0 –ϕ14.0	15	Internal	VP	◎		◎	◎	○	○			
			MWS...X20DB	ϕ3.0 –ϕ14.0	20	Internal	VP	◎		◎	◎	○	○			
			MWS...X25DB	ϕ3.0 –ϕ12.0	25	Internal	VP	◎		◎	◎	○	○			
			MWS...X30DB	ϕ3.0 –ϕ10.0	30	Internal	VP	◎		◎	◎	○	○			

Tool material	Drill Type (Series Title)	Applications	Product Code	Size Range	Effective Hole Depth (L/d)	Coolant	Coating	Work Material P Carbon Steel, Alloy Steel	Work Material H Hardened Steel	Work Material M Stainless Steel	Work Material K Cast Iron	Work Material N Light Alloy	Work Material S Heat Resistant Alloy	Shape	Page Number Dimensions	Page Number Cutting Conditions
Solid Carbide	WSTAR SUPER LONG DRILLS	Aluminium Alloy	NEW MNS...LB	ϕ3.0 –ϕ14.0	5	Internal	–					◎			D044	D049
			NEW MNS...X10DB	ϕ3.0 –ϕ14.0	10	Internal	–					◎				
			NEW MNS...X20DB	ϕ3.0 –ϕ14.0	20	Internal	–					◎				
			NEW MNS...X30DB	ϕ3.0 –ϕ10.0	30	Internal	–					◎				
		Mould Materials	NEW MHS...L020B -L300B	ϕ3.0 –ϕ12.0	1 -30	Internal	VP		◎				○		D052	D058
	ZET1 DRILLS	General Drilling	MZE...SA/SB	ϕ1.0 –ϕ20.0	2	External	VP / –	◎	○	○	◎	○	○		D062	D073
			MZE...MA	ϕ3.0 –ϕ20.0	3	External	VP / –	◎	○	○	◎	○	○			
			MZS...MB	ϕ2.0 –ϕ20.0	3	Internal	VP	◎		◎	◎	○	○		D062	D073
			MZS...LB	ϕ1.0 –ϕ20.0	5	Internal	VP	◎		◎	◎	○	○			
			MZS...XB	ϕ1.0 –ϕ2.9	12	Internal	VP	◎		◎	◎	○	○			
		With Chamfered Cutting Edges	MZE...SM	ϕ3.4 –ϕ10.3	2	External	VP	◎	○	○	◎	○	○		D072	D073
			MZE...MM	ϕ3.4 –ϕ10.3	3	External	VP	◎	○	○	◎	○	○			
			MZS...SM	ϕ3.4 –ϕ10.3	2	Internal	VP	◎		◎	◎	○	○		D072	D073
			MZS...MM	ϕ3.4 –ϕ10.3	3	Internal	VP	◎		◎	◎	○	○			
	MIRACLE MINI STAR DRILL	General Drilling (SMALL DIAMETER)	MSE...SB	ϕ0.1 –ϕ3.0	5 -12	External	VP	◎	○	○	◎	○	○		D076	D079
			MSP03005B	–	–	External	VP	◎	○	○	◎	○	○		D078	D079

DRILLS SELECTION CHART CEMENTED CARBIDE

Tool material	Drill Type (Series Title)	Applications	Product Code	Size Range	Effective Hole Depth (L/d)	Coolant	Coating	Work Material P Carbon Steel, Alloy Steel	Work Material H Hardened Steel	Work Material M Stainless Steel	Work Material K Cast Iron	Work Material N Light Alloy	Work Material S Heat Resistant Alloy	Shape	Page Number Dimensions	Page Number Cutting Conditions
Solid Carbide	Solid Gun Drill	Deep Hole Drilling	MGS...SB	ϕ0.7 –ϕ3.0	-100	Internal	–	◎	○	◎	◎	◎	○		D080	D081
Solid Carbide	MIRACLE DRILLS	General Drilling	VC-5SS	ϕ2.5 –ϕ20.0	3	External	VC	◎	○		○	○	○		D083	D086
Solid Carbide	MIRACLE DRILLS	General Drilling	VC-5SM	ϕ6.0 –ϕ20.0	5	External	VC	◎	○		○	○	○		D085	D086
Solid Carbide	MIRACLE DRILLS	Hardened Steel	VC-5SS (3mm shank)	ϕ0.3 –ϕ2.4	5	External	VC	○	◎	○	○	○	○		D082	D082
Solid Carbide	MIRACLE DRILLS	Hardened Steel	VC-HSM	ϕ2.5 –ϕ16.0	3	External	VC		◎				○		D087	D087
Solid Carbide	MAE/MAS DRILLS	Aluminium Alloy, Cast Iron	MAE...MB	ϕ3.0 –ϕ16.0	3	External	–				○	◎			D088	D093
Solid Carbide	MAE/MAS DRILLS	Aluminium Alloy, Cast Iron	MAS...MB	ϕ3.0 –ϕ16.0	3	Internal	–				○	◎			D088	D093
Solid Carbide	MAE/MAS DRILLS	Aluminium Alloy, Cast Iron	MAS...LB	ϕ3.0 –ϕ16.0	6	Internal	–				○	◎			D088	D093
Solid Carbide	DIAMOND COATED DRILLS	Non-ferrous Materials	DC-5SS	ϕ0.2 –ϕ2.0	–	External	DC					○			D137	D139
Solid Carbide	DIAMOND COATED DRILLS	Non-ferrous Materials	DC-5SM	ϕ2.1 –ϕ3.0	–	External	DC					○			D137	D139
Solid Carbide	DIAMOND COATED DRILLS	Hard Brittle Materials	DC-BSS	ϕ0.05 –ϕ3.0	–	External	DC	Hard brittle materials such as ceramics							D138	D139
Brazed	BRS/BRM/BRK DRILLS	General Drilling	BRS	ϕ14.0 –ϕ30.0	3	Internal	UP	◎		◎	○				D094	D095
Brazed	BRS/BRM/BRK DRILLS	General Drilling	BRM	ϕ14.0 –ϕ30.0	5	Internal	UP	◎		◎	○				D096	D097
Brazed	BRS/BRM/BRK DRILLS	General Drilling	BRK	ϕ14.0 –ϕ30.0	7	Internal	UP	◎			○				D098	D099
Brazed	BRS/BRM/BRK DRILLS	For Bridge Construction	BRSB	ϕ24.5 –ϕ26.7	3	Internal	UP	◎							D100	D101
Brazed	BRS/BRM/BRK DRILLS	For Bridge Construction	BRMB	ϕ24.5 –ϕ26.7	5	Internal	UP	◎							D100	D101

Tool material	Drill Type (Series Title)	Applications	Product Code	Size Range	Effective Hole Depth (L/d)	Coolant	Coating	Work Material P Carbon Steel, Alloy Steel	Work Material H Hardened Steel	Work Material M Stainless Steel	Work Material K Cast Iron	Work Material N Light Alloy	Work Material S Heat Resistant Alloy	Shape	Page Number Dimensions	Page Number Cutting Conditions
Brazed	BRA/BRL DRILLS	General Drilling	BRA	φ8.0 –φ40.0	3	Internal	UP	◎		○	○				D102	D106
		General Drilling (For turning)	BRL	φ8.0 –φ40.0	3	Internal	–	◎		○	○				D104	D106
		For Bridge Construction	BRB	φ24.5 –φ26.7	3	Internal	–	◎							D101	D101
Indexable	TAW DRILLS	General Drilling	NEW STAWSN	φ10.0 –φ13.9	3	Internal	VP	◎		○	◎	○			D108	D110
			NEW STAWMN		5	Internal	VP	◎		○	◎	○				
			TAWSN(H)	φ14.0 –φ30.4	3	Internal	VP	◎		○	◎				D112	D122
			TAWMN(H)		5	Internal	VP	◎		○	◎					
			TAWLN(H)		8	Internal	VP	◎		○	◎					
		For Bridge Construction	TAWSB	φ24.5 –φ26.7	3	Internal	VP	◎							D123	D123
			TAWMB		5	Internal	VP	◎								
	TAF TYPE DRILL	General Drilling	TAFS	φ12.0 –φ56.0	2	Internal	–	◎		◎	◎				D126	D131
			TAFM	φ12.0 –φ56.0	3	Internal	–	◎		◎	◎					
			TAFL	φ16.0 –φ34.0	4	Internal	–	◎		◎	◎					
Brazed	GUN DRILL	Ultra Deep Holes	–	φ2.0 –φ30.3	–	Internal	–	◎		○	○	○			D134	–
	GUN REAMER	Ultra Deep Holes	–	φ6.0 –φ30.0	–	Internal	–	○		○	○	○			D135	–
	GUN REAMER with Diamond Compound	Ultra Deep Holes	–	φ6.0 –φ30.3	–	Internal	–				◎	◎			D136	D136

HSS

DRILLS SELECTION CHART HSS

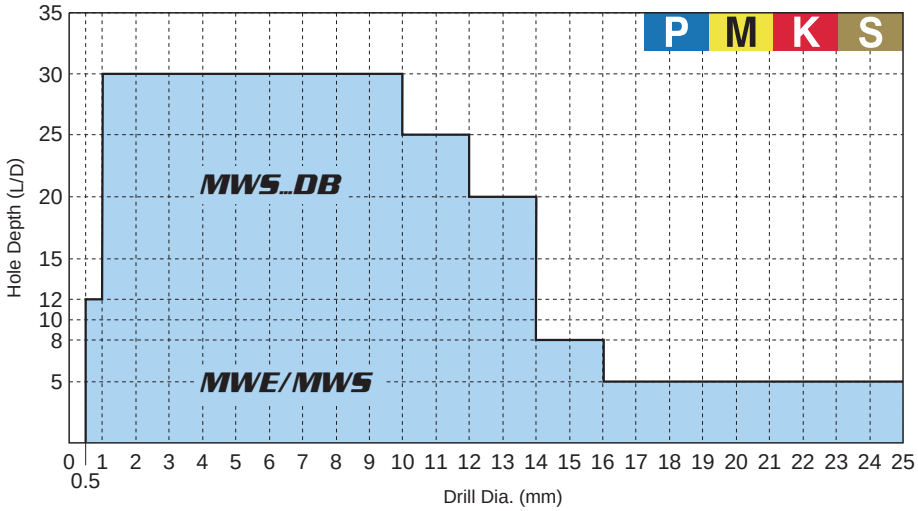
Drill Type (Series Title)	Applications	Product Code	Size Range	Tool material	Coolant	Coating	Work Material P Carbon Steel, Alloy Steel	Work Material H Hardened Steel	Work Material M Stainless Steel	Work Material K Cast Iron	Work Material N Light Alloy	Work Material S Heat Resistant Alloy	Shape	Page Number Dimensions	Page Number Cutting Conditions
VIOLET COATED DRILLS	General, High Precision	VA-PDS	ϕ0.5 –ϕ13.0	High Grade, High Speed Steel	External	V	◎		○	○		○		D140	D144
		VA-PDM	ϕ0.5 –ϕ32.0		External	V	◎		○	○		○		D145	D148
	General, High Precision Steel	VA-PDS-SUS	ϕ0.5 –ϕ20.0	Cobalt High Speed Steel	External	V	○		◎	○	○			D149	D161
		VA-PDM-SUS	ϕ0.5 –ϕ13.0		External	V	○		◎	○	○			D155	D161
	Spot Milling	VA-PDS-CB NEW	ϕ3.0 –ϕ14.0	High Grade, High Speed Steel	External	V	◎		○	○	○			D162	D162
VIOLET DRILL	Stainless	VE-USM	ϕ1.0 –ϕ13.0	Cobalt High Speed Steel	External	V	○		◎		○			D163	D165
	General Drilling	V-SD	ϕ0.5 –ϕ13.0	High-Speed Steel	External	V	◎		○	○				D166	D167
		V-TDS	ϕ6.0 –ϕ32.0		External	V	◎		◎	○				D169	D170
	For steel frame	V-TSD-OH	ϕ18.0 –ϕ26.0	Cobalt High Speed Steel	Internal	V	◎							D168	D168
STRAIGHT SHANK DRILL	General Drilling	G-SD	ϕ0.5 –ϕ13.0	High-Speed Steel	External	G	◎		○	○	○			D171	D211
		SD	ϕ0.2 –ϕ17.5		External	–	◎		○	○	○			D173	D212
		SD (1/100 Straight)	ϕ0.25 –ϕ5.95		External	–	◎		○	○	○			D175	D212
		E-SS	ϕ0.5 –ϕ13.0	Cobalt High Speed Steel	External	–	◎			○	○			D178	–
		KSD	ϕ1.0 –ϕ13.0		External	–	◎		◎		○			D180	D212
		HSD	ϕ2.0 –ϕ13.0	High Speed Steel	External	–	○		○		◎			D182	D212

Drill Type (Series Title)	Applications	Product Code	Size Range	Tool material	Coolant	Coating	Work Material P Carbon Steel, Alloy Steel	Work Material H Hardened Steel	Work Material M Stainless Steel	Work Material K Cast Iron	Work Material N Light Alloy	Work Material S Heat Resistant Alloy	Shape	Page Number Dimensions	Page Number Cutting Conditions
STRAIGHT SHANK DRILL	Deep Hole Drilling	G-WSS	ϕ1.0 –ϕ13.0	Cobalt High Speed Steel	External	G	◎		○	○	○			D183	D211
		G-WSL	ϕ2.0 –ϕ13.0		External	G	◎		○	○	○			D185	D211
		LSD	ϕ1.0 –ϕ13.0	High Speed Steel	External	–	○			○	○			D187	D212
	Sheet Steel	E-PSS	ϕ2.0 –ϕ13.0	High Speed Steel	External	–	○		○	○	○			D191	–
TAPER SHANK DRILL	General Drilling	G-TD	ϕ6.0 –ϕ40.0	High Speed Steel	External	G	◎		○	○	○			D192	D211
		TD	ϕ3.0 –ϕ75.0		External	–	◎		○	○	○			D193	D212
		KTD	ϕ5.0 –ϕ50.0	Cobalt High Speed Steel	External	–	◎		○	○	○			D198	D212
	Stainless	GE-UTM	ϕ6.0 –ϕ32.0	Cobalt High Speed Steel	External	G	○		◎	○	○			D201	D211
	Deep Hole Drilling	G-WTS	ϕ6.0 –ϕ32.0	Cobalt High Speed Steel	External	G	◎		○	○	○			D203	D211
		LTD	ϕ6.0 –ϕ40.0	High Speed Steel	External	–	○			○	○			D205	–
	For steel frame	G-TTD	ϕ17.0 –ϕ32.0	High Speed Steel	External	G	◎							D208	D211
		TTD	ϕ17.0 –ϕ32.0	High Speed Steel	External	–	○							D209	–
TRIANGULAR SHANK DRILL	For General-purpose Electric Drills	3KD	ϕ7.0 –ϕ26.0	High Speed Steel	External	–	○			○	○			D210	–

WSTAR DRILLS SERIES

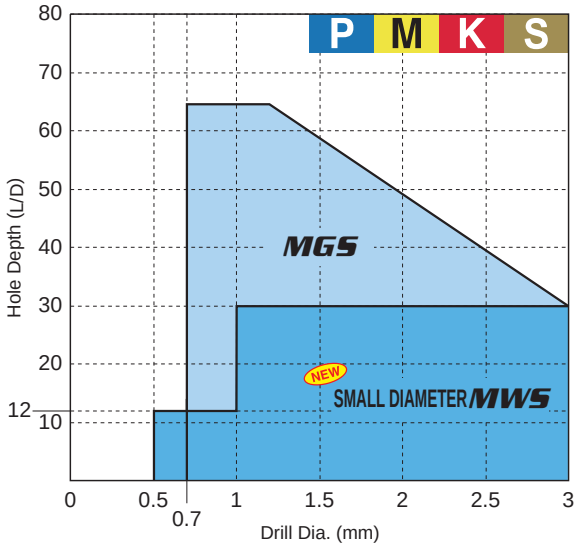
SOLID CARBIDE

MWE/MWS,MWS...DB (SUPER LONG)



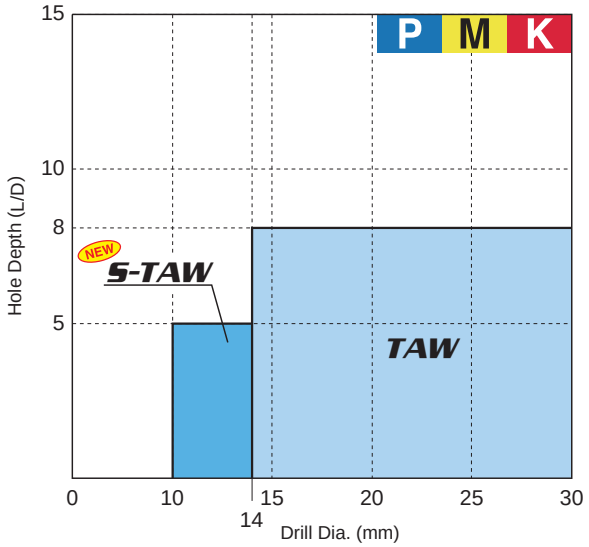
SOLID CARBIDE

SMALL DIAMETER MWS,MGS



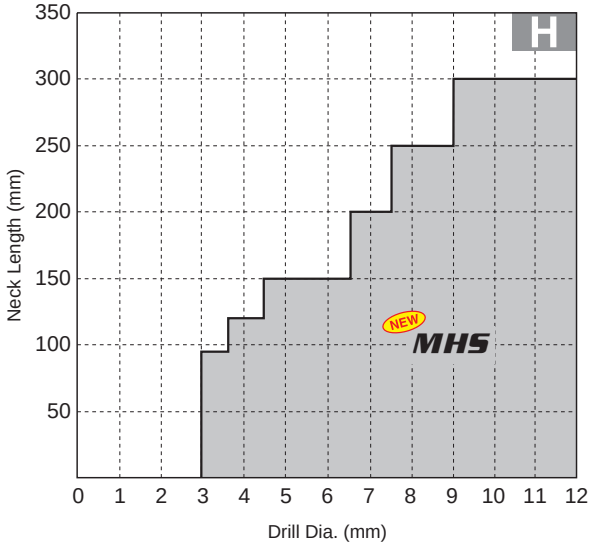
INDEXABLE TYPE

S-TAW,TAW



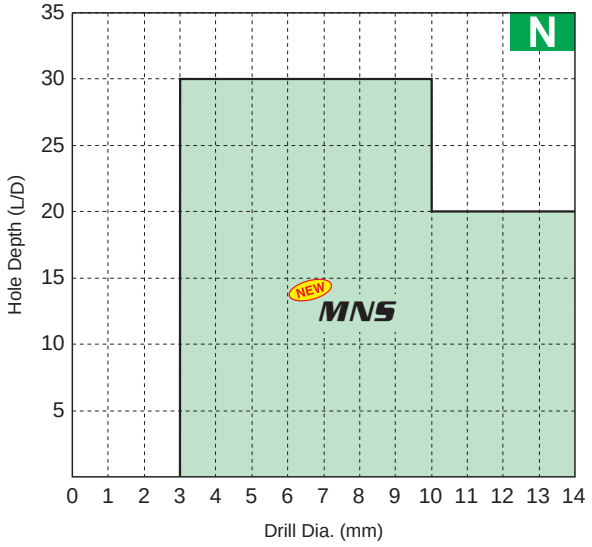
SOLID CARBIDE

MHS (For die & mould machining)



SOLID CARBIDE

MNS (For machining of aluminium alloys)



Memo

SMALL DIAMETER MWS
WSTAR DRILLS

- Through coolant micro drills for stable deep hole drilling.
- For high accuracy and efficient drilling of carbon steels through to difficult-to-cut materials.

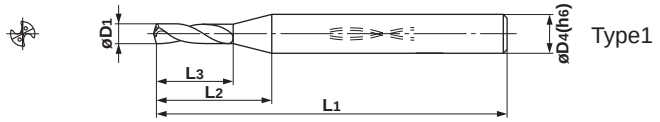
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎	○	○

		0.5≤D1<1	1≤D1<2.95
D1 Tolerance (mm)	MWS-SB	+0.009 0	+0.014 0
	MWS-LB/XB MWS-DB	0 −0.009	0 −0.014
D4 Tolerance (mm)		0 −0.006	0 −0.006

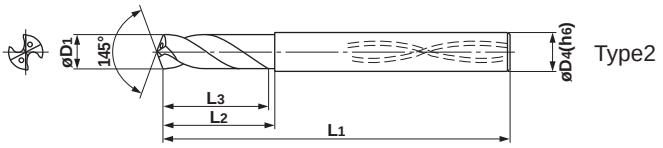
MWS (Internal coolant)

SB Type

(For pilot holes)

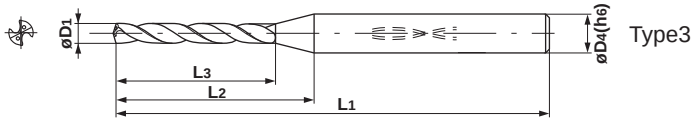


Type1

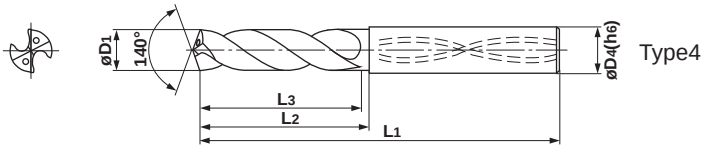


Type2

LB/XB Type



Type3



Type4

(Note) MWS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
0.50	NEW 1	Int.	●	MWS0050SB	2.5	7.2	47	3	1
	5	Int.	●	0050LB	8	13	47	3	3
	12	Int.	●	0050XB	16	21	47	3	3
0.51	NEW 1	Int.	●	0051SB	2.6	7.2	47	3	1
	5	Int.	●	0051LB	8	13	47	3	3
	12	Int.	●	0051XB	16	21	47	3	3
0.52	NEW 1	Int.	●	0052SB	2.6	7.2	47	3	1
	5	Int.	●	0052LB	8	13	47	3	3
	12	Int.	●	0052XB	16	21	47	3	3
0.53	NEW 1	Int.	●	0053SB	2.6	7.2	47	3	1
	5	Int.	●	0053LB	8	13	47	3	3
	12	Int.	●	0053XB	16	21	47	3	3
0.54	NEW 1	Int.	●	0054SB	2.6	7.2	47	3	1
	5	Int.	●	0054LB	8	13	47	3	3
	12	Int.	●	0054XB	16	21	47	3	3
0.55	NEW 1	Int.	●	0055SB	2.6	7.2	47	3	1
	5	Int.	●	0055LB	8	13	47	3	3
	12	Int.	●	0055XB	16	21	47	3	3
0.56	NEW 1	Int.	●	0056SB	2.9	7.5	47	3	1
	5	Int.	●	0056LB	8	13	47	3	3
	12	Int.	●	0056XB	16	21	47	3	3
0.57	NEW 1	Int.	●	0057SB	2.9	7.4	47	3	1
	5	Int.	●	0057LB	8	13	47	3	3
	12	Int.	●	0057XB	16	21	47	3	3

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
0.58	NEW 1	Int.	●	MWS0058SB	2.9	7.4	47	3	1
	5	Int.	●	0058LB	8	13	47	3	3
	12	Int.	●	0058XB	16	21	47	3	3
0.59	NEW 1	Int.	●	0059SB	2.9	7.4	47	3	1
	5	Int.	●	0059LB	8	12	47	3	3
	12	Int.	●	0059XB	16	20	47	3	3
0.60	NEW 1	Int.	●	0060SB	2.9	7.4	47	3	1
	5	Int.	●	0060LB	8	12	47	3	3
	12	Int.	●	0060XB	16	20	47	3	3
0.61	NEW 1	Int.	●	0061SB	3.1	7.6	47	3	1
	5	Int.	●	0061LB	8	12	47	3	3
	12	Int.	●	0061XB	16	20	47	3	3
0.62	NEW 1	Int.	●	0062SB	3.1	7.5	47	3	1
	5	Int.	●	0062LB	8	12	47	3	3
	12	Int.	●	0062XB	16	20	47	3	3
0.63	NEW 1	Int.	●	0063SB	3.1	7.5	47	3	1
	5	Int.	●	0063LB	8	12	47	3	3
	12	Int.	●	0063XB	16	20	47	3	3
0.64	NEW 1	Int.	●	0064SB	3.1	7.5	47	3	1
	5	Int.	●	0064LB	8	12	47	3	3
	12	Int.	●	0064XB	16	20	47	3	3
0.65	NEW 1	Int.	●	0065SB	3.1	7.5	47	3	1
	5	Int.	●	0065LB	8	12	47	3	3
	12	Int.	●	0065XB	16	20	47	3	3

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
NEW 0.66	1	Int.	●	MWS0066SB	3.4	7.8	47	3	1
	5	Int.	●	0066LB	8	12	47	3	3
	12	Int.	●	0066XB	16	20	47	3	3
NEW 0.67	1	Int.	●	0067SB	3.4	7.7	47	3	1
	5	Int.	●	0067LB	8	12	47	3	3
	12	Int.	●	0067XB	16	20	47	3	3
NEW 0.68	1	Int.	●	0068SB	3.4	7.7	47	3	1
	5	Int.	●	0068LB	8	12	47	3	3
	12	Int.	●	0068XB	16	20	47	3	3
NEW 0.69	1	Int.	●	0069SB	3.4	7.7	47	3	1
	5	Int.	●	0069LB	8	12	47	3	3
	12	Int.	●	0069XB	16	20	47	3	3
NEW 0.70	1	Int.	●	0070SB	3.4	7.7	47	3	1
	5	Int.	●	0070LB	8	12	47	3	3
	12	Int.	●	0070XB	16	20	47	3	3
NEW 0.71	1	Int.	●	0071SB	3.6	7.9	50	3	1
	5	Int.	●	0071LB	10	14	50	3	3
	12	Int.	●	0071XB	20	24	50	3	3
NEW 0.72	1	Int.	●	0072SB	3.6	7.9	50	3	1
	5	Int.	●	0072LB	10	14	50	3	3
	12	Int.	●	0072XB	20	24	50	3	3
NEW 0.73	1	Int.	●	0073SB	3.6	7.8	50	3	1
	5	Int.	●	0073LB	10	14	50	3	3
	12	Int.	●	0073XB	20	24	50	3	3
NEW 0.74	1	Int.	●	0074SB	3.6	7.8	50	3	1
	5	Int.	●	0074LB	10	14	50	3	3
	12	Int.	●	0074XB	20	24	50	3	3
NEW 0.75	1	Int.	●	0075SB	3.6	7.8	50	3	1
	5	Int.	●	0075LB	10	14	50	3	3
	12	Int.	●	0075XB	20	24	50	3	3
NEW 0.76	1	Int.	●	0076SB	3.9	8.1	50	3	1
	5	Int.	●	0076LB	10	14	50	3	3
	12	Int.	●	0076XB	20	24	50	3	3
NEW 0.77	1	Int.	●	0077SB	3.9	8.1	50	3	1
	5	Int.	●	0077LB	10	14	50	3	3
	12	Int.	●	0077XB	20	24	50	3	3
NEW 0.78	1	Int.	●	0078SB	3.9	8.0	50	3	1
	5	Int.	●	0078LB	10	14	50	3	3
	12	Int.	●	0078XB	20	24	50	3	3
NEW 0.79	1	Int.	●	0079SB	3.9	8.0	50	3	1
	5	Int.	●	0079LB	10	14	50	3	3
	12	Int.	●	0079XB	20	24	50	3	3
NEW 0.80	1	Int.	●	0080SB	3.9	8.0	50	3	1
	5	Int.	●	0080LB	10	14	50	3	3
	12	Int.	●	0080XB	20	24	50	3	3
NEW 0.81	1	Int.	●	0081SB	4.1	8.2	50	3	1
	5	Int.	●	0081LB	10	14	50	3	3
	12	Int.	●	0081XB	20	24	50	3	3

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
NEW 0.82	1	Int.	●	MWS0082SB	4.1	8.2	50	3	1
	5	Int.	●	0082LB	10	14	50	3	3
	12	Int.	●	0082XB	20	24	50	3	3
NEW 0.83	1	Int.	●	0083SB	4.1	8.1	50	3	1
	5	Int.	●	0083LB	10	14	50	3	3
	12	Int.	●	0083XB	20	24	50	3	3
NEW 0.84	1	Int.	●	0084SB	4.1	8.1	50	3	1
	5	Int.	●	0084LB	10	14	50	3	3
	12	Int.	●	0084XB	20	24	50	3	3
NEW 0.85	1	Int.	●	0085SB	4.1	8.1	50	3	1
	5	Int.	●	0085LB	10	14	50	3	3
	12	Int.	●	0085XB	20	24	50	3	3
NEW 0.86	1	Int.	●	0086SB	4.4	8.4	50	3	1
	5	Int.	●	0086LB	10	14	50	3	3
	12	Int.	●	0086XB	20	24	50	3	3
NEW 0.87	1	Int.	●	0087SB	4.4	8.4	50	3	1
	5	Int.	●	0087LB	10	14	50	3	3
	12	Int.	●	0087XB	20	24	50	3	3
NEW 0.88	1	Int.	●	0088SB	4.4	8.4	50	3	1
	5	Int.	●	0088LB	10	14	50	3	3
	12	Int.	●	0088XB	20	24	50	3	3
NEW 0.89	1	Int.	●	0089SB	4.4	8.3	50	3	1
	5	Int.	●	0089LB	10	14	50	3	3
	12	Int.	●	0089XB	20	24	50	3	3
NEW 0.90	1	Int.	●	0090SB	4.4	8.3	50	3	1
	5	Int.	●	0090LB	10	14	50	3	3
	12	Int.	●	0090XB	20	24	50	3	3
NEW 0.91	1	Int.	●	0091SB	4.6	8.5	50	3	1
	5	Int.	●	0091LB	10	14	50	3	3
	12	Int.	●	0091XB	20	24	50	3	3
NEW 0.92	1	Int.	●	0092SB	4.6	8.5	50	3	1
	5	Int.	●	0092LB	10	14	50	3	3
	12	Int.	●	0092XB	20	24	50	3	3
NEW 0.93	1	Int.	●	0093SB	4.6	8.5	50	3	1
	5	Int.	●	0093LB	10	14	50	3	3
	12	Int.	●	0093XB	20	24	50	3	3
NEW 0.94	1	Int.	●	0094SB	4.6	8.4	50	3	1
	5	Int.	●	0094LB	10	14	50	3	3
	12	Int.	●	0094XB	20	24	50	3	3
NEW 0.95	1	Int.	●	0095SB	4.6	8.4	50	3	1
	5	Int.	●	0095LB	10	14	50	3	3
	12	Int.	●	0095XB	20	24	50	3	3
NEW 0.96	1	Int.	●	0096SB	4.9	8.7	50	3	1
	5	Int.	●	0096LB	10	14	50	3	3
	12	Int.	●	0096XB	20	24	50	3	3
NEW 0.97	1	Int.	●	0097SB	4.9	8.7	50	3	1
	5	Int.	●	0097LB	10	14	50	3	3
	12	Int.	●	0097XB	20	24	50	3	3

CUTTING CONDITIONS D017
OPERATION GUIDANCE D018
TECHNICAL DATA F001

CARBIDE

SMALL DIAMETER MWS
WSTAR DRILLS

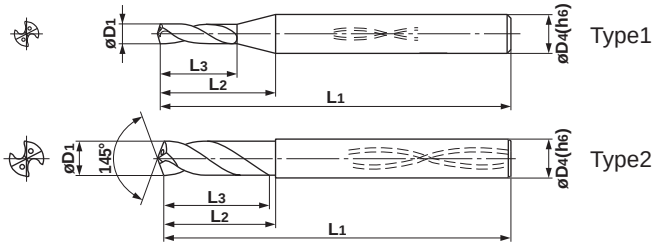
- Through coolant micro drills for stable deep hole drilling.
- For high accuracy and efficient drilling of carbon steels through to difficult-to-cut materials.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎	○	○

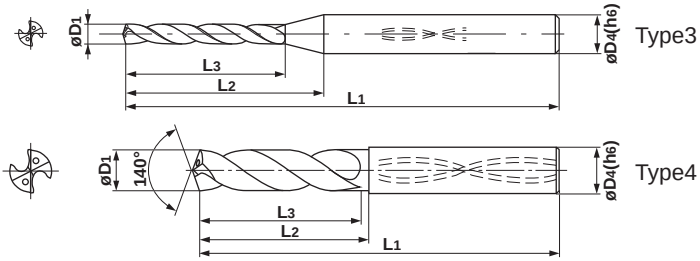
		0.5≤D1<1	1≤D1<2.95
D1 Tolerance (mm)	MWS-SB	+0.009 0	+0.014 0
	MWS-LB/XB MWS-DB	0 −0.009	0 −0.014
D4 Tolerance (mm)		0 −0.006	0 −0.006

MWS (Internal coolant)

SB Type
(For pilot holes)



LB/XB Type



DB Type

(Note) MWS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
0.98	NEW 1	Int.	●	MWS0098SB	4.9	8.7	50	3	1
	5	Int.	●	0098LB	10	14	50	3	3
	12	Int.	●	0098XB	20	24	50	3	3
0.99	NEW 1	Int.	●	0099SB	4.9	8.7	50	3	1
	5	Int.	●	0099LB	10	14	50	3	3
	12	Int.	●	0099XB	20	24	50	3	3
1.00	NEW 1	Int.	●	0100SB	5.0	8.7	55	3	1
	5	Int.	●	0100LB	11	15	55	3	3
	12	Int.	●	0100XB	23	27	55	3	3
	NEW 20	Int.	●	0100X20DB	24	28	60	3	3
	NEW 25	Int.	●	0100X25DB	28	32	66	3	3
	NEW 30	Int.	●	0100X30DB	33	37	72	3	3
1.05	NEW 1	Int.	□	0105SB	5.2	8.8	55	3	1
	20	Int.	□	0105X20DB	24	28	60	3	3
	25	Int.	□	0105X25DB	29	33	66	3	3
	30	Int.	□	0105X30DB	35	38	72	3	3
1.10	NEW 1	Int.	●	0110SB	5.4	8.9	55	3	1
	5	Int.	●	0110LB	17	21	55	3	3
	12	Int.	●	0110XB	23	27	55	3	3
	NEW 20	Int.	●	0110X20DB	25	29	60	3	3
	NEW 25	Int.	●	0110X25DB	31	34	66	3	3
	NEW 30	Int.	●	0110X30DB	36	40	72	3	3

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
1.15	NEW 1	Int.	□	MWS0115SB	5.6	9.1	55	3	1
	20	Int.	□	0115X20DB	26	30	60	3	3
	25	Int.	□	0115X25DB	32	36	66	3	3
	30	Int.	□	0115X30DB	38	41	72	3	3
1.20	NEW 1	Int.	●	0120SB	6.0	9.4	55	3	1
	5	Int.	●	0120LB	17	20	55	3	3
	12	Int.	●	0120XB	23	26	55	3	3
	NEW 20	Int.	●	0120X20DB	28	31	60	3	3
	NEW 25	Int.	●	0120X25DB	34	37	66	3	3
	NEW 30	Int.	●	0120X30DB	40	43	72	3	3
1.25	NEW 1	Int.	□	0125SB	6.2	9.5	55	3	1
	20	Int.	□	0125X20DB	29	32	68	3	3
	25	Int.	□	0125X25DB	35	38	74	3	3
	30	Int.	□	0125X30DB	41	45	82	3	3
1.30	NEW 1	Int.	●	0130SB	6.4	9.6	55	3	1
	5	Int.	●	0130LB	17	20	55	3	3
	12	Int.	●	0130XB	23	26	55	3	3
	NEW 20	Int.	●	0130X20DB	30	33	68	3	3
	NEW 25	Int.	●	0130X25DB	36	40	74	3	3
	NEW 30	Int.	●	0130X30DB	43	46	82	3	3
1.35	NEW 1	Int.	□	0135SB	6.6	9.7	55	3	1
	20	Int.	□	0135X20DB	31	34	68	3	3
	25	Int.	□	0135X25DB	38	41	74	3	3
	30	Int.	□	0135X30DB	45	48	82	3	3

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
1.40	1	Int.	●	MWS0140SB	7.0	10.0	55	3	1
	5	Int.	●	0140LB	17	20	55	3	3
	12	Int.	●	0140XB	23	26	55	3	3
	20	Int.	●	0140X20DB	32	35	68	3	3
	25	Int.	●	0140X25DB	39	42	74	3	3
	30	Int.	●	0140X30DB	46	49	82	3	3
1.45	1	Int.	□	0145SB	7.2	10.1	55	3	1
	20	Int.	□	0145X20DB	33	36	68	3	3
	25	Int.	□	0145X25DB	41	43	74	3	3
	30	Int.	□	0145X30DB	48	51	82	3	3
1.50	1	Int.	●	0150SB	7.4	10.2	55	3	1
	5	Int.	●	0150LB	17	20	55	3	3
	12	Int.	●	0150XB	23	26	55	3	3
	20	Int.	●	0150X20DB	35	37	68	3	3
	25	Int.	●	0150X25DB	42	45	74	3	3
	30	Int.	●	0150X30DB	50	52	82	3	3
1.55	1	Int.	□	0155SB	7.6	10.3	68	3	1
	20	Int.	□	0155X20DB	36	38	78	3	3
	25	Int.	□	0155X25DB	43	46	86	3	3
	30	Int.	□	0155X30DB	51	54	95	3	3
1.60	1	Int.	●	0160SB	8.0	10.6	68	3	1
	5	Int.	●	0160LB	22	25	68	3	3
	12	Int.	●	0160XB	30	33	68	3	3
	20	Int.	●	0160X20DB	37	39	78	3	3
	25	Int.	●	0160X25DB	45	47	86	3	3
	30	Int.	●	0160X30DB	53	55	95	3	3
1.65	1	Int.	□	0165SB	8.2	10.7	68	3	1
	20	Int.	□	0165X20DB	38	40	78	3	3
	25	Int.	□	0165X25DB	46	49	86	3	3
	30	Int.	□	0165X30DB	54	57	95	3	3
1.70	1	Int.	●	0170SB	8.4	10.8	68	3	1
	5	Int.	●	0170LB	22	24	68	3	3
	12	Int.	●	0170XB	30	32	68	3	3
	20	Int.	●	0170X20DB	39	42	78	3	3
	25	Int.	●	0170X25DB	48	50	86	3	3
	30	Int.	●	0170X30DB	56	59	95	3	3
1.75	1	Int.	□	0175SB	8.6	10.9	68	3	1
	20	Int.	□	0175X20DB	40	43	84	3	3
	25	Int.	□	0175X25DB	49	51	94	3	3
	30	Int.	□	0175X30DB	58	60	102	3	3
1.80	1	Int.	●	0180SB	9.0	11.2	68	3	1
	5	Int.	●	0180LB	22	24	68	3	3
	12	Int.	●	0180XB	30	32	68	3	3
	20	Int.	●	0180X20DB	41	44	84	3	3
	25	Int.	●	0180X25DB	50	53	94	3	3
	30	Int.	●	0180X30DB	59	62	102	3	3

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
1.85	1	Int.	□	MWS0185SB	9.2	11.3	68	3	1
	20	Int.	□	0185X20DB	43	45	84	3	3
	25	Int.	□	0185X25DB	52	54	94	3	3
	30	Int.	□	0185X30DB	61	63	102	3	3
1.90	1	Int.	●	0190SB	9.4	11.5	68	3	1
	5	Int.	●	0190LB	22	24	68	3	3
	12	Int.	●	0190XB	30	32	68	3	3
	20	Int.	●	0190X20DB	44	46	84	3	3
	25	Int.	●	0190X25DB	53	55	94	3	3
	30	Int.	●	0190X30DB	63	65	102	3	3
1.95	1	Int.	□	0195SB	9.6	11.6	68	3	1
	20	Int.	□	0195X20DB	45	47	84	3	3
	25	Int.	□	0195X25DB	55	57	94	3	3
	30	Int.	□	0195X30DB	64	66	102	3	3
2.00	1	Int.	●	0200SB	10.0	11.9	68	3	1
	5	Int.	●	0200LB	22	24	68	3	3
	12	Int.	●	0200XB	30	32	68	3	3
	20	Int.	●	0200X20DB	46	48	84	3	3
	25	Int.	●	0200X25DB	56	58	94	3	3
	30	Int.	●	0200X30DB	66	68	102	3	3
2.05	1	Int.	□	0205SB	10.2	12.0	74	3	1
	20	Int.	□	0205X20DB	47	49	94	3	3
	25	Int.	□	0205X25DB	57	59	107	3	3
	30	Int.	□	0205X30DB	68	69	118	3	3
2.10	1	Int.	●	0210SB	10.4	12.1	74	3	1
	5	Int.	●	0210LB	28	30	74	3	3
	12	Int.	●	0210XB	38	40	74	3	3
	20	Int.	●	0210X20DB	48	50	94	3	3
	25	Int.	●	0210X25DB	59	60	107	3	3
	30	Int.	●	0210X30DB	69	71	118	3	3
2.15	1	Int.	□	0215SB	10.6	12.2	74	3	1
	20	Int.	□	0215X20DB	49	51	94	3	3
	25	Int.	□	0215X25DB	60	62	107	3	3
	30	Int.	□	0215X30DB	71	73	118	3	3
2.20	1	Int.	●	0220SB	11.0	12.5	74	3	1
	5	Int.	●	0220LB	28	29	74	3	3
	12	Int.	●	0220XB	38	39	74	3	3
	20	Int.	●	0220X20DB	51	52	94	3	3
	25	Int.	●	0220X25DB	62	63	107	3	3
	30	Int.	●	0220X30DB	73	74	118	3	3
2.25	1	Int.	□	0225SB	11.2	12.6	74	3	1
	20	Int.	□	0225X20DB	52	53	94	3	3
	25	Int.	□	0225X25DB	63	64	107	3	3
	30	Int.	□	0225X30DB	74	76	118	3	3

CUTTING CONDITIONS D017
OPERATION GUIDANCE D018
TECHNICAL DATA F001

DRILLING(SOLID CARBIDE)

SMALL DIAMETER MWS
WSTAR DRILLS

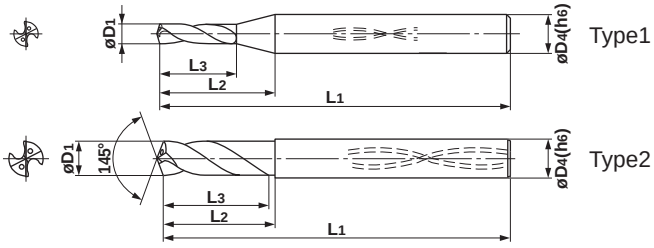
- Through coolant micro drills for stable deep hole drilling.
- For high accuracy and efficient drilling of carbon steels through to difficult-to-cut materials.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎	○	○

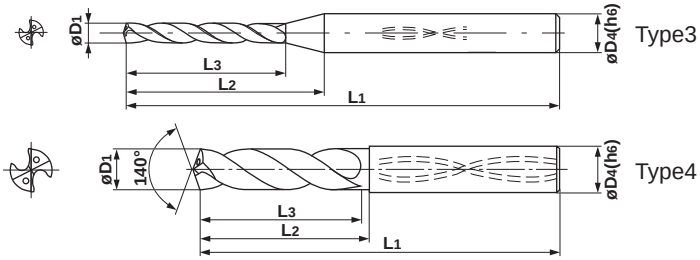
		0.5≤D1<1	1≤D1<2.95
D1 Tolerance (mm)	MWS-SB	+0.009 0	+0.014 0
	MWS-LB/XB MWS-DB	0 −0.009	0 −0.014
D4 Tolerance (mm)		0 −0.006	0 −0.006

MWS (Internal coolant)

SB Type
(For pilot holes)



LB/XB Type



DB Type

(Note) MWS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
2.30	NEW 1	Int.	●	MWS0230SB	11.4	12.7	74	3	1
	5	Int.	●	0230LB	28	29	74	3	3
	12	Int.	●	0230XB	38	39	74	3	3
	NEW 20	Int.	●	0230X20DB	53	54	94	3	3
	NEW 25	Int.	●	0230X25DB	64	66	107	3	3
	NEW 30	Int.	●	0230X30DB	76	77	118	3	3
2.35	NEW 1	Int.	□	0235SB	11.6	12.8	74	3	1
	20	Int.	□	0235X20DB	54	55	94	3	3
	25	Int.	□	0235X25DB	66	67	107	3	3
	30	Int.	□	0235X30DB	78	79	118	3	3
2.40	NEW 1	Int.	●	0240SB	12.0	13.1	74	3	1
	5	Int.	●	0240LB	28	29	74	3	3
	12	Int.	●	0240XB	38	39	74	3	3
	NEW 20	Int.	●	0240X20DB	55	56	94	3	3
	NEW 25	Int.	●	0240X25DB	67	68	107	3	3
	NEW 30	Int.	●	0240X30DB	79	80	118	3	3
2.45	NEW 1	Int.	□	0245SB	12.2	13.2	74	3	1
	20	Int.	□	0245X20DB	56	57	94	3	3
	25	Int.	□	0245X25DB	69	70	107	3	3
	30	Int.	□	0245X30DB	81	82	118	3	3

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
2.50	NEW 1	Int.	●	MWS0250SB	12.4	13.3	74	3	1
	5	Int.	●	0250LB	28	29	74	3	3
	12	Int.	●	0250XB	38	39	74	3	3
	NEW 20	Int.	●	0250X20DB	58	59	94	3	3
	NEW 25	Int.	●	0250X25DB	70	71	107	3	3
	NEW 30	Int.	●	0250X30DB	83	84	118	3	3
2.55	NEW 1	Int.	□	0255SB	12.6	12.6	81	3	2
	20	Int.	□	0255X20DB	59	59	103	3	4
	25	Int.	□	0255X25DB	71	71	117	3	4
	30	Int.	□	0255X30DB	84	84	132	3	4
2.60	NEW 1	Int.	●	0260SB	13.0	13.0	81	3	2
	5	Int.	●	0260LB	33	33	81	3	4
	12	Int.	●	0260XB	45	45	81	3	4
	NEW 20	Int.	●	0260X20DB	60	60	103	3	4
	NEW 25	Int.	●	0260X25DB	73	73	117	3	4
	NEW 30	Int.	●	0260X30DB	86	86	132	3	4
2.65	NEW 1	Int.	□	0265SB	13.2	13.2	81	3	2
	20	Int.	□	0265X20DB	61	61	103	3	4
	25	Int.	□	0265X25DB	74	74	117	3	4
	30	Int.	□	0265X30DB	87	87	132	3	4

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
2.70	NEW 1	Int.	●	MWS0270SB	13.4	13.4	81	3	2
	5	Int.	●	0270LB	33	33	81	3	4
	12	Int.	●	0270XB	45	45	81	3	4
	NEW 20	Int.	●	0270X20DB	62	62	103	3	4
	NEW 25	Int.	●	0270X25DB	76	76	117	3	4
	NEW 30	Int.	●	0270X30DB	89	89	132	3	4
2.75	NEW 1	Int.	□	0275SB	13.6	13.6	81	3	2
	20	Int.	□	0275X20DB	63	63	103	3	4
	25	Int.	□	0275X25DB	77	77	117	3	4
	30	Int.	□	0275X30DB	91	91	132	3	4
2.80	NEW 1	Int.	●	0280SB	14.0	14.0	81	3	2
	5	Int.	●	0280LB	33	33	81	3	4
	12	Int.	●	0280XB	45	45	81	3	4
	NEW 20	Int.	●	0280X20DB	64	64	103	3	4
	NEW 25	Int.	●	0280X25DB	78	78	117	3	4
	NEW 30	Int.	●	0280X30DB	92	92	132	3	4

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
2.85	NEW 1	Int.	□	MWS0285SB	14.2	14.2	81	3	2
	20	Int.	□	0285X20DB	66	66	103	3	4
	25	Int.	□	0285X25DB	80	80	117	3	4
	30	Int.	□	0285X30DB	94	94	132	3	4
2.90	NEW 1	Int.	●	0290SB	14.4	14.4	81	3	2
	5	Int.	●	0290LB	33	33	81	3	4
	12	Int.	●	0290XB	45	45	81	3	4
	NEW 20	Int.	●	0290X20DB	67	67	103	3	4
	NEW 25	Int.	●	0290X25DB	81	81	117	3	4
	NEW 30	Int.	●	0290X30DB	96	96	132	3	4
2.95	NEW 1	Int.	□	0295SB	14.6	14.6	81	3	2
	20	Int.	□	0295X20DB	68	68	103	3	4
	25	Int.	□	0295X25DB	83	83	117	3	4
	30	Int.	□	0295X30DB	97	97	132	3	4

RECOMMENDED CUTTING CONDITIONS

SB/LB/XB Type Drill

Work Material		Drill Dia. / Conditions / Hardness	ϕ0.50—ϕ0.70 Cutting Speed (m/min)	ϕ0.50—ϕ0.70 Feed (mm/rev)	ϕ0.71—ϕ0.85 Cutting Speed (m/min)	ϕ0.71—ϕ0.85 Feed (mm/rev)	ϕ0.86—ϕ0.99 Cutting Speed (m/min)	ϕ0.86—ϕ0.99 Feed (mm/rev)	ϕ1.0—ϕ2.95 Cutting Speed (m/min)	ϕ1.0—ϕ2.95 Feed (mm/rev)
P	Mild Steel	≤180HB	50 (40—60)	0.010 (0.005—0.015)	50 (40—60)	0.02 (0.01—0.03)	50 (40—60)	0.03 (0.02—0.05)	50 (40—60)	0.08 (0.04—0.12)
P	Carbon Steel Alloy Steel	180—280HB	50 (40—60)	0.010 (0.005—0.015)	50 (40—60)	0.02 (0.01—0.03)	50 (40—60)	0.03 (0.02—0.05)	50 (40—60)	0.08 (0.04—0.12)
P	Carbon Steel Alloy Steel	280—350HB	50 (40—60)	0.010 (0.005—0.015)	50 (40—60)	0.02 (0.01—0.03)	50 (40—60)	0.03 (0.02—0.05)	50 (40—60)	0.08 (0.04—0.12)
M	Stainless Steel	≤200HB	30 (20—40)	0.008 (0.005—0.01)	30 (20—40)	0.015 (0.008—0.02)	30 (20—40)	0.02 (0.01—0.03)	30 (20—40)	0.05 (0.02—0.10)
K	Gray Cast Iron	Tensile Strength ≤350MPa	50 (40—60)	0.015 (0.008—0.02)	50 (40—60)	0.02 (0.01—0.03)	50 (40—60)	0.04 (0.02—0.06)	50 (40—60)	0.08 (0.04—0.12)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	30 (20—40)	0.010 (0.005—0.015)	30 (20—40)	0.02 (0.01—0.03)	30 (20—40)	0.03 (0.02—0.05)	30 (20—40)	0.06 (0.02—0.10)
N	Aluminium Alloy	—	60 (50—80)	0.03 (0.02—0.05)	60 (50—80)	0.04 (0.03—0.06)	60 (50—80)	0.06 (0.04—0.08)	60 (50—80)	0.10 (0.05—0.15)
S	Heat Resistant Alloy	—	10 (5—15)	0.006 (0.004—0.008)	10 (5—15)	0.01 (0.005—0.02)	10 (5—15)	0.01 (0.005—0.02)	10 (5—15)	0.03 (0.01—0.05)

DB Type Long Drill

Work Material		Drill Dia. / Conditions / Hardness	ϕ1.0—ϕ2.0 Cutting Speed (m/min)	ϕ1.0—ϕ2.0 Feed (mm/rev)	ϕ2.05—ϕ2.95 Cutting Speed (m/min)	ϕ2.05—ϕ2.95 Feed (mm/rev)
P	Mild Steel	≤180HB	50 (40—60)	0.08 (0.04—0.10)	60 (50—70)	0.10 (0.08—0.12)
P	Carbon Steel Alloy Steel	180—280HB	40 (30—50)	0.07 (0.04—0.08)	50 (40—60)	0.09 (0.06—0.12)
P	Carbon Steel Alloy Steel	280—350HB	30 (20—40)	0.04 (0.03—0.06)	50 (40—60)	0.07 (0.05—0.10)
M	Stainless Steel	≤200HB	30 (20—40)	0.03 (0.01—0.05)	30 (20—40)	0.06 (0.04—0.08)
K	Gray Cast Iron	Tensile Strength ≤350MPa	40 (30—50)	0.07 (0.04—0.08)	50 (40—60)	0.09 (0.06—0.12)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	30 (20—40)	0.04 (0.03—0.06)	50 (40—60)	0.07 (0.05—0.10)
S	Heat Resistant Alloy	—	10 (5—15)	0.02 (0.01—0.03)	15 (10—20)	0.03 (0.01—0.05)

SOLID CARBIDE DRILLING

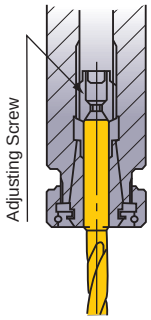
OPERATION GUIDANCE D018 TECHNICAL DATA F001

CARBIDE

SMALL DIAMETER MWS
WSTAR DRILLS

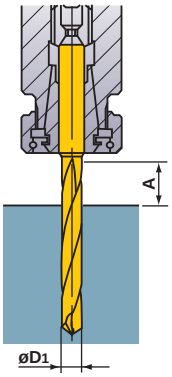
OPERATIONAL GUIDANCE

Drill Holding



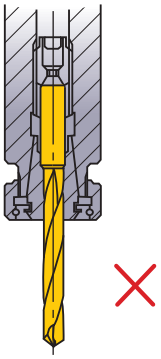
Thrust bearing type collet chuck holds the drill securely.

Drill Length



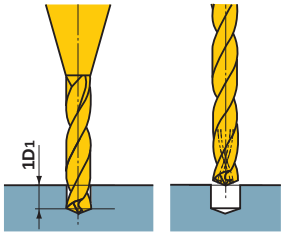
A ≥ D1 x 2.0

Drill Installation



Do not clamp on the flutes.

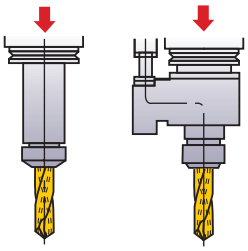
Drill Installation



①For pilot hole drilling, use theSB type drill.
②Use the prepared hole as a guide when using a drill with an oil hole. Depending on the cutting conditions, peck feed is recommended.

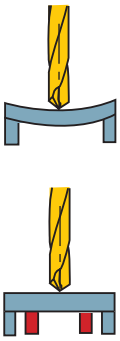
Through Coolant Type

Spindles Through Coolant Type | Revolving Coolant Machine Type



At least 1.5Mpa is required.
Recommended coolant pressure: ≥3Mpa

Thin Workpiece



If Bending Occurs ×

Support the Workpiece ○

Coolant Handling

1) Small particles of swarf will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

NOTES ON USE

●Please use a fine mesh filter (mesh≤3μm) for coolant to prevent jamming in the oil hole.
●For deep drilling with the long type drill, machining a pilot hole is recommended.
(Otherwise, centrifugal forces may cause drill breakage.)

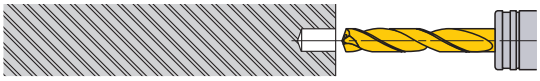
SOLID CARBIDE DRILLING

OPERATIONAL GUIDANCE FOR MWS LONG TYPE DRILLS (L/D ≥ 10)

FLAT FACE DRILLING

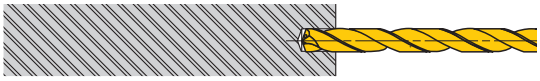
●Drilling a blind hole

1. Drilling a pilot hole



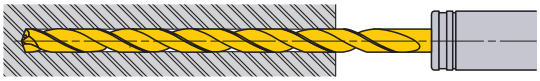
①Use the SB type drill.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1D.
(Adjust the pilot hole depth according to the length of the long type drill.)

2. Initial cutting with the long type drill



①Penetrate the guide hole at low revolution. (Revolution 1000min^{-1}, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 0.5—1.0mm short of the guide hole bottom.

3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

4. Drill retraction

①After drilling, lower the cutting revolution about 0.5—1.0mm short of the hole end. (Revolution of around 1000min^{-1})
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.

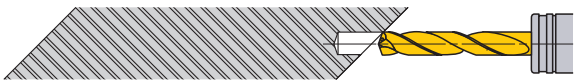
INTERRUPED DRILLING

●Drilling and breaking through on irregular faces or angles

1. Spot facing

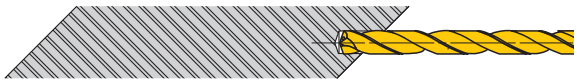
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a pilot hole



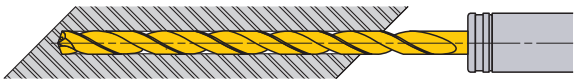
①Use a drill with a larger (flatter) point angle than the long type. TheMWS-SB type is recommended.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1D.
(Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial cutting with the long type drill



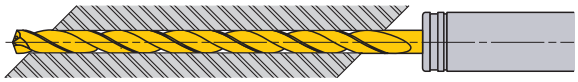
①Penetrate the guide hole at a low revolution. (Revolution 1000min^{-1}, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 0.5—1.0mm short of the guide hole bottom.

4. Drill the deep hole



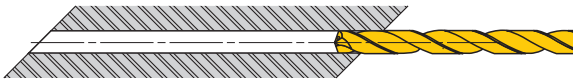
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



①When breaking through, the cutting edge can be damaged.
②Feed rate should be half the normal feed.

6. Drill retraction



①Finally clear the hole at a revolution speed of 1000min^{-1} and feed rate of 0.2—0.3mm/rev.
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.

MWE/MWS
WSTAR DRILLS

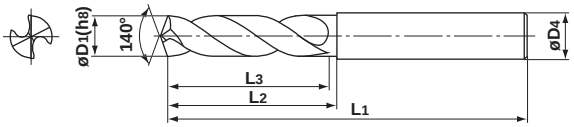
- For high accuracy and efficient drilling of steels, carbon steels and difficult-to-cut materials.
- Also suitable for lower speed applications.

UWC | VP | 140° | X Thinning

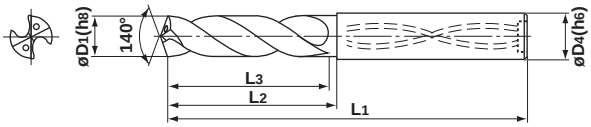
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MWE only)	◎(MWE:○)	◎	○	○

		D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤25
D1 Tolerance (mm)		0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MWE-5A/5B	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MWE-5B/MB MWS	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MWE (External coolant)



MWS (Internal coolant)



(Note 1) MWS type bigger thanϕ5.0 have a recess in the end face.
(Note 2) MWE/S-SB/MB/LB/X8DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.0	2	Ext.	●	MWE0300SA	16	16	55	3.0
	3	Ext.	●	MWE0300MA	21	21	60	3.0
	2	Ext.	●	MWE0300SB	16	16	55	3.0
	3	Ext.	●	MWE0300MB	21	21	60	3.0
	3	Int.	●	MWS0300MB	24	24	72	3.0
	5	Int.	●	MWS0300LB	33	33	81	3.0
	8	Int.	●	MWS0300X8DB	35	35	81	3.0
3.1	2	Ext.	●	MWE0310SA	18	18	55	3.1
	3	Ext.	●	MWE0310MA	24	24	60	3.1
	2	Ext.	□	MWE0310SB	18	20	55	4.0
	3	Ext.	□	MWE0310MB	24	26	60	4.0
	3	Int.	●	MWS0310MB	28	28	76	4.0
	5	Int.	●	MWS0310LB	39	39	87	4.0
	8	Int.	●	MWS0310X8DB	41	41	87	4.0
3.2	2	Ext.	●	MWE0320SA	18	18	55	3.2
	3	Ext.	●	MWE0320MA	24	24	60	3.2
	2	Ext.	□	MWE0320SB	18	20	55	4.0
	3	Ext.	□	MWE0320MB	24	26	60	4.0
	3	Int.	●	MWS0320MB	28	28	76	4.0
	5	Int.	●	MWS0320LB	39	39	87	4.0
	8	Int.	●	MWS0320X8DB	41	41	87	4.0
3.3	2	Ext.	●	MWE0330SA	18	18	55	3.3
	3	Ext.	●	MWE0330MA	24	24	60	3.3
	2	Ext.	●	MWE0330SB	18	20	55	4.0
	3	Ext.	●	MWE0330MB	24	26	60	4.0
	3	Int.	●	MWS0330MB	28	28	76	4.0
	5	Int.	●	MWS0330LB	39	39	87	4.0
	8	Int.	●	MWS0330X8DB	41	41	87	4.0
3.4	2	Ext.	●	MWE0340SA	20	20	55	3.4
	3	Ext.	●	MWE0340MA	24	24	60	3.4
	2	Ext.	●	MWE0340SB	18	20	55	4.0
	3	Ext.	●	MWE0340MB	24	26	60	4.0
	3	Int.	●	MWS0340MB	28	28	76	4.0
	5	Int.	●	MWS0340LB	39	39	87	4.0
	8	Int.	●	MWS0340X8DB	41	41	87	4.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.5	2	Ext.	●	MWE0350SA	20	20	55	3.5
	3	Ext.	●	MWE0350MA	24	24	60	3.5
	2	Ext.	●	MWE0350SB	18	20	55	4.0
	3	Ext.	●	MWE0350MB	24	26	60	4.0
	3	Int.	●	MWS0350MB	28	28	76	4.0
	5	Int.	●	MWS0350LB	39	39	87	4.0
	8	Int.	●	MWS0350X8DB	41	41	87	4.0
3.6	2	Ext.	●	MWE0360SA	20	20	55	3.6
	3	Ext.	●	MWE0360MA	27	27	60	3.6
	2	Ext.	□	MWE0360SB	20	20	55	4.0
	3	Ext.	□	MWE0360MB	27	27	60	4.0
	3	Int.	●	MWS0360MB	32	32	80	4.0
	5	Int.	●	MWS0360LB	44	44	92	4.0
	8	Int.	●	MWS0360X8DB	46	46	92	4.0
3.7	2	Ext.	●	MWE0370SA	20	20	55	3.7
	3	Ext.	●	MWE0370MA	27	27	60	3.7
	2	Ext.	●	MWE0370SB	20	20	55	4.0
	3	Ext.	●	MWE0370MB	27	27	60	4.0
	3	Int.	●	MWS0370MB	32	32	80	4.0
	5	Int.	●	MWS0370LB	44	44	92	4.0
	8	Int.	●	MWS0370X8DB	46	46	92	4.0
3.8	2	Ext.	●	MWE0380SA	22	22	55	3.8
	3	Ext.	●	MWE0380MA	27	27	60	3.8
	2	Ext.	●	MWE0380SB	20	20	55	4.0
	3	Ext.	●	MWE0380MB	27	27	60	4.0
	3	Int.	●	MWS0380MB	32	32	80	4.0
	5	Int.	●	MWS0380LB	44	44	92	4.0
	8	Int.	●	MWS0380X8DB	46	46	92	4.0
3.9	2	Ext.	●	MWE0390SA	22	22	55	3.9
	3	Ext.	●	MWE0390MA	27	27	60	3.9
	2	Ext.	●	MWE0390SB	20	20	55	4.0
	3	Ext.	●	MWE0390MB	27	27	60	4.0
	3	Int.	●	MWS0390MB	32	32	80	4.0
	5	Int.	●	MWS0390LB	44	44	92	4.0
	8	Int.	●	MWS0390X8DB	46	46	92	4.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
4.0	2	Ext.	●	MWE0400SA	22	22	55	4.0
	3	Ext.	●	MWE0400MA	27	27	60	4.0
	2	Ext.	●	MWE0400SB	20	20	55	4.0
	3	Ext.	●	MWE0400MB	27	27	60	4.0
	3	Int.	●	MWS0400MB	32	32	80	4.0
	5	Int.	●	MWS0400LB	44	44	92	4.0
	8	Int.	●	MWS0400X8DB	46	46	92	4.0
4.1	2	Ext.	●	MWE0410SA	22	22	55	4.1
	3	Ext.	●	MWE0410MA	29	29	63	4.1
	2	Ext.	□	MWE0410SB	22	24	62	5.0
	3	Ext.	□	MWE0410MB	29	31	68	5.0
	3	Int.	●	MWS0410MB	36	36	86	5.0
	5	Int.	●	MWS0410LB	50	50	100	5.0
	8	Int.	●	MWS0410X8DB	52	52	100	5.0
4.2	2	Ext.	●	MWE0420SA	22	22	55	4.2
	3	Ext.	●	MWE0420MA	29	29	63	4.2
	2	Ext.	●	MWE0420SB	22	24	62	5.0
	3	Ext.	●	MWE0420MB	29	31	68	5.0
	3	Int.	●	MWS0420MB	36	36	86	5.0
	5	Int.	●	MWS0420LB	50	50	100	5.0
	8	Int.	●	MWS0420X8DB	52	52	100	5.0
4.3	2	Ext.	●	MWE0430SA	24	24	58	4.3
	3	Ext.	●	MWE0430MA	29	29	63	4.3
	2	Ext.	●	MWE0430SB	22	24	62	5.0
	3	Ext.	●	MWE0430MB	29	31	68	5.0
	3	Int.	●	MWS0430MB	36	36	86	5.0
	5	Int.	●	MWS0430LB	50	50	100	5.0
	8	Int.	●	MWS0430X8DB	52	52	100	5.0
4.4	2	Ext.	●	MWE0440SA	24	24	58	4.4
	3	Ext.	●	MWE0440MA	29	29	63	4.4
	2	Ext.	●	MWE0440SB	22	24	62	5.0
	3	Ext.	●	MWE0440MB	29	31	68	5.0
	3	Int.	●	MWS0440MB	36	36	86	5.0
	5	Int.	●	MWS0440LB	50	50	100	5.0
	8	Int.	●	MWS0440X8DB	52	52	100	5.0
4.5	2	Ext.	●	MWE0450SA	24	24	58	4.5
	3	Ext.	●	MWE0450MA	29	29	63	4.5
	2	Ext.	●	MWE0450SB	22	24	62	5.0
	3	Ext.	●	MWE0450MB	29	31	68	5.0
	3	Int.	●	MWS0450MB	36	36	86	5.0
	5	Int.	●	MWS0450LB	50	50	100	5.0
	8	Int.	●	MWS0450X8DB	52	52	100	5.0
4.6	2	Ext.	●	MWE0460SA	24	24	58	4.6
	3	Ext.	●	MWE0460MA	32	32	68	4.6
	2	Ext.	□	MWE0460SB	24	24	62	5.0
	3	Ext.	□	MWE0460MB	32	32	68	5.0
	3	Int.	●	MWS0460MB	40	40	90	5.0
	5	Int.	●	MWS0460LB	55	55	105	5.0
	8	Int.	●	MWS0460X8DB	57	57	105	5.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
4.7	2	Ext.	●	MWE0470SA	24	24	58	4.7
	3	Ext.	●	MWE0470MA	32	32	68	4.7
	2	Ext.	□	MWE0470SB	24	24	62	5.0
	3	Ext.	□	MWE0470MB	32	32	68	5.0
	3	Int.	●	MWS0470MB	40	40	90	5.0
	5	Int.	●	MWS0470LB	55	55	105	5.0
	8	Int.	●	MWS0470X8DB	57	57	105	5.0
4.8	2	Ext.	●	MWE0480SA	26	26	62	4.8
	3	Ext.	●	MWE0480MA	32	32	68	4.8
	2	Ext.	□	MWE0480SB	24	24	62	5.0
	3	Ext.	□	MWE0480MB	32	32	68	5.0
	3	Int.	●	MWS0480MB	40	40	90	5.0
	5	Int.	●	MWS0480LB	55	55	105	5.0
	8	Int.	●	MWS0480X8DB	57	57	105	5.0
4.9	2	Ext.	●	MWE0490SA	26	26	62	4.9
	3	Ext.	●	MWE0490MA	32	32	68	4.9
	2	Ext.	□	MWE0490SB	24	24	62	5.0
	3	Ext.	□	MWE0490MB	32	32	68	5.0
	3	Int.	●	MWS0490MB	40	40	90	5.0
	5	Int.	●	MWS0490LB	55	55	105	5.0
	8	Int.	●	MWS0490X8DB	57	57	105	5.0
5.0	2	Ext.	●	MWE0500SA	26	26	62	5.0
	3	Ext.	●	MWE0500MA	32	32	68	5.0
	2	Ext.	●	MWE0500SB	24	24	62	5.0
	3	Ext.	●	MWE0500MB	32	32	68	5.0
	3	Int.	●	MWS0500MB	27.5	30	82	6.0
	5	Int.	●	MWS0500LB	44	48	100	6.0
	8	Int.	●	MWS0500X8DB	57	57	105	5.0
5.1	2	Ext.	●	MWE0510SA	26	26	62	5.1
	3	Ext.	●	MWE0510MA	34	34	72	5.1
	2	Ext.	●	MWE0510SB	26	28	66	6.0
	3	Ext.	●	MWE0510MB	34	36	74	6.0
	3	Int.	●	MWS0510MB	27.5	30	82	6.0
	5	Int.	●	MWS0510LB	44	48	100	6.0
	8	Int.	●	MWS0510X8DB	61	66	118	6.0
5.2	2	Ext.	●	MWE0520SA	26	26	62	5.2
	3	Ext.	●	MWE0520MA	34	34	72	5.2
	2	Ext.	●	MWE0520SB	26	28	66	6.0
	3	Ext.	●	MWE0520MB	34	36	74	6.0
	3	Int.	●	MWS0520MB	27.5	30	82	6.0
	5	Int.	●	MWS0520LB	44	48	100	6.0
	8	Int.	●	MWS0520X8DB	61	66	118	6.0
5.3	2	Ext.	●	MWE0530SA	26	26	62	5.3
	3	Ext.	●	MWE0530MA	34	34	72	5.3
	2	Ext.	□	MWE0530SB	26	28	66	6.0
	3	Ext.	□	MWE0530MB	34	36	74	6.0
	3	Int.	●	MWS0530MB	27.5	30	82	6.0
	5	Int.	●	MWS0530LB	44	48	100	6.0
	8	Int.	●	MWS0530X8DB	61	66	118	6.0

CUTTING CONDITIONS D033
OPERATION GUIDANCE D034
TECHNICAL DATA F001

MWE/MWS
WSTAR DRILLS

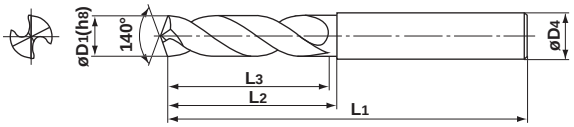
- For high accuracy and efficient drilling of steels, carbon steels and difficult-to-cut materials.
- Also suitable for lower speed applications.

UWC | VP | 140° | X Thinning

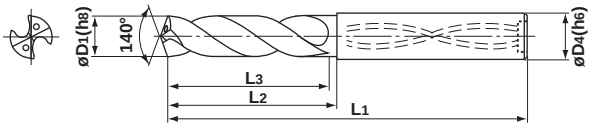
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MWE only)	◎(MWE:○)	◎	○	○

		D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤25
D1 Tolerance (mm)		0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MWE-5A/5B	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MWE-5B/MB MWS	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MWE (External coolant)



MWS (Internal coolant)



(Note 1) MWS type bigger thanϕ5.0 have a recess in the end face.
(Note 2) MWE/S-SB/MB/LB/X8DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
5.4	2	Ext.	●	MWE0540SA	28	28	66	5.4
	3	Ext.	●	MWE0540MA	34	34	72	5.4
	2	Ext.	□	MWE0540SB	26	28	66	6.0
	3	Ext.	□	MWE0540MB	34	36	74	6.0
	3	Int.	●	MWS0540MB	27.5	30	82	6.0
	5	Int.	●	MWS0540LB	44	48	100	6.0
	8	Int.	●	MWS0540X8DB	61	66	118	6.0
5.5	2	Ext.	●	MWE0550SA	28	28	66	5.5
	3	Ext.	●	MWE0550MA	34	34	72	5.5
	2	Ext.	●	MWE0550SB	26	28	66	6.0
	3	Ext.	●	MWE0550MB	34	36	74	6.0
	3	Int.	●	MWS0550MB	27.5	30	82	6.0
	5	Int.	●	MWS0550LB	44	48	100	6.0
	8	Int.	●	MWS0550X8DB	61	66	118	6.0
5.6	2	Ext.	●	MWE0560SA	28	28	66	5.6
	3	Ext.	●	MWE0560MA	36	36	74	5.6
	2	Ext.	□	MWE0560SB	28	28	66	6.0
	3	Ext.	□	MWE0560MB	36	36	74	6.0
	3	Int.	●	MWS0560MB	30	30	82	6.0
	5	Int.	●	MWS0560LB	48	48	100	6.0
	8	Int.	●	MWS0560X8DB	66	66	118	6.0
5.7	2	Ext.	●	MWE0570SA	28	28	66	5.7
	3	Ext.	●	MWE0570MA	36	36	74	5.7
	2	Ext.	□	MWE0570SB	28	28	66	6.0
	3	Ext.	□	MWE0570MB	36	36	74	6.0
	3	Int.	●	MWS0570MB	30	30	82	6.0
	5	Int.	●	MWS0570LB	48	48	100	6.0
	8	Int.	●	MWS0570X8DB	66	66	118	6.0
5.8	2	Ext.	●	MWE0580SA	28	28	66	5.8
	3	Ext.	●	MWE0580MA	36	36	74	5.8
	2	Ext.	□	MWE0580SB	28	28	66	6.0
	3	Ext.	□	MWE0580MB	36	36	74	6.0
	3	Int.	●	MWS0580MB	30	30	82	6.0
	5	Int.	●	MWS0580LB	48	48	100	6.0
	8	Int.	●	MWS0580X8DB	66	66	118	6.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
5.9	2	Ext.	●	MWE0590SA	28	28	66	5.9
	3	Ext.	●	MWE0590MA	36	36	74	5.9
	2	Ext.	□	MWE0590SB	28	28	66	6.0
	3	Ext.	□	MWE0590MB	36	36	74	6.0
	3	Int.	●	MWS0590MB	30	30	82	6.0
	5	Int.	●	MWS0590LB	48	48	100	6.0
	8	Int.	●	MWS0590X8DB	66	66	118	6.0
6.0	2	Ext.	●	MWE0600SA	28	28	66	6.0
	3	Ext.	●	MWE0600MA	41	41	81	6.0
	2	Ext.	●	MWE0600SB	28	28	66	6.0
	3	Ext.	●	MWE0600MB	36	36	74	6.0
	3	Int.	●	MWS0600MB	30	30	82	6.0
	5	Int.	●	MWS0600LB	48	48	100	6.0
	8	Int.	●	MWS0600X8DB	66	66	118	6.0
6.1	2	Ext.	●	MWE0610SA	31	31	70	6.1
	3	Ext.	●	MWE0610MA	41	41	81	6.1
	2	Ext.	●	MWE0610SB	31	34	74	7.0
	3	Ext.	●	MWE0610MB	41	44	83	7.0
	3	Int.	●	MWS0610MB	32.5	35	88	7.0
	5	Int.	●	MWS0610LB	52	56	109	7.0
	8	Int.	●	MWS0610X8DB	72	77	130	7.0
6.2	2	Ext.	●	MWE0620SA	31	31	70	6.2
	3	Ext.	●	MWE0620MA	41	41	81	6.2
	2	Ext.	●	MWE0620SB	31	34	74	7.0
	3	Ext.	●	MWE0620MB	41	44	83	7.0
	3	Int.	●	MWS0620MB	32.5	35	88	7.0
	5	Int.	●	MWS0620LB	52	56	109	7.0
	8	Int.	●	MWS0620X8DB	72	77	130	7.0
6.3	2	Ext.	●	MWE0630SA	31	31	70	6.3
	3	Ext.	●	MWE0630MA	41	41	81	6.3
	2	Ext.	□	MWE0630SB	31	34	74	7.0
	3	Ext.	□	MWE0630MB	41	44	83	7.0
	3	Int.	●	MWS0630MB	32.5	35	88	7.0
	5	Int.	●	MWS0630LB	52	56	109	7.0
	8	Int.	●	MWS0630X8DB	72	77	130	7.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
6.4	2	Ext.	●	MWE0640SA	31	31	70	6.4
	3	Ext.	●	MWE0640MA	41	41	81	6.4
	2	Ext.	□	MWE0640SB	31	34	74	7.0
	3	Ext.	□	MWE0640MB	41	44	83	7.0
	3	Int.	●	MWS0640MB	32.5	35	88	7.0
	5	Int.	●	MWS0640LB	52	56	109	7.0
	8	Int.	●	MWS0640X8DB	72	77	130	7.0
6.5	2	Ext.	●	MWE0650SA	31	31	70	6.5
	3	Ext.	●	MWE0650MA	41	41	81	6.5
	2	Ext.	●	MWE0650SB	31	34	74	7.0
	3	Ext.	●	MWE0650MB	41	44	83	7.0
	3	Int.	●	MWS0650MB	32.5	35	88	7.0
	5	Int.	●	MWS0650LB	52	56	109	7.0
	8	Int.	●	MWS0650X8DB	72	77	130	7.0
6.6	2	Ext.	●	MWE0660SA	31	31	70	6.6
	3	Ext.	●	MWE0660MA	43	43	83	6.6
	2	Ext.	□	MWE0660SB	34	34	74	7.0
	3	Ext.	□	MWE0660MB	43	43	83	7.0
	3	Int.	●	MWS0660MB	35	35	88	7.0
	5	Int.	●	MWS0660LB	56	56	109	7.0
	8	Int.	●	MWS0660X8DB	77	77	130	7.0
6.7	2	Ext.	●	MWE0670SA	31	31	70	6.7
	3	Ext.	●	MWE0670MA	43	43	83	6.7
	2	Ext.	●	MWE0670SB	34	34	74	7.0
	3	Ext.	●	MWE0670MB	43	43	83	7.0
	3	Int.	●	MWS0670MB	35	35	88	7.0
	5	Int.	●	MWS0670LB	56	56	109	7.0
	8	Int.	●	MWS0670X8DB	77	77	130	7.0
6.8	2	Ext.	●	MWE0680SA	34	34	74	6.8
	3	Ext.	●	MWE0680MA	43	43	83	6.8
	2	Ext.	●	MWE0680SB	34	34	74	7.0
	3	Ext.	●	MWE0680MB	43	43	83	7.0
	3	Int.	●	MWS0680MB	35	35	88	7.0
	5	Int.	●	MWS0680LB	56	56	109	7.0
	8	Int.	●	MWS0680X8DB	77	77	130	7.0
6.9	2	Ext.	●	MWE0690SA	34	34	74	6.9
	3	Ext.	●	MWE0690MA	43	43	83	6.9
	2	Ext.	●	MWE0690SB	34	34	74	7.0
	3	Ext.	●	MWE0690MB	43	43	83	7.0
	3	Int.	●	MWS0690MB	35	35	88	7.0
	5	Int.	●	MWS0690LB	56	56	109	7.0
	8	Int.	●	MWS0690X8DB	77	77	130	7.0
7.0	2	Ext.	●	MWE0700SA	34	34	74	7.0
	3	Ext.	●	MWE0700MA	43	43	83	7.0
	2	Ext.	●	MWE0700SB	34	34	74	7.0
	3	Ext.	●	MWE0700MB	43	43	83	7.0
	3	Int.	●	MWS0700MB	35	35	88	7.0
	5	Int.	●	MWS0700LB	56	56	109	7.0
	8	Int.	●	MWS0700X8DB	77	77	130	7.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
7.1	2	Ext.	●	MWE0710SA	34	34	74	7.1
	3	Ext.	●	MWE0710MA	45	45	87	7.1
	2	Ext.	□	MWE0710SB	34	37	79	8.0
	3	Ext.	□	MWE0710MB	45	48	90	8.0
	3	Int.	●	MWS0710MB	37.5	40	94	8.0
	5	Int.	●	MWS0710LB	60	64	118	8.0
	8	Int.	●	MWS0710X8DB	83	88	142	8.0
7.2	2	Ext.	●	MWE0720SA	34	34	74	7.2
	3	Ext.	●	MWE0720MA	45	45	87	7.2
	2	Ext.	□	MWE0720SB	34	37	79	8.0
	3	Ext.	□	MWE0720MB	45	48	90	8.0
	3	Int.	●	MWS0720MB	37.5	40	94	8.0
	5	Int.	●	MWS0720LB	60	64	118	8.0
	8	Int.	●	MWS0720X8DB	83	88	142	8.0
7.3	2	Ext.	●	MWE0730SA	34	34	74	7.3
	3	Ext.	●	MWE0730MA	45	45	87	7.3
	2	Ext.	□	MWE0730SB	34	37	79	8.0
	3	Ext.	□	MWE0730MB	45	48	90	8.0
	3	Int.	●	MWS0730MB	37.5	40	94	8.0
	5	Int.	●	MWS0730LB	60	64	118	8.0
	8	Int.	●	MWS0730X8DB	83	88	142	8.0
7.4	2	Ext.	●	MWE0740SA	34	34	74	7.4
	3	Ext.	●	MWE0740MA	45	45	87	7.4
	2	Ext.	□	MWE0740SB	34	37	79	8.0
	3	Ext.	□	MWE0740MB	45	48	90	8.0
	3	Int.	●	MWS0740MB	37.5	40	94	8.0
	5	Int.	●	MWS0740LB	60	64	118	8.0
	8	Int.	●	MWS0740X8DB	83	88	142	8.0
7.5	2	Ext.	●	MWE0750SA	34	34	74	7.5
	3	Ext.	●	MWE0750MA	45	45	87	7.5
	2	Ext.	●	MWE0750SB	34	37	79	8.0
	3	Ext.	●	MWE0750MB	45	48	90	8.0
	3	Int.	●	MWS0750MB	37.5	40	94	8.0
	5	Int.	●	MWS0750LB	60	64	118	8.0
	8	Int.	●	MWS0750X8DB	83	88	142	8.0
7.6	2	Ext.	●	MWE0760SA	37	37	79	7.6
	3	Ext.	●	MWE0760MA	48	48	90	7.6
	2	Ext.	□	MWE0760SB	37	37	79	8.0
	3	Ext.	□	MWE0760MB	48	48	90	8.0
	3	Int.	●	MWS0760MB	40	40	94	8.0
	5	Int.	●	MWS0760LB	64	64	118	8.0
	8	Int.	●	MWS0760X8DB	88	88	142	8.0
7.7	2	Ext.	●	MWE0770SA	37	37	79	7.7
	3	Ext.	●	MWE0770MA	48	48	90	7.7
	2	Ext.	●	MWE0770SB	37	37	79	8.0
	3	Ext.	●	MWE0770MB	48	48	90	8.0
	3	Int.	●	MWS0770MB	40	40	94	8.0
	5	Int.	●	MWS0770LB	64	64	118	8.0
	8	Int.	●	MWS0770X8DB	88	88	142	8.0

CUTTING CONDITIONS D033
OPERATION GUIDANCE D034
TECHNICAL DATA F001

MWE/MWS
WSTAR DRILLS

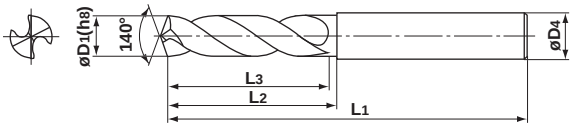
- For high accuracy and efficient drilling of steels, carbon steels and difficult-to-cut materials.
- Also suitable for lower speed applications.

UWC | VP | 140° | X Thinning

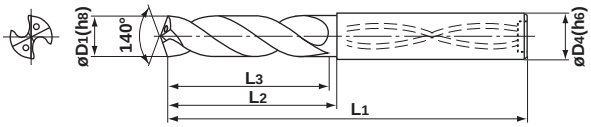
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MWE only)	◎(MWE:○)	◎	○	○

		D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤25
D1 Tolerance (mm)		0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MWE-5A/5B	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MWE-5B/MB MWS	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MWE (External coolant)



MWS (Internal coolant)



(Note 1) MWS type bigger thanϕ5.0 have a recess in the end face.
(Note 2) MWE/S-SB/MB/LB/X8DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
7.8	2	Ext.	●	MWE0780SA	37	37	79	7.8
	3	Ext.	●	MWE0780MA	48	48	90	7.8
	2	Ext.	●	MWE0780SB	37	37	79	8.0
	3	Ext.	●	MWE0780MB	48	48	90	8.0
	3	Int.	●	MWS0780MB	40	40	94	8.0
	5	Int.	●	MWS0780LB	64	64	118	8.0
	8	Int.	●	MWS0780X8DB	88	88	142	8.0
7.9	2	Ext.	●	MWE0790SA	37	37	79	7.9
	3	Ext.	●	MWE0790MA	48	48	90	7.9
	2	Ext.	●	MWE0790SB	37	37	79	8.0
	3	Ext.	●	MWE0790MB	48	48	90	8.0
	3	Int.	●	MWS0790MB	40	40	94	8.0
	5	Int.	●	MWS0790LB	64	64	118	8.0
	8	Int.	●	MWS0790X8DB	88	88	142	8.0
8.0	2	Ext.	●	MWE0800SA	37	37	79	8.0
	3	Ext.	●	MWE0800MA	48	48	90	8.0
	2	Ext.	●	MWE0800SB	37	37	79	8.0
	3	Ext.	●	MWE0800MB	48	48	90	8.0
	3	Int.	●	MWS0800MB	40	40	94	8.0
	5	Int.	●	MWS0800LB	64	64	118	8.0
	8	Int.	●	MWS0800X8DB	88	88	142	8.0
8.1	2	Ext.	●	MWE0810SA	37	37	79	8.1
	3	Ext.	●	MWE0810MA	53	53	96	8.1
	2	Ext.	□	MWE0810SB	37	40	84	9.0
	3	Ext.	□	MWE0810MB	53	56	98	9.0
	3	Int.	●	MWS0810MB	42.5	45	100	9.0
	5	Int.	●	MWS0810LB	68	72	127	9.0
	8	Int.	●	MWS0810X8DB	94	99	154	9.0
8.2	2	Ext.	●	MWE0820SA	37	37	79	8.2
	3	Ext.	●	MWE0820MA	53	53	96	8.2
	2	Ext.	□	MWE0820SB	37	40	84	9.0
	3	Ext.	□	MWE0820MB	53	56	98	9.0
	3	Int.	●	MWS0820MB	42.5	45	100	9.0
	5	Int.	●	MWS0820LB	68	72	127	9.0
	8	Int.	●	MWS0820X8DB	94	99	154	9.0
8.3	2	Ext.	●	MWE0830SA	37	37	79	8.3
	3	Ext.	●	MWE0830MA	53	53	96	8.3
	2	Ext.	□	MWE0830SB	37	40	84	9.0
	3	Ext.	□	MWE0830MB	53	56	98	9.0
	3	Int.	●	MWS0830MB	42.5	45	100	9.0
	5	Int.	●	MWS0830LB	68	72	127	9.0
	8	Int.	●	MWS0830X8DB	94	99	154	9.0
8.4	2	Ext.	●	MWE0840SA	37	37	79	8.4
	3	Ext.	●	MWE0840MA	53	53	96	8.4
	2	Ext.	●	MWE0840SB	37	40	84	9.0
	3	Ext.	●	MWE0840MB	53	56	98	9.0
	3	Int.	●	MWS0840MB	42.5	45	100	9.0
	5	Int.	●	MWS0840LB	68	72	127	9.0
	8	Int.	●	MWS0840X8DB	94	99	154	9.0
8.5	2	Ext.	●	MWE0850SA	37	37	79	8.5
	3	Ext.	●	MWE0850MA	53	53	96	8.5
	2	Ext.	●	MWE0850SB	37	40	84	9.0
	3	Ext.	●	MWE0850MB	53	56	98	9.0
	3	Int.	●	MWS0850MB	42.5	45	100	9.0
	5	Int.	●	MWS0850LB	68	72	127	9.0
	8	Int.	●	MWS0850X8DB	94	99	154	9.0
8.6	2	Ext.	●	MWE0860SA	40	40	84	8.6
	3	Ext.	●	MWE0860MA	55	55	98	8.6
	2	Ext.	●	MWE0860SB	40	40	84	9.0
	3	Ext.	●	MWE0860MB	55	55	98	9.0
	3	Int.	●	MWS0860MB	45	45	100	9.0
	5	Int.	●	MWS0860LB	72	72	127	9.0
	8	Int.	●	MWS0860X8DB	99	99	154	9.0
8.7	2	Ext.	●	MWE0870SA	40	40	84	8.7
	3	Ext.	●	MWE0870MA	55	55	98	8.7
	2	Ext.	□	MWE0870SB	40	40	84	9.0
	3	Ext.	□	MWE0870MB	55	55	98	9.0
	3	Int.	●	MWS0870MB	45	45	100	9.0
	5	Int.	●	MWS0870LB	72	72	127	9.0
	8	Int.	●	MWS0870X8DB	99	99	154	9.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
8.8	2	Ext.	●	MWE0880SA	40	40	84	8.8
	3	Ext.	●	MWE0880MA	55	55	98	8.8
	2	Ext.	□	MWE0880SB	40	40	84	9.0
	3	Ext.	□	MWE0880MB	55	55	98	9.0
	3	Int.	●	MWS0880MB	45	45	100	9.0
	5	Int.	●	MWS0880LB	72	72	127	9.0
	8	Int.	●	MWS0880X8DB	99	99	154	9.0
8.9	2	Ext.	●	MWE0890SA	40	40	84	8.9
	3	Ext.	●	MWE0890MA	55	55	98	8.9
	2	Ext.	□	MWE0890SB	40	40	84	9.0
	3	Ext.	□	MWE0890MB	55	55	98	9.0
	3	Int.	●	MWS0890MB	45	45	100	9.0
	5	Int.	●	MWS0890LB	72	72	127	9.0
	8	Int.	●	MWS0890X8DB	99	99	154	9.0
9.0	2	Ext.	●	MWE0900SA	40	40	84	9.0
	3	Ext.	●	MWE0900MA	55	55	98	9.0
	2	Ext.	●	MWE0900SB	40	40	84	9.0
	3	Ext.	●	MWE0900MB	55	55	98	9.0
	3	Int.	●	MWS0900MB	45	45	100	9.0
	5	Int.	●	MWS0900LB	72	72	127	9.0
	8	Int.	●	MWS0900X8DB	99	99	154	9.0
9.1	2	Ext.	●	MWE0910SA	40	40	84	9.1
	3	Ext.	●	MWE0910MA	58	58	102	9.1
	2	Ext.	□	MWE0910SB	40	43	89	10.0
	3	Ext.	□	MWE0910MB	58	61	105	10.0
	3	Int.	●	MWS0910MB	47.5	50	106	10.0
	5	Int.	●	MWS0910LB	76	80	136	10.0
	8	Int.	●	MWS0910X8DB	105	110	166	10.0
9.2	2	Ext.	●	MWE0920SA	40	40	84	9.2
	3	Ext.	●	MWE0920MA	58	58	102	9.2
	2	Ext.	□	MWE0920SB	40	43	89	10.0
	3	Ext.	□	MWE0920MB	58	61	105	10.0
	3	Int.	●	MWS0920MB	47.5	50	106	10.0
	5	Int.	●	MWS0920LB	76	80	136	10.0
	8	Int.	●	MWS0920X8DB	105	110	166	10.0
9.3	2	Ext.	●	MWE0930SA	40	40	84	9.3
	3	Ext.	●	MWE0930MA	58	58	102	9.3
	2	Ext.	□	MWE0930SB	40	43	89	10.0
	3	Ext.	□	MWE0930MB	58	61	105	10.0
	3	Int.	●	MWS0930MB	47.5	50	106	10.0
	5	Int.	●	MWS0930LB	76	80	136	10.0
	8	Int.	●	MWS0930X8DB	105	110	166	10.0
9.4	2	Ext.	●	MWE0940SA	40	40	84	9.4
	3	Ext.	●	MWE0940MA	58	58	102	9.4
	2	Ext.	●	MWE0940SB	40	43	89	10.0
	3	Ext.	●	MWE0940MB	58	61	105	10.0
	3	Int.	●	MWS0940MB	47.5	50	106	10.0
	5	Int.	●	MWS0940LB	76	80	136	10.0
	8	Int.	●	MWS0940X8DB	105	110	166	10.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
9.5	2	Ext.	●	MWE0950SA	40	40	84	9.5
	3	Ext.	●	MWE0950MA	58	58	102	9.5
	2	Ext.	●	MWE0950SB	40	43	89	10.0
	3	Ext.	●	MWE0950MB	58	61	105	10.0
	3	Int.	●	MWS0950MB	47.5	50	106	10.0
	5	Int.	●	MWS0950LB	76	80	136	10.0
	8	Int.	●	MWS0950X8DB	105	110	166	10.0
9.6	2	Ext.	●	MWE0960SA	43	43	89	9.6
	3	Ext.	●	MWE0960MA	60	60	105	9.6
	2	Ext.	●	MWE0960SB	43	43	89	10.0
	3	Ext.	●	MWE0960MB	60	60	105	10.0
	3	Int.	●	MWS0960MB	50	50	106	10.0
	5	Int.	●	MWS0960LB	80	80	136	10.0
	8	Int.	●	MWS0960X8DB	110	110	166	10.0
9.7	2	Ext.	●	MWE0970SA	43	43	89	9.7
	3	Ext.	●	MWE0970MA	60	60	105	9.7
	2	Ext.	□	MWE0970SB	43	43	89	10.0
	3	Ext.	□	MWE0970MB	60	60	105	10.0
	3	Int.	●	MWS0970MB	50	50	106	10.0
	5	Int.	●	MWS0970LB	80	80	136	10.0
	8	Int.	●	MWS0970X8DB	110	110	166	10.0
9.8	2	Ext.	●	MWE0980SA	43	43	89	9.8
	3	Ext.	●	MWE0980MA	60	60	105	9.8
	2	Ext.	□	MWE0980SB	43	43	89	10.0
	3	Ext.	□	MWE0980MB	60	60	105	10.0
	3	Int.	●	MWS0980MB	50	50	106	10.0
	5	Int.	●	MWS0980LB	80	80	136	10.0
	8	Int.	●	MWS0980X8DB	110	110	166	10.0
9.9	2	Ext.	●	MWE0990SA	43	43	89	9.9
	3	Ext.	●	MWE0990MA	60	60	105	9.9
	2	Ext.	□	MWE0990SB	43	43	89	10.0
	3	Ext.	□	MWE0990MB	60	60	105	10.0
	3	Int.	●	MWS0990MB	50	50	106	10.0
	5	Int.	●	MWS0990LB	80	80	136	10.0
	8	Int.	●	MWS0990X8DB	110	110	166	10.0
10.0	2	Ext.	●	MWE1000SA	43	43	89	10.0
	3	Ext.	●	MWE1000MA	60	60	105	10.0
	2	Ext.	●	MWE1000SB	43	43	89	10.0
	3	Ext.	●	MWE1000MB	60	60	105	10.0
	3	Int.	●	MWS1000MB	50	50	106	10.0
	5	Int.	●	MWS1000LB	80	80	136	10.0
	8	Int.	●	MWS1000X8DB	110	110	166	10.0
10.1	2	Ext.	●	MWE1010SA	43	43	89	10.1
	3	Ext.	●	MWE1010MA	66	66	112	10.1
	2	Ext.	□	MWE1010SB	43	46	95	11.0
	3	Ext.	□	MWE1010MB	66	69	114	11.0
	3	Int.	●	MWS1010MB	52.5	55	116	11.0
	5	Int.	●	MWS1010LB	84	88	149	11.0
	8	Int.	●	MWS1010X8DB	116	121	182	11.0

CUTTING CONDITIONS D033
OPERATION GUIDANCE D034
TECHNICAL DATA F001

MWE/MWS
WSTAR DRILLS

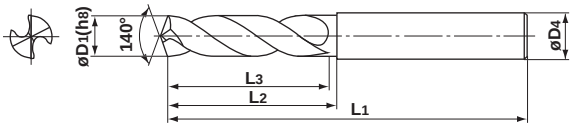
- For high accuracy and efficient drilling of steels, carbon steels and difficult-to-cut materials.
- Also suitable for lower speed applications.

UWC | VP | 140° | X Thinning

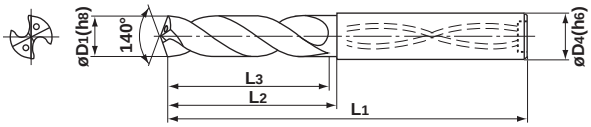
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MWE only)	◎(MWE:○)	◎	○	○

		D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤25
D1 Tolerance (mm)		0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MWE-5A/5B	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MWE-5B/MB MWS	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MWE (External coolant)



MWS (Internal coolant)



(Note 1) MWS type bigger thanϕ5.0 have a recess in the end face.
(Note 2) MWE/S-SB/MB/LB/X8DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
10.2	2	Ext.	●	MWE1020SA	43	43	89	10.2
	3	Ext.	●	MWE1020MA	66	66	112	10.2
	2	Ext.	●	MWE1020SB	43	46	95	11.0
	3	Ext.	●	MWE1020MB	66	69	114	11.0
	3	Int.	●	MWS1020MB	52.5	55	116	11.0
	5	Int.	●	MWS1020LB	84	88	149	11.0
	8	Int.	●	MWS1020X8DB	116	121	182	11.0
10.3	2	Ext.	●	MWE1030SA	43	43	89	10.3
	3	Ext.	●	MWE1030MA	66	66	112	10.3
	2	Ext.	●	MWE1030SB	43	46	95	11.0
	3	Ext.	●	MWE1030MB	66	69	114	11.0
	3	Int.	●	MWS1030MB	52.5	55	116	11.0
	5	Int.	●	MWS1030LB	84	88	149	11.0
	8	Int.	●	MWS1030X8DB	116	121	182	11.0
10.4	2	Ext.	●	MWE1040SA	43	43	89	10.4
	3	Ext.	●	MWE1040MA	66	66	112	10.4
	2	Ext.	●	MWE1040SB	43	46	95	11.0
	3	Ext.	●	MWE1040MB	66	69	114	11.0
	3	Int.	●	MWS1040MB	52.5	55	116	11.0
	5	Int.	●	MWS1040LB	84	88	149	11.0
	8	Int.	●	MWS1040X8DB	116	121	182	11.0
10.5	2	Ext.	●	MWE1050SA	43	43	89	10.5
	3	Ext.	●	MWE1050MA	66	66	112	10.5
	2	Ext.	●	MWE1050SB	43	46	95	11.0
	3	Ext.	●	MWE1050MB	66	69	114	11.0
	3	Int.	●	MWS1050MB	52.5	55	116	11.0
	5	Int.	●	MWS1050LB	84	88	149	11.0
	8	Int.	●	MWS1050X8DB	116	121	182	11.0
10.6	2	Ext.	●	MWE1060SA	43	43	89	10.6
	3	Ext.	●	MWE1060MA	68	68	114	10.6
	2	Ext.	□	MWE1060SB	47	47	95	11.0
	3	Ext.	□	MWE1060MB	68	68	114	11.0
	3	Int.	●	MWS1060MB	55	55	116	11.0
	5	Int.	●	MWS1060LB	88	88	149	11.0
	8	Int.	●	MWS1060X8DB	121	121	182	11.0
10.7	2	Ext.	●	MWE1070SA	47	47	95	10.7
	3	Ext.	●	MWE1070MA	68	68	114	10.7
	2	Ext.	□	MWE1070SB	47	47	95	11.0
	3	Ext.	□	MWE1070MB	68	68	114	11.0
	3	Int.	●	MWS1070MB	55	55	116	11.0
	5	Int.	●	MWS1070LB	88	88	149	11.0
	8	Int.	●	MWS1070X8DB	121	121	182	11.0
10.8	2	Ext.	●	MWE1080SA	47	47	95	10.8
	3	Ext.	●	MWE1080MA	68	68	114	10.8
	2	Ext.	□	MWE1080SB	47	47	95	11.0
	3	Ext.	□	MWE1080MB	68	68	114	11.0
	3	Int.	●	MWS1080MB	55	55	116	11.0
	5	Int.	●	MWS1080LB	88	88	149	11.0
	8	Int.	●	MWS1080X8DB	121	121	182	11.0
10.9	2	Ext.	●	MWE1090SA	47	47	95	10.9
	3	Ext.	●	MWE1090MA	68	68	114	10.9
	2	Ext.	□	MWE1090SB	47	47	95	11.0
	3	Ext.	□	MWE1090MB	68	68	114	11.0
	3	Int.	●	MWS1090MB	55	55	116	11.0
	5	Int.	●	MWS1090LB	88	88	149	11.0
	8	Int.	●	MWS1090X8DB	121	121	182	11.0
11.0	2	Ext.	●	MWE1100SA	47	47	95	11.0
	3	Ext.	●	MWE1100MA	68	68	114	11.0
	2	Ext.	●	MWE1100SB	47	47	95	11.0
	3	Ext.	●	MWE1100MB	68	68	114	11.0
	3	Int.	●	MWS1100MB	55	55	116	11.0
	5	Int.	●	MWS1100LB	88	88	149	11.0
	8	Int.	●	MWS1100X8DB	121	121	182	11.0
11.1	2	Ext.	●	MWE1110SA	47	47	95	11.1
	3	Ext.	●	MWE1110MA	71	71	118	11.1
	2	Ext.	□	MWE1110SB	47	50	95	12.0
	3	Ext.	□	MWE1110MB	71	74	121	12.0
	3	Int.	●	MWS1110MB	57.5	60	122	12.0
	5	Int.	●	MWS1110LB	92	96	158	12.0
	8	Int.	●	MWS1110X8DB	127	132	194	12.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
11.2	2	Ext.	●	MWE1120SA	47	47	95	11.2
	3	Ext.	●	MWE1120MA	71	71	118	11.2
	2	Ext.	□	MWE1120SB	47	50	95	12.0
	3	Ext.	□	MWE1120MB	71	74	121	12.0
	3	Int.	●	MWS1120MB	57.5	60	122	12.0
	5	Int.	●	MWS1120LB	92	96	158	12.0
	8	Int.	●	MWS1120X8DB	127	132	194	12.0
11.3	2	Ext.	●	MWE1130SA	47	47	95	11.3
	3	Ext.	●	MWE1130MA	71	71	118	11.3
	2	Ext.	□	MWE1130SB	47	50	95	12.0
	3	Ext.	□	MWE1130MB	71	74	121	12.0
	3	Int.	●	MWS1130MB	57.5	60	122	12.0
	5	Int.	●	MWS1130LB	92	96	158	12.0
	8	Int.	●	MWS1130X8DB	127	132	194	12.0
11.4	2	Ext.	●	MWE1140SA	47	47	95	11.4
	3	Ext.	●	MWE1140MA	71	71	118	11.4
	2	Ext.	□	MWE1140SB	47	50	95	12.0
	3	Ext.	□	MWE1140MB	71	74	121	12.0
	3	Int.	●	MWS1140MB	57.5	60	122	12.0
	5	Int.	●	MWS1140LB	92	96	158	12.0
	8	Int.	●	MWS1140X8DB	127	132	194	12.0
11.5	2	Ext.	●	MWE1150SA	47	47	95	11.5
	3	Ext.	●	MWE1150MA	71	71	118	11.5
	2	Ext.	●	MWE1150SB	47	50	95	12.0
	3	Ext.	●	MWE1150MB	71	74	121	12.0
	3	Int.	●	MWS1150MB	57.5	60	122	12.0
	5	Int.	●	MWS1150LB	92	96	158	12.0
	8	Int.	●	MWS1150X8DB	127	132	194	12.0
11.6	2	Ext.	●	MWE1160SA	47	47	95	11.6
	3	Ext.	●	MWE1160MA	73	73	121	11.6
	2	Ext.	□	MWE1160SB	47	47	95	12.0
	3	Ext.	□	MWE1160MB	73	73	121	12.0
	3	Int.	●	MWS1160MB	60	60	122	12.0
	5	Int.	●	MWS1160LB	96	96	158	12.0
	8	Int.	●	MWS1160X8DB	132	132	194	12.0
11.7	2	Ext.	●	MWE1170SA	47	47	95	11.7
	3	Ext.	●	MWE1170MA	73	73	121	11.7
	2	Ext.	□	MWE1170SB	47	47	95	12.0
	3	Ext.	□	MWE1170MB	73	73	121	12.0
	3	Int.	●	MWS1170MB	60	60	122	12.0
	5	Int.	●	MWS1170LB	96	96	158	12.0
	8	Int.	●	MWS1170X8DB	132	132	194	12.0
11.8	2	Ext.	●	MWE1180SA	47	47	95	11.8
	3	Ext.	●	MWE1180MA	73	73	121	11.8
	2	Ext.	□	MWE1180SB	47	47	95	12.0
	3	Ext.	□	MWE1180MB	73	73	121	12.0
	3	Int.	●	MWS1180MB	60	60	122	12.0
	5	Int.	●	MWS1180LB	96	96	158	12.0
	8	Int.	●	MWS1180X8DB	132	132	194	12.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
11.9	2	Ext.	●	MWE1190SA	51	51	102	11.9
	3	Ext.	●	MWE1190MA	73	73	121	11.9
	2	Ext.	●	MWE1190SB	47	47	95	12.0
	3	Ext.	●	MWE1190MB	73	73	121	12.0
	3	Int.	●	MWS1190MB	60	60	122	12.0
	5	Int.	●	MWS1190LB	96	96	158	12.0
	8	Int.	●	MWS1190X8DB	132	132	194	12.0
12.0	2	Ext.	●	MWE1200SA	51	51	102	12.0
	3	Ext.	●	MWE1200MA	73	73	121	12.0
	2	Ext.	●	MWE1200SB	47	47	95	12.0
	3	Ext.	●	MWE1200MB	73	73	121	12.0
	3	Int.	●	MWS1200MB	60	60	122	12.0
	5	Int.	●	MWS1200LB	96	96	158	12.0
	8	Int.	●	MWS1200X8DB	132	132	194	12.0
12.1	2	Ext.	●	MWE1210SA	51	51	102	12.1
	3	Ext.	●	MWE1210MA	76	76	135	12.1
	2	Ext.	●	MWE1210SB	51	54	102	13.0
	3	Ext.	●	MWE1210MB	76	79	137	13.0
	3	Int.	●	MWS1210MB	62.5	65	128	13.0
	5	Int.	●	MWS1210LB	100	104	167	13.0
	8	Int.	□	MWS1210X8DB	138	143	206	13.0
12.2	2	Ext.	●	MWE1220SA	51	51	102	12.2
	3	Ext.	●	MWE1220MA	76	76	135	12.2
	2	Ext.	□	MWE1220SB	51	54	102	13.0
	3	Ext.	□	MWE1220MB	76	79	137	13.0
	3	Int.	●	MWS1220MB	62.5	65	128	13.0
	5	Int.	●	MWS1220LB	100	104	167	13.0
	8	Int.	□	MWS1220X8DB	138	143	206	13.0
12.3	2	Ext.	●	MWE1230SA	51	51	102	12.3
	3	Ext.	●	MWE1230MA	76	76	135	12.3
	2	Ext.	□	MWE1230SB	51	54	102	13.0
	3	Ext.	□	MWE1230MB	76	79	137	13.0
	3	Int.	●	MWS1230MB	62.5	65	128	13.0
	5	Int.	●	MWS1230LB	100	104	167	13.0
	8	Int.	□	MWS1230X8DB	138	143	206	13.0
12.4	2	Ext.	●	MWE1240SA	51	51	102	12.4
	3	Ext.	●	MWE1240MA	76	76	135	12.4
	2	Ext.	□	MWE1240SB	51	54	102	13.0
	3	Ext.	□	MWE1240MB	76	79	137	13.0
	3	Int.	●	MWS1240MB	62.5	65	128	13.0
	5	Int.	●	MWS1240LB	100	104	167	13.0
	8	Int.	□	MWS1240X8DB	138	143	206	13.0
12.5	2	Ext.	●	MWE1250SA	51	51	102	12.5
	3	Ext.	●	MWE1250MA	76	76	135	12.5
	2	Ext.	●	MWE1250SB	51	54	102	13.0
	3	Ext.	●	MWE1250MB	76	79	137	13.0
	3	Int.	●	MWS1250MB	62.5	65	128	13.0
	5	Int.	●	MWS1250LB	100	104	167	13.0
	8	Int.	●	MWS1250X8DB	138	143	206	13.0

CUTTING CONDITIONS D033
OPERATION GUIDANCE D034
TECHNICAL DATA F001

MWE/MWS
WSTAR DRILLS

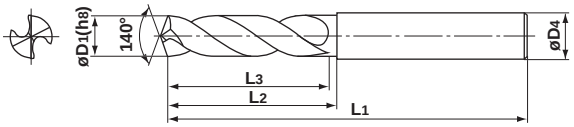
- For high accuracy and efficient drilling of steels, carbon steels and difficult-to-cut materials.
- Also suitable for lower speed applications.

UWC | VP | 140° | X Thinning

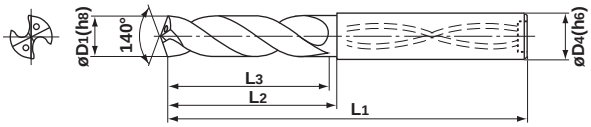
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MWE only)	◎(MWE:○)	◎	○	○

		D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤25
D1 Tolerance (mm)		0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MWE-5A/5B	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MWE-5B/MB MWS	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MWE (External coolant)



MWS (Internal coolant)



(Note 1) MWS type bigger thanϕ5.0 have a recess in the end face.
(Note 2) MWE/S-SB/MB/LB/X8DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
12.6	2	Ext.	●	MWE1260SA	51	51	102	12.6
	3	Ext.	●	MWE1260MA	78	78	137	12.6
	2	Ext.	□	MWE1260SB	51	51	102	13.0
	3	Ext.	□	MWE1260MB	78	78	137	13.0
	3	Int.	●	MWS1260MB	65	65	128	13.0
	5	Int.	●	MWS1260LB	104	104	167	13.0
	8	Int.	□	MWS1260X8DB	143	143	206	13.0
12.7	2	Ext.	●	MWE1270SA	51	51	102	12.7
	3	Ext.	●	MWE1270MA	78	78	137	12.7
	2	Ext.	□	MWE1270SB	51	51	102	13.0
	3	Ext.	□	MWE1270MB	78	78	137	13.0
	3	Int.	●	MWS1270MB	65	65	128	13.0
	5	Int.	●	MWS1270LB	104	104	167	13.0
	8	Int.	□	MWS1270X8DB	143	143	206	13.0
12.8	2	Ext.	●	MWE1280SA	51	51	102	12.8
	3	Ext.	●	MWE1280MA	78	78	137	12.8
	2	Ext.	□	MWE1280SB	51	51	102	13.0
	3	Ext.	□	MWE1280MB	78	78	137	13.0
	3	Int.	●	MWS1280MB	65	65	128	13.0
	5	Int.	●	MWS1280LB	104	104	167	13.0
	8	Int.	□	MWS1280X8DB	143	143	206	13.0
12.9	2	Ext.	●	MWE1290SA	51	51	102	12.9
	3	Ext.	●	MWE1290MA	78	78	137	12.9
	2	Ext.	□	MWE1290SB	51	51	102	13.0
	3	Ext.	□	MWE1290MB	78	78	137	13.0
	3	Int.	●	MWS1290MB	65	65	128	13.0
	5	Int.	●	MWS1290LB	104	104	167	13.0
	8	Int.	□	MWS1290X8DB	143	143	206	13.0
13.0	2	Ext.	●	MWE1300SA	51	51	102	13.0
	3	Ext.	●	MWE1300MA	78	78	137	13.0
	2	Ext.	●	MWE1300SB	51	51	102	13.0
	3	Ext.	●	MWE1300MB	78	78	137	13.0
	3	Int.	●	MWS1300MB	65	65	128	13.0
	5	Int.	●	MWS1300LB	104	104	167	13.0
	8	Int.	●	MWS1300X8DB	143	143	206	13.0
13.1	2	Ext.	●	MWE1310SA	51	51	102	13.1
	3	Ext.	●	MWE1310MA	84	84	144	13.1
	2	Ext.	□	MWE1310SB	54	57	107	14.0
	3	Ext.	□	MWE1310MB	84	87	147	14.0
	3	Int.	●	MWS1310MB	67.5	70	134	14.0
	5	Int.	●	MWS1310LB	108	112	176	14.0
	8	Int.	□	MWS1310X8DB	149	154	218	14.0
13.2	2	Ext.	●	MWE1320SA	51	51	102	13.2
	3	Ext.	●	MWE1320MA	84	84	144	13.2
	2	Ext.	□	MWE1320SB	54	57	107	14.0
	3	Ext.	□	MWE1320MB	84	87	147	14.0
	3	Int.	●	MWS1320MB	67.5	70	134	14.0
	5	Int.	●	MWS1320LB	108	112	176	14.0
	8	Int.	□	MWS1320X8DB	149	154	218	14.0
13.3	2	Ext.	●	MWE1330SA	54	54	107	13.3
	3	Ext.	●	MWE1330MA	84	84	144	13.3
	2	Ext.	□	MWE1330SB	54	57	107	14.0
	3	Ext.	□	MWE1330MB	84	87	147	14.0
	3	Int.	●	MWS1330MB	67.5	70	134	14.0
	5	Int.	●	MWS1330LB	108	112	176	14.0
	8	Int.	□	MWS1330X8DB	149	154	218	14.0
13.4	2	Ext.	●	MWE1340SA	54	54	107	13.4
	3	Ext.	●	MWE1340MA	84	84	144	13.4
	2	Ext.	□	MWE1340SB	54	57	107	14.0
	3	Ext.	□	MWE1340MB	84	87	147	14.0
	3	Int.	●	MWS1340MB	67.5	70	134	14.0
	5	Int.	●	MWS1340LB	108	112	176	14.0
	8	Int.	□	MWS1340X8DB	149	154	218	14.0
13.5	2	Ext.	●	MWE1350SA	54	54	107	13.5
	3	Ext.	●	MWE1350MA	84	84	144	13.5
	2	Ext.	●	MWE1350SB	54	57	107	14.0
	3	Ext.	●	MWE1350MB	84	87	147	14.0
	3	Int.	●	MWS1350MB	67.5	70	134	14.0
	5	Int.	●	MWS1350LB	108	112	176	14.0
	8	Int.	●	MWS1350X8DB	149	154	218	14.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
13.6	2	Ext.	●	MWE1360SA	54	54	107	13.6
	3	Ext.	●	MWE1360MA	86	86	147	13.6
	2	Ext.	□	MWE1360SB	54	54	107	14.0
	3	Ext.	□	MWE1360MB	86	86	147	14.0
	3	Int.	●	MWS1360MB	70	70	134	14.0
	5	Int.	●	MWS1360LB	112	112	176	14.0
	8	Int.	□	MWS1360X8DB	154	154	218	14.0
13.7	2	Ext.	●	MWE1370SA	54	54	107	13.7
	3	Ext.	●	MWE1370MA	86	86	147	13.7
	2	Ext.	□	MWE1370SB	54	54	107	14.0
	3	Ext.	□	MWE1370MB	86	86	147	14.0
	3	Int.	●	MWS1370MB	70	70	134	14.0
	5	Int.	●	MWS1370LB	112	112	176	14.0
	8	Int.	□	MWS1370X8DB	154	154	218	14.0
13.8	2	Ext.	●	MWE1380SA	54	54	107	13.8
	3	Ext.	●	MWE1380MA	86	86	147	13.8
	2	Ext.	□	MWE1380SB	54	54	107	14.0
	3	Ext.	□	MWE1380MB	86	86	147	14.0
	3	Int.	●	MWS1380MB	70	70	134	14.0
	5	Int.	●	MWS1380LB	112	112	176	14.0
	8	Int.	□	MWS1380X8DB	154	154	218	14.0
13.9	2	Ext.	●	MWE1390SA	54	54	107	13.9
	3	Ext.	●	MWE1390MA	86	86	147	13.9
	2	Ext.	●	MWE1390SB	54	54	107	14.0
	3	Ext.	●	MWE1390MB	86	86	147	14.0
	3	Int.	●	MWS1390MB	70	70	134	14.0
	5	Int.	●	MWS1390LB	112	112	176	14.0
	8	Int.	□	MWS1390X8DB	154	154	218	14.0
14.0	2	Ext.	●	MWE1400SA	54	54	107	14.0
	3	Ext.	●	MWE1400MA	86	86	147	14.0
	2	Ext.	●	MWE1400SB	54	54	107	14.0
	3	Ext.	●	MWE1400MB	86	86	147	14.0
	3	Int.	●	MWS1400MB	70	70	134	14.0
	5	Int.	●	MWS1400LB	112	112	176	14.0
	8	Int.	●	MWS1400X8DB	154	154	218	14.0
14.1	2	Ext.	●	MWE1410SA	56	56	111	14.1
	3	Ext.	●	MWE1410MA	89	89	151	14.1
	2	Ext.	●	MWE1410SB	56	59	111	15.0
	3	Ext.	●	MWE1410MB	89	92	153	15.0
	3	Int.	●	MWS1410MB	72.5	75	140	15.0
	5	Int.	●	MWS1410LB	116	120	185	15.0
	8	Int.	□	MWS1410X8DB	160	165	225	15.0
14.2	2	Ext.	●	MWE1420SA	56	56	111	14.2
	3	Ext.	●	MWE1420MA	89	89	151	14.2
	2	Ext.	□	MWE1420SB	56	59	111	15.0
	3	Ext.	□	MWE1420MB	89	92	153	15.0
	3	Int.	●	MWS1420MB	72.5	75	140	15.0
	5	Int.	●	MWS1420LB	116	120	185	15.0
	8	Int.	●	MWS1420X8DB	160	165	225	15.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
14.3	2	Ext.	□	MWE1430SA	56	56	111	14.3
	3	Ext.	●	MWE1430MA	89	89	151	14.3
	2	Ext.	□	MWE1430SB	56	59	111	15.0
	3	Ext.	□	MWE1430MB	89	92	153	15.0
	3	Int.	●	MWS1430MB	72.5	75	140	15.0
	5	Int.	●	MWS1430LB	116	120	185	15.0
	8	Int.	□	MWS1430X8DB	160	165	225	15.0
14.4	2	Ext.	□	MWE1440SA	56	56	111	14.4
	3	Ext.	●	MWE1440MA	89	89	151	14.4
	2	Ext.	□	MWE1440SB	56	59	111	15.0
	3	Ext.	□	MWE1440MB	89	92	153	15.0
	3	Int.	●	MWS1440MB	72.5	75	140	15.0
	5	Int.	●	MWS1440LB	116	120	185	15.0
	8	Int.	□	MWS1440X8DB	160	165	225	15.0
14.5	2	Ext.	●	MWE1450SA	56	56	111	14.5
	3	Ext.	●	MWE1450MA	89	89	151	14.5
	2	Ext.	●	MWE1450SB	56	59	111	15.0
	3	Ext.	●	MWE1450MB	89	92	153	15.0
	3	Int.	●	MWS1450MB	72.5	75	140	15.0
	5	Int.	●	MWS1450LB	116	120	185	15.0
	8	Int.	●	MWS1450X8DB	160	165	225	15.0
14.6	2	Ext.	□	MWE1460SA	56	56	111	14.6
	3	Ext.	●	MWE1460MA	91	91	153	14.6
	2	Ext.	□	MWE1460SB	56	56	111	15.0
	3	Ext.	□	MWE1460MB	91	91	153	15.0
	3	Int.	●	MWS1460MB	75	75	140	15.0
	5	Int.	●	MWS1460LB	120	120	185	15.0
	8	Int.	□	MWS1460X8DB	165	165	225	15.0
14.7	2	Ext.	□	MWE1470SA	56	56	111	14.7
	3	Ext.	●	MWE1470MA	91	91	153	14.7
	2	Ext.	□	MWE1470SB	56	56	111	15.0
	3	Ext.	□	MWE1470MB	91	91	153	15.0
	3	Int.	●	MWS1470MB	75	75	140	15.0
	5	Int.	●	MWS1470LB	120	120	185	15.0
	8	Int.	□	MWS1470X8DB	165	165	225	15.0
14.8	2	Ext.	□	MWE1480SA	56	56	111	14.8
	3	Ext.	●	MWE1480MA	91	91	153	14.8
	2	Ext.	□	MWE1480SB	56	56	111	15.0
	3	Ext.	□	MWE1480MB	91	91	153	15.0
	3	Int.	●	MWS1480MB	75	75	140	15.0
	5	Int.	●	MWS1480LB	120	120	185	15.0
	8	Int.	□	MWS1480X8DB	165	165	225	15.0
14.9	2	Ext.	□	MWE1490SA	56	56	111	14.9
	3	Ext.	●	MWE1490MA	91	91	153	14.9
	2	Ext.	□	MWE1490SB	56	56	111	15.0
	3	Ext.	□	MWE1490MB	91	91	153	15.0
	3	Int.	●	MWS1490MB	75	75	140	15.0
	5	Int.	●	MWS1490LB	120	120	185	15.0
	8	Int.	□	MWS1490X8DB	165	165	225	15.0

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MWE/MWS
WSTAR DRILLS

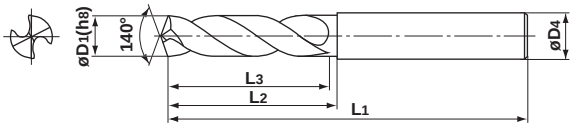
- For high accuracy and efficient drilling of steels, carbon steels and difficult-to-cut materials.
- Also suitable for lower speed applications.

UWC | VP | 140° | X Thinning

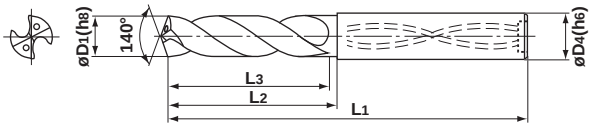
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MWE only)	◎(MWE:○)	◎	○	○

		D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤25
D1 Tolerance (mm)		0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MWE-5A/5B	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MWE-5B/MB MWS	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MWE (External coolant)



MWS (Internal coolant)



(Note 1) MWS type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MWE/S-SB/MB/LB/X8DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
15.0	2	Ext.	●	MWE1500SA	56	56	111	15.0
	3	Ext.	●	MWE1500MA	91	91	153	15.0
	2	Ext.	●	MWE1500SB	56	56	111	15.0
	3	Ext.	●	MWE1500MB	91	91	153	15.0
	3	Int.	●	MWS1500MB	75	75	140	15.0
	5	Int.	●	MWS1500LB	120	120	185	15.0
	8	Int.	●	MWS1500X8DB	165	165	225	15.0
15.1	2	Ext.	□	MWE1510SA	58	58	115	15.1
	3	Ext.	●	MWE1510MA	94	94	157	15.1
	2	Ext.	□	MWE1510SB	58	61	115	16.0
	3	Ext.	□	MWE1510MB	94	97	160	16.0
	3	Int.	●	MWS1510MB	77.5	80	145	16.0
	5	Int.	●	MWS1510LB	124	128	193	16.0
	8	Int.	□	MWS1510X8DB	171	181	241	16.0
15.2	2	Ext.	●	MWE1520SA	58	58	115	15.2
	3	Ext.	●	MWE1520MA	94	94	157	15.2
	2	Ext.	□	MWE1520SB	58	61	115	16.0
	3	Ext.	□	MWE1520MB	94	97	160	16.0
	3	Int.	●	MWS1520MB	77.5	80	145	16.0
	5	Int.	●	MWS1520LB	124	128	193	16.0
	8	Int.	□	MWS1520X8DB	171	181	241	16.0
15.3	2	Ext.	□	MWE1530SA	58	58	115	15.3
	3	Ext.	●	MWE1530MA	94	94	157	15.3
	2	Ext.	□	MWE1530SB	58	61	115	16.0
	3	Ext.	□	MWE1530MB	94	97	160	16.0
	3	Int.	●	MWS1530MB	77.5	80	145	16.0
	5	Int.	●	MWS1530LB	124	128	193	16.0
	8	Int.	□	MWS1530X8DB	171	181	241	16.0
15.4	2	Ext.	□	MWE1540SA	58	58	115	15.4
	3	Ext.	●	MWE1540MA	94	94	157	15.4
	2	Ext.	●	MWE1540SB	58	61	115	16.0
	3	Ext.	●	MWE1540MB	94	97	160	16.0
	3	Int.	●	MWS1540MB	77.5	80	145	16.0
	5	Int.	●	MWS1540LB	124	128	193	16.0
	8	Int.	□	MWS1540X8DB	171	181	241	16.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
15.5	2	Ext.	●	MWE1550SA	58	58	115	15.5
	3	Ext.	●	MWE1550MA	94	94	157	15.5
	2	Ext.	●	MWE1550SB	58	61	115	16.0
	3	Ext.	●	MWE1550MB	94	97	160	16.0
	3	Int.	●	MWS1550MB	77.5	80	145	16.0
	5	Int.	●	MWS1550LB	124	128	193	16.0
	8	Int.	●	MWS1550X8DB	171	181	241	16.0
15.6	2	Ext.	□	MWE1560SA	58	58	115	15.6
	3	Ext.	●	MWE1560MA	96	96	160	15.6
	2	Ext.	●	MWE1560SB	58	58	115	16.0
	3	Ext.	●	MWE1560MB	96	96	160	16.0
	3	Int.	●	MWS1560MB	80	80	145	16.0
	5	Int.	●	MWS1560LB	128	128	193	16.0
	8	Int.	□	MWS1560X8DB	176	181	241	16.0
15.7	2	Ext.	□	MWE1570SA	58	58	115	15.7
	3	Ext.	●	MWE1570MA	96	96	160	15.7
	2	Ext.	□	MWE1570SB	58	58	115	16.0
	3	Ext.	□	MWE1570MB	96	96	160	16.0
	3	Int.	●	MWS1570MB	80	80	145	16.0
	5	Int.	●	MWS1570LB	128	128	193	16.0
	8	Int.	□	MWS1570X8DB	176	181	241	16.0
15.8	2	Ext.	□	MWE1580SA	58	58	115	15.8
	3	Ext.	●	MWE1580MA	96	96	160	15.8
	2	Ext.	□	MWE1580SB	58	58	115	16.0
	3	Ext.	□	MWE1580MB	96	96	160	16.0
	3	Int.	●	MWS1580MB	80	80	145	16.0
	5	Int.	●	MWS1580LB	128	128	193	16.0
	8	Int.	□	MWS1580X8DB	176	181	241	16.0
15.9	2	Ext.	□	MWE1590SA	58	58	115	15.9
	3	Ext.	●	MWE1590MA	96	96	160	15.9
	2	Ext.	□	MWE1590SB	58	58	115	16.0
	3	Ext.	□	MWE1590MB	96	96	160	16.0
	3	Int.	●	MWS1590MB	80	80	145	16.0
	5	Int.	●	MWS1590LB	128	128	193	16.0
	8	Int.	□	MWS1590X8DB	176	181	241	16.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
16.0	2	Ext.	●	MWE1600SA	58	58	115	16.0
	3	Ext.	●	MWE1600MA	96	96	160	16.0
	2	Ext.	●	MWE1600SB	58	58	115	16.0
	3	Ext.	●	MWE1600MB	96	96	160	16.0
	3	Int.	●	MWS1600MB	80	80	145	16.0
	5	Int.	●	MWS1600LB	128	128	193	16.0
	8	Int.	●	MWS1600X8DB	176	181	241	16.0
16.1	2	Ext.	□	MWE1610SA	60	60	119	16.1
	3	Ext.	□	MWE1610MA	102	102	167	16.1
	3	Int.	□	MWS1610MB	82.5	85	150	17.0
	5	Int.	□	MWS1610LB	132	136	201	17.0
16.2	2	Ext.	●	MWE1620SA	60	60	119	16.2
	3	Ext.	□	MWE1620MA	102	102	167	16.2
	3	Int.	□	MWS1620MB	82.5	85	150	17.0
	5	Int.	□	MWS1620LB	132	136	201	17.0
16.3	2	Ext.	●	MWE1630SA	60	60	119	16.3
	3	Ext.	□	MWE1630MA	102	102	167	16.3
	3	Int.	□	MWS1630MB	82.5	85	150	17.0
	5	Int.	□	MWS1630LB	132	136	201	17.0
16.4	2	Ext.	□	MWE1640SA	60	60	119	16.4
	3	Ext.	□	MWE1640MA	102	102	167	16.4
	3	Int.	□	MWS1640MB	82.5	85	150	17.0
	5	Int.	□	MWS1640LB	132	136	201	17.0
16.5	2	Ext.	●	MWE1650SA	60	60	119	16.5
	3	Ext.	●	MWE1650MA	102	102	167	16.5
	3	Int.	●	MWS1650MB	82.5	85	150	17.0
	5	Int.	●	MWS1650LB	132	136	201	17.0
16.6	2	Ext.	□	MWE1660SA	60	60	119	16.6
	3	Ext.	□	MWE1660MA	102	102	167	16.6
	3	Int.	□	MWS1660MB	85	85	150	17.0
	5	Int.	□	MWS1660LB	136	136	201	17.0
16.7	2	Ext.	□	MWE1670SA	60	60	119	16.7
	3	Ext.	□	MWE1670MA	102	102	167	16.7
	3	Int.	□	MWS1670MB	85	85	150	17.0
	5	Int.	□	MWS1670LB	136	136	201	17.0
16.8	2	Ext.	□	MWE1680SA	60	60	119	16.8
	3	Ext.	□	MWE1680MA	102	102	167	16.8
	3	Int.	□	MWS1680MB	85	85	150	17.0
	5	Int.	□	MWS1680LB	136	136	201	17.0
16.9	2	Ext.	□	MWE1690SA	60	60	119	16.9
	3	Ext.	□	MWE1690MA	102	102	167	16.9
	3	Int.	□	MWS1690MB	85	85	150	17.0
	5	Int.	□	MWS1690LB	136	136	201	17.0
17.0	2	Ext.	●	MWE1700SA	60	60	119	17.0
	3	Ext.	●	MWE1700MA	102	102	167	17.0
	3	Int.	●	MWS1700MB	85	85	150	17.0
	5	Int.	●	MWS1700LB	136	136	201	17.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
17.1	2	Ext.	□	MWE1710SA	62	62	123	17.1
	3	Ext.	□	MWE1710MA	102	102	167	17.1
	3	Int.	□	MWS1710MB	87.5	90	155	18.0
	5	Int.	□	MWS1710LB	140	144	209	18.0
17.2	2	Ext.	□	MWE1720SA	62	62	123	17.2
	3	Ext.	□	MWE1720MA	102	102	167	17.2
	3	Int.	□	MWS1720MB	87.5	90	155	18.0
	5	Int.	□	MWS1720LB	140	144	209	18.0
17.3	2	Ext.	□	MWE1730SA	62	62	123	17.3
	3	Ext.	□	MWE1730MA	102	102	167	17.3
	3	Int.	□	MWS1730MB	87.5	90	155	18.0
	5	Int.	□	MWS1730LB	140	144	209	18.0
17.4	2	Ext.	□	MWE1740SA	62	62	123	17.4
	3	Ext.	□	MWE1740MA	102	102	167	17.4
	3	Int.	□	MWS1740MB	87.5	90	155	18.0
	5	Int.	□	MWS1740LB	140	144	209	18.0
17.5	2	Ext.	●	MWE1750SA	62	62	123	17.5
	3	Ext.	●	MWE1750MA	102	102	167	17.5
	3	Int.	●	MWS1750MB	87.5	90	155	18.0
	5	Int.	●	MWS1750LB	140	144	209	18.0
17.6	2	Ext.	□	MWE1760SA	62	62	123	17.6
	3	Ext.	□	MWE1760MA	102	102	167	17.6
	3	Int.	□	MWS1760MB	90	90	155	18.0
	5	Int.	□	MWS1760LB	144	144	209	18.0
17.7	2	Ext.	□	MWE1770SA	62	62	123	17.7
	3	Ext.	□	MWE1770MA	102	102	167	17.7
	3	Int.	□	MWS1770MB	90	90	155	18.0
	5	Int.	□	MWS1770LB	144	144	209	18.0
17.8	2	Ext.	●	MWE1780SA	62	62	123	17.8
	3	Ext.	□	MWE1780MA	102	102	167	17.8
	3	Int.	□	MWS1780MB	90	90	155	18.0
	5	Int.	□	MWS1780LB	144	144	209	18.0
17.9	2	Ext.	□	MWE1790SA	62	62	123	17.9
	3	Ext.	□	MWE1790MA	102	102	167	17.9
	3	Int.	□	MWS1790MB	90	90	155	18.0
	5	Int.	□	MWS1790LB	144	144	209	18.0
18.0	2	Ext.	●	MWE1800SA	62	62	123	18.0
	3	Ext.	●	MWE1800MA	102	102	167	18.0
	3	Int.	●	MWS1800MB	90	90	155	18.0
	5	Int.	●	MWS1800LB	144	144	209	18.0
18.1	2	Ext.	□	MWE1810SA	64	64	127	18.1
	3	Ext.	□	MWE1810MA	114	114	179	18.1
	3	Int.	□	MWS1810MB	92.5	95	160	19.0
	5	Int.	□	MWS1810LB	148	152	217	19.0
18.2	2	Ext.	□	MWE1820SA	64	64	127	18.2
	3	Ext.	□	MWE1820MA	114	114	179	18.2
	3	Int.	□	MWS1820MB	92.5	95	160	19.0
	5	Int.	□	MWS1820LB	148	152	217	19.0

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MWE/MWS
WSTAR DRILLS

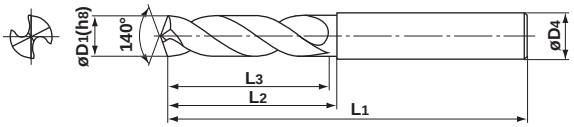
- For high accuracy and efficient drilling of steels, carbon steels and difficult-to-cut materials.
- Also suitable for lower speed applications.

UWC | VP | 140° | X Thinning

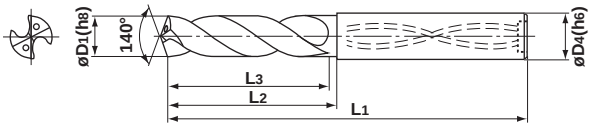
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MWE only)	◎(MWE:○)	◎	○	○

		D1=3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤25
D1 Tolerance (mm)		0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MWE-5A/5B	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MWE-5B/MB MWS	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MWE (External coolant)



MWS (Internal coolant)



(Note 1) MWS type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MWE/S-SB/MB/LB/X8DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
18.3	2	Ext.	□	MWE1830SA	64	64	127	18.3
	3	Ext.	□	MWE1830MA	114	114	179	18.3
	3	Int.	□	MWS1830MB	92.5	95	160	19.0
	5	Int.	□	MWS1830LB	148	152	217	19.0
18.4	2	Ext.	□	MWE1840SA	64	64	127	18.4
	3	Ext.	□	MWE1840MA	114	114	179	18.4
	3	Int.	□	MWS1840MB	92.5	95	160	19.0
	5	Int.	□	MWS1840LB	148	152	217	19.0
18.5	2	Ext.	●	MWE1850SA	64	64	127	18.5
	3	Ext.	●	MWE1850MA	114	114	179	18.5
	3	Int.	●	MWS1850MB	92.5	95	160	19.0
	5	Int.	●	MWS1850LB	148	152	217	19.0
18.6	2	Ext.	□	MWE1860SA	64	64	127	18.6
	3	Ext.	□	MWE1860MA	114	114	179	18.6
	3	Int.	□	MWS1860MB	95	95	160	19.0
	5	Int.	□	MWS1860LB	152	152	217	19.0
18.7	2	Ext.	□	MWE1870SA	64	64	127	18.7
	3	Ext.	□	MWE1870MA	114	114	179	18.7
	3	Int.	□	MWS1870MB	95	95	160	19.0
	5	Int.	□	MWS1870LB	152	152	217	19.0
18.8	2	Ext.	□	MWE1880SA	64	64	127	18.8
	3	Ext.	□	MWE1880MA	114	114	179	18.8
	3	Int.	□	MWS1880MB	95	95	160	19.0
	5	Int.	□	MWS1880LB	152	152	217	19.0
18.9	2	Ext.	□	MWE1890SA	64	64	127	18.9
	3	Ext.	□	MWE1890MA	114	114	179	18.9
	3	Int.	□	MWS1890MB	95	95	160	19.0
	5	Int.	□	MWS1890LB	152	152	217	19.0
19.0	2	Ext.	●	MWE1900SA	64	64	127	19.0
	3	Ext.	●	MWE1900MA	114	114	179	19.0
	3	Int.	●	MWS1900MB	95	95	160	19.0
	5	Int.	●	MWS1900LB	152	152	217	19.0
19.1	2	Ext.	□	MWE1910SA	66	66	131	19.1
	3	Ext.	□	MWE1910MA	114	114	179	19.1
	3	Int.	□	MWS1910MB	97.5	100	165	20.0
	5	Int.	□	MWS1910LB	156	160	225	20.0
19.2	2	Ext.	□	MWE1920SA	66	66	131	19.2
	3	Ext.	□	MWE1920MA	114	114	179	19.2
	3	Int.	□	MWS1920MB	97.5	100	165	20.0
	5	Int.	□	MWS1920LB	156	160	225	20.0
19.3	2	Ext.	□	MWE1930SA	66	66	131	19.3
	3	Ext.	□	MWE1930MA	114	114	179	19.3
	3	Int.	□	MWS1930MB	97.5	100	165	20.0
	5	Int.	□	MWS1930LB	156	160	225	20.0
19.4	2	Ext.	□	MWE1940SA	66	66	131	19.4
	3	Ext.	□	MWE1940MA	114	114	179	19.4
	3	Int.	□	MWS1940MB	97.5	100	165	20.0
	5	Int.	□	MWS1940LB	156	160	225	20.0
19.5	2	Ext.	●	MWE1950SA	66	66	131	19.5
	3	Ext.	●	MWE1950MA	114	114	179	19.5
	3	Int.	●	MWS1950MB	97.5	100	165	20.0
	5	Int.	●	MWS1950LB	156	160	225	20.0
19.6	2	Ext.	□	MWE1960SA	66	66	131	19.6
	3	Ext.	□	MWE1960MA	114	114	179	19.6
	3	Int.	□	MWS1960MB	100	100	165	20.0
	5	Int.	□	MWS1960LB	160	160	225	20.0
19.7	2	Ext.	□	MWE1970SA	66	66	131	19.7
	3	Ext.	□	MWE1970MA	114	114	179	19.7
	3	Int.	□	MWS1970MB	100	100	165	20.0
	5	Int.	□	MWS1970LB	160	160	225	20.0
19.8	2	Ext.	□	MWE1980SA	66	66	131	19.8
	3	Ext.	□	MWE1980MA	114	114	179	19.8
	3	Int.	□	MWS1980MB	100	100	165	20.0
	5	Int.	□	MWS1980LB	160	160	225	20.0
19.9	2	Ext.	□	MWE1990SA	66	66	131	19.9
	3	Ext.	□	MWE1990MA	114	114	179	19.9
	3	Int.	□	MWS1990MB	100	100	165	20.0
	5	Int.	□	MWS1990LB	160	160	225	20.0
20.0	2	Ext.	●	MWE2000SA	66	66	131	20.0
	3	Ext.	●	MWE2000MA	114	114	179	20.0
	3	Int.	●	MWS2000MB	100	100	165	20.0
	5	Int.	●	MWS2000LB	160	160	225	20.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
NEW 20.5	3	Int.	●	MWS2050MB	103	105	176	21.0
	5	Int.	●	MWS2050LB	166	168	239	21.0
NEW 21.0	3	Int.	●	MWS2100MB	105	105	176	21.0
	5	Int.	●	MWS2100LB	168	168	239	21.0
NEW 21.5	3	Int.	●	MWS2150MB	108	110	182	22.0
	5	Int.	●	MWS2150LB	174	176	248	22.0
NEW 22.0	3	Int.	●	MWS2200MB	110	110	182	22.0
	5	Int.	●	MWS2200LB	176	176	248	22.0
NEW 22.5	3	Int.	●	MWS2250MB	113	115	188	23.0
	5	Int.	●	MWS2250LB	182	184	257	23.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
NEW 23.0	3	Int.	●	MWS2300MB	115	115	188	23.0
	5	Int.	●	MWS2300LB	184	184	257	23.0
NEW 23.5	3	Int.	●	MWS2350MB	118	120	194	24.0
	5	Int.	●	MWS2350LB	190	192	266	24.0
NEW 24.0	3	Int.	●	MWS2400MB	120	120	194	24.0
	5	Int.	●	MWS2400LB	192	192	266	24.0
NEW 24.5	3	Int.	●	MWS2450MB	123	125	200	25.0
	5	Int.	●	MWS2450LB	198	200	270	25.0
NEW 25.0	3	Int.	●	MWS2500MB	125	125	200	25.0
	5	Int.	●	MWS2500LB	200	200	270	25.0

RECOMMENDED CUTTING CONDITIONS

MWE (External coolant)

Work Material		Drill Dia. / Conditions / Hardness	ϕ3.0–ϕ6.0 Cutting Speed (m/min)	ϕ3.0–ϕ6.0 Feed (mm/rev)	ϕ6.1–ϕ10.0 Cutting Speed (m/min)	ϕ6.1–ϕ10.0 Feed (mm/rev)	ϕ10.1–ϕ14.0 Cutting Speed (m/min)	ϕ10.1–ϕ14.0 Feed (mm/rev)	ϕ14.1–ϕ20.0 Cutting Speed (m/min)	ϕ14.1–ϕ20.0 Feed (mm/rev)
P	Mild Steel	≤180HB	85 (35–100)	0.20 (0.15–0.30)	85 (45–120)	0.25 (0.15–0.35)	90 (55–120)	0.30 (0.20–0.35)	100 (60–130)	0.35 (0.20–0.40)
P	Carbon Steel Alloy Steel	180–280HB	80 (40–95)	0.20 (0.15–0.30)	90 (50–120)	0.25 (0.15–0.35)	90 (60–130)	0.30 (0.15–0.35)	90 (60–130)	0.35 (0.20–0.40)
P	Carbon Steel Alloy Steel	280–350HB	75 (35–80)	0.15 (0.15–0.20)	80 (45–115)	0.20 (0.15–0.25)	85 (55–115)	0.25 (0.15–0.30)	85 (55–115)	0.30 (0.20–0.35)
M	Stainless Steel	≤200HB	20 (15–30)	0.10 (0.05–0.15)	25 (15–30)	0.12 (0.05–0.15)	25 (15–30)	0.15 (0.10–0.20)	25 (15–30)	0.20 (0.10–0.25)
K	Gray Cast Iron	Tensile Strength ≤350MPa	70 (40–85)	0.25 (0.15–0.30)	75 (50–90)	0.30 (0.20–0.35)	80 (50–95)	0.35 (0.20–0.40)	85 (55–95)	0.40 (0.30–0.45)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	65 (35–80)	0.20 (0.15–0.25)	70 (45–85)	0.25 (0.15–0.30)	75 (45–90)	0.30 (0.20–0.35)	80 (50–90)	0.35 (0.20–0.40)
N	Aluminium Alloy	–	80 (70–90)	0.20 (0.10–0.25)	90 (80–100)	0.25 (0.15–0.30)	100 (90–110)	0.30 (0.20–0.35)	110 (100–120)	0.35 (0.20–0.40)
S	Heat Resistant Alloy	–	20 (10–25)	0.10 (0.05–0.15)	25 (15–30)	0.12 (0.05–0.15)	25 (15–30)	0.15 (0.10–0.20)	30 (25–35)	0.20 (0.10–0.25)
H	Hardened Steel	40–60HRC	20 (15–25)	0.10 (0.05–0.15)	25 (15–30)	0.12 (0.05–0.15)	25 (15–30)	0.15 (0.10–0.20)	30 (15–35)	0.20 (0.10–0.25)

MWS (Internal coolant)

Work Material		Drill Dia. / Conditions / Hardness	ϕ3.0–ϕ6.0 Cutting Speed (m/min)	ϕ3.0–ϕ6.0 Feed (mm/rev)	ϕ6.1–ϕ10.0 Cutting Speed (m/min)	ϕ6.1–ϕ10.0 Feed (mm/rev)	ϕ10.1–ϕ14.0 Cutting Speed (m/min)	ϕ10.1–ϕ14.0 Feed (mm/rev)	ϕ14.1–ϕ20.0 Cutting Speed (m/min)	ϕ14.1–ϕ20.0 Feed (mm/rev)
P	Mild Steel	≤180HB	110 (50–120)	0.20 (0.15–0.25)	130 (80–140)	0.25 (0.20–0.35)	150 (90–170)	0.30 (0.20–0.40)	160 (100–180)	0.35 (0.20–0.40)
P	Carbon Steel Alloy Steel	180–280HB	90 (50–100)	0.20 (0.15–0.25)	110 (70–120)	0.25 (0.20–0.35)	130 (80–140)	0.25 (0.20–0.40)	140 (100–150)	0.30 (0.20–0.40)
P	Carbon Steel Alloy Steel	280–350HB	80 (40–90)	0.20 (0.15–0.30)	90 (60–110)	0.25 (0.15–0.30)	110 (70–130)	0.25 (0.15–0.40)	120 (90–140)	0.30 (0.20–0.40)
M	Stainless Steel	≤200HB	60 (20–100)	0.10 (0.05–0.15)	80 (40–120)	0.20 (0.10–0.25)	90 (50–120)	0.25 (0.15–0.30)	100 (60–120)	0.25 (0.15–0.30)
K	Gray Cast Iron	Tensile Strength ≤350MPa	100 (70–120)	0.25 (0.15–0.30)	130 (100–140)	0.30 (0.20–0.35)	150 (110–160)	0.35 (0.25–0.40)	160 (120–170)	0.35 (0.25–0.40)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	65 (35–80)	0.20 (0.15–0.25)	70 (40–90)	0.20 (0.15–0.30)	90 (50–110)	0.25 (0.20–0.40)	100 (60–110)	0.30 (0.20–0.40)
N	Aluminium Alloy	–	120 (80–150)	0.25 (0.20–0.35)	150 (100–170)	0.30 (0.20–0.50)	160 (100–170)	0.40 (0.20–0.80)	170 (100–180)	0.50 (0.20–1.00)
S	Heat Resistant Alloy	–	20 (10–25)	0.10 (0.05–0.15)	25 (15–30)	0.12 (0.05–0.15)	25 (15–30)	0.15 (0.10–0.20)	30 (25–35)	0.20 (0.10–0.25)

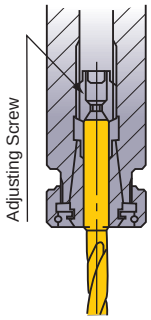
OPERATION GUIDANCE D034
TECHNICAL DATA F001

CARBIDE

MWE/MWS
WSTAR DRILLS

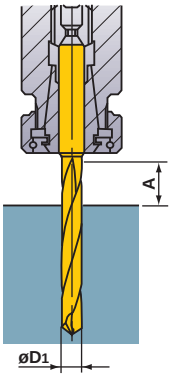
OPERATIONAL GUIDANCE

Drill Holding



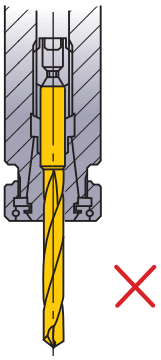
Thrust bearing type collet chuck holds the drill securely.

