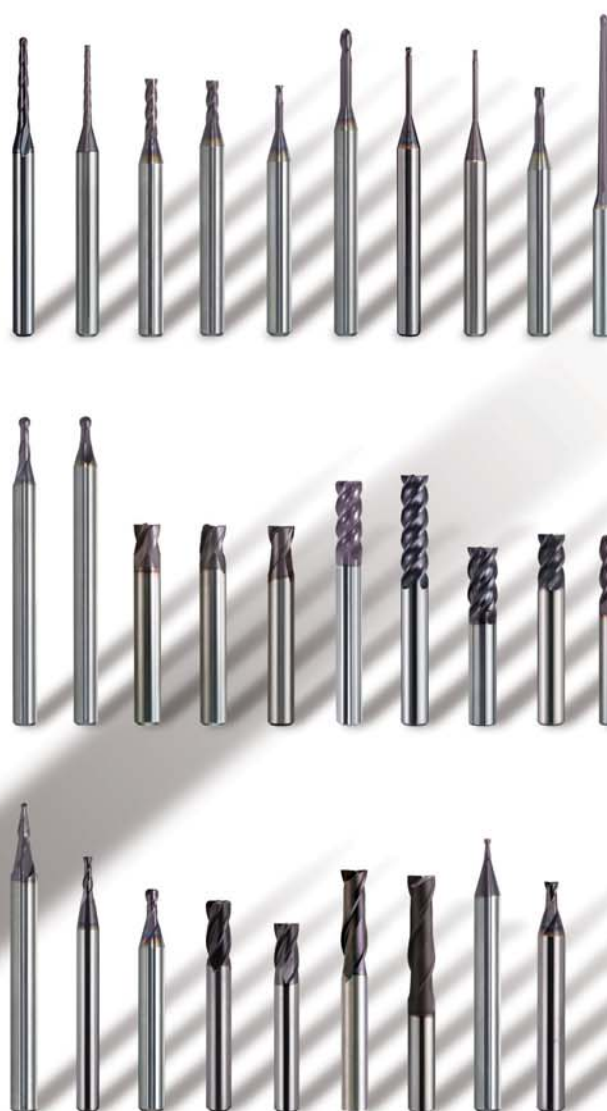


MSTAR



**29 different types.
Line up 1830 sizes.**

29 different types. Line up 1830 sizes.

General Use Series

559 Size



Long Neck
Taper Neck Series

660 Size



High Helix
End Mill Series

177 Size



For Rib Processing
Series

361 Size



For Small
Automatic Lathes Series

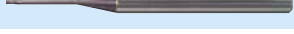
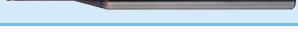
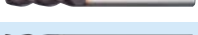
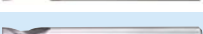
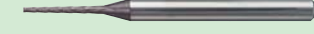
73 Size



1830

29 Series/1830 Size

INDEX

Type	Features	No. of Flutes	Product Code	Shape	Size Range	Dimensions	Cutting Conditions	
SQUARE	General Use	2	MS25S		φ0.1—φ12	⌀P.3	⌀P.63	General Use
		2	MS2MS		φ0.2—φ20	⌀P.4	⌀P.63	
		2	MS2JS		φ0.1—φ12	⌀P.6	⌀P.64	
		2	MS2LS		φ0.2—φ12	⌀P.7	⌀P.65	
		4	MS45C		φ1—φ12	⌀P.8	⌀P.66	
		4	MS4MC		φ1—φ20	⌀P.9	⌀P.66	
		4	MS4JC		φ1—φ12	⌀P.10	⌀P.67	
	Long Neck	2	MS2XL		φ0.2—φ6	⌀P.11	⌀P.68	Long Neck
		2	MS2XL6		φ0.3—φ2.5	⌀P.14	⌀P.69	
		4	MS4XL		φ1—φ10	⌀P.16	⌀P.70	
	High Helix	3	MSMHZD		φ1—φ20	⌀P.19	⌀P.71	High Helix
		4	MS5HD		φ3—φ20	⌀P.20	⌀P.72	
		4	MSMHD		φ2—φ25	⌀P.21	⌀P.72	
		4	MSJHD		φ2—φ20	⌀P.23	⌀P.73	
	For Small Automatic Lathe	2	MS2ES		φ3—φ12	⌀P.24	⌀P.74	For Small Automatic Lathe
		3	MS3ES		φ3—φ12	⌀P.25	⌀P.74	
		4	MS4EC		φ3—φ14	⌀P.26	⌀P.74	
BALL	General Use	2	MS25B		R0.1—R6	⌀P.27	⌀P.75	General Use
		2	MS2MB		R0.25—R6	⌀P.28	⌀P.75	
	Long Neck	2	MS2XLB		R0.1—R3	⌀P.29	⌀P.76	
	Taper Neck	2	MS2XB		R0.1—R2	⌀P.35	⌀P.77	
RADIUS	General Use	2	MS2MRB		φ1 x R0.1—φ12 x R3	⌀P.39	⌀P.63	General Use
		4	MS4MRB		φ3 x R0.1—φ20 x R3	⌀P.41	⌀P.78	
	Long Neck	2	MS2XLRB		φ1 x R0.1—φ6 x R0.5	⌀P.43	⌀P.79	
	High Helix	4	MSMHDRB		φ2 x R0.2—φ20 x R3	⌀P.44	⌀P.80	
TAPER	General Use	2	MS2MT		φ0.2—φ10	⌀P.46	⌀P.81	General Use
	Ball	2	MS2MTB		R0.2—R1.5	⌀P.50	⌀P.75	
	For Rib Processing	4	MS4LT		φ0.2—φ3	⌀P.51	⌀P.82	
		4	MS4LTB		R0.3—R1	⌀P.57	⌀P.83	

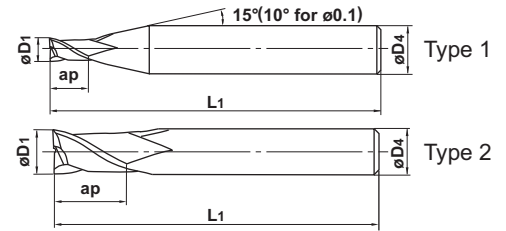
MSTAR END MILLS

MS2SS

End mill, Short cut length, 2 flute



D1=0.1 0 - -0.010
0.1<D1 0 - -0.020



● 2 flute end mill for general use.

Unit : mm

Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
	D1	ap	L1	D4	N		
MS2SSD0010	0.1	0.15	40	4	2	●	1
D0020	0.2	0.3	40	4	2	●	1
D0030	0.3	0.45	40	4	2	●	1
D0040	0.4	0.6	40	4	2	●	1
D0050	0.5	0.75	40	4	2	●	1
D0060	0.6	0.9	40	4	2	●	1
D0070	0.7	1.1	40	4	2	●	1
D0080	0.8	1.2	40	4	2	●	1
D0090	0.9	1.4	40	4	2	●	1
D0100	1	1.5	40	4	2	●	1
D0120	1.2	1.8	40	4	2	●	1
D0150	1.5	2.3	40	4	2	●	1
D0180	1.8	2.7	40	4	2	●	1
D0200	2	3	40	4	2	●	1
D0250	2.5	3.8	40	4	2	●	1
D0300	3	4.5	45	6	2	●	1
D0400	4	6	50	6	2	●	1
D0500	5	7.5	50	6	2	●	1
D0600	6	9	50	6	2	●	2
D0700	7	10.5	60	8	2	●	1
D0800	8	12	60	8	2	●	2
D0900	9	13.5	70	10	2	●	1
D1000	10	15	70	10	2	●	2
D1100	11	16.5	75	12	2	●	1
D1200	12	18	75	12	2	●	2

● : Inventory maintained.

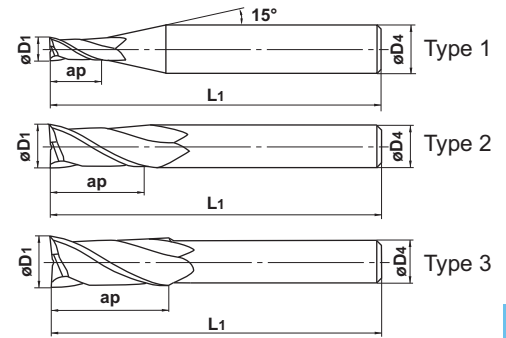
CUTTING CONDITIONS



P.63



● 2 flute end mill for general use.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MSD0020	0.2	0.4	40	4	2	●	1
D0030	0.3	0.6	40	4	2	●	1
D0040	0.4	0.8	40	4	2	●	1
D0050	0.5	1	40	4	2	●	1
D0060	0.6	1.2	40	4	2	●	1
D0070	0.7	1.4	40	4	2	●	1
D0080	0.8	1.6	40	4	2	●	1
D0090	0.9	1.8	40	4	2	●	1
D0100	1	2	40	4	2	●	1
D0110	1.1	2.2	40	4	2	●	1
D0120	1.2	2.4	40	4	2	●	1
D0130	1.3	2.6	40	4	2	●	1
D0140	1.4	2.8	40	4	2	●	1
D0150	1.5	3	40	4	2	●	1
D0160	1.6	3.2	40	4	2	●	1
D0170	1.7	3.4	40	4	2	●	1
D0180	1.8	3.6	40	4	2	●	1
D0190	1.9	3.8	40	4	2	●	1
D0200	2	4	40	4	2	●	1
D0210	2.1	4.2	40	4	2	●	1
D0220	2.2	4.4	40	4	2	●	1
D0230	2.3	4.6	40	4	2	●	1
D0240	2.4	4.8	40	4	2	●	1
D0250	2.5	5	40	4	2	●	1
D0260	2.6	5.2	40	4	2	●	1
D0270	2.7	5.4	40	4	2	●	1
D0280	2.8	5.6	40	4	2	●	1
D0290	2.9	5.8	40	4	2	●	1
D0300	3	6	45	6	2	●	1
D0310	3.1	6.2	45	6	2	●	1
D0320	3.2	6.4	45	6	2	●	1
D0330	3.3	6.6	45	6	2	●	1
D0340	3.4	6.8	45	6	2	●	1
D0350	3.5	7	45	6	2	●	1
D0360	3.6	7.2	45	6	2	●	1
D0370	3.7	7.4	45	6	2	●	1
D0380	3.8	7.6	45	6	2	●	1
D0390	3.9	7.8	45	6	2	●	1

General Use

SQUARE
Long Neck

High Helix

For Small
Automatic Lathe

BALL
Long Neck

RADIUS
Long Neck

General Use

TAPER
For Rib Processing

MSTAR END MILLS

MS2MS

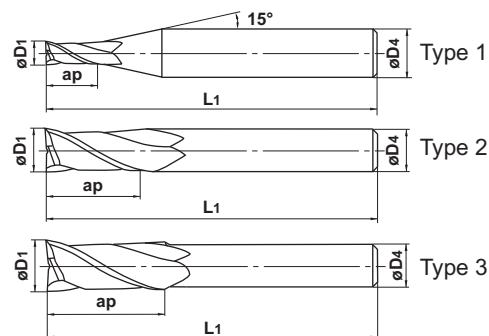
End mill, Medium cut length, 2 flute



$D_1 \leq 12$ 0 — -0.020
 $12 < D_1$ 0 — -0.030



● 2 flute end mill for general use.



