

azstar
A u s t r a l i a n E n g i n e e r i n g



 Catalogue 2011

End Mills Ball Nose Roughing Cutters Single Flute Cutter

BALL NOSE

	Dimensions	Cutting Conditions
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END MILLS

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ROUGHING CUTTERS

3 - 4 FLUTE, FINE PITCH RMR END MILLS
 3 FLUTE END MILL, MEDIUM LENGTH RMR END MILLS FOR ALUMINIUM
 4 FLUTE, VARIABLE PITCH, RMR / FINISH ENDMILL

Dimensions	Cutting Conditions
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**COMPOSITE
TIMBER
PLASTIC**

SINGLE FLUTE CUTTERS FOR PLASTIC, ALUMINIUM AND TIMBER

Page WW1	Page CC11
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**TECHNICAL
DATA**

CALCULATING CUTTING CONDITIONS
 PART NUMBER DESIGNATION

Page TD1
Page TD1



NEW COATING

SPECIAL TOOLING

Metal Cutting Technology has been producing special carbide tooling for the manufacturing industry for the last 7 years. Utilizing our highly skilled application engineers that work with the manufacturers we design cutting tools that improve specific applications.

TOOLING

Drill and chamfer tools
Drill, chamfer and counter sink tools
Drill and burnish tools
Endmills for exotic materials (aerospace/medical etc..)
Regrinding and recoating

Taper endmills
Form tools
Reamers
Boring and back boring tools
Tool Modifications

BENEFITS

Cycle time reduction
Tool life increase

Tool quantity consolidation
(ie drill and chamfer tool)

PRODUCT AVAILABILITY

Short lead times

Inventory held for ongoing items

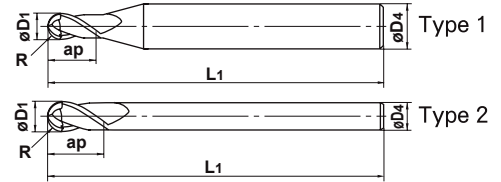
APPLICATIONS

Contact your local MCT sales engineer to assist in finding applications that can be improved through special tooling.

Flexible
RANGE

Leading
QUALITY

Competitive
PRICES



2 FLUTE, SHORT SERIES, BALLNOSE

Part Number	D1 Diameter	R Radius of Ballnose	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
B2S0200L06S03F	2	1	6	39	3			1	●	●
B2S0300L08S03F	3	1.5	8	76	3			2	●	●
B2S0400L08S04F	4	2	8	76	4			2	●	●
B2S0500L10S05F	5	2.5	10	76	5			2	●	●
B2S0600L10S06F	6	3	10	76	6			2	●	●
B2S0800L12S08F	8	4	12	64	8			2	●	●
B2S1000L15S10F	10	5	15	73	10			2	●	●
B2S1200L22S12F	12	6	22	84	12			2	●	●
B2S1600L28S16F	16	8	28	100	16			2	●	●
B2S2000L32S20F	20	10	32	100	20			2	●	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC1 for Cutting Conditions

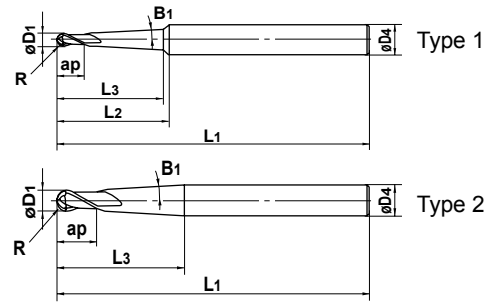


2 FLUTE, LONG SERIES, BALLNOSE

Part Number	D1 Diameter	R Radius of Ballnose	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
B2X0200L04S06F	2	1	4	100	6			1	●	●
B2L0300L08S06F	3	1.5	8	58	6			1	●	●
B2X0300L08S06F	3	1.5	8	100	6			1	●	●
B2L0400L08S06F	4	2	8	100	6			1	●	●
B2L0500L10S06F	5	2.5	10	100	6			1	●	●
B2L0600L12S06F	6	3	12	100	6			2	●	●
B2L0800L12S08F	8	4	12	100	8			2	●	●
B2L0800L40S08F	8	4	40	100	8			2	●	●
B2L1000L15S10F	10	5	15	100	10			2	●	●
B2L1200L18S12F	12	6	18	100	12			2	●	●
B2L1600L24S16F	16	8	24	150	16			2	●	●
B2L2000L38S20F	20	10	38	150	20			2	●	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC1 for Cutting Conditions



2 FLUTE, TAPER NECK, BALLNOSE

Part Number	D1 Diameter	R Radius of Ballnose	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	B1 Taper Angle One Side	L3 Neck Length	Type	Stock	Coated
B2X0200L04T0130S06F	2	1	4	100	6	1° 30'	41	1	●	●
B2X0200L04T0300S06F	2	1	4	100	6	3°	23	2	●	●
B2X0300L08T0130S06F	3	1.5	8	100	6	1° 30'	52	1	●	●
B2X0300L08T0300S06F	3	1.5	8	100	6	3°	32	2	●	●
B2X0400L10T0130S06F	4	2	10	100	6	1° 30'	49	1	●	●
B2X0400L10T0300S06F	4	2	10	100	6	3°	28	2	●	●
B2X0600L12T0130S08F	6	3	12	100	8	1° 30'	53	1	●	●
B2X0600L12T0300S08F	6	3	12	100	8	3°	34	2	●	●
B2X0800L15T0130S10F	8	4	15	150	10	1° 30'	55	1	●	●
B2X0800L15T0300S10F	8	4	15	150	10	3°	36	2	●	●
B2X1000L15T0130S12F	10	5	15	150	12	1° 30'	59	1	●	●
B2X1000L15T0300S12F	10	5	15	150	12	3°	40	2	○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC1 for Cutting Conditions

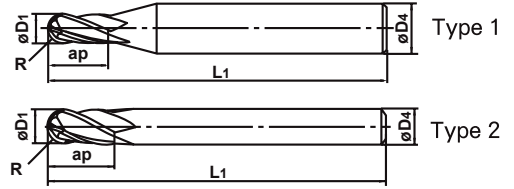


2 FLUTE, LONG SERIES, ALUMINIUM, BALLNOSE

Part Number	D1 Diameter	R Radius of Ballnose	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
B2L0300L09S03UAL	3	1.5	9	76	3				●	
B2L0400L12S04UAL	4	2	12	76	4				●	
B2L0500L15S05UAL	5	2.5	15	76	5				●	
B2L0600L18S06UAL	6	3	18	100	6				●	
B2L0800L24S08UAL	8	4	24	100	8				●	
B2L1000L25S10UAL	10	5	25	100	10				●	
B2L1200L28S12UAL	12	6	28	100	12				●	
B2L1600L32S16UAL	16	8	32	150	16				○	
B2L2000L40S20UAL	20	10	40	150	20				○	

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC2 for Cutting Conditions

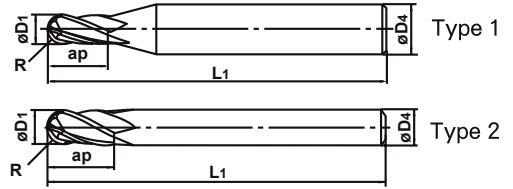


4 FLUTE, SHORT SERIES, BALLNOSE

Part Number	D1 Diameter	R Radius of Ballnose	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
B4S0200L10S03F	2	1	10	39	3			1	●	●
B4S0300L12S03F	3	1.5	12	39	3			2	●	●
B4S0400L12S04F	4	2	12	51	4			2	●	●
B4S0500L15S05F	5	2.5	15	51	5			2	●	●
B4S0600L19S06F	6	3	19	58	6			2	●	●
B4S0800L20S08F	8	4	20	64	8			2	●	●
B4S1000L25S10F	10	5	25	73	10			2	●	●
B4S1200L25S12F	12	6	29	84	12			2	●	●
B4S1600L32S16F	16	8	32	100	16			2	●	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC3 for Cutting Conditions

