MITSUBISHI
MITSUBISHI MATERIALS

TOOLS NEWS

2008.10 Update B093G

Coated CBN Grade for Hardened Steel

MBC020

Expanded Inserts

Exceptional wear and fracture resistance

Superior grade for machining hardened materials

- Using ***MIRACLE***® coating technology.
- A wide variety of honing types suitable for continuous to light interrupted cutting.
- Single sided, multi-corner types included.
- New breaker insert series for superior chip control now available.
- Corner R0.2 inserts now added to NP-TNGA and NP-VNGA types.
  The series now available for use in a wider range of machining applications.

Coated CBN Grade for Hardened Steel

MBC020

Features

MBC020 is a general purpose coated CBN grade suitable for continuous turning to light interrupted machining of hardened steel. The combination of high cutting edge rigidity and a coating for higher wear resistance allows MBC020 to cover a wider range of machining applications than conventional CBN grades.

Coating for Higher Wear Resistance

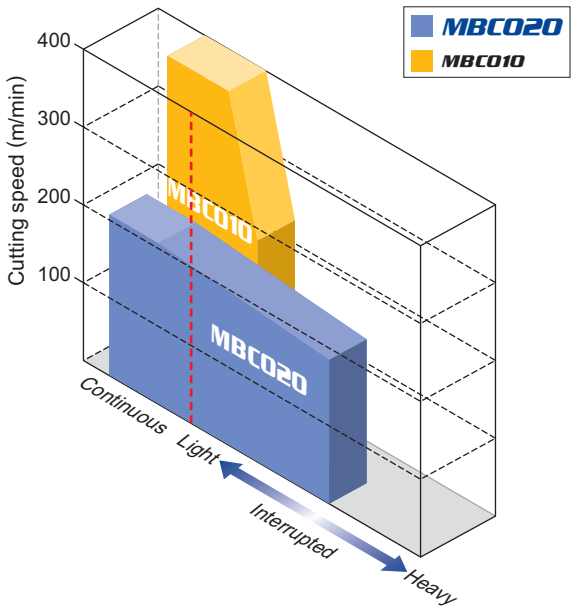
A special new coating, originating from MIRACLE technology, is used for MBC020.
This coating technology gives superb wear resistance for machining hardened steels.

Tougher Cutting Edge

MBC020 utilises a “Particle-activated Sintering Method” during the manufacturing process.
As a result, the cutting edge toughness has been increased and also provides superior wear resistance.

Application Range

MBC020 further expands the application range of high efficiency machining.



Recommended Cutting Conditions

Work Material	Cutting Mode	Cutting Speed (m/min) 100 200 300	Feed (mm/rev)	Depth of Cut (mm)	Coolant
Hardened Steel (Tempered steel)	Continuous cutting		−0.5	−0.5	Wet, Dry
	Interrupted cutting		−0.2	−0.3	

Why is a high hardness CBN grade coated using MIRACLE coating technology?

MBC020 is a new coated type CBN to compliment the exisiting MBC010 grade. By applying a coating to the substrate, MBC020 can obtain a higher wear resistance.

Why does a coating on a high hardness CBN grade increase wear resistance?

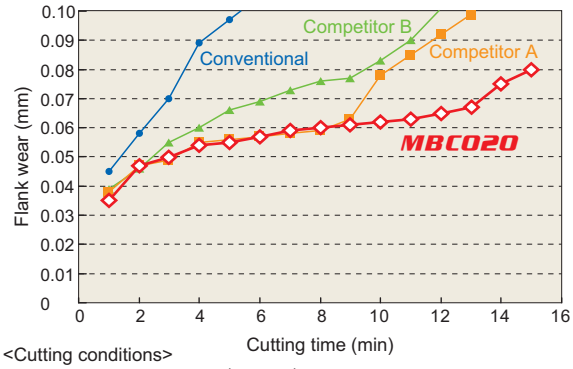
CBN has a hardness value second only to diamond. Taking advantage of this feature, CBN tools are able to withstand high temperatures when machining hardened steels.

However, for MBC020, MIRACLE coating technology has been used and covers the CBN with a highly heat-resistant ceramic coating layer that maximises the hardness properties. As a result, MBC020 displays a higher wear resistance than uncoated CBN inserts of the same grade.