Unit : mm

	Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		D1	ap	L1	D4	N		
General Use	MS2MSD0400	4	8	50	6	2	●	1
	D0410	4.1	8.2	50	6	2	●	1
	D0420	4.2	8.4	50	6	2	●	1
	D0430	4.3	8.6	50	6	2	●	1
	D0440	4.4	8.8	50	6	2	●	1
	D0450	4.5	9	50	6	2	●	1
	D0460	4.6	9.2	50	6	2	●	1
	D0470	4.7	9.4	50	6	2	●	1
	D0480	4.8	9.6	50	6	2	●	1
	D0490	4.9	9.8	50	6	2	●	1
Long Neck	D0500	5	10	50	6	2	●	1
	D0510	5.1	10.2	50	6	2	●	1
	D0520	5.2	10.4	50	6	2	●	1
	D0530	5.3	10.6	50	6	2	●	1
	D0540	5.4	10.8	50	6	2	●	1
	D0550	5.5	11	50	6	2	●	1
	D0560	5.6	11.2	50	6	2	●	1
	D0570	5.7	11.4	50	6	2	●	1
	D0580	5.8	11.6	50	6	2	●	1
	D0590	5.9	11.8	50	6	2	●	1
High Helix	D0600	6	12	50	6	2	●	2
	D0650	6.5	13	60	8	2	●	1
	D0700	7	14	60	8	2	●	1
	D0750	7.5	15	60	8	2	●	1
	D0800	8	16	60	8	2	●	2
	D0850	8.5	17	70	10	2	●	1
	D0900	9	18	70	10	2	●	1
	D0950	9.5	19	70	10	2	●	1
	D1000	10	20	70	10	2	●	2
	D1100	11	22	75	12	2	●	1
For Small Automatic Lathe	D1200	12	24	75	12	2	●	2
	D1600	16	32	90	16	2	●	2
	D1800	18	36	90	16	2	●	3
	D2000	20	40	100	20	2	●	2
General Use								
Long Neck								
Taper Neck								
General Use								
Long Neck								
Taper Neck								
General Use								
Long Neck								
Taper Neck								
General Use								
Long Neck								
Taper Neck								

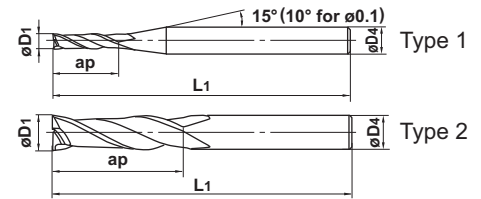
The diameter tolerance is only applied to items produced after July 2006.

● : Inventory maintained.

CUTTING CONDITIONS



P.63



D1 < 3

D1 < 3

3 ≤ D1

● 2 flute end mill for general use.

Unit : mm

Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
	D1	ap	L1	D4	N		
MS2JSD0010	0.1	0.3	40	4	2	●	1
D0020	0.2	0.6	40	4	2	●	1
D0030	0.3	0.9	40	4	2	●	1
D0040	0.4	1.2	40	4	2	●	1
D0050	0.5	1.5	40	4	2	●	1
D0060	0.6	1.8	40	4	2	●	1
D0070	0.7	2.1	40	4	2	●	1
D0080	0.8	2.4	40	4	2	●	1
D0090	0.9	2.7	40	4	2	●	1
D0100	1	3	40	4	2	●	1
D0120	1.2	3.6	40	4	2	●	1
D0150	1.5	4.5	40	4	2	●	1
D0180	1.8	5.4	40	4	2	●	1
D0200	2	6	40	4	2	●	1
D0250	2.5	7.5	40	4	2	●	1
D0300	3	9	45	6	2	●	1
D0400	4	12	50	6	2	●	1
D0500	5	15	50	6	2	●	1
D0600	6	18	50	6	2	●	2
D0800	8	24	70	8	2	●	2
D1000	10	30	90	10	2	●	2
D1200	12	36	90	12	2	●	2

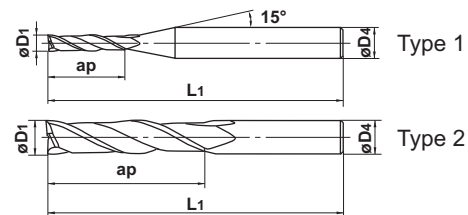
The diameter tolerance is only applied to items produced after July 2006.

SQUARE	General Use
	Long Neck
	High Helix
BALL	For Small Automatic Lathe
	General Use
RADIUS	Long Neck
	High Helix
TAPER	General Use
	For Rib Processing

MSTAR END MILLS

MS2LS

End mill, long cut length, 2 flute



$D1 < 3$

$D1 < 3$

$3 \leq D1$

● 2 flute end mill for general use.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2LSD0020	0.2	0.8	40	4	2	●	1
D0030	0.3	1.2	40	4	2	●	1
D0040	0.4	1.6	40	4	2	●	1
D0050	0.5	2	40	4	2	●	1
D0060	0.6	2.4	40	4	2	●	1
D0070	0.7	2.8	40	4	2	●	1
D0080	0.8	3.2	40	4	2	●	1
D0090	0.9	3.6	40	4	2	●	1
D0100	1	4	40	4	2	●	1
D0150	1.5	6	40	4	2	●	1
D0200	2	8	40	4	2	●	1
D0250	2.5	10	50	4	2	●	1
D0300	3	12	50	6	2	●	1
D0400	4	16	50	6	2	●	1
D0500	5	20	60	6	2	●	1
D0600	6	24	60	6	2	●	2
D0800	8	32	70	8	2	●	2
D1000	10	40	90	10	2	●	2
D1200	12	48	110	12	2	●	2

General Use

Long Neck

High Helix

For Small Automatic Lathe

Long Neck

Taper Neck

General Use

Long Neck

High Helix

General Use

For Rib Processing

Ball

TAPER

SQUARE

BALL

RADIUS

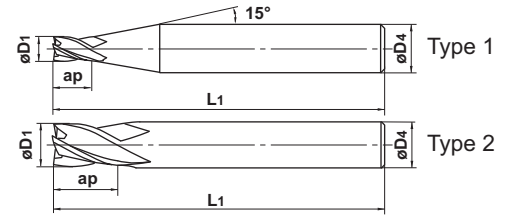


MS45C

End mill, Short cut length, 4 flute



0 - -0.020



● 4 flute end mill for general use.

Unit : mm

Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
	D1	ap	L1	D4	N		
MS4SCD0100	1	1.5	40	4	4	●	1
D0150	1.5	2.3	40	4	4	●	1
D0200	2	3	40	4	4	●	1
D0250	2.5	3.8	40	4	4	●	1
D0300	3	4.5	50	6	4	●	1
D0400	4	6	50	6	4	●	1
D0500	5	7.5	50	6	4	●	1
D0600	6	9	50	6	4	●	2
D0800	8	12	60	8	4	●	2
D1000	10	15	70	10	4	●	2
D1200	12	18	75	12	4	●	2

General Use

SQUARE
Long Neck

High Helix

For Small
Automatic Lathe

BALL
Taper
Long Neck

RADIUS
Long Neck

High Helix

General Use

TAPER
Ball
For Rib Processing

MSTAR END MILLS

MS4MC

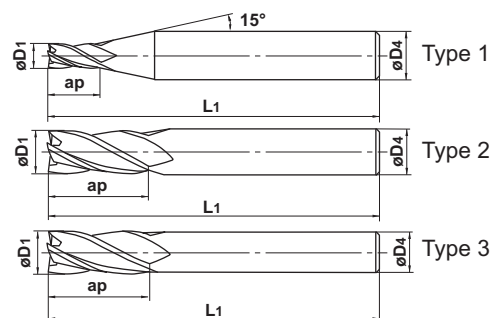
End mill, Medium cut length, 4 flute



D1 ≤ 12 0 — -0.020
12 < D1 0 — -0.030



● 4 flute end mill for general use.



Unit : mm

Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
	D1	ap	L1	D4	N		
MS4MCD0100	1	2.5	40	4	4	●	1
D0150	1.5	3.8	40	4	4	●	1
D0200	2	5	40	4	4	●	1
D0250	2.5	6.3	40	4	4	●	1
D0300	3	7.5	50	6	4	●	1
D0350	3.5	9	50	6	4	●	1
D0400	4	10	50	6	4	●	1
D0450	4.5	11.5	50	6	4	●	1
D0500	5	12.5	50	6	4	●	1
D0550	5.5	14	50	6	4	●	1
D0600	6	15	50	6	4	●	2
D0650	6.5	16.5	60	8	4	●	1
D0700	7	17.5	60	8	4	●	1
D0750	7.5	19	60	8	4	●	1
D0800	8	20	60	8	4	●	2
D0850	8.5	21.5	70	10	4	●	1
D0900	9	22.5	70	10	4	●	1
D0950	9.5	24	70	10	4	●	1
D1000	10	25	70	10	4	●	2
D1100	11	27.5	75	12	4	●	1
D1200	12	30	90	12	4	●	2
D1400	14	35	90	12	4	●	3
D1600	16	40	100	16	4	●	2
D1800	18	45	100	16	4	●	3
D2000	20	50	110	20	4	●	2

The diameter tolerance is only applied to items produced after July 2006.