Drill Length



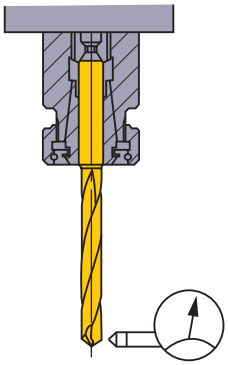
A ≥ D1 x 1.5

Drill Installation



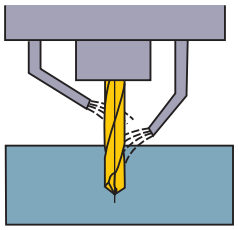
Do not clamp on the flutes.

Installation Tolerance



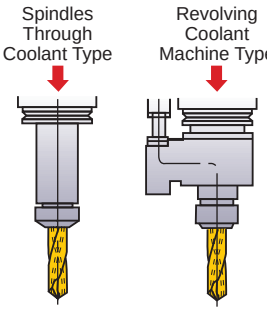
Run-out ≤ 0.03mm

Coolant Method (MWE)



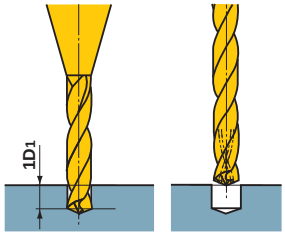
Two coolant positions, at the end and at the center are ideal.

Through Coolant Type (MWS)



Coolant pressure is approx. 0.5—1MPa (<ϕ5:2—3MPa). Coolant volume is 1.5—4.0l/min.

Drill Installation



①When machining a prepared hole with the MWE-SB please set the depth to 1D (D=drill diameter).
②Use the prepared hole as a guide when using a drill with an oil hole. Depending on the cutting conditions, peck feed is recommended.

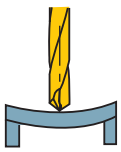
Coolant Handling

<MWS Type>

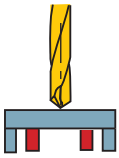
1) Small particles of swarf will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

Thin Workpiece

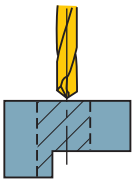


If Bending Occurs ×



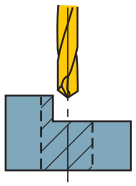
Support the Workpiece ○

Interrupted Cutting



One Process ○

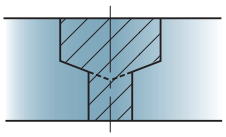
①Lower the feed when drilling the interrupted part.



Requires Prior Machining △

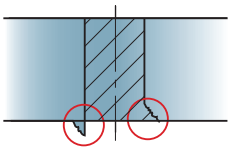
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the two processes.
②Drill the larger hole first.
⁎A tool for machining both chamfer and spot face can be produced to order.

Burring and Workpiece Chipping



①Lower the feed rate by 50% at the end of through cutting.
②Add a 45°chamfer.
③Change the point angle.

CAUTION TO USE MWS TYPE (Drill Diameter ≤ ϕ3)

●Please use a fine mesh filter (mesh≤3μm) for coolant to prevent jamming in the oil hole.
●For deep drilling (l/d>3), machining guiding hole is recommended. (Use MWE□□□□SB type for guiding hole.)

SOLID CARBIDE DRILLING

MWS...DB

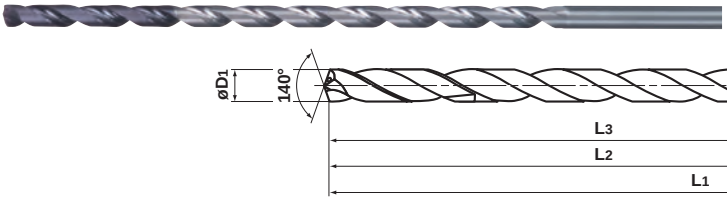
MWS TYPE LONG DRILL

- For 10-30×D hole depth drilling.
- Can be used with minimum lubricant for steel and cast iron.

UWC VP 140° X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎	○	○

	D1=3	3<D1≤6	6<D1≤10	10<D1≤14
D1 Tolerance (mm)	−0.017 −0.031	−0.025 −0.043	−0.033 −0.055	−0.041 −0.068
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011



(Note 1) MWS-DB type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MWS-DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.0	10	Int.	●	MWS0300X10DB	39	42	90	3
	15	Int.	●	0300X15DB	54	57	105	3
	20	Int.	●	0300X20DB	69	72	120	3
	25	Int.	●	0300X25DB	84	87	135	3
	30	Int.	●	0300X30DB	99	102	150	3
3.1	10	Int.	●	0310X10DB	46	49	97	4
	15	Int.	●	0310X15DB	63	66	114	4
	20	Int.	●	0310X20DB	81	84	132	4
	25	Int.	●	0310X25DB	98	101	149	4
	30	Int.	●	0310X30DB	116	119	167	4
3.2	10	Int.	●	0320X10DB	46	49	97	4
	15	Int.	●	0320X15DB	63	66	114	4
	20	Int.	●	0320X20DB	81	84	132	4
	25	Int.	●	0320X25DB	98	101	149	4
	30	Int.	●	0320X30DB	116	119	167	4
3.3	10	Int.	●	0330X10DB	46	49	97	4
	15	Int.	●	0330X15DB	63	66	114	4
	20	Int.	●	0330X20DB	81	84	132	4
	25	Int.	●	0330X25DB	98	101	149	4
	30	Int.	●	0330X30DB	116	119	167	4
3.4	10	Int.	●	0340X10DB	46	49	97	4
	15	Int.	●	0340X15DB	63	66	114	4
	20	Int.	●	0340X20DB	81	84	132	4
	25	Int.	●	0340X25DB	98	101	149	4
	30	Int.	●	0340X30DB	116	119	167	4
3.5	10	Int.	●	0350X10DB	46	49	97	4
	15	Int.	●	0350X15DB	63	66	114	4
	20	Int.	●	0350X20DB	81	84	132	4
	25	Int.	●	0350X25DB	98	101	149	4
	30	Int.	●	0350X30DB	116	119	167	4
3.6	10	Int.	●	0360X10DB	52	55	103	4
	15	Int.	●	0360X15DB	72	75	123	4
	20	Int.	●	0360X20DB	92	95	143	4
	25	Int.	●	0360X25DB	112	115	163	4
	30	Int.	●	0360X30DB	132	135	183	4

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.7	10	Int.	●	MWS0370X10DB	52	55	103	4
	15	Int.	●	0370X15DB	72	75	123	4
	20	Int.	●	0370X20DB	92	95	143	4
	25	Int.	●	0370X25DB	112	115	163	4
	30	Int.	●	0370X30DB	132	135	183	4
3.8	10	Int.	●	0380X10DB	52	55	103	4
	15	Int.	●	0380X15DB	72	75	123	4
	20	Int.	●	0380X20DB	92	95	143	4
	25	Int.	●	0380X25DB	112	115	163	4
	30	Int.	●	0380X30DB	132	135	183	4
3.9	10	Int.	●	0390X10DB	52	55	103	4
	15	Int.	●	0390X15DB	72	75	123	4
	20	Int.	●	0390X20DB	92	95	143	4
	25	Int.	●	0390X25DB	112	115	163	4
	30	Int.	●	0390X30DB	132	135	183	4
4.0	10	Int.	●	0400X10DB	52	55	103	4
	15	Int.	●	0400X15DB	72	75	123	4
	20	Int.	●	0400X20DB	92	95	143	4
	25	Int.	●	0400X25DB	112	115	163	4
	30	Int.	●	0400X30DB	132	135	183	4
4.1	10	Int.	●	0410X10DB	59	62	112	5
	15	Int.	●	0410X15DB	81	84	134	5
	20	Int.	●	0410X20DB	104	107	157	5
	25	Int.	●	0410X25DB	126	129	179	5
	30	Int.	●	0410X30DB	149	152	202	5
4.2	10	Int.	●	0420X10DB	59	62	112	5
	15	Int.	●	0420X15DB	81	84	134	5
	20	Int.	●	0420X20DB	104	107	157	5
	25	Int.	●	0420X25DB	126	129	179	5
	30	Int.	●	0420X30DB	149	152	202	5
4.3	10	Int.	●	0430X10DB	59	62	112	5
	15	Int.	●	0430X15DB	81	84	134	5
	20	Int.	●	0430X20DB	104	107	157	5
	25	Int.	●	0430X25DB	126	129	179	5
	30	Int.	●	0430X30DB	149	152	202	5

(Note) Please specify the following when ordering.
①Drill name
②Workpiece material, drilling depth and required accuracy.
③Drilling mode (through hole, blind hole, cross hole...)
④Drill dimensions (dimensions specified in the drawing above).
Please contact us for inquiries.

● : Inventory maintained in Japan.

CUTTING CONDITIONS D042
OPERATION GUIDANCE D043
TECHNICAL DATA F001

MWS...DB

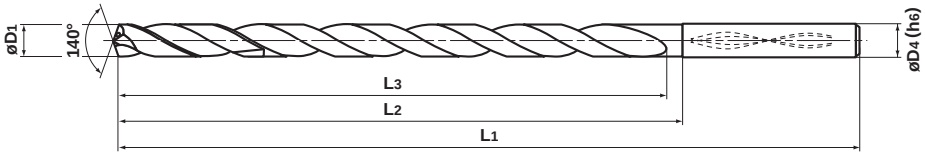
MWS TYPE LONG DRILL

- For 10-30×D hole depth drilling.
- Can be used with minimum lubricant for steel and cast iron.

UWC | VP | 140° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎	○	○

	D1=3	3<D1≤6	6<D1≤10	10<D1≤14
D1 Tolerance (mm)	−0.017 −0.031	−0.025 −0.043	−0.033 −0.055	−0.041 −0.068
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011



(Note 1) MWS-DB type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MWS-DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
4.4	10	Int.	●	MWS0440X10DB	59	62	112	5
	15	Int.	●	0440X15DB	81	84	134	5
	20	Int.	●	0440X20DB	104	107	157	5
	25	Int.	●	0440X25DB	126	129	179	5
	30	Int.	●	0440X30DB	149	152	202	5
4.5	10	Int.	●	0450X10DB	59	62	112	5
	15	Int.	●	0450X15DB	81	84	134	5
	20	Int.	●	0450X20DB	104	107	157	5
	25	Int.	●	0450X25DB	126	129	179	5
	30	Int.	●	0450X30DB	149	152	202	5
4.6	10	Int.	●	0460X10DB	65	68	118	5
	15	Int.	●	0460X15DB	90	93	143	5
	20	Int.	●	0460X20DB	115	118	168	5
	25	Int.	●	0460X25DB	140	143	193	5
	30	Int.	●	0460X30DB	165	168	218	5
4.7	10	Int.	●	0470X10DB	65	68	118	5
	15	Int.	●	0470X15DB	90	93	143	5
	20	Int.	●	0470X20DB	115	118	168	5
	25	Int.	●	0470X25DB	140	143	193	5
	30	Int.	●	0470X30DB	165	168	218	5
4.8	10	Int.	●	0480X10DB	65	68	118	5
	15	Int.	●	0480X15DB	90	93	143	5
	20	Int.	●	0480X20DB	115	118	168	5
	25	Int.	●	0480X25DB	140	143	193	5
	30	Int.	●	0480X30DB	165	168	218	5
4.9	10	Int.	●	0490X10DB	65	68	118	5
	15	Int.	●	0490X15DB	90	93	143	5
	20	Int.	●	0490X20DB	115	118	168	5
	25	Int.	●	0490X25DB	140	143	193	5
	30	Int.	●	0490X30DB	165	168	218	5
5.0	10	Int.	●	0500X10DB	65	68	118	5
	15	Int.	●	0500X15DB	90	93	143	5
	20	Int.	●	0500X20DB	115	118	168	5
	25	Int.	●	0500X25DB	140	143	193	5
	30	Int.	●	0500X30DB	165	168	218	5

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
5.1	10	Int.	●	MWS0510X10DB	72	75	127	6
	15	Int.	●	0510X15DB	99	102	154	6
	20	Int.	●	0510X20DB	127	130	182	6
	25	Int.	●	0510X25DB	154	157	209	6
	30	Int.	●	0510X30DB	182	185	237	6
5.2	10	Int.	●	0520X10DB	72	75	127	6
	15	Int.	●	0520X15DB	99	102	154	6
	20	Int.	●	0520X20DB	127	130	182	6
	25	Int.	●	0520X25DB	154	157	209	6
	30	Int.	●	0520X30DB	182	185	237	6
5.3	10	Int.	●	0530X10DB	72	75	127	6
	15	Int.	●	0530X15DB	99	102	154	6
	20	Int.	●	0530X20DB	127	130	182	6
	25	Int.	●	0530X25DB	154	157	209	6
	30	Int.	●	0530X30DB	182	185	237	6
5.4	10	Int.	●	0540X10DB	72	75	127	6
	15	Int.	●	0540X15DB	99	102	154	6
	20	Int.	●	0540X20DB	127	130	182	6
	25	Int.	●	0540X25DB	154	157	209	6
	30	Int.	●	0540X30DB	182	185	237	6
5.5	10	Int.	●	0550X10DB	72	75	127	6
	15	Int.	●	0550X15DB	99	102	154	6
	20	Int.	●	0550X20DB	127	130	182	6
	25	Int.	●	0550X25DB	154	157	209	6
	30	Int.	●	0550X30DB	182	185	237	6
5.6	10	Int.	●	0560X10DB	78	81	133	6
	15	Int.	●	0560X15DB	108	111	163	6
	20	Int.	●	0560X20DB	138	141	193	6
	25	Int.	●	0560X25DB	168	171	223	6
	30	Int.	●	0560X30DB	198	201	253	6
5.7	10	Int.	●	0570X10DB	78	81	133	6
	15	Int.	●	0570X15DB	108	111	163	6
	20	Int.	●	0570X20DB	138	141	193	6
	25	Int.	●	0570X25DB	168	171	223	6
	30	Int.	●	0570X30DB	198	201	253	6

(Note) Please specify the following when ordering.
①Drill name
②Workpiece material, drilling depth and required accuracy.
③Drilling mode (through hole, blind hole, cross hole...)
④Drill dimensions (dimensions specified in the drawing above).
Please contact us for inquiries.

● : Inventory maintained in Japan.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
5.8	10	Int.	●	MWS0580X10DB	78	81	133	6
	15	Int.	●	0580X15DB	108	111	163	6
	20	Int.	●	0580X20DB	138	141	193	6
	25	Int.	●	0580X25DB	168	171	223	6
	30	Int.	●	0580X30DB	198	201	253	6
5.9	10	Int.	●	0590X10DB	78	81	133	6
	15	Int.	●	0590X15DB	108	111	163	6
	20	Int.	●	0590X20DB	138	141	193	6
	25	Int.	●	0590X25DB	168	171	223	6
	30	Int.	●	0590X30DB	198	201	253	6
6.0	10	Int.	●	0600X10DB	78	81	133	6
	15	Int.	●	0600X15DB	108	111	163	6
	20	Int.	●	0600X20DB	138	141	193	6
	25	Int.	●	0600X25DB	168	171	223	6
	30	Int.	●	0600X30DB	198	201	253	6
6.1	10	Int.	●	0610X10DB	85	88	141	7
	15	Int.	●	0610X15DB	117	120	173	7
	20	Int.	●	0610X20DB	150	153	206	7
	25	Int.	●	0610X25DB	182	185	238	7
	30	Int.	●	0610X30DB	215	218	271	7
6.2	10	Int.	●	0620X10DB	85	88	141	7
	15	Int.	●	0620X15DB	117	120	173	7
	20	Int.	●	0620X20DB	150	153	206	7
	25	Int.	●	0620X25DB	182	185	238	7
	30	Int.	●	0620X30DB	215	218	271	7
6.3	10	Int.	●	0630X10DB	85	88	141	7
	15	Int.	●	0630X15DB	117	120	173	7
	20	Int.	●	0630X20DB	150	153	206	7
	25	Int.	●	0630X25DB	182	185	238	7
	30	Int.	●	0630X30DB	215	218	271	7
6.4	10	Int.	●	0640X10DB	85	88	141	7
	15	Int.	●	0640X15DB	117	120	173	7
	20	Int.	●	0640X20DB	150	153	206	7
	25	Int.	●	0640X25DB	182	185	238	7
	30	Int.	●	0640X30DB	215	218	271	7
6.5	10	Int.	●	0650X10DB	85	88	141	7
	15	Int.	●	0650X15DB	117	120	173	7
	20	Int.	●	0650X20DB	150	153	206	7
	25	Int.	●	0650X25DB	182	185	238	7
	30	Int.	●	0650X30DB	215	218	271	7
6.6	10	Int.	●	0660X10DB	91	94	147	7
	15	Int.	●	0660X15DB	126	129	182	7
	20	Int.	●	0660X20DB	161	164	217	7
	25	Int.	●	0660X25DB	196	199	252	7
	30	Int.	●	0660X30DB	231	234	287	7
6.7	10	Int.	●	0670X10DB	91	94	147	7
	15	Int.	●	0670X15DB	126	129	182	7
	20	Int.	●	0670X20DB	161	164	217	7
	25	Int.	●	0670X25DB	196	199	252	7
	30	Int.	●	0670X30DB	231	234	287	7

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
6.8	10	Int.	●	MWS0680X10DB	91	94	147	7
	15	Int.	●	0680X15DB	126	129	182	7
	20	Int.	●	0680X20DB	161	164	217	7
	25	Int.	●	0680X25DB	196	199	252	7
	30	Int.	●	0680X30DB	231	234	287	7
6.9	10	Int.	●	0690X10DB	91	94	147	7
	15	Int.	●	0690X15DB	126	129	182	7
	20	Int.	●	0690X20DB	161	164	217	7
	25	Int.	●	0690X25DB	196	199	252	7
	30	Int.	●	0690X30DB	231	234	287	7
7.0	10	Int.	●	0700X10DB	91	94	147	7
	15	Int.	●	0700X15DB	126	129	182	7
	20	Int.	●	0700X20DB	161	164	217	7
	25	Int.	●	0700X25DB	196	199	252	7
	30	Int.	●	0700X30DB	231	234	287	7
7.1	10	Int.	●	0710X10DB	98	101	155	8
	15	Int.	●	0710X15DB	135	138	192	8
	20	Int.	●	0710X20DB	173	176	230	8
	25	Int.	●	0710X25DB	210	213	267	8
	30	Int.	●	0710X30DB	248	251	305	8
7.2	10	Int.	●	0720X10DB	98	101	155	8
	15	Int.	●	0720X15DB	135	138	192	8
	20	Int.	●	0720X20DB	173	176	230	8
	25	Int.	●	0720X25DB	210	213	267	8
	30	Int.	●	0720X30DB	248	251	305	8
7.3	10	Int.	●	0730X10DB	98	101	155	8
	15	Int.	●	0730X15DB	135	138	192	8
	20	Int.	●	0730X20DB	173	176	230	8
	25	Int.	●	0730X25DB	210	213	267	8
	30	Int.	●	0730X30DB	248	251	305	8
7.4	10	Int.	●	0740X10DB	98	101	155	8
	15	Int.	●	0740X15DB	135	138	192	8
	20	Int.	●	0740X20DB	173	176	230	8
	25	Int.	●	0740X25DB	210	213	267	8
	30	Int.	●	0740X30DB	248	251	305	8
7.5	10	Int.	●	0750X10DB	98	101	155	8
	15	Int.	●	0750X15DB	135	138	192	8
	20	Int.	●	0750X20DB	173	176	230	8
	25	Int.	●	0750X25DB	210	213	267	8
	30	Int.	●	0750X30DB	248	251	305	8
7.6	10	Int.	●	0760X10DB	104	107	161	8
	15	Int.	●	0760X15DB	144	147	201	8
	20	Int.	●	0760X20DB	184	187	241	8
	25	Int.	●	0760X25DB	224	227	281	8
	30	Int.	●	0760X30DB	264	267	321	8
7.7	10	Int.	●	0770X10DB	104	107	161	8
	15	Int.	●	0770X15DB	144	147	201	8
	20	Int.	●	0770X20DB	184	187	241	8
	25	Int.	●	0770X25DB	224	227	281	8
	30	Int.	●	0770X30DB	264	267	321	8

CUTTING CONDITIONS D042
OPERATION GUIDANCE D043
TECHNICAL DATA F001

MWS...DB

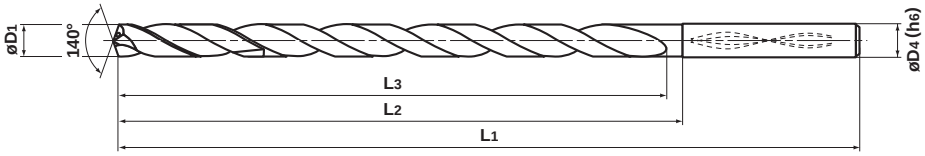
MWS TYPE LONG DRILL

- For 10-30×D hole depth drilling.
- Can be used with minimum lubricant for steel and cast iron.

UWC VP 140° X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎	○	○

	D1=3	3<D1≤6	6<D1≤10	10<D1≤14
D1 Tolerance (mm)	−0.017 −0.031	−0.025 −0.043	−0.033 −0.055	−0.041 −0.068
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011



(Note 1) MWS-DB type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MWS-DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
7.8	10	Int.	●	MWS0780X10DB	104	107	161	8
	15	Int.	●	0780X15DB	144	147	201	8
	20	Int.	●	0780X20DB	184	187	241	8
	25	Int.	●	0780X25DB	224	227	281	8
	30	Int.	●	0780X30DB	264	267	321	8
7.9	10	Int.	●	0790X10DB	104	107	161	8
	15	Int.	●	0790X15DB	144	147	201	8
	20	Int.	●	0790X20DB	184	187	241	8
	25	Int.	●	0790X25DB	224	227	281	8
	30	Int.	●	0790X30DB	264	267	321	8
8.0	10	Int.	●	0800X10DB	104	107	161	8
	15	Int.	●	0800X15DB	144	147	201	8
	20	Int.	●	0800X20DB	184	187	241	8
	25	Int.	●	0800X25DB	224	227	281	8
	30	Int.	●	0800X30DB	264	267	321	8
8.1	10	Int.	●	0810X10DB	111	114	169	9
	15	Int.	●	0810X15DB	153	156	211	9
	20	Int.	●	0810X20DB	196	199	254	9
	25	Int.	●	0810X25DB	238	241	296	9
NEW	30	Int.	●	0810X30DB	281	284	339	9
8.2	10	Int.	●	0820X10DB	111	114	169	9
	15	Int.	●	0820X15DB	153	156	211	9
	20	Int.	●	0820X20DB	196	199	254	9
	25	Int.	●	0820X25DB	238	241	296	9
NEW	30	Int.	●	0820X30DB	281	284	339	9
8.3	10	Int.	●	0830X10DB	111	114	169	9
	15	Int.	●	0830X15DB	153	156	211	9
	20	Int.	●	0830X20DB	196	199	254	9
	25	Int.	●	0830X25DB	238	241	296	9
NEW	30	Int.	●	0830X30DB	281	284	339	9
8.4	10	Int.	●	0840X10DB	111	114	169	9
	15	Int.	●	0840X15DB	153	156	211	9
	20	Int.	●	0840X20DB	196	199	254	9
	25	Int.	●	0840X25DB	238	241	296	9
NEW	30	Int.	●	0840X30DB	281	284	339	9

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
8.5	10	Int.	●	MWS0850X10DB	111	114	169	9
	15	Int.	●	0850X15DB	153	156	211	9
	20	Int.	●	0850X20DB	196	199	254	9
	25	Int.	●	0850X25DB	238	241	296	9
NEW	30	Int.	●	0850X30DB	281	284	339	9
8.6	10	Int.	●	0860X10DB	117	120	175	9
	15	Int.	●	0860X15DB	162	165	220	9
	20	Int.	●	0860X20DB	207	210	265	9
	25	Int.	●	0860X25DB	252	255	310	9
NEW	30	Int.	●	0860X30DB	297	300	355	9
8.7	10	Int.	●	0870X10DB	117	120	175	9
	15	Int.	●	0870X15DB	162	165	220	9
	20	Int.	●	0870X20DB	207	210	265	9
	25	Int.	●	0870X25DB	252	255	310	9
NEW	30	Int.	●	0870X30DB	297	300	355	9
8.8	10	Int.	●	0880X10DB	117	120	175	9
	15	Int.	●	0880X15DB	162	165	220	9
	20	Int.	●	0880X20DB	207	210	265	9
	25	Int.	●	0880X25DB	252	255	310	9
NEW	30	Int.	●	0880X30DB	297	300	355	9
8.9	10	Int.	●	0890X10DB	117	120	175	9
	15	Int.	●	0890X15DB	162	165	220	9
	20	Int.	●	0890X20DB	207	210	265	9
	25	Int.	●	0890X25DB	252	255	310	9
NEW	30	Int.	●	0890X30DB	297	300	355	9
9.0	10	Int.	●	0900X10DB	117	120	175	9
	15	Int.	●	0900X15DB	162	165	220	9
	20	Int.	●	0900X20DB	207	210	265	9
	25	Int.	●	0900X25DB	252	255	310	9
NEW	30	Int.	●	0900X30DB	297	300	355	9
9.1	10	Int.	●	0910X10DB	124	127	182	10
	15	Int.	●	0910X15DB	171	174	229	10
	20	Int.	●	0910X20DB	219	222	277	10
	25	Int.	●	0910X25DB	266	269	324	10
NEW	30	Int.	●	0910X30DB	314	317	372	10

(Note) Please specify the following when ordering.
①Drill name
②Workpiece material, drilling depth and required accuracy.
③Drilling mode (through hole, blind hole, cross hole...)
④Drill dimensions (dimensions specified in the drawing above).
Please contact us for inquiries.

● : Inventory maintained in Japan.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
9.2	10	Int.	●	MWS0920X10DB	124	127	182	10
	15	Int.	●	0920X15DB	171	174	229	10
	20	Int.	●	0920X20DB	219	222	277	10
	25	Int.	●	0920X25DB	266	269	324	10
	NEW 30	Int.	●	0920X30DB	314	317	372	10
9.3	10	Int.	●	0930X10DB	124	127	182	10
	15	Int.	●	0930X15DB	171	174	229	10
	20	Int.	●	0930X20DB	219	222	277	10
	25	Int.	●	0930X25DB	266	269	324	10
	NEW 30	Int.	●	0930X30DB	314	317	372	10
9.4	10	Int.	●	0940X10DB	124	127	182	10
	15	Int.	●	0940X15DB	171	174	229	10
	20	Int.	●	0940X20DB	219	222	277	10
	25	Int.	●	0940X25DB	266	269	324	10
	NEW 30	Int.	●	0940X30DB	314	317	372	10
9.5	10	Int.	●	0950X10DB	124	127	182	10
	15	Int.	●	0950X15DB	171	174	229	10
	20	Int.	●	0950X20DB	219	222	277	10
	25	Int.	●	0950X25DB	266	269	324	10
	NEW 30	Int.	●	0950X30DB	314	317	372	10
9.6	10	Int.	●	0960X10DB	130	133	188	10
	15	Int.	●	0960X15DB	180	183	238	10
	20	Int.	●	0960X20DB	230	233	288	10
	25	Int.	●	0960X25DB	280	283	338	10
	NEW 30	Int.	●	0960X30DB	330	333	388	10
9.7	10	Int.	●	0970X10DB	130	133	188	10
	15	Int.	●	0970X15DB	180	183	238	10
	20	Int.	●	0970X20DB	230	233	288	10
	25	Int.	●	0970X25DB	280	283	338	10
	NEW 30	Int.	●	0970X30DB	330	333	388	10
9.8	10	Int.	●	0980X10DB	130	133	188	10
	15	Int.	●	0980X15DB	180	183	238	10
	20	Int.	●	0980X20DB	230	233	288	10
	25	Int.	●	0980X25DB	280	283	338	10
	NEW 30	Int.	●	0980X30DB	330	333	388	10
9.9	10	Int.	●	0990X10DB	130	133	188	10
	15	Int.	●	0990X15DB	180	183	238	10
	20	Int.	●	0990X20DB	230	233	288	10
	25	Int.	●	0990X25DB	280	283	338	10
	NEW 30	Int.	●	0990X30DB	330	333	388	10
10.0	10	Int.	●	1000X10DB	130	133	188	10
	15	Int.	●	1000X15DB	180	183	238	10
	20	Int.	●	1000X20DB	230	233	288	10
	25	Int.	●	1000X25DB	280	283	338	10
	NEW 30	Int.	●	1000X30DB	330	333	388	10
10.1	10	Int.	●	1010X10DB	137	140	201	11
	15	Int.	●	1010X15DB	189	192	253	11
	20	Int.	●	1010X20DB	242	245	306	11
	NEW 25	Int.	●	1010X25DB	294	297	358	11

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
10.2	10	Int.	●	MWS1020X10DB	137	140	201	11
	15	Int.	●	1020X15DB	189	192	253	11
	20	Int.	●	1020X20DB	242	245	306	11
	NEW 25	Int.	●	1020X25DB	294	297	358	11
10.3	10	Int.	●	1030X10DB	137	140	201	11
	15	Int.	●	1030X15DB	189	192	253	11
	20	Int.	●	1030X20DB	242	245	306	11
	NEW 25	Int.	●	1030X25DB	294	297	358	11
10.4	10	Int.	●	1040X10DB	137	140	201	11
	15	Int.	●	1040X15DB	189	192	253	11
	20	Int.	●	1040X20DB	242	245	306	11
	NEW 25	Int.	●	1040X25DB	294	297	358	11
10.5	10	Int.	●	1050X10DB	137	140	201	11
	15	Int.	●	1050X15DB	189	192	253	11
	20	Int.	●	1050X20DB	242	245	306	11
	NEW 25	Int.	●	1050X25DB	294	297	358	11
10.6	10	Int.	●	1060X10DB	143	146	207	11
	15	Int.	●	1060X15DB	198	201	262	11
	20	Int.	●	1060X20DB	253	256	317	11
	NEW 25	Int.	●	1060X25DB	308	311	372	11
10.7	10	Int.	●	1070X10DB	143	146	207	11
	15	Int.	●	1070X15DB	198	201	262	11
	20	Int.	●	1070X20DB	253	256	317	11
	NEW 25	Int.	●	1070X25DB	308	311	372	11
10.8	10	Int.	●	1080X10DB	143	146	207	11
	15	Int.	●	1080X15DB	198	201	262	11
	20	Int.	●	1080X20DB	253	256	317	11
	NEW 25	Int.	●	1080X25DB	308	311	372	11
10.9	10	Int.	●	1090X10DB	143	146	207	11
	15	Int.	●	1090X15DB	198	201	262	11
	20	Int.	●	1090X20DB	253	256	317	11
	NEW 25	Int.	●	1090X25DB	308	311	372	11
11.0	10	Int.	●	1100X10DB	143	146	207	11
	15	Int.	●	1100X15DB	198	201	262	11
	20	Int.	●	1100X20DB	253	256	317	11
	NEW 25	Int.	●	1100X25DB	308	311	372	11
11.1	10	Int.	●	1110X10DB	150	153	215	12
	15	Int.	●	1110X15DB	207	210	272	12
	20	Int.	●	1110X20DB	265	268	330	12
	NEW 25	Int.	●	1110X25DB	322	325	387	12
11.2	10	Int.	●	1120X10DB	150	153	215	12
	15	Int.	●	1120X15DB	207	210	272	12
	20	Int.	●	1120X20DB	265	268	330	12
	NEW 25	Int.	●	1120X25DB	322	325	387	12
11.3	10	Int.	●	1130X10DB	150	153	215	12
	15	Int.	●	1130X15DB	207	210	272	12
	20	Int.	●	1130X20DB	265	268	330	12
	NEW 25	Int.	●	1130X25DB	322	325	387	12

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MWS...DB

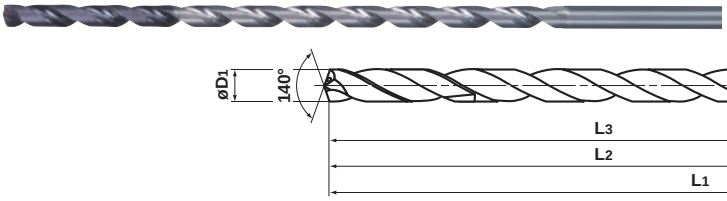
MWS TYPE LONG DRILL

- For 10-30×D hole depth drilling.
- Can be used with minimum lubricant for steel and cast iron.

UWC | VP | 140° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎	○	○

	D1=3	3<D1≤6	6<D1≤10	10<D1≤14
D1 Tolerance (mm)	−0.017 −0.031	−0.025 −0.043	−0.033 −0.055	−0.041 −0.068
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011



(Note 1) MWS-DB type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MWS-DB drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
11.4	10	Int.	●	MWS1140X10DB	150	153	215	12
	15	Int.	●	1140X15DB	207	210	272	12
	20	Int.	●	1140X20DB	265	268	330	12
NEW	25	Int.	●	1140X25DB	322	325	387	12
11.5	10	Int.	●	1150X10DB	150	153	215	12
	15	Int.	●	1150X15DB	207	210	272	12
	20	Int.	●	1150X20DB	265	268	330	12
NEW	25	Int.	●	1150X25DB	322	325	387	12
11.6	10	Int.	●	1160X10DB	156	159	221	12
	15	Int.	●	1160X15DB	216	219	281	12
	20	Int.	●	1160X20DB	276	279	341	12
NEW	25	Int.	●	1160X25DB	336	339	401	12
11.7	10	Int.	●	1170X10DB	156	159	221	12
	15	Int.	●	1170X15DB	216	219	281	12
	20	Int.	●	1170X20DB	276	279	341	12
NEW	25	Int.	●	1170X25DB	336	339	401	12
11.8	10	Int.	●	1180X10DB	156	159	221	12
	15	Int.	●	1180X15DB	216	219	281	12
	20	Int.	●	1180X20DB	276	279	341	12
NEW	25	Int.	●	1180X25DB	336	339	401	12
11.9	10	Int.	●	1190X10DB	156	159	221	12
	15	Int.	●	1190X15DB	216	219	281	12
	20	Int.	●	1190X20DB	276	279	341	12
NEW	25	Int.	●	1190X25DB	336	339	401	12
12.0	10	Int.	●	1200X10DB	156	159	221	12
	15	Int.	●	1200X15DB	216	219	281	12
	20	Int.	●	1200X20DB	276	279	341	12
NEW	25	Int.	●	1200X25DB	336	339	401	12
12.1	10	Int.	□	1210X10DB	163	166	229	13
	15	Int.	□	1210X15DB	225	228	291	13
NEW	20	Int.	□	1210X20DB	288	291	354	13
12.2	10	Int.	□	1220X10DB	163	166	229	13
	15	Int.	□	1220X15DB	225	228	291	13
NEW	20	Int.	□	1220X20DB	288	291	354	13

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
12.3	10	Int.	□	MWS1230X10DB	163	166	229	13
	15	Int.	□	1230X15DB	225	228	291	13
NEW	20	Int.	□	1230X20DB	288	291	354	13
12.4	10	Int.	□	1240X10DB	163	166	229	13
	15	Int.	□	1240X15DB	225	228	291	13
NEW	20	Int.	□	1240X20DB	288	291	354	13
12.5	10	Int.	●	1250X10DB	163	166	229	13
	15	Int.	●	1250X15DB	225	228	291	13
NEW	20	Int.	●	1250X20DB	288	291	354	13
12.6	10	Int.	□	1260X10DB	169	172	235	13
	15	Int.	□	1260X15DB	234	237	300	13
NEW	20	Int.	□	1260X20DB	299	302	365	13
12.7	10	Int.	□	1270X10DB	169	172	235	13
	15	Int.	□	1270X15DB	234	237	300	13
NEW	20	Int.	□	1270X20DB	299	302	365	13
12.8	10	Int.	□	1280X10DB	169	172	235	13
	15	Int.	□	1280X15DB	234	237	300	13
NEW	20	Int.	□	1280X20DB	299	302	365	13
12.9	10	Int.	□	1290X10DB	169	172	235	13
	15	Int.	□	1290X15DB	234	237	300	13
NEW	20	Int.	□	1290X20DB	299	302	365	13
13.0	10	Int.	●	1300X10DB	169	172	235	13
	15	Int.	●	1300X15DB	234	237	300	13
NEW	20	Int.	●	1300X20DB	299	302	365	13
13.1	10	Int.	□	1310X10DB	176	179	243	14
	15	Int.	□	1310X15DB	243	246	310	14
NEW	20	Int.	□	1310X20DB	311	314	378	14
13.2	10	Int.	□	1320X10DB	176	179	243	14
	15	Int.	□	1320X15DB	243	246	310	14
NEW	20	Int.	□	1320X20DB	311	314	378	14
13.3	10	Int.	□	1330X10DB	176	179	243	14
	15	Int.	□	1330X15DB	243	246	310	14
NEW	20	Int.	□	1330X20DB	311	314	378	14

(Note) Please specify the following when ordering.
①Drill name
②Workpiece material, drilling depth and required accuracy.
③Drilling mode (through hole, blind hole, cross hole...)
④Drill dimensions (dimensions specified in the drawing above).
Please contact us for inquiries.

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
	10	Int.	□	**MWS1340X10DB**	176	179	243	14
13.4	15	Int.	□	**1340X15DB**	243	246	310	14
NEW	20	Int.	□	**1340X20DB**	311	314	378	14
	10	Int.	●	**1350X10DB**	176	179	243	14
13.5	15	Int.	●	**1350X15DB**	243	246	310	14
NEW	20	Int.	●	**1350X20DB**	311	314	378	14
	10	Int.	□	**1360X10DB**	182	185	249	14
13.6	15	Int.	□	**1360X15DB**	252	255	319	14
NEW	20	Int.	□	**1360X20DB**	322	325	389	14
	10	Int.	□	**1370X10DB**	182	185	249	14
13.7	15	Int.	□	**1370X15DB**	252	255	319	14
NEW	20	Int.	□	**1370X20DB**	322	325	389	14

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
	10	Int.	□	**MWS1380X10DB**	182	185	249	14
13.8	15	Int.	□	**1380X15DB**	252	255	319	14
NEW	20	Int.	□	**1380X20DB**	322	325	389	14
	10	Int.	□	**1390X10DB**	182	185	249	14
13.9	15	Int.	□	**1390X15DB**	252	255	319	14
NEW	20	Int.	□	**1390X20DB**	322	325	389	14
	10	Int.	●	**1400X10DB**	182	185	249	14
14.0	15	Int.	●	**1400X15DB**	252	255	319	14
NEW	20	Int.	●	**1400X20DB**	322	325	389	14

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MWS...DB

MWS TYPE LONG DRILL

RECOMMENDED CUTTING CONDITIONS

Work Material		Drill Dia. / Conditions / Hardness	ϕ3.0—ϕ6.0		ϕ6.1—ϕ10.0		ϕ10.1—ϕ14.0	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel	≤180HB	90 (50—120)	0.20 (0.15—0.30)	110 (80—140)	0.25 (0.20—0.35)	130 (90—170)	0.30 (0.20—0.40)
P	Carbon Steel Alloy Steel	180—280HB	80 (50—100)	0.20 (0.15—0.30)	90 (70—120)	0.25 (0.20—0.35)	110 (80—140)	0.25 (0.20—0.40)
P	Carbon Steel Alloy Steel	280—350HB	70 (40—90)	0.20 (0.15—0.25)	80 (60—110)	0.25 (0.15—0.30)	90 (70—130)	0.25 (0.15—0.35)
M	Stainless Steel	≤200HB	50 (20—100)	0.10 (0.05—0.15)	70 (40—120)	0.20 (0.10—0.25)	80 (50—120)	0.25 (0.15—0.30)
K	Gray Cast Iron	Tensile Strength ≤350MPa	90 (70—120)	0.25 (0.15—0.30)	110 (100—140)	0.30 (0.15—0.35)	130 (110—160)	0.35 (0.25—0.40)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	50 (30—80)	0.20 (0.15—0.25)	60 (40—90)	0.20 (0.15—0.30)	80 (50—110)	0.25 (0.20—0.40)
N	Aluminium Alloy	—	100 (80—150)	0.25 (0.20—0.35)	130 (100—170)	0.30 (0.20—0.50)	140 (100—170)	0.40 (0.20—0.80)
S	Heat Resistant Alloy	—	20 (10—25)	0.10 (0.05—0.15)	20 (15—30)	0.12 (0.05—0.15)	20 (15—30)	0.15 (0.10—0.20)

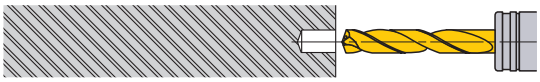
(Note 1) When drilling deeper than l/d=10, lower the cutting speed shown in the table above.
(Note 2) Be sure to drill a guide hole.
(Note 3) Raise to the above regular cutting revolution after putting a long drill into a guide hole.
(Note 4) For pilot hole drilling, Mitsubishi's MWE / MWS drill is recommended.

OPERATIONAL GUIDANCE

FLAT FACE DRILLING

●Drilling a blind hole

1. Drilling a pilot hole

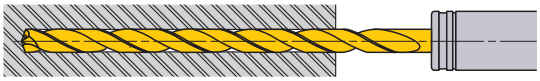


①Use a drill with a larger (flatter) point angle than the super long type. Mitsubishi type MZE, MZS, MWE or MWS is recommended.
②Use a drill with the same diameter as the deep hole drill.
③Drill depth : Approx 1D or deeper.
④Ensure a high precision hole is drilled for the guide.

2. Initial cutting with the long type drill

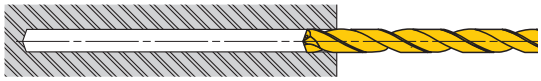
①Penetrate the guide hole at low revolution. (Cutting speed 20—30m/min, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 1—3mm short of the guide hole bottom.

3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

4. Drill retraction



①After drilling, lower the cutting revolution about 1—2mm short of the hole end. (Cutting speed of around 20—30m/min)
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.

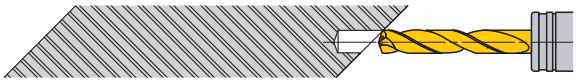
INTERRUPED DRILLING

●Drilling and breaking through on irregular faces or angles

1. Spot facing

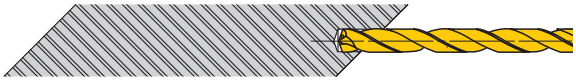
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a pilot hole



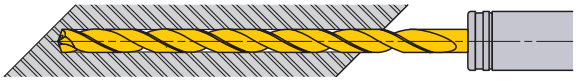
①Use a drill with a larger (flatter) point angle than the super long type. Mitsubishi type MZE, MZS, MWE or MWS is recommended.
②Use a drill with the same diameter as the deep hole drill.
③Drill depth : Approx 1D or deeper.
④Ensure a high precision hole is drilled for the guide.

3. Initial cutting with the long type drill



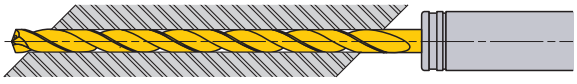
①Penetrate the guide hole at a low revolution. (Cutting speed 20—30m/min, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 1—3mm short of the guide hole bottom.

4. Drill the deep hole



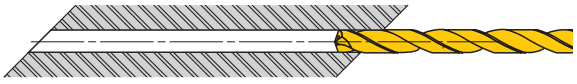
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



①When breaking through, the cutting edge can be damaged.
②A feed rate of 0.05—0.1mm/rev is recommended.

6. Drill retraction



①Finally clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.

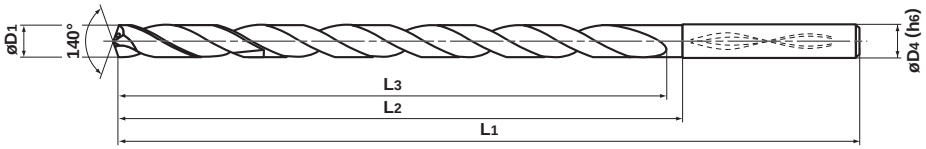
MNS/MNS...DB NEW

WSTAR DRILLS MNS TYPE LONG DRILL

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
				◎	

	D1=3	3<D1≤6	6<D1≤10	10<D1≤14
D1 Tolerance (mm)	0 −0.014	0 −0.018	0 −0.022	0 −0.027
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011

●4.5 or smaller diameter drills are designed with 2 colant holes.



(Note) MNS drills are suitable for use with shrink fit holders.

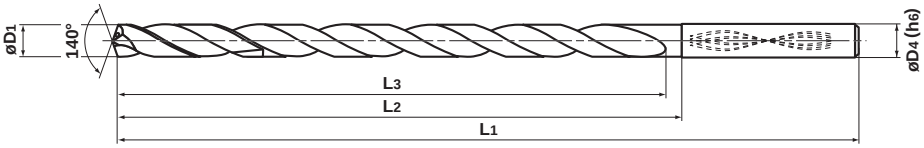
Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.0	5	Int.	●	MNS0300LB	33	33	81	3.0
	10	Int.	●	0300X10DB	39	42	90	3.0
	20	Int.	●	0300X20DB	69	72	120	3.0
	30	Int.	●	0300X30DB	99	102	150	3.0
3.1	5	Int.	●	0310LB	39	39	87	4.0
	10	Int.	□	0310X10DB	46	49	97	4.0
	20	Int.	□	0310X20DB	81	84	132	4.0
	30	Int.	□	0310X30DB	116	119	167	4.0
3.2	5	Int.	●	0320LB	39	39	87	4.0
	10	Int.	●	0320X10DB	46	49	97	4.0
	20	Int.	●	0320X20DB	81	84	132	4.0
	30	Int.	●	0320X30DB	116	119	167	4.0
3.3	5	Int.	●	0330LB	39	39	87	4.0
	10	Int.	□	0330X10DB	46	49	97	4.0
	20	Int.	□	0330X20DB	81	84	132	4.0
	30	Int.	□	0330X30DB	116	119	167	4.0
3.4	5	Int.	●	0340LB	39	39	87	4.0
	10	Int.	●	0340X10DB	46	49	97	4.0
	20	Int.	●	0340X20DB	81	84	132	4.0
	30	Int.	●	0340X30DB	116	119	167	4.0
3.5	5	Int.	●	0350LB	39	39	87	4.0
	10	Int.	□	0350X10DB	46	49	97	4.0
	20	Int.	□	0350X20DB	81	84	132	4.0
	30	Int.	□	0350X30DB	116	119	167	4.0
3.6	5	Int.	●	0360LB	44	44	92	4.0
	10	Int.	●	0360X10DB	52	55	103	4.0
	20	Int.	●	0360X20DB	92	95	143	4.0
	30	Int.	●	0360X30DB	132	135	183	4.0
3.7	5	Int.	●	0370LB	44	44	92	4.0
	10	Int.	□	0370X10DB	52	55	103	4.0
	20	Int.	□	0370X20DB	92	95	143	4.0
	30	Int.	□	0370X30DB	132	135	183	4.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.8	5	Int.	●	MNS0380LB	44	44	92	4.0
	10	Int.	□	0380X10DB	52	55	103	4.0
	20	Int.	□	0380X20DB	92	95	143	4.0
	30	Int.	□	0380X30DB	132	135	183	4.0
3.9	5	Int.	●	0390LB	44	44	92	4.0
	10	Int.	●	0390X10DB	52	55	103	4.0
	20	Int.	●	0390X20DB	92	95	143	4.0
	30	Int.	●	0390X30DB	132	135	183	4.0
4.0	5	Int.	●	0400LB	44	44	92	4.0
	10	Int.	●	0400X10DB	52	55	103	4.0
	20	Int.	●	0400X20DB	92	95	143	4.0
	30	Int.	●	0400X30DB	132	135	183	4.0
4.1	5	Int.	●	0410LB	50	50	100	5.0
	10	Int.	□	0410X10DB	59	62	112	5.0
	20	Int.	□	0410X20DB	104	107	157	5.0
	30	Int.	□	0410X30DB	149	152	202	5.0
4.2	5	Int.	●	0420LB	50	50	100	5.0
	10	Int.	□	0420X10DB	59	62	112	5.0
	20	Int.	□	0420X20DB	104	107	157	5.0
	30	Int.	□	0420X30DB	149	152	202	5.0
4.3	5	Int.	●	0430LB	50	50	100	5.0
	10	Int.	□	0430X10DB	59	62	112	5.0
	20	Int.	□	0430X20DB	104	107	157	5.0
	30	Int.	□	0430X30DB	149	152	202	5.0
4.4	5	Int.	●	0440LB	50	50	100	5.0
	10	Int.	□	0440X10DB	59	62	112	5.0
	20	Int.	□	0440X20DB	104	107	157	5.0
	30	Int.	□	0440X30DB	149	152	202	5.0
4.5	5	Int.	●	0450LB	50	50	100	5.0
	10	Int.	□	0450X10DB	59	62	112	5.0
	20	Int.	□	0450X20DB	104	107	157	5.0
	30	Int.	□	0450X30DB	149	152	202	5.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

	$D_1=3$	$3<D_1\leq 6$	$6<D_1\leq 10$	$10<D_1\leq 14$
D_1 Tolerance (mm)	$^{0}_{-0.014}$	$^{0}_{-0.018}$	$^{0}_{-0.022}$	$^{0}_{-0.027}$
D_4 Tolerance (mm)	$^{0}_{-0.006}$	$^{0}_{-0.008}$	$^{0}_{-0.009}$	$^{0}_{-0.011}$



Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
4.6	5	Int.	●	MNS0460LB	55	55	105	5.0
	10	Int.	□	0460X10DB	65	68	118	5.0
	20	Int.	□	0460X20DB	115	118	168	5.0
	30	Int.	□	0460X30DB	165	168	218	5.0
4.7	5	Int.	●	0470LB	55	55	105	5.0
	10	Int.	□	0470X10DB	65	68	118	5.0
	20	Int.	□	0470X20DB	115	118	168	5.0
	30	Int.	□	0470X30DB	165	168	218	5.0
4.8	5	Int.	●	0480LB	55	55	105	5.0
	10	Int.	□	0480X10DB	65	68	118	5.0
	20	Int.	□	0480X20DB	115	118	168	5.0
	30	Int.	□	0480X30DB	165	168	218	5.0
4.9	5	Int.	●	0490LB	55	55	105	5.0
	10	Int.	●	0490X10DB	65	68	118	5.0
	20	Int.	●	0490X20DB	115	118	168	5.0
	30	Int.	●	0490X30DB	165	168	218	5.0
5.0	5	Int.	●	0500LB	44	44	100	6.0
	10	Int.	●	0500X10DB	65	68	118	5.0
	20	Int.	●	0500X20DB	115	118	168	5.0
	30	Int.	●	0500X30DB	165	168	218	5.0
5.1	5	Int.	●	0510LB	44	44	100	6.0
	10	Int.	●	0510X10DB	72	75	127	6.0
	20	Int.	●	0510X20DB	127	130	182	6.0
	30	Int.	●	0510X30DB	182	185	237	6.0
5.2	5	Int.	●	0520LB	44	44	100	6.0
	10	Int.	□	0520X10DB	72	75	127	6.0
	20	Int.	□	0520X20DB	127	130	182	6.0
	30	Int.	□	0520X30DB	182	185	237	6.0
5.3	5	Int.	●	0530LB	44	44	100	6.0
	10	Int.	□	0530X10DB	72	75	127	6.0
	20	Int.	□	0530X20DB	127	130	182	6.0
	30	Int.	□	0530X30DB	182	185	237	6.0
5.4	5	Int.	●	0540LB	44	44	100	6.0
	10	Int.	□	0540X10DB	72	75	127	6.0
	20	Int.	□	0540X20DB	127	130	182	6.0
	30	Int.	□	0540X30DB	182	185	237	6.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
5.5	5	Int.	●	MNS0550LB	44	44	100	6.0
	10	Int.	●	0550X10DB	72	75	127	6.0
	20	Int.	●	0550X20DB	127	130	182	6.0
	30	Int.	●	0550X30DB	182	185	237	6.0
5.6	5	Int.	●	0560LB	48	48	100	6.0
	10	Int.	□	0560X10DB	78	81	133	6.0
	20	Int.	□	0560X20DB	138	141	193	6.0
	30	Int.	□	0560X30DB	198	201	253	6.0
5.7	5	Int.	●	0570LB	48	48	100	6.0
	10	Int.	□	0570X10DB	78	81	133	6.0
	20	Int.	□	0570X20DB	138	141	193	6.0
	30	Int.	□	0570X30DB	198	201	253	6.0
5.8	5	Int.	●	0580LB	48	48	100	6.0
	10	Int.	□	0580X10DB	78	81	133	6.0
	20	Int.	□	0580X20DB	138	141	193	6.0
	30	Int.	□	0580X30DB	198	201	253	6.0
5.9	5	Int.	●	0590LB	48	48	100	6.0
	10	Int.	□	0590X10DB	78	81	133	6.0
	20	Int.	□	0590X20DB	138	141	193	6.0
	30	Int.	□	0590X30DB	198	201	253	6.0
6.0	5	Int.	●	0600LB	48	48	100	6.0
	10	Int.	●	0600X10DB	78	81	133	6.0
	20	Int.	●	0600X20DB	138	141	193	6.0
	30	Int.	●	0600X30DB	198	201	253	6.0
6.1	5	Int.	●	0610LB	52	52	109	7.0
	10	Int.	●	0610X10DB	85	88	141	7.0
	20	Int.	●	0610X20DB	150	153	206	7.0
	30	Int.	●	0610X30DB	215	218	271	7.0
6.2	5	Int.	●	0620LB	52	52	109	7.0
	10	Int.	□	0620X10DB	85	88	141	7.0
	20	Int.	□	0620X20DB	150	153	206	7.0
	30	Int.	□	0620X30DB	215	218	271	7.0
6.3	5	Int.	●	0630LB	52	52	109	7.0
	10	Int.	□	0630X10DB	85	88	141	7.0
	20	Int.	□	0630X20DB	150	153	206	7.0
	30	Int.	□	0630X30DB	215	218	271	7.0

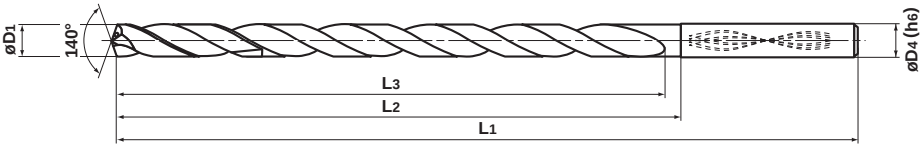
CUTTING CONDITIONS D049
OPERATION GUIDANCE D050
TECHNICAL DATA F001

MNS/MNS...DB NEW

WSTAR DRILLS MNS TYPE LONG DRILL

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
				◎	

	D1=3	3<D1≤6	6<D1≤10	10<D1≤14
D1 Tolerance (mm)	0 −0.014	0 −0.018	0 −0.022	0 −0.027
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011



(Note) MNS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
6.4	5	Int.	●	MNS0640LB	52	52	109	7.0
	10	Int.	□	0640X10DB	85	88	141	7.0
	20	Int.	□	0640X20DB	150	153	206	7.0
	30	Int.	□	0640X30DB	215	218	271	7.0
6.5	5	Int.	●	0650LB	52	52	109	7.0
	10	Int.	●	0650X10DB	85	88	141	7.0
	20	Int.	●	0650X20DB	150	153	206	7.0
	30	Int.	●	0650X30DB	215	218	271	7.0
6.6	5	Int.	●	0660LB	56	56	109	7.0
	10	Int.	□	0660X10DB	91	94	147	7.0
	20	Int.	□	0660X20DB	161	164	217	7.0
	30	Int.	□	0660X30DB	231	234	287	7.0
6.7	5	Int.	●	0670LB	56	56	109	7.0
	10	Int.	●	0670X10DB	91	94	147	7.0
	20	Int.	●	0670X20DB	161	164	217	7.0
	30	Int.	●	0670X30DB	231	234	287	7.0
6.8	5	Int.	●	0680LB	56	56	109	7.0
	10	Int.	□	0680X10DB	91	94	147	7.0
	20	Int.	□	0680X20DB	161	164	217	7.0
	30	Int.	□	0680X30DB	231	234	287	7.0
6.9	5	Int.	●	0690LB	56	56	109	7.0
	10	Int.	□	0690X10DB	91	94	147	7.0
	20	Int.	□	0690X20DB	161	164	217	7.0
	30	Int.	□	0690X30DB	231	234	287	7.0
7.0	5	Int.	●	0700LB	56	56	109	7.0
	10	Int.	●	0700X10DB	91	94	147	7.0
	20	Int.	●	0700X20DB	161	164	217	7.0
	30	Int.	●	0700X30DB	231	234	287	7.0
7.1	5	Int.	●	0710LB	60	64	118	8.0
	10	Int.	□	0710X10DB	98	101	155	8.0
	20	Int.	□	0710X20DB	173	176	230	8.0
	30	Int.	□	0710X30DB	248	251	305	8.0
7.2	5	Int.	●	0720LB	60	64	118	8.0
	10	Int.	●	0720X10DB	98	101	155	8.0
	20	Int.	●	0720X20DB	173	176	230	8.0
	30	Int.	●	0720X30DB	248	251	305	8.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
7.3	5	Int.	●	MNS0730LB	60	64	118	8.0
	10	Int.	□	0730X10DB	98	101	155	8.0
	20	Int.	□	0730X20DB	173	176	230	8.0
	30	Int.	□	0730X30DB	248	251	305	8.0
7.4	5	Int.	●	0740LB	60	64	118	8.0
	10	Int.	□	0740X10DB	98	101	155	8.0
	20	Int.	□	0740X20DB	173	176	230	8.0
	30	Int.	□	0740X30DB	248	251	305	8.0
7.5	5	Int.	●	0750LB	60	64	118	8.0
	10	Int.	□	0750X10DB	98	101	155	8.0
	20	Int.	□	0750X20DB	173	176	230	8.0
	30	Int.	□	0750X30DB	248	251	305	8.0
7.6	5	Int.	●	0760LB	64	64	118	8.0
	10	Int.	□	0760X10DB	104	107	161	8.0
	20	Int.	□	0760X20DB	184	187	241	8.0
	30	Int.	□	0760X30DB	264	267	321	8.0
7.7	5	Int.	●	0770LB	64	64	118	8.0
	10	Int.	□	0770X10DB	104	107	161	8.0
	20	Int.	□	0770X20DB	184	187	241	8.0
	30	Int.	□	0770X30DB	264	267	321	8.0
7.8	5	Int.	●	0780LB	64	64	118	8.0
	10	Int.	●	0780X10DB	104	107	161	8.0
	20	Int.	●	0780X20DB	184	187	241	8.0
	30	Int.	●	0780X30DB	264	267	321	8.0
7.9	5	Int.	●	0790LB	64	64	118	8.0
	10	Int.	□	0790X10DB	104	107	161	8.0
	20	Int.	□	0790X20DB	184	187	241	8.0
	30	Int.	□	0790X30DB	264	267	321	8.0
8.0	5	Int.	●	0800LB	64	64	118	8.0
	10	Int.	●	0800X10DB	104	107	161	8.0
	20	Int.	●	0800X20DB	184	187	241	8.0
	30	Int.	●	0800X30DB	264	267	321	8.0
8.1	5	Int.	●	0810LB	68	72	127	9.0
	10	Int.	□	0810X10DB	111	114	169	9.0
	20	Int.	□	0810X20DB	196	199	254	9.0
	30	Int.	□	0810X30DB	281	284	339	9.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
8.2	5	Int.	●	MNS0820LB	68	72	127	9.0
	10	Int.	□	0820X10DB	111	114	169	9.0
	20	Int.	□	0820X20DB	196	199	254	9.0
	30	Int.	□	0820X30DB	281	284	339	9.0
8.3	5	Int.	●	0830LB	68	72	127	9.0
	10	Int.	□	0830X10DB	111	114	169	9.0
	20	Int.	□	0830X20DB	196	199	254	9.0
	30	Int.	□	0830X30DB	281	284	339	9.0
8.4	5	Int.	●	0840LB	68	72	127	9.0
	10	Int.	□	0840X10DB	111	114	169	9.0
	20	Int.	□	0840X20DB	196	199	254	9.0
	30	Int.	□	0840X30DB	281	284	339	9.0
8.5	5	Int.	●	0850LB	68	72	127	9.0
	10	Int.	□	0850X10DB	111	114	169	9.0
	20	Int.	□	0850X20DB	196	199	254	9.0
	30	Int.	□	0850X30DB	281	284	339	9.0
8.6	5	Int.	●	0860LB	72	72	127	9.0
	10	Int.	□	0860X10DB	117	120	175	9.0
	20	Int.	□	0860X20DB	207	210	265	9.0
	30	Int.	□	0860X30DB	297	300	355	9.0
8.7	5	Int.	●	0870LB	72	72	127	9.0
	10	Int.	□	0870X10DB	117	120	175	9.0
	20	Int.	□	0870X20DB	207	210	265	9.0
	30	Int.	□	0870X30DB	297	300	355	9.0
8.8	5	Int.	●	0880LB	72	72	127	9.0
	10	Int.	□	0880X10DB	117	120	175	9.0
	20	Int.	□	0880X20DB	207	210	265	9.0
	30	Int.	□	0880X30DB	297	300	355	9.0
8.9	5	Int.	●	0890LB	72	72	127	9.0
	10	Int.	□	0890X10DB	117	120	175	9.0
	20	Int.	□	0890X20DB	207	210	265	9.0
	30	Int.	□	0890X30DB	297	300	355	9.0
9.0	5	Int.	●	0900LB	72	72	127	9.0
	10	Int.	●	0900X10DB	117	120	175	9.0
	20	Int.	●	0900X20DB	207	210	265	9.0
	30	Int.	●	0900X30DB	297	300	355	9.0
9.1	5	Int.	●	0910LB	76	80	136	10.0
	10	Int.	□	0910X10DB	124	127	182	10.0
	20	Int.	□	0910X20DB	219	222	277	10.0
	30	Int.	□	0910X30DB	314	317	372	10.0
9.2	5	Int.	●	0920LB	76	80	136	10.0
	10	Int.	□	0920X10DB	124	127	182	10.0
	20	Int.	□	0920X20DB	219	222	277	10.0
	30	Int.	□	0920X30DB	314	317	372	10.0
9.3	5	Int.	●	0930LB	76	80	136	10.0
	10	Int.	□	0930X10DB	124	127	182	10.0
	20	Int.	□	0930X20DB	219	222	277	10.0
	30	Int.	□	0930X30DB	314	317	372	10.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
9.4	5	Int.	●	MNS0940LB	76	80	136	10.0
	10	Int.	□	0940X10DB	124	127	182	10.0
	20	Int.	□	0940X20DB	219	222	277	10.0
	30	Int.	□	0940X30DB	314	317	372	10.0
9.5	5	Int.	●	0950LB	76	80	136	10.0
	10	Int.	□	0950X10DB	124	127	182	10.0
	20	Int.	□	0950X20DB	219	222	277	10.0
	30	Int.	□	0950X30DB	314	317	372	10.0
9.6	5	Int.	●	0960LB	80	80	136	10.0
	10	Int.	□	0960X10DB	130	133	188	10.0
	20	Int.	□	0960X20DB	230	233	288	10.0
	30	Int.	□	0960X30DB	330	333	388	10.0
9.7	5	Int.	●	0970LB	80	80	136	10.0
	10	Int.	□	0970X10DB	130	133	188	10.0
	20	Int.	□	0970X20DB	230	233	288	10.0
	30	Int.	□	0970X30DB	330	333	388	10.0
9.8	5	Int.	●	0980LB	80	80	136	10.0
	10	Int.	●	0980X10DB	130	133	188	10.0
	20	Int.	●	0980X20DB	230	233	288	10.0
	30	Int.	●	0980X30DB	330	333	388	10.0
9.9	5	Int.	●	0990LB	80	80	136	10.0
	10	Int.	□	0990X10DB	130	133	188	10.0
	20	Int.	□	0990X20DB	230	233	288	10.0
	30	Int.	□	0990X30DB	330	333	388	10.0
10.0	5	Int.	●	1000LB	80	80	136	10.0
	10	Int.	●	1000X10DB	130	133	188	10.0
	20	Int.	●	1000X20DB	230	233	288	10.0
	30	Int.	●	1000X30DB	330	333	388	10.0
10.1	5	Int.	●	1010LB	84	88	149	11.0
	10	Int.	□	1010X10DB	137	140	201	11.0
	20	Int.	□	1010X20DB	242	245	306	11.0
10.2	5	Int.	●	1020LB	84	88	149	11.0
	10	Int.	□	1020X10DB	137	140	201	11.0
	20	Int.	□	1020X20DB	242	245	306	11.0
10.3	5	Int.	●	1030LB	84	88	149	11.0
	10	Int.	□	1030X10DB	137	140	201	11.0
	20	Int.	□	1030X20DB	242	245	306	11.0
10.4	5	Int.	●	1040LB	84	88	149	11.0
	10	Int.	□	1040X10DB	137	140	201	11.0
	20	Int.	□	1040X20DB	242	245	306	11.0
10.5	5	Int.	●	1050LB	84	88	149	11.0
	10	Int.	●	1050X10DB	137	140	201	11.0
	20	Int.	●	1050X20DB	242	245	306	11.0
10.6	5	Int.	●	1060LB	88	88	149	11.0
	10	Int.	□	1060X10DB	143	146	207	11.0
	20	Int.	□	1060X20DB	253	256	317	11.0

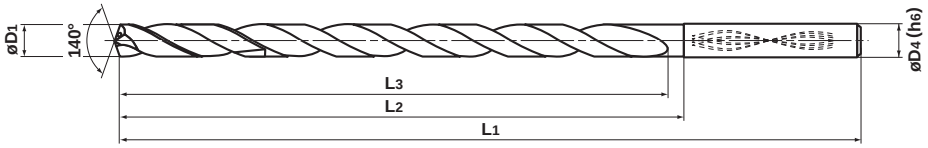
CUTTING CONDITIONS D049
OPERATION GUIDANCE D050
TECHNICAL DATA F001

MNS/MNS...DB NEW

WSTAR DRILLS MNS TYPE LONG DRILL

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
				◎	

	D1=3	3<D1≤6	6<D1≤10	10<D1≤14
D1 Tolerance (mm)	0 −0.014	0 −0.018	0 −0.022	0 −0.027
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011



(Note) MNS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
	5	Int.	●	MNS1070LB	88	88	149	11.0
10.7	10	Int.	□	1070X10DB	143	146	207	11.0
	20	Int.	□	1070X20DB	253	256	317	11.0
	5	Int.	●	1080LB	88	88	149	11.0
10.8	10	Int.	□	1080X10DB	143	146	207	11.0
	20	Int.	□	1080X20DB	253	256	317	11.0
	5	Int.	●	1090LB	88	88	149	11.0
10.9	10	Int.	□	1090X10DB	143	146	207	11.0
	20	Int.	□	1090X20DB	253	256	317	11.0
	5	Int.	●	1100LB	88	88	149	11.0
11.0	10	Int.	●	1100X10DB	143	146	207	11.0
	20	Int.	●	1100X20DB	253	256	317	11.0
	5	Int.	●	1110LB	92	96	158	12.0
11.1	10	Int.	□	1110X10DB	150	153	215	12.0
	20	Int.	□	1110X20DB	265	268	330	12.0
	5	Int.	●	1120LB	92	96	158	12.0
11.2	10	Int.	□	1120X10DB	150	153	215	12.0
	20	Int.	□	1120X20DB	265	268	330	12.0
	5	Int.	●	1130LB	92	96	158	12.0
11.3	10	Int.	□	1130X10DB	150	153	215	12.0
	20	Int.	□	1130X20DB	265	268	330	12.0
	5	Int.	●	1140LB	92	96	158	12.0
11.4	10	Int.	□	1140X10DB	150	153	215	12.0
	20	Int.	□	1140X20DB	265	268	330	12.0
	5	Int.	●	1150LB	92	96	158	12.0
11.5	10	Int.	□	1150X10DB	150	153	215	12.0
	20	Int.	□	1150X20DB	265	268	330	12.0
	5	Int.	●	1160LB	96	96	158	12.0
11.6	10	Int.	□	1160X10DB	156	159	221	12.0
	20	Int.	□	1160X20DB	276	279	341	12.0
	5	Int.	●	1170LB	96	96	158	12.0
11.7	10	Int.	□	1170X10DB	156	159	221	12.0
	20	Int.	□	1170X20DB	276	279	341	12.0
	5	Int.	●	1180LB	96	96	158	12.0
11.8	10	Int.	□	1180X10DB	156	159	221	12.0
	20	Int.	□	1180X20DB	276	279	341	12.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
	5	Int.	●	MNS1190LB	96	96	158	12.0
11.9	10	Int.	□	1190X10DB	156	159	221	12.0
	20	Int.	□	1190X20DB	276	279	341	12.0
	5	Int.	●	1200LB	96	96	158	12.0
12.0	10	Int.	●	1200X10DB	156	159	221	12.0
	20	Int.	●	1200X20DB	276	279	341	12.0
	5	Int.	●	1210LB	100	104	167	13.0
12.1	10	Int.	□	1210X10DB	163	166	229	13.0
	20	Int.	□	1210X20DB	288	291	354	13.0
	5	Int.	●	1220LB	100	104	167	13.0
12.2	10	Int.	□	1220X10DB	163	166	229	13.0
	20	Int.	□	1220X20DB	288	291	354	13.0
	5	Int.	●	1230LB	100	104	167	13.0
12.3	10	Int.	□	1230X10DB	163	166	229	13.0
	20	Int.	□	1230X20DB	288	291	354	13.0
	5	Int.	●	1240LB	100	104	167	13.0
12.4	10	Int.	□	1240X10DB	163	166	229	13.0
	20	Int.	□	1240X20DB	288	291	354	13.0
	5	Int.	●	1250LB	100	104	167	13.0
12.5	10	Int.	□	1250X10DB	163	166	229	13.0
	20	Int.	□	1250X20DB	288	291	354	13.0
	5	Int.	●	1260LB	104	104	167	13.0
12.6	10	Int.	□	1260X10DB	169	172	235	13.0
	20	Int.	□	1260X20DB	299	302	365	13.0
	5	Int.	●	1270LB	104	104	167	13.0
12.7	10	Int.	□	1270X10DB	169	172	235	13.0
	20	Int.	□	1270X20DB	299	302	365	13.0
	5	Int.	●	1280LB	104	104	167	13.0
12.8	10	Int.	□	1280X10DB	169	172	235	13.0
	20	Int.	□	1280X20DB	299	302	365	13.0
	5	Int.	●	1290LB	104	104	167	13.0
12.9	10	Int.	□	1290X10DB	169	172	235	13.0
	20	Int.	□	1290X20DB	299	302	365	13.0
	5	Int.	●	1300LB	104	104	167	13.0
13.0	10	Int.	●	1300X10DB	169	172	235	13.0
	20	Int.	●	1300X20DB	299	302	365	13.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
	5	Int.	●	**MNS1310LB**	108	112	176	14.0
13.1	10	Int.	□	**1310X10DB**	176	179	243	14.0
	20	Int.	□	**1310X20DB**	311	314	378	14.0
	5	Int.	●	**1320LB**	108	112	176	14.0
13.2	10	Int.	□	**1320X10DB**	176	179	243	14.0
	20	Int.	□	**1320X20DB**	311	314	378	14.0
	5	Int.	●	**1330LB**	108	112	176	14.0
13.3	10	Int.	□	**1330X10DB**	176	179	243	14.0
	20	Int.	□	**1330X20DB**	311	314	378	14.0
	5	Int.	●	**1340LB**	108	112	176	14.0
13.4	10	Int.	□	**1340X10DB**	176	179	243	14.0
	20	Int.	□	**1340X20DB**	311	314	378	14.0
	5	Int.	●	**1350LB**	108	112	176	14.0
13.5	10	Int.	□	**1350X10DB**	176	179	243	14.0
	20	Int.	□	**1350X20DB**	311	314	378	14.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock TF15	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
	5	Int.	●	**MNS1360LB**	112	112	176	14.0
13.6	10	Int.	□	**1360X10DB**	182	185	249	14.0
	20	Int.	□	**1360X20DB**	322	325	389	14.0
	5	Int.	●	**1370LB**	112	112	176	14.0
13.7	10	Int.	□	**1370X10DB**	182	185	249	14.0
	20	Int.	□	**1370X20DB**	322	325	389	14.0
	5	Int.	●	**1380LB**	112	112	176	14.0
13.8	10	Int.	□	**1380X10DB**	182	185	249	14.0
	20	Int.	□	**1380X20DB**	322	325	389	14.0
	5	Int.	●	**1390LB**	112	112	176	14.0
13.9	10	Int.	□	**1390X10DB**	182	185	249	14.0
	20	Int.	□	**1390X20DB**	322	325	389	14.0
	5	Int.	●	**1400LB**	112	112	176	14.0
14.0	10	Int.	●	**1400X10DB**	182	185	249	14.0
	20	Int.	●	**1400X20DB**	322	325	389	14.0

RECOMMENDED CUTTING CONDITIONS

Work Material		Order Number	Drill Diameter ϕ3.0—ϕ6.0 Cutting Speed(m/min)	ϕ3.0—ϕ6.0 Feed(mm/rev)	ϕ6.1—ϕ10.0 Cutting Speed(m/min)	ϕ6.1—ϕ10.0 Feed(mm/rev)	ϕ10.1—ϕ14.0 Cutting Speed(m/min)	ϕ10.1—ϕ14.0 Feed(mm/rev)
N	Aluminium Alloy Casting Aluminium Alloy Die Casting	MNS...LB	80—150	0.20—0.50	100—200	0.30—1.00	150—250	0.30—1.00
		MNS...DB	60—120	0.20—0.50	80—150	0.30—1.00	120—200	0.30—1.00
	Wrought Aluminium Alloy	MNS...LB	80—150	0.15—0.30	100—200	0.20—0.40	150—250	0.20—0.40
		MNS...DB	60—120	0.15—0.30	80—150	0.20—0.40	120—200	0.20—0.40

(Note 1) When using the drill with a length over l/d 10, it is necessary to use a prep holes as a guide. (If no prep-hole is used then drill breakage can occur)
(Note 2) For pilot hole drilling, Mitsubishi Materials MNS-LB, MAE-MB or MAS-MB drill is recommended.

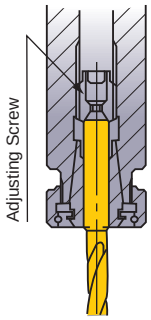
OPERATION GUIDANCE D050 TECHNICAL DATA F001

MNS/MNS...DB NEW

WSTAR DRILLS MNS TYPE LONG DRILL

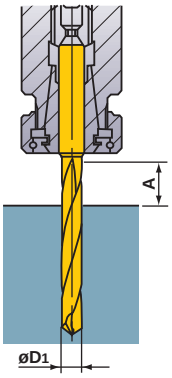
OPERATIONAL GUIDANCE

Drill Holding



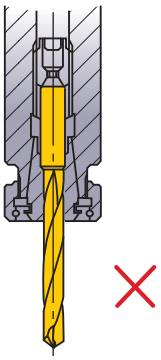
Thrust bearing type collet chuck holds the drill securely.

Drill Length



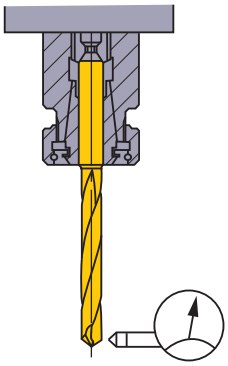
A ≥ D1 x 1.5

Drill Installation



Do not clamp on the flutes.

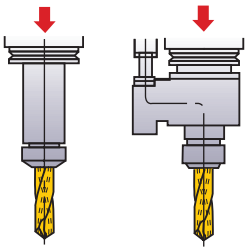
Installation Tolerance



Run-out ≤ 0.03mm

Through Coolant Type

Spindles Through Coolant Type | Revolving Coolant Machine Type



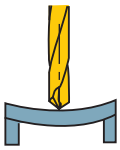
Coolant pressure is approx. 0.5MPa—7MPa

Coolant Handling

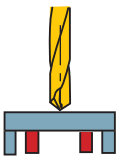
1) Small particles of swarf will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

Thin Workpiece

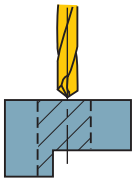


If Bending Occurs ×



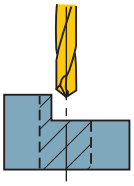
Support the Workpiece ○

Interrupted Cutting



One Process ○

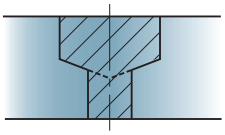
①Lower the feed when drilling the interrupted part.



Requires Prior Machining △

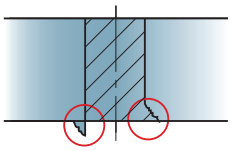
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the two processes.
②Drill the larger hole first.
⋆A tool for machining both chamfer and spot face can be produced to order.

Burring and Workpiece Chipping



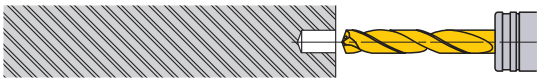
①Lower the feed rate by 50% at the end of through cutting.
②Add a 45°chamfer.
③Change the point angle.

OPERATIONAL GUIDANCE FOR MNS...DB DRILLS

FLAT FACE DRILLING

●Drilling a blind hole

1. Drilling a pilot hole

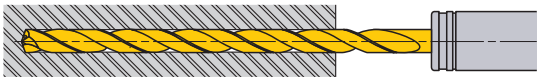


①Use a drill with a larger (flatter) point angle than the super long type. Mitsubishi type MNS-LB, MAE-MB or MAS-MB drill is recommended.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1D.
(Adjust the pilot hole depth according to the length of the long type drill.)

2. Initial cutting with the long type drill

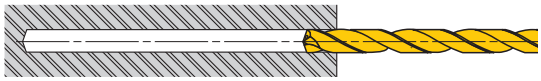
①Penetrate the guide hole at low revolution. (Cutting speed 20—30m/min, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 1—3mm short of the guide hole bottom.

3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

4. Drill retraction

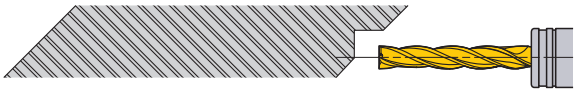


①After drilling, lower the cutting revolution about 1—2mm short of the hole end. (Cutting speed of around 20—30m/min)
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.

INTERRUPED DRILLING

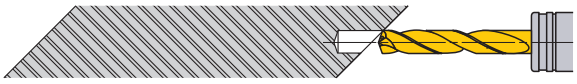
●Drilling and breaking through on irregular faces or angles

1. Spot facing



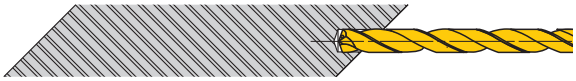
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a pilot hole



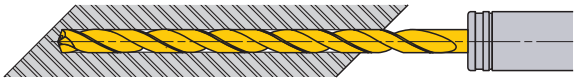
①Use a drill with a larger (flatter) point angle than the super long type. Mitsubishi type MNS-LB, MAE-MB or MAS-MB drill is recommended.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1D.
(Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial cutting with the long type drill



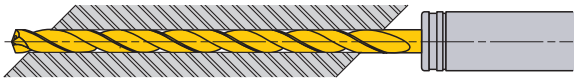
①Penetrate the guide hole at a low revolution. (Cutting speed 20—30m/min, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 1—3mm short of the guide hole bottom.

4. Drill the deep hole



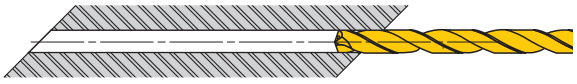
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



①When breaking through, the cutting edge can be damaged.
②A feed rate of 0.05—0.1mm/rev is recommended.

6. Drill retraction



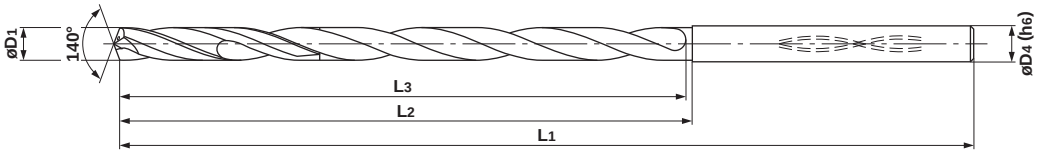
①Finally clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.

MHS NEW

WSTAR DRILLS

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
	◎				○

	D1=3	3<D1≤6	6<D1≤10	10<D1≤12
D1 Tolerance (mm)	+0.010 −0.002	+0.010 −0.002	+0.010 −0.005	+0.010 −0.008
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011



(Note 1) MHS drills are suitable for use with shrink fit holders.
(Note 2) Use the shortest type in the respective diameter as a pilot drill.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.0	4	Int.	●	MHS0300L020B	19.0	20	70	4.0
	10	Int.	●	0300L040B	39.0	40	90	4.0
	17	Int.	●	0300L060B	59.0	60	110	4.0
	27	Int.	●	0300L090B	89.0	90	140	4.0
3.1	4	Int.	□	0310L020B	19.5	20	70	4.0
	10	Int.	□	0310L040B	39.5	40	90	4.0
	17	Int.	□	0310L060B	59.5	60	110	4.0
	26	Int.	□	0310L090B	89.5	90	140	4.0
3.2	4	Int.	□	0320L020B	19.5	20	70	4.0
	10	Int.	□	0320L040B	39.5	40	90	4.0
	16	Int.	□	0320L060B	59.5	60	110	4.0
	25	Int.	□	0320L090B	89.5	90	140	4.0
3.3	3	Int.	□	0330L020B	19.5	20	70	4.0
	9	Int.	□	0330L040B	39.5	40	90	4.0
	16	Int.	□	0330L060B	59.5	60	110	4.0
	25	Int.	□	0330L090B	89.5	90	140	4.0
3.4	3	Int.	□	0340L020B	19.5	20	70	4.0
	9	Int.	□	0340L040B	39.5	40	90	4.0
	15	Int.	□	0340L060B	59.5	60	110	4.0
	24	Int.	□	0340L090B	89.5	90	140	4.0
3.5	3	Int.	●	0350L020B	19.5	20	70	4.0
	9	Int.	●	0350L040B	39.5	40	90	4.0
	14	Int.	●	0350L060B	59.5	60	110	4.0
	23	Int.	●	0350L090B	89.5	90	140	4.0
3.6	3	Int.	□	0360L020B	20.0	20	70	4.0
	9	Int.	□	0360L040B	40.0	40	90	4.0
	14	Int.	□	0360L060B	60.0	60	110	4.0
	22	Int.	□	0360L090B	90.0	90	140	4.0
	31	Int.	□	0360L120B	120.0	120	170	4.0
3.7	3	Int.	□	0370L020B	20.0	20	70	4.0
	8	Int.	□	0370L040B	40.0	40	90	4.0
	14	Int.	□	0370L060B	60.0	60	110	4.0
	22	Int.	□	0370L090B	90.0	90	140	4.0
	30	Int.	□	0370L120B	120.0	120	170	4.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.8	3	Int.	●	MHS0380L020B	20.0	20	70	4.0
	8	Int.	●	0380L040B	40.0	40	90	4.0
	13	Int.	●	0380L060B	60.0	60	110	4.0
	21	Int.	●	0380L090B	90.0	90	140	4.0
	29	Int.	●	0380L120B	120.0	120	170	4.0
3.9	3	Int.	□	0390L020B	20.0	20	70	4.0
	8	Int.	□	0390L040B	40.0	40	90	4.0
	13	Int.	□	0390L060B	60.0	60	110	4.0
	21	Int.	□	0390L090B	90.0	90	140	4.0
	28	Int.	□	0390L120B	120.0	120	170	4.0
4.0	2	Int.	●	0400L020B	20.0	20	70	4.0
	7	Int.	●	0400L040B	40.0	40	90	4.0
	12	Int.	●	0400L060B	60.0	60	110	4.0
	20	Int.	●	0400L090B	90.0	90	140	4.0
	27	Int.	●	0400L120B	120.0	120	170	4.0
4.1	2	Int.	□	0410L020B	18.5	20	70	6.0
	7	Int.	□	0410L040B	38.5	40	90	6.0
	12	Int.	□	0410L060B	58.5	60	110	6.0
	19	Int.	□	0410L090B	88.5	90	140	6.0
	26	Int.	□	0410L120B	118.5	120	170	6.0
4.2	2	Int.	□	0420L020B	18.5	20	70	6.0
	7	Int.	□	0420L040B	38.5	40	90	6.0
	11	Int.	□	0420L060B	58.5	60	110	6.0
	19	Int.	□	0420L090B	88.5	90	140	6.0
	26	Int.	□	0420L120B	118.5	120	170	6.0
4.3	2	Int.	□	0430L020B	18.5	20	70	6.0
	6	Int.	□	0430L040B	38.5	40	90	6.0
	11	Int.	□	0430L060B	58.5	60	110	6.0
	18	Int.	□	0430L090B	88.5	90	140	6.0
	25	Int.	□	0430L120B	118.5	120	170	6.0
4.4	2	Int.	□	0440L020B	18.5	20	70	6.0
	6	Int.	□	0440L040B	38.5	40	90	6.0
	11	Int.	□	0440L060B	58.5	60	110	6.0
	18	Int.	□	0440L090B	88.5	90	140	6.0
	24	Int.	□	0440L120B	118.5	120	170	6.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
4.5	2	Int.	●	MHS0450L020B	18.5	20	70	6.0
	6	Int.	●	0450L040B	38.5	40	90	6.0
	10	Int.	●	0450L060B	58.5	60	110	6.0
	17	Int.	●	0450L090B	88.5	90	140	6.0
	24	Int.	●	0450L120B	118.5	120	170	6.0
4.6	2	Int.	□	0460L020B	19.0	20	70	6.0
	6	Int.	□	0460L040B	39.0	40	90	6.0
	10	Int.	□	0460L060B	59.0	60	110	6.0
	17	Int.	□	0460L090B	89.0	90	140	6.0
	23	Int.	□	0460L120B	119.0	120	170	6.0
	30	Int.	□	0460L150B	149.0	150	200	6.0
4.7	2	Int.	□	0470L020B	19.0	20	70	6.0
	6	Int.	□	0470L040B	39.0	40	90	6.0
	10	Int.	□	0470L060B	59.0	60	110	6.0
	16	Int.	□	0470L090B	89.0	90	140	6.0
	23	Int.	□	0470L120B	119.0	120	170	6.0
	29	Int.	□	0470L150B	149.0	150	200	6.0
4.8	1	Int.	●	0480L020B	19.0	20	70	6.0
	6	Int.	●	0480L040B	39.0	40	90	6.0
	10	Int.	●	0480L060B	59.0	60	110	6.0
	16	Int.	●	0480L090B	89.0	90	140	6.0
	22	Int.	●	0480L120B	119.0	120	170	6.0
	29	Int.	●	0480L150B	149.0	150	200	6.0
4.9	1	Int.	□	0490L020B	19.0	20	70	6.0
	5	Int.	□	0490L040B	39.0	40	90	6.0
	10	Int.	□	0490L060B	59.0	60	110	6.0
	16	Int.	□	0490L090B	89.0	90	140	6.0
	22	Int.	□	0490L120B	119.0	120	170	6.0
	28	Int.	□	0490L150B	149.0	150	200	6.0
5.0	1	Int.	●	0500L020B	19.0	20	70	6.0
	5	Int.	●	0500L040B	39.0	40	90	6.0
	9	Int.	●	0500L060B	59.0	60	110	6.0
	15	Int.	●	0500L090B	89.0	90	140	6.0
	21	Int.	●	0500L120B	119.0	120	170	6.0
	27	Int.	●	0500L150B	149.0	150	200	6.0
5.1	3	Int.	□	0510L030B	29.5	30	80	6.0
	9	Int.	□	0510L060B	59.5	60	110	6.0
	15	Int.	□	0510L090B	89.5	90	140	6.0
	21	Int.	□	0510L120B	119.5	120	170	6.0
	27	Int.	□	0510L150B	149.5	150	200	6.0
5.2	3	Int.	□	0520L030B	29.5	30	80	6.0
	9	Int.	□	0520L060B	59.5	60	110	6.0
	15	Int.	□	0520L090B	89.5	90	140	6.0
	20	Int.	□	0520L120B	119.5	120	170	6.0
	26	Int.	□	0520L150B	149.5	150	200	6.0
5.3	3	Int.	□	0530L030B	29.5	30	80	6.0
	9	Int.	□	0530L060B	59.5	60	110	6.0
	14	Int.	□	0530L090B	89.5	90	140	6.0
	20	Int.	□	0530L120B	119.5	120	170	6.0
	26	Int.	□	0530L150B	149.5	150	200	6.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
5.4	3	Int.	□	MHS0540L030B	29.5	30	80	6.0
	9	Int.	□	0540L060B	59.5	60	110	6.0
	14	Int.	□	0540L090B	89.5	90	140	6.0
	20	Int.	□	0540L120B	119.5	120	170	6.0
	25	Int.	□	0540L150B	149.5	150	200	6.0
5.5	3	Int.	●	0550L030B	29.5	30	80	6.0
	8	Int.	●	0550L060B	59.5	60	110	6.0
	14	Int.	●	0550L090B	89.5	90	140	6.0
	19	Int.	●	0550L120B	119.5	120	170	6.0
	25	Int.	●	0550L150B	149.5	150	200	6.0
5.6	3	Int.	□	0560L030B	30.0	30	80	6.0
	8	Int.	□	0560L060B	60.0	60	110	6.0
	14	Int.	□	0560L090B	90.0	90	140	6.0
	19	Int.	□	0560L120B	120.0	120	170	6.0
	24	Int.	□	0560L150B	150.0	150	200	6.0
5.7	3	Int.	□	0570L030B	30.0	30	80	6.0
	8	Int.	□	0570L060B	60.0	60	110	6.0
	13	Int.	□	0570L090B	90.0	90	140	6.0
	19	Int.	□	0570L120B	120.0	120	170	6.0
	24	Int.	□	0570L150B	150.0	150	200	6.0
5.8	3	Int.	●	0580L030B	30.0	30	80	6.0
	8	Int.	●	0580L060B	60.0	60	110	6.0
	13	Int.	●	0580L090B	90.0	90	140	6.0
	18	Int.	●	0580L120B	120.0	120	170	6.0
	23	Int.	●	0580L150B	150.0	150	200	6.0
5.9	3	Int.	□	0590L030B	30.0	30	80	6.0
	8	Int.	□	0590L060B	60.0	60	110	6.0
	13	Int.	□	0590L090B	90.0	90	140	6.0
	18	Int.	□	0590L120B	120.0	120	170	6.0
	23	Int.	□	0590L150B	150.0	150	200	6.0
6.0	2	Int.	●	0600L030B	30.0	30	80	6.0
	7	Int.	●	0600L060B	60.0	60	110	6.0
	12	Int.	●	0600L090B	90.0	90	140	6.0
	17	Int.	●	0600L120B	120.0	120	170	6.0
	22	Int.	●	0600L150B	150.0	150	200	6.0
6.1	2	Int.	□	0610L030B	28.5	30	80	8.0
	7	Int.	□	0610L060B	58.5	60	110	8.0
	12	Int.	□	0610L090B	88.5	90	140	8.0
	17	Int.	□	0610L120B	118.5	120	170	8.0
	22	Int.	□	0610L150B	148.5	150	200	8.0
6.2	2	Int.	□	0620L030B	28.5	30	80	8.0
	7	Int.	□	0620L060B	58.5	60	110	8.0
	12	Int.	□	0620L090B	88.5	90	140	8.0
	17	Int.	□	0620L120B	118.5	120	170	8.0
	21	Int.	□	0620L150B	148.5	150	200	8.0
6.3	2	Int.	□	0630L030B	28.5	30	80	8.0
	7	Int.	□	0630L060B	58.5	60	110	8.0
	12	Int.	□	0630L090B	88.5	90	140	8.0
	16	Int.	□	0630L120B	118.5	120	170	8.0
	21	Int.	□	0630L150B	148.5	150	200	8.0

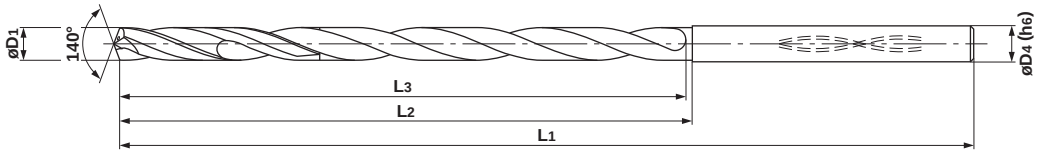
CUTTING CONDITIONS D058
OPERATION GUIDANCE D059
TECHNICAL DATA F001

MHS NEW

WSTAR DRILLS

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
	◎				○

	$D_1=3$	$3<D_1\leq 6$	$6<D_1\leq 10$	$10<D_1\leq 12$
D_1 Tolerance (mm)	$^{+0.010}_{-0.002}$	$^{+0.010}_{-0.002}$	$^{+0.010}_{-0.005}$	$^{+0.010}_{-0.008}$
D_4 Tolerance (mm)	$^{0}_{-0.006}$	$^{0}_{-0.008}$	$^{0}_{-0.009}$	$^{0}_{-0.011}$



(Note 1) MHS drills are suitable for use with shrink fit holders.
(Note 2) Use the shortest type in the respective diameter as a pilot drill.

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4
6.4	2	Int.	□	MHS0640L030B	28.5	30	80	8.0
	7	Int.	□	0640L060B	58.5	60	110	8.0
	11	Int.	□	0640L090B	88.5	90	140	8.0
	16	Int.	□	0640L120B	118.5	120	170	8.0
	21	Int.	□	0640L150B	148.5	150	200	8.0
6.5	2	Int.	●	0650L030B	28.5	30	80	8.0
	6	Int.	●	0650L060B	58.5	60	110	8.0
	11	Int.	●	0650L090B	88.5	90	140	8.0
	16	Int.	●	0650L120B	118.5	120	170	8.0
	20	Int.	●	0650L150B	148.5	150	200	8.0
6.6	2	Int.	□	0660L030B	29.0	30	80	8.0
	6	Int.	□	0660L060B	59.0	60	110	8.0
	11	Int.	□	0660L090B	89.0	90	140	8.0
	16	Int.	□	0660L120B	119.0	120	170	8.0
	20	Int.	□	0660L150B	149.0	150	200	8.0
	28	Int.	□	0660L200B	199.0	200	250	8.0
6.7	2	Int.	□	0670L030B	29.0	30	80	8.0
	6	Int.	□	0670L060B	59.0	60	110	8.0
	11	Int.	□	0670L090B	89.0	90	140	8.0
	15	Int.	□	0670L120B	119.0	120	170	8.0
	20	Int.	□	0670L150B	149.0	150	200	8.0
	27	Int.	□	0670L200B	199.0	200	250	8.0
6.8	2	Int.	●	0680L030B	29.0	30	80	8.0
	6	Int.	●	0680L060B	59.0	60	110	8.0
	11	Int.	●	0680L090B	89.0	90	140	8.0
	15	Int.	●	0680L120B	119.0	120	170	8.0
	19	Int.	●	0680L150B	149.0	150	200	8.0
	27	Int.	●	0680L200B	199.0	200	250	8.0
6.9	2	Int.	□	0690L030B	29.0	30	80	8.0
	6	Int.	□	0690L060B	59.0	60	110	8.0
	10	Int.	□	0690L090B	89.0	90	140	8.0
	15	Int.	□	0690L120B	119.0	120	170	8.0
	19	Int.	□	0690L150B	149.0	150	200	8.0
	26	Int.	□	0690L200B	199.0	200	250	8.0

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4
7.0	2	Int.	●	MHS0700L030B	29.0	30	80	8.0
	6	Int.	●	0700L060B	59.0	60	110	8.0
	10	Int.	●	0700L090B	89.0	90	140	8.0
	14	Int.	●	0700L120B	119.0	120	170	8.0
	19	Int.	●	0700L150B	149.0	150	200	8.0
	26	Int.	●	0700L200B	199.0	200	250	8.0
7.1	2	Int.	□	0710L030B	29.5	30	80	8.0
	6	Int.	□	0710L060B	59.5	60	110	8.0
	10	Int.	□	0710L090B	89.5	90	140	8.0
	14	Int.	□	0710L120B	119.5	120	170	8.0
	19	Int.	□	0710L150B	149.5	150	200	8.0
	26	Int.	□	0710L200B	199.5	200	250	8.0
7.2	2	Int.	□	0720L030B	29.5	30	80	8.0
	6	Int.	□	0720L060B	59.5	60	110	8.0
	10	Int.	□	0720L090B	89.5	90	140	8.0
	14	Int.	□	0720L120B	119.5	120	170	8.0
	18	Int.	□	0720L150B	149.5	150	200	8.0
	25	Int.	□	0720L200B	199.5	200	250	8.0
7.3	2	Int.	□	0730L030B	29.5	30	80	8.0
	6	Int.	□	0730L060B	59.5	60	110	8.0
	10	Int.	□	0730L090B	89.5	90	140	8.0
	14	Int.	□	0730L120B	119.5	120	170	8.0
	18	Int.	□	0730L150B	149.5	150	200	8.0
	25	Int.	□	0730L200B	199.5	200	250	8.0
7.4	1	Int.	□	0740L030B	29.5	30	80	8.0
	6	Int.	□	0740L060B	59.5	60	110	8.0
	10	Int.	□	0740L090B	89.5	90	140	8.0
	14	Int.	□	0740L120B	119.5	120	170	8.0
	18	Int.	□	0740L150B	149.5	150	200	8.0
	24	Int.	□	0740L200B	199.5	200	250	8.0
7.5	1	Int.	●	0750L030B	29.5	30	80	8.0
	5	Int.	●	0750L060B	59.5	60	110	8.0
	9	Int.	●	0750L090B	89.5	90	140	8.0
	13	Int.	●	0750L120B	119.5	120	170	8.0
	17	Int.	●	0750L150B	149.5	150	200	8.0
	24	Int.	●	0750L200B	199.5	200	250	8.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
7.6	1	Int.	□	MHS0760L030B	30.0	30	80	8.0
	5	Int.	□	0760L060B	60.0	60	110	8.0
	9	Int.	□	0760L090B	90.0	90	140	8.0
	13	Int.	□	0760L120B	120.0	120	170	8.0
	17	Int.	□	0760L150B	150.0	150	200	8.0
	24	Int.	□	0760L200B	200.0	200	250	8.0
	30	Int.	□	0760L250B	250.0	250	300	8.0
7.7	1	Int.	□	0770L030B	30.0	30	80	8.0
	5	Int.	□	0770L060B	60.0	60	110	8.0
	9	Int.	□	0770L090B	90.0	90	140	8.0
	13	Int.	□	0770L120B	120.0	120	170	8.0
	17	Int.	□	0770L150B	150.0	150	200	8.0
	23	Int.	□	0770L200B	200.0	200	250	8.0
	30	Int.	□	0770L250B	250.0	250	300	8.0
7.8	1	Int.	●	0780L030B	30.0	30	80	8.0
	5	Int.	●	0780L060B	60.0	60	110	8.0
	9	Int.	●	0780L090B	90.0	90	140	8.0
	13	Int.	●	0780L120B	120.0	120	170	8.0
	17	Int.	●	0780L150B	150.0	150	200	8.0
	23	Int.	●	0780L200B	200.0	200	250	8.0
	30	Int.	●	0780L250B	250.0	250	300	8.0
7.9	1	Int.	□	0790L030B	30.0	30	80	8.0
	5	Int.	□	0790L060B	60.0	60	110	8.0
	9	Int.	□	0790L090B	90.0	90	140	8.0
	13	Int.	□	0790L120B	120.0	120	170	8.0
	16	Int.	□	0790L150B	150.0	150	200	8.0
	23	Int.	□	0790L200B	200.0	200	250	8.0
	29	Int.	□	0790L250B	250.0	250	300	8.0
8.0	1	Int.	●	0800L030B	30.0	30	80	8.0
	5	Int.	●	0800L060B	60.0	60	110	8.0
	9	Int.	●	0800L090B	90.0	90	140	8.0
	12	Int.	●	0800L120B	120.0	120	170	8.0
	16	Int.	●	0800L150B	150.0	150	200	8.0
	22	Int.	●	0800L200B	200.0	200	250	8.0
	29	Int.	●	0800L250B	250.0	250	300	8.0
8.1	2	Int.	□	0810L040B	38.5	40	100	10.0
	8	Int.	□	0810L090B	88.5	90	150	10.0
	12	Int.	□	0810L120B	118.5	120	180	10.0
	16	Int.	□	0810L150B	148.5	150	210	10.0
	22	Int.	□	0810L200B	198.5	200	260	10.0
	28	Int.	□	0810L250B	248.5	250	310	10.0
8.2	2	Int.	□	0820L040B	38.5	40	100	10.0
	8	Int.	□	0820L090B	88.5	90	150	10.0
	12	Int.	□	0820L120B	118.5	120	180	10.0
	16	Int.	□	0820L150B	148.5	150	210	10.0
	22	Int.	□	0820L200B	198.5	200	260	10.0
	28	Int.	□	0820L250B	248.5	250	310	10.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
8.3	2	Int.	□	MHS0830L040B	38.5	40	100	10.0
	8	Int.	□	0830L090B	88.5	90	150	10.0
	12	Int.	□	0830L120B	118.5	120	180	10.0
	15	Int.	□	0830L150B	148.5	150	210	10.0
	21	Int.	□	0830L200B	198.5	200	260	10.0
	27	Int.	□	0830L250B	248.5	250	310	10.0
8.4	2	Int.	□	0840L040B	38.5	40	100	10.0
	8	Int.	□	0840L090B	88.5	90	150	10.0
	12	Int.	□	0840L120B	118.5	120	180	10.0
	15	Int.	□	0840L150B	148.5	150	210	10.0
	21	Int.	□	0840L200B	198.5	200	260	10.0
	27	Int.	□	0840L250B	248.5	250	310	10.0
8.5	2	Int.	●	0850L040B	38.5	40	100	10.0
	8	Int.	●	0850L090B	88.5	90	150	10.0
	11	Int.	●	0850L120B	118.5	120	180	10.0
	15	Int.	●	0850L150B	148.5	150	210	10.0
	21	Int.	●	0850L200B	198.5	200	260	10.0
	27	Int.	●	0850L250B	248.5	250	310	10.0
8.6	2	Int.	□	0860L040B	39.0	40	100	10.0
	8	Int.	□	0860L090B	89.0	90	150	10.0
	11	Int.	□	0860L120B	119.0	120	180	10.0
	15	Int.	□	0860L150B	149.0	150	210	10.0
	21	Int.	□	0860L200B	199.0	200	260	10.0
	26	Int.	□	0860L250B	249.0	250	310	10.0
8.7	2	Int.	□	0870L040B	39.0	40	100	10.0
	8	Int.	□	0870L090B	89.0	90	150	10.0
	11	Int.	□	0870L120B	119.0	120	180	10.0
	15	Int.	□	0870L150B	149.0	150	210	10.0
	20	Int.	□	0870L200B	199.0	200	260	10.0
	26	Int.	□	0870L250B	249.0	250	310	10.0
8.8	2	Int.	●	0880L040B	39.0	40	100	10.0
	8	Int.	●	0880L090B	89.0	90	150	10.0
	11	Int.	●	0880L120B	119.0	120	180	10.0
	14	Int.	●	0880L150B	149.0	150	210	10.0
	20	Int.	●	0880L200B	199.0	200	260	10.0
	26	Int.	●	0880L250B	249.0	250	310	10.0
8.9	2	Int.	□	0890L040B	39.0	40	100	10.0
	7	Int.	□	0890L090B	89.0	90	150	10.0
	11	Int.	□	0890L120B	119.0	120	180	10.0
	14	Int.	□	0890L150B	149.0	150	210	10.0
	20	Int.	□	0890L200B	199.0	200	260	10.0
	25	Int.	□	0890L250B	249.0	250	310	10.0
9.0	2	Int.	●	0900L040B	39.0	40	100	10.0
	7	Int.	●	0900L090B	89.0	90	150	10.0
	11	Int.	●	0900L120B	119.0	120	180	10.0
	14	Int.	●	0900L150B	149.0	150	210	10.0
	20	Int.	●	0900L200B	199.0	200	260	10.0
	25	Int.	●	0900L250B	249.0	250	310	10.0

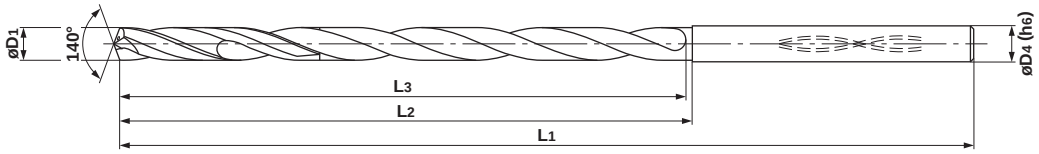
CUTTING CONDITIONS D058
OPERATION GUIDANCE D059
TECHNICAL DATA F001

MHS NEW

WSTAR DRILLS

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
	◎				○

	$D_1=3$	$3<D_1\leq 6$	$6<D_1\leq 10$	$10<D_1\leq 12$
D_1 Tolerance (mm)	$^{+0.010}_{-0.002}$	$^{+0.010}_{-0.002}$	$^{+0.010}_{-0.005}$	$^{+0.010}_{-0.008}$
D_4 Tolerance (mm)	$^{0}_{-0.006}$	$^{0}_{-0.008}$	$^{0}_{-0.009}$	$^{0}_{-0.011}$



(Note 1) MHS drills are suitable for use with shrink fit holders.
(Note 2) Use the shortest type in the respective diameter as a pilot drill.

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4
9.1	2	Int.	□	**MHS0910L040B**	39.5	40	100	10.0
	7	Int.	□	**0910L090B**	89.5	90	150	10.0
	11	Int.	□	**0910L120B**	119.5	120	180	10.0
	14	Int.	□	**0910L150B**	149.5	150	210	10.0
	19	Int.	□	**0910L200B**	199.5	200	260	10.0
	25	Int.	□	**0910L250B**	249.5	250	310	10.0
	30	Int.	□	**0910L300B**	299.5	300	360	10.0
9.2	2	Int.	□	**0920L040B**	39.5	40	100	10.0
	7	Int.	□	**0920L090B**	89.5	90	150	10.0
	10	Int.	□	**0920L120B**	119.5	120	180	10.0
	14	Int.	□	**0920L150B**	149.5	150	210	10.0
	19	Int.	□	**0920L200B**	199.5	200	260	10.0
	25	Int.	□	**0920L250B**	249.5	250	310	10.0
	30	Int.	□	**0920L300B**	299.5	300	360	10.0
9.3	2	Int.	□	**0930L040B**	39.5	40	100	10.0
	7	Int.	□	**0930L090B**	89.5	90	150	10.0
	10	Int.	□	**0930L120B**	119.5	120	180	10.0
	14	Int.	□	**0930L150B**	149.5	150	210	10.0
	19	Int.	□	**0930L200B**	199.5	200	260	10.0
	24	Int.	□	**0930L250B**	249.5	250	310	10.0
	30	Int.	□	**0930L300B**	299.5	300	360	10.0
9.4	2	Int.	□	**0940L040B**	39.5	40	100	10.0
	7	Int.	□	**0940L090B**	89.5	90	150	10.0
	10	Int.	□	**0940L120B**	119.5	120	180	10.0
	13	Int.	□	**0940L150B**	149.5	150	210	10.0
	19	Int.	□	**0940L200B**	199.5	200	260	10.0
	24	Int.	□	**0940L250B**	249.5	250	310	10.0
	29	Int.	□	**0940L300B**	299.5	300	360	10.0
9.5	2	Int.	●	**0950L040B**	39.5	40	100	10.0
	7	Int.	●	**0950L090B**	89.5	90	150	10.0
	10	Int.	●	**0950L120B**	119.5	120	180	10.0
	13	Int.	●	**0950L150B**	149.5	150	210	10.0
	18	Int.	●	**0950L200B**	199.5	200	260	10.0
	24	Int.	●	**0950L250B**	249.5	250	310	10.0
	29	Int.	●	**0950L300B**	299.5	300	360	10.0

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4
9.6	2	Int.	□	**MHS0960L040B**	40.0	40	100	10.0
	7	Int.	□	**0960L090B**	90.0	90	150	10.0
	10	Int.	□	**0960L120B**	120.0	120	180	10.0
	13	Int.	□	**0960L150B**	150.0	150	210	10.0
	18	Int.	□	**0960L200B**	200.0	200	260	10.0
	24	Int.	□	**0960L250B**	250.0	250	310	10.0
	29	Int.	□	**0960L300B**	300.0	300	360	10.0
9.7	2	Int.	□	**0970L040B**	40.0	40	100	10.0
	7	Int.	□	**0970L090B**	90.0	90	150	10.0
	10	Int.	□	**0970L120B**	120.0	120	180	10.0
	13	Int.	□	**0970L150B**	150.0	150	210	10.0
	18	Int.	□	**0970L200B**	200.0	200	260	10.0
	23	Int.	□	**0970L250B**	250.0	250	310	10.0
	28	Int.	□	**0970L300B**	300.0	300	360	10.0
9.8	2	Int.	●	**0980L040B**	40.0	40	100	10.0
	7	Int.	●	**0980L090B**	90.0	90	150	10.0
	10	Int.	●	**0980L120B**	120.0	120	180	10.0
	13	Int.	●	**0980L150B**	150.0	150	210	10.0
	18	Int.	●	**0980L200B**	200.0	200	260	10.0
	23	Int.	●	**0980L250B**	250.0	250	310	10.0
	28	Int.	●	**0980L300B**	300.0	300	360	10.0
9.9	2	Int.	□	**0990L040B**	40.0	40	100	10.0
	7	Int.	□	**0990L090B**	90.0	90	150	10.0
	10	Int.	□	**0990L120B**	120.0	120	180	10.0
	13	Int.	□	**0990L150B**	150.0	150	210	10.0
	18	Int.	□	**0990L200B**	200.0	200	260	10.0
	23	Int.	□	**0990L250B**	250.0	250	310	10.0
	28	Int.	□	**0990L300B**	300.0	300	360	10.0
10.0	1	Int.	●	**1000L040B**	40.0	40	100	10.0
	6	Int.	●	**1000L090B**	90.0	90	150	10.0
	9	Int.	●	**1000L120B**	120.0	120	180	10.0
	12	Int.	●	**1000L150B**	150.0	150	210	10.0
	17	Int.	●	**1000L200B**	200.0	200	260	10.0
	22	Int.	●	**1000L250B**	250.0	250	310	10.0
	27	Int.	●	**1000L300B**	300.0	300	360	10.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
	1	Int.	□	MHS1010L040B	38.5	40	100	12.0
	6	Int.	□	1010L090B	88.5	90	150	12.0
	9	Int.	□	1010L120B	118.5	120	180	12.0
10.1	12	Int.	□	1010L150B	148.5	150	210	12.0
	17	Int.	□	1010L200B	198.5	200	260	12.0
	22	Int.	□	1010L250B	248.5	250	310	12.0
	27	Int.	□	1010L300B	298.5	300	360	12.0
	1	Int.	□	1020L040B	38.5	40	100	12.0
	6	Int.	□	1020L090B	88.5	90	150	12.0
	9	Int.	□	1020L120B	118.5	120	180	12.0
10.2	12	Int.	□	1020L150B	148.5	150	210	12.0
	17	Int.	□	1020L200B	198.5	200	260	12.0
	22	Int.	□	1020L250B	248.5	250	310	12.0
	27	Int.	□	1020L300B	298.5	300	360	12.0
	1	Int.	□	1030L040B	38.5	40	100	12.0
	6	Int.	□	1030L090B	88.5	90	150	12.0
	9	Int.	□	1030L120B	118.5	120	180	12.0
10.3	12	Int.	□	1030L150B	148.5	150	210	12.0
	17	Int.	□	1030L200B	198.5	200	260	12.0
	22	Int.	□	1030L250B	248.5	250	310	12.0
	26	Int.	□	1030L300B	298.5	300	360	12.0
	1	Int.	□	1040L040B	38.5	40	100	12.0
	6	Int.	□	1040L090B	88.5	90	150	12.0
	9	Int.	□	1040L120B	118.5	120	180	12.0
10.4	12	Int.	□	1040L150B	148.5	150	210	12.0
	17	Int.	□	1040L200B	198.5	200	260	12.0
	21	Int.	□	1040L250B	248.5	250	310	12.0
	26	Int.	□	1040L300B	298.5	300	360	12.0
	1	Int.	●	1050L040B	38.5	40	100	12.0
	6	Int.	●	1050L090B	88.5	90	150	12.0
	9	Int.	●	1050L120B	118.5	120	180	12.0
10.5	12	Int.	●	1050L150B	148.5	150	210	12.0
	16	Int.	●	1050L200B	198.5	200	260	12.0
	21	Int.	●	1050L250B	248.5	250	310	12.0
	26	Int.	●	1050L300B	298.5	300	360	12.0
	1	Int.	□	1060L040B	39.0	40	100	12.0
	6	Int.	□	1060L090B	89.0	90	150	12.0
	9	Int.	□	1060L120B	119.0	120	180	12.0
10.6	12	Int.	□	1060L150B	149.0	150	210	12.0
	16	Int.	□	1060L200B	199.0	200	260	12.0
	21	Int.	□	1060L250B	249.0	250	310	12.0
	26	Int.	□	1060L300B	299.0	300	360	12.0
	1	Int.	□	1070L040B	39.0	40	100	12.0
	6	Int.	□	1070L090B	89.0	90	150	12.0
	9	Int.	□	1070L120B	119.0	120	180	12.0
10.7	11	Int.	□	1070L150B	149.0	150	210	12.0
	16	Int.	□	1070L200B	199.0	200	260	12.0
	21	Int.	□	1070L250B	249.0	250	310	12.0
	25	Int.	□	1070L300B	299.0	300	360	12.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
	1	Int.	●	MHS1080L040B	39.0	40	100	12.0
	6	Int.	●	1080L090B	89.0	90	150	12.0
	9	Int.	●	1080L120B	119.0	120	180	12.0
10.8	11	Int.	●	1080L150B	149.0	150	210	12.0
	16	Int.	●	1080L200B	199.0	200	260	12.0
	21	Int.	●	1080L250B	249.0	250	310	12.0
	25	Int.	●	1080L300B	299.0	300	360	12.0
	1	Int.	□	1090L040B	39.0	40	100	12.0
	6	Int.	□	1090L090B	89.0	90	150	12.0
	8	Int.	□	1090L120B	119.0	120	180	12.0
10.9	11	Int.	□	1090L150B	149.0	150	210	12.0
	16	Int.	□	1090L200B	199.0	200	260	12.0
	20	Int.	□	1090L250B	249.0	250	310	12.0
	25	Int.	□	1090L300B	299.0	300	360	12.0
	1	Int.	●	1100L040B	39.0	40	100	12.0
	6	Int.	●	1100L090B	89.0	90	150	12.0
	8	Int.	●	1100L120B	119.0	120	180	12.0
11.0	11	Int.	●	1100L150B	149.0	150	210	12.0
	16	Int.	●	1100L200B	199.0	200	260	12.0
	20	Int.	●	1100L250B	249.0	250	310	12.0
	25	Int.	●	1100L300B	299.0	300	360	12.0
	1	Int.	□	1110L040B	39.5	40	100	12.0
	6	Int.	□	1110L090B	89.5	90	150	12.0
	8	Int.	□	1110L120B	119.5	120	180	12.0
11.1	11	Int.	□	1110L150B	149.5	150	210	12.0
	15	Int.	□	1110L200B	199.5	200	260	12.0
	20	Int.	□	1110L250B	249.5	250	310	12.0
	24	Int.	□	1110L300B	299.5	300	360	12.0
	1	Int.	□	1120L040B	39.5	40	100	12.0
	5	Int.	□	1120L090B	89.5	90	150	12.0
	8	Int.	□	1120L120B	119.5	120	180	12.0
11.2	11	Int.	□	1120L150B	149.5	150	210	12.0
	15	Int.	□	1120L200B	199.5	200	260	12.0
	20	Int.	□	1120L250B	249.5	250	310	12.0
	24	Int.	□	1120L300B	299.5	300	360	12.0
	1	Int.	□	1130L040B	39.5	40	100	12.0
	5	Int.	□	1130L090B	89.5	90	150	12.0
	8	Int.	□	1130L120B	119.5	120	180	12.0
11.3	11	Int.	□	1130L150B	149.5	150	210	12.0
	15	Int.	□	1130L200B	199.5	200	260	12.0
	20	Int.	□	1130L250B	249.5	250	310	12.0
	24	Int.	□	1130L300B	299.5	300	360	12.0
	1	Int.	□	1140L040B	39.5	40	100	12.0
	5	Int.	□	1140L090B	89.5	90	150	12.0
	8	Int.	□	1140L120B	119.5	120	180	12.0
11.4	11	Int.	□	1140L150B	149.5	150	210	12.0
	15	Int.	□	1140L200B	199.5	200	260	12.0
	19	Int.	□	1140L250B	249.5	250	310	12.0
	24	Int.	□	1140L300B	299.5	300	360	12.0

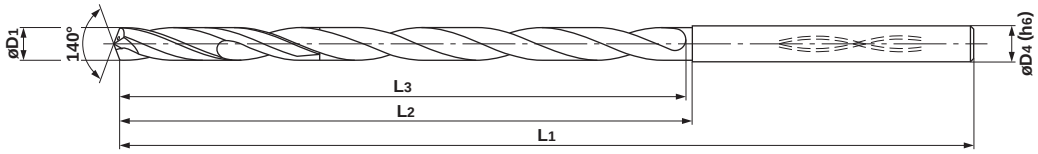
CUTTING CONDITIONS D058
OPERATION GUIDANCE D059
TECHNICAL DATA F001

MHS NEW

WSTAR DRILLS

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
	◎				○

	D1=3	3<D1≤6	6<D1≤10	10<D1≤12
D1 Tolerance (mm)	+0.010 −0.002	+0.010 −0.002	+0.010 −0.005	+0.010 −0.008
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011



(Note 1) MHS drills are suitable for use with shrink fit holders.
(Note 2) Use the shortest type in the respective diameter as a pilot drill.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
11.5	1	Int.	●	MHS1150L040B	39.5	40	100	12.0
	5	Int.	●	1150L090B	89.5	90	150	12.0
	8	Int.	●	1150L120B	119.5	120	180	12.0
	10	Int.	●	1150L150B	149.5	150	210	12.0
	15	Int.	●	1150L200B	199.5	200	260	12.0
	19	Int.	●	1150L250B	249.5	250	310	12.0
	24	Int.	●	1150L300B	299.5	300	360	12.0
11.6	1	Int.	□	1160L040B	40.0	40	100	12.0
	5	Int.	□	1160L090B	90.0	90	150	12.0
	8	Int.	□	1160L120B	120.0	120	180	12.0
	10	Int.	□	1160L150B	150.0	150	210	12.0
	15	Int.	□	1160L200B	200.0	200	260	12.0
	19	Int.	□	1160L250B	250.0	250	310	12.0
	23	Int.	□	1160L300B	300.0	300	360	12.0
11.7	1	Int.	□	1170L040B	40.0	40	100	12.0
	5	Int.	□	1170L090B	90.0	90	150	12.0
	8	Int.	□	1170L120B	120.0	120	180	12.0
	10	Int.	□	1170L150B	150.0	150	210	12.0
	15	Int.	□	1170L200B	200.0	200	260	12.0
	19	Int.	□	1170L250B	250.0	250	310	12.0
	23	Int.	□	1170L300B	300.0	300	360	12.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
11.8	1	Int.	●	MHS1180L040B	40.0	40	100	12.0
	5	Int.	●	1180L090B	90.0	90	150	12.0
	8	Int.	●	1180L120B	120.0	120	180	12.0
	10	Int.	●	1180L150B	150.0	150	210	12.0
	14	Int.	●	1180L200B	200.0	200	260	12.0
	19	Int.	●	1180L250B	250.0	250	310	12.0
	23	Int.	●	1180L300B	300.0	300	360	12.0
11.9	1	Int.	□	1190L040B	40.0	40	100	12.0
	5	Int.	□	1190L090B	90.0	90	150	12.0
	8	Int.	□	1190L120B	120.0	120	180	12.0
	10	Int.	□	1190L150B	150.0	150	210	12.0
	14	Int.	□	1190L200B	200.0	200	260	12.0
	19	Int.	□	1190L250B	250.0	250	310	12.0
	23	Int.	□	1190L300B	300.0	300	360	12.0
12.0	1	Int.	●	1200L040B	40.0	40	100	12.0
	5	Int.	●	1200L090B	90.0	90	150	12.0
	7	Int.	●	1200L120B	120.0	120	180	12.0
	10	Int.	●	1200L150B	150.0	150	210	12.0
	14	Int.	●	1200L200B	200.0	200	260	12.0
	18	Int.	●	1200L250B	250.0	250	310	12.0
	22	Int.	●	1200L300B	300.0	300	360	12.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

RECOMMENDED CUTTING CONDITIONS

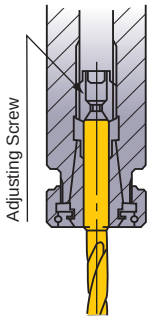
Work Material		Drill Dia. / Conditions / Hardness	ϕ3.0−ϕ6.0 Cutting Speed (m/min)	ϕ3.0−ϕ6.0 Feed (mm/rev)	ϕ6.1−ϕ10.0 Cutting Speed (m/min)	ϕ6.1−ϕ10.0 Feed (mm/rev)	ϕ10.1−ϕ12.0 Cutting Speed (m/min)	ϕ10.1−ϕ12.0 Feed (mm/rev)
H	Heat-treated steel Pre-Hardened Steel	−40HRC	40−70	0.10−0.20	40−70	0.15−0.25	40−70	0.20−0.30
		40−50HRC	20−50	0.05−0.15	20−50	0.10−0.20	20−50	0.15−0.25
		50−55HRC	10−30	0.03−0.10	10−30	0.05−0.15	10−30	0.05−0.20

(Note 1) When using the drill with a length over l/d 10, it is necessary to use a prep holes as a guide. (If no prep-hole is used then drill breakage can occur)
(Note 2) Use the shortest flute drill in the respective size as a pilot drill.

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

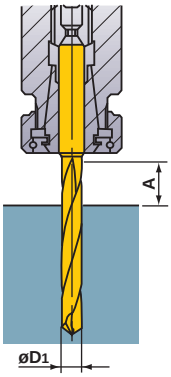
OPERATIONAL GUIDANCE

Drill Holding



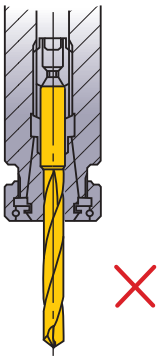
Thrust bearing type collet chuck holds the drill securely.

Drill Length



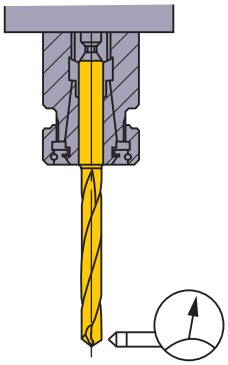
A ≥ D1 x 1.5

Drill Installation



Do not clamp on the flutes.

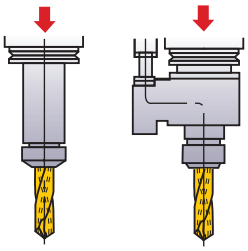
Installation Tolerance



Run-out ≤ 0.03mm

Through Coolant Type

Spindles Through Coolant Type | Revolving Coolant Machine Type



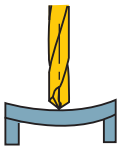
Coolant pressure is approx. 0.5MPa—7MPa

Coolant Handling

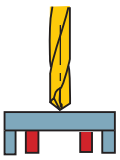
1) Small particles of swarf will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

Thin Workpiece

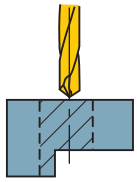


If Bending Occurs ×



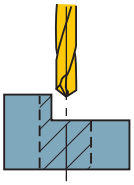
Support the Workpiece ○

Interrupted Cutting



One Process ○

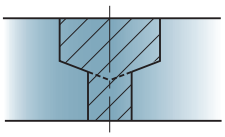
①Lower the feed when drilling the interrupted part.



Requires Prior Machining △

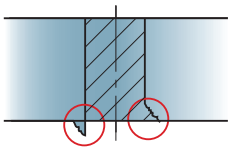
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the two processes.
②Drill the larger hole first.
⋆A tool for machining both chamfer and spot face can be produced to order.

Burring and Workpiece Chipping



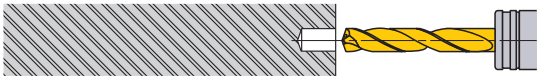
①Lower the feed rate by 50% at the end of through cutting.
②Change the point angle.

OPERATIONAL GUIDANCE FOR THE MHS LONG TYPE DRILL (L/D ≥ 10)

FLAT FACE DRILLING

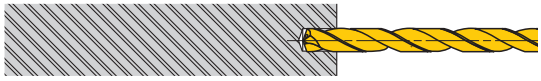
●Drilling a blind hole

1. Drilling a pilot hole



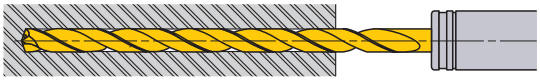
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1D.
(Adjust the pilot hole depth according to the length of the long type drill.)

2. Initial cutting with the long type drill



①Penetrate the guide hole at low revolution. (Cutting speed 20—30m/min, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 1—3mm short of the guide hole bottom.

3. Drill the deep hole



①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

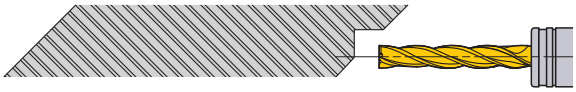
4. Drill retraction

①After drilling, lower the cutting revolution about 1—2mm short of the hole end. (Cutting speed of around 20—30m/min)
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.
③Finally, clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.

INTERRUPED DRILLING

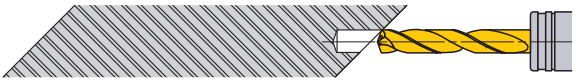
●Drilling and breaking through on irregular faces or angles

1. Spot facing



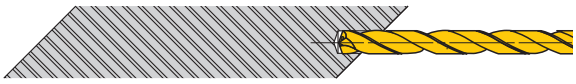
①Machine a flat or the irregular face by using an end mill or slot drill capable of spot facing. Make the spot face diameter the same size as the required deep hole diameter.

2. Drilling a pilot hole



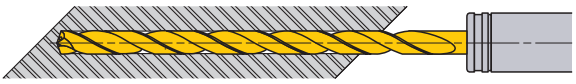
①Use a drill with a larger (flatter) point angle than the super long type. Use the shortest flute possible.
②Ensure a high precision hole is drilled for the guide.
③Drill depth : Approx 1D.
(Adjust the pilot hole depth according to the length of the long type drill.)

3. Initial cutting with the long type drill



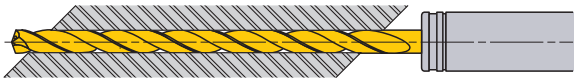
①Penetrate the guide hole at a low revolution. (Cutting speed 20—30m/min, feed rate 0.2—0.3mm/rev)
②Stop the long type drill 1—3mm short of the guide hole bottom.

4. Drill the deep hole



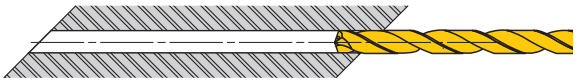
①Start cutting at the recommended speed and feed with a non-peck (continuous feed) cycle.

5. Breaking through



①When breaking through, the cutting edge can be damaged.
②A feed rate of 0.03—0.1mm/rev is recommended.

6. Drill retraction



①Finally clear the hole at a cutting speed of 20—30m/min and feed rate of 0.2—0.3mm/rev.
②Retract the drill to the pilot hole depth starting point at a feed rate of 3000mm/min.

Memo

MZE/MZS

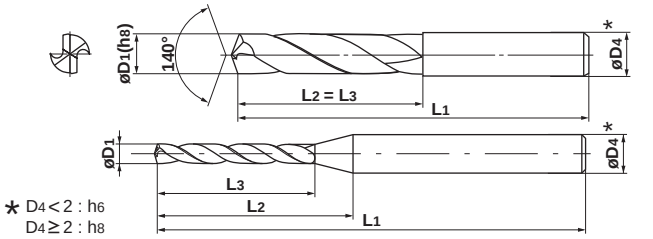
- Excellent chip disposal.
- Helical coolant hole enables high speed machining (MZS type).

UWC | VP | 140° | X Thinning

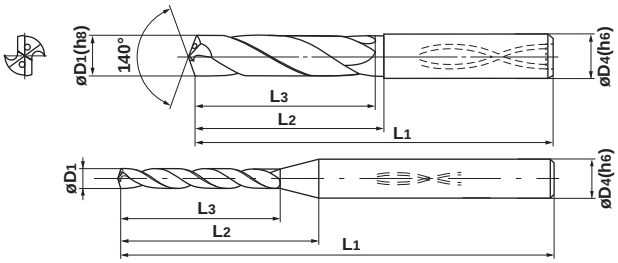
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MZE only)	◎(MZE:○)	◎	○	○

		D1<2	2≤D1≤3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)		0 −0.014	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MZE	0 −0.006	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MZS	0 −0.006	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MZE (External coolant)



MZS (Internal coolant)



(Note) MZS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
1.0	2	Ext.	●		MZE0100SB	6	8	55	2.0
	5	Int.	●		MZS0100LB	11	15	55	3.0
	12	Int.	□		MZS0100XB	23	27	55	3.0
1.1	2	Ext.	●		MZE0110SB	7	9	55	2.0
	5	Int.	●		MZS0110LB	17	21	55	3.0
	12	Int.	□		MZS0110XB	23	27	55	3.0
1.2	2	Ext.	●		MZE0120SB	8	9	55	2.0
	5	Int.	●		MZS0120LB	17	20	55	3.0
	12	Int.	□		MZS0120XB	23	26	55	3.0
1.3	2	Ext.	●		MZE0130SB	8	9	55	2.0
	5	Int.	●		MZS0130LB	17	20	55	3.0
	12	Int.	□		MZS0130XB	23	26	55	3.0
1.4	2	Ext.	●		MZE0140SB	9	10	55	2.0
	5	Int.	●		MZS0140LB	17	20	55	3.0
	12	Int.	□		MZS0140XB	23	26	55	3.0
1.5	2	Ext.	●		MZE0150SB	9	10	55	2.0
	5	Int.	●		MZS0150LB	17	20	55	3.0
	12	Int.	□		MZS0150XB	23	26	55	3.0
1.6	2	Ext.	●		MZE0160SB	10	10	55	2.0
	5	Int.	●		MZS0160LB	22	25	68	3.0
	12	Int.	□		MZS0160XB	30	33	68	3.0
1.7	2	Ext.	●		MZE0170SB	10	10	55	2.0
	5	Int.	●		MZS0170LB	22	24	68	3.0
	12	Int.	□		MZS0170XB	30	32	68	3.0
1.8	2	Ext.	●		MZE0180SB	11	11	55	2.0
	5	Int.	●		MZS0180LB	22	24	68	3.0
	12	Int.	□		MZS0180XB	30	32	68	3.0
1.9	2	Ext.	●		MZE0190SB	11	11	55	2.0
	5	Int.	●		MZS0190LB	22	24	68	3.0
	12	Int.	□		MZS0190XB	30	32	68	3.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
2.0	2	Ext.	●		MZE0200SA	12	12	55	2.0
	3	Ext.	●		MZE0200MA	16	16	55	2.0
	3	Int.	●		MZS0200MB	16	18	62	3.0
	5	Int.	●		MZS0200LB	22	24	68	3.0
	12	Int.	□		MZS0200XB	30	32	68	3.0
2.1	2	Ext.	●		MZE0210SA	12	12	55	2.1
	3	Ext.	●		MZE0210MA	16	16	55	2.1
	3	Int.	●		MZS0210MB	20	22	66	3.0
	5	Int.	●		MZS0210LB	28	30	74	3.0
	12	Int.	□		MZS0210XB	38	40	74	3.0
2.2	2	Ext.	●		MZE0220SA	13	13	55	2.2
	3	Ext.	●		MZE0220MA	18	18	55	2.2
	3	Int.	●		MZS0220MB	20	21	66	3.0
	5	Int.	●		MZS0220LB	28	29	74	3.0
	12	Int.	□		MZS0220XB	38	39	74	3.0
2.3	2	Ext.	●		MZE0230SA	13	13	55	2.3
	3	Ext.	●		MZE0230MA	18	18	55	2.3
	3	Int.	●		MZS0230MB	20	21	66	3.0
	5	Int.	●		MZS0230LB	28	29	74	3.0
	12	Int.	□		MZS0230XB	38	39	74	3.0
2.4	2	Ext.	●		MZE0240SA	16	16	55	2.4
	3	Ext.	●		MZE0240MA	20	20	55	2.4
	3	Int.	●		MZS0240MB	20	21	66	3.0
	5	Int.	●		MZS0240LB	28	29	74	3.0
	12	Int.	□		MZS0240XB	38	39	74	3.0
2.5	2	Ext.	●		MZE0250SA	16	16	55	2.5
	3	Ext.	●		MZE0250MA	20	20	55	2.5
	3	Int.	●		MZS0250MB	20	21	66	3.0
	5	Int.	●		MZS0250LB	28	29	74	3.0
	12	Int.	□		MZS0250XB	38	39	74	3.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock HTi10 NEW	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
2.6	2	Ext.	●		MZE0260SA	16	16	55	2.6
	3	Ext.	●		MZE0260MA	20	20	55	2.6
	3	Int.	●		MZS0260MB	24	24	72	3.0
	5	Int.	●		MZS0260LB	33	33	81	3.0
	12	Int.	□		MZS0260XB	45	45	81	3.0
2.7	2	Ext.	●		MZE0270SA	16	16	55	2.7
	3	Ext.	●		MZE0270MA	20	20	55	2.7
	3	Int.	●		MZS0270MB	24	24	72	3.0
	5	Int.	●		MZS0270LB	33	33	81	3.0
	12	Int.	□		MZS0270XB	45	45	81	3.0
2.8	2	Ext.	●		MZE0280SA	16	16	55	2.8
	3	Ext.	●		MZE0280MA	21	21	60	2.8
	3	Int.	●		MZS0280MB	24	24	72	3.0
	5	Int.	●		MZS0280LB	33	33	81	3.0
	12	Int.	□		MZS0280XB	45	45	81	3.0
2.9	2	Ext.	●		MZE0290SA	16	16	55	2.9
	3	Ext.	●		MZE0290MA	21	21	60	2.9
	3	Int.	●		MZS0290MB	24	24	72	3.0
	5	Int.	●		MZS0290LB	33	33	81	3.0
	12	Int.	□		MZS0290XB	45	45	81	3.0
3.0	2	Ext.	●	●	MZE0300SA	16	16	55	3.0
	3	Ext.	●	●	MZE0300MA	21	21	60	3.0
	3	Int.	●		MZS0300MB	24	24	72	3.0
	5	Int.	●		MZS0300LB	33	33	81	3.0
3.1	2	Ext.	●	●	MZE0310SA	18	18	55	3.1
	3	Ext.	●	●	MZE0310MA	24	24	60	3.1
	3	Int.	●		MZS0310MB	28	28	76	4.0
	5	Int.	●		MZS0310LB	39	39	87	4.0
3.2	2	Ext.	●	●	MZE0320SA	18	18	55	3.2
	3	Ext.	●	●	MZE0320MA	24	24	60	3.2
	3	Int.	●		MZS0320MB	28	28	76	4.0
	5	Int.	●		MZS0320LB	39	39	87	4.0
3.3	2	Ext.	●	●	MZE0330SA	18	18	55	3.3
	3	Ext.	●	●	MZE0330MA	24	24	60	3.3
	3	Int.	●		MZS0330MB	28	28	76	4.0
	5	Int.	●		MZS0330LB	39	39	87	4.0
3.4	2	Ext.	●	●	MZE0340SA	20	20	55	3.4
	3	Ext.	●	●	MZE0340MA	24	24	60	3.4
	3	Int.	●		MZS0340MB	28	28	76	4.0
	5	Int.	●		MZS0340LB	39	39	87	4.0
3.5	2	Ext.	●	●	MZE0350SA	20	20	55	3.5
	3	Ext.	●	●	MZE0350MA	24	24	60	3.5
	3	Int.	●		MZS0350MB	28	28	76	4.0
	5	Int.	●		MZS0350LB	39	39	87	4.0
3.6	2	Ext.	●	●	MZE0360SA	20	20	55	3.6
	3	Ext.	●	●	MZE0360MA	27	27	60	3.6
	3	Int.	●		MZS0360MB	32	32	80	4.0
	5	Int.	●		MZS0360LB	44	44	92	4.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock HTi10 NEW	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
3.7	2	Ext.	●	●	MZE0370SA	20	20	55	3.7
	3	Ext.	●	●	MZE0370MA	27	27	60	3.7
	3	Int.	●		MZS0370MB	32	32	80	4.0
	5	Int.	●		MZS0370LB	44	44	92	4.0
3.8	2	Ext.	●	●	MZE0380SA	22	22	55	3.8
	3	Ext.	●	●	MZE0380MA	27	27	60	3.8
	3	Int.	●		MZS0380MB	32	32	80	4.0
	5	Int.	●		MZS0380LB	44	44	92	4.0
3.9	2	Ext.	●	●	MZE0390SA	22	22	55	3.9
	3	Ext.	●	●	MZE0390MA	27	27	60	3.9
	3	Int.	●		MZS0390MB	32	32	80	4.0
	5	Int.	●		MZS0390LB	44	44	92	4.0
4.0	2	Ext.	●	●	MZE0400SA	22	22	55	4.0
	3	Ext.	●	●	MZE0400MA	27	27	60	4.0
	3	Int.	●		MZS0400MB	32	32	80	4.0
	5	Int.	●		MZS0400LB	44	44	92	4.0
4.1	2	Ext.	●	●	MZE0410SA	22	22	55	4.1
	3	Ext.	●	●	MZE0410MA	29	29	63	4.1
	3	Int.	●		MZS0410MB	36	36	86	5.0
	5	Int.	●		MZS0410LB	50	50	100	5.0
4.2	2	Ext.	●	●	MZE0420SA	22	22	55	4.2
	3	Ext.	●	●	MZE0420MA	29	29	63	4.2
	3	Int.	●		MZS0420MB	36	36	86	5.0
	5	Int.	●		MZS0420LB	50	50	100	5.0
4.3	2	Ext.	●	●	MZE0430SA	24	24	58	4.3
	3	Ext.	●	●	MZE0430MA	29	29	63	4.3
	3	Int.	●		MZS0430MB	36	36	86	5.0
	5	Int.	●		MZS0430LB	50	50	100	5.0
4.4	2	Ext.	●	●	MZE0440SA	24	24	58	4.4
	3	Ext.	●	●	MZE0440MA	29	29	63	4.4
	3	Int.	●		MZS0440MB	36	36	86	5.0
	5	Int.	●		MZS0440LB	50	50	100	5.0
4.5	2	Ext.	●	●	MZE0450SA	24	24	58	4.5
	3	Ext.	●	●	MZE0450MA	29	29	63	4.5
	3	Int.	●		MZS0450MB	36	36	86	5.0
	5	Int.	●		MZS0450LB	50	50	100	5.0
4.6	2	Ext.	●	●	MZE0460SA	24	24	58	4.6
	3	Ext.	●	●	MZE0460MA	32	32	68	4.6
	3	Int.	●		MZS0460MB	40	40	90	5.0
	5	Int.	●		MZS0460LB	55	55	105	5.0
4.7	2	Ext.	●	●	MZE0470SA	24	24	58	4.7
	3	Ext.	●	●	MZE0470MA	32	32	68	4.7
	3	Int.	●		MZS0470MB	40	40	90	5.0
	5	Int.	●		MZS0470LB	55	55	105	5.0
4.8	2	Ext.	●	●	MZE0480SA	26	26	62	4.8
	3	Ext.	●	●	MZE0480MA	32	32	68	4.8
	3	Int.	●		MZS0480MB	40	40	90	5.0
	5	Int.	●		MZS0480LB	55	55	105	5.0

CUTTING CONDITIONS D073
OPERATION GUIDANCE D074
TECHNICAL DATA F001

CARBIDE

MZE/MZS

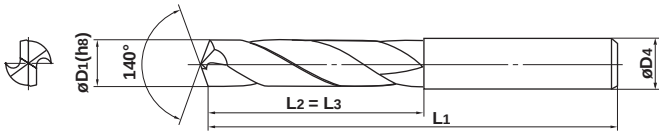
- Excellent chip disposal.
- Helical coolant hole enables high speed machining (MZS type).