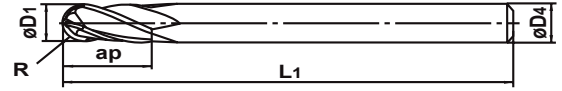


4 FLUTE, LONG SERIES, BALLNOSE

Part Number	D1 Diameter	R Radius of Ballnose	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
B4L0300L08S06F	3	1.5	8	58	6			1	●	●
B4L0300L08S03F	3	1.5	8	76	3			2	●	●
B4L0400L08S06F	4	2	8	100	6			1	●	●
B4L0400L12S04F	4	2	12	76	4			2	●	●
B4L0500L12S06F	5	2.5	12	100	6			1	●	●
B4L0500L15S05F	5	2.5	15	76	5			2	●	●
B4L0600L12S06F	6	3	12	100	6			2	●	●
B4L0800L15S08F	8	4	15	100	8			2	●	●
B4L1000L15S10F	10	5	15	100	10			2	●	●
B4L1200L18S12F	12	6	18	100	12			2	●	●
B4L1600L32S16F	16	8	32	150	16			2	○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC3 for Cutting Conditions

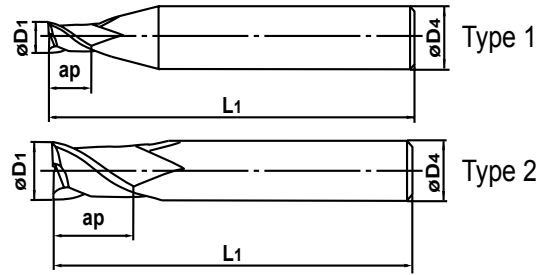


4 FLUTE, LONG SERIES, LONG SHANK, BALLNOSE

Part Number	D1 Diameter	R Radius of Ballnose	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
B4X0600L12S06F	6	3	12	150	6				●	●
B4X0800L25S08F	8	4	25	150	8				●	●
B4X1000L30S10F	10	5	30	150	10				●	●
B4X1200L36S12F	12	6	36	150	12				●	●
B4X1600L50S16F	16	8	50	150	16				○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC2 for Cutting Conditions

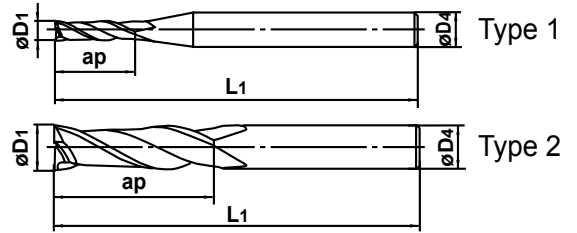


2 FLUTE, SHORT SERIES, ENDMILLS

Part Number	D1 Diameter	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	Type	Stock	Coated
E2S0200L065S03F	2	6.5	39	3	1	●	●
E2S0300L08S03F	3	8	39	3	2	●	●
E2S0400L10S04F	4	10	51	4	2	●	●
E2S0500L13S05F	5	13	51	5	2	●	●
E2S0600L13S06F	6	13	58	6	2	●	●
E2S0635L127S0635F	1/4" (6.35)	1/2" (12.7)	2"	1/4" (6.35)	2	●	●
E2S0800L19S08F	8	19	64	8	2	●	●
E2S1000L22S10F	10	22	73	10	2	●	●
E2S1200L26S12F	12	26	84	12	2	●	●
E2S1270L26S127F	1/2" (12.7)	1" (26)	3 1/4" 84	1/2" (12.7)	2	●	●
E2S1400L35S14F	14	35	100	14	2	●	●
E2S1600L30S16F	16	30	100	16	2	●	●
E2S2000L35X20F	20	35	100	20	2	●	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC4 for Cutting Conditions

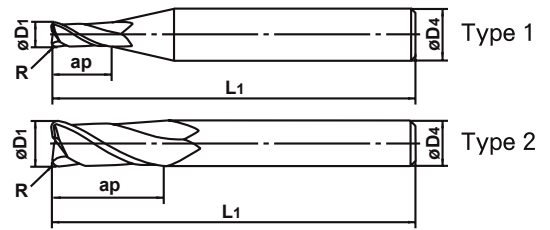


2 FLUTE, LONG SERIES, ENDMILLS

Part Number	D1 Diameter	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	Type	Stock	Coated
E2L0300L12S03F	3	12	76	3	2	●	●
E2L0400L15S04F	4	15	76	4	2	●	●
E2L0500L20S05F	5	20	76	5	2	●	●
E2L0600L20S06F	6	20	100	6	2	●	●
E2L0700L25S07F	7	25	100	7	2	●	●
E2L0800L25S08F	8	25	100	8	2	●	●
E2L0900L30S09F	9	30	100	9	2	●	●
E2L1000L30S10F	10	30	100	10	2	●	●
E2L1200L30S12F	12	30	100	12	2	●	●
E2L1600L50S16F	16	50	110	16	2	●	●
E2L2000L75S20F	20	75	150	20	2	●	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC4 for Cutting Conditions

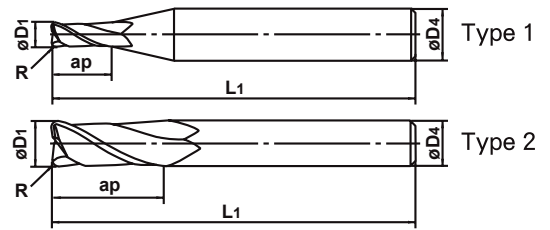


2 FLUTE, LONG SERIES, CORNER RADIUS, ENDMILLS

Part Number	D1 Diameter	R Radius of Corner	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
E2L0400L09R040S06F	4	0.4	9	76	6			1	●	●
E2L0500L20R050S06F	5	0.5	20	100	6			1	●	●
E2L0600L20R050S06F	6	0.5	20	100	6			2	●	●
E2L0600L20R100S06F	6	1.0	20	100	6			2	●	●
E2L0600L20R150S06F	6	1.5	20	100	6			2	●	●
E2L0600L20R200S06F	6	2.0	20	100	6			2	●	●
E2L0800L25R050S08F	8	0.5	25	100	8			2	●	●
E2L0800L25R100S08F	8	1.0	25	100	8			2	●	●
E2L0800L25R150S08F	8	1.5	25	100	8			2	●	●
E2L0800L30R200S08F	8	2.0	30	100	8			2	●	●
E2L1000L30R050S10F	10	0.5	30	100	10			2	●	●
E2L1000L30R100S10F	10	1.0	30	100	10			2	●	●
E2L1000L30R150S10F	10	1.5	30	100	10			2	●	●
E2L1000L30R200S10F	10	2.0	30	100	10			2	○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC4 for Cutting Conditions

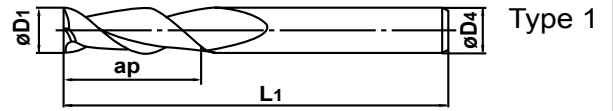


2 FLUTE, LONG SERIES, CORNER RADIUS, ENDMILLS

Part Number	D1 Diameter	R Radius of Corner	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
E2L1200L30R050S12F	12	0.5	30	100	12			2	●	●
E2L1200L30R100S12F	12	1.0	30	100	12			2	●	●
E2L1200L30R150S12F	12	1.5	30	100	12			2	●	●
E2L1200L30R200S12F	12	2.0	30	100	12			2	○	●
E2L1600L40R050S16F	16	0.5	40	100	16			2	○	●
E2L1600L40R100S16F	16	1.0	40	100	16			2	○	●
E2L1600L40R150S16F	16	1.5	40	100	16			2	○	●
E2L1600L40R200S16F	16	2.0	40	100	16			2	○	●
E2L2000L50R050S20F	20	0.5	50	110	20			2	●	●
E2L2000L50R100S20F	20	1.0	50	110	20			2	○	●
E2L2000L50R150S20F	20	1.5	50	110	20			2	○	●
E2L2000L50R200S20F	20	2.0	50	110	20			2	●	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC4 for Cutting Conditions