General Use

Long Neck

High Helix

For Small Automatic Lathe

General Use

Long Neck

General Use

Long Neck

General Use

For Rib Processing

9

● : Inventory maintained.

CUTTING CONDITIONS



P.66

MS4JC

End mill, Semi long cut length, 4 flute

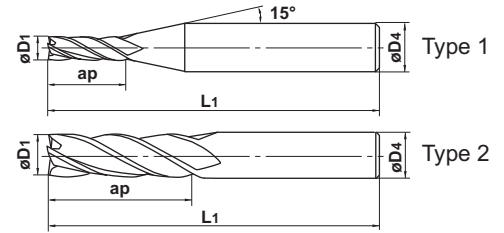


0 - -0.020



D1 < 3

● 4 flute end mill for general use.



Unit : mm

Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
	D1	ap	L1	D4	N		
MS4JCD0100	1	4	40	4	4	●	1
D0150	1.5	6	40	4	4	●	1
D0200	2	8	40	4	4	●	1
D0250	2.5	10	50	4	4	●	1
D0300	3	12	50	6	4	●	1
D0400	4	16	50	6	4	●	1
D0500	5	20	60	6	4	●	1
D0600	6	24	60	6	4	●	2
D0800	8	32	70	8	4	●	2
D1000	10	40	90	10	4	●	2
D1200	12	48	110	12	4	●	2

The diameter tolerance is only applied to items produced after July 2006.

General Use

SQUARE
Long Neck

High Helix

For Small
Automatic Lathe

BALL
Taper Neck
Long Neck

RADIUS
Long Neck
High Helix

TAPER
Ball
For Rib Processing

CUTTING CONDITIONS



P.67

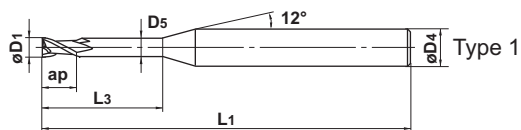
MSTAR END MILLS

MS2XL

End mill, Short cut length, 2 flute, Long neck



$D_1 < 0.5$ 0 — -0.010
 $0.5 \leq D_1$ 0 — -0.020



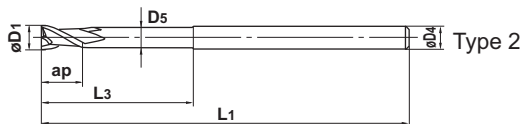
Type 1



$D_1 < 0.4$



$0.4 \leq D_1$



Type 2

● 2 flute long neck end mill.

Unit : mm

	Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
		D1	ap	L3	D5	L1	D4	N	Stock	Type
General Use	MS2XLD0020N005	0.2	0.3	0.5	0.18	45	4	2	●	1
	D0020N010	0.2	0.3	1	0.18	45	4	2	●	1
	D0020N015	0.2	0.3	1.5	0.18	45	4	2	●	1
	D0030N010	0.3	0.4	1	0.28	45	4	2	●	1
	D0030N020	0.3	0.4	2	0.28	45	4	2	●	1
	D0030N030	0.3	0.4	3	0.28	45	4	2	●	1
	D0030N060	0.3	0.4	6	0.28	45	4	2	●	1
	D0030N090	0.3	0.4	9	0.28	45	4	2	●	1
	D0040N020	0.4	0.6	2	0.37	45	4	2	●	1
	D0040N030	0.4	0.6	3	0.37	45	4	2	●	1
Long Neck	D0040N040	0.4	0.6	4	0.37	45	4	2	●	1
	D0040N080	0.4	0.6	8	0.37	45	4	2	●	1
	D0040N120	0.4	0.6	12	0.37	45	4	2	●	1
	D0050N020	0.5	0.7	2	0.46	45	4	2	●	1
	D0050N040	0.5	0.7	4	0.46	45	4	2	●	1
	D0050N060	0.5	0.7	6	0.46	45	4	2	●	1
	D0050N080	0.5	0.7	8	0.46	50	4	2	●	1
	D0050N100	0.5	0.7	10	0.46	50	4	2	●	1
	D0050N150	0.5	0.7	15	0.46	50	4	2	●	1
	D0060N020	0.6	0.9	2	0.56	45	4	2	●	1
High Helix	D0060N040	0.6	0.9	4	0.56	45	4	2	●	1
	D0060N060	0.6	0.9	6	0.56	45	4	2	●	1
	D0060N080	0.6	0.9	8	0.56	50	4	2	●	1
	D0060N100	0.6	0.9	10	0.56	50	4	2	●	1
	D0060N120	0.6	0.9	12	0.56	50	4	2	●	1
	D0060N180	0.6	0.9	18	0.56	50	4	2	●	1
	D0070N020	0.7	1	2	0.66	45	4	2	●	1
	D0070N040	0.7	1	4	0.66	45	4	2	●	1
	D0070N060	0.7	1	6	0.66	45	4	2	●	1
	D0070N080	0.7	1	8	0.66	50	4	2	●	1
For Small Automatic Lathe	D0070N100	0.7	1	10	0.66	50	4	2	●	1
	D0080N040	0.8	1.2	4	0.76	45	4	2	●	1
	D0080N060	0.8	1.2	6	0.76	45	4	2	●	1
	D0080N080	0.8	1.2	8	0.76	50	4	2	●	1
	D0080N100	0.8	1.2	10	0.76	50	4	2	●	1
	D0080N120	0.8	1.2	12	0.76	50	4	2	●	1
	D0080N160	0.8	1.2	16	0.76	50	4	2	●	1
	D0080N240	0.8	1.2	24	0.76	60	4	2	●	1

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2XLD0090N060	0.9	1.4	6	0.86	45	4	2	●	1
D0090N080	0.9	1.4	8	0.86	50	4	2	●	1
D0090N100	0.9	1.4	10	0.86	50	4	2	●	1
D0090N150	0.9	1.4	15	0.86	60	4	2	●	1
D0100N040	1	1.5	4	0.95	50	4	2	●	1
D0100N060	1	1.5	6	0.95	50	4	2	●	1
D0100N080	1	1.5	8	0.95	50	4	2	●	1
D0100N100	1	1.5	10	0.95	50	4	2	●	1
D0100N120	1	1.5	12	0.95	50	4	2	●	1
D0100N160	1	1.5	16	0.95	60	4	2	●	1
D0100N200	1	1.5	20	0.95	60	4	2	●	1
D0100N250	1	1.5	25	0.95	70	4	2	●	1
D0100N300	1	1.5	30	0.95	70	4	2	●	1
D0120N060	1.2	1.8	6	1.15	50	4	2	●	1
D0120N080	1.2	1.8	8	1.15	50	4	2	●	1
D0120N100	1.2	1.8	10	1.15	50	4	2	●	1
D0120N120	1.2	1.8	12	1.15	50	4	2	●	1
D0120N160	1.2	1.8	16	1.15	60	4	2	●	1
D0120N200	1.2	1.8	20	1.15	60	4	2	●	1
D0150N060	1.5	2.3	6	1.45	50	4	2	●	1
D0150N080	1.5	2.3	8	1.45	50	4	2	●	1
D0150N100	1.5	2.3	10	1.45	50	4	2	●	1
D0150N120	1.5	2.3	12	1.45	50	4	2	●	1
D0150N140	1.5	2.3	14	1.45	60	4	2	●	1
D0150N160	1.5	2.3	16	1.45	60	4	2	●	1
D0150N180	1.5	2.3	18	1.45	60	4	2	●	1
D0150N200	1.5	2.3	20	1.45	60	4	2	●	1
D0150N250	1.5	2.3	25	1.45	70	4	2	●	1
D0150N300	1.5	2.3	30	1.45	70	4	2	●	1
D0150N380	1.5	2.3	38	1.45	80	4	2	●	1
D0150N450	1.5	2.3	45	1.45	80	4	2	●	1
D0200N060	2	3	6	1.94	50	4	2	●	1
D0200N080	2	3	8	1.94	50	4	2	●	1
D0200N100	2	3	10	1.94	50	4	2	●	1
D0200N120	2	3	12	1.94	50	4	2	●	1
D0200N140	2	3	14	1.94	60	4	2	●	1
D0200N160	2	3	16	1.94	60	4	2	●	1
D0200N180	2	3	18	1.94	60	4	2	●	1
D0200N200	2	3	20	1.94	60	4	2	●	1
D0200N250	2	3	25	1.94	70	4	2	●	1
D0200N300	2	3	30	1.94	70	4	2	●	1
D0200N350	2	3	35	1.94	80	4	2	●	1
D0200N400	2	3	40	1.94	90	4	2	●	1
D0200N500	2	3	50	1.94	100	4	2	●	1
D0200N600	2	3	60	1.94	110	4	2	●	1
D0250N080	2.5	3.7	8	2.4	50	4	2	●	1
D0250N120	2.5	3.7	12	2.4	50	4	2	●	1
D0250N160	2.5	3.7	16	2.4	60	4	2	●	1

SQUARE	General Use
	Long Neck
	High Helix
	For Small Automatic Lathe
BALL	General Use
	Long Neck
	Taper Neck
RADIUS	General Use
	Long Neck
	High Helix
TAPER	General Use
	Ball Processing

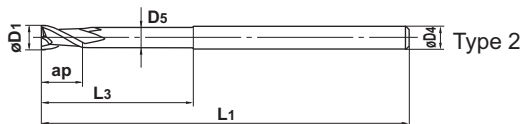
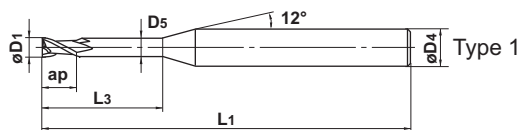
MSTAR END MILLS

MS2XL

End mill, Short cut length, 2 flute, Long neck



D1 < 0.5 0 - -0.010
0.5 ≤ D1 0 - -0.020



D1 < 0.4

0.4 ≤ D1

● 2 flute long neck end mill.