UWC VP 140° X Thinning

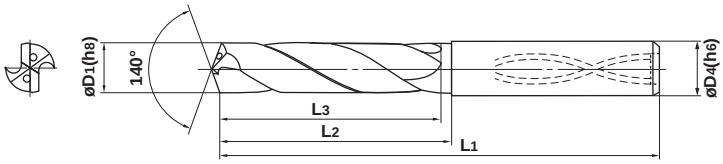
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MZE only)	◎(MZE:○)	◎	○	○

		D1<2	2≤D1≤3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)		0 −0.014	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MZE	0 −0.006	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MZS	0 −0.006	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MZE (External coolant)



MZS (Internal coolant)



(Note 1) MZS type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MZS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
4.9	2	Ext.	●	●	MZE0490SA	26	26	62	4.9
	3	Ext.	●	●	MZE0490MA	32	32	68	4.9
	3	Int.	●		MZS0490MB	40	40	90	5.0
	5	Int.	●		MZS0490LB	55	55	105	5.0
5.0	2	Ext.	●	●	MZE0500SA	26	26	62	5.0
	3	Ext.	●	●	MZE0500MA	32	32	68	5.0
	3	Int.	●		MZS0500MB	27.5	30	82	6.0
	5	Int.	●		MZS0500LB	44	48	100	6.0
5.1	2	Ext.	●	●	MZE0510SA	26	26	62	5.1
	3	Ext.	●	●	MZE0510MA	34	34	72	5.1
	3	Int.	●		MZS0510MB	27.5	30	82	6.0
	5	Int.	●		MZS0510LB	44	48	100	6.0
5.2	2	Ext.	●	●	MZE0520SA	26	26	62	5.2
	3	Ext.	●	●	MZE0520MA	34	34	72	5.2
	3	Int.	●		MZS0520MB	27.5	30	82	6.0
	5	Int.	●		MZS0520LB	44	48	100	6.0
5.3	2	Ext.	●	●	MZE0530SA	26	26	62	5.3
	3	Ext.	●	●	MZE0530MA	34	34	72	5.3
	3	Int.	●		MZS0530MB	27.5	30	82	6.0
	5	Int.	●		MZS0530LB	44	48	100	6.0
5.4	2	Ext.	●	●	MZE0540SA	28	28	66	5.4
	3	Ext.	●	●	MZE0540MA	34	34	72	5.4
	3	Int.	●		MZS0540MB	27.5	30	82	6.0
	5	Int.	●		MZS0540LB	44	48	100	6.0
5.5	2	Ext.	●	●	MZE0550SA	28	28	66	5.5
	3	Ext.	●	●	MZE0550MA	34	34	72	5.5
	3	Int.	●		MZS0550MB	27.5	30	82	6.0
	5	Int.	●		MZS0550LB	44	48	100	6.0
5.6	2	Ext.	●	●	MZE0560SA	28	28	66	5.6
	3	Ext.	●	●	MZE0560MA	36	36	74	5.6
	3	Int.	●		MZS0560MB	30	30	82	6.0
	5	Int.	●		MZS0560LB	48	48	100	6.0
5.7	2	Ext.	●	●	MZE0570SA	28	28	66	5.7
	3	Ext.	●	●	MZE0570MA	36	36	74	5.7
	3	Int.	●		MZS0570MB	30	30	82	6.0
	5	Int.	●		MZS0570LB	48	48	100	6.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
5.8	2	Ext.	●	●	MZE0580SA	28	28	66	5.8
	3	Ext.	●	●	MZE0580MA	36	36	74	5.8
	3	Int.	●		MZS0580MB	30	30	82	6.0
	5	Int.	●		MZS0580LB	48	48	100	6.0
5.9	2	Ext.	●	●	MZE0590SA	28	28	66	5.9
	3	Ext.	●	●	MZE0590MA	36	36	74	5.9
	3	Int.	●		MZS0590MB	30	30	82	6.0
	5	Int.	●		MZS0590LB	48	48	100	6.0
6.0	2	Ext.	●	●	MZE0600SA	28	28	66	6.0
	3	Ext.	●	●	MZE0600MA	41	41	81	6.0
	3	Int.	●		MZS0600MB	30	30	82	6.0
	5	Int.	●		MZS0600LB	48	48	100	6.0
6.1	2	Ext.	●	●	MZE0610SA	31	31	70	6.1
	3	Ext.	●	●	MZE0610MA	41	41	81	6.1
	3	Int.	●		MZS0610MB	32.5	35	88	7.0
	5	Int.	●		MZS0610LB	52	56	109	7.0
6.2	2	Ext.	●	●	MZE0620SA	31	31	70	6.2
	3	Ext.	●	●	MZE0620MA	41	41	81	6.2
	3	Int.	●		MZS0620MB	32.5	35	88	7.0
	5	Int.	●		MZS0620LB	52	56	109	7.0
6.3	2	Ext.	●	●	MZE0630SA	31	31	70	6.3
	3	Ext.	●	●	MZE0630MA	41	41	81	6.3
	3	Int.	●		MZS0630MB	32.5	35	88	7.0
	5	Int.	●		MZS0630LB	52	56	109	7.0
6.4	2	Ext.	●	●	MZE0640SA	31	31	70	6.4
	3	Ext.	●	●	MZE0640MA	41	41	81	6.4
	3	Int.	●		MZS0640MB	32.5	35	88	7.0
	5	Int.	●		MZS0640LB	52	56	109	7.0
6.5	2	Ext.	●	●	MZE0650SA	31	31	70	6.5
	3	Ext.	●	●	MZE0650MA	41	41	81	6.5
	3	Int.	●		MZS0650MB	32.5	35	88	7.0
	5	Int.	●		MZS0650LB	52	56	109	7.0
6.6	2	Ext.	●	●	MZE0660SA	31	31	70	6.6
	3	Ext.	●	●	MZE0660MA	43	43	83	6.6
	3	Int.	●		MZS0660MB	35	35	88	7.0
	5	Int.	●		MZS0660LB	56	56	109	7.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock HTi10 NEW	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
6.7	2	Ext.	●	●	MZE0670SA	31	31	70	6.7
	3	Ext.	●	●	MZE0670MA	43	43	83	6.7
	3	Int.	●		MZS0670MB	35	35	88	7.0
	5	Int.	●		MZS0670LB	56	56	109	7.0
6.8	2	Ext.	●	●	MZE0680SA	34	34	74	6.8
	3	Ext.	●	●	MZE0680MA	43	43	83	6.8
	3	Int.	●		MZS0680MB	35	35	88	7.0
	5	Int.	●		MZS0680LB	56	56	109	7.0
6.9	2	Ext.	●	●	MZE0690SA	34	34	74	6.9
	3	Ext.	●	●	MZE0690MA	43	43	83	6.9
	3	Int.	●		MZS0690MB	35	35	88	7.0
	5	Int.	●		MZS0690LB	56	56	109	7.0
7.0	2	Ext.	●	●	MZE0700SA	34	34	74	7.0
	3	Ext.	●	●	MZE0700MA	43	43	83	7.0
	3	Int.	●		MZS0700MB	35	35	88	7.0
	5	Int.	●		MZS0700LB	56	56	109	7.0
7.1	2	Ext.	●	●	MZE0710SA	34	34	74	7.1
	3	Ext.	●	●	MZE0710MA	45	45	87	7.1
	3	Int.	●		MZS0710MB	37.5	40	94	8.0
	5	Int.	●		MZS0710LB	60	64	118	8.0
7.2	2	Ext.	●	●	MZE0720SA	34	34	74	7.2
	3	Ext.	●	●	MZE0720MA	45	45	87	7.2
	3	Int.	●		MZS0720MB	37.5	40	94	8.0
	5	Int.	●		MZS0720LB	60	64	118	8.0
7.3	2	Ext.	●	●	MZE0730SA	34	34	74	7.3
	3	Ext.	●	●	MZE0730MA	45	45	87	7.3
	3	Int.	●		MZS0730MB	37.5	40	94	8.0
	5	Int.	●		MZS0730LB	60	64	118	8.0
7.4	2	Ext.	●	●	MZE0740SA	34	34	74	7.4
	3	Ext.	●	●	MZE0740MA	45	45	87	7.4
	3	Int.	●		MZS0740MB	37.5	40	94	8.0
	5	Int.	●		MZS0740LB	60	64	118	8.0
7.5	2	Ext.	●	●	MZE0750SA	34	34	74	7.5
	3	Ext.	●	●	MZE0750MA	45	45	87	7.5
	3	Int.	●		MZS0750MB	37.5	40	94	8.0
	5	Int.	●		MZS0750LB	60	64	118	8.0
7.6	2	Ext.	●	●	MZE0760SA	37	37	79	7.6
	3	Ext.	●	●	MZE0760MA	48	48	90	7.6
	3	Int.	●		MZS0760MB	40	40	94	8.0
	5	Int.	●		MZS0760LB	64	64	118	8.0
7.7	2	Ext.	●	●	MZE0770SA	37	37	79	7.7
	3	Ext.	●	●	MZE0770MA	48	48	90	7.7
	3	Int.	●		MZS0770MB	40	40	94	8.0
	5	Int.	●		MZS0770LB	64	64	118	8.0
7.8	2	Ext.	●	●	MZE0780SA	37	37	79	7.8
	3	Ext.	●	●	MZE0780MA	48	48	90	7.8
	3	Int.	●		MZS0780MB	40	40	94	8.0
	5	Int.	●		MZS0780LB	64	64	118	8.0
7.9	2	Ext.	●	●	MZE0790SA	37	37	79	7.9
	3	Ext.	●	●	MZE0790MA	48	48	90	7.9
	3	Int.	●		MZS0790MB	40	40	94	8.0
	5	Int.	●		MZS0790LB	64	64	118	8.0
8.0	2	Ext.	●	●	MZE0800SA	37	37	79	8.0
	3	Ext.	●	●	MZE0800MA	48	48	90	8.0
	3	Int.	●		MZS0800MB	40	40	94	8.0
	5	Int.	●		MZS0800LB	64	64	118	8.0
8.1	2	Ext.	●	●	MZE0810SA	37	37	79	8.1
	3	Ext.	●	●	MZE0810MA	53	53	96	8.1
	3	Int.	●		MZS0810MB	42.5	45	100	9.0
	5	Int.	●		MZS0810LB	68	72	127	9.0
8.2	2	Ext.	●	●	MZE0820SA	37	37	79	8.2
	3	Ext.	●	●	MZE0820MA	53	53	96	8.2
	3	Int.	●		MZS0820MB	42.5	45	100	9.0
	5	Int.	●		MZS0820LB	68	72	127	9.0
8.3	2	Ext.	●	●	MZE0830SA	37	37	79	8.3
	3	Ext.	●	●	MZE0830MA	53	53	96	8.3
	3	Int.	●		MZS0830MB	42.5	45	100	9.0
	5	Int.	●		MZS0830LB	68	72	127	9.0
8.4	2	Ext.	●	●	MZE0840SA	37	37	79	8.4
	3	Ext.	●	●	MZE0840MA	53	53	96	8.4
	3	Int.	●		MZS0840MB	42.5	45	100	9.0
	5	Int.	●		MZS0840LB	68	72	127	9.0
8.5	2	Ext.	●	●	MZE0850SA	37	37	79	8.5
	3	Ext.	●	●	MZE0850MA	53	53	96	8.5
	3	Int.	●		MZS0850MB	42.5	45	100	9.0
	5	Int.	●		MZS0850LB	68	72	127	9.0
8.6	2	Ext.	●	●	MZE0860SA	40	40	84	8.6
	3	Ext.	●	●	MZE0860MA	55	55	98	8.6
	3	Int.	●		MZS0860MB	45	45	100	9.0
	5	Int.	●		MZS0860LB	72	72	127	9.0
8.7	2	Ext.	●	●	MZE0870SA	40	40	84	8.7
	3	Ext.	●	●	MZE0870MA	55	55	98	8.7
	3	Int.	●		MZS0870MB	45	45	100	9.0
	5	Int.	●		MZS0870LB	72	72	127	9.0
8.8	2	Ext.	●	●	MZE0880SA	40	40	84	8.8
	3	Ext.	●	●	MZE0880MA	55	55	98	8.8
	3	Int.	●		MZS0880MB	45	45	100	9.0
	5	Int.	●		MZS0880LB	72	72	127	9.0
8.9	2	Ext.	●	●	MZE0890SA	40	40	84	8.9
	3	Ext.	●	●	MZE0890MA	55	55	98	8.9
	3	Int.	●		MZS0890MB	45	45	100	9.0
	5	Int.	●		MZS0890LB	72	72	127	9.0
9.0	2	Ext.	●	●	MZE0900SA	40	40	84	9.0
	3	Ext.	●	●	MZE0900MA	55	55	98	9.0
	3	Int.	●		MZS0900MB	45	45	100	9.0
	5	Int.	●		MZS0900LB	72	72	127	9.0

CUTTING CONDITIONS D073
OPERATION GUIDANCE D074
TECHNICAL DATA F001

MZE/MZS

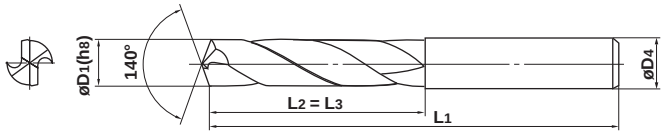
- Excellent chip disposal.
- Helical coolant hole enables high speed machining (MZS type).

UWC | VP | 140° | X Thinning

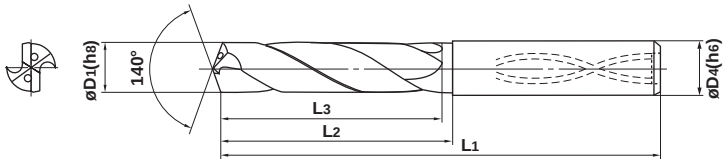
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MZE only)	◎(MZE:○)	◎	○	○

		D1<2	2≤D1≤3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)		0 −0.014	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MZE	0 −0.006	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MZS	0 −0.006	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MZE (External coolant)



MZS (Internal coolant)



(Note 1) MZS type bigger thanϕ5.0 have a recess in the end face.
(Note 2) MZS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
9.1	2	Ext.	●	●	MZE0910SA	40	40	84	9.1
	3	Ext.	●	●	MZE0910MA	58	58	102	9.1
	3	Int.	●		MZS0910MB	47.5	50	106	10.0
	5	Int.	●		MZS0910LB	76	80	136	10.0
9.2	2	Ext.	●	●	MZE0920SA	40	40	84	9.2
	3	Ext.	●	●	MZE0920MA	58	58	102	9.2
	3	Int.	●		MZS0920MB	47.5	50	106	10.0
	5	Int.	●		MZS0920LB	76	80	136	10.0
9.3	2	Ext.	●	●	MZE0930SA	40	40	84	9.3
	3	Ext.	●	●	MZE0930MA	58	58	102	9.3
	3	Int.	●		MZS0930MB	47.5	50	106	10.0
	5	Int.	●		MZS0930LB	76	80	136	10.0
9.4	2	Ext.	●	●	MZE0940SA	40	40	84	9.4
	3	Ext.	●	●	MZE0940MA	58	58	102	9.4
	3	Int.	●		MZS0940MB	47.5	50	106	10.0
	5	Int.	●		MZS0940LB	76	80	136	10.0
9.5	2	Ext.	●	●	MZE0950SA	40	40	84	9.5
	3	Ext.	●	●	MZE0950MA	58	58	102	9.5
	3	Int.	●		MZS0950MB	47.5	50	106	10.0
	5	Int.	●		MZS0950LB	76	80	136	10.0
9.6	2	Ext.	●	●	MZE0960SA	43	43	89	9.6
	3	Ext.	●	●	MZE0960MA	60	60	105	9.6
	3	Int.	●		MZS0960MB	50	50	106	10.0
	5	Int.	●		MZS0960LB	80	80	136	10.0
9.7	2	Ext.	●	●	MZE0970SA	43	43	89	9.7
	3	Ext.	●	●	MZE0970MA	60	60	105	9.7
	3	Int.	●		MZS0970MB	50	50	106	10.0
	5	Int.	●		MZS0970LB	80	80	136	10.0
9.8	2	Ext.	●	●	MZE0980SA	43	43	89	9.8
	3	Ext.	●	●	MZE0980MA	60	60	105	9.8
	3	Int.	●		MZS0980MB	50	50	106	10.0
	5	Int.	●		MZS0980LB	80	80	136	10.0
9.9	2	Ext.	●	●	MZE0990SA	43	43	89	9.9
	3	Ext.	●	●	MZE0990MA	60	60	105	9.9
	3	Int.	●		MZS0990MB	50	50	106	10.0
	5	Int.	●		MZS0990LB	80	80	136	10.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
10.0	2	Ext.	●	●	MZE1000SA	43	43	89	10.0
	3	Ext.	●	●	MZE1000MA	60	60	105	10.0
	3	Int.	●		MZS1000MB	50	50	106	10.0
	5	Int.	●		MZS1000LB	80	80	136	10.0
10.1	2	Ext.	●	●	MZE1010SA	43	43	89	10.1
	3	Ext.	●	●	MZE1010MA	66	66	112	10.1
	3	Int.	●		MZS1010MB	52.5	55	116	11.0
	5	Int.	●		MZS1010LB	84	88	149	11.0
10.2	2	Ext.	●	●	MZE1020SA	43	43	89	10.2
	3	Ext.	●	●	MZE1020MA	66	66	112	10.2
	3	Int.	●		MZS1020MB	52.5	55	116	11.0
	5	Int.	●		MZS1020LB	84	88	149	11.0
10.3	2	Ext.	●	●	MZE1030SA	43	43	89	10.3
	3	Ext.	●	●	MZE1030MA	66	66	112	10.3
	3	Int.	●		MZS1030MB	52.5	55	116	11.0
	5	Int.	●		MZS1030LB	84	88	149	11.0
10.4	2	Ext.	●	●	MZE1040SA	43	43	89	10.4
	3	Ext.	●	●	MZE1040MA	66	66	112	10.4
	3	Int.	●		MZS1040MB	52.5	55	116	11.0
	5	Int.	●		MZS1040LB	84	88	149	11.0
10.5	2	Ext.	●	●	MZE1050SA	43	43	89	10.5
	3	Ext.	●	●	MZE1050MA	66	66	112	10.5
	3	Int.	●		MZS1050MB	52.5	55	116	11.0
	5	Int.	●		MZS1050LB	84	88	149	11.0
10.6	2	Ext.	●	●	MZE1060SA	43	43	89	10.6
	3	Ext.	●	●	MZE1060MA	68	68	114	10.6
	3	Int.	●		MZS1060MB	55	55	116	11.0
	5	Int.	●		MZS1060LB	88	88	149	11.0
10.7	2	Ext.	●	●	MZE1070SA	47	47	95	10.7
	3	Ext.	●	●	MZE1070MA	68	68	114	10.7
	3	Int.	●		MZS1070MB	55	55	116	11.0
	5	Int.	●		MZS1070LB	88	88	149	11.0
10.8	2	Ext.	●	●	MZE1080SA	47	47	95	10.8
	3	Ext.	●	●	MZE1080MA	68	68	114	10.8
	3	Int.	●		MZS1080MB	55	55	116	11.0
	5	Int.	●		MZS1080LB	88	88	149	11.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock HTi10 NEW	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
10.9	2	Ext.	●	●	MZE1090SA	47	47	95	10.9
	3	Ext.	●	●	MZE1090MA	68	68	114	10.9
	3	Int.	●		MZS1090MB	55	55	116	11.0
	5	Int.	●		MZS1090LB	88	88	149	11.0
11.0	2	Ext.	●	●	MZE1100SA	47	47	95	11.0
	3	Ext.	●	●	MZE1100MA	68	68	114	11.0
	3	Int.	●		MZS1100MB	55	55	116	11.0
	5	Int.	●		MZS1100LB	88	88	149	11.0
11.1	2	Ext.	●	●	MZE1110SA	47	47	95	11.1
	3	Ext.	●	●	MZE1110MA	71	71	118	11.1
	3	Int.	●		MZS1110MB	57.5	60	122	12.0
	5	Int.	●		MZS1110LB	92	96	158	12.0
11.2	2	Ext.	●	●	MZE1120SA	47	47	95	11.2
	3	Ext.	●	●	MZE1120MA	71	71	118	11.2
	3	Int.	●		MZS1120MB	57.5	60	122	12.0
	5	Int.	●		MZS1120LB	92	96	158	12.0
11.3	2	Ext.	●	●	MZE1130SA	47	47	95	11.3
	3	Ext.	●	●	MZE1130MA	71	71	118	11.3
	3	Int.	●		MZS1130MB	57.5	60	122	12.0
	5	Int.	●		MZS1130LB	92	96	158	12.0
11.4	2	Ext.	●	●	MZE1140SA	47	47	95	11.4
	3	Ext.	●	●	MZE1140MA	71	71	118	11.4
	3	Int.	●		MZS1140MB	57.5	60	122	12.0
	5	Int.	●		MZS1140LB	92	96	158	12.0
11.5	2	Ext.	●	●	MZE1150SA	47	47	95	11.5
	3	Ext.	●	●	MZE1150MA	71	71	118	11.5
	3	Int.	●		MZS1150MB	57.5	60	122	12.0
	5	Int.	●		MZS1150LB	92	96	158	12.0
11.6	2	Ext.	●	●	MZE1160SA	47	47	95	11.6
	3	Ext.	●	●	MZE1160MA	73	73	121	11.6
	3	Int.	●		MZS1160MB	60	60	122	12.0
	5	Int.	●		MZS1160LB	96	96	158	12.0
11.7	2	Ext.	●	●	MZE1170SA	47	47	95	11.7
	3	Ext.	●	●	MZE1170MA	73	73	121	11.7
	3	Int.	●		MZS1170MB	60	60	122	12.0
	5	Int.	●		MZS1170LB	96	96	158	12.0
11.8	2	Ext.	●	●	MZE1180SA	47	47	95	11.8
	3	Ext.	●	●	MZE1180MA	73	73	121	11.8
	3	Int.	●		MZS1180MB	60	60	122	12.0
	5	Int.	●		MZS1180LB	96	96	158	12.0
11.9	2	Ext.	●	●	MZE1190SA	51	51	102	11.9
	3	Ext.	●	●	MZE1190MA	73	73	121	11.9
	3	Int.	●		MZS1190MB	60	60	122	12.0
	5	Int.	●		MZS1190LB	96	96	158	12.0
12.0	2	Ext.	●	●	MZE1200SA	51	51	102	12.0
	3	Ext.	●	●	MZE1200MA	73	73	121	12.0
	3	Int.	●		MZS1200MB	60	60	122	12.0
	5	Int.	●		MZS1200LB	96	96	158	12.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock HTi10 NEW	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
12.1	2	Ext.	●	●	MZE1210SA	51	51	102	12.1
	3	Ext.	●	●	MZE1210MA	76	76	135	12.1
	3	Int.	●		MZS1210MB	62.5	65	128	13.0
	5	Int.	●		MZS1210LB	100	104	167	13.0
12.2	2	Ext.	●	●	MZE1220SA	51	51	102	12.2
	3	Ext.	●	●	MZE1220MA	76	76	135	12.2
	3	Int.	●		MZS1220MB	62.5	65	128	13.0
	5	Int.	●		MZS1220LB	100	104	167	13.0
12.3	2	Ext.	●	●	MZE1230SA	51	51	102	12.3
	3	Ext.	●	●	MZE1230MA	76	76	135	12.3
	3	Int.	●		MZS1230MB	62.5	65	128	13.0
	5	Int.	●		MZS1230LB	100	104	167	13.0
12.4	2	Ext.	●	●	MZE1240SA	51	51	102	12.4
	3	Ext.	●	●	MZE1240MA	76	76	135	12.4
	3	Int.	●		MZS1240MB	62.5	65	128	13.0
	5	Int.	●		MZS1240LB	100	104	167	13.0
12.5	2	Ext.	●	●	MZE1250SA	51	51	102	12.5
	3	Ext.	●	●	MZE1250MA	76	76	135	12.5
	3	Int.	●		MZS1250MB	62.5	65	128	13.0
	5	Int.	●		MZS1250LB	100	104	167	13.0
12.6	2	Ext.	●	●	MZE1260SA	51	51	102	12.6
	3	Ext.	●	●	MZE1260MA	78	78	137	12.6
	3	Int.	●		MZS1260MB	65	65	128	13.0
	5	Int.	●		MZS1260LB	104	104	167	13.0
12.7	2	Ext.	●	●	MZE1270SA	51	51	102	12.7
	3	Ext.	●	●	MZE1270MA	78	78	137	12.7
	3	Int.	●		MZS1270MB	65	65	128	13.0
	5	Int.	●		MZS1270LB	104	104	167	13.0
12.8	2	Ext.	●	●	MZE1280SA	51	51	102	12.8
	3	Ext.	●	●	MZE1280MA	78	78	137	12.8
	3	Int.	●		MZS1280MB	65	65	128	13.0
	5	Int.	●		MZS1280LB	104	104	167	13.0
12.9	2	Ext.	●	●	MZE1290SA	51	51	102	12.9
	3	Ext.	●	●	MZE1290MA	78	78	137	12.9
	3	Int.	●		MZS1290MB	65	65	128	13.0
	5	Int.	●		MZS1290LB	104	104	167	13.0
13.0	2	Ext.	●	●	MZE1300SA	51	51	102	13.0
	3	Ext.	●	●	MZE1300MA	78	78	137	13.0
	3	Int.	●		MZS1300MB	65	65	128	13.0
	5	Int.	●		MZS1300LB	104	104	167	13.0
13.1	2	Ext.	●	●	MZE1310SA	51	51	102	13.1
	3	Ext.	●	●	MZE1310MA	84	84	144	13.1
	3	Int.	●		MZS1310MB	67.5	70	134	14.0
	5	Int.	●		MZS1310LB	108	112	176	14.0
13.2	2	Ext.	●	●	MZE1320SA	51	51	102	13.2
	3	Ext.	●	●	MZE1320MA	84	84	144	13.2
	3	Int.	●		MZS1320MB	67.5	70	134	14.0
	5	Int.	●		MZS1320LB	108	112	176	14.0

CUTTING CONDITIONS D073
OPERATION GUIDANCE D074
TECHNICAL DATA F001

MZE/MZS

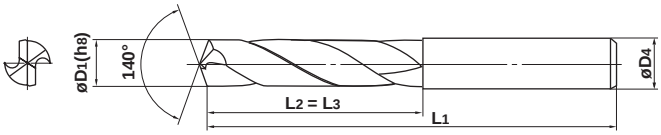
- Excellent chip disposal.
- Helical coolant hole enables high speed machining (MZS type).

UWC VP 140° X Thinning

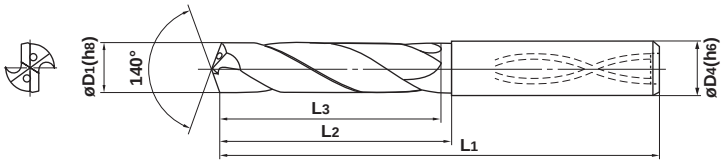
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MZE only)	◎(MZE:○)	◎	○	○

		D1<2	2≤D1≤3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)		0 −0.014	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MZE	0 −0.006	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MZS	0 −0.006	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MZE (External coolant)



MZS (Internal coolant)



(Note 1) MZS type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MZS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
13.3	2	Ext.	●	●	MZE1330SA	54	54	107	13.3
	3	Ext.	●	●	MZE1330MA	84	84	144	13.3
	3	Int.	●		MZS1330MB	67.5	70	134	14.0
	5	Int.	●		MZS1330LB	108	112	176	14.0
13.4	2	Ext.	●	●	MZE1340SA	54	54	107	13.4
	3	Ext.	●	●	MZE1340MA	84	84	144	13.4
	3	Int.	●		MZS1340MB	67.5	70	134	14.0
	5	Int.	●		MZS1340LB	108	112	176	14.0
13.5	2	Ext.	●	●	MZE1350SA	54	54	107	13.5
	3	Ext.	●	●	MZE1350MA	84	84	144	13.5
	3	Int.	●		MZS1350MB	67.5	70	134	14.0
	5	Int.	●		MZS1350LB	108	112	176	14.0
13.6	2	Ext.	●	●	MZE1360SA	54	54	107	13.6
	3	Ext.	●	●	MZE1360MA	86	86	147	13.6
	3	Int.	●		MZS1360MB	70	70	134	14.0
	5	Int.	●		MZS1360LB	112	112	176	14.0
13.7	2	Ext.	●	●	MZE1370SA	54	54	107	13.7
	3	Ext.	●	●	MZE1370MA	86	86	147	13.7
	3	Int.	●		MZS1370MB	70	70	134	14.0
	5	Int.	●		MZS1370LB	112	112	176	14.0
13.8	2	Ext.	●	●	MZE1380SA	54	54	107	13.8
	3	Ext.	●	●	MZE1380MA	86	86	147	13.8
	3	Int.	●		MZS1380MB	70	70	134	14.0
	5	Int.	●		MZS1380LB	112	112	176	14.0
13.9	2	Ext.	●	●	MZE1390SA	54	54	107	13.9
	3	Ext.	●	●	MZE1390MA	86	86	147	13.9
	3	Int.	●		MZS1390MB	70	70	134	14.0
	5	Int.	●		MZS1390LB	112	112	176	14.0
14.0	2	Ext.	●	●	MZE1400SA	54	54	107	14.0
	3	Ext.	●	●	MZE1400MA	86	86	147	14.0
	3	Int.	●		MZS1400MB	70	70	134	14.0
	5	Int.	●		MZS1400LB	112	112	176	14.0
14.1	2	Ext.	●	●	MZE1410SA	56	56	111	14.1
	3	Ext.	●	●	MZE1410MA	89	89	151	14.1
	3	Int.	●		MZS1410MB	72.5	75	140	15.0
	5	Int.	●		MZS1410LB	116	120	185	15.0
14.2	2	Ext.	●	●	MZE1420SA	56	56	111	14.2
	3	Ext.	●	●	MZE1420MA	89	89	151	14.2
	3	Int.	●		MZS1420MB	72.5	75	140	15.0
	5	Int.	●		MZS1420LB	116	120	185	15.0
14.3	2	Ext.	□	●	MZE1430SA	56	56	111	14.3
	3	Ext.	●	●	MZE1430MA	89	89	151	14.3
	3	Int.	●		MZS1430MB	72.5	75	140	15.0
	5	Int.	●		MZS1430LB	116	120	185	15.0
14.4	2	Ext.	□	●	MZE1440SA	56	56	111	14.4
	3	Ext.	●	●	MZE1440MA	89	89	151	14.4
	3	Int.	●		MZS1440MB	72.5	75	140	15.0
	5	Int.	●		MZS1440LB	116	120	185	15.0
14.5	2	Ext.	●	●	MZE1450SA	56	56	111	14.5
	3	Ext.	●	●	MZE1450MA	89	89	151	14.5
	3	Int.	●		MZS1450MB	72.5	75	140	15.0
	5	Int.	●		MZS1450LB	116	120	185	15.0
14.6	2	Ext.	□	●	MZE1460SA	56	56	111	14.6
	3	Ext.	●	●	MZE1460MA	91	91	153	14.6
	3	Int.	●		MZS1460MB	75	75	140	15.0
	5	Int.	●		MZS1460LB	120	120	185	15.0
14.7	2	Ext.	□	●	MZE1470SA	56	56	111	14.7
	3	Ext.	●	●	MZE1470MA	91	91	153	14.7
	3	Int.	●		MZS1470MB	75	75	140	15.0
	5	Int.	●		MZS1470LB	120	120	185	15.0
14.8	2	Ext.	□	●	MZE1480SA	56	56	111	14.8
	3	Ext.	●	●	MZE1480MA	91	91	153	14.8
	3	Int.	●		MZS1480MB	75	75	140	15.0
	5	Int.	●		MZS1480LB	120	120	185	15.0
14.9	2	Ext.	□	●	MZE1490SA	56	56	111	14.9
	3	Ext.	●	●	MZE1490MA	91	91	153	14.9
	3	Int.	●		MZS1490MB	75	75	140	15.0
	5	Int.	●		MZS1490LB	120	120	185	15.0
15.0	2	Ext.	●	●	MZE1500SA	56	56	111	15.0
	3	Ext.	●	●	MZE1500MA	91	91	153	15.0
	3	Int.	●		MZS1500MB	75	75	140	15.0
	5	Int.	●		MZS1500LB	120	120	185	15.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock HTi10 NEW	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
15.1	2	Ext.	□	●	MZE1510SA	58	58	115	15.1
	3	Ext.	●	●	MZE1510MA	94	94	157	15.1
	3	Int.	●		MZS1510MB	77.5	80	145	16.0
	5	Int.	●		MZS1510LB	124	128	193	16.0
15.2	2	Ext.	●	●	MZE1520SA	58	58	115	15.2
	3	Ext.	●	●	MZE1520MA	94	94	157	15.2
	3	Int.	●		MZS1520MB	77.5	80	145	16.0
	5	Int.	●		MZS1520LB	124	128	193	16.0
15.3	2	Ext.	□	●	MZE1530SA	58	58	115	15.3
	3	Ext.	●	●	MZE1530MA	94	94	157	15.3
	3	Int.	●		MZS1530MB	77.5	80	145	16.0
	5	Int.	●		MZS1530LB	124	128	193	16.0
15.4	2	Ext.	□	●	MZE1540SA	58	58	115	15.4
	3	Ext.	●	●	MZE1540MA	94	94	157	15.4
	3	Int.	●		MZS1540MB	77.5	80	145	16.0
	5	Int.	●		MZS1540LB	124	128	193	16.0
15.5	2	Ext.	●	●	MZE1550SA	58	58	115	15.5
	3	Ext.	●	●	MZE1550MA	94	94	157	15.5
	3	Int.	●		MZS1550MB	77.5	80	145	16.0
	5	Int.	●		MZS1550LB	124	128	193	16.0
15.6	2	Ext.	□	●	MZE1560SA	58	58	115	15.6
	3	Ext.	●	●	MZE1560MA	96	96	160	15.6
	3	Int.	●		MZS1560MB	80	80	145	16.0
	5	Int.	●		MZS1560LB	128	128	193	16.0
15.7	2	Ext.	□	●	MZE1570SA	58	58	115	15.7
	3	Ext.	●	●	MZE1570MA	96	96	160	15.7
	3	Int.	●		MZS1570MB	80	80	145	16.0
	5	Int.	●		MZS1570LB	128	128	193	16.0
15.8	2	Ext.	□	●	MZE1580SA	58	58	115	15.8
	3	Ext.	●	●	MZE1580MA	96	96	160	15.8
	3	Int.	●		MZS1580MB	80	80	145	16.0
	5	Int.	●		MZS1580LB	128	128	193	16.0
15.9	2	Ext.	□	●	MZE1590SA	58	58	115	15.9
	3	Ext.	●	●	MZE1590MA	96	96	160	15.9
	3	Int.	●		MZS1590MB	80	80	145	16.0
	5	Int.	●		MZS1590LB	128	128	193	16.0
16.0	2	Ext.	●	●	MZE1600SA	58	58	115	16.0
	3	Ext.	●	●	MZE1600MA	96	96	160	16.0
	3	Int.	●		MZS1600MB	80	80	145	16.0
	5	Int.	●		MZS1600LB	128	128	193	16.0
16.1	2	Ext.	□	□	MZE1610SA	60	60	119	16.1
	3	Ext.	□	□	MZE1610MA	102	102	167	16.1
	3	Int.	□		MZS1610MB	82.5	85	150	17.0
	5	Int.	□		MZS1610LB	132	136	201	17.0
16.2	2	Ext.	●	□	MZE1620SA	60	60	119	16.2
	3	Ext.	□	□	MZE1620MA	102	102	167	16.2
	3	Int.	□		MZS1620MB	82.5	85	150	17.0
	5	Int.	□		MZS1620LB	132	136	201	17.0
16.3	2	Ext.	●	□	MZE1630SA	60	60	119	16.3
	3	Ext.	□	□	MZE1630MA	102	102	167	16.3
	3	Int.	□		MZS1630MB	82.5	85	150	17.0
	5	Int.	□		MZS1630LB	132	136	201	17.0
16.4	2	Ext.	□	□	MZE1640SA	60	60	119	16.4
	3	Ext.	□	□	MZE1640MA	102	102	167	16.4
	3	Int.	□		MZS1640MB	82.5	85	150	17.0
	5	Int.	□		MZS1640LB	132	136	201	17.0
16.5	2	Ext.	●	●	MZE1650SA	60	60	119	16.5
	3	Ext.	●	●	MZE1650MA	102	102	167	16.5
	3	Int.	●		MZS1650MB	82.5	85	150	17.0
	5	Int.	●		MZS1650LB	132	136	201	17.0
16.6	2	Ext.	□	□	MZE1660SA	60	60	119	16.6
	3	Ext.	□	□	MZE1660MA	102	102	167	16.6
	3	Int.	□		MZS1660MB	85	85	150	17.0
	5	Int.	□		MZS1660LB	136	136	201	17.0
16.7	2	Ext.	□	□	MZE1670SA	60	60	119	16.7
	3	Ext.	□	□	MZE1670MA	102	102	167	16.7
	3	Int.	□		MZS1670MB	85	85	150	17.0
	5	Int.	□		MZS1670LB	136	136	201	17.0
16.8	2	Ext.	□	□	MZE1680SA	60	60	119	16.8
	3	Ext.	□	□	MZE1680MA	102	102	167	16.8
	3	Int.	□		MZS1680MB	85	85	150	17.0
	5	Int.	□		MZS1680LB	136	136	201	17.0
16.9	2	Ext.	□	□	MZE1690SA	60	60	119	16.9
	3	Ext.	□	□	MZE1690MA	102	102	167	16.9
	3	Int.	□		MZS1690MB	85	85	150	17.0
	5	Int.	□		MZS1690LB	136	136	201	17.0
17.0	2	Ext.	●	●	MZE1700SA	60	60	119	17.0
	3	Ext.	●	●	MZE1700MA	102	102	167	17.0
	3	Int.	●		MZS1700MB	85	85	150	17.0
	5	Int.	●		MZS1700LB	136	136	201	17.0
17.1	2	Ext.	□	□	MZE1710SA	62	62	123	17.1
	3	Ext.	□	□	MZE1710MA	102	102	167	17.1
	3	Int.	□		MZS1710MB	87.5	90	155	18.0
	5	Int.	□		MZS1710LB	140	144	209	18.0
17.2	2	Ext.	□	□	MZE1720SA	62	62	123	17.2
	3	Ext.	□	□	MZE1720MA	102	102	167	17.2
	3	Int.	□		MZS1720MB	87.5	90	155	18.0
	5	Int.	□		MZS1720LB	140	144	209	18.0
17.3	2	Ext.	□	□	MZE1730SA	62	62	123	17.3
	3	Ext.	□	□	MZE1730MA	102	102	167	17.3
	3	Int.	□		MZS1730MB	87.5	90	155	18.0
	5	Int.	□		MZS1730LB	140	144	209	18.0
17.4	2	Ext.	□	□	MZE1740SA	62	62	123	17.4
	3	Ext.	□	□	MZE1740MA	102	102	167	17.4
	3	Int.	□		MZS1740MB	87.5	90	155	18.0
	5	Int.	□		MZS1740LB	140	144	209	18.0

SOLID CARBIDE DRILLING

CUTTING CONDITIONS D073
OPERATION GUIDANCE D074
TECHNICAL DATA F001

MZE/MZS

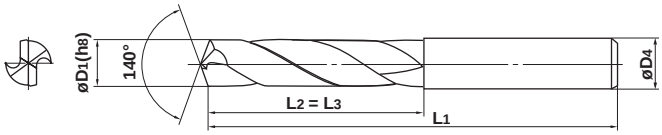
- Excellent chip disposal.
- Helical coolant hole enables high speed machining (MZS type).

UWC | VP | 140° | X Thinning

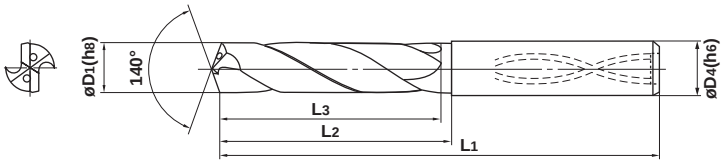
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MZE only)	◎(MZE:○)	◎	○	○

		D1<2	2≤D1≤3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)		0 −0.014	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	MZE	0 −0.006	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
	MZS	0 −0.006	0 −0.006	0 −0.008	0 −0.009	0 −0.011	0 −0.013

MZE (External coolant)



MZS (Internal coolant)



(Note 1) MZS type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MZS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
17.5	2	Ext.	●	●	MZE1750SA	62	62	123	17.5
	3	Ext.	●	●	MZE1750MA	102	102	167	17.5
	3	Int.	●		MZS1750MB	87.5	90	155	18.0
	5	Int.	●		MZS1750LB	140	144	209	18.0
17.6	2	Ext.	□	□	MZE1760SA	62	62	123	17.6
	3	Ext.	□	□	MZE1760MA	102	102	167	17.6
	3	Int.	□		MZS1760MB	90	90	155	18.0
	5	Int.	□		MZS1760LB	144	144	209	18.0
17.7	2	Ext.	□	□	MZE1770SA	62	62	123	17.7
	3	Ext.	□	□	MZE1770MA	102	102	167	17.7
	3	Int.	□		MZS1770MB	90	90	155	18.0
	5	Int.	□		MZS1770LB	144	144	209	18.0
17.8	2	Ext.	●	□	MZE1780SA	62	62	123	17.8
	3	Ext.	□	□	MZE1780MA	102	102	167	17.8
	3	Int.	□		MZS1780MB	90	90	155	18.0
	5	Int.	□		MZS1780LB	144	144	209	18.0
17.9	2	Ext.	□	□	MZE1790SA	62	62	123	17.9
	3	Ext.	□	□	MZE1790MA	102	102	167	17.9
	3	Int.	□		MZS1790MB	90	90	155	18.0
	5	Int.	□		MZS1790LB	144	144	209	18.0
18.0	2	Ext.	●	●	MZE1800SA	62	62	123	18.0
	3	Ext.	●	●	MZE1800MA	102	102	167	18.0
	3	Int.	●		MZS1800MB	90	90	155	18.0
	5	Int.	●		MZS1800LB	144	144	209	18.0
18.1	2	Ext.	□	□	MZE1810SA	64	64	127	18.1
	3	Ext.	□	□	MZE1810MA	114	114	179	18.1
	3	Int.	□		MZS1810MB	92.5	95	160	19.0
	5	Int.	□		MZS1810LB	148	152	217	19.0
18.2	2	Ext.	□	□	MZE1820SA	64	64	127	18.2
	3	Ext.	□	□	MZE1820MA	114	114	179	18.2
	3	Int.	□		MZS1820MB	92.5	95	160	19.0
	5	Int.	□		MZS1820LB	148	152	217	19.0
18.3	2	Ext.	□	□	MZE1830SA	64	64	127	18.3
	3	Ext.	□	□	MZE1830MA	114	114	179	18.3
	3	Int.	□		MZS1830MB	92.5	95	160	19.0
	5	Int.	□		MZS1830LB	148	152	217	19.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock NEW HTi10	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
18.4	2	Ext.	□	□	MZE1840SA	64	64	127	18.4
	3	Ext.	□	□	MZE1840MA	114	114	179	18.4
	3	Int.	□		MZS1840MB	92.5	95	160	19.0
	5	Int.	□		MZS1840LB	148	152	217	19.0
18.5	2	Ext.	●	●	MZE1850SA	64	64	127	18.5
	3	Ext.	●	●	MZE1850MA	114	114	179	18.5
	3	Int.	●		MZS1850MB	92.5	95	160	19.0
	5	Int.	●		MZS1850LB	148	152	217	19.0
18.6	2	Ext.	□	□	MZE1860SA	64	64	127	18.6
	3	Ext.	□	□	MZE1860MA	114	114	179	18.6
	3	Int.	□		MZS1860MB	95	95	160	19.0
	5	Int.	□		MZS1860LB	152	152	217	19.0
18.7	2	Ext.	□	□	MZE1870SA	64	64	127	18.7
	3	Ext.	□	□	MZE1870MA	114	114	179	18.7
	3	Int.	□		MZS1870MB	95	95	160	19.0
	5	Int.	□		MZS1870LB	152	152	217	19.0
18.8	2	Ext.	□	□	MZE1880SA	64	64	127	18.8
	3	Ext.	□	□	MZE1880MA	114	114	179	18.8
	3	Int.	□		MZS1880MB	95	95	160	19.0
	5	Int.	□		MZS1880LB	152	152	217	19.0
18.9	2	Ext.	□	□	MZE1890SA	64	64	127	18.9
	3	Ext.	□	□	MZE1890MA	114	114	179	18.9
	3	Int.	□		MZS1890MB	95	95	160	19.0
	5	Int.	□		MZS1890LB	152	152	217	19.0
19.0	2	Ext.	●	●	MZE1900SA	64	64	127	19.0
	3	Ext.	●	●	MZE1900MA	114	114	179	19.0
	3	Int.	●		MZS1900MB	95	95	160	19.0
	5	Int.	●		MZS1900LB	152	152	217	19.0
19.1	2	Ext.	□	□	MZE1910SA	66	66	131	19.1
	3	Ext.	□	□	MZE1910MA	114	114	179	19.1
	3	Int.	□		MZS1910MB	97.5	100	165	20.0
	5	Int.	□		MZS1910LB	156	160	225	20.0
19.2	2	Ext.	□	□	MZE1920SA	66	66	131	19.2
	3	Ext.	□	□	MZE1920MA	114	114	179	19.2
	3	Int.	□		MZS1920MB	97.5	100	165	20.0
	5	Int.	□		MZS1920LB	156	160	225	20.0

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock HTi10 NEW	Order Number	Dimensions (mm) Flute Length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4
19.3	2	Ext.	□	□	**MZE1930SA**	66	66	131	19.3
	3	Ext.	□	□	**MZE1930MA**	114	114	179	19.3
	3	Int.	□		**MZS1930MB**	97.5	100	165	20.0
	5	Int.	□		**MZS1930LB**	156	160	225	20.0
19.4	2	Ext.	□	□	**MZE1940SA**	66	66	131	19.4
	3	Ext.	□	□	**MZE1940MA**	114	114	179	19.4
	3	Int.	□		**MZS1940MB**	97.5	100	165	20.0
	5	Int.	□		**MZS1940LB**	156	160	225	20.0
19.5	2	Ext.	●	●	**MZE1950SA**	66	66	131	19.5
	3	Ext.	●	●	**MZE1950MA**	114	114	179	19.5
	3	Int.	●		**MZS1950MB**	97.5	100	165	20.0
	5	Int.	●		**MZS1950LB**	156	160	225	20.0
19.6	2	Ext.	□	□	**MZE1960SA**	66	66	131	19.6
	3	Ext.	□	□	**MZE1960MA**	114	114	179	19.6
	3	Int.	□		**MZS1960MB**	100	100	165	20.0
	5	Int.	□		**MZS1960LB**	160	160	225	20.0

Drill Dia. D_1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock VP15TF	Stock HTi10 NEW	Order Number	Dimensions (mm) Flute Length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4
19.7	2	Ext.	□	□	**MZE1970SA**	66	66	131	19.7
	3	Ext.	□	□	**MZE1970MA**	114	114	179	19.7
	3	Int.	□		**MZS1970MB**	100	100	165	20.0
	5	Int.	□		**MZS1970LB**	160	160	225	20.0
19.8	2	Ext.	□	□	**MZE1980SA**	66	66	131	19.8
	3	Ext.	□	□	**MZE1980MA**	114	114	179	19.8
	3	Int.	□		**MZS1980MB**	100	100	165	20.0
	5	Int.	□		**MZS1980LB**	160	160	225	20.0
19.9	2	Ext.	□	□	**MZE1990SA**	66	66	131	19.9
	3	Ext.	□	□	**MZE1990MA**	114	114	179	19.9
	3	Int.	□		**MZS1990MB**	100	100	165	20.0
	5	Int.	□		**MZS1990LB**	160	160	225	20.0
20.0	2	Ext.	●	●	**MZE2000SA**	66	66	131	20.0
	3	Ext.	●	●	**MZE2000MA**	114	114	179	20.0
	3	Int.	●		**MZS2000MB**	100	100	165	20.0
	5	Int.	●		**MZS2000LB**	160	160	225	20.0

CUTTING CONDITIONS D073 OPERATION GUIDANCE D074 TECHNICAL DATA F001

CARBIDE

MZE/MZS STEP DRILLS

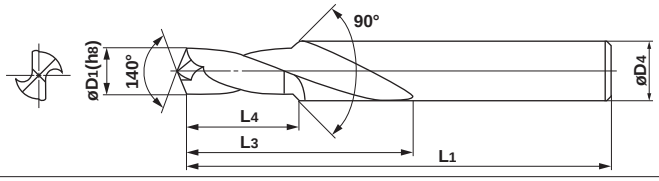
- Pre-hole drilling for metric screw thread.
- Helical coolant hole enables high speed machining (MZS type).

UWC VP 140° X Thinning

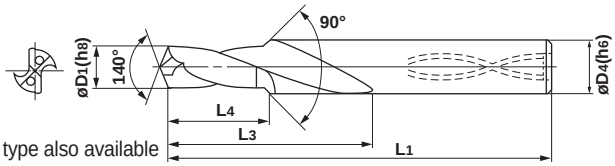
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○(MZE only)	◎(MZE:○)	◎	○	○

		3<D1≤6	6<D1≤10	10<D1≤18
D1 Tolerance (mm)		0 −0.018	0 −0.022	0 −0.027
D4 Tolerance (mm)	MZE	0 −0.018	0 −0.022	0 −0.027
	MZS	0 −0.008	0 −0.009	0 −0.011

MZE (External coolant)



MZS (Internal coolant)



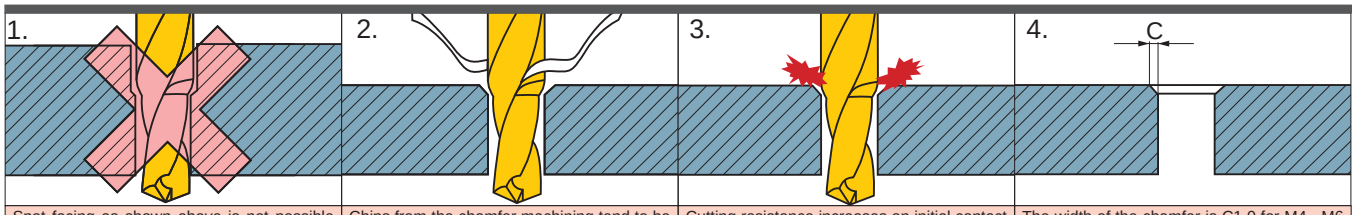
(Note 1) MZS type bigger than ϕ5.0 have a recess in the end face.
(Note 2) Spot face drilling is not possible (chamfering only).
(Note 3) For metric coarse thread.
(Note 4) MZS type also available for shrink fit holder.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Order Number	Thread Size	Stock VP15TF	Dimensions (mm) Step length L4	Flute Length L3	Overall Length L1	Shank Dia. D4
3.4	2	Ext.	MZE0340SM04	M4	●	8	21	73	6.0
	2	Int.	MZS0340SM04	M4	●	8	21	73	6.0
	3	Ext.	MZE0340MM04	M4	●	12	25	77	6.0
	3	Int.	MZS0340MM04	M4	●	12	25	77	6.0
4.3	2	Ext.	MZE0430SM05	M5	●	10	26	79	7.0
	2	Int.	MZS0430SM05	M5	●	10	26	79	7.0
	3	Ext.	MZE0430MM05	M5	●	15	31	84	7.0
	3	Int.	MZS0430MM05	M5	●	15	31	84	7.0
5.1	2	Ext.	MZE0510SM06	M6	●	12	30	84	8.0
	2	Int.	MZS0510SM06	M6	●	12	30	84	8.0
	3	Ext.	MZE0510MM06	M6	●	18	36	90	8.0
	3	Int.	MZS0510MM06	M6	●	18	36	90	8.0

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Order Number	Thread Size	Stock VP15TF	Dimensions (mm) Step length L4	Flute Length L3	Overall Length L1	Shank Dia. D4
6.8	2	Ext.	MZE0680SM08	M8	●	16	40	96	10.0
	2	Int.	MZS0680SM08	M8	●	16	40	96	10.0
	3	Ext.	MZE0680MM08	M8	●	24	48	104	10.0
	3	Int.	MZS0680MM08	M8	●	24	48	104	10.0
8.5	2	Ext.	MZE0850SM10	M10	●	20	50	112	12.0
	2	Int.	MZS0850SM10	M10	●	20	50	112	12.0
	3	Ext.	MZE0850MM10	M10	●	30	60	122	12.0
	3	Int.	MZS0850MM10	M10	●	30	60	122	12.0
10.3	2	Ext.	MZE1030SM12	M12	●	24	60	124	14.0
	2	Int.	MZS1030SM12	M12	●	24	60	124	14.0
	3	Ext.	MZE1030MM12	M12	●	36	72	136	14.0
	3	Int.	MZS1030MM12	M12	●	36	72	136	14.0

(Note) Please contact us for any geometry that is not in the catalogue (e.g. different diameter and length).

CAUTION FOR USE



1. Spot facing as shown above is not possible due to the large diameter not having a back taper. Please contact us if spot face drills are required.
2. Chips from the chamfer machining tend to be elongated and may cause jamming. It is recommended to pick feed to reduce the length of chips.
3. Cutting resistance increases on initial contact with the chamfer. Reduce feed at this point.
4. The width of the chamfer is C1.0 for M4−M6, and C1.5 for M8−M12. For widths other than those stated above please contact us.

DRILL SIZE AND HOLE DIAMETERS FOR TAPPING

For Metric Coarse Screw Thread				
Thread Size	Initial Thread Diameter Tolerance max.	Initial Thread Diameter Tolerance min.	MZE/MZS Drill Application (ϕD)	Reference HSS Drill
M2.5x0.45	2.138	2.013	2.1	2.1
M3x0.5	2.599	2.459	2.5	2.5
M3.5x0.6	3.010	2.850	2.9	2.9
M4x0.7	3.422	3.242	3.4	3.3
M4.5x0.75	3.878	3.688	3.8	3.8
M5x0.8	4.334	4.134	4.3	4.2
M6x1	5.153	4.917	5.1	5.0
M7x1.25	6.153	5.917	6.1	6.0
M8x1.25	6.912	6.647	6.8	6.8

For Metric Coarse Screw Thread				
Thread Size	Initial Thread Diameter Tolerance max.	Initial Thread Diameter Tolerance min.	MZE/MZS Drill Application (ϕD)	Reference HSS Drill
M9x1.25	7.912	7.647	7.8	7.8
M10x1.5	8.676	8.376	8.5	8.5
M11x1.5	9.676	9.376	9.5	9.5
M12x1.75	10.441	10.106	10.3	10.3
M14x2	12.210	11.835	12.0	12.0
M16x2	14.210	13.835	14.0	14.0
M18x2.5	15.744	15.294	15.5	15.5
M20x2.5	17.744	17.294	17.5	17.5
M22x2.5	19.744	19.294	19.5	19.5

(Note) Holes drilled with an MZE type drill should be +0.01−+0.03mm oversize.
For thread tapping and replacement of HSS drills, a drill approximately 0.1mm bigger is recommended.

● : Inventory maintained in Japan.

OPERATION GUIDANCE D074

RECOMMENDED CUTTING CONDITIONS OF MZE/MZS DRILLS

MZE (External coolant)

Work Material		Drill Diameter / Conditions / Hardness	φ2.0—φ6.0		φ6.1—φ10.0		φ10.1—φ14.0		φ14.1—φ20.0	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel	≤180HB	45 (35—55)	0.20 (0.10—0.25)	55 (45—65)	0.25 (0.15—0.30)	65 (55—75)	0.30 (0.20—0.35)	70 (60—80)	0.35 (0.20—0.40)
P	Carbon Steel Alloy Steel	180—280HB	40 (30—50)	0.20 (0.10—0.25)	50 (40—60)	0.25 (0.15—0.25)	60 (50—70)	0.30 (0.20—0.35)	65 (55—75)	0.35 (0.20—0.40)
P	Carbon Steel Alloy Steel	280—350HB	35 (25—45)	0.15 (0.10—0.20)	45 (35—55)	0.20 (0.10—0.25)	55 (45—65)	0.25 (0.15—0.30)	60 (50—70)	0.30 (0.20—0.35)
M	Stainless Steel	≤200HB	20 (15—30)	0.10 (0.05—0.15)	25 (15—30)	0.12 (0.05—0.15)	25 (15—30)	0.15 (0.10—0.20)	25 (15—30)	0.20 (0.10—0.25)
K	Gray Cast Iron	Tensile Strength ≤350MPa	50 (40—60)	0.25 (0.15—0.30)	60 (50—80)	0.30 (0.20—0.35)	70 (60—80)	0.35 (0.20—0.40)	70 (60—80)	0.40 (0.30—0.45)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	45 (35—55)	0.20 (0.10—0.25)	55 (45—65)	0.25 (0.15—0.30)	65 (55—75)	0.30 (0.20—0.35)	70 (60—80)	0.35 (0.20—0.40)
N	Aluminium Alloy	—	80 (70—90)	0.20 (0.10—0.25)	90 (80—100)	0.25 (0.15—0.30)	100 (90—110)	0.30 (0.20—0.35)	110 (100—120)	0.35 (0.20—0.40)
S	Heat Resistant Alloy	—	20 (10—25)	0.10 (0.05—0.15)	25 (15—30)	0.12 (0.05—0.15)	25 (15—30)	0.15 (0.10—0.20)	30 (25—35)	0.20 (0.10—0.25)
H	Hardened Steel	40—60HRC	20 (10—25)	0.10 (0.05—0.15)	25 (15—30)	0.12 (0.05—0.15)	25 (15—30)	0.15 (0.10—0.20)	30 (25—35)	0.20 (0.10—0.25)

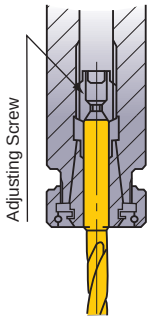
MZS (Internal coolant)

Work Material		Drill Diameter / Conditions / Hardness	φ1.0—φ6.0		φ6.1—φ10.0		φ10.1—φ14.0		φ14.1—φ20.0	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel	≤180HB	80 (50—120)	0.20 (0.10—0.25)	130 (100—140)	0.25 (0.15—0.30)	150 (110—160)	0.30 (0.20—0.40)	160 (120—170)	0.35 (0.25—0.40)
P	Carbon Steel Alloy Steel	180—280HB	70 (50—100)	0.20 (0.10—0.25)	110 (80—120)	0.20 (0.10—0.25)	130 (90—140)	0.25 (0.15—0.35)	140 (100—150)	0.30 (0.20—0.35)
P	Carbon Steel Alloy Steel	280—350HB	60 (30—80)	0.15 (0.10—0.20)	70 (40—90)	0.20 (0.10—0.25)	90 (50—100)	0.25 (0.15—0.35)	100 (60—110)	0.30 (0.20—0.35)
M	Stainless Steel	≤200HB	40 (20—60)	0.10 (0.05—0.15)	70 (40—80)	0.20 (0.10—0.25)	90 (50—100)	0.25 (0.15—0.35)	100 (60—110)	0.25 (0.15—0.30)
K	Gray Cast Iron	Tensile Strength ≤350MPa	100 (70—120)	0.25 (0.15—0.30)	130 (100—140)	0.30 (0.20—0.35)	150 (110—160)	0.35 (0.25—0.40)	160 (120—170)	0.35 (0.25—0.40)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	60 (30—80)	0.20 (0.10—0.25)	70 (40—90)	0.20 (0.10—0.25)	90 (50—110)	0.25 (0.15—0.35)	100 (60—110)	0.30 (0.20—0.35)
N	Aluminium Alloy	—	120 (80—130)	0.20 (0.10—0.25)	150 (100—160)	0.30 (0.15—0.50)	160 (100—150)	0.40 (0.20—0.35)	170 (100—180)	0.50 (0.20—1.00)
S	Heat Resistant Alloy	—	20 (10—25)	0.10 (0.05—0.15)	25 (15—30)	0.12 (0.05—0.15)	25 (15—30)	0.15 (0.10—0.20)	30 (25—35)	0.20 (0.10—0.25)

MZE/MZS DRILLS

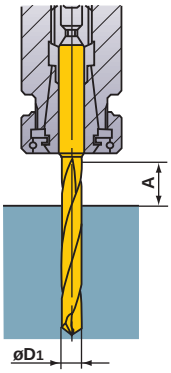
OPERATIONAL GUIDANCE

Drill Holding



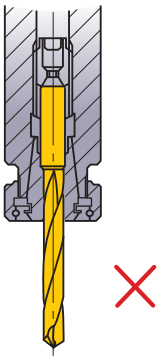
Thrust bearing type collet chuck holds the drill securely.

Drill Length



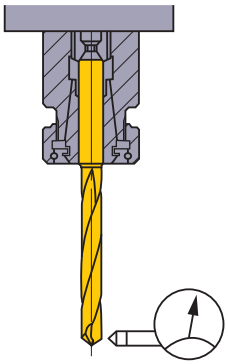
A ≥ D1 x 1.5

Drill Installation



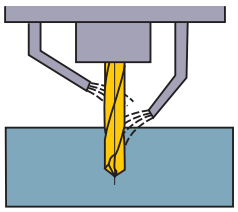
Do not clamp on the flutes.

Installation Tolerance



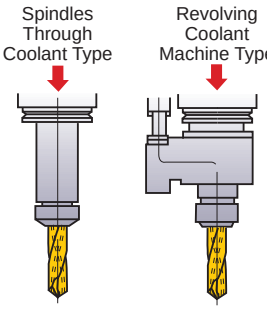
Run-out ≤ 0.03mm

Coolant Method (MZE)



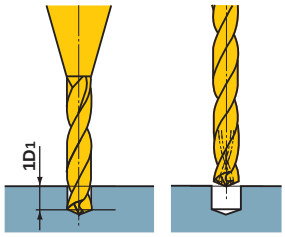
Two coolant positions, at the end and at the center are ideal.

Through Coolant Type (MZS)



Coolant pressure is approx. 0.5—1MPa (<ϕ5:2—3MPa). Coolant volume is 1.5—4.0l/min.

Drill Installation



①When machining a prepared hole with the MZE-SA please set the depth to 1D (D=drill diameter).
②Use the prepared hole as a guide when using a drill with an oil hole. Depending on the cutting conditions, peck feed is recommended.

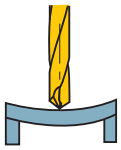
Coolant Handling

<MZS Type>

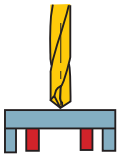
1) Small particles of swarf will jam in the oil hole of small diameter drills. Always use a fine mesh filter as a preventative measure.

2) Dirt and dust particles adhere to the oil in old coolant and prevent an efficient flow. Regular coolant exchange is recommended.

Thin Workpiece

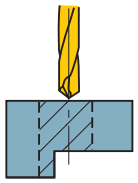


If Bending Occurs ×



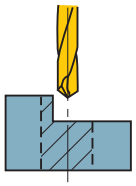
Support the Workpiece ○

Interrupted Cutting



One Process ○

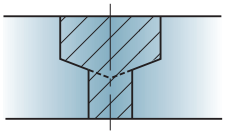
①Lower the feed when drilling the interrupted part.



Requires Prior Machining △

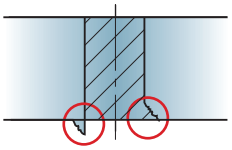
①Spot face with an end mill prior to drilling.

Stepped Holes



①Divide the two processes.
②Drill the larger hole first.
⋆A tool for machining both chamfer and spot face can be produced to order.

Burring and Workpiece Chipping



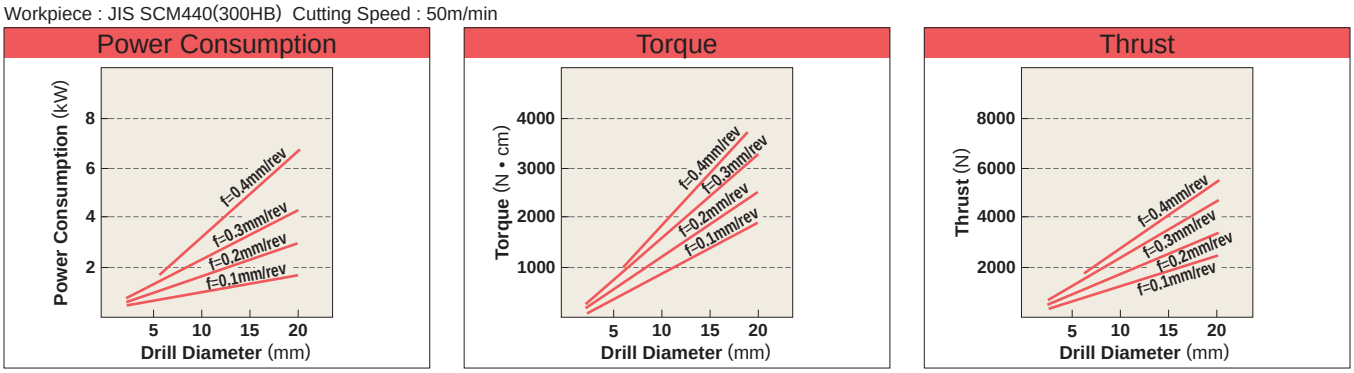
①Lower the feed rate by 50% at the end of through cutting.
②Add a 45°chamfer.
③Change the point angle.

CAUTION TO USE MZS TYPE (Drill Diameter ≤ ϕ3)

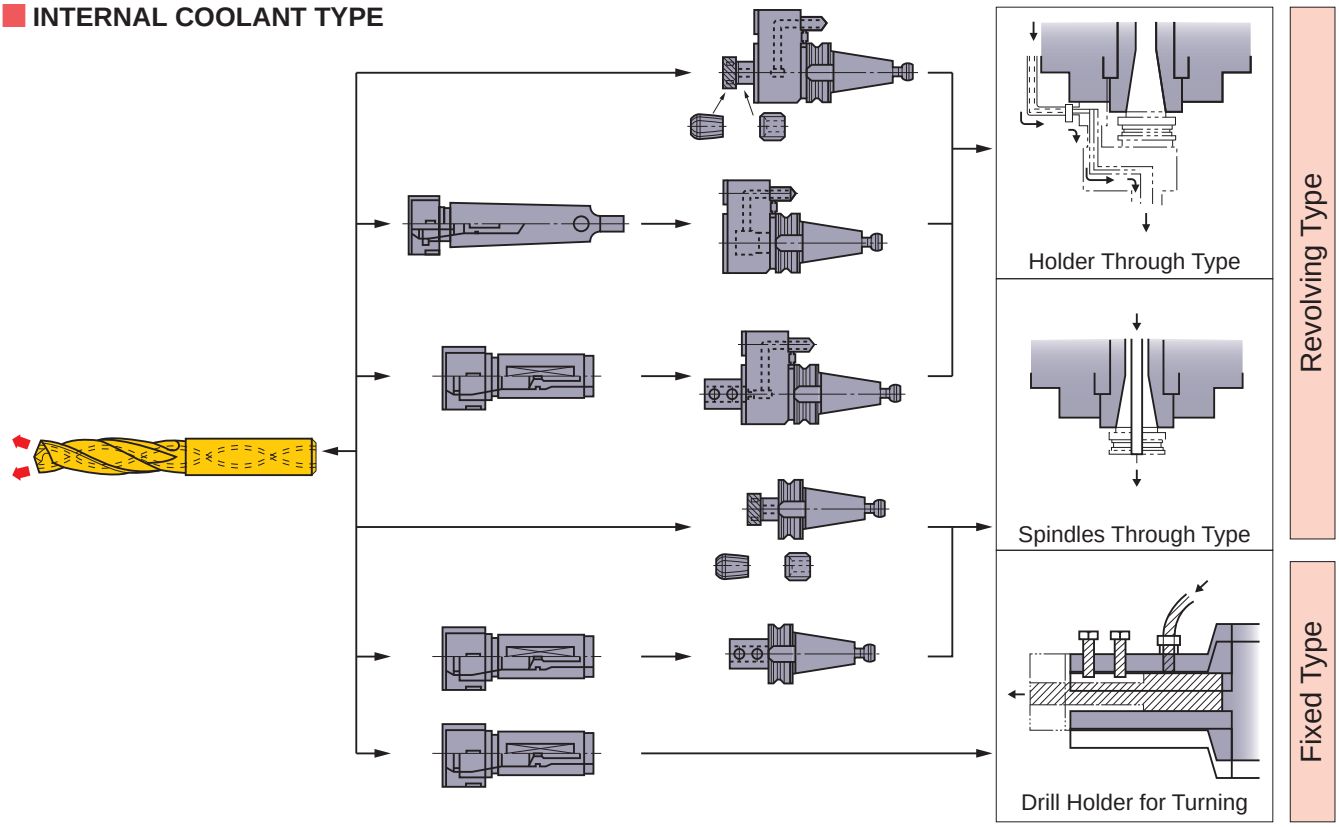
- Please use a fine mesh filter (mesh≤3μm) for coolant to prevent jamming in the oil hole.
- For deep drilling (l/d>3), machining guiding hole is recommended. (Use MZE□□□□SA type for guiding hole.)
- Pick drilling is also effective.

CUTTING RESISTANCE

Workpiece : JIS SCM440(300HB) Cutting Speed : 50m/min



INTERNAL COOLANT TYPE



(Note) When using an internal coolant type drill, small particles of swarf will jam in the oil hole. Always use a filter for the coolant.

MSE

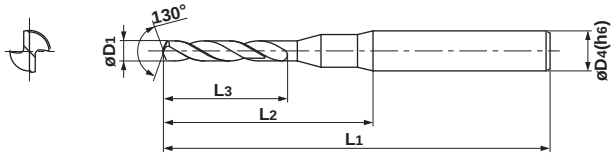
MIRACLE MINI STAR DRILL

- Wide flute for preventing chip jamming.
- Stable, small diameter machining.

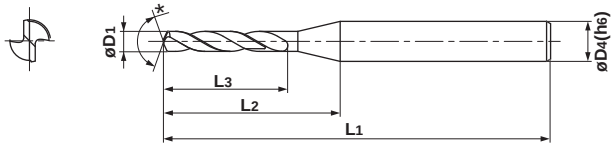
UWC VP 130° 140°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○	○	◎	○	○

	0.1≤D1≤3
D1 Tolerance (mm)	0 −0.009
D4 Tolerance (mm)	0 −0.006



Type1



Type2

★Drill Dia. ϕ0.30−1.59 : 130°
ϕ1.60−2.50 : 140°

(Note) MSE drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Coolant (Int./Ext.)	Stock VP20MF	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
0.10	Ext.	●		MSE0010SB	1.2	9.7	38	3	1
0.11	Ext.	●		0011SB	1.2	9.7	38	3	1
0.12	Ext.	●		0012SB	1.4	9.7	38	3	1
0.13	Ext.	●		0013SB	1.4	9.7	38	3	1
0.14	Ext.	●		0014SB	2	9.7	38	3	1
0.15	Ext.	●		0015SB	2	9.7	38	3	1
0.16	Ext.	●		0016SB	2	9.7	38	3	1
0.17	Ext.	●		0017SB	2	9.7	38	3	1
0.18	Ext.	●		0018SB	2	9.7	38	3	1
0.19	Ext.	●		0019SB	2	9.7	38	3	1
0.20	Ext.	●		0020SB	2.5	9.7	38	3	1
0.21	Ext.	●		0021SB	2.5	9.7	38	3	1
0.22	Ext.	●		0022SB	2.5	9.7	38	3	1
0.23	Ext.	●		0023SB	2.5	9.7	38	3	1
0.24	Ext.	●		0024SB	3	9.7	38	3	1
0.25	Ext.	●		0025SB	3	9.7	38	3	1
0.26	Ext.	●		0026SB	3	9.7	38	3	1
0.27	Ext.	●		0027SB	3	9.7	38	3	1
0.28	Ext.	●		0028SB	3	9.7	38	3	1
0.29	Ext.	●		0029SB	3	9.7	38	3	1
0.30	Ext.		●	0030SB	5	10.2	38	3	2
0.31	Ext.		●	0031SB	5	10.2	38	3	2
0.32	Ext.		●	0032SB	5	10.2	38	3	2
0.33	Ext.		●	0033SB	5	10.2	38	3	2
0.34	Ext.		●	0034SB	6	11.2	38	3	2
0.35	Ext.		●	0035SB	6	11.1	38	3	2
0.36	Ext.		●	0036SB	6	11.1	38	3	2
0.37	Ext.		●	0037SB	6	11.1	38	3	2
0.38	Ext.		●	0038SB	6	11.1	38	3	2
0.39	Ext.		●	0039SB	6	11.1	38	3	2
0.40	Ext.		●	0040SB	7	12.1	38	3	2
0.41	Ext.		●	0041SB	7	12.0	38	3	2
0.42	Ext.		●	0042SB	7	12.0	38	3	2
0.43	Ext.		●	0043SB	7	12.0	38	3	2

Drill Dia. D1 (mm)	Coolant (Int./Ext.)	Stock VP20MF	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
0.44	Ext.		●	MSE0044SB	7	12.0	38	3	2
0.45	Ext.		●	0045SB	7	12.0	38	3	2
0.46	Ext.		●	0046SB	7	11.9	38	3	2
0.47	Ext.		●	0047SB	7	11.9	38	3	2
0.48	Ext.		●	0048SB	7	11.9	38	3	2
0.49	Ext.		●	0049SB	7	11.9	38	3	2
0.50	Ext.		●	0050SB	7	11.9	38	3	2
0.51	Ext.		●	0051SB	7	11.8	38	3	2
0.52	Ext.		●	0052SB	7	11.8	38	3	2
0.53	Ext.		●	0053SB	7	11.8	38	3	2
0.54	Ext.		●	0054SB	7	11.8	38	3	2
0.55	Ext.		●	0055SB	7	11.8	38	3	2
0.56	Ext.		●	0056SB	7	11.8	38	3	2
0.57	Ext.		●	0057SB	7	11.7	38	3	2
0.58	Ext.		●	0058SB	7	11.7	38	3	2
0.59	Ext.		●	0059SB	7	11.7	38	3	2
0.60	Ext.		●	0060SB	7	11.7	38	3	2
0.61	Ext.		●	0061SB	7	11.7	38	3	2
0.62	Ext.		●	0062SB	7	11.6	38	3	2
0.63	Ext.		●	0063SB	7	11.6	38	3	2
0.64	Ext.		●	0064SB	7	11.6	38	3	2
0.65	Ext.		●	0065SB	7	11.6	38	3	2
0.66	Ext.		●	0066SB	7	11.6	38	3	2
0.67	Ext.		●	0067SB	7	11.5	38	3	2
0.68	Ext.		●	0068SB	7	11.5	38	3	2
0.69	Ext.		●	0069SB	7	11.5	38	3	2
0.70	Ext.		●	0070SB	8	12.5	38	3	2
0.71	Ext.		●	0071SB	8	12.5	38	3	2
0.72	Ext.		●	0072SB	8	12.5	38	3	2
0.73	Ext.		●	0073SB	8	12.4	38	3	2
0.74	Ext.		●	0074SB	8	12.4	38	3	2
0.75	Ext.		●	0075SB	8	12.4	38	3	2
0.76	Ext.		●	0076SB	8	12.4	38	3	2
0.77	Ext.		●	0077SB	8	12.4	38	3	2

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan.

Drill Dia. D1 (mm)	Coolant (Int./Ext.)	Stock VP20MF	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
0.78	Ext.		●	MSE0078SB	8	12.3	38	3	2
0.79	Ext.		●	0079SB	8	12.3	38	3	2
0.80	Ext.		●	0080SB	10	14.3	38	3	2
0.81	Ext.		●	0081SB	10	14.3	38	3	2
0.82	Ext.		●	0082SB	10	14.3	38	3	2
0.83	Ext.		●	0083SB	10	14.3	38	3	2
0.84	Ext.		●	0084SB	10	14.2	38	3	2
0.85	Ext.		●	0085SB	10	14.2	38	3	2
0.86	Ext.		●	0086SB	10	14.2	38	3	2
0.87	Ext.		●	0087SB	10	14.2	38	3	2
0.88	Ext.		●	0088SB	10	14.2	38	3	2
0.89	Ext.		●	0089SB	10	14.1	38	3	2
0.90	Ext.		●	0090SB	10	14.1	38	3	2
0.91	Ext.		●	0091SB	10	14.1	38	3	2
0.92	Ext.		●	0092SB	10	14.1	38	3	2
0.93	Ext.		●	0093SB	10	14.1	38	3	2
0.94	Ext.		●	0094SB	10	14.0	38	3	2
0.95	Ext.		●	0095SB	10	14.0	38	3	2
0.96	Ext.		●	0096SB	10	14.0	38	3	2
0.97	Ext.		●	0097SB	10	14.0	38	3	2
0.98	Ext.		●	0098SB	10	14.0	38	3	2
0.99	Ext.		●	0099SB	10	14.0	38	3	2
1.00	Ext.		●	0100SB	10	13.9	38	3	2
1.01	Ext.		●	0101SB	10	13.9	38	3	2
1.02	Ext.		●	0102SB	10	13.9	38	3	2
1.03	Ext.		●	0103SB	10	13.9	38	3	2
1.04	Ext.		●	0104SB	10	13.9	38	3	2
1.05	Ext.		●	0105SB	10	13.8	38	3	2
1.06	Ext.		●	0106SB	10	13.8	38	3	2
1.07	Ext.		●	0107SB	10	13.8	38	3	2
1.08	Ext.		●	0108SB	10	13.8	38	3	2
1.09	Ext.		●	0109SB	10	13.8	38	3	2
1.10	Ext.		●	0110SB	10	13.7	38	3	2
1.11	Ext.		●	0111SB	10	13.7	38	3	2
1.12	Ext.		●	0112SB	10	13.7	38	3	2
1.13	Ext.		●	0113SB	10	13.7	38	3	2
1.14	Ext.		●	0114SB	10	13.7	38	3	2
1.15	Ext.		●	0115SB	10	13.7	38	3	2
1.16	Ext.		●	0116SB	10	13.6	38	3	2
1.17	Ext.		●	0117SB	10	13.6	38	3	2
1.18	Ext.		●	0118SB	10	13.6	38	3	2
1.19	Ext.		●	0119SB	10	13.6	38	3	2
1.20	Ext.		●	0120SB	10	13.6	38	3	2
1.21	Ext.		●	0121SB	10	13.5	38	3	2
1.22	Ext.		●	0122SB	10	13.5	38	3	2
1.23	Ext.		●	0123SB	10	13.5	38	3	2
1.24	Ext.		●	0124SB	10	13.5	38	3	2
1.25	Ext.		●	0125SB	10	13.5	38	3	2
1.26	Ext.		●	0126SB	10	13.4	38	3	2
1.27	Ext.		●	0127SB	10	13.4	38	3	2

Drill Dia. D1 (mm)	Coolant (Int./Ext.)	Stock VP20MF	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
1.28	Ext.		●	MSE0128SB	10	13.4	38	3	2
1.29	Ext.		●	0129SB	10	13.4	38	3	2
1.30	Ext.		●	0130SB	10	13.4	38	3	2
1.31	Ext.		●	0131SB	10	13.4	38	3	2
1.32	Ext.		●	0132SB	10	13.3	38	3	2
1.33	Ext.		●	0133SB	10	13.3	38	3	2
1.34	Ext.		●	0134SB	10	13.3	38	3	2
1.35	Ext.		●	0135SB	10	13.3	38	3	2
1.36	Ext.		●	0136SB	10	13.3	38	3	2
1.37	Ext.		●	0137SB	10	13.2	38	3	2
1.38	Ext.		●	0138SB	10	13.2	38	3	2
1.39	Ext.		●	0139SB	10	13.2	38	3	2
1.40	Ext.		●	0140SB	10	13.2	38	3	2
1.41	Ext.		●	0141SB	10	13.2	38	3	2
1.42	Ext.		●	0142SB	10	13.1	38	3	2
1.43	Ext.		●	0143SB	10	13.1	38	3	2
1.44	Ext.		●	0144SB	10	13.1	38	3	2
1.45	Ext.		●	0145SB	10	13.1	38	3	2
1.46	Ext.		●	0146SB	10	13.1	38	3	2
1.47	Ext.		●	0147SB	10	13.1	38	3	2
1.48	Ext.		●	0148SB	10	13.0	38	3	2
1.49	Ext.		●	0149SB	10	13.0	38	3	2
1.50	Ext.		●	0150SB	10	13.0	38	3	2
1.51	Ext.		●	0151SB	10	13.0	38	3	2
1.52	Ext.		●	0152SB	10	13.0	38	3	2
1.53	Ext.		●	0153SB	10	12.9	38	3	2
1.54	Ext.		●	0154SB	10	12.9	38	3	2
1.55	Ext.		●	0155SB	10	12.9	38	3	2
1.56	Ext.		●	0156SB	10	12.9	38	3	2
1.57	Ext.		●	0157SB	10	12.9	38	3	2
1.58	Ext.		●	0158SB	10	12.8	38	3	2
1.59	Ext.		●	0159SB	10	12.8	38	3	2
1.60	Ext.		●	0160SB	12	14.6	45	3	2
1.61	Ext.		●	0161SB	12	14.6	45	3	2
1.62	Ext.		●	0162SB	12	14.6	45	3	2
1.63	Ext.		●	0163SB	12	14.6	45	3	2
1.64	Ext.		●	0164SB	12	14.5	45	3	2
1.65	Ext.		●	0165SB	12	14.5	45	3	2
1.66	Ext.		●	0166SB	12	14.5	45	3	2
1.67	Ext.		●	0167SB	12	14.5	45	3	2
1.68	Ext.		●	0168SB	12	14.5	45	3	2
1.69	Ext.		●	0169SB	12	14.4	45	3	2
1.70	Ext.		●	0170SB	12	14.4	45	3	2
1.71	Ext.		●	0171SB	12	14.4	45	3	2
1.72	Ext.		●	0172SB	12	14.4	45	3	2
1.73	Ext.		●	0173SB	12	14.4	45	3	2
1.74	Ext.		●	0174SB	12	14.4	45	3	2
1.75	Ext.		●	0175SB	12	14.3	45	3	2
1.76	Ext.		●	0176SB	12	14.3	45	3	2
1.77	Ext.		●	0177SB	12	14.3	45	3	2

CUTTING CONDITIONS D079
TECHNICAL DATA F001

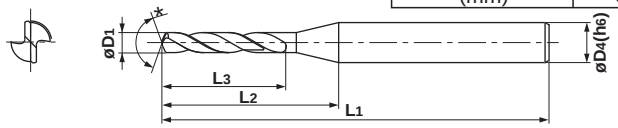
MSE
MIRACLE MINI STAR DRILL

- Wide flute for preventing chip jamming.
- Stable, small diameter machining.

UWC VP 130° 140°

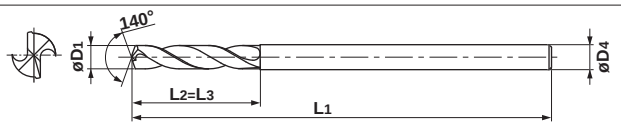
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○	○	◎	○	○

	0.1≤D1≤3
D1 Tolerance (mm)	0 −0.009
D4 Tolerance (mm)	0 −0.006



Type2

★Drill Dia. ϕ0.30−1.59 : 130°
ϕ1.60−2.50 : 140°



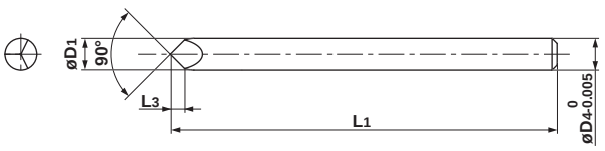
Type3

(Note) MSE drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Coolant (Int./Ext.)	Stock VP20MF	Stock VP15TF	Order Number	Dimensions (mm) Flute Length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Type
1.78	Ext.		●	MSE0178SB	12	14.3	45	3	2
1.79	Ext.		●	0179SB	12	14.3	45	3	2
1.80	Ext.		●	0180SB	12	14.2	45	3	2
1.81	Ext.		●	0181SB	12	14.2	45	3	2
1.82	Ext.		●	0182SB	12	14.2	45	3	2
1.83	Ext.		●	0183SB	12	14.2	45	3	2
1.84	Ext.		●	0184SB	12	14.2	45	3	2
1.85	Ext.		●	0185SB	12	14.1	45	3	2
1.86	Ext.		●	0186SB	12	14.1	45	3	2
1.87	Ext.		●	0187SB	12	14.1	45	3	2
1.88	Ext.		●	0188SB	12	14.1	45	3	2
1.89	Ext.		●	0189SB	12	14.1	45	3	2
1.90	Ext.		●	0190SB	12	14.1	45	3	2
1.91	Ext.		●	0191SB	12	14.0	45	3	2
1.92	Ext.		●	0192SB	12	14.0	45	3	2
1.93	Ext.		●	0193SB	12	14.0	45	3	2
1.94	Ext.		●	0194SB	12	14.0	45	3	2
1.95	Ext.		●	0195SB	12	14.0	45	3	2
1.96	Ext.		●	0196SB	12	13.9	45	3	2
1.97	Ext.		●	0197SB	12	13.9	45	3	2
1.98	Ext.		●	0198SB	12	13.9	45	3	2
1.99	Ext.		●	0199SB	12	13.9	45	3	2
2.00	Ext.		●	MSE0200SB	15	16.9	50	3	2
2.05	Ext.		●	0205SB	15	16.8	50	3	2
2.10	Ext.		●	0210SB	15	16.7	50	3	2
2.15	Ext.		●	0215SB	15	16.6	50	3	2
2.20	Ext.		●	0220SB	15	16.5	50	3	2
2.25	Ext.		●	0225SB	15	16.4	50	3	2
2.30	Ext.		●	0230SB	15	16.3	50	3	2
2.35	Ext.		●	0235SB	15	16.2	50	3	2
2.40	Ext.		●	0240SB	15	16.1	50	3	2
2.45	Ext.		●	0245SB	15	16.0	50	3	2
2.50	Ext.		●	0250SB	15	15.9	50	3	2
2.55	Ext.		●	0255SB	15	15	50	3	3
2.60	Ext.		●	0260SB	15	15	50	3	3
2.65	Ext.		●	0265SB	15	15	50	3	3
2.70	Ext.		●	0270SB	15	15	50	3	3
2.75	Ext.		●	0275SB	15	15	50	3	3
2.80	Ext.		●	0280SB	15	15	50	3	3
2.85	Ext.		●	0285SB	15	15	50	3	3
2.90	Ext.		●	0290SB	15	15	50	3	3
2.95	Ext.		●	0295SB	15	15	50	3	3
3.00	Ext.		●	0300SB	15	15	50	3	3

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

MSP
SPOT DRILL



Order Number	Grade	Stock	Dimensions (mm) Drill Dia. D1	Length of Cut L3	Overall Length L1	Shank Dia. D4	Diameter Range (mm)
MSP0300SB	VP15TF	●	3	1.5	38	3	0.1−3.0

● : Inventory maintained in Japan.

RECOMMENDED CUTTING CONDITIONS

	Work Material	Hardness	Drill Dia. ϕ0.10—ϕ0.19			Drill Dia. ϕ0.20—ϕ0.29			Drill Dia. ϕ0.30—ϕ0.49		
			Revolution (min^{-1})	Feed (mm/rev)	Step (mm)	Revolution (min^{-1})	Feed (mm/rev)	Step (mm)	Revolution (min^{-1})	Feed (mm/rev)	Step (mm)
P	Carbon Steel	≤180HB	20000	0.002	0.02	20000	0.003	0.04	20000	0.004	0.05
	Alloy Steel Pre-Hardened Steel	≤40HRC	20000	0.002	0.02	20000	0.003	0.04	20000	0.004	0.05
M	Stainless Steel	≤200HB	20000	0.002	0.02	18000	0.003	0.04	15000	0.004	0.05
K	Cast Iron	Tensile Strength≤350MPa	20000	0.002	0.02	20000	0.003	0.04	20000	0.004	0.05
N	Aluminium Alloy	—	20000	0.004	0.05	20000	0.006	0.1	20000	0.02	0.3
S	Heat Resistant Alloy	—	7000	0.001	0.02	5000	0.002	0.04	4000	0.003	0.05

	Work Material	Hardness	Drill Dia. ϕ0.50—ϕ0.79			Drill Dia. ϕ0.80—ϕ0.99			Drill Dia. ϕ1.00—ϕ1.19		
			Revolution (min^{-1})	Feed (mm/rev)	Step (mm)	Revolution (min^{-1})	Feed (mm/rev)	Step (mm)	Revolution (min^{-1})	Feed (mm/rev)	Step (mm)
P	Carbon Steel	≤180HB	20000	0.01	0.1	20000	0.04	0.3	16000	0.06	0.5
	Alloy Steel Pre-Hardened Steel	≤40HRC	20000	0.01	0.1	20000	0.02	0.3	16000	0.03	0.5
M	Stainless Steel	≤200HB	10000	0.01	0.1	6000	0.02	0.2	5000	0.03	0.3
K	Cast Iron	Tensile Strength≤350MPa	20000	0.01	0.1	20000	0.04	0.3	16000	0.06	0.5
N	Aluminium Alloy	—	20000	0.05	0.5	20000	0.06	0.8	20000	0.08	1.0
S	Heat Resistant Alloy	—	3000	0.005	0.1	1800	0.01	0.2	1000	0.015	0.3

	Work Material	Hardness	Drill Dia. ϕ1.20—ϕ1.49			Drill Dia. ϕ1.50—ϕ1.99			Drill Dia. ϕ2.00—ϕ2.45		
			Revolution (min^{-1})	Feed (mm/rev)	Step (mm)	Revolution (min^{-1})	Feed (mm/rev)	Step (mm)	Revolution (min^{-1})	Feed (mm/rev)	Step (mm)
P	Carbon Steel	≤180HB	13000	0.07	0.6	12000	0.08	0.7	9500	0.10	0.8
	Alloy Steel Pre-Hardened Steel	≤40HRC	13000	0.05	0.6	10000	0.06	0.7	7000	0.07	0.8
M	Stainless Steel	≤200HB	4000	0.03	0.4	3000	0.04	0.5	3000	0.05	0.6
K	Cast Iron	Tensile Strength≤350MPa	13000	0.07	0.6	12000	0.08	0.7	9500	0.10	0.8
N	Aluminium Alloy	—	18000	0.10	1.2	15000	0.10	1.5	12000	0.12	2.0
S	Heat Resistant Alloy	—	—	—	—	—	—	—	—	—	—

	Work Material	Hardness	Drill Dia. ϕ2.50—ϕ2.95			Drill Dia. ϕ3.00		
			Revolution (min^{-1})	Feed (mm/rev)	Step (mm)	Revolution (min^{-1})	Feed (mm/rev)	Step (mm)
P	Carbon Steel	≤180HB	7600	0.12	0.9	6300	0.12	1.0
	Alloy Steel Pre-Hardened Steel	≤40HRC	5500	0.08	0.9	4500	0.10	1.0
M	Stainless Steel	≤200HB	2500	0.08	0.7	2000	0.10	0.8
K	Cast Iron	Tensile Strength≤350MPa	7600	0.12	0.9	6300	0.12	1.0
N	Aluminium Alloy	—	9000	0.12	2.5	7500	0.15	3.0
S	Heat Resistant Alloy	—	—	—	—	—	—	—

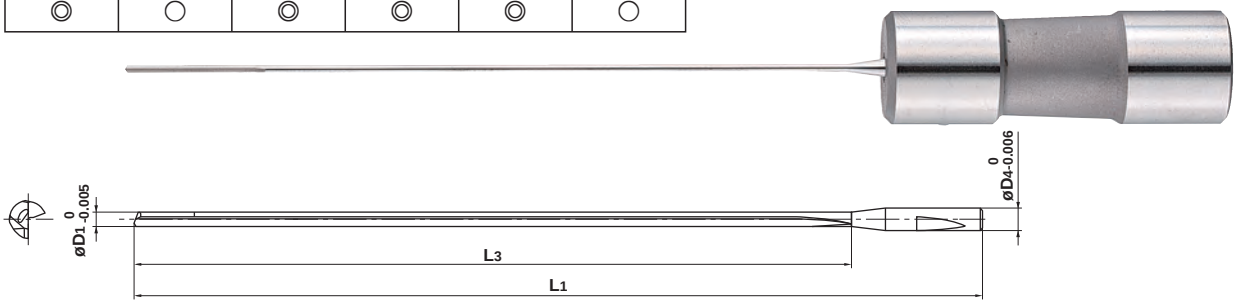
(Notes)
- When drilling holes up to ϕ0.3mm, the use of a spot drill is recommended.
  (Order number : MSP0300SB, Cutting conditions : See below.)
- Change cutting conditions depending on your machine and workpiece rigidity.
- When machining holes over 5D, reduce the step stated above.
- The use of water-soluble fluid (diluted by 20 times) is recommended for drilling under the cutting conditions above.
  Lower the revolutions if you use oil fluid or mist.
- Work materials marked by "—" in the tables above are difficult to drill with external coolant.
  The use of internal coolant type MZS or VA-PDS-SUS is recommended.

Order Number	Revolution (min^{-1})	Table Feed (mm/min)
MSP0300SB	10000	5.0

MGS
SOLID GUN DRILL

- Micro deep hole drilling is possible.
- Excellent run-out accuracy ensures high precision drilling.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○	◎	◎	◎	○



(Note) MGS drills are suitable for use with shrink fit holders.

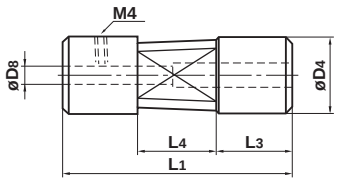
Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
0.7	50	Int.	●	MGS0070L040B	40	80	3
	80	Int.	●	0070L060B	60	100	3
0.8	45	Int.	●	0080L040B	40	80	3
	70	Int.	●	0080L060B	60	100	3
0.9	40	Int.	●	0090L040B	40	80	3
	60	Int.	●	0090L060B	60	100	3
1.0	35	Int.	●	0100L040B	40	80	3
	55	Int.	●	0100L060B	60	100	3
	75	Int.	●	0100L080B	80	120	3
1.1	30	Int.	●	0110L040B	40	80	3
	50	Int.	●	0110L060B	60	100	3
	65	Int.	●	0110L080B	80	120	3
1.2	30	Int.	●	0120L040B	40	80	3
	45	Int.	●	0120L060B	60	100	3
	60	Int.	●	0120L080B	80	120	3
1.3	40	Int.	●	0130L060B	60	100	3
	55	Int.	●	0130L080B	80	120	3
	70	Int.	●	0130L100B	100	140	3
1.4	35	Int.	●	0140L060B	60	100	3
	50	Int.	●	0140L080B	80	120	3
	65	Int.	●	0140L100B	100	140	3
1.5	35	Int.	●	0150L060B	60	100	3
	50	Int.	●	0150L080B	80	120	3
	60	Int.	●	0150L100B	100	140	3
1.6	30	Int.	●	0160L060B	60	100	3
	45	Int.	●	0160L080B	80	120	3
	55	Int.	●	0160L100B	100	140	3
1.7	30	Int.	●	0170L060B	60	100	3
	40	Int.	●	0170L080B	80	120	3
	55	Int.	●	0170L100B	100	140	3

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
1.8	30	Int.	●	MGS0180L060B	60	100	3
	40	Int.	●	0180L080B	80	120	3
	50	Int.	●	0180L100B	100	140	3
1.9	25	Int.	●	0190L060B	60	100	3
	35	Int.	●	0190L080B	80	120	3
	45	Int.	●	0190L100B	100	140	3
2.0	25	Int.	●	0200L060B	60	100	3
	35	Int.	●	0200L080B	80	120	3
	45	Int.	●	0200L100B	100	140	3
2.1	35	Int.	●	0210L080B	80	120	3
	40	Int.	●	0210L100B	100	140	3
2.2	30	Int.	●	0220L080B	80	120	3
	40	Int.	●	0220L100B	100	140	3
2.3	30	Int.	●	0230L080B	80	120	3
	40	Int.	●	0230L100B	100	140	3
2.4	30	Int.	●	0240L080B	80	120	3
	35	Int.	●	0240L100B	100	140	3
2.5	25	Int.	●	0250L080B	80	120	3
	35	Int.	●	0250L100B	100	140	3
2.6	25	Int.	●	0260L080B	80	120	3
	35	Int.	●	0260L100B	100	140	3
2.7	25	Int.	●	0270L080B	80	120	3
	30	Int.	●	0270L100B	100	140	3
2.8	25	Int.	●	0280L080B	80	120	3
	30	Int.	●	0280L100B	100	140	3
2.9	20	Int.	●	0290L080B	80	120	3
	30	Int.	●	0290L100B	100	140	3
3.0	20	Int.	●	0300L080B	80	120	3
	30	Int.	●	0300L100B	100	140	3

(Note) Please consult us regarding coated type drills (**VP**, **GP** and **UP** coated carbide).

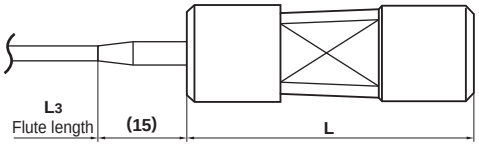
● : **Inventory maintained in Japan.**

DRIVER



Order Number	Stock	Dimensions (mm)					Set Screw	Wrench
		D4	D8	L1	L3	L4		
MGD38	●	12.7	3.0	38.1	12.6	12.7	HSS04004	HKY20F
MGD70	●	12.7	3.0	70.0	25.0	20.0	HSS04004	HKY20F

WHEN CONNECTED WITH A DRIVER



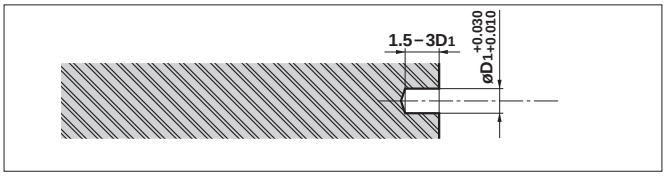
RECOMMENDED CUTTING CONDITIONS

	Work Material	Drill Diameter / Conditions / Hardness	−ϕ3.0 Cutting Speed (m/min)	−ϕ3.0 Feed (mm/rev)	Coolant
P	Mild Steel	≤180HB	70	−0.01	Non-water soluble
P	Carbon Steel Alloy Steel	180−280HB	60	−0.007	Non-water soluble
P	Carbon Steel Alloy Steel	280−350HB	40	−0.005	Non-water soluble
M	Stainless Steel	≤200HB	40	−0.005	Non-water soluble
K	Cast Iron	Tensile Strength ≤350MPa	70	−0.02	Non-water soluble
K	Ductile Cast Iron	Tensile Strength ≤450MPa	50	−0.015	W.S.O
N	Aluminium Alloys	–	110	−0.02	W.S.O
N	Copper Alloys	–	70	−0.02	W.S.O

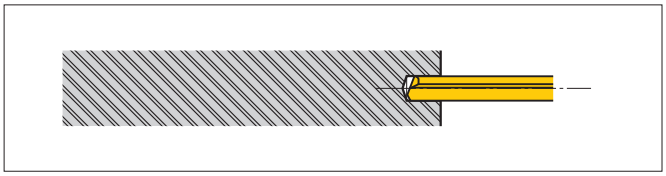
SPECIAL APPLICATION NOTES

- For safety and success, high pressure coolant is required. (Minimum coolant pressure=1,000PSI)
- Coolant filter must be less than 5 microns. Fine filtration is necessary to prevent blockage of the coolant holes.
- A pilot hole or guide bushing is required.

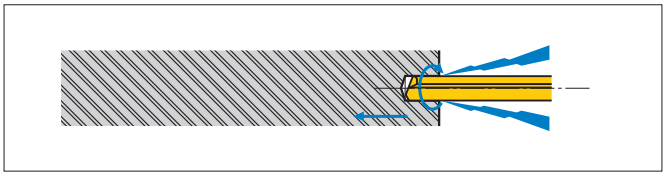
HOW TO USE



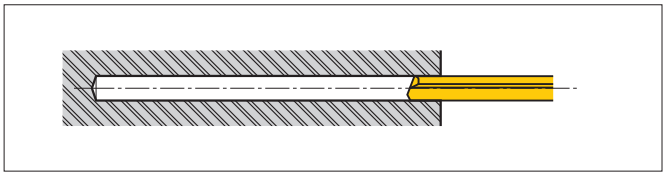
1. Pilot hole drilling. (Mitsubishi's MZE, MZS, MWE or MWS is recommended.)



2. Drill is inserted into the pilot hole. (Drill is not rotating.)



3. Coolant is turned ON, raise cutting speed and feed to the recommended cutting condition.



4. Return to "Pos 2" after drilling end, coolant turned OFF and drill rotation is stopped.

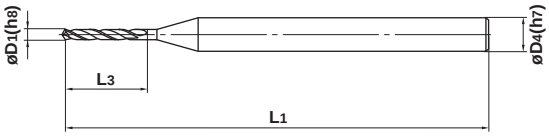
VC-SSS

Short, For steel (3mm shank series)

UWC | VC | 130° D1≤0.6 | 120° D1≥0.7 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○	◎	○	○	○	○

	D1≤3
D1 Tolerance (mm)	0 −0.014
D4 Tolerance (mm)	0 −0.010



● First recommendation for pilot hole drilling of hardened material.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSSD0030	0.3	3	38	3	●
D0040	0.4	4	38	3	●
D0050	0.5	4	38	3	●
D0060	0.6	5	38	3	●
D0070	0.7	5	38	3	●
D0080	0.8	6	38	3	●
D0090	0.9	6	38	3	●
D0100	1.0	8	38	3	●
D0110	1.1	8	38	3	●
D0120	1.2	8	38	3	●
D0130	1.3	8	38	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSSD0140	1.4	8	38	3	●
D0150	1.5	10	45	3	●
D0160	1.6	10	45	3	●
D0170	1.7	10	45	3	●
D0180	1.8	10	45	3	●
D0190	1.9	10	45	3	●
D0200	2.0	12	45	3	●
D0210	2.1	12	45	3	●
D0220	2.2	12	45	3	●
D0230	2.3	12	45	3	●
D0240	2.4	12	45	3	●

RECOMMENDED CUTTING CONDITIONS

Work material	Heat-treated steel AISI H13, AISI 4140 etc. (40−50HRC)			Hardened steel AISI H13, AISI 420 etc. (50−55HRC)			Hardened steel AISI D2, Powder high-speed steel etc. (55−60HRC)		
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Step feed (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Step feed (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Step feed (mm)
0.3	21000	0.005	0.03	16000	0.005	0.03	11000	0.005	0.03
0.5	13000	0.005	0.05	9600	0.005	0.05	6400	0.005	0.05
0.8	8000	0.008	0.08	6000	0.008	0.08	4000	0.008	0.08
1.0	6400	0.01	0.10	4800	0.01	0.10	3200	0.01	0.10
1.2	5300	0.01	0.15	4000	0.01	0.15	2700	0.01	0.10
1.5	4200	0.02	0.20	3200	0.01	0.20	2100	0.01	0.20
1.8	3500	0.03	0.25	2700	0.01	0.25	1800	0.01	0.20
2.0	3200	0.04	0.30	2400	0.02	0.30	1600	0.02	0.30
2.2	2900	0.04	0.40	2200	0.02	0.40	1400	0.02	0.30
2.4	2700	0.05	0.50	2000	0.02	0.50	1300	0.02	0.30

1) Please use a machine with a high accuracy spindle.
2) A collet chuck is recommended to maintain shank condition.
3) Use emulsion as a cutting fluid.

● : **Inventory maintained in Japan.**

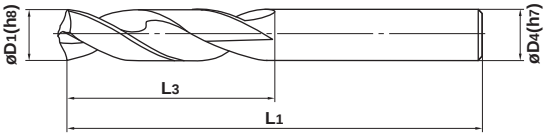
VC-SSS

Short, For steel

UWC VC 135° X Thinning D1<6 SSf Special Subflute D1≥6

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○		○	○	○

	D1≤3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	0 −0.010	0 −0.012	0 −0.015	0 −0.018	0 −0.021



● Highly efficient drilling and long tool life. Also suitable for chamfering. (D1≥6mm)

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSSD0250	2.5	13	50	2.5	●
D0260	2.6	13	50	2.6	●
D0270	2.7	15	50	2.7	●
D0280	2.8	15	50	2.8	●
D0290	2.9	15	50	2.9	●
D0300	3.0	15	50	3.0	●
D0310	3.1	15	50	3.1	●
D0320	3.2	17	50	3.2	●
D0330	3.3	17	50	3.3	●
D0340	3.4	17	50	3.4	●
D0350	3.5	19	51	3.5	●
D0360	3.6	19	51	3.6	●
D0370	3.7	19	51	3.7	●
D0380	3.8	21	54	3.8	●
D0390	3.9	21	54	3.9	●
D0400	4.0	21	54	4.0	●
D0410	4.1	21	54	4.1	●
D0420	4.2	21	54	4.2	●
D0430	4.3	21	54	4.3	●
D0440	4.4	21	54	4.4	●
D0450	4.5	23	57	4.5	●
D0460	4.6	23	57	4.6	●
D0470	4.7	23	57	4.7	●
D0480	4.8	25	61	4.8	●
D0490	4.9	25	61	4.9	●
D0500	5.0	25	61	5.0	●
D0510	5.1	25	61	5.1	●
D0520	5.2	25	61	5.2	●
D0530	5.3	25	61	5.3	●
D0540	5.4	25	61	5.4	●
D0550	5.5	27	65	5.5	●
D0560	5.6	27	65	5.6	●
D0570	5.7	27	65	5.7	●
D0580	5.8	27	65	5.8	●
D0590	5.9	27	65	5.9	●
D0600	6.0	27	65	6.0	●
D0610	6.1	27	65	6.1	●
D0620	6.2	30	69	6.2	●
D0630	6.3	30	69	6.3	●
D0640	6.4	30	69	6.4	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSSD0650	6.5	30	69	6.5	●
D0660	6.6	30	69	6.6	●
D0670	6.7	30	69	6.7	●
D0680	6.8	32	72	6.8	●
D0690	6.9	32	72	6.9	●
D0700	7.0	32	72	7.0	●
D0710	7.1	32	72	7.1	●
D0720	7.2	32	72	7.2	●
D0730	7.3	32	72	7.3	●
D0740	7.4	32	72	7.4	●
D0750	7.5	32	72	7.5	●
D0760	7.6	32	72	7.6	●
D0770	7.7	32	72	7.7	●
D0780	7.8	35	77	7.8	●
D0790	7.9	35	77	7.9	●
D0800	8.0	35	77	8.0	●
D0810	8.1	35	77	8.1	●
D0820	8.2	35	77	8.2	●
D0830	8.3	35	77	8.3	●
D0840	8.4	35	77	8.4	●
D0850	8.5	35	77	8.5	●
D0860	8.6	35	77	8.6	●
D0870	8.7	35	77	8.7	●
D0880	8.8	38	82	8.8	●
D0890	8.9	38	82	8.9	●
D0900	9.0	38	82	9.0	●
D0910	9.1	38	82	9.1	●
D0920	9.2	38	82	9.2	●
D0930	9.3	38	82	9.3	●
D0940	9.4	38	82	9.4	●
D0950	9.5	38	82	9.5	●
D0960	9.6	38	82	9.6	●
D0970	9.7	38	82	9.7	●
D0980	9.8	41	87	9.8	●
D0990	9.9	41	87	9.9	●
D1000	10.0	41	87	10.0	●
D1010	10.1	41	87	10.1	●
D1020	10.2	41	87	10.2	●
D1030	10.3	41	87	10.3	●
D1040	10.4	41	87	10.4	●

CUTTING CONDITIONS D086

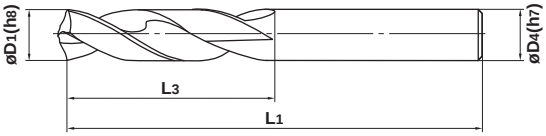
VC-SSS

Short, For steel

UWC | VC | 135° | X Thinning (D1<6) | SSf Special Subflute (D1≥6)

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○		○	○	○

	D1≤3	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)	0 −0.014	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	0 −0.010	0 −0.012	0 −0.015	0 −0.018	0 −0.021



● Highly efficient drilling and long tool life. Also suitable for chamfering. (D1≥6mm)

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSSD1050	10.5	41	87	10.5	●
D1060	10.6	41	87	10.6	●
D1070	10.7	41	87	10.7	●
D1080	10.8	45	93	10.8	●
D1090	10.9	45	93	10.9	●
D1100	11.0	45	93	11.0	●
D1110	11.1	45	93	11.1	●
D1120	11.2	45	93	11.2	●
D1130	11.3	45	93	11.3	●
D1140	11.4	45	93	11.4	●
D1150	11.5	45	93	11.5	●
D1160	11.6	45	93	11.6	●
D1170	11.7	45	93	11.7	●
D1180	11.8	45	93	11.8	●
D1190	11.9	45	93	11.9	●
D1200	12.0	49	100	12.0	●
D1210	12.1	49	100	12.1	●
D1220	12.2	49	100	12.2	●
D1230	12.3	49	100	12.3	●
D1240	12.4	49	100	12.4	●
D1250	12.5	49	100	12.5	●
D1260	12.6	49	100	12.6	●
D1270	12.7	49	100	12.7	●
D1280	12.8	49	100	12.8	●
D1290	12.9	49	100	12.9	●
D1300	13.0	49	100	13.0	●
D1350	13.5	51	104	13.5	●
D1400	14.0	51	104	14.0	●
D1420	14.2	51	104	14.2	●
D1450	14.5	53	108	14.5	●
D1500	15.0	53	108	15.0	●
D1550	15.5	55	112	15.5	●
D1600	16.0	55	112	16.0	●
D1650	16.5	57	116	16.5	●
D1700	17.0	57	116	17.0	●
D1750	17.5	58	119	17.5	●
D1800	18.0	58	119	18.0	●
D1850	18.5	60	123	18.5	●
D1900	19.0	60	123	19.0	●
D1950	19.5	62	127	19.5	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSSD2000	20.0	62	127	20.0	●

● : **Inventory maintained in Japan.**

CUTTING CONDITIONS D086

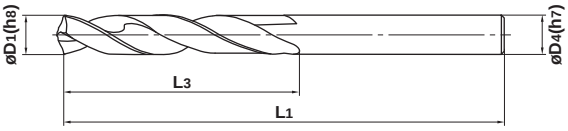
VC-SSM

Medium, For steel

UWC VC 135° SSf Special Subflute

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○		○	○	○

	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	0 −0.012	0 −0.015	0 −0.018	0 −0.021



● Highly efficient drilling and long tool life. Also suitable for chamfering.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSMD0600	6.0	41	81	6.0	●
D0610	6.1	41	81	6.1	●
D0620	6.2	41	81	6.2	●
D0630	6.3	41	81	6.3	●
D0640	6.4	41	81	6.4	●
D0650	6.5	41	81	6.5	●
D0660	6.6	43	83	6.6	●
D0670	6.7	43	83	6.7	●
D0680	6.8	43	83	6.8	●
D0690	6.9	43	83	6.9	●
D0700	7.0	43	83	7.0	●
D0710	7.1	45	87	7.1	●
D0720	7.2	45	87	7.2	●
D0730	7.3	45	87	7.3	●
D0740	7.4	45	87	7.4	●
D0750	7.5	45	87	7.5	●
D0760	7.6	48	90	7.6	●
D0770	7.7	48	90	7.7	●
D0780	7.8	48	90	7.8	●
D0790	7.9	48	90	7.9	●
D0800	8.0	48	90	8.0	●
D0810	8.1	53	96	8.1	●
D0820	8.2	53	96	8.2	●
D0830	8.3	53	96	8.3	●
D0840	8.4	53	96	8.4	●
D0850	8.5	53	96	8.5	●
D0860	8.6	55	98	8.6	●
D0870	8.7	55	98	8.7	●
D0880	8.8	55	98	8.8	●
D0890	8.9	55	98	8.9	●
D0900	9.0	55	98	9.0	●
D0910	9.1	58	102	9.1	●
D0920	9.2	58	102	9.2	●
D0930	9.3	58	102	9.3	●
D0940	9.4	58	102	9.4	●
D0950	9.5	58	102	9.5	●
D0960	9.6	60	105	9.6	●
D0970	9.7	60	105	9.7	●
D0980	9.8	60	105	9.8	●
D0990	9.9	60	105	9.9	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSMD1000	10.0	60	105	10.0	●
D1010	10.1	66	112	10.1	●
D1020	10.2	66	112	10.2	●
D1030	10.3	66	112	10.3	●
D1040	10.4	66	112	10.4	●
D1050	10.5	66	112	10.5	●
D1060	10.6	68	114	10.6	●
D1070	10.7	68	114	10.7	●
D1080	10.8	68	114	10.8	●
D1090	10.9	68	114	10.9	●
D1100	11.0	68	114	11.0	●
D1110	11.1	71	118	11.1	●
D1120	11.2	71	118	11.2	●
D1130	11.3	71	118	11.3	●
D1140	11.4	71	118	11.4	●
D1150	11.5	71	118	11.5	●
D1160	11.6	73	121	11.6	●
D1170	11.7	73	121	11.7	●
D1180	11.8	73	121	11.8	●
D1190	11.9	73	121	11.9	●
D1200	12.0	73	121	12.0	●
D1210	12.1	76	135	12.1	●
D1220	12.2	76	135	12.2	●
D1230	12.3	76	135	12.3	●
D1240	12.4	76	135	12.4	●
D1250	12.5	76	135	12.5	●
D1260	12.6	78	137	12.6	●
D1270	12.7	78	137	12.7	●
D1280	12.8	78	137	12.8	●
D1290	12.9	78	137	12.9	●
D1300	13.0	78	137	13.0	●
D1350	13.5	84	144	13.5	●
D1400	14.0	86	147	14.0	●
D1420	14.2	89	151	14.2	●
D1450	14.5	89	151	14.5	●
D1500	15.0	91	153	15.0	●
D1550	15.5	94	157	15.5	●
D1600	16.0	96	160	16.0	●
D1650	16.5	102	167	16.5	●
D1700	17.0	102	167	17.0	●

CUTTING CONDITIONS D086

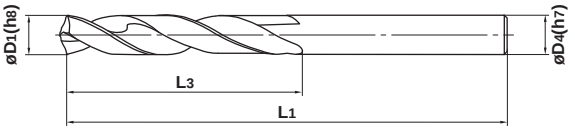
CARBIDE

VC-SSM

Medium, For steel

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎	○		○	○	○

	3<D1≤6	6<D1≤10	10<D1≤18	18<D1≤20
D1 Tolerance (mm)	0 −0.018	0 −0.022	0 −0.027	0 −0.033
D4 Tolerance (mm)	0 −0.012	0 −0.015	0 −0.018	0 −0.021



● Highly efficient drilling and long tool life. Also suitable for chamfering.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSMD1750	17.5	102	167	17.5	●
D1800	18.0	102	167	18.0	●
D1850	18.5	114	179	18.5	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCSSMD1900	19.0	114	179	19.0	●
D1950	19.5	114	179	19.5	●
D2000	20.0	114	179	20.0	●

RECOMMENDED CUTTING CONDITIONS

VC-SSS/VC-SSM

Work material	Cast iron AISI 80/55/06 etc.		Structural steel		Carbon steel AISI 1049 etc. (20−30HRC)		Alloy steel AISI 4140 etc. (30−40HRC)		Heat-treated steel AISI H13, AISI 4140 etc. (40−50HRC)	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
2.5	10000	0.10	13000	0.14	10000	0.10	7600	0.09	3800	0.07
3.0	8500	0.12	11000	0.15	8500	0.12	6400	0.10	3200	0.08
4.0	6400	0.14	8000	0.18	6400	0.14	4800	0.11	2400	0.09
5.0	5100	0.16	6400	0.19	5100	0.16	3800	0.12	1900	0.10
6.0	3700	0.20	5300	0.20	4200	0.20	3200	0.16	1900	0.12
8.0	2800	0.23	4000	0.23	3200	0.23	2400	0.18	1400	0.14
10.0	2200	0.25	3200	0.25	2500	0.25	1900	0.20	1100	0.15
12.0	1600	0.25	2100	0.27	1600	0.25	1100	0.21	900	0.16
14.0	1400	0.27	1800	0.28	1400	0.27	900	0.23	800	0.17
16.0	1200	0.27	1600	0.28	1200	0.27	800	0.23	600	0.18
18.0	1100	0.28	1400	0.30	1100	0.28	700	0.25	500	0.19
20.0	1000	0.28	1300	0.30	1000	0.28	600	0.25	500	0.20

1) Use rigid machines.
2) Collet chuck is recommended to maintain shank condition.
3) Use emulsion as a cutting fluid.
4) This table indicates conditions with drilling depths of 2.5D (D:drill diameter).
5) This table assumes drilling conditions above 1) through 4).
Please change the cutting conditions referring to the table below when circumstances are different.
Please multiply by coefficients when circumstances match the table.

<Appended table>

Situation	Coefficient
Non-water-soluble cutting fluid is used.	0.8
Horizontal machining center is used. (Hardness of work material: Less than 40 HRC)	0.7
Horizontal machining center is used. (Hardness of work material: More than 40 HRC)	0.9
Depth of drilled hole 3D	0.9

● : **Inventory maintained in Japan.**

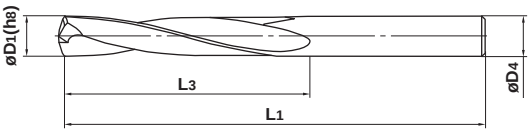
VC-HSM

Medium, For hardened material

UWC VC 130° D1<6 120° 140° D1≥6 X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
	◎				○

	D1≤3	3<D1≤6	6<D1≤10	10<D1≤16
D1 Tolerance (mm)	0 −0.014	0 −0.018	0 −0.022	0 −0.027
D4 Tolerance (mm)	0 −0.009	0 −0.012	0 −0.015	0 −0.018



● A suitable geometry for high hardness (60 HRC) material drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCHSMD0250	2.5	20	55	2.5	●
D0260	2.6	20	55	2.6	●
D0270	2.7	20	55	2.7	●
D0280	2.8	21	60	2.8	●
D0290	2.9	21	60	2.9	●
D0300	3.0	21	60	3	●
D0310	3.1	24	60	3.1	●
D0320	3.2	24	60	3.2	●
D0330	3.3	24	60	3.3	●
D0340	3.4	24	60	3.4	●
D0350	3.5	24	60	3.5	●
D0360	3.6	27	60	3.6	●
D0370	3.7	27	60	3.7	●
D0380	3.8	27	60	3.8	●
D0390	3.9	27	60	3.9	●
D0400	4.0	27	60	4	●
D0410	4.1	29	63	4.1	●
D0420	4.2	29	63	4.2	●
D0430	4.3	29	63	4.3	●
D0440	4.4	29	63	4.4	●
D0450	4.5	29	63	4.5	●
D0460	4.6	32	68	4.6	●
D0470	4.7	32	68	4.7	●
D0480	4.8	32	68	4.8	●
D0490	4.9	32	68	4.9	●
D0500	5.0	32	68	5	●
D0510	5.1	34	72	5.1	●
D0520	5.2	34	72	5.2	●
D0530	5.3	34	72	5.3	●
D0540	5.4	34	72	5.4	●
D0550	5.5	34	72	5.5	●
D0560	5.6	36	74	5.6	●
D0570	5.7	36	74	5.7	●
D0580	5.8	36	74	5.8	●
D0590	5.9	36	74	5.9	●
D0600	6.0	41	81	6	●
D0650	6.5	41	81	6.5	●
D0690	6.9	43	83	6.9	●
D0700	7.0	43	83	7	●
D0750	7.5	45	87	7.5	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VCHSMD0800	8.0	48	90	8	●
D0850	8.5	53	96	8.5	●
D0860	8.6	55	98	8.6	●
D0900	9.0	55	98	9	●
D0950	9.5	58	102	9.5	●
D1000	10.0	60	105	10	●
D1040	10.4	66	112	10.4	●
D1050	10.5	66	112	10.5	●
D1100	11.0	68	114	11	●
D1150	11.5	71	118	11.5	●
D1200	12.0	73	121	12	●
D1250	12.5	76	135	12.5	●
D1300	13.0	78	137	13	●
D1350	13.5	84	144	13.5	●
D1400	14.0	86	147	14	●
D1450	14.5	89	151	14.5	●
D1500	15.0	91	153	15	●
D1550	15.5	94	157	15.5	●
D1600	16.0	96	160	16	●

RECOMMENDED CUTTING CONDITIONS

Work material	Hardened steel AISI H13, AISI 420 etc. (50−55HRC)		Hardened steel AISI D2, Powder high-speed steel etc. (55−60HRC)	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
2.5	1900	0.06	1300	0.04
3.0	1600	0.06	1100	0.04
4.0	1200	0.06	800	0.04
5.0	1000	0.06	600	0.04
6.0	800	0.06	530	0.04
8.0	600	0.07	400	0.05
10.0	480	0.07	320	0.05
12.0	400	0.07	270	0.05
14.0	340	0.07	230	0.05
16.0	300	0.07	200	0.05

1) Use rigid machines.
2) Collet chuck is recommended to maintain shank condition.
3) Use emulsion as cutting fluid.
4) Recommended depth of drilling is 3D (D:drill diameter) under these cutting conditions.

DRILLING(SOLID CARBIDE)

MAE/MAS

- Specially for aluminium and cast iron drilling.
- High hole accuracy.
- Pre-hole drilling for roll taps.
- Helical through coolant hole enables high speed machining (MAS type).

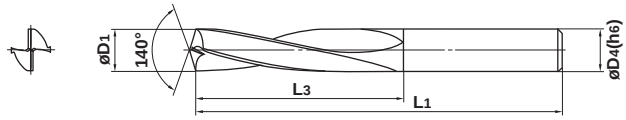
UWC 140°

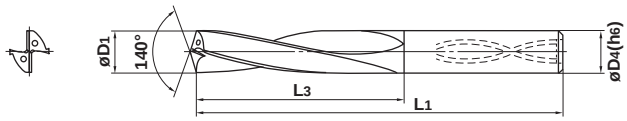
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
			○	◎	

	D1=3	3<D1≤6	6<D1≤10	10<D1≤16
D1 Tolerance (mm)	+0.005 0	+0.005 0	+0.005 0	+0.005 0
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011

MAE (External Coolant)

MAS (Internal Coolant)





(Note 1) MAS type bigger thanϕ5.0 have a recess in the end face.
(Note 2) MAE/MAS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
3.0	3	Ext.	●	MAE0300MB	21	61	3
	3	Int.	□	MAS0300MB	21	61	3
	6	Int.	●	MAS0300LB	30	70	3
3.1	3	Ext.	●	MAE0310MB	24	64	4
	3	Int.	□	MAS0310MB	24	64	4
	6	Int.	●	MAS0310LB	34	74	4
3.2	3	Ext.	●	MAE0320MB	24	64	4
	3	Int.	□	MAS0320MB	24	64	4
	6	Int.	●	MAS0320LB	34	74	4
3.3	3	Ext.	●	MAE0330MB	24	64	4
	3	Int.	□	MAS0330MB	24	64	4
	6	Int.	●	MAS0330LB	34	74	4
3.4	3	Ext.	●	MAE0340MB	24	64	4
	3	Int.	□	MAS0340MB	24	64	4
	6	Int.	●	MAS0340LB	34	74	4
3.5	3	Ext.	●	MAE0350MB	24	64	4
	3	Int.	□	MAS0350MB	24	64	4
	6	Int.	●	MAS0350LB	34	74	4
3.6	3	Ext.	●	MAE0360MB	28	68	4
	3	Int.	□	MAS0360MB	28	68	4
	6	Int.	●	MAS0360LB	40	80	4
3.65	3	Ext.	●	⁎ MAE0365MB	28	68	4
	3	Int.	□	⁎ MAS0365MB	28	68	4
	6	Int.	●	⁎ MAS0365LB	40	80	4
3.7	3	Ext.	●	MAE0370MB	28	68	4
	3	Int.	□	MAS0370MB	28	68	4
	6	Int.	●	MAS0370LB	40	80	4
3.8	3	Ext.	●	MAE0380MB	28	68	4
	3	Int.	□	MAS0380MB	28	68	4
	6	Int.	●	MAS0380LB	40	80	4
3.9	3	Ext.	●	MAE0390MB	28	68	4
	3	Int.	□	MAS0390MB	28	68	4
	6	Int.	●	MAS0390LB	40	80	4
4.0	3	Ext.	●	MAE0400MB	28	68	4
	3	Int.	□	MAS0400MB	28	68	4
	6	Int.	●	MAS0400LB	40	80	4
4.1	3	Ext.	●	MAE0410MB	31	71	5
	3	Int.	□	MAS0410MB	31	71	5
	6	Int.	●	MAS0410LB	44	84	5

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
4.2	3	Ext.	●	MAE0420MB	31	71	5
	3	Int.	□	MAS0420MB	31	71	5
	6	Int.	●	MAS0420LB	44	84	5
4.3	3	Ext.	●	MAE0430MB	31	71	5
	3	Int.	□	MAS0430MB	31	71	5
	6	Int.	●	MAS0430LB	44	84	5
4.4	3	Ext.	●	MAE0440MB	31	71	5
	3	Int.	□	MAS0440MB	31	71	5
	6	Int.	●	MAS0440LB	44	84	5
4.5	3	Ext.	●	MAE0450MB	31	71	5
	3	Int.	□	MAS0450MB	31	71	5
	6	Int.	●	MAS0450LB	44	84	5
4.6	3	Ext.	●	⁎ MAE0460MB	33	73	5
	3	Int.	□	⁎ MAS0460MB	33	73	5
	6	Int.	●	⁎ MAS0460LB	48	88	5
4.7	3	Ext.	●	MAE0470MB	33	73	5
	3	Int.	□	MAS0470MB	33	73	5
	6	Int.	●	MAS0470LB	48	88	5
4.8	3	Ext.	●	MAE0480MB	33	73	5
	3	Int.	□	MAS0480MB	33	73	5
	6	Int.	●	MAS0480LB	48	88	5
4.9	3	Ext.	●	MAE0490MB	33	73	5
	3	Int.	□	MAS0490MB	33	73	5
	6	Int.	●	MAS0490LB	48	88	5
5.0	3	Ext.	●	MAE0500MB	33	73	5
	3	Int.	●	MAS0500MB	33	73	5
	6	Int.	●	MAS0500LB	48	88	5
5.1	3	Ext.	●	MAE0510MB	36	76	6
	3	Int.	□	MAS0510MB	36	76	6
	6	Int.	●	MAS0510LB	52	92	6
5.2	3	Ext.	●	MAE0520MB	36	76	6
	3	Int.	□	MAS0520MB	36	76	6
	6	Int.	●	MAS0520LB	52	92	6
5.3	3	Ext.	●	MAE0530MB	36	76	6
	3	Int.	□	MAS0530MB	36	76	6
	6	Int.	●	MAS0530LB	52	92	6
5.4	3	Ext.	●	MAE0540MB	36	76	6
	3	Int.	□	MAS0540MB	36	76	6
	6	Int.	●	MAS0540LB	52	92	6

⁎ Standard hole size for rolled thread taps.

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
5.5	3	Ext.	●	⁎ MAE0550MB	36	76	6
	3	Int.	●	⁎ MAS0550MB	36	76	6
	6	Int.	●	⁎ MAS0550LB	52	92	6
5.6	3	Ext.	●	MAE0560MB	39	79	6
	3	Int.	□	MAS0560MB	39	79	6
	6	Int.	●	MAS0560LB	57	97	6
5.7	3	Ext.	●	MAE0570MB	39	79	6
	3	Int.	□	MAS0570MB	39	79	6
	6	Int.	●	MAS0570LB	57	97	6
5.8	3	Ext.	●	MAE0580MB	39	79	6
	3	Int.	□	MAS0580MB	39	79	6
	6	Int.	●	MAS0580LB	57	97	6
5.9	3	Ext.	●	MAE0590MB	39	79	6
	3	Int.	□	MAS0590MB	39	79	6
	6	Int.	●	MAS0590LB	57	97	6
6.0	3	Ext.	●	MAE0600MB	39	79	6
	3	Int.	●	MAS0600MB	39	79	6
	6	Int.	●	MAS0600LB	57	97	6
6.1	3	Ext.	●	MAE0610MB	42	84	7
	3	Int.	□	MAS0610MB	42	84	7
	6	Int.	●	MAS0610LB	62	104	7
6.2	3	Ext.	●	MAE0620MB	42	84	7
	3	Int.	□	MAS0620MB	42	84	7
	6	Int.	●	MAS0620LB	62	104	7
6.3	3	Ext.	●	MAE0630MB	42	84	7
	3	Int.	□	MAS0630MB	42	84	7
	6	Int.	●	MAS0630LB	62	104	7
6.4	3	Ext.	●	MAE0640MB	42	84	7
	3	Int.	□	MAS0640MB	42	84	7
	6	Int.	●	MAS0640LB	62	104	7
6.5	3	Ext.	●	MAE0650MB	42	84	7
	3	Int.	●	MAS0650MB	42	84	7
	6	Int.	●	MAS0650LB	62	104	7
6.6	3	Ext.	●	MAE0660MB	42	84	7
	3	Int.	□	MAS0660MB	42	84	7
	6	Int.	●	MAS0660LB	65	107	7
6.7	3	Ext.	●	MAE0670MB	42	84	7
	3	Int.	□	MAS0670MB	42	84	7
	6	Int.	●	MAS0670LB	65	107	7
6.8	3	Ext.	●	MAE0680MB	42	84	7
	3	Int.	●	MAS0680MB	42	84	7
	6	Int.	●	MAS0680LB	65	107	7
6.9	3	Ext.	●	MAE0690MB	42	84	7
	3	Int.	□	MAS0690MB	42	84	7
	6	Int.	●	MAS0690LB	65	107	7
7.0	3	Ext.	●	MAE0700MB	42	84	7
	3	Int.	●	MAS0700MB	42	84	7
	6	Int.	●	MAS0700LB	65	107	7
7.1	3	Ext.	●	MAE0710MB	48	90	8
	3	Int.	□	MAS0710MB	48	90	8
	6	Int.	●	MAS0710LB	68	110	8
7.2	3	Ext.	●	MAE0720MB	48	90	8
	3	Int.	□	MAS0720MB	48	90	8
	6	Int.	●	MAS0720LB	68	110	8
7.3	3	Ext.	●	MAE0730MB	48	90	8
	3	Int.	□	MAS0730MB	48	90	8
	6	Int.	●	MAS0730LB	68	110	8
7.35	3	Ext.	●	⁎ MAE0735MB	48	90	8
	3	Int.	●	⁎ MAS0735MB	48	90	8
	6	Int.	●	⁎ MAS0735LB	68	110	8
7.4	3	Ext.	●	MAE0740MB	48	90	8
	3	Int.	□	MAS0740MB	48	90	8
	6	Int.	●	MAS0740LB	68	110	8
7.5	3	Ext.	●	MAE0750MB	48	90	8
	3	Int.	□	MAS0750MB	48	90	8
	6	Int.	●	MAS0750LB	68	110	8
7.6	3	Ext.	●	MAE0760MB	48	90	8
	3	Int.	□	MAS0760MB	48	90	8
	6	Int.	●	MAS0760LB	72	114	8
7.7	3	Ext.	●	MAE0770MB	48	90	8
	3	Int.	□	MAS0770MB	48	90	8
	6	Int.	●	MAS0770LB	72	114	8
7.8	3	Ext.	●	MAE0780MB	48	90	8
	3	Int.	□	MAS0780MB	48	90	8
	6	Int.	●	MAS0780LB	72	114	8
7.9	3	Ext.	●	MAE0790MB	48	90	8
	3	Int.	□	MAS0790MB	48	90	8
	6	Int.	●	MAS0790LB	72	114	8
8.0	3	Ext.	●	MAE0800MB	48	90	8
	3	Int.	●	MAS0800MB	48	90	8
	6	Int.	●	MAS0800LB	72	114	8
8.1	3	Ext.	●	MAE0810MB	50	94	9
	3	Int.	□	MAS0810MB	50	94	9
	6	Int.	●	MAS0810LB	75	119	9
8.2	3	Ext.	●	MAE0820MB	50	94	9
	3	Int.	□	MAS0820MB	50	94	9
	6	Int.	●	MAS0820LB	75	119	9
8.3	3	Ext.	●	MAE0830MB	50	94	9
	3	Int.	□	MAS0830MB	50	94	9
	6	Int.	●	MAS0830LB	75	119	9
8.4	3	Ext.	●	MAE0840MB	50	94	9
	3	Int.	□	MAS0840MB	50	94	9
	6	Int.	●	MAS0840LB	75	119	9
8.5	3	Ext.	●	MAE0850MB	50	94	9
	3	Int.	●	MAS0850MB	50	94	9
	6	Int.	●	MAS0850LB	75	119	9

⁎ Standard hole size for rolled thread taps.

CUTTING CONDITIONS D093
TECHNICAL DATA F001

DRILLING(SOLID CARBIDE)

MAE/MAS

- Specially for aluminium and cast iron drilling.
- High hole accuracy.
- Pre-hole drilling for roll taps.
- Helical through coolant hole enables high speed machining (MAS type).

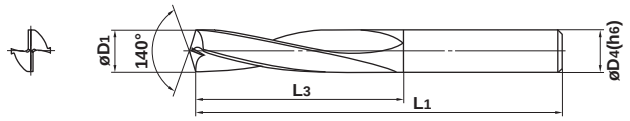
UWC 140°

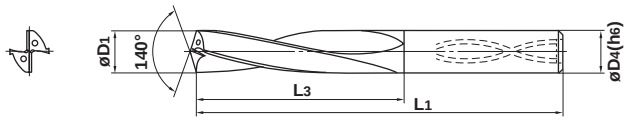
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
			○	◎	

	D1=3	3<D1≤6	6<D1≤10	10<D1≤16
D1 Tolerance (mm)	+0.005 0	+0.005 0	+0.005 0	+0.005 0
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011

MAE (External Coolant)

MAS (Internal Coolant)





(Note 1) MAS type bigger thanϕ5.0 have a recess in the end face.
(Note 2) MAE/MAS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
8.6	3	Ext.	●	MAE0860MB	50	94	9
	3	Int.	□	MAS0860MB	50	94	9
	6	Int.	●	MAS0860LB	77	121	9
8.7	3	Ext.	●	MAE0870MB	50	94	9
	3	Int.	□	MAS0870MB	50	94	9
	6	Int.	●	MAS0870LB	77	121	9
8.8	3	Ext.	●	MAE0880MB	50	94	9
	3	Int.	□	MAS0880MB	50	94	9
	6	Int.	●	MAS0880LB	77	121	9
8.9	3	Ext.	●	MAE0890MB	50	94	9
	3	Int.	□	MAS0890MB	50	94	9
	6	Int.	●	MAS0890LB	77	121	9
9.0	3	Ext.	●	MAE0900MB	50	94	9
	3	Int.	●	MAS0900MB	50	94	9
	6	Int.	●	MAS0900LB	77	121	9
9.1	3	Ext.	●	MAE0910MB	53	97	10
	3	Int.	□	MAS0910MB	53	97	10
	6	Int.	●	MAS0910LB	81	125	10
9.2	3	Ext.	●	MAE0920MB	53	97	10
	3	Int.	□	MAS0920MB	53	97	10
	6	Int.	●	MAS0920LB	81	125	10
9.21	3	Ext.	●	⁎ MAE0921MB	53	97	10
	3	Int.	●	⁎ MAS0921MB	53	97	10
	6	Int.	●	⁎ MAS0921LB	81	125	10
9.3	3	Ext.	●	MAE0930MB	53	97	10
	3	Int.	□	MAS0930MB	53	97	10
	6	Int.	●	MAS0930LB	81	125	10
9.4	3	Ext.	●	MAE0940MB	53	97	10
	3	Int.	□	MAS0940MB	53	97	10
	6	Int.	●	MAS0940LB	81	125	10
9.5	3	Ext.	●	MAE0950MB	53	97	10
	3	Int.	●	MAS0950MB	53	97	10
	6	Int.	●	MAS0950LB	81	125	10
9.6	3	Ext.	●	MAE0960MB	53	97	10
	3	Int.	□	MAS0960MB	53	97	10
	6	Int.	●	MAS0960LB	81	125	10
9.7	3	Ext.	●	MAE0970MB	53	97	10
	3	Int.	□	MAS0970MB	53	97	10
	6	Int.	●	MAS0970LB	81	125	10

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
9.8	3	Ext.	●	MAE0980MB	53	97	10
	3	Int.	□	MAS0980MB	53	97	10
	6	Int.	●	MAS0980LB	81	125	10
9.9	3	Ext.	●	MAE0990MB	53	97	10
	3	Int.	□	MAS0990MB	53	97	10
	6	Int.	●	MAS0990LB	81	125	10
10.0	3	Ext.	●	MAE1000MB	53	97	10
	3	Int.	●	MAS1000MB	53	97	10
	6	Int.	●	MAS1000LB	81	125	10
10.1	3	Ext.	□	MAE1010MB	55	101	11
	3	Int.	□	MAS1010MB	55	101	11
	6	Int.	□	MAS1010LB	89	135	11
10.2	3	Ext.	□	MAE1020MB	55	101	11
	3	Int.	□	MAS1020MB	55	101	11
	6	Int.	□	MAS1020LB	89	135	11
10.3	3	Ext.	●	MAE1030MB	55	101	11
	3	Int.	●	MAS1030MB	55	101	11
	6	Int.	●	MAS1030LB	89	135	11
10.4	3	Ext.	□	MAE1040MB	55	101	11
	3	Int.	□	MAS1040MB	55	101	11
	6	Int.	□	MAS1040LB	89	135	11
10.5	3	Ext.	●	MAE1050MB	55	101	11
	3	Int.	●	MAS1050MB	55	101	11
	6	Int.	●	MAS1050LB	89	135	11
10.6	3	Ext.	□	MAE1060MB	55	101	11
	3	Int.	□	MAS1060MB	55	101	11
	6	Int.	□	MAS1060LB	89	135	11
10.7	3	Ext.	□	MAE1070MB	55	101	11
	3	Int.	□	MAS1070MB	55	101	11
	6	Int.	□	MAS1070LB	89	135	11
10.8	3	Ext.	□	MAE1080MB	55	101	11
	3	Int.	□	MAS1080MB	55	101	11
	6	Int.	□	MAS1080LB	89	135	11
10.9	3	Ext.	□	MAE1090MB	55	101	11
	3	Int.	□	MAS1090MB	55	101	11
	6	Int.	□	MAS1090LB	89	135	11
11.0	3	Ext.	●	MAE1100MB	55	101	11
	3	Int.	●	MAS1100MB	55	101	11
	6	Int.	●	MAS1100LB	89	135	11

⁎ Standard hole size for rolled thread taps.