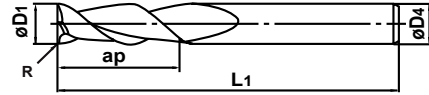


2 FLUTE, LONG SERIES, ALUMINIUM, ENDMILLS

Part Number	D1 Diameter	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	Type	Stock	Coated
E2L0300L12S03UAL	3	12	76	3	1	●	
E2L0400L15S04UAL	4	15	76	4	1	●	
E2L0500L20S05UAL	5	20	76	5	1	●	
E2L0600L20S06UAL	6	20	100	6	1	●	
E2L0600L30S06UAL	6	30	100	6	1	●	
E2L0800L25S08UAL	8	25	100	8	1	●	
E2L1000L30S10UAL	10	30	100	10	1	●	
E2L1200L30S12UAL	12	30	100	12	1	●	
E2L1600L35S16UAL	16	35	100	16	1	●	
E2L2000L50S20UAL	20	50	110	20	1	●	

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC5 for Cutting Conditions



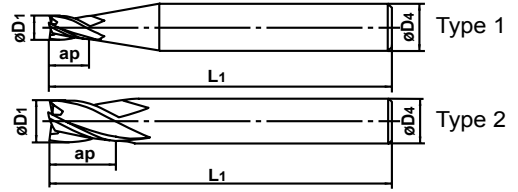
Type 2

2 FLUTE, LONG SERIES, CORNER RADIUS, ALUMINIUM, ENDMILLS

Part Number	D1 Diameter	R Radius of Corner	ap Length of Cut	L1 Overall Length	D4 Shank Diameter			Type	Stock	Coated
E2L0400L15R050S04UAL	4	0.5	15	76	4			2	●	
E2L0500L20R050S05UAL	5	0.5	20	76	5			2	●	
E2L0600L25R050S06UAL	6	0.5	20	100	6			2	●	
E2L0800L25R050S08UAL	8	0.5	25	100	8			2	●	
E2L0800L25R200S08UAL	8	2.0	25	100	8			2	○	
E2L1000L30R050S10UAL	10	0.5	30	100	10			2	●	
E2L1000L30R200S10UAL	10	2.0	30	100	10			2	●	
E2L1000L30R300S10UAL	10	3.0	30	100	10			2	○	
E2L1200L30R050S12UAL	12	0.5	30	100	12			2	●	
E2L1200L30R200S12UAL	12	2.0	30	100	12			2	●	
E2L1200L30R300S12UAL	12	3.0	30	100	12			2	○	
E2L1600L35R050S16UAL	16	0.5	35	100	16			2	●	
E2L1600L35R200S16UAL	16	2.0	35	100	16			2	○	
E2L1600L35R300S16UAL	16	3.0	35	100	16			2	○	
E2L2000L75R050S20UAL	20	0.5	75	150	20			2	○	
E2L2000L75R020S20UAL	20	2.0	75	150	20			2	○	
E2L2000L75R300S20UAL	20	3.0	75	150	20			2	○	

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC5 for Cutting Conditions

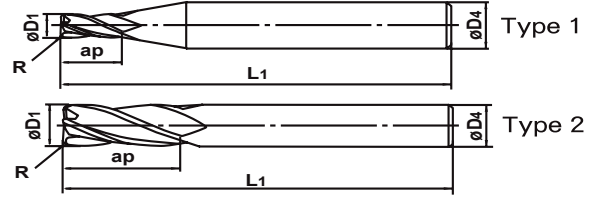


4 FLUTE, SHORT SERIES, ECCENTRIC RELIEF, VARIABLE PITCH, SQUARE SHOULDER

Part Number	D1 Diameter	Number of Flutes	ap Length of Cut	L1 Overall Length	D4 Shank Diameter		Stock	Coated
E4S0200L07S03F-EC	2	4	7	58	3		○	●
E4S0250L07S03F-EC	2.5	4	7	58	3		○	●
E4S0300L12S03F-EC	3	4	12	58	3		●	●
E4S0300L12S06F-EC	3	4	12	58	6		○	●
E4S0400L12S04F-EC	4	4	12	58	4		●	●
E4S0400L12S06F-EC	4	4	12	58	6		○	●
E4S0500L15S05F-EC	5	4	15	58	5		●	●
E4S0500L15S06F-EC	5	4	15	58	6		○	●
E4S0600L21S06F-EC	6	4	21	58	6		●	●
E4S0700L21S07F-EC	7	4	21	64	7		○	●
E4S0700L21S08F-EC	7	4	21	64	8		○	●
E4S0800L23S08F-EC	8	4	23	64	8		●	●
E4S0900L24S09F-EC	9	4	24	73	9		○	●
E4S0900L24S10F-EC	9	4	24	73	10		○	●
E4S1000L24S10F-EC	10	4	24	73	10		●	●
E4S1200L34S12F-EC	12	4	34	84	12		●	●
E4S1400L36S14F-EC	14	4	36	100	14		○	●
E4S1600L36S16F-EC	16	4	36	100	16		●	●
E4S1800L36S18F-EC	18	4	36	110	18		○	●
E4S2000L35S20F-EC	20	4	35	110	20		○	●
E4S2200L40S22F-EC	22	4	40	110	22		○	●
E4S2500L45S25F-EC	25	4	45	110	25		○	●

Note: Please refer to Page CC6 for Cutting Conditions

Stocked..... ●
Produced to Order..... ○



4 FLUTE, SHORT SERIES, ECCENTRIC RELIEF, VARIABLE PITCH, CORNOR RADIUS

Part Number	D1 Diameter	Number of Flutes	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	R Corner Radius	Stock	Coated
E4S0300L12R050S03F-EC	3	4	12	58	3	0.50	●	●
E4S0300L12R050S06F-EC	3	4	12	58	6	0.50	●	●
E4S0400L12R050S04F-EC	4	4	12	58	4	0.50	●	●
E4S0400L12R050S06F-EC	4	4	12	58	6	0.50	●	●
E4S0500L15R050S05F-EC	5	4	15	58	5	0.50	●	●
E4S0500L15R050S06F-EC	5	4	15	58	6	0.50	○	●
E4S0600L21R050S06F-EC	6	4	21	58	6	0.50	●	●
E4S0700L21R050S07F-EC	7	4	21	64	7	0.50	○	●
E4S0700L21R050S08F-EC	7	4	21	64	8	0.50	○	●
E4S0800L23R050S08F-EC	8	4	23	64	8	0.50	●	●
E4S0900L24R050S09F-EC	9	4	24	73	9	0.50	○	●
E4S0900L24R050S10F-EC	9	4	24	73	10	0.50	○	●
E4S1000L24R050S10F-EC	10	4	24	73	10	0.50	●	●
E4S1200L34R050S12F-EC	12	4	34	84	12	0.50	●	●
E4S1400L36R050S14F-EC	14	4	36	100	14	0.50	●	●
E4S1600L36R050S16F-EC	16	4	36	100	16	0.50	●	●
E4S1800L36R050S18F-EC	18	4	36	110	18	0.50	○	●
E4S2000L40R050S20F-EC	20	4	40	110	20	0.50	○	●
E4S2200L40R050S22F-EC	22	4	40	110	22	0.50	○	●
E4S2500L45R050S25F-EC	25	4	45	110	25	0.50	○	●

Note: Please refer to Page CC6 for Cutting Conditions

Stocked..... ●
Produced to Order..... ○

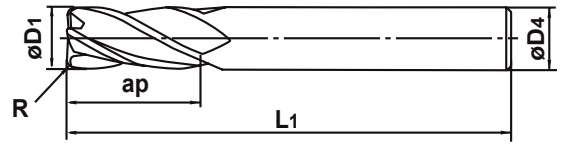


4 FLUTE, LONG SERIES, ENDMILLS

Part Number	D1 Diameter	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	Type	Stock	Coated
E4L0300L12S03F	3	12	76	3	2	●	●
E4L0400L15S04F	4	15	76	4	2	●	●
E4L0450L15S05F	4.5	15	76	5	1	○	●
E4L0500L20S05F	5	20	76	5	2	●	●
E4L0600L20S06F	6	20	100	6	2	●	●
E4L0700L25S07F	7	25	100	7	2	●	●
E4L0800L25S08F	8	25	100	8	2	●	●
E4L0900L30S09F	9	30	100	9	2	●	●
E4L1000L30S10F	10	30	100	10	2	●	●
E4L1000L40S10F	10	40	100	10	2	○	●
E4L1200L30S12F	12	30	100	12	2	●	●
E4L1200L50S12F	12	50	100	12	2	○	●
E4L1600L50S16F	16	50	110	16	2	●	●
E4X1600L80S16F	16	80	150	16	2	○	●
E4L2000L80S20F	20	80	150	20	2	●	●
E4L2500L80S25F	25	80	150	25	2	●	●
E4X2500L94S25F	25	94	150	25	2	○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC5 for Cutting Conditions