Unit : mm

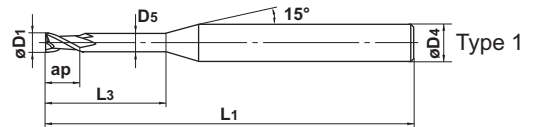
Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2XLD0250N200	2.5	3.7	20	2.4	60	4	2	●	1
D0250N250	2.5	3.7	25	2.4	70	4	2	●	1
D0250N300	2.5	3.7	30	2.4	70	4	2	●	1
D0250N400	2.5	3.7	40	2.4	90	4	2	●	1
D0250N500	2.5	3.7	50	2.4	100	4	2	●	1
D0300N080	3	4.5	8	2.85	50	6	2	●	1
D0300N120	3	4.5	12	2.85	50	6	2	●	1
D0300N160	3	4.5	16	2.85	60	6	2	●	1
D0300N200	3	4.5	20	2.85	60	6	2	●	1
D0300N250	3	4.5	25	2.85	70	6	2	●	1
D0300N300	3	4.5	30	2.85	70	6	2	●	1
D0300N400	3	4.5	40	2.85	90	6	2	●	1
D0300N500	3	4.5	50	2.85	100	6	2	●	1
D0400N120	4	6	12	3.8	50	6	2	●	1
D0400N160	4	6	16	3.8	60	6	2	●	1
D0400N200	4	6	20	3.8	60	6	2	●	1
D0400N250	4	6	25	3.8	70	6	2	●	1
D0400N300	4	6	30	3.8	70	6	2	●	1
D0400N350	4	6	35	3.8	80	6	2	●	1
D0400N400	4	6	40	3.8	90	6	2	●	1
D0400N450	4	6	45	3.8	90	6	2	●	1
D0400N500	4	6	50	3.8	100	6	2	●	1
D0400N600	4	6	60	3.8	110	6	2	●	1
D0500N160	5	7.5	16	4.8	60	6	2	●	1
D0500N250	5	7.5	25	4.8	70	6	2	●	1
D0500N350	5	7.5	35	4.8	80	6	2	●	1
D0500N500	5	7.5	50	4.8	110	6	2	●	1
D0500N600	5	7.5	60	4.8	120	6	2	●	1
D0600N200	6	9	20	5.8	80	6	2	●	2
D0600N300	6	9	30	5.8	90	6	2	●	2
D0600N400	6	9	40	5.8	100	6	2	●	2
D0600N500	6	9	50	5.8	110	6	2	●	2
D0600N600	6	9	60	5.8	120	6	2	●	2

● : Inventory maintained.

CUTTING CONDITIONS



P.68



- 2 flute long neck end mill.
- $\phi 6$ shank type.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2XL6D0030N008	0.3	0.8	—	—	50	6	2	●	1
D0030N015	0.3	0.5	1.5	0.27	50	6	2	●	1
D0040N010	0.4	0.6	1	0.36	50	6	2	●	1
D0040N020	0.4	0.6	2	0.36	50	6	2	●	1
D0050N013	0.5	0.8	1.3	0.46	50	6	2	●	1
D0050N025	0.5	0.8	2.5	0.46	50	6	2	●	1
D0060N015	0.6	0.9	1.5	0.56	50	6	2	●	1
D0060N030	0.6	0.9	3	0.56	50	6	2	●	1
D0070N018	0.7	1.1	1.8	0.66	50	6	2	●	1
D0070N035	0.7	1.1	3.5	0.66	50	6	2	●	1
D0080N020	0.8	1.2	2	0.76	50	6	2	●	1
D0080N040	0.8	1.2	4	0.76	50	6	2	●	1
D0090N023	0.9	1.4	2.3	0.86	50	6	2	●	1
D0090N045	0.9	1.4	4.5	0.86	50	6	2	●	1
D0100N025	1	1.5	2.5	0.94	50	6	2	●	1
D0100N050	1	1.5	5	0.94	50	6	2	●	1
D0110N028	1.1	1.7	2.8	1.04	50	6	2	●	1
D0110N055	1.1	1.7	5.5	1.04	50	6	2	●	1
D0120N030	1.2	1.8	3	1.14	50	6	2	●	1
D0120N060	1.2	1.8	6	1.14	50	6	2	●	1
D0130N033	1.3	2	3.3	1.24	50	6	2	●	1
D0130N065	1.3	2	6.5	1.24	50	6	2	●	1
D0140N035	1.4	2.1	3.5	1.34	50	6	2	●	1
D0140N070	1.4	2.1	7	1.34	50	6	2	●	1
D0150N038	1.5	2.3	3.8	1.44	50	6	2	●	1
D0150N075	1.5	2.3	7.5	1.44	50	6	2	●	1
D0160N040	1.6	2.4	4	1.54	50	6	2	●	1
D0160N080	1.6	2.4	8	1.54	50	6	2	●	1
D0170N043	1.7	2.6	4.3	1.64	50	6	2	●	1
D0170N085	1.7	2.6	8.5	1.64	50	6	2	●	1
D0180N045	1.8	2.7	4.5	1.74	50	6	2	●	1
D0180N090	1.8	2.7	9	1.74	50	6	2	●	1
D0190N048	1.9	2.9	4.8	1.84	50	6	2	●	1
D0190N095	1.9	2.9	9.5	1.84	50	6	2	●	1
D0200N050	2	3	5	1.90	50	6	2	●	1
D0200N100	2	3	10	1.90	50	6	2	●	1
D0210N053	2.1	3.2	5.3	2.00	50	6	2	●	1
D0210N105	2.1	3.2	10.5	2.00	60	6	2	●	1

General Use

SQUARE
Long Neck

High Helix

For Small
Automatic Lathe

BALL
Long Neck

RADIUS
Long Neck

TAPER
Ball

For Rib
Processing

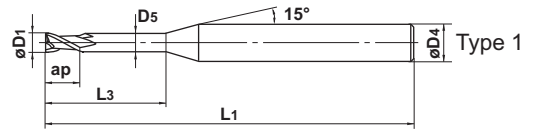
MSTAR END MILLS

MS2XL6

End mill, Short cut length, 2 flute, 6mm shank



0 - -0.020



- 2 flute long neck end mill.
- $\phi 6$ shank type.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2XL6D0220N055	2.2	3.3	5.5	2.10	50	6	2	●	1
D0220N110	2.2	3.3	11	2.10	60	6	2	●	1
D0230N058	2.3	3.5	5.8	2.20	50	6	2	●	1
D0230N115	2.3	3.5	11.5	2.20	60	6	2	●	1
D0240N060	2.4	3.6	6	2.30	50	6	2	●	1
D0240N120	2.4	3.6	12	2.30	60	6	2	●	1
D0250N063	2.5	3.8	6.3	2.40	50	6	2	●	1
D0250N125	2.5	3.8	12.5	2.40	60	6	2	●	1

The diameter tolerance is only applied to items produced after April 2005.

General Use

Long Neck
SQUARE

High Helix

For Small
Automatic Lathe

Long Neck
BALL

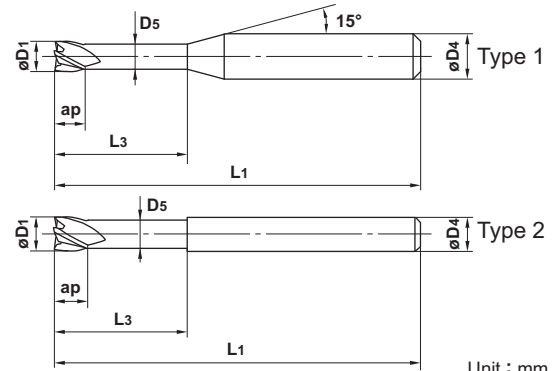
General Use
RADIUS

High Helix
General Use

For Rib
Processing
TAPER



● 4 flute long neck end mill.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4XLD0100N040	1	1	4	0.94	50	4	4	●	1
D0100N060	1	1	6	0.94	50	4	4	●	1
D0100N080	1	1	8	0.94	50	4	4	●	1
D0100N100	1	1	10	0.94	50	4	4	●	1
D0100N120	1	1	12	0.94	50	4	4	●	1
D0100N160	1	1	16	0.94	60	4	4	●	1
D0110N060	1.1	1.1	6	1.04	50	4	4	●	1
D0110N100	1.1	1.1	10	1.04	50	4	4	●	1
D0110N160	1.1	1.1	16	1.04	60	4	4	●	1
D0120N060	1.2	1.2	6	1.14	50	4	4	●	1
D0120N080	1.2	1.2	8	1.14	50	4	4	●	1
D0120N100	1.2	1.2	10	1.14	50	4	4	●	1
D0120N120	1.2	1.2	12	1.14	50	4	4	●	1
D0120N160	1.2	1.2	16	1.14	60	4	4	●	1
D0130N060	1.3	1.3	6	1.24	50	4	4	●	1
D0130N120	1.3	1.3	12	1.24	50	4	4	●	1
D0130N180	1.3	1.3	18	1.24	60	4	4	●	1
D0140N060	1.4	1.4	6	1.34	50	4	4	●	1
D0140N080	1.4	1.4	8	1.34	50	4	4	●	1
D0140N100	1.4	1.4	10	1.34	50	4	4	●	1
D0140N120	1.4	1.4	12	1.34	50	4	4	●	1
D0140N140	1.4	1.4	14	1.34	60	4	4	●	1
D0140N160	1.4	1.4	16	1.34	60	4	4	●	1
D0140N220	1.4	1.4	22	1.34	60	4	4	●	1
D0150N060	1.5	1.5	6	1.44	50	4	4	●	1
D0150N080	1.5	1.5	8	1.44	50	4	4	●	1
D0150N100	1.5	1.5	10	1.44	50	4	4	●	1
D0150N120	1.5	1.5	12	1.44	50	4	4	●	1
D0150N140	1.5	1.5	14	1.44	60	4	4	●	1
D0150N160	1.5	1.5	16	1.44	60	4	4	●	1
D0150N180	1.5	1.5	18	1.44	60	4	4	●	1
D0150N200	1.5	1.5	20	1.44	60	4	4	●	1
D0160N060	1.6	1.6	6	1.54	50	4	4	●	1
D0160N080	1.6	1.6	8	1.54	50	4	4	●	1
D0160N100	1.6	1.6	10	1.54	50	4	4	●	1
D0160N120	1.6	1.6	12	1.54	50	4	4	●	1
D0160N140	1.6	1.6	14	1.54	60	4	4	●	1
D0160N160	1.6	1.6	16	1.54	60	4	4	●	1

General Use

SQUARE
Long Neck

High Helix

For Small
Automatic Lathe

BALL
Long Neck

RADIUS
Long Neck

TAPER
For Rib Processing

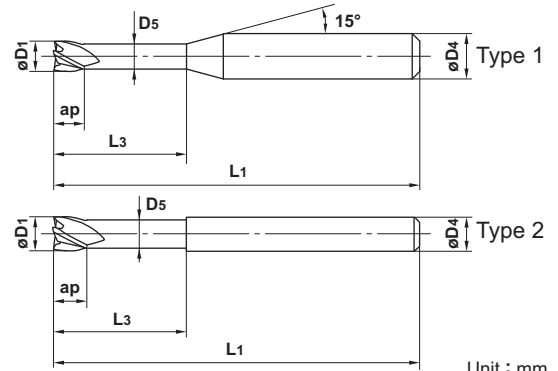
MSTAR END MILLS

MS4XL

End mill, Short cut length, 4 flute, Long neck



● 4 flute long neck end mill.