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
11.08	3	Ext.	●	⁎ MAE1108MB	60	106	12
	3	Int.	●	⁎ MAS1108MB	60	106	12
	6	Int.	●	⁎ MAS1108LB	94	140	12
11.1	3	Ext.	□	MAE1110MB	60	106	12
	3	Int.	□	MAS1110MB	60	106	12
	6	Int.	□	MAS1110LB	94	140	12
11.2	3	Ext.	□	MAE1120MB	60	106	12
	3	Int.	□	MAS1120MB	60	106	12
	6	Int.	□	MAS1120LB	94	140	12
11.3	3	Ext.	□	MAE1130MB	60	106	12
	3	Int.	□	MAS1130MB	60	106	12
	6	Int.	□	MAS1130LB	94	140	12
11.4	3	Ext.	□	MAE1140MB	60	106	12
	3	Int.	□	MAS1140MB	60	106	12
	6	Int.	□	MAS1140LB	94	140	12
11.5	3	Ext.	□	MAE1150MB	60	106	12
	3	Int.	□	MAS1150MB	60	106	12
	6	Int.	□	MAS1150LB	94	140	12
11.6	3	Ext.	□	MAE1160MB	60	106	12
	3	Int.	□	MAS1160MB	60	106	12
	6	Int.	□	MAS1160LB	94	140	12
11.7	3	Ext.	□	MAE1170MB	60	106	12
	3	Int.	□	MAS1170MB	60	106	12
	6	Int.	□	MAS1170LB	94	140	12
11.8	3	Ext.	□	MAE1180MB	60	106	12
	3	Int.	□	MAS1180MB	60	106	12
	6	Int.	□	MAS1180LB	94	140	12
11.9	3	Ext.	□	MAE1190MB	60	106	12
	3	Int.	□	MAS1190MB	60	106	12
	6	Int.	□	MAS1190LB	94	140	12
12.0	3	Ext.	●	MAE1200MB	60	106	12
	3	Int.	●	MAS1200MB	60	106	12
	6	Int.	●	MAS1200LB	94	140	12
12.1	3	Ext.	□	MAE1210MB	65	115	13
	3	Int.	□	MAS1210MB	65	115	13
	6	Int.	□	MAS1210LB	100	150	13
12.2	3	Ext.	□	MAE1220MB	65	115	13
	3	Int.	□	MAS1220MB	65	115	13
	6	Int.	□	MAS1220LB	100	150	13
12.3	3	Ext.	□	MAE1230MB	65	115	13
	3	Int.	□	MAS1230MB	65	115	13
	6	Int.	□	MAS1230LB	100	150	13
12.4	3	Ext.	□	MAE1240MB	65	115	13
	3	Int.	□	MAS1240MB	65	115	13
	6	Int.	□	MAS1240LB	100	150	13
12.5	3	Ext.	●	MAE1250MB	65	115	13
	3	Int.	●	MAS1250MB	65	115	13
	6	Int.	●	MAS1250LB	100	150	13
12.6	3	Ext.	□	MAE1260MB	65	115	13
	3	Int.	□	MAS1260MB	65	115	13
	6	Int.	□	MAS1260LB	100	150	13
12.7	3	Ext.	□	MAE1270MB	65	115	13
	3	Int.	□	MAS1270MB	65	115	13
	6	Int.	□	MAS1270LB	100	150	13
12.8	3	Ext.	□	MAE1280MB	65	115	13
	3	Int.	□	MAS1280MB	65	115	13
	6	Int.	□	MAS1280LB	100	150	13
12.9	3	Ext.	□	MAE1290MB	65	115	13
	3	Int.	□	MAS1290MB	65	115	13
	6	Int.	□	MAS1290LB	100	150	13
12.96	3	Ext.	●	⁎ MAE1296MB	65	115	13
	3	Int.	●	⁎ MAS1296MB	65	115	13
	6	Int.	●	⁎ MAS1296LB	100	150	13
13.0	3	Ext.	●	MAE1300MB	65	115	13
	3	Int.	●	MAS1300MB	65	115	13
	6	Int.	●	MAS1300LB	100	150	13
13.1	3	Ext.	□	MAE1310MB	70	120	14
	3	Int.	□	MAS1310MB	70	120	14
	6	Int.	□	MAS1310LB	110	160	14
13.2	3	Ext.	□	MAE1320MB	70	120	14
	3	Int.	□	MAS1320MB	70	120	14
	6	Int.	□	MAS1320LB	110	160	14
13.3	3	Ext.	□	MAE1330MB	70	120	14
	3	Int.	□	MAS1330MB	70	120	14
	6	Int.	□	MAS1330LB	110	160	14
13.4	3	Ext.	□	MAE1340MB	70	120	14
	3	Int.	□	MAS1340MB	70	120	14
	6	Int.	□	MAS1340LB	110	160	14
13.5	3	Ext.	●	MAE1350MB	70	120	14
	3	Int.	●	MAS1350MB	70	120	14
	6	Int.	●	MAS1350LB	110	160	14
13.6	3	Ext.	□	MAE1360MB	70	120	14
	3	Int.	□	MAS1360MB	70	120	14
	6	Int.	□	MAS1360LB	110	160	14
13.7	3	Ext.	□	MAE1370MB	70	120	14
	3	Int.	□	MAS1370MB	70	120	14
	6	Int.	□	MAS1370LB	110	160	14
13.8	3	Ext.	□	MAE1380MB	70	120	14
	3	Int.	□	MAS1380MB	70	120	14
	6	Int.	□	MAS1380LB	110	160	14
13.9	3	Ext.	□	MAE1390MB	70	120	14
	3	Int.	□	MAS1390MB	70	120	14
	6	Int.	□	MAS1390LB	110	160	14
14.0	3	Ext.	●	MAE1400MB	70	120	14
	3	Int.	●	MAS1400MB	70	120	14
	6	Int.	●	MAS1400LB	110	160	14

⁎ Standard hole size for rolled thread taps.

CUTTING CONDITIONS D093
TECHNICAL DATA F001

DRILLING(SOLID CARBIDE)

MAE/MAS

- Specially for aluminium and cast iron drilling.
- High hole accuracy.
- Pre-hole drilling for roll taps.
- Helical through coolant hole enables high speed machining (MAS type).

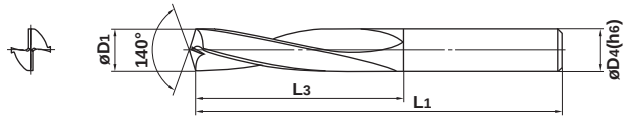
UWC 140°

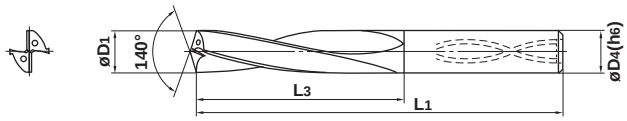
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
			○	◎	

	D1=3	3<D1≤6	6<D1≤10	10<D1≤16
D1 Tolerance (mm)	+0.005 0	+0.005 0	+0.005 0	+0.005 0
D4 Tolerance (mm)	0 −0.006	0 −0.008	0 −0.009	0 −0.011

MAE (External Coolant)

MAS (Internal Coolant)





(Note 1) MAS type bigger than ϕ5.0 have a recess in the end face.
(Note 2) MAE/MAS drills are suitable for use with shrink fit holders.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
14.1	3	Ext.	□	MAE1410MB	72	130	15
	3	Int.	□	MAS1410MB	72	130	15
	6	Int.	□	MAS1410LB	115	173	15
14.2	3	Ext.	□	MAE1420MB	72	130	15
	3	Int.	□	MAS1420MB	72	130	15
	6	Int.	□	MAS1420LB	115	173	15
14.3	3	Ext.	□	MAE1430MB	72	130	15
	3	Int.	□	MAS1430MB	72	130	15
	6	Int.	□	MAS1430LB	115	173	15
14.4	3	Ext.	□	MAE1440MB	72	130	15
	3	Int.	□	MAS1440MB	72	130	15
	6	Int.	□	MAS1440LB	115	173	15
14.5	3	Ext.	□	MAE1450MB	72	130	15
	3	Int.	□	MAS1450MB	72	130	15
	6	Int.	□	MAS1450LB	115	173	15
14.6	3	Ext.	□	MAE1460MB	72	130	15
	3	Int.	□	MAS1460MB	72	130	15
	6	Int.	□	MAS1460LB	115	173	15
14.7	3	Ext.	□	MAE1470MB	72	130	15
	3	Int.	□	MAS1470MB	72	130	15
	6	Int.	□	MAS1470LB	115	173	15
14.8	3	Ext.	□	MAE1480MB	72	130	15
	3	Int.	□	MAS1480MB	72	130	15
	6	Int.	□	MAS1480LB	115	173	15
14.9	3	Ext.	□	MAE1490MB	72	130	15
	3	Int.	□	MAS1490MB	72	130	15
	6	Int.	□	MAS1490LB	115	173	15
14.96	3	Ext.	●	⁎ MAE1496MB	72	130	15
	3	Int.	●	⁎ MAS1496MB	72	130	15
	6	Int.	●	⁎ MAS1496LB	115	173	15
15.0	3	Ext.	●	MAE1500MB	72	130	15
	3	Int.	●	MAS1500MB	72	130	15
	6	Int.	●	MAS1500LB	115	173	15
15.1	3	Ext.	□	MAE1510MB	76	134	16
	3	Int.	□	MAS1510MB	76	134	16
	6	Int.	□	MAS1510LB	120	178	16

Drill Dia. D1 (mm)	Hole Depth (l/d)	Coolant (Int./Ext.)	Stock HTi10	Order Number	Dimensions (mm) Flute Length L3	Overall Length L1	Shank Dia. D4
15.2	3	Ext.	□	MAE1520MB	76	134	16
	3	Int.	□	MAS1520MB	76	134	16
	6	Int.	□	MAS1520LB	120	178	16
15.3	3	Ext.	□	MAE1530MB	76	134	16
	3	Int.	□	MAS1530MB	76	134	16
	6	Int.	□	MAS1530LB	120	178	16
15.4	3	Ext.	□	MAE1540MB	76	134	16
	3	Int.	□	MAS1540MB	76	134	16
	6	Int.	□	MAS1540LB	120	178	16
15.5	3	Ext.	□	MAE1550MB	76	134	16
	3	Int.	□	MAS1550MB	76	134	16
	6	Int.	□	MAS1550LB	120	178	16
15.6	3	Ext.	□	MAE1560MB	76	134	16
	3	Int.	□	MAS1560MB	76	134	16
	6	Int.	□	MAS1560LB	120	178	16
15.7	3	Ext.	□	MAE1570MB	76	134	16
	3	Int.	□	MAS1570MB	76	134	16
	6	Int.	□	MAS1570LB	120	178	16
15.8	3	Ext.	□	MAE1580MB	76	134	16
	3	Int.	□	MAS1580MB	76	134	16
	6	Int.	□	MAS1580LB	120	178	16
15.9	3	Ext.	□	MAE1590MB	76	134	16
	3	Int.	□	MAS1590MB	76	134	16
	6	Int.	□	MAS1590LB	120	178	16
16.0	3	Ext.	●	MAE1600MB	76	134	16
	3	Int.	●	MAS1600MB	76	134	16
	6	Int.	●	MAS1600LB	120	178	16

⁎ Standard hole size for rolled thread taps.

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

RECOMMENDED CUTTING CONDITIONS

Type		Work Material	Drill Dia. ϕ3.0—ϕ6.0		Drill Dia. ϕ6.1—ϕ10.0		Drill Dia. ϕ10.1—ϕ16.0	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
MAE	N	Aluminium Alloy Casting	90 (40—140)	0.15 (0.05—0.3)	100 (50—150)	0.2 (0.1—0.3)	120 (60—170)	0.25 (0.1—0.4)
		Aluminium Alloy Die Casting	100 (60—150)	0.12 (0.05—0.25)	110 (70—160)	0.15 (0.05—0.25)	130 (80—180)	0.2 (0.1—0.3)
	K	Gray Cast Iron	40 (20—60)	0.15 (0.1—0.2)	60 (40—80)	0.2 (0.1—0.3)	80 (60—100)	0.3 (0.2—0.4)
		Ductile Cast Iron	30 (20—40)	0.1 (0.05—0.15)	40 (20—60)	0.12 (0.05—0.2)	60 (40—80)	0.2 (0.1—0.3)
MAS	N	Aluminium Alloy Casting	100 (60—150)	0.15 (0.05—0.3)	120 (80—170)	0.2 (0.1—0.3)	150 (100—200)	0.25 (0.1—0.4)
		Aluminium Alloy Die Casting	120 (80—170)	0.12 (0.05—0.25)	150 (100—180)	0.15 (0.05—0.25)	160 (120—200)	0.2 (0.1—0.3)
	K	Gray Cast Iron	60 (40—80)	0.15 (0.1—0.2)	80 (60—110)	0.2 (0.1—0.3)	100 (70—130)	0.3 (0.2—0.4)
		Ductile Cast Iron	45 (30—60)	0.1 (0.05—0.15)	60 (40—80)	0.12 (0.05—0.2)	80 (60—100)	0.2 (0.1—0.3)

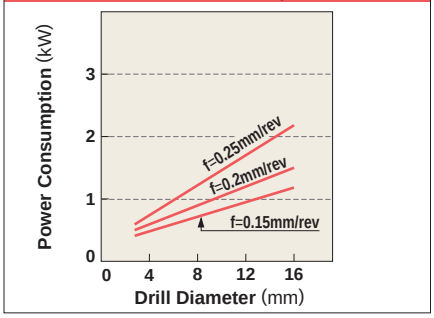
HOLE AND DRILL DIAMETERS FOR THREAD TAPPING

Thread Size	Thread Tapping			Rolled Thread Tapping		
	Drill Diameter (ϕD1)	Hole Diameter Tolerance		Drill Diameter (ϕD1)	Hole Diameter Tolerance	
		max.	min.		max.	min.
M4x0.7	**3.3**	3.242	3.422	**3.65**	3.65	3.70
M5x0.8	**4.2**	4.134	4.334	**4.60**	4.59	4.66
M6x1.0	**5.0**	4.917	5.153	**5.50**	5.48	5.57
M8x1.25	**6.8**	6.647	6.912	**7.35**	7.34	7.41
M10x1.5	**8.5**	8.376	8.676	**9.21**	9.18	9.28
M12x1.75	**10.3**	10.106	10.441	**11.08**	11.05	11.15
M14x2	**12.0**	11.835	12.210	**12.96**	12.92	13.04
M16x2	**14.0**	13.835	14.210	**14.96**	14.92	15.04

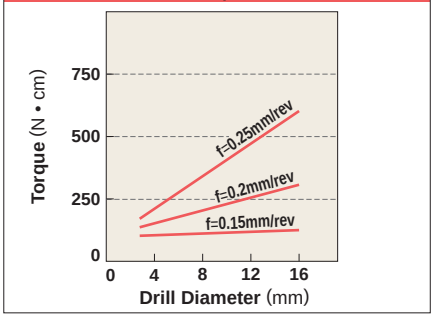
CUTTING RESISTANCE

Workpiece : JIS AC4B-T6 Drilled Depth : l/d=3(Through Hole) Cutting Speed : 100m/min WSO (10%)

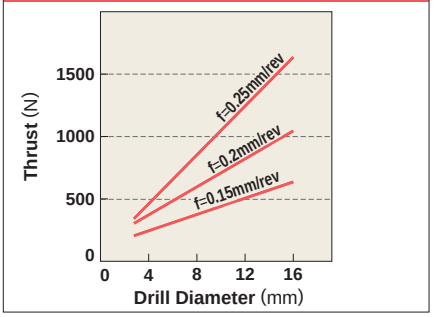
Power Consumption



Torque



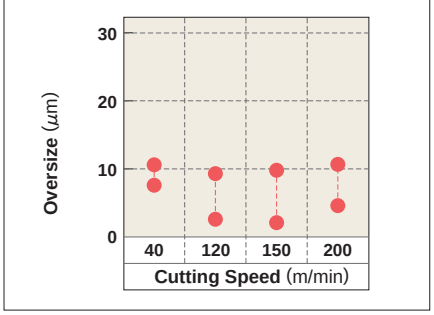
Thrust



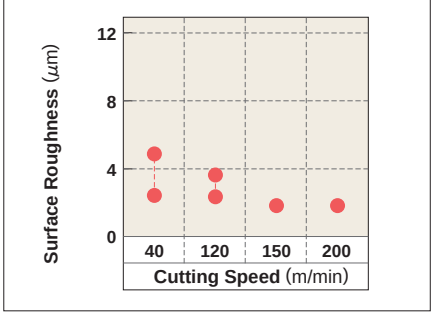
MACHINED HOLE ACCURACY

Tool : MAS1100MB Workpiece : JIS AC4B-T6 Feed : 0.35mm/rev Drilled Depth : 33mm WSO (10%)

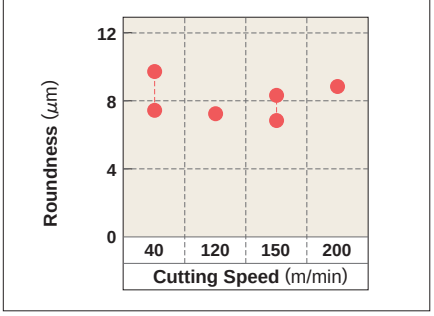
Oversize



Surface Roughness



Roundness



DRILLING(BRAZED TYPE)

BRS

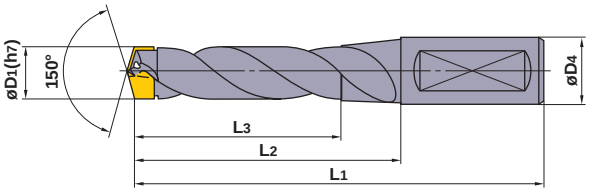
- Excellent cutting sharpness and chip discharge due to high rake type insert.
- High efficiency, high accuracy machining.

UWC | UP | 150° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	○		

	14<D1≤18	18<D1≤30
D1 Tolerance (mm)	0 −0.018	0 −0.021

(l/d=3)



Drill Dia. D1 (mm)	Standard Diameter Order Number	Stock UP20M	Intermediate Diameters Range of Drill Diameters (D1)	Intermediate Diameters Order Number	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
14.0	BRS1400S16	●	14.0<D1≤14.5	BRS□□□□S16	52	66	114	16
14.5	1450S16	●			52	66	114	16
15.0	1500S20	●	14.5<D1≤15.5	BRS□□□□S20	61	76	126	20
15.5	1550S20	●			61	76	126	20
16.0	1600S20	●	15.5<D1≤16.5		65	81	131	20
16.5	1650S20	●			65	81	131	20
17.0	1700S20	●	16.5<D1≤17.5		69	86	136	20
17.5	1750S20	●			69	86	136	20
18.0	1800S20	●	17.5<D1≤18.5		73	91	141	20
18.5	1850S20	●			73	91	141	20
19.0	1900S25	●	18.5<D1≤19.5	BRS□□□□S25	77	101	157	25
19.5	1950S25	●			77	101	157	25
20.0	2000S25	●	19.5<D1≤20.5		81	101	157	25
20.5	2050S25	●			81	101	157	25
21.0	2100S25	●	20.5<D1≤21.5		80	101	157	25
21.5	2150S25	●			80	101	157	25
22.0	2200S25	●	21.5<D1≤22.5		84	106	162	25
22.5	2250S25	●			84	106	162	25
23.0	2300S25	●	22.5<D1≤23.5		83	106	162	25
23.5	2350S25	●			83	106	162	25
24.0	2400S32	●	23.5<D1≤24.5	BRS□□□□S32	87	111	171	32
24.5	2450S32	●			87	111	171	32
25.0	2500S32	●	24.5<D1≤25.5		86	111	171	32
25.5	2550S32	●			86	111	171	32
26.0	2600S32	●	25.5<D1≤26.5		90	116	176	32
26.5	2650S32	●			90	116	176	32
27.0	2700S32	●	26.5<D1≤27.5		89	116	176	32
27.5	2750S32	●			89	116	176	32
28.0	2800S32	●	27.5<D1≤28.5		93	121	181	32
28.5	2850S32	●			93	121	181	32
29.0	2900S32	●	28.5<D1≤29.5		97	126	186	32
29.5	2950S32	●			97	126	186	32
30.0	3000S32	●	29.5<D1≤30.5		96	126	186	32

For ordering an intermediate diameter, please enter the diameter (D1) into the 4-digit space□□□□in the nominal designation.
(Ex. UP20M BRS2530S32 for a diameter of ϕ25.30mm)

● : **Inventory maintained in Japan.**

RECOMMENDED CUTTING CONDITIONS

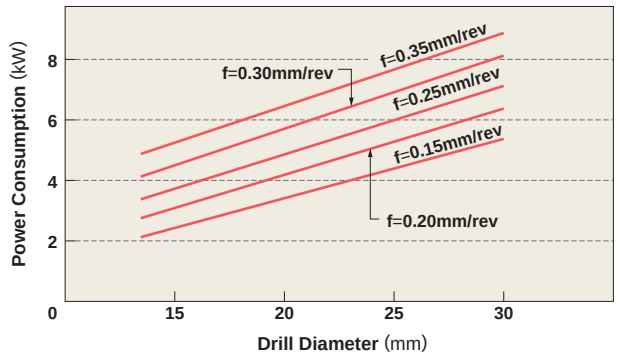
	Work Material		Hardness	Drill Dia. ϕ14.0—ϕ20.0		Drill Dia. ϕ20.0—ϕ30.0	
				Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel		≤180HB	65 (50—75)	0.3 (0.20—0.40)	70 (55—85)	0.35 (0.20—0.45)
P	Structural Steel	SS400 (JIS)	Tensile Strength 400—500MPa	80 (70—90)	0.30 (0.25—0.35)	80 (70—90)	0.35 (0.30—0.45)
P	Structural Steel	SM490 (JIS)	Tensile Strength 490—610MPa	70 (60—80)	0.25 (0.20—0.30)	70 (60—80)	0.30 (0.20—0.04)
P	Structural Steel	SM570 (JIS)	Tensile Strength 570—720MPa	60 (50—70)	0.25 (0.20—0.30)	60 (50—70)	0.30 (0.20—0.35)
P	Carbon Steel Alloy Steel		180—280HB	60 (45—70)	0.25 (0.1—0.35)	65 (45—80)	0.30 (0.15—0.35)
P	Carbon Steel Alloy Steel		280—350HB	55 (40—65)	0.20 (0.15—0.35)	60 (45—70)	0.25 (0.15—0.35)
M	Stainless Steel (Austenitic)		≤200HB	70 (50—90)	0.30 (0.20—0.40)	80 (60—100)	0.3 (0.20—0.40)
K	Gray Cast Iron		Tensile Strength≤350MPa	75 (60—110)	0.30 (0.20—0.40)	80 (60—100)	0.35 (0.25—0.50)
K	Ductile Cast Iron		Tensile Strength≤450MPa	75 (60—100)	0.30 (0.20—0.40)	80 (60—100)	0.35 (0.20—0.45)
K	Ductile Cast Iron		Tensile Strength 500—800MPa	70 (55—90)	0.25 (0.15—0.35)	75 (55—90)	0.30 (0.15—0.40)

(Note) The above conditions are for general cutting. The cutting conditions need to be modified depending on power, rigidity of the machine and workpiece shape.

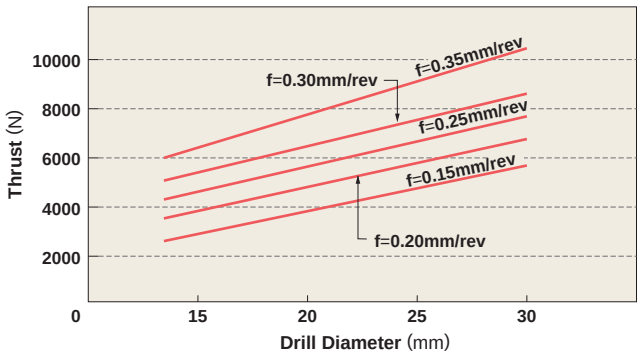
CUTTING RESISTANCE

Workpiece : JIS SUS304 Drilled Depth : l/d=3(Through Hole) Cutting Speed : 70m/min WSO (10%)

Power Consumption



Thrust



DRILLING(BRAZED TYPE)

BRM

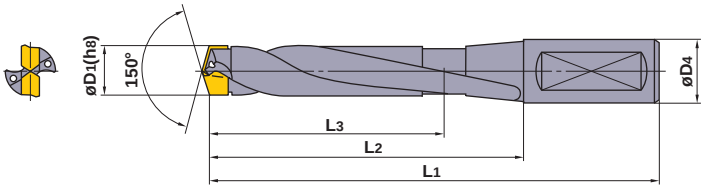
- Excellent cutting sharpness and chip discharge due to high rake type insert.
- High efficiency, high accuracy machining.

UWC | UP | 150° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	○		

D1 Tolerance (mm)	14<D1≤18	18<D1≤30
	0 −0.027	0 −0.033

(l/d=5)



Drill Dia. D1 (mm)	Standard Diameter Order Number	Stock UP20M	Intermediate Diameters Range of Drill Diameters (D1)	Intermediate Diameters Order Number	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
14.0	BRM1400S16	●	14.0≤D1≤14.5	BRM□□□□S16	78	92	140	16
14.5	1450S16	●			78	92	140	16
15.0	1500S20	●	14.5<D1≤15.5	BRM□□□□S20	85	100	150	20
15.5	1550S20	●			85	100	150	20
16.0	1600S20	●	15.5<D1≤16.5		89	105	155	20
16.5	1650S20	●			89	105	155	20
17.0	1700S20	●	16.5<D1≤17.5		98	115	165	20
17.5	1750S20	●			98	115	165	20
18.0	1800S20	●	17.5<D1≤18.5		102	120	170	20
18.5	1850S20	●			102	120	170	20
19.0	1900S25	●	18.5<D1≤19.5	BRM□□□□S25	105	124	180	25
19.5	1950S25	●			105	124	180	25
20.0	2000S25	●	19.5<D1≤20.5		114	134	190	25
20.5	2050S25	●			114	134	190	25
21.0	2100S25	●	20.5<D1≤21.5		118	139	195	25
21.5	2150S25	●			118	139	195	25
22.0	2200S25	●	21.5<D1≤22.5		122	144	200	25
22.5	2250S25	●			122	144	200	25
23.0	2300S25	●	22.5<D1≤23.5		126	149	205	25
23.5	2350S25	●			126	149	205	25
24.0	2400S32	●	23.5<D1≤24.5	BRM□□□□S32	136	160	220	32
24.5	2450S32	●			136	160	220	32
25.0	2500S32	●	24.5<D1≤25.5		140	165	225	32
25.5	2550S32	●			140	165	225	32
26.0	2600S32	●	25.5<D1≤26.5		144	170	230	32
26.5	2650S32	●			144	170	230	32
27.0	2700S32	●	26.5<D1≤27.5		148	175	235	32
27.5	2750S32	●			148	175	235	32
28.0	2800S32	●	27.5<D1≤28.5		157	185	245	32
28.5	2850S32	●			157	185	245	32
29.0	2900S32	●	28.5<D1≤29.5		161	190	250	32
29.5	2950S32	●			161	190	250	32
30.0	3000S32	●	29.5<D1≤30.0		165	195	255	32

For ordering an intermediate diameter, please enter the diameter (D1) into the 4-digit space□□□□in the nominal designation.
(Ex. UP20M BRM2530S32 for a diameter of ϕ25.30mm)

● : **Inventory maintained in Japan.**

RECOMMENDED CUTTING CONDITIONS

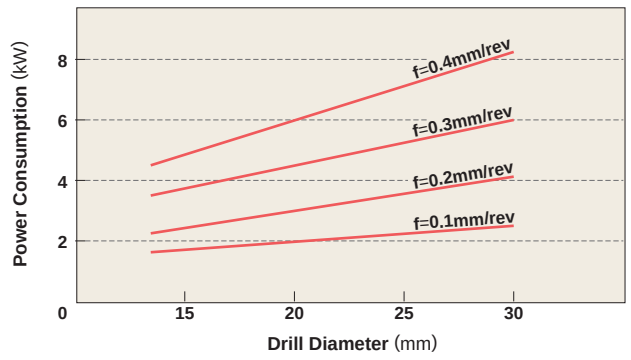
	Work Material		Hardness	Drill Dia. ϕ14.0—ϕ20.0		Drill Dia. ϕ20.0—ϕ30.0	
				Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel		≤180HB	65 (50—75)	0.30 (0.20—0.40)	70 (55—85)	0.35 (0.20—0.45)
P	Structural Steel	SS400 (JIS)	Tensile Strength 400—500MPa	70 (60—80)	0.30 (0.25—0.35)	70 (60—80)	0.35 (0.30—0.45)
P	Structural Steel	SM490 (JIS)	Tensile Strength 490—610MPa	60 (50—70)	0.25 (0.20—0.30)	60 (50—70)	0.30 (0.20—0.40)
P	Structural Steel	SM570 (JIS)	Tensile Strength 570—720MPa	50 (40—60)	0.25 (0.20—0.30)	50 (40—60)	0.30 (0.20—0.35)
P	Carbon Steel Alloy Steel		180—280HB	60 (45—70)	0.25 (0.15—0.35)	65 (45—80)	0.30 (0.15—0.40)
P	Carbon Steel Alloy Steel		280—350HB	55 (40—65)	0.20 (0.15—0.35)	60 (45—70)	0.25 (0.15—0.35)
M	Stainless Steel (Austenitic)		≤200HB	60 (50—80)	0.25 (0.15—0.35)	65 (50—80)	0.30 (0.20—0.40)
K	Gray Cast Iron		Tensile Strength≤350MPa	65 (50—100)	0.30 (0.20—0.40)	70 (50—100)	0.35 (0.25—0.50)
K	Ductile Cast Iron		Tensile Strength≤450MPa	65 (50—90)	0.30 (0.2—0.40)	70 (50—90)	0.35 (0.20—0.45)
K	Ductile Cast Iron		Tensile Strength 500—800MPa	60 (45—80)	0.25 (0.15—0.35)	65 (45—80)	0.30 (0.15—0.40)

(Note) The above conditions are for general cutting. The cutting conditions need to be modified depending on power, rigidity of the machine and workpiece shape.

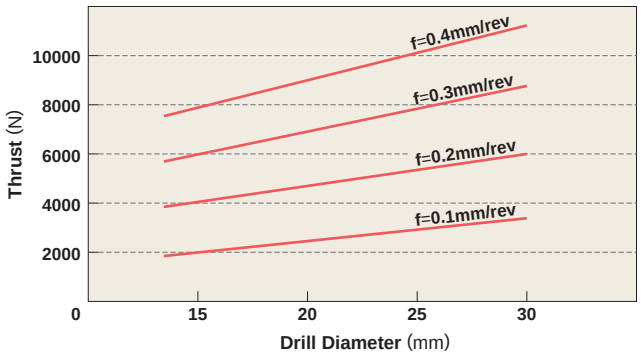
CUTTING RESISTANCE

Workpiece : JIS SUS304 Drilled Depth : l/d=5(Through Hole) Cutting Speed : 60m/min WSO (10%)

Power Consumption



Thrust



DRILLING(BRAZED TYPE)

BRK

- Excellent cutting sharpness and chip discharge due to high rake type insert.
- High efficiency, high accuracy machining.

UWC | UP | 150° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎			○		

	14<D1≤18	18<D1≤30
D1 Tolerance (mm)	0 −0.027	0 −0.033

(l/d=7)

Drill Dia. D1 (mm)	Standard Diameter Order Number	Stock UP20M	Intermediate Diameters Range of Drill Diameters (D1)	Intermediate Diameters Order Number	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
14.0	BRK1400S16	●	14.0≤D1≤14.5	BRK□□□□S16	112	126	174	16
15.0	1500S20	●	14.5<D1≤15.5	BRK□□□□S20	120	135	185	20
16.0	1600S20	●	15.5<D1≤16.5		128	144	194	20
17.0	1700S20	●	16.5<D1≤17.5		136	153	203	20
18.0	1800S20	●	17.5<D1≤18.5		144	162	212	20
19.0	1900S25	●	18.5<D1≤19.5	BRK□□□□S25	152	171	227	25
20.0	2000S25	●	19.5<D1≤20.5		160	180	236	25
21.0	2100S25	●	20.5<D1≤21.5		168	189	245	25
22.0	2200S25	●	21.5<D1≤22.5		176	198	254	25
23.0	2300S25	●	22.5<D1≤23.5		184	207	263	25
24.0	2400S32	●	23.5<D1≤24.5	BRK□□□□S32	192	216	276	32
25.0	2500S32	●	24.5<D1≤25.5		200	225	285	32
26.0	2600S32	●	25.5<D1≤26.5		208	234	294	32
27.0	2700S32	●	26.5<D1≤27.5		216	243	303	32
28.0	2800S32	●	27.5<D1≤28.5		224	252	312	32
29.0	2900S32	●	28.5<D1≤29.5		232	261	321	32
30.0	3000S32	●	29.5<D1≤30.5		240	270	330	32

For ordering an intermediate diameter, please enter the diameter (D1) into the 4-digit space□□□□in the nominal designation.
(Ex. UP20M BRK2530S32 for a diameter of ϕ25.30mm)

● : Inventory maintained in Japan.

RECOMMENDED CUTTING CONDITIONS

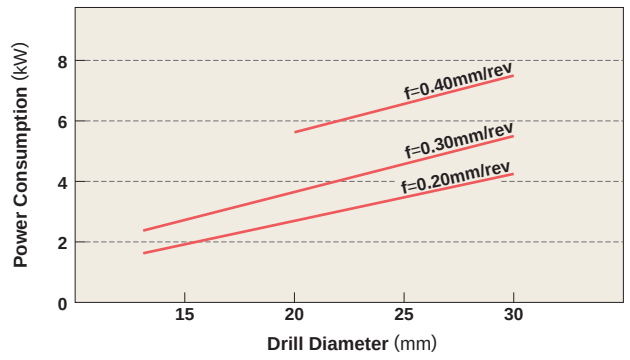
	Work Material	Hardness	Drill Dia. ϕ14.0—ϕ16.0		Drill Dia. ϕ16.0—ϕ20.0		Drill Dia. ϕ20.0—ϕ30.0	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel	≤180HB	60 (40—75)	0.25 (0.15—0.30)	65 (40—80)	0.30 (0.20—0.35)	70 (50—85)	0.30 (0.20—0.35)
P	Carbon Steel Alloy Steel	180—280HB	55 (40—65)	0.25 (0.15—0.30)	60 (45—70)	0.30 (0.20—0.35)	65 (50—75)	0.30 (0.20—0.35)
P		280—350HB	45 (30—55)	0.20 (0.10—0.25)	50 (35—60)	0.25 (0.15—0.30)	55 (40—65)	0.25 (0.15—0.30)
P	High Alloy Steel	200—280HB	40 (30—50)	0.20 (0.10—0.25)	45 (35—55)	0.25 (0.15—0.30)	50 (40—60)	0.25 (0.15—0.30)
K	Gray Cast Iron	Tensile Strength≤350MPa	60 (50—70)	0.30 (0.20—0.35)	60 (50—80)	0.35 (0.25—0.40)	70 (60—90)	0.35 (0.25—0.40)
K	Ductile Cast Iron	Tensile Strength≤450MPa	45 (30—60)	0.25 (0.15—0.30)	50 (35—60)	0.30 (0.20—0.35)	55 (40—65)	0.35 (0.20—0.35)

(Note 1) The above conditions are for general cutting. The cutting conditions need to be modified depending on power, rigidity of the machine and workpiece shape.
(Note 2) Decrease the feed rate to 1/3 of the values below, until the full drill diameter is 3 to 5mm into the workpiece.

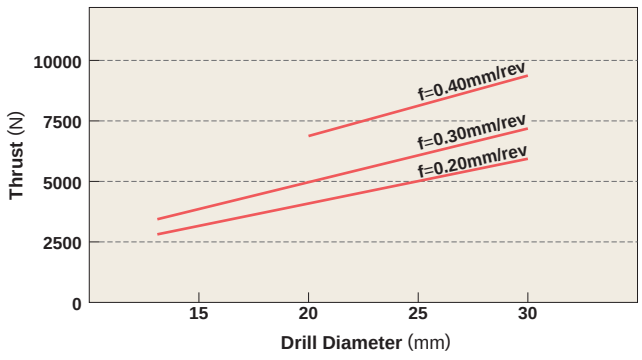
CUTTING RESISTANCE

Workpiece : JIS SCM440(220HB) Drilled Depth : l/d=7(Through Hole) Cutting Speed : 60m/min WSO (10%)

Power Consumption



Thrust



FOR BRIDGE CONSTRUCTION

- Excellent cutting sharpness and chip discharge due to high rake type insert.
- Unique flute shape is used. (l/d=3,5)

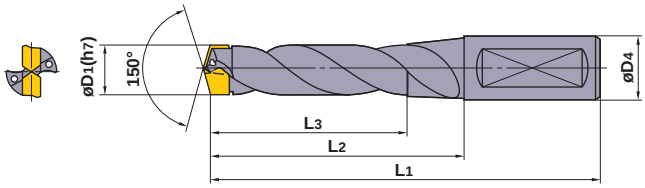
UWC UP 150° X Thinning

BRSB

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎					

D1 Tolerance (mm)	18<D1≤30
	0 −0.021

Key point drill for bridge construction
(l/d=3)



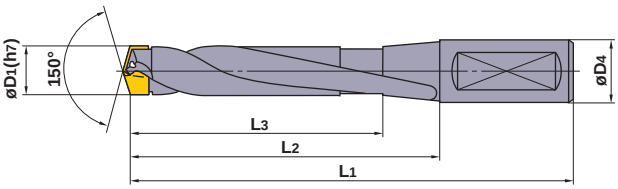
Drill Dia. D1 (mm)	Order Number	Stock UP20M	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
24.5	BRSB2450S32	●	87	111	171	32
24.6	2460S32	●	86	111	171	32
24.7	2470S32	●	86	111	171	32
26.5	2650S32	●	90	116	176	32
26.7	2670S32	●	89	116	176	32

BRMB

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎					

D1 Tolerance (mm)	18<D1≤30
	0 −0.021

Key point drill for bridge construction
(l/d=5)



Drill Dia. D1 (mm)	Order Number	Stock UP20M	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
24.5	BRMB2450S32	●	136	160	220	32
24.6	2460S32	●	140	165	225	32
24.7	2470S32	●	140	165	225	32
26.5	2650S32	●	144	170	230	32
26.7	2670S32	●	148	175	235	32

● : Inventory maintained in Japan.

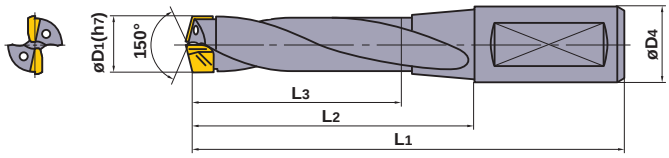
UWC 150° X Thinning

BRB

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎					

D1 Tolerance (mm)	18<D1≤30
	0 −0.021

New point drill for bridge construction parts
(l/d=3)



Drill Dia. D1 (mm)	Order Number	Stock UTi20T	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
24.5	**BRB2450S32M**	●	87	111	171	32
24.6	**2460S32M**	●	86	111	171	32
24.7	**2470S32M**	●	86	111	171	32
26.5	**2650S32M**	●	90	116	176	32
26.7	**2670S32M**	●	89	116	176	32

RECOMMENDED CUTTING CONDITIONS

Work Material		Hardness	BRB Cutting Speed (m/min)	BRB Feed (mm/rev)	BRSB Cutting Speed (m/min)	BRSB Feed (mm/rev)	BRMB Cutting Speed (m/min)	BRMB Feed (mm/rev)
P Structural Steel	SS400 (JIS)	Tensile Strength 400−500MPa	65 (60−75)	0.35 (0.3−0.4)	80 (70−90)	0.35 (0.3−0.45)	70 (60−80)	0.35 (0.3−0.45)
	SM490 (JIS)	Tensile Strength 490−610MPa	60 (50−70)	0.3 (0.2−0.4)	70 (60−80)	0.3 (0.2−0.4)	60 (50−70)	0.3 (0.2−0.4)
	SM570 (JIS)	Tensile Strength 570−720MPa	55 (50−60)	0.3 (0.2−0.35)	60 (50−70)	0.3 (0.2−0.35)	50 (40−60)	0.3 (0.2−0.35)
Mild Steel		≤180HB	65 (50−30)	0.35 (0.25−0.4)	70 (55−85)	0.35 (0.2−0.45)	70 (55−85)	0.35 (0.2−0.45)

DRILLING(BRAZED TYPE)

BRA

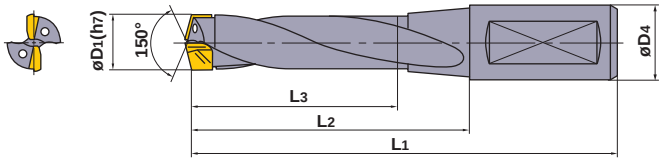
- Low thrust due to the absence of a chisel edge.
- Easy regrinding.

UWC UP 150°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○		

	8≤D1≤10	10<D1≤18	18<D1≤30	30<D1≤40
D1 Tolerance (mm)	0 −0.015	0 −0.018	0 −0.021	0 −0.025

General Use (Carbon Steel, Alloy Steel, Stainless Steel)
(l/d=3)



Drill Dia. D1 (mm)	Standard Diameter Order Number	Stock UP20M	Intermediate Diameters Range of Drill Diameters (D1)	Intermediate Diameters Order Number	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
8.0	BRA0800S16	●	8.0<D1≤8.5	BRA□□□□S16	23	35	83	16
8.5	0850S16	●			23	35	83	16
9.0	0900S16	●	8.5<D1≤9.5		28	40	88	16
9.5	0950S16	●			28	40	88	16
10.0	1000S16	●	9.5<D1≤10.5		35	45	93	16
10.5	1050S16	●			35	45	93	16
11.0	1100S16	●	10.5<D1≤11.5		40	51	99	16
11.5	1150S16	●			40	51	99	16
12.0	1200S16	●	11.5<D1≤12.5		44	56	104	16
12.5	1250S16	●			44	56	104	16
13.0	1300S16	●	12.5<D1≤13.5		48	61	109	16
13.5	1350S16	●			48	61	109	16
14.0	1400S16	●	13.5<D1≤14.5		52	66	114	16
14.5	1450S16	●			52	66	114	16
15.0	1500S20	●	14.5<D1≤15.5	BRA□□□□S20	61	76	126	20
15.5	1550S20	●			61	76	126	20
16.0	1600S20	●	15.5<D1≤16.5		65	81	131	20
16.5	1650S20	●			65	81	131	20
17.0	1700S20	●	16.5<D1≤17.5		69	86	136	20
17.5	1750S20	●			69	86	136	20
18.0	1800S20	●	17.5<D1≤18.5		73	91	141	20
18.5	1850S20	●			73	91	141	20
19.0	1900S25	●	18.5<D1≤19.5	BRA□□□□S25	77	101	157	25
19.5	1950S25	●			77	101	157	25
20.0	2000S25	●	19.5<D1≤20.5		81	101	157	25
20.5	2050S25	●			81	101	157	25
21.0	2100S25	●	20.5<D1≤21.5		80	101	157	25
21.5	2150S25	●			80	101	157	25
22.0	2200S25	●	21.5<D1≤22.5		84	106	162	25
22.5	2250S25	●			84	106	162	25

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D_1 (mm)	Standard Diameter		Intermediate Diameters		Dimensions (mm)			
	Order Number	Stock UP20M	Range of Drill Diameters (D_1)	Order Number	Effective flute length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4
23.0	BRA2300S25	●	22.5<D_1≦23.5	BRA□□□□S25	83	106	162	25
23.5	2350S25	●			83	106	162	25
24.0	2400S32	●	23.5<D_1≦24.5	BRA□□□□S32	87	111	171	32
24.5	2450S32	●			87	111	171	32
25.0	2500S32	●	24.5<D_1≦25.5		86	111	171	32
25.5	2550S32	●			86	111	171	32
26.0	2600S32	●	25.5<D_1≦26.5		90	116	176	32
26.5	2650S32	●			90	116	176	32
27.0	2700S32	●	26.5<D_1≦27.5		89	116	176	32
27.5	2750S32	●			89	116	176	32
28.0	2800S32	●	27.5<D_1≦28.5		93	121	181	32
28.5	2850S32	●			93	121	181	32
29.0	2900S32	●	28.5<D_1≦29.5		97	126	186	32
29.5	2950S32	●			97	126	186	32
30.0	3000S32	●	29.5<D_1≦30.5		96	126	186	32
30.5	3050S32	●			96	126	186	32
31.0	3100S40	□	30.5<D_1≦31.5	BRA□□□□S40	96	127	197	40
31.5	3150S40	□			96	127	197	40
32.0	3200S40	□	31.5<D_1≦32.5		100	132	202	40
32.5	3250S40	□			100	132	202	40
33.0	3300S40	□	32.5<D_1≦33.5		104	137	207	40
33.5	3350S40	□			104	137	207	40
34.0	3400S40	□	33.5<D_1≦34.5		103	137	207	40
34.5	3450S40	□			103	137	207	40
35.0	3500S40	□	34.5<D_1≦35.5		107	142	212	40
35.5	3550S40	□			107	142	212	40
36.0	3600S40	□	35.5<D_1≦36.5		111	147	217	40
36.5	3650S40	□			111	147	217	40
37.0	3700S40	□	36.5<D_1≦37.5		115	152	222	40
37.5	3750S40	□			115	152	222	40
38.0	3800S40	□	37.5<D_1≦38.5		119	157	227	40
38.5	3850S40	□			119	157	227	40
39.0	3900S40	□	38.5<D_1≦39.5		118	157	227	40
39.5	3950S40	□			118	157	227	40
40.0	4000S40	□	39.5<D_1≦40.0		122	162	232	40

(Note 1) Drills in the intermediate drill diameter range are produced to order only.
(Note 2) For ordering an intermediate diameter, please enter the diameter (D_1) into the 4-digit space□□□□in the nominal designation.
(Ex. UP20M BRA2530S32 for a diameter of ϕ25.30mm)
(Note 3) Please contact us regarding special designs.
(Note 4) Please contact us for any geometry that is not in this catalogue (e.g. drills with chamfered cutting edges can be made to order).

CUTTING CONDITIONS D106 TECHNICAL DATA F001

DRILLING(BRAZED TYPE)

BRL

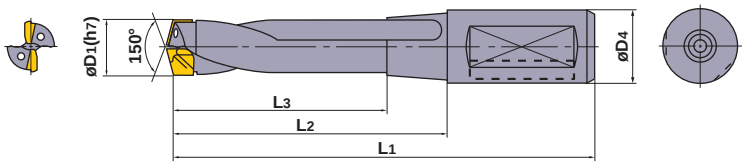
- Low thrust due to the absence of a chisel edge.
- Easy regrinding.
- Unique flute shape for lathes.

UWC 150°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○		

D1 Tolerance (mm)	8≤D1≤10	10<D1≤18	18<D1≤30	30<D1≤40
	0 −0.015	0 −0.018	0 −0.021	0 −0.025

For turning
(l/d=3)



Drill Dia. D1 (mm)	Standard Diameter Order Number	Stock STi40T	Intermediate Diameters Range of Drill Diameters (D1)	Intermediate Diameters Order Number	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
8.0	BRL0800S16	●	8.0≤D1≤8.5	BRL□□□□S16	23	35	83	16
8.5	0850S16	●			23	35	83	16
9.0	0900S16	●	8.5<D1≤9.5		28	40	88	16
9.5	0950S16	●			28	40	88	16
10.0	1000S16	●	9.5<D1≤10.5		35	45	93	16
10.5	1050S16	●			35	45	93	16
11.0	1100S16	●	10.5<D1≤11.5		40	51	99	16
11.5	1150S16	●			40	51	99	16
12.0	1200S16	●	11.5<D1≤12.5		44	56	104	16
12.5	1250S16	●			44	56	104	16
13.0	1300S16	●	12.5<D1≤13.5		48	61	109	16
13.5	1350S16	●			48	61	109	16
14.0	1400S16	●	13.5<D1≤14.5		52	66	114	16
14.5	1450S16	●			52	66	114	16
15.0	1500S20	●	14.5<D1≤15.5	BRL□□□□S20	61	76	126	20
15.5	1550S20	●			61	76	126	20
16.0	1600S20	●	15.5<D1≤16.5		65	81	131	20
16.5	1650S20	●			65	81	131	20
17.0	1700S20	●	16.5<D1≤17.5		69	86	136	20
17.5	1750S20	●			69	86	136	20
18.0	1800S20	●	17.5<D1≤18.5		73	91	141	20
18.5	1850S20	●			73	91	141	20
19.0	1900S25	●	18.5<D1≤19.5	BRL□□□□S25	77	101	157	25
19.5	1950S25	●			77	101	157	25
20.0	2000S25	●	19.5<D1≤20.5		81	101	157	25
20.5	2050S25	●			81	101	157	25
21.0	2100S25	●	20.5<D1≤21.5		80	101	157	25
21.5	2150S25	●			80	101	157	25
22.0	2200S25	●	21.5<D1≤22.5		84	106	162	25
22.5	2250S25	●			84	106	162	25

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. D1 (mm)	Standard Diameter		Intermediate Diameters		Dimensions (mm)			
	Order Number	Stock STi40T	Range of Drill Diameters (D1)	Order Number	Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4
23.0	BRL2300S25	●	22.5<D1≦23.5	BRL□□□□S25	83	106	162	25
23.5	2350S25	●			83	106	162	25
24.0	2400S32	●	23.5<D1≦24.5	BRL□□□□S32	87	111	171	32
24.5	2450S32	●			87	111	171	32
25.0	2500S32	●	24.5<D1≦25.5		86	111	171	32
25.5	2550S32	●			86	111	171	32
26.0	2600S32	●	25.5<D1≦26.5		90	116	176	32
26.5	2650S32	●			90	116	176	32
27.0	2700S32	●	26.5<D1≦27.5		89	116	176	32
27.5	2750S32	●			89	116	176	32
28.0	2800S32	●	27.5<D1≦28.5		93	121	181	32
28.5	2850S32	●			93	121	181	32
29.0	2900S32	●	28.5<D1≦29.5		97	126	186	32
29.5	2950S32	●			97	126	186	32
30.0	3000S32	●	29.5<D1≦30.5		96	126	186	32
30.5	3050S32	●			96	126	186	32
31.0	3100S40	□	30.5<D1≦31.5	BRL□□□□S40	96	127	197	40
31.5	3150S40	□			96	127	197	40
32.0	3200S40	□	31.5<D1≦32.5		100	132	202	40
32.5	3250S40	□			100	132	202	40
33.0	3300S40	□	32.5<D1≦33.5		104	137	207	40
33.5	3350S40	□			104	137	207	40
34.0	3400S40	□	33.5<D1≦34.5		103	137	207	40
34.5	3450S40	□			103	137	207	40
35.0	3500S40	□	34.5<D1≦35.5		107	142	212	40
35.5	3550S40	□			107	142	212	40
36.0	3600S40	□	35.5<D1≦36.5		111	147	217	40
36.5	3650S40	□			111	147	217	40
37.0	3700S40	□	36.5<D1≦37.5		115	152	222	40
37.5	3750S40	□			115	152	222	40
38.0	3800S40	□	37.5<D1≦38.5		119	157	227	40
38.5	3850S40	□			119	157	227	40
39.0	3900S40	□	38.5<D1≦39.5		118	157	227	40
39.5	3950S40	□			118	157	227	40
40.0	4000S40	□	39.5<D1≦40.0		122	162	232	40

(Note 1) Drills in the intermediate drill diameter range are produced to order only.
(Note 2) For ordering an intermediate diameter, please enter the diameter (D1) into the 4-digit space□□□□in the nominal designation.
(Ex.STi40T BRL2530S32 for a diameter of ϕ25.30mm)
(Note 3) Please contact us regarding special designs that are not standard products.
(Note 4) Please contact us for any geometry that is not in this catalogue (e.g. drills with chamfered cutting edges can be made to order).

CUTTING CONDITIONS D106 TECHNICAL DATA F001

BRA/BRL

RECOMMENDED CUTTING CONDITIONS

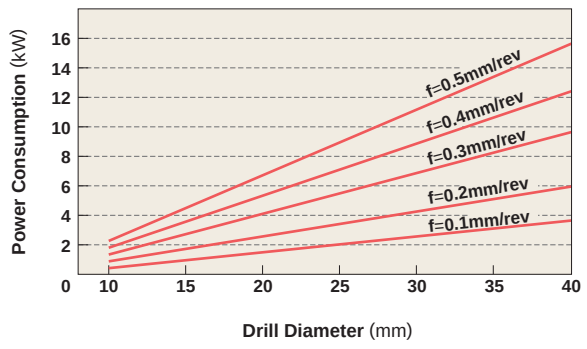
Tool		Work Material	Hardness	Drill Diameter φ8.0—φ13.0		Drill Diameter φ13.0—φ18.0		Drill Diameter ≥φ18.0	
				Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
BRA	P	Mild Steel	≤180HB	55 (40—65)	0.25 (0.20—0.30)	65 (50—75)	0.30 (0.25—0.35)	75 (60—85)	0.30 (0.25—0.35)
		Carbon Steel Alloy Steel	180—280HB	50 (35—60)	0.25 (0.20—0.30)	60 (45—70)	0.30 (0.25—0.35)	70 (55—80)	0.30 (0.25—0.35)
			280—350HB	40 (30—50)	0.25 (0.20—0.30)	50 (40—60)	0.25 (0.20—0.30)	55 (45—65)	0.27 (0.20—0.30)
	M	Stainless Steel	≤200HB	30 (20—40)	0.25 (0.20—0.27)	35 (25—45)	0.27 (0.20—0.30)	40 (30—50)	0.30 (0.25—0.35)
	K	Cast Iron	Tensile Strength≤350MPa	60 (40—70)	0.30 (0.25—0.35)	70 (50—80)	0.35 (0.30—0.40)	80 (60—90)	0.40 (0.35—0.45)
		Ductile Cast Iron	Tensile Strength≤450MPa	55 (40—65)	0.27 (0.20—0.30)	60 (45—70)	0.30 (0.25—0.35)	70 (55—80)	0.30 (0.25—0.35)
	S	Heat Resistant Alloy	—	15 (10—20)	0.10 (0.05—0.12)	20 (1—25)	0.15 (0.10—0.20)	25 (20—30)	0.15 (0.10—0.20)
		Titanium Alloy	—	20 (10—25)	0.15 (0.10—0.17)	30 (20—35)	0.20 (0.15—0.25)	35 (30—40)	0.25 (0.20—0.30)
BRL	P	Mild Steel	≤180HB	50 (35—60)	0.25 (0.20—0.30)	60 (45—70)	0.30 (0.25—0.35)	65 (50—75)	0.30 (0.25—0.35)
		Carbon Steel Alloy Steel	180—280HB	45 (30—55)	0.25 (0.20—0.30)	55 (40—65)	0.30 (0.25—0.35)	60 (45—70)	0.30 (0.25—0.35)
			280—350HB	35 (25—45)	0.25 (0.20—0.30)	45 (35—55)	0.25 (0.20—0.30)	50 (40—60)	0.27 (0.20—0.30)
	M	Stainless Steel	≤200HB	30 (20—40)	0.25 (0.20—0.27)	30 (20—40)	0.27 (0.20—0.30)	35 (25—45)	0.30 (0.25—0.35)
	K	Gray Cast Iron	Tensile Strength≤350MPa	55 (40—70)	0.30 (0.25—0.35)	60 (45—75)	0.35 (0.3—0.40)	65 (50—80)	0.40 (0.35—0.45)
		Ductile Cast Iron	Tensile Strength≤450MPa	50 (35—60)	0.27 (0.20—0.30)	55 (40—65)	0.30 (0.25—0.35)	60 (45—70)	0.30 (0.25—0.35)
	S	Heat Resistant Alloy	—	15 (10—20)	0.10 (0.05—0.12)	15 (10—20)	0.15 (0.10—0.20)	20 (15—25)	0.15 (0.10—0.20)
		Titanium Alloy	—	20 (10—25)	0.15 (0.10—0.17)	25 (10—30)	0.20 (0.15—0.25)	30 (20—35)	0.25 (0.20—0.30)

(Note) The above conditions are for general cutting. The cutting conditions need to be modified depending on power, rigidity of the machine and workpiece shape.

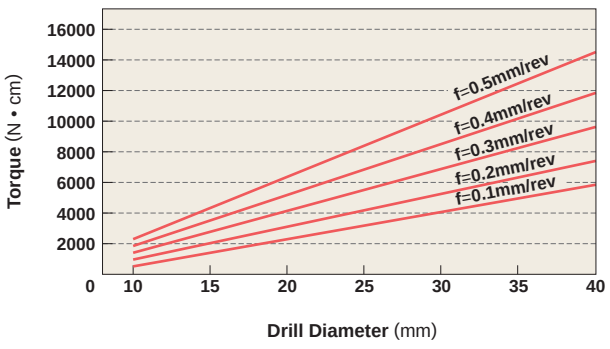
CUTTING RESISTANCE

Workpiece : JIS SCM440(200HB) Cutting Speed : 60m/min

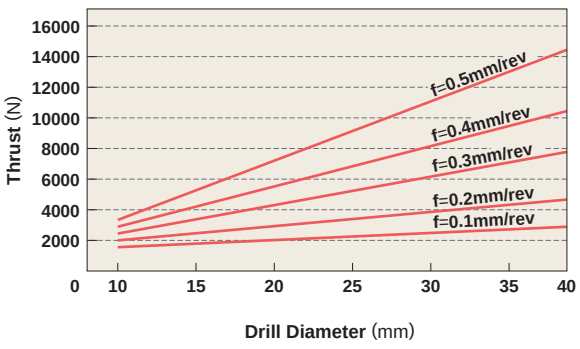
Power Consumption



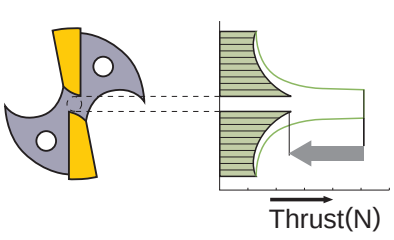
Torque

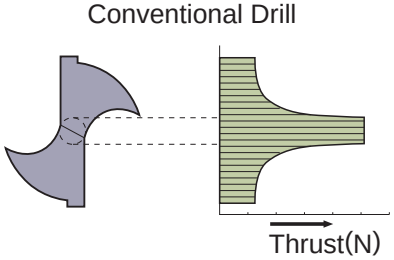


Thrust

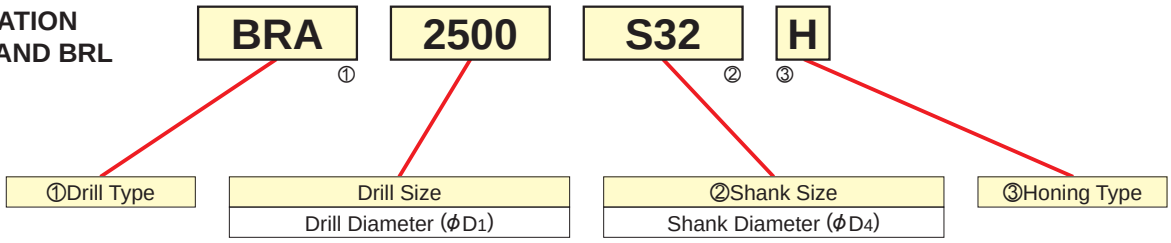


Reason for Low Thrust Load





IDENTIFICATION FOR BRA AND BRL



①Drill Type

Type	Description						Applications	Products Name
	Point Angle	Hole Depth	Helix Angle	Relief Angle	Back Taper	Body Dia.		
BRA	150°	l/d=3—4	20°	10°	0.3mm/100mm	øD1-0.2mm	For General Use (Carbon / Alloy / Stainless Steel)	BRA○○○○S○○
BRL	150°	l/d=3—4	10°+ Straight	10°	1.0mm/100mm	øD1-1.0mm	For Turning	BRL○○○○S○○L

②Shank Size

Type	Shank Diameter	Drill Diameter
S16	ø16 (h6)	ø8.0≤D1≤ø14.5
S20	ø20 (h6)	ø14.5<D1≤ø18.5
S25	ø25 (h6)	ø18.5<D1≤ø23.5
S32	ø32 (h6)	ø23.5<D1≤ø30.5
S40	ø40 (h6)	ø30.5<D1≤ø40.0

③Honing Type

Type	Honing Width (mm)	Work Material	
		BRA	**BRL**
-(Standard)	0.15—0.2	Carbon Steel, Alloy Steel, Mild Steel	Carbon Steel (≥200HB), Alloy Steel, Stainless Steel
S	0.2—0.25	—	Carbon Steel (<200HB)
M	0.25—0.3	—	High Tension Steel, Rolled Steel for Welded Structures
L	0.3—0.4	—	Mild Steel
H	0.05—0.1	Stainless Steel, Heat Resistant Alloy, Titanium Alloy	—
G	0.025—0.08	Cast Iron, Aluminium Alloy, Non-Ferrous Metals	Cast Iron

CARBIDE

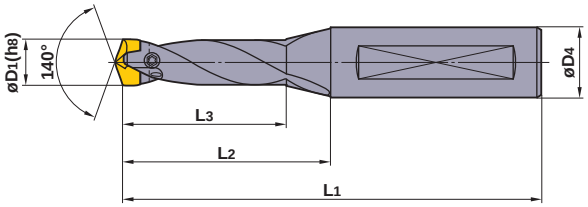
S-TAW NEW

Small Diameter Indexable Drill

- Wavy cutting edge design for good chip control.
- Highly rigid clamping system offers stability and reliability for small hole drilling.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	◎	○	

D1 Tolerance (mm)	D1=10	10<D1<14
	0 −0.022	0 −0.027



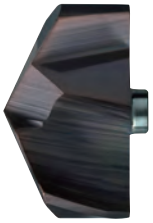
HOLDERS

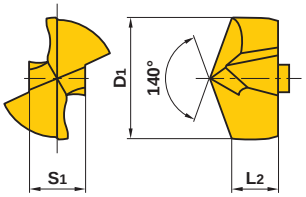
Drill Dia. Range D1 (mm)	Hole Depth (l/d)	Holder Order Number	Holder Stock	Insert Drill Dia. D1 (mm)	Insert Order Number	Insert Stock VP15TF	Insert Stock VP10H	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Wrench
10.0 – 10.4	3	STAWSN1000S16	●	10.0	STAWN1000TH	●	□	37	47	95	16	①TIP06F
				10.1	STAWN1010TH	●	□					
				10.2	STAWN1020TH	●	□					
	5	STAWMN1000S16	●	10.3	STAWN1030TH	●	□	57	67	115	16	①TIP06F
				10.4	STAWN1040TH	●	□					
10.5 – 10.9	3	STAWSN1050S16	●	10.5	STAWN1050TH	●	□	37	47	95	16	①TIP06F
				10.6	STAWN1060TH	●	□					
				10.7	STAWN1070TH	●	□					
	5	STAWMN1050S16	●	10.8	STAWN1080TH	●	□	57	67	115	16	①TIP06F
				10.9	STAWN1090TH	●	□					
11.0 – 11.4	3	STAWSN1100S16	●	11.0	STAWN1100TH	●	□	41	52	100	16	①TIP06F
				11.1	STAWN1110TH	●	□					
				11.2	STAWN1120TH	●	□					
	5	STAWMN1100S16	●	11.3	STAWN1130TH	●	□	66	77	125	16	①TIP06F
				11.4	STAWN1140TH	●	□					
11.5 – 11.9	3	STAWSN1150S16	●	11.5	STAWN1150TH	●	□	41	52	100	16	①TIP06F
				11.6	STAWN1160TH	●	□					
				11.7	STAWN1170TH	●	□					
	5	STAWMN1150S16	●	11.8	STAWN1180TH	●	□	66	77	125	16	①TIP06F
				11.9	STAWN1190TH	●	□					
12.0 – 12.4	3	STAWSN1200S16	●	12.0	STAWN1200TH	●	□	45	57	105	16	①TIP06F
				12.1	STAWN1210TH	●	□					
				12.2	STAWN1220TH	●	□					
	5	STAWMN1200S16	●	12.3	STAWN1230TH	●	□	70	82	130	16	①TIP06F
				12.4	STAWN1240TH	●	□					
12.5 – 12.9	3	STAWSN1250S16	●	12.5	STAWN1250TH	●	□	45	57	105	16	①TIP06F
				12.6	STAWN1260TH	●	□					
				12.7	STAWN1270TH	●	□					
	5	STAWMN1250S16	●	12.8	STAWN1280TH	●	□	70	82	130	16	①TIP06F
				12.9	STAWN1290TH	●	□					
13.0 – 13.4	3	STAWSN1300S16	●	13.0	STAWN1300TH	●	□	49	62	110	16	②TIP08W
				13.1	STAWN1310TH	●	□					
				13.2	STAWN1320TH	●	□					
	5	STAWMN1300S16	●	13.3	STAWN1330TH	●	□	74	87	135	16	②TIP08W
				13.4	STAWN1340TH	●	□					
13.5 – 13.9	3	STAWSN1350S16	●	13.5	STAWN1350TH	●	□	49	62	110	16	②TIP08W
				13.6	STAWN1360TH	●	□					
				13.7	STAWN1370TH	●	□					
	5	STAWMN1350S16	●	13.8	STAWN1380TH	●	□	74	87	135	16	②TIP08W
				13.9	STAWN1390TH	●	□					

(Note) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

INSERTS





Order Number	Stock		Dimensions (mm)			Applicable Holder
	VP15TF	VP10H	D1	L2	S1	
STAWN1000TH	●	□	10.0	3.8	4.6	STAWSN1000S16 STAWMN1000S16
1010TH	●	□	10.1	3.8	4.6	
1020TH	●	□	10.2	3.8	4.6	
1030TH	●	□	10.3	3.8	4.6	
1040TH	●	□	10.4	3.8	4.6	
1050TH	●	□	10.5	4.0	4.8	STAWSN1050S16 STAWMN1050S16
1060TH	●	□	10.6	4.0	4.8	
1070TH	●	□	10.7	4.0	4.8	
1080TH	●	□	10.8	4.0	4.8	
1090TH	●	□	10.9	4.0	4.8	
1100TH	●	□	11.0	4.2	5.1	STAWSN1100S16 STAWMN1100S16
1110TH	●	□	11.1	4.2	5.1	
1120TH	●	□	11.2	4.2	5.1	
1130TH	●	□	11.3	4.2	5.1	
1140TH	●	□	11.4	4.2	5.1	
1150TH	●	□	11.5	4.4	5.3	STAWSN1150S16 STAWMN1150S16
1160TH	●	□	11.6	4.4	5.3	
1170TH	●	□	11.7	4.4	5.3	
1180TH	●	□	11.8	4.4	5.3	
1190TH	●	□	11.9	4.4	5.3	
1200TH	●	□	12.0	4.6	5.5	STAWSN1200S16 STAWMN1200S16
1210TH	●	□	12.1	4.6	5.5	
1220TH	●	□	12.2	4.6	5.5	
1230TH	●	□	12.3	4.6	5.5	
1240TH	●	□	12.4	4.6	5.5	
1250TH	●	□	12.5	4.8	5.8	STAWSN1250S16 STAWMN1250S16
1260TH	●	□	12.6	4.8	5.8	
1270TH	●	□	12.7	4.8	5.8	
1280TH	●	□	12.8	4.8	5.8	
1290TH	●	□	12.9	4.8	5.8	
1300TH	●	□	13.0	4.9	6.0	STAWSN1300S16 STAWMN1300S16
1310TH	●	□	13.1	4.9	6.0	
1320TH	●	□	13.2	4.9	6.0	
1330TH	●	□	13.3	4.9	6.0	
1340TH	●	□	13.4	4.9	6.0	
1350TH	●	□	13.5	5.1	6.2	STAWSN1350S16 STAWMN1350S16
1360TH	●	□	13.6	5.1	6.2	
1370TH	●	□	13.7	5.1	6.2	
1380TH	●	□	13.8	5.1	6.2	
1390TH	●	□	13.9	5.1	6.2	

● : Inventory maintained in Japan. (2 inserts in one case) □ : Non stock, produced to order only.

CARBIDE

S-TAW NEW

Small Diameter Indexable Drill

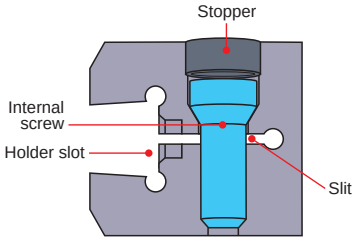
RECOMMENDED CUTTING CONDITIONS

Work Material		Drill Diameter / Conditions / Hardness	ϕ10.0—ϕ12.9		ϕ13.0—ϕ13.9	
			Cutting Speed (m/min)	Feed (mm/rev)	Cutting Speed (m/min)	Feed (mm/rev)
P	Mild Steel	≤180HB	80 (60—100)	0.20 (0.15—0.25)	90 (70—110)	0.25 (0.20—0.30)
P	Carbon Steel Alloy Steel	180—280HB	80 (60—100)	0.20 (0.15—0.25)	90 (70—110)	0.25 (0.20—0.30)
P	Carbon Steel Alloy Steel	280—350HB	70 (60—90)	0.20 (0.15—0.25)	80 (60—100)	0.25 (0.20—0.30)
M	Stainless Steel	≤200HB	40 (30—50)	0.13 (0.10—0.16)	50 (40—60)	0.15 (0.12—0.18)
K	Gray Cast Iron	Tensile Strength ≤350MPa	80 (60—100)	0.20 (0.15—0.25)	90 (70—110)	0.25 (0.20—0.30)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	70 (60—90)	0.20 (0.15—0.25)	80 (60—100)	0.25 (0.20—0.30)

NOTES ON USE

INSERT INSTALLATION

1. Before inserting the insert into the holder, ensure that there are no foreign objects or dirt in the holder slot or slit. If there are any foreign objects or dirt, use compressed air to remove them.



2. Use the provided wrench to loosen the inner screw to open the tip of the holder, then put the insert into the holder slot as shown in figure 1.
   ⁎Ensure that the wrench is firmly in contact with the base of the inner screw head when tightening.

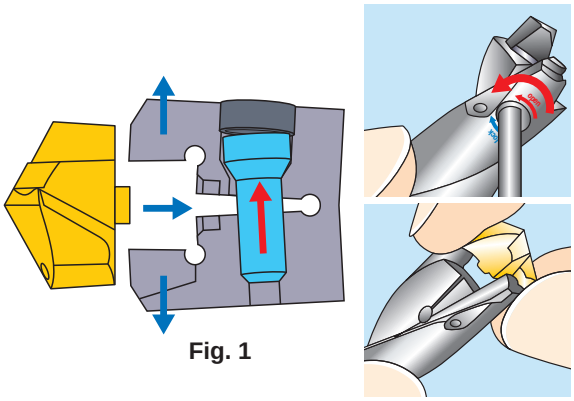


Fig. 1

3. After the insert has been set in the holder slot, tighten the inner screw while holding the insert lightly as shown in figure 2 to securely clamp and locate the insert.
   ⁎Ensure that the wrench is firmly in contact with the base of the inner screw head when tightening.

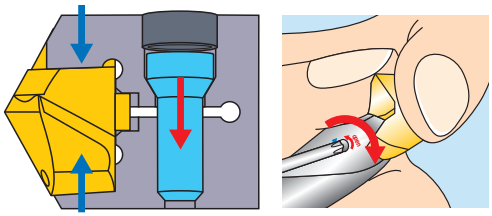
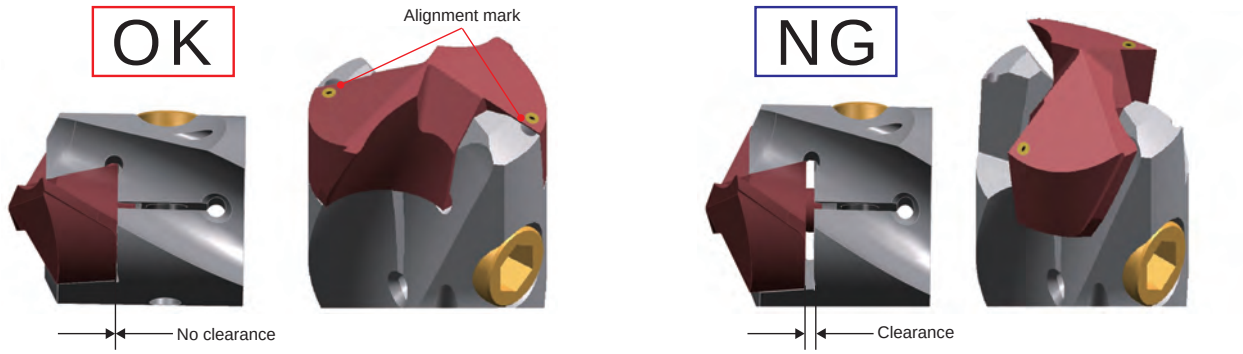


Fig. 2

4. Check there is no gap between the bottom of the insert and holder slot.



(Note) Poor or incorrect clamping of inserts can cause poor drilling performance and/or drill breakage.
Therefore ensure that the alignment marks on both the body and insert are aligned when setting.
When machining, use safety guards and goggles.

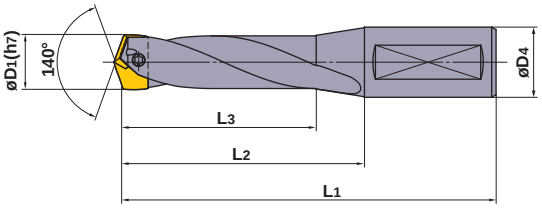
TAW

- Wavy cutting edge design for good chip control.
- Serration geometry for accurate insert location.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	◎		

D1 Tolerance (mm)	14≤D1≤18	18<D1≤30	30<D1≤40
	0 −0.018	0 −0.021	0 −0.025

(General Use)



HOLDERS

Drill Dia. Range D1 (mm)	Hole Depth (l/d)	Holder Order Number	Stock	Insert Drill Dia. D1 (mm)	Insert Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
14.0 | 14.4	3	TAWSNH1400S16	●	14.0	TAWNH1400T	●	□	51	67	115	16	WS254012T	TKY08D	WPT4405	MK1KS
				14.1	TAWNH1410T	●	□								
	5	TAWMNH1400S16	●	14.2	TAWNH1420T	●	□	80	97	145	16	WS254012T	TKY08D	WPT4405	MK1KS
				14.3	TAWNH1430T	●	□								
	8	TAWLNH1400S16	●	14.4	TAWNH1440T	●	□	122	137	185	16	WS254012T	TKY08D	WPT4405	MK1KS
14.5 | 15.4	3	TAWSNH1500S20	●	14.5	TAWNH1450T	●	□	54	75	125	20	WS254013T	TKY08D	WPT4405	MK1KS
				14.6	TAWNH1460T	●	□								
				14.7	TAWNH1470T	●	□								
	5	TAWMNH1500S20	●	14.8	TAWNH1480T	●	□	85	105	155	20	WS254013T	TKY08D	WPT4405	MK1KS
				14.9	TAWNH1490T	●	□								
				15.0	TAWNH1500T	●	□								
				15.1	TAWNH1510T	●	□								
	8	TAWLNH1500S20	●	15.2	TAWNH1520T	●	□	130	148	198	20	WS254013T	TKY08D	WPT4405	MK1KS
				15.3	TAWNH1530T	●	□								
				15.4	TAWNH1540T	●	□								
15.5 | 16.4	3	TAWSN1600S20	●	15.5	TAWN1550T	●	□	58 (58)	80 (80)	130 (130)	20	WS254014T	TKY08D	WPT4405	MK1KS
					TAWNH1550T	●	□								
				15.6	TAWN1560T	●	□								
					TAWNH1560T	●	□								
				15.7	TAWN1570T	●	□								
					TAWNH1570T	●	□								
	5	TAWMN1600S20	●	15.8	TAWN1580T	●	□	91 (91)	115 (115)	165 (165)	20	WS254014T	TKY08D	WPT4405	MK1KS
					TAWNH1580T	●	□								
				15.9	TAWN1590T	●	□								
					TAWNH1590T	●	□								
				16.0	TAWN1600T	●	□								
					TAWNH1600T	●	□								
				16.1	TAWN1610T	●	□								
					TAWNH1610T	●	□								
	8	TAWLN1600S20	●	16.2	TAWN1620T	●	□	138 (138)	158 (158)	208 (208)	20	WS254014T	TKY08D	WPT4405	MK1KS
					TAWNH1620T	●	□								
				16.3	TAWN1630T	●	□								
					TAWNH1630T	●	□								
				16.4	TAWN1640T	●	□								
					TAWNH1640T	●	□								

(Note 1) The dimensions in brackets represent the sizes when TAWN-U type inserts are used.
(Note 2) The TAWN-U type inserts cannot be used for the TAWS/M/L NH1400S16 and TAWS/M/L NH1500S20 holders.
(Note 3) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. Range D_1 (mm)	Hole Depth (l/d)	Holder Order Number	Holder Stock	Insert Drill Dia. D_1 (mm)	Insert Order Number	Stock VP15TF	Stock VP10H	Effective flute length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
16.5 | 17.4	3	TAWSN1700S20	●	16.5	TAWN1650T	●	□	61 (61)	85 (85)	135 (135)	20	WS254015T	①TKY08D	WPT4405	MK1KS
					TAWNH1650T	●	□								
				16.6	TAWN1660T	●	□								
					TAWNH1660T	●	□								
				16.7	TAWN1670T	●	□								
					TAWNH1670T	●	□								
	5	TAWMN1700S20	●	16.8	TAWN1680T	●	□	96 (96)	120 (120)	170 (170)	20	WS254015T	①TKY08D	WPT4405	MK1KS
					TAWNH1680T	●	□								
				16.9	TAWN1690T	●	□								
					TAWNH1690T	●	□								
				17.0	TAWN1700T	●	□								
					TAWNH1700T	●	□								
				17.1	TAWN1710T	●	□								
					TAWNH1710T	●	□								
	8	TAWLN1700S20	●	17.2	TAWN1720T	●	□	146 (146)	166 (166)	216 (216)	20	WS254015T	①TKY08D	WPT4405	MK1KS
					TAWNH1720T	●	□								
				17.3	TAWN1730T	●	□								
					TAWN1730TH	●	□								
				17.4	TAWN1740T	●	□								
					TAWNH1740T	●	□								
17.5 | 18.4	3	TAWSN1800S20	●	17.5	TAWN1750T	●	□	65 (65)	90 (90)	140 (140)	20	WS254016T	①TKY08D	WPT4405	MK1KS
					TAWNH1750T	●	□								
				17.6	TAWN1760T	●	□								
					TAWNH1760T	●	□								
				17.7	TAWN1770T	●	□								
					TAWNH1770T	●	□								
	5	TAWMN1800S20	●	17.8	TAWN1780T	●	□	102 (102)	125 (125)	175 (175)	20	WS254016T	①TKY08D	WPT4405	MK1KS
					TAWNH1780T	●	□								
				17.9	TAWN1790T	●	□								
					TAWNH1790T	●	□								
				18.0	TAWN1800T	●	□								
					TAWNH1800T	●	□								
				18.1	TAWN1810T	●	□								
					TAWNH1810T	●	□								
	8	TAWLN1800S20	●	18.2	TAWN1820T	●	□	154 (154)	174 (174)	224 (224)	20	WS254016T	①TKY08D	WPT4405	MK1KS
					TAWNH1820T	●	□								
				18.3	TAWN1830T	●	□								
					TAWNH1830T	●	□								
				18.4	TAWN1840T	●	□								
					TAWNH1840T	●	□								
18.5 | 19.4	3	TAWSN1900S25	●	18.5	TAWN1850T	●	□	68 (68)	99 (99)	155 (155)	25	WS304517T	②TKY10T	WPT4405	MK1KS
					TAWNH1850T	●	□								
				18.6	TAWN1860T	●	□								
					TAWNH1860T	●	□								
				18.7	TAWN1870T	●	□								
					TAWNH1870T	●	□								
	5	TAWMN1900S25	●	18.8	TAWN1880T	●	□	107 (107)	134 (134)	190 (190)	25	WS304517T	②TKY10T	WPT4405	MK1KS
					TAWNH1880T	●	□								
				18.9	TAWN1890T	●	□								
					TAWNH1890T	●	□								
				19.0	TAWN1900T	●	□								
					TAWNH1900T	●	□								
				19.1	TAWN1910T	●	□								
					TAWNH1910T	●	□								
	8	TAWLN1900S25	●	19.2	TAWN1920T	●	□	162 (162)	185 (185)	241 (241)	25	WS304517T	②TKY10T	WPT4405	MK1KS
					TAWNH1920T	●	□								
				19.3	TAWN1930T	●	□								
					TAWNH1930T	●	□								
				19.4	TAWN1940T	●	□								
					TAWNH1940T	●	□								

INSERT DESCRIPTION D118 CUTTING CONDITIONS D122 USAGE NOTE D122 TECHNICAL DATA F001

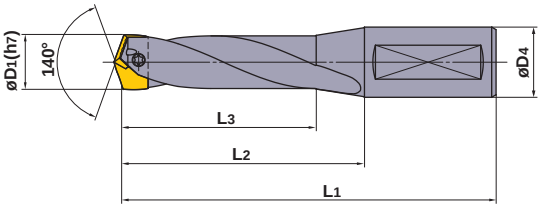
TAW

- Wavy cutting edge design for good chip control.
- Serration geometry for accurate insert location.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	◎		

D1 Tolerance (mm)	14≤D1≤18	18<D1≤30	30<D1≤40
	0 −0.018	0 −0.021	0 −0.025

(General Use)



HOLDERS

Drill Dia. Range D1 (mm)	Hole Depth (l/d)	Holder Order Number	Holder Stock	Insert Drill Dia. D1 (mm)	Insert Order Number	Insert Stock VP15TF	Insert Stock VP10H	Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
19.5 | 20.4	3	TAWSN2000S25	●	19.5	TAWN1950T	●	□	72 (72)	99 (99)	155 (155)	25	WS304518T	TKY10T	WPT4405	MK1KS
					TAWNH1950T	●	□								
				19.6	TAWN1960T	●	□								
					TAWNH1960T	●	□								
				19.7	TAWN1970T	●	□								
					TAWNH1970T	●	□								
	5	TAWMN2000S25	●	19.8	TAWN1980T	●	□	113 (113)	139 (139)	195 (195)	25	WS304518T	TKY10T	WPT4405	MK1KS
					TAWNH1980T	●	□								
				19.9	TAWN1990T	●	□								
					TAWNH1990T	●	□								
				20.0	TAWN2000T	●	□								
					TAWNH2000T	●	□								
	8	TAWLN2000S25	●	20.1	TAWN2010T	□	□	170 (170)	193 (193)	249 (249)	25	WS304518T	TKY10T	WPT4405	MK1KS
					TAWNH2010T	□	□								
				20.2	TAWN2020T	□	□								
					TAWNH2020T	□	□								
				20.3	TAWN2030T	□	□								
					TAWNH2030T	□	□								
				20.4	TAWN2040T	□	□								
					TAWNH2040T	□	□								
20.5 | 21.4	3	TAWSN2100S25	●	20.5	TAWN2050T	●	□	75 (75)	99 (99)	155 (155)	25	WS304518T	TKY10T	WPT4405	MK1KS
					TAWNH2050T	●	□								
				20.6	TAWN2060T	□	□								
					TAWNH2060T	□	□								
				20.7	TAWN2070T	□	□								
					TAWNH2070T	□	□								
	5	TAWMN2100S25	●	20.8	TAWN2080T	□	□	118 (118)	139 (139)	195 (195)	25	WS304518T	TKY10T	WPT4405	MK1KS
					TAWNH2080T	□	□								
				20.9	TAWN2090T	□	□								
					TAWNH2090T	□	□								
				21.0	TAWN2100T	●	□								
					TAWNH2100T	●	□								
	8	TAWLN2100S25	●	21.1	TAWN2110T	□	□	178 (178)	202 (202)	258 (258)	25	WS304518T	TKY10T	WPT4405	MK1KS
					TAWNH2110T	□	□								
				21.2	TAWN2120T	□	□								
					TAWNH2120T	□	□								
				21.3	TAWN2130T	□	□								
					TAWNH2130T	□	□								
				21.4	TAWN2140T	□	□								
					TAWNH2140T	□	□								
21.5 | 22.4	3	TAWSN2200S25	●	21.5	TAWN2150T	●	□	79.3 (79)	104.3 (104)	160.3 (160)	25	WS355520T	TKY15T	WPT4405	MK1KS
					TAWNH2150T	●	□								
				21.6	TAWN2160T	□	□								
					TAWNH2160T	□	□								
	5	TAWMN2200S25	●	21.7	TAWN2170T	□	□	124.3 (124)	144.3 (144)	200.3 (200)	25	WS355520T	TKY15T	WPT4405	MK1KS
					TAWNH2170T	□	□								
				21.8	TAWN2180T	□	□								
					TAWNH2180T	□	□								
	8	TAWLN2200S25	●	21.9	TAWN2190T	□	□	186 (185.7)	210 (209.7)	266 (265.7)	25	WS355520T	TKY15T	WPT4405	MK1KS
					TAWNH2190T	□	□								

(Note 1) The dimensions in brackets represent the sizes when TAWN-U type inserts are used.
(Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. Range D_1 (mm)	Hole Depth (l/d)	Holder Order Number	Holder Stock	Insert Drill Dia. D_1 (mm)	Insert Order Number	Insert Stock VP15TF	Insert Stock VP10H	Dimensions (mm) Effective flute length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
21.5 | 22.4	3	TAWSN2200S25	●	22.0	TAWN2200T	●	□	79.3 (79)	104.3 (104)	160.3 (160)	25	WS355520T	TKY15T	WPT4405	MK1KS
					TAWNH2200T	●	□								
				22.1	TAWN2210T	□	□								
					TAWNH2210T	□	□								
	5	TAWMN2200S25	●	22.2	TAWN2220T	□	□	124.3 (124)	144.3 (144)	200.3 (200)	25	WS355520T	TKY15T	WPT4405	MK1KS
					TAWNH2220T	□	□								
				22.3	TAWN2230T	□	□								
					TAWNH2230T	□	□								
	8	TAWLN2200S25	●	22.4	TAWN2240T	□	□	186 (185.7)	210 (209.7)	266 (265.7)	25	WS355520T	TKY15T	WPT4405	MK1KS
					TAWNH2240T	□	□								
22.5 | 23.4	3	TAWSN2300S25	●	22.5	TAWN2250T	●	□	82.3 (82)	104.3 (104)	160.3 (160)	25	WS355521T	TKY15T	WPT4405	MK1KS
					TAWNH2250T	●	□								
				22.6	TAWN2260T	□	□								
					TAWNH2260T	□	□								
				22.7	TAWN2270T	□	□								
					TAWNH2270T	□	□								
	5	TAWMN2300S25	●	22.8	TAWN2280T	□	□	129.3 (129)	154.3 (154)	210.3 (210)	25	WS355521T	TKY15T	WPT4405	MK1KS
					TAWNH2280T	□	□								
				22.9	TAWN2290T	□	□								
					TAWNH2290T	□	□								
				23.0	TAWN2300T	●	□								
					TAWNH2300T	●	□								
				23.1	TAWN2310T	□	□								
					TAWNH2310T	□	□								
	8	TAWLN2300S25	●	23.2	TAWN2320T	□	□	194 (193.7)	223 (222.7)	279 (278.7)	25	WS355521T	TKY15T	WPT4405	MK1KS
					TAWNH2320T	□	□								
				23.3	TAWN2330T	□	□								
					TAWNH2330T	□	□								
				23.4	TAWN2340T	□	□								
					TAWNH2340T	□	□								
23.5 | 24.4	3	TAWSN2400S32	●	23.5	TAWN2350T	●	□	86.3 (86)	110.3 (110)	170.3 (170)	32	WS355521T	TKY15T	WPT4405	MK1KS
					TAWNH2350T	●	□								
				23.6	TAWN2360T	□	□								
					TAWNH2360T	□	□								
				23.7	TAWN2370T	□	□								
					TAWNH2370T	□	□								
	5	TAWMN2400S32	●	23.8	TAWN2380T	□	□	135.3 (135)	160.3 (160)	220.3 (220)	32	WS355521T	TKY15T	WPT4405	MK1KS
					TAWNH2380T	□	□								
				23.9	TAWN2390T	□	□								
					TAWNH2390T	□	□								
				24.0	TAWN2400T	●	□								
					TAWNH2400T	●	□								
				24.1	TAWN2410T	□	□								
					TAWNH2410T	□	□								
	8	TAWLN2400S32	●	24.2	TAWN2420T	□	□	202 (201.7)	232 (231.7)	292 (291.7)	32	WS355521T	TKY15T	WPT4405	MK1KS
					TAWNH2420T	□	□								
				24.3	TAWN2430T	□	□								
					TAWNH2430T	□	□								
				24.4	TAWN2440T	□	□								
					TAWNH2440T	□	□								
24.5 | 25.4	3	TAWSN2500S32	●	24.5	TAWN2450T	●	□	88.6 (88)	110.6 (110)	170.6 (170)	32	WS406023T	TKY25T	WPT4405	MK1KS
					TAWNH2450T	●	□								
				24.6	TAWN2460T	□	□								
					TAWNH2460T	□	□								
	5	TAWMN2500S32	●	24.7	TAWN2470T	□	□	140.6 (140)	165.6 (165)	225.6 (225)	32	WS406023T	TKY25T	WPT4405	MK1KS
					TAWNH2470T	□	□								
				24.8	TAWN2480T	□	□								
					TAWNH2480T	□	□								
	8	TAWLN2500S32	●	24.9	TAWN2490T	□	□	210 (209.4)	240 (239.4)	300 (299.4)	32	WS406023T	TKY25T	WPT4405	MK1KS
					TAWNH2490T	□	□								

INSERT DESCRIPTION D118 CUTTING CONDITIONS D122 USAGE NOTE D122 TECHNICAL DATA F001

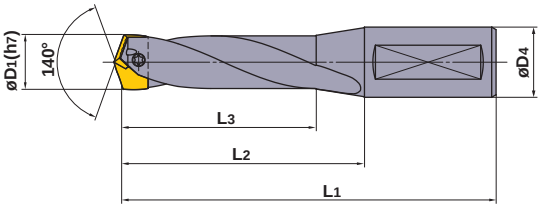
TAW

- Wavy cutting edge design for good chip control.
- Serration geometry for accurate insert location.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	◎		

D1 Tolerance (mm)	14≤D1≤18	18<D1≤30	30<D1≤40
	0 −0.018	0 −0.021	0 −0.025

(General Use)



HOLDERS

Drill Dia. Range D1 (mm)	Hole Depth (l/d)	Holder Order Number	Holder Stock	Insert Drill Dia. D1 (mm)	Insert Order Number	Insert Stock VP15TF	Insert Stock VP10H	Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
24.5 – 25.4	3	TAWSN2500S32	●	25.0	TAWN2500T	●	□	88.6 (88)	110.6 (110)	170.6 (170)	32	WS406023T	TKY25T	WPT4405	MK1KS
					TAWNH2500T	●	□								
				25.1	TAWN2510T	□	□								
					TAWNH2510T	□	□								
	5	TAWMN2500S32	●	25.2	TAWN2520T	□	□	140.6 (140)	165.6 (165)	225.6 (225)	32	WS406023T	TKY25T	WPT4405	MK1KS
					TAWNH2520T	□	□								
				25.3	TAWN2530T	□	□								
					TAWNH2530T	□	□								
	8	TAWLN2500S32	●	25.4	TAWN2540T	□	□	210 (209.4)	240 (239.4)	300 (299.4)	32	WS406023T	TKY25T	WPT4405	MK1KS
					TAWNH2540T	□	□								
25.5 – 26.4	3	TAWSN2600S32	●	25.5	TAWN2550T	●	□	92.6 (92)	115.6 (115)	175.6 (175)	32	WS406024T	TKY25T	WPT4405	MK1KS
					TAWNH2550T	●	□								
				25.6	TAWN2560T	□	□								
					TAWNH2560T	□	□								
				25.7	TAWN2570T	□	□								
					TAWNH2570T	□	□								
	5	TAWMN2600S32	●	25.8	TAWN2580T	□	□	146.6 (146)	170.6 (170)	230.6 (230)	32	WS406024T	TKY25T	WPT4405	MK1KS
					TAWNH2580T	□	□								
				25.9	TAWN2590T	□	□								
					TAWNH2590T	□	□								
				26.0	TAWN2600T	●	□								
					TAWNH2600T	●	□								
	8	TAWLN2600S32	●	26.1	TAWN2610T	□	□	218 (217.4)	248 (247.4)	308 (307.4)	32	WS406024T	TKY25T	WPT4405	MK1KS
					TAWNH2610T	□	□								
				26.2	TAWN2620T	□	□								
					TAWNH2620T	□	□								
				26.3	TAWN2630T	□	□								
					TAWNH2630T	□	□								
				26.4	TAWN2640T	□	□								
					TAWNH2640T	□	□								
26.5 – 27.4	3	TAWSN2700S32	●	26.5	TAWN2650T	●	□	94.6 (94)	115.6 (115)	175.6 (175)	32	WS406024T	TKY25T	WPT4405	MK1KS
					TAWNH2650T	●	□								
				26.6	TAWN2660T	□	□								
					TAWNH2660T	□	□								
				26.7	TAWN2670T	□	□								
					TAWNH2670T	□	□								
	5	TAWMN2700S32	●	26.8	TAWN2680T	□	□	151.6 (151)	175.6 (175)	235.6 (235)	32	WS406024T	TKY25T	WPT4405	MK1KS
					TAWNH2680T	□	□								
				26.9	TAWN2690T	□	□								
					TAWNH2690T	□	□								
				27.0	TAWN2700T	●	□								
					TAWNH2700T	●	□								
	8	TAWLN2700S32	●	27.1	TAWN2710T	□	□	226 (225.4)	256 (255.4)	316 (315.4)	32	WS406024T	TKY25T	WPT4405	MK1KS
					TAWNH2710T	□	□								
				27.2	TAWN2720T	□	□								
					TAWNH2720T	□	□								
				27.3	TAWN2730T	□	□								
					TAWNH2730T	□	□								
				27.4	TAWN2740T	□	□								
					TAWNH2740T	□	□								

(Note 1) The dimensions in brackets represent the sizes when TAWN-U type inserts are used.
(Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained in Japan. □ : Non stock, produced to order only.

Drill Dia. Range D_1 (mm)	Hole Depth (l/d)	Holder Order Number	Holder Stock	Drill Dia. D_1 (mm)	Insert Order Number	Insert Stock VP15TF	Insert Stock VP10H	Effective flute length L_3	Neck Length L_2	Overall Length L_1	Shank Dia. D_4	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
27.5 | 28.4	3	TAWSN2800S32	●	27.5	TAWN2750T	●	□	97.2 (97)	120.2 (120)	180.2 (180)	32	WS508026T	TKY27T	WPT4405	MK1KS
					TAWNH2750T	●	□								
				27.6	TAWN2760T	□	□								
					TAWNH2760T	□	□								
				27.7	TAWN2770T	□	□								
					TAWNH2770T	□	□								
				27.8	TAWN2780T	□	□								
					TAWNH2780T	□	□								
	5	TAWMN2800S32	●	27.9	TAWN2790T	□	□	157.2 (157)	180.2 (180)	240.2 (240)	32	WS508026T	TKY27T	WPT4405	MK1KS
					TAWNH2790T	□	□								
				28.0	TAWN2800T	●	□								
					TAWNH2800T	●	□								
				28.1	TAWN2810T	□	□								
					TAWNH2810T	□	□								
	8	TAWLN2800S32	●	28.2	TAWN2820T	□	□	234 (233.8)	264 (263.8)	324 (323.8)	32	WS508026T	TKY27T	WPT4405	MK1KS
					TAWNH2820T	□	□								
				28.3	TAWN2830T	□	□								
					TAWNH2830T	□	□								
				28.4	TAWN2840T	□	□								
					TAWNH2840T	□	□								
28.5 | 29.4	3	TAWSN2900S32	●	28.5	TAWN2850T	●	□	100.2 (100)	125.2 (125)	185.2 (185)	32	WS508027T	TKY27T	WPT4405	MK1KS
					TAWNH2850T	●	□								
				28.6	TAWN2860T	□	□								
					TAWNH2860T	□	□								
				28.7	TAWN2870T	□	□								
					TAWNH2870T	□	□								
	5	TAWMN2900S32	●	28.8	TAWN2880T	□	□	162.2 (162)	185.2 (185)	245.2 (245)	32	WS508027T	TKY27T	WPT4405	MK1KS
					TAWNH2880T	□	□								
				28.9	TAWN2890T	□	□								
					TAWNH2890T	□	□								
				29.0	TAWN2900T	●	□								
					TAWNH2900T	●	□								
				29.1	TAWN2910T	□	□								
					TAWNH2910T	□	□								
	8	TAWLN2900S32	●	29.2	TAWN2920T	□	□	242 (241.8)	272 (271.8)	332 (331.8)	32	WS508027T	TKY27T	WPT4405	MK1KS
					TAWNH2920T	□	□								
				29.3	TAWN2930T	□	□								
					TAWNH2930T	□	□								
				29.4	TAWN2940T	□	□								
					TAWNH2940T	□	□								
29.5 | 30.4	3	TAWSN3000S32	●	29.5	TAWN2950T	●	□	104.2 (104)	125.2 (125)	185.2 (185)	32	WS508027T	TKY27T	WPT4405	MK1KS
					TAWNH2950T	●	□								
				29.6	TAWN2960T	□	□								
					TAWNH2960T	□	□								
				29.7	TAWN2970T	□	□								
					TAWNH2970T	□	□								
	5	TAWMN3000S32	●	29.8	TAWN2980T	□	□	167.2 (167)	195.2 (195)	255.2 (255)	32	WS508027T	TKY27T	WPT4405	MK1KS
					TAWNH2980T	□	□								
				29.9	TAWN2990T	□	□								
					TAWNH2990T	□	□								
				30.0	TAWN3000T	●	□								
					TAWNH3000T	●	□								
				30.1	TAWN3010T	□	□								
					TAWNH3010T	□	□								
	8	TAWLN3000S32	●	30.2	TAWN3020T	□	□	250 (249.8)	285 (284.8)	345 (344.8)	32	WS508027T	TKY27T	WPT4405	MK1KS
					TAWNH3020T	□	□								
				30.3	TAWN3030T	□	□								
					TAWNH3030T	□	□								
				30.4	TAWN3040T	□	□								
					TAWNH3040T	□	□								

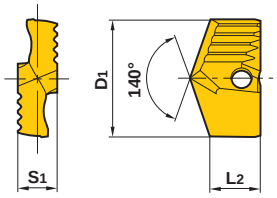
INSERT DESCRIPTION D118 CUTTING CONDITIONS D122 USAGE NOTE D122 TECHNICAL DATA F001

TAW

- Wavy cutting edge design for good chip control.
- Serration geometry for accurate insert location.

INSERTS

H Type



Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWNH1400T	●	□	14.0	7.6	5.0	TAWSNH 1400S16
1410T	●	□	14.1	7.6	5.0	TAWMNH 1400S16
1420T	●	□	14.2	7.6	5.0	TAWLNH 1400S16
1430T	●	□	14.3	7.6	5.0	
1440T	●	□	14.4	7.6	5.0	
1450T	●	□	14.5	7.5	5.0	TAWSNH 1500S20
1460T	●	□	14.6	7.5	5.0	TAWMNH 1500S20
1470T	●	□	14.7	7.5	5.0	TAWLNH 1500S20
1480T	●	□	14.8	7.5	5.0	
1490T	●	□	14.9	7.5	5.0	
1500T	●	□	15.0	7.4	5.0	
1510T	●	□	15.1	7.4	5.0	
1520T	●	□	15.2	7.4	5.0	
1530T	●	□	15.3	7.4	5.0	
1540T	●	□	15.4	7.4	5.0	
1550T	●	□	15.5	7.9	6.0	TAWSN 1600S20
1560T	●	□	15.6	7.9	6.0	TAWMN 1600S20
1570T	●	□	15.7	7.9	6.0	TAWLN 1600S20
1580T	●	□	15.8	7.9	6.0	
1590T	●	□	15.9	7.9	6.0	
1600T	●	□	16.0	7.8	6.0	
1610T	●	□	16.1	7.8	6.0	
1620T	●	□	16.2	7.8	6.0	
1630T	●	□	16.3	7.8	6.0	
1640T	●	□	16.4	7.8	6.0	
1650T	●	□	16.5	7.7	6.0	TAWSN 1700S20
1660T	●	□	16.6	7.7	6.0	TAWMN 1700S20
1670T	●	□	16.7	7.7	6.0	TAWLN 1700S20
1680T	●	□	16.8	7.7	6.0	
1690T	●	□	16.9	7.7	6.0	
1700T	●	□	17.0	7.6	6.0	
1710T	●	□	17.1	7.6	6.0	
1720T	●	□	17.2	7.6	6.0	
1730T	●	□	17.3	7.6	6.0	
1740T	●	□	17.4	7.6	6.0	
1750T	●	□	17.5	7.5	6.0	TAWSN 1800S20
1760T	●	□	17.6	7.5	6.0	TAWMN 1800S20
1770T	●	□	17.7	7.5	6.0	TAWLN 1800S20
1780T	●	□	17.8	7.5	6.0	
1790T	●	□	17.9	7.5	6.0	
1800T	●	□	18.0	7.4	6.0	
1810T	●	□	18.1	7.4	6.0	
1820T	●	□	18.2	7.4	6.0	
1830T	●	□	18.3	7.4	6.0	
1840T	●	□	18.4	7.4	6.0	

Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWNH1850T	●	□	18.5	9.3	7.0	TAWSN 1900S25
1860T	●	□	18.6	9.3	7.0	TAWMN 1900S25
1870T	●	□	18.7	9.3	7.0	TAWLN 1900S25
1880T	●	□	18.8	9.3	7.0	
1890T	●	□	18.9	9.3	7.0	
1900T	●	□	19.0	9.2	7.0	
1910T	●	□	19.1	9.2	7.0	
1920T	●	□	19.2	9.2	7.0	
1930T	●	□	19.3	9.2	7.0	
1940T	●	□	19.4	9.2	7.0	
1950T	●	□	19.5	9.1	7.0	TAWSN 2000S25
1960T	●	□	19.6	9.1	7.0	TAWMN 2000S25
1970T	●	□	19.7	9.1	7.0	TAWLN 2000S25
1980T	●	□	19.8	9.1	7.0	
1990T	●	□	19.9	9.1	7.0	
2000T	●	□	20.0	9.0	7.0	
2010T	□	□	20.1	9.0	7.0	
2020T	□	□	20.2	9.0	7.0	
2030T	□	□	20.3	9.0	7.0	
2040T	□	□	20.4	9.0	7.0	
2050T	●	□	20.5	8.9	7.0	TAWSN 2100S25
2060T	□	□	20.6	8.9	7.0	TAWMN 2100S25
2070T	□	□	20.7	8.9	7.0	TAWLN 2100S25
2080T	□	□	20.8	8.9	7.0	
2090T	□	□	20.9	8.9	7.0	
2100T	●	□	21.0	8.8	7.0	
2110T	□	□	21.1	8.8	7.0	
2120T	□	□	21.2	8.8	7.0	
2130T	□	□	21.3	8.8	7.0	
2140T	□	□	21.4	8.8	7.0	
2150T	●	□	21.5	10.6	8.0	TAWSN 2200S25
2160T	□	□	21.6	10.6	8.0	TAWMN 2200S25
2170T	□	□	21.7	10.6	8.0	TAWLN 2200S25
2180T	□	□	21.8	10.6	8.0	
2190T	□	□	21.9	10.6	8.0	
2200T	●	□	22.0	10.5	8.0	
2210T	□	□	22.1	10.5	8.0	
2220T	□	□	22.2	10.5	8.0	
2230T	□	□	22.3	10.5	8.0	
2240T	□	□	22.4	10.5	8.0	
2250T	●	□	22.5	10.4	8.0	TAWSN 2300S25
2260T	□	□	22.6	10.4	8.0	TAWMN 2300S25
2270T	□	□	22.7	10.4	8.0	TAWLN 2300S25
2280T	□	□	22.8	10.4	8.0	
2290T	□	□	22.9	10.4	8.0	

● : Inventory maintained in Japan. (2 inserts in one case) □ : Non stock, produced to order only.

Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWNH2300T	●	□	23.0	10.3	8.0	TAWSN 2300S25
2310T	□	□	23.1	10.3	8.0	
2320T	□	□	23.2	10.3	8.0	TAWMN 2300S25
2330T	□	□	23.3	10.3	8.0	
2340T	□	□	23.4	10.3	8.0	TAWLN 2300S25
2350T	●	□	23.5	10.2	8.0	
2360T	□	□	23.6	10.2	8.0	
2370T	□	□	23.7	10.2	8.0	TAWSN 2400S32
2380T	□	□	23.8	10.2	8.0	
2390T	□	□	23.9	10.2	8.0	TAWMN 2400S32
2400T	●	□	24.0	10.1	8.0	
2410T	□	□	24.1	10.1	8.0	TAWLN 2400S32
2420T	□	□	24.2	10.1	8.0	
2430T	□	□	24.3	10.1	8.0	
2440T	□	□	24.4	10.1	8.0	
2450T	●	□	24.5	11.7	9.0	
2460T	□	□	24.6	11.7	9.0	
2470T	□	□	24.7	11.7	9.0	TAWSN 2500S32
2480T	□	□	24.8	11.7	9.0	
2490T	□	□	24.9	11.7	9.0	TAWMN 2500S32
2500T	●	□	25.0	11.6	9.0	
2510T	□	□	25.1	11.6	9.0	TAWLN 2500S32
2520T	□	□	25.2	11.6	9.0	
2530T	□	□	25.3	11.6	9.0	
2540T	□	□	25.4	11.6	9.0	
2550T	●	□	25.5	11.5	9.0	
2560T	□	□	25.6	11.5	9.0	
2570T	□	□	25.7	11.5	9.0	TAWSN 2600S32
2580T	□	□	25.8	11.5	9.0	
2590T	□	□	25.9	11.5	9.0	TAWMN 2600S32
2600T	●	□	26.0	11.4	9.0	
2610T	□	□	26.1	11.4	9.0	TAWLN 2600S32
2620T	□	□	26.2	11.4	9.0	
2630T	□	□	26.3	11.4	9.0	
2640T	□	□	26.4	11.4	9.0	
2650T	●	□	26.5	11.3	9.0	
2660T	□	□	26.6	11.3	9.0	
2670T	□	□	26.7	11.3	9.0	TAWSN 2700S32
2680T	□	□	26.8	11.3	9.0	
2690T	□	□	26.9	11.3	9.0	TAWMN 2700S32
2700T	●	□	27.0	11.2	9.0	
2710T	□	□	27.1	11.2	9.0	TAWLN 2700S32
2720T	□	□	27.2	11.2	9.0	
2730T	□	□	27.3	11.2	9.0	
2740T	□	□	27.4	11.2	9.0	

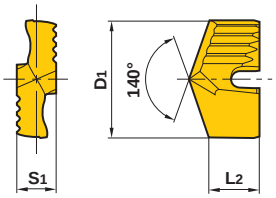
Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWNH2750T	●	□	27.5	12.3	10.0	
2760T	□	□	27.6	12.3	10.0	
2770T	□	□	27.7	12.3	10.0	TAWSN 2800S32
2780T	□	□	27.8	12.3	10.0	
2790T	□	□	27.9	12.3	10.0	TAWMN 2800S32
2800T	●	□	28.0	12.2	10.0	
2810T	□	□	28.1	12.2	10.0	TAWLN 2800S32
2820T	□	□	28.2	12.2	10.0	
2830T	□	□	28.3	12.2	10.0	
2840T	□	□	28.4	12.2	10.0	
2850T	●	□	28.5	12.1	10.0	
2860T	□	□	28.6	12.1	10.0	
2870T	□	□	28.7	12.1	10.0	TAWSN 2900S32
2880T	□	□	28.8	12.1	10.0	
2890T	□	□	28.9	12.1	10.0	TAWMN 2900S32
2900T	●	□	29.0	12.0	10.0	
2910T	□	□	29.1	12.0	10.0	TAWLN 2900S32
2920T	□	□	29.2	12.0	10.0	
2930T	□	□	29.3	12.0	10.0	
2940T	□	□	29.4	12.0	10.0	
2950T	●	□	29.5	11.9	10.0	
2960T	□	□	29.6	11.9	10.0	
2970T	□	□	29.7	11.9	10.0	TAWSN 3000S32
2980T	□	□	29.8	11.9	10.0	
2990T	□	□	29.9	11.9	10.0	TAWMN 3000S32
3000T	●	□	30.0	11.8	10.0	
3010T	□	□	30.1	11.8	10.0	TAWLN 3000S32
3020T	□	□	30.2	11.8	10.0	
3030T	□	□	30.3	11.8	10.0	
3040T	□	□	30.4	11.8	10.0	

TAW

- Wavy cutting edge design for good chip control.
- Serration geometry for accurate insert location.

INSERTS

U Type



Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWN1550T	●	□	15.5	7.9	6.0	
1560T	●	□	15.6	7.9	6.0	
1570T	●	□	15.7	7.9	6.0	TAWSN 1600S20
1580T	●	□	15.8	7.9	6.0	
1590T	●	□	15.9	7.9	6.0	TAWMN 1600S20
1600T	●	□	16.0	7.8	6.0	
1610T	●	□	16.1	7.8	6.0	TAWLN 1600S20
1620T	●	□	16.2	7.8	6.0	
1630T	●	□	16.3	7.8	6.0	
1640T	●	□	16.4	7.8	6.0	
1650T	●	□	16.5	7.7	6.0	
1660T	●	□	16.6	7.7	6.0	
1670T	●	□	16.7	7.7	6.0	TAWSN 1700S20
1680T	●	□	16.8	7.7	6.0	
1690T	●	□	16.9	7.7	6.0	TAWMN 1700S20
1700T	●	□	17.0	7.6	6.0	
1710T	●	□	17.1	7.6	6.0	TAWLN 1700S20
1720T	●	□	17.2	7.6	6.0	
1730T	●	□	17.3	7.6	6.0	
1740T	●	□	17.4	7.6	6.0	
1750T	●	□	17.5	7.5	6.0	
1760T	●	□	17.6	7.5	6.0	
1770T	●	□	17.7	7.5	6.0	TAWSN 1800S20
1780T	●	□	17.8	7.5	6.0	
1790T	●	□	17.9	7.5	6.0	TAWMN 1800S20
1800T	●	□	18.0	7.4	6.0	
1810T	●	□	18.1	7.4	6.0	TAWLN 1800S20
1820T	●	□	18.2	7.4	6.0	
1830T	●	□	18.3	7.4	6.0	
1840T	●	□	18.4	7.4	6.0	
1850T	●	□	18.5	9.3	7.0	
1860T	●	□	18.6	9.3	7.0	
1870T	●	□	18.7	9.3	7.0	TAWSN 1900S25
1880T	●	□	18.8	9.3	7.0	
1890T	●	□	18.9	9.3	7.0	TAWMN 1900S25
1900T	●	□	19.0	9.2	7.0	
1910T	●	□	19.1	9.2	7.0	TAWLN 1900S25
1920T	●	□	19.2	9.2	7.0	
1930T	●	□	19.3	9.2	7.0	
1940T	●	□	19.4	9.2	7.0	

Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWN1950T	●	□	19.5	9.1	7.0	
1960T	●	□	19.6	9.1	7.0	
1970T	●	□	19.7	9.1	7.0	TAWSN 2000S25
1980T	●	□	19.8	9.1	7.0	
1990T	●	□	19.9	9.1	7.0	TAWMN 2000S25
2000T	●	□	20.0	9.0	7.0	
2010T	□	□	20.1	9.0	7.0	TAWLN 2000S25
2020T	□	□	20.2	9.0	7.0	
2030T	□	□	20.3	9.0	7.0	
2040T	□	□	20.4	9.0	7.0	
2050T	●	□	20.5	8.9	7.0	
2060T	□	□	20.6	8.9	7.0	
2070T	□	□	20.7	8.9	7.0	TAWSN 2100S25
2080T	□	□	20.8	8.9	7.0	
2090T	□	□	20.9	8.9	7.0	TAWMN 2100S25
2100T	●	□	21.0	8.8	7.0	
2110T	□	□	21.1	8.8	7.0	TAWLN 2100S25
2120T	□	□	21.2	8.8	7.0	
2130T	□	□	21.3	8.8	7.0	
2140T	□	□	21.4	8.8	7.0	
2150T	●	□	21.5	10.3	8.0	
2160T	□	□	21.6	10.3	8.0	
2170T	□	□	21.7	10.3	8.0	TAWSN 2200S25
2180T	□	□	21.8	10.3	8.0	
2190T	□	□	21.9	10.3	8.0	TAWMN 2200S25
2200T	●	□	22.0	10.2	8.0	
2210T	□	□	22.1	10.2	8.0	TAWLN 2200S25
2220T	□	□	22.2	10.2	8.0	
2230T	□	□	22.3	10.2	8.0	
2240T	□	□	22.4	10.2	8.0	
2250T	●	□	22.5	10.1	8.0	
2260T	□	□	22.6	10.1	8.0	
2270T	□	□	22.7	10.1	8.0	TAWSN 2300S25
2280T	□	□	22.8	10.1	8.0	
2290T	□	□	22.9	10.1	8.0	TAWMN 2300S25
2300T	●	□	23.0	10.0	8.0	
2310T	□	□	23.1	10.0	8.0	TAWLN 2300S25
2320T	□	□	23.2	10.0	8.0	
2330T	□	□	23.3	10.0	8.0	
2340T	□	□	23.4	10.0	8.0	

● : Inventory maintained in Japan. (2 inserts in one case) □ : Non stock, produced to order only.

Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWN2350T	●	□	23.5	9.9	8.0	
2360T	□	□	23.6	9.9	8.0	
2370T	□	□	23.7	9.9	8.0	TAWSN 2400S32
2380T	□	□	23.8	9.9	8.0	
2390T	□	□	23.9	9.9	8.0	TAWMN 2400S32
2400T	●	□	24.0	9.8	8.0	
2410T	□	□	24.1	9.8	8.0	TAWLN 2400S32
2420T	□	□	24.2	9.8	8.0	
2430T	□	□	24.3	9.8	8.0	
2440T	□	□	24.4	9.8	8.0	
2450T	●	□	24.5	11.1	9.0	
2460T	□	□	24.6	11.1	9.0	
2470T	□	□	24.7	11.1	9.0	TAWSN 2500S32
2480T	□	□	24.8	11.1	9.0	
2490T	□	□	24.9	11.1	9.0	TAWMN 2500S32
2500T	●	□	25.0	11.0	9.0	
2510T	□	□	25.1	11.0	9.0	TAWLN 2500S32
2520T	□	□	25.2	11.0	9.0	
2530T	□	□	25.3	11.0	9.0	
2540T	□	□	25.4	11.0	9.0	
2550T	●	□	25.5	10.9	9.0	
2560T	□	□	25.6	10.9	9.0	
2570T	□	□	25.7	10.9	9.0	TAWSN 2600S32
2580T	□	□	25.8	10.9	9.0	
2590T	□	□	25.9	10.9	9.0	TAWMN 2600S32
2600T	●	□	26.0	10.8	9.0	
2610T	□	□	26.1	10.8	9.0	TAWLN 2600S32
2620T	□	□	26.2	10.8	9.0	
2630T	□	□	26.3	10.8	9.0	
2640T	□	□	26.4	10.8	9.0	
2650T	●	□	26.5	10.7	9.0	
2660T	□	□	26.6	10.7	9.0	
2670T	□	□	26.7	10.7	9.0	TAWSN 2700S32
2680T	□	□	26.8	10.7	9.0	
2690T	□	□	26.9	10.7	9.0	TAWMN 2700S32
2700T	●	□	27.0	10.6	9.0	
2710T	□	□	27.1	10.6	9.0	TAWLN 2700S32
2720T	□	□	27.2	10.6	9.0	
2730T	□	□	27.3	10.6	9.0	
2740T	□	□	27.4	10.6	9.0	
2750T	●	□	27.5	12.1	10.0	
2760T	□	□	27.6	12.1	10.0	
2770T	□	□	27.7	12.1	10.0	TAWSN 2800S32
2780T	□	□	27.8	12.1	10.0	
2790T	□	□	27.9	12.1	10.0	TAWMN 2800S32
2800T	●	□	28.0	12.0	10.0	
2810T	□	□	28.1	12.0	10.0	TAWLN 2800S32
2820T	□	□	28.2	12.0	10.0	
2830T	□	□	28.3	12.0	10.0	
2840T	□	□	28.4	12.0	10.0	

Order Number	Stock VP15TF	Stock VP10H	Dimensions (mm) D1	L2	S1	Applicable Holder
TAWN2850T	●	□	28.5	11.9	10.0	
2860T	□	□	28.6	11.9	10.0	
2870T	□	□	28.7	11.9	10.0	TAWSN 2900S32
2880T	□	□	28.8	11.9	10.0	
2890T	□	□	28.9	11.9	10.0	TAWMN 2900S32
2900T	●	□	29.0	11.8	10.0	
2910T	□	□	29.1	11.8	10.0	TAWLN 2900S32
2920T	□	□	29.2	11.8	10.0	
2930T	□	□	29.3	11.8	10.0	
2940T	□	□	29.4	11.8	10.0	
2950T	●	□	29.5	11.7	10.0	
2960T	□	□	29.6	11.7	10.0	
2970T	□	□	29.7	11.7	10.0	TAWSN 3000S32
2980T	□	□	29.8	11.7	10.0	
2990T	□	□	29.9	11.7	10.0	TAWMN 3000S32
3000T	●	□	30.0	11.6	10.0	
3010T	□	□	30.1	11.6	10.0	TAWLN 3000S32
3020T	□	□	30.2	11.6	10.0	
3030T	□	□	30.3	11.6	10.0	
3040T	□	□	30.4	11.6	10.0	

TAW

RECOMMENDED CUTTING CONDITIONS

Work Material		Drill Diameter / Conditions / Hardness	ϕ14.0—ϕ15.4 Cutting Speed (m/min)	ϕ14.0—ϕ15.4 Feed (mm/rev)	ϕ15.5—ϕ18.4 Cutting Speed (m/min)	ϕ15.5—ϕ18.4 Feed (mm/rev)	ϕ18.5—ϕ21.4 Cutting Speed (m/min)	ϕ18.5—ϕ21.4 Feed (mm/rev)
P	Mild Steel	≤180HB	70 (60—90)	0.20 (0.15—0.25)	80 (60—100)	0.25 (0.20—0.30)	90 (70—110)	0.25 (0.20—0.30)
P	Carbon Steel Alloy Steel	180—280HB	70 (60—90)	0.20 (0.15—0.25)	80 (60—100)	0.25 (0.20—0.30)	80 (60—100)	0.25 (0.20—0.30)
P	Carbon Steel Alloy Steel	280—350HB	60 (50—80)	0.15 (0.12—0.18)	70 (50—90)	0.20 (0.15—0.25)	70 (50—90)	0.20 (0.15—0.25)
M	Stainless Steel	≤200HB	50 (40—60)	0.15 (0.12—0.18)	50 (40—60)	0.15 (0.12—0.18)	60 (50—70)	0.20 (0.15—0.22)
K	Gray Cast Iron	Tensile Strength ≤350MPa	70 (50—90)	0.20 (0.15—0.25)	80 (60—90)	0.25 (0.20—0.30)	90 (70—110)	0.25 (0.20—0.30)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	70 (50—90)	0.20 (0.15—0.25)	80 (60—90)	0.25 (0.20—0.30)	80 (60—90)	0.25 (0.20—0.30)

Work Material		Drill Diameter / Conditions / Hardness	ϕ21.5—ϕ24.4 Cutting Speed (m/min)	ϕ21.5—ϕ24.4 Feed (mm/rev)	ϕ24.5—ϕ27.4 Cutting Speed (m/min)	ϕ24.5—ϕ27.4 Feed (mm/rev)	ϕ27.5—ϕ30.4 Cutting Speed (m/min)	ϕ27.5—ϕ30.4 Feed (mm/rev)
P	Mild Steel	≤180HB	100 (80—120)	0.30 (0.25—0.35)	110 (80—120)	0.30 (0.25—0.35)	110 (80—120)	0.30 (0.25—0.35)
P	Carbon Steel Alloy Steel	180—280HB	90 (70—110)	0.30 (0.25—0.35)	100 (80—120)	0.30 (0.25—0.35)	100 (80—120)	0.30 (0.25—0.35)
P	Carbon Steel Alloy Steel	280—350HB	80 (60—100)	0.25 (0.20—0.30)	90 (70—110)	0.25 (0.20—0.30)	90 (70—110)	0.25 (0.20—0.30)
M	Stainless Steel	≤200HB	60 (50—70)	0.20 (0.15—0.22)	70 (60—80)	0.25 (0.20—0.28)	70 (60—80)	0.25 (0.20—0.28)
K	Gray Cast Iron	Tensile Strength ≤350MPa	100 (80—110)	0.35 (0.25—0.40)	110 (90—120)	0.35 (0.25—0.40)	110 (90—120)	0.40 (0.30—0.45)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	90 (60—100)	0.30 (0.25—0.35)	100 (80—110)	0.30 (0.25—0.35)	100 (80—110)	0.30 (0.25—0.35)

(Note 1) When using the 8D type holder, reduce the cutting speed by approx. 20%.
(Note 2) When using the 8D type holder, it is recommended to drill a pilot guide hole.
(Note 3) H type honing is recommended when machining mild steel and stainless steel.

HONE WIDTH

If an insert with honing other than standard is needed, please order using the symbols below.

(Insert Order Number)

T A W N H 1 4 0 0 T ○

- T A W — TAW Product Name
- N — N : General Use / B : For Bridges
- H — H : H Type / None : U Type
- 1 4 0 0 — Insert Diameter
- T — Honing Symbol
- ○ — Honing Type

(Honing Standard)

Honing Type	Hone Width (mm)
F	0
G	0.02—0.05
H	0.05—0.10
-(Standard)	0.10—0.15
K	0.15—0.20
S	0.20—0.25
M	0.25—0.30

NOTES ON USE

INSERT INSTALLATION

- Loosen the clamp screw to install the insert.
- Correctly mesh the insert and the holder serrations, then slide the insert to the bottom of the slot.
- Fasten the clamp screw using the torque wrench provided while holding the insert lightly as shown. (Figure 1)
- Check there is no gap between the bottom of the insert and holder. (Figure 2)

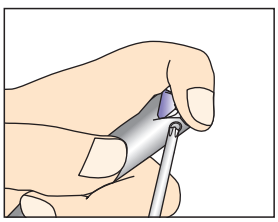


Fig. 1

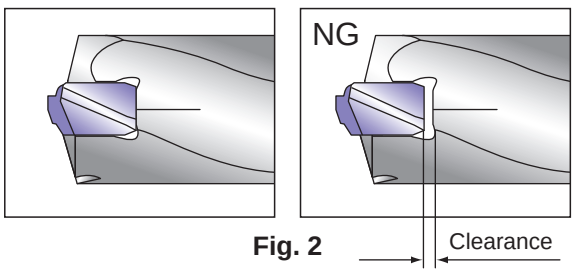


Fig. 2

INSERT REPLACEMENT

- Thouroughly clean the serrations of the holder before installing a new insert.
  Remove heavy dirt in the holder serrations by using the cleaning plate provided.

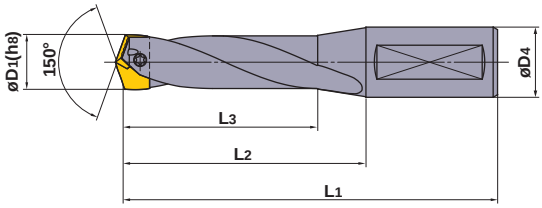
TAW

- Wavy cutting edge design for good chip control.
- Serration geometry for accurate insert location.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎					

	18<D1≤30
D1 Tolerance (mm)	0 −0.033

(For Bridge Construction)



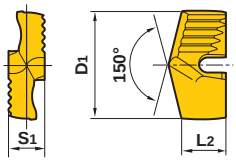
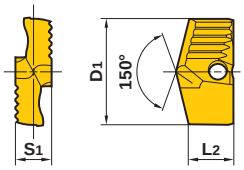
HOLDERS

Drill Dia. Range D1 (mm)	Hole Depth (l/d)	Holder Order Number	Holder Stock	Insert Drill Dia. D1 (mm)	Insert Order Number	Insert Stock VP15TF	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Clamp Screw	Wrench	Plate	Anti-seize Lubricant
24.5 24.6 24.7	3	TAWSB2500S32	●	24.5	TAWB2450T	●	88.6 (88)	110.6 (110)	170.6 (170)	32	WS406023T	TKY25T	WPT4405	MK1KS
					TAWBH2450T	●								
				24.6	TAWB2460T	□								
					TAWBH2460T	□								
	5	TAWMB2500S32	□	24.7	TAWB2470T	●	140.6 (140)	165.6 (165)	225.6 (225)	32	WS406023T	TKY25T	WPT4405	MK1KS
					TAWBH2470T	●								
26.5 26.7	3	TAWSB2700S32	●	26.5	TAWB2650T	□	94.6 (94)	115.6 (115)	175.6 (175)	32	WS406024T	TKY25T	WPT4405	MK1KS
					TAWBH2650T	□								
	5	TAWMB2700S32	□	26.7	TAWB2670T	●	151.6 (151)	175.6 (175)	235.6 (235)	32	WS406024T	TKY25T	WPT4405	MK1KS
					TAWBH2670T	●								

(Note 1) The dimensions in brackets represent the sizes when TAWN-U type inserts are used.
(Note 2) Please contact us for any geometry that is not in this catalogue (e.g. different diameter and length).

● : Inventory maintained. □ : Non stock, produced to order only.

INSERTS

Shape	Order Number	Stock VP15TF	Dimensions (mm) D1	L2	S1	Applicable Holder	Hone Width (mm)	Geometry
U Type	TAWB2450T	●	24.5	11.1	9.0	TAWSB2500S32 TAWMB2500S32	0.20−0.25	
	2460T	□	24.6	11.1	9.0			
	2470T	●	24.7	11.1	9.0			
	2650T	□	26.5	10.7	9.0	TAWSB2700S32 TAWMB2700S32		
	2670T	●	26.7	10.7	9.0			
H Type	TAWBH2450T	●	24.5	11.7	9.0	TAWSB2500S32 TAWMB2500S32	0.20−0.25	
	2460T	□	24.6	11.7	9.0			
	2470T	●	24.7	11.7	9.0			
	2650T	□	26.5	11.3	9.0	TAWSB2700S32 TAWMB2700S32		
	2670T	●	26.7	11.3	9.0			

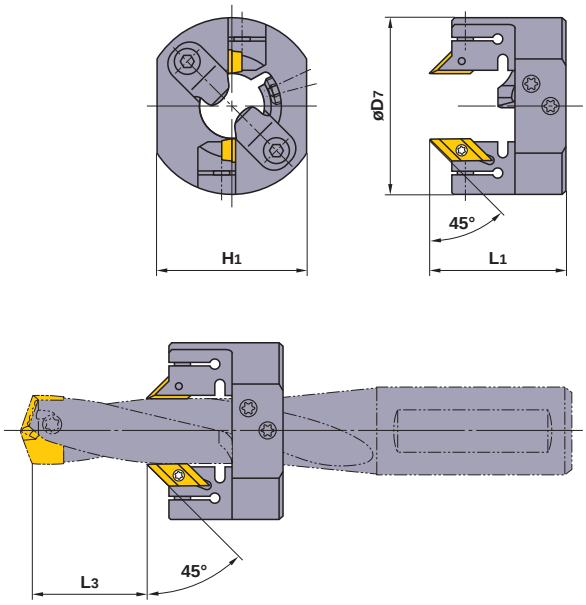
● : Inventory maintained. (2 inserts in one case) □ : Non stock, produced to order only.

RECOMMENDED CUTTING CONDITIONS

Work Material			Drill Diameter / Conditions / Hardness	ϕ24.5, ϕ24.6, ϕ24.7 Cutting Speed (m/min)	ϕ24.5, ϕ24.6, ϕ24.7 Feed (mm/rev)	ϕ26.5, ϕ26.7 Cutting Speed (m/min)	ϕ26.5, ϕ26.7 Feed (mm/rev)
P	Structural Steel	SS400 (JIS)	Tensile Strength ≤400−500MPa	70 (60−80)	0.30 (0.25−0.35)	70 (60−80)	0.30 (0.25−0.35)
		SM490 (JIS)	Tensile Strength ≤490−610MPa	65 (55−75)	0.30 (0.25−0.35)	65 (55−75)	0.30 (0.25−0.35)
		SM570 (JIS)	Tensile Strength ≤570−720MPa	60 (50−70)	0.30 (0.25−0.35)	60 (50−70)	0.30 (0.25−0.35)

CHAMFER RING

- Drilling and chamfering can be done at the same time.
- Chamfering position can be changed according to the machining depth.
- Maximum chamfer width: 4mm



Tool Holder Number	Stock	Dimensions (mm)			Maximum chamfer width	Drilled Depth L3 (min.—max.)			Suitable TAW Type Drill
		L1	D7	H1		TAWS	TAWM	TAWL	
TAW200R-90	○	40	53	44	4	12—29	29—70	70—127	TAWS/M/L2000S25
210R-90	○	40	54	46	4	12—32	32—75	75—135	TAWS/M/L2100S25
220R-90	○	40	55	46	4	14—36	36—81	81—143	TAWS/M/L2200S25
230R-90	○	40	56	48	4	14—39	39—86	86—151	TAWS/M/L2300S25
240R-90	○	40	57	48	4	14—43	43—92	92—159	TAWS/M/L2400S32
250R-90	○	42	58	50	4	15—43	43—95	95—165	TAWS/M/L2500S32
260R-90	○	42	59	50	4	15—47	47—101	101—173	TAWS/M/L2600S32
270R-90	○	42	60	52	4	15—49	49—106	106—181	TAWS/M/L2700S32
280R-90	○	42	61	52	4	15—52	52—112	112—189	TAWS/M/L2800S32
290R-90	○	45	62	54	4	15—52	52—114	114—194	TAWS/M/L2900S32
300R-90	○	45	63	54	4	15—56	56—119	119—202	TAWS/M/L3000S32

(Note) For cutting conditions, refer to the recommended cutting conditions for the TAW drill on D122.
If tears or vibrations occur, reduce the feed or cutting speed.

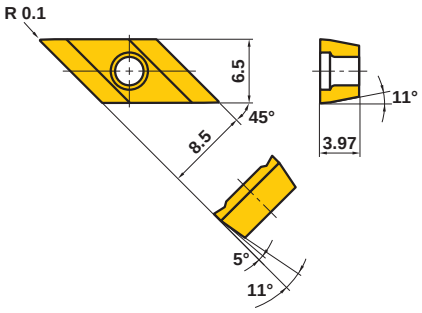
SPARE PARTS

Tool Holder Number	Clamp Screw (Insert)	Guide Plate	Screw (Guide Plate)	Set screw (Chamfer Ring)	Run-out adjust Screw	Wrench	Insert
TAW200R-90	TS254	TAWP20-21	HSC04008	TSR06011S	TSR05008S		
210R-90	TS254	TAWP20-21	HSC04008	TSR06011S	TSR05008S		
220R-90	TS254	TAWP22-24	HSC04008	TSR06011S	TSR05008S		
230R-90	TS254	TAWP22-24	HSC04008	TSR06011S	TSR05008S		
240R-90	TS254	TAWP22-24	HSC04008	TSR06011S	TSR05008S	①TKY20R	
250R-90	TS254	TAWP25-26	HSC04008	TSR06011S	TSR05008S	①TKY10R	TAWC12T301-45GM
260R-90	TS254	TAWP25-26	HSC04008	TSR06011S	TSR05008S	②TKY08F	
270R-90	TS254	TAWP27-28	HSC04008	TSR06011S	TSR05008S		
280R-90	TS254	TAWP27-28	HSC04008	TSR06011S	TSR05008S		
290R-90	TS254	TAWP29-30	HSC04008	TSR06011S	TSR05008S		
300R-90	TS254	TAWP29-30	HSC04008	TSR06011S	TSR05008S		

(Note) The above parts are provided with the chamfer ring except insert.

○ : **Inventory maintained in Japan. (Available from spring 2009)**

INSERTS

Shape	Order Number	Stock VP15TF	Geometry
	TAWC12T301-45GM	○	

CHAMFER RING INSTALLATION

1 Loosen the set screws (A) and clearance adjust screw (B) on the chamfer ring.
2 Install the chamfering insert on the chamfer ring.
3 Put the chamfer ring on from the front of the drill. Remove the TAW drill insert or clamp screw beforehand.
4 Ensure that the TAW drill insert is securely located using the clamp screw.
5 Fasten the 2 set screws (A) on the chamfer ring to attach it to the drill as shown in fig. 1.
Note : The guide plate of the chamfer ring should be fixed on the back (left) side of the TAW drill flute.
6 Tighten the adjust screw (B) until the chamfering insert comes into contact with the TAW drill as shown in fig. 2.
Note : Stop when the chamfering insert contacts the TAW drill.
If the screw is overtightened, the chamfering insert may be damaged.
(Clamp Torque (Guide) : 2.0N • m)

Fig. 1

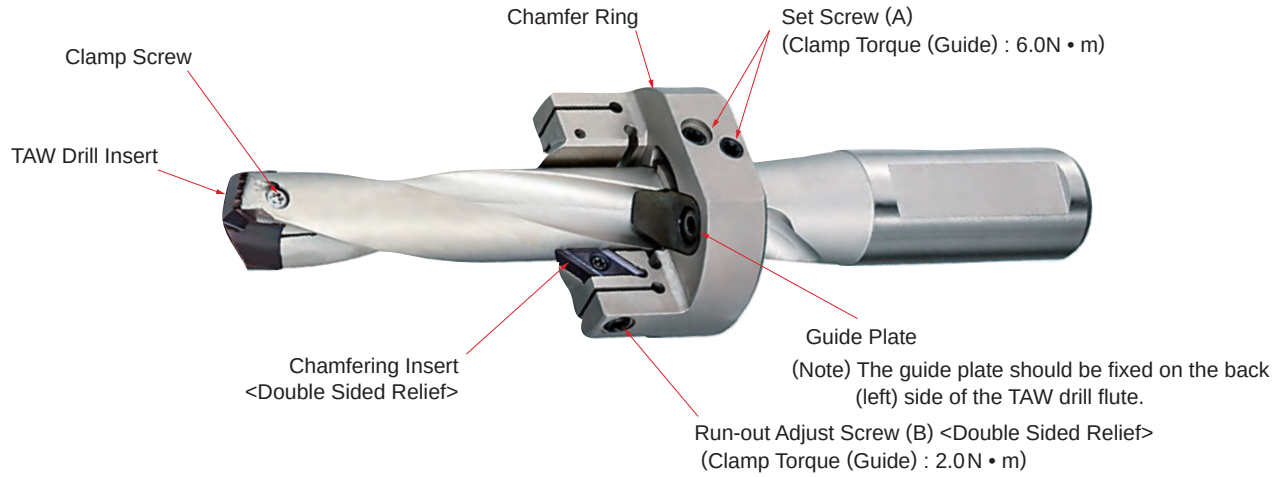
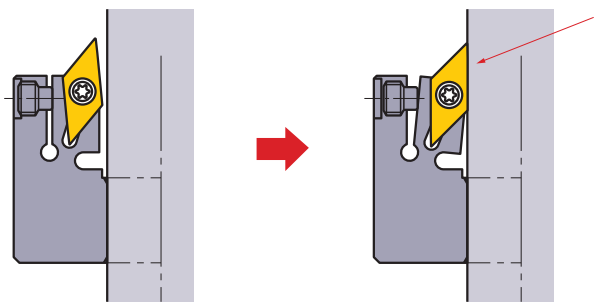


Fig. 2

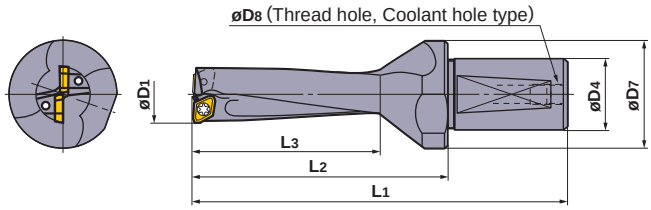


Make the chamfering insert contact with the TAW drill.
(When detaching or moving the chamfer ring,
ensure there is a clearance between the inserts and the body.)

TAFS/TAFM/TAFL

- High rigidity holder.
- 4 corner use insert.
- Various grades and chip breakers.

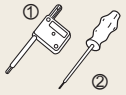
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎		



*A screw hole on the flange section is not a coolant hole.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Order Number	Stock	Number of Teeth	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Flange diameter D7	Through coolant hole D8	Insert Number	Clamp Screw	Wrench
12.0	2	TAFS1200F20	●	2	29	39	82	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
	3	TAFM1200F20	●	2	41	51	94	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
12.5	2	TAFS1250F20	●	2	29	39	82	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
	3	TAFM1250F20	●	2	41	51	94	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
13.0	2	TAFS1300F20	●	2	31	41	84	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
	3	TAFM1300F20	●	2	44	54	97	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
13.5	2	TAFS1350F20	●	2	31	41	84	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
	3	TAFM1350F20	●	2	44	54	97	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
14.0	2	TAFS1400F20	●	2	33	43	86	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
	3	TAFM1400F20	●	2	47	57	100	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
14.5	2	TAFS1450F20	●	2	33	43	86	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
	3	TAFM1450F20	●	2	47	57	100	20	25	PT1/8	GCMT040204-U◌	TS2	TKY06F
15.0	2	TAFS1500F20	●	2	35	45	88	20	25	PT1/8	GPMT060204-U◌	TS2	TKY06F
	3	TAFM1500F20	●	2	50	60	103	20	25	PT1/8	GPMT060204-U◌	TS2	TKY06F
15.5	2	TAFS1550F20	●	2	35	45	88	20	25	PT1/8	GPMT060204-U◌	TS2	TKY06F
	3	TAFM1550F20	●	2	50	60	103	20	25	PT1/8	GPMT060204-U◌	TS2	TKY06F
16.0	2	TAFS1600F25	●	2	38	57	107	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
	3	TAFM1600F25	●	2	54	73	123	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
	4	TAFL1600F25	●	2	70	89	139	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
16.5	2	TAFS1650F25	●	2	38	57	107	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
	3	TAFM1650F25	●	2	54	73	123	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
17.0	2	TAFS1700F25	●	2	41	59	109	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
	3	TAFM1700F25	●	2	58	76	126	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
	4	TAFL1700F25	●	2	75	93	143	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
17.5	2	TAFS1750F25	●	2	41	59	109	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
	3	TAFM1750F25	●	2	58	76	126	25	35	PT1/8	GPMT060204-U◌	TS2	TKY06F
18.0	2	TAFS1800F25	●	2	43	61	111	25	35	PT1/8	GPMT070204-U◌	TS25	TKY08F
	3	TAFM1800F25	●	2	61	79	129	25	35	PT1/8	GPMT070204-U◌	TS25	TKY08F
	4	TAFL1800F25	●	2	79	97	147	25	35	PT1/8	GPMT070204-U◌	TS25	TKY08F
18.5	2	TAFS1850F25	●	2	43	61	111	25	35	PT1/8	GPMT070204-U◌	TS25	TKY08F
	3	TAFM1850F25	●	2	61	79	129	25	35	PT1/8	GPMT070204-U◌	TS25	TKY08F

● : Inventory maintained in Japan.

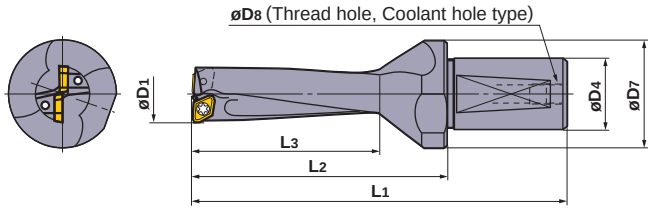
Drill Dia. D1 (mm)	Hole Depth (l/d)	Order Number	Stock	Number of Teeth	Dimensions (mm)						Insert Number		
					Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Flange diameter D7	Through coolant hole D8		Clamp Screw	Wrench
19.0	2	TAFS1900F25	●	2	46	63	113	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	3	TAFM1900F25	●	2	65	82	132	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	4	TAFL1900F25	●	2	84	101	151	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
19.5	2	TAFS1950F25	●	2	46	63	113	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	3	TAFM1950F25	●	2	65	82	132	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
20.0	2	TAFS2000F25	●	2	48	65	115	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	3	TAFM2000F25	●	2	68	85	135	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	4	TAFL2000F25	●	2	88	105	155	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
20.5	2	TAFS2050F25	●	2	48	65	115	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	3	TAFM2050F25	●	2	68	85	135	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
21.0	2	TAFS2100F25	●	2	50	67	117	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	3	TAFM2100F25	●	2	71	88	138	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	4	TAFL2100F25	●	2	92	109	159	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
21.5	2	TAFS2150F25	●	2	50	67	117	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	3	TAFM2150F25	●	2	71	88	138	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
22.0	2	TAFS2200F25	●	2	53	69	119	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	3	TAFM2200F25	●	2	75	91	141	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	4	TAFL2200F25	●	2	97	113	163	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
22.5	2	TAFS2250F25	●	2	53	69	119	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
	3	TAFM2250F25	●	2	75	91	141	25	35	PT1/8	GPMT070204-U○	TS25	①TKY08F
23.0	2	TAFS2300F25	●	2	55	71	121	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2300F25	●	2	78	94	144	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
	4	TAFL2300F25	●	2	101	117	167	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
23.5	2	TAFS2350F25	●	2	55	71	121	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2350F25	●	2	78	94	144	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
24.0	2	TAFS2400F25	●	2	58	73	123	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2400F25	●	2	82	97	147	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
	4	TAFL2400F25	●	2	106	121	171	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
24.5	2	TAFS2450F25	●	2	58	73	123	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2450F25	●	2	82	97	147	25	35	PT1/8	GPMT090304-U○	TS3	①TKY08F
25.0	2	TAFS2500F32	●	2	60	75	130	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2500F32	●	2	85	100	155	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	4	TAFL2500F32	●	2	110	125	180	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
25.5	2	TAFS2550F32	●	2	60	75	130	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2550F32	●	2	85	100	155	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
26.0	2	TAFS2600F32	●	2	62	77	132	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2600F32	●	2	88	103	158	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	4	TAFL2600F32	●	2	114	129	184	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
26.5	2	TAFS2650F32	●	2	62	77	132	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2650F32	●	2	88	103	158	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
27.0	2	TAFS2700F32	●	2	65	79	134	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2700F32	●	2	92	106	161	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	4	TAFL2700F32	●	2	119	133	188	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
27.5	2	TAFS2750F32	●	2	65	79	134	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
	3	TAFM2750F32	●	2	92	106	161	32	42	PT1/8	GPMT090304-U○	TS3	①TKY08F
28.0	2	TAFS2800F32	●	2	67	81	136	32	42	PT1/8	GPMT11T308-U○	TS4	②TKY15D
	3	TAFM2800F32	●	2	95	109	164	32	42	PT1/8	GPMT11T308-U○	TS4	②TKY15D
	4	TAFL2800F32	●	2	123	137	192	32	42	PT1/8	GPMT11T308-U○	TS4	②TKY15D

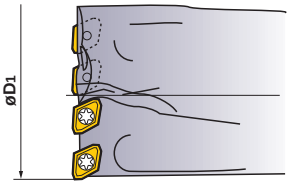
INSERT DESCRIPTION D130 CUTTING CONDITIONS D131 USAGE NOTE D133 TECHNICAL DATA F001

TAFS/TAFM/TAFL

- High rigidity holder.
- 4 corner use insert.
- Various grades and chip breakers.