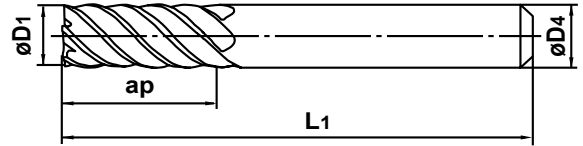


4 FLUTE, LONG SERIES, CORNER RADIUS, ENDMILLS

Part Number	D1 Diameter	R Radius of Bullnose	ap Length of Cut	L1 Overall Length	D4 Shank Diameter				Stock	Coated
E4L0600L20R100S06F	6	1.0	20	100	6				●	●
E4L0800L25R100S08F	8	1.0	25	100	8				●	●
E4L1000L30R100S10F	10	1.0	30	100	10				●	●
E4X1000L30R050S10F	10	1.0	30	150	10				●	●
E4L1200L30R100S12F	12	1.0	30	100	12				●	●
E4L1600L35R100S16F	16	1.0	35	100	16				○	●
E4L2000L35R100S20F	20	1.0	40	100	20				○	●
E4L2500L40R100S25F	25	1.0	45	100	2				○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC5 for Cutting Conditions

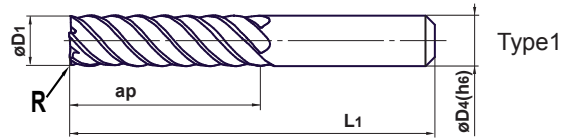


6 FLUTE, SHORT SERIES, 45 DEG. HELIX, ENDMILLS

Part Number	D1 Diameter	ap Length of Cut	L1 Overall Length	D4 Shank Diameter				Stock	Coated
E6S0600L13S06FH45	6	13	58	6				●	●
E6S0800L20S08FH45	8	20	64	8				●	●
E6S1000L22S10FH45	10	22	73	10				●	●
E6S1200L25S12FH45	12	25	84	12				●	●
E6S1600L40S16FH45	16	40	100	16				●	●
E6S2000L90S20FH45	20	90	150	20				○	●
E6S2500L90S25FH45	25	90	150	25				○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC7 for Cutting Conditions

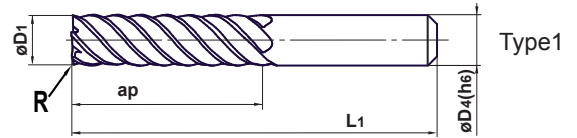


6 FLUTE, LONG SERIES, 45 DEG. HELIX, CORNER RADIUS, ENDMILLS

Part Number	D1 Diameter	R Radius of Corner	ap Length of Cut	L1 Overall Length	D4 Shank Diameter				Stock	Coated
E6L0600L25R050S06FH45	6	0.5	25	58	6				●	●
E6L0600L25R100S06FH45	6	1.0	25	58	6				●	●
E6L0600L25R150S06FH45	6	1.5	25	58	6				○	●
E6L0600L25R200S06FH45	6	2.0	25	58	6				○	●
E6L0800L33R050S08FH45	8	0.5	33	100	8				●	●
E6L0800L33R100S08FH45	8	1.0	33	100	8				●	●
E6L0800L33R150S08FH45	8	1.5	33	100	8				○	●
E6L0800L33R200S08FH45	8	2.0	33	100	8				○	●
E6L1000L44R050S10FH45	10	0.5	44	100	10				●	●
E6L1000L44R100S10FH45	10	1.0	44	100	10				●	●
E6L1000L44R150S10FH45	10	1.5	44	100	10				○	●
E6L1000L44R200S10FH45	10	2.0	44	100	10				○	●
E6L1200L50R050S12FH45	12	0.5	50	100	12				●	●
E6L1200L50R100S12FH45	12	1.0	50	100	12				●	●
E6L1200L50R150S12FH45	12	1.5	50	100	12				●	●
E6L1200L50R200S12FH45	12	2.0	50	100	12				○	●
E6L1600L55R050S16FH45	16	0.5	55	110	16				○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC7 for Cutting Conditions

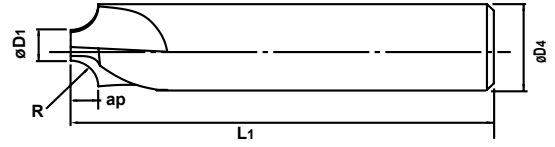


6 FLUTE, LONG SERIES, 45 DEG. HELIX, CORNER RADIUS, ENDMILLS

Part Number	D1 Diameter	R Radius of Corner	ap Length of Cut	L1 Overall Length	D4 Shank Diameter				Stock	Coated
E6L1600L55R100S16FH45	16	1.0	55	110	16				●	●
E6L1600L55R150S16FH45	16	1.5	55	110	16				○	●
E6L1600L55R200S16FH45	16	2.0	55	110	16				○	●
E6L2000L90R050S20FH45	20	0.5	90	150	20				○	●
E6L2000L90R100S20FH45	20	1.0	90	150	20				○	●
E6L2000L90R150S20FH45	20	1.5	90	150	20				○	●
E6L2000L90R200S20FH45	20	2.0	90	150	20				○	●
E6L2500L90R050S25FH45	25	0.5	90	150	25				○	●
E6L2500L90R100S25FH45	25	1.0	90	150	25				○	●
E6L2500L90R150S25FH45	25	1.5	90	150	25				○	●
E6L2500L90R200S25FH45	25	2.0	90	150	25				○	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC7 for Cutting Conditions

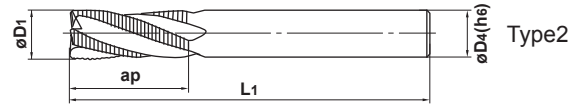


3 FLUTE, CONCAVE, CORNER RADIUS, ENDMILLS

Part Number	D1 Diameter End	R Radius		L1 Overall Length	D4 Shank Diameter				Stock	Coated
CR3S0400R010S06U	4.0	1		58	6				●	
CR3S0500R015S08U	5.0	1.5		63	8				●	
CR3S0400R020S08U	4.0	2		63	8				●	
CR3S0500R025S10U	5.0	2.5		73	10				●	
CR3S0400R030S10U	4.0	3		73	10				●	
CR3S0400R040S12U	4.0	4		76	12				●	
CR3S0600R050S16U	6.0	5		83	16				●	
CR3S0800R060S20U	8.0	6		83	20				●	
CR3S0600R070S20U	6.0	7		80	20				○	
CR3S0900R080S25U	9.0	8		80	25				●	
CR3S0500R100S25U	5.0	10		80	25				●	
CR3S0800R120S32U	8.0	12		80	32				○	

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC12 for Cutting Conditions

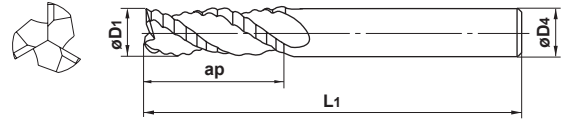


3 - 4 FLUTE, FINE PITCH RMR END MILLS

Part Number	D1 Diameter	Number of Flutes	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	Corner Chamfer		Stock	Coated
R3S0400L09S04F	4	3	9	51	4	0.3 x 45 deg		●	●
R3S0500L13S05F	5	3	13	51	5	0.3 x 45 deg		●	●
R4S0600L14S06F	6	4	14	58	6	0.5 x 45 deg		●	●
R4S0800L19S08F	8	4	19	64	8	0.5 x 45 deg		●	●
R4S1000L22S10F	10	4	22	73	10	0.5 x 45 deg		●	●
R4S1200L27S12F	12	4	27	84	12	0.5 x 45 deg		●	●
R4S1600L34S16F	16	4	34	100	16	0.5 x 45 deg		●	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to Page CC8 for Cutting Conditions