	Order Number	Dia.	Length of Cut	Neck Length	Neck Dia.	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		D1	ap	L3	D5	L1	D4	N		
General Use	MS4XLD0160N180	1.6	1.6	18	1.54	60	4	4	●	1
	D0160N200	1.6	1.6	20	1.54	60	4	4	●	1
	D0160N260	1.6	1.6	26	1.54	70	4	4	●	1
	D0170N060	1.7	1.7	6	1.64	50	4	4	●	1
	D0170N140	1.7	1.7	14	1.64	60	4	4	●	1
	D0170N240	1.7	1.7	24	1.64	70	4	4	●	1
	D0180N060	1.8	1.8	6	1.74	50	4	4	●	1
	D0180N080	1.8	1.8	8	1.74	50	4	4	●	1
	D0180N100	1.8	1.8	10	1.74	50	4	4	●	1
	D0180N120	1.8	1.8	12	1.74	50	4	4	●	1
	D0180N140	1.8	1.8	14	1.74	60	4	4	●	1
	D0180N160	1.8	1.8	16	1.74	60	4	4	●	1
	D0180N180	1.8	1.8	18	1.74	60	4	4	●	1
	D0180N200	1.8	1.8	20	1.74	60	4	4	●	1
	D0180N250	1.8	1.8	25	1.74	70	4	4	●	1
Long Neck	D0190N060	1.9	1.9	6	1.84	50	4	4	●	1
	D0190N160	1.9	1.9	16	1.84	60	4	4	●	1
	D0190N280	1.9	1.9	28	1.84	70	4	4	●	1
	D0200N060	2	2	6	1.9	50	4	4	●	1
	D0200N080	2	2	8	1.9	50	4	4	●	1
	D0200N100	2	2	10	1.9	50	4	4	●	1
	D0200N120	2	2	12	1.9	50	4	4	●	1
	D0200N140	2	2	14	1.9	60	4	4	●	1
	D0200N160	2	2	16	1.9	60	4	4	●	1
	D0200N180	2	2	18	1.9	60	4	4	●	1
	D0200N200	2	2	20	1.9	60	4	4	●	1
	D0200N250	2	2	25	1.9	70	4	4	●	1
	D0200N300	2	2	30	1.9	70	4	4	●	1
	D0250N080	2.5	2.5	8	2.4	50	4	4	●	1
	D0250N120	2.5	2.5	12	2.4	50	4	4	●	1
High Helix	D0250N160	2.5	2.5	16	2.4	60	4	4	●	1
	D0250N200	2.5	2.5	20	2.4	60	4	4	●	1
	D0250N250	2.5	2.5	25	2.4	70	4	4	●	1
	D0300N080	3	3	8	2.9	50	6	4	●	1
	D0300N120	3	3	12	2.9	50	6	4	●	1
	D0300N160	3	3	16	2.9	60	6	4	●	1
	D0300N200	3	3	20	2.9	60	6	4	●	1
	D0300N250	3	3	25	2.9	70	6	4	●	1
For Small Automatic Lathe										
General Use										

● : Inventory maintained.

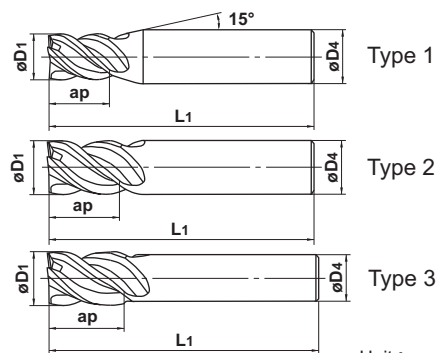
Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4XLD0300N300	3	3	30	2.9	70	6	4	●	1
D0350N150	3.5	3.5	15	3.4	60	6	4	●	1
D0350N250	3.5	3.5	25	3.4	70	6	4	●	1
D0350N350	3.5	3.5	35	3.4	80	6	4	●	1
D0400N120	4	4	12	3.9	50	6	4	●	1
D0400N160	4	4	16	3.9	60	6	4	●	1
D0400N200	4	4	20	3.9	60	6	4	●	1
D0400N250	4	4	25	3.9	70	6	4	●	1
D0400N300	4	4	30	3.9	70	6	4	●	1
D0400N350	4	4	35	3.9	80	6	4	●	1
D0400N400	4	4	40	3.9	90	6	4	●	1
D0400N450	4	4	45	3.9	90	6	4	●	1
D0400N500	4	4	50	3.9	100	6	4	●	1
D0500N160	5	5	16	4.9	60	6	4	●	1
D0500N250	5	5	25	4.9	70	6	4	●	1
D0500N350	5	5	35	4.9	80	6	4	●	1
D0500N500	5	5	50	4.9	110	6	4	●	1
D0600N200	6	6	20	5.85	80	6	4	●	2
D0600N300	6	6	30	5.85	90	6	4	●	2
D0600N400	6	6	40	5.85	100	6	4	●	2
D0600N500	6	6	50	5.85	110	6	4	●	2
D0800N300	8	8	30	7.85	90	8	4	●	2
D0800N500	8	8	50	7.85	110	8	4	●	2
D0800N700	8	8	70	7.85	130	8	4	●	2
D1000N400	10	10	40	9.7	100	10	4	●	2
D1000N600	10	10	60	9.7	120	10	4	●	2
D1000N800	10	10	80	9.7	140	10	4	●	2

SQUARE	General Use	
	Long Neck	
	High Helix	
	For Small Automatic Lathe	
BALL	General Use	
	Long Neck	
RADIUS	General Use	
	Long Neck	
TAPER	High Helix	
	General Use	
TAPER	Ball	
	For Rib Processing	



● 4 flute high power end mill.



Unit : mm

Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
	D1	ap	L1	D4	N		
MSSHDD0300	3	4.5	45	6	4	●	1
D0350	3.5	5.3	45	6	4	●	1
D0400	4	6	45	6	4	●	1
D0450	4.5	6.8	45	6	4	●	1
D0500	5	7.5	50	6	4	●	1
D0550	5.5	8.3	50	6	4	●	1
D0600	6	9	50	6	4	●	2
D0650	6.5	9.8	60	8	4	●	1
D0700	7	10.5	60	8	4	●	1
D0750	7.5	11.3	60	8	4	●	1
D0800	8	12	60	8	4	●	2
D0850	8.5	12.8	70	10	4	●	1
D0900	9	13.5	70	10	4	●	1
D0950	9.5	14.3	70	10	4	●	1
D1000	10	15	70	10	4	●	2
D1100	11	16.5	75	12	4	●	1
D1200	12	18	75	12	4	●	2
D1300	13	19.5	75	12	4	●	3
D1400	14	21	90	16	4	●	1
D1500	15	22.5	90	16	4	●	1
D1600	16	24	90	16	4	●	2
D1700	17	25.5	100	16	4	●	3
D1800	18	27	100	16	4	●	3
D1900	19	28.5	110	20	4	●	1
D2000	20	30	110	20	4	●	2

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL

Long Neck

Taper Neck

RADIUS

Long Neck

High Helix

TAPER

Ball

For Rib Processing

MSTAR END MILLS

MSMHDD

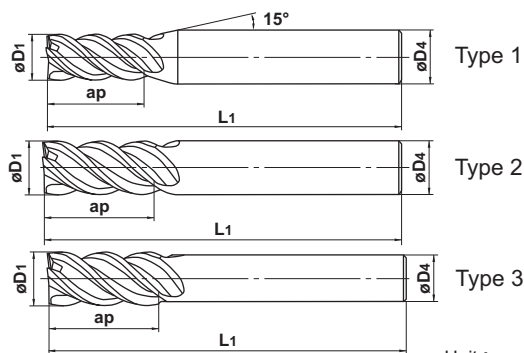
High power, Medium cut length, 4 flute



$D_1 \leq 12$ 0 — -0.020
 $12 < D_1$ 0 — -0.030



● 4 flute high power end mill.