MBC020 elevating speed and efficiency to a higher level

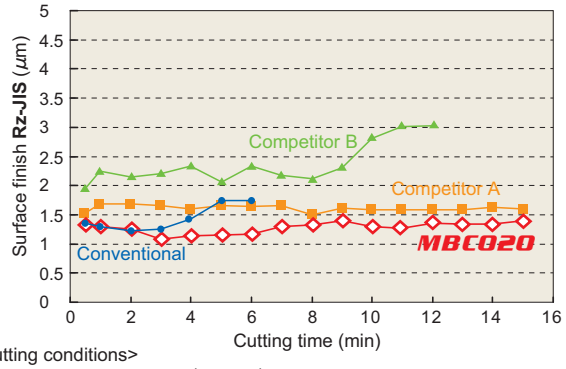
Cutting Performance

Wear resistance



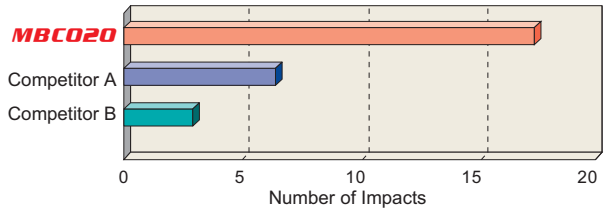
<Cutting conditions>
Workpiece : JIS SCr420(60HRC)
Insert : NP-CNGA120408GA4
Cutting speed: 220m/min
Feed : 0.1mm/rev
Depth of cut: 0.1mm
Continuous cutting (Dry)

Surface finish

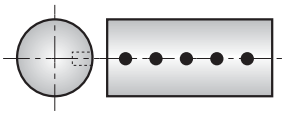


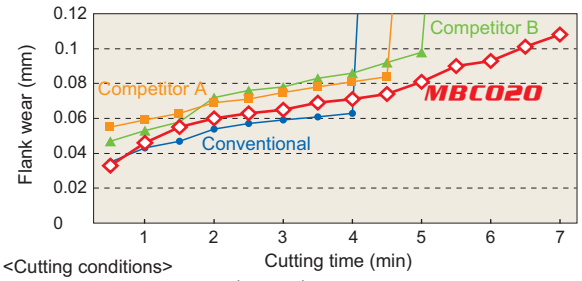
<Cutting conditions>
Workpiece : JIS SCr420(60HRC)
Insert : NP-CNGA120408GA4
Cutting speed: 220m/min
Feed : 0.1mm/rev
Depth of cut: 0.1mm
Continuous cutting (Dry)

Toughness

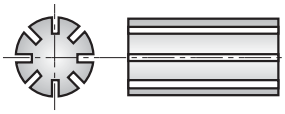


<Cutting conditions>
Workpiece : JIS SCr420(60HRC)
With hole
Insert : NP-CNGA120408GA4
Cutting speed: 120m/min
Feed : 0.15mm/rev
Depth of cut : 0.15mm
Interrupted cutting (Dry)



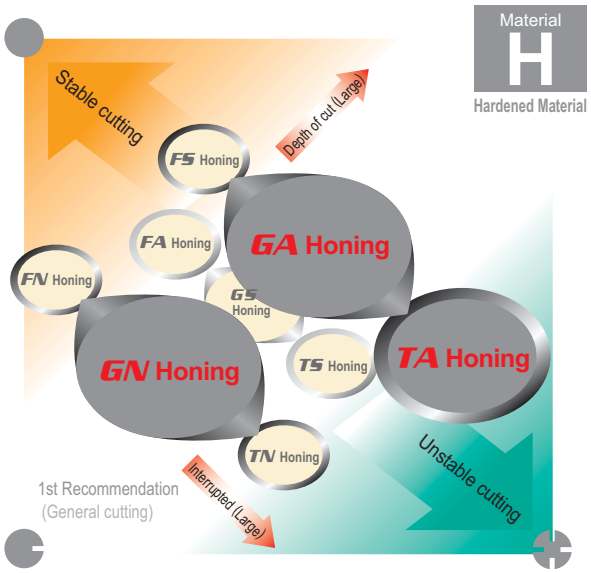


<Cutting conditions>
Workpiece : JIS SCM415(60HRC)
8 Grooves
Insert : NP-CNGA120408GA4
Cutting speed: 200m/min
Feed : 0.1mm/rev
Depth of cut : 0.1mm
Interrupted cutting (Dry)



A Wide Variety of Edge Preparation Forms (Honing types)

Cutting performance of CBN tools greatly depends on the type of edge preparation (honing). To make tools available with the optimum edge honing, Mitsubishi's CBN insert series offers an additional 6 types of edge honing based on the 3 conventional honing types, namely F (for continuous cutting), G (for general purpose) and T (for interrupted cutting). For MBC020, to maximize the benefits of its grade properties, three honing types, GA (for general purpose), GN (for general purpose & for less crater wear) and TA (for interrupted cutting) are offered as standard.