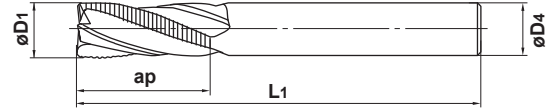


3 FLUTE END MILL, MEDIUM LENGTH RMR END MILLS FOR ALUMINIUM

Part Number	D1 Diameter	Number of Flutes	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	Corner Chamfer	Stock
R3S0300L08S03UAL	3		8	39	3	0.3 x 45 deg	●
R3S0300L08S06UAL	3		8	58	6	0.3 x 45 deg	○
R3S0400L11S04UAL	4		11	51	4	0.3 x 45 deg	●
R3S0400L11S06UAL	4		11	58	6	0.3 x 45 deg	○
R3S0500L13S05UAL	5		13	58	5	0.3 x 45 deg	●
R3S0500L13S06UAL	5		13	58	6	0.3 x 45 deg	○
R3S0600L13S06UAL	6		13	58	6	0.6 x 45 deg	●
R3S0800L20S08UAL	8		20	64	8	0.6 x 45 deg	●
R3S1000L22S10UAL	10		22	73	10	0.6 x 45 deg	●
R3S1200L26S12UAL	12		26	84	12	0.7 x 45 deg	●
R3S1400L26S14UAL	14		26	100	14	0.7 x 45 deg	○
R3S1600L32S16UAL	16		32	100	16	0.7 x 45 deg	●
R3S1800L32S18UAL	18		32	110	18	0.7 x 45 deg	○
R3S2000L38S20UAL	20		38	110	20	0.7 x 45 deg	●
R3S2500L45S25UAL	25		45	110	25	0.7 x 45 deg	○

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC9 for Cutting Conditions

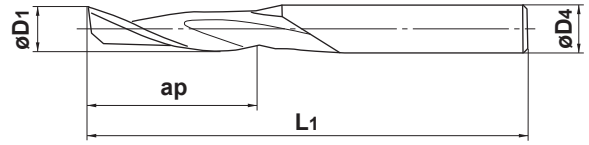


4 FLUTE, VARIABLE PITCH, RMR / FINISH ENDMILL

Part Number	D1 Diameter	Number of Flutes	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	Corner Chamfer	Stock
RF4S0400L11S04F	4	4	11	58	4	0.3 x 45Deg.	○
RF4S0400L11S06F	4	4	11	58	6	0.3 x 45Deg.	○
RF4S0500L13S05F	5	4	13	58	5	0.3 x 45Deg.	○
RF4S0500L13S06F	5	4	13	58	6	0.3 x 45Deg.	○
RF4S0600L14S06F	6	4	14	58	6	0.3 x 45Deg.	○
RF4S0800L19S08F	8	4	19	64	8	0.3 x 45Deg.	●
RF4S1000L22S10F	10	4	22	73	10	0.3 x 45Deg.	●
RF4S1200L26S12F	12	4	26	84	12	0.3 x 45Deg.	●
RF4S1400L30S14F	14	4	30	84	14	0.3 x 45Deg.	●
RF4S1600L34S16F	16	4	34	100	16	0.3 x 45Deg.	●
RF4S2000L42S20F	20	4	42	110	20	0.3 x 45Deg.	○
RF4S2500L52S25F	25	4	52	110	25	0.3 x 45Deg.	○

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC10 for Cutting Conditions



SINGLE FLUTE CUTTERS FOR PLASTIC, ALUMINIUM AND TIMBER

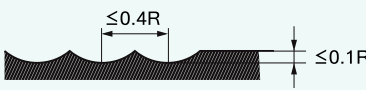
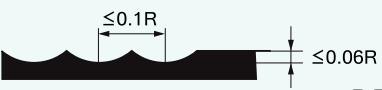
Part Number	D1 Diameter	Number of Flutes	ap Length of Cut	L1 Overall Length	D4 Shank Diameter	C Corner Chamfer	Stock
W1S0300L10S03U	3	1	10	39	3	0.3 x 45 Deg	●
W1S0400L14S04U	4	1	14	51	4	0.3 x 45 Deg	●
W1S0500L16S05U	5	1	16	58	5	0.3 x 45 Deg	●
W1S0600L20S06U	6	1	20	58	6	0.3 x 45 Deg	●
W1S0800L25S08U	8	1	25	64	8	0.3 x 45 Deg	●
W1S1000L25S10U	10	1	25	73	10	0.5 x 45 Deg	●
W1S1200L25S12U	12	1	25	84	12	0.5 x 45 Deg	●

Stocked..... ●
Produced to Order..... ○

Note: Please refer to page CC11 for Cutting Conditions

2 FLUTE, SHORT & LONG SERIES, BALLNOSE

Work material	Alloy steel, Tool steel, Pre-hardened steel (-45HRC) AISI H13, AISI D2, NAK				Hardened steel (45-55HRC) AISI H13			
	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		$\alpha \leq 15^\circ$		$\alpha > 15^\circ$	
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)
R 1	35,000	2,400	25,000	1,400	25,000	1,500	20,000	900
R 1.5	30,000	2,500	23,000	1,400	20,000	1,500	15,000	900
R 2	25,000	2,600	20,000	1,500	17,000	1,500	13,000	900
R 2.5	23,000	2,600	17,000	1,500	15,000	1,500	11,000	900
R 3	20,000	2,600	15,000	1,500	13,000	1,500	10,000	900
R 4	15,000	2,700	11,000	1,500	10,000	1,500	7,500	900
R 5	12,000	2,700	9,000	1,500	8,000	1,500	6,000	900
R 6	10,000	2,500	7,500	1,400	6,600	1,400	5,000	800
R 8	7,000	2,000	5,200	1,300	4,600	1,000	3,500	700
R 10	5,600	1,700	4,200	1,100	3,700	900	2,300	500

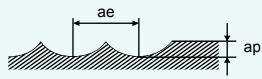
Depth of cut	SHORT SERIES		LONG SERIES	
		$\leq 0.4R$	$\leq 0.1R$	

R: Radius

- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the rev rate proportionately.
- 2) If the depth of cut is shallow or when rib milling, the revolution and feed rate can be increased. Please reduce the feed rate if surface finish is important.
- 3) α is the inclination of machined surface

2 FLUTE, TAPER NECK, BALLNOSE

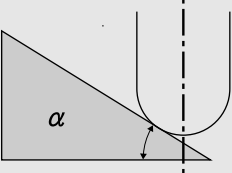
Work material				Alloy steel, Tool steel, Pre-hardened steel (-45HRC) AISI H13, AISI D2, NAK		Hardened steel (45-55HRC) AISI H13		
R (mm)	Neck taper half angle	Neck length (mm)	Depth of cut		Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
			ap (mm)	ae (mm)				
R1	1° 30'	23	0.1	0.2	18,000	570	10,000	260
	3°	41	0.1					
R2	1° 30'	49	0.2	0.8	14,000	670	6,000	200
	3°	28	0.2					
R3	1° 30'	53	0.3	1.2	10,000	840	5,000	220
	3°	34	0.3					
R4	1° 30'	55	0.4	1.6	8,000	840	4,000	270
	3°	36	0.4					
R5	1° 30'	59	0.5	2	6,000	840	3,000	310
	3°	40	0.5					

Depth of cut


- 1) Please reduce the cutting depth (especially ap) if chattering and noise are generated.
- 2) When high machining accuracy is especially needed, we recommend reduce feed rate.
- 3) If the cutting depth is shallow, the revolution and feed rate can be increased.