Unit : mm

	Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		D1	ap	L1	D4	N		
General Use	MSMHDD0200	2	4	45	4	4	●	1
	D0210	2.1	5	45	4	4	●	1
	D0220	2.2	5	45	4	4	●	1
	D0230	2.3	5	45	4	4	●	1
	D0240	2.4	5	45	4	4	●	1
	D0250	2.5	5	45	4	4	●	1
	D0260	2.6	6	45	4	4	●	1
	D0270	2.7	6	45	4	4	●	1
	D0280	2.8	6	45	4	4	●	1
	D0290	2.9	6	45	4	4	●	1
Long Neck	D0300	3	8	45	6	4	●	1
	D0310	3.1	8	45	6	4	●	1
	D0320	3.2	8	45	6	4	●	1
	D0330	3.3	8	45	6	4	●	1
	D0340	3.4	8	45	6	4	●	1
	D0350	3.5	8	45	6	4	●	1
	D0360	3.6	11	45	6	4	●	1
	D0370	3.7	11	45	6	4	●	1
	D0380	3.8	11	45	6	4	●	1
	D0390	3.9	11	45	6	4	●	1
High Helix	D0400	4	11	45	6	4	●	1
	D0410	4.1	12	45	6	4	●	1
	D0420	4.2	12	45	6	4	●	1
	D0430	4.3	12	45	6	4	●	1
	D0440	4.4	12	45	6	4	●	1
	D0450	4.5	12	45	6	4	●	1
	D0460	4.6	13	50	6	4	●	1
	D0470	4.7	13	50	6	4	●	1
	D0480	4.8	13	50	6	4	●	1
	D0490	4.9	13	50	6	4	●	1
For Small Automatic Lathe	D0500	5	13	50	6	4	●	1
	D0510	5.1	13	50	6	4	●	1
	D0520	5.2	13	50	6	4	●	1
	D0530	5.3	13	50	6	4	●	1
	D0540	5.4	13	50	6	4	●	1
	D0550	5.5	13	50	6	4	●	1
	D0560	5.6	13	50	6	4	●	1
	D0570	5.7	13	50	6	4	●	1
General Use								
Long Neck								
Taper Neck								
General Use								
Long Neck								
Taper Neck								
General Use								
Long Neck								
Taper Neck								

● : Inventory maintained.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSMHDD0580	5.8	13	50	6	4	●	1
D0590	5.9	13	50	6	4	●	1
D0600	6	13	50	6	4	●	2
D0650	6.5	16	60	8	4	●	1
D0700	7	19	60	8	4	●	1
D0750	7.5	19	60	8	4	●	1
D0800	8	19	60	8	4	●	2
D0850	8.5	19	70	10	4	●	1
D0900	9	22	70	10	4	●	1
D0950	9.5	22	70	10	4	●	1
D1000	10	22	70	10	4	●	2
D1100	11	26	75	12	4	●	1
D1200S10	12	26	75	10	4	●	3
D1200	12	26	75	12	4	●	2
D1300	13	26	75	12	4	●	3
D1400	14	30	90	16	4	●	1
D1500	15	35	90	16	4	●	1
D1600	16	35	90	16	4	●	2
D1700	17	35	100	16	4	●	3
D1800	18	40	100	16	4	●	3
D1900	19	40	110	20	4	●	1
D2000	20	45	110	20	4	●	2
D2200	22	50	125	20	4	●	3
D2500	25	55	125	25	4	●	2

TAPER	RADIUS			BALL		SQUARE	
	General Use	High Helix	Long Neck	General Use	Long Neck	For Small Automatic Lathe	High Helix
For Rib Processing	Ball						

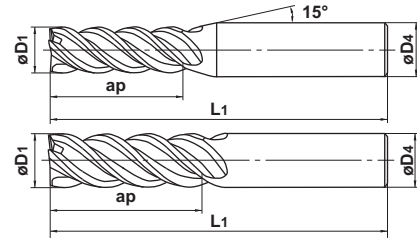
MSTAR END MILLS

MSJHD

High power, Semi long cut length, 4 flute



$D_1 \leq 12$ 0 — -0.020
 $12 < D_1$ 0 — -0.030



Type 1

Type 2

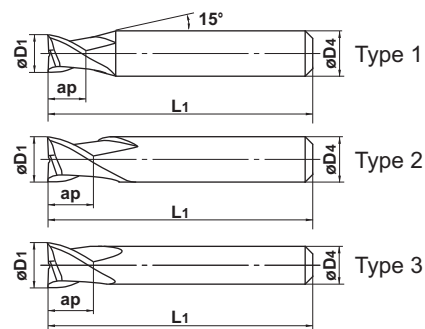
● 4 flute high power end mill.

Unit : mm

	Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		D1	ap	L1	D4	N		
General Use Long Neck High Helix	MSJHDD0200	2	8	60	6	4	●	1
	D0250	2.5	10	60	6	4	●	1
	D0300	3	12	60	6	4	●	1
	D0350	3.5	14	60	6	4	●	1
	D0400	4	16	60	6	4	●	1
	D0450	4.5	18	60	6	4	●	1
	D0500	5	20	60	6	4	●	1
	D0600	6	24	60	6	4	●	2
	D0700	7	25	80	8	4	●	1
	D0800	8	28	80	8	4	●	2
	D0900	9	32	90	10	4	●	1
	D1000	10	35	90	10	4	●	2
	D1100	11	35	100	12	4	●	1
	D1200	12	36	100	12	4	●	2
	D1400	14	42	110	16	4	●	1
	D1500	15	45	110	16	4	●	1
For Small Automatic Lathe	D1600	16	48	125	16	4	●	2
	D2000	20	55	140	20	4	●	2



● 2 flute end mill.



Overall length 35mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2ESD0300L35S04	3	3	35	4	2	●	1
D0350L35S04	3.5	3.5	35	4	2	●	1
D0400L35S04	4	4	35	4	2	●	2
D0500L35S05	5	5	35	5	2	●	2
D0500L35S06	5	5	35	6	2	●	1
D0600L35S05	6	6	35	5	2	●	3
D0600L35S06	6	6	35	6	2	●	2
D0700L35S07	7	6	35	7	2	●	2
D0800L35S07	8	6	35	7	2	●	3
D0800L35S08	8	6	35	8	2	●	2
D1000L35S07	10	6	35	7	2	●	3
D1000L35S10	10	6	35	10	2	●	2
D1200L35S10	12	6	35	10	2	●	3

Overall length 45mm

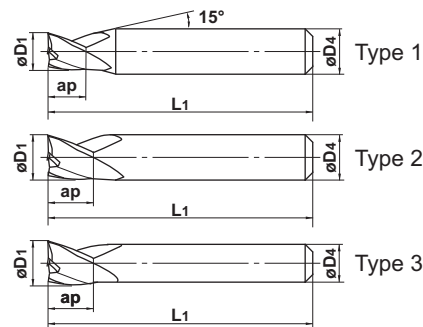
Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2ESD0300L45S04	3	3	45	4	2	●	1
D0350L45S04	3.5	3.5	45	4	2	●	1
D0400L45S04	4	4	45	4	2	●	2
D0500L45S06	5	5	45	6	2	●	1
D0600L45S06	6	6	45	6	2	●	2
D0700L45S07	7	7	45	7	2	●	2
D0800L45S07	8	8	45	7	2	●	3
D0800L45S08	8	8	45	8	2	●	2
D1000L45S07	10	10	45	7	2	●	3
D1000L45S10	10	10	45	10	2	●	2
D1200L45S10	12	12	45	10	2	●	3

SQUARE	General Use
	Long Neck
	High Helix
BALL	General Use
	Long Neck
	Taper Neck
RADIUS	General Use
	Long Neck
	High Helix
TAPER	General Use
	Ball
	For Rib Processing



● 3 flute end mill.



Overall length 35mm

Unit : mm

Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
	D1	ap	L1	D4	N		
MS3ESD0300L35S04	3	3	35	4	3	●	1
D0350L35S04	3.5	3.5	35	4	3	●	1
D0400L35S04	4	4	35	4	3	●	2
D0500L35S05	5	5	35	5	3	●	2
D0500L35S06	5	5	35	6	3	●	1
D0600L35S05	6	6	35	5	3	●	3
D0600L35S06	6	6	35	6	3	●	2
D0700L35S07	7	6	35	7	3	●	2
D0800L35S07	8	6	35	7	3	●	3
D0800L35S08	8	6	35	8	3	●	2
D1000L35S07	10	6	35	7	3	●	3
D1000L35S10	10	6	35	10	3	●	2
D1200L35S10	12	6	35	10	3	●	3

Overall length 45mm

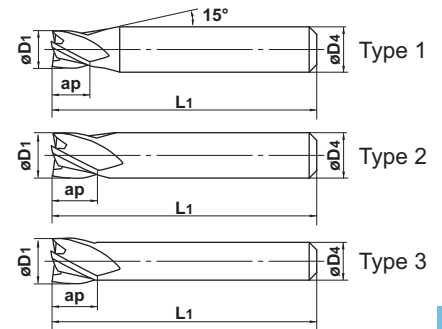
Unit : mm

Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
	D1	ap	L1	D4	N		
MS3ESD0300L45S04	3	3	45	4	3	●	1
D0350L45S04	3.5	3.5	45	4	3	●	1
D0400L45S04	4	4	45	4	3	●	2
D0500L45S06	5	5	45	6	3	●	1
D0600L45S06	6	6	45	6	3	●	2
D0700L45S07	7	7	45	7	3	●	2
D0800L45S07	8	8	45	7	3	●	3
D0800L45S08	8	8	45	8	3	●	2
D1000L45S07	10	10	45	7	3	●	3
D1000L45S10	10	10	45	10	3	●	2
D1200L45S10	12	12	45	10	3	●	3





● 4 flute end mill.



Overall length 35mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4ECD0300L35S04	3	3	35	4	4	●	1
D0350L35S04	3.5	3.5	35	4	4	●	1
D0400L35S04	4	4	35	4	4	●	2
D0500L35S05	5	5	35	5	4	●	2
D0500L35S06	5	5	35	6	4	●	1
D0600L35S05	6	6	35	5	4	●	3
D0600L35S06	6	6	35	6	4	●	2
D0700L35S07	7	6	35	7	4	●	2
D0800L35S07	8	6	35	7	4	●	3
D0800L35S08	8	6	35	8	4	●	2
D1000L35S07	10	6	35	7	4	●	3
D1000L35S10	10	6	35	10	4	●	2
D1200L35S10	12	6	35	10	4	●	3

Overall length 45mm

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4ECD0300L45S04	3	3	45	4	4	●	1
D0350L45S04	3.5	3.5	45	4	4	●	1
D0400L45S04	4	4	45	4	4	●	2
D0500L45S06	5	5	45	6	4	●	1
D0600L45S06	6	6	45	6	4	●	2
D0700L45S07	7	7	45	7	4	●	2
D0800L45S07	8	8	45	7	4	●	3
D0800L45S08	8	8	45	8	4	●	2
D1000L45S07	10	10	45	7	4	●	3
D1000L45S10	10	10	45	10	4	●	2
D1200L45S10	12	12	45	10	4	●	3
D1400L45S10	14	14	45	10	4	●	3

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL

Long Neck

RADIUS

General Use

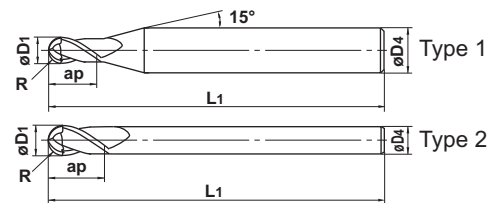
TAPER

For Rib Processing

MSTAR END MILLS

MS2SB

Ball nose end mill, Short cut length, 2 flute



● 2 flute ball nose end mill for general use.