Please select GA honing if the major application is continuous to light interrupted cutting, and select TA honing if the major application is interrupted cutting.

MBC020

Features of Breaker Inserts

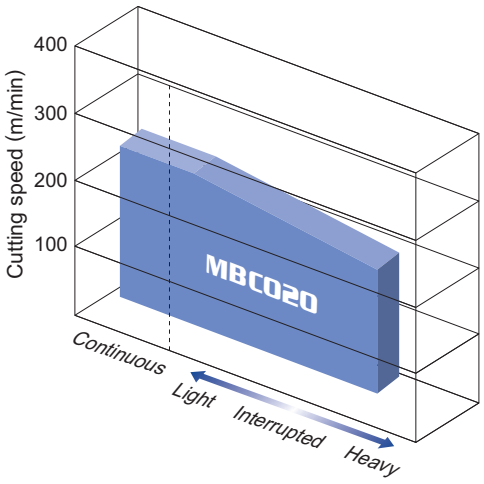
Chip Breaker Geometry Designed for Excellent Chip Control

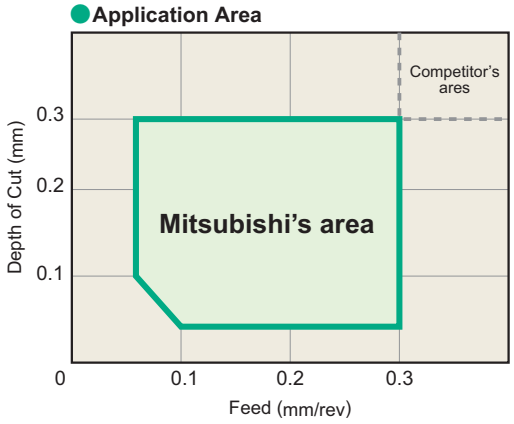
R-shaped chip breaker ensures optimization of the cutting point and the chip breaker position. Enables effective chip discharge even when copying and prevents the chips from wrapping around the holder under the cutting conditions for finishing.

Long Life Coated CBN Grade

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

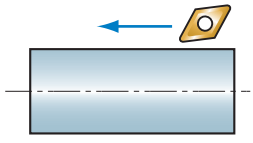
Application Range





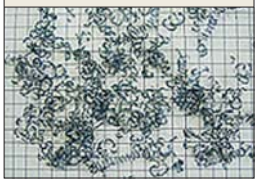
Cutting Performance of Breaker Inserts

External cutting



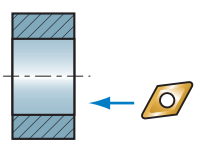
<Cutting Conditions>
Workpiece : JIS SCr420H(55HRC)
Insert : BF-CNGG120408TA4
Cutting Speed: 100m/min
Feed : 0.2mm/rev
Depth of Cut : 0.1mm
Dry

Mitsubishi's breaker



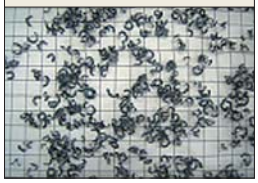
Competitor's breaker

Internal cutting

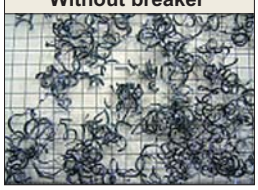


<Cutting Conditions>
Workpiece : JIS SCM420H(60HRC)
Insert : BF-CCGT09T308TA2
Cutting Speed: 120m/min
Feed : 0.2mm/rev
Depth of Cut : 0.3mm
Dry

Mitsubishi's breaker



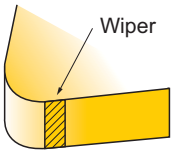
Without breaker



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 shorten machining times but also make it possible to combine roughing and finishing operations.

Increased Tool Life
When changing 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.

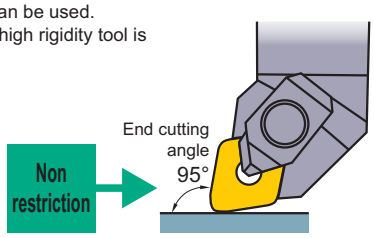
Improving Chip Control
Under high feed conditions, the chips generated become thicker and are more easily broken, thus, chip control is improved.