2 FLUTE, LONG SERIES , ALUMINIUM, BALLNOSE

Work material	ALUMINIUM ALLOY			
R (mm)	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$	
	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
R1.5	30,000	3,000	23,000	1,700
R2	25,000	3,000	20,000	1,700
R2.5	23,000	3,000	17,000	1,700
R3	20,000	3,000	15,000	1,700
R4	15,000	3,000	11,000	1,700
R5	12,000	2,900	9,000	1,600
R6	10,000	2,500	7,500	1,400
R8	7,400	1,850	5,500	1,100
R10	6,000	1,800	4,500	1,000
Depth of cut				



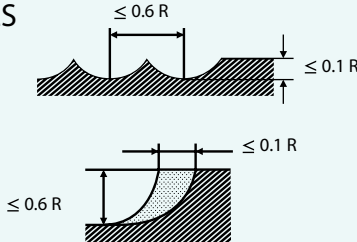
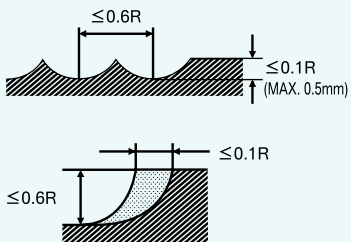
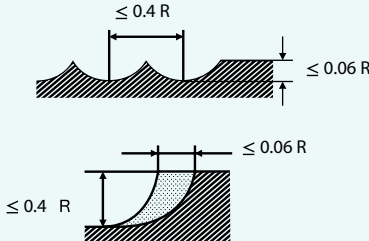
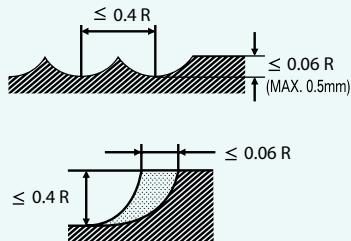
- 1) α is the inclination of machining surface.
- 2) Cutting condition may be considerably different due to the overhang (milling depth and neck length), depth of cut, and machine tools. Please see the above table as a standard. If the rigidity of the machine or the work material installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.
- 3) When high machining accuracy is especially needed, we recommend lowering feed rate.
- 4) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 5) When cutting Copper tungsten alloy, please set the revolution and the feed rate at under 70% of the table value.
- 6) Water-soluble cutting fluid is recommended.

4 FLUTE, LONG SERIES ,LONG SHANK, BALLNOSE

Work material	Alloy steel, Tool steel Pre-hardened steel (-45HRC) SCM, AISI H13, AISI D2, NAK etc.		Hardened steel (45-55HRC) AISI H13, AISI D2, SUS420 etc.		Hardened steel (55-62HRC) AISI D2, SKH, SKS etc.	
	R (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)
R 3	14000	1260 - 3950	9100	840 - 2590	5810	490 - 1050
R 4	10500	1540 - 3500	7000	980 - 2380	4340	490 - 910
R 5	8400	1610 - 3220	5600	1050 - 2100	3500	560 - 840
R 6	7000	1330 - 2870	4620	910 - 1890	2870	490 - 700
R 8	5250	1120 - 2240	3500	770 - 1540	2170	210 - 560
Depth of cut						

- 1) Please use rigid machining center and NC milling machine. If chattering generates due to the low rigidity of the machine or installation of work material, please reduce the revolution and the feed rate proportionately.
- 2) The above table shows cutting conditions in counter line machining center (side milling). In shape milling like mould, cutting condition changes substantially due to the machined shape, milling method and depth of cut (pick feed axis).
- 3) When the overhang of end mill (milling depth) is long, reduce the revolution and feed rate proportionately to prevent chattering.
- 4) Air blow is recommended to dispose chips compulsorily.

4 FLUTE, SHORT SERIES ,BALLNOSE & 4 FLUTE, LONG SERIES, BALLNOSE

Work material	Alloy steel, Tool steel Pre-hardened steel (-45HRC) SCM, AISI H13, AISI D2, NAK etc.		Hardened steel (45-55HRC) AISI H13, AISI D2, SUS420 etc.		Hardened steel (55-62HRC) AISI D2, SKH, SKS etc.		
	R (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3.0 SHANK 4.0 SHANK 5.0 SHANK	R 1.5	33,000	2,000 - 6,000	20,000	1,200 - 3,400	13,000	800 - 1,500
	R 1.5	7,200	400 - 800	9,200	720 - 330	5,400	130 - 270
	R 2	25,000	2,000 - 6,000	17,000	1,200 - 3,400	10,000	800 - 1,500
	R 2	8,500	1,400 - 1,920	6,300	640 - 890	4,700	290 - 380
	R 2.5	23,000	2,000 - 6,000	15,000	1,200 - 3,400	9,000	800 - 1,500
	R 2.5	8,300	800 - 1,100	5,100	330 - 430	3,800	150 - 220
	R 3	20,000	1,800 - 5,500	13,000	1,200 - 3,700	8,300	700 - 1,500
	R 4	15,000	2,200 - 5,000	10,000	1,400 - 3,400	6,200	700 - 1,300
	R 5	12,000	2,300 - 4,600	8,000	1,500 - 3,000	5,000	800 - 1,200
	R 6	10,000	1,900 - 4,100	6,600	1,300 - 2,700	4,100	700 - 1,000
	R 8	7,500	1,600 - 3,200	5,000	1,100 - 2,200	3,100	600 - 800
	R10	6,000	1,300 - 2,600	4,000	900 - 1,700	2,500	500 - 700
Depth of cut	SHORT SERIES						
							
Depth of cut	LONG SERIES						
							

R:Radius

- 1) Please use rigid machining center and NC milling machine. If chattering generates due to the low rigidity of the machine or installation of work material, please reduce the revolution and the feed rate proportionately.
- 2) The above table shows cutting conditions in counter line machining center (side milling). In shape milling like mould, cutting condition changes substantially due to the machined shape, milling method and depth of cut (pick feed axis).
- 3) When the overhang of end mill (milling depth) is long, reduce the revolution and feed rate proportionately to prevent chattering.
- 4) Air blow is recommended to dispose chips compulsorily.

2 FLUTE, SHORT SERIES, ENDMILL

Work material	Carbon steel (-30HRC) AISI 1049, SCM Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
	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	15,000	600	10,000	400	9,100	300	8,000	120
3	10,000	600	7,000	400	6,000	300	5,000	120
4	7,500	600	5,200	400	4,500	300	4,000	120
5	6,000	600	4,200	400	3,600	300	3,200	120
6	5,000	600	3,500	400	3,000	300	2,700	120
8	4,000	520	2,800	350	2,400	260	2,000	110
10	3,200	450	2,200	300	1,900	230	1,600	100
12	2,700	410	1,900	270	1,600	210	1,300	100
16	2,000	320	1,400	210	1,200	170	1,000	80
20	1,600	270	1,100	180	1,000	150	800	65

Depth of cut	$\leq 0.1D$ ($D \leq \phi 3$) $\leq 0.2D$ ($D > \phi 3$)		$\leq 1.5D$		$\leq 0.05D$ $\leq 1D$		$\leq 0.05D$ ($\phi 0.5 \leq D \leq \phi 2$) $\leq 0.1D$ ($D > \phi 2$)	

D: Dia.

- 1) Please use 4 fluted end mills for workpieces of 55-60HRC.
- 2) 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 at 60% and the feed rate 40% when slotting austenitic stainless steels.
- 3) When cutting austenitic stainless steels and wear resistant alloys, the use of non-water-soluble cutting fluid is especially effective.
- 4) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.
- 5) When drilling, reduce the feed rate by 70%.

2 FLUTE, LONG SERIES, ENDMILLS & 2 FLUTE, CORNER RADIUS, ENDMILLS

Work material	Carbon steel (-30HRC) AISI 1049, SCM Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		Austenitic stainless steel AISI 304, AISI 316		Hardened steel (45-55HRC) AISI H13	
	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	4,200	65 (60)	3,400	55 (45)	2,600	40 (40)	2,100	25 (25)
4	3,400	80 (60)	2,700	65 (45)	2,100 (1,600)	50 (30)	1,700	35 (25)
5	2,900	100 (60)	2,300	80 (45)	1,800 (1,350)	60 (30)	1,500	40 (25)
6	2,500	120 (60)	2,000	100 (50)	1,500 (1,100)	75 (30)	1,300	50 (25)
8	1,900	130 (60)	1,500	100 (50)	1,200 (900)	80 (30)	1,000	50 (25)
10	1,600	130 (60)	1,300	100 (50)	950 (710)	75 (30)	800	50 (25)
12	1,300	120 (60)	1,100	100 (50)	800 (600)	75 (30)	670	50 (25)
16	1,000	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)

Depth of cut	$\leq 0.05D$ (MAX.0.5mm) $\leq 2.5D$		$\leq 0.02D$ $\leq 2D$	

D: Dia.

- () : Indicates standard revolution and feed rate for slotting.
- 1) Please use 4 fluted end mills for workpieces of 55-60HRC.
 - 2) When cutting austenitic stainless steels and wear resistant alloys, the use of non-water-soluble cutting fluid is especially effective.
 - 3) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.
 - 4) When drilling, reduce the feed rate by 70%.