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	◎		



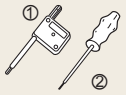


Number of Teeth = 4 (ϕD1 ≥ 49)

★A screw hole on the flange section is not a coolant hole.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Order Number	Stock	Number of Teeth	Dimensions (mm) Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Flange diameter D7	Through coolant hole D8	Insert Number	Clamp Screw	Wrench
28.5	2	TAFS2850F32	●	2	67	81	136	32	42	PT1/8	GPMT11T308-U◌	TS4	TKY15D
	3	TAFM2850F32	●	2	95	109	164	32	42	PT1/8	GPMT11T308-U◌	TS4	TKY15D
29.0	2	TAFS2900F32	●	2	70	83	138	32	42	PT1/8	GPMT11T308-U◌	TS4	TKY15D
	3	TAFM2900F32	●	2	99	112	167	32	42	PT1/8	GPMT11T308-U◌	TS4	TKY15D
	4	TAFL2900F32	●	2	128	141	196	32	42	PT1/8	GPMT11T308-U◌	TS4	TKY15D
29.5	2	TAFS2950F32	●	2	70	83	138	32	42	PT1/8	GPMT11T308-U◌	TS4	TKY15D
	3	TAFM2950F32	●	2	99	112	167	32	42	PT1/8	GPMT11T308-U◌	TS4	TKY15D
30.0	2	TAFS3000F40	●	2	72	90	155	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	3	TAFM3000F40	●	2	102	120	185	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	4	TAFL3000F40	●	2	132	150	215	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
31.0	2	TAFS3100F40	●	2	74	92	157	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	3	TAFM3100F40	●	2	105	123	188	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	4	TAFL3100F40	●	2	136	154	219	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
32.0	2	TAFS3200F40	●	2	77	94	159	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	3	TAFM3200F40	●	2	109	126	191	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	4	TAFL3200F40	●	2	141	158	223	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
33.0	2	TAFS3300F40	●	2	79	96	161	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	3	TAFM3300F40	●	2	112	129	194	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	4	TAFL3300F40	●	2	145	162	227	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
34.0	2	TAFS3400F40	●	2	82	98	163	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	3	TAFM3400F40	●	2	116	132	197	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
	4	TAFL3400F40	●	2	150	166	231	40	50	PT1/4	GPMT11T308-U◌	TS4	TKY15D
35.0	2	TAFS3500F40	●	2	84	100	165	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
	3	TAFM3500F40	●	2	119	135	200	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
36.0	2	TAFS3600F40	●	2	86	102	167	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
	3	TAFM3600F40	●	2	122	138	203	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
37.0	2	TAFS3700F40	●	2	89	104	169	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
	3	TAFM3700F40	●	2	126	141	206	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
38.0	2	TAFS3800F40	●	2	91	106	171	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
	3	TAFM3800F40	●	2	129	144	209	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
39.0	2	TAFS3900F40	●	2	94	108	173	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D
	3	TAFM3900F40	●	2	133	147	212	40	50	PT1/4	GPMT140408-U◌	TS55	TKY25D

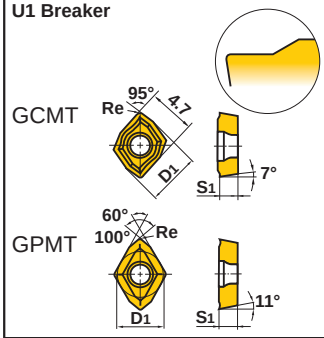
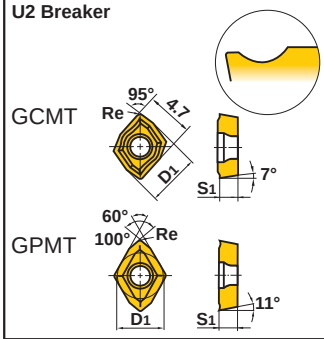
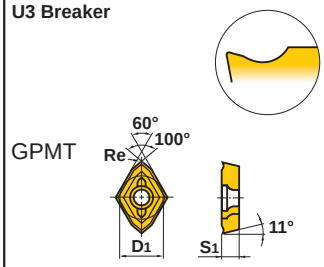
● : Inventory maintained in Japan.

Drill Dia. D1 (mm)	Hole Depth (l/d)	Order Number	Stock	Number of Teeth	Dimensions (mm)						Insert Number		
					Effective flute length L3	Neck Length L2	Overall Length L1	Shank Dia. D4	Flange diameter D7	Through coolant hole D8		Clamp Screw	Wrench
40.0	2	TAFS4000F40	●	2	96	110	175	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4000F40	●	2	136	150	215	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
41.0	2	TAFS4100F40	●	2	98	112	177	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4100F40	●	2	139	153	218	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
42.0	2	TAFS4200F40	●	2	101	114	179	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4200F40	●	2	143	156	221	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
43.0	2	TAFS4300F40	●	2	103	116	181	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4300F40	●	2	146	159	224	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
44.0	2	TAFS4400F40	●	2	106	118	183	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4400F40	●	2	150	162	227	40	50	PT1/4	GPMT140408-U○	TS55	②TKY25D
45.0	2	TAFS4500F40	●	2	108	120	185	40	54	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4500F40	●	2	153	165	230	40	54	PT1/4	GPMT140408-U○	TS55	②TKY25D
46.0	2	TAFS4600F40	●	2	110	122	187	40	54	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4600F40	●	2	156	168	233	40	54	PT1/4	GPMT140408-U○	TS55	②TKY25D
47.0	2	TAFS4700F40	●	2	113	124	189	40	54	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4700F40	●	2	160	171	236	40	54	PT1/4	GPMT140408-U○	TS55	②TKY25D
48.0	2	TAFS4800F40	●	2	115	126	191	40	54	PT1/4	GPMT140408-U○	TS55	②TKY25D
	3	TAFM4800F40	●	2	163	174	239	40	54	PT1/4	GPMT140408-U○	TS55	②TKY25D
49.0	2	TAFS4900F40	●	4	118	133	198	40	58	PT1/4	GPMT090304-U○	TS3	①TKY08F
	3	TAFM4900F40	●	4	167	182	247	40	58	PT1/4	GPMT090304-U○	TS3	①TKY08F
50.0	2	TAFS5000F40	●	4	120	135	200	40	58	PT1/4	GPMT090304-U○	TS3	①TKY08F
	3	TAFM5000F40	●	4	170	185	250	40	58	PT1/4	GPMT090304-U○	TS3	①TKY08F
51.0	2	TAFS5100F40	●	4	122	137	202	40	58	PT1/4	GPMT090304-U○	TS3	①TKY08F
	3	TAFM5100F40	●	4	173	188	253	40	58	PT1/4	GPMT090304-U○	TS3	①TKY08F
52.0	2	TAFS5200F40	●	4	125	139	204	40	58	PT1/4	GPMT090304-U○	TS3	①TKY08F
	3	TAFM5200F40	●	4	177	191	256	40	58	PT1/4	GPMT090304-U○	TS3	①TKY08F
53.0	2	TAFS5300F40	●	4	127	141	206	40	63	PT1/4	GPMT090304-U○	TS3	①TKY08F
	3	TAFM5300F40	●	4	180	194	259	40	63	PT1/4	GPMT090304-U○	TS3	①TKY08F
54.0	2	TAFS5400F40	●	4	128	143	208	40	63	PT1/4	GPMT090304-U○	TS3	①TKY08F
	3	TAFM5400F40	●	4	182	197	262	40	63	PT1/4	GPMT090304-U○	TS3	①TKY08F
55.0	2	TAFS5500F40	●	4	130	145	210	40	63	PT1/4	GPMT090304-U○	TS3	①TKY08F
	3	TAFM5500F40	●	4	185	200	265	40	63	PT1/4	GPMT090304-U○	TS3	①TKY08F
56.0	2	TAFS5600F40	●	4	132	147	212	40	63	PT1/4	GPMT090304-U○	TS3	①TKY08F
	3	TAFM5600F40	●	4	188	203	268	40	63	PT1/4	GPMT090304-U○	TS3	①TKY08F

INSERT DESCRIPTION D130 CUTTING CONDITIONS D131 USAGE NOTE D133 TECHNICAL DATA F001

TAFS/TAFM/TAFL

INSERTS

Geometry	Drill Dia.	Insert Number	Dimensions (mm)			Stock					
			D1	S1	Re	VP15TF	UP20M	GP20M	UE6020	US735	F5010
U1 Breaker 	ø12—ø14.5	GCMT040204-U1	5.0	2.38	0.4		●				
	ø15—ø17.5	GPMT060204-U1	5.56	2.38	0.4		●		●	●	●
	ø18—ø22.5	GPMT070204-U1	6.35	2.38	0.4		●		●	●	●
	ø23—ø27.5 ø49—ø56	GPMT090304-U1	7.94	3.18	0.4		●		●	●	●
	ø28—ø34	GPMT11T308-U1	9.525	3.97	0.8		●		●	●	●
	ø35—ø48	GPMT140408-U1	12.70	4.76	0.8		●		●	●	●
U2 Breaker 	ø12—ø14.5	GCMT040204-U2	5.0	2.38	0.4	●		●			
	ø15—ø17.5	GPMT060204-U2	5.56	2.38	0.4	●	●		●	●	●
	ø18—ø22.5	GPMT070204-U2	6.35	2.38	0.4	●	●		●	●	●
	ø23—ø27.5 ø49—ø56	GPMT090304-U2	7.94	3.18	0.4	●	●		●	●	●
	ø28—ø34	GPMT11T308-U2	9.525	3.97	0.8	●	●		●	●	●
	ø35—ø48	GPMT140408-U2	12.70	4.76	0.8	●	●		●	●	●
U3 Breaker 	ø15—ø17.5	GPMT060204-U3	5.56	2.38	0.4		●		●	●	●
	ø18—ø22.5	GPMT070204-U3	6.35	2.38	0.4		●		●	●	●
	ø23—ø27.5 ø49—ø56	GPMT090304-U3	7.94	3.18	0.4		●		●	●	●
	ø28—ø34	GPMT11T308-U3	9.525	3.97	0.8		●		●	●	●
	ø35—ø48	GPMT140408-U3	12.70	4.76	0.8		●		●	●	●

INSERT RECOMMENDATION

CHIP BREAKER RECOMMENDATION

◎ : 1st Recommendation ○ : 2nd Recommendation

Work Material / Breaker	P						M		K			
	Mild Steel		Carbon Steel		Alloy Steel		Stainless Steel		Gray Cast Iron		Ductile Cast Iron	
	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT
U1	◎	◎	○	○	○	○	○	○	○	○	○	○
U2	○	○	◎	○	◎	○	◎	◎	◎	○	◎	○
U3		○		◎		◎		○		◎		◎

INSERT GRADE RECOMMENDATION

◎ : 1st Recommendation ○ : 2nd Recommendation

Work Material / Grade	P						M		K			
	Mild Steel		Carbon Steel		Alloy Steel		Stainless Steel		Gray Cast Iron		Ductile Cast Iron	
	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT	GCMT	GPMT
VP15TF	○	○	◎	○	◎	○	◎	◎	◎	○	◎	○
UP20M	◎	◎	○	○	○	○	○	○	○	○	○	◎
GP20M	○		◎		◎		◎		◎		◎	
UE6020		○		◎		◎		○		○		○
US735		○		○		○		◎		○		○
F5010										◎		◎

● : Inventory maintained in Japan. (10 inserts in one case)

RECOMMENDED CUTTING CONDITIONS

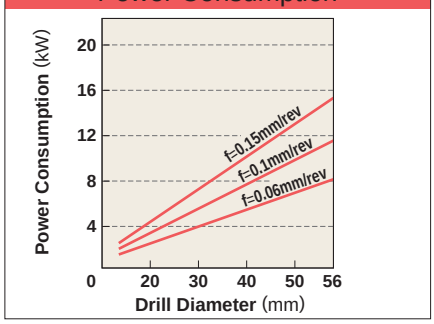
Work Material		Hardness	Cutting Speed (m/min) For l/d=2,3 (ϕ12–ϕ14.5)	Cutting Speed (m/min) For l/d=2,3 (ϕ15–)	Cutting Speed (m/min) For l/d=4 (ϕ16–)	Breaker	Feed (mm/rev) Drill Diameter (mm) ϕ12–ϕ14.5	ϕ15–ϕ22.5	ϕ23–ϕ34	ϕ35–ϕ48	ϕ49–ϕ56
P	Mild Steel	≤180HB	150 (100–200)	200 (150–300)	140 (100–200)	U1	0.06 (0.04–0.10)	0.07 (0.04–0.10)	0.08 (0.04–0.10)	0.10 (0.04–0.12)	0.08 (0.04–0.10)
						U2	0.06 (0.04–0.10)	0.08 (0.04–0.12)	0.10 (0.04–0.12)	0.12 (0.04–0.14)	0.10 (0.04–0.12)
						U3	–	0.08 (0.04–0.12)	0.10 (0.04–0.12)	0.12 (0.04–0.14)	0.10 (0.04–0.12)
	Carbon Steel	180–280HB	120 (80–160)	150 (120–180)	100 (80–120)	U1	0.06 (0.04–0.10)	0.09 (0.06–0.12)	0.12 (0.08–0.14)	0.15 (0.08–0.18)	0.12 (0.08–0.14)
						U2	0.06 (0.04–0.10)	0.12 (0.06–0.14)	0.14 (0.08–0.18)	0.17 (0.08–0.20)	0.14 (0.08–0.18)
						U3	–	0.12 (0.06–0.14)	0.14 (0.08–0.18)	0.17 (0.08–0.20)	0.14 (0.08–0.18)
	Alloy Steel	180–280HB	120 (80–160)	150 (120–180)	100 (80–120)	U1	0.06 (0.04–0.10)	0.08 (0.06–0.10)	0.09 (0.06–0.12)	0.11 (0.06–0.14)	0.09 (0.06–0.12)
						U2	0.06 (0.04–0.10)	0.10 (0.06–0.12)	0.12 (0.08–0.16)	0.14 (0.08–0.18)	0.12 (0.08–0.16)
						U3	–	0.10 (0.06–0.12)	0.12 (0.08–0.16)	0.14 (0.08–0.18)	0.12 (0.08–0.16)
M	Stainless Steel	≤200HB	100 (80–120)	150 (120–200)	110 (80–140)	U1	0.07 (0.04–0.10)	0.07 (0.04–0.10)	0.08 (0.04–0.10)	0.10 (0.04–0.12)	0.08 (0.04–0.10)
						U2	0.07 (0.04–0.10)	0.08 (0.04–0.12)	0.10 (0.04–0.14)	0.12 (0.04–0.16)	0.10 (0.04–0.14)
						U3	–	0.08 (0.04–0.12)	0.10 (0.04–0.14)	0.12 (0.04–0.16)	0.10 (0.04–0.14)
K	Gray Cast Iron	Tensile Strength ≤350MPa	120 (80–160)	150 (120–180)	140 (110–160)	U1	0.07 (0.06–0.10)	0.07 (0.06–0.10)	0.10 (0.04–0.14)	0.10 (0.06–0.14)	0.10 (0.06–0.14)
						U2	0.07 (0.06–0.10)	0.15 (0.10–0.18)	0.20 (0.10–0.25)	0.20 (0.10–0.25)	0.20 (0.10–0.25)
						U3	–	0.15 (0.10–0.18)	0.20 (0.10–0.25)	0.20 (0.10–0.25)	0.20 (0.10–0.25)
	Ductile Cast Iron	Tensile Strength ≤450MPa	120 (80–150)	150 (120–180)	100 (80–120)	U1	0.06 (0.04–0.10)	0.07 (0.06–0.10)	0.10 (0.06–0.14)	0.10 (0.06–0.14)	0.10 (0.06–0.14)
						U2	0.06 (0.04–0.10)	0.12 (0.08–0.14)	0.15 (0.08–0.20)	0.18 (0.08–0.20)	0.15 (0.08–0.20)
						U3	–	0.12 (0.08–0.14)	0.15 (0.08–0.20)	0.18 (0.08–0.20)	0.15 (0.08–0.20)

(Note) When using drills for l/d= 4, the feed should be reduced to 80% of the above recommendations.

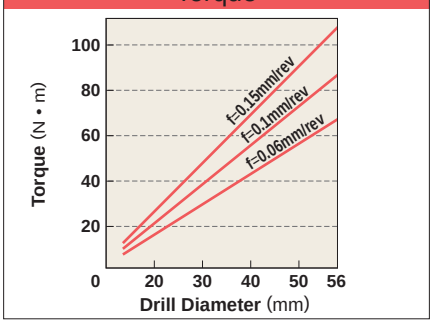
CUTTING RESISTANCE

Workpiece : JIS SCM440(220HB) Cutting Speed : 150m/min Insert : U2 Breaker

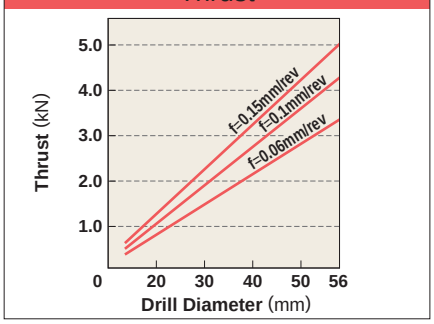
Power Consumption



Torque

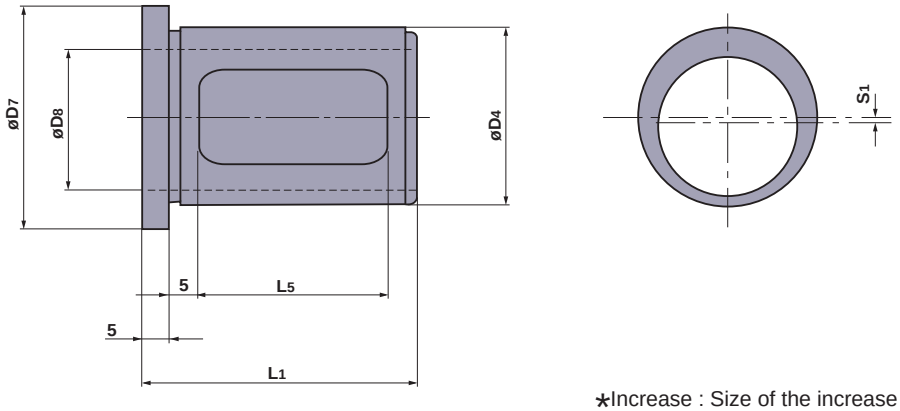


Thrust



JUST FIT SLEEVE [JFS]

● A sleve designed to improve the performance of TAF drills, allowing the cutting diameter to be increased in increments of 0.1mm



∗Increase : Size of the increase in the cutting diameter.

Set Order Number	Individual Order Number	Stock	Dimensions (mm)					∗Increase (S1×2)	Suitable TAF Type Drill
			D7	D4	D8	L1	L5		
JFS-1	JFS2520-10	●	33	25	20	43	30	0.10	TAFS/M/L1200F20 ~ TAFS/M/L1550F20
	2520-20	●	33	25	20	43	30	0.20	
	2520-30	●	33	25	20	43	30	0.30	
	2520-40	●	33	25	20	43	30	0.40	
	2520-50	●	33	25	20	43	30	0.50	
JFS-2	JFS3225-10	●	40	32	25	50	34	0.10	TAFS/M/L1600F25 ~ TAFS/M/L2450F25
	3225-20	●	40	32	25	50	34	0.20	
	3225-30	●	40	32	25	50	34	0.30	
	3225-40	●	40	32	25	50	34	0.40	
	3225-50	●	40	32	25	50	34	0.50	
JFS-3	JFS4032-10	●	48	40	32	55	40	0.10	TAFS/M/L2500F32 ~ TAFS/M/L2950F32
	4032-20	●	48	40	32	55	40	0.20	
	4032-30	●	48	40	32	55	40	0.30	
	4032-40	●	48	40	32	55	40	0.40	
	4032-50	●	48	40	32	55	40	0.50	

GUIDELINE FOR SELECTING A JUST FIT SLEEVE

Desired = (Drillϕ+ Increase of JFS) + 0.1mm

(Eg.) Desired diameter is 20.3mm (oversize is taken as 0.1mm).

ø20.3=(TAS/M/L2000F25+JFS3225-20)+0.1

- TAS/M/L2000F25 → 20mm Drill
- JFS3225-20 → Using JFS an Increase of 0.2mm.
- 0.1 → Oversize

<Tool Selected>
TAF Drill : **TAFM2000F25**
JUST FIT SLEEVE [JFS]
: **JFS3225-20**

(Note) Oversize can vary due to the cutting conditions used, please use the above as a guideline.

ORDERING THE JUST FIT SLEEVE

●Purchasing Method 1
Oversize can vary due to the cutting conditions used. Therefore it is recommended to purchase as a set. When placing an order, please use the set order number. (5 sleeves/set)

●Purchasing Method 2
It is possible to order individually. When placing an order, please use the individual order number.

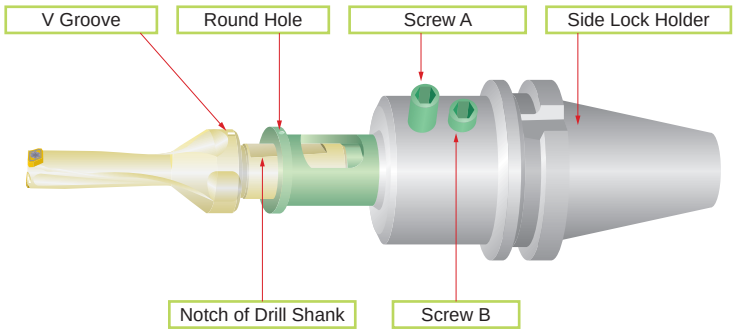
● : Inventory maintained in Japan.

APPLICATION OF JUST FIT SLEEVE

1 When inserting the drill into the side lock holder, aligin the V groove on the outer peripheral edge of the drill flange, as well as the round holes of the outer peripheral edge of the sleeve flange and the screws of the side lock holder for fixing the drill. (If the drill does not have a V groove, align the notch of the drill shank with the round holes of the sleeve.)

2 Insert screws A of the side lock holder directly to the open window of the sleeve and fix the drill. Tighten screw B to a degree so as not to damage the sleeve.

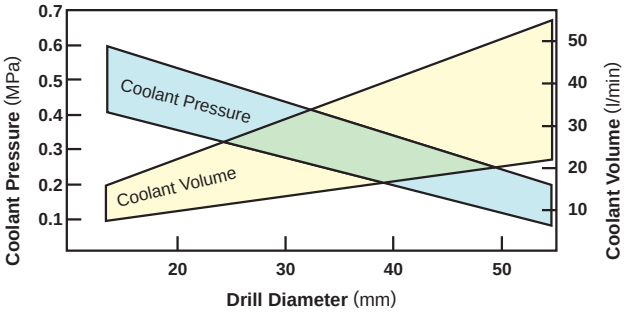
(Note)
- Fine adjustments cannot be made for the diameter of the sleeve.
- Cannot be used with collect chuck type holders.



APPLICATION OF TAF TYPE DRILL

●Please ensure the highest rigidity possible exists in both machine set up and workholding.

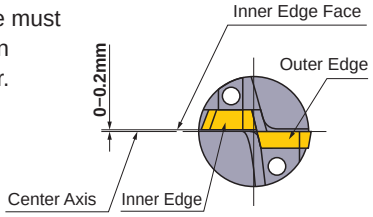
●Refer to the following graph for coolant pressure and volume. Coolant is an important factor in the efficient use of these drills.



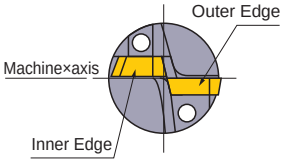
●Cannot be used for stack drilling.
In common with many indexable insert drills, these drills produce a round disc on exit which unless evacuated may cause the drill to fracture.

●Use on a Lathe

(1)The inner cutting edge must be positioned between 0—0.2mm over center.

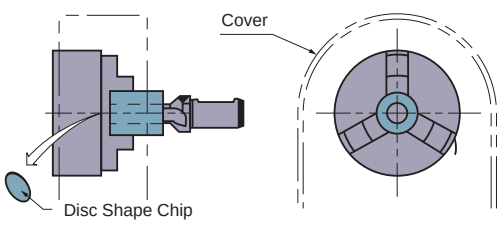


(2)To adjust the hole diameter by off-setting the drill, the outer cutting edge and machine axis must be set parallel.



(3)When producing an oversize hole.
The drill offset should be no more than 2% of the diameter. It is not possible to produce an undersized hole.

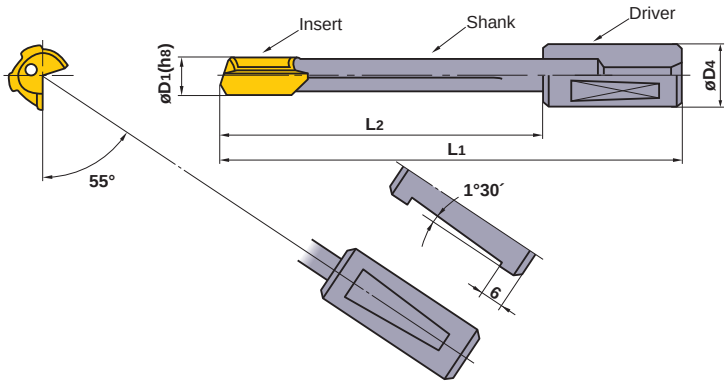
(4)When through hole drilling on a lathe the disc produced by the drill exiting the workpiece may be expelled at high velocity.
To reduce the danger of injury or damage a cover guard is highly recommended.



GUN DRILL

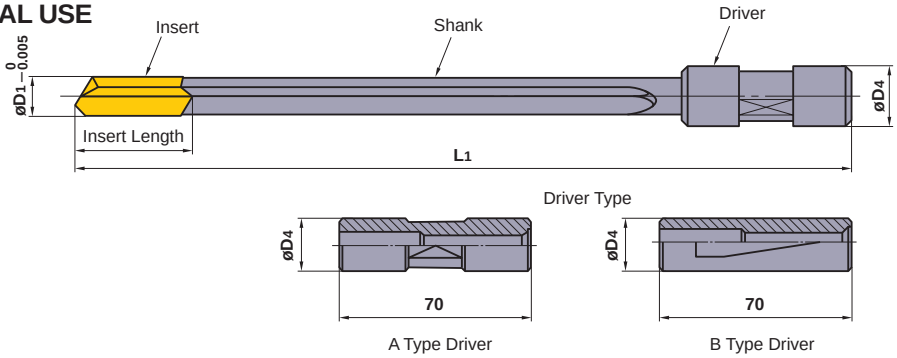
●GUN DRILL FOR MACHINING CENTER

- ●Suitable for deep hole drilling on Machining Center.
- ●Drill Diameter : ϕ6.0—ϕ20.0



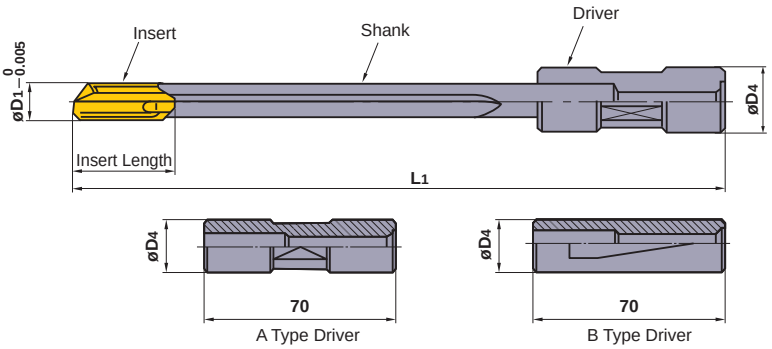
●GUN DRILL FOR GENERAL USE

- ●Suitable for deep hole drilling.
- ●Drill Diameter : ϕ2.0—ϕ30.3



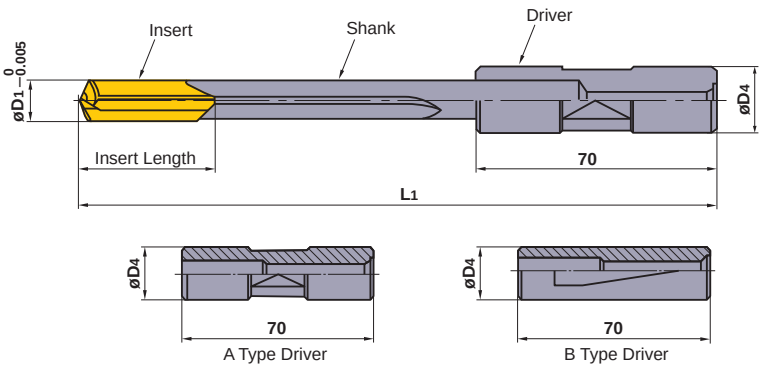
●SAMMIKA GUN DRILL

- ●The unique uneven cutting edge shape displays excellent chip dividing and enables high feed machining.
- ●Drill Diameter : ϕ5.0—ϕ30.3



●ARROW JET GUN DRILL

- ●Excellent chip discharge due to the double-tooth design and chip breaker.
- ●Drill Diameter : ϕ6.0—ϕ30.0



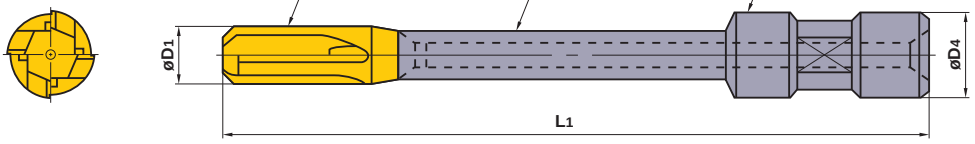
■ORDERING METHOD

Please specify the following when ordering.
①Drill Name ②Diameter of Drill (ϕD1) ③Length of Drill (L1) ④Outside Diameter of Driver (ϕD4) and Type ⑤Workpiece Material, Drilling Accuracy, Drilling Depth and Drilling Mode (Through Hole, Blind Hole)
e.g.) General Gun Drill ϕ8 x 500 x ϕ19.5 A type Driver, SCM440(250HB) x $\phi 8^{\pm 0.020}$ x 300 x Through Hole

GUN REAMER

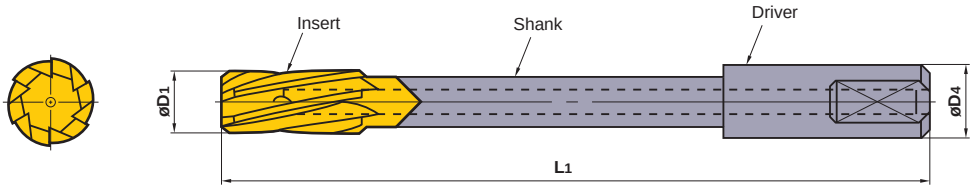
●Straight Reamer Type

●Reamer Diameter : ϕ6.0—ϕ30.0
●Number of teeth : 1, 2, 3, 4, 6



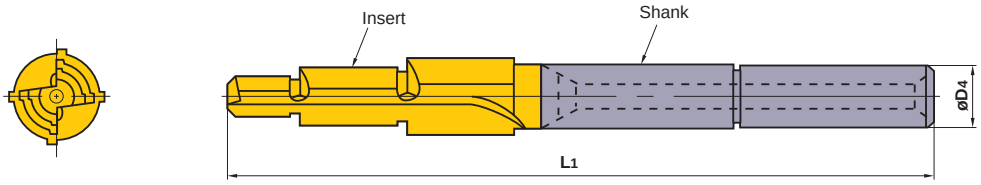
●Spiral Reamer Type

●Reamer Diameter : ϕ6.0—ϕ30.0
●Number of teeth : 4, 6



●Line Reamer Type

●Reamer Diameter : ϕ6.0—ϕ30.0
●Number of teeth : 1, 2, 4



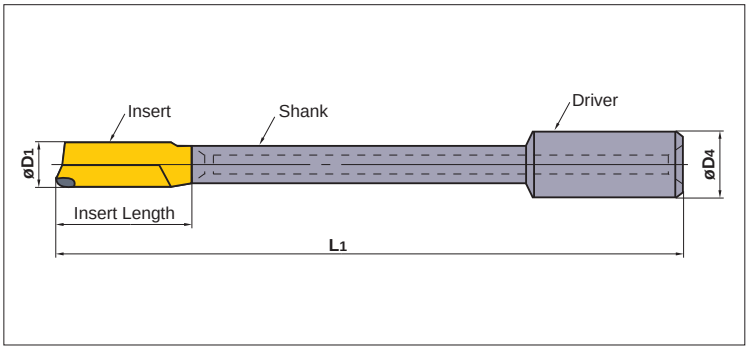
■ORDERING METHOD

Please specify the following when ordering.
①Reamer Name ②Diameter of Reamer (ϕD1) ③Length of Reamer (L1) ④Outside Diameter of Driver (ϕD4) and Type
⑤Number of Teeth ⑥Workpiece Material, Drilling Accuracy, Drilling Depth and Drilling Mode (Through Hole, Blind Hole)
e.g.) General Gun Reamer ϕ12 x 450 x ϕ19.5 A type Driver, 4-Teeth, FC250 (180HB) x $\phi 12^{\pm 0.020}$ x 100 x Through Hole

DRILLING(BRAZED TYPE)

WITH DIAMOND COMPOUND

GUN REAMER



STANDARD

Reamer Diameter	Insert Length	Overall Length **L1**	Number of Teeth	Shape of Teeth
ø6−ø30.3	*	*	*	Straight

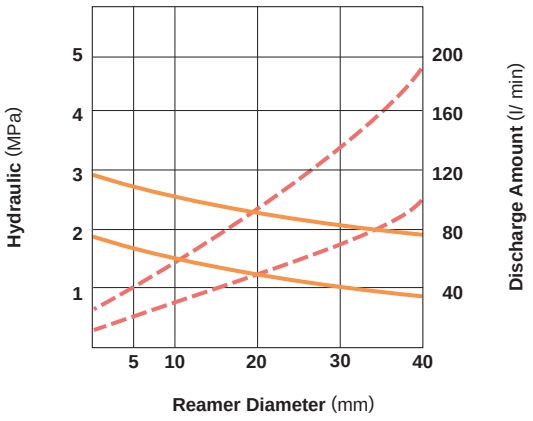
*Please contact us for any geometry (different diameter of reamer, insert length, tool length, number of teeth) that is not in this list.

Reamer Diameter **D1**	Internal Diameter of Driver **D8**	External Diameter of Driver **D4**
6.0≤D1≤7.0	3.5	12.70
7.0<D1≤13.3	4.8	19.05
13.3<D1≤20.8	6.4	25.40
20.8<D1≤25.3	8.0	31.75
25.3<D1≤30.3	8.0	38.10

RECOMMENDED CUTTING CONDITIONS

Work Material	Cutting Speed (m/min)	Feed (mm/rev)		
		ø5 − ø10	**ø10 − ø20**	**ø25 − ø30**
Aluminium Alloy	150 (100−200)	0.08 (0.05−0.10)	0.10 (0.05−0.15)	0.10 (0.05−0.15)
Alloy Steel	130 (80−180)	0.03 (0.02−0.04)	0.05 (0.03−0.06)	0.06 (0.04−0.07)

COOLANT



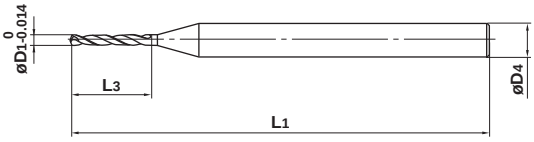
ORDERING METHOD

Please specify the following when ordering.
①Reamer Name ②Diameter of Reamer (ϕD1) ③Length of Reamer (L1) ④Number of Teeth ⑤Outside Diameter of Driver (ϕD4) and Type ⑥Workpiece Material, Drilling Accuracy, Drilling Depth and Drilling Mode (Through Hole, Blind Hole)
e.g.) Gun Reamer with Diamond Compound ϕ10 x 300 x 1-Tooth x ϕ19.05 A Type Driver, AC4B x $\phi 10\ ^{+0.01}_{0}$ x 200 x Through Hole

DC-SSS

Short, For non-ferrous material

UWC | DC | 130° D1<1.5 | 135° D1≥1 | X Thinning D1≥1.5



- Our original diamond coating technology ensures excellent film adherence, for stable drilling without flaking or chipping.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
DCSSSD0020	0.2	2	38	3	●
D0030	0.3	3	38	3	●
D0040	0.4	4	38	3	●
D0050	0.5	4	38	3	●
D0060	0.6	5	38	3	●
D0070	0.7	5	38	3	●
D0080	0.8	6	38	3	●
D0090	0.9	6	38	3	●
D0100	1.0	8	38	3	●
D0110	1.1	8	38	3	●

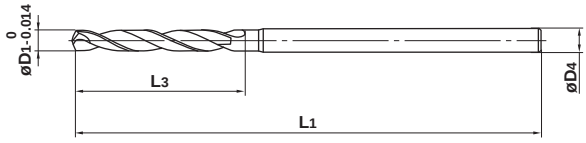
Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
DCSSSD0120	1.2	8	38	3	●
D0130	1.3	8	38	3	●
D0140	1.4	8	38	3	●
D0150	1.5	10	45	3	●
D0160	1.6	10	45	3	●
D0170	1.7	10	45	3	●
D0180	1.8	10	45	3	●
D0190	1.9	10	45	3	●
D0200	2.0	12	45	3	●

CUTTING CONDITIONS D139

DC-SSM

Medium, For non-ferrous material

UWC | DC | 135° | X Thinning



- Our original diamond coating technology ensures excellent film adherence, for stable drilling without flaking or chipping.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
DCSSMD0210	2.1	17	60	3	●
D0220	2.2	17	60	3	●
D0230	2.3	17	60	3	●
D0240	2.4	17	60	3	●
D0250	2.5	21	60	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
DCSSMD0260	2.6	21	60	3	●
D0270	2.7	21	60	3	●
D0280	2.8	21	60	3	●
D0290	2.9	21	60	3	●
D0300	3.0	21	60	3	●

● : **Inventory maintained in Japan.**

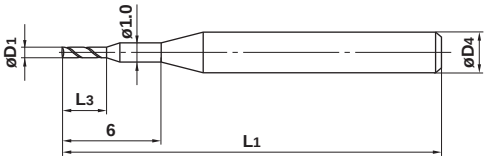
CUTTING CONDITIONS D139

DC-BSS

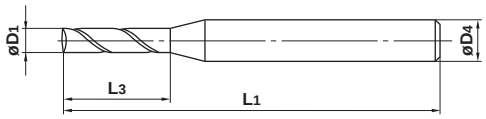
Drill for hard brittle materials

UWC DC

D1 Tolerance (mm)	0.05≤D1<0.2	D1≥0.2
	0 −0.009	0 −0.014



Type1



Type2

- Drill for machining hard brittle materials such as sintered ceramics and quartz glass that cannot be machined with conventional drills.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock	Type	Short Delivery
—	0.05	0.5	38	3	□		
—	0.06	0.6	38	3	□		
—	0.07	0.7	38	3	□		
—	0.08	0.8	38	3	□		
—	0.09	0.9	38	3	□		
—	0.1	1	38	3	□	1	◎
—	0.11	1.2	38	3	□	1	◎
—	0.12	1.4	38	3	□	1	
—	0.13	1.5	38	3	□	1	◎
—	0.14	1.5	38	3	□	1	◎
—	0.15	1.5	38	3	□	1	◎
—	0.16	1.5	38	3	□	1	
—	0.17	1.5	38	3	□	1	◎
—	0.18	1.5	38	3	□	1	◎
—	0.19	1.5	38	3	□	1	
—	0.2	2	38	3	□	2	◎
—	0.25	2.5	38	3	□	2	◎
—	0.3	3	38	3	□	2	◎
—	0.35	3.5	38	3	□	2	◎
—	0.4	4	38	3	□	2	◎
—	0.5	4	38	3	□	2	◎
—	0.6	5	38	3	□	2	◎
—	0.7	5	38	3	□	2	◎
—	0.8	6	38	3	□	2	◎
—	0.9	6	38	3	□	2	◎
—	1	8	38	3	□	2	◎

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock	Type	Short Delivery
—	1.1	8	38	3	□	2	◎
—	1.2	8	38	3	□	2	◎
—	1.3	8	38	3	□	2	◎
—	1.4	8	38	3	□	2	
—	1.5	10	38	3	□	2	◎
—	1.6	10	38	3	□	2	◎
—	1.7	10	38	3	□	2	◎
—	1.8	10	38	3	□	2	◎
—	1.9	10	38	3	□	2	
—	2	12	38	3	□	2	◎
—	2.1	12	38	3	□	2	
—	2.2	12	38	3	□	2	
—	2.3	12	38	3	□	2	
—	2.4	12	38	3	□	2	◎
—	2.5	12	38	3	□	2	◎
—	2.6	12	38	3	□	2	
—	2.7	12	38	3	□	2	
—	2.8	12	38	3	□	2	
—	2.9	12	38	3	□	2	
—	3	12	38	3	□	2	◎

(Note 1) The dimensions shown in the above table are basic sizes. Contact Mitsubishi Materials if different diameters and flute lengths are required.
(Note 2) Drills with ◎ mark can be delivered in shorter time (1—2 weeks). For the delivery of other drills, contact Mitsubishi Materials.
(Note 3) Drills with D1 0.05—0.09mm are designed with a special geometry.

□ : **Non stock, produced to order only.**

DC-SSS DC-SSM DC-BSS

Short / Medium, For non-ferrous materials

Drill for hard brittle materials

RECOMMENDED CUTTING CONDITIONS

DC-SSS, DC-SSM

Work material	Aluminium alloy		Aluminium alloy		Copper Copper alloy		Graphite Machineable Ceramics		MMC FRP	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.2	20000	0.006	10000	0.003	20000	0.003	20000	0.01	10000	0.003
0.5	20000	0.02	10000	0.01	20000	0.01	20000	0.03	10000	0.01
1.0	20000	0.04	10000	0.02	20000	0.02	20000	0.05	10000	0.02
1.5	20000	0.05	10000	0.02	16000	0.02	16000	0.08	10000	0.02
2.0	20000	0.06	9000	0.03	11000	0.03	11000	0.10	9000	0.03
2.5	18500	0.08	7500	0.04	10000	0.04	10000	0.12	7500	0.04
3.0	17000	0.10	6000	0.05	8500	0.05	8500	0.15	6000	0.05

1) When drilling very hard work material, reduce the feed.
2) When drilling deep holes, moderate the cutting conditions.
3) The revolution can be increased by using a high speed spindle.

DC-BSS

Work material	Aluminium nitride		Alumina		Zirconia		Silicon carbide Silicon nitride		Quartz glass	
Step	0.01mm		0.005mm		0.003mm		0.002mm		0.05mm	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.1	20000	0.0002	20000	0.0001	20000	0.0001	20000	0.00005	20000	0.0002
0.2	15000	0.0002	15000	0.0001	15000	0.0001	15000	0.00005	15000	0.0002
0.5	12000	0.0002	12000	0.0001	12000	0.0001	12000	0.00005	12000	0.0003
1.0	10000	0.0002	10000	0.0001	10000	0.0001	10000	0.00005	10000	0.0003
1.5	7500	0.0003	7500	0.0002	7500	0.0002	7500	0.0001	7500	0.0004
2.0	6000	0.0003	6000	0.0002	6000	0.0002	6000	0.0001	6000	0.0004
2.5	5000	0.0003	5000	0.0003	5000	0.0002	5000	0.0001	5000	0.0005
3.0	5000	0.0003	5000	0.0003	5000	0.0002	5000	0.0001	5000	0.0005

1) Depending on the type of machine, it is possible to apply cutting speeds over 20000min^{-1}.
2) Please use the water soluble coolant or grinding fluid.

VIOLET DRILLS

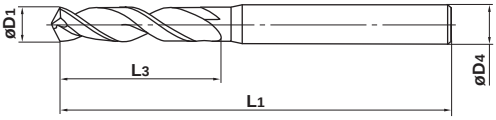
VA-PDS

Short, High precision

HG HSS | V | 118° D1<2 | 135° D1≥2 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○		○

All drills except those with intervals of 0.1mm and under dia. 2.0mm have a tolerance of 0−-0.009mm.



● Highly efficient drilling and long tool life have been achieved with the newly developed Violet coating.
(Standard drill depth : less than 3 times the drill diameter)

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSD0050	0.5	3	50	3	●
D0051	0.51	3	50	3	●
D0052	0.52	3	50	3	●
D0053	0.53	3	50	3	●
D0054	0.54	3	50	3	●
D0055	0.55	3	50	3	●
D0056	0.56	4	50	3	●
D0057	0.57	4	50	3	●
D0058	0.58	4	50	3	●
D0059	0.59	4	50	3	●
D0060	0.6	5	50	3	●
D0061	0.61	5	50	3	●
D0062	0.62	5	50	3	●
D0063	0.63	5	50	3	●
D0064	0.64	5	50	3	●
D0065	0.65	5	50	3	●
D0066	0.66	5	50	3	●
D0067	0.67	5	50	3	●
D0068	0.68	5	50	3	●
D0069	0.69	5	50	3	●
D0070	0.7	5	50	3	●
D0071	0.71	5	50	3	●
D0072	0.72	5	50	3	●
D0073	0.73	5	50	3	●
D0074	0.74	5	50	3	●
D0075	0.75	5	50	3	●
D0076	0.76	5	50	3	●
D0077	0.77	5	50	3	●
D0078	0.78	5	50	3	●
D0079	0.79	5	50	3	●
D0080	0.8	5	50	3	●
D0081	0.81	5	50	3	●
D0082	0.82	5	50	3	●
D0083	0.83	5	50	3	●
D0084	0.84	5	50	3	●
D0085	0.85	5	50	3	●
D0086	0.86	6	50	3	●
D0087	0.87	6	50	3	●
D0088	0.88	6	50	3	●
D0089	0.89	6	50	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSD0090	0.9	6	50	3	●
D0091	0.91	6	50	3	●
D0092	0.92	6	50	3	●
D0093	0.93	6	50	3	●
D0094	0.94	6	50	3	●
D0095	0.95	6	50	3	●
D0096	0.96	6	50	3	●
D0097	0.97	6	50	3	●
D0098	0.98	6	50	3	●
D0099	0.99	6	50	3	●
D0100	1.0	6	50	3	●
D0101	1.01	6	50	3	●
D0102	1.02	6	50	3	●
D0103	1.03	6	50	3	●
D0104	1.04	6	50	3	●
D0105	1.05	6	50	3	●
D0106	1.06	6	50	3	●
D0107	1.07	8	55	3	●
D0108	1.08	8	55	3	●
D0109	1.09	8	55	3	●
D0110	1.1	8	55	3	●
D0111	1.11	8	55	3	●
D0112	1.12	8	55	3	●
D0113	1.13	8	55	3	●
D0114	1.14	8	55	3	●
D0115	1.15	8	55	3	●
D0116	1.16	8	55	3	●
D0117	1.17	8	55	3	●
D0118	1.18	8	55	3	●
D0119	1.19	8	55	3	●
D0120	1.2	8	55	3	●
D0121	1.21	8	55	3	●
D0122	1.22	8	55	3	●
D0123	1.23	8	55	3	●
D0124	1.24	8	55	3	●
D0125	1.25	8	55	3	●
D0126	1.26	8	55	3	●
D0127	1.27	8	55	3	●
D0128	1.28	8	55	3	●
D0129	1.29	8	55	3	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSD0130	1.3	9	55	3	●
D0131	1.31	9	55	3	●
D0132	1.32	9	55	3	●
D0133	1.33	9	55	3	●
D0134	1.34	9	55	3	●
D0135	1.35	9	55	3	●
D0136	1.36	9	55	3	●
D0137	1.37	9	55	3	●
D0138	1.38	9	55	3	●
D0139	1.39	9	55	3	●
D0140	1.4	9	55	3	●
D0141	1.41	9	55	3	●
D0142	1.42	9	55	3	●
D0143	1.43	9	55	3	●
D0144	1.44	9	55	3	●
D0145	1.45	9	55	3	●
D0146	1.46	9	55	3	●
D0147	1.47	9	55	3	●
D0148	1.48	9	55	3	●
D0149	1.49	9	55	3	●
D0150	1.5	9	55	3	●
D0151	1.51	11	55	3	●
D0152	1.52	11	55	3	●
D0153	1.53	11	55	3	●
D0154	1.54	11	55	3	●
D0155	1.55	11	55	3	●
D0156	1.56	11	55	3	●
D0157	1.57	11	55	3	●
D0158	1.58	11	55	3	●
D0159	1.59	11	55	3	●
D0160	1.6	11	55	3	●
D0161	1.61	11	55	3	●
D0162	1.62	11	55	3	●
D0163	1.63	11	55	3	●
D0164	1.64	11	55	3	●
D0165	1.65	11	55	3	●
D0166	1.66	11	55	3	●
D0167	1.67	11	55	3	●
D0168	1.68	11	55	3	●
D0169	1.69	11	55	3	●
D0170	1.7	11	55	3	●
D0171	1.71	11	55	3	●
D0172	1.72	11	55	3	●
D0173	1.73	11	55	3	●
D0174	1.74	11	55	3	●
D0175	1.75	11	55	3	●
D0176	1.76	11	55	3	●
D0177	1.77	11	55	3	●
D0178	1.78	11	55	3	●
D0179	1.79	11	55	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSD0180	1.8	11	55	3	●
D0181	1.81	11	55	3	●
D0182	1.82	11	55	3	●
D0183	1.83	11	55	3	●
D0184	1.84	11	55	3	●
D0185	1.85	11	55	3	●
D0186	1.86	11	55	3	●
D0187	1.87	11	55	3	●
D0188	1.88	11	55	3	●
D0189	1.89	11	55	3	●
D0190	1.9	12	55	3	●
D0191	1.91	12	60	3	●
D0192	1.92	12	60	3	●
D0193	1.93	12	60	3	●
D0194	1.94	12	60	3	●
D0195	1.95	12	60	3	●
D0196	1.96	12	60	3	●
D0197	1.97	12	60	3	●
D0198	1.98	12	60	3	●
D0199	1.99	12	60	3	●
D0200	2.0	12	60	3	●
D0205	2.05	12	60	3	●
D0210	2.1	12	60	3	●
D0215	2.15	12	60	3	●
D0220	2.2	12	60	3	●
D0225	2.25	12	60	3	●
D0230	2.3	13	60	3	●
D0235	2.35	13	60	3	●
D0240	2.4	13	60	3	●
D0245	2.45	13	60	3	●
D0250	2.5	13	60	3	●
D0255	2.55	13	60	3	●
D0260	2.6	15	60	3	●
D0265	2.65	15	60	3	●
D0270	2.7	15	60	3	●
D0275	2.75	15	60	3	●
D0280	2.8	15	60	3	●
D0285	2.85	15	60	3	●
D0290	2.9	15	60	3	●
D0295	2.95	15	60	3	●
D0300	3.0	15	60	3	●
D0305	3.05	17	70	4	●
D0310	3.1	17	70	4	●
D0315	3.15	17	70	4	●
D0320	3.2	17	70	4	●
D0325	3.25	17	70	4	●
D0330	3.3	19	70	4	●
D0335	3.35	19	70	4	●
D0340	3.4	19	70	4	●
D0345	3.45	19	70	4	●

CUTTING CONDITIONS D144

VIOLET DRILLS

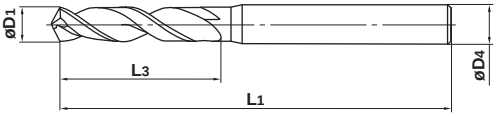
VA-PDS

Short, High precision

HG HSS | V | 118° D1<2 | 135° D1≥2 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○		○

All drills except those with intervals of 0.1mm and under dia. 2.0mm have a tolerance of 0−-0.009mm.



● Highly efficient drilling and long tool life have been achieved with the newly developed Violet coating.
(Standard drill depth : less than 3 times the drill diameter)

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSD0350	3.5	19	70	4	●
D0355	3.55	19	70	4	●
D0360	3.6	21	70	4	●
D0365	3.65	21	70	4	●
D0370	3.7	21	70	4	●
D0375	3.75	21	70	4	●
D0380	3.8	21	70	4	●
D0385	3.85	21	70	4	●
D0390	3.9	21	70	4	●
D0395	3.95	21	70	4	●
D0400	4.0	21	70	4	●
D0405	4.05	21	80	6	●
D0410	4.1	21	80	6	●
D0415	4.15	21	80	6	●
D0420	4.2	21	80	6	●
D0425	4.25	21	80	6	●
D0430	4.3	23	80	6	●
D0435	4.35	23	80	6	●
D0440	4.4	23	80	6	●
D0445	4.45	23	80	6	●
D0450	4.5	23	80	6	●
D0455	4.55	23	80	6	●
D0460	4.6	25	80	6	●
D0465	4.65	25	80	6	●
D0470	4.7	25	80	6	●
D0475	4.75	25	80	6	●
D0480	4.8	25	80	6	●
D0485	4.85	25	80	6	●
D0490	4.9	25	80	6	●
D0495	4.95	25	80	6	●
D0500	5.0	25	80	6	●
D0505	5.05	25	80	6	●
D0510	5.1	25	80	6	●
D0515	5.15	25	80	6	●
D0520	5.2	25	80	6	●
D0525	5.25	25	80	6	●
D0530	5.3	25	80	6	●
D0535	5.35	27	80	6	●
D0540	5.4	27	80	6	●
D0545	5.45	27	80	6	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSD0550	5.5	27	80	6	●
D0555	5.55	27	80	6	●
D0560	5.6	27	80	6	●
D0565	5.65	27	80	6	●
D0570	5.7	27	80	6	●
D0575	5.75	27	80	6	●
D0580	5.8	27	80	6	●
D0585	5.85	27	80	6	●
D0590	5.9	27	80	6	●
D0595	5.95	27	80	6	●
D0600	6.0	27	80	6	●
D0605	6.05	30	80	8	●
D0610	6.1	30	80	8	●
D0615	6.15	30	80	8	●
D0620	6.2	30	80	8	●
D0625	6.25	30	80	8	●
D0630	6.3	30	80	8	●
D0635	6.35	30	80	8	●
D0640	6.4	30	80	8	●
D0645	6.45	30	80	8	●
D0650	6.5	30	80	8	●
D0655	6.55	30	80	8	●
D0660	6.6	30	80	8	●
D0665	6.65	30	80	8	●
D0670	6.7	30	80	8	●
D0675	6.75	32	80	8	●
D0680	6.8	32	80	8	●
D0685	6.85	32	80	8	●
D0690	6.9	32	80	8	●
D0695	6.95	32	80	8	●
D0700	7.0	32	80	8	●
D0705	7.05	32	80	8	●
D0710	7.1	32	80	8	●
D0715	7.15	32	80	8	●
D0720	7.2	32	80	8	●
D0725	7.25	32	80	8	●
D0730	7.3	32	80	8	●
D0735	7.35	32	80	8	●
D0740	7.4	32	80	8	●
D0745	7.45	32	80	8	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Shank Dia. D_4	Stock
VAPDSD0750	7.5	32	80	8	●
D0755	7.55	35	85	8	●
D0760	7.6	35	85	8	●
D0765	7.65	35	85	8	●
D0770	7.7	35	85	8	●
D0775	7.75	35	85	8	●
D0780	7.8	35	85	8	●
D0785	7.85	35	85	8	●
D0790	7.9	35	85	8	●
D0795	7.95	35	85	8	●
D0800	8.0	35	85	8	●
D0805	8.05	35	90	10	●
D0810	8.1	35	90	10	●
D0815	8.15	35	90	10	●
D0820	8.2	35	90	10	●
D0825	8.25	35	90	10	●
D0830	8.3	35	90	10	●
D0835	8.35	35	90	10	●
D0840	8.4	35	90	10	●
D0845	8.45	35	90	10	●
D0850	8.5	35	90	10	●
D0855	8.55	38	93	10	●
D0860	8.6	38	93	10	●
D0865	8.65	38	93	10	●
D0870	8.7	38	93	10	●
D0875	8.75	38	93	10	●
D0880	8.8	38	93	10	●
D0885	8.85	38	93	10	●
D0890	8.9	38	93	10	●
D0895	8.95	38	93	10	●
D0900	9.0	38	93	10	●
D0905	9.05	38	93	10	●
D0910	9.1	38	93	10	●
D0915	9.15	38	93	10	●
D0920	9.2	38	93	10	●
D0925	9.25	38	93	10	●
D0930	9.3	38	93	10	●
D0935	9.35	38	93	10	●
D0940	9.4	38	93	10	●
D0945	9.45	38	93	10	●
D0950	9.5	38	93	10	●
D0955	9.55	41	96	10	●
D0960	9.6	41	96	10	●
D0965	9.65	41	96	10	●
D0970	9.7	41	96	10	●
D0975	9.75	41	96	10	●
D0980	9.8	41	96	10	●
D0985	9.85	41	96	10	●
D0990	9.9	41	96	10	●
D0995	9.95	41	96	10	●

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Shank Dia. D_4	Stock
VAPDSD1000	10.0	41	96	10	●
D1005	10.05	41	101	12	●
D1010	10.1	41	101	12	●
D1015	10.15	41	101	12	●
D1020	10.2	41	101	12	●
D1025	10.25	41	101	12	●
D1030	10.3	41	101	12	●
D1035	10.35	41	101	12	●
D1040	10.4	41	101	12	●
D1045	10.45	41	101	12	●
D1050	10.5	41	101	12	●
D1055	10.55	41	101	12	●
D1060	10.6	41	101	12	●
D1065	10.65	45	105	12	●
D1070	10.7	45	105	12	●
D1075	10.75	45	105	12	●
D1080	10.8	45	105	12	●
D1085	10.85	45	105	12	●
D1090	10.9	45	105	12	●
D1095	10.95	45	105	12	●
D1100	11.0	45	105	12	●
D1105	11.05	45	105	12	●
D1110	11.1	45	105	12	●
D1115	11.15	45	105	12	●
D1120	11.2	45	105	12	●
D1125	11.25	45	105	12	●
D1130	11.3	45	105	12	●
D1135	11.35	45	105	12	●
D1140	11.4	45	105	12	●
D1145	11.45	45	105	12	●
D1150	11.5	45	105	12	●
D1155	11.55	45	105	12	●
D1160	11.6	45	105	12	●
D1165	11.65	45	105	12	●
D1170	11.7	45	105	12	●
D1175	11.75	45	105	12	●
D1180	11.8	45	105	12	●
D1185	11.85	49	109	12	●
D1190	11.9	49	109	12	●
D1195	11.95	49	109	12	●
D1200	12.0	49	109	12	●
D1210	12.1	49	109	12	●
D1220	12.2	49	109	12	●
D1230	12.3	49	109	12	●
D1240	12.4	49	109	12	●
D1250	12.5	49	109	12	●
D1260	12.6	49	109	12	●
D1270	12.7	49	109	12	●
D1280	12.8	49	109	12	●
D1290	12.9	49	109	12	●
D1300	13.0	49	109	12	●

CUTTING CONDITIONS D144

HSS

VA-PDS

Short, High precision

RECOMMENDED CUTTING CONDITIONS

(Standard drilling depth : 3 times or below the drill diameter)

Work material	Structural steel		Carbon steel AISI 1049 Alloy steel SCM Cast iron FC		Alloy tool steel AISI D2 (Low-hardness materials) Ferritic stainless steel AISI 430, AISI 405 Martensitic stainless steel AISI 420, AISI 440		Alloy tool steel AISI H13 (−40HRC) Precipitation hardeningstainless steel ASTM 630, ASTM 631	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	18000	0.02	16000	0.02	9000	0.02	8200	0.02
1.0	12000	0.05	10000	0.05	6300	0.05	5500	0.04
2.0	6400	0.09	5500	0.09	3200	0.09	2900	0.05
3.0	4300	0.13	3700	0.13	2100	0.13	1900	0.06
4.0	3200	0.15	2800	0.15	1600	0.15	1400	0.08
5.0	2600	0.18	2200	0.18	1300	0.18	1100	0.10
6.0	2100	0.19	1800	0.19	1100	0.20	950	0.11
8.0	1600	0.24	1400	0.24	800	0.22	720	0.13
10.0	1300	0.28	1100	0.28	640	0.25	570	0.15
12.0	1100	0.34	930	0.34	530	0.30	480	0.17
13.0	980	0.36	860	0.36	490	0.32	440	0.19

1) Please reduce the revolution and feed rate depending on the drilling situation when the installation of workpiece or machine lacks rigidity.
2) Please use a collet type drill chuck or a milling chuck.
3) Use sufficient cutting fluid.
4) VA-PDS-SUS are recommended for austenitic stainless steels (AISI 304).
5) When drilling holes greater than 4 x drill diameter hole depths, please use a peck feed.

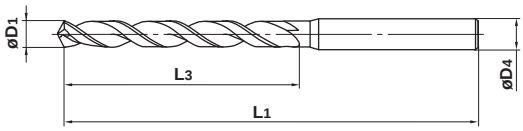
The above-mentioned cutting condition is standard when using water-soluble cutting fluid.
Please reduce the revolution when using non-water-soluble cutting fluid.

VA-PDM

Medium, High precision

HG HSS | V | 118° D1<2 | 135° D1≥2 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○		○



● Highly efficient drilling and long tool life have been achieved with the newly developed Violet coating.
(Standard drill depth : less than 5 times the drill diameter)

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMD0050	0.5	6	50	3	●
D0055	0.55	6	50	3	●
D0060	0.6	8	50	3	●
D0065	0.65	8	50	3	●
D0070	0.7	10	50	3	●
D0075	0.75	10	50	3	●
D0080	0.8	10	50	3	●
D0085	0.85	10	50	3	●
D0090	0.9	12	50	3	●
D0095	0.95	12	50	3	●
D0100	1.0	12	60	3	●
D0105	1.05	12	60	3	●
D0110	1.1	16	60	3	●
D0115	1.15	16	60	3	●
D0120	1.2	16	60	3	●
D0125	1.25	16	60	3	●
D0130	1.3	16	60	3	●
D0135	1.35	18	60	3	●
D0140	1.4	18	60	3	●
D0145	1.45	18	60	3	●
D0150	1.5	18	60	3	●
D0155	1.55	20	60	3	●
D0160	1.6	20	60	3	●
D0165	1.65	20	60	3	●
D0170	1.7	20	60	3	●
D0175	1.75	20	60	3	●
D0180	1.8	22	60	3	●
D0185	1.85	22	60	3	●
D0190	1.9	22	60	3	●
D0195	1.95	23	60	3	●
D0200	2.0	23	70	3	●
D0205	2.05	23	70	3	●
D0210	2.1	23	70	3	●
D0215	2.15	23	70	3	●
D0220	2.2	26	70	3	●
D0225	2.25	26	70	3	●
D0230	2.3	26	70	3	●
D0235	2.35	26	70	3	●
D0240	2.4	29	70	3	●
D0245	2.45	29	70	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMD0250	2.5	29	70	3	●
D0255	2.55	29	70	3	●
D0260	2.6	29	70	3	●
D0265	2.65	29	70	3	●
D0270	2.7	32	70	3	●
D0275	2.75	32	70	3	●
D0280	2.8	32	70	3	●
D0285	2.85	32	70	3	●
D0290	2.9	32	70	3	●
D0295	2.95	32	70	3	●
D0300	3.0	32	70	3	●
D0305	3.05	35	85	4	●
D0310	3.1	35	85	4	●
D0315	3.15	35	85	4	●
D0320	3.2	35	85	4	●
D0325	3.25	35	85	4	●
D0330	3.3	35	85	4	●
D0335	3.35	35	85	4	●
D0340	3.4	38	85	4	●
D0345	3.45	38	85	4	●
D0350	3.5	38	85	4	●
D0355	3.55	38	85	4	●
D0360	3.6	38	85	4	●
D0365	3.65	38	85	4	●
D0370	3.7	38	85	4	●
D0375	3.75	42	85	4	●
D0380	3.8	42	85	4	●
D0385	3.85	42	85	4	●
D0390	3.9	42	85	4	●
D0395	3.95	42	85	4	●
D0400	4.0	42	85	4	●
D0405	4.05	42	100	6	●
D0410	4.1	42	100	6	●
D0415	4.15	42	100	6	●
D0420	4.2	42	100	6	●
D0425	4.25	46	100	6	●
D0430	4.3	46	100	6	●
D0435	4.35	46	100	6	●
D0440	4.4	46	100	6	●
D0445	4.45	46	100	6	●

● : Inventory maintained in Japan.

CUTTING CONDITIONS D148

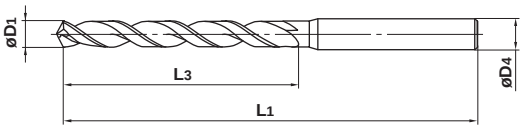
HSS

VA-PDM

Medium, High precision

HG HSS | V | 118° D1<2 | 135° D1≥2 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○		○



● Highly efficient drilling and long tool life have been achieved with the newly developed Violet coating.
(Standard drill depth : less than 5 times the drill diameter)

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMD0450	4.5	46	100	6	●
D0455	4.55	46	100	6	●
D0460	4.6	46	100	6	●
D0465	4.65	46	100	6	●
D0470	4.7	46	100	6	●
D0475	4.75	46	100	6	●
D0480	4.8	51	100	6	●
D0485	4.85	51	100	6	●
D0490	4.9	51	100	6	●
D0495	4.95	51	100	6	●
D0500	5.0	51	100	6	●
D0505	5.05	51	100	6	●
D0510	5.1	51	100	6	●
D0515	5.15	51	100	6	●
D0520	5.2	51	100	6	●
D0525	5.25	51	100	6	●
D0530	5.3	51	100	6	●
D0535	5.35	56	106	6	●
D0540	5.4	56	106	6	●
D0545	5.45	56	106	6	●
D0550	5.5	56	106	6	●
D0555	5.55	56	106	6	●
D0560	5.6	56	106	6	●
D0565	5.65	56	106	6	●
D0570	5.7	56	106	6	●
D0575	5.75	56	106	6	●
D0580	5.8	56	106	6	●
D0585	5.85	56	106	6	●
D0590	5.9	56	106	6	●
D0595	5.95	56	106	6	●
D0600	6.0	56	106	6	●
D0605	6.05	62	112	8	●
D0610	6.1	62	112	8	●
D0615	6.15	62	112	8	●
D0620	6.2	62	112	8	●
D0625	6.25	62	112	8	●
D0630	6.3	62	112	8	●
D0635	6.35	62	112	8	●
D0640	6.4	62	112	8	●
D0645	6.45	62	112	8	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMD0650	6.5	62	112	8	●
D0655	6.55	62	112	8	●
D0660	6.6	62	112	8	●
D0665	6.65	62	112	8	●
D0670	6.7	62	112	8	●
D0675	6.75	67	117	8	●
D0680	6.8	67	117	8	●
D0685	6.85	67	117	8	●
D0690	6.9	67	117	8	●
D0695	6.95	67	117	8	●
D0700	7.0	67	117	8	●
D0705	7.05	67	117	8	●
D0710	7.1	67	117	8	●
D0715	7.15	67	117	8	●
D0720	7.2	67	117	8	●
D0725	7.25	67	117	8	●
D0730	7.3	67	117	8	●
D0735	7.35	67	117	8	●
D0740	7.4	67	117	8	●
D0745	7.45	67	117	8	●
D0750	7.5	67	117	8	●
D0755	7.55	73	123	8	●
D0760	7.6	73	123	8	●
D0765	7.65	73	123	8	●
D0770	7.7	73	123	8	●
D0775	7.75	73	123	8	●
D0780	7.8	73	123	8	●
D0785	7.85	73	123	8	●
D0790	7.9	73	123	8	●
D0795	7.95	73	123	8	●
D0800	8.0	73	123	8	●
D0805	8.05	73	128	10	●
D0810	8.1	73	128	10	●
D0815	8.15	73	128	10	●
D0820	8.2	73	128	10	●
D0825	8.25	73	128	10	●
D0830	8.3	73	128	10	●
D0835	8.35	73	128	10	●
D0840	8.4	73	128	10	●
D0845	8.45	73	128	10	●

● : **Inventory maintained in Japan.**

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Shank Dia. D_4	Stock
VAPDMD0850	8.5	73	128	10	●
D0855	8.55	79	134	10	●
D0860	8.6	79	134	10	●
D0865	8.65	79	134	10	●
D0870	8.7	79	134	10	●
D0875	8.75	79	134	10	●
D0880	8.8	79	134	10	●
D0885	8.85	79	134	10	●
D0890	8.9	79	134	10	●
D0895	8.95	79	134	10	●
D0900	9.0	79	134	10	●
D0910	9.1	79	134	10	●
D0920	9.2	79	134	10	●
D0930	9.3	79	134	10	●
D0940	9.4	79	134	10	●
D0950	9.5	79	134	10	●
D0960	9.6	85	140	10	●
D0970	9.7	85	140	10	●
D0980	9.8	85	140	10	●
D0990	9.9	85	140	10	●
D1000	10.0	85	140	10	●
D1010	10.1	85	145	12	●
D1020	10.2	85	145	12	●
D1030	10.3	85	145	12	●
D1040	10.4	85	145	12	●
D1050	10.5	85	145	12	●
D1060	10.6	85	145	12	●
D1070	10.7	92	152	12	●
D1080	10.8	92	152	12	●
D1090	10.9	92	152	12	●
D1100	11.0	92	152	12	●
D1110	11.1	92	152	12	●
D1120	11.2	92	152	12	●
D1130	11.3	92	152	12	●
D1140	11.4	92	152	12	●
D1150	11.5	92	152	12	●
D1160	11.6	92	152	12	●
D1170	11.7	92	152	12	●
D1180	11.8	92	152	12	●
D1190	11.9	99	159	12	●
D1200	12.0	99	159	12	●
D1210	12.1	99	159	12	●
D1220	12.2	99	159	12	●
D1230	12.3	99	159	12	●
D1240	12.4	99	159	12	●
D1250	12.5	99	159	12	●
D1260	12.6	99	159	12	●
D1270	12.7	99	159	12	●
D1280	12.8	99	159	12	●
D1290	12.9	99	159	12	●

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Shank Dia. D_4	Stock
VAPDMD1300	13.0	99	159	12	●
D1350	13.5	100	160	16	●
D1400	14.0	100	160	16	●
D1410	14.1	105	165	16	●
D1420	14.2	105	165	16	●
D1450	14.5	105	165	16	●
D1500	15.0	105	165	16	●
D1550	15.5	110	170	16	●
D1560	15.6	110	170	16	●
D1570	15.7	110	170	16	●
D1600	16.0	110	170	16	●
D1650	16.5	110	175	20	●
D1700	17.0	110	175	20	●
D1750	17.5	115	180	20	●
D1760	17.6	115	180	20	●
D1770	17.7	115	180	20	●
D1800	18.0	115	180	20	●
D1850	18.5	120	185	20	●
D1900	19.0	120	185	20	●
D1950	19.5	120	185	20	●
D1960	19.6	120	185	20	●
D1970	19.7	120	185	20	●
D2000	20.0	120	185	20	●
D2050	20.5	125	200	25	●
D2100	21.0	125	200	25	●
D2110	21.1	125	200	25	●
D2120	21.2	125	200	25	●
D2150	21.5	125	200	25	●
D2200	22.0	125	200	25	●
D2250	22.5	130	205	25	●
D2300	23.0	130	205	25	●
D2350	23.5	130	205	25	●
D2400	24.0	135	210	25	●
D2450	24.5	135	210	25	●
D2500	25.0	135	210	25	●
D2550	25.5	140	220	32	●
D2600	26.0	140	220	32	●
D2650	26.5	140	220	32	●
D2700	27.0	140	220	32	●
D2800	28.0	140	220	32	●
D2900	29.0	145	225	32	●
D3000	30.0	145	225	32	●
D3100	31.0	150	230	32	●
D3200	32.0	155	235	32	●

CUTTING CONDITIONS D148

HSS

VA-PDM

Medium, High precision

RECOMMENDED CUTTING CONDITIONS

(Standard drilling depth : 5 times or below the drill diameter)

Work material	Structural steel		Carbon steel AISI 1049 Alloy steel SCM Cast iron FC		Alloy tool steel AISI D2 (Low-hardness materials) Ferritic stainless steel AISI 430, AISI 405 Martensitic stainless steel AISI 420, AISI 440		Alloy tool steel AISI H13 (−40HRC) Precipitation hardeningstainless steel ASTM 630, ASTM 631	
Drill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	17000	0.01	12800	0.01	8000	0.01	6600	0.01
1.0	11000	0.05	8300	0.05	5000	0.05	4100	0.04
2.0	6400	0.09	4800	0.09	2900	0.06	2400	0.05
3.0	4300	0.13	3200	0.13	1900	0.10	1600	0.06
4.0	3200	0.15	2400	0.15	1400	0.10	1200	0.08
5.0	2600	0.18	1900	0.18	1100	0.13	950	0.10
6.0	2100	0.19	1600	0.20	950	0.15	800	0.11
8.0	1600	0.24	1200	0.22	720	0.18	600	0.13
10.0	1300	0.28	950	0.25	570	0.21	480	0.15
12.0	1100	0.34	800	0.30	480	0.25	400	0.17
14.0	910	0.39	680	0.35	410	0.30	340	0.21
15.0	850	0.40	640	0.36	380	0.31	320	0.22
16.0	800	0.42	600	0.38	360	0.32	300	0.23
18.0	710	0.44	530	0.40	320	0.34	270	0.24
20.0	570	0.44	450	0.40	250	0.34	220	0.24
22.0	520	0.46	410	0.42	230	0.36	200	0.25
24.0	480	0.48	370	0.44	210	0.37	190	0.26
26.0	440	0.51	340	0.46	200	0.39	170	0.28
28.0	410	0.53	320	0.48	180	0.41	160	0.29
30.0	380	0.55	300	0.50	170	0.43	150	0.30
32.0	360	0.55	280	0.50	160	0.43	140	0.30

1) Please reduce the revolution and feed rate depending on the drilling situation when the installation of workpiece or machine lacks rigidity.
2) Please use a collet type drill chuck or a milling chuck.
3) Use sufficient cutting fluid.
4) VA-PDM-SUS are recommended for austenitic stainless steels (AISI 304).
5) When drilling holes greater than 4 x drill diameter hole depths, please use a peck feed.

The above-mentioned cutting condition is standard when using water-soluble cutting fluid.
Please reduce the revolution when using non-water-soluble cutting fluid.

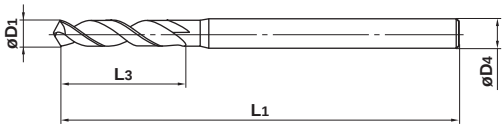
VA-PDS-SUS

Short, High precision, For stainless steel

CO HSS | V | 135° | X Thinning D1≥1

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	

All drills except those with intervals of 0.1mm and under dia. 4.0mm have a tolerance of 0−-0.009mm.



● New design and the Violet coating combination enable high efficiency drilling and long tool life for drilling of stainless steels.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0050	0.5	3	50	3	●
D0051	0.51	3	50	3	●
D0052	0.52	3	50	3	●
D0053	0.53	3	50	3	●
D0054	0.54	3	50	3	●
D0055	0.55	3	50	3	●
D0056	0.56	4	50	3	●
D0057	0.57	4	50	3	●
D0058	0.58	4	50	3	●
D0059	0.59	4	50	3	●
D0060	0.6	5	50	3	●
D0061	0.61	5	50	3	●
D0062	0.62	5	50	3	●
D0063	0.63	5	50	3	●
D0064	0.64	5	50	3	●
D0065	0.65	5	50	3	●
D0066	0.66	5	50	3	●
D0067	0.67	5	50	3	●
D0068	0.68	5	50	3	●
D0069	0.69	5	50	3	●
D0070	0.7	5	50	3	●
D0071	0.71	5	50	3	●
D0072	0.72	5	50	3	●
D0073	0.73	5	50	3	●
D0074	0.74	5	50	3	●
D0075	0.75	5	50	3	●
D0076	0.76	5	50	3	●
D0077	0.77	5	50	3	●
D0078	0.78	5	50	3	●
D0079	0.79	5	50	3	●
D0080	0.8	5	50	3	●
D0081	0.81	5	50	3	●
D0082	0.82	5	50	3	●
D0083	0.83	5	50	3	●
D0084	0.84	5	50	3	●
D0085	0.85	5	50	3	●
D0086	0.86	6	50	3	●
D0087	0.87	6	50	3	●
D0088	0.88	6	50	3	●
D0089	0.89	6	50	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0090	0.9	6	50	3	●
D0091	0.91	6	50	3	●
D0092	0.92	6	50	3	●
D0093	0.93	6	50	3	●
D0094	0.94	6	50	3	●
D0095	0.95	6	50	3	●
D0096	0.96	6	50	3	●
D0097	0.97	6	50	3	●
D0098	0.98	6	50	3	●
D0099	0.99	6	50	3	●
D0100	1.0	6	50	3	●
D0101	1.01	6	50	3	●
D0102	1.02	6	50	3	●
D0103	1.03	6	50	3	●
D0104	1.04	6	50	3	●
D0105	1.05	6	50	3	●
D0106	1.06	6	50	3	●
D0107	1.07	8	55	3	●
D0108	1.08	8	55	3	●
D0109	1.09	8	55	3	●
D0110	1.1	8	55	3	●
D0111	1.11	8	55	3	●
D0112	1.12	8	55	3	●
D0113	1.13	8	55	3	●
D0114	1.14	8	55	3	●
D0115	1.15	8	55	3	●
D0116	1.16	8	55	3	●
D0117	1.17	8	55	3	●
D0118	1.18	8	55	3	●
D0119	1.19	8	55	3	●
D0120	1.2	8	55	3	●
D0121	1.21	8	55	3	●
D0122	1.22	8	55	3	●
D0123	1.23	8	55	3	●
D0124	1.24	8	55	3	●
D0125	1.25	8	55	3	●
D0126	1.26	8	55	3	●
D0127	1.27	8	55	3	●
D0128	1.28	8	55	3	●
D0129	1.29	8	55	3	●

● : Inventory maintained in Japan.

CUTTING CONDITIONS D161

HSS

VA-PDS-SUS

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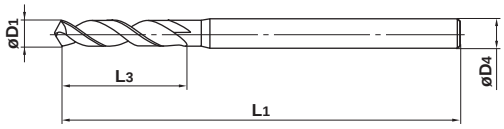
Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	

All drills except those with intervals of 0.1mm and under dia. 4.0mm have a tolerance of 0−-0.009mm.



● New design and the Violet coating combination enable high efficiency drilling and long tool life for drilling of stainless steels.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0130	1.3	9	55	3	●
D0131	1.31	9	55	3	●
D0132	1.32	9	55	3	●
D0133	1.33	9	55	3	●
D0134	1.34	9	55	3	●
D0135	1.35	9	55	3	●
D0136	1.36	9	55	3	●
D0137	1.37	9	55	3	●
D0138	1.38	9	55	3	●
D0139	1.39	9	55	3	●
D0140	1.4	9	55	3	●
D0141	1.41	9	55	3	●
D0142	1.42	9	55	3	●
D0143	1.43	9	55	3	●
D0144	1.44	9	55	3	●
D0145	1.45	9	55	3	●
D0146	1.46	9	55	3	●
D0147	1.47	9	55	3	●
D0148	1.48	9	55	3	●
D0149	1.49	9	55	3	●
D0150	1.5	9	55	3	●
D0151	1.51	11	55	3	●
D0152	1.52	11	55	3	●
D0153	1.53	11	55	3	●
D0154	1.54	11	55	3	●
D0155	1.55	11	55	3	●
D0156	1.56	11	55	3	●
D0157	1.57	11	55	3	●
D0158	1.58	11	55	3	●
D0159	1.59	11	55	3	●
D0160	1.6	11	55	3	●
D0161	1.61	11	55	3	●
D0162	1.62	11	55	3	●
D0163	1.63	11	55	3	●
D0164	1.64	11	55	3	●
D0165	1.65	11	55	3	●
D0166	1.66	11	55	3	●
D0167	1.67	11	55	3	●
D0168	1.68	11	55	3	●
D0169	1.69	11	55	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0170	1.7	11	55	3	●
D0171	1.71	11	55	3	●
D0172	1.72	11	55	3	●
D0173	1.73	11	55	3	●
D0174	1.74	11	55	3	●
D0175	1.75	11	55	3	●
D0176	1.76	11	55	3	●
D0177	1.77	11	55	3	●
D0178	1.78	11	55	3	●
D0179	1.79	11	55	3	●
D0180	1.8	11	55	3	●
D0181	1.81	11	55	3	●
D0182	1.82	11	55	3	●
D0183	1.83	11	55	3	●
D0184	1.84	11	55	3	●
D0185	1.85	11	55	3	●
D0186	1.86	11	55	3	●
D0187	1.87	11	55	3	●
D0188	1.88	11	55	3	●
D0189	1.89	11	55	3	●
D0190	1.9	12	55	3	●
D0191	1.91	12	60	3	●
D0192	1.92	12	60	3	●
D0193	1.93	12	60	3	●
D0194	1.94	12	60	3	●
D0195	1.95	12	60	3	●
D0196	1.96	12	60	3	●
D0197	1.97	12	60	3	●
D0198	1.98	12	60	3	●
D0199	1.99	12	60	3	●
D0200	2.0	12	60	3	●
D0201	2.01	12	60	3	●
D0202	2.02	12	60	3	●
D0203	2.03	12	60	3	●
D0204	2.04	12	60	3	●
D0205	2.05	12	60	3	●
D0206	2.06	12	60	3	●
D0207	2.07	12	60	3	●
D0208	2.08	12	60	3	●
D0209	2.09	12	60	3	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0210	2.1	12	60	3	●
D0211	2.11	12	60	3	●
D0212	2.12	12	60	3	●
D0213	2.13	12	60	3	●
D0214	2.14	12	60	3	●
D0215	2.15	12	60	3	●
D0216	2.16	12	60	3	●
D0217	2.17	12	60	3	●
D0218	2.18	12	60	3	●
D0219	2.19	12	60	3	●
D0220	2.2	12	60	3	●
D0221	2.21	12	60	3	●
D0222	2.22	12	60	3	●
D0223	2.23	12	60	3	●
D0224	2.24	12	60	3	●
D0225	2.25	12	60	3	●
D0226	2.26	12	60	3	●
D0227	2.27	12	60	3	●
D0228	2.28	12	60	3	●
D0229	2.29	12	60	3	●
D0230	2.3	13	60	3	●
D0231	2.31	13	60	3	●
D0232	2.32	13	60	3	●
D0233	2.33	13	60	3	●
D0234	2.34	13	60	3	●
D0235	2.35	13	60	3	●
D0236	2.36	13	60	3	●
D0237	2.37	13	60	3	●
D0238	2.38	13	60	3	●
D0239	2.39	13	60	3	●
D0240	2.4	13	60	3	●
D0241	2.41	13	60	3	●
D0242	2.42	13	60	3	●
D0243	2.43	13	60	3	●
D0244	2.44	13	60	3	●
D0245	2.45	13	60	3	●
D0246	2.46	13	60	3	●
D0247	2.47	13	60	3	●
D0248	2.48	13	60	3	●
D0249	2.49	13	60	3	●
D0250	2.5	13	60	3	●
D0251	2.51	13	60	3	●
D0252	2.52	13	60	3	●
D0253	2.53	13	60	3	●
D0254	2.54	13	60	3	●
D0255	2.55	13	60	3	●
D0256	2.56	13	60	3	●
D0257	2.57	13	60	3	●
D0258	2.58	13	60	3	●
D0259	2.59	13	60	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0260	2.6	15	60	3	●
D0261	2.61	15	60	3	●
D0262	2.62	15	60	3	●
D0263	2.63	15	60	3	●
D0264	2.64	15	60	3	●
D0265	2.65	15	60	3	●
D0266	2.66	15	60	3	●
D0267	2.67	15	60	3	●
D0268	2.68	15	60	3	●
D0269	2.69	15	60	3	●
D0270	2.7	15	60	3	●
D0271	2.71	15	60	3	●
D0272	2.72	15	60	3	●
D0273	2.73	15	60	3	●
D0274	2.74	15	60	3	●
D0275	2.75	15	60	3	●
D0276	2.76	15	60	3	●
D0277	2.77	15	60	3	●
D0278	2.78	15	60	3	●
D0279	2.79	15	60	3	●
D0280	2.8	15	60	3	●
D0281	2.81	15	60	3	●
D0282	2.82	15	60	3	●
D0283	2.83	15	60	3	●
D0284	2.84	15	60	3	●
D0285	2.85	15	60	3	●
D0286	2.86	15	60	3	●
D0287	2.87	15	60	3	●
D0288	2.88	15	60	3	●
D0289	2.89	15	60	3	●
D0290	2.9	15	60	3	●
D0291	2.91	15	60	3	●
D0292	2.92	15	60	3	●
D0293	2.93	15	60	3	●
D0294	2.94	15	60	3	●
D0295	2.95	15	60	3	●
D0296	2.96	15	60	3	●
D0297	2.97	15	60	3	●
D0298	2.98	15	60	3	●
D0299	2.99	15	60	3	●
D0300	3.0	15	60	3	●
D0301	3.01	17	70	4	●
D0302	3.02	17	70	4	●
D0303	3.03	17	70	4	●
D0304	3.04	17	70	4	●
D0305	3.05	17	70	4	●
D0306	3.06	17	70	4	●
D0307	3.07	17	70	4	●
D0308	3.08	17	70	4	●
D0309	3.09	17	70	4	●

CUTTING CONDITIONS D161

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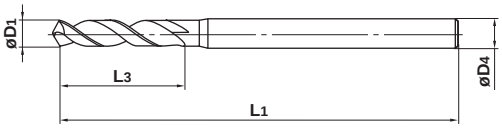


● New design and the Violet coating combination enable high efficiency drilling and long tool life for drilling of stainless steels.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0310	3.1	17	70	4	●
D0311	3.11	17	70	4	●
D0312	3.12	17	70	4	●
D0313	3.13	17	70	4	●
D0314	3.14	17	70	4	●
D0315	3.15	17	70	4	●
D0316	3.16	17	70	4	●
D0317	3.17	17	70	4	●
D0318	3.18	17	70	4	●
D0319	3.19	17	70	4	●
D0320	3.2	17	70	4	●
D0321	3.21	17	70	4	●
D0322	3.22	17	70	4	●
D0323	3.23	17	70	4	●
D0324	3.24	17	70	4	●
D0325	3.25	17	70	4	●
D0326	3.26	17	70	4	●
D0327	3.27	17	70	4	●
D0328	3.28	17	70	4	●
D0329	3.29	17	70	4	●
D0330	3.3	19	70	4	●
D0331	3.31	19	70	4	●
D0332	3.32	19	70	4	●
D0333	3.33	19	70	4	●
D0334	3.34	19	70	4	●
D0335	3.35	19	70	4	●
D0336	3.36	19	70	4	●
D0337	3.37	19	70	4	●
D0338	3.38	19	70	4	●
D0339	3.39	19	70	4	●
D0340	3.4	19	70	4	●
D0341	3.41	19	70	4	●
D0342	3.42	19	70	4	●
D0343	3.43	19	70	4	●
D0344	3.44	19	70	4	●
D0345	3.45	19	70	4	●
D0346	3.46	19	70	4	●
D0347	3.47	19	70	4	●
D0348	3.48	19	70	4	●
D0349	3.49	19	70	4	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0350	3.5	19	70	4	●
D0351	3.51	19	70	4	●
D0352	3.52	19	70	4	●
D0353	3.53	19	70	4	●
D0354	3.54	19	70	4	●
D0355	3.55	19	70	4	●
D0356	3.56	19	70	4	●
D0357	3.57	19	70	4	●
D0358	3.58	19	70	4	●
D0359	3.59	19	70	4	●
D0360	3.6	21	70	4	●
D0361	3.61	21	70	4	●
D0362	3.62	21	70	4	●
D0363	3.63	21	70	4	●
D0364	3.64	21	70	4	●
D0365	3.65	21	70	4	●
D0366	3.66	21	70	4	●
D0367	3.67	21	70	4	●
D0368	3.68	21	70	4	●
D0369	3.69	21	70	4	●
D0370	3.7	21	70	4	●
D0371	3.71	21	70	4	●
D0372	3.72	21	70	4	●
D0373	3.73	21	70	4	●
D0374	3.74	21	70	4	●
D0375	3.75	21	70	4	●
D0376	3.76	21	70	4	●
D0377	3.77	21	70	4	●
D0378	3.78	21	70	4	●
D0379	3.79	21	70	4	●
D0380	3.8	21	70	4	●
D0381	3.81	21	70	4	●
D0382	3.82	21	70	4	●
D0383	3.83	21	70	4	●
D0384	3.84	21	70	4	●
D0385	3.85	21	70	4	●
D0386	3.86	21	70	4	●
D0387	3.87	21	70	4	●
D0388	3.88	21	70	4	●
D0389	3.89	21	70	4	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0390	3.9	21	70	4	●
D0391	3.91	21	70	4	●
D0392	3.92	21	70	4	●
D0393	3.93	21	70	4	●
D0394	3.94	21	70	4	●
D0395	3.95	21	70	4	●
D0396	3.96	21	70	4	●
D0397	3.97	21	70	4	●
D0398	3.98	21	70	4	●
D0399	3.99	21	70	4	●
D0400	4.0	21	70	4	●
D0405	4.05	21	80	6	●
D0410	4.1	21	80	6	●
D0415	4.15	21	80	6	●
D0420	4.2	21	80	6	●
D0425	4.25	21	80	6	●
D0430	4.3	23	80	6	●
D0435	4.35	23	80	6	●
D0440	4.4	23	80	6	●
D0445	4.45	23	80	6	●
D0450	4.5	23	80	6	●
D0455	4.55	23	80	6	●
D0460	4.6	25	80	6	●
D0465	4.65	25	80	6	●
D0470	4.7	25	80	6	●
D0475	4.75	25	80	6	●
D0480	4.8	25	80	6	●
D0485	4.85	25	80	6	●
D0490	4.9	25	80	6	●
D0495	4.95	25	80	6	●
D0500	5.0	25	80	6	●
D0505	5.05	25	80	6	●
D0510	5.1	25	80	6	●
D0515	5.15	25	80	6	●
D0520	5.2	25	80	6	●
D0525	5.25	25	80	6	●
D0530	5.3	25	80	6	●
D0535	5.35	27	80	6	●
D0540	5.4	27	80	6	●
D0545	5.45	27	80	6	●
D0550	5.5	27	80	6	●
D0555	5.55	27	80	6	●
D0560	5.6	27	80	6	●
D0565	5.65	27	80	6	●
D0570	5.7	27	80	6	●
D0575	5.75	27	80	6	●
D0580	5.8	27	80	6	●
D0585	5.85	27	80	6	●
D0590	5.9	27	80	6	●
D0595	5.95	27	80	6	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0600	6.0	27	80	6	●
D0605	6.05	30	80	8	●
D0610	6.1	30	80	8	●
D0615	6.15	30	80	8	●
D0620	6.2	30	80	8	●
D0625	6.25	30	80	8	●
D0630	6.3	30	80	8	●
D0635	6.35	30	80	8	●
D0640	6.4	30	80	8	●
D0645	6.45	30	80	8	●
D0650	6.5	30	80	8	●
D0655	6.55	30	80	8	●
D0660	6.6	30	80	8	●
D0665	6.65	30	80	8	●
D0670	6.7	30	80	8	●
D0675	6.75	32	80	8	●
D0680	6.8	32	80	8	●
D0685	6.85	32	80	8	●
D0690	6.9	32	80	8	●
D0695	6.95	32	80	8	●
D0700	7.0	32	80	8	●
D0705	7.05	32	80	8	●
D0710	7.1	32	80	8	●
D0715	7.15	32	80	8	●
D0720	7.2	32	80	8	●
D0725	7.25	32	80	8	●
D0730	7.3	32	80	8	●
D0735	7.35	32	80	8	●
D0740	7.4	32	80	8	●
D0745	7.45	32	80	8	●
D0750	7.5	32	80	8	●
D0755	7.55	35	85	8	●
D0760	7.6	35	85	8	●
D0765	7.65	35	85	8	●
D0770	7.7	35	85	8	●
D0775	7.75	35	85	8	●
D0780	7.8	35	85	8	●
D0785	7.85	35	85	8	●
D0790	7.9	35	85	8	●
D0795	7.95	35	85	8	●
D0800	8.0	35	85	8	●
D0805	8.05	35	90	10	●
D0810	8.1	35	90	10	●
D0815	8.15	35	90	10	●
D0820	8.2	35	90	10	●
D0825	8.25	35	90	10	●
D0830	8.3	35	90	10	●
D0835	8.35	35	90	10	●
D0840	8.4	35	90	10	●
D0845	8.45	35	90	10	●

CUTTING CONDITIONS D161

HSS

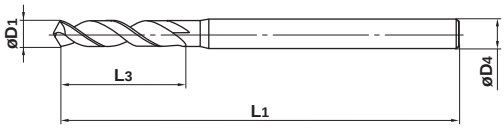
VA-PDS-SUS

Short, High precision, For stainless steel

CO HSS | V | 135° | X Thinning D1≥1

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	

All drills except those with intervals of 0.1mm and under dia. 4.0mm have a tolerance of 0−-0.009mm.



● New design and the Violet coating combination enable high efficiency drilling and long tool life for drilling of stainless steels.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD0850	8.5	35	90	10	●
D0855	8.55	38	93	10	●
D0860	8.6	38	93	10	●
D0865	8.65	38	93	10	●
D0870	8.7	38	93	10	●
D0875	8.75	38	93	10	●
D0880	8.8	38	93	10	●
D0885	8.85	38	93	10	●
D0890	8.9	38	93	10	●
D0895	8.95	38	93	10	●
D0900	9.0	38	93	10	●
D0910	9.1	38	93	10	●
D0920	9.2	38	93	10	●
D0930	9.3	38	93	10	●
D0940	9.4	38	93	10	●
D0950	9.5	38	93	10	●
D0960	9.6	41	96	10	●
D0970	9.7	41	96	10	●
D0980	9.8	41	96	10	●
D0990	9.9	41	96	10	●
D1000	10.0	41	96	10	●
D1010	10.1	41	101	12	●
D1020	10.2	41	101	12	●
D1030	10.3	41	101	12	●
D1040	10.4	41	101	12	●
D1050	10.5	41	101	12	●
D1060	10.6	41	101	12	●
D1070	10.7	45	105	12	●
D1080	10.8	45	105	12	●
D1090	10.9	45	105	12	●
D1100	11.0	45	105	12	●
D1110	11.1	45	105	12	●
D1120	11.2	45	105	12	●
D1130	11.3	45	105	12	●
D1140	11.4	45	105	12	●
D1150	11.5	45	105	12	●
D1160	11.6	45	105	12	●
D1170	11.7	45	105	12	●
D1180	11.8	45	105	12	●
D1190	11.9	49	109	12	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSSUSD1200	12.0	49	109	12	●
D1210	12.1	49	109	12	●
D1220	12.2	49	109	12	●
D1230	12.3	49	109	12	●
D1240	12.4	49	109	12	●
D1250	12.5	49	109	12	●
D1260	12.6	49	109	12	●
D1270	12.7	49	109	12	●
D1280	12.8	49	109	12	●
D1290	12.9	49	109	12	●
D1300	13.0	49	109	12	●
D1350	13.5	51	111	16	●
D1400	14.0	51	111	16	●
D1410	14.1	53	113	16	●
D1420	14.2	53	113	16	●
D1450	14.5	53	113	16	●
D1500	15.0	53	113	16	●
D1550	15.5	55	115	16	●
D1560	15.6	55	115	16	●
D1570	15.7	55	115	16	●
D1600	16.0	55	115	16	●
D1650	16.5	57	122	20	●
D1700	17.0	57	122	20	●
D1750	17.5	58	123	20	●
D1760	17.6	58	123	20	●
D1770	17.7	58	123	20	●
D1800	18.0	58	123	20	●
D1850	18.5	60	125	20	●
D1900	19.0	60	125	20	●
D1950	19.5	62	127	20	●
D1960	19.6	62	127	20	●
D1970	19.7	62	127	20	●
D2000	20.0	62	127	20	●

● : Inventory maintained in Japan.

CUTTING CONDITIONS D161

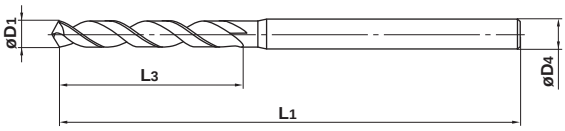
VA-PDM-SUS

Medium, High precision, For stainless steel

CO HSS | V | 118° D1<4 | 135° D1≥4 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	

All drills except those with intervals of 0.1mm and under dia. 4.0mm have a tolerance of 0−-0.009mm.



- New design and the Violet coating combination enable high efficiency drilling and long tool life for drilling of stainless steels.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0050	0.5	6	50	3	●
D0051	0.51	6	50	3	●
D0052	0.52	6	50	3	●
D0053	0.53	6	50	3	●
D0054	0.54	6	50	3	●
D0055	0.55	6	50	3	●
D0056	0.56	8	50	3	●
D0057	0.57	8	50	3	●
D0058	0.58	8	50	3	●
D0059	0.59	8	50	3	●
D0060	0.6	8	50	3	●
D0061	0.61	8	50	3	●
D0062	0.62	8	50	3	●
D0063	0.63	8	50	3	●
D0064	0.64	8	50	3	●
D0065	0.65	8	50	3	●
D0066	0.66	8	50	3	●
D0067	0.67	8	50	3	●
D0068	0.68	8	50	3	●
D0069	0.69	8	50	3	●
D0070	0.7	10	50	3	●
D0071	0.71	10	50	3	●
D0072	0.72	10	50	3	●
D0073	0.73	10	50	3	●
D0074	0.74	10	50	3	●
D0075	0.75	10	50	3	●
D0076	0.76	10	50	3	●
D0077	0.77	10	50	3	●
D0078	0.78	10	50	3	●
D0079	0.79	10	50	3	●
D0080	0.8	10	50	3	●
D0081	0.81	10	50	3	●
D0082	0.82	10	50	3	●
D0083	0.83	10	50	3	●
D0084	0.84	10	50	3	●
D0085	0.85	10	50	3	●
D0086	0.86	12	50	3	●
D0087	0.87	12	50	3	●
D0088	0.88	12	50	3	●
D0089	0.89	12	50	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0090	0.9	12	50	3	●
D0091	0.91	12	50	3	●
D0092	0.92	12	50	3	●
D0093	0.93	12	50	3	●
D0094	0.94	12	50	3	●
D0095	0.95	12	50	3	●
D0096	0.96	12	50	3	●
D0097	0.97	12	50	3	●
D0098	0.98	12	50	3	●
D0099	0.99	12	50	3	●
D0100	1.0	12	60	3	●
D0101	1.01	12	60	3	●
D0102	1.02	12	60	3	●
D0103	1.03	12	60	3	●
D0104	1.04	12	60	3	●
D0105	1.05	12	60	3	●
D0106	1.06	12	60	3	●
D0107	1.07	16	60	3	●
D0108	1.08	16	60	3	●
D0109	1.09	16	60	3	●
D0110	1.1	16	60	3	●
D0111	1.11	16	60	3	●
D0112	1.12	16	60	3	●
D0113	1.13	16	60	3	●
D0114	1.14	16	60	3	●
D0115	1.15	16	60	3	●
D0116	1.16	16	60	3	●
D0117	1.17	16	60	3	●
D0118	1.18	16	60	3	●
D0119	1.19	16	60	3	●
D0120	1.2	16	60	3	●
D0121	1.21	16	60	3	●
D0122	1.22	16	60	3	●
D0123	1.23	16	60	3	●
D0124	1.24	16	60	3	●
D0125	1.25	16	60	3	●
D0126	1.26	16	60	3	●
D0127	1.27	16	60	3	●
D0128	1.28	16	60	3	●
D0129	1.29	16	60	3	●

CUTTING CONDITIONS D161

VIOLET DRILLS

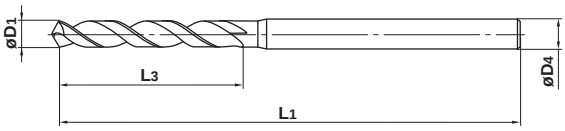
VA-PDM-SUS

Medium, High precision, For stainless steel

CO HSS | V | 118° D1<4 | 135° D1≥4 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	

All drills except those with intervals of 0.1mm and under dia. 4.0mm have a tolerance of 0−-0.009mm.



● New design and the Violet coating combination enable high efficiency drilling and long tool life for drilling of stainless steels.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0130	1.3	16	60	3	●
D0131	1.31	18	60	3	●
D0132	1.32	18	60	3	●
D0133	1.33	18	60	3	●
D0134	1.34	18	60	3	●
D0135	1.35	18	60	3	●
D0136	1.36	18	60	3	●
D0137	1.37	18	60	3	●
D0138	1.38	18	60	3	●
D0139	1.39	18	60	3	●
D0140	1.4	18	60	3	●
D0141	1.41	18	60	3	●
D0142	1.42	18	60	3	●
D0143	1.43	18	60	3	●
D0144	1.44	18	60	3	●
D0145	1.45	18	60	3	●
D0146	1.46	18	60	3	●
D0147	1.47	18	60	3	●
D0148	1.48	18	60	3	●
D0149	1.49	18	60	3	●
D0150	1.5	18	60	3	●
D0151	1.51	20	60	3	●
D0152	1.52	20	60	3	●
D0153	1.53	20	60	3	●
D0154	1.54	20	60	3	●
D0155	1.55	20	60	3	●
D0156	1.56	20	60	3	●
D0157	1.57	20	60	3	●
D0158	1.58	20	60	3	●
D0159	1.59	20	60	3	●
D0160	1.6	20	60	3	●
D0161	1.61	20	60	3	●
D0162	1.62	20	60	3	●
D0163	1.63	20	60	3	●
D0164	1.64	20	60	3	●
D0165	1.65	20	60	3	●
D0166	1.66	20	60	3	●
D0167	1.67	20	60	3	●
D0168	1.68	20	60	3	●
D0169	1.69	20	60	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0170	1.7	20	60	3	●
D0171	1.71	20	60	3	●
D0172	1.72	20	60	3	●
D0173	1.73	20	60	3	●
D0174	1.74	20	60	3	●
D0175	1.75	20	60	3	●
D0176	1.76	20	60	3	●
D0177	1.77	20	60	3	●
D0178	1.78	20	60	3	●
D0179	1.79	20	60	3	●
D0180	1.8	22	60	3	●
D0181	1.81	22	60	3	●
D0182	1.82	22	60	3	●
D0183	1.83	22	60	3	●
D0184	1.84	22	60	3	●
D0185	1.85	22	60	3	●
D0186	1.86	22	60	3	●
D0187	1.87	22	60	3	●
D0188	1.88	22	60	3	●
D0189	1.89	22	60	3	●
D0190	1.9	22	60	3	●
D0191	1.91	23	60	3	●
D0192	1.92	23	60	3	●
D0193	1.93	23	60	3	●
D0194	1.94	23	60	3	●
D0195	1.95	23	60	3	●
D0196	1.96	23	60	3	●
D0197	1.97	23	60	3	●
D0198	1.98	23	60	3	●
D0199	1.99	23	60	3	●
D0200	2.0	23	70	3	●
D0201	2.01	23	70	3	●
D0202	2.02	23	70	3	●
D0203	2.03	23	70	3	●
D0204	2.04	23	70	3	●
D0205	2.05	23	70	3	●
D0206	2.06	23	70	3	●
D0207	2.07	23	70	3	●
D0208	2.08	23	70	3	●
D0209	2.09	23	70	3	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0210	2.1	23	70	3	●
D0211	2.11	23	70	3	●
D0212	2.12	23	70	3	●
D0213	2.13	23	70	3	●
D0214	2.14	23	70	3	●
D0215	2.15	23	70	3	●
D0216	2.16	23	70	3	●
D0217	2.17	23	70	3	●
D0218	2.18	23	70	3	●
D0219	2.19	23	70	3	●
D0220	2.2	26	70	3	●
D0221	2.21	26	70	3	●
D0222	2.22	26	70	3	●
D0223	2.23	26	70	3	●
D0224	2.24	26	70	3	●
D0225	2.25	26	70	3	●
D0226	2.26	26	70	3	●
D0227	2.27	26	70	3	●
D0228	2.28	26	70	3	●
D0229	2.29	26	70	3	●
D0230	2.3	26	70	3	●
D0231	2.31	26	70	3	●
D0232	2.32	26	70	3	●
D0233	2.33	26	70	3	●
D0234	2.34	26	70	3	●
D0235	2.35	26	70	3	●
D0236	2.36	26	70	3	●
D0237	2.37	26	70	3	●
D0238	2.38	26	70	3	●
D0239	2.39	26	70	3	●
D0240	2.4	29	70	3	●
D0241	2.41	29	70	3	●
D0242	2.42	29	70	3	●
D0243	2.43	29	70	3	●
D0244	2.44	29	70	3	●
D0245	2.45	29	70	3	●
D0246	2.46	29	70	3	●
D0247	2.47	29	70	3	●
D0248	2.48	29	70	3	●
D0249	2.49	29	70	3	●
D0250	2.5	29	70	3	●
D0251	2.51	29	70	3	●
D0252	2.52	29	70	3	●
D0253	2.53	29	70	3	●
D0254	2.54	29	70	3	●
D0255	2.55	29	70	3	●
D0256	2.56	29	70	3	●
D0257	2.57	29	70	3	●
D0258	2.58	29	70	3	●
D0259	2.59	29	70	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0260	2.6	29	70	3	●
D0261	2.61	29	70	3	●
D0262	2.62	29	70	3	●
D0263	2.63	29	70	3	●
D0264	2.64	29	70	3	●
D0265	2.65	29	70	3	●
D0266	2.66	29	70	3	●
D0267	2.67	29	70	3	●
D0268	2.68	29	70	3	●
D0269	2.69	29	70	3	●
D0270	2.7	32	70	3	●
D0271	2.71	32	70	3	●
D0272	2.72	32	70	3	●
D0273	2.73	32	70	3	●
D0274	2.74	32	70	3	●
D0275	2.75	32	70	3	●
D0276	2.76	32	70	3	●
D0277	2.77	32	70	3	●
D0278	2.78	32	70	3	●
D0279	2.79	32	70	3	●
D0280	2.8	32	70	3	●
D0281	2.81	32	70	3	●
D0282	2.82	32	70	3	●
D0283	2.83	32	70	3	●
D0284	2.84	32	70	3	●
D0285	2.85	32	70	3	●
D0286	2.86	32	70	3	●
D0287	2.87	32	70	3	●
D0288	2.88	32	70	3	●
D0289	2.89	32	70	3	●
D0290	2.9	32	70	3	●
D0291	2.91	32	70	3	●
D0292	2.92	32	70	3	●
D0293	2.93	32	70	3	●
D0294	2.94	32	70	3	●
D0295	2.95	32	70	3	●
D0296	2.96	32	70	3	●
D0297	2.97	32	70	3	●
D0298	2.98	32	70	3	●
D0299	2.99	32	70	3	●
D0300	3.0	32	70	3	●
D0301	3.01	35	85	4	●
D0302	3.02	35	85	4	●
D0303	3.03	35	85	4	●
D0304	3.04	35	85	4	●
D0305	3.05	35	85	4	●
D0306	3.06	35	85	4	●
D0307	3.07	35	85	4	●
D0308	3.08	35	85	4	●
D0309	3.09	35	85	4	●

CUTTING CONDITIONS
D161

HSS

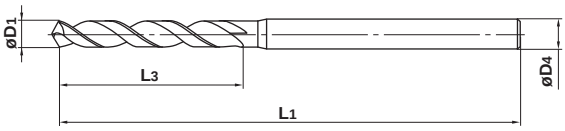
VA-PDM-SUS

Medium, High precision, For stainless steel

CO HSS | V | 118° D1<4 | 135° D1≥4 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	

All drills except those with intervals of 0.1mm and under dia. 4.0mm have a tolerance of 0ー-0.009mm.



● New design and the Violet coating combination enable high efficiency drilling and long tool life for drilling of stainless steels.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0310	3.1	35	85	4	●
D0311	3.11	35	85	4	●
D0312	3.12	35	85	4	●
D0313	3.13	35	85	4	●
D0314	3.14	35	85	4	●
D0315	3.15	35	85	4	●
D0316	3.16	35	85	4	●
D0317	3.17	35	85	4	●
D0318	3.18	35	85	4	●
D0319	3.19	35	85	4	●
D0320	3.2	35	85	4	●
D0321	3.21	35	85	4	●
D0322	3.22	35	85	4	●
D0323	3.23	35	85	4	●
D0324	3.24	35	85	4	●
D0325	3.25	35	85	4	●
D0326	3.26	35	85	4	●
D0327	3.27	35	85	4	●
D0328	3.28	35	85	4	●
D0329	3.29	35	85	4	●
D0330	3.3	35	85	4	●
D0331	3.31	38	85	4	●
D0332	3.32	38	85	4	●
D0333	3.33	38	85	4	●
D0334	3.34	38	85	4	●
D0335	3.35	38	85	4	●
D0336	3.36	38	85	4	●
D0337	3.37	38	85	4	●
D0338	3.38	38	85	4	●
D0339	3.39	38	85	4	●
D0340	3.4	38	85	4	●
D0341	3.41	38	85	4	●
D0342	3.42	38	85	4	●
D0343	3.43	38	85	4	●
D0344	3.44	38	85	4	●
D0345	3.45	38	85	4	●
D0346	3.46	38	85	4	●
D0347	3.47	38	85	4	●
D0348	3.48	38	85	4	●
D0349	3.49	38	85	4	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0350	3.5	38	85	4	●
D0351	3.51	38	85	4	●
D0352	3.52	38	85	4	●
D0353	3.53	38	85	4	●
D0354	3.54	38	85	4	●
D0355	3.55	38	85	4	●
D0356	3.56	38	85	4	●
D0357	3.57	38	85	4	●
D0358	3.58	38	85	4	●
D0359	3.59	38	85	4	●
D0360	3.6	38	85	4	●
D0361	3.61	38	85	4	●
D0362	3.62	38	85	4	●
D0363	3.63	38	85	4	●
D0364	3.64	38	85	4	●
D0365	3.65	38	85	4	●
D0366	3.66	38	85	4	●
D0367	3.67	38	85	4	●
D0368	3.68	38	85	4	●
D0369	3.69	38	85	4	●
D0370	3.7	38	85	4	●
D0371	3.71	42	85	4	●
D0372	3.72	42	85	4	●
D0373	3.73	42	85	4	●
D0374	3.74	42	85	4	●
D0375	3.75	42	85	4	●
D0376	3.76	42	85	4	●
D0377	3.77	42	85	4	●
D0378	3.78	42	85	4	●
D0379	3.79	42	85	4	●
D0380	3.8	42	85	4	●
D0381	3.81	42	85	4	●
D0382	3.82	42	85	4	●
D0383	3.83	42	85	4	●
D0384	3.84	42	85	4	●
D0385	3.85	42	85	4	●
D0386	3.86	42	85	4	●
D0387	3.87	42	85	4	●
D0388	3.88	42	85	4	●
D0389	3.89	42	85	4	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0390	3.9	42	85	4	●
D0391	3.91	42	85	4	●
D0392	3.92	42	85	4	●
D0393	3.93	42	85	4	●
D0394	3.94	42	85	4	●
D0395	3.95	42	85	4	●
D0396	3.96	42	85	4	●
D0397	3.97	42	85	4	●
D0398	3.98	42	85	4	●
D0399	3.99	42	85	4	●
D0400	4.0	42	85	4	●
D0405	4.05	42	100	6	●
D0410	4.1	42	100	6	●
D0415	4.15	42	100	6	●
D0420	4.2	42	100	6	●
D0425	4.25	46	100	6	●
D0430	4.3	46	100	6	●
D0435	4.35	46	100	6	●
D0440	4.4	46	100	6	●
D0445	4.45	46	100	6	●
D0450	4.5	46	100	6	●
D0455	4.55	46	100	6	●
D0460	4.6	46	100	6	●
D0465	4.65	46	100	6	●
D0470	4.7	46	100	6	●
D0475	4.75	46	100	6	●
D0480	4.8	51	100	6	●
D0485	4.85	51	100	6	●
D0490	4.9	51	100	6	●
D0495	4.95	51	100	6	●
D0500	5.0	51	100	6	●
D0505	5.05	51	100	6	●
D0510	5.1	51	100	6	●
D0515	5.15	51	100	6	●
D0520	5.2	51	100	6	●
D0525	5.25	51	100	6	●
D0530	5.3	51	100	6	●
D0535	5.35	56	106	6	●
D0540	5.4	56	106	6	●
D0545	5.45	56	106	6	●
D0550	5.5	56	106	6	●
D0555	5.55	56	106	6	●
D0560	5.6	56	106	6	●
D0565	5.65	56	106	6	●
D0570	5.7	56	106	6	●
D0575	5.75	56	106	6	●
D0580	5.8	56	106	6	●
D0585	5.85	56	106	6	●
D0590	5.9	56	106	6	●
D0595	5.95	56	106	6	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0600	6.0	56	106	6	●
D0605	6.05	62	112	8	●
D0610	6.1	62	112	8	●
D0615	6.15	62	112	8	●
D0620	6.2	62	112	8	●
D0625	6.25	62	112	8	●
D0630	6.3	62	112	8	●
D0635	6.35	62	112	8	●
D0640	6.4	62	112	8	●
D0645	6.45	62	112	8	●
D0650	6.5	62	112	8	●
D0655	6.55	62	112	8	●
D0660	6.6	62	112	8	●
D0665	6.65	62	112	8	●
D0670	6.7	62	112	8	●
D0675	6.75	67	117	8	●
D0680	6.8	67	117	8	●
D0685	6.85	67	117	8	●
D0690	6.9	67	117	8	●
D0695	6.95	67	117	8	●
D0700	7.0	67	117	8	●
D0705	7.05	67	117	8	●
D0710	7.1	67	117	8	●
D0715	7.15	67	117	8	●
D0720	7.2	67	117	8	●
D0725	7.25	67	117	8	●
D0730	7.3	67	117	8	●
D0735	7.35	67	117	8	●
D0740	7.4	67	117	8	●
D0745	7.45	67	117	8	●
D0750	7.5	67	117	8	●
D0755	7.55	73	123	8	●
D0760	7.6	73	123	8	●
D0765	7.65	73	123	8	●
D0770	7.7	73	123	8	●
D0775	7.75	73	123	8	●
D0780	7.8	73	123	8	●
D0785	7.85	73	123	8	●
D0790	7.9	73	123	8	●
D0795	7.95	73	123	8	●
D0800	8.0	73	123	8	●
D0805	8.05	73	128	10	●
D0810	8.1	73	128	10	●
D0815	8.15	73	128	10	●
D0820	8.2	73	128	10	●
D0825	8.25	73	128	10	●
D0830	8.3	73	128	10	●
D0835	8.35	73	128	10	●
D0840	8.4	73	128	10	●
D0845	8.45	73	128	10	●

CUTTING CONDITIONS D161

HSS

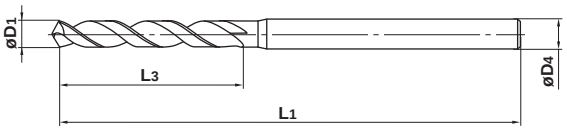
VA-PDM-SUS

Medium, High precision, For stainless steel

CO HSS | V | 118° D1<4 | 135° D1≥4 | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	

All drills except those with intervals of 0.1mm and under dia. 4.0mm have a tolerance of 0−-0.009mm.



● New design and the Violet coating combination enable high efficiency drilling and long tool life for drilling of stainless steels.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD0850	8.5	73	128	10	●
D0855	8.55	79	134	10	●
D0860	8.6	79	134	10	●
D0865	8.65	79	134	10	●
D0870	8.7	79	134	10	●
D0875	8.75	79	134	10	●
D0880	8.8	79	134	10	●
D0885	8.85	79	134	10	●
D0890	8.9	79	134	10	●
D0895	8.95	79	134	10	●
D0900	9.0	79	134	10	●
D0910	9.1	79	134	10	●
D0920	9.2	79	134	10	●
D0930	9.3	79	134	10	●
D0940	9.4	79	134	10	●
D0950	9.5	79	134	10	●
D0960	9.6	85	140	10	●
D0970	9.7	85	140	10	●
D0980	9.8	85	140	10	●
D0990	9.9	85	140	10	●
D1000	10.0	85	140	10	●
D1010	10.1	85	145	12	●
D1020	10.2	85	145	12	●
D1030	10.3	85	145	12	●
D1040	10.4	85	145	12	●
D1050	10.5	85	145	12	●
D1060	10.6	85	145	12	●
D1070	10.7	92	152	12	●
D1080	10.8	92	152	12	●
D1090	10.9	92	152	12	●
D1100	11.0	92	152	12	●
D1110	11.1	92	152	12	●
D1120	11.2	92	152	12	●
D1130	11.3	92	152	12	●
D1140	11.4	92	152	12	●
D1150	11.5	92	152	12	●
D1160	11.6	92	152	12	●
D1170	11.7	92	152	12	●
D1180	11.8	92	152	12	●
D1190	11.9	99	159	12	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDMSUSD1200	12.0	99	159	12	●
D1210	12.1	99	159	12	●
D1220	12.2	99	159	12	●
D1230	12.3	99	159	12	●
D1240	12.4	99	159	12	●
D1250	12.5	99	159	12	●
D1260	12.6	99	159	12	●
D1270	12.7	99	159	12	●
D1280	12.8	99	159	12	●
D1290	12.9	99	159	12	●
D1300	13.0	99	159	12	●

● : Inventory maintained in Japan.

VA-PDS-SUS VA-PDM-SUS

VIOLET DRILLS, High precision, For stainless steel, Short/medium

RECOMMENDED CUTTING CONDITIONS

Work material	Stainless steel				Carbon steel AISI 1049 Alloy steel SCM Cast iron FC Copper, Copper alloy		Structural steel Aluminium alloy	
	Austenitic AISI 304, AISI 316		Martensitic Ferritic AISI 430					
Drill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	7600	0.01	8800	0.01	11250	0.01	15000	0.02
1.0	4800	0.02	6300	0.05	10000	0.05	12000	0.05
2.0	2400	0.04	3200	0.06	5500	0.09	6400	0.09
3.0	1600	0.07	2100	0.10	3700	0.13	4300	0.13
4.0	1200	0.09	1600	0.10	2800	0.15	3200	0.15
5.0	950	0.12	1300	0.13	2200	0.18	2600	0.18
6.0	800	0.14	1100	0.15	1800	0.20	2100	0.19
8.0	600	0.18	800	0.18	1400	0.22	1600	0.24
10.0	480	0.22	640	0.21	1100	0.25	1300	0.28
12.0	400	0.24	530	0.25	930	0.30	1100	0.34
13.0	370	0.26	490	0.28	860	0.32	1000	0.36
14.0	340	0.30	450	0.27	730	0.31	930	0.36
15.0	320	0.31	425	0.28	680	0.32	870	0.38
16.0	300	0.32	400	0.30	640	0.34	820	0.42
18.0	270	0.34	350	0.32	570	0.36	725	0.43
20.0	240	0.36	320	0.35	510	0.38	660	0.45

1) Please reduce the revolultion and feed rate depending on the drilling situation when the installation of workpiece or machine lacks rigidity.
2) Please use a collet type drill chuck.
3) Use sufficient cutting fluid.
4) For precipitation-hardened stainless steels (JIS SUS630 and SUS631), NWE and MWS are recommended.
5) When drilling holes greater than 4 x drill diameter hole depths, please use a peck feed.

The above-mentioned cutting conditions are standard when using water-soluble cutting fluid.
Please reduce the revolution when using non-water-soluble cutting fluid.

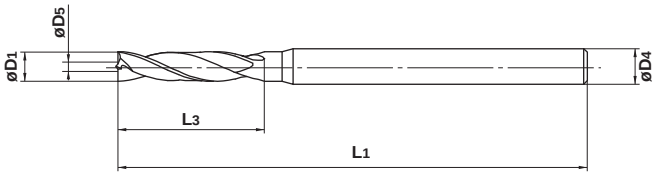
HSS

VA-PDS-CB NEW

Short flute length, High precision, For counter boring

HG HSS | V | 180° 118° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Unique geometry offers high efficiency counter boring.
Excellent chip breaking and flat counterbored surface.

Unit : mm

Order Number	Drill Dia. D1	118° Dia. D5	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSCBD0300	3.0	0.8	15	60	3	●
D0350	3.5	0.8	19	70	4	●
D0400	4.0	1.0	21	70	4	●
D0450	4.5	1.0	23	80	6	●
D0500	5.0	1.4	25	80	6	●
D0550	5.5	1.4	27	80	6	●
D0600	6.0	1.4	27	80	6	●
D0650	6.5	1.4	30	80	8	●
D0700	7.0	1.8	32	80	8	●
D0750	7.5	1.8	32	80	8	●
D0800	8.0	2.0	35	85	8	●
D0850	8.5	2.0	35	90	10	●

Order Number	Drill Dia. D1	118° Dia. D5	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
VAPDSCBD0900	9.0	2.8	38	93	10	●
D0950	9.5	2.8	38	93	10	●
D1000	10.0	3.2	41	96	10	●
D1050	10.5	3.2	41	101	12	●
D1100	11.0	3.7	45	105	12	●
D1150	11.5	3.7	45	105	12	●
D1200	12.0	3.7	49	109	12	●
D1250	12.5	3.7	49	109	12	●
D1300	13.0	4.2	49	109	12	●
D1350	13.5	4.2	51	121	16	●
D1400	14.0	4.2	51	121	16	●

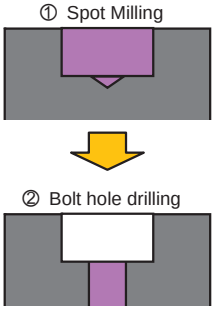
RECOMMENDED CUTTING CONDITIONS

Work material	Structural steel		Carbon steel AISI 1049 Alloy steel SCM Cast iron FCD		Alloy tool steel AISI D2 (Low-hardness materials) Ferritic stainless steel AISI 430, AISI 405 Martensitic stainless steel AISI 420, AISI 440		Alloy tool steel AISI H13 (−40HRC) Precipitation hardeningstainless steel ASTM 630, ASTM 631	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
3.0	3700	0.10	3200	0.10	2100	0.10	1900	0.05
4.0	2800	0.12	2400	0.12	1600	0.12	1400	0.06
5.0	2200	0.14	1900	0.14	1300	0.14	1150	0.07
6.0	1850	0.15	1600	0.15	1050	0.15	950	0.08
8.0	1400	0.20	1200	0.20	800	0.20	720	0.10
10.0	1100	0.23	960	0.23	640	0.21	570	0.11
12.0	950	0.26	800	0.26	530	0.24	470	0.12
14.0	800	0.27	680	0.27	450	0.25	410	0.13

1) The above cutting conditions are for drilling 3xD hole depths without a pilot hole. When drilling holes smaller than 1xD hole depths, it is possible to increase the revolution speed by 20%.
2) Drilling without a pilot hole is recommended. If there is a pilot hole, chips are not broken. Use a pick feed when chip breaking is necessary.
3) For counter boring of a sloped face, a carbide end mill is recommended.
4) When machining austenitic stainless steels (JIS SUS304, SUS316), set the revolution at 40%−70% and the feed rate 40%−60%.
5) Please use a collet type drill chuck or a milling chuck.
6) Please reduce the revolution and feed rate depending on the drilling situation when the installation of workpiece or machine lacks rigidity.
7) Use sufficient cutting fluid.

The above-mentioned cutting condition is standard when using water-soluble cutting fluid.
Please reduce the revolution when using non-water-soluble cutting fluid.

■ RECOMMENDED CUTTING METHOD



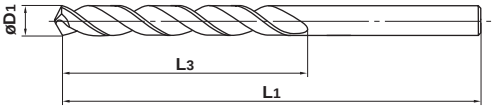
● : **Inventory maintained in Japan.**

VE-USM

Medium, For stainless steel

CO HSS | V | 125° D1<2 | 118° D1≥2 | XR Thinning D1≥2

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎		○	



● Excellent tool life for stainless steel or deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
VEUSMD0100	1.0	12	40	●
D0110	1.1	16	42	●
D0120	1.2	16	42	●
D0130	1.3	16	45	●
D0140	1.4	18	48	●
D0150	1.5	18	48	●
D0160	1.6	19	50	●
D0170	1.7	19	50	●
D0180	1.8	21	52	●
D0190	1.9	21	52	●
D0200	2.0	23	55	●
D0210	2.1	23	55	●
D0220	2.2	26	58	●
D0230	2.3	26	58	●
D0240	2.4	29	61	●
D0250	2.5	29	61	●
D0260	2.6	29	64	●
D0270	2.7	32	64	●
D0280	2.8	32	67	●
D0290	2.9	32	71	●
D0300	3.0	32	71	●
D0310	3.1	35	71	●
D0320	3.2	35	71	●
D0330	3.3	35	73	●
D0340	3.4	38	73	●
D0350	3.5	38	73	●
D0360	3.6	38	76	●
D0370	3.7	38	76	●
D0380	3.8	42	76	●
D0390	3.9	42	79	●
D0400	4.0	42	83	●
D0410	4.1	42	83	●
D0420	4.2	42	83	●
D0430	4.3	46	83	●
D0440	4.4	46	86	●
D0450	4.5	46	86	●
D0460	4.6	46	86	●
D0470	4.7	46	89	●
D0480	4.8	50	89	●
D0490	4.9	50	92	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
VEUSMD0500	5.0	50	92	●
D0510	5.1	50	92	●
D0520	5.2	50	95	●
D0530	5.3	50	95	●
D0540	5.4	55	95	●
D0550	5.5	55	95	●
D0560	5.6	55	98	●
D0570	5.7	55	98	●
D0580	5.8	55	98	●
D0590	5.9	55	98	●
D0600	6.0	55	102	●
D0610	6.1	61	102	●
D0620	6.2	61	102	●
D0630	6.3	61	102	●
D0640	6.4	61	105	●
D0650	6.5	61	105	●
D0660	6.6	61	105	●
D0670	6.7	61	105	●
D0680	6.8	67	105	●
D0690	6.9	67	105	●
D0700	7.0	67	105	●
D0710	7.1	67	108	●
D0720	7.2	67	108	●
D0730	7.3	67	108	●
D0740	7.4	67	111	●
D0750	7.5	67	111	●
D0760	7.6	72	111	●
D0770	7.7	72	114	●
D0780	7.8	72	114	●
D0790	7.9	72	114	●
D0800	8.0	72	114	●
D0810	8.1	72	117	●
D0820	8.2	72	117	●
D0830	8.3	72	117	●
D0840	8.4	72	121	●
D0850	8.5	72	121	●
D0860	8.6	78	121	●
D0870	8.7	78	121	●
D0880	8.8	78	124	●
D0890	8.9	78	124	●

CUTTING CONDITIONS D165

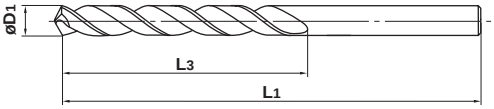
HSS

VE-USM

Medium, For stainless steel

CO HSS | V | 125° D1<2 | 118° D1≥2 | XR Thinning D1≥2

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎		○	



● Excellent tool life for stainless steel or deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
VEUSMD0900	9.0	78	124	●
D0910	9.1	78	124	●
D0920	9.2	78	127	●
D0930	9.3	78	127	●
D0940	9.4	78	127	●
D0950	9.5	78	127	●
D0960	9.6	84	130	●
D0970	9.7	84	130	●
D0980	9.8	84	130	●
D0990	9.9	84	130	●
D1000	10.0	84	130	●
D1010	10.1	84	133	●
D1020	10.2	84	133	●
D1030	10.3	84	133	●
D1040	10.4	84	133	●
D1050	10.5	84	137	●
D1060	10.6	84	137	●
D1070	10.7	90	137	●
D1080	10.8	90	140	●
D1090	10.9	90	140	●
D1100	11.0	90	140	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
VEUSMD1110	11.1	90	140	●
D1120	11.2	90	143	●
D1130	11.3	90	143	●
D1140	11.4	90	143	●
D1150	11.5	90	143	●
D1160	11.6	90	146	●
D1170	11.7	90	146	●
D1180	11.8	90	146	●
D1190	11.9	97	146	●
D1200	12.0	97	149	●
D1210	12.1	97	149	●
D1220	12.2	97	149	●
D1230	12.3	97	149	●
D1240	12.4	97	152	●
D1250	12.5	97	152	●
D1260	12.6	97	152	●
D1270	12.7	97	152	●
D1280	12.8	97	152	●
D1290	12.9	97	152	●
D1300	13.0	97	152	●

● : **Inventory maintained in Japan.**

RECOMMENDED CUTTING CONDITIONS

Work material	Stainless steel				Carbon steel AISI 1049 Alloy steel SCM Copper, Copper alloy		Structural steel Aluminium alloy	
	Austenitic AISI 304, AISI 316		Martensitic Ferritic AISI 430					
Drill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
1.0	3800	0.02	6300	0.02	7600	0.03	10000	0.03
2.0	2400	0.04	3200	0.05	4800	0.05	6400	0.06
3.0	1600	0.06	2100	0.07	3200	0.08	4300	0.09
4.0	1200	0.08	1600	0.09	2400	0.10	3200	0.12
5.0	960	0.10	1300	0.12	1900	0.13	2600	0.15
6.0	800	0.12	1100	0.14	1600	0.16	2100	0.18
8.0	600	0.14	800	0.17	1200	0.19	1600	0.22
10.0	480	0.17	640	0.20	960	0.22	1300	0.26
12.0	400	0.19	530	0.22	800	0.25	1100	0.29
13.0	370	0.22	490	0.25	740	0.28	1000	0.32

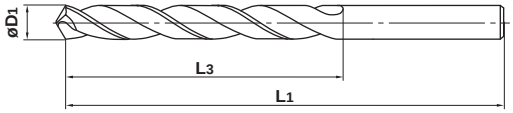
1) Please reduce the revolultion and feed rate depending on the drilling situation when the installation of workpiece or machine lacks rigidity.
2) When drilling deep holes, moderate the cutting conditions.
3) The above-mentioned cutting conditions is standard when using water-soluble cutting fluid.

VIOLET DRILLS

V-SD
Straight shank

HSS | V | 110° D1<0.7 | 118° D1≥0.7 | X Thinning D1<2 | XR Thinning D1≥2

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○		



Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
VSDD0050	0.5	6	27	●
D0060	0.6	7	30	●
D0070	0.7	9	32	●
D0080	0.8	10	34	●
D0090	0.9	11	36	●
D0100	1.0	12	40	●
D0110	1.1	14	42	●
D0120	1.2	16	42	●
D0130	1.3	16	45	●
D0140	1.4	18	48	●
D0150	1.5	18	48	●
D0160	1.6	20	50	●
D0170	1.7	20	50	●
D0180	1.8	22	52	●
D0190	1.9	22	52	●
D0200	2.0	23	55	●
D0210	2.1	23	55	●
D0220	2.2	26	58	●
D0230	2.3	26	58	●
D0240	2.4	29	61	●
D0250	2.5	29	61	●
D0260	2.6	29	64	●
D0270	2.7	32	64	●
D0280	2.8	32	67	●
D0290	2.9	32	71	●
D0300	3.0	32	71	●
D0310	3.1	35	71	●
D0320	3.2	35	71	●
D0330	3.3	35	73	●
D0340	3.4	38	73	●
D0350	3.5	38	73	●
D0360	3.6	38	76	●
D0370	3.7	38	76	●
D0380	3.8	42	76	●
D0390	3.9	42	79	●
D0400	4.0	42	83	●
D0410	4.1	42	83	●
D0420	4.2	42	83	●
D0430	4.3	46	83	●
D0440	4.4	46	86	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
VSDD0450	4.5	46	86	●
D0460	4.6	46	86	●
D0470	4.7	46	89	●
D0480	4.8	51	89	●
D0490	4.9	51	92	●
D0500	5.0	51	92	●
D0510	5.1	51	92	●
D0520	5.2	51	95	●
D0530	5.3	51	95	●
D0540	5.4	56	95	●
D0550	5.5	56	95	●
D0560	5.6	56	98	●
D0570	5.7	56	98	●
D0580	5.8	56	98	●
D0590	5.9	56	98	●
D0600	6.0	56	102	●
D0610	6.1	62	102	●
D0620	6.2	62	102	●
D0630	6.3	62	102	●
D0640	6.4	62	105	●
D0650	6.5	62	105	●
D0660	6.6	62	105	●
D0670	6.7	62	105	●
D0680	6.8	67	105	●
D0690	6.9	67	105	●
D0700	7.0	67	105	●
D0710	7.1	67	108	●
D0720	7.2	67	108	●
D0730	7.3	67	108	●
D0740	7.4	67	111	●
D0750	7.5	67	111	●
D0760	7.6	73	111	●
D0770	7.7	73	114	●
D0780	7.8	73	114	●
D0790	7.9	73	114	●
D0800	8.0	73	114	●
D0810	8.1	73	117	●
D0820	8.2	73	117	●
D0830	8.3	73	117	●
D0840	8.4	73	121	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Stock
VSDD0850	8.5	73	121	●
D0860	8.6	79	121	●
D0870	8.7	79	121	●
D0880	8.8	79	124	●
D0890	8.9	79	124	●
D0900	9.0	79	124	●
D0910	9.1	79	124	●
D0920	9.2	79	127	●
D0930	9.3	79	127	●
D0940	9.4	79	127	●
D0950	9.5	79	127	●
D0960	9.6	85	130	●
D0970	9.7	85	130	●
D0980	9.8	85	130	●
D0990	9.9	85	130	●
D1000	10.0	85	130	●
D1010	10.1	85	133	●
D1020	10.2	85	133	●
D1030	10.3	85	133	●
D1040	10.4	85	133	●
D1050	10.5	85	137	●
D1060	10.6	85	137	●
D1070	10.7	92	137	●

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Stock
VSDD1080	10.8	92	140	●
D1090	10.9	92	140	●
D1100	11.0	92	140	●
D1110	11.1	92	140	●
D1120	11.2	92	143	●
D1130	11.3	92	143	●
D1140	11.4	92	143	●
D1150	11.5	92	143	●
D1160	11.6	92	146	●
D1170	11.7	92	146	●
D1180	11.8	92	146	●
D1190	11.9	99	146	●
D1200	12.0	99	149	●
D1210	12.1	99	149	●
D1220	12.2	99	149	●
D1230	12.3	99	149	●
D1240	12.4	99	152	●
D1250	12.5	99	152	●
D1260	12.6	99	152	●
D1270	12.7	99	152	●
D1280	12.8	99	152	●
D1290	12.9	99	152	●
D1300	13.0	99	152	●

RECOMMENDED CUTTING CONDITIONS

Work material	Structural steel		Carbon steel AISI 1049		Stainless steel AISI 420		Stainless steel AISI 304 Tool steel AISI D2 (Low-hardness materials) Heat-treated steel AISI H13 (−40HRC)	
Cutting speed	40m/min		30m/min		20m/min		10−14m/min	
Drill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	15000	0.01	11250	0.01	7500	0.01	5620	0.01
1.0	10000	0.02	7500	0.02	5000	0.02	3750	0.02
1.5	8200	0.03	6150	0.03	4100	0.03	2800	0.03
2.0	6370	0.05	4780	0.05	3180	0.05	2200	0.04
3.0	4250	0.10	3180	0.10	2120	0.07	1400	0.06
4.0	3180	0.13	2390	0.13	1590	0.09	1100	0.08
5.0	2550	0.15	1910	0.15	1270	0.11	860	0.10
6.0	2120	0.18	1590	0.18	1060	0.13	720	0.11
7.0	1820	0.20	1360	0.20	910	0.14	610	0.12
8.0	1590	0.22	1190	0.21	800	0.15	540	0.13
9.0	1420	0.24	1060	0.22	710	0.17	480	0.14
10.0	1270	0.26	960	0.23	640	0.18	430	0.15
11.0	1160	0.28	870	0.24	580	0.19	390	0.16
12.0	1060	0.30	800	0.25	530	0.20	360	0.17
13.0	980	0.30	730	0.26	490	0.20	330	0.17

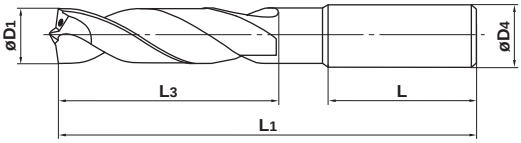
1) Please reduce the revolution depending on drilling situation when the application lacks rigidity.
2) Please use step drilling and reduce the cutting conditions in the case when the drilling depth exceeds 3D (D: drill diameter).
3) The above-mentioned cutting condition is standard when using water-soluble cutting fluid.
   Please reduce the revolution when using non-water-soluble cutting fluid.

HSS

V-TSD-OH

Oil hole, For steel frame

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎					



- With Violet coating and through coolant hole exclusively designed for steel frame drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Tool Length L	Stock
VTSDOHD1800A140S20	18.0	70	140	20	50	●
D1800A210S24	18.0	130	210	24	56	●
D2200A161S25	22.0	85	161	25	56	●
D2200A210S24	22.0	130	210	24	56	●
D2400A170S32	24.0	90	170	32	60	●
D2400A210S24	24.0	130	210	24	56	●
D2450A170S32	24.5	90	170	32	60	●
D2500A170S32	25.0	90	170	32	60	●
D2500A210S24	25.0	130	210	24	56	●
D2600A170S32	26.0	90	170	32	60	●
D2600A210S24	26.0	130	210	24	56	●

RECOMMENDED CUTTING CONDITIONS

Work material	Structural steel		Steels for welded structure JIS SM490, JIS SN490		High tensile strength steels JIS SM 570, High tensile 60	
Drill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
18.0	710	0.32	620	0.32	530	0.29
20.0	640	0.36	560	0.36	480	0.32
22.0	580	0.40	510	0.40	430	0.36
24.0	530	0.43	460	0.43	400	0.39
26.0	490	0.47	430	0.47	370	0.42

1) The depth of drilling with cutting fluid is recommended to be 3D(D:drill diameter) under these cutting conditions.

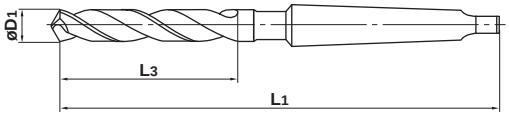
● : **Inventory maintained in Japan.**

V-TDS

Short, Taper shank

HSS V 118° XR Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎	○		



Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
VTDSD0600M1	6.0	44	126	1	●
D0650M1	6.5	44	126	1	●
D0660M1	6.6	44	126	1	●
D0680M1	6.8	44	126	1	●
D0700M1	7.0	44	126	1	●
D0720M1	7.2	44	126	1	●
D0750M1	7.5	44	126	1	●
D0770M1	7.7	48	130	1	●
D0780M1	7.8	48	130	1	●
D0800M1	8.0	48	130	1	●
D0820M1	8.2	48	130	1	●
D0850M1	8.5	48	130	1	●
D0880M1	8.8	52	133	1	●
D0900M1	9.0	52	133	1	●
D0950M1	9.5	52	133	1	●
D0970M1	9.7	56	137	1	●
D0980M1	9.8	56	137	1	●
D1000M1	10.0	56	137	1	●
D1030M1	10.3	56	137	1	●
D1050M1	10.5	56	137	1	●
D1080M1	10.8	61	142	1	●
D1100M1	11.0	61	142	1	●
D1150M1	11.5	61	142	1	●
D1200M1	12.0	66	146	1	●
D1250M2	12.5	66	163	2	●
D1300M2	13.0	66	163	2	●
D1350M2	13.5	70	168	2	●
D1400M2	14.0	70	168	2	●
D1450M2	14.5	73	171	2	●
D1500M2	15.0	73	171	2	●
D1550M2	15.5	77	175	2	●
D1600M2	16.0	77	175	2	●
D1650M2	16.5	80	178	2	●
D1700M2	17.0	80	178	2	●
D1750M2	17.5	84	182	2	●
D1800M2	18.0	84	182	2	●
D1850M2	18.5	86	184	2	●
D1900M2	19.0	86	184	2	●
D1950M2	19.5	90	188	2	●
D2000M2	20.0	90	188	2	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
VTDSD2050M2	20.5	93	191	2	●
D2100M2	21.0	93	191	2	●
D2150M2	21.5	96	194	2	●
D2200M2	22.0	96	194	2	●
D2250M2	22.5	100	198	2	●
D2300M2	23.0	100	198	2	●
D2350M3	23.5	102	224	3	●
D2400M3	24.0	102	224	3	●
D2450M3	24.5	102	224	3	●
D2500M3	25.0	102	224	3	●
D2550M3	25.5	105	226	3	●
D2600M3	26.0	105	226	3	●
D2650M3	26.5	105	226	3	●
D2700M3	27.0	108	230	3	●
D2750M3	27.5	108	230	3	●
D2800M3	28.0	108	230	3	●
D2850M3	28.5	111	232	3	●
D2900M3	29.0	111	232	3	●
D2950M3	29.5	111	232	3	●
D3000M3	30.0	111	232	3	●
D3050M3	30.5	114	235	3	●
D3100M3	31.0	114	235	3	●
D3150M3	31.5	114	235	3	●
D3200M3	32.0	114	235	3	●

CUTTING CONDITIONS D170

HSS

V-TDS

Short, Taper shank

RECOMMENDED CUTTING CONDITIONS

Work material	Structural steel		Carbon steel AISI 1049		Stainless steel AISI 420 Copper alloy, Brass		Stainless steel AISI 304 Tool steel AISI D2 (Low-hardness materials)		Heat-treated steel AISI H13 (35—40HRC)	
Cutting speed	33—38m/min		28—33m/min		20m/min		15m/min		18m/min	
Drill Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
6.0	2000	0.18	1750	0.18	1060	0.15	800	0.12	950	0.12
8.0	1400	0.22	1270	0.22	800	0.20	600	0.15	720	0.15
10.0	1100	0.25	960	0.25	640	0.22	480	0.18	570	0.18
14.0	790	0.30	680	0.28	450	0.25	340	0.23	410	0.23
18.0	610	0.35	530	0.34	350	0.30	270	0.27	320	0.27
20.0	540	0.40	480	0.38	320	0.33	240	0.30	280	0.30
22.0	480	0.42	430	0.40	290	0.35	220	0.30	260	0.30
24.0	430	0.42	380	0.40	260	0.35	200	0.30	240	0.30
28.0	370	0.45	330	0.42	220	0.38	170	0.33	200	0.33
32.0	320	0.45	280	0.42	200	0.38	150	0.33	180	0.33

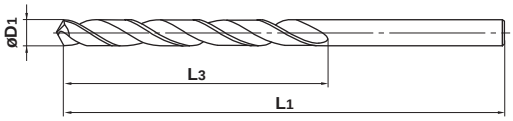
1) The above-mentioned cutting condition is standard when using water-soluble cutting fluid.
Please reduce the revolution when using non-water-soluble cutting fluid.