Unit : mm

	Order Number	Radius of Ball Nose	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		R	D1	ap	L1	D4	N		
General Use	MS2SBR0010S04	0.1	0.2	0.3	45	4	2	●	1
	R0010S06	0.1	0.2	0.3	50	6	2	●	1
	R0015S04	0.15	0.3	0.5	45	4	2	●	1
	R0015S06	0.15	0.3	0.5	50	6	2	●	1
	R0020S04	0.2	0.4	0.6	45	4	2	●	1
	R0020S06	0.2	0.4	0.6	50	6	2	●	1
	R0025S04	0.25	0.5	0.8	45	4	2	●	1
	R0025S06	0.25	0.5	0.8	50	6	2	●	1
	R0030S04	0.3	0.6	0.9	45	4	2	●	1
	R0030S06	0.3	0.6	0.9	50	6	2	●	1
	R0035S04	0.35	0.7	1.1	45	4	2	●	1
	R0040S04	0.4	0.8	1.2	45	4	2	●	1
Long Neck	R0040S06	0.4	0.8	1.2	50	6	2	●	1
	R0045S04	0.45	0.9	1.4	45	4	2	●	1
	R0050S04	0.5	1	1.5	45	4	2	●	1
	R0050S06	0.5	1	1.5	50	6	2	●	1
	R0060S04	0.6	1.2	1.8	45	4	2	●	1
	R0060S06	0.6	1.2	1.8	50	6	2	●	1
	R0070S04	0.7	1.4	2.1	45	4	2	●	1
	R0070S06	0.7	1.4	2.1	50	6	2	●	1
	R0075S04	0.75	1.5	2.3	45	4	2	●	1
	R0075S06	0.75	1.5	2.3	50	6	2	●	1
	R0080S04	0.8	1.6	2.4	45	4	2	●	1
	R0080S06	0.8	1.6	2.4	50	6	2	●	1
High Helix	R0090S04	0.9	1.8	2.7	45	4	2	●	1
	R0090S06	0.9	1.8	2.7	50	6	2	●	1
	R0100S04	1	2	3	50	4	2	●	1
	R0100S06	1	2	3	50	6	2	●	1
	R0125S04	1.25	2.5	3.8	50	4	2	●	1
	R0125S06	1.25	2.5	3.8	50	6	2	●	1
	R0150S06	1.5	3	4.5	70	6	2	●	1
	R0200S06	2	4	6	70	6	2	●	1
	R0250S06	2.5	5	7.5	80	6	2	●	1
	R0300S06	3	6	9	80	6	2	●	2
	R0400S08	4	8	12	90	8	2	●	2
	R0500S10	5	10	15	100	10	2	●	2
For Small Automatic Lathe	R0600S12	6	12	18	110	12	2	●	2

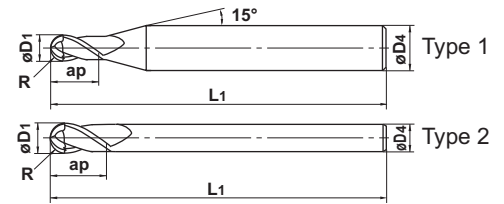
The diameter tolerance is only applied to items produced after July 2006.



±0.01



0 - -0.020



● 2 flute ball nose end mill for general use.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MBR0025	0.25	0.5	1	45	4	2	●	1
R0030	0.3	0.6	1.2	45	4	2	●	1
R0040	0.4	0.8	1.6	45	4	2	●	1
R0050	0.5	1	2.5	45	4	2	●	1
R0060	0.6	1.2	2.5	45	4	2	●	1
R0070	0.7	1.4	3	45	4	2	●	1
R0075	0.75	1.5	4	45	4	2	●	1
R0080	0.8	1.6	4	45	4	2	●	1
R0090	0.9	1.8	5	45	4	2	●	1
R0100	1	2	6	50	4	2	●	1
R0125	1.25	2.5	6	50	4	2	●	1
R0150S03	1.5	3	8	70	3	2	●	2
R0150	1.5	3	8	70	6	2	●	1
R0175	1.75	3.5	8	70	6	2	●	1
R0200S04	2	4	8	70	4	2	●	2
R0200	2	4	8	70	6	2	●	1
R0250	2.5	5	12	80	6	2	●	1
R0300	3	6	12	80	6	2	●	2
R0400	4	8	14	90	8	2	●	2
R0500	5	10	18	100	10	2	●	2
R0600	6	12	22	110	12	2	●	2

The diameter tolerance is only applied to items produced after July 2006.

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL
Long Neck

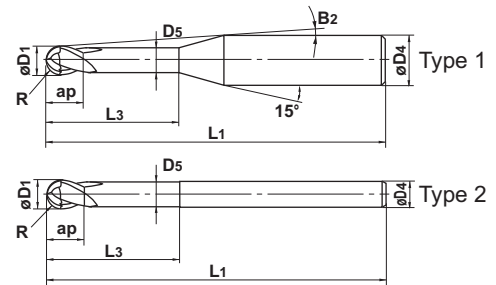
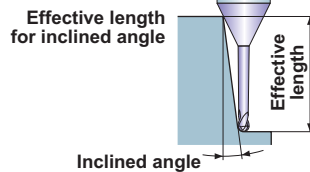
RADIUS
Long Neck

TAPER
For Rib Processing

MSTAR END MILLS

MS2XLB

Ball nose end mill, Short cut length, 2 flute, Long neck



● 2 flute long neck ball nose end mill.

Unit : mm

	Order Number	Radius of Ball Nose	Dia.	Length of Cut	Neck Length	Neck Dia.	Cutting Edge to Shank Angle	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
		R	D1	ap	L3	D5	B2	L1	D4	N			30°	1°	2°	3°
General Use	MS2XLB R0010N005	0.1	0.2	0.2	0.5	0.17	13.7°	50	4	2	●	1	0.7	0.8	0.9	0.9
	R0010N005S06	0.1	0.2	0.2	0.5	0.17	14.1°	50	6	2	●	1	0.7	0.8	0.9	0.9
	R0010N008S06	0.1	0.2	0.2	0.8	0.17	13.8°	50	6	2	●	1	1.1	1.1	1.2	1.3
	R0010N010	0.1	0.2	0.2	1	0.17	12.9°	50	4	2	●	1	1.3	1.3	1.5	1.6
	R0010N010S06	0.1	0.2	0.2	1	0.17	13.6°	50	6	2	●	1	1.3	1.3	1.5	1.6
	R0010N013	0.1	0.2	0.2	1.25	0.17	12.5°	50	4	2	●	1	1.5	1.6	1.7	1.9
	R0010N013S06	0.1	0.2	0.2	1.25	0.17	13.3°	50	6	2	●	1	1.5	1.6	1.7	1.9
	R0010N015	0.1	0.2	0.2	1.5	0.17	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
	R0010N015S06	0.1	0.2	0.2	1.5	0.17	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
	R0010N018	0.1	0.2	0.2	1.75	0.17	11.9°	50	4	2	●	1	2.1	2.2	2.3	2.5
	R0010N018S06	0.1	0.2	0.2	1.75	0.17	12.8°	50	6	2	●	1	2.1	2.2	2.3	2.5
	R0010N020	0.1	0.2	0.2	2	0.17	11.6°	50	4	2	●	1	2.3	2.4	2.6	2.8
Long Neck	R0010N020S06	0.1	0.2	0.2	2	0.17	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
	R0010N025	0.1	0.2	0.2	2.5	0.17	11°	50	4	2	●	1	2.8	3	3.2	3.4
	R0010N030	0.1	0.2	0.2	3	0.17	10.5°	50	4	2	●	1	3.4	3.5	3.8	4.1
	R0015N008S06	0.15	0.3	0.3	0.8	0.27	13.8°	50	6	2	●	1	1.1	1.1	1.2	1.3
	R0015N010	0.15	0.3	0.3	1	0.27	12.9°	50	4	2	●	1	1.3	1.3	1.4	1.6
	R0015N010S06	0.15	0.3	0.3	1	0.27	13.6°	50	6	2	●	1	1.3	1.3	1.4	1.6
	R0015N012S06	0.15	0.3	0.3	1.2	0.27	13.4°	50	6	2	●	1	1.5	1.5	1.7	1.8
	R0015N015	0.15	0.3	0.3	1.5	0.27	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
	R0015N015S06	0.15	0.3	0.3	1.5	0.27	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
	R0015N020	0.15	0.3	0.3	2	0.27	11.5°	50	4	2	●	1	2.3	2.4	2.6	2.8
	R0015N020S06	0.15	0.3	0.3	2	0.27	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
	R0015N025	0.15	0.3	0.3	2.5	0.27	11°	50	4	2	●	1	2.8	3	3.2	3.4
High Helix	R0015N030	0.15	0.3	0.3	3	0.27	10.4°	50	4	2	●	1	3.4	3.5	3.7	4
	R0015N040	0.15	0.3	0.3	4	0.27	9.5°	50	4	2	●	1	4.4	4.6	4.9	5.3
	R0020N010	0.2	0.4	0.4	1	0.36	12.9°	50	4	2	●	1	1.3	1.4	1.5	1.6
	R0020N010S06	0.2	0.4	0.4	1	0.36	13.6°	50	6	2	●	1	1.3	1.4	1.5	1.6
	R0020N012S06	0.2	0.4	0.4	1.2	0.36	13.4°	50	6	2	●	1	1.5	1.6	1.7	1.8
	R0020N015	0.2	0.4	0.4	1.5	0.36	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
	R0020N015S06	0.2	0.4	0.4	1.5	0.36	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
	R0020N020	0.2	0.4	0.4	2	0.36	11.5°	50	4	2	●	1	2.3	2.4	2.6	2.8
	R0020N020S06	0.2	0.4	0.4	2	0.36	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
	R0020N025	0.2	0.4	0.4	2.5	0.36	10.9°	50	4	2	●	1	2.9	3	3.2	3.4
	R0020N025S06	0.2	0.4	0.4	2.5	0.36	12.1°	50	6	2	●	1	2.9	3	3.2	3.4
	R0020N030	0.2	0.4	0.4	3	0.36	10.4°	50	4	2	●	1	3.4	3.5	3.8	4.1
	R0020N030S06	0.2	0.4	0.4	3	0.36	11.7°	50	6	2	●	1	3.4	3.5	3.8	4.1
TAPER	R0020N035	0.2	0.4	0.4	3.5	0.36	9.9°	50	4	2	●	1	3.9	4	4.3	4.7

● : Inventory maintained.