2 FLUTE, LONG SERIES, ALUMINIUM, ENDMILL & 2 FLUTE, LONG SERIES, ALUMINIUM, CORNER RADIUS, ENDMILL

SIDE MILLING

Work material	Aluminium alloy A7075		Aluminium cast AC4B	
Cutting speed	300m/min		240m/min	
Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	32,000	1,400	25,000	950
4	24,000	1,500	19,000	1,000
5	19,000	1,600	15,000	1,000
6	16,000	1,900	13,000	1,100
8	12,000	1,900	9,500	1,200
10	9,500	1,900	7,600	1,200
12	8,000	1,900	6,400	1,200
16	6,000	1,900	4,800	1,200
20	4,800	1,500	3,800	1,000

Depth of cut: $\leq 0.5D$ ($D \geq \phi 3$)

D: Dia.

SLOTING

Work material	Aluminium alloy A7075		Aluminium cast AC4B	
Cutting speed	240m/min		200m/min	
Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	25,000	950	21,000	600
4	19,000	1,000	16,000	650
5	15,000	1,000	13,000	700
6	13,000	1,100	11,000	750
8	9,500	1,200	8,000	800
10	7,600	1,200	6,400	800
12	6,400	1,200	5,300	800
16	4,800	1,000	4,000	720
20	3,800	970	3,200	660

Depth of cut: $\leq 1D$ (MAX. 10mm)

D: Dia.

- 1) If the rigidity of the machine or the work material installation is very low, or chattering and noise are generated, please reduce the revolution and the 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 cut is recommended for side milling.

4 FLUTE, LONG SERIES, ENDMILL & 4 FLUTE, CORNER RADIUS, ENDMILLS

Work material	Carbon steel (-30HRC) AISI 1049, SCM Cast iron AISI 35		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK		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	3,700	90	3,400	90	2,600	60	2,100	35	1,800	25
4	3,000	110	2,700	90	2,100	70	1,700	50	1,400	30
5	2,600	140	2,300	110	1,800	85	1,500	55	1,200	35
6	2,300	170	2,000	140	1,500	110	1,300	70	1,000	40
8	1,700	180	1,500	140	1,200	110	1,000	70	800	40
10	1,400	180	1,300	140	950	110	800	70	650	40
12	1,200	170	1,100	140	800	110	670	70	530	40
16	900	125	820	100	600	70	500	50	400	30
20	720	100	650	80	480	65	400	40	320	25
25	580	75	520	60	380	45	320	35	250	20

Depth of cut (Left): $\leq 0.05D$ (MAX. 0.5mm), $\leq 2.5D$

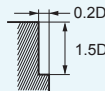
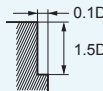
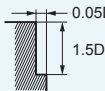
Depth of cut (Right): $\leq 0.02D$, $\leq 2D$, $\leq 0.05D$

D: Dia.

- 1) The above table shows cutting conditions for standard side milling. For slotting, please reduce 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 cutting austenitic stainless steels and wear resistant alloys, the use of non-water-soluble cutting fluid is especially effective.
- 3) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.
- 4) When drilling, please reduce the feed rate by 70%.

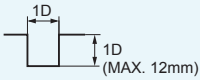
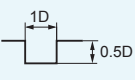
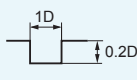
RECOMMENDED CUTTING CONDITIONS FOR 4 FLUTE SHORT END MILLS

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)
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.

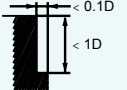
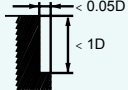
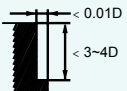
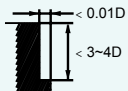
Slotting

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)
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 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 feed rate proportionately, or set the depth of cut smaller.
- 4) Climb cutting is recommended for side milling.

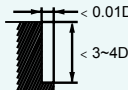
6 FLUTE, 45 DEG. HELIX, ENDMILLS

Work material	Carbon steel, Alloy steel (-30HRC) SS400, AISI 1049, SCM Cast iron, FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK, SUS630		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Heat resistant alloy Inconel etc.			
	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	10,600	2,900	8,000	2,000	4,200	900	2,100	320	
	8	8,000	2,900	6,000	2,000	3,200	900	1,600	300	
	10	6,400	2,700	4,800	2,000	2,500	870	1,300	260	
	12	5,300	2,700	4,000	2,000	2,100	830	1,100	230	
Depth of cut										
	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										

D: Dia.

- 1) In cutting austenitic stainless steels, the use of water-soluble cutting fluid 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 material installation is very low, or chattering is generated, please reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
- 4) For side milling, climb cut is recommended.

6 FLUTE, LONG SERIES, 45 DEG HELIX CORNER RADIUS, ENDMILL

Work material	Carbon steel, Alloy steel (-30HRC) SS400, AISI 1049, SCM Cast iron, FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK, SUS630		Austenitic stainless steel AISI 304, AISI 316 Titanium alloy Ti-6Al-4V		Heat resistant alloy Inconel etc.			
	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	2,700	740	2,100	450	1,100	235	550	85	
	8	2,100	720	1,600	430	850	230	420	80	
	10	1,700	700	1,300	420	690	220	340	80	
	12	1,400	620	1,100	380	580	200	290	70	
	16	1,000	500	800	310	420	160	210	60	
	20	850	460	640	270	340	140	170	50	
	25	670	390	510	230	270	120	130	40	
Depth of cut										

D: Dia.

- 1) In cutting austenitic stainless steels, the use of water-soluble cutting fluid 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 material installation is very low, or chattering is generated, please reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
- 4) For side milling, climb cut is recommended.

3 - 4 FLUTE, ECCENTRIC RELIEF, VARIABLE PITCH RMR END MILL

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)
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



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)
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



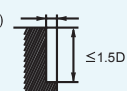
D:Dia.

- 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.

3 FLUTE END MILL, MEDIUM LENGTH RMR END MILLS FOR ALUMINIUM

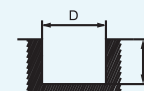
SIDE MILLING

Work material	Aluminium alloy		Aluminium cast		
	Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
	3	28,000	1,900	18,000	800
	4	29,000	2,200	16,000	900
	5	27,000	4,900	14,500	2,000
	6	27,000	6,100	13,000	2,300
	8	20,000	6,000	10,000	2,400
	10	16,000	5,800	8,000	2,300
	12	13,000	5,300	6,500	2,100
	16	10,000	5,100	5,000	2,000
	20	8,000	4,800	4,000	1,900
	25	6,400	4,600	3,200	1,800

Depth of cut	$\leq 0.25D$ ($D \geq \phi 3$)  $\leq 1.5D$				D:Dia.
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SLOTING

Work material	Aluminium alloy		Aluminium cast		
	Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
	3	21,000	1,300	11,000	500
	4	19,000	1,800	9,500	700
	5	17,000	2,000	9,000	800
	6	16,000	2,400	8,000	1,000
	8	12,000	2,500	6,000	1,000
	10	9,500	2,600	5,000	1,100
	12	8,000	2,300	4,000	900
	16	6,000	2,100	3,000	800
	20	4,800	2,000	2,400	800
	25	3,800	2,000	1,900	700

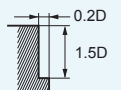
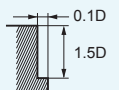
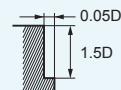
Depth of cut	 $\leq 1D$ (MAX. 10mm)				D:Dia.
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- 1) If the rigidity of the machine or the work material rigidity is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) Water-soluble cutting fluid is recommended.
- 4) Climb cut is recommended for side milling.
- 5) It is advisable to always use a ramping process rather than vertical feed to achieve the best performance.