Operational Guidance

When using NP-CNGA / NP-CCGW types

No restriction for holders

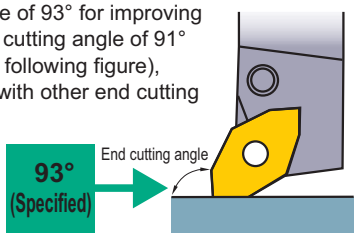
Standard holders can be used.
(*A double clamp, high rigidity tool is recommended.)



When using NP-DNGA type

Restriction for holders

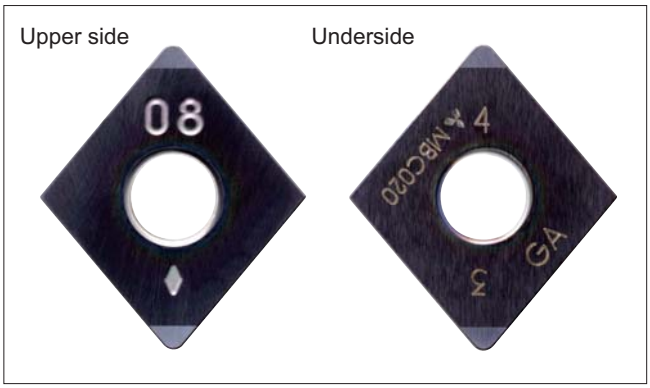
Use a holder with an end cutting angle of 93° for improving wiper efficiency. A holder with an end cutting angle of 91° can improve wiper efficiency (see the following figure), however, there is no wiper efficiency with other end cutting angles (60°, 90°, 107°etc.).



Multi-corner Type Inserts

- Single sided negative inserts are now included.
- The same honing types are available for both single and double sided multi-corner inserts.

Double sided, multi-corner type insert



Single sided, multi-corner type insert

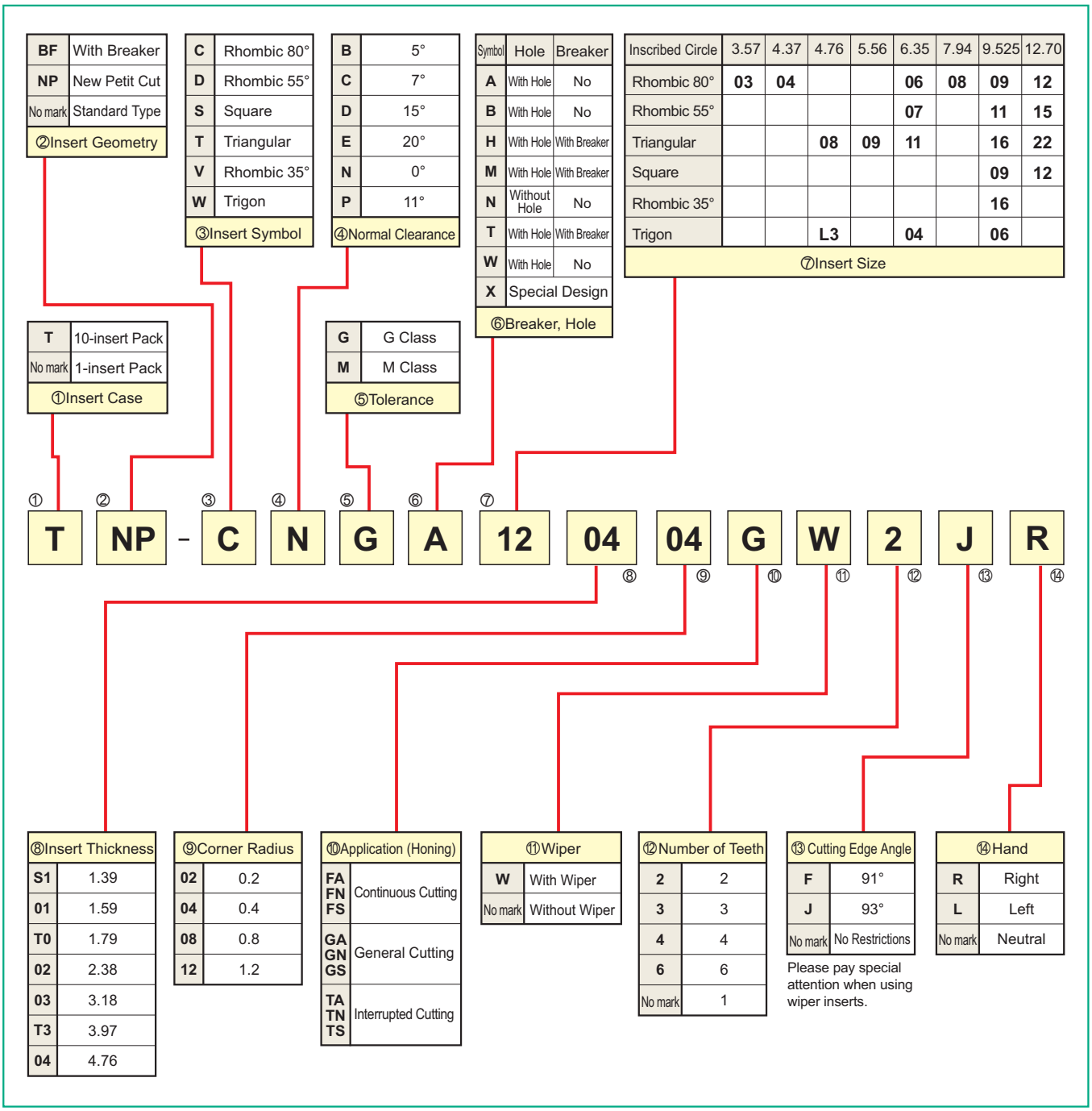
- A single sided, multi-corner type insert has no cutting edges on the underside. The type of grade is stamped on the upper side.