G-SD

TiN, Straight shank

HSS | G | 110° D1<0.7 | 118° D1≥0.7 | X Thinning D1<2 | XR Thinning D1≥2

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GSDD0050	0.5	6	27	●
D0060	0.6	7	30	●
D0070	0.7	9	32	●
D0080	0.8	10	34	●
D0090	0.9	11	36	●
D0100	1.0	12	40	●
D0110	1.1	14	42	●
D0120	1.2	16	42	●
D0130	1.3	16	45	●
D0140	1.4	18	48	●
D0150	1.5	18	48	●
D0160	1.6	20	50	●
D0170	1.7	20	50	●
D0180	1.8	22	52	●
D0190	1.9	22	52	●
D0200	2.0	23	55	●
D0210	2.1	23	55	●
D0220	2.2	26	58	●
D0230	2.3	26	58	●
D0240	2.4	29	61	●
D0250	2.5	29	61	●
D0260	2.6	29	64	●
D0270	2.7	32	64	●
D0280	2.8	32	67	●
D0290	2.9	32	71	●
D0300	3.0	32	71	●
D0310	3.1	35	71	●
D0320	3.2	35	71	●
D0330	3.3	35	73	●
D0340	3.4	38	73	●
D0350	3.5	38	73	●
D0360	3.6	38	76	●
D0370	3.7	38	76	●
D0380	3.8	42	76	●
D0390	3.9	42	79	●
D0400	4.0	42	83	●
D0410	4.1	42	83	●
D0420	4.2	42	83	●
D0430	4.3	46	83	●
D0440	4.4	46	86	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GSDD0450	4.5	46	86	●
D0460	4.6	46	86	●
D0470	4.7	46	89	●
D0480	4.8	51	89	●
D0490	4.9	51	92	●
D0500	5.0	51	92	●
D0510	5.1	51	92	●
D0520	5.2	51	95	●
D0530	5.3	51	95	●
D0540	5.4	56	95	●
D0550	5.5	56	95	●
D0560	5.6	56	98	●
D0570	5.7	56	98	●
D0580	5.8	56	98	●
D0590	5.9	56	98	●
D0600	6.0	56	102	●
D0610	6.1	62	102	●
D0620	6.2	62	102	●
D0630	6.3	62	102	●
D0640	6.4	62	105	●
D0650	6.5	62	105	●
D0660	6.6	62	105	●
D0670	6.7	62	105	●
D0680	6.8	67	105	●
D0690	6.9	67	105	●
D0700	7.0	67	105	●
D0710	7.1	67	108	●
D0720	7.2	67	108	●
D0730	7.3	67	108	●
D0740	7.4	67	111	●
D0750	7.5	67	111	●
D0760	7.6	73	111	●
D0770	7.7	73	114	●
D0780	7.8	73	114	●
D0790	7.9	73	114	●
D0800	8.0	73	114	●
D0810	8.1	73	117	●
D0820	8.2	73	117	●
D0830	8.3	73	117	●
D0840	8.4	73	121	●

● : Inventory maintained in Japan.

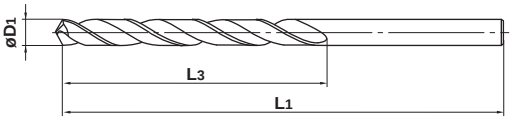
CUTTING CONDITIONS D211

STRAIGHT SHANK DRILLS

G-SD
TiN, Straight shank

HSS | G | 110° D1<0.7 | 118° D1≥0.7 | X Thinning D1<2 | XR Thinning D1≥2

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GSDD0850	8.5	73	121	●
D0860	8.6	79	121	●
D0870	8.7	79	121	●
D0880	8.8	79	124	●
D0890	8.9	79	124	●
D0900	9.0	79	124	●
D0910	9.1	79	124	●
D0920	9.2	79	127	●
D0930	9.3	79	127	●
D0940	9.4	79	127	●
D0950	9.5	79	127	●
D0960	9.6	85	130	●
D0970	9.7	85	130	●
D0980	9.8	85	130	●
D0990	9.9	85	130	●
D1000	10.0	85	130	●
D1010	10.1	85	133	●
D1020	10.2	85	133	●
D1030	10.3	85	133	●
D1040	10.4	85	133	●
D1050	10.5	85	137	●
D1060	10.6	85	137	●
D1070	10.7	92	137	●
D1080	10.8	92	140	●
D1090	10.9	92	140	●
D1100	11.0	92	140	●
D1110	11.1	92	140	●
D1120	11.2	92	143	●
D1130	11.3	92	143	●
D1140	11.4	92	143	●
D1150	11.5	92	143	●
D1160	11.6	92	146	●
D1170	11.7	92	146	●
D1180	11.8	92	146	●
D1190	11.9	99	146	●
D1200	12.0	99	149	●
D1210	12.1	99	149	●
D1220	12.2	99	149	●
D1230	12.3	99	149	●
D1240	12.4	99	152	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GSDD1250	12.5	99	152	●
D1260	12.6	99	152	●
D1270	12.7	99	152	●
D1280	12.8	99	152	●
D1290	12.9	99	152	●
D1300	13.0	99	152	●

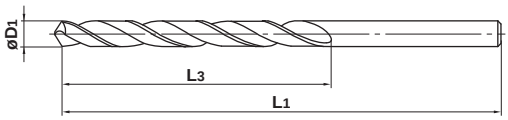
● : **Inventory maintained in Japan.**

CUTTING CONDITIONS D211

SD
Straight shank

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● For general drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0020	0.2	2.5	19	●
D0030	0.3	3	19	●
D0040	0.4	5	20	●
D0050	0.5	6	22	●
D0060	0.6	7	24	●
D0070	0.7	10	32	●
D0080	0.8	11	34	●
D0090	0.9	13	36	●
D0100	1.0	18	40	●
D0110	1.1	20	42	●
D0120	1.2	20	42	●
D0130	1.3	22	45	●
D0140	1.4	23	48	●
D0150	1.5	23	48	●
D0160	1.6	25	50	●
D0170	1.7	25	50	●
D0180	1.8	28	52	●
D0190	1.9	28	52	●
D0200	2.0	29	55	●
D0210	2.1	29	55	●
D0220	2.2	33	58	●
D0230	2.3	33	58	●
D0240	2.4	35	61	●
D0250	2.5	35	61	●
D0260	2.6	37	64	●
D0270	2.7	37	64	●
D0280	2.8	39	67	●
D0290	2.9	42	71	●
D0300	3.0	42	71	●
D0310	3.1	42	71	●
D0320	3.2	42	71	●
D0330	3.3	45	73	●
D0340	3.4	45	73	●
D0350	3.5	45	73	●
D0360	3.6	48	76	●
D0370	3.7	48	76	●
D0380	3.8	48	76	●
D0390	3.9	51	79	●
D0400	4.0	54	83	●
D0410	4.1	54	83	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0420	4.2	54	83	●
D0430	4.3	54	83	●
D0440	4.4	56	86	●
D0450	4.5	56	86	●
D0460	4.6	56	86	●
D0470	4.7	59	89	●
D0480	4.8	59	89	●
D0490	4.9	62	92	●
D0500	5.0	62	92	●
D0510	5.1	62	92	●
D0520	5.2	64	95	●
D0530	5.3	64	95	●
D0540	5.4	64	95	●
D0550	5.5	64	95	●
D0560	5.6	67	98	●
D0570	5.7	67	98	●
D0580	5.8	67	98	●
D0590	5.9	67	98	●
D0600	6.0	70	102	●
D0610	6.1	70	102	●
D0620	6.2	70	102	●
D0630	6.3	70	102	●
D0640	6.4	73	105	●
D0650	6.5	73	105	●
D0660	6.6	73	105	●
D0670	6.7	73	105	●
D0680	6.8	73	105	●
D0690	6.9	73	105	●
D0700	7.0	73	105	●
D0710	7.1	75	108	●
D0720	7.2	75	108	●
D0730	7.3	75	108	●
D0740	7.4	78	111	●
D0750	7.5	78	111	●
D0760	7.6	78	111	●
D0770	7.7	81	114	●
D0780	7.8	81	114	●
D0790	7.9	81	114	●
D0800	8.0	81	114	●
D0810	8.1	84	117	●

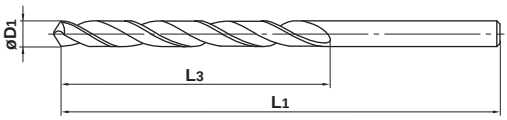
CUTTING CONDITIONS D212

STRAIGHT SHANK DRILLS

SD
Straight shank

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● For general drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0820	8.2	84	117	●
D0830	8.3	84	117	●
D0840	8.4	87	121	●
D0850	8.5	87	121	●
D0860	8.6	87	121	●
D0870	8.7	87	121	●
D0880	8.8	89	124	●
D0890	8.9	89	124	●
D0900	9.0	89	124	●
D0910	9.1	89	124	●
D0920	9.2	92	127	●
D0930	9.3	92	127	●
D0940	9.4	92	127	●
D0950	9.5	92	127	●
D0960	9.6	95	130	●
D0970	9.7	95	130	●
D0980	9.8	95	130	●
D0990	9.9	95	130	●
D1000	10.0	95	130	●
D1010	10.1	98	133	●
D1020	10.2	98	133	●
D1030	10.3	98	133	●
D1040	10.4	98	133	●
D1050	10.5	100	137	●
D1060	10.6	100	137	●
D1070	10.7	100	137	●
D1080	10.8	103	140	●
D1090	10.9	103	140	●
D1100	11.0	103	140	●
D1110	11.1	103	140	●
D1120	11.2	106	143	●
D1130	11.3	106	143	●
D1140	11.4	106	143	●
D1150	11.5	106	143	●
D1160	11.6	109	146	●
D1170	11.7	109	146	●
D1180	11.8	109	146	●
D1190	11.9	109	146	●
D1200	12.0	111	149	●
D1210	12.1	111	149	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD1220	12.2	111	149	●
D1230	12.3	111	149	●
D1240	12.4	114	152	●
D1250	12.5	114	152	●
D1260	12.6	114	152	●
D1270	12.7	114	152	●
D1280	12.8	114	152	●
D1290	12.9	114	152	●
D1300	13.0	114	152	●
D1350	13.5	122	168	●
D1400	14.0	122	168	●
D1450	14.5	122	168	●
D1500	15.0	132	181	●
D1550	15.5	132	181	●
D1600	16.0	132	181	●
D1650	16.5	132	181	●
D1700	17.0	143	194	●
D1750	17.5	143	194	●

● : **Inventory maintained in Japan.**

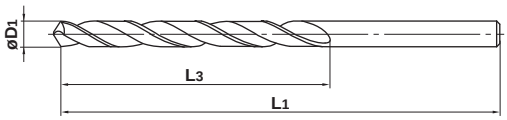
CUTTING CONDITIONS D212

SD

Straight shank, 1/100mm

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● The diameter tolerance is $_{-0.007}^{0}$ mm.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0025	0.25	3	19	●
D0035	0.35	4	19	●
D0045	0.45	5	20	●
D0055	0.55	7	24	●
D0065	0.65	8	26	●
D0071	0.71	11	34	●
D0072	0.72	11	34	●
D0073	0.73	11	34	●
D0074	0.74	11	34	●
D0075	0.75	11	34	●
D0076	0.76	11	34	●
D0077	0.77	11	34	●
D0078	0.78	11	34	●
D0079	0.79	11	34	●
D0081	0.81	13	36	●
D0082	0.82	13	36	●
D0083	0.83	13	36	●
D0084	0.84	13	36	●
D0085	0.85	13	36	●
D0086	0.86	13	36	●
D0087	0.87	13	36	●
D0088	0.88	13	36	●
D0089	0.89	13	36	●
D0091	0.91	18	40	●
D0092	0.92	18	40	●
D0093	0.93	18	40	●
D0094	0.94	18	40	●
D0095	0.95	18	40	●
D0096	0.96	18	40	●
D0097	0.97	18	40	●
D0098	0.98	18	40	●
D0099	0.99	18	40	●
D0101	1.01	20	42	●
D0102	1.02	20	42	●
D0103	1.03	20	42	●
D0104	1.04	20	42	●
D0105	1.05	20	42	●
D0106	1.06	20	42	●
D0107	1.07	20	42	●
D0108	1.08	20	42	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0109	1.09	20	42	●
D0111	1.11	20	42	●
D0112	1.12	20	42	●
D0113	1.13	20	42	●
D0114	1.14	20	42	●
D0115	1.15	20	42	●
D0116	1.16	20	42	●
D0117	1.17	20	42	●
D0118	1.18	20	42	●
D0119	1.19	20	42	●
D0121	1.21	22	45	●
D0122	1.22	22	45	●
D0123	1.23	22	45	●
D0124	1.24	22	45	●
D0125	1.25	22	45	●
D0126	1.26	22	45	●
D0127	1.27	22	45	●
D0128	1.28	22	45	●
D0129	1.29	22	45	●
D0131	1.31	23	48	●
D0132	1.32	23	48	●
D0133	1.33	23	48	●
D0134	1.34	23	48	●
D0135	1.35	23	48	●
D0136	1.36	23	48	●
D0137	1.37	23	48	●
D0138	1.38	23	48	●
D0139	1.39	23	48	●
D0141	1.41	23	48	●
D0142	1.42	23	48	●
D0143	1.43	23	48	●
D0144	1.44	23	48	●
D0145	1.45	23	48	●
D0146	1.46	23	48	●
D0147	1.47	23	48	●
D0148	1.48	23	48	●
D0149	1.49	23	48	●
D0151	1.51	25	50	●
D0152	1.52	25	50	●
D0153	1.53	25	50	●

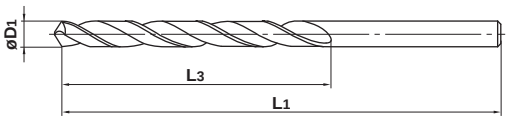
CUTTING CONDITIONS D212

STRAIGHT SHANK DRILLS

SD
Straight shank, 1/100mm

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● The diameter tolerance is $_{-0.007}^{0}$ mm.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0154	1.54	25	50	●
D0155	1.55	25	50	●
D0156	1.56	25	50	●
D0157	1.57	25	50	●
D0158	1.58	25	50	●
D0159	1.59	25	50	●
D0161	1.61	25	50	●
D0162	1.62	25	50	●
D0163	1.63	25	50	●
D0164	1.64	25	50	●
D0165	1.65	25	50	●
D0166	1.66	25	50	●
D0167	1.67	25	50	●
D0168	1.68	25	50	●
D0169	1.69	25	50	●
D0171	1.71	28	52	●
D0172	1.72	28	52	●
D0173	1.73	28	52	●
D0174	1.74	28	52	●
D0175	1.75	28	52	●
D0176	1.76	28	52	●
D0177	1.77	28	52	●
D0178	1.78	28	52	●
D0179	1.79	28	52	●
D0181	1.81	28	52	●
D0182	1.82	28	52	●
D0183	1.83	28	52	●
D0184	1.84	28	52	●
D0185	1.85	28	52	●
D0186	1.86	28	52	●
D0187	1.87	28	52	●
D0188	1.88	28	52	●
D0189	1.89	28	52	●
D0191	1.91	29	55	●
D0192	1.92	29	55	●
D0193	1.93	29	55	●
D0194	1.94	29	55	●
D0195	1.95	29	55	●
D0196	1.96	29	55	●
D0197	1.97	29	55	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0198	1.98	29	55	●
D0199	1.99	29	55	●
D0201	2.01	29	55	●
D0202	2.02	29	55	●
D0203	2.03	29	55	●
D0204	2.04	29	55	●
D0205	2.05	29	55	●
D0206	2.06	29	55	●
D0207	2.07	29	55	●
D0208	2.08	29	55	●
D0209	2.09	29	55	●
D0211	2.11	29	55	●
D0212	2.12	29	55	●
D0213	2.13	29	55	●
D0214	2.14	29	55	●
D0215	2.15	29	55	●
D0216	2.16	29	55	●
D0217	2.17	29	55	●
D0218	2.18	29	55	●
D0219	2.19	29	55	●
D0221	2.21	33	58	●
D0222	2.22	33	58	●
D0223	2.23	33	58	●
D0224	2.24	33	58	●
D0225	2.25	33	58	●
D0226	2.26	33	58	●
D0227	2.27	33	58	●
D0228	2.28	33	58	●
D0229	2.29	33	58	●
D0231	2.31	33	58	●
D0232	2.32	33	58	●
D0233	2.33	33	58	●
D0234	2.34	33	58	●
D0235	2.35	33	58	●
D0236	2.36	33	58	●
D0237	2.37	33	58	●
D0238	2.38	33	58	●
D0239	2.39	33	58	●
D0241	2.41	35	61	●
D0242	2.42	35	61	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0243	2.43	35	61	●
D0244	2.44	35	61	●
D0245	2.45	35	61	●
D0246	2.46	35	61	●
D0247	2.47	35	61	●
D0248	2.48	35	61	●
D0249	2.49	35	61	●
D0251	2.51	35	61	●
D0252	2.52	35	61	●
D0253	2.53	35	61	●
D0254	2.54	37	64	●
D0255	2.55	37	64	●
D0256	2.56	37	64	●
D0257	2.57	37	64	●
D0258	2.58	37	64	●
D0259	2.59	37	64	●
D0261	2.61	37	64	●
D0262	2.62	37	64	●
D0263	2.63	37	64	●
D0264	2.64	37	64	●
D0265	2.65	37	64	●
D0266	2.66	37	64	●
D0267	2.67	37	64	●
D0268	2.68	37	64	●
D0269	2.69	37	64	●
D0271	2.71	37	64	●
D0272	2.72	39	67	●
D0273	2.73	39	67	●
D0274	2.74	39	67	●
D0275	2.75	39	67	●
D0276	2.76	39	67	●
D0277	2.77	39	67	●
D0278	2.78	39	67	●
D0279	2.79	39	67	●
D0281	2.81	39	67	●
D0282	2.82	39	67	●
D0283	2.83	39	67	●
D0284	2.84	39	67	●
D0285	2.85	39	67	●
D0286	2.86	39	67	●
D0287	2.87	39	67	●
D0288	2.88	39	67	●
D0289	2.89	42	71	●
D0291	2.91	42	71	●
D0292	2.92	42	71	●
D0293	2.93	42	71	●
D0294	2.94	42	71	●
D0295	2.95	42	71	●
D0296	2.96	42	71	●
D0297	2.97	42	71	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
SDD0298	2.98	42	71	●
D0299	2.99	42	71	●
D0305	3.05	42	71	●
D0315	3.15	42	71	●
D0325	3.25	42	71	●
D0335	3.35	45	73	●
D0345	3.45	45	73	●
D0355	3.55	45	73	●
D0365	3.65	48	76	●
D0375	3.75	48	76	●
D0385	3.85	51	79	●
D0395	3.95	51	79	●
D0405	4.05	54	83	●
D0415	4.15	54	83	●
D0425	4.25	54	83	●
D0435	4.35	54	83	●
D0445	4.45	56	86	●
D0455	4.55	56	86	●
D0465	4.65	59	89	●
D0475	4.75	59	89	●
D0485	4.85	59	89	●
D0495	4.95	62	92	●
D0505	5.05	62	92	●
D0515	5.15	62	92	●
D0525	5.25	64	95	●
D0535	5.35	64	95	●
D0545	5.45	64	95	●
D0555	5.55	64	95	●
D0565	5.65	67	98	●
D0575	5.75	67	98	●
D0585	5.85	67	98	●
D0595	5.95	67	98	●

CUTTING CONDITIONS D212

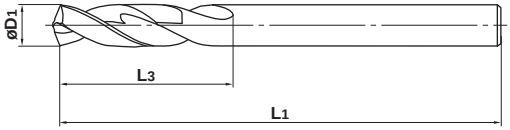
HSS

E-SS

Cobalt HSS, Stub flute length

CO HSS | 118° D1<2 | 135° D1≥2 | X Thinning D1<4 | SSf Special Subflute D1≥4

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎			○	○	



● Rigid geometry and Cobalt HSS for efficient drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
ESSD0050	0.5	3	27	●
D0060	0.6	5	27	●
D0070	0.7	5	27	●
D0080	0.8	5	27	●
D0090	0.9	6	30	●
D0100	1.0	6	30	●
D0110	1.1	8	35	●
D0120	1.2	8	35	●
D0130	1.3	9	35	●
D0140	1.4	9	36	●
D0150	1.5	9	36	●
D0160	1.6	11	42	●
D0170	1.7	11	42	●
D0180	1.8	11	42	●
D0190	1.9	12	42	●
D0200	2.0	12	46	●
D0210	2.1	12	46	●
D0220	2.2	12	46	●
D0230	2.3	13	49	●
D0240	2.4	13	49	●
D0250	2.5	13	49	●
D0260	2.6	15	53	●
D0270	2.7	15	53	●
D0280	2.8	15	53	●
D0290	2.9	15	53	●
D0300	3.0	15	53	●
D0310	3.1	17	58	●
D0320	3.2	17	58	●
D0330	3.3	19	58	●
D0340	3.4	19	62	●
D0350	3.5	19	62	●
D0360	3.6	21	62	●
D0370	3.7	21	62	●
D0380	3.8	21	64	●
D0390	3.9	21	64	●
D0400	4.0	21	64	●
D0410	4.1	21	64	●
D0420	4.2	21	64	●
D0430	4.3	23	68	●
D0440	4.4	23	68	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
ESSD0450	4.5	23	68	●
D0460	4.6	25	70	●
D0470	4.7	25	70	●
D0480	4.8	25	73	●
D0490	4.9	25	73	●
D0500	5.0	25	73	●
D0510	5.1	25	73	●
D0520	5.2	25	73	●
D0530	5.3	25	73	●
D0540	5.4	27	79	●
D0550	5.5	27	79	●
D0560	5.6	27	79	●
D0570	5.7	27	79	●
D0580	5.8	27	79	●
D0590	5.9	27	79	●
D0600	6.0	27	79	●
D0610	6.1	30	85	●
D0620	6.2	30	85	●
D0630	6.3	30	85	●
D0640	6.4	30	85	●
D0650	6.5	30	85	●
D0660	6.6	30	85	●
D0670	6.7	30	85	●
D0680	6.8	32	90	●
D0690	6.9	32	90	●
D0700	7.0	32	90	●
D0710	7.1	32	90	●
D0720	7.2	32	90	●
D0730	7.3	32	90	●
D0740	7.4	32	90	●
D0750	7.5	32	90	●
D0760	7.6	35	96	●
D0770	7.7	35	96	●
D0780	7.8	35	96	●
D0790	7.9	35	96	●
D0800	8.0	35	96	●
D0810	8.1	35	96	●
D0820	8.2	35	96	●
D0830	8.3	35	96	●
D0840	8.4	35	96	●

● : Inventory maintained in Japan.

Unit : mm

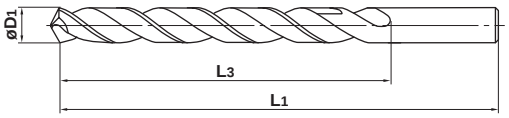
Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Stock
ESSD0850	8.5	35	96	●
D0860	8.6	38	105	●
D0870	8.7	38	105	●
D0880	8.8	38	105	●
D0890	8.9	38	105	●
D0900	9.0	38	105	●
D0910	9.1	38	105	●
D0920	9.2	38	105	●
D0930	9.3	38	105	●
D0940	9.4	38	105	●
D0950	9.5	38	105	●
D0960	9.6	41	109	●
D0970	9.7	41	109	●
D0980	9.8	41	109	●
D0990	9.9	41	109	●
D1000	10.0	41	109	●
D1010	10.1	41	109	●
D1020	10.2	41	109	●
D1030	10.3	41	109	●
D1040	10.4	41	109	●
D1050	10.5	41	109	●
D1060	10.6	41	109	●
D1070	10.7	45	117	●
D1080	10.8	45	117	●
D1090	10.9	45	117	●
D1100	11.0	45	117	●
D1110	11.1	45	117	●
D1120	11.2	45	117	●
D1130	11.3	45	117	●
D1140	11.4	45	117	●
D1150	11.5	45	117	●
D1160	11.6	45	117	●
D1170	11.7	45	117	●
D1180	11.8	45	117	●
D1190	11.9	49	125	●
D1200	12.0	49	125	●
D1210	12.1	49	125	●
D1220	12.2	49	125	●
D1230	12.3	49	125	●
D1240	12.4	49	125	●
D1250	12.5	49	125	●
D1260	12.6	49	125	●
D1270	12.7	49	125	●
D1280	12.8	49	125	●
D1290	12.9	49	125	●
D1300	13.0	49	125	●

STRAIGHT SHANK DRILLS

KSD
Cobalt HSS, For stainless steel

CO HSS | 125° D1<2 | 118° D1≥2 | XR Thinning D1≥2

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		◎		○	



● Sharp edge geometry for stainless steels up to 200HB.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
KSDD0100	1.0	12	40	●
D0110	1.1	14	42	●
D0120	1.2	16	42	●
D0130	1.3	16	45	●
D0140	1.4	18	48	●
D0150	1.5	18	48	●
D0160	1.6	20	50	●
D0170	1.7	20	50	●
D0180	1.8	22	52	●
D0190	1.9	22	52	●
D0200	2.0	29	55	●
D0210	2.1	29	55	●
D0220	2.2	33	58	●
D0230	2.3	33	58	●
D0240	2.4	35	61	●
D0250	2.5	35	61	●
D0260	2.6	37	64	●
D0270	2.7	37	64	●
D0280	2.8	39	67	●
D0290	2.9	42	71	●
D0300	3.0	42	71	●
D0310	3.1	42	71	●
D0320	3.2	42	71	●
D0330	3.3	45	73	●
D0340	3.4	45	73	●
D0350	3.5	45	73	●
D0360	3.6	48	76	●
D0370	3.7	48	76	●
D0380	3.8	48	76	●
D0390	3.9	51	79	●
D0400	4.0	54	83	●
D0410	4.1	54	83	●
D0420	4.2	54	83	●
D0430	4.3	54	83	●
D0440	4.4	56	86	●
D0450	4.5	56	86	●
D0460	4.6	56	86	●
D0470	4.7	59	89	●
D0480	4.8	59	89	●
D0490	4.9	62	92	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
KSDD0500	5.0	62	92	●
D0510	5.1	62	92	●
D0520	5.2	64	95	●
D0530	5.3	64	95	●
D0540	5.4	64	95	●
D0550	5.5	64	95	●
D0560	5.6	67	98	●
D0570	5.7	67	98	●
D0580	5.8	67	98	●
D0590	5.9	67	98	●
D0600	6.0	70	102	●
D0610	6.1	70	102	●
D0620	6.2	70	102	●
D0630	6.3	70	102	●
D0640	6.4	73	105	●
D0650	6.5	73	105	●
D0660	6.6	73	105	●
D0670	6.7	73	105	●
D0680	6.8	73	105	●
D0690	6.9	73	105	●
D0700	7.0	73	105	●
D0710	7.1	75	108	●
D0720	7.2	75	108	●
D0730	7.3	75	108	●
D0740	7.4	78	111	●
D0750	7.5	78	111	●
D0760	7.6	78	111	●
D0770	7.7	81	114	●
D0780	7.8	81	114	●
D0790	7.9	81	114	●
D0800	8.0	81	114	●
D0810	8.1	84	117	●
D0820	8.2	84	117	●
D0830	8.3	84	117	●
D0840	8.4	87	121	●
D0850	8.5	87	121	●
D0860	8.6	87	121	●
D0870	8.7	87	121	●
D0880	8.8	89	124	●
D0890	8.9	89	124	●

● : **Inventory maintained in Japan.**

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Stock
KSDD0900	9.0	89	124	●
D0910	9.1	89	124	●
D0920	9.2	92	127	●
D0930	9.3	92	127	●
D0940	9.4	92	127	●
D0950	9.5	92	127	●
D0960	9.6	95	130	●
D0970	9.7	95	130	●
D0980	9.8	95	130	●
D0990	9.9	95	130	●
D1000	10.0	95	130	●
D1010	10.1	98	133	●
D1020	10.2	98	133	●
D1030	10.3	98	133	●
D1040	10.4	98	133	●
D1050	10.5	100	137	●
D1060	10.6	100	137	●
D1070	10.7	100	137	●
D1080	10.8	103	140	●
D1090	10.9	103	140	●
D1100	11.0	103	140	●
D1110	11.1	103	140	●
D1120	11.2	106	143	●
D1130	11.3	106	143	●
D1140	11.4	106	143	●
D1150	11.5	106	143	●
D1160	11.6	109	146	●
D1170	11.7	109	146	●
D1180	11.8	109	146	●
D1190	11.9	109	146	●
D1200	12.0	111	149	●
D1210	12.1	111	149	●
D1220	12.2	111	149	●
D1230	12.3	111	149	●
D1240	12.4	114	152	●
D1250	12.5	114	152	●
D1260	12.6	114	152	●
D1270	12.7	114	152	●
D1280	12.8	114	152	●
D1290	12.9	114	152	●
D1300	13.0	114	152	●

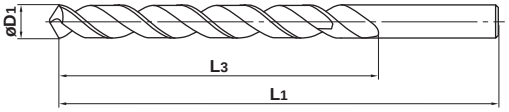
CUTTING CONDITIONS D212

STRAIGHT SHANK DRILLS

HSD
High helix

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		○		◎	



● Suitable for drilling mild steels and aluminium.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
HSDD0200	2.0	29	55	●
D0210	2.1	29	55	●
D0220	2.2	33	58	●
D0230	2.3	33	58	●
D0240	2.4	35	61	●
D0250	2.5	35	61	●
D0260	2.6	37	64	●
D0270	2.7	37	64	●
D0280	2.8	39	67	●
D0290	2.9	42	71	●
D0300	3.0	42	71	●
D0310	3.1	42	71	●
D0320	3.2	42	71	●
D0330	3.3	45	73	●
D0340	3.4	45	73	●
D0350	3.5	45	73	●
D0360	3.6	48	76	●
D0370	3.7	48	76	●
D0380	3.8	48	76	●
D0390	3.9	51	79	●
D0400	4.0	54	83	●
D0410	4.1	54	83	●
D0420	4.2	54	83	●
D0430	4.3	54	83	●
D0440	4.4	56	86	●
D0450	4.5	56	86	●
D0460	4.6	56	86	●
D0470	4.7	59	89	●
D0480	4.8	59	89	●
D0490	4.9	62	92	●
D0500	5.0	62	92	●
D0510	5.1	62	92	●
D0520	5.2	64	95	●
D0530	5.3	64	95	●
D0540	5.4	64	95	●
D0550	5.5	64	95	●
D0560	5.6	67	98	●
D0570	5.7	67	98	●
D0580	5.8	67	98	●
D0590	5.9	67	98	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
HSDD0600	6.0	70	102	●
D0650	6.5	73	105	●
D0680	6.8	73	105	●
D0700	7.0	73	105	●
D0750	7.5	78	111	●
D0800	8.0	81	114	●
D0820	8.2	84	117	●
D0850	8.5	87	121	●
D0900	9.0	89	124	●
D0950	9.5	92	127	●
D1000	10.0	95	130	●
D1100	11.0	103	140	●
D1200	12.0	111	149	●
D1300	13.0	114	152	●

● : **Inventory maintained in Japan.**

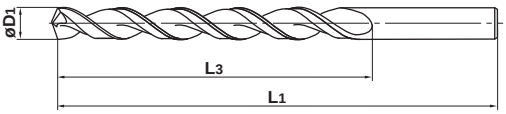
CUTTING CONDITIONS D212

G-WSS

TiN, For deep hole, Convolute flute

CO HSS | G | 118° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Suitable for general and deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GWSSD0100	1.0	18	40	●
D0110	1.1	20	42	●
D0120	1.2	20	42	●
D0130	1.3	22	45	●
D0140	1.4	23	48	●
D0150	1.5	23	48	●
D0160	1.6	25	50	●
D0170	1.7	25	50	●
D0180	1.8	28	52	●
D0190	1.9	28	52	●
D0200	2.0	29	55	●
D0210	2.1	29	55	●
D0220	2.2	33	58	●
D0230	2.3	33	58	●
D0240	2.4	35	61	●
D0250	2.5	35	61	●
D0260	2.6	37	64	●
D0270	2.7	37	64	●
D0280	2.8	39	67	●
D0290	2.9	42	71	●
D0300	3.0	42	71	●
D0310	3.1	42	71	●
D0320	3.2	42	71	●
D0330	3.3	45	73	●
D0340	3.4	45	73	●
D0350	3.5	45	73	●
D0360	3.6	48	76	●
D0370	3.7	48	76	●
D0380	3.8	48	76	●
D0390	3.9	51	79	●
D0400	4.0	54	83	●
D0410	4.1	54	83	●
D0420	4.2	54	83	●
D0430	4.3	54	83	●
D0440	4.4	56	86	●
D0450	4.5	56	86	●
D0460	4.6	56	86	●
D0470	4.7	59	89	●
D0480	4.8	59	89	●
D0490	4.9	62	92	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GWSSD0500	5.0	62	92	●
D0510	5.1	62	92	●
D0520	5.2	64	95	●
D0530	5.3	64	95	●
D0540	5.4	64	95	●
D0550	5.5	64	95	●
D0560	5.6	67	98	●
D0570	5.7	67	98	●
D0580	5.8	67	98	●
D0590	5.9	67	98	●
D0600	6.0	70	102	●
D0610	6.1	70	102	●
D0620	6.2	70	102	●
D0630	6.3	70	102	●
D0640	6.4	73	105	●
D0650	6.5	73	105	●
D0660	6.6	73	105	●
D0670	6.7	73	105	●
D0680	6.8	73	105	●
D0690	6.9	73	105	●
D0700	7.0	73	105	●
D0710	7.1	75	108	●
D0720	7.2	75	108	●
D0730	7.3	75	108	●
D0740	7.4	78	111	●
D0750	7.5	78	111	●
D0760	7.6	78	111	●
D0770	7.7	81	114	●
D0780	7.8	81	114	●
D0790	7.9	81	114	●
D0800	8.0	81	114	●
D0810	8.1	84	117	●
D0820	8.2	84	117	●
D0830	8.3	84	117	●
D0840	8.4	87	121	●
D0850	8.5	87	121	●
D0860	8.6	87	121	●
D0870	8.7	87	121	●
D0880	8.8	89	124	●
D0890	8.9	89	124	●

CUTTING CONDITIONS D211

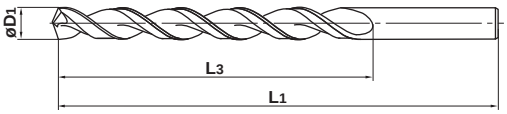
HSS

G-WSS

TiN, For deep hole, Convolute flute

CO HSS | G | 118° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Suitable for general and deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GWSSD0900	9.0	89	124	●
D0910	9.1	89	124	●
D0920	9.2	92	127	●
D0930	9.3	92	127	●
D0940	9.4	92	127	●
D0950	9.5	92	127	●
D0960	9.6	95	130	●
D0970	9.7	95	130	●
D0980	9.8	95	130	●
D0990	9.9	95	130	●
D1000	10.0	95	130	●
D1010	10.1	98	133	●
D1020	10.2	98	133	●
D1030	10.3	98	133	●
D1040	10.4	98	133	●
D1050	10.5	100	137	●
D1060	10.6	100	137	●
D1070	10.7	100	137	●
D1080	10.8	103	140	●
D1090	10.9	103	140	●
D1100	11.0	103	140	●
D1110	11.1	103	140	●
D1120	11.2	106	143	●
D1130	11.3	106	143	●
D1140	11.4	106	143	●
D1150	11.5	106	143	●
D1160	11.6	109	146	●
D1170	11.7	109	146	●
D1180	11.8	109	146	●
D1190	11.9	109	146	●
D1200	12.0	111	149	●
D1210	12.1	111	149	●
D1220	12.2	111	149	●
D1230	12.3	111	149	●
D1240	12.4	114	152	●
D1250	12.5	114	152	●
D1260	12.6	114	152	●
D1270	12.7	114	152	●
D1280	12.8	114	152	●
D1290	12.9	114	152	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GWSSD1300	13.0	114	152	●

● : **Inventory maintained in Japan.**

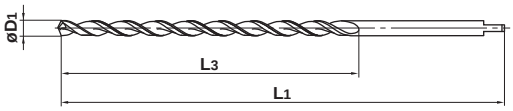
CUTTING CONDITIONS D211

G-WSL

TiN, Extra long

CO HSS | G | 118° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Suitable for extra deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GWSLD0200A125	2.0	80	125	●
D0200A160	2.0	100	160	●
D0210A125	2.1	80	125	●
D0210A160	2.1	100	160	●
D0220A125	2.2	80	125	●
D0220A160	2.2	100	160	●
D0230A125	2.3	80	125	●
D0230A160	2.3	100	160	●
D0240A125	2.4	80	125	●
D0240A160	2.4	100	160	●
D0250A125	2.5	80	125	●
D0250A160	2.5	100	160	●
D0260A125	2.6	80	125	●
D0260A160	2.6	100	160	●
D0270A125	2.7	80	125	●
D0270A160	2.7	100	160	●
D0280A125	2.8	80	125	●
D0280A160	2.8	100	160	●
D0290A125	2.9	80	125	●
D0290A160	2.9	100	160	●
D0300A125	3.0	80	125	●
D0300A160	3.0	100	160	●
D0300A200	3.0	125	200	●
D0310A160	3.1	100	160	●
D0310A200	3.1	125	200	●
D0320A160	3.2	100	160	●
D0320A200	3.2	125	200	●
D0330A160	3.3	100	160	●
D0330A200	3.3	125	200	●
D0340A160	3.4	100	160	●
D0340A200	3.4	125	200	●
D0350A160	3.5	100	160	●
D0350A200	3.5	125	200	●
D0360A160	3.6	100	160	●
D0360A200	3.6	125	200	●
D0370A160	3.7	100	160	●
D0370A200	3.7	125	200	●
D0380A160	3.8	100	160	●
D0380A200	3.8	125	200	●
D0390A160	3.9	100	160	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GWSLD0390A200	3.9	125	200	●
D0400A160	4.0	100	160	●
D0400A200	4.0	125	200	●
D0400A250	4.0	160	250	●
D0410A160	4.1	100	160	●
D0410A200	4.1	125	200	●
D0410A250	4.1	160	250	●
D0420A160	4.2	100	160	●
D0420A200	4.2	125	200	●
D0420A250	4.2	160	250	●
D0430A160	4.3	100	160	●
D0430A200	4.3	125	200	●
D0430A250	4.3	160	250	●
D0440A160	4.4	100	160	●
D0440A200	4.4	125	200	●
D0440A250	4.4	160	250	●
D0450A160	4.5	100	160	●
D0450A200	4.5	125	200	●
D0450A250	4.5	160	250	●
D0460A160	4.6	100	160	●
D0460A200	4.6	125	200	●
D0460A250	4.6	160	250	●
D0470A160	4.7	100	160	●
D0470A200	4.7	125	200	●
D0470A250	4.7	160	250	●
D0480A160	4.8	100	160	●
D0480A200	4.8	125	200	●
D0480A250	4.8	160	250	●
D0490A160	4.9	100	160	●
D0490A200	4.9	125	200	●
D0490A250	4.9	160	250	●
D0500A160	5.0	100	160	●
D0500A200	5.0	125	200	●
D0500A250	5.0	160	250	●
D0510A160	5.1	100	160	●
D0510A200	5.1	125	200	●
D0510A250	5.1	160	250	●
D0520A160	5.2	100	160	●
D0520A200	5.2	125	200	●
D0520A250	5.2	160	250	●

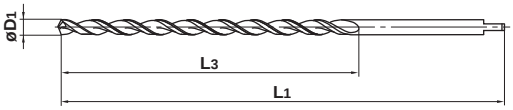
CUTTING CONDITIONS D211

STRAIGHT SHANK DRILLS

G-WSL
TiN, Extra long

CO HSS | G | 118° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Suitable for extra deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GWSLD0530A160	5.3	100	160	●
D0530A200	5.3	125	200	●
D0530A250	5.3	160	250	●
D0540A160	5.4	100	160	●
D0540A200	5.4	125	200	●
D0540A250	5.4	160	250	●
D0550A160	5.5	100	160	●
D0550A200	5.5	125	200	●
D0550A250	5.5	160	250	●
D0560A160	5.6	100	160	●
D0560A200	5.6	125	200	●
D0560A250	5.6	160	250	●
D0570A160	5.7	100	160	●
D0570A200	5.7	125	200	●
D0570A250	5.7	160	250	●
D0580A160	5.8	100	160	●
D0580A200	5.8	125	200	●
D0580A250	5.8	160	250	●
D0590A160	5.9	100	160	●
D0590A200	5.9	125	200	●
D0590A250	5.9	160	250	●
D0600A160	6.0	100	160	●
D0600A200	6.0	125	200	●
D0600A250	6.0	160	250	●
D0600A315	6.0	200	315	●
D0650A160	6.5	100	160	●
D0650A200	6.5	125	200	●
D0650A250	6.5	160	250	●
D0650A315	6.5	200	315	●
D0680A160	6.8	100	160	●
D0680A200	6.8	125	200	●
D0680A250	6.8	160	250	●
D0680A315	6.8	200	315	●
D0700A160	7.0	100	160	●
D0700A200	7.0	125	200	●
D0700A250	7.0	160	250	●
D0700A315	7.0	200	315	●
D0750A200	7.5	125	200	●
D0750A250	7.5	160	250	●
D0750A315	7.5	200	315	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
GWSLD0800A200	8.0	125	200	●
D0800A250	8.0	160	250	●
D0800A315	8.0	200	315	●
D0850A200	8.5	140	200	●
D0850A250	8.5	160	250	●
D0850A315	8.5	200	315	●
D0900A200	9.0	140	200	●
D0900A250	9.0	160	250	●
D0900A315	9.0	200	315	●
D0950A200	9.5	140	200	●
D0950A250	9.5	160	250	●
D0950A315	9.5	200	315	●
D1000A200	10.0	140	200	●
D1000A250	10.0	160	250	●
D1000A315	10.0	200	315	●
D1050A250	10.5	160	250	●
D1050A315	10.5	200	315	●
D1100A250	11.0	160	250	●
D1100A315	11.0	200	315	●
D1150A250	11.5	160	250	●
D1150A315	11.5	200	315	●
D1200A250	12.0	160	250	●
D1200A315	12.0	200	315	●
D1250A250	12.5	160	250	●
D1250A315	12.5	200	315	●
D1300A250	13.0	160	250	●
D1300A315	13.0	200	315	●

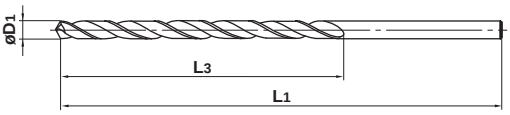
● : **Inventory maintained in Japan.**

CUTTING CONDITIONS D211

LSD
Extra long

HSS | 118° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○			○	○	



● Widely used for deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
LSDD0100A100	1.0	25	100	●
D0100A150	1.0	25	150	●
D0110A100	1.1	25	100	●
D0110A150	1.1	25	150	●
D0120A100	1.2	25	100	●
D0120A150	1.2	25	150	●
D0130A100	1.3	30	100	●
D0130A150	1.3	30	150	●
D0140A100	1.4	30	100	●
D0140A150	1.4	30	150	●
D0150A100	1.5	30	100	●
D0150A150	1.5	30	150	●
D0160A100	1.6	40	100	●
D0160A150	1.6	40	150	●
D0170A100	1.7	40	100	●
D0170A150	1.7	40	150	●
D0180A100	1.8	40	100	●
D0180A150	1.8	40	150	●
D0190A100	1.9	40	100	●
D0190A150	1.9	40	150	●
D0200A100	2.0	50	100	●
D0200A125	2.0	65	125	●
D0200A150	2.0	75	150	●
D0210A100	2.1	50	100	●
D0210A150	2.1	75	150	●
D0220A100	2.2	50	100	●
D0220A150	2.2	75	150	●
D0230A100	2.3	50	100	●
D0230A150	2.3	75	150	●
D0240A100	2.4	50	100	●
D0240A150	2.4	75	150	●
D0250A100	2.5	50	100	●
D0250A125	2.5	65	125	●
D0250A150	2.5	75	150	●
D0260A100	2.6	50	100	●
D0260A150	2.6	75	150	●
D0270A100	2.7	50	100	●
D0270A150	2.7	75	150	●
D0280A100	2.8	50	100	●
D0280A150	2.8	75	150	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
LSDD0290A100	2.9	50	100	●
D0290A150	2.9	75	150	●
D0300A100	3.0	50	100	●
D0300A125	3.0	65	125	●
D0300A150	3.0	75	150	●
D0300A200	3.0	100	200	●
D0310A150	3.1	75	150	●
D0310A200	3.1	100	200	●
D0320A125	3.2	65	125	●
D0320A150	3.2	75	150	●
D0320A200	3.2	100	200	●
D0320A250	3.2	130	250	●
D0330A150	3.3	75	150	●
D0330A200	3.3	100	200	●
D0340A150	3.4	75	150	●
D0340A200	3.4	100	200	●
D0350A125	3.5	65	125	●
D0350A150	3.5	75	150	●
D0350A200	3.5	100	200	●
D0350A250	3.5	130	250	●
D0360A150	3.6	75	150	●
D0360A200	3.6	100	200	●
D0370A150	3.7	75	150	●
D0370A200	3.7	100	200	●
D0380A150	3.8	75	150	●
D0380A200	3.8	100	200	●
D0390A150	3.9	75	150	●
D0390A200	3.9	100	200	●
D0400A125	4.0	70	125	●
D0400A150	4.0	75	150	●
D0400A200	4.0	100	200	●
D0400A250	4.0	130	250	●
D0410A150	4.1	75	150	●
D0410A200	4.1	100	200	●
D0420A150	4.2	75	150	●
D0420A200	4.2	100	200	●
D0430A150	4.3	75	150	●
D0430A200	4.3	100	200	●
D0440A150	4.4	75	150	●
D0440A200	4.4	100	200	●

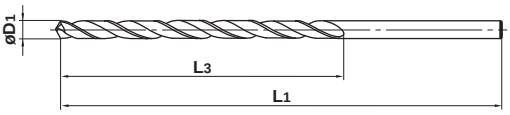
CUTTING CONDITIONS D212

STRAIGHT SHANK DRILLS

LSD
Extra long

HSS | 118° | X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○			○	○	



● Widely used for deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
LSDD0450A125	4.5	70	125	●
D0450A150	4.5	75	150	●
D0450A200	4.5	100	200	●
D0450A250	4.5	130	250	●
D0460A150	4.6	90	150	●
D0460A200	4.6	100	200	●
D0470A150	4.7	90	150	●
D0470A200	4.7	100	200	●
D0480A150	4.8	90	150	●
D0480A200	4.8	100	200	●
D0480A250	4.8	130	250	●
D0490A150	4.9	90	150	●
D0490A200	4.9	100	200	●
D0500A150	5.0	90	150	●
D0500A200	5.0	100	200	●
D0500A250	5.0	130	250	●
D0500A300	5.0	150	300	●
D0510A200	5.1	100	200	●
D0510A250	5.1	130	250	●
D0520A200	5.2	100	200	●
D0520A250	5.2	130	250	●
D0530A200	5.3	100	200	●
D0530A250	5.3	130	250	●
D0530A300	5.3	150	300	●
D0540A200	5.4	100	200	●
D0540A250	5.4	130	250	●
D0540A300	5.4	150	300	●
D0550A150	5.5	90	150	●
D0550A200	5.5	100	200	●
D0550A250	5.5	130	250	●
D0550A300	5.5	150	300	●
D0560A200	5.6	100	200	●
D0560A250	5.6	130	250	●
D0570A200	5.7	100	200	●
D0570A250	5.7	130	250	●
D0580A200	5.8	100	200	●
D0580A250	5.8	130	250	●
D0590A200	5.9	100	200	●
D0590A250	5.9	130	250	●
D0600A150	6.0	90	150	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
LSDD0600A200	6.0	100	200	●
D0600A250	6.0	130	250	●
D0600A300	6.0	150	300	●
D0610A200	6.1	120	200	●
D0610A250	6.1	130	250	●
D0610A300	6.1	150	300	●
D0620A200	6.2	120	200	●
D0620A250	6.2	130	250	●
D0620A300	6.2	150	300	●
D0630A200	6.3	120	200	●
D0630A250	6.3	130	250	●
D0630A300	6.3	150	300	●
D0640A200	6.4	120	200	●
D0640A250	6.4	130	250	●
D0640A300	6.4	150	300	●
D0650A150	6.5	90	150	●
D0650A200	6.5	120	200	●
D0650A250	6.5	130	250	●
D0650A300	6.5	150	300	●
D0660A200	6.6	120	200	●
D0660A250	6.6	130	250	●
D0670A200	6.7	120	200	●
D0670A250	6.7	130	250	●
D0680A200	6.8	120	200	●
D0680A250	6.8	130	250	●
D0690A200	6.9	120	200	●
D0690A250	6.9	130	250	●
D0690A300	6.9	150	300	●
D0700A150	7.0	90	150	●
D0700A200	7.0	120	200	●
D0700A250	7.0	130	250	●
D0700A300	7.0	150	300	●
D0710A200	7.1	120	200	●
D0710A250	7.1	130	250	●
D0710A300	7.1	150	300	●
D0720A200	7.2	120	200	●
D0720A250	7.2	130	250	●
D0720A300	7.2	150	300	●
D0730A200	7.3	120	200	●
D0730A250	7.3	130	250	●

● : **Inventory maintained in Japan.**

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Stock
LSDD0730A300	7.3	150	300	●
D0740A250	7.4	130	250	●
D0740A300	7.4	150	300	●
D0750A150	7.5	90	150	●
D0750A200	7.5	120	200	●
D0750A250	7.5	130	250	●
D0750A300	7.5	150	300	●
D0760A200	7.6	120	200	●
D0760A250	7.6	130	250	●
D0760A300	7.6	150	300	●
D0770A200	7.7	120	200	●
D0770A250	7.7	130	250	●
D0770A300	7.7	150	300	●
D0780A200	7.8	120	200	●
D0780A250	7.8	130	250	●
D0780A300	7.8	150	300	●
D0790A200	7.9	120	200	●
D0790A250	7.9	130	250	●
D0800A150	8.0	90	150	●
D0800A200	8.0	120	200	●
D0800A250	8.0	130	250	●
D0800A300	8.0	150	300	●
D0810A250	8.1	130	250	●
D0810A300	8.1	180	300	●
D0810A350	8.1	200	350	●
D0820A250	8.2	130	250	●
D0820A300	8.2	180	300	●
D0830A250	8.3	130	250	●
D0830A300	8.3	180	300	●
D0840A200	8.4	120	200	●
D0840A250	8.4	130	250	●
D0840A300	8.4	180	300	●
D0850A200	8.5	120	200	●
D0850A250	8.5	130	250	●
D0850A300	8.5	180	300	●
D0850A350	8.5	200	350	●
D0860A250	8.6	130	250	●
D0870A250	8.7	130	250	●
D0870A300	8.7	180	300	●
D0880A200	8.8	120	200	●
D0880A250	8.8	130	250	●
D0880A300	8.8	180	300	●
D0890A200	8.9	120	200	●
D0890A250	8.9	130	250	●
D0890A300	8.9	180	300	●
D0900A200	9.0	120	200	●
D0900A250	9.0	130	250	●
D0900A300	9.0	180	300	●
D0900A350	9.0	200	350	●
D0910A250	9.1	130	250	●

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	Stock
LSDD0910A300	9.1	180	300	●
D0920A250	9.2	130	250	●
D0920A300	9.2	180	300	●
D0930A250	9.3	130	250	●
D0930A300	9.3	180	300	●
D0940A250	9.4	130	250	●
D0940A300	9.4	180	300	●
D0950A200	9.5	120	200	●
D0950A250	9.5	130	250	●
D0950A300	9.5	180	300	●
D0950A350	9.5	200	350	●
D0960A250	9.6	130	250	●
D0960A300	9.6	180	300	●
D0970A250	9.7	130	250	●
D0970A300	9.7	180	300	●
D0980A250	9.8	130	250	●
D0980A300	9.8	180	300	●
D0990A250	9.9	130	250	●
D0990A300	9.9	180	300	●
D1000A200	10.0	120	200	●
D1000A250	10.0	130	250	●
D1000A300	10.0	180	300	●
D1000A350	10.0	200	350	●
D1010A250	10.1	130	250	●
D1010A300	10.1	180	300	●
D1020A250	10.2	130	250	●
D1020A300	10.2	180	300	●
D1030A250	10.3	130	250	●
D1030A300	10.3	180	300	●
D1040A250	10.4	130	250	●
D1040A300	10.4	180	300	●
D1050A200	10.5	120	200	●
D1050A250	10.5	130	250	●
D1050A300	10.5	180	300	●
D1050A350	10.5	200	350	●
D1060A300	10.6	180	300	●
D1070A300	10.7	180	300	●
D1080A300	10.8	180	300	●
D1090A300	10.9	180	300	●
D1100A200	11.0	120	200	●
D1100A250	11.0	130	250	●
D1100A300	11.0	180	300	●
D1100A350	11.0	200	350	●
D1110A250	11.1	130	250	●
D1110A350	11.1	200	350	●
D1120A250	11.2	130	250	●
D1120A350	11.2	200	350	●
D1130A250	11.3	130	250	●
D1130A350	11.3	200	350	●
D1140A250	11.4	130	250	●

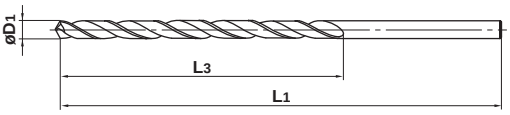
CUTTING CONDITIONS D212

STRAIGHT SHANK DRILLS

LSD
Extra long

HSS 118° X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○			○	○	



● Widely used for deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
LSDD1140A350	11.4	200	350	●
D1150A200	11.5	120	200	●
D1150A250	11.5	130	250	●
D1150A300	11.5	180	300	●
D1150A350	11.5	200	350	●
D1200A200	12.0	120	200	●
D1200A250	12.0	130	250	●
D1200A300	12.0	180	300	●
D1200A350	12.0	200	350	●
D1250A200	12.5	120	200	●
D1250A250	12.5	130	250	●
D1250A300	12.5	180	300	●
D1250A350	12.5	200	350	●
D1300A200	13.0	120	200	●
D1300A250	13.0	130	250	●
D1300A300	13.0	180	300	●
D1300A350	13.0	200	350	●

● : **Inventory maintained in Japan.**

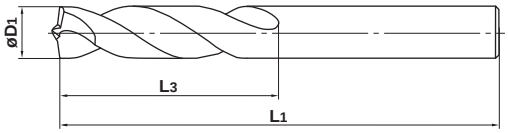
CUTTING CONDITIONS D212

E-PSS

Plate pal

HSS 170° 110° X Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		○	○	○	



● Special cutting edge geometry to prevent through hole burrs.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
EPSSD0200	2.0	17	48	●
D0210	2.1	17	48	●
D0220	2.2	17	48	●
D0230	2.3	17	48	●
D0240	2.4	17	48	●
D0250	2.5	17	48	●
D0260	2.6	17	48	●
D0270	2.7	17	48	●
D0280	2.8	17	48	●
D0290	2.9	17	48	●
D0300	3.0	17	48	●
D0310	3.1	17	48	●
D0320	3.2	17	48	●
D0330	3.3	17	48	●
D0340	3.4	19	51	●
D0350	3.5	19	51	●
D0360	3.6	19	51	●
D0370	3.7	19	51	●
D0380	3.8	21	54	●
D0390	3.9	21	54	●
D0400	4.0	21	54	●
D0410	4.1	21	54	●
D0420	4.2	21	54	●
D0430	4.3	23	57	●
D0440	4.4	23	57	●
D0450	4.5	23	57	●
D0460	4.6	23	57	●
D0470	4.7	23	57	●
D0480	4.8	24	60	●
D0490	4.9	24	60	●
D0500	5.0	24	60	●
D0510	5.1	24	60	●
D0520	5.2	24	60	●
D0530	5.3	24	60	●
D0540	5.4	26	64	●
D0550	5.5	26	64	●
D0600	6.0	26	64	●
D0650	6.5	29	68	●
D0680	6.8	32	72	●
D0700	7.0	32	72	●

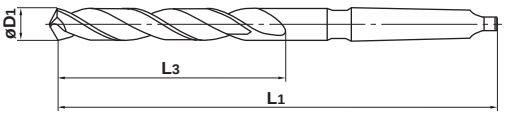
Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Stock
EPSSD0750	7.5	32	72	●
D0800	8.0	34	76	●
D0820	8.2	34	76	●
D0850	8.5	34	76	●
D0900	9.0	37	81	●
D0950	9.5	37	81	●
D1000	10.0	40	86	●
D1020	10.2	40	86	●
D1030	10.3	40	86	●
D1050	10.5	40	86	●
D1100	11.0	43	91	●
D1150	11.5	43	91	●
D1200	12.0	47	98	●
D1250	12.5	47	98	●
D1300	13.0	47	98	●

TAPER SHANK DRILLS

G-TD
TiN

HSS G 118° XR Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Original manufacturing and coating technology for improved performance.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GTDD0600M1	6.0	55	148	1	●
D0650M1	6.5	61	152	1	●
D0660M1	6.6	61	155	1	●
D0680M1	6.8	67	155	1	●
D0700M1	7.0	67	155	1	●
D0720M1	7.2	67	158	1	●
D0750M1	7.5	67	158	1	●
D0770M1	7.7	72	162	1	●
D0780M1	7.8	72	162	1	●
D0800M1	8.0	72	162	1	●
D0820M1	8.2	72	168	1	●
D0850M1	8.5	72	168	1	●
D0880M1	8.8	78	172	1	●
D0900M1	9.0	78	172	1	●
D0950M1	9.5	78	175	1	●
D0970M1	9.7	84	178	1	●
D0980M1	9.8	84	178	1	●
D1000M1	10.0	84	178	1	●
D1030M1	10.3	84	182	1	●
D1050M1	10.5	84	182	1	●
D1080M1	10.8	90	185	1	●
D1100M1	11.0	90	185	1	●
D1150M1	11.5	90	188	1	●
D1200M1	12.0	97	192	1	●
D1250M1	12.5	97	195	1	●
D1300M1	13.0	97	198	1	●
D1350M1	13.5	103	202	1	●
D1400M1	14.0	103	205	1	●
D1450M2	14.5	109	222	2	●
D1500M2	15.0	109	225	2	●
D1550M2	15.5	115	228	2	●
D1600M2	16.0	115	230	2	●
D1650M2	16.5	119	232	2	●
D1700M2	17.0	119	235	2	●
D1750M2	17.5	124	240	2	●
D1800M2	18.0	124	240	2	●
D1850M2	18.5	129	245	2	●
D1900M2	19.0	129	245	2	●
D1950M2	19.5	133	250	2	●
D2000M2	20.0	133	250	2	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GTDD2050M2	20.5	138	255	2	●
D2100M2	21.0	138	255	2	●
D2150M2	21.5	143	260	2	●
D2150M3	21.5	143	280	3	●
D2200M2	22.0	143	260	2	●
D2200M3	22.0	143	280	3	●
D2250M2	22.5	147	265	2	●
D2250M3	22.5	147	285	3	●
D2300M2	23.0	147	265	2	●
D2300M3	23.0	147	285	3	●
D2350M3	23.5	147	285	3	●
D2400M3	24.0	152	285	3	●
D2450M3	24.5	152	285	3	●
D2500M3	25.0	152	285	3	●
D2550M3	25.5	156	285	3	●
D2600M3	26.0	156	285	3	●
D2650M3	26.5	156	290	3	●
D2700M3	27.0	161	290	3	●
D2750M3	27.5	161	295	3	●
D2800M3	28.0	161	295	3	●
D2850M3	28.5	165	300	3	●
D2900M3	29.0	165	300	3	●
D2950M3	29.5	165	305	3	●
D3000M3	30.0	165	305	3	●
D3050M3	30.5	170	310	3	●
D3100M3	31.0	170	310	3	●
D3150M3	31.5	170	315	3	●
D3200M3	32.0	174	315	3	●
D3300M4	33.0	174	345	4	●
D3400M4	34.0	179	350	4	●
D3500M4	35.0	179	350	4	●
D3600M4	36.0	183	355	4	●
D3700M4	37.0	183	355	4	●
D3800M4	38.0	187	360	4	●
D3900M4	39.0	187	360	4	●
D4000M4	40.0	187	365	4	●

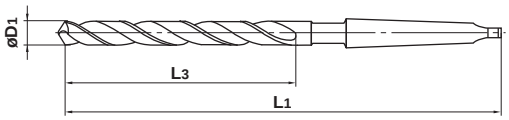
● : **Inventory maintained in Japan.**

CUTTING CONDITIONS D211

TD
Taper shank

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● For general drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
TDD0300M1	3.0	38	115	1	●
D0310M1	3.1	45	122	1	●
D0320M1	3.2	45	122	1	●
D0330M1	3.3	45	122	1	●
D0340M1	3.4	45	122	1	●
D0350M1	3.5	45	122	1	●
D0360M1	3.6	50	128	1	●
D0370M1	3.7	50	128	1	●
D0380M1	3.8	50	128	1	●
D0390M1	3.9	50	128	1	●
D0400M1	4.0	50	128	1	●
D0410M1	4.1	55	135	1	●
D0420M1	4.2	55	135	1	●
D0430M1	4.3	55	135	1	●
D0440M1	4.4	55	135	1	●
D0450M1	4.5	55	135	1	●
D0460M1	4.6	60	140	1	●
D0470M1	4.7	60	140	1	●
D0480M1	4.8	60	140	1	●
D0490M1	4.9	60	140	1	●
D0500M1	5.0	60	140	1	●
D0510M1	5.1	65	145	1	●
D0520M1	5.2	65	145	1	●
D0530M1	5.3	65	145	1	●
D0540M1	5.4	65	145	1	●
D0550M1	5.5	65	145	1	●
D0560M1	5.6	68	148	1	●
D0570M1	5.7	68	148	1	●
D0580M1	5.8	68	148	1	●
D0590M1	5.9	68	148	1	●
D0600M1	6.0	68	148	1	●
D0610M1	6.1	72	152	1	●
D0620M1	6.2	72	152	1	●
D0630M1	6.3	72	152	1	●
D0640M1	6.4	72	152	1	●
D0650M1	6.5	72	152	1	●
D0660M1	6.6	75	155	1	●
D0670M1	6.7	75	155	1	●
D0680M1	6.8	75	155	1	●
D0690M1	6.9	75	155	1	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
TDD0700M1	7.0	75	155	1	●
D0710M1	7.1	78	158	1	●
D0720M1	7.2	78	158	1	●
D0730M1	7.3	78	158	1	●
D0740M1	7.4	78	158	1	●
D0750M1	7.5	78	158	1	●
D0760M1	7.6	82	162	1	●
D0770M1	7.7	82	162	1	●
D0780M1	7.8	82	162	1	●
D0790M1	7.9	82	162	1	●
D0800M1	8.0	82	162	1	●
D0810M1	8.1	85	168	1	●
D0820M1	8.2	85	168	1	●
D0830M1	8.3	85	168	1	●
D0840M1	8.4	85	168	1	●
D0850M1	8.5	85	168	1	●
D0860M1	8.6	88	172	1	●
D0870M1	8.7	88	172	1	●
D0880M1	8.8	88	172	1	●
D0890M1	8.9	88	172	1	●
D0900M1	9.0	88	172	1	●
D0910M1	9.1	92	175	1	●
D0920M1	9.2	92	175	1	●
D0930M1	9.3	92	175	1	●
D0940M1	9.4	92	175	1	●
D0950M1	9.5	92	175	1	●
D0960M1	9.6	95	178	1	●
D0970M1	9.7	95	178	1	●
D0980M1	9.8	95	178	1	●
D0990M1	9.9	95	178	1	●
D1000M1	10.0	95	178	1	●
D1010M1	10.1	98	182	1	●
D1020M1	10.2	98	182	1	●
D1030M1	10.3	98	182	1	●
D1040M1	10.4	98	182	1	●
D1050M1	10.5	98	182	1	●
D1060M1	10.6	102	185	1	●
D1070M1	10.7	102	185	1	●
D1080M1	10.8	102	185	1	●
D1090M1	10.9	102	185	1	●

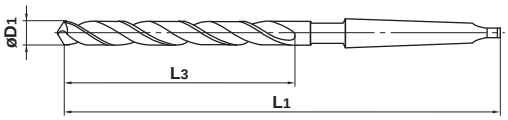
CUTTING CONDITIONS D212

TAPER SHANK DRILLS

TD
Taper shank

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● For general drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
TDD1100M1	11.0	102	185	1	●
D1110M1	11.1	105	188	1	●
D1120M1	11.2	105	188	1	●
D1130M1	11.3	105	188	1	●
D1140M1	11.4	105	188	1	●
D1150M1	11.5	105	188	1	●
D1160M1	11.6	108	192	1	●
D1170M1	11.7	108	192	1	●
D1180M1	11.8	108	192	1	●
D1190M1	11.9	108	192	1	●
D1200M1	12.0	108	192	1	●
D1210M1	12.1	112	195	1	●
D1220M1	12.2	112	195	1	●
D1230M1	12.3	112	195	1	●
D1240M1	12.4	112	195	1	●
D1250M1	12.5	112	195	1	●
D1260M1	12.6	115	198	1	●
D1270M1	12.7	115	198	1	●
D1280M1	12.8	115	198	1	●
D1290M1	12.9	115	198	1	●
D1300M1	13.0	115	198	1	●
D1310M1	13.1	118	202	1	●
D1320M1	13.2	118	202	1	●
D1330M1	13.3	118	202	1	●
D1340M1	13.4	118	202	1	●
D1350M1	13.5	118	202	1	●
D1360M1	13.6	122	205	1	●
D1370M1	13.7	122	205	1	●
D1380M1	13.8	122	205	1	●
D1390M1	13.9	122	205	1	●
D1400M1	14.0	122	205	1	●
D1410M2	14.1	122	222	2	●
D1420M2	14.2	122	222	2	●
D1430M2	14.3	122	222	2	●
D1440M2	14.4	122	222	2	●
D1450M2	14.5	122	222	2	●
D1460M2	14.6	125	225	2	●
D1470M2	14.7	125	225	2	●
D1480M2	14.8	125	225	2	●
D1490M2	14.9	125	225	2	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
TDD1500M2	15.0	125	225	2	●
D1510M2	15.1	128	228	2	●
D1520M2	15.2	128	228	2	●
D1530M2	15.3	128	228	2	●
D1540M2	15.4	128	228	2	●
D1550M2	15.5	128	228	2	●
D1560M2	15.6	130	230	2	●
D1570M2	15.7	130	230	2	●
D1580M2	15.8	130	230	2	●
D1590M2	15.9	130	230	2	●
D1600M2	16.0	130	230	2	●
D1610M2	16.1	132	232	2	●
D1620M2	16.2	132	232	2	●
D1630M2	16.3	132	232	2	●
D1640M2	16.4	132	232	2	●
D1650M2	16.5	132	232	2	●
D1660M2	16.6	135	235	2	●
D1670M2	16.7	135	235	2	●
D1680M2	16.8	135	235	2	●
D1690M2	16.9	135	235	2	●
D1700M2	17.0	135	235	2	●
D1710M2	17.1	140	240	2	●
D1720M2	17.2	140	240	2	●
D1730M2	17.3	140	240	2	●
D1740M2	17.4	140	240	2	●
D1750M2	17.5	140	240	2	●
D1760M2	17.6	140	240	2	●
D1770M2	17.7	140	240	2	●
D1780M2	17.8	140	240	2	●
D1790M2	17.9	140	240	2	●
D1800M2	18.0	140	240	2	●
D1810M2	18.1	145	245	2	●
D1820M2	18.2	145	245	2	●
D1830M2	18.3	145	245	2	●
D1840M2	18.4	145	245	2	●
D1850M2	18.5	145	245	2	●
D1860M2	18.6	145	245	2	●
D1870M2	18.7	145	245	2	●
D1880M2	18.8	145	245	2	●
D1890M2	18.9	145	245	2	●

● : **Inventory maintained in Japan.**

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	M.T.No.	Stock
TDD1900M2	19.0	145	245	2	●
D1910M2	19.1	150	250	2	●
D1920M2	19.2	150	250	2	●
D1930M2	19.3	150	250	2	●
D1940M2	19.4	150	250	2	●
D1950M2	19.5	150	250	2	●
D1960M2	19.6	150	250	2	●
D1970M2	19.7	150	250	2	●
D1980M2	19.8	150	250	2	●
D1990M2	19.9	150	250	2	●
D2000M2	20.0	150	250	2	●
D2010M2	20.1	155	255	2	●
D2020M2	20.2	155	255	2	●
D2030M2	20.3	155	255	2	●
D2040M2	20.4	155	255	2	●
D2050M2	20.5	155	255	2	●
D2060M2	20.6	155	255	2	●
D2070M2	20.7	155	255	2	●
D2080M2	20.8	155	255	2	●
D2090M2	20.9	155	255	2	●
D2100M2	21.0	155	255	2	●
D2110M2	21.1	160	260	2	●
D2120M2	21.2	160	260	2	●
D2130M2	21.3	160	260	2	●
D2140M2	21.4	160	260	2	●
D2150M2	21.5	160	260	2	●
D2160M2	21.6	160	260	2	●
D2170M2	21.7	160	260	2	●
D2180M2	21.8	160	260	2	●
D2190M2	21.9	160	260	2	●
D2200M2	22.0	160	260	2	●
D2210M2	22.1	165	265	2	●
D2220M2	22.2	165	265	2	●
D2230M2	22.3	165	265	2	●
D2240M2	22.4	165	265	2	●
D2250M2	22.5	165	265	2	●
D2260M2	22.6	165	265	2	●
D2270M2	22.7	165	265	2	●
D2280M2	22.8	165	265	2	●
D2290M2	22.9	165	265	2	●
D2300M2	23.0	165	265	2	●
D2310M3	23.1	165	285	3	●
D2320M3	23.2	165	285	3	●
D2330M3	23.3	165	285	3	●
D2340M3	23.4	165	285	3	●
D2350M3	23.5	165	285	3	●
D2360M3	23.6	165	285	3	●
D2370M3	23.7	165	285	3	●
D2380M3	23.8	165	285	3	●
D2390M3	23.9	165	285	3	●

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	M.T.No.	Stock
TDD2400M3	24.0	165	285	3	●
D2410M3	24.1	165	285	3	●
D2420M3	24.2	165	285	3	●
D2430M3	24.3	165	285	3	●
D2440M3	24.4	165	285	3	●
D2450M3	24.5	165	285	3	●
D2460M3	24.6	165	285	3	●
D2470M3	24.7	165	285	3	●
D2480M3	24.8	165	285	3	●
D2490M3	24.9	165	285	3	●
D2500M3	25.0	165	285	3	●
D2510M3	25.1	165	285	3	●
D2520M3	25.2	165	285	3	●
D2530M3	25.3	165	285	3	●
D2540M3	25.4	165	285	3	●
D2550M3	25.5	165	285	3	●
D2560M3	25.6	165	285	3	●
D2570M3	25.7	165	285	3	●
D2580M3	25.8	165	285	3	●
D2590M3	25.9	165	285	3	●
D2600M3	26.0	165	285	3	●
D2610M3	26.1	170	290	3	●
D2620M3	26.2	170	290	3	●
D2630M3	26.3	170	290	3	●
D2640M3	26.4	170	290	3	●
D2650M3	26.5	170	290	3	●
D2660M3	26.6	170	290	3	●
D2670M3	26.7	170	290	3	●
D2680M3	26.8	170	290	3	●
D2690M3	26.9	170	290	3	●
D2700M3	27.0	170	290	3	●
D2710M3	27.1	175	295	3	●
D2720M3	27.2	175	295	3	●
D2730M3	27.3	175	295	3	●
D2740M3	27.4	175	295	3	●
D2750M3	27.5	175	295	3	●
D2760M3	27.6	175	295	3	●
D2770M3	27.7	175	295	3	●
D2780M3	27.8	175	295	3	●
D2790M3	27.9	175	295	3	●
D2800M3	28.0	175	295	3	●
D2810M3	28.1	180	300	3	●
D2820M3	28.2	180	300	3	●
D2830M3	28.3	180	300	3	●
D2840M3	28.4	180	300	3	●
D2850M3	28.5	180	300	3	●
D2860M3	28.6	180	300	3	●
D2870M3	28.7	180	300	3	●
D2880M3	28.8	180	300	3	●
D2890M3	28.9	180	300	3	●

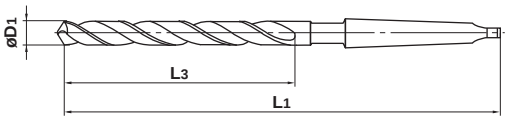
CUTTING CONDITIONS D212

TAPER SHANK DRILLS

TD
Taper shank

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● For general drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
TDD2900M3	29.0	180	300	3	●
D2910M3	29.1	185	305	3	●
D2920M3	29.2	185	305	3	●
D2930M3	29.3	185	305	3	●
D2940M3	29.4	185	305	3	●
D2950M3	29.5	185	305	3	●
D2960M3	29.6	185	305	3	●
D2970M3	29.7	185	305	3	●
D2980M3	29.8	185	305	3	●
D2990M3	29.9	185	305	3	●
D3000M3	30.0	185	305	3	●
D3010M3	30.1	190	310	3	●
D3020M3	30.2	190	310	3	●
D3030M3	30.3	190	310	3	●
D3040M3	30.4	190	310	3	●
D3050M3	30.5	190	310	3	●
D3060M3	30.6	190	310	3	●
D3070M3	30.7	190	310	3	●
D3080M3	30.8	190	310	3	●
D3090M3	30.9	190	310	3	●
D3100M3	31.0	190	310	3	●
D3110M3	31.1	195	315	3	●
D3120M3	31.2	195	315	3	●
D3130M3	31.3	195	315	3	●
D3140M3	31.4	195	315	3	●
D3150M3	31.5	195	315	3	●
D3160M3	31.6	195	315	3	●
D3170M3	31.7	195	315	3	●
D3180M3	31.8	195	315	3	●
D3190M3	31.9	195	315	3	●
D3200M3	32.0	195	315	3	●
D3250M4	32.5	200	345	4	●
D3300M4	33.0	200	345	4	●
D3350M4	33.5	205	350	4	●
D3400M4	34.0	205	350	4	●
D3450M4	34.5	205	350	4	●
D3500M4	35.0	205	350	4	●
D3550M4	35.5	210	355	4	●
D3600M4	36.0	210	355	4	●
D3650M4	36.5	210	355	4	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
TDD3700M4	37.0	210	355	4	●
D3750M4	37.5	215	360	4	●
D3800M4	38.0	215	360	4	●
D3850M4	38.5	215	360	4	●
D3900M4	39.0	215	360	4	●
D3950M4	39.5	220	365	4	●
D4000M4	40.0	220	365	4	●
D4050M4	40.5	220	365	4	●
D4100M4	41.0	220	365	4	●
D4150M4	41.5	225	370	4	●
D4200M4	42.0	225	370	4	●
D4250M4	42.5	225	370	4	●
D4300M4	43.0	225	370	4	●
D4350M4	43.5	230	375	4	●
D4400M4	44.0	230	375	4	●
D4450M4	44.5	230	375	4	●
D4500M4	45.0	230	375	4	●
D4550M4	45.5	235	380	4	●
D4600M4	46.0	235	380	4	●
D4650M4	46.5	235	380	4	●
D4700M4	47.0	235	380	4	●
D4750M4	47.5	240	385	4	●
D4800M4	48.0	240	385	4	●
D4850M4	48.5	240	385	4	●
D4900M4	49.0	240	385	4	●
D4950M4	49.5	245	390	4	●
D5000M4	50.0	245	390	4	●
D5100M5	51.0	245	425	5	●
D5200M5	52.0	250	430	5	●
D5300M5	53.0	250	430	5	●
D5400M5	54.0	255	435	5	●
D5500M5	55.0	255	435	5	●
D5600M5	56.0	260	440	5	●
D5700M5	57.0	260	440	5	●
D5800M5	58.0	265	445	5	●
D5900M5	59.0	265	445	5	●
D6000M5	60.0	270	450	5	●
D6100M5	61.0	270	450	5	●
D6200M5	62.0	275	455	5	●
D6300M5	63.0	275	455	5	●

● : **Inventory maintained in Japan.**

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	M.T.No.	Stock
TDD6400M5	64.0	280	460	5	●
D6500M5	65.0	280	460	5	●
D6600M5	66.0	285	465	5	●
D6700M5	67.0	285	465	5	●
D6800M5	68.0	290	470	5	●
D6900M5	69.0	290	470	5	●
D7000M5	70.0	295	475	5	●
D7100M5	71.0	295	475	5	●
D7200M5	72.0	300	480	5	●
D7300M5	73.0	300	480	5	●
D7400M5	74.0	305	485	5	●
D7500M5	75.0	305	485	5	●

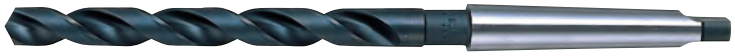
CUTTING CONDITIONS D212

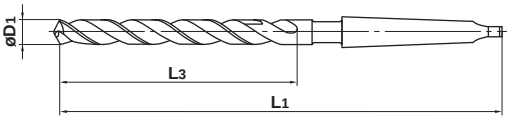
TAPER SHANK DRILLS

KTD
Cobalt HSS

CO HSS | 118° D1<10,D1>35 | 128° 10≤D1≤35 | C Thinning 16≤D1≤35 | S Thinning D1>35

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	





● Suitable for drilling of difficult-to-cut materials.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
KTDD0500M1	5.0	60	140	1	●
D0550M1	5.5	65	145	1	●
D0600M1	6.0	68	148	1	●
D0650M1	6.5	72	152	1	●
D0700M1	7.0	75	155	1	●
D0750M1	7.5	78	158	1	●
D0800M1	8.0	82	162	1	●
D0850M1	8.5	85	168	1	●
D0900M1	9.0	88	172	1	●
D0950M1	9.5	92	175	1	●
D1000M1	10.0	95	178	1	●
D1010M1	10.1	98	182	1	●
D1020M1	10.2	98	182	1	●
D1030M1	10.3	98	182	1	●
D1040M1	10.4	98	182	1	●
D1050M1	10.5	98	182	1	●
D1060M1	10.6	102	185	1	●
D1070M1	10.7	102	185	1	●
D1080M1	10.8	102	185	1	●
D1090M1	10.9	102	185	1	●
D1100M1	11.0	102	185	1	●
D1110M1	11.1	105	188	1	●
D1120M1	11.2	105	188	1	●
D1130M1	11.3	105	188	1	●
D1140M1	11.4	105	188	1	●
D1150M1	11.5	105	188	1	●
D1160M1	11.6	108	192	1	●
D1170M1	11.7	108	192	1	●
D1180M1	11.8	108	192	1	●
D1190M1	11.9	108	192	1	●
D1200M1	12.0	108	192	1	●
D1210M2	12.1	112	212	2	●
D1220M2	12.2	112	212	2	●
D1230M2	12.3	112	212	2	●
D1240M2	12.4	112	212	2	●
D1250M2	12.5	112	212	2	●
D1260M2	12.6	115	215	2	●
D1270M2	12.7	115	215	2	●
D1280M2	12.8	115	215	2	●
D1290M2	12.9	115	215	2	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
KTDD1300M2	13.0	115	215	2	●
D1310M2	13.1	118	218	2	●
D1320M2	13.2	118	218	2	●
D1330M2	13.3	118	218	2	●
D1340M2	13.4	118	218	2	●
D1350M2	13.5	118	218	2	●
D1360M2	13.6	122	222	2	●
D1370M2	13.7	122	222	2	●
D1380M2	13.8	122	222	2	●
D1390M2	13.9	122	222	2	●
D1400M2	14.0	122	222	2	●
D1410M2	14.1	122	222	2	●
D1420M2	14.2	122	222	2	●
D1430M2	14.3	122	222	2	●
D1440M2	14.4	122	222	2	●
D1450M2	14.5	122	222	2	●
D1460M2	14.6	125	225	2	●
D1470M2	14.7	125	225	2	●
D1480M2	14.8	125	225	2	●
D1490M2	14.9	125	225	2	●
D1500M2	15.0	125	225	2	●
D1510M2	15.1	128	228	2	●
D1520M2	15.2	128	228	2	●
D1530M2	15.3	128	228	2	●
D1540M2	15.4	128	228	2	●
D1550M2	15.5	128	228	2	●
D1560M2	15.6	130	230	2	●
D1570M2	15.7	130	230	2	●
D1580M2	15.8	130	230	2	●
D1590M2	15.9	130	230	2	●
D1600M2	16.0	130	230	2	●
D1610M2	16.1	132	232	2	●
D1620M2	16.2	132	232	2	●
D1630M2	16.3	132	232	2	●
D1640M2	16.4	132	232	2	●
D1650M2	16.5	132	232	2	●
D1660M2	16.6	135	235	2	●
D1670M2	16.7	135	235	2	●
D1680M2	16.8	135	235	2	●
D1690M2	16.9	135	235	2	●

● : Inventory maintained in Japan.

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	M.T.No.	Stock
KTDD1700M2	17.0	135	235	2	●
D1710M2	17.1	140	240	2	●
D1720M2	17.2	140	240	2	●
D1730M2	17.3	140	240	2	●
D1740M2	17.4	140	240	2	●
D1750M2	17.5	140	240	2	●
D1760M2	17.6	140	240	2	●
D1770M2	17.7	140	240	2	●
D1780M2	17.8	140	240	2	●
D1790M2	17.9	140	240	2	●
D1800M2	18.0	140	240	2	●
D1810M2	18.1	145	245	2	●
D1820M2	18.2	145	245	2	●
D1830M2	18.3	145	245	2	●
D1840M2	18.4	145	245	2	●
D1850M2	18.5	145	245	2	●
D1860M2	18.6	145	245	2	●
D1870M2	18.7	145	245	2	●
D1880M2	18.8	145	245	2	●
D1890M2	18.9	145	245	2	●
D1900M2	19.0	145	245	2	●
D1910M2	19.1	150	250	2	●
D1920M2	19.2	150	250	2	●
D1930M2	19.3	150	250	2	●
D1940M2	19.4	150	250	2	●
D1950M2	19.5	150	250	2	●
D1960M2	19.6	150	250	2	●
D1970M2	19.7	150	250	2	●
D1980M2	19.8	150	250	2	●
D1990M2	19.9	150	250	2	●
D2000M2	20.0	150	250	2	●
D2010M3	20.1	155	275	3	●
D2020M3	20.2	155	275	3	●
D2030M3	20.3	155	275	3	●
D2040M3	20.4	155	275	3	●
D2050M3	20.5	155	275	3	●
D2060M3	20.6	155	275	3	●
D2070M3	20.7	155	275	3	●
D2080M3	20.8	155	275	3	●
D2090M3	20.9	155	275	3	●
D2100M3	21.0	155	275	3	●
D2110M3	21.1	160	280	3	●
D2120M3	21.2	160	280	3	●
D2130M3	21.3	160	280	3	●
D2140M3	21.4	160	280	3	●
D2150M3	21.5	160	280	3	●
D2160M3	21.6	160	280	3	●
D2170M3	21.7	160	280	3	●
D2180M3	21.8	160	280	3	●
D2190M3	21.9	160	280	3	●

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	M.T.No.	Stock
KTDD2200M3	22.0	160	280	3	●
D2210M3	22.1	165	285	3	●
D2220M3	22.2	165	285	3	●
D2230M3	22.3	165	285	3	●
D2240M3	22.4	165	285	3	●
D2250M3	22.5	165	285	3	●
D2260M3	22.6	165	285	3	●
D2270M3	22.7	165	285	3	●
D2280M3	22.8	165	285	3	●
D2290M3	22.9	165	285	3	●
D2300M3	23.0	165	285	3	●
D2310M3	23.1	165	285	3	●
D2320M3	23.2	165	285	3	●
D2330M3	23.3	165	285	3	●
D2340M3	23.4	165	285	3	●
D2350M3	23.5	165	285	3	●
D2360M3	23.6	165	285	3	●
D2370M3	23.7	165	285	3	●
D2380M3	23.8	165	285	3	●
D2390M3	23.9	165	285	3	●
D2400M3	24.0	165	285	3	●
D2410M3	24.1	165	285	3	●
D2420M3	24.2	165	285	3	●
D2430M3	24.3	165	285	3	●
D2440M3	24.4	165	285	3	●
D2450M3	24.5	165	285	3	●
D2460M3	24.6	165	285	3	●
D2470M3	24.7	165	285	3	●
D2480M3	24.8	165	285	3	●
D2490M3	24.9	165	285	3	●
D2500M3	25.0	165	285	3	●
D2510M3	25.1	165	285	3	●
D2520M3	25.2	165	285	3	●
D2530M3	25.3	165	285	3	●
D2540M3	25.4	165	285	3	●
D2550M3	25.5	165	285	3	●
D2560M3	25.6	165	285	3	●
D2570M3	25.7	165	285	3	●
D2580M3	25.8	165	285	3	●
D2590M3	25.9	165	285	3	●
D2600M3	26.0	165	285	3	●
D2650M3	26.5	170	290	3	●
D2700M3	27.0	170	290	3	●
D2750M4	27.5	175	320	4	●
D2800M4	28.0	175	320	4	●
D2850M4	28.5	180	325	4	●
D2900M4	29.0	180	325	4	●
D2950M4	29.5	185	330	4	●
D3000M4	30.0	185	330	4	●
D3050M4	30.5	190	335	4	●

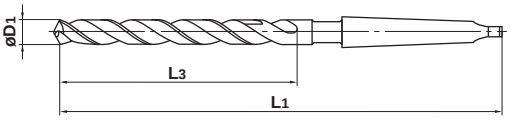
CUTTING CONDITIONS D212

TAPER SHANK DRILLS

KTD
Cobalt HSS

CO HSS | 118° D1<10,D1>35 | 128° 10≤D1≤35 | C Thinning 16≤D1≤35 | S Thinning D1>35

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Suitable for drilling of difficult-to-cut materials.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
KTDD3100M4	31.0	190	335	4	●
D3150M4	31.5	195	340	4	●
D3200M4	32.0	195	340	4	●
D3300M4	33.0	200	345	4	●
D3400M4	34.0	205	350	4	●
D3500M4	35.0	205	350	4	●
D3600M4	36.0	210	355	4	●
D3700M4	37.0	210	355	4	●
D3800M4	38.0	215	360	4	●
D3900M4	39.0	215	360	4	●
D4000M4	40.0	220	365	4	●
D4100M4	41.0	220	365	4	●
D4200M4	42.0	225	370	4	●
D4300M4	43.0	225	370	4	●
D4400M4	44.0	230	375	4	●
D4500M4	45.0	230	375	4	●
D4600M4	46.0	235	380	4	●
D4700M4	47.0	235	380	4	●
D4800M4	48.0	240	385	4	●
D4900M4	49.0	240	385	4	●
D5000M4	50.0	245	390	4	●

● : **Inventory maintained in Japan.**

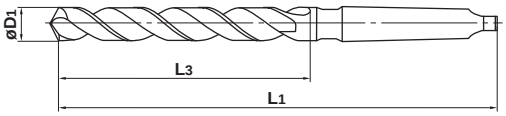
CUTTING CONDITIONS D212

GE-UTM

TiN, For stainless steel

CO HSS | G | 118° | XR Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	



● Geometry and coating for stainless steel drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GEUTMD0600M1	6.0	55	136	1	●
D0650M1	6.5	61	142	1	●
D0660M1	6.6	61	142	1	●
D0670M1	6.7	61	142	1	●
D0680M1	6.8	67	148	1	●
D0700M1	7.0	67	148	1	●
D0750M1	7.5	67	148	1	●
D0770M1	7.7	72	153	1	●
D0780M1	7.8	72	153	1	●
D0800M1	8.0	72	153	1	●
D0820M1	8.2	72	153	1	●
D0830M1	8.3	72	153	1	●
D0850M1	8.5	72	153	1	●
D0860M1	8.6	78	159	1	●
D0870M1	8.7	78	159	1	●
D0880M1	8.8	78	159	1	●
D0900M1	9.0	78	159	1	●
D0950M1	9.5	78	159	1	●
D0970M1	9.7	84	165	1	●
D0980M1	9.8	84	165	1	●
D1000M1	10.0	84	165	1	●
D1020M1	10.2	84	165	1	●
D1030M1	10.3	84	165	1	●
D1040M1	10.4	84	165	1	●
D1050M1	10.5	84	165	1	●
D1070M1	10.7	90	171	1	●
D1080M1	10.8	90	171	1	●
D1100M1	11.0	90	171	1	●
D1120M1	11.2	90	171	1	●
D1150M1	11.5	90	171	1	●
D1180M1	11.8	90	171	1	●
D1200M1	12.0	97	178	1	●
D1220M1	12.2	97	178	1	●
D1230M1	12.3	97	178	1	●
D1250M1	12.5	97	178	1	●
D1300M1	13.0	97	178	1	●
D1320M1	13.2	97	178	1	●
D1330M1	13.3	103	184	1	●
D1340M1	13.4	103	184	1	●
D1350M1	13.5	103	184	1	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GEUTMD1380M1	13.8	103	184	1	●
D1400M1	14.0	103	184	1	●
D1410M2	14.1	109	207	2	●
D1420M2	14.2	109	207	2	●
D1430M2	14.3	109	207	2	●
D1450M2	14.5	109	207	2	●
D1470M2	14.7	109	207	2	●
D1500M2	15.0	109	207	2	●
D1520M2	15.2	115	213	2	●
D1530M2	15.3	115	213	2	●
D1550M2	15.5	115	213	2	●
D1570M2	15.7	115	213	2	●
D1580M2	15.8	115	213	2	●
D1600M2	16.0	115	213	2	●
D1610M2	16.1	119	217	2	●
D1620M2	16.2	119	217	2	●
D1650M2	16.5	119	217	2	●
D1700M2	17.0	119	217	2	●
D1750M2	17.5	124	222	2	●
D1800M2	18.0	124	222	2	●
D1850M2	18.5	129	227	2	●
D1900M2	19.0	129	227	2	●
D1950M2	19.5	133	231	2	●
D2000M2	20.0	133	231	2	●
D2050M2	20.5	138	236	2	●
D2100M2	21.0	138	236	2	●
D2150M2	21.5	143	241	2	●
D2200M2	22.0	143	241	2	●
D2250M2	22.5	147	245	2	●
D2300M2	23.0	147	245	2	●
D2350M3	23.5	147	268	3	●
D2400M3	24.0	152	273	3	●
D2450M3	24.5	152	273	3	●
D2500M3	25.0	152	273	3	●
D2550M3	25.5	156	277	3	●
D2600M3	26.0	156	277	3	●
D2650M3	26.5	156	277	3	●
D2700M3	27.0	161	282	3	●
D2750M3	27.5	161	282	3	●
D2800M3	28.0	161	282	3	●

CUTTING CONDITIONS D211

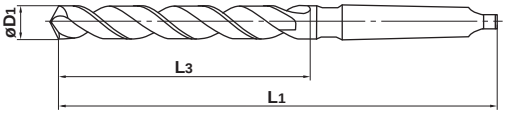
HSS

GE-UTM

TiN, For stainless steel

CO HSS | G | 118° | XR Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○		◎	○	○	



● Geometry and coating for stainless steel drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GEUTMD2850M3	28.5	165	286	3	●
D2900M3	29.0	165	286	3	●
D2950M3	29.5	165	286	3	●
D3000M3	30.0	165	286	3	●
D3050M3	30.5	170	291	3	●
D3100M3	31.0	170	291	3	●
D3150M3	31.5	170	291	3	●
D3200M3	32.0	174	298	3	●

● : **Inventory maintained in Japan.**

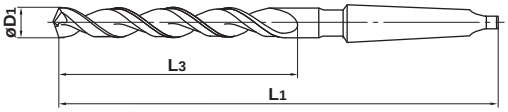
CUTTING CONDITIONS D211

G-WTS

TiN, For deep hole, Convolute flute

CO HSS | G | 118° | XR Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Suitable for general and deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GWTSD0600M1	6.0	68	148	1	●
D0610M1	6.1	72	152	1	●
D0620M1	6.2	72	152	1	●
D0630M1	6.3	72	152	1	●
D0640M1	6.4	72	152	1	●
D0650M1	6.5	72	152	1	●
D0660M1	6.6	75	155	1	●
D0670M1	6.7	75	155	1	●
D0680M1	6.8	75	155	1	●
D0690M1	6.9	75	155	1	●
D0700M1	7.0	75	155	1	●
D0710M1	7.1	78	158	1	●
D0720M1	7.2	78	158	1	●
D0730M1	7.3	78	158	1	●
D0740M1	7.4	78	158	1	●
D0750M1	7.5	78	158	1	●
D0760M1	7.6	82	162	1	●
D0770M1	7.7	82	162	1	●
D0780M1	7.8	82	162	1	●
D0790M1	7.9	82	162	1	●
D0800M1	8.0	82	162	1	●
D0810M1	8.1	85	168	1	●
D0820M1	8.2	85	168	1	●
D0830M1	8.3	85	168	1	●
D0840M1	8.4	85	168	1	●
D0850M1	8.5	85	168	1	●
D0860M1	8.6	88	172	1	●
D0870M1	8.7	88	172	1	●
D0880M1	8.8	88	172	1	●
D0890M1	8.9	88	172	1	●
D0900M1	9.0	88	172	1	●
D0910M1	9.1	92	175	1	●
D0920M1	9.2	92	175	1	●
D0930M1	9.3	92	175	1	●
D0940M1	9.4	92	175	1	●
D0950M1	9.5	92	175	1	●
D0960M1	9.6	95	178	1	●
D0970M1	9.7	95	178	1	●
D0980M1	9.8	95	178	1	●
D0990M1	9.9	95	178	1	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GWTSD1000M1	10.0	95	178	1	●
D1010M1	10.1	98	182	1	●
D1020M1	10.2	98	182	1	●
D1030M1	10.3	98	182	1	●
D1040M1	10.4	98	182	1	●
D1050M1	10.5	98	182	1	●
D1060M1	10.6	102	185	1	●
D1070M1	10.7	102	185	1	●
D1080M1	10.8	102	185	1	●
D1090M1	10.9	102	185	1	●
D1100M1	11.0	102	185	1	●
D1110M1	11.1	105	188	1	●
D1120M1	11.2	105	188	1	●
D1130M1	11.3	105	188	1	●
D1140M1	11.4	105	188	1	●
D1150M1	11.5	105	188	1	●
D1160M1	11.6	108	192	1	●
D1170M1	11.7	108	192	1	●
D1180M1	11.8	108	192	1	●
D1190M1	11.9	108	192	1	●
D1200M1	12.0	108	192	1	●
D1210M2	12.1	112	212	2	●
D1220M2	12.2	112	212	2	●
D1230M2	12.3	112	212	2	●
D1240M2	12.4	112	212	2	●
D1250M2	12.5	112	212	2	●
D1260M2	12.6	115	215	2	●
D1270M2	12.7	115	215	2	●
D1280M2	12.8	115	215	2	●
D1290M2	12.9	115	215	2	●
D1300M2	13.0	115	215	2	●
D1310M2	13.1	118	218	2	●
D1320M2	13.2	118	218	2	●
D1330M2	13.3	118	218	2	●
D1340M2	13.4	118	218	2	●
D1350M2	13.5	118	218	2	●
D1360M2	13.6	122	222	2	●
D1370M2	13.7	122	222	2	●
D1380M2	13.8	122	222	2	●
D1390M2	13.9	122	222	2	●

CUTTING CONDITIONS D211

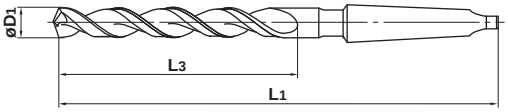
HSS

G-WTS

TiN, For deep hole, Convolute flute

CO HSS | G | 118° | XR Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎		○	○	○	



● Suitable for general and deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GWTSD1400M2	14.0	122	222	2	●
D1410M2	14.1	122	222	2	●
D1420M2	14.2	122	222	2	●
D1430M2	14.3	122	222	2	●
D1440M2	14.4	122	222	2	●
D1450M2	14.5	122	222	2	●
D1460M2	14.6	125	225	2	●
D1470M2	14.7	125	225	2	●
D1480M2	14.8	125	225	2	●
D1490M2	14.9	125	225	2	●
D1500M2	15.0	125	225	2	●
D1510M2	15.1	128	228	2	●
D1520M2	15.2	128	228	2	●
D1530M2	15.3	128	228	2	●
D1540M2	15.4	128	228	2	●
D1550M2	15.5	128	228	2	●
D1560M2	15.6	130	230	2	●
D1570M2	15.7	130	230	2	●
D1580M2	15.8	130	230	2	●
D1590M2	15.9	130	230	2	●
D1600M2	16.0	130	230	2	●
D1650M2	16.5	132	232	2	●
D1700M2	17.0	135	235	2	●
D1750M2	17.5	140	240	2	●
D1800M2	18.0	140	240	2	●
D1850M2	18.5	145	245	2	●
D1900M2	19.0	145	245	2	●
D1950M2	19.5	150	250	2	●
D2000M2	20.0	150	250	2	●
D2050M3	20.5	155	275	3	●
D2100M3	21.0	155	275	3	●
D2150M3	21.5	160	280	3	●
D2200M3	22.0	160	280	3	●
D2250M3	22.5	165	285	3	●
D2300M3	23.0	165	285	3	●
D2350M3	23.5	165	285	3	●
D2400M3	24.0	165	285	3	●
D2450M3	24.5	165	285	3	●
D2500M3	25.0	165	285	3	●
D2550M3	25.5	165	285	3	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GWTSD2600M3	26.0	165	285	3	●
D2650M3	26.5	170	290	3	●
D2700M3	27.0	170	290	3	●
D2750M4	27.5	175	320	4	●
D2800M4	28.0	175	320	4	●
D2850M4	28.5	180	325	4	●
D2900M4	29.0	180	325	4	●
D2950M4	29.5	185	330	4	●
D3000M4	30.0	185	330	4	●
D3050M4	30.5	190	335	4	●
D3100M4	31.0	190	335	4	●
D3150M4	31.5	195	340	4	●
D3200M4	32.0	195	340	4	●

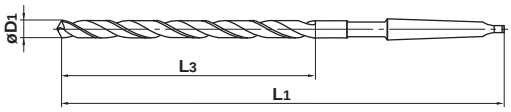
● : Inventory maintained in Japan.

CUTTING CONDITIONS D211

LTD
Extra long

HSS | 118° | S Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○			○	○	



● For deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
LTDD0600A200M1	6.0	100	200	1	●
D0600A250M1	6.0	150	250	1	●
D0600A300M1	6.0	200	300	1	●
D0600A350M1	6.0	225	350	1	●
D0650A250M1	6.5	150	250	1	●
D0650A300M1	6.5	200	300	1	●
D0650A350M1	6.5	225	350	1	●
D0700A250M1	7.0	150	250	1	●
D0700A300M1	7.0	200	300	1	●
D0700A350M1	7.0	225	350	1	●
D0750A250M1	7.5	150	250	1	●
D0750A300M1	7.5	200	300	1	●
D0750A350M1	7.5	225	350	1	●
D0800A250M1	8.0	150	250	1	●
D0800A300M1	8.0	200	300	1	●
D0800A350M1	8.0	225	350	1	●
D0850A250M1	8.5	150	250	1	●
D0850A300M1	8.5	200	300	1	●
D0850A350M1	8.5	225	350	1	●
D0900A250M1	9.0	150	250	1	●
D0900A300M1	9.0	200	300	1	●
D0900A350M1	9.0	225	350	1	●
D0950A250M1	9.5	150	250	1	●
D0950A300M1	9.5	200	300	1	●
D0950A350M1	9.5	225	350	1	●
D0950A400M1	9.5	250	400	1	●
D1000A250M1	10.0	150	250	1	●
D1000A300M1	10.0	200	300	1	●
D1000A350M1	10.0	225	350	1	●
D1000A400M1	10.0	250	400	1	●
D1050A250M1	10.5	150	250	1	●
D1050A300M1	10.5	200	300	1	●
D1050A350M1	10.5	225	350	1	●
D1050A400M1	10.5	250	400	1	●
D1100A250M1	11.0	150	250	1	●
D1100A300M1	11.0	200	300	1	●
D1100A350M1	11.0	225	350	1	●
D1100A400M1	11.0	250	400	1	●
D1150A250M1	11.5	150	250	1	●
D1150A300M1	11.5	200	300	1	●

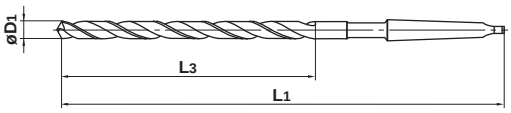
Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
LTDD1150A350M1	11.5	225	350	1	●
D1150A400M1	11.5	250	400	1	●
D1200A250M1	12.0	150	250	1	●
D1200A300M1	12.0	200	300	1	●
D1200A350M1	12.0	225	350	1	●
D1200A400M1	12.0	250	400	1	●
D1250A250M1	12.5	150	250	1	●
D1250A300M1	12.5	200	300	1	●
D1250A350M1	12.5	225	350	1	●
D1250A400M1	12.5	250	400	1	●
D1300A250M1	13.0	150	250	1	●
D1300A300M1	13.0	200	300	1	●
D1300A350M1	13.0	225	350	1	●
D1300A400M1	13.0	250	400	1	●
D1350A300M1	13.5	200	300	1	●
D1350A350M1	13.5	225	350	1	●
D1350A400M1	13.5	250	400	1	●
D1350A450M1	13.5	300	450	1	●
D1350A500M1	13.5	350	500	1	●
D1350A600M1	13.5	400	600	1	●
D1400A300M1	14.0	200	300	1	●
D1400A350M1	14.0	225	350	1	●
D1400A400M1	14.0	250	400	1	●
D1400A450M1	14.0	300	450	1	●
D1400A500M1	14.0	350	500	1	●
D1400A600M1	14.0	400	600	1	●
D1450A300M2	14.5	175	300	2	●
D1450A350M2	14.5	225	350	2	●
D1450A400M2	14.5	250	400	2	●
D1450A450M2	14.5	300	450	2	●
D1450A500M2	14.5	350	500	2	●
D1450A600M2	14.5	400	600	2	●
D1500A300M2	15.0	175	300	2	●
D1500A350M2	15.0	225	350	2	●
D1500A400M2	15.0	250	400	2	●
D1500A450M2	15.0	300	450	2	●
D1500A500M2	15.0	350	500	2	●
D1500A600M2	15.0	400	600	2	●
D1550A300M2	15.5	175	300	2	●
D1550A350M2	15.5	225	350	2	●

TAPER SHANK DRILLS

LTD
Extra long

HSS | 118° | S Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○			○	○	



● For deep hole drilling.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
LTDD1550A400M2	15.5	250	400	2	●
D1550A450M2	15.5	300	450	2	●
D1550A500M2	15.5	350	500	2	●
D1550A600M2	15.5	400	600	2	●
D1600A300M2	16.0	175	300	2	●
D1600A350M2	16.0	225	350	2	●
D1600A400M2	16.0	250	400	2	●
D1600A450M2	16.0	300	450	2	●
D1600A500M2	16.0	350	500	2	●
D1600A600M2	16.0	400	600	2	●
D1650A300M2	16.5	175	300	2	●
D1650A350M2	16.5	225	350	2	●
D1650A400M2	16.5	250	400	2	●
D1650A450M2	16.5	300	450	2	●
D1650A500M2	16.5	350	500	2	●
D1650A600M2	16.5	400	600	2	●
D1700A300M2	17.0	175	300	2	●
D1700A350M2	17.0	225	350	2	●
D1700A400M2	17.0	250	400	2	●
D1700A450M2	17.0	300	450	2	●
D1700A500M2	17.0	350	500	2	●
D1700A600M2	17.0	400	600	2	●
D1750A300M2	17.5	175	300	2	●
D1750A350M2	17.5	225	350	2	●
D1750A400M2	17.5	250	400	2	●
D1750A450M2	17.5	300	450	2	●
D1750A500M2	17.5	350	500	2	●
D1750A600M2	17.5	400	600	2	●
D1800A300M2	18.0	175	300	2	●
D1800A350M2	18.0	225	350	2	●
D1800A400M2	18.0	250	400	2	●
D1800A450M2	18.0	300	450	2	●
D1800A500M2	18.0	350	500	2	●
D1800A600M2	18.0	400	600	2	●
D1850A300M2	18.5	175	300	2	●
D1850A350M2	18.5	225	350	2	●
D1850A400M2	18.5	250	400	2	●
D1850A450M2	18.5	300	450	2	●
D1850A500M2	18.5	350	500	2	●
D1850A600M2	18.5	400	600	2	●

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
LTDD1900A300M2	19.0	175	300	2	●
D1900A350M2	19.0	225	350	2	●
D1900A400M2	19.0	250	400	2	●
D1900A450M2	19.0	300	450	2	●
D1900A500M2	19.0	350	500	2	●
D1900A600M2	19.0	400	600	2	●
D1950A300M2	19.5	175	300	2	●
D1950A350M2	19.5	225	350	2	●
D1950A400M2	19.5	250	400	2	●
D1950A450M2	19.5	300	450	2	●
D1950A500M2	19.5	350	500	2	●
D1950A600M2	19.5	400	600	2	●
D2000A300M2	20.0	175	300	2	●
D2000A350M2	20.0	225	350	2	●
D2000A400M2	20.0	250	400	2	●
D2000A450M2	20.0	300	450	2	●
D2000A500M2	20.0	350	500	2	●
D2000A600M2	20.0	400	600	2	●
D2050A350M2	20.5	225	350	2	●
D2050A400M2	20.5	250	400	2	●
D2050A450M2	20.5	300	450	2	●
D2050A500M2	20.5	350	500	2	●
D2050A600M2	20.5	400	600	2	●
D2100A350M2	21.0	225	350	2	●
D2100A400M2	21.0	250	400	2	●
D2100A450M2	21.0	300	450	2	●
D2100A500M2	21.0	350	500	2	●
D2100A600M2	21.0	400	600	2	●
D2150A350M2	21.5	225	350	2	●
D2150A400M2	21.5	250	400	2	●
D2150A450M2	21.5	300	450	2	●
D2150A500M2	21.5	350	500	2	●
D2150A600M2	21.5	400	600	2	●
D2200A350M2	22.0	225	350	2	●
D2200A400M2	22.0	250	400	2	●
D2200A450M2	22.0	300	450	2	●
D2200A500M2	22.0	350	500	2	●
D2200A600M2	22.0	400	600	2	●
D2250A350M2	22.5	225	350	2	●
D2250A400M2	22.5	250	400	2	●

● : **Inventory maintained in Japan.**

Unit : mm

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	M.T.No.	Stock
LTDD2250A450M2	22.5	300	450	2	●
D2250A500M2	22.5	350	500	2	●
D2250A600M2	22.5	400	600	2	●
D2300A350M2	23.0	225	350	2	●
D2300A400M2	23.0	250	400	2	●
D2300A450M2	23.0	300	450	2	●
D2300A500M2	23.0	350	500	2	●
D2300A600M2	23.0	400	600	2	●
D2350A350M3	23.5	200	350	3	●
D2350A400M3	23.5	250	400	3	●
D2350A450M3	23.5	300	450	3	●
D2350A500M3	23.5	350	500	3	●
D2350A600M3	23.5	400	600	3	●
D2400A350M3	24.0	200	350	3	●
D2400A400M3	24.0	250	400	3	●
D2400A450M3	24.0	300	450	3	●
D2400A500M3	24.0	350	500	3	●
D2400A600M3	24.0	400	600	3	●
D2450A350M3	24.5	200	350	3	●
D2450A400M3	24.5	250	400	3	●
D2450A450M3	24.5	300	450	3	●
D2450A500M3	24.5	350	500	3	●
D2450A600M3	24.5	400	600	3	●
D2500A350M3	25.0	200	350	3	●
D2500A400M3	25.0	250	400	3	●
D2500A450M3	25.0	300	450	3	●
D2500A500M3	25.0	350	500	3	●
D2500A600M3	25.0	400	600	3	●
D2550A400M3	25.5	250	400	3	●
D2550A450M3	25.5	300	450	3	●
D2550A500M3	25.5	350	500	3	●
D2550A600M3	25.5	400	600	3	●
D2600A400M3	26.0	250	400	3	●
D2600A450M3	26.0	300	450	3	●
D2600A500M3	26.0	350	500	3	●
D2600A600M3	26.0	400	600	3	●
D2650A400M3	26.5	250	400	3	●
D2650A450M3	26.5	300	450	3	●
D2650A500M3	26.5	350	500	3	●
D2650A600M3	26.5	400	600	3	●
D2700A400M3	27.0	250	400	3	●
D2700A450M3	27.0	300	450	3	●
D2700A500M3	27.0	350	500	3	●
D2700A600M3	27.0	400	600	3	●
D2750A400M3	27.5	250	400	3	●
D2750A450M3	27.5	300	450	3	●
D2750A500M3	27.5	350	500	3	●
D2750A600M3	27.5	400	600	3	●
D2800A400M3	28.0	250	400	3	●
D2800A450M3	28.0	300	450	3	●

Order Number	Drill Dia. D_1	Flute Length L_3	Overall Length L_1	M.T.No.	Stock
LTDD2800A500M3	28.0	350	500	3	●
D2800A600M3	28.0	400	600	3	●
D2850A400M3	28.5	250	400	3	●
D2850A450M3	28.5	300	450	3	●
D2850A500M3	28.5	350	500	3	●
D2850A600M3	28.5	400	600	3	●
D2900A400M3	29.0	250	400	3	●
D2900A450M3	29.0	300	450	3	●
D2900A500M3	29.0	350	500	3	●
D2900A600M3	29.0	400	600	3	●
D2950A400M3	29.5	250	400	3	●
D2950A450M3	29.5	300	450	3	●
D2950A500M3	29.5	350	500	3	●
D2950A600M3	29.5	400	600	3	●
D3000A400M3	30.0	250	400	3	●
D3000A450M3	30.0	300	450	3	●
D3000A500M3	30.0	350	500	3	●
D3000A600M3	30.0	400	600	3	●
D3050A450M3	30.5	300	450	3	●
D3050A500M3	30.5	350	500	3	●
D3050A600M3	30.5	400	600	3	●
D3100A450M3	31.0	300	450	3	●
D3100A500M3	31.0	350	500	3	●
D3100A600M3	31.0	400	600	3	●
D3150A450M3	31.5	300	450	3	●
D3150A500M3	31.5	350	500	3	●
D3150A600M3	31.5	400	600	3	●
D3200A450M3	32.0	300	450	3	●
D3200A500M3	32.0	350	500	3	●
D3200A600M3	32.0	400	600	3	●
D3300A500M4	33.0	350	500	4	●
D3300A600M4	33.0	400	600	4	●
D3400A500M4	34.0	350	500	4	●
D3400A600M4	34.0	400	600	4	●
D3500A500M4	35.0	350	500	4	●
D3500A600M4	35.0	400	600	4	●
D3600A500M4	36.0	350	500	4	●
D3600A600M4	36.0	400	600	4	●
D3700A500M4	37.0	350	500	4	●
D3700A600M4	37.0	400	600	4	●
D3800A500M4	38.0	350	500	4	●
D3800A600M4	38.0	400	600	4	●
D3900A500M4	39.0	350	500	4	●
D3900A600M4	39.0	400	600	4	●
D4000A500M4	40.0	350	500	4	●
D4000A600M4	40.0	400	600	4	●

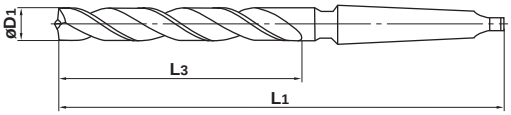
TAPER SHANK DRILLS

G-TTD

TiN, For steel frame

HSS | G | 160° 100° | N Thinning

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
◎					



● Special point geometry for minimal through hole burrs.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
GTTDD1700M3	17.0	135	255	3	●
D1750M3	17.5	140	260	3	●
D1800M3	18.0	140	260	3	●
D1900M3	19.0	145	265	3	●
D2000M3	20.0	150	270	3	●
D2150M3	21.5	160	280	3	●
D2200M3	22.0	160	280	3	●
D2250M3	22.5	165	285	3	●
D2300M3	23.0	165	285	3	●
D2350M3	23.5	165	285	3	●
D2400M3	24.0	165	285	3	●
D2450M3	24.5	165	285	3	●
D2500M3	25.0	165	285	3	●
D2600M3	26.0	165	285	3	●
D2650M3	26.5	170	290	3	●
D2800M4	28.0	175	320	4	●
D3200M4	32.0	195	340	4	●

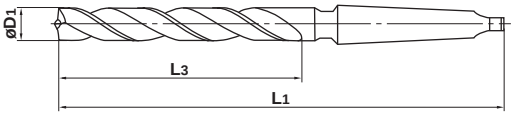
● : **Inventory maintained in Japan.**

CUTTING CONDITIONS D211

TTD

For steel frame

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○					



● Special point geometry for minimal through hole burrs.

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	M.T.No.	Stock
TTDD1700M3	17.0	135	255	3	●
D1750M3	17.5	140	260	3	●
D1800M3	18.0	140	260	3	●
D1900M3	19.0	145	265	3	●
D2000M3	20.0	150	270	3	●
D2150M3	21.5	160	280	3	●
D2200M3	22.0	160	280	3	●
D2250M3	22.5	165	285	3	●
D2300M3	23.0	165	285	3	●
D2350M3	23.5	165	285	3	●
D2400M3	24.0	165	285	3	●
D2450M3	24.5	165	285	3	●
D2500M3	25.0	165	285	3	●
D2600M3	26.0	165	285	3	●
D2650M3	26.5	170	290	3	●
D2800M4	28.0	175	320	4	●
D3200M4	32.0	195	340	4	●

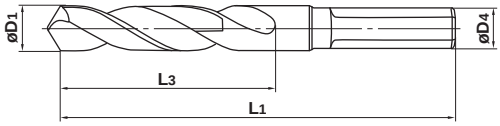
TRIANGULAR SHANK DRILLS

3KD

Triangular shank (Type 6.5)(Type 10)(Type 13)

HSS 118°

Carbon Steel Alloy Steel	Hardened Steel	Stainless Steel	Cast Iron	Light Alloy	Heat Resistant Alloy
○			○	○	



● 3 shank types for portable power tools.

Type 6.5

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
3KD6D0700	7.0	35	75	6.5	●
6D0750	7.5	35	75	6.5	●
6D0800	8.0	35	75	6.5	●
6D0850	8.5	35	75	6.5	●
6D0900	9.0	35	75	6.5	●
6D0950	9.5	35	75	6.5	●
6D1000	10.0	50	90	6.5	●
6D1050	10.5	50	90	6.5	●
6D1100	11.0	50	90	6.5	●
6D1150	11.5	50	90	6.5	●
6D1200	12.0	50	90	6.5	●
6D1250	12.5	50	90	6.5	●
6D1300	13.0	50	90	6.5	●

Type 10

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
3KD10D1000	10.0	50	90	10	●
10D1050	10.5	50	90	10	●
10D1100	11.0	50	90	10	●
10D1150	11.5	50	90	10	●
10D1200	12.0	50	90	10	●
10D1250	12.5	50	90	10	●
10D1300	13.0	50	90	10	●
10D1350	13.5	85	140	10	●
10D1400	14.0	85	140	10	●
10D1450	14.5	85	140	10	●
10D1500	15.0	85	140	10	●
10D1550	15.5	85	140	10	●
10D1600	16.0	85	140	10	●

Type 13

Unit : mm

Order Number	Drill Dia. D1	Flute Length L3	Overall Length L1	Shank Dia. D4	Stock
3KD13D1350	13.5	85	140	13	●
13D1400	14.0	85	140	13	●
13D1450	14.5	85	140	13	●
13D1500	15.0	85	140	13	●
13D1550	15.5	85	140	13	●
13D1600	16.0	85	140	13	●
13D1650	16.5	85	140	13	●
13D1700	17.0	85	140	13	●
13D1750	17.5	85	140	13	●
13D1800	18.0	85	140	13	●
13D1850	18.5	85	140	13	●
13D1900	19.0	85	140	13	●
13D1950	19.5	85	140	13	●
13D2000	20.0	85	140	13	●
13D2050	20.5	85	140	13	●
13D2100	21.0	85	140	13	●
13D2150	21.5	85	140	13	●
13D2200	22.0	85	140	13	●
13D2250	22.5	85	140	13	●
13D2300	23.0	85	140	13	●
13D2350	23.5	85	140	13	●
13D2400	24.0	85	140	13	●
13D2450	24.5	85	140	13	●
13D2500	25.0	85	140	13	●
13D2550	25.5	85	140	13	●
13D2600	26.0	85	140	13	●

● : Inventory maintained in Japan.

G-SD G-WSS G-WSL G-TD GE-UTM G-WTS G-TTD

TiN coated drills

RECOMMENDED CUTTING CONDITIONS

Work material	Structural steel SS Carbon steel S-C (−25HRC)		Alloy steel SCM Tool steel SK (−35HRC)		Alloy steel SCM Die steel SKD (−40HRC)		Cast iron FC	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	8000	0.01	7000	0.008	6000	0.005	8000	0.01
1.0	6000	0.02	5500	0.01	4500	0.008	6000	0.02
2.0	4700	0.05	3600	0.03	2400	0.02	4700	0.05
3.0	3200	0.10	2400	0.08	1800	0.05	3500	0.10
6.0	1600	0.18	1200	0.15	900	0.13	1750	0.18
8.0	1200	0.20	900	0.18	680	0.15	1300	0.20
10.0	960	0.22	720	0.20	550	0.18	1100	0.22
12.0	800	0.24	600	0.22	450	0.20	880	0.24
15.0	630	0.28	480	0.24	350	0.22	700	0.28
20.0	470	0.33	360	0.26	260	0.24	530	0.33
25.0	380	0.36	290	0.28	210	0.26	420	0.36
30.0	310	0.40	240	0.30	180	0.28	330	0.40

Work material	Stainless steel				Copper alloy, Brass		Aluminium alloy	
	Martensitic AISI 420 Ferritic AISI 430		Austenitic AISI 304 Precipitation hardening ASTM 630					
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	8000	0.01	6000	0.01	8000	0.01	10000	0.02
1.0	5000	0.02	4000	0.02	6000	0.02	7000	0.04
2.0	2500	0.05	2300	0.04	4700	0.05	6000	0.08
3.0	1900	0.10	1500	0.07	3200	0.10	5500	0.13
6.0	950	0.18	750	0.10	1600	0.18	3100	0.23
8.0	700	0.20	530	0.13	1200	0.20	2300	0.28
10.0	560	0.22	420	0.15	960	0.22	1900	0.33
12.0	460	0.24	340	0.17	800	0.24	1600	0.38
15.0	360	0.26	270	0.20	630	0.26	1300	0.42
20.0	270	0.28	200	0.23	470	0.28	950	0.45
25.0	210	0.32	160	0.24	380	0.32	750	0.48
30.0	180	0.35	135	0.25	310	0.35	630	0.50

1) Please reduce the cutting conditions when drilling a deep hole.
2) This table only shows standard cutting conditions with water-soluble cutting fluids. Please make corrections or adjustments depending on the application.

Reduction rate of cutting conditions for hole drilling

Drilling depth	Reduction rate of cutting speed	Reduction rate of feed
4D	10%	10%
5D	10%	15%
6D	20%	20%
7D	20%	20%

Drilling depth	Reduction rate of cutting speed	Reduction rate of feed
8D	30%	20%
10D	30%	25%
15D	40%	30%
20D	40%	45%

D : Drill dia.

RECOMMENDED CUTTING CONDITIONS

Work material	Structural steel SS Carbon steel S-C (−25HRC)		Alloy steel SCM Tool steel SK (−35HRC)		Alloy steel SCM Die steel SKD (−40HRC)		Cast iron FC	
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	6000	0.01	5000	0.008	4000	0.005	6000	0.01
1.0	5000	0.02	4000	0.01	2800	0.008	5000	0.02
2.0	3000	0.05	2500	0.03	1800	0.02	3000	0.05
3.0	2100	0.10	1800	0.08	1200	0.05	2300	0.10
6.0	1100	0.18	900	0.15	600	0.13	1100	0.18
8.0	800	0.20	670	0.18	450	0.15	900	0.20
10.0	650	0.22	540	0.20	350	0.18	700	0.22
12.0	520	0.24	450	0.22	300	0.20	600	0.24
15.0	420	0.28	360	0.24	240	0.22	470	0.28
20.0	320	0.33	270	0.26	180	0.24	350	0.33
25.0	250	0.36	210	0.28	145	0.26	280	0.36
30.0	210	0.40	180	0.30	120	0.28	230	0.40
40.0	160	0.42	130	0.32	90	0.30	180	0.42

Work material	Stainless steel				Copper alloy, Brass		Aluminium alloy	
	Martensitic AISI 420 Ferritic AISI 430		Austenitic AISI 304 Precipitation hardening ASTM 630					
Dia. (mm)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)	Revolution (min^{-1})	Feed rate (mm/rev)
0.5	5000	0.01	4000	0.01	6000	0.01	10000	0.02
1.0	4000	0.02	3000	0.02	5000	0.02	7000	0.04
2.0	2200	0.05	1500	0.04	3000	0.05	5000	0.08
3.0	1600	0.10	1000	0.07	2100	0.10	4200	0.13
6.0	800	0.18	530	0.10	1100	0.18	2100	0.23
8.0	600	0.20	400	0.13	800	0.20	1600	0.28
10.0	480	0.22	310	0.15	650	0.22	1200	0.33
12.0	400	0.24	250	0.17	520	0.24	1000	0.38
15.0	320	0.26	170	0.20	420	0.26	850	0.42
20.0	240	0.28	130	0.23	320	0.28	630	0.45
25.0	190	0.32	100	0.24	250	0.32	500	0.48
30.0	160	0.35	85	0.25	210	0.35	400	0.50
40.0	120	0.38	65	0.28	160	0.38	300	0.52

1) Please reduce the cutting conditions when drilling a deep hole.
2) This table only shows standard cutting conditions with water-soluble cutting fluids. Please make corrections or adjustments depending on the application.

Reduction rate of cutting conditions for hole drilling

Drilling depth	Reduction rate of cutting speed	Reduction rate of feed
4D	10%	10%
5D	10%	15%
6D	20%	20%
7D	20%	20%

Drilling depth	Reduction rate of cutting speed	Reduction rate of feed
8D	30%	20%
10D	30%	25%
15D	40%	30%
20D	40%	45%

D : Drill dia.