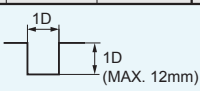
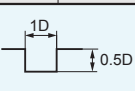
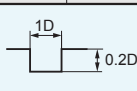
4 FLUTE, VARIABLE PITCH, RMR / FINISH END MILL

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			
	Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Feed rate (mm/max)	Revolution (min ⁻¹)	Feed rate (mm/min)	Feed rate (mm/max)	Revolution (min ⁻¹)	Feed rate (mm/min)	Feed rate (mm/max)
4	7950	954	2385	4610	443	1106	3580	258	644	
4	7950	1113	2798	4610	516	1291	3580	301	759	
5	6360	1018	2544	3690	472	1181	3180	305	763	
5	6360	1145	2875	3690	531	1328	3180	343	865	
6	5300	1060	2650	3070	491	1228	2650	318	795	
8	3980	995	2388	2300	442	1104	1990	387	716	
10	3180	890	2226	1845	413	1033	1650	277	693	
12	2650	795	1993	1540	370	924	1720	310	777	
14	2270	726	1816	1320	338	845	1360	261	653	
16	1990	716	1792	1150	331	828	1190	257	643	
20	1590	700	1749	920	324	810	875	231	578	
25	1270	660	1651	740	308	770	700	218	546	
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			
	Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (mm/max)	Revolution (min ⁻¹)	Feed rate (mm/min)	Feed rate (mm/max)	Revolution (min ⁻¹)	Feed rate (mm/min)	Feed rate (mm/max)
4	7950	731	1844	4610	339	848	3180	176	445	
4	7950	827	2067	4610	384	959	3180	198	496	
5	6360	763	1908	3690	354	886	2545	183	458	
5	6360	860	2162	3690	399	1004	2545	206	519	
6	5300	795	1993	3070	368	921	2120	191	475	
8	3980	716	1799	2300	331	828	1590	172	432	
10	3180	661	1654	1845	307	768	1270	158	396	
12	2650	594	1484	1540	276	690	1060	142	356	
14	2270	545	1362	1320	253	634	910	131	328	
16	1990	573	1433	1150	265	662	795	137	343	
20	1590	560	1399	920	259	648	640	135	338	
25	1270	528	1321	740	246	616	510	127	318	
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 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 feed rate proportionately, or set the depth of cut smaller.
- 4) Climb cutting is recommended for side milling.

SINGLE FLUTE CUTTERS FOR ALUMINIUM, PLASTIC AND TIMBER

SIDE MILLING

SLOTING

ALUMINIUM

Dia. (mm)	Aluminium alloy		Aluminium cast	
	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	40000	1320	40000	1200
4	37000	1630	32000	1280
5	29000	1600	26000	1300
6	24000	1580	21000	1260
8	19000	1670	16000	1280
10	15000	1650	13000	1300
12	12000	1580	11000	1320

Depth of cut $\leq 0.25D$ $\leq 1.5D$ D:Dia.

Dia. (mm)	Aluminium alloy		Aluminium cast	
	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	39000	1030	35000	840
4	29000	1020	26200	840
5	23500	1030	2100	840
6	19600	1030	17500	840
8	14700	1030	13000	830
10	11800	1040	10500	840
12	9800	1030	8750	840

Depth of cut $\leq 1D$ (MAX. 10mm) D:Dia.

PLASTIC

Dia. (mm)	Soft Plastic		Hard Plastic	
	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	21000	690-1380	40000	1980-3900
4	16000	700-1400	32000	2100-4200
5	13000	710-1430	25000	2060-4100
6	10000	660-1320	21000	2080-4160
8	8000	700-1390	16000	2100-4200
10	6400	700-1410	13000	2150-4300
12	5300	710-1420	11000	2180-4360

Depth of cut $\leq 0.25D$ $\leq 1.5D$ D:Dia.

Dia. (mm)	Soft Plastic		Hard Plastic	
	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	40000	860-1950	40000	960-3600
4	40000	1150-2600	40000	1280-4800
5	40000	1440-3240	40000	1600-6000
6	36000	1550-3500	40000	1900-7200
8	27000	1550-3500	30000	1900-7200
10	21000	1500-3400	23800	1900-7100
12	18000	1550-3500	19800	1900-7100

Depth of cut $\leq 1D$ (MAX. 10mm) D:Dia.

TIMBER

Dia. (mm)	Revolution (min ⁻¹)	1 x Dia.	2 x Dia.	> 2 x Dia.
		Feed rate (mm/min)	Feed rate (mm/min)	Feed rate (mm/min)
3	40000	3200 - 6500	2400 - 4800	1600 - 3200
4	40000	4400 - 8500	3200 - 6500	2200 - 4400
5	40000	5200 - 10000	3900 - 7700	2600 - 5200
6	40000	5600 - 11000	4200 - 8500	2800 - 5600
8	30000	4500 - 9000	3300 - 6600	2200 - 4500
10	23800	3800 - 7500	2800 - 5700	1900 - 3800
12	19800	3500 7100	2600 -5300	1700 - 3500

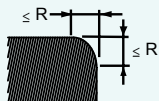
Depth of cut $\leq 0.25D$ $\leq 2.0D$ $\leq 0.15D$ $> 2.0D$ D:Dia.

Dia. (mm)	Revolution (min ⁻¹)	1 x Dia.	2 x Dia.	> 2 x Dia.
		Feed rate (mm/min)	Feed rate (mm/min)	Feed rate (mm/min)
3	40000	2500 - 5100	1900 - 3800	1200 - 2500
4	40000	3500 - 7000	2600 - 5200	1700 - 3500
5	40000	3900 - 7900	2900 - 5900	1900 - 3900
6	40000	3500 - 7100	2700 - 5300	1800 - 3500
8	30000	2900 - 5700	2100 - 4300	1500 - 2900
10	23800	2400 - 4800	1800 - 3700	1200 - 2400
12	19800	2300 - 4600	1700 -3400	1100 - 2300

Depth of cut $\leq 1D$ (MAX. 10mm) D:Dia.

3 FLUTE, CONCAVE CORNER RADIUS, ENDMILL

Work material	Carbon steel, Alloy steel (-30HRC) SS400, AISI 1049, SCM Cast iron, FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) AISI H13, NAK, SUS630		Aluminium	
	R (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)
1	7,500	560	2,800	210	13,300	2,000
1.5	6,600	460	2,100	120	10,000	1,100
2	5,000	320	2,100	130	10,000	1,200
2.5	4,600	320	1,700	120	8,000	1,100
3	4,400	290	1,700	120	9,000	1,200
4	3,500	160	1,400	70	6,600	600
5	3,000	120	1,100	50	5,000	390
6	2,400	130	850	50	4,000	430
7	2,300	110	850	40	4,000	390
8	1,300	60	680	30	3,200	290
10	1,200	55	680	30	3,200	290
12	1,000	45	530	25	2,500	230

Depth of cut	
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- 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 at 60% and the feed rate 40% when slotting austenitic stainless steels.
- 2) When cutting austenitic stainless steels and wear resistant alloys, the use of non-water-soluble cutting fluid is especially effective.
- 3) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.

CALCULATING CUTTING CONDITIONS

CUTTING SPEED – METRES / MINUTE

To calculate cutting speed in (m/min.) = $\frac{\pi \times \text{Tool } \varnothing \times \text{RPM}}{1000}$

CUTTING SPEED – METRES / SECOND (FOR ROUTERS)

To calculate cutting speed in (m/sec) = $\frac{\left\{ \frac{\text{RPM} \times \text{Tool } \varnothing}{318} \right\}}{60}$

FEEDRATE – MILLIMETRES / TOOTH

To calculate feed per tooth in mm = $\frac{\text{Feed Rate (mm/min)}}{\text{RPM} \times \text{No. Of Flutes}}$

FEEDRATE – MILLIMETRES / SECOND (FOR ROUTERS)

To calculate feed rate in (mm/sec) = $\frac{\text{Feed Rate (mm/min)}}{60}$

PART NUMBER DESIGNATION

PART NUMBER

E 2 S 0800 L26 R100 S08 X (H45) (Optional Information)
 A B C D E F G H I

- A) E = Endmill B = Ballnose R = RMR Profile WC = Compression RF = RMR Profile / Finish
- B) 2 = 2 flute 3 = 3 flute 4 = 4 flute 6 = 6 flute
- C) S = Short series L = Long series
- D) 0800 = 8mm dia 1200 = 12mm dia
- E) L26 = LOC is 26mm
- F) R100 = Corner radius is 1mm T0130 = Taper Neck Shank 1 Deg 30 min / side
- G) S08 = Shank is 8mm
- H) X = TecLube T = TiN F = Firecoat UAL = Uncoated for aluminium
- I) H45 = 45 Deg Helix HC = Hard Material (45 - 62 HRC)



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AUSTRALIAN MADE 