Small Corner Radius Inserts

- Corner R0.2 inserts now added to NP-TNGA and NP-VNGA types. Making it suitable for the machining of small work corner radii.

MBC020

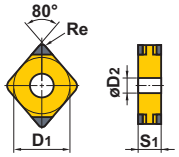
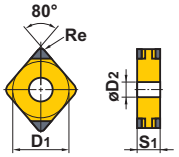
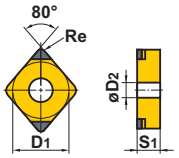
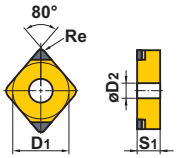
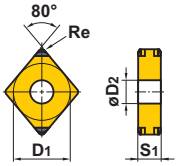
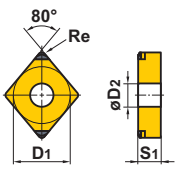
IDENTIFICATION(CBN AND PCD)



Note) There are exceptions to the identifications mentioned above.

Inserts

●Negative Inserts

Shape	Order Number	Stock	Dimensions (mm)				Geometry	Holders
			D1	S1	Re	D2		
NEW PETIT CUT  Multi-corner Type Double Sided	**NP-CNGA120404GA4**	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head LL cartridge
	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 (Wiper) ∗1  Multi-corner Type Double Sided	**NP-CNGA120404GAW4**	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head LL cartridge
	120408GAW4	●	12.7	4.76	0.8	5.16		
	120412GAW4	●	12.7	4.76	1.2	5.16		
NEW PETIT CUT  Multi-corner Type Single Sided	**NP-CNGA120404GA2**	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head LL cartridge
	120408GA2	●	12.7	4.76	0.8	5.16		
	120412GA2	●	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		
	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		
NEW PETIT CUT (Wiper)  Multi-corner Type Single Sided	**NP-CNGA120404GAW2**	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head LL cartridge
	120408GAW2	●	12.7	4.76	0.8	5.16		
	120412GAW2	●	12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Breaker)  Multi-corner Type Double Sided	**BF-CNGG120404TA4**	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head LL cartridge
	120408TA4	●	12.7	4.76	0.8	5.16		
	120412TA4	●	12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Breaker)  Multi-corner Type Single Sided	**BF-CNGM120404TA2**	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head LL cartridge
	120408TA2	●	12.7	4.76	0.8	5.16		
	120412TA2	●	12.7	4.76	1.2	5.16		

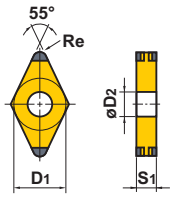
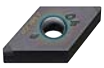
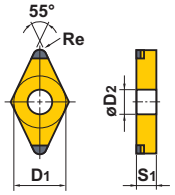
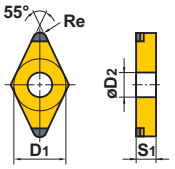
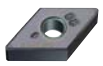
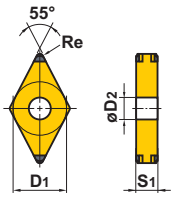
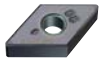
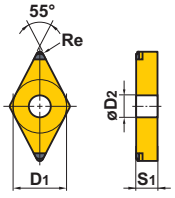
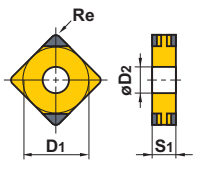
∗1 Please refer to page 4 before using wiper inserts.