SPARE PARTS

IDENTIFICATION E002
SPARE PARTS
- CLAMP SCREW E003
- SHIM E009
- SHIM PIN AND CLAMP LEVER E012
- CLAMP LEVER AND LOCK PIN E013
- CLAMP BRIDGE E013
- BREAKER PIECE E015
- REPLACEMENT PARTS FOR OLD TYPE TOOLS
  - TURNING HOLDERS E016
  - BORING BARS E020
  - BORING UNITS E023
  - FACE MILLS E024
  - INDEXABLE TYPE END MILLS E028
  - INDEXABLE TYPE DRILLS E032
- ANTI SEIZE LUBRICANT E035

IDENTIFICATION

IDENTIFICATION OF CLAMP SCREW (Metric coarse right screw thread)

H **SC** **060** **05**

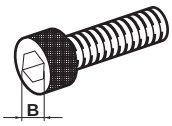
Length

Example	
Symbol	L
05	5
10	10

Screw Diameter

Example	
Symbol	d
050	M5
060	M6

● **Hexagonal Hole Dimensions**



Diameter	Pitch	B Dimensions			
		HBH	HFC	HSC	HSO
M2	0.4	—	—	1.5	0.9
M2.5	0.45	—	—	2	1.3
M3	0.5	2	2	2.5	1.5
M4	0.7	2.5	2.5	3	2
M5	0.8	3	3	4	2.5
M6	1	4	4	5	3
M8	1.25	5	5	6	4
M10	1.5	6	6	8	5

Screw Head

Symbol	Manufacturer	Head Type
BH / BHA	CHUUBURASHI CO. / UNBRAKO CO.	Button Head
FC	CHUUBURASHI CO.	Flat Head
SC	JIS Standard	Socket Head
PM	JIS Standard	Pan Head
FM	JIS Standard	Flat Head
SD	JIS Standard	Set Screw (Cut Point)
SP	JIS Standard	Set Screw (Cone Point)
SR	JIS Standard	Set Screw (Dog Point)
SS	JIS Standard	Set Screw (Flat Point)

Hexagonal Hole Dimensions

Symbol	Shape
H	

With Slot

Symbol	Shape
S	

With Cross Hole

Symbol	Shape
C	

IDENTIFICATION OF WRENCH

HKY **15** **R**

Symbol	Wrench
HKY	Hexagonal Wrench
TKY	Torx Wrench
TIP	Torx plus® Wrench

Hexagonal Wrench

Symbol	B
15	1.5
20	2
25	2.5
30	3
40	4
50	5
60	6

Torx Wrench

Symbol	B	Size
06	1.7	T6
08	2.3	T8
10	2.7	T10
15	3.3	T15
20	3.8	T20
25	4.4	T25
27	5.0	T27
30	5.5	T30

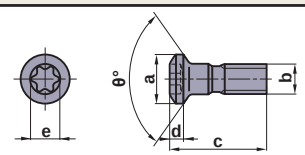
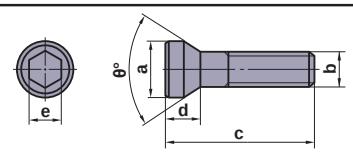
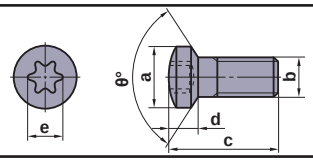
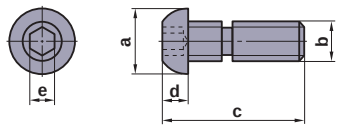
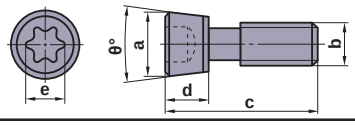
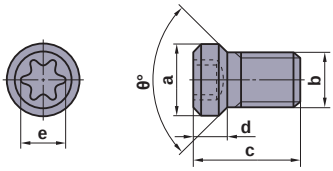
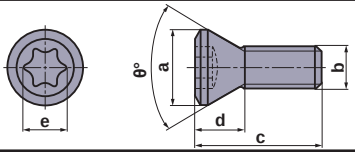
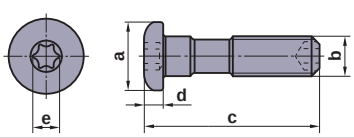
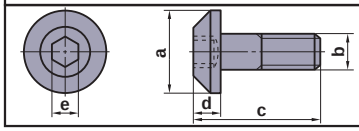
Torx plus® Wrench

Symbol	Size
06	6IP
07	7IP
08	8IP
15	15IP

R	Standard L Wrench
L	Long L Wrench
T	T Wrench
F	Flag Wrench
W	Flag Wrench
D	Driver

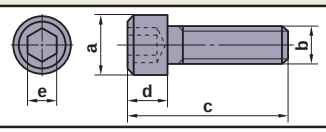
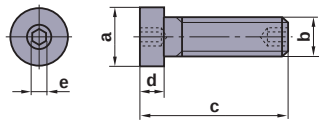
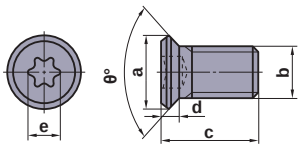
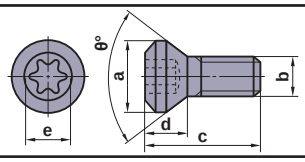
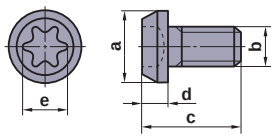
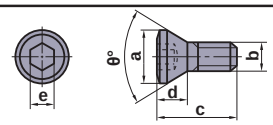
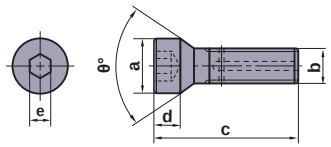
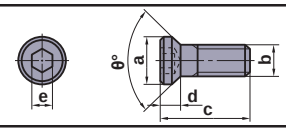
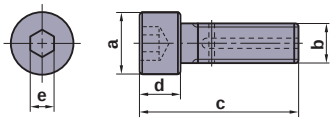
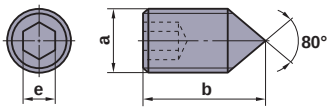
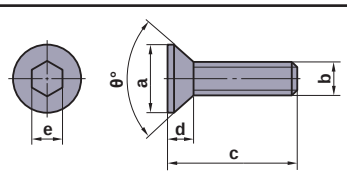
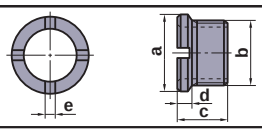
SPARE PARTS

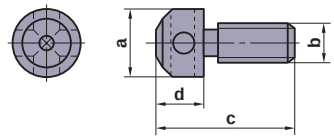
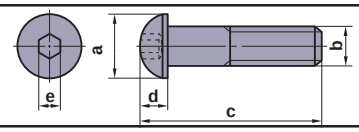
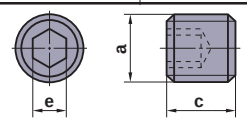
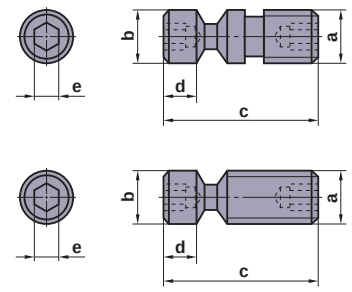
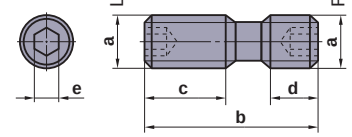
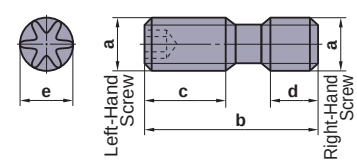
CLAMP SCREW

Geometry	Order Number	Dimensions (mm) a	b	c	d	e	Angle θ°	Drive Size	Torque (N•m)	Tool Holder
	**AJS3010T10**	5	M3×0.5	10	1.5	2.8	120	T10	2.5	**Profile** Holder (➲A224)
	4012T15	7	M4×0.7	12	2.2	3.4	120	T15	3.5	**AJX** Type Cutter (➲C136—C140)
	5014T25	8	M5×0.8	14	2.7	4.5	120	T25	7.5	
	**BOES101**	15	M10×1.5	45	10	8	60	—	10.0	**OCTACUT** Type Cutter (➲C149, C150)
	**BRS103**	5	M3×0.5	9.9	2.9	3.4	120	T15	3.5	**BRE** Type Cutter (➲C182)
	105	8	M5×0.8	13.8	3.8	4.5	120	T25	7.5	
	**CS3**(For Use with C3)	7	M4×0.7	14.6	2.6	2.5	—	—	2.2	**F** Type Boring Bar (➲A290)
	CS4(For Use with C4)	9	M5×0.8	15.4	3.4	3	—	—	3.3	
	CS5(For Use with C5)	10.5	M6×1	22	4	4	—	—	7.0	This clamp screw is included with the clamp as a set.
	**CAS51T**	7.9	M5×0.8	19	5	4.5	10	T25	8.5	**BF407** Type Cutter (➲C084)
	**CS200T**	3.2	M2×0.4	5	1.6	1.8	90	T6	0.6	**AL** Holder (➲A228)
	250T	3.7	M2.5×0.45	6	1.8	2.4	90	T8	1.0	**F** Type Boring Bar (➲A289)
*	**250560T**	3.9	M2.5×0.45	5.2	2.5	2.4	60	T8	1.0	**MMTI** Type Boring Bar (➲A391)
	300590T	4.1	M3×0.5	5.5	2.1	2.4	90	T8	1.0	**SNT** Type Boring Bar (➲A402)
	300790TS	4.7	M3×0.5	7	2.3	2.8	90	T10	2.0	**Milling Tools** Series (➲C072—C194)
	300890T	4.1	M3×0.5	8	2.1	2.4	90	T8	1.0	**SS** Type Cartridge (➲C211)
	350690T	4.8	M3.5×0.6	6.5	2.4	2.8	90	T10	2.5	**Boring Unit** (➲C217)
*	**350760T**	5.5	M3.5×0.6	7	4	3.4	60	T15	3.5	**MI** Type Boring Bar (➲C219)
	350790T	4.8	M3.5×0.6	7	2.4	2.8	90	T10	2.5	
*	**350860T**	5.5	M3.5×0.6	8.4	4	3.4	60	T15	3.5	
	350990T	4.8	M3.5×0.6	9	2.4	2.8	90	T10	2.5	
	400990T	6.0	M4×0.7	9	2.8	3.4	90	T15	3.5	
	401160T	5.7	M4×0.7	11	4.5	3.4	60	T15	3.5	
	401990T	6.0	M4×0.7	19	3.0	3.9	90	T20	3.5	
	451190T	6.3	M4.5×0.75	11	2.9	3.9	90	T20	5.0	
*	**501160T**	7.0	M5×0.8	11	3.6	3.9	60	T20	5.0	
	501290T	7.0	M5×0.8	11	3.5	4.5	90	T25	7.5	
	502190T	8.5	M5×0.8	21	4.0	5.1	90	T27	7.5	
	6016060T	8.5	M6×1.0	16	4.5	4.5	60	T25	7.5	
	**CSF401260T**	7.2	M4×0.5	12	5.2	3.9	60	T20	5.0	**PMR** Type Cutter (➲C190)
	**DC0520T**	8.5	M5×0.8	22.5	2.5	3.4	—	T15	3.5	**DOUBLE CLAMP** Holder (➲A196, A198, A207, A212—A215)
	0621T	10.5	M6×1.0	25	4	3.9	—	T20	5.0	**DOUBLE CLAMP DIMPLE BAR** (➲A277—A279)
										HSK Tool Holder (➲A432—A437)
	**DGS51**	11.5	M5×0.8	19	4	4	—	—	7.0	**DG** Type Holder (➲A338—A357)
										HSK Tool Holder (➲A440—A445)

SPARE PARTS

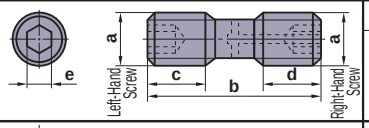
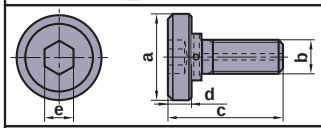
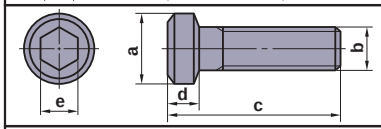
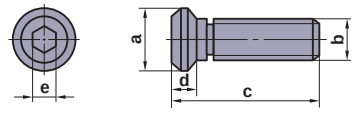
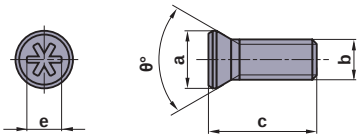
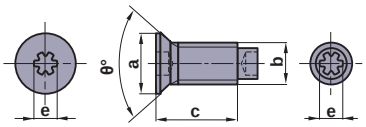
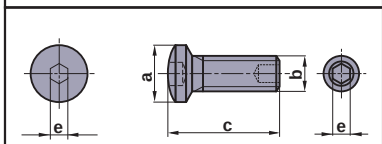
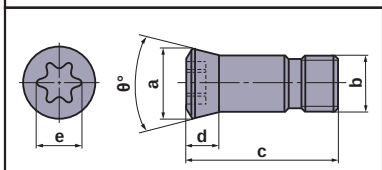
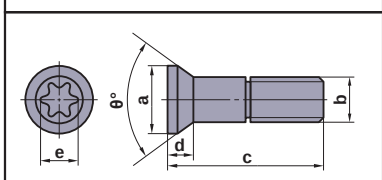
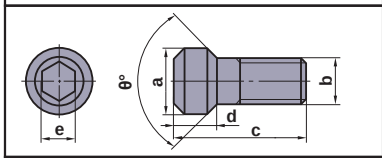
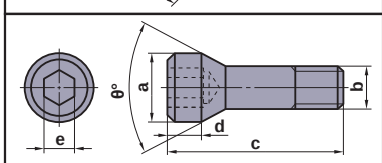
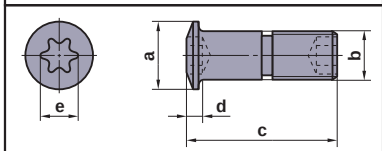
CLAMP SCREW

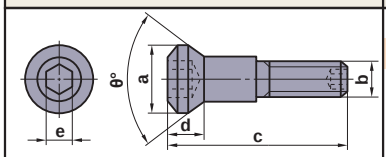
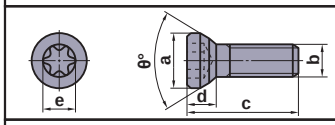
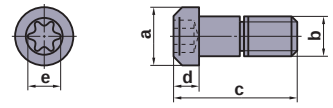
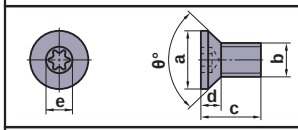
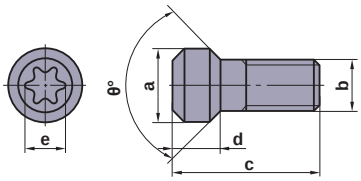
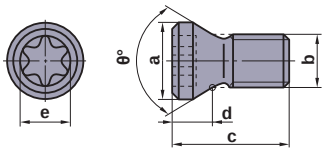
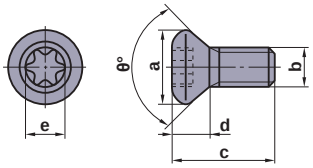
Geometry	Order Number	Dimensions (mm) a	b	c	d	e	Angle θ°	Drive Size	Torque (N•m)	Tool Holder
	**DKS4**	5.6	M4×0.7	18	3.5	3	—	—	3.3	
	5	7.6	M5×0.8	19	4.5	4	—	—	7.0	
	**EGS06019**	9	M6×1	22.5	3.5	3	—	—	3.3	**EG** Type Holder (➲A362)
	08024	11	M8×1.25	28.5	4.5	4	—	—	7.0	
	**FC400890T**	5.6	M4×0.7	7.5	1.3	2.8	90	T10	2.5	**AL** Type Holder (➲A229, A230) **AL** Type Boring Bar (➲A304) **SMG** Type Holder (➲A366, A406)
	**GY05016S**	8.7	M5×0.8	16	3.5	3.9	90	T20	4.5	**GY** Series
	**GY06013M**	12	M6×1.0	18	5	5.6	—	T30	6.0	**GY** Series (➲A321—A329)
	**HFF06015**	10	M6×1	15	6	5	80	—	8.2	
	**HFF08043H**	11	M8×1.25	43	5	5	90	—	8.2	**BXD** Type Cutter (➲C124, C125)
	**HS5S**	6.8	M5×0.8	9	2.8	3	80	—	3.3	
	**HSC08030H**	13	M8×1.25	38	8	5	—	—	24	**APX3000** Type Cutter (➲C107)
	10030H	16	M10×1.5	40	10	6	—	—	40	**APX4000** Type Cutter (➲C113)
	12035H	18	M12×1.75	47	12	10	—	—	80	**AXD7000** Type Cutter (➲C120, C121)
	16040H	24	M16×2	56	16	14	—	—	150	**BXD** Type Cutter (➲C124, C125)
										AJX Type Cutter (➲C136)
	**HSP05008C**	M5×0.8	8	—	—	2.5	—	—	2.5	**MP** Type Holder (➲A212—A214) **D** Type Boring Head (➲A307)
	**HY-A1**	4.4	M3×0.5	7	2.1	2	82	—	1.5	**Boring Unit** (➲C217)
	-V1	5.5	M3×0.5	7	2.5	2	82	—	1.5	
	2	5.5	M3×0.5	10	2.5	2	82	—	1.5	
	3	7	M3.5×0.6	12	2.9	2	82	—	1.5	
	4	9.3	M5×0.8	16	3.6	3	82	—	3.3	
	**JSS7**	8	M7×0.75	4.4	1.5	1	—	—	—	

Geometry	Order Number	Dimensions (mm) a	b	c	d	e	Angle θ°	Drive Size	Torque (N•m)	Tool Holder
	**KS1**	7	M4×0.7	14	5	—	—	—	—	**V10000** Type Cutter (➲C194) **LL** Type Cartridge (➲C207) **BC** Type Cartridge (➲C209) **SS** Type Cartridge (➲C211, C213) **SET/MG/DG** Type Cartridge (➲C215) **MI** Type Boring Bar (➲C219)
	2	10	M6×1	18	7	—	—	—	—	
	3	8	M4×0.7	14	6.5	—	—	—	—	
	1S	7	M4×0.7	14	5	—	—	—	—	
	2S	10	M6×1	18	7	—	—	—	—	
	**KS11**	8	M5×0.8	19	3	3	—	—	3.3	
	12	10	M6×1	26	4	4	—	—	7.0	
	13	10	M6×1	30	4	4	—	—	7.0	
	14	13	M8×1.25	45	5	5	—	—	9.0	
	**LLR1**	M5×0.8	—	3.5	—	2.5	—	—	—	**LL** Type Cartridge (➲C207)
	2	M6×1	—	5	—	3	—	—	—	
 **LLCS103, LLCS105** **LLCS125, LLCS205** The products with "✱" do not have a hexagonal hole at the end marked **b**. The products with "☆" do not have a hexagonal hole at the end marked **a**.	☆**LLCS103**	M3×0.5	4	11	4.6	2	—	—	1.5	**LL** Type Holder (➲A196—A204, A206, A209, A215, A218) **P** Type Boring Bar (➲A299—A302) **D** Type Boring Head (➲A305, A306) **HSK** Tool Holder (➲A432—A436, A438) **KSMG** Type Cutter (➲C186) **LL** Type Cartridge (➲C207) **Boring Unit** (➲C217)
	✱ **105**	M5×0.8	M5×0.8	10	1.5	2	—	—	1.5	
	106	M6×1	6	16.5	3.5	2.5	—	—	2.2	
	✱ **106S**	M6×1	6	13.4	0.7	2.5	—	—	2.2	
	108	M8×1.25	8	21	6.5	3	—	—	3.3	
	✱ **108S**	M8×1.25	8	16.5	2	3	—	—	3.3	
	110	M10×1.5	10	29	8	4	—	—	7.0	
	112	M12×1	11.9	36.2	9	5	—	—	8.0	
	125	M5×0.8	M5×0.8	12	2	2	—	—	1.5	
	205	M5×0.8	M5×0.8	16	4	2	—	—	1.5	
	206	M6×1	6	26	13	2.5	—	—	2.2	
	208	M8×1.25	8	24	6.5	3	—	—	3.3	
	306	M6×1	6	21	4	2.5	—	—	2.2	
	308	M8×1.25	8	42	27.5	3	—	—	3.3	
	310	M10×1	10	29	8	4	—	—	7.0	
	410	M10×1	10	30	6.6	4	—	—	7.0	
	508	M8×1	8	24	6.5	3	—	—	3.3	
	508S	M8×1	8	20.5	3	3	—	—	3.3	
 ✱Without Hexagonal Hole on Right-Hand Screw	**LS1**	M6×1	22	8	8	3	—	—	5.0	**DOUBLE CLAMP** Holder (For Heavy Cutting) (➲A197, A200, A202) **MC** Type Holder (➲A201, A204, A205, A208, A210, A226, A227) **UG** Type Holder (➲A360) **Milling Tools** Series (➲C070—C199)
	2	M8×1	29	13	10	4	—	—	8.2	
	3	M8×1	32	13	13	4	—	—	8.2	
	✱ **4**	M6×1	15	8	4	3	—	—	5.0	
	✱ **5**	M6×1	18	8	5	3	—	—	5.0	
	✱ **6**	M8×1	24	13	5	4	—	—	8.2	
	✱ **7**	M8×1	27	13	8	4	—	—	8.2	
	✱ **8**	M6×0.75	18	7	7	3	—	—	5.0	
	✱ **9**	M6×0.75	22	8	8	3	—	—	5.0	
	✱ **10**	M7×0.75	16	6	6	4	—	—	8.2	
	✱ **11**	M8×1	16	6	6	4	—	—	8.2	
	✱ **12**	M8×1	24	7	7	4	—	—	8.2	
	✱ **13**	M8×1	34	12	12	4	—	—	8.2	
	✱ **14**	M7×0.75	24	10	10	4	—	—	8.2	
	✱ **15**	M7×0.75	18	6	8	4	—	—	8.2	
	✱ **16**	M7×0.75	23	11	8	4	—	—	8.2	
	✱ **17**	M8×1	42	17	11	4	—	—	8.2	
	✱ **18**	M7×0.75	14	6	4	4	—	—	8.2	
	✱ **20**	M10×1.5	26	9	9	5	—	—	9.0	
	✱ **21**	M10×1.5	32	12	12	5	—	—	9.0	
	24	M8×1.25	24	8.5	8.5	4	—	—	8.2	
	25	M8×1.0	27.7	11.8	10.2	4	—	—	8.2	
	**LS10T**	M7×0.75	14	6	5	4.5	—	T25	8.5	
	14T	M7×0.75	24	10	10	4.5	—	T25	8.5	
	15T	M7×0.75	18	7	7	4.5	—	T25	8.5	
	19T	M6×0.75	11	4	4	3.4	—	T15	5.0	
	10TS	M7×0.75	13	6	4	4.5	—	T25	8.5	
	0622T	M6×0.75	22	8	8	3.4	—	T15	6.0	

SPARE PARTS

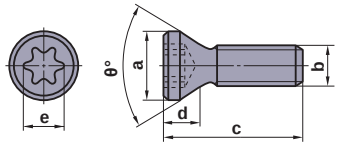
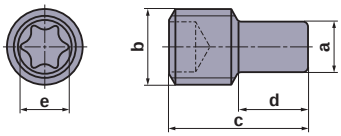
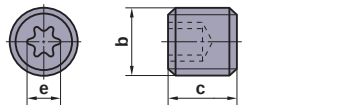
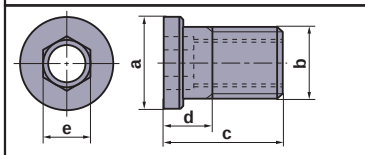
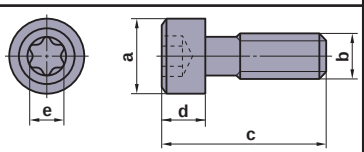
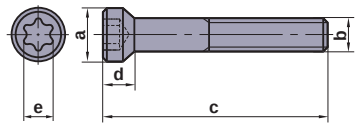
CLAMP SCREW

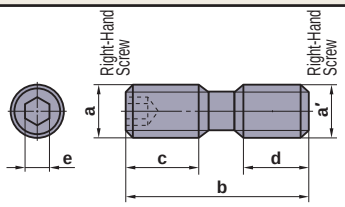
Geometry	Order Number	Dimensions (mm) a	b	c	d	e	Angle θ°	Drive Size	Torque (N•m)	Tool Holder
	**LS24H**	M8×1.25	24	8.5	8.5	4	—	—	8.2	**APX3000** Type Cutter (➲C107)
	**MBA20040H**	50	M20×2.5	54	14	17	—	—	320	**APX4000** Type Cutter (➲C113)
	24045H	65	M24×3	59	14	17	—	—	520	**BXD** Type Cutter (➲C124, C125)
										AXD7000 Type Cutter (➲C120, C121)
										AJX Type Cutter (➲C136)
	**MGS6**	10	M6×1	26	4	5	—	—	9.0	
	**MHT1**	11	M8×1	18.5	3.5	4	—	—	8.7	
	**NS251**	3.6	M2.5×0.45	7	—	2.2	60	—	0.7	**SMALL TOOLS** (➲A247, A250, A259)
	401	5.8	M4×0.7	6	—	3.6	60	—	3.5	
	**NS402W**	5.85	M4×0.7	10	—	2.2	60	—	0.7	**SMALL TOOLS** (➲A245, A246, A248, A250, A252, A256, A262)
	403W	5.85	M4×0.7	12	—	2.2	60	—	0.7	
	404W	5.8	M4×0.7	10	—	2.2	90	—	0.7	
	**NS501W**	8	M5×0.8	16	—	2.5	120	—	2.2	**SMALL TOOLS** (➲A253—A255)
	502W	8	M5×0.8	20	—	2.5	120	—	2.2	
	**RN-S4S**	5.8	M4×0.5	8.4	2.5	3.4	61	T15	3.5	
	-S4M	5.8	M4×0.5	10	2.2	3.4	61	T15	3.5	
	-S4	5.8	M4×0.5	12.5	2.2	3.4	61	T15	3.5	
	-S5	8.1	M5×0.5	15.4	3.6	3.9	61	T20	5.0	
	-S6	9.5	M6×0.75	20.3	4.6	3.9	61	T20	5.0	
	-S7	11	M7×0.75	24.7	5.2	4.5	61	T25	7.5	
	**RS3008T**	4.3	M3×0.35	8.6	2	2.4	61	T8	1.5	**SRF** Type Cutter (➲C169, C170)
	3510T	5	M3.5×0.35	10	2.3	2.8	61	T10	2.5	
	4015T	6	M4×0.5	14	2.7	3.4	61	T15	3.3	
	5020T	8.1	M5×0.5	16.4	3.6	3.9	61	T20	5.0	
	6025T	9.5	M6×0.75	21.5	4.2	4.5	61	T25	7.5	
	8030T	12	M8×0.75	25	5	5.6	61	T30	10.0	
	**S1**	3.5	M2×0.4	5.5	2.2	1.5	92	—	1.0	**Boring Unit** (➲C217)
	3	4.5	M3×0.5	7.7	2.4	2	92	—	1.5	
	4	5.3	M4×0.7	8	1.8	2.5	62	—	2.2	
	5	6.8	M5×0.8	9	2.4	3	62	—	3.3	
	**SD32**	12	M8×1.25	28	7.2	6	50	—	9.5	**D** Type Head Arbor (➲A307, A376, A415)
	40	12	M8×1.25	36	7.2	6	50	—	9.5	
	50	16	M10×1.5	46	8.2	8	50	—	1.0	
	63	16	M10×1.5	61	8.2	8	50	—	1.0	
	**SETS51**	6.8	M5×0.8	14.8	1.5	3.4	—	T15	3.5	**MMTE** Type Holder (➲A390) **MMTI** Type Boring Bar (➲A391) **SET** Type Holder (➲A400) **SNT** Type Boring Bar (➲A402) **HSK** Tool Holder (➲A448) **SET** Type Cartridge (➲C215)
	61	8	M6×1	20	1.8	3.9	—	T20	5.0	

Geometry	Order Number	Dimensions (mm)					Angle	Drive Size	Torque (N•m)	Tool Holder
		a	b	c	d	e	θ°			
	**SLCS105**	10	M5×0.8	25	6.3	4	90	—	7.0	**WP** Type Holder (➲A206, A208, A211)
	106	12	M6×1	32	6.2	4	90	—	7.0	**M** Type Boring Bar (➲A303)
	**SPS1**	8.5	M5×0.8	16	4	4.5	70	T25	5.0	
	**SRS5**	6.7	M5×0.8	16	3.5	3.9	—	T20	5.0	**SRE** Type Cutter (➲C146)
	**STS1**	6.8	M3×0.5	7	2.2	2.8	90	T10	2.5	
	✱ **TS16**	2.5	M1.6×0.35	3.2	1.6	1.8	60	T6	0.6	**SP** Type Holder (➲A216—A217, A219—A223)
	2	2.7	M2×0.4	4.6	1.4	1.8	60	T6	0.6	**Profile Holder** (➲A224)
	✱ **2A**	2.7	M2×0.4	4.5	1.2	1.8	60	T6	0.6	**SMALL TOOLS** (➲A242—A244, A258)
	2C	2.7	M2×0.4	3.8	1.4	1.8	60	T6	0.6	**DIMPLE BAR** (➲A270—A276)
	☆ **2D**	3.8	M2×0.4	5.3	1.9	1.8	82	T6	0.6	**MICRO-DEX** (➲A280, A281)
	21	2.7	M2×0.4	3.4	1.4	1.8	60	T6	0.6	**F** Type Boring Bar (➲A291, A372, A412)
	✱ **22**	3.0	M2.2×0.45	5	1.2	1.8	60	T6	0.6	**S** Type Boring Bar (➲A292—A298)
	✱ **25**	3.3	M2.5×0.45	5.5	1.7	2.4	60	T8	1.0	**GY** SERIES (➲A321—A329)
	☆ **25D**	4.4	M2.5×0.45	6.2	2.2	2.4	82	T8	1.0	**MMTI** Type Boring Bar (➲A391)
	✱ **25H**	3.6	M2.5×0.45	5.5	2	2.4	60	T8	1.0	**SNT** Type Boring Bar (➲A402)
	202	2.7	M2×0.4	5.5	1.8	1.8	60	T6	0.6	**HSK** Tool Holder (➲A439)
	253	3.3	M2.5×0.45	4.5	1.7	2.4	60	T8	1.0	**Milling Tools** Series (➲C083—C189)
	254	3.3	M2.5×0.45	7	1.7	2.4	60	T8	1.0	**SS** Type Cartridge (➲C211, C213)
	✱ **255**	3.5	M2.5×0.45	7.5	1.6	2.4	60	T8	1.0	**Boring Unit** (➲C217)
	3	3.9	M3×0.5	6	2	2.4	60	T8	1.0	**TAF** Drill (➲D126—D129)
	3D	5.0	M3×0.5	6	2.3	2.8	82	T10	2.5	
	31D	4.8	M3×0.5	7.2	2.2	2.8	82	T10	2.5	
	✱ **32**	3.9	M3×0.5	7.5	2	2.4	60	T8	1.0	
	✱ **33**	3.9	M3×0.5	6.7	2	2.4	60	T8	1.0	
✱ 	**35**	4.8	M3.5×0.6	6.5	2.4	2.8	60	T10	2.5	
	✱ **35D**	5.3	M3.5×0.6	12	2.8	3.4	60	T15	3.5	
	351	4.8	M3.5×0.6	7.2	2.4	2.8	60	T10	2.5	
	4S	5.4	M4×0.7	7	2.4	3.4	80	T15	3.5	
	✱ **4SL**	5.4	M4×0.7	8	2.4	3.4	80	T15	4.0	
	✱ **4SB**	5.8	M4×0.7	9	2.7	3.4	80	T15	3.5	
	✱ **4SBL**	5.8	M4×0.7	10.5	2.7	3.4	80	T15	3.5	
☆ 	**4**	5.4	M4×0.7	8	2.6	3.4	60	T15	3.5	
	4D	5.6	M4×0.7	7.7	2.5	3.4	82	T15	3.5	
	42	5.4	M4×0.7	6	2.6	3.4	60	T15	3.5	
	43	5.4	M4×0.7	10	2.6	3.4	60	T15	3.5	
	44	5.4	M4×0.7	12	2.6	3.4	60	T15	3.5	
	407	5.4	M4×0.7	9	2.6	3.4	60	T15	3.5	
	5S	6.8	M5×0.8	9	2.9	4.5	80	T25	7.5	
	✱ **5SL**	6.8	M5×0.8	12	2.9	4.5	80	T25	7.5	
	5	6.8	M5×0.8	9	3.2	4.5	60	T25	7.5	
	5L	6.8	M5×0.8	15	2.9	4.5	80	T25	7.5	
	52	6.8	M5×0.8	8	3.2	4.5	60	T25	7.5	
	54	6.8	M5×0.8	12	3.2	4.5	60	T25	7.5	
	55	6.8	M5×0.8	10.5	3.2	4.5	60	T25	7.5	
	✱ **6S**	8.5	M6×1.0	13	4.4	5.6	60	T30	10.0	
	✱ **6**	8.5	M6×1.0	16	4.4	5.6	60	T30	10.0	

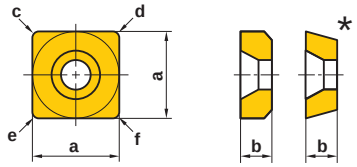
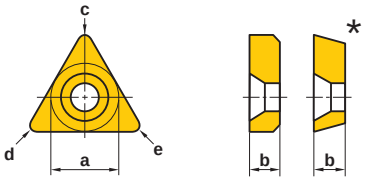
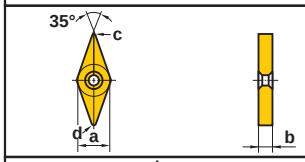
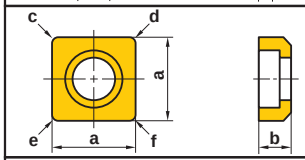
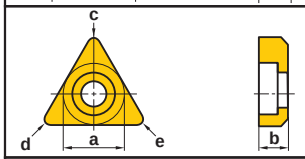
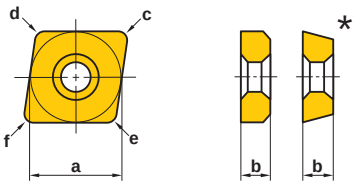
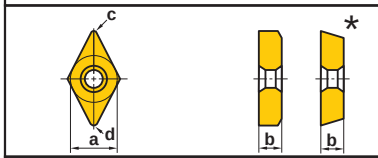
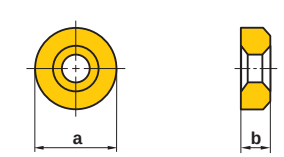
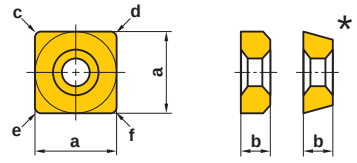
SPARE PARTS

CLAMP SCREW

Geometry	Order Number	Dimensions (mm) a	b	c	d	e	Angle θ°	Drive Size	Torque (N•m)	Tool Holder
	**TPS20**	2.7	M2×0.4	3.5	1.3	1.8	60	6IP	0.6	**ASX445** Type Cutter (➲C064, C066)
	22	3.0	M2.2×0.45	4.7	1.6	2.1	60	7IP	0.6	**ASX400** Type Cutter (➲C086, C088)
	22S	3.0	M2.2×0.45	4.2	1.6	2.1	60	7IP	0.6	**APX3000** Type Cutter (➲C106—C108)
	25	3.3	M2.5×0.45	5.5	1.7	2.1	60	7IP	1.0	**APX4000** Type Cutter (➲C112—C114, C118)
	25-1	3.3	M2.5×0.45	6.5	1.7	2.1	60	7IP	1.0	**ARX** Type Cutter (➲C152, C153)
	35	5.3	M3.5×0.6	11.5	2.8	3.4	60	15IP	3.5	**PMR** Type Cutter (➲C190)
	4	5.3	M4×0.7	8	2.6	3.4	60	15IP	3.5	
	43	5.3	M4×0.7	10	2.6	3.4	60	15IP	3.5	
	**TSR05008S**	3.5	M5×0.8	8	—	2.8	—	T10	—	CHAMFER RING (➲D124)
	06011S	4	M6×1.0	11	—	3.9	—	T20	—	
	**TSS04005**	—	M4×0.7	5	—	2.4	—	T8	—	**PMF** Type Cutter (➲C189)
	05006	—	M5×0.8	6	—	2.8	—	T10	—	**BC** Type Cartridge (➲C209)
	06010	—	M6×1	10	—	3.9	—	T20	—	**SS** Type Cartridge (➲C211, C213)
	**WCS503507H**	6.3	M5×0.5	7	3.3	3.5	—	—	6.5	**ASX445** Type Cutter (➲C064, C066)
	604010H	7.8	M6×0.75	10	4.1	4.0	—	—	7.0	**ASX400** Type Cutter (➲C086, C088)
										PMR Type Cutter (➲C190)
	**WS1**	8.5	M5×0.8	19	5	4.5	—	T25	7.5	
	**WS254012T**	4	M2.5×0.45	11.5	2.2	2.4	80	T8	2.0	**TAW** Drill (➲D112—D117, D123)
	254013T	4	M2.5×0.45	12.5	2.2	2.4	80	T8	2.0	
	254014T	4	M2.5×0.45	13.5	2.2	2.4	80	T8	2.0	
	254015T	4	M2.5×0.45	14.5	2.2	2.4	80	T8	2.0	
	254016T	4	M2.5×0.45	15.5	2.2	2.4	80	T8	2.0	
	304517T	4.5	M3×0.5	16.5	3.4	2.8	60	T10	3.5	
	304518T	4.5	M3×0.5	17.5	3.4	2.8	60	T10	3.5	
	355520T	5.5	M3.5×0.6	19.5	3.9	3.4	60	T15	5.5	
	355521T	5.5	M3.5×0.6	20.5	3.9	3.4	60	T15	5.5	
	406023T	6	M4×0.7	22.0	4.4	4.5	60	T25	8.5	
	406024T	6	M4×0.7	23.0	4.4	4.5	60	T25	8.5	
	508026T	8	M5×0.8	25.0	5.2	5.1	60	T27	12.0	
	508027T	8	M5×0.8	26.0	5.2	5.1	60	T27	12.0	

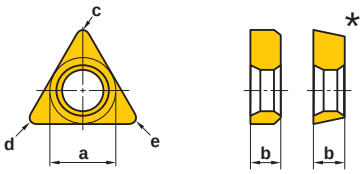
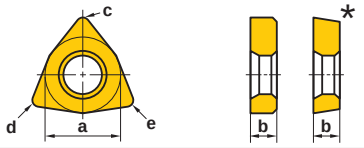
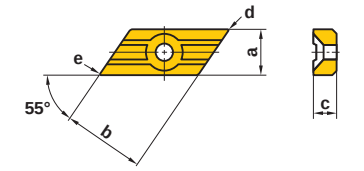
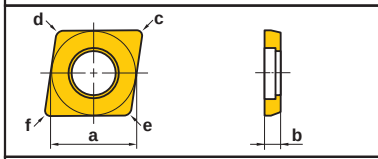
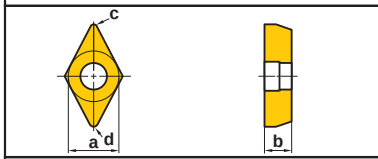
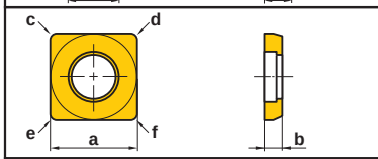
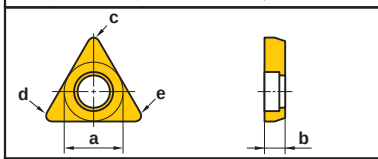
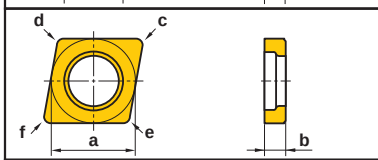
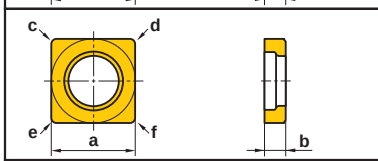
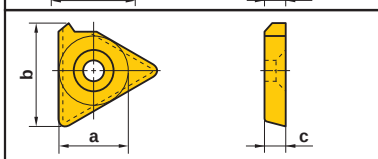
Geometry	Order Number	Dimensions (mm) a	a′	b	c	d	e	Torque (N•m)	Tool Holder
	**HDS08030**	M8×0.75	M8×1.25	30	13.5	11.5	4	8.2	**BRP** Type Cutter (➲C158)
	10031	M10×1.0	M10×1.5	31	14	12	5	9.0	**OCTACUT** Type Cutter (➲C149, C150)
									PMF Type Cutter (➲C189)

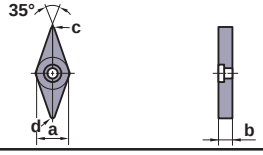
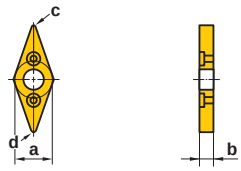
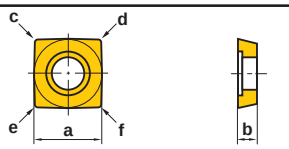
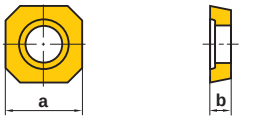
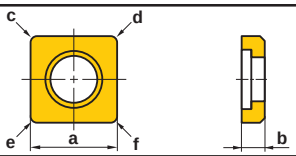
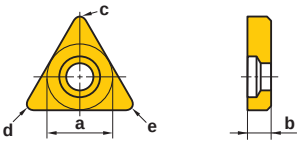
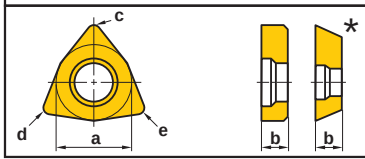
SHIM

Geometry	Order Number	Dimensions (mm)						Tool Holder
		a	b	c	d	e	f	
	**CS32**	9.52	3.18	0.8	0.8	1.2	1.2	**MC** Type Holder (Negative type) (➲A201, A204, A205)
	42	12.70	3.18	0.8	0.8	1.2	1.6	
	43	12.70	4.76	0.8	0.8	1.2	1.6	
	62	19.05	3.18	1.2	1.2	1.6	1.6	
	∗ **PS31**	8.28	2.38	0.2	0.2	0.6	0.6	**MC** Type Holder (Positive type) (➲A226)
	∗ **42**	11.46	3.18	0.2	0.2	0.6	1.0	**BC** Type Cartridge (➲C209)
	∗ **62**	17.20	3.18	0.3	0.3	0.7	0.7	
	**CT22**	6.35	3.18	0.4	0.8	1.2	—	**MC** Type Holder (Negative type) (➲A208, A210)
	32	9.52	3.18	0.4	0.8	1.2	—	
	33	9.52	4.76	0.4	0.8	1.2	—	
	42	12.70	3.18	0.4	0.8	1.2	—	
	∗ **PT21**	5.11	2.38	0.2	0.2	0.6	—	**MC** Type Holder (Positive type) (➲A227)
	∗ **32**	8.28	3.18	0.2	0.2	0.6	—	**F** Type Boring Bar (➲A290)
	∗ **42**	10.85	3.18	0.3	0.3	0.7	—	**BC** Type Cartridge (➲C209)
	BPT322	7.8	3.18	—	—	—	—	
	**DCSVN32**	9.52	3.18	0.8	1.2	—	—	**DOUBLE CLAMP** Holder (➲A212—A214) **DOUBLE CLAMP DIMPLE BAR** (➲A279)
	**ESS42**	12.70	3.18	0.8	0.8	1.2	1.6	**ML** Type Holder (➲A203)
	**EST32**	9.52	3.18	0.4	0.8	1.2	—	**ML** Type Holder (➲A207, A209—A211)
	43	12.70	4.76	0.4	0.8	1.2	—	
	**LLSCN3T3**	9.52	3.97	0.4	0.4	0.8	0.8	**DOUBLE CLAMP** Holder (➲A196) **LL** Type Holder (➲A196, A197) **DOUBLE CLAMP DIMPLE BAR** (➲A277) **P** Type Boring Bar (➲A300) **D** Type Boring Head (➲A306) **HSK** Tool Holder (➲A412—A434) **LL** Type Cartridge (➲C207)
	33	9.52	4.76	0.4	0.4	0.8	0.8	
	42	12.70	3.18	0.8	0.8	1.2	1.2	
	53	15.87	4.76	1.2	1.2	1.6	1.6	
	63	19.05	4.76	1.2	1.2	1.6	1.6	
	∗ **LLSCP42**	12.70	3.18	0.8	0.8	1.2	1.2	**DOUBLE CLAMP DIMPLE BAR** (➲A277)
	∗ **63**	19.05	4.76	1.2	1.2	1.6	1.6	**P** Type Boring Bar (➲A300)
								HSK Tool Holder (➲A434)
	**LLSDN32**	9.52	3.18	0.8	1.2	—	—	**DOUBLE CLAMP** Holder (➲A198) **LL** Type Holder (➲A198, A199) **DOUBLE CLAMP DIMPLE BAR** (➲A277) **P** Type Boring Bar (➲A300—A302) **D** Type Boring Head (➲A305, A306) **HSK** Tool Holder (➲435—A437)
	42	12.70	3.18	0.8	1.2	—	—	
	43	12.70	4.76	0.8	1.2	—	—	
	53	15.87	4.76	1.2	1.6	—	—	
	∗ **LLSDP42**	12.70	3.18	0.8	1.2	—	—	**DOUBLE CLAMP DIMPLE BAR** (➲A277)
	**LLSRN103**	8.3	3.18	—	—	—	—	**LL** Type Holder (➲A218) **HSK** Tool Holder (➲A438)
	123	9.8	3.18	—	—	—	—	
	164	13.6	4.76	—	—	—	—	
	204	17.3	4.76	—	—	—	—	
	256	22.0	6.35	—	—	—	—	
	326	28.0	6.35	—	—	—	—	
	**LLSSN32**	9.52	3.18	0.8	0.8	1.2	1.2	**LL** Type Holder (➲A200—A204) **DOUBLE CLAMP DIMPLE BAR** (➲A278) **P** Type Boring Bar (➲A299) **LL** Type Cartridge (➲C207)
	33	9.52	4.76	0.8	0.8	1.2	1.2	
	42	12.70	3.18	0.8	0.8	1.2	1.6	
	53	15.87	4.76	1.2	1.2	1.6	1.6	
	63	19.05	4.76	1.2	1.2	1.6	2.0	
	84	25.40	6.35	1.6	1.6	2.4	2.4	
	∗ **LLSSP42**	12.70	3.18	0.8	0.8	1.2	1.6	

SPARE PARTS

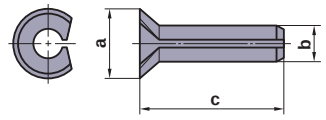
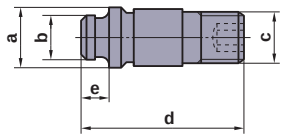
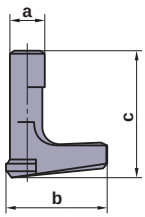
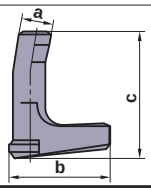
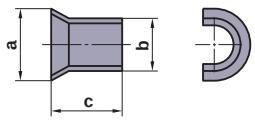
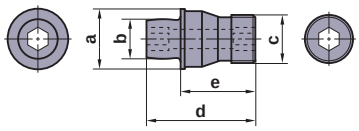
SHIM

Geometry	Order Number	Dimensions (mm) a	b	c	d	e	f	Tool Holder
	**LLSTE32**	7.6	3.18	0.4	0.4	0.4	—	**LL** Type Holder (➲A206, A209)
	LLSTN32	9.52	3.18	0.4	0.8	1.2	—	**DOUBLE CLAMP** Holder (➲A207)
	33	9.52	4.76	0.4	0.8	1.2	—	**DOUBLE CLAMP DIMPLE BAR** (➲A278)
	42	12.70	3.18	0.4	0.8	1.2	—	**P** Type Boring Bar (➲A299)
	53	15.87	4.76	0.8	1.2	1.6	—	**D** Type Boring Head (➲A305)
	⁎ **LLSTP32**	9.52	3.18	0.4	0.8	1.2	—	**LL** Type Cartridge (➲C207)
	⁎ **42**	12.70	3.18	0.4	0.8	1.2	—	**Boring Unit** (➲C217)
	**LLSWN32**	9.52	3.18	0.4	0.8	1.2	—	**LL** Type Holder (➲A215)
	3T3	9.52	3.97	0.4	0.8	1.2	—	**DOUBLE CLAMP** Holder (➲A215)
	42	12.70	3.18	0.4	0.8	1.2	—	**DOUBLE CLAMP DIMPLE BAR** (➲A279)
	⁎ **LLSWP32**	9.52	3.18	0.4	0.8	1.2	—	
	⁎ **42**	12.70	3.18	0.4	0.8	1.2	—	
	**MHS532R/L**	9.4	15.7	4.5	0.8	0.8	—	
	533R/L	9.4	15.7	4.5	1.2	1.2	—	
	534R/L	9.4	15.7	4.5	1.6	1.6	—	
	542R/L	9.4	15.7	6.5	0.8	0.8	—	
	543R/L	9.4	15.7	6.5	1.2	1.2	—	
	544R/L	9.4	15.7	6.5	1.6	1.6	—	
	**MLCP42**	12.58	3.18	1.2	1.2	1.2	1.2	**P** Type Boring Bar (➲A300)
	**MLDP42**	12.56	3.18	1.2	1.2	—	—	**P** Type Boring Bar (➲A300—A302)
	**MLSP42**	12.63	3.18	1.2	1.2	1.2	1.2	**P** Type Boring Bar (➲A299)
	**MLTP32**	9.50	3.18	1.2	1.2	1.2	—	**P** Type Boring Bar (➲A299)
	**MSCN63**	18.8	4.76	1.6	1.6	1.6	1.6	**DOUBLE CLAMP** Holder (For Heavy Cutting) (➲A197)
	**MSSN63**	18.8	4.76	1.6	1.6	1.6	1.6	**DOUBLE CLAMP** Holder (For Heavy Cutting) (➲A200, A202)
	**CT32T1**	9.525	15.03	3.18	—	—	—	**SET** Type Holder (➲A400) **SNT** Type Boring Bar (➲A402) **SET** Type Cartridge (➲C215)
	PT32T1R	8.28	13.34	3.18	—	—	—	
	32T2R	8.28	13.19	3.18	—	—	—	
	42TR	10.85	17.20	3.18	—	—	—	

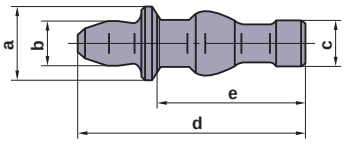
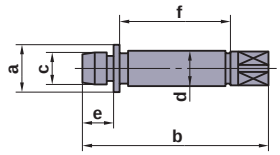
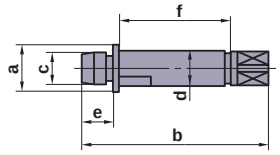
Geometry	Order Number	Dimensions (mm)						Tool Holder
		a	b	c	d	e	f	
	**PV321**	9.52	3.18	0.4	0.4	—	—	**MP** Type Holder (➲A212—A214) **D** Type Boring Head (➲A307)
	322	9.52	3.18	0.8	0.8	—	—	
	323	9.52	3.18	1.2	1.2	—	—	
	**SPSVN32**	8.06	3.18	0.3	0.3	—	—	**SP** Type Holder (➲A222, A223) **HSK** Tool Holder (➲A439)
	**STASX400N**	11.00	3.00	0.4	0.4	0.4	0.4	**ASX400** Type Cutter (➲C086, C088)
	**STASX445N**	10.76	3.00	—	—	—	—	**ASX445** Type Cutter (➲C064, C066)
	**STBS500N**	12.7	3.18	0.8	0.8	0.8	0.8	
	**WPSTN33**	9.3	4.76	0.8	0.4	1.2	—	**WP** Type Holder (➲A206, A208, A211)
	43	12.50	4.76	0.8	0.4	1.2	—	
	＊**WPSWC43**	12.50	4.76	0.4	0.8	1.2	—	**M** Type Boring Bar (➲A303)
	WPSWN43	12.50	4.76	0.4	0.8	1.2	—	

SPARE PARTS

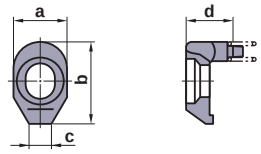
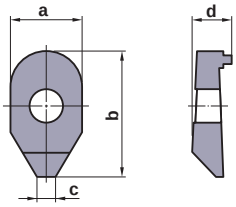
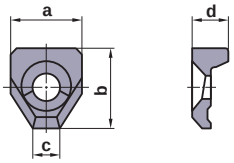
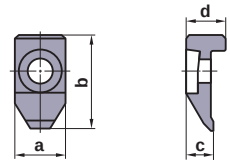
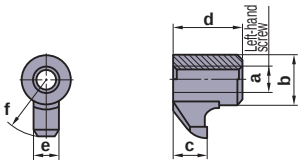
SHIM PIN AND CLAMP LEVER

Geometry	Order Number	Dimensions (mm)					Tool Holder
		a	b	c	d	e	
	**BCP141**	3.0	1.4	5.6	—	—	**MC** Type Holder (➲A201, A204, A205, A208, A210, A226, A227) **SP** Type Holder (➲A222, A223) **F** Type Boring Bar (➲A290) **HSK** Tool Holder (➲A439) **BC** Type Cartridge (➲C209)
	201	4.3	2	7.4	—	—	
	202	4.3	2	6.4	—	—	
	251	4.8	2.5	7.4	—	—	
	252	4.8	2.5	6.4	—	—	
	301	5.3	3	7.4	—	—	
	401	6.3	4	7.4	—	—	
	**CCP33**	6.5	3.66	M5×0.8	18.5	3	**WP** Holder (➲A206, A208, A211) **M** Type Boring Bar (➲A303)
	34	7.5	5.0	M6×1.0	18.5	3	
	44	7.5	5.0	M5×0.8	14.2	3	
	**LLCL12S**	2.1	9.3	5.6	—	—	**LL** Type Holder (➲A196—A204, A206, A209, A215, A218) **P** Type Boring Bar (➲A299—A302) **D** Type Boring Head (➲A305, A306) **HSK** Tool Holder (➲A432—A436, A438) **KSMG** Type Cutter (➲C186) **LL** Type Cartridge (➲C207) **Boring Unit** (➲C217)
	13	3.6	10	12.5	—	—	
	13S	3.6	10	7.8	—	—	
	14	4.7	13.4	13.2	—	—	
	14S	4.7	13.6	12.2	—	—	
	15	6.0	19	17	—	—	
	16	7.5	20.8	21	—	—	
	18	8.6	25.4	25.2	—	—	
	23	3.6	12.0	11.5	—	—	
	23S	3.6	11.6	9.5	—	—	
	24	4.7	16.2	14.8	—	—	
	25	6.0	17.1	17	—	—	
	**110**	3.0	10.7	11.6	—	—	
	112	3.5	13	13.5	—	—	
	116	4.5	18.5	18	—	—	
	120	5.6	20.3	19	—	—	
	125	6	24	24	—	—	
	132	8	30	27	—	—	
	**LLP13**	5.55	4.85	5.3	—	—	**LL** Type Holder (➲A196—A204, A206, A209, A215, A218) **DOUBLE CLAMP** Holder (➲A196, A198, A207, A212—A215) **DOUBLE CLAMP DIMPLE BAR** (➲A277—A279) **P** Type Boring Bar (➲A299—A302) **D** Type Boring Head (➲A305, A306) **HSK** Tool Holder (➲A432—A438) **KSMG** Type Cutter (➲C186) **LL** Type Cartridge (➲C207) **Boring Unit** (➲C217)
	14	7.25	6.55	5.8	—	—	
	15	8.8	8.05	8.6	—	—	
	16	10.85	9.85	11.1	—	—	
	18	15.35	13.05	12.0	—	—	
	23	5.55	4.85	6.8	—	—	
	24	7.25	6.55	9.1	—	—	
	**MP6**	11.9	7.8	M10×1	22.1	15	**DOUBLE CLAMP** Holder (For Heavy Cutting) (➲A197, A200, A202)

LOCK PIN

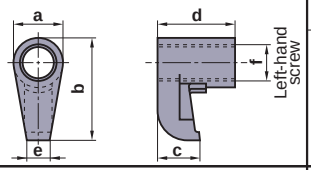
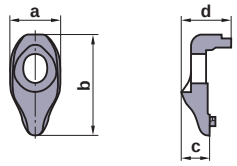
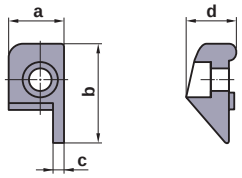
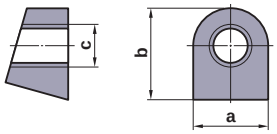
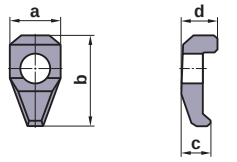
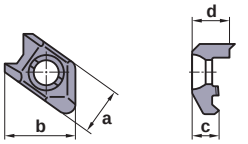
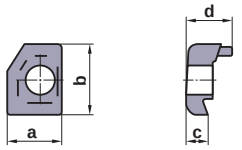
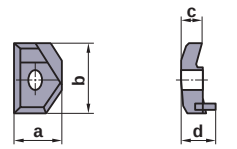
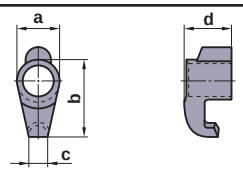
Geometry	Order Number	Dimensions (mm)						Tool Holder
		a	b	c	d	e	f	
	**P11S**	6	3.7	4	17	11.1	—	**MP** Type Holder (➲A212—A214)
	21S	7.5	4.9	4.5	17.2	11.5	—	**D** Type Boring Head (➲A307, A376, A414)
	**P221US**	4	18	2.11	3.5	3.3	7.7	**ML** Type Holder (➲A203, A207, A209—A211)
	321US	5.5	18	3.64	5.0	3.3	7.5	
	322US	5.5	21	3.64	5.0	3.3	10.5	
	323US	5.5	24	3.64	5.0	3.3	13.5	
	332US	5.5	21	3.64	5.0	4.9	8.9	
	**P323WS**	5.8	24	3.64	5.0	3.3	12.9	**ML** Type Holder (➲A203, A207, A209—A211)
	333WS	5.8	24	3.64	5.0	4.9	11.3	
	334WS	5.8	30	3.64	5.0	4.9	17.3	
	433W	7.8	24	5.03	7.0	4.9	10.8	
	434W	7.8	30	5.03	7.0	4.9	16.8	

CLAMP BRIDGE

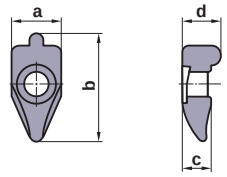
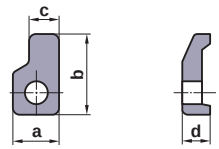
Geometry	Order Number	Dimensions (mm)						Tool Holder
		a	b	c	d	e	f	
	**AMS3**	7	12	3	3.3	—	—	**Profile** Holder (➲A224)
	4	9	13.5	3	3.8	—	—	**AJX** Type Cutter (➲C136—C140)
	5	10	15	3.5	5	—	—	**BRE** Type Cutter (➲C182)
	**CA142**	8	15	4	7	—	—	
	150	9	16	4.5	7	—	—	
	151	10	17	5	7	—	—	
	152	10	19	5	7	—	—	
	153	10	24	5	7	—	—	
	161	13	20	6	8	—	—	
	162	13	24	6	8	—	—	
	163	13	27	6	8	—	—	
	181	16	30	8	10	—	—	
	183	16	37	8	10	—	—	
	**CCK13**	15	18.5	6	9	—	—	**WP** Type Holder (➲A206, A208, A211)
	14	19	22	8	9.5	—	—	**M** Type Boring Bar (➲A303)
	**CCTC1**	13	25	7	10.2	—	—	
	**CK231**	M6×1	8	4	7.5	4.5	9.5	**MC** Type Holder (➲A201, A204, A205, A208, A210, A226, A227)
	232	M6×1	8	4.5	8	4.5	11.5	
	341	M8×1	11	5.5	13.5	6	13.5	
	342	M8×1	11	6	14	6	16.5	

SPARE PARTS

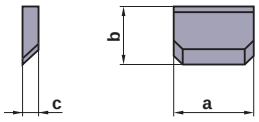
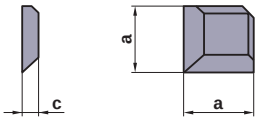
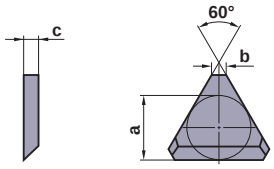
CLAMP BRIDGE

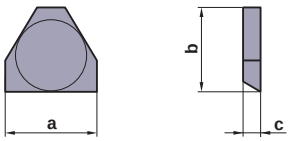
Geometry	Order Number	Dimensions (mm)						Tool Holder
		a	b	c	d	e	f	
	**CKW6**	10.9	22.5	9.2	16.8	5	M8×1	**DOUBLE CLAMP** Holder (For Heavy Cutting) (➲A197, A200, A202)
	**DCK2211**	11	22	6.57	11.1	—	—	**DOUBLE CLAMP** Holder (➲A196, A198, A207, A212—A215) **DOUBLE CLAMP DIMPLE BAR** (➲A277—A279) **HSK** Tool Holder (➲A432—A437)
	2613	13	26.5	7.35	12.9	—	—	
	3113	13	31	9	14.5	—	—	
	**DGK2R/L**	13.7	26.5	1.2	9	—	—	**DG** Type Holder (➲A338—A356)
	3R/L	13.7	26.5	2	9	—	—	
	4R/L	13.7	26.5	3	9	—	—	
	5R/L	13.7	26.5	4	9	—	—	
	6R/L	13.7	26.5	5	9	—	—	
	7R/L	13.7	26.5	6	9	—	—	
	8R/L	13.7	26.5	7	9	—	—	
	**KGC1**	12.0	15.0	M7×0.75	—	—	—	**UG** Type Holder (➲A360)
	**LK1**	8	14.3	4.5	5.9	—	—	
	**MHK5NR/L**	15.5	23.5	8.1	12.1	—	—	
	**MTK1R/L**	13	17.5	5	12	—	—	**MG1** Type Holder (➲A363) **MG** Type Holder (➲A364) **MT** Type Holder (➲A404) **MT1** Type Holder (➲A404) **HSK** Tool Holder (➲A446, A449) **MG** Type Cartridge (➲C215)
	**MTK2R/L**	18	28	7	14	—	—	
	**SETK51**	6.8	14.5	2.9	8	—	—	**MMTE** Type Holder (➲A390) **MMTI** Type Holder (➲A391) **SET** Type Holder (➲A400) **SNT** Type Holder (➲A402) **HSK** Tool Holder (➲A448) **SET** Type Cartridge (➲C215)
	61	8.9	18.1	4.1	8.6	—	—	

CLAMP BRIDGE

Geometry	Order Number	Dimensions (mm)				Tool Holder
		a	b	c	d	
	**SRK1R**	9.4	21	5.5	7.5	**SRE** Type Cutter (➲C146)
	**UCR**	12	24	8	7	

BREAKER PIECE

Geometry	Order Number	Dimensions (mm)					Tool Holder
		a	b	c	Inscribed Circle	Breaker Width	
	**CBS3**	9.4	8.0	1.5	9.525	1.5	**MC** Type Holder (➲A201, A205)
	4	12.6	9.2	2.5	12.70	3.5	
	4N	12.6	10.2	2.5	12.70	2.5	
	4F	12.6	11.2	2.5	12.70	1.5	
	6	18.9	14.6	2.5	19.05	4.5	
	6N	18.9	16.6	2.5	19.05	2.5	
	6F	18.9	17.6	2.5	19.05	1.5	
	**CBS3D**	8.0	–	1.5	9.525	1.5	**MC** Type Holder (➲A204, A226)
	4D	10.2	–	2.5	12.70	2.5	
	6D	15.6	–	2.5	19.05	3.5	
	**CBT2**	5.33	1.4	1.5	6.35	1.5	**MC** Type Holder (➲A208, A210, A227) **F** Type Boring Bar (➲A290) *For positive inserts, the breaker width is 0.5mm larger than the figures in the list.
	2N	5.67	1.4	1.5	6.35	1.0	
	3	7.20	1.4	2.5	9.525	3.5	
	3N	7.87	1.4	2.5	9.525	2.5	
	3F	8.53	1.4	2.5	9.525	1.5	
	4	9.73	1.4	2.5	12.70	4.5	
	4N	11.07	1.4	2.5	12.70	2.5	
	4F	11.73	1.4	2.5	12.70	1.5	

Geometry	Order Number	Dimensions (mm)			Thread Pitch (mm)	Tool Holder
		a	b	c		
	**CBT3106**	11.5	10.6	2.0	2.5–3.0	
	3113	11.5	11.3	2.0	1.5–2.0	
	3120	11.5	12	2.0	0.75–1.25	
	4108	13.3	10.8	2.0	3.5–4.0	
	4128	13.3	12.8	2.0	4.5–5.0	

REPLACEMENT PARTS FOR OLD TYPE TOOLS (TURNING HOLDERS)

LL TYPE HOLDER

Old Type Tool Number		Shim	Shim Pin	Clamp Lever	Clamp Screw	Wrench	Punch
Type	Size						
PCFNR/L PCLNR/L PCBNR/L	**1616H09**	LLSCN3T3	LLP13	LLCL13	LLCS106	HKY25R	LLH3
	2020K09	LLSCN3T3	LLP13	LLCL13	LLCS106	HKY25R	LLH3
	2525M09	LLSCN3T3	LLP13	LLCL13	LLCS106	HKY25R	LLH3
	2020K12	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
	2525M12	LLSCN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
	2525M16	LLSCN53	LLP15	LLCL25	LLCS508	HKY30R	—
	3225P16	LLSCN53	LLP15	LLCL25	LLCS508	HKY30R	—
	4040R19	LLSCN63	LLP16	LLCL16	LLCS310	HKY40R	—
PTANR/L PTBNR/L PTTNR/L PTGNR/L PTFNR/L	**1010E11**	—	—	LLCL12S	LLCS105	HKY20F	—
	1212F11	—	—	LLCL12S	LLCS105	HKY20F	—
	1616H16	LLSTN32	LLP13	LLCL13	LLCS106	HKY25R	LLH3
	2020K16	LLSTN32	LLP13	LLCL13	LLCS106	HKY25R	LLH3
	2525M16	LLSTN32	LLP13	LLCL13	LLCS206	HKY25R	LLH3
	2525M22	LLSTN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
	3225P22	LLSTN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
	3232P22	LLSTN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
	4040R27	LLSTN53	LLP15	LLCL25	LLCS508	HKY30R	—
PSBNR/L PSSNR/L PSKNR/L	**3225P12**	LLSSN42	LLP14	LLCL14	LLCS108	HKY30R	LLH4
	2525M15	LLSSN53	LLP15	LLCL25	LLCS508	HKY30R	—
	3232P15	LLSSN53	LLP15	LLCL25	LLCS508	HKY30R	—
	3232P19	LLSSN63	LLP16	LLCL16	LLCS310	HKY40R	—
	4040R19	LLSSN63	LLP16	LLCL16	LLCS310	HKY40R	—
	5050T25	LLSSN84	LLP18	LLCL18	LLCS112	HKY50R	—
PRGCR/L PRDCN	**2020K10**	LLSRN103	LLP13	LLCL110	LLCS205	HKY20R	LLH3
	2020K12	LLSRN123	LLP13	LLCL112	LLCS106	HKY25R	LLH3
	3225P12	LLSRN123	LLP13	LLCL112	LLCS106	HKY25R	LLH3
	3225P16	LLSRN164	LLP24	LLCL116	LLCS306	HKY25R	LLH4
	4040R25	LLSRN256	LLP16	LLCL125	LLCS410	HKY40R	—
	5050T32	LLSRN326	LLP18	LLCL132	LLCS112	HKY50R	—

MC TYPE HOLDER (OLD TYPE PRODUCTS)

Old Type Tool Number		Shim	Shim Pin	Clamp Bridge	Clamp Screw	Breaker Piece	Wrench
Type	Size						
N11R/L N12R/L N13R/L N14M N15R/L	**22**	CS32	BCP251	CK6	LS1	CBS3◌	HKY30R
	33H	CS42	BCP301	⁎ CK2	LS2	CBS4◌	HKY40R
	44	CS42	BCP301	⁎ CK2	LS3	CBS4◌	HKY40R
N21R/L N22R/L N25R/L	**22**	CT22	BCP201	CK1	LS1	CBT2◌	HKY30R
	33H	CT32	BCP301	CK2	LS2	CBT3◌	HKY40R
	44	CT32	BCP301	CK2	LS3	CBT3◌	HKY40R
P11R/L P12R/L P14M P15R/L	**22**	PS31	BCP201	CK6	LS1	CBS3◌	HKY30R
	33	PS42	BCP251	⁎ CK3	LS2	CBS4◌	HKY40R
	44	PS42	BCP251	⁎ CK3	LS3	CBS4◌	HKY40R
P21R/L P22R/L P25R/L	**22**	PT21	BCP141	CK1	LS1	CBT2◌	HKY30R
	33	CT32	BCP201	CK2	LS2	CBT3◌	HKY40R
	44	CT32	BCP201	CK2	LS3	CBT3◌	HKY40R

⁎Please use clamp bridge No.CK3 with N11R/L33H and N11R/L44 types. Please use clamp bridge No.CK2 with P12R/L33 and P12R/L44 types.

MC TYPE HOLDER

Old Type Tool Number		Shim	Shim Pin	Clamp Bridge	Clamp Screw	Breaker Piece	Wrench	Spring
Type	Size							
CTANR/L CTGNR/L	1616	CT22	BCP201	CK231	LS1	CBT2◌	HKY30R	–
	2020	CT32	BCP301	CK341	LS2	CBT3◌	HKY40R	–
	2525	CT32	BCP301	CK341	LS3	CBT3◌	HKY40R	–
CSTNR/L CSSNR/L	1616	CS32	BCP251	CK232	LS1	CBS3◌	HKY30R	–
	2020	CS42	BCP301	CK341	LS2	CBS4◌	HKY40R	–
	2525M43	CS42	BCP301	CK341	LS3	CBS4◌	HKY40R	–
CTAPR/L	2020	PT32	BCP201	CK341	LS2	CBT3◌	HKY40R	–
CSBPR/L CSSPR/L CSKPR/L	1616	PS31	BCP201	CK232	LS1	CBS3◌	HKY30R	–
	2020	PS42	BCP251	CK342	LS2	CBS4◌	HKY40R	–
CTCPR/L	2020K16	BPT322	BCP201	CCTC1	HSC06020	CBT3◌	HKY50R	MES3
	2525M16	BPT322	BCP201	CCTC1	HSC06020	CBT3◌	HKY50R	MES3

ML TYPE HOLDER (OLD TYPE PRODUCTS)

Old Type Tool Number		Lock Pin	Shim	Stop Ring	Spanner
Type	Size				
E11R/L E12R/L E13R/L E14R/L E15R/L	11U	P321US	–	ER3	KY40
	22U	P322US	–	ER3	KY40
	33W	P433W	ESS42	ER4	KY40
	44W	P434W	ESS42	ER4	KY40
E21R/L E22R/L E25R/L E26M E27R/L	11U	P221US	–	ER2	KY25
	22FU	P322US	–	ER3	KY40
	33HU	P332US	–	ER3	KY40
	33FW	P323WS	EST32	ER3	KY40
	33HW	P333WS	EST32	ER3	KY40
	44AW	P334WS	EST32	ER3	KY40
	44BW	P434W	EST43	ER4	KY40

ML TYPE HOLDER

Old Type Tool Number		Lock Pin	Shim	Stop Ring	Spanner
Type	Size				
ETANR/L ETENN ETFNR/L ETXNR/L	1212	P221US	–	ER2	KY25
	1616H32	P322US	–	ER3	KY40
	1616H33	P332US	–	ER3	KY40
	2020K32W	P323WS	EST32	ER3	KY40
	2020K33W	P333WS	EST32	ER3	KY40
	2525M33W	P334WS	EST32	ER3	KY40
	2525M43W	P434W	EST43	ER4	KY40
ESBNR/L ESENR/L ESDNR/L ESKNR/L	1212	P321US	–	ER3	KY40
	1616H32	P322US	–	ER3	KY40
	2020W	P433W	ESS42	ER4	KY40
	2525W	P434W	ESS42	ER4	KY40

MH TYPE HOLDER

Old Type Tool Number		Shim	Shim Pin	Clamp Bridge	Clamp Screw	Stop Ring	Wrench
Type	Size						
KKCR/L	445	MHS532R/L 533R/L 534R/L	SFC03010	MHK5NR/L	MHT1	CE8	HKY40R

REPLACEMENT PARTS FOR OLD TYPE TOOLS (TURNING HOLDERS)

SL TYPE HOLDER

Old Type Tool Number		Shim	Lock Pin	Nut	Clamp Wedge	Clamp Screw	Wrench
Type	Size						
ETJNR/L ETQNR/L	33K16S	SLSTN33	SLP13	SLN13	SLCW13	SLCS105	HKY25R HKY40R
	44M16S	SLSTN33	SLP13	SLN13	SLCW13	SLCS105	HKY25R HKY40R
	44M22S	SLSTN43	SLP14	SLN14	SLCW14	SLCS106	HKY30R HKY40R
	54P22S	SLSTN43	SLP14	SLN14	SLCW14	SLCS106	HKY30R HKY40R
ETNNR/L	64M22S	SLSTN43	SLP14	SLN14	SLCW14	SLCS106	HKY30R HKY40R
	85M22S	SLSTN43	SLP14	SLN14	SLCW14	SLCS106	HKY30R HKY40R

WP TYPE HOLDER (OLD TYPE PRODUCTS)

Old Type Tool Number		Shim	Shim Pin	Clamp Bridge	Clamp Screw	Side Lock Plate	Lock Screw	Spring	Wrench
Type	Size								
MTJNR/L MTENN MTQNR/L	2020K16	SLSTN33	CCP13	CCK13	SLCS105	CPT13	WPS1	MES2	HKY25R HKY30R
	2525M16	SLSTN33	CCP13	CCK13	SLCS105	CPT13	WPS1	MES2	HKY25R HKY30R
	2525M22	SLSTN43	CCP14	CCK14	SLCS106	CPT14	WPS1	MES3	HKY30R HKY40R
	5032M22	SLSTN43	CCP14	CCK14	SLCS106	CPT14	WPS1	MES3	HKY30R HKY40R
MWLNR/L	2020K08	WPSWN43	CCP34	CCK13	SLCS105	CPT24	—	MES2	HKY40R
	2525M08								
	3225P08								

SP TYPE HOLDER

Old Type Tool Number		Clamp Screw	Wrench	Shim	Shim Pin
Type	Size				
SDJCR/L SDFCR/L SDXCR/L	0808D07	TS25	TKY08F	—	—
	1010E07	TS25	TKY08F	—	—
	1212F07	TS25	TKY08F	—	—
	1616H11	TS43	TKY15F	—	—
SVJCR/L SVVCN SVPCR/L	0808D11	TS25	TKY08F	—	—
	1010E11	TS25	TKY08F	—	—
	1212F16	TS43	TKY15F	—	—
	3225P16	TS44	TKY15R	SPSVN32	BCP141
SSBCR/L	1616H09	TS43	TKY15F	—	—
SRGCR/L SRXCR/L SRDCN	0808D06	TS25	TKY08F	—	—
	1010E06	TS25	TKY08F	—	—
	1212F06	TS25	TKY08F	—	—
	1010E08	TS3	TKY08F	—	—
	1212F08	TS3	TKY08F	—	—

MP TYPE HOLDER

Old Type Tool Number		Shim	Lock Pin	Lock Screw	Stop Ring	Wrench
Type	Size					
PVVNN PVPNR/L	3225P16	PV32◌	P11S	HSP05008C	E03	HKY25R

SR TYPE HOLDER

Old Type Tool Number		Clamp Screw	Wrench
Type	Size		
SRSGR/L SRSGN	2525M20	TS5	TKY25F
	3225P20	TS5	TKY25F

AL TYPE HOLDER

Old Type Tool Number		Shim	Shim Pin	Clamp Lever	Clamp Screw	Wrench	Punch
Type	Size						
PTGER/L PTFER/L	2020K16	LLSTE32	LLP13	LLCL131	LLCS106	HKY25R	LLH3
	2525M16	LLSTE32	LLP13	LLCL131	LLCS106	HKY25R	LLH3
SVVDN SVPDR/L	1616H16	–	–	–	FC400890T	TKY10F	–
	2020K16	–	–	–	FC400890T	TKY10F	–
	2525M16	–	–	–	FC400890T	TKY10F	–

MT2 TYPE HOLDER

Old Type Tool Number		Clamp Bridge	Clamp Screw	Spring	Wrench
Type	Size				
MT2R/L	2525M4	MTK1L/R	HBH06020	MES3	HKY40R

MG2 TYPE HOLDER

Old Type Tool Number		Clamp Bridge	Clamp Screw	Spring	Wrench
Type	Size				
MG2R/L	2525M4315	MTK1R/L	HBH06020	MES3	HKY40R
	2525M4323	MTK1R/L	HBH06020	MES3	HKY40R
	2525M4333	MTK1R/L	HBH06020	MES3	HKY40R

MG TYPE HOLDER

Old Type Tool Number		Clamp Bridge	Clamp Screw	Spring	Wrench
Type	Size				
MGHR/L	2020K3333	MTK1L/R	HBH06020	MES3	HKY40R
	2020K4447	MTK1L/R	HBH06020	MES3	HKY40R
	3232P5660	MTK2L/R	MGS6	MES3	HKY50R
	3232P5670	MTK2L/R	MGS6	MES3	HKY50R
	3232P5680	MTK2L/R	MGS6	MES3	HKY50R

EG TYPE HOLDER

Old Type Tool Number		Clamp Screw	Wrench
Type	Size		
EGHR	2525M7	EGS08024	HKY40R
	2525M8	EGS08024	HKY40R

ET TYPE HOLDER

Old Type Tool Number		Clamp Bridge	Clamp Screw	Shim Screw	Shim	Breaker Piece	Wrench
Type	Size						
ETHR	2525M16	CK341	LS2	CFM02008	PT32T1R PT32T2R	CBT3106 CBT3113 CBT3120	HKY40R

REPLACEMENT PARTS FOR OLD TYPE TOOLS (BORING BARS)

COBRA (STEEL SHANK)

Old Type Tool Number		Clamp Screw	Wrench
Type	Size		
S08HSTFPR09		TS253	TKY08F
S10KSTFPR09		TS25	TKY08F
S○○○STFPR11		TS3	TKY08F
S○○○STFPR16		TS4	TKY15F
S○○○SCLPR/L08		TS3	TKY08F
S○○○SCLPR/L09		TS4	TKY15F
S○○○SWLPR/L04		TS25	TKY08F
S○○○SWLPR/L06		TS4	TKY15F

COBRA (CARBIDE SHANK)

Old Type Tool Number		Clamp Screw	Wrench
Type	Size		
E08KSTFPR09		TS253	TKY08F
E10MSTFPR09		TS25	TKY08F
E○○○STFPR11		TS3	TKY08F
E○○○SCLPR08		TS3	TKY08F
E○○○SCLPR09		TS4	TKY15F

S TYPE (STEEL SHANK)

Old Type Tool Number		Clamp Screw	Wrench
Type	Size		
S○○○SSKCR/L12		TS5	TKY25F
S○○○SDQCR/L15		TS5	TKY25F
S○○○SCZCR/L06		TS25	TKY08F
S○○○SCZCR/L09		TS4	TKY15F
S○○○SCZCR/L12		TS5	TKY25F
S○○○SDZCR11		TS4	TKY15F

S TYPE (CARBIDE SHANK)

Old Type Tool Number		Clamp Screw	Wrench
Type	Size		
C○○○SSKCR/L09		TS4	TKY15F
C○○○SDUCR/L15		TS5	TKY25F
C○○○SVUCR/L11		TS25	TKY08F
C○○○SVUCR/L16		TS4	TKY15F
C○○○SCLCR/L12		TS5	TKY25F
C○○○SCZCR/L06		TS25	TKY08F
C○○○SCZCR/L09		TS4	TKY15F
C○○○SCZCR/L12		TS5	TKY25F
C○○○SDZCR11		TS4	TKY15F

F TYPE

Old Type Tool Number		Shim	Shim Pin	Clamp Set	Breaker Piece	Wrench
Type	Size					
FCSK	116R/L	—	—	C3	CBS3	HKY25R
	120R/L	—	—	C3	CBS3	HKY25R
	125R/L	PS42	BCP252	C4	CBS4F	HKY30R
	132R/L	PS42	BCP251	C4	CBS4F	HKY30R
FCSK	216R/L	—	—	C3	CBS3	HKY25R
	220R/L	—	—	C3	CBS3	HKY25R
	225R/L	PS42	BCP252	C4	CBS4F	HKY30R
FCTU	232R/L	PT32	BCP201	C4	CBT3F	HKY30R

P TYPE

Old Type Tool Number		Shim	Shim Pin	Clamp Lever	Clamp Screw	Wrench	Plug
Type	Size						
A50UPSKNR/L19		LLSSP63	LLP16	LLCL16	LLCS310	HKY40R	HGM-PT3/8
A40TPCLNR/L16		LLSCN53	LLP15	LLCL25	LLCS508	HKY30R	HGM-PT3/8
A50UPCLNR/L19		LLSCP63	LLP16	LLCL16	LLCS310	HKY40R	HGM-PT3/8

D TYPE (FOR BORING)

Old Type Tool Number		Shim	Shim Pin	Clamp Lever	Clamp Screw	Clamp Set	Breaker Piece	Stop Ring	Wrench
Type	Size								
DPSK	132R/L	LLSSN42	LLP14	LLCL14	LLCS108	—	—	—	HKY30R
	140R/L	LLSSN42	LLP14	LLCL14	LLCS108	—	—	—	HKY30R
	150R/L	LLSSN63	LLP16	LLCL16	LLCS110	—	—	—	HKY40R
	163R/L	LLSSN63	LLP16	LLCL16	LLCS110	—	—	—	HKY40R
DPTF	150R/L	LLSTN42	LLP14	LLCL14	LLCS108	—	—	—	HKY30R
	163R/L	LLSTN42	LLP14	LLCL14	LLCS108	—	—	—	HKY30R
DPDU DPDH DPDZ	132R/L	LLSDN42	LLP14	LLCL24	LLCS108	—	—	—	HKY30R
	140R/L	LLSDN42	LLP14	LLCL24	LLCS108	—	—	—	HKY30R
	* 150R/L	LLSDN53	LLP15	LLCL15	LLCS208	—	—	—	HKY30R
DPCL	150R/L	LLSCN63	LLP16	LLCL16	LLCS110	—	—	—	HKY40R
	163R/L	LLSCN63	LLP16	LLCL16	LLCS110	—	—	—	HKY40R
DPVP	150R/L	PV322	P11S	—	HSP05008C	—	—	E03	HKY25R
DCTU	132R/L	PT32	BCP201	—	—	C4	CBT3N	—	HKY30R
	140R/L	PT42	BCP251	—	—	C5	CBT4F	—	HKY40R
	150R/L	PT42	BCP251	—	—	C5	CBT4F	—	HKY40R

*DPDH150R/L can be compatible with 140R/L.

REPLACEMENT PARTS FOR OLD TYPE TOOLS (BORING BARS)

D TYPE (FOR GROOVING AND THREADING)

Old Type Tool Number		Lock Pin	Lock Screw	Stop Ring	Wrench
Type	Size				
DPT2	132R	P21S	HSP08014	E01	HKY40R
	140R	P21S	HSP08014	E01	HKY40R
DPT4	132R	P21S	HSP08014	E01	HKY40R
	140R	P21S	HSP08014	E01	HKY40R

F TYPE (FOR GROOVING AND THREADING)

Old Type Tool Number		Clamp Bridge	Clamp Set	Clamp Screw	Shim	Shim Pin	Stop Ring	Wrench
Type	Size							
FCL5	116R/L	LK1	–	HBH04012	–	–	–	HKY25R
	120R/L	LK1	–	HBH04012	–	–	–	HKY25R
	125R/L	LK1	–	HBH04012	–	–	–	HKY25R
	132R/L	LK1	–	HBH04012	–	–	–	HKY25R
	216R/L	LK1	–	HBH04012	–	–	–	HKY25R
	220R/L	LK1	–	HBH04012	–	–	–	HKY25R
	225R/L	LK1	–	HBH04012	–	–	–	HKY25R
NTF	M16R	–	C3	–	–	–	–	HKY25R
	Q20R	–	C4	–	–	–	–	HKY30R
	R25R	–	C4	–	–	–	–	HKY30R
	R216R	–	C3	–	–	–	–	HKY25R
	S220R	–	C4	–	–	–	–	HKY30R
	T225R	–	C4	–	–	–	–	HKY30R
SNTF	M210R11	–	–	TS25	–	–	–	TKY08F
	Q212R11	–	–	TS25	–	–	–	TKY08F
	R216R	–	–	CS350860T	–	–	–	TKY15F
	S220R	SETK51	–	SETS51	CT32T1	HFC03008	CR4	TKY15F
	T225R	SETK51	–	SETS51	CT32T1	HFC03008	CR4	TKY15F
FCDG4	125R/L5M	–	BC5	–	–	–	–	TKY20R
	132R/L5M	–	BC5	–	–	–	–	TKY20R
FCDG4	125R/L5J	–	BC5	–	–	–	–	TKY20R
	132R/L5J	–	BC5	–	–	–	–	TKY20R

REPLACEMENT PARTS FOR OLD TYPE TOOLS (BORING UNITS)

UNIT

Old Type Tool Number	Washer Screw	Bush Screw	Wrench	Bush	Washer	Leaf Spring
NA1	HFC03008	HY-A1	HKY20R	The parts above are not sold separately as accuracy can only be guaranteed by having the complete set. Please contact us for questions about parts replacement.		
NV1	HFC03008	HY-V1	HKY20R			
NA2	HSC03010	HY2	HKY20R HKY25R			
NV2	HSC03010	HY2	HS-N2 HKY25R			
NA3	HSC04010	HY3	HKY20R HKY30R			
NV3	HSC04010	HY3	HKY20R HKY30R			
NA4	HSC05012	HY4	HKY30R HKY40R			
NV4	HSC05012	HY4	HKY30R HKY40R			

CARTRIDGE

Old Type Tool Number	Clamp Lever	Clamp Screw	Shim	Shim Pin	Spanner	Wrench
NASP11	–	CS250T	–	–	HR12	TKY08F
NVSP11	–	CS250T	–	–	HR12	TKY08F
NASP21	–	CS300890T	–	–	HR12	TKY08F
NVSP21	–	CS300890T	–	–	HR12	TKY08F
NAPN21	LLCL12S	LLCS103	–	–	HR12	HKY20F
NVPN21	LLCL12S	LLCS103	–	–	HR12	HKY20F
NASP31	–	CS300890T	–	–	HR34	TKY08F
NVSP31	–	CS300890T	–	–	HR34	TKY08F
NAPN31	LLCL12S	LLCS103	–	–	HR34	HKY20F
NVPN31	LLCL12S	LLCS103	–	–	HR34	HKY20F
NAPN41	LLCL13	LLCS106	LLSTN32	LLP13	HR34	HKY25F
NVPN41	LLCL13	LLCS106	LLSTN32	LLP13	HR34	HKY25F

REPLACEMENT PARTS FOR OLD TYPE TOOLS (FACE MILLS)

AF5000 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Adjust Screw	Wrench	Wrench	Recommended Cutter
AF5000 Type	CWAF5R/L	LS10T	KS1S	TKY25T	HKY15R	**NF10000 Type** (➲C195)

BN425 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Wrench	Recommended Cutter
BN425 Type	CWS43SNN	LS14T	TKY25T	—

BOE TYPE

Old Type Tool Number	Set Bolt	Set Bolt	Clamp Screw	Wrench (Insert)	Wrench (Set Bolt)	Recommended Cutter
BOER0202B	LS21	—	CS501290T	TKY25T	HKY50R	**OCTACUT Type** (➲C149)
-050A02R	LS20	—	CS501290T	TKY25T	HKY50R	
R2H03B	—	BOES101	CS501290T	TKY25T	HKY80R	
-063A03R	—	BOES101	CS501290T	TKY25T	HKY80R	
R0304C	—	—	CS501290T	TKY25T	—	
R0405D	—	HSC16035	CS501290T	TKY25T	—	

BSX400 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Cutter
BSX400R05004A	TS43	TKY15F	**ASX400 Type** (➲C086)
06305A	TS43	TKY15F	
08006C	TS43	TKY15F	
10008D	TS43	TKY15F	
12510E	TS43	TKY15D	
16012E	TS43	TKY15D	

BSX500 TYPE

Old Type Tool Number	Clamp Screw	Shim Screw	Shim	Wrench	Recommended Cutter
BSX500 Type	CSF401260T	WCS604010H	STBS500N	TKY20D	**ASX4000 Type** (➲C086)

BXD7000 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Cutter
BXD7000 Type	TS5SL	TKY25D	**AXD7000 Type** (➲C120)

BZC400 TYPE

Old Type Tool Number	Clamp Screw	Set Bolt	Wrench (Wedge)	Wrench (Set Bolt)	Recommended Cutter
BZC400-032A03R	CS350990T	LS24	TKY10F	HKY40R	**APX4000 Type** (➲C113)
-040A04R	CS350990T	—	TKY10F	—	
R0408D	CS350990T	—	TKY10F	—	

E404 TYPE

Old Type Tool Number	Locator	Locator Screw	Shim	Shim Screw	Wedge	Clamp Screw (Wedge)	Wrench	Wrench	Recommended Cutter
E404 Type	SSE41R/L	SPS1	SCD43	STS1	CWS3R/L	WS1	TKY10R	TKY25T	**BF407 Type** (➲C084)

FN548 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Wrench	Wrench	Hexagonal Head	Recommended Cutter
FN548 Type	CWS4	LS14	HKY40T	120QSPK x 80 (KANNON-SEIKI CO.)	6.35□ x 4 (KYOKUTO MFG CO.)	—

MG300, 400 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Cutter
MG300 Type	CS350990T	TKY10F	**NSE300 Type** (➲C092)
MG400 Type	CS451190T	TKY20F	**ASX400 Type** (➲C086)

MG345, 445 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Cutter
MG345 Type	CS350990T	TKY10F	**ASX445 Type** (➲C064)
MG445 Type	CS451190T	TKY20F	

MGP445 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Cutter
MGP445 Type	CS401160T	TKY15D	**ASX445 Type** (➲C064)

MSD445 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Wrench	Recommended Cutter
MSD445 Type	CWMSE445R2	LS15T	TKY25T	**ASX445 Type** (➲C064)

MSE445 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Wrench	Recommended Cutter
MSE445 Type	CWMSE445R2	LS15T	TKY25T	**ASX445 Type** (➲C064)

REPLACEMENT PARTS FOR OLD TYPE TOOLS (FACE MILLS)

NR10000 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Adjusting Wedge	Adjusting Screw	Clamp Screw	Wrench	Recommended Cutter
NR10000 Type	CWAF10R2	LS10T	CWAF10N	LS15T	CSAF10	TKY25T	—

P425, P525 TYPE

Old Type Tool Number	Locator	Locator Screw	Shim	Shim Screw	Wedge	Clamp Screw (Wedge)	Wrench	Wrench	Recommended Cutter
P425 Type	SSP41R/L	SPS1	SCP431R/L	STS1	CWS1R/L	WS1	TKY10R	TKY25T	**ASX445 Type** (➲C064) **SE415 Type** (➲C076)
P525 Type	SSP51R/L	SPS1	SCP521R/L	STS1	CWS1R/L	WS1	TKY10R	TKY25T	**SE545 Type** (➲C070) **SE515 Type** (➲C078)

QBF407 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Setting Screw	Guide Plate	Stop Screw	Wrench	Recommended Cutter
QBF407R0304Q	CWSF407TR1	LS15T	CAS51T	QPAR1	TFC04010	TKY20R TKY25T	—
0406Q	CWSF407TR1	LS15T	CAS51T	QPAR1	TFC04010	TKY20R TKY25T	
0508Q	CWSF407TR2	LS15T	CAS51T	QPAR1	TFC04010	TKY20R TKY25T	

QBP415 TYPE

Old Type Tool Number	Shim	Shim Pin	Wedge-T	Clamp Screw	Wrench	Recommended Cutter
QBP415 Type	STSP415R	TS32	QWGR1	LS10T	TKY25T	—

QF10000 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Guide Plate	Stop Screw	Adjusting Wedge	Adjusting Screw	Stop Screw	Wrench	Recommended Cutter
QF10000 Type	CWAF10R3	LS15T	QPCR1	TFC04010	CWAF10N	LS10T	CSAF10	TKY20T TKY25T	—

QSE415 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Setting Screw	Guide Plate	Stop Screw	Wrench	Recommended Cutter
QSE415 Type	CWSF407TR3	LS15T	CAS51T	QPAR1	TFC04010	TKY20R TKY25T	—

SE300 TYPE

Old Type Tool Number	Locator	Locator (Wiper)	Wedge-T	Wedge-S	Wedge-S (Wiper)	Clamp Screw	Wrench	Recommended Cutter
SE300 Type	SPSE300R	SPSEW300R	CWNSE300TR	CWSE300SN	CWSEW300SN	LS10T	TKY25T	**NSE300 Type** (➲C092)

SE400 TYPE

Old Type Tool Number	Locator	Locator (Wiper)	Wedge-T	Wedge-S	Clamp Screw	Wrench	Recommended Cutter
SE400 Type	SPSE400R	SPSEW400R	CWNSE400TN	CWSE300SN	LS15T (SE400R0304C:LS10T)	TKY25T	**NSE400 Type** (➲C094)

SHP400 TYPE

Old Type Tool Number	Locator	Wedge-T	Clamp Screw	Locator Screw	Wrench (Wedge)	Wrench (Locator)	Recommended Cutter
SHP400 Type	SPSHP400R/L	CWSE300TR/L	LS10T	TS32	TKY25T	TKY08F	**ASX400 Type** (➲C086)

VIP400 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Cutter
VIP400 Type	CS501160T	TKY20F	**ASX400 Type** (➲C086)

VIP445 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Cutter
VIP445 Type	CS501160T	TKY20F	**ASX445 Type** (➲C064)

VSD645 TYPE

Old Type Tool Number	Locator	Locator Screw	Clamp Screw	Adjust Screw	Wrench (Insert)	Wrench	Recommended Cutter
VSD645 Type	NE04R30	SE03-65	SE02-81	SA04-47	TKY15D	HKY30R	**ASX445 Type** (➲C064)

REPLACEMENT PARTS FOR OLD TYPE TOOLS (END MILLS)

BAE TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
BAE500R161S16	TS42	TKY15F	**APX4000 Type** (➲C112)
201S20	TS42	TKY15F	
252S25	TS42	TKY15F	
323S32	TS4	TKY15F	
403S32	TS4	TKY15F	
504S32	TS4	TKY15F	
BAE600 Type	TS52	TKY25F	

BOE TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
BOE Type	CS501290T	TKY25T	**OCTACUT Type** (➲C148)

BSX300 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
BSX300 Type	TS32	TKY08F	**APX3000 Type** (➲C106)

BSX400 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
BSX400 Type	TS43	TKY15F	**ASX400 Type** (➲C088)

BSX500 TYPE

Old Type Tool Number	Clamp Screw	Shim Screw	Shim	Wrench	Recommended End Mill
BSX500 Type	CSF401260T	WCS604010H	STBS500N	TKY20D	**ASX400 Type** (➲C088)

BXD7000 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
BXD7000R251SA25SA/B	TS5S	TKY25D	**AXD7000 Type** (➲C120)
321SA32SA/B	TS5S	TKY25D	
402SA42SA/B	TS5SL	TKY25D	

BZC400 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
BZC400 Type	CS350990T	TKY10F	**BAP400 Type** (➲C098)

CV TYPE

Referência do Suporte Obsoleto	Clamp Screw	Clamp Bridge	Clamp Screw (Bridge)	Spring	Wrench	Recommended End Mill
CV10R253S32	TS4	AMS3	BRS103	ASS2	TKY15R	**BRP Type** (➲C156)
12R323S32	TS4	AMS3	BRS103	ASS2	TKY15R	
16R403S32	TS5	AMS5	BRS105	ASS3	TKY25R	

CV20 TYPE

Old Type Tool Number	Clamp Screw	Wedge	Wrench	Recommended End Mill
CV20R403S32	LS14T	CWCV20	TKY25T	—

DCSD, DCSN TYPE

Old Type Tool Number	Holder			Cartridge					Wrench	Recommended End Mill
	Shim	Shim Screw	Clamp Screw	Body	Shim	Shim Screw	Clamp Screw	Wrench		
DCSDR2063SN	—	—	TS5S	JKDS4	—	—	DKS5	HKY40R	TKY25T	**SPX Type** (➲C162)
2063LN	—	—	TS5S	JKDS4	—	—	DKS5	HKY40R	TKY25T	
2080SN	—	—	TS5S	JKDS4	—	—	DKS5	HKY40R	TKY25T	
2100SN	—	—	TS5S	JKDS4	—	—	DKS5	HKY40R	TKY25T	
DCSNR2063SN	JENS42	JSS7	TS5L	JKNS4	JENS42	JSS7	DKS5	HKY40R	TKY25T	
2063LN	JENS42	JSS7	TS5L	JKNS4	JENS42	JSS7	DKS5	HKY40R	TKY25T	
DCSDR2063SB	—	—	TS5S	JKDS4	—	—	DKS5	HKY40R	TKY25T	
2063LN	—	—	TS5S	JKDS4	—	—	DKS5	HKY40R	TKY25T	
DCSNR2063SB	JENS42	JSS7	TS5L	JKNS4	JENS42	JSS7	DKS5	HKY40R	TKY25T	
DCSDR2080SA	—	—	TS5S	JKDS4	—	—	DKS5	HKY40R	TKY25T	
DCSNR2080SA	JENS42	JSS7	TS5L	JKNS4	JENS42	JSS7	DKS5	HKY40R	TKY25T	

ECMP TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
ECMP252S25	TS4	TKY15R	—
322S32	TS5	TKY25R	
402S42	TS5	TKY25R	

FF3000 TYPE

Old Type Tool Number	Shim	Lock Pin	Wrench	Recommended End Mill
FF3000 Type	FFSS	FFP	HKY25L	—

FSTE TYPE

Old Type Tool Number	Locator	Wedge	Clamp Screw	Locator Screw	Wrench	Recommended End Mill
FSTE Type	TS441R	CWFSTE	LS10T	CPM03008	TKY25T	**ASX400 Type** (➲C088)

MG200, 300 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
MG200 Type	CS300890T	TKY08F	**NSE300 Type** (➲C092)
MG300 Type	CS350990T	TKY10F	**ASX400 Type** (➲C088)

MG245, 345 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
MG245 Type	CS300890T	TKY08F	**ASX445 Type** (➲C066)
MG345 Type	CS350990T	TKY10F	

MSE445 TYPE

Old Type Tool Number	Wedge	Clamp Screw	Wrench	Recommended End Mill
MSE445 Type	CWMSE445R1	LS15T	TKY25T	**ASX445 Type** (➲C066)

REPLACEMENT PARTS FOR OLD TYPE TOOLS (END MILLS)

SE300 TYPE

Old Type Tool Number	Locator	Wedge-T	Wedge-S	Clamp Screw	Wrench	Recommended End Mill
SE300 Type	SPSE300R	CWNSE300TR	CWSE300SN	LS10T	TKY25T	**NSE300 Type** (➲C092)

SHP400 TYPE

Old Type Tool Number	Locator	Wedge-T	Clamp Screw	Locator Screw	Wrench (Insert)	Wrench (Locator)	Recommended End Mill
SHP400 Type	SPSHP400R	CWSE300TR	LS10T	TS32	TKY25T	TKY08F	**ASX400 Type** (➲C088)

VIPER TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
VIPER Type	CS400990T	TKY15D	**SPX Type** (➲C162)

ZR TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
ZR202C/T	TS25	TKY08F	–
252C/T	CS300890T	TKY08F	
322C/T	CS300990T	TKY10F	
402C/T	CS451190T	TKY20F	
502C/T	CS451190T	TKY20F	

FBE2 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
FBE2200SM	CS300590T	TKY08R	**SRF Type** (➲C169)
2250SM	CS350790T	TKY10R	
2300SM	CS400990T	TKY15R	
2200SF	CS300590T	TKY08R	
2250SF	CS350790T	TKY10R	
2300SF	CS400990T	TKY15R	

TBE1/TBE2 TYPE

Old Type Tool Number		Clamp Screw		Wrench				Recommended End Mill
Type	Tool Holder	R	Peripheral	R		Peripheral		
Small	**TBE1100SS**	TS3	–	TKY08F	–	–	–	**SRM2 Type** (➲C172)
	1100SM	TS3	–	TKY08F	–	–	–	
	1100S	TS3	–	TKY08F	–	–	–	
Standard	**1150S**	CS300790TS	–	–	TKY10R	–	–	
	1200S	CS400990T	–	–	TKY15R	–	–	
	1250S	CS400990T	–	–	TKY15R	–	–	
	1300S	CS501290T	–	–	TKY25R	–	–	
	2200S	CS350790T	–	–	TKY10R	–	–	
	2200SM	CS350790T	–	–	TKY10R	–	–	
	2250S	CS400990T	–	–	TKY15R	–	–	
	2250SM	CS400990T	–	–	TKY15R	–	–	
	2300S	CS501290T	–	–	TKY25R	–	–	
	2300SM	CS501290T	–	–	TKY25R	–	–	
Under-Cut	**1150SU**	CS300790TS	–	–	TKY10R	–	–	
	1200SU	CS400990T	–	–	TKY15R	–	–	
	1250SU	CS400990T	–	–	TKY15R	–	–	
	1300SU	CS501290T	–	–	TKY25R	–	–	
	2200SU	CS350790T	–	–	TKY10R	–	–	
	2250SU	CS400990T	–	–	TKY15R	–	–	
	2300SU	CS501290T	–	–	TKY25R	–	–	
Long	**1200SL**	CS400990T	TS3	–	TKY15R	TKY08F	–	
	1250SL	CS400990T	TS3	–	TKY15R	TKY08F	–	
	1300SL	CS501290T	TS4	–	TKY25R	–	TKY15R	
	2200SL	CS350790T	CS350790T	–	TKY10R	–	TKY10R	
	2250SL	CS400990T	CS400990T	–	TKY15R	–	TKY15R	
	2300SL	CS501290T	CS400990T	–	TKY25R	–	TKY15R	

TBE2 TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended End Mill
TBE2150S/SM/SU	TS254	TKY08F	**SRM Type** (➲C172)
2160S/SM/SU	TS254	TKY08F	

TRM2 TYPE

Old Type Tool Number	Clamp Screw		Wrench		Recommended End Mill
	Inner, Outer	Peripheral	Inner, Outer	Peripheral	
TRM2200SM	CS300790TS	–	TKY10R	–	**SRM2 Type** (➲C172)
2250SM	CS400990T	–	TKY15R	–	
2300SM	CS501290T	–	TKY25R	–	
2200SL	CS300790TS	TS3	TKY10R	TKY08F	
2250SL	CS400990T	TS3	TKY15R	TKY08F	
2300SL	CS501290T	TS4	TKY25R	TKY15R	
2200SF	CS300790TS	TS3	TKY10R	TKY08F	
2250SF	CS400990T	TS3	TKY15R	TKY08F	
2300SF	CS501290T	TS4	TKY25R	TKY15R	

REPLACEMENT PARTS FOR OLD TYPE TOOLS (DRILLS)

TASS TYPE (STANDARD)

Old Type Tool Number	Clamp Screw	Wrench	Recommended Drill
TASS1600S32	TS202	TKY06F	**TAF Drill** (➲D126)
1700S32	TS202	TKY06F	
1800S32	TS202	TKY06F	
1900S32	TS202	TKY06F	
2000S32	TS25	TKY08F	
2100S32	TS25	TKY08F	
2200S32	TS25	TKY08F	
2300S32	TS25	TKY08F	
2400S32	TS25	TKY08F	
2500S32	TS32	TKY08F	
2600S32	TS32	TKY08F	
2700S32	TS32	TKY08F	
2800S32	TS32	TKY08F	
2900S32	TS32	TKY08F	
3000S32	TS43	TKY15F	
3100S32	TS43	TKY15F	
3200S32	TS43	TKY15F	
3300S40	TS43	TKY15F	
3400S40	TS43	TKY15F	
3500S40	TS43	TKY15F	
3600S40	TS43	TKY15F	

TASS TYPE (FLANGE)

Old Type Tool Number	Clamp Screw	Wrench	Recommended Drill
TASS1600C20	TS202	TKY06F	**TAF Drill** (➲D126)
1650C20	TS202	TKY06F	
1700C20	TS202	TKY06F	
1750C20	TS202	TKY06F	
1800C20	TS202	TKY06F	
1850C20	TS202	TKY06F	
1900C20	TS202	TKY06F	
1950C20	TS202	TKY06F	
2000C20	TS25	TKY08F	
2100C25	TS25	TKY08F	
2200C25	TS25	TKY08F	
2300C25	TS25	TKY08F	
2400C25	TS25	TKY08F	
2500C25	TS32	TKY08F	
2600C25	TS32	TKY08F	
2700C25	TS32	TKY08F	
2800C25	TS32	TKY08F	
2900C25	TS32	TKY08F	
3000C25	TS43	TKY15F	
3100C32	TS43	TKY15F	
3200C32	TS43	TKY15F	
3300C32	TS43	TKY15F	
3400C32	TS43	TKY15F	
3500C32	TS43	TKY15F	
3600C32	TS43	TKY15F	
3700C32	TS43	TKY15F	
3800C32	TS43	TKY15F	
3900C32	TS43	TKY15F	
4000C32	TS5	TKY25F	
4100C32	TS5	TKY25F	
4200C40	TS5	TKY25F	
4300C40	TS5	TKY25F	
4400C40	TS5	TKY25F	
4500C40	TS5	TKY25F	
4600C40	TS5	TKY25F	
4700C40	TS5	TKY25F	
4800C40	TS5	TKY25F	
4900C40	TS5	TKY25F	
5000C40	TS32	TKY08F	

TAGS TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Drill
TAGS1600F25	TS2	TKY06F	
1700F25	TS2	TKY06F	
1800F25	TS2	TKY06F	
1900F25	TS2	TKY06F	
2000F25	TS25	TKY08F	
2100F25	TS25	TKY08F	
2200F25	TS25	TKY08F	
2300F25	TS25	TKY08F	
2400F25	TS25	TKY08F	
2500F32	TS3	TKY08F	
2600F32	TS3	TKY08F	
2700F32	TS3	TKY08F	
2800F32	TS3	TKY08F	
2900F32	TS3	TKY08F	
3000F40	TS4	TKY15F	
3100F40	TS4	TKY15F	
3200F40	TS4	TKY15F	
3300F40	TS4	TKY15F	
3400F40	TS4	TKY15F	
3500F40	TS4	TKY15F	
3600F40	TS4	TKY15F	
3700F40	TS4	TKY15F	**TAF Drill** (➔D126)
3800F40	TS4	TKY15F	
3900F40	TS4	TKY15F	
4000F40	TS5	TKY25F	
4100F40	TS5	TKY25F	
4200F40	TS5	TKY25F	
4300F40	TS5	TKY25F	
4400F40	TS5	TKY25F	
4500F40	TS5	TKY25F	
4600F40	TS5	TKY25F	
4700F40	TS5	TKY25F	
4800F40	TS5	TKY25F	
4900F40	TS5	TKY25F	
5000F40	TS3	TKY08F	
5100F40	TS3	TKY08F	
5200F40	TS3	TKY08F	
5300F40	TS3	TKY08F	
5400F40	TS3	TKY08F	
5500F40	TS4	TKY15F	
5600F40	TS4	TKY15F	
5700F40	TS4	TKY15F	
5800F40	TS4	TKY15F	
5900F40	TS4	TKY15F	

TAGM TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Drill
TAGM1600F25	TS2	TKY06F	
1700F25	TS2	TKY06F	
1800F25	TS2	TKY06F	
1900F25	TS2	TKY06F	
2000F25	TS25	TKY08F	
2100F25	TS25	TKY08F	
2200F25	TS25	TKY08F	
2300F25	TS25	TKY08F	
2400F25	TS25	TKY08F	
2500F32	TS3	TKY08F	
2600F32	TS3	TKY08F	
2700F32	TS3	TKY08F	
2800F32	TS3	TKY08F	
2900F32	TS3	TKY08F	
3000F40	TS4	TKY15F	
3100F40	TS4	TKY15F	
3200F40	TS4	TKY15F	
3300F40	TS4	TKY15F	
3400F40	TS4	TKY15F	
3500F40	TS4	TKY15F	
3600F40	TS4	TKY15F	
3700F40	TS4	TKY15F	**TAF Drill** (➔D126)
3800F40	TS4	TKY15F	
3900F40	TS4	TKY15F	
4000F40	TS5	TKY25F	
4100F40	TS5	TKY25F	
4200F40	TS5	TKY25F	
4300F40	TS5	TKY25F	
4400F40	TS5	TKY25F	
4500F40	TS5	TKY25F	
4600F40	TS5	TKY25F	
4700F40	TS5	TKY25F	
4800F40	TS5	TKY25F	
4900F40	TS5	TKY25F	
5000F40	TS3	TKY08F	
5100F40	TS3	TKY08F	
5200F40	TS3	TKY08F	
5300F40	TS3	TKY08F	
5400F40	TS3	TKY08F	
5500F40	TS4	TKY15F	
5600F40	TS4	TKY15F	
5700F40	TS4	TKY15F	
5800F40	TS4	TKY15F	
5900F40	TS4	TKY15F	

REPLACEMENT PARTS FOR OLD TYPE TOOLS (DRILLS)

TAB TYPE

Old Type Tool Number	Clamp Screw	Plug	Wrench	Recommended Drill
TAB1700S32	TS3	PT1/4	TKY08D	
1800S32	TS3	PT1/4	TKY08D	
1900S32	TS3	PT1/4	TKY08D	
2000S32	TS32	PT1/4	TKY08D	
2100S32	TS32	PT1/4	TKY08D	
2200S32	TS32	PT1/4	TKY08D	
2300S32	TS32	PT1/4	TKY08D	
2400S32	TS32	PT1/4	TKY08D	
2500S32	TS32	PT1/4	TKY08D	
2600S32	TS4	PT1/4	TKY15D	
2700S32	TS4	PT1/4	TKY15D	
2800S32	TS4	PT1/4	TKY15D	
2900S32	TS4	PT1/4	TKY15D	
3000S32	TS4	PT1/4	TKY15D	
3100S32	TS4	PT1/4	TKY15D	**TAF Drill** (➔D126)
3200S32	TS4	PT1/4	TKY15D	
3300S40	TS5	PT1/4	TKY25D	
3400S40	TS5	PT1/4	TKY25D	
3500S40	TS5	PT1/4	TKY25D	
3600S40	TS5	PT1/4	TKY25D	
3700S40	TS5	PT1/4	TKY25D	
3800S40	TS5	PT1/4	TKY25D	
3900S40	TS5	PT1/4	TKY25D	
4000S40	TS5	PT1/4	TKY25D	
4100S40	TS5	PT1/4	TKY25D	
4200S40	TS5	PT1/4	TKY25D	
4300S40	TS5	PT1/4	TKY25D	
4400S40	TS5	PT1/4	TKY25D	
4500S40	TS5	PT1/4	TKY25D	

NPX TYPE

Old Type Tool Number	Clamp Screw	Wrench	Recommended Drill
NPXM2000S25	TS3	TKY08F	
2100S25	TS3	TKY08F	
2200S25	TS3	TKY08F	
2300S25	TS35	TKY10F	
2400S32	TS35	TKY10F	**TAW Drill** (➔D112)
2500S32	TS35	TKY10F	
2600S32	TS35	TKY10F	
2700S32	TS4	TKY15F	
2800S32	TS4	TKY15F	
2900S32	TS4	TKY15F	
3000S32	TS4	TKY15F	

ANTI SEIZE LUBRICANT

ANTI SEIZE LUBRICANT

Shape	Order Number	Stock	Volume (g)
	MK1K	●	20
	MK1KS	●	3

● : **Inventory maintained.**

Memo

TECHNICAL DATA

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END MILL TERMINOLOGY F019
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DIE STEELS F032
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SYSTEM OF UNITSTOOL WEAR AND DAMAGE F042
CUTTING TOOL MATERIALS F043
GRADE CHAIN F044
GRADES COMPARISON TABLE F045
INSERT CHIP BREAKER COMPARISON TABLE F050

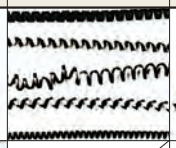
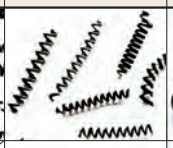
TROUBLE SHOOTING FOR TURNING

Trouble	Factors	Solution: Insert Grade Selection: Select a harder grade	Select a tougher grade	Select a grade with better thermal shock resistance	Select a grade with better adhesion resistance	Cutting Conditions: Cutting speed (Up ↗ / Down ↘)	Feed (Up ↗ / Down ↘)	Depth of cut (Up ↗ / Down ↘)	Coolant: Do not use water-soluble cutting fluid	Coolant: Determine dry or wet cutting	Style and Design of the Tool: Select chip breaker	Rake (Up ↗ / Down ↘)	Corner radius (Up ↗ / Down ↘)	Lead angle (Up ↗ / Down ↘)	Honing strengthens the cutting edge (Up ↗ / Down ↘)	Class of insert	Improve tool holder rigidity	Machine, Installation of Tool: Increase clamping rigidity of the tool and workpiece	Decrease holder overhang	Decrease power and machine backlash
Deterioration of Tool Life	Insert wear quickly generated	Improper tool grade	●																	
		Improper cutting edge geometry									●	↗ ●	↗ ●	↗ ●	● ↘					
		Improper cutting speed				● ↘	↗ ●			● Wet										
	Chipping or fracturing of cutting edge	Improper tool grade		●																
		Improper cutting conditions					● ↘	● ↘												
		Lack of cutting edge strength.									●		↗ ●		↗ ●					
		Thermal crack occurs			●	● ↘	● ↘	● ↘	●	● Dry										
		Build-up edge occurs				↗ ●	↗ ●		●	● Wet										
		Lack of rigidity															●	●	●	●
Out of Tolerance	Dimensions are not constant	Poor insert accuracy														●				
		Large cutting resistance and cutting edge flank									●	●	● ↘	● ↘	● ↘		●	●	●	●
	Necessary to adjust often because of over-size	Improper tool grade	●																	
		Improper cutting conditions				● ↘	↗ ●													
Deterioration of Surface Finish	Poor finished surface	Welding occurs				↗ ●			●	● Wet										
		Improper cutting edge geometry									●		↗ ●							
		Chattering				● ↘	● ↘	● ↘									●	●	●	●
Generation of Heat	Workpiece over heating can cause poor accuracy and short life of insert	Improper cutting conditions				● ↘	● ↘	● ↘												
		Improper cutting edge geometry									●	↗ ●			● ↘					

Trouble	Factors \ Solution	Insert Grade Selection				Cutting Conditions					Style and Design of the Tool							Machine, Installation of Tool		
		Select a harder grade	Select a tougher grade	Select a grade with better thermal shock resistance	Select a grade with better adhesion resistance	Cutting speed (Up ↗ / Down ↘)	Feed (Up ↗ / Down ↘)	Depth of cut (Up ↗ / Down ↘)	Coolant: Do not use water-soluble cutting fluid	Coolant: Determine dry or wet cutting	Select chip breaker	Rake (Up ↗ / Down ↘)	Corner radius (Up ↗ / Down ↘)	Lead angle (Up ↗ / Down ↘)	Honing strengthens the cutting edge (Up ↗ / Down ↘)	Class of insert	Improve tool holder rigidity	Increase clamping rigidity of the tool and workpiece	Decrease holder overhang	Decrease power and machine backlash
Burrs, Chipping etc.	Burrs (steel, aluminium) — Notch wear	●																		
	Burrs (steel, aluminium) — improper cutting conditions					● ↘	● ↗			● Wet										
	Burrs (steel, aluminium) — Improper cutting edge geometry										●	● ↗	● ↘	● ↘	● ↘					
	Workpiece chipping (cast iron) — improper cutting conditions						● ↘	● ↘												
	Workpiece chipping (cast iron) — Improper cutting edge geometry										●	● ↗	● ↗	● ↗	● ↘					
	Workpiece chipping (cast iron) — Vibration occurs																●	●	●	●
	Burrs (mild steel) — Improper tool grade				●															
	Burrs (mild steel) — Improper cutting conditions					● ↗			●	● Wet										
	Burrs (mild steel) — Improper cutting edge geometry										●	● ↗			● ↘					
	Burrs (mild steel) — Vibration occurs																●	●	●	●
Poor Chip Dispersal	long chips — improper cutting conditions					● ↘	● ↗	● ↗		● Wet										
	long chips — Large chip control range										●									
	long chips — Improper cutting edge geometry												● ↘	● ↘						
	Chips are short and scattered — improper cutting conditions						● ↘	● ↘		● Dry										
	Chips are short and scattered — Small chip control range										●									
	Chips are short and scattered — Improper cutting edge geometry												● ↗	● ↗						

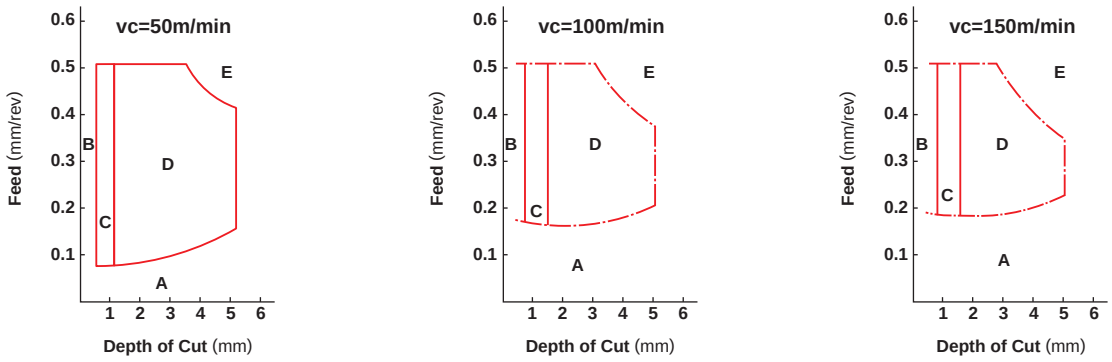
CHIP CONTROL FOR TURNING

CHIP BREAKING CONDITIONS IN STEEL TURNING

Type	A Type	B Type	C Type	D Type	E Type
Small Depth of Cut d<7mm					
Small Depth of Cut d=7—15mm					
Curl Length l	Curless	l≥50mm	l≤50mm 1—5 Curl	≒ 1 Curl	Less Than 1 Curl Half a Curl
Note	●Irregular continuous shape ●Tangles around tool and workpiece	●Regular continuous shape ●Long chips	Good	Good	●Chip scattering ●Chattering ●Poor finished surface ●Maximum

Cutting speed and chip control range of chip breaker

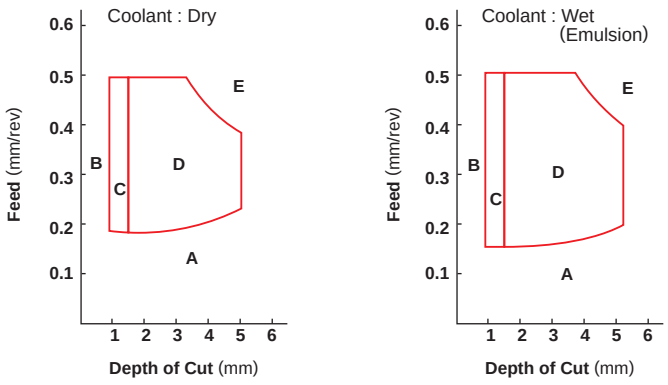
In general, when cutting speed increases, the chip control range tends to become narrower.



Workpiece : **S45C(180HB)** Tool : **MTJNR2525M16N**
Insert : **TNMG160408** Dry Cutting
Grade : **P10**Cemented Carbide

Effects of coolant on the chip control range of a chip breaker

If the cutting speed is the same, the range of chip control differs according to whether coolant is used or not.



Workpiece : **S45C**
Cutting Conditions : **vc=100m/min**

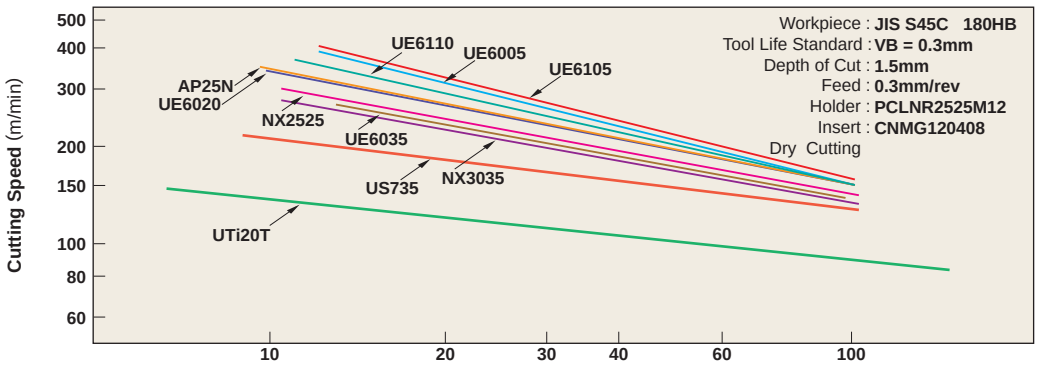
EFFECTS OF CUTTING CONDITIONS FOR TURNING

EFFECTS OF CUTTING CONDITIONS

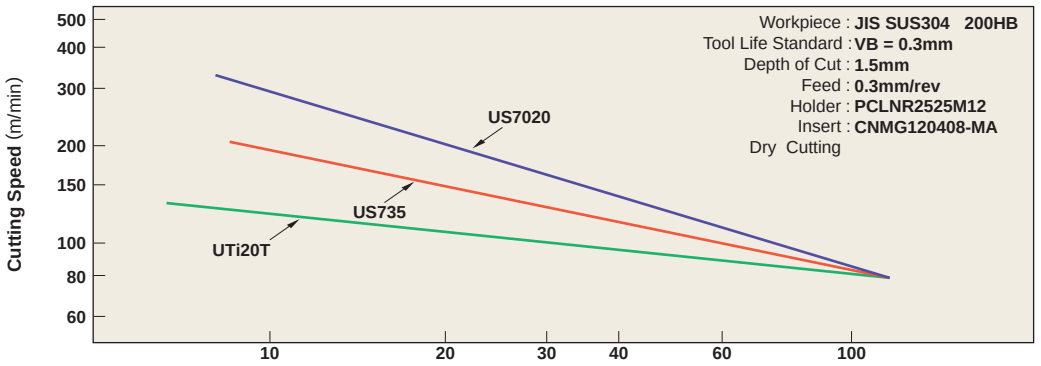
Ideal conditions for cutting are short cutting time, long tool life, and high cutting accuracy. In order to obtain these conditions, selection of efficient cutting conditions and tool, based on work material, hardness, shape and machine capability is necessary.

CUTTING SPEED

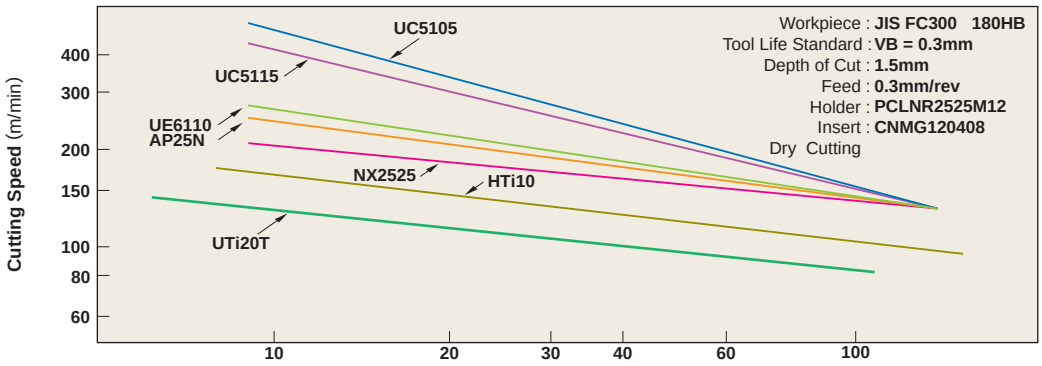
Cutting speed effects tool life greatly. Increasing cutting speed increases cutting temperature and results in shortening tool life. Cutting speed varies depending on the type and hardness of the work material. Selecting a tool grade suitable for the cutting speed is necessary.



P Class Grade Tool Life



M Class Grade Tool Life



K Class Grade Tool Life

Effects of Cutting Conditions

1. Increasing cutting speed by 20% decreases tool life by 1/2. Increasing cutting speed by 50% decreases tool life by 1/5.
2. Cutting at low cutting speed (20—40 m/min) tends to cause chattering. Thus, tool life is shortened.

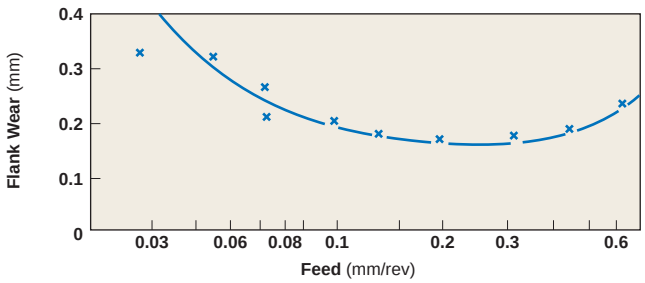
EFFECTS OF CUTTING CONDITIONS FOR TURNING

FEED

When cutting with a general type holder, feed is the distance a holder moves per workpiece revolution. When milling, feed is the distance a machine table moves per cutter revolution divided by the number of inserts. Thus, it is indicated as feed per tooth. Feed rate relates to finished surface roughness.

Effects of Feed

1. Decreasing feed rate results in flank wear and shortens tool life.
2. Increasing feed rate increases cutting temperature and flank wear. However, effects on the tool life is minimal compared to cutting speed.
3. Increasing feed rate improves machining efficiency.



Cutting Conditions Workpiece : **JIS SNCM431** Grade : **STi10T**
Tool Shape : **0-0-5-5-35-35-0.3mm**
Depth of Cut **ap=1.0mm** Cutting Speed **vc=200m/min**
Cutting Time **Tc=10min**

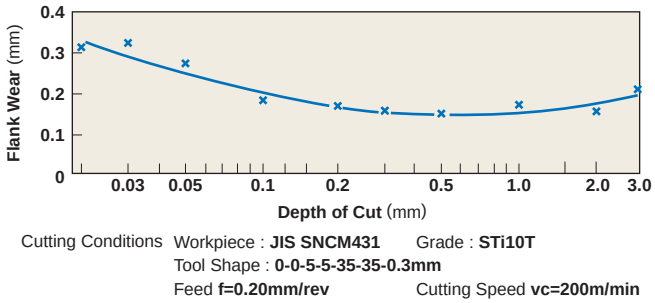
Feed and Flank Wear Relationship in Steel Turning

DEPTH OF CUT

Depth of cut is determined according to the required stock removal, shape of workpiece, power and rigidity of the machine and tool rigidity.

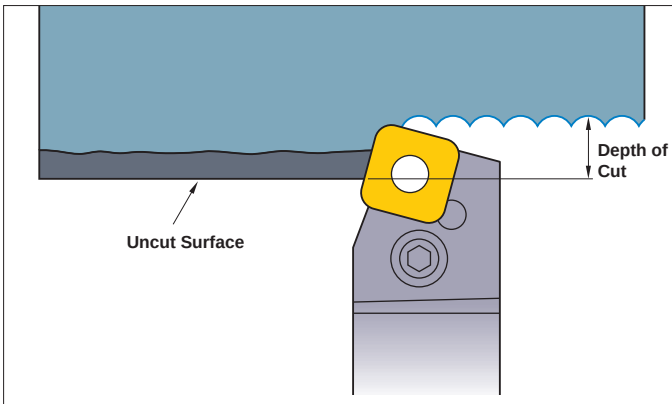
Effects of Depth of Cut

1. Changing depth of cut doesn't effect tool life greatly.
2. Small depths of cut result in friction when cutting the hardened layer of a workpiece. Thus tool life is shortened.
3. When cutting uncut surfaces or cast iron surfaces, the depth of cut needs to be increased as much as the machine power allows in order to avoid cutting impure hard layers with the tip of cutting edge to prevent chipping and abnormal wear.



Cutting Conditions Workpiece : **JIS SNCM431** Grade : **STi10T**
Tool Shape : **0-0-5-5-35-35-0.3mm**
Feed **f=0.20mm/rev** Cutting Speed **vc=200m/min**
Cutting Time **Tc=10min**

Depth of Cut and Flank Wear Relationship in Steel Turning

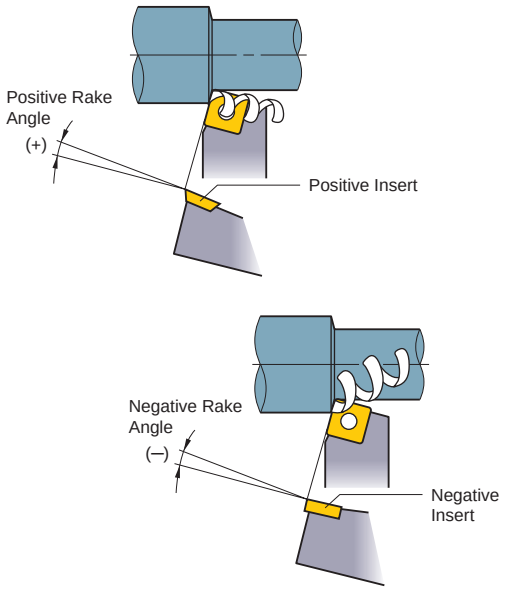


Roughing of the Surface Layer that Includes Uncut Surface

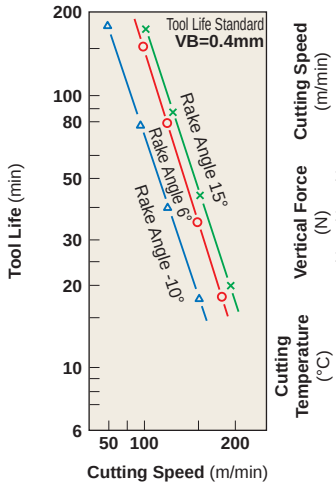
FUNCTION OF TOOL FEATURES FOR TURNING

RAKE ANGLE

Rake angle is a cutting edge angle that has a large effect on cutting resistance, chip disposal, cutting temperature and tool life.

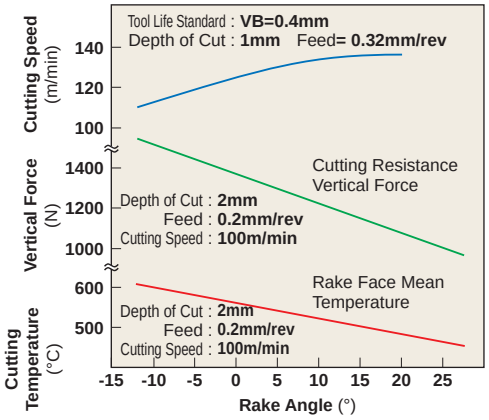


Chip Disposal and Rake Angle



Cutting Conditions
Grade : **STi10**
Depth of Cut : **1mm** Feed : **0.32mm/rev**
Workpiece : **JIS SK5**

Rake Angle and Tool Life



Cutting Conditions
Workpiece : **JIS SK5** Grade : **STi10T**
Tool Shape : **0-Var-5-5-20-20-0.5mm**
Dry Cutting

Effects of Rake Angle on Cutting Speed, Vertical Force, and Cutting Temperature

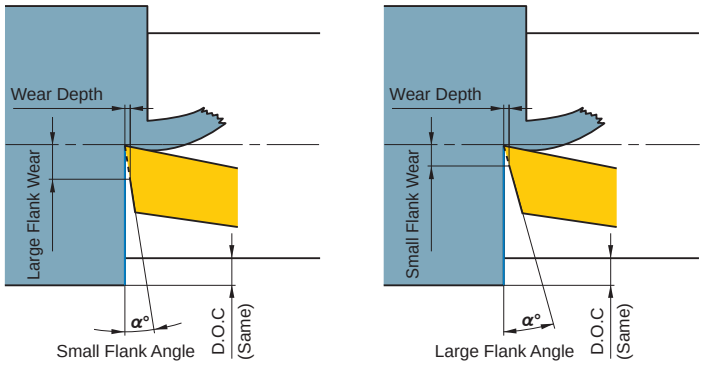
Effects of Rake Angle

1. Increasing rake angle in the positive (+) direction improves sharpness.
2. Increasing rake angle by 1° in the positive (+) direction decreases cutting power by about 1%.
3. Increasing rake angle in the positive (+) direction lowers cutting edge strength and in the negative (–) direction increases cutting resistance.

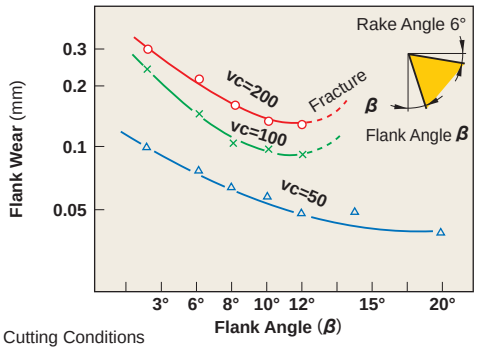
When to Increase Rake Angle in the Negative (–) Direction	When to Increase Rake Angle in the Positive (+) Direction
○Hard workpieces. ○When the cutting edge strength is required such as for uncut surfaces and interrupted cutting.	○Soft workpieces. ○Workpiece is easily machined. ○When the workpiece or the machine have poor rigidity.

FLANK ANGLE

Flank angle prevents friction between flank face and workpiece resulting in smooth feed.



Flank angle creates a space between tool and workpiece. Flank angle relates to flank wear.



Cutting Conditions
Workpiece : **JIS SNCM431 (200HB)**
Grade : **STi20** Tool Shape : **0•6•β•β•20•20•0.5**
Depth of Cut : **1mm** Feed : **0.32mm/rev** Cutting Time : **20min**

Flank Angle and Flank Wear Relationship

Effects of Rake Angle

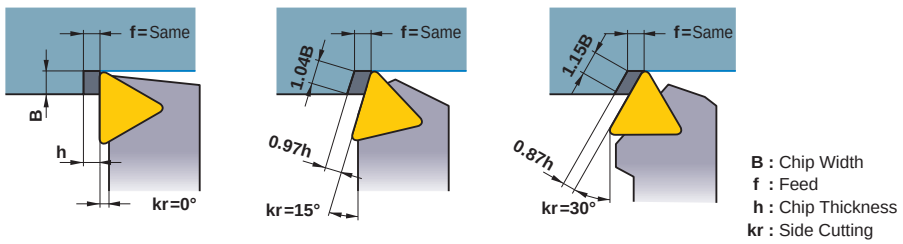
1. Increasing flank angle decreases flank wear occurrence.
2. Increasing flank angle lowers cutting edge strength.

When to Decrease Flank Angle	When to Increase Flank Angle
○Hard workpieces. ○When cutting edge strength is required.	○Soft workpieces. ○Workpieces suffer from work hardening easily.

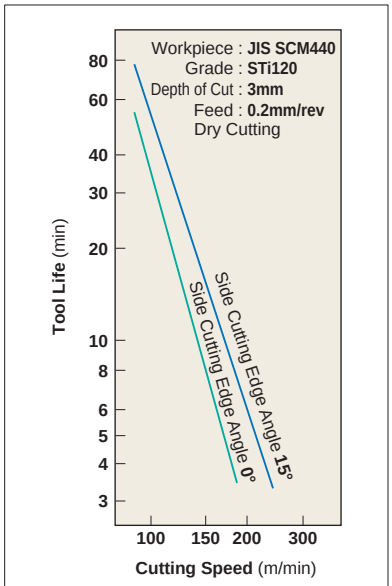
FUNCTION OF TOOL FEATURES FOR TURNING

SIDE CUTTING EDGE ANGLE (LEAD ANGLE)

The side cutting edge angle reduces impact load and affects the amount of feed force, back force and chip thickness.



Side Cutting Edge Angle and Chip Thickness

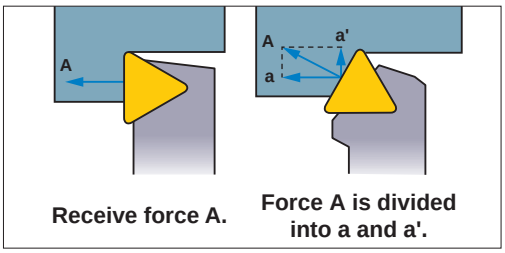


Side Cutting Edge and Tool Life

Effects of Side Cutting Edge Angle (Lead Angle)

1. At the same feed rate, increasing the side cutting edge angle increases the chip contact length and decreases chip thickness. As a result, the cutting force is dispersed on a longer cutting edge and tool life is prolonged. (Refer to the chart.)
2. Increasing the side cutting edge angle increases force a'. Thus, thin, long workpieces suffer from bending in some cases.
3. Increasing the side cutting edge angle decreases chip control.
4. Increasing the side cutting edge angle decreases the chip thickness and increases chip width. Thus, breaking chips is difficult.

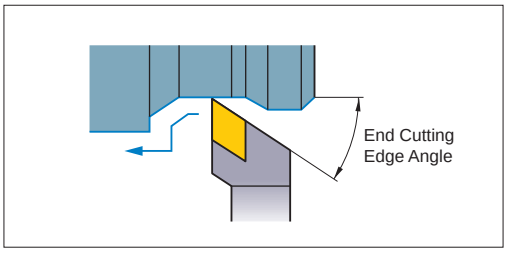
When to Decrease Lead Angle	When to Increase Lead Angle
○Finishing with small depth of cut. ○Thin, long workpieces. ○When the machine has poor rigidity.	○Hard workpieces which produce high cutting temperature. ○When roughing a workpiece with large diameter. ○When the machine has high rigidity.



Receive force A. **Force A is divided into a and a'.**

END CUTTING EDGE ANGLE

The end cutting edge angle avoids interference between the machined surface and the tool (end cutting edge). Usually 5°—15°.

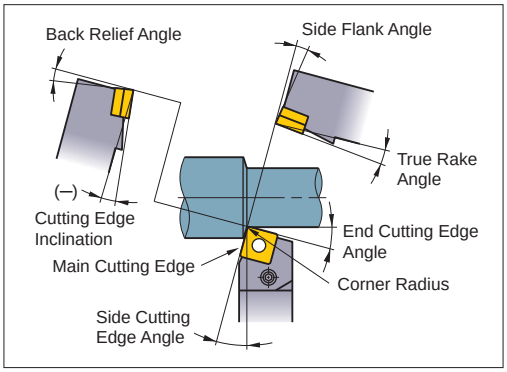


Effects of End Cutting Edge Angle

1. Decreasing the end cutting edge angle increases cutting edge strength, but it also increases cutting edge temperature.
2. Decreasing the end cutting edge angle increases the back force and can result in chattering and vibration while machining.
3. Small end cutting edge angle for roughing and large angle for finishing are recommended.

CUTTING EDGE INCLINATION

Cutting edge inclination indicates inclination of the rake face. During heavy cutting, the cutting edge receives an extremely large shock at the beginning of each cut. Cutting edge inclination keeps the cutting edge from receiving this shock and prevents fracturing. 3°—5° in turning and 10°—15° in milling are recommended.

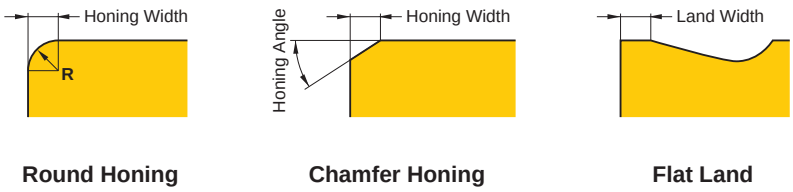


Effects of Cutting Edge Inclination

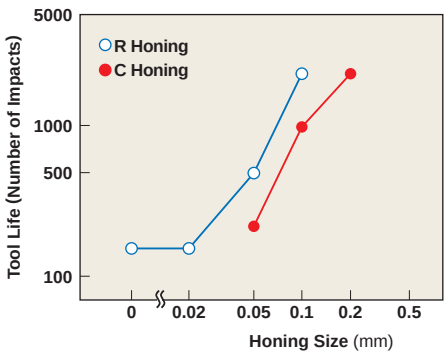
1. Negative (—) cutting edge inclination disposes chips in the workpiece direction, and positive (+) disposes chips in the opposite direction.
2. Negative (—) cutting edge inclination increases cutting edge strength, but it also increases the back force of cutting resistance. Thus, chattering can easily occur.

HONING AND LAND

Honing and land are cutting edge shapes that maintain cutting edge strength.
Honing can be round or chamfer type. The optimal honing width is approximately 1/2 of the feed. Land is the narrow flat area on the rake or flank face.

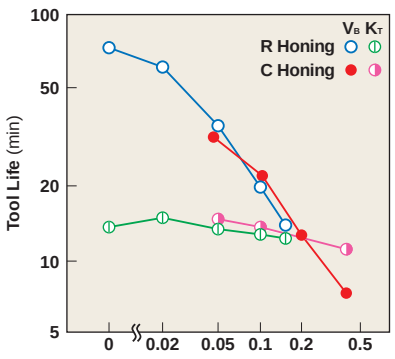


Round Honing **Chamfer Honing** **Flat Land**



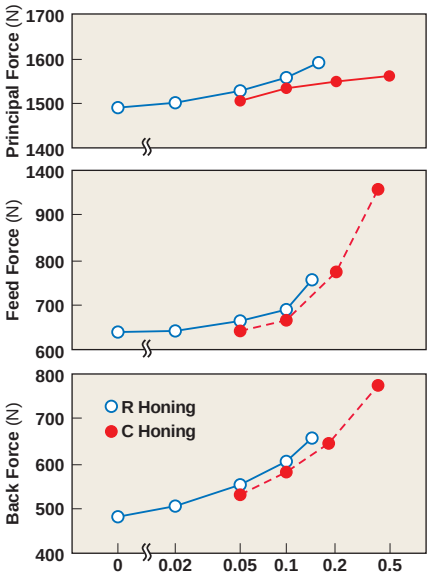
Workpiece : **JIS SNCM439 (280HB)**
Grade : **P10**
Cutting Conditions : **vc=200m/min ap=1.5mm f=0.335mm/rev**

Honing Size and Tool Life Due to Fracturing



Workpiece : **JIS SNCM439 (220HB)**
Grade : **P10**
Cutting Conditions : **vc=160m/min ap=1.5mm f=0.45mm/rev**

Honing Size and Tool Life Due to Wear



Workpiece : **JIS SNCM439 (220HB)**
Grade : **P10**
Cutting Conditions : **vc=100m/min ap=1.5mm f=0.425mm/rev**

Honing Size and Cutting Resistance

Effects of Honing

1. Enlarging the honing increases cutting edge strength, tool life and reduces fracturing.
2. Enlarging the honing increases flank wear occurrence and shortens tool life. Honing size doesn't affect rake wear.
3. Enlarging the honing increases cutting resistance and chattering.

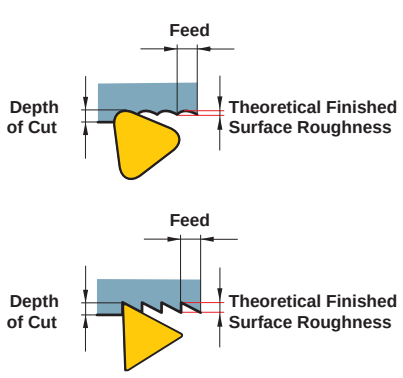
When to Decrease Honing Size	When to Increase Honing Size
○When finishing with small depth of cut and small feed. ○Soft workpieces. ○When the workpiece or the machine have poor rigidity.	○Hard workpieces. ○When the cutting edge strength is required such as for uncut surfaces and interrupted cutting. ○When the machine has high rigidity.

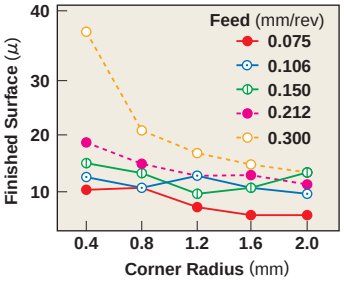
* Cemented carbide, coated diamond, and indexable cermet inserts have round honing as standard.

FUNCTION OF TOOL FEATURES FOR TURNING

RADIUS

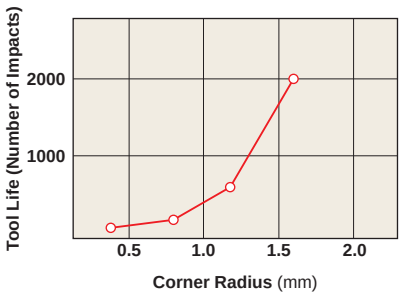
Radius effects the cutting edge strength and finished surface. In general, a corner radius 2—3 times the feed is recommended.





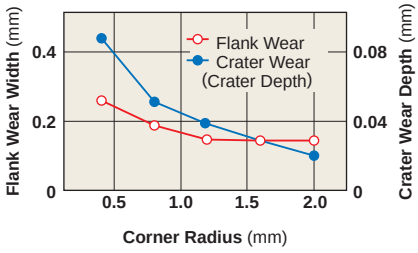
Workpiece : **JIS SNCM439 (200HB)**
Grade : **P20**
Cutting Speed : **vc=120m/min ap=0.5mm**

Corner Radius and Finished Surface



Workpiece : **JIS SNCM440 (280HB)**
Grade : **P10**
Cutting Conditions : **vc=100m/min ap=2mm f=0.335mm/rev**

Corner Radius Size and Tool Life Due to Fracturing



Workpiece : **JIS SNCM439 (200HB)**
Grade : **P10**
Cutting Conditions : **vc=140m/min ap=2mm f=0.212mm/rev Tc=10min**

Corner Radius Size and Tool Wear

Effects of Corner Radius

1. Increasing the corner radius improves the surface finish.
2. Increasing the corner radius improves cutting edge strength.
3. Increasing the corner radius too much increases the cutting resistance and causes chattering.
4. Increasing the corner radius decreases flank and rake wear.
5. Increasing the corner radius too much results in poor chip control.

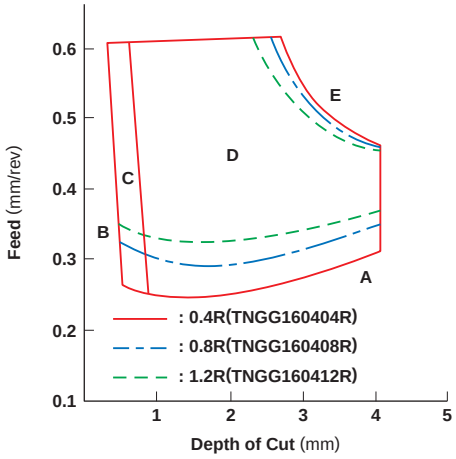
When to Decrease Corner Radius

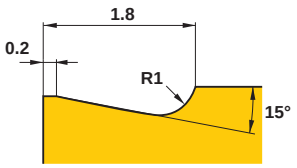
○Finishing with small depth of cut.
○Thin, long workpieces.
○When the machine has poor rigidity.

When to Increase Corner Radius

○When the cutting edge strength is required such as in interrupted cutting and uncut surface cutting.
○When roughing a workpiece with large diameter.
○When the machine has high rigidity.

Corner Radius and Chip Control Range





Workpiece : **JIS S45C (180HB)**
Insert : **TNGG160404R TNGG160408R TNGG160412R (STi10T)**
Holder : **ETJNR33K16**
(Side Cutting Edge angle 3°)
Cutting Speed : **vc=100m/min**
Dry Cutting

(Note) Please refer to page F004 for chip shapes (A, B, C, D, E).

FORMULAE FOR CUTTING POWER

CUTTING POWER (Pc)

$$Pc = \frac{ap \cdot f \cdot vc \cdot Kc}{60 \times 10^3 \times \eta} (kW)$$

Pc	(kW)	: Actual Cutting Power	ap	(mm)	: Depth of Cut
f	(mm/rev)	: Feed per Revolution	vc	(m/min)	: Cutting Speed
Kc	(MPa)	: Specific Cutting Force	η		(Machine Coefficient)

(Problem) What is the cutting power required for machining mild steel at cutting speed 120m/min with depth of cut 3mm and feed 0.2mm/rev (Machine coefficient 80%) ?

(Answer) Substitute the specific cutting force Kc=3100MPa into the formula.

$$Pc = \frac{3 \times 0.2 \times 120 \times 3100}{60 \times 10^3 \times 0.8} = 4.65(kW)$$

Kc

Work Material	Tensile Strength(MPa) and Hardness	Specific Cutting Force **Kc** (MPa)				
		0.1 (mm/rev)	0.2 (mm/rev)	0.3 (mm/rev)	0.4 (mm/rev)	0.6 (mm/rev)
Mild Steel	**520**	3610	3100	2720	2500	2280
Medium Steel	**620**	3080	2700	2570	2450	2300
Hard Steel	**720**	4050	3600	3250	2950	2640
Tool Steel	**670**	3040	2800	2630	2500	2400
Tool Steel	**770**	3150	2850	2620	2450	2340
Chrome Manganese Steel	**770**	3830	3250	2900	2650	2400
Chrome Manganese Steel	**630**	4510	3900	3240	2900	2630
Chrome Molybdenum Steel	**730**	4500	3900	3400	3150	2850
Chrome Molybdenum Steel	**600**	3610	3200	2880	2700	2500
Nickel Chrome Molybdenum Steel	**900**	3070	2650	2350	2200	1980
Nickel Chrome Molybdenum Steel	**352HB**	3310	2900	2580	2400	2200
Hard Cast Iron	**46HRC**	3190	2800	2600	2450	2270
Meehanite Cast Iron	**360**	2300	1930	1730	1600	1450
Gray Cast Iron	**200HB**	2110	1800	1600	1400	1330

CUTTING SPEED (vc)

$$vc = \frac{\pi \cdot Dm \cdot n}{1000} (m/min)$$

vc	(m/min)	: Cutting Speed
Dm	(mm)	: Workpiece Diameter
π	(3.14)	: Pi
n	(min^{-1})	: Main Axis Spindle Speed

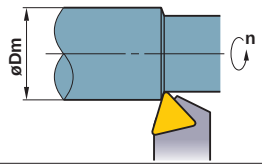
✱Divide by 1,000 to change to m from mm.

(Problem) What is the cutting speed when main axis spindle speed is 700 min^{-1} and external diameter is ϕ50 ?

(Answer) Substitute π=3.14, Dm=50, n=700 into the formula.

$$vc = \frac{\pi \cdot Dm \cdot n}{1000} = \frac{3.14 \times 50 \times 700}{1000} = 110m/min$$

Cutting speed is 110m/min.



FEED (f)

$$f = \frac{l}{n} (mm/rev)$$

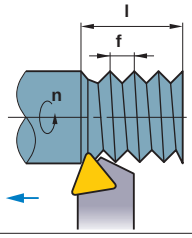
f	(mm/rev)	: Feed per Revolution
l	(mm/min)	: Cutting Length per Min.
n	(min^{-1})	: Main Axis Spindle Speed

(Problem) What is the feed per revolution when main axis spindle speed is 500min^{-1} and cutting length per minute is 120 mm/min ?

(Answer) Substitute n=500, l=120 into the formula.

$$f = \frac{l}{n} = \frac{120}{500} = 0.24mm/rev$$

The answer is 0.24mm/rev.



CUTTING TIME (Tc)

$$Tc = \frac{lm}{l} (min)$$

Tc	(min)	: Cutting Time
lm	(mm)	: Workpiece Length
l	(mm/min)	: Cutting Length per Min.

(Problem) What is the cutting time when 100mm workpiece is machined at 1000min^{-1} with feed=0.2mm/rev ?

(Answer) First, calculate the cutting length per min. from the feed and spindle speed.

$$l = f \times n = 0.2 \times 1000 = 200mm/min$$

Substitute the answer above into the formula.

$$Tc = \frac{lm}{l} = \frac{100}{200} = 0.5min$$

0.5x60=30(sec.) The answer is 30 sec.

THEORETICAL FINISHED SURFACE ROUGHNESS (h)

$$h = \frac{f^2}{8Re} \times 1000(\mu m)$$

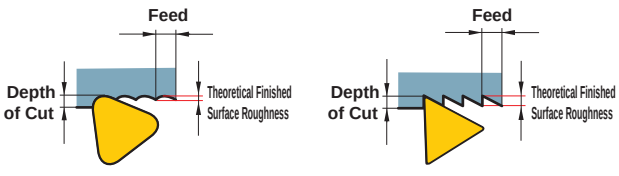
h	(μm)	: Finished Surface Roughness
f	(mm/rev)	: Feed per Revolution
Re	(mm)	: Insert Corner Radius

(Problem) What is the theoretical finished surface roughness when the insert corner radius is 0.8mm and feed is 0.2 mm/rev ?

(Answer) Substitute f=0.2 mm/rev, Re=0.8 into the formula.

$$h = \frac{0.2^2}{8 \times 0.8} \times 1000 = 6.25\mu m$$

The theoretical finished surface roughness is 6μm.

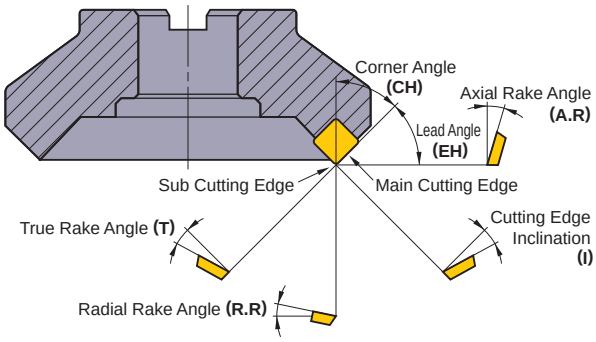


TROUBLE SHOOTING FOR FACE MILLING

Trouble	Factors	Solution	Insert Grade Selection: Select A Harder Grade	Insert Grade Selection: Select A Tougher Grade	Insert Grade Selection: Select A Grade With Better thermal Shock Resistance	Insert Grade Selection: Select A Grade With Better adhesion Resistance	Cutting Conditions: Cutting Speed (Up ↗ / Down ↘)	Cutting Conditions: Feed (Up ↗ / Down ↘)	Cutting Conditions: Depth Of Cut (Up ↗ / Down ↘)	Cutting Conditions: Engage angle (↗ Up)	Cutting Conditions: Coolant: Do Not Use Water-soluble Cutting Fluid	Cutting Conditions: Coolant: Determine Dry Or wet Cutting	Style and Design of the Tool: Rake (Up ↗ / Down ↘)	Style and Design of the Tool: Corner Angle (Up ↗ / Down ↘)	Style and Design of the Tool: Honing Strengthens the Cutting Edge (Up ↗ / Down ↘)	Style and Design of the Tool: Cutter Diameter (Up ↗ / Down ↘)	Style and Design of the Tool: Number Of Teeth (Smaller ↘ / Larger ↗)	Style and Design of the Tool: Wider Chip Pocket	Style and Design of the Tool: Use of a wiper insert	Style and Design of the Tool: Improve run-out accuracy	Style and Design of the Tool: Cutter Rigidity	Machine, Installation of Tool: Increase clamping rigidity of the tool and workpiece	Machine, Installation of Tool: Decrease overhang	Machine, Installation of Tool: Decrease power and machine backlash
Deterioration of Tool Life	Insert wear quickly generated	Improper tool grade	●																					
		Improper cutting edge geometry											↗●	↗●	●↘					●				
		Improper cutting speed					●↘					● Wet												
	Chipping or fracturing of cutting edge	Improper tool grade		●																				
		Improper cutting conditions						●↘	●↘															
		Lack of cutting edge strength.													↗●									
		Thermal crack occurs			●		●↘	●↘	●↘		●	● Dry												
		Build-up edge occurs				●	●↗	●↗			●	● Wet												
		Lack of rigidity																			●	●	●	●
Deterioration of Surface Finish	Poor finished surface	Improper cutting conditions	●				●↘	●↘	●↘															
		Welding occurs				●	●↗				●	● Wet	↗●		●↘									
		Poor run-out accuracy																	●	●				
		Chattering					●↘	●↘	●↘	↗●			↗●		●↘		●↘				●	●	●	●
	Not parallel or irregular surface	Workpiece bending						●↘	●↘				↗●	●↘	●↘		●↘					●		
		Tool clearance																			●	●	●	●
		Large back force											↗●	●↘	●↘		●↘							
Burr, Workpiece Chipping	Burrs, chipping	Chip thickness is too large					●↗	●↘	●↘															
		Cutter diameter is too large								↗●						●↘								
		Low sharpness											↗●		●↘									
		A large corner angle												●↘										
	Workpiece edge chipping	Improper cutting conditions						●↘	●↘															
		Low sharpness											↗●		●↘									
		A small corner angle												●↗										
		Chattering					●↘	●↘	●↘	↗●			↗●		●↘		●↘				●	●	●	●
Chip Control	Poor chip dispersal, chip jamming and chip packing	Welding occurs					●↗																	
		Chip thickness is too thin					●↗	●↗																
		Cutter diameter is too small														●↘								
		Poor chip disposal									●	● Wet					●↘	●						

FUNCTION OF TOOL FEATURES FOR FACE MILLING

FUNCTION OF EACH CUTTING EDGE ANGLE IN FACE MILLING

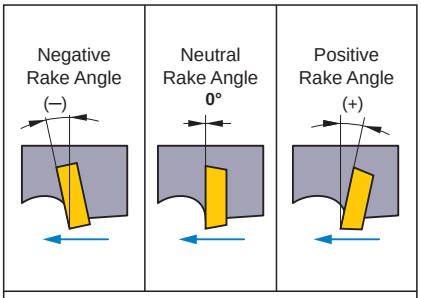


Each Cutting Edge Angle in Face Milling

Type of Angle	Symbol	Function	Effect
Axial Rake Angle	**A.R**	Determines chip disposal direction.	**Positive** : Excellent machinability.
Radial Rake Angle	**R.R**	Determines sharpness.	**Negative** : Excellent chip disposal.
Corner Angle	**CH**	Determines chip thickness.	**Large** : Thin chips and small cutting impact. Large back force.
True Rake Angle	**T**	Determines actual sharpness.	**Positive (large)** : Excellent machinability. Minimal welding. **Negative(large)** : Poor machinability. Strong cutting edge.
Cutting Edge Inclination	**I**	Determines chip disposal direction.	**Positive (large)** : Excellent chip disposal. Low cutting edge strength.

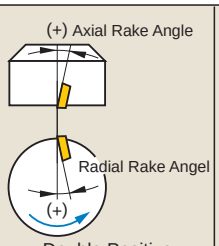
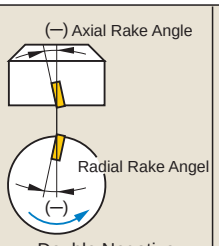
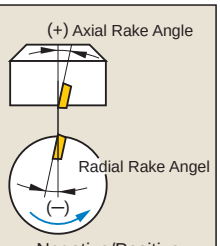
STANDARD INSERTS

Positive and Negative Rake Angle

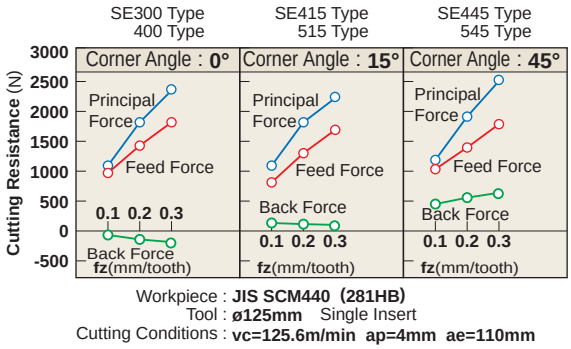


- Insert shape whose cutting edge precedes is a positive rake angle.
- Insert shape whose cutting edge follows is a negative rake angle.

Standard Cutting Edge Shape

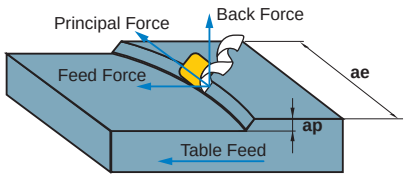
Standard Cutting Edge Combinations		 Double Positive (DP Edge Type)	 Double Negative (DN Edge Type)	 Negative/Positive (NP Edge Type)
Axial Rake Angle(A.R)		Positive (+)	Negative (–)	Positive (+)
Radial Rake Angle(R.R)		Positive (+)	Negative (–)	Negative (–)
Insert Used		Positive Insert (One Sided Use)	Negative Insert (Double Sided Use)	Positive Insert (One Sided Use)
Work Material	**Steel**	●	–	●
	Cast Iron	–	●	●
	Aluminium Alloy	●	–	–
	Difficult-to-Cut Material	●	–	●

CORNER ANGLE (CH) AND CUTTING CHARACTERISTICS



Workpiece : **JIS SCM440 (281HB)**
Tool : **ø125mm** Single Insert
Cutting Conditions : **vc=125.6m/min ap=4mm ae=110mm**

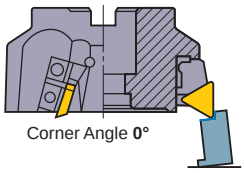
Cutting Resistance Comparison between Different Insert Shapes



Three Cutting Resistance Forces in Milling

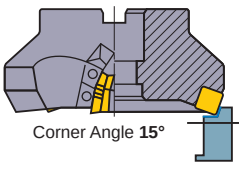
Corner Angle 0°

Back force is in the minus direction.
Lifts the workpiece when workpiece clamp rigidity is low.


Corner Angle **0°**

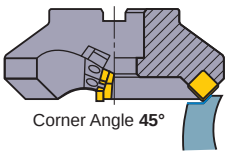
Corner Angle 15°

Corner angle 15° is recommended for face milling of workpieces with low rigidity such as thin workpieces.


Corner Angle **15°**

Corner Angle 45°

The largest back force.
Bends thin workpieces and lowers cutting accuracy.
✶ Prevents workpiece edge chipping when cast iron cutting.