● : Inventory maintained.

MBC020

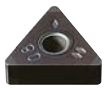
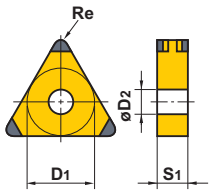
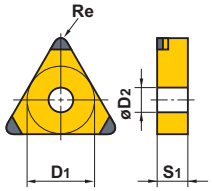
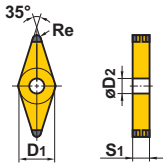
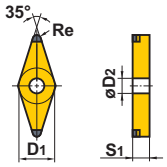
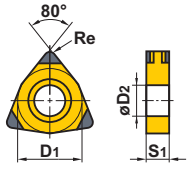
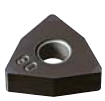
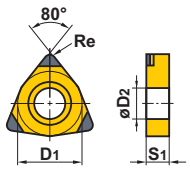
Inserts

●Negative Inserts

Shape	Order Number	Stock	Dimensions (mm) D1	S1	Re	D2	Geometry	Holders
NEW PETIT CUT  Multi-corner Type Double Sided	NP-DNGA150404GA4	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head
	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  Multi-corner Type Single Sided	NP-DNGA150404GA2	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head
	150408GA2	●	12.7	4.76	0.8	5.16		
	150412GA2	●	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		
	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		
NEW PETIT CUT (Wiper) *1  Multi-corner Type Single Sided	NP-DNGA150404GAW2JR	●	12.7	4.76	0.4	5.16	 Right hand holder shown.	LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head
	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)  Multi-corner Type Double Sided	BF-DNGG150404TA4	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head
	150408TA4	●	12.7	4.76	0.8	5.16		
	150412TA4	●	12.7	4.76	1.2	5.16		
NEW PETIT CUT (With Breaker)  Multi-corner Type Single Sided	BF-DNGM150404TA2	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder Double clamp dimple bar P type boring bar D type boring head
	150408TA2	●	12.7	4.76	0.8	5.16		
	150412TA2	●	12.7	4.76	1.2	5.16		
NEW PETIT CUT  Multi-corner Type Double Sided	NP-SNGA120404GA4	●	12.7	4.76	0.4	5.16		LL holder Double clamp holder ML holder Double clamp dimple bar P type boring bar LL cartridge
	120408GA4	●	12.7	4.76	0.8	5.16		
	120412GA4	●	12.7	4.76	1.2	5.16		

*1 Please refer to page 4 before using wiper inserts.

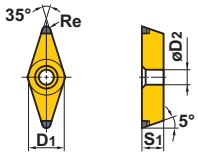
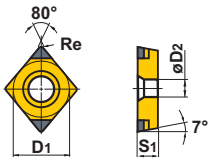
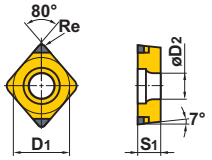
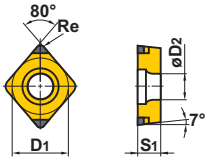
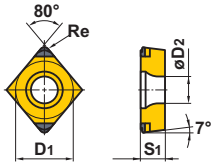
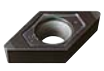
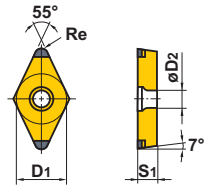
● : Inventory maintained.