Corner Angle **45°**

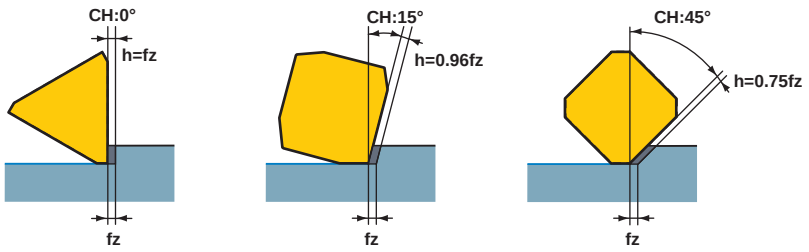
✶ Principal force : Force is in the opposite direction of face milling rotation.
✶ Back force : Force that pushes in the axial direction.
✶ Feed Force : Force is in the feed direction and is caused by table feed.

FUNCTION OF TOOL FEATURES FOR FACE MILLING

CORNER ANGLE AND TOOL LIFE

Corner angle and chip thickness

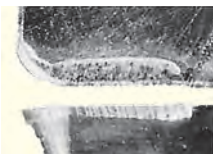
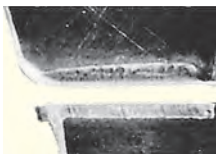
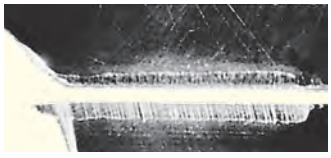
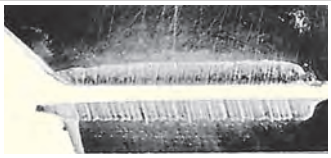
When the depth of cut and feed per tooth, fz, are fixed, the larger the corner angle (CH) is, then the thinner the chip thickness (h) becomes (for a 45° CH, it is approx. 75% that of a 0° CH). Therefore as the CH increases, the cutting resistance decreases resulting in longer tool life.



Effects on chip thickness due to the variation of corner angles

Corner angle and crater wear

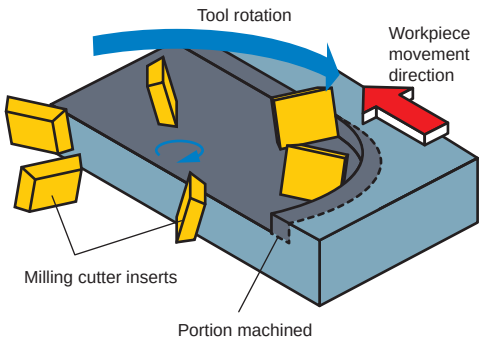
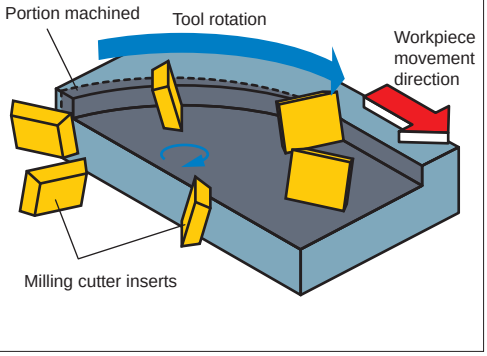
The table below shows wear patterns for different corner angles.When comparing crater wear for 0° and 45° corner angles, it can be clearly seen that the crater wear for 0° corner angle is larger. This is because if the chip thickness is relatively large, the cutting resistance increases and so promotes crater wear. As the crater develops then cutting edge strength will reduce and lead to fracturing.

	Corner Angle **0°**	Corner Angle **15°**	Corner Angle **45°**
vc=100m/min Tc=69min			
vc=125m/min Tc=55min			
vc=160m/min Tc=31min			

Workpiece : **SNCM439 287HB**
Tools : **D1=125**
Insert : **M20**Cemented Carbide
Cutting Conditions : **ap=3.0mm**
ae=110m
fz=0.2m/tooth
Dry Cutting

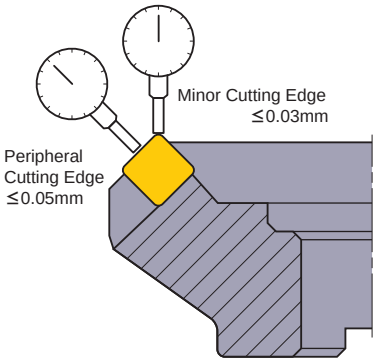
UP AND DOWN CUT (CLIMB) MILLING

When choosing a method to machine, up cutting or down cut milling (climb milling) is decided by the conditions of the machine tool, the milling cutter and the application. However, it is said that in terms of tool life, down cut (climb) milling is more advantageous.

Up Cut	Down Cut
	

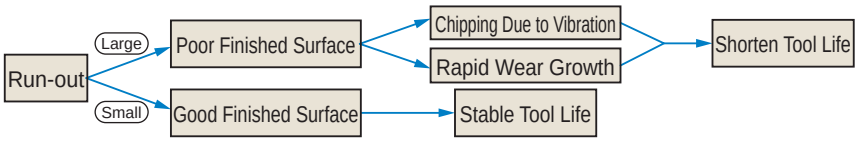
FINISHED SURFACE

Cutting Edge Run-out Accuracy



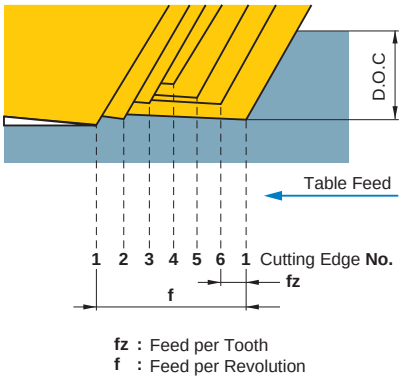
Cutting Edge Run-out and Accuracy in Face Milling

Cutting edge run-out accuracy of indexable inserts on the cutter body greatly affects the surface finish and tool life.



Face Milling Run-out Accuracy
Minor Cutting Edge ≤0.03mm
Peripheral Cutting Edge ≤0.05mm

Improve Finished Surface Roughness



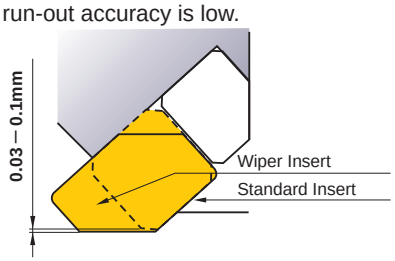
fz : Feed per Tooth
f : Feed per Revolution

Sub Cutting Edge Run-out and Finished Surface

Since Mitsubishi Materials' normal sub cutting edge width is 1.4mm, and the sub cutting edges are set parallel to the face of a milling cutter, theoretically the finished surface accuracy should be maintained even if run-out accuracy is low.

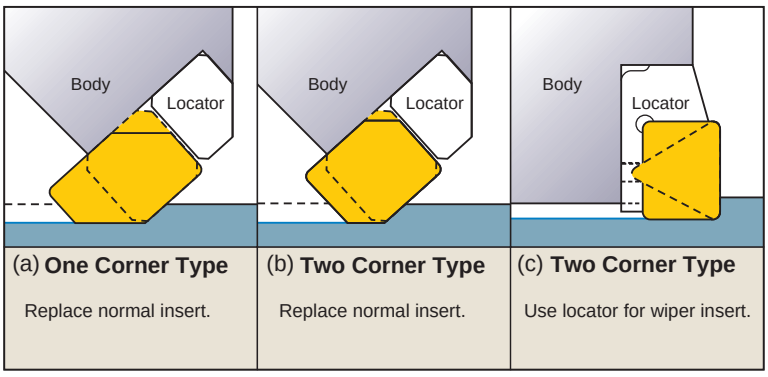
Actual Problems	Countermeasure
• Cutting edge run-out. • Sub cutting edge inclination. • Milling cutter body accuracy. • Spare parts accuracy. • Welding, vibration, chattering.	Wiper Insert

* Machine a surface that has already been pre-machined in order to produce smooth finished surface.



- Replace one or two normal inserts with wiper inserts.
- Wiper inserts should be set to protrude by 0.03–0.1mm from the standard inserts.

How to Set a Wiper Insert



(a) **One Corner Type**
Replace normal insert.

(b) **Two Corner Type**
Replace normal insert.

(c) **Two Corner Type**
Use locator for wiper insert.

- Sub cutting edge length has to be longer than the feed per revolution.

*Too long sub cutting edge causes chattering.

- When the cutter diameter is large and feed per revolution is longer than the sub cutting edge of the wiper insert, use two or three wiper inserts.
- When using more than 1 wiper inserts, eliminate run-out of wiper inserts.
- Use a high hardness grade (high wear resistance) for wiper inserts.

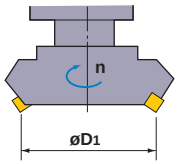
FORMULAE FOR FACE MILLING

CUTTING SPEED (vc)

$$vc = \frac{\pi \cdot D_1 \cdot n}{1000} \text{ (m/min)}$$

vc (m/min) : Cutting Speed
D1 (mm) : Cutter Diameter
π (3.14) : Pi
n (min^{-1}) : Main Axis Spindle Speed

∗Divide by 1,000 to change to m from mm.



(Problem) What is the cutting speed when main axis spindle speed is 350min^{-1} and cutter diameter is ϕ125 ?

(Answer) Substitute π=3.14, D1=125, n=350 into the formula.

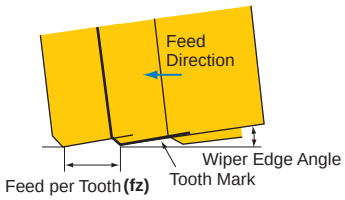
$$vc = \frac{\pi \cdot D_1 \cdot n}{1000} = \frac{3.14 \times 125 \times 350}{1000} = 137.4 \text{m/min}$$

The cutting speed is 137.4m/min.

FEED PER TOOTH (fz)

$$fz = \frac{vf}{z \cdot n} \text{ (mm/tooth)}$$

fz (mm/tooth) : Feed per Tooth
z : Insert Number
vf (mm/min) : Table Feed per Min.
n (min^{-1}) : Main Axis Spindle Speed (Feed per Revolution **f=z×fz**)



(Problem) What is the feed per tooth when the main axis spindle speed is 500min^{-1}, number of inserts is 10, and table feed is 500mm/min ?

(Answer) Substitute the above figures into the formula.

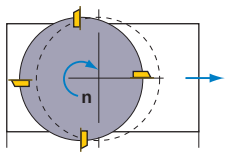
$$fz = \frac{vf}{z \times n} = \frac{500}{10 \times 500} = 0.1 \text{mm/tooth}$$

The answer is 0.1mm/tooth.

TABLE FEED (vf)

$$vf = fz \cdot z \cdot n \text{ (mm/min)}$$

vf (mm/min) : Table Feed per Min.
fz (mm/tooth) : Feed per Tooth
z : Insert Number
n (min^{-1}) : Main Axis Spindle Speed



(Problem) What is the table feed when feed per tooth is 0.1mm/tooth, number of inserts is 10, and main axis spindle speed is 500min^{-1}?

(Answer) Substitute the above figures into the formula.

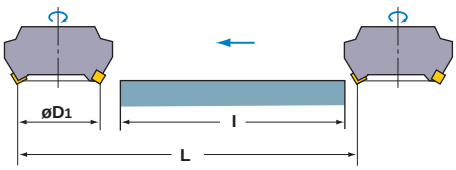
$$vf = fz \times z \times n = 0.1 \times 10 \times 500 = 500 \text{mm/min}$$

The table feed is 500mm/min.

CUTTING TIME (Tc)

$$Tc = \frac{L}{vf} \text{ (min)}$$

Tc (min) : Cutting Time
vf (mm/min) : Table Feed per Min.
L (mm) : Total Table Feed Length (Workpiece Length (**l**) + Cutter Diameter (**D1**))



(Problem) What is the cutting time required for finishing 100 mm width and 300mm length surface of a cast iron (JIS FC200) block when cutter diameter is ϕ200mm, the number of inserts is 16, the cutting speed is 125m/min, and feed per tooth is 0.25 mm. (spindle speed is 200min^{-1})

(Answer) Calculate table feed per min vf=0.25×16×200=800mm/min
Calculate total table feed length. L=300+200=500mm
Substitute the above answers into the formula.

$$Tc = \frac{500}{800} = 0.625 \text{ (min)}$$

0.625×60=37.5 (sec). The answer is 37.5 sec.

CUTTING POWER (Pc)

$$Pc = \frac{ap \cdot ae \cdot vf \cdot Kc}{60 \times 10^6 \times \eta}$$

Pc (kW)	: Actual Cutting Power	**ap (mm)**	: Depth of Cut
ae (mm)	: Cutting Width	**vf (mm/min)**	: Table Feed per Min
Kc (MPa)	: Specific Cutting Force	**η**	(Machine Coefficient)

(Problem) What is the cutting power required for milling tool steel at a cutting speed of 80m/min.
With depth of cut 2mm, cutting width 80mm, and table feed 280mm/min by ϕ250 cutter with 12 inserts. Machine coefficient 80%.

(Answer) First, calculate spindle speed in order to obtain feed per tooth.

$$n = \frac{1000vc}{\pi D_1} = \frac{1000 \times 80}{3.14 \times 250} = 101.91 min^{-1}$$

Feed per Tooth $$fz = \frac{vf}{z \times n} = \frac{280}{12 \times 101.9} = 0.228 mm/tooth$$

Substitute the specific cutting force into the formula.

$$Pc = \frac{2 \times 80 \times 280 \times 1800}{60 \times 10^6 \times 0.8} = 1.68 kW$$

Kc

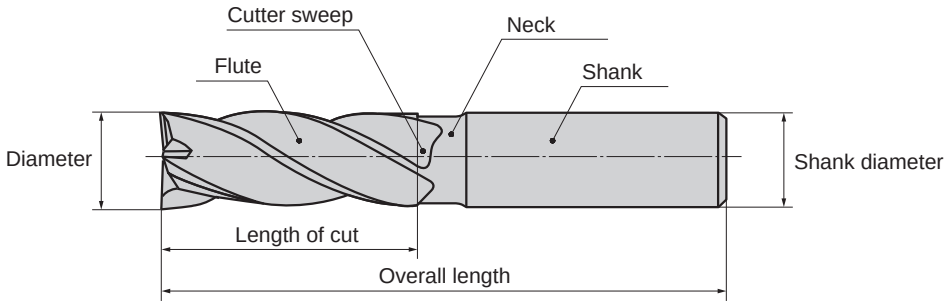
Work Material	Tensile Strength (MPa) and Hardness	Specific Cutting Force **Kc** (MPa)				
		0.1mm/tooth	0.2mm/tooth	0.3mm/tooth	0.4mm/tooth	0.6mm/tooth
Mild Steel	**520**	2200	1950	1820	1700	1580
Medium Steel	**620**	1980	1800	1730	1600	1570
Hard Steel	**720**	2520	2200	2040	1850	1740
Tool Steel	**670**	1980	1800	1730	1700	1600
Tool Steel	**770**	2030	1800	1750	1700	1580
Chrome Manganese Steel	**770**	2300	2000	1880	1750	1660
Chrome Manganese Steel	**630**	2750	2300	2060	1800	1780
Chrome Molybdenum Steel	**730**	2540	2250	2140	2000	1800
Chrome Molybdenum Steel	**600**	2180	2000	1860	1800	1670
Nickel Chrome Molybdenum Steel	**940**	2000	1800	1680	1600	1500
Nickel Chrome Molybdenum Steel	**352HB**	2100	1900	1760	1700	1530
Cast Iron	**520**	2800	2500	2320	2200	2040
Hard Cast Iron	**46HRC**	3000	2700	2500	2400	2200
Meehanite Cast Iron	**360**	2180	2000	1750	1600	1470
Gray Cast Iron	**200HB**	1750	1400	1240	1050	970
Brass	**500**	1150	950	800	700	630
Light Alloy(Al-Mg)	**160**	580	480	400	350	320
Light Alloy(Al-Si)	**200**	700	600	490	450	390

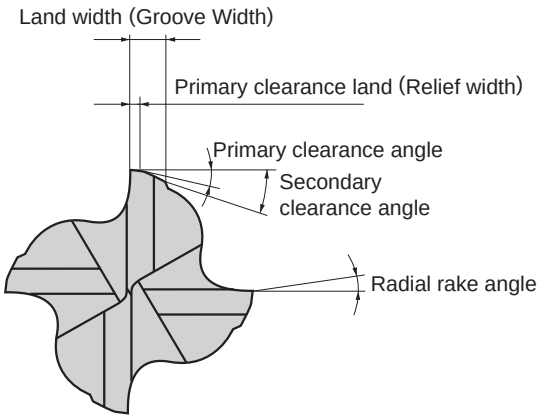
TROUBLE SHOOTING FOR END MILLING

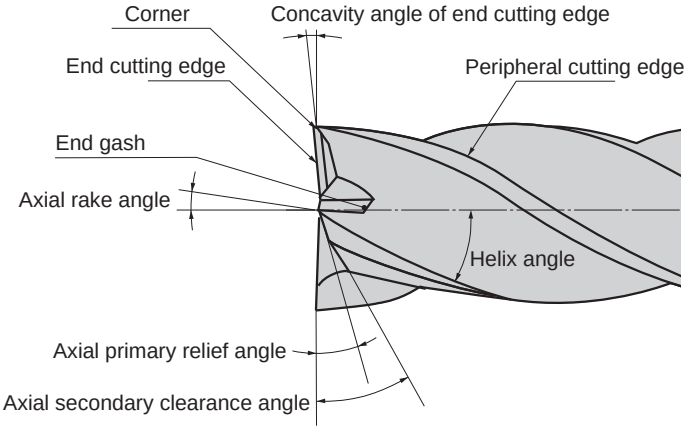
Trouble		Factors	Insert Grade Selection: Coated tool	Cutting Conditions: Cutting speed (Up↗ / Down↘)	Feed (Up↗ / Down↘)	Depth of cut (Up↗ / Down↘)	Pick feed (↘ Down)	Down cut	Use air blow	Coolant: Increase coolant quantity	Coolant: Do not use water-soluble cutting fluid	Coolant: Determine dry or wet cutting	Style and Design of the Tool: Helix angle (Up↗ Larger / Down↘ Smaller)	Insert number (Up↗ Larger / Down↘ Smaller)	Concavity angle of end cutting edge (Up↗ Larger / Down↘ Smaller)	Tool diameter (Up↗ Larger / Down↘ Smaller)	Cutter rigidity	Wider chip pocket	Machine, Installation of Tool: Shorten tool overhang	Increase tool installation accuracy	Increase spindle collet run-out accuracy	Collet inspection and exchange	Increase chuck clamping power	Increase work clamping rigidity
Deterioration of Tool Life	Large peripheral cutting edge wear	Non-coated end mill is used	●																					
		A small number of cutting edges												↗●										
		Improper cutting conditions		●↘							●													
		Up cut milling is used						Down Cut																
	Severe chipping	Improper cutting conditions																						
		Fragile cutting edge															●							
		Insufficient clamping force																				●	●	
		Low clamping rigidity																	●	●	●	●	●	●
	Breakage during cutting	Improper cutting conditions				●↘																		
		Low end mill rigidity													↗●		●							
		Overhang longer than necessary				●↘													●					
		Chip jamming								●								●						
Deterioration of Surface Finish	Vibration during cutting	Improper cutting conditions		●↘	●↘																			
		Low end mill rigidity											↗●	↗●		↗●	●							
		Low clamping rigidity																	●	●	●	●	●	●
	Poor surface finish on walls	Large cutting edge wear	●																					
		Improper cutting conditions		●↘		●↘																		
		Chip packing.							●	●		Wet												
	Poor surface finish on faces	The end cutting edge does not have a concave angle			●↘	●↘									↗●									
		Large pick feed					●↘																	
	Out of vertical	Large cutting edge wear	●																					
		Improper cutting conditions			●↘	●↘																		
		Lack of end mill rigidty											↗●	↗●		↗●	●							
	Poor dimensional accuracy	Improper cutting conditions		●↘	●↘	●↘																		
		Low clamping rigidity																	●	●	●	●	●	●
Burrs, Chipping, etc.	Burr or chipping occurs	Improper cutting conditions			●↘	●↘																		
		Large helix angle											●↘											
	Quick bur formation	Notch wear	●																					
		Improper cutting conditions		●↘	↗●																			
Poor Chip Dispersal	Chip packing	Metal removal too large			●↘	●↘																		
		Lack of chip pocket												●↘				●						

END MILL TERMINOLOGY

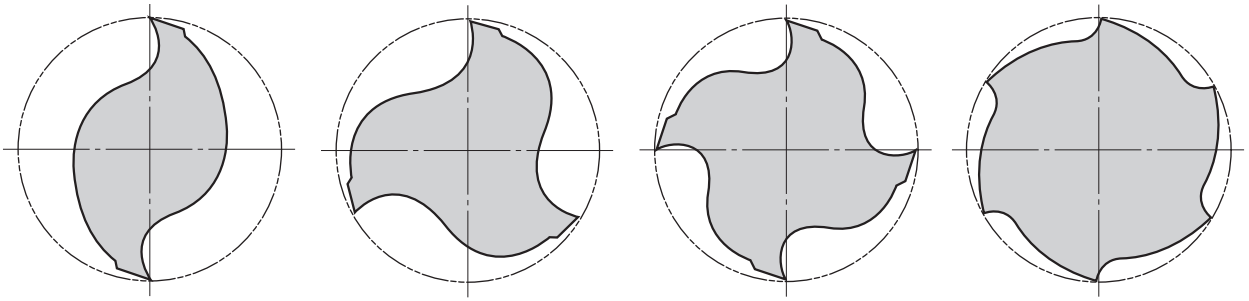
END MILL TERMINOLOGY







COMPARISON OF SECTIONAL SHAPE AREA OF CHIP POCKET



2-flutes
50%

3-flutes
45%

4-flutes
40%

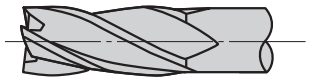
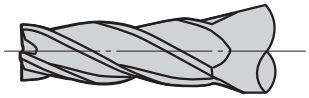
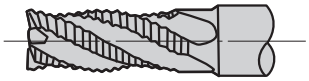
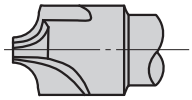
6-flutes
20%

CHARACTERISTICS AND APPLICATIONS OF DIFFERENT-NUMBER-OF-FLUTE END MILLS

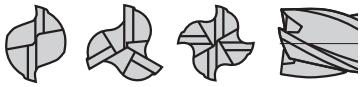
		2-flutes	3-flutes	4-flutes	6-flutes
Feature	Advantage	Chip disposability is excellent. Suitable for sinking. Low cutting resistance.	Chip disposability is excellent. Suitable for sinking.	High rigidity	High rigidity. Superior cutting edge durability.
	Fault	Low rigidity	Diameter is not easily measured.	Chip disposability is poor.	Chip disposability is poor.
Usage		Slotting, side milling, sinking etc. Wide range of use.	Slotting, side milling Heavy cutting, finishing	Shallow slotting, side milling Finishing	High Hardness Material Shallow slotting, side milling

TYPES AND SHAPES OF END MILLS

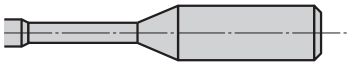
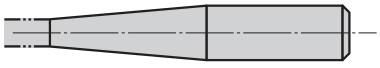
Peripheral Cutting Edge

Kind	Shape	Feature
Ordinary Flute		Ordinary flute type is most generally used for the slotting, side milling, and the shoulder milling, etc. Can be used for roughing, semi-finishing, and the finishing.
Tapered Flute		A tapered fute is used for milling mould drafts and angled faces.
Roughing Flute		Because a roughing tooth has a wave-like form and produces small chips. Cutting resistance is low, and is suitable for roughing. Not suitable for finishing. The tooth face is re-grindable.
Formed Flute		A corner radius cutter is shown. An infinite range of form cutters can be produced.

End Cutting Edge

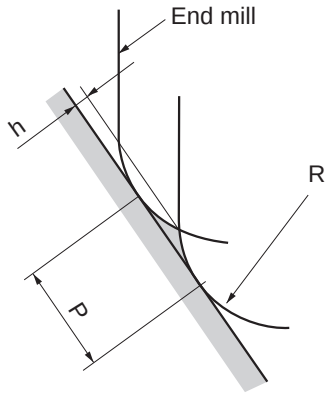
Kind	Shape	Feature
Square End (With Center Hole)		This is generally used for slotting, side milling, and shoulder milling. Sinking is not possible. Grinding is center supported, making re-grinding accurate.
Square End (Center Cut)		It is generally used for slotting, side milling, and shoulder milling. Vertical cutting can be performed. Re-grinding is possible.
Ball End		Suitable for profile machining and pick feed milling.
Radius End		For corner radius milling and contouring. Efficient small corner radius milling due to large diameter and small corner radius.

Shank And Neck Parts

Kind	Shape	Feature
Standard (Straight Shank)		For general use.
Long Shank		For deep slotting and has a long shank, so that adjustment of the overhang is possible.
Long Neck		For deep slotting and small diameter end mills, also suitable for boring.
Taper Neck		For best performance in deep slotting and on mould drafts.

PITCH SELECTION OF PICK FEED

PICK FEED MILLING (CONTOURING) WITH BALL NOSE END MILLS & END MILLS WITH CORNER RADIUS



$$h=R \cdot \left[1-\cos\left\{\sin^{-1}\left(\frac{P}{2R}\right)\right\}\right]$$

R : Radius of Ball Nose, Corner Radius

P : Pick Feed

h : Cusp Height

CORNER R OF END MILLS AND CUSP HEIGHT BY PICK FEED

Unit : mm

P / R	Pitch of Pick Feed (P)									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0.5	0.003	0.010	0.023	0.042	0.067	0.100	–	–	–	–
1	0.001	0.005	0.011	0.020	0.032	0.046	0.063	0.083	0.107	–
1.5	0.001	0.003	0.008	0.013	0.021	0.030	0.041	0.054	0.069	0.086
2	0.001	0.003	0.006	0.010	0.016	0.023	0.031	0.040	0.051	0.064
2.5	0.001	0.002	0.005	0.008	0.013	0.018	0.025	0.032	0.041	0.051
3		0.002	0.004	0.007	0.010	0.015	0.020	0.027	0.034	0.042
4		0.001	0.003	0.005	0.008	0.011	0.015	0.020	0.025	0.031
5		0.001	0.002	0.004	0.006	0.009	0.012	0.016	0.020	0.025
6		0.001	0.002	0.003	0.005	0.008	0.010	0.013	0.017	0.021
8			0.001	0.003	0.004	0.006	0.008	0.010	0.013	0.016
10			0.001	0.002	0.003	0.005	0.006	0.008	0.010	0.013
12.5			0.001	0.002	0.003	0.004	0.005	0.006	0.008	0.010

P / R	Pitch of Pick Feed (P)									
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0.5	–	–	–	–	–	–	–	–	–	–
1	–	–	–	–	–	–	–	–	–	–
1.5	0.104	–	–	–	–	–	–	–	–	–
2	0.077	0.092	0.109	–	–	–	–	–	–	–
2.5	0.061	0.073	0.086	0.100	–	–	–	–	–	–
3	0.051	0.061	0.071	0.083	0.095	0.109	–	–	–	–
4	0.038	0.045	0.053	0.062	0.071	0.081	0.091	0.103	–	–
5	0.030	0.036	0.042	0.049	0.057	0.064	0.073	0.082	0.091	0.101
6	0.025	0.030	0.035	0.041	0.047	0.054	0.061	0.068	0.076	0.084
8	0.019	0.023	0.026	0.031	0.035	0.040	0.045	0.051	0.057	0.063
10	0.015	0.018	0.021	0.025	0.028	0.032	0.036	0.041	0.045	0.050
12.5	0.012	0.014	0.017	0.020	0.023	0.026	0.029	0.032	0.036	0.040

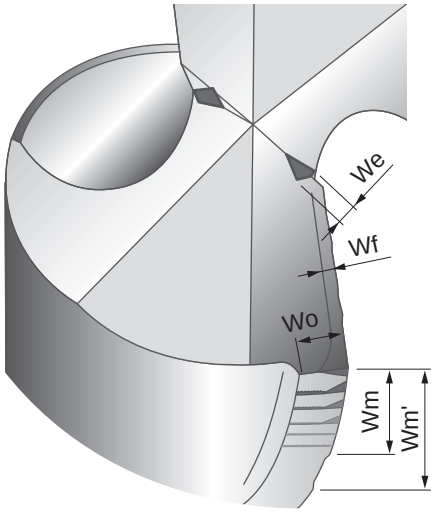
TROUBLE SHOOTING FOR DRILLING

Trouble	Factors	Solution: Cutting Conditions: Cutting Speed (Up ↗ / Down ↘)	Feed (Up ↗ / Down ↘)	Lower Feed At Initial Cutting	Lower Feed When Breaking through	Step Feed	Increase accuracy of prep-hole and depth	Coolant: Increase Oil Ratio	Coolant: Increase Volume	Coolant: Increase Coolant Pressure	Style and Design of the Tool: Chisel width (Up ↗ / Down ↘)	Honing Width (Up ↗ / Down ↘)	Core Thickness (Up ↗ / Down ↘)	Shorten flute length	Decrease lip height	Use internal coolant type drill	Change to a drill with X type thinning	Machine, Installation of Tool: Increase tool installation accuracy	Shorten Tool Overhang	Flat Workpiece Face	Increase work clamping rigidity	Reduce machine backrush and increase rigidity
Deterioration of Tool Life	Drill breakage	Lack of drill rigidity											● ↗	●								
		Improper cutting conditions	● ↘																			
		Large deflection of the tool holder																●				●
		Workpiece face is inclined																		●		
	Large wear at the peripheral cutting edge and along the land	Improper cutting conditions	● ↘																			
		An increase in temperature at the cutting point						●	●							●						
		Poor run-out accuracy																●				
	Chipping of the peripheral cutting edge	Improper cutting conditions		● ↘			●															
		Large deflection of the tool holder																●				●
		chattering, vibration										● ↘							●		●	●
	Chisel edge chipping	The chisel edge width is too wide									● ↘											
		Poor entry			●																	
		Chattering, vibration										● ↘							●		●	●
Deterioration of Hole Accuracy	Hole diameter increases	Lack of drill rigidity											● ↗	●								
		Improper drill geometry													●							
	Hole diameter becomes smaller	An increase in temperature at the cutting point						●	●							●						
		Improper cutting conditions	● ↘																			
		Improper drill geometry													●							
	Poor straightness	Lack of drill rigidity											● ↗	●								
		Large deflection of the tool holder																●				●
		Poor guiding properties					●															
	Poor hole positioning accuracy, roundness and surface finish	Lack of drill rigidity											● ↗	●								
		Poor entry															●					
		Improper cutting conditions			●																	
		Large deflection of the tool holder																●				●
Burrs	Burrs at the hole exit	Improper drill geometry										● ↘										
		Improper cutting conditions				●																
Poor Chip Dispersal	Long chips	Improper cutting conditions		● ↗			●															
		Poor chip disposal							●	●			● ↘			●						
	Chip jamming	Improper cutting conditions	● ↘	● ↘			●															
		Poor chip disposal							●	●			● ↘			●						

DRILL WEAR AND CUTTING EDGE DAMAGE

DRILL WEAR CONDITION

The table below shows a simple drawing depicting the wear of a drill's cutting edge. The generation and the amount of wear differ according to the workpiece materials and cutting conditions used. But generally, the peripheral wear is largest and determines a drill tool life. When regrinding, the flank wear at the point needs to be ground away completely. Therefore, if there is large wear more material needs to be ground away to renew the cutting edge.



We : **Chisel edge wear width**

Wf : **Flank Wear (The middle of the cutting edge)**

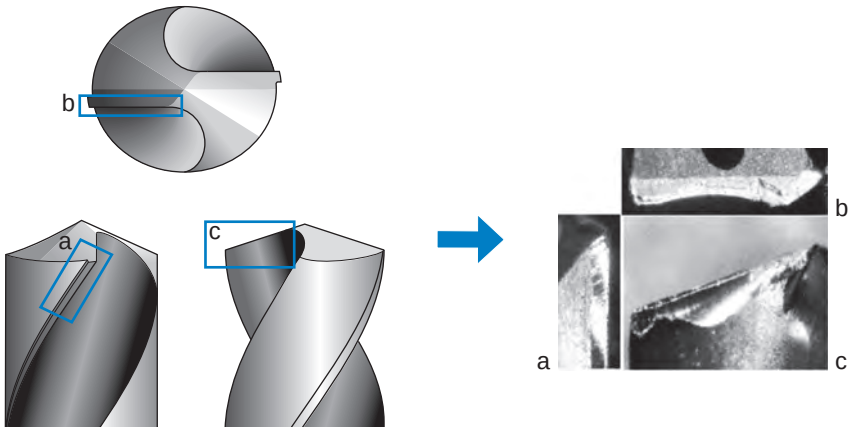
Wo : **Outer corner wear width**

Wm : **Margin wear width**

Wm' : **Margin wear width (Leading edge)**

CUTTING EDGE DAMAGE

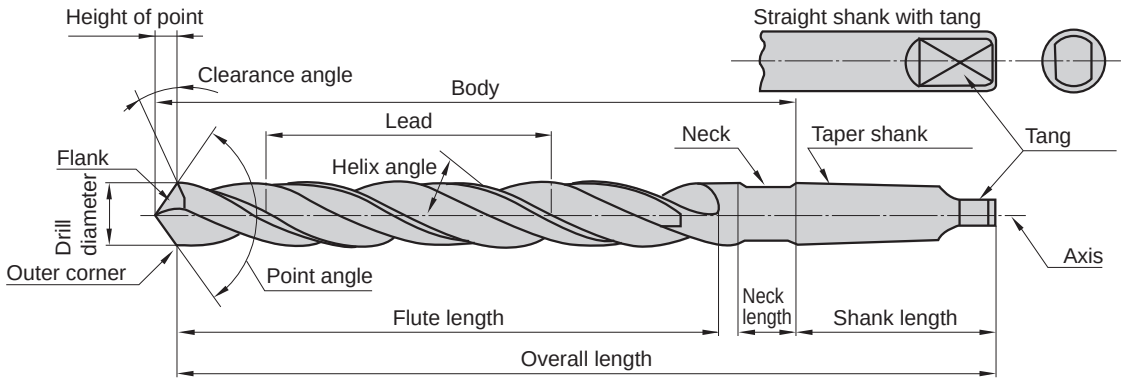
When drilling, the cutting edge of the drill can suffer from chipping, fracture and abnormal damage. In such cases, it is important to take a closer look at the damage, investigate the cause and take countermeasures.

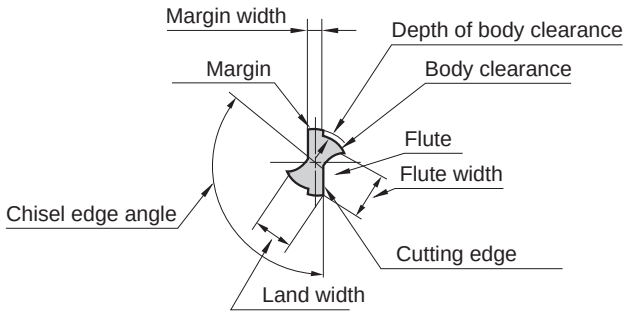


Cutting edge damage

DRILL TERMINOLOGY AND CUTTING CHARACTERISTICS

NAMES OF EACH PART OF A DRILL





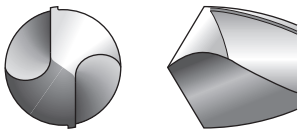
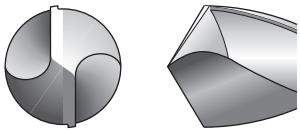
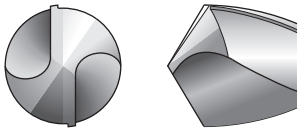
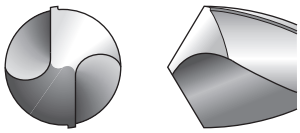
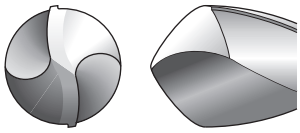
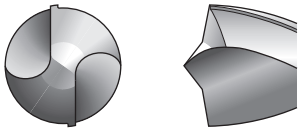
SHAPE SPECIFICATION AND CUTTING CHARACTERISTICS

Helix Angle	Is the inclination of the flute with respect to the axial direction of a drill, which corresponds to the rake angle of a bit.The rake angle of a drill differs according to the position of the cutting edge, and it decreases greatly as the circumference approaches the center. The chisel edge has a negative rake angle, crushing the work. **High-hardness material** Small ◀•• Rake Angle ••▶ Large **Soft material** (Aluminium, etc.)
Flute Length	It is determined by depth of hole, bush length, and regrinding allowance. Since the influence on the tool life is great, it is necessary to minimize it as much as possible.
Point Angle	In general, the angle is 118°, which is set differently to various applications. **Soft material with good machinability** Small ◀•• Point angle ••▶ Large **For hard material and high-efficiency machining**
Web Thickness	It is an important element that determines the rigidity and chip raking performance of a drill. The web thickness is set according to applications. Small cutting resistance Low rigidity Good chip raking performance Machinable material } Thin ◀•• Web thickness ••▶ Thick { Large cutting resistance High rigidity Poor chip raking performance High-hardness material, cross hole drilling, etc.
Margin	The tip determines the drill diameter and functions as a drill guide during drilling. The margin width is determined in consideration of friction during hole drilling. **Poor guiding performance** Small ◀•• Margin width ••▶ Large **Good guiding performance**
Diameter Back Taper	To reduce friction with the inside of the drilled hole, the portion from the tip to the shank is tapered slightly.The degree is usually represented by the quantity of reduction in the diameter with respect to the flute length, which is approx. 0.04—0.1mm. It is set at a larger value for high-efficiency drills and the work material that allows blind holes.

CUTTING EDGE GEOMETRY AND ITS INFLUENCE

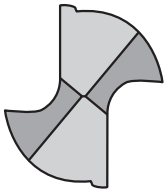
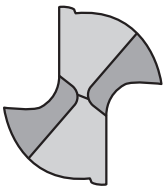
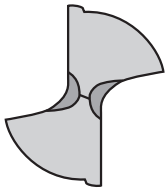
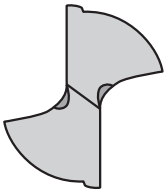
As shown in the table below, it is possible to select the most suitable cutting edge geometry for different applications. If the most suitable cutting edge geometry is selected then higher machining efficiency and higher hole accuracy can be obtained.

Cutting Edge Shapes

Grinding name	Shape	Features and effect	Application
Conical		•The flank is conical and the clearance angle increases toward the centre of the drill.	• General Use
Flat		• The flank is flat. • Easy grinding.	• Mainly for small diameter drills.
Three rank angles		• As there is no chisel edge, the results are high centripetal force and small hole oversize. • Requires a special grinding machine. • Surface grinding of three sides.	• For drilling operations that require high hole accuracy and positioning accuracy.
Spiral point		• To increase the clearance angle near the centre of the drill, conical grinding combined with irregular helix. • S type chisel edge with high centripetal force and machining accuracy.	• For drilling that requires high accuracy.
Radial lip		• The cutting edge is ground radial with the aim of dispersing load. • High machining accuracy and finished surface roughness. • For through holes, small burrs on the base. • Requires a special grinding machine.	• Cast Iron, Aluminium Alloy • For cast iron plates. • Steel
Centre point drill		• This geometry has two-stage point angle for better concentricity and a reduction in shock when exiting the workpiece.	• For thin sheet drilling.

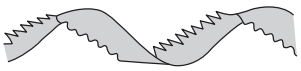
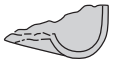
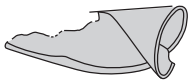
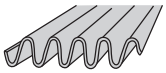
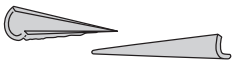
WEB THINNING

The rake angle of the cutting edge of a drill reduces toward the center, and it changes into a negative angle at the chisel edge. During drilling, the center of a drill crushes the work, generating 50—70% of the cutting resistance. Web thinning is very effective for reduction in the cutting resistance of a drill, early removal of cut chips at the chisel edge, and better initial bite.

Shape	 **X type**	 **XR type**	 **S type**	 **N type**
Features	The thrust load substantially reduces, and the bite performance improves. This is effective when the web is thick.	The initial performance is slightly inferior to that of the X type, but the cutting edge is hard and the applicable range of work is wide.	Popular design, easy cutting type.	Effective when the web is comparatively thick.
Major Applications	General drilling and deep hole drilling.	General drilling and stainless steel drilling.	General drilling for steel, cast iron, and non-ferrous metal.	Deep hole drilling.

DRILL TERMINOLOGY AND CUTTING CHARACTERISTICS

DRILLING CHIPS

Types of Chips	Shape	Features and Ease of Raking
Conical Spiral		Fan-shaped chips cut by the cutting edge are curved by the flute. Chips of this type are produced when the feeding rate of ductile material is small. If the chip breaks after several turns, the chip raking performance is satisfactory.
Long Pitch		The generated chip comes out without coiling. It will easily coil around the drill.
Fan		This is a chip broken by the restraint caused by the drill flute and the wall of a drilled hole. It is generated when the feed rate is high.
Segment		A conical spiral chip that is broken before the chip grows into the long-pitch shape by the restraint caused by the wall of the drilled hole due to the insufficiency of ductility. Excellent chip disposal and chip discharge.
Zigzag		A chip that is buckled and folded because of the shape of flute and the characteristics of the material. It easily causes chip packing in the flute.
Needle		Chips broken by vibration or broken when brittle material is curled with a small radius. The raking performance is satisfactory, but these chips can pack closely creating jams.

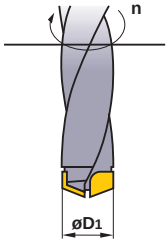
FORMULAE FOR DRILLING

CUTTING SPEED (vc)

$$vc = \frac{\pi \cdot D_1 \cdot n}{1000} \text{ (m/min)}$$

vc (m/min) : Cutting Speed
D1 (mm) : Drill Diameter
π (3.14) : Pi
n (min^{-1}) : Main Axis Spindle Speed

*Divide by 1,000 to change to m from mm.



(Problem) What is the cutting speed when main axis spindle speed is 1350min^{-1} and drill diameter is 12mm ?

(Answer) Substitute π=3.14, D1=12, n=1350 into the formula

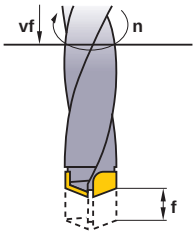
$$vc = \frac{\pi \cdot D_1 \cdot n}{1000} = \frac{3.14 \times 12 \times 1350}{1000} = 50.9\text{m/min}$$

The cutting speed is 50.9m/min.

FEED OF THE MAIN SPINDLE (vf)

$$vf = f \cdot n \text{ (mm/min)}$$

vf (mm/min) : Feed Speed of the Main Spindle (Z axis)
f (mm/rev) : Feed per Revolution
n (min^{-1}) : Main Axis Spindle Speed



(Problem) What is the spindle feed (vf) when feed per revolution is 0.2mm/rev and main axis spindle speed is 1350min^{-1}?

(Answer) Substitute f=0.2, n=1350 into the formula

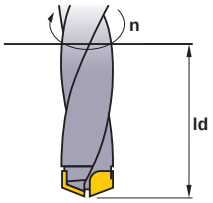
$$vf = f \times n = 0.2 \times 1350 = 270\text{mm/min}$$

The spindle feed is 270mm/min.

DRILLING TIME (Tc)

$$Tc = \frac{ld \cdot i}{n \cdot f}$$

Tc (min) : Drilling Time
n (min^{-1}) : Spindle Speed
ld (mm) : Hole Depth
f (mm/rev) : Feed per Revolution
i : Number of Holes



(Problem) What is the drilling time required for drilling a 30mm length hole in alloy steel (JIS SCM440) at a cutting speed of 50m/min and feed 0.15mm/rev ?

(Answer) Spindle Speed $n = \frac{50 \times 1000}{15 \times 3.14} = 1061.57\text{min}^{-1}$

$$Tc = \frac{30 \times 1}{1061.57 \times 0.15} = 0.188$$

$= 0.188 \times 60 \fallingdotseq 11.3$ sec.

METALLIC MATERIALS CROSS REFERENCE LIST

CARBON STEEL

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
STKM 12A STKM 12C	1.0038	RSt.37-2	4360 40 C	–	E 24-2 Ne	–	–	1311	A570.36	15
–	1.0401	C15	080M15	–	CC12	C15, C16	F.111	1350	1015	15
–	1.0402	C22	050A20	2C	CC20	C20, C21	F.112	1450	1020	20
SUM22	1.0715	9SMn28	230M07	1A	S250	CF9SMn28	F.2111 11SMn28	1912	1213	Y15
SUM22L	1.0718	9SMnPb28	–	–	S250Pb	CF9SMnPb28	11SMnPb28	1914	12L13	–
–	1.0722	10SPb20	–	–	10PbF2	CF10Pb20	10SPb20	–	–	–
–	1.0736	9SMn36	240M07	1B	S300	CF9SMn36	12SMn35	–	1215	Y13
–	1.0737	9SMnPb36	–	–	S300Pb	CF9SMnPb36	12SMnP35	1926	12L14	–
S15C	1.1141	Ck15	080M15	32C	XC12	C16	C15K	1370	1015	15
S25C	1.1158	Ck25	–	–	–	–	–	–	1025	25
–	1.8900	StE380	4360 55 E	–	–	FeE390KG	–	2145	A572-60	–
–	1.0501	C35	060A35	–	CC35	C35	F.113	1550	1035	35
–	1.0503	C45	080M46	–	CC45	C45	F.114	1650	1045	45
–	1.0726	35S20	212M36	8M	35MF4	–	F210G	1957	1140	–
–	1.1157	40Mn4	150M36	15	35M5	–	–	–	1039	40Mn
SMn438(H)	1.1167	36Mn5	–	–	40M5	–	36Mn5	2120	1335	35Mn2
SCMn1	1.1170	28Mn6	150M28	14A	20M5	C28Mn	–	–	1330	30Mn
S35C	1.1183	Cf35	060A35	–	XC38TS	C36	–	1572	1035	35Mn
S45C	1.1191	Ck45	080M46	–	XC42	C45	C45K	1672	1045	Ck45
S50C	1.1213	Cf53	060A52	–	XC48TS	C53	–	1674	1050	50
–	1.0535	C55	070M55	9	–	C55	–	1655	1055	55
–	1.0601	C60	080A62	43D	CC55	C60	–	–	1060	60
S55C	1.1203	Ck55	070M55	–	XC55	C50	C55K	–	1055	55
S58C	1.1221	Ck60	080A62	43D	XC60	C60	–	1678	1060	60Mn
–	1.1274	Ck101	060A96	–	XC100	–	F.5117	1870	1095	–
SK3	1.1545	C105W1	BW1A	–	Y105	C36KU	F.5118	1880	W1	–
SUP4	1.1545	C105W1	BW2	–	Y120	C120KU	F.515	2900	W210	–

ALLOY STEEL

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
SM400A, SM400B SM400C	1.0144	St.44.2	4360 43 C	–	E28-3	–	–	1412	A573-81	–
SM490A, SM490B SM490C	1.0570	St52-3	4360 50 B	–	E36-3	Fe52BFN Fe52CFN	–	2132	–	–
–	1.0841	St52-3	150M19	–	20MC5	Fe52	F.431	2172	5120	–
–	1.0904	55Si7	250A53	45	55S7	55Si8	56Si7	2085	9255	55Si2Mn
–	1.0961	60SiCr7	–	–	60SC7	60SiCr8	60SiCr8	–	9262	–
SUJ2	1.3505	100Cr6	534A99	31	100C6	100Cr6	F.131	2258	ASTM 52100	Gr15, 45G
–	1.5415	15Mo3	1501-240	–	15D3	16Mo3KW	16Mo3	2912	ASTM A204Gr.A	–
–	1.5423	16Mo5	1503-245-420	–	–	16Mo5	16Mo5	–	4520	–
–	1.5622	14Ni6	–	–	16N6	14Ni6	15Ni6	–	ASTM A350LF5	–
–	1.5662	X8Ni9	1501-509-510	–	–	X10Ni9	XBNi09	–	ASTM A353	–
SNC236	1.5710	36NiCr6	640A35	111A	35NC6	–	–	–	3135	–
SNC415(H)	1.5732	14NiCr10	–	–	14NC11	16NiCr11	15NiCr11	–	3415	–
SNC815(H)	1.5752	14NiCr14	655M13	36A	12NC15	–	–	–	3415, 3310	–
SNCM220(H)	1.6523	21NiCrMo2	805M20	362	20NCD2	20NiCrMo2	20NiCrMo2	2506	8620	–
SNCM240	1.6546	40NiCrMo22	311-Type 7	–	–	40NiCrMo2(KB)	40NiCrMo2	–	8740	–
–	1.6587	17CrNiMo6	820A16	–	18NCD6	–	14NiCrMo13	–	–	–
SCr415(H)	1.7015	15Cr3	523M15	–	12C3	–	–	–	5015	15Cr

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
SCr440	1.7045	42Cr4	–	–	–	–	42Cr4	2245	5140	40Cr
SUP9(A)	1.7176	55Cr3	527A60	48	55C3	–	–	–	5155	20CrMn
SCM415(H)	1.7262	15CrMo5	–	–	12CD4	–	12CrMo4	2216	–	–
–	1.7335	13CrMo4 4	1501-620Gr27	–	15CD3.5 15CD4.5	14CrMo45	14CrMo45	–	ASTM A182 F11, F12	–
–	1.7380	10CrMo910	1501-622 Gr31, 45	–	12CD9 12CD10	12CrMo9 12CrMo10	TU.H	2218	ASTM A182 F.22	–
–	1.7715	14MoV63	1503-660-440	–	–	–	13MoCrV6	–	–	–
–	1.8523	39CrMoV13 9	897M39	40C	–	36CrMoV12	–	–	–	–
–	1.6511	36CrNiMo4	816M40	110	40NCD3	38NiCrMo4(KB)	35NiCrMo4	–	9840	–
–	1.6582	34CrNiMo6	817M40	24	35NCD6	35NiCrMo6(KB)	–	2541	4340	40CrNiMoA
SCr430(H)	1.7033	34Cr4	530A32	18B	32C4	34Cr4(KB)	35Cr4	–	5132	35Cr
SCr440(H)	1.7035	41Cr4	530M40	18	42C4	41Cr4	42Cr4	–	5140	40Cr
–	1.7131	16MnCr5	(527M20)	–	16MC5	16MnCr5	16MnCr5	2511	5115	18CrMn
SCM420 SCM430	1.7218	25CrMo4	1717CDS110 708M20	–	25CD4	25CrMo4(KB)	55Cr3	2225	4130	30CrMn
SCM432 SCCRM3	1.7220	34CrMo4	708A37	19B	35CD4	35CrMo4	34CrMo4	2234	4137 4135	35CrMo
SCM 440	1.7223	41CrMo4	708M40	19A	42CD4TS	41CrMo4	42CrMo4	2244	4140 4142	40CrMoA
SCM440(H)	1.7225	42CrMo4	708M40	19A	42CD4	42CrMo4	42CrMo4	2244	4140	42CrMo 42CrMnMo
–	1.7361	32CrMo12	722M24	40B	30CD12	32CrMo12	F.124.A	2240	–	–
SUP10	1.8159	50CrV4	735A50	47	50CV4	50CrV4	51CrV4	2230	6150	50CrVA
–	1.8509	41CrAlMo7	905M39	41B	40CAD6 40CAD2	41CrAlMo7	41CrAlMo7	2940	–	–
–	1.2067	100Cr6	BL3	–	Y100C6	–	100Cr6	–	L3	CrV, 9SiCr
SKS31 SKS2, SKS3	1.2419	105WCr6	–	–	105WC13	100WCr6 107WCr5KU	105WCr5	2140	–	CrWMo
SKT4	1.2713	55NiCrMoV6	BH224/5	–	55NCDV7	–	F.520.S	–	L6	5CrNiMo
–	1.5662	X8Ni9	1501-509	–	–	X10Ni9	XBNi09	–	ASTM A353	–
–	1.5680	12Ni19	–	–	Z18N5	–	–	–	2515	–
–	1.6657	14NiCrMo134	832M13	36C	–	15NiCrMo13	14NiCrMo131	–	–	–
SKD1	1.2080	X210Cr12	BD3	–	Z200C12	X210Cr13KU X250Cr12KU	X210Cr12	–	D3 ASTM D3	Cr12
SKD61	1.2344	X40CrMoV51 X40CrMoV51	BH13	–	Z40CDV5	X35CrMoV05KU X40CrMoV51KU	X40CrMoV5	2242	H13 ASTM H13	40CrMoV5
SKD12	1.2363	X100CrMoV51	BA2	–	Z100CDV5	X100CrMoV51KU	X100CrMoV5	2260	A2	100CrMoV5
SKD2	1.2436	X210CrW12	–	–	–	X215CrW121KU	X210CrW12	2312	–	–
–	1.2542	45WCrV7	BS1	–	–	45WCrV8KU	45WCrSi8	2710	S1	–
SKD5	1.2581	X30WCrV93	BH21	–	Z30WCV9	X28W09KU	X30WCrV9	–	H21	30WCrV9
–	1.2601	X165CrMoV12	–	–	–	X165CrMoW12KU	X160CrMoV12	2310	–	–
SKS43	1.2833	100V1	BW2	–	Y1105V	–	–	–	W210	V
SKH3	1.3255	S 18-1-2-5	BT4	–	Z80WKCV	X78WCo1805KU	HS18-1-1-5	–	T4	W18Cr4VCo5
SKH2	1.3355	S 18-0-1	BT1	–	Z80WCV	X75W18KU	HS18-0-1	–	T1	–
SCMnH/1	1.3401	G-X120Mn12	Z120M12	–	Z120M12	XG120Mn12	X120MN12	–	–	–
SUH1	1.4718	X45CrSi93	401S45	52	Z45CS9	X45CrSi8	F.322	–	HW3	X45CrSi93
SUH3	1.3343	S6-5-2	4959BA2	–	Z40CSD10	15NiCrMo13	–	2715	D3	–
SKH9, SKH51	1.3343	S6/5/2	BM2	–	Z85WDCV	HS6-5-2-2	F.5603	2722	M2	–
–	1.3348	S 2-9-2	–	–	–	HS2-9-2	HS2-9-2	2782	M7	–
SKH55	1.3243	S6/5/2/5	BM35	–	6-5-2-5	HS6-5-2-5	F.5613	2723	M35	–

METALLIC MATERIALS CROSS REFERENCE LIST

STAINLESS STEEL (FERRITIC,MARTENSITIC)

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
SUS403	1.4000	X7Cr13	403S17	–	Z6C13	X6Cr13	F.3110	2301	403	OCr13 1Cr12
–	1.4001	X7Cr14	–	–	–	–	F.8401	–	–	–
SUS416	1.4005	X12CrS13	416S21	–	Z11CF13	X12CrS13	F.3411	2380	416	–
SUS410	1.4006	X10Cr13	410S21	56A	Z10C14	X12Cr13	F.3401	2302	410	1Cr13
SUS430	1.4016	X8Cr17	430S15	60	Z8C17	X8Cr17	F.3113	2320	430	1Cr17
SCS2	1.4027	G-X20Cr14	420C29	56B	Z20C13M	–	–	–	–	–
SUS420J2	1.4034	X46Cr13	420S45	56D	Z40CM Z38C13M	X40Cr14	F.3405	2304	–	4Cr13
–	1.4003	–	405S17	–	Z8CA12	X6CrAl13	–	–	405	–
–	1.4021	–	420S37	–	Z8CA12	X20Cr13	–	2303	420	–
SUS431	1.4057	X22CrNi17	431S29	57	Z15CNi6.02	X16CrNi16	F.3427	2321	431	1Cr17Ni2
SUS430F	1.4104	X12CrMoS17	–	–	Z10CF17	X10CrS17	F.3117	2383	430F	Y1Cr17
SUS434	1.4113	X6CrMo17	434S17	–	Z8CD17.01	X8CrMo17	–	2325	434	1Cr17Mo
SCS5	1.4313	X5CrNi134	425C11	–	Z4CND13.4M	(G)X6CrNi304	–	2385	CA6-NM	–
SUS405	1.4724	X10CrA113	403S17	–	Z10C13	X10CrA112	F.311	–	405	OCr13Al
SUS430	1.4742	X10CrA118	430S15	60	Z10CAS18	X8Cr17	F.3113	–	430	Cr17
SUH4	1.4747	X80CrNiSi20	443S65	59	Z80CSN20.02	X80CrSiNi20	F.320B	–	HNV6	–
SUH446	1.4762	X10CrA124	–	–	Z10CAS24	X16Cr26	–	2322	446	2Cr25N
SUH35	1.4871	X53CrMnNiN219	349S54	–	Z52CMN21.09	X53CrMnNiN219	–	–	EV8	5Cr2Mn9Ni4N
–	1.4521	X1CrMoTi182	–	–	–	–	–	2326	S44400	–
–	1.4922	X20CrMoV12-1	–	–	–	X20CrMoNi1201	–	2317	–	–
–	1.4542	–	–	–	Z7CNU17-04	–	–	–	630	–

STAINLESS STEEL (AUSTENITIC)

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
SUS304L	1.4306	X2CrNi1911	304S11	–	Z2CN18.10	X2CrNi18.11	–	2352	304L	OCr19Ni10
SUS304	1.4350	X5CrNi189	304S11	58E	Z6CN18.09	X5CrNi1810	F.3551 F.3541 F.3504	2332	304	OCr18Ni9
SUS303	1.4305	X12CrNiS188	303S21	58M	Z10CNF18.09	X10CrNiS18.09	F.3508	2346	303	1Cr18Ni9MoZr
SUS304L	–	–	304C12	–	Z3CN19.10	–	–	2333	–	–
SCS19	1.4306	X2CrNi189	304S12	–	Z2CrNi1810	X2CrNi18.11	F.3503	2352	304L	–
SUS301	1.4310	X12CrNi177	–	–	Z12CN17.07	X12CrNi1707	F.3517	2331	301	Cr17Ni7
SUS304LN	1.4311	X2CrNiN1810	304S62	–	Z2CN18.10	–	–	2371	304LN	–
SUS316	1.4401	X5CrNiMo1810	316S16	58J	Z6CND17.11	X5CrNiMo1712	F.3543	2347	316	0Cr17Ni11Mo2
SCS13	1.4308	G-X6CrNi189	304C15	–	Z6CN18.10M	–	–	–	–	–
SCS14	1.4408	G-X6CrNiMo1810	316C16	–	–	–	F.8414	–	–	–
SCS22	1.4581	G-X5CrNiMoNb1810	318C17	–	Z4CNDNb1812M	XG8CrNiMo1811	–	–	–	–
SUS316LN	1.4429	X2CrNiMoN1813	–	–	Z2CND17.13	–	–	2375	316LN	OCr17Ni13Mo
–	1.4404	–	316S13	–	Z2CND17.12	X2CrNiMo1712	–	2348	316L	–
SCS16 SUS316L	1.4435	X2CrNiMo1812	316S13	–	Z2CND17.12	X2CrNiMo1712	–	2353	316L	OCr27Ni12Mo3
–	1.4436	–	316S13	–	Z6CND18-12-03	X8CrNiMo1713	–	2343, 2347	316	–
SUS317L	1.4438	X2CrNiMo1816	317S12	–	Z2CND19.15	X2CrNiMo1816	–	2367	317L	OOCr19Ni13Mo
–	1.4539	X1NiCrMo	–	–	Z6CNT18.10	–	–	2562	UNS V 0890A	–
SUS321	1.4541	X10CrNiTi189	321S12	58B	Z6CNT18.10	X6CrNiTi1811	F.3553 F.3523	2337	321	1Cr18NI9Ti
SUS347	1.4550	X10CrNiNb189	347S17	58F	Z6CNNb18.10	X6CrNiNb1811	F.3552 F.3524	2338	347	1Cr18Ni11Nb
–	1.4571	X10CrNiMoTi1810	320S17	58J	Z6CNDT17.12	X6CrNiMoTi1712	F.3535	2350	316Ti	Cr18Ni12Mo2T
–	1.4583	X10CrNiMoNb1812	–	–	Z6CNDNb1713B	X6CrNiMoNb1713	–	–	318	Cr17Ni12Mo3Mb

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
SUH309	1.4828	X15CrNiSi2012	309S24	–	Z15CNS20.12	X6CrNi2520	–	–	309	1Cr23Ni13
SUH310	1.4845	X12CrNi2521	310S24	–	Z12CN2520	X6CrNi2520	F.331	2361	310S	OCr25Ni20
SCS17	1.4406	X10CrNi18.08	–	58C	Z1NCDU25.20	–	F.8414	2370	308	–
–	1.4418	X4CrNiMo165	–	–	Z6CND16-04-01	–	–	–	–	–
–	1.4568 1.4504	–	316S111	–	Z8CNA17-07	X2CrNiMo1712	–	–	17-7PH	–
–	1.4563	–	–	–	Z1NCDU31-27-03 Z1CNDU20-18-06AZ	–	–	2584 2378	NO8028 S31254	–
SUS321	1.4878	X12CrNiTi189	321S32	58B, 58C	Z6CNT18.12B	X6CrNiTi18 11	F.3523	–	321	1Cr18Ni9Ti

HEAT RESISTANT STEELS

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
SUH330	1.4864	X12NiCrSi3616	–	–	Z12NCS35.16	–	–	–	330	–
SCH15	1.4865	G-X40NiCrSi3818	330C11	–	–	XG50NiCr3919	–	–	HT, HT 50	–

GRAY CAST IRON

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
–	–	–	–	–	–	–	–	0100	–	–
FC100	–	GG 10	–	–	Ft 10 D	–	–	0110	No 20 B	–
FC150	0.6015	GG 15	Grade 150	–	Ft 15 D	G15	FG15	0115	No 25 B	HT150
FC200	0.6020	GG 20	Grade 220	–	Ft 20 D	G20	–	0120	No 30 B	HT200
FC250	0.6025	GG 25	Grade 260	–	Ft 25 D	G25	FG25	0125	No 35 B	HT250
–	–	–	–	–	–	–	–	–	No 40 B	–
FC300	0.6030	GG 30	Grade 300	–	Ft 30 D	G30	FG30	0130	No 45 B	HT300
FC350	0.6035	GG 35	Grade 350	–	Ft 35 D	G35	FG35	0135	No 50 B	HT350
–	0.6040	GG 40	Grade 400	–	Ft 40 D	–	–	0140	No 55 B	HT400
–	0.6660	GGL NiCr202	L-NiCuCr202	–	L-NC 202	–	–	0523	A436 Type 2	–

DUCTILE CAST IRON

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
FCD400	0.7040	GGG 40	SNG 420/12	–	FCS 400-12	GS 370-17	FGE 38-17	07 17-02	60-40-18	QT400-18
–	–	GGG 40.3	SNG 370/17	–	FGS 370-17	–	–	07 17-12	–	–
–	0.7033	GGG 35.3	–	–	–	–	–	07 17-15	–	–
FCD500	0.7050	GGG 50	SNG 500/7	–	FGS 500-7	GS 500	FGE 50-7	07 27-02	80-55-06	QT500-7
–	0.7660	GGG NiCr202	Grade S6	–	S-NC202	–	–	07 76	A43D2	–
–	–	GGG NiMn137	L-NiMn 137	–	L-MN 137	–	–	07 72	–	–
FCD600	–	GGG 60	SNG 600/3	–	FGS 600-3	–	–	07 32-03	–	QT600-3
FCD700	0.7070	GGG 70	SNG 700/2	–	FGS 700-2	GS 700-2	FGS 70-2	07 37-01	100-70-03	QT700-18

MALLEABLE CAST IRON

Japan	Germany		U.K.		France	Italy	Spain	Sweden	USA	China
JIS	W.-nr.	DIN	BS	EN	AFNOR	UNI	UNE	SS	AISI/SAE	GB
FCMB310	–	–	8 290/6	–	MN 32-8	–	–	08 14	–	–
FCMW330	–	GTS-35	B 340/12	–	MN 35-10	–	–	08 15	32510	–
FCMW370	0.8145	GTS-45	P 440/7	–	Mn 450	GMN45	–	08 52	40010	–
FCMP490	0.8155	GTS-55	P 510/4	–	MP 50-5	GMN55	–	08 54	50005	–
FCMP540	–	GTS-65	P 570/3	–	MP 60-3	–	–	08 58	70003	–
FCMP590	0.8165	GTS-65-02	P 570/3	–	Mn 650-3	GMN 65	–	08 56	A220-70003	–
FCMP690	–	GTS-70-02	P 690/2	–	Mn 700-2	GMN 70	–	08 62	A220-80002	–

DIE STEELS

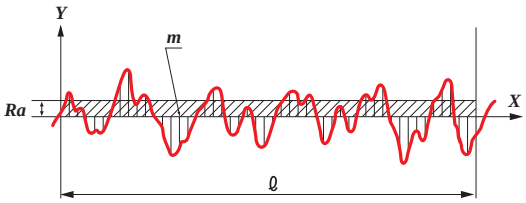
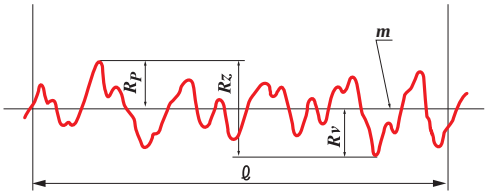
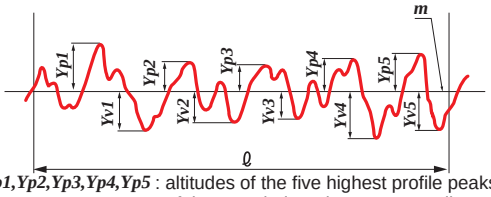
Classification	JIS (Others)	Aichi Steel Works	Uddeholm	Kobe Steel, Ltd.	Sumitomo Metal Industries, Ltd.	Daido Steel Co., Ltd.	Nippon Koshuha	Hitachi Metals, Ltd.	Mitsubishi Steel Manufacturing Co., Ltd.
Carbon Steel for Machine Structure	S50C	AUK1		KTSM2A	SD10	PDS1	KPM1		MT50C
	I			KTSM21	SD17	PXZ			
	S55C			KTSM22	SD21				
Alloy Steel for Machine Structure	SCM440	AUK11		KTSM3A	SD61	PDS3			
	I			KTSM31					
	SCM445		HOLDAX						
Carbon Tool Steel	SK3	SK3				YK3	K3	YC3	
Alloy Tool Steel (For Cold Working)	SKS3	SKS3				GOA	KS3	SGT	
	SKS31					GO31	K31		
	SKS93	SK301				YK30	K3M	YCS3	
	SKD1						KD1	CRD	
	SKD11	SKD11		KAD181		DC11	KD11	SLD	
	SKD11	AUD11				DC3	KD11V	SLD2	
	SKD11						KDQ		
	SKD12		RIGOR			DC12	KD12	SCD	
		SX4							
		SX44							
		SX105V					FH5		
		TCD							
						DC53	KD21	SLD8	
						PD613			
						GO4		ACD37	
						GO5		HMD5	
						GO40F		HPM2T	
								YSM	
								HPM31	
								HMD1	
							KDM5	HMD5	
							KD11S	ACD6	
								ACD8	
								ACD9	
Alloy Tool Steel (For Cold Working and Others)	(P20)		IMPAX	KTSM3M		PX5	KPM30	HPM2	MT24M
	(P20)							HPM7	
	(P21)			KTSM40EF		NAK55	KAP	HPM1	
				KTSM40E		NAK80	KAP2	HPM50	
						GLD2		CENA1	
Alloy Tool Steel (For Hot Working)	SKD4					DH4	KD4	YDC	
	SKD5					DH5	KD5	HDC	
	SKD6					DH6	KD6		
	SKD61	SKD61	Over M Suprem			DHA1	KDA	DAC	
	SKD61						MFA		
	SKD62	SKD62				DH62	KDB	DBC	
	SKT4					GFA	KTV	DM	
	SKD7					DH72	KDH1	YEM	
	(H10)					DH73			
	SKD8					DH41	KDF	MDC	
			QRO80M						
								YHD40	
						DH71			
						DH42			
						DH21			
							KDW		
							KDHM		
							AE31		
								YEM4	
								YHD50	
	SKT4	SKT4A						YHD26	
	6F4	MPH							
	SKT4								
						DH31	KDA1	DAC3	
							KDA5	DAC10	
								DAC40	
						GF78		DAC45	
						DH76		DAC55	
							TD3		
						DH2F	KDAS	FDAC	
								YHD3	
								MDC−K	
								YEM−K	

Classification	JIS (Others)	Aichi Steel Works	Uddeholm	Kobe Steel, Ltd.	Sumitomo Metal Industries, Ltd.	Daido Steel Co., Ltd.	Nippon Koshuha	Hitachi Metals, Ltd.	Mitsubishi Steel Manufacturing Co., Ltd.
High-speed Tool Steel	SKH51					MH51	H51	YXM1	
	SKH55					MH55	HM35	YXM4	
	SKH57					MH57	MV10	XVC5	
						MH8	NK4	YXM60	
						MH24			
						MH7V1			
						MH64			
						VH54	HV2	XVC11	
							HM3	YXM7	
						MH85	KDMV	YXR3	
						MH88	HM9TL	YXR4	
								YXR7	
								YXR35	
Powder High-speed Tool Steel			ASP23	KHA32		DEX20		HAP10	
			ASP30	KHA30		DEX40		HAP40	
				KHA3VN		DEX60		HAP50	
				KHA30N		DEX70		HAP63	
				KHA33N		DEX80		HAP72	
				KHA50					
				KHA77					
			ASP60	KHA60					
Stainless Steel	SUS403					GLD1			
	SUS420		STAVAX			S−STAR	KSP1	HPM38	
	SUS440C		ELMAX (Powder)	KAS440 (Powder)		SUS440C	KSP3		
	SUS420							SUS420	
	SUS630					NAK101	U630	PSL	
	(414)								
Maraging Steel						MAS1C	KMS18−20	YAG	DMG300
Heat Resistant Alloy								HRNC	
Forged Tool								ICD1	
								ICD5	

SURFACE ROUGHNESS

SURFACE ROUGHNESS

(From JIS B 0601-1994)

Type	Code	Determination	Determination Example (Figure)
Arithmetical Mean Roughness	Ra	Ra means the value obtained by the following formula and expressed in micrometer (μm) when sampling only the reference length from the roughness curve in the direction of the mean line, taking X-axis in the direction of mean line and Y-axis in the direction of longitudinal magnification of this sampled part and the roughness curve is expressed by y=f(x): $Ra=\frac{1}{\ell}\int_0^{\ell}\{f(x)\}dx$	
Maximum Height	Rz	Rz shall be that only when the reference length is sampled from the roughness curve in the direction of the mean line, the distance between the top profile peak line and the bottom profile valley line on this sampled portion is measured in the longitudinal magnification direction of roughness curve and the obtained value is expressed in micrometer (μm). (Note) When finding Rz, a portion without an exceptionally high peak or low valley, which may be regarded as a flaw, is selected as the sampling length. $Rz=R_P+Rv$	
Ten-Point Mean Roughness	RzJIS	RzJIS shall be that only when the reference length is sampled from the roughness curve in the direction of its mean line, the sum of the average value of absolute values of the heights of five highest profile peaks (Yp) and the depths of five deepest profile valleys (Yv) measured in the vertical magnification direction from the mean line of this sampled portion and this sum is expressed in micrometer (μm). $Rz_{JIS}=\frac{(Yp1+Yp2+Yp3+Yp4+Yp5)+(Yv1+Yv2+Yv3+Yv4+Yv5)}{5}$	 $Yp1,Yp2,Yp3,Yp4,Yp5$: altitudes of the five highest profile peaks of the sampled portion corresponding to the reference length l. $Yv1,Yv2,Yv3,Yv4,Yv5$: altitudes of the five deepest profile valleys of the sampled portion corresponding to the reference length l.

RELATIONSHIP BETWEEN ARITHMETICAL MEAN (Ra) AND CONVENTIONAL DESIGNATION (REFERENCE DATA)

Arithmetical Mean Roughness Ra		Max. Height Rz	Ten-Point Mean Roughness RzJIS	Sampling Length for Rz • RzJIS l (mm)	Conventional Finish Mark
Standard Series	Cutoff Value λc (mm)	Standard Series			
0.012a	0.08	0.05s	0.05z	0.08	▽▽▽▽
0.025a	0.25	0.1 s	0.1 z		
0.05 a		0.2 s	0.2 z	0.25	
0.1 a	0.8	0.4 s	0.4 z		
0.2 a		0.8 s	0.8 z	0.8	
0.4 a		1.6 s	1.6 z		▽▽▽
0.8 a		3.2 s	3.2 z		
1.6 a		6.3 s	6.3 z		
3.2 a	2.5	12.5 s	12.5 z	2.5	▽▽
6.3 a		25 s	25 z		
12.5 a	8	50 s	50 z		▽
25 a		100 s	100 z	8	
50 a		200 s	200 z		–
100 a	–	400 s	400 z	–	

∗The correlation among the three is shown for convenience and is not exact.
∗Ra: The evaluation length of Rz and RzJIS is the cutoff value and sampling length multiplied by 5, respectively.

HARDNESS COMPARISON TABLE

HARDNESS CONVERSION NUMBERS OF STEEL

Brinell Hardness (HB) 10mm Ball,Load: 3,000 kgf		Vickers Hardness	Rockwell Hardness				Shore Hardness	Tensile Strength (Approx.)
Standard Ball	Tungsten Carbide Ball	(HV)	A Scale, Load:60kgf, Diamond Point (HRA)	B Scale, Load:100kgf, 1/16" Ball (HRB)	C Scale, Load:150kgf, Diamond Point (HRC)	D Scale, Load:100kgf, Diamond Point (HRD)	(HS)	Mpa
—	—	940	85.6	—	68.0	76.9	97	—
—	—	920	85.3	—	67.5	76.5	96	—
—	—	900	85.0	—	67.0	76.1	95	—
—	(767)	880	84.7	—	66.4	75.7	93	—
—	(757)	860	84.4	—	65.9	75.3	92	—
—	(745)	840	84.1	—	65.3	74.8	91	—
—	(733)	820	83.8	—	64.7	74.3	90	—
—	(722)	800	83.4	—	64.0	73.8	88	—
—	(712)	—	—	—	—	—	—	—
—	(710)	780	83.0	—	63.3	73.3	87	—
—	(698)	760	82.6	—	62.5	72.6	86	—
—	(684)	740	82.2	—	61.8	72.1	—	—
—	(682)	737	82.2	—	61.7	72.0	84	—
—	(670)	720	81.8	—	61.0	71.5	83	—
—	(656)	700	81.3	—	60.1	70.8	—	—
—	(653)	697	81.2	—	60.0	70.7	81	—
—	(647)	690	81.1	—	59.7	70.5	—	—
—	(638)	680	80.8	—	59.2	70.1	80	—
—	630	670	80.6	—	58.8	69.8	—	—
—	627	667	80.5	—	58.7	69.7	79	—
—	—	677	80.7	—	59.1	70.0	—	—
—	601	640	79.8	—	57.3	68.7	77	—
—	—	640	79.8	—	57.3	68.7	—	—
—	578	615	79.1	—	56.0	67.7	75	—
—	—	607	78.8	—	55.6	67.4	—	—
—	555	591	78.4	—	54.7	66.7	73	2055
—	—	579	78.0	—	54.0	66.1	—	2015
—	534	569	77.8	—	53.5	65.8	71	1985
—	—	533	77.1	—	52.5	65.0	—	1915
—	514	547	76.9	—	52.1	64.7	70	1890
(495)	—	539	76.7	—	51.6	64.3	—	1855
—	—	530	76.4	—	51.1	63.9	—	1825
	495	528	76.3	—	51.0	63.8	68	1820
(477)	—	516	75.9	—	50.3	63.2	—	1780
—	—	508	75.6	—	49.6	62.7	—	1740
	477	508	75.6	—	49.6	62.7	66	1740
(461)	—	495	75.1	—	48.8	61.9	—	1680
—	—	491	74.9	—	48.5	61.7	—	1670
	461	491	74.9	—	48.5	61.7	65	1670
444	—	474	74.3	—	47.2	61.0	—	1595
—	—	472	74.2	—	47.1	60.8	—	1585
—	444	472	74.2	—	47.1	60.8	63	1585

Brinell Hardness (HB) 10mm Ball,Load: 3,000 kgf		Vickers Hardness	Rockwell Hardness				Shore Hardness	Tensile Strength (Approx.)
Standard Ball	Tungsten Carbide Ball	(HV)	A Scale, Load:60kgf, Diamond Point (HRA)	B Scale, Load:100kgf, 1/16" Ball (HRB)	C Scale, Load:150kgf, Diamond Point (HRC)	D Scale, Load:100kgf, Diamond Point (HRD)	(HS)	Mpa
429	429	455	73.4	—	45.7	59.7	61	1510
415	415	440	72.8	—	44.5	58.8	59	1460
401	401	425	72.0	—	43.1	57.8	58	1390
388	388	410	71.4	—	41.8	56.8	56	1330
375	375	396	70.6	—	40.4	55.7	54	1270
363	363	383	70.0	—	39.1	54.6	52	1220
352	352	372	69.3	(110.0)	37.9	53.8	51	1180
341	341	360	68.7	(109.0)	36.6	52.8	50	1130
331	331	350	68.1	(108.5)	35.5	51.9	48	1095
321	321	339	67.5	(108.0)	34.3	51.0	47	1060
311	311	328	66.9	(107.5)	33.1	50.0	46	1025
302	302	319	66.3	(107.0)	32.1	49.3	45	1005
293	293	309	65.7	(106.0)	30.9	48.3	43	970
285	285	301	65.3	(105.5)	29.9	47.6	—	950
277	277	292	64.6	(104.5)	28.8	46.7	41	925
269	269	284	64.1	(104.0)	27.6	45.9	40	895
262	262	276	63.6	(103.0)	26.6	45.0	39	875
255	255	269	63.0	(102.0)	25.4	44.2	38	850
248	248	261	62.5	(101.0)	24.2	43.2	37	825
241	241	253	61.8	100	22.8	42.0	36	800
235	235	247	61.4	99.0	21.7	41.4	35	785
229	229	241	60.8	98.2	20.5	40.5	34	765
223	223	234	—	97.3	(18.8)	—	—	—
217	217	228	—	96.4	(17.5)	—	33	725
212	212	222	—	95.5	(16.0)	—	—	705
207	207	218	—	94.6	(15.2)	—	32	690
201	201	212	—	93.8	(13.8)	—	31	675
197	197	207	—	92.8	(12.7)	—	30	655
192	192	202	—	91.9	(11.5)	—	29	640
187	187	196	—	90.7	(10.0)	—	—	620
183	183	192	—	90.0	(9.0)	—	28	615
179	179	188	—	89.0	(8.0)	—	27	600
174	174	182	—	87.8	(6.4)	—	—	585
170	170	178	—	86.8	(5.4)	—	26	570
167	167	175	—	86.0	(4.4)	—	—	560
163	163	171	—	85.0	(3.3)	—	25	545
156	156	163	—	82.9	(0.9)	—	—	525
149	149	156	—	80.8	—	—	23	505
143	143	150	—	78.7	—	—	22	490
137	137	143	—	76.4	—	—	21	460
131	131	137	—	74.0	—	—	—	450
126	126	132	—	72.0	—	—	20	435
121	121	127	—	69.8	—	—	19	415
116	116	122	—	67.6	—	—	18	400
111	111	117	—	65.7	—	—	15	385

(Note 1) Above list is the same as that at AMS Metals Hand book with tensile strength in approximate metric value and Brinell hardness over a recommended range.
(Note 2) 1MPa=1N/mm^2
(Note 3) Figures in ( ) are rarely used and are included for reference. This list has been taken from JIS Handbook Steel I.

FIT TOLERANCE TABLE (HOLE)

Classification of Standard Dimensions (mm)		Class of Geometrical Tolerance Zone of Holes														
>	≤	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7
—	3	+180 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +20	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+6 0	+10 0
3	6	+188 +140	+100 +70	+118 +70	+48 +30	+60 +30	+78 +30	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+8 0	+12 0
6	10	+208 +150	+116 +80	+138 +80	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+9 0	+15 0
10	14	+220 +150	+138 +95	+165 +95	+77 +50	+93 +50	+120 +50	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 +6	+11 0	+18 0
14	18																
18	24	+244 +160	+162 +110	+194 +110	+98 +65	+117 +65	+149 +65	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+13 0	+21 0
24	30																
30	40	+270 +170	+182 +120	+220 +120	+119 +80	+142 +80	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+16 0	+25 0
40	50	+280 +180	+192 +130	+230 +130													
50	65	+310 +190	+214 +140	+260 +140	+146 +100	+174 +100	+220 +100	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+19 0	+30 0
65	80	+320 +200	+224 +150	+270 +150													
80	100	+360 +220	+257 +170	+310 +170	+174 +120	+207 +120	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+22 0	+35 0
100	120	+380 +240	+267 +180	+320 +180													
120	140	+420 +260	+300 +200	+360 +200	+208 +145	+245 +145	+305 +145	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+25 0	+40 0
140	160	+440 +280	+310 +210	+370 +210													
160	180	+470 +310	+330 +230	+390 +230													
180	200	+525 +340	+355 +240	+425 +240	+242 +170	+285 +170	+355 +170	+146 +100	+172 +100	+215 +100	+79 +50	+96 +50	+122 +50	+44 +15	+61 +15	+29 0	+46 0
200	225	+565 +380	+375 +260	+445 +260													
225	250	+605 +420	+395 +280	+465 +280													
250	280	+690 +480	+430 +300	+510 +300	+271 +190	+320 +190	+400 +190	+162 +110	+191 +110	+240 +110	+88 +56	+108 +56	+137 +56	+49 +17	+69 +17	+32 0	+52 0
280	315	+750 +540	+460 +330	+540 +330													
315	355	+830 +600	+500 +360	+590 +360	+299 +210	+350 +210	+440 +210	+182 +125	+214 +125	+265 +125	+98 +62	+119 +62	+151 +62	+54 +18	+75 +18	+36 0	+57 0
355	400	+910 +680	+540 +400	+630 +400													
400	450	+1010 +760	+595 +440	+690 +440	+327 +230	+385 +230	+480 +230	+198 +135	+232 +135	+290 +135	+108 +68	+131 +68	+165 +68	+60 +20	+83 +20	+40 0	+63 0
450	500	+1090 +840	+635 +480	+730 +480													

(Note) Values shown in the upper portion of respective lines are upper dimensional tolerance, while values shown in the lower portion of respective lines are lower dimensional tolerance.

Units : μm

Class of Geometrical Tolerance Zone of Holes																
H8	**H9**	**H10**	**JS6**	**JS7**	**K6**	**K7**	**M6**	**M7**	**N6**	**N7**	**P6**	**P7**	**R7**	**S7**	**T7**	**U7**	**X7**
+14 0	+25 0	+40 0	±3	±5	0 −6	0 −10	−2 −8	−2 −12	−4 −10	−4 −14	−6 −12	−6 −16	−10 −20	−14 −24	–	−18 −28	−20 −30
+18 0	+30 0	+48 0	±4	±6	+2 −6	+3 −9	−1 −9	0 −12	−5 −13	−4 −16	−9 −17	−8 −20	−11 −23	−15 −27	–	−19 −31	−24 −36
+22 0	+36 0	+58 0	±4.5	±7	+2 −7	+5 −10	−3 −12	0 −15	−7 −16	−4 −19	−12 −21	−9 −24	−13 −28	−17 −32	–	−22 −37	−28 −43
+27 0	+43 0	+70 0	±5.5	±9	+2 −9	+6 −12	−4 −15	0 −18	−9 −20	−5 −23	−15 −26	−11 −29	−16 −34	−21 −39	–	−26 −44	−33 −51 −38 −56
+33 0	+52 0	+84 0	±6.5	±10	+2 −11	+6 −15	−4 −17	0 −21	−11 −24	−7 −28	−18 −31	−14 −35	−20 −41	−27 −48	– −33 −54	−33 −54 −40 −61	−46 −67 −56 −77
+39 0	+62 0	+100 0	±8	±12	+3 −13	+7 −18	−4 −20	0 −25	−12 −28	−8 −33	−21 −37	−17 −42	−25 −50	−34 −59	−39 −64 −45 −70	−51 −76 −61 −86	–
+46 0	+74 0	+120 0	±9.5	±15	+4 −15	+9 −21	−5 −24	0 −30	−14 −33	−9 −39	−26 −45	−21 −51	−30 −60 −32 −62	−42 −72 −48 −78	−55 −85 −64 −94	−76 −106 −91 −121	–
+54 0	+87 0	+140 0	±11	±17	+4 −18	+10 −25	−6 −28	0 −35	−16 −38	−10 −45	−30 −52	−24 −59	−38 −73 −41 −76	−58 −93 −66 −101	−78 −113 −91 −126	−111 −146 −131 −166	–
+63 0	+100 0	+160 0	±12.5	±20	+4 −21	+12 −28	−8 −33	0 −40	−20 −45	−12 −52	−36 −61	−28 −68	−48 −88 −50 −90 −53 −93	−77 −117 −85 −125 −93 −133	−107 −147 −119 −159 −131 −171	–	–
+72 0	+115 0	+185 0	±14.5	±23	+5 −24	+13 −33	−8 −37	0 −46	−22 −51	−14 −60	−41 −70	−33 −79	−60 −106 −63 −109 −67 −113	−105 −151 −113 −159 −123 −169	–	–	–
+81 0	+130 0	+210 0	±16	±26	+5 −27	+16 −36	−9 −41	0 −52	−25 −57	−14 −66	−47 −79	−36 −88	−74 −126 −78 −130	–	–	–	–
+89 0	+140 0	+230 0	±18	±28	+7 −29	+17 −40	−10 −46	0 −57	−26 −62	−16 −73	−51 −87	−41 −98	−87 −144 −93 −150	–	–	–	–
+97 0	+155 0	+250 0	±20	±31	+8 −32	+18 −45	−10 −50	0 −63	−27 −67	−17 −80	−55 −95	−45 −108	−103 −166 −109 −172	–	–	–	–

FIT TOLERANCE TABLE (SHAFTS)

Classification of Standard Dimensions (mm)		Class of Geometrical Tolerance Zone of Shafts													
>	≤	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7
–	3	−140 −165	−60 −85	−20 −34	−20 −45	−14 −24	−14 −28	−14 −39	−6 −12	−6 −16	−6 −20	−2 −6	−2 −8	0 −4	0 −6	0 −10
3	6	−140 −170	−70 −100	−30 −48	−30 −60	−20 −32	−20 −38	−20 −50	−10 −18	−10 −22	−10 −28	−4 −9	−4 −12	0 −5	0 −8	0 −12
6	10	−150 −186	−80 −116	−40 −62	−40 −76	−25 −40	−25 −47	−25 −61	−13 −22	−13 −28	−13 −35	−5 −11	−5 −14	0 −6	0 −9	0 −15
10	14	−150 −193	−95 −138	−50 −77	−50 −93	−32 −50	−32 −59	−32 −75	−16 −27	−16 −34	−16 −43	−6 −14	−6 −17	0 −8	0 −11	0 −18
14	18															
18	24	−160 −212	−110 −162	−65 −98	−65 −117	−40 −61	−40 −73	−40 −92	−20 −33	−20 −41	−20 −53	−7 −16	−7 −20	0 −9	0 −13	0 −21
24	30															
30	40	−170 −232	−120 −182	−80 −119	−80 −142	−50 −75	−50 −89	−50 −112	−25 −41	−25 −50	−25 −64	−9 −20	−9 −25	0 −11	0 −16	0 −25
40	50	−180 −242	−130 −192													
50	65	−190 −264	−140 −214	−100 −146	−100 −174	−60 −90	−60 −106	−60 −134	−30 −49	−30 −60	−30 −76	−10 −23	−10 −29	0 −13	0 −19	0 −30
65	80	−200 −274	−150 −224													
80	100	−220 −307	−170 −257	−120 −174	−120 −207	−72 −107	−72 −126	−72 −159	−36 −58	−36 −71	−36 −90	−12 −27	−12 −34	0 −15	0 −22	0 −35
100	120	−240 −327	−180 −267													
120	140	−260 −360	−200 −300	−145 −208	−145 −245	−85 −125	−85 −148	−85 −185	−43 −68	−43 −83	−43 −106	−14 −32	−14 −39	0 −18	0 −25	0 −40
140	160	−280 −380	−210 −310													
160	180	−310 −410	−230 −330													
180	200	−340 −455	−240 −355	−170 −242	−170 −285	−100 −146	−100 −172	−100 −215	−50 −79	−50 −96	−50 −122	−15 −35	−15 −44	0 −20	0 −29	0 −46
200	225	−380 −495	−260 −375													
225	250	−420 −535	−280 −395													
250	280	−480 −610	−300 −430	−190 −271	−190 −320	−110 −162	−110 −191	−110 −240	−56 −88	−56 −108	−56 −137	−17 −40	−17 −49	0 −23	0 −32	0 −52
280	315	−540 −670	−330 −460													
315	355	−600 −740	−360 −500	−210 −299	−210 −350	−125 −182	−125 −214	−125 −265	−62 −98	−62 −119	−62 −151	−18 −43	−18 −54	0 −25	0 −36	0 −57
355	400	−680 −820	−400 −540													
400	450	−760 −915	−440 −595	−230 −327	−230 −385	−135 −198	−135 −232	−135 −290	−68 −108	−68 −131	−68 −165	−20 −47	−20 −60	0 −27	0 −40	0 −63
450	500	−840 −995	−480 −635													

(Note) Values shown in the upper portion of respective lines are upper dimensional tolerance, while values shown in the lower portion of respective lines are lower dimensional tolerance.

Units : μm

Class of Geometrical Tolerance Zone of Shafts															
h8	**h9**	**js5**	**js6**	**js7**	**k5**	**k6**	**m5**	**m6**	**n6**	**p6**	**r6**	**s6**	**t6**	**u6**	**x6**
0 −14	0 −25	±2	±3	±5	+4 0	+6 0	+6 +2	+8 +2	+10 +4	+12 +6	+16 +10	+20 +14	–	+24 +18	+26 +20
0 −18	0 −30	±2.5	±4	±6	+6 +1	+9 +1	+9 +4	+12 +4	+16 +8	+20 +12	+23 +15	+27 +19	–	+31 +23	+36 +28
0 −22	0 −36	±3	±4.5	±7	+7 +1	+10 +1	+12 +6	+15 +6	+19 +10	+24 +15	+28 +19	+32 +23	–	+37 +28	+43 +34
0 −27	0 −43	±4	±5.5	±9	+9 +1	+12 +1	+15 +7	+18 +7	+23 +12	+29 +18	+34 +23	+39 +28	–	+44 +33	+51 +40 +56 +45
0 −33	0 −52	±4.5	±6.5	±10	+11 +2	+15 +2	+17 +8	+21 +8	+28 +15	+35 +22	+41 +28	+48 +35	– +54 +41	+54 +41 +61 +48	+67 +54 +77 +64
0 −39	0 −62	±5.5	±8	±12	+13 +2	+18 +2	+20 +9	+25 +9	+33 +17	+42 +26	+50 +34	+59 +43	+64 +48 +70 +54	+76 +60 +86 +70	–
0 −46	0 −74	±6.5	±9.5	±15	+15 +2	+21 +2	+24 +11	+30 +11	+39 +20	+51 +32	+60 +41 +62 +43	+72 +53 +78 +59	+85 +66 +94 +75	+106 +87 +121 +102	–
0 −54	0 −87	±7.5	±11	±17	+18 +3	+25 +3	+28 +13	+35 +13	+45 +23	+59 +37	+73 +51 +76 +54	+93 +71 +101 +79	+113 +91 +126 +104	+146 +124 +166 +144	–
0 −63	0 −100	±9	±12.5	±20	+21 +3	+28 +3	+33 +15	+40 +15	+52 +27	+68 +43	+88 +63 +90 +65 +93 +68	+117 +92 +125 +100 +133 +108	+147 +122 +159 +134 +171 +146	–	–
0 −72	0 −115	±10	±14.5	±23	+24 +4	+33 +4	+37 +17	+46 +17	+60 +31	+79 +50	+106 +77 +109 +80 +113 +84	+151 +122 +159 +130 +169 +140	–	–	–
0 −81	0 −130	±11.5	±16	±26	+27 +4	+36 +4	+43 +20	+52 +20	+66 +34	+88 +56	+126 +94 +130 +98	–	–	–	–
0 −89	0 −140	±12.5	±18	±28	+29 +4	+40 +4	+46 +21	+57 +21	+73 +37	+98 +62	+144 +108 +150 +114	–	–	–	–
0 −97	0 −155	±13.5	±20	±31	+32 +5	+45 +5	+50 +23	+63 +23	+80 +40	+108 +68	+166 +126 +172 +132	–	–	–	–

DRILL DIAMETERS FOR PREPARED HOLES

●Metric Coarse Screw Thread

Nominal	Drill Diameter	
	HSS	Carbide
M1 ×0.25	0.75	0.75
M1.1×0.25	0.85	0.85
M1.2×0.25	0.95	0.95
M1.4×0.3	1.10	1.10
M1.6×0.35	1.25	1.30
M1.7×0.35	1.35	1.40
M1.8×0.35	1.45	1.50
M2 ×0.4	1.60	1.65
M2.2×0.45	1.75	1.80
M2.3×0.4	1.90	1.95
M2.5×0.45	2.10	2.15
M2.6×0.45	2.15	2.20
M3 ×0.5	2.50	2.55
M3.5×0.6	2.90	2.95
M4 ×0.7	3.3	3.4
M4.5×0.75	3.8	3.9
M5 ×0.8	4.2	4.3
M6 ×1.0	5.0	5.1
M7 ×1.0	6.0	6.1
M8 ×1.25	6.8	6.9
M9 ×1.25	7.8	7.9
M10 ×1.5	8.5	8.7
M11 ×1.5	9.5	9.7
M12 ×1.75	10.3	10.5
M14 ×2.0	12.0	12.2
M16 ×2.0	14.0	14.2
M18 ×2.5	15.5	15.7
M20 ×2.5	17.5	17.7
M22 ×2.5	19.5	19.7
M24 ×3.0	21.0	—
M27 ×3.0	24.0	—
M30 ×3.5	26.5	—
M33 ×3.5	29.5	—
M36 ×4.0	32.0	—
M39 ×4.0	35.0	—
M42 ×4.5	37.5	—
M45 ×4.5	40.5	—
M48 ×5.0	43.0	—

●Metric Fine Screw Thread

Nominal	Drill Diameter	
	HSS	Carbide
M1 ×0.2	0.80	0.80
M1.1×0.2	0.90	0.90
M1.2×0.2	1.00	1.00
M1.4×0.2	1.20	1.20
M1.6×0.2	1.40	1.40
M1.8×0.2	1.60	1.60
M2 ×0.25	1.75	1.75
M2.2×0.25	1.95	2.00
M2.5×0.35	2.20	2.20
M3 ×0.35	2.70	2.70
M3.5×0.35	3.20	3.20
M4 ×0.5	3.50	3.55
M4.5×0.5	4.00	4.05
M5 ×0.5	4.50	4.55
M5.5×0.5	5.00	5.05
M6 ×0.75	5.30	5.35
M7 ×0.75	6.30	6.35
M8 ×1.0	7.00	7.10
M8 ×0.75	7.30	7.35
M9 ×1.0	8.00	8.10
M9 ×0.75	8.30	8.35
M10 ×1.25	8.80	8.90
M10 ×1.0	9.00	9.10
M10 ×0.75	9.30	9.35
M11 ×1.0	10.0	10.1
M11 ×0.75	10.3	10.3
M12 ×1.5	10.5	10.7
M12 ×1.25	10.8	10.9
M12 ×1.0	11.0	11.1
M14 ×1.5	12.5	12.7
M14 ×1.0	13.0	13.1
M15 ×1.5	13.5	13.7
M15 ×1.0	14.0	14.1
M16 ×1.5	14.5	14.7
M16 ×1.0	15.0	15.1
M17 ×1.5	15.5	15.7
M17 ×1.0	16.0	16.1
M18 ×2.0	16.0	16.3
M18 ×1.5	16.5	16.7
M18 ×1.0	17.0	17.1

Nominal	Drill Diameter	
	HSS	Carbide
M20 ×2.0	18.0	18.3
M20 ×1.5	18.5	18.7
M20 ×1.0	19.0	19.1
M22 ×2.0	20.0	—
M22 ×1.5	20.5	—
M22 ×1.0	21.0	—
M24 ×2.0	22.0	—
M24 ×1.5	22.5	—
M24 ×1.0	23.0	—
M25 ×2.0	23.0	—
M25 ×1.5	23.5	—
M25 ×1.0	24.0	—
M26 ×1.5	24.5	—
M27 ×2.0	25.0	—
M27 ×1.5	25.5	—
M27 ×1.0	26.0	—
M28 ×2.0	26.0	—
M28 ×1.5	26.5	—
M28 ×1.0	27.0	—
M30 ×3.0	27.0	—
M30 ×2.0	28.0	—
M30 ×1.5	28.5	—
M30 ×1.0	29.0	—
M32 ×2.0	30.0	—
M32 ×1.5	30.5	—
M33 ×3.0	30.0	—
M33 ×2.0	31.0	—
M33 ×1.5	31.5	—
M35 ×1.5	33.5	—
M36 ×3.0	33.0	—
M36 ×2.0	34.0	—
M36 ×1.5	34.5	—
M38 ×1.5	36.5	—
M39 ×3.0	36.0	—
M39 ×2.0	37.0	—
M39 ×1.5	37.5	—
M40 ×3.0	37.0	—
M40 ×2.0	38.0	—
M40 ×1.5	38.5	—
M42 ×4.0	38.0	—

Nominal	Drill Diameter	
	HSS	Carbide
M42 ×3.0	39.0	—
M42 ×2.0	40.0	—
M42 ×1.5	40.5	—
M45 ×4.0	41.0	—
M45 ×3.0	42.0	—
M45 ×2.0	43.0	—
M45 ×1.5	43.5	—
M48 ×4.0	44.0	—
M48 ×3.0	45.0	—
M48 ×2.0	46.0	—
M48 ×1.5	46.5	—
M50 ×3.0	47.0	—
M50 ×2.0	48.0	—
M50 ×1.5	48.5	—

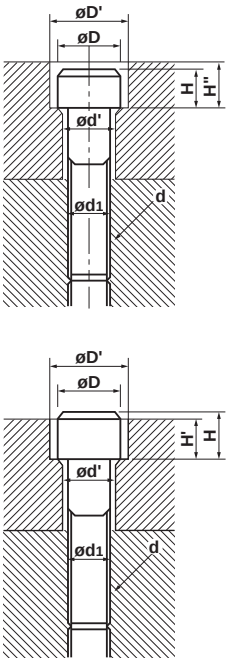
(Note) When using the drill diameters shown in this table, that the processed hole should be measured since the size accuracy of a drill hole may change due to the drilling condition, and that if found to be inappropriate for a prepared hole, the drill diameter must be corrected accordingly.

HEXAGON SOCKET HEAD BOLT HOLE SIZE / INTERNATIONAL SYSTEM OF UNITS

DIMENSIONS OF COUNTERBORING FOR HEXAGON SOCKET HEAD CAP SCREW AND BOLT HOLE

Unit : mm

Nominal dimensions of thread d	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
d1	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
d'	3.4	4.5	5.5	6.6	9	11	14	16	18	20	22	24	26	30	33
D	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36	40	45
D'	6.5	8	9.5	11	14	17.5	20	23	26	29	32	35	39	43	48
H	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
H'	2.7	3.6	4.6	5.5	7.4	9.2	11	12.8	14.5	16.5	18.5	20.5	22.5	25	28
H"	3.3	4.4	5.4	6.5	8.6	10.8	13	15.2	17.5	19.5	21.5	23.5	25.5	29	32



INTERNATIONAL SYSTEM OF UNITS

UNIT CONVERSION TABLE for EASIER CHANGE into SI UNITS (Bold type Indicates SI unit)

Pressure

Pa	**kPa**	**MPa**	bar	kgf/cm^2	atm	mmH$_2$O	mmHg or Torr
1	1×10^{-3}	1×10^{-6}	1×10^{-5}	1.01972×10^{-5}	9.86923×10^{-6}	1.01972×10^{-1}	7.50062×10^{-3}
1×10^{3}	1	1×10^{-3}	1×10^{-2}	1.01972×10^{-2}	9.86923×10^{-3}	1.01972×10^{2}	7.50062
1×10^{6}	1×10^{3}	1	1×10	1.01972×10	9.86923	1.01972×10^{5}	7.50062×10^{3}
1×10^{5}	1×10^{2}	1×10^{-1}	1	1.01972	9.86923×10^{-1}	1.01972×10^{4}	7.50062×10^{2}
9.80665×10^{4}	9.80665×10	9.80665×10^{-2}	9.80665×10^{-1}	1	9.67841×10^{-1}	1×10^{4}	7.35559×10^{2}
1.01325×10^{5}	1.01325×10^{2}	1.01325×10^{-1}	1.01325	1.03323	1	1.03323×10^{4}	7.60000×10^{2}
9.80665	9.80665×10^{-3}	9.80665×10^{-6}	9.80665×10^{-5}	1×10^{-4}	9.67841×10^{-5}	1	7.35559×10^{-2}
1.33322×10^{2}	1.33322×10^{-1}	1.33322×10^{-4}	1.33322×10^{-3}	1.35951×10^{-3}	1.31579×10^{-3}	1.35951×10	1

(Note) 1Pa=1N/m^2

Force

N	dyn	kgf
1	1×10^{5}	1.01972×10^{-1}
1×10^{-5}	1	1.01972×10^{-6}
9.80665	9.80665×10^{5}	1

Stress

Pa	**MPa** or **N/mm^2**	kgf/mm^2	kgf/cm^2
1	1×10^{-6}	1.01972×10^{-7}	1.01972×10^{-5}
1×10^{6}	1	1.01972×10^{-1}	1.01972×10
9.80665×10^{6}	9.80665	1	1×10^{2}
9.80665×10^{4}	9.80665×10^{-2}	1×10^{-2}	1

(Note) 1Pa=1N/m^2

Work / Energy / Quantity of Heat

J	kW • h	kgf • m	kcal
1	2.77778×10^{-7}	1.01972×10^{-1}	2.38889×10^{-4}
3.600×10^{6}	1	3.67098×10^{5}	8.6000×10^{2}
9.80665	2.72407×10^{-6}	1	2.34270×10^{-3}
4.18605×10^{3}	1.16279×10^{-3}	4.26858×10^{2}	1

(Note) 1J=1W • s, 1J=1N • m
1cal=4.18605J
(By the law of weights and measures)

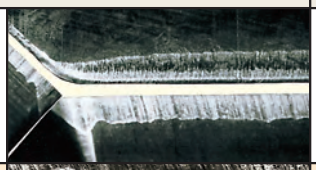
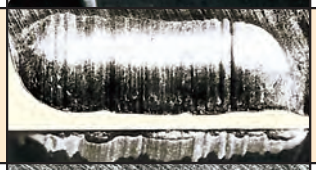
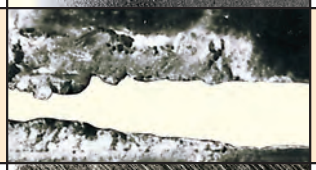
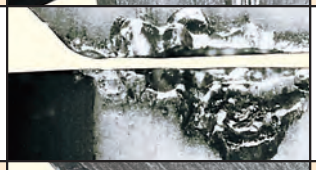
Power (Rate of Production / Motive Power) /Heat Flow Rate

W	kgf • m/s	PS	kcal/h
1	1.01972×10^{-1}	1.35962×10^{-3}	8.6000×10^{-1}
9.80665	1	1.33333×10^{-2}	8.43371
7.355×10^{2}	7.5×10	1	6.32529×10^{2}
1.16279	1.18572×10^{-1}	1.58095×10^{-3}	1

(Note) 1W=1J/s, PS:French horse power
1PS=0.7355kW
(By the enforcement act for the law of weights and measures)
1cal=4.18605J

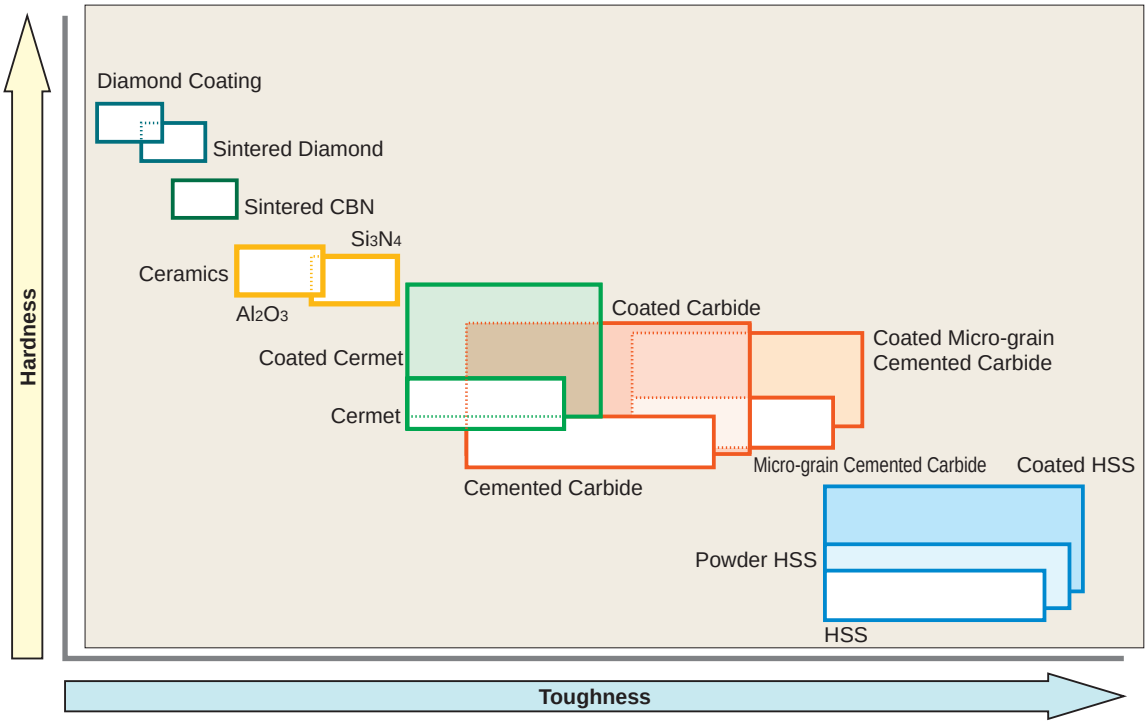
TOOL WEAR AND DAMAGE

CAUSES AND COUNTERMEASURES

Tool Damage Form		Cause	Countermeasure
Flank Wear		• Tool grade is too soft. • Cutting speed is too high. • Flank angle is too small. • Feed rate is extremely low.	• Tool grade with high wear resistance. • Lower cutting speed. • Increase flank angle. • Increase feed rate.
Crater Wear		• Tool grade is too soft. • Cutting speed is too high. • Feed rate is too high.	• Tool grade with high wear resistance. • Lower cutting speed. • Lower feed rate.
Chipping		• Tool grade is too hard. • Feed rate is too high. • Lack of cutting edge strength. • Lack of shank or holder rigidity	• Tool grade with high toughness. • Lower feed rate. • Increase honing. (Round honing is to be changed to chamfer honing.) • Use large shank size.
Fracture		• Tool grade is too hard. • Feed rate is too high. • Lack of cutting edge strength. • Lack of shank or holder rigidity.	• Tool grade with high toughness. • Lower feed rate. • Increase honing. (Round honing is to be changed to chamfer honing.) • Use large shank size.
Plastic Deformation		• Tool grade is too soft. • Cutting speed is too high. • Depth of cut and feed rate are too large. • Cutting temperature is high.	• Tool grade with high wear resistance. • Lower cutting speed. • Decrease depth of cut and feed rate. • Tool grade with high thermal conductivity.
Welding		• Cutting speed is low. • Poor sharpness. • Unsuitable grade.	• Increase cutting speed. (For JIS S45C, cutting speed 80m/min.) • Increase rake angle. • Tool grade with low affinity. (Coated grade, cermet grade)
Thermal Cracks		• Expansion or shrinkage due to cutting heat. • Tool grade is too hard. *Especially in milling.	• Dry cutting. (For wet cutting, flood workpiece with cutting fluid) • Tool grade with high toughness.
Notching		• Hard surfaces such as uncut surface, chilled parts and machining hardened layer. • Friction caused by jagged shape chips. (Caused by small vibration)	• Tool grade with high wear resistance. • Increase rake angle to improve sharpness.
Flaking		• Cutting edge welding and adhesion. • Poor chip disposal.	• Increase rake angle to improve sharpness. • Enlarge chip pocket.
Flank Wear Fracture *Damage for polycrystallines		• Damage due to the lack of strength of a curved cutting edge.	• Increase honing. • Tool grade with high toughness.
Crater Wear Fracture *Damage for polycrystallines		• Tool grade is too soft. • Cutting resistance is too high and causes high cutting heat.	• Decrease honing. • Tool grade with high wear resistance.

CUTTING TOOL MATERIALS

The table below shows the relationship between various tool materials, in relation with hardness on a vertical axis and toughness on a horizontal axis. Today, cemented carbide, coated carbide and TiC-TiN-based cermet are key tool materials in the market. This is because they have the best balance of hardness and toughness.

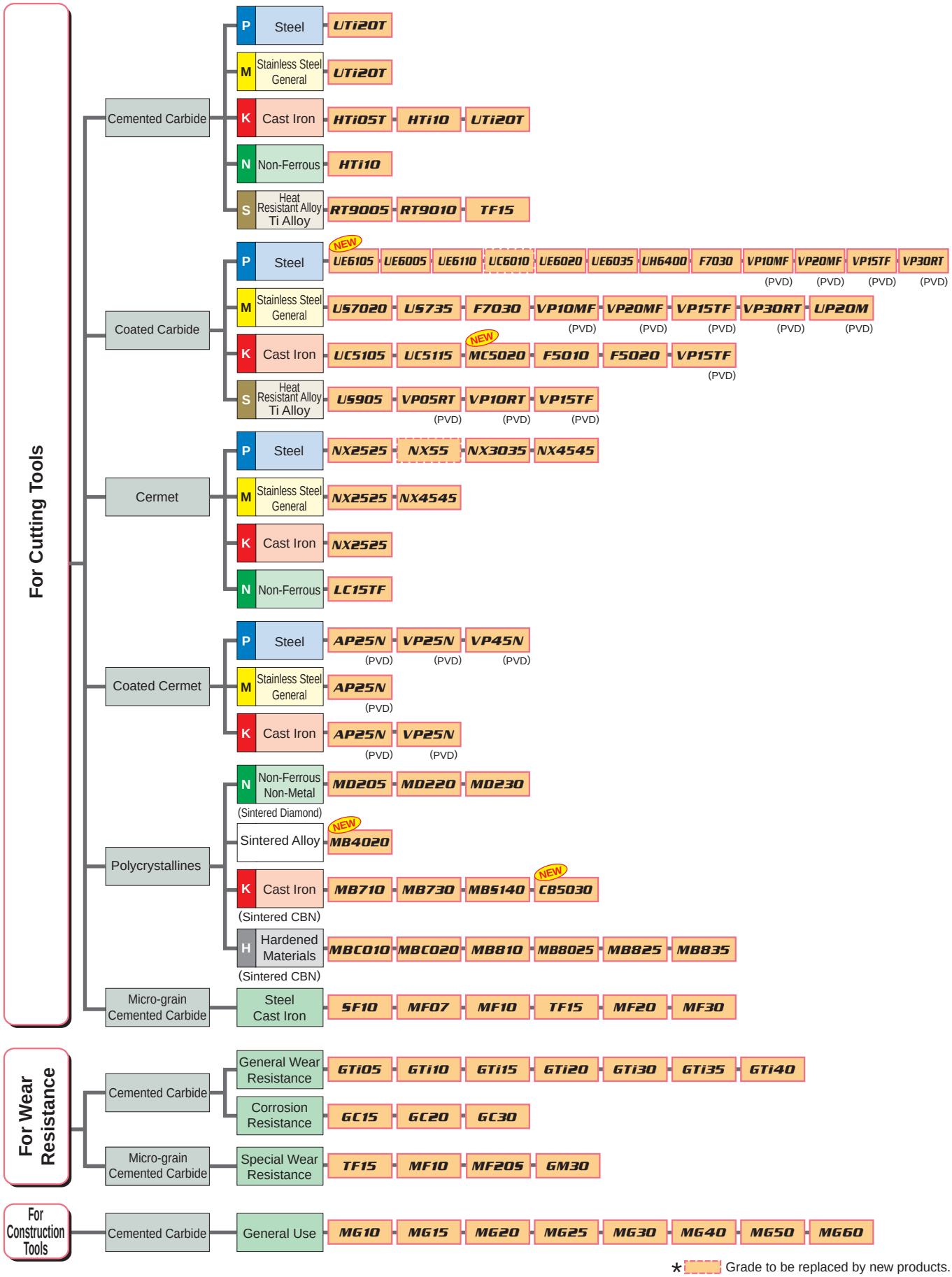


GRADE CHARACTERISTICS

Hard Materials	Hardness (Hv)	Energy Formation (kcal/g • atom)	Solubility in Iron (%.1250°C)	Thermal Conductivity (W/m • k)	Thermal Expansion ($\times 10^{-6}$/k) ✶	Tool Material
Diamond	>9000	—	Highly Soluble	2100	3.1	Sintered Diamond
CBN	>4500	—	—	1300	4.7	Sintered CBN
Si_3N_4	1600	—	—	100	3.4	Ceramics
Al_2O_3	2100	-100	≒0	29	7.8	Ceramics Cemented Carbide
TiC	3200	-35	<0.5	21	7.4	Cermet Coated Carbide
TiN	2500	-50	—	29	9.4	Cermet Coated Carbide
TaC	1800	-40	0.5	21	6.3	Cemented Carbide
WC	2100	-10	7	121	5.2	Cemented Carbide

✶ 1W/m • K=2.39×10^{-3}cal/cm • sec • °C

GRADE CHAIN



* Grade to be replaced by new products.

GRADES COMPARISON TABLE

CEMENTED CARBIDE

	ISO Classification	ISO Symbol	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Hitachi Tool	Sandvik	Kennametal	Seco Tools	Iscar
Turning	P	P01										
		P10		ST10P	TX10S		SRT	WS10	S1P	P10		IC70
		P20	UTi20T	ST20E	TX20 TX25		SRT DX30	EX35	SMA	K125M TTM		IC70 IC50M
		P30	UTi20T	A30 A30N	TX30 UX30	PW30	SR30 DX30	EX35 EX40	SM30	GK K600 TTR		IC50M IC54
		P40		ST40E	TX40		SR30 DX35	EX45	S6	G13		IC54
	M	M10		EH510 U10E	TU10		UMN	WA10B	H10A	K313	890	
		M20	UTi20T	EH520 U2	TU20 UX30		DX25 UMS	EX35	H13A	K68 KMF K125M TTM	HX 883	IC08
		M30	UTi20T	A30 A30N	UX30		DX25 UMS	EX40 EX45	H10F SM30	K600 TTR		IC08 IC28
		M40			TU40		UM40	EX45	S6	G13		IC128
	K	K01	HTi05T	H1 H2	TH03 KS05F		KG03	WH05	H1P	K605		
		K10	HTi10	EH10 EH510	G1F TH10	KW10	KG10 KT9	WH10	H1P H10 HM	K313 K110M THM THM-U	890	IC20
		K20	UTi20T	G10E EH20 EH520	G2F, KS15F G2, KS20	GW10	CR1 KG20	WH20	H13A	K715 KMF K600	890 HX 883	IC20 IC10
		K30	UTi20T	G10E	G3		KG30			THR	883	IC10 IC28
	N	N01		H1 H2	KS05F		KG03		H10 H13A	K605		
		N10	HTi10	EH10 EH510	TH10 H10T		KG10 KT9			K313 K110M THM THM-U	890 H15	
		N20		G10E EH20 EH520	KS15F		CR1 KG20			K715 KMF K600	HX KX 883 H15 H25	
		N30					KG30			G13 THR	H25	
	S	S01	RT9005				KG03					
		S10	RT9005 RT9010	EH10 EH510	KS05F TH10		FZ05 KG10		H10 H10A H10F H13A	K10 K313 THM	890	
		S20	RT9010 TF15	EH20 EH520	KS15F KS20		FZ15 KG20			K715 KMF	890 883 HX H25	
		S30	TF15				KG30			G13 K600 THR		
Milling	P	P10					SRT		S1P			
		P20	UTi20T	A30N	TX25		SRT DX30	EX35		K125		IC50M IC28
		P30	UTi20T	A30N	UX30	PW30	SR30 DX30	EX35 EX40		GX K600		IC50M IC28
		P40				PW30	SR30	EX45				IC28
	M	M10					UMN			K110M		
		M20	UTi20T	A30N			DX25 UMS	EX35		K313		
		M30	UTi20T	A30N	UX30		DX25 UMS	EX40 EX45		KFM K600		IC28
		M40			TU40			EX45				IC28
	K	K01	HTi05T				KG03					
		K10	HTi10	G10E	TH10	KW10	KG10	WH10	H1P	K110M K313		IC20
		K20	UTi20T	G10E			KT9 CR1 KG20	WH20		KFM	HX	IC20 IC10
		K30	UTi20T				KG30					IC10 IC28

(Note) The above table is selected from a publication. We have not obtained approval from each company.

GRADES COMPARISON TABLE

MICRO GRAIN

	ISO Classification	ISO Symbol	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Hitachi Tool	Sandvik	Kennametal	Seco Tools
Cutting Tools	Z	Z01	**SF10 MF07 MF10**	F0	F MD08F		FZ05 FB10	NM08	6UF 8UF PN90		
		Z10	**HTi10 MF20**	XF1 F1 AFU	M MD10 MD05F MD07F	FW30	FZ10 FZ15 FB15	NM15	H6FF 12UF		890
		Z20	**TF15 MF30**	AF0 SF2 AF1	MD15 EM10 MD20		FZ15 FB15 FB20	BRM20 EF20N	N6F H10F		890 883
		Z30		A1 CC	UM		FZ20 FB20	NM25			883

CERMET

	ISO Classification	ISO Symbol	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Hitachi Tool	Sandvik	Kennametal	Seco Tools	Iscar
Turning	P	P01	**AP25N**	T110A T2000Z	NS520 AT520 GT520 GT720	TN30 PV30	LN10 CX50					IC20N IC520N
		P10	**AP25N NX2525**	T1200A T2000Z	NS520 AT530 GT720 GT730	TN60 TN6010 PV60 PV7010	CX50 CX75 PX75	CZ25	CT5015 GC1525	KT315 TTI25	CM CMP	IC20N IC520N IC530N
		P20	**AP25N NX2525 NX3035**	T1200A T2000Z T3000Z	NS530 GT530 GT730 NS730	TN90 TN6020 PV90 PV7020	CX75 PX75 PX90	CH550	GC1525	KT5020 KT325		IC20N IC75T IC30N IC520N IC530N
		P30	**VP45N**	T3000Z	NS530 NS730		PX90			KT1120		IC75T IC30N
	M	M10	**NX2525 AP25N**	T110A T2000Z	NS520 AT530 GT530 GT720	TN60 TN6020 PV60 PV7020	LN10 CX50		GC1525	TTI25	CM CMP	
		M20	**NX2525 AP25N NX3035**	T1200A T2000Z	NS530 GT730 NS730	TN90 TN6020 PV90 PV7020	CX50 CX75	CH550				
		M30		T3000Z								
	K	K01	**AP25N NX2525**	T110A T2000Z	NS710 NS520 AT520 GT520 GT720	TN30 PV30 PV7005	LN10					
		K10	**AP25N NX2525**	T1200A T2000Z	NS520 GT530 GT730 NS730	TN60 TN6020 PV60 PV7020	LN10		CT5015	KT325 TTI25		
		K20	**AP25N NX2525**	T3000Z			CX75					
Milling	P	P10	**NX2525**			TN60	CX75				C15M	IC30N
		P20	**NX2525**		NS530	TN100M	CX75 CX90	CH550 CH7030 MZ1000 MZ2000	CT530	KT530M HT7 KT605M	C15M	IC30N
		P30	**NX4545**	T250A	NS530 NS540 NS740		CX90 CX99	MZ3000 CH7035				IC30N
	M	M10	**NX2525**			TN60						IC30N
		M20	**NX2525**		NS530	TN100M	CX75	CH550 CH7030 MZ1000 MZ2000	CT530	KT530M HT7 KT605M	C15M	IC30N
		M30	**NX4545**	T250A	NS540 NS740		CX90 CX99	MZ3000 CH7035				
	K	K01										
		K10	**NX2525**		NS530	TN60						
		K20	**NX2525**				CX75			KT530M HT7		

(Note) The above table is selected from a publication. We have not obtained approval from each company.

CVD COATED GRADE

	ISO Classification	ISO Symbol	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Hitachi Tool	Sandvik	Kennametal	Seco Tools	Iscar
Turning	P	P01	**UE6105 UE6005**	AC700G	T9005	CA5505	JC110V	HG8010 GM8015	GC4205 GC3005 GC4005	KCP05 KC9105	TP1500 TP1000	IC9150 IC8150
		P10	**UE6105 UE6005 UE6110 UC6010**	AC700G AC2000 AC820P	T9005 T9015	CA5505 CA5515	JC110V JC215V	HG8010 HG8025 GM8015	GC4215 GC3005 GC4015	KCP10 KCP25 KC9110	TP1500 TP2500 TP1000 TP2000	IC9150 IC9015 IC8150 IC8250
		P20	**UE6110 UE6020 UC6010**	AC2000 AC3000 AC820P AC830P	T9015 T9025	CA5515 CA5525 CA5025 CR9025	JC110V JC215V	HG8025 GM8020 GM25	GC4215 GC4225 GC4015 GC4025	KCP25 KC9125	TP2500 TP2000 TP200	IC8250 IC9025 IC9250 IC8350 IC9054
		P30	**UE6020 UE6035 UH6400 US735**	AC3000 AC630M AC830P	T9025 T9035	CA5525 CA5535 CR9025	JC215V JC325V	GM25 GM8035	GC4225 GC4235 GC4025 GC4035	KCP30 KCP40 KC8050	TP3000 TP300	IC8350 IC9350 IC656
		P40	**UE6035 UH6400 US735**	AC630M	T9035	CA5535	JC325V JC450V	GM8035 GX30	GC4235 GC4035 GC235	KCP30 KCP40 KC9140 KC9040 KC9240 KC9245	TP3000 TP40	IC635
	M	M10	**US7020**	AC610M	T9015	CA6515 CA6015	JC110V		GC2015	KCM15 KC9210	TM2000 TP200	IC9250
		M20	**US7020**	AC610M AC630M	T6020 T9025	CA6515 CA6525 CA6015	JC110V	HG8025 GM25	GC2025	KCM15 KC9225	TM2000 TP200	IC9250 IC9025 IC9054
		M30	**US735**	AC630M	T6030	CA6525		GM8035 GX30	GC235	KCM25 KC9230	TM4000 TP400 TP40	IC9025 IC9350
		M40	**US735**					GX30		KCM35 KC9240 KC9245	TM4000 TP400 TP40	IC635 IC656
	K	K01	**UC5105**	AC410K	T5105 T5010	CA4010	JC105V	HG3305	GC3205 GC3210	KCK05	TK1000	IC5005 IC5010 IC9150 IC9007 IC428 IC4028
		K10	**UC5115**	AC410K AC700G	T5115 T5010	CA4010 CA4115	JC105V JC110V	HG3315 HG8010	GC3205 GC3210 GC3115	KCK15 KCK20 KC9315	TK1000 TK2000	IC5005 IC5010 IC9150 IC418 IC9015 IC4010
		K20	**UC5115 UE6110**	AC700G AC820P	T5115 T5125 T5020	CA4120	JC110V JC215V	HG8025 GM8020	GC3215	KCK20 KC9325	TK2000	IC4010 IC9015
		K30	**UE6110**	AC820P	T5125		JC215	HG8025 GM8020		KC9325		
	S	S01	**US905**						S05F			
Milling	P	P10		ACP100			JC730U					IC9080 IC4100 IC9015
		P20	**FH7020 F7030**	ACP100			JC730U	GX2030	GC4220 GC4020		T200M T250M	IC5100 IC520M
		P30	**F7030**	ACP100 AC230	T3130 T3030			GX2030	GC4230 GC4030	KC930M	T250M T350M T25M	IC4050
		P40		AC230				GX2030 GX30 GF30	GC4240 GC4040	KC935M	T350M	
	M	M10										IC9250
		M20	**F7030**	ACP100			JC730U			KC925M	T250M T25M	IC520M IC9350
		M30	**F7030**	ACP100	T3130 T3030			GF30 GX30	GC2040	KC930M	T350M T25M	IC4050
		M40						GF30 GX30		KC930M KC935M		
	K	K01					JC600					IC9080
		K10	**MC5020 F5010**	AC211 ACK200	T1015		JC600					IC4100 IC5100 IC9150
		K20	**MC5020 F5020**	ACK200	T1015		JC610		GC3220 GC3020 K20W	KC915M	T250M T200M	IC520M DT7150
		K30					JC610	GX2030 GX30	GC3040	KC930M KC935M	T200M	IC4050

(Note) The above table is selected from a publication. We have not obtained approval from each company.

GRADES COMPARISON TABLE

PVD COATED GRADE

	ISO Classification	ISO Symbol	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Hitachi Tool	Sandvik	Kennametal	Seco Tools	Iscar
Turning	P	P01				PR915	JC5003					
		P10	VP10MF		AH710	PR915 PR930	JC5003			KC5010 KC5510	CP200	IC507
		P20	VP10RT VP20RT VP15TF VP20MF		AH710 AH330	PR630 PR915 PR930 PR660	JC5015	IP2000	GC1020 GC1025	KC5025	CP250	IC908 IC928 IC1008 IC1028
		P30	VP10RT VP20RT VP15TF VP20MF		GH330 GH730 AH120 AH330 AH740	PR630 PR660	JC5015	IP3000	GC1025 GC4125	K7010 K7020 K7235	CP500	IC928 IC1008 IC1028
		P40			AH120	PR660			GC1020 GC2145	K7030	CP500	IC928 IC1008 IC1028
	M	M01		AC510U EH510Z EH10Z		PR915						
		M10	VP10MF	AC520U EH510Z EH10Z		PR915 PR930	JC5003	IP050S	GC1005 GC1025	KC5010 KC5510	CP200	IC507 IC907
		M20	VP10RT VP20RT VP15TF VP20MF	AC520U EH520Z EH20Z	GH330 GH730	PR630 PR915 PR930	JC5015	IP100S	GC1020 GC1025 GC4125	KC5025 KC730 KC5525	CP200 CP500	IC354 IC3028
		M30	VP10RT VP20RT VP15TF VP20MF		AH120	PR630 PR660	JC5015		GC1020 GC2035	KC5025 KC5525	CP500	IC908 IC928 IC1008 IC1028
		M40		AC530U		PR660			GC2145			IC228 IC328
	K	K01		EH10Z	AH110		JC5003					
		K10		EH10Z	GH110 AH110		JC5003 JC5015			KC5010 KC5510	CP200	
		K20	VP10RT VP20RT VP15TF	EH20Z	AH120		JC5015		GC1020	KC7015	CP200 CP250	IC928 IC1008 IC908 IC22
		K30	VP10RT VP20RT VP15TF						GC4125	KC7225	CP500	IC928 IC1008 IC908 IC22
	S	S01	VP05RT		AH110	PR915	JC5003		GC1105			
		S10	VP05RT VP10RT VP20RT	AC510U EH510Z EH10Z	AH120	PR915	JC5015		GC1005 GC1025	KC5410 KC5010 KC5510	CP200 CP250 CP500	
		S20	VP10RT VP20RT VP15TF	AC520U EH20Z EH520Z		PR915			GC4125	KC5025 KC5525	CP250 CP500	
		S30	VP15TF						GC2145			
Milling	P	P01		ACP100			JC5003	PTH08M PCA08M PCS08M TB6005 JX1005				
		P10		ACZ310 ACP100		PR730 PR830	JC5003 JC5030	CY9020 PCA12M TB6005 JX1020 PC20M JP4020		KC715M		IC903 IC950
		P20	VP15TF	ACZ310 ACZ330 ACP200		PR630 PR730 PR830 PR660	JC5015 JC5030 JC5040	TB6020 CY150 CY15 JX1015	GC1025	KC522M KC525M	F25M	IC950 IC900 IC908 IC910
		P30	VP15TF VP30RT	ACZ330 ACZ350 ACZ200	GH330 AH330 AH120 AH740	PR630 PR660 PR730 PR830	JC5015 JC5040	TB6045 CY250 CY25 HC844 JX1045 PTH30E	GC1030	KC725M	F25M F30M	IC900 IC928 IC300 IC328
		P40	VP30RT	ACZ350 ACP300	AH120	PR660	JC5040	PTH30E TB6060 PTH40H JX1060 GF30 GX30		KC735M	F40M T60M	IC900 IC928 IC300 IC328
	M	M01						PCS08M				
		M10				PR630 PR730 PR830	JC5003	CY9020 JX1020	GC1025	KC715M		
		M20	VP15TF VP20RT	ACZ310 EH20Z	GH330	PR630 PR730 PR830 PR660	JC5015 JC5030 JC5040 JC4015	TB6020 CY150 CY15 JX1015	GC2030	KC522M KC525M	F25M	IC900 IC903 IC908 IC928
		M30	VP15TF VP20RT VP30RT	ACZ330 EH20Z ACZ350	AH120	PR630 PR660 PR730 PR830	JC5015 JC5030 JC5040 JC4015	TB6045 CY250 CY25 HC844 JX1045	GC2030	KC725M KC735M	F30M F40M	IC928 IC328
		M40	VP30RT	ACZ350	AH140	PR660	JC5015	TB6060 PTH40H JX1060 GF30 GX30			F40M	IC928 IC328
	K	K01			AH110	PR510 PR905	JC5003	PTH08M PCA08M PCS08M				
		K10		ACZ310 ACK200	AH110 GH110	PR510 PR905	JC5003	CY9020 TB6005 CY100H CY10H		KC510M		IC900 IC910
		K20	VP15TF VP20RT	ACZ310 ACK200	AH120	PR510 PR905	JC5015	TB6020 CY150 CY15 PTH13S JX1015		KC520M KC525M		IC910 IC950
		K30	VP15TF VP20RT	ACZ330 ACK300			JC5015	TB6045 CY250 CY25 PTH40H PTH30E JX1045		KC725M KC735M		IC908 IC950 IC928
	S	S01					JC5003					
		S10	VP15TF		AH120	PR660	JC5015	PCS08M		KC510M		IC908
		S20	VP15TF			PR660		CY100H CY10H	GC1025	KC522M KC525M		IC908
		S30				PR660			GC2030	KC725M	F40M	IC328 IC928
	H	H01					JC5003					
		H10	VP15TF				JC5015	PTH08M PCA08M JX1005 TB6005		KC635M	F15M	
		H20	VP15TF							KC635M	F15M	
		H30								KC530M	F30M	

(Note) The above table is selected from a publication. We have not obtained approval from each company.

CBN

	ISO Classification	ISO Symbol	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Sandvik	Seco Tools	Element Six
Turning	H	H01	**MBC010 MB810**	BNC100 BNX10	BX310 BXC30	KBN10B KBN10N			CBN100 CBN100P CBN050C	
		H10	**MBC020 MB8025**	BNC160 BNX20	BX330 BXA30	KBN510 KBN10C KBN25C	JBN300	CB7015 CB7020	CBN150	DCC500
		H20	**MBC020 MB8025 MB825**	BN250 BNC200 BNX25	BX360 BXA40	KBN525 KBN10M KBN25M	JBN245	CB7050	CBN200	DCN450
		H30	**MBC020 MB835**	BNC300 BN350	BX380 BXC50	KBN900			CBN350	DCX650
	S	S01	**MB730**	BN700	BX950 BX450 BX480	KBN65M				
		S10								
		S20								
		S30								
	K	K01	**MB710**	BN500	BX930	KBN65B				
		K10	**MB710 MB730**	BN700	BX470 BX480 BX950	KBN900	JBN795	CB7050	CBN200	DBC80
		K20	**MB730 MBS140 CB5030**	BN700 BNS800	BX90S BXC90		JBN330		CBN300	DBS900
		K30	**MBS140 CB5030**	BNS800	BXC90					
	Sintered Alloy		**MB4020**	BN700	BX480					

PCD

	ISO Classification	ISO Symbol	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Sandvik	GE	Element Six
Turning	N	N01	**MD205**	DA90	DX180	KPD025	JDA735		1700	CTH025
		N10	**MD205 MD220**	DA150	DX160	KPD010	JDA745	CD10	1500	CTB010
		N20	**MD220 MD230**	DA200 DA2200	DX140 DX120	KPD002	JDA715 JDA10		1300	CTB002
		N30	**MD230**	DA1000		KPD001			1600	

(Note) The above table is selected from a publication. We have not obtained approval from each company.

INSERT CHIP BREAKER COMPARISON TABLE

NEGATIVE INSERT TYPE

ISO Classification	Cutting Mode	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Hitachi Tool	Sandvik	Kennametal	Seco Tools
P	Finish	PK* FH FY	 FA FL	01* TF ZF	DP* GP, VF XP, XP-T		FE	QF	UF, FF	FF1
	Light	C SA SH	SU LU SX	 NS, 27 TSF, TS	 HQ, CQ	PF UR UA, UT	 BE BH, CE	 PF MF	 LF, FN	 MF2
	Light (Mild Steel)	SY		17	XQ, XS					
	Light (With Wiper)	SW	LUW	AFW, ASW	WP, WQ			WP, WF	FW	W-MF2
	Medium	MP, MV MA MH	GU UG GE, UX	NM, ZM, AS TM DM, 37	CJ, GS PS, HS PT, CS	 PG UB	CT, AB AH AY, AE	PM QM SM	 MG, MN	MF3 MF5, M3 M5
	Medium (With Wiper)	MW	GUW					WMX, WM	MW	W-M3
	Semi Heavy	GH	MU, MX	TH	PH GT, HT	UD, GG	AR, RE	PR	RN	MR7
	Heavy	HZ HX HV	MP HG, HP	57 65, TU	PX HX	UC	TE, UE HX HE, H	QR, PR HR	MR RM, RH	R4, R6 R7 RR9
M	Finish Light	SH	SU	SS	MQ, GU		MP, SE	MF	K, FP	
	Medium	MS ES	EX, UP	SA, SM S	MS, MU SU, HU ST	SF SG	PV, DE	MM	P, MP	MF4
	Heavy	GH HZ	MP					MR MR	RP	M5, MR7 56, R6
K	Finish Light	MA	UZ	CF	Std.		VA	KF	FN	M4
	Medium	Std.	GZ, UX	CM, 33, Std.	C, ZS, GC		V	KM	Std., UN	
	Heavy	Flat Top	Flat Top	CH, Flat Top	Flat Top			KR		
S	Finish	FJ*							FS, K	MF1
	Light	MJ, MJ*	SU*		TK					
	Medium	MS		SA				○NGP*, 23	○NGP*	M1
	Heavy	GJ						SR	MS	

*Peripheral ground type insert.

(Note) Above charts are based on published data and not authorized by each manufacturer.

7°POSITIVE INSERT TYPE

ISO Classification	Cutting Mode	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Hitachi Tool	Sandvik	Kennametal	Seco Tools
P	Finish	SMG*	FC*, SC*	JS*, 01*	CF*, CK*, GQ*			UM*	LF*	
	Finish Light	FV, SV	FP, LU, SU, SK	PF, PS	GP, XP, VF		JQ	UF, PF	11, UF, LF	FF1, F1
	Light (With Wiper)	SW	LUW					WK*, WF, WP	FW	W-F1
	Medium	MV, Std.	MU	23, PM, 24	HQ, XQ, GK	FT	JE	UM, PM	MF	F2
	Medium (With Wiper)	MW						WM	MW	
M	Finish Light	SV		SS*			MP	MF		
	Medium	Std.						MM		
K	Medium	Flat Top	Flat Top*	Flat Top	Flat Top*	FT		KF, KM, KR		
N	Medium	AZ*	AG*, AW*	AL*	AH*	ASF*, ALU*, ACB*		AL*	HP*	AL*
S	Finish Light	FJ*	SC*						LF*, HP*	

*Peripheral ground type insert.
(Note) Above charts are based on published data and not authorized by each manufacturer.

11°POSITIVE INSERT TYPE

ISO Classification	Cutting Mode	Mitsubishi Carbide	Sumitomo Electric	Tungaloy	Kyocera	Dijet	Hitachi Tool	Sandvik	Kennametal	Seco Tools
P	Finish Light	SV	FK, LU, SU	01*, PF, PS	GP, XP		JQ	PF	UF, LF	
	Medium	MV	MU	PM, 23, 24	HQ, XQ		JE	PM	MF	
M	Finish Light	SV		SS*			MP	MF		
	Medium	MV						MM		

*Peripheral ground type insert.
(Note) Above charts are based on published data and not authorized by each manufacturer.

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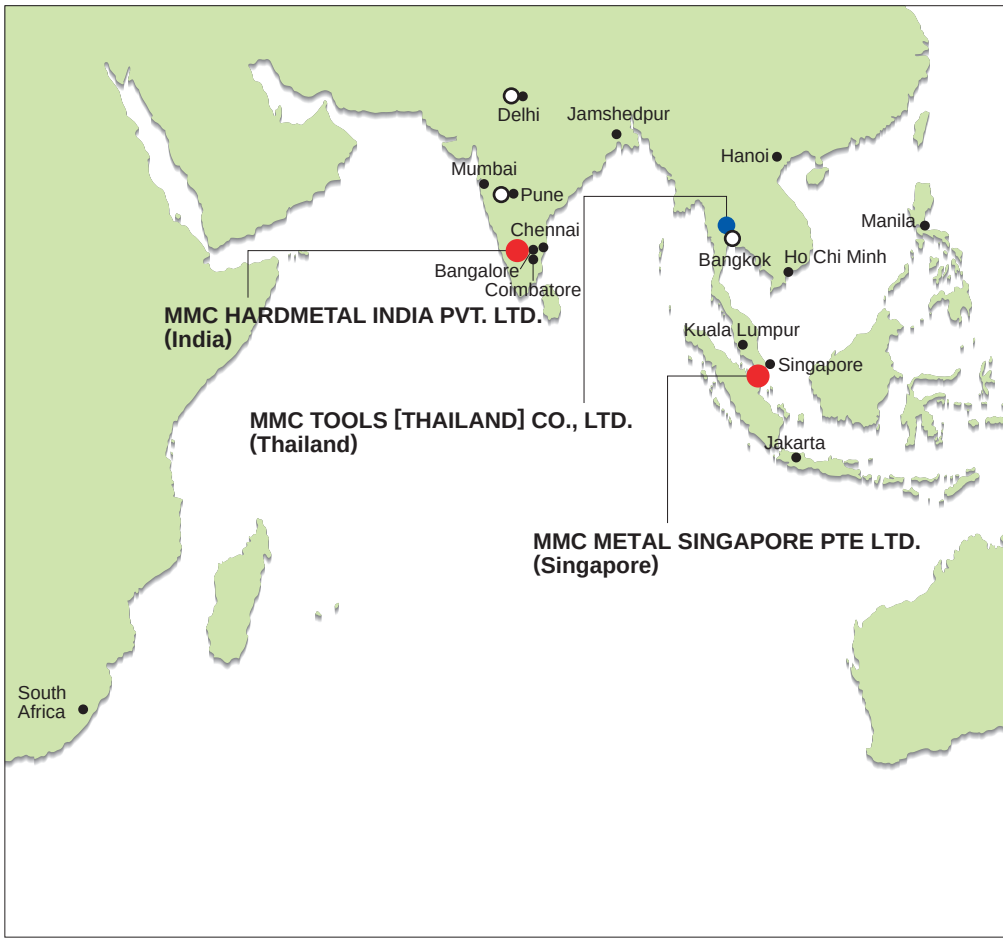

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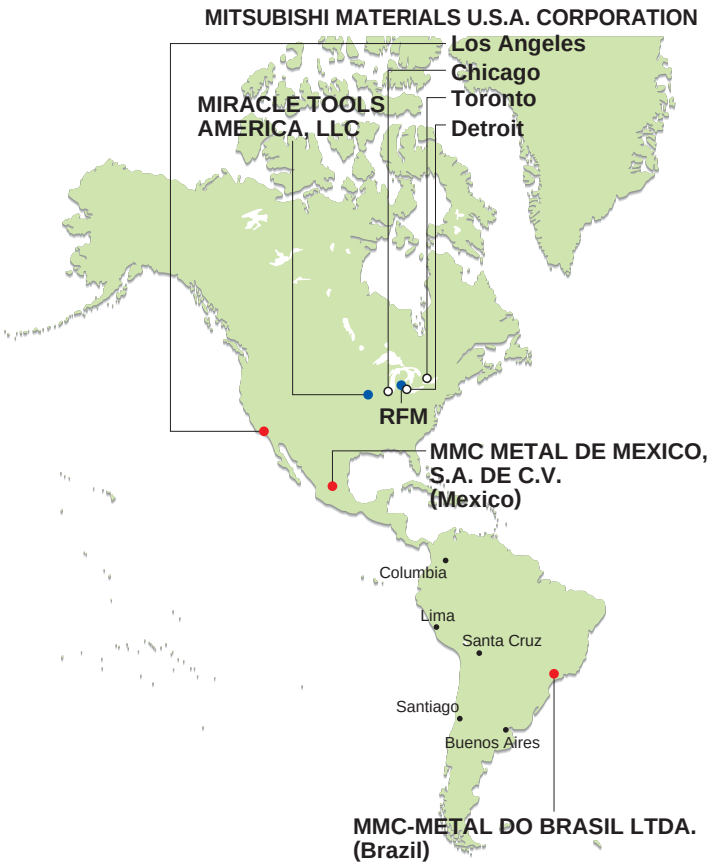

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	MSR MARKETING SDN BHD.	TEL +60-3-8941-0018 FAX +60-3-8945-0187
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Philippines	**SHIMEX TRADING, INC.**	TEL +63-2-810-2991 FAX +63-2-892-1867
Singapore	**JEP INDUSTRADES PTE LTD.**	TEL +65-6241-2522 FAX +65-6241-2131
	MSR PTE LTD.	TEL +65-6746-5755 FAX +65-6741-5655
South Africa	**MULTITRADE DISTRIBUTORDS**	TEL +27-11-453-8034 FAX +27-11-453-9696
Thailand	**MATERIALS CARBIDE CO.,LTD.**	TEL +66-2-370-1599 FAX +66-2-370-1303
Vietnam	**M.M.V.CO.,LTD**	TEL +84-8-920-3323 FAX +84-8-837-4541

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