Shape	Order Number	Stock	Dimensions (mm)				Geometry	Holders
			D1	S1	Re	D2		
NEW PETIT CUT  Multi-corner Type Double Sided	**NP-TNGA160404GA6**	●	9.525	4.76	0.4	3.81		LL holder Double clamp holder ML holder WP holder Double clamp dimple bar P type boring bar D type boring head LL cartridge
	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  Multi-corner Type Single Sided	NEW **NP-TNGA160402GA3**	●	9.525	4.76	0.2	3.81		LL holder Double clamp holder ML holder WP holder Double clamp dimple bar P type boring bar D type boring head LL cartridge
	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		
	NEW **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		
	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		
NEW PETIT CUT  Multi-corner Type Double Sided	**NP-VNGA160404GA4**	●	9.525	4.76	0.4	3.81		Double clamp holder MP holder Double clamp dimple bar D type boring head
	160408GA4	●	9.525	4.76	0.8	3.81		
NEW PETIT CUT  Multi-corner Type Single Sided	NEW **NP-VNGA160402GA2**	●	9.525	4.76	0.2	3.81		Double clamp holder MP holder Double clamp dimple bar D type boring head
	160404GA2	●	9.525	4.76	0.4	3.81		
	160408GA2	●	9.525	4.76	0.8	3.81		
	NEW **160402GN2**	●	9.525	4.76	0.2	3.81		
NEW PETIT CUT  Multi-corner Type Double Sided	**NP-WNGA080408GA6**	●	12.7	4.76	0.8	5.16		LL holder Double clamp holder MP holder Double clamp dimple bar D type boring head
NEW PETIT CUT  Multi-corner Type Single Sided	**NP-WNGA080408GA3**	●	12.7	4.76	0.8	5.16		LL holder Double clamp holder MP holder Double clamp dimple bar D type boring head

MBC020

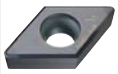
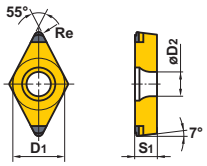
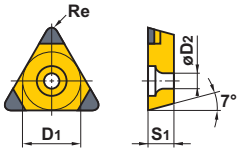
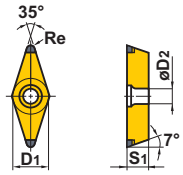
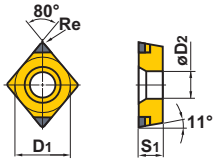
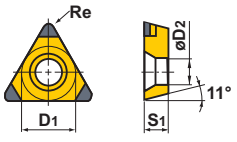
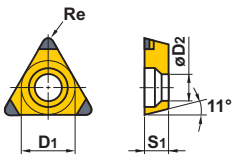
Inserts

●Positive inserts

Shape	Order Number	Stock	Dimensions (mm) D1	S1	Re	D2	Geometry	Holders
NEW PETIT CUT  Multi-corner Type Single Sided	NP-VBGW160404GA2	●	9.525	4.76	0.4	4.43		Dimple bar
	160408GA2	●	9.525	4.76	0.8	4.43		
NEW PETIT CUT  Multi-corner Type Single Sided	NP-CCGB060204GA2	●	6.35	2.38	0.4	2.8		Dimple bar
NEW PETIT CUT  Multi-corner Type Single Sided	NP-CCGW060202GA2	●	6.35	2.38	0.2	2.8		SP holder Small tools S type boring bar
	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		
	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		
NEW PETIT CUT (Wiper) *1  Multi-corner Type Single Sided	NP-CCGW09T308GAW2	●	9.525	3.97	0.8	4.4		SP holder Small tools S type boring bar
NEW PETIT CUT (With Breaker)  Multi-corner Type Single Sided	BF-CCGT09T304TA2	●	9.525	3.97	0.4	4.4		SP holder Small tools S type boring bar
	09T308TA2	●	9.525	3.97	0.8	4.4		
NEW PETIT CUT  Multi-corner Type Single Sided	NP-DCGW070202GA2	●	6.35	2.38	0.2	2.8		SP holder Small tools Dimple bar S type boring bar
	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		
	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		

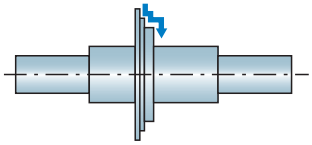
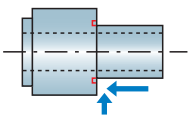
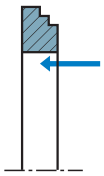
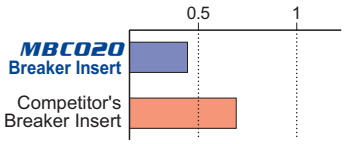
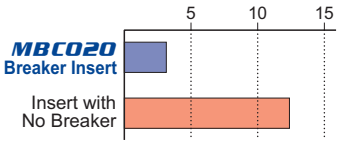
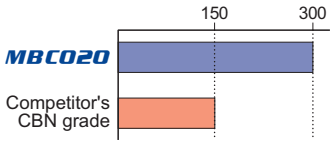
*1 Please refer to page 4 before using wiper inserts.

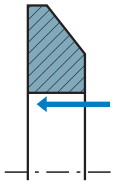
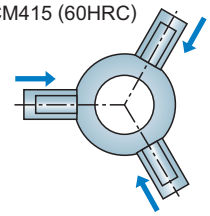
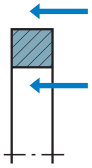
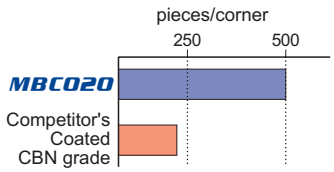
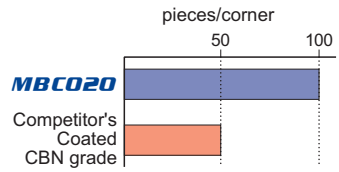
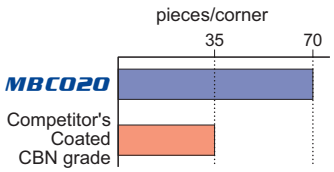
● : Inventory maintained. □ : Non stock, produced to order only.

Shape	Order Number	Stock	Dimensions (mm)				Geometry	Holders
			D1	S1	Re	D2		
NEW PETIT CUT (With Breaker)  Multi-corner Type Single Sided	**BF-DCGT11T304TA2**	●	9.525	3.97	0.4	4.4		SP holder Small tools Dimple bar S type boring bar
	11T308TA2	●	9.525	3.97	0.8	4.4		
NEW PETIT CUT  Multi-corner Type Single Sided	**NP-TCGW090202GA3**	●	5.56	2.38	0.2	2.5		SP holder S type boring bar
	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		
NEW PETIT CUT  Multi-corner Type Single Sided	**NP-VCGW160404GA2**	●	9.525	4.76	0.4	4.4		SP holder S type boring bar
	160408GA2	●	9.525	4.76	0.8	4.4		
NEW PETIT CUT  Multi-corner Type Single Sided	**NP-CPGB080204GA2**	●	7.94	2.38	0.4	3.5		Dimple bar
	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  Multi-corner Type Single Sided	**NP-TPGB080204GA3**	●	4.76	2.38	0.4	2.4		Dimple bar
	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  Multi-corner Type Single Sided	**NP-TPGX080202GA3**	□	4.76	2.38	0.2	2.5		F type boring bar
	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	3.0		
	090208GA3	□	5.56	2.38	0.8	3.0		
	110304GA3	□	6.35	3.18	0.4	3.5		
	110308GA3	□	6.35	3.18	0.8	3.5		

Coated CBN Grade for Hardened Steel

Application Examples

Insert	BF-CNGM120404TA2	BF-DCGT11T304TA2	NP-CNGA120408GA4
Workpiece	Alloy Steel (60HRC) 	Alloy Steel (60HRC) 	JIS SUJ2 (60HRC) 
Component	Shaft	Gear parts	Gear parts
Cutting Conditions: Cutting Sapeed(m/min)	120	150	130
Cutting Conditions: Feed (mm/rev)	0.08	0.2	0.15
Cutting Conditions: Depth of Cut (mm)	0.1–0.15	0.15	0.2
Coolant	Wet cutting	Wet cutting	Dry cutting
Results	Chip wrap occurrence (%)  Lower chip wrap occurance and longer insert life when machining 400 pieces per corner.	Chip wrap occurrence (%)  Lower chip wrap occurance and longer insert life when machining 240 pieces per corner.	pieces/corner  A competitor's grade reached the end of tool life after machining 150 pieces, MBC020 doubled tool life by machining up to 300 pieces.

Insert	NP-CNGA120412GA4	NP-CNGA120408GAW4	NP-CNGA120408GA4
Workpiece	JIS SCM420 (60HRC) 	JIS SCM415 (60HRC) 	JIS SCR420H (60HRC) 
Component	Gear parts	Joint parts	Bearing parts
Cutting Conditions: Cutting Speed (m/min)	120	100	130
Cutting Conditions: Feed (mm/rev)	0.08	0.25	0.15
Cutting Conditions: Depth of Cut (mm)	0.15	0.2	0.2
Coolant	Wet cutting	Dry cutting	Dry cutting
Results	pieces/corner  MBC020 maintained a good surface finish after machining 500 pieces compared with only 200 pieces from a conventional grade.	pieces/corner  MBC020 doubled the components machined compared to a competitors grade.	pieces/corner  A competitor's grade reached the end of tool life after machining 35 pieces, MBC020 doubled tool life by machining up to 70 pieces.

For Your Safety
●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When attaching inserts or spare parts, please use only the correct wrench or spanner.

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(Tools specifications subject to change without notice.)

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