Unit : mm

Order Number	Radius of Ball Nose	Dia.	Length of Cut	Neck Length	Neck Dia.	Cutting Edge to Shank Angle	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	ap	L3	D5	B2	L1	D4	N			30°	1°	2°	3°
MS2XLBR0020N040	0.2	0.4	0.4	4	0.36	9.5°	50	4	2	●	1	4.4	4.6	4.9	5.3
R0020N045	0.2	0.4	0.4	4.5	0.36	9°	50	4	2	●	1	4.9	5.1	5.5	5.9
R0020N050	0.2	0.4	0.4	5	0.36	8.7°	50	4	2	●	1	5.5	5.6	6.1	6.5
R0020N055	0.2	0.4	0.4	5.5	0.36	8.3°	50	4	2	●	1	6	6.2	6.6	7.2
R0020N060	0.2	0.4	0.4	6	0.36	8°	50	4	2	●	1	6.5	6.7	7.2	7.8
R0025N015	0.25	0.5	0.5	1.5	0.46	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
R0025N015S06	0.25	0.5	0.5	1.5	0.46	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
R0025N020	0.25	0.5	0.5	2	0.46	11.5°	50	4	2	●	1	2.3	2.4	2.6	2.8
R0025N020S06	0.25	0.5	0.5	2	0.46	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
R0025N025	0.25	0.5	0.5	2.5	0.46	10.9°	50	4	2	●	1	2.9	3	3.2	3.4
R0025N025S06	0.25	0.5	0.5	2.5	0.46	12.1°	50	6	2	●	1	2.9	3	3.2	3.4
R0025N030	0.25	0.5	0.5	3	0.46	10.3°	50	4	2	●	1	3.4	3.5	3.8	4
R0025N030S06	0.25	0.5	0.5	3	0.46	11.7°	50	6	2	●	1	3.4	3.5	3.8	4
R0025N035	0.25	0.5	0.5	3.5	0.46	9.8°	50	4	2	●	1	3.9	4	4.3	4.7
R0025N035S06	0.25	0.5	0.5	3.5	0.46	11.3°	50	6	2	●	1	3.9	4	4.3	4.7
R0025N040	0.25	0.5	0.5	4	0.46	9.4°	50	4	2	●	1	4.4	4.6	4.9	5.3
R0025N040S06	0.25	0.5	0.5	4	0.46	10.9°	50	6	2	●	1	4.4	4.6	4.9	5.3
R0025N045	0.25	0.5	0.5	4.5	0.46	9°	50	4	2	●	1	4.9	5.1	5.5	5.9
R0025N045S06	0.25	0.5	0.5	4.5	0.46	10.5°	50	6	2	●	1	4.9	5.1	5.5	5.9
R0025N050	0.25	0.5	0.5	5	0.46	8.6°	50	4	2	●	1	5.5	5.6	6.1	6.5
R0025N050S06	0.25	0.5	0.5	5	0.46	10.2°	50	6	2	●	1	5.5	5.6	6.1	6.5
R0025N055	0.25	0.5	0.5	5.5	0.46	8.3°	50	4	2	●	1	6	6.2	6.6	7.1
R0025N055S06	0.25	0.5	0.5	5.5	0.46	9.9°	50	6	2	●	1	6	6.2	6.6	7.1
R0025N060	0.25	0.5	0.5	6	0.46	7.9°	50	4	2	●	1	6.5	6.7	7.2	7.8
R0025N060S06	0.25	0.5	0.5	6	0.46	9.6°	50	6	2	●	1	6.5	6.7	7.2	7.8
R0025N070	0.25	0.5	0.5	7	0.46	7.4°	50	4	2	●	1	7.5	7.8	8.4	9
R0025N070S06	0.25	0.5	0.5	7	0.46	9°	50	6	2	●	1	7.5	7.8	8.4	9
R0025N080	0.25	0.5	0.5	8	0.46	6.9°	50	4	2	●	1	8.6	8.9	9.5	10.3
R0025N080S06	0.25	0.5	0.5	8	0.46	8.6°	50	6	2	●	1	8.6	8.9	9.5	10.3
R0025N100	0.25	0.5	0.5	10	0.46	6.1°	50	4	2	●	1	10.6	11	11.8	12.7
R0025N100S06	0.25	0.5	0.5	10	0.46	7.7°	50	6	2	●	1	10.6	11	11.8	12.7
R0030N018S06	0.3	0.6	0.6	1.8	0.56	12.8°	50	6	2	●	1	2.1	2.2	2.4	2.5
R0030N020	0.3	0.6	0.6	2	0.56	11.5°	50	4	2	●	1	2.3	2.4	2.6	2.8
R0030N020S06	0.3	0.6	0.6	2	0.56	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
R0030N025	0.3	0.6	0.6	2.5	0.56	10.9°	50	4	2	●	1	2.9	3	3.2	3.4
R0030N025S06	0.3	0.6	0.6	2.5	0.56	12.1°	50	6	2	●	1	2.9	3	3.2	3.4
R0030N030	0.3	0.6	0.6	3	0.56	10.3°	50	4	2	●	1	3.4	3.5	3.7	4
R0030N030S06	0.3	0.6	0.6	3	0.56	11.7°	50	6	2	●	1	3.4	3.5	3.7	4
R0030N035	0.3	0.6	0.6	3.5	0.56	9.8°	50	4	2	●	1	3.9	4	4.3	4.7
R0030N035S06	0.3	0.6	0.6	3.5	0.56	11.2°	50	6	2	●	1	3.9	4	4.3	4.7
R0030N040	0.3	0.6	0.6	4	0.56	9.3°	50	4	2	●	1	4.4	4.6	4.9	5.3
R0030N040S06	0.3	0.6	0.6	4	0.56	10.9°	50	6	2	●	1	4.4	4.6	4.9	5.3
R0030N045	0.3	0.6	0.6	4.5	0.56	8.9°	50	4	2	●	1	4.9	5.1	5.5	5.9
R0030N045S06	0.3	0.6	0.6	4.5	0.56	10.5°	50	6	2	●	1	4.9	5.1	5.5	5.9
R0030N050	0.3	0.6	0.6	5	0.56	8.5°	50	4	2	●	1	5.5	5.6	6	6.5
R0030N050S06	0.3	0.6	0.6	5	0.56	10.2°	50	6	2	●	1	5.5	5.6	6	6.5
R0030N060	0.3	0.6	0.6	6	0.56	7.9°	50	4	2	●	1	6.5	6.7	7.2	7.8
R0030N060S06	0.3	0.6	0.6	6	0.56	9.5°	50	6	2	●	1	6.5	6.7	7.2	7.8

General Use

SQUARE
Long Neck

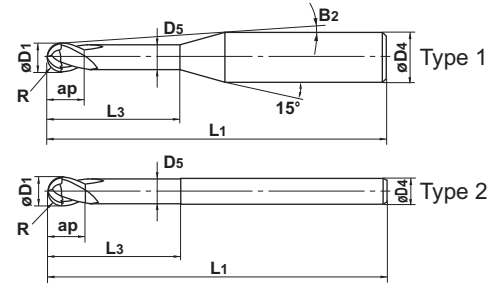
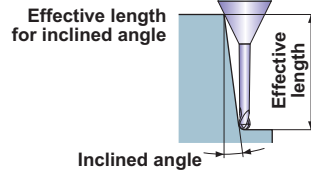
High Helix

For Small
Automatic LatheBALL
Long NeckRADIUS
Long NeckTAPER
Ball Processing

MSTAR END MILLS

MS2XLB

Ball nose end mill, Short cut length, 2 flute, Long neck



● 2 flute long neck ball nose end mill.

Unit : mm

	Order Number	Radius of Ball Nose	Dia.	Length of Cut	Neck Length	Neck Dia.	Cutting Edge to Shank Angle	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
		R	D1	ap	L3	D5	B2	L1	D4	N			30°	1°	2°	3°
General Use	MS2XLB R0030N070	0.3	0.6	0.6	7	0.56	7.3°	50	4	2	●	1	7.5	7.8	8.3	9
	R0030N080	0.3	0.6	0.6	8	0.56	6.8°	50	4	2	●	1	8.6	8.8	9.5	10.2
	R0030N080S06	0.3	0.6	0.6	8	0.56	8.5°	50	6	2	●	1	8.6	8.8	9.5	10.2
	R0030N090	0.3	0.6	0.6	9	0.56	6.3°	50	4	2	●	1	9.6	9.9	10.6	11.5
	R0030N100	0.3	0.6	0.6	10	0.56	6°	50	4	2	●	1	10.6	11	11.8	12.7
	R0030N100S06	0.3	0.6	0.6	10	0.56	7.7°	50	6	2	●	1	10.6	11	11.8	12.7
	R0030N110	0.3	0.6	0.6	11	0.56	5.6°	50	4	2	●	1	11.7	12.1	12.9	14
	R0030N120	0.3	0.6	0.6	12	0.56	5.3°	50	4	2	●	1	12.7	13.1	14.1	15.2
	R0040N020	0.4	0.8	0.8	2	0.76	11.4°	50	4	2	●	1	2.3	2.4	2.6	2.8
	R0040N020S06	0.4	0.8	0.8	2	0.76	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
Long Neck	R0040N024S06	0.4	0.8	0.8	2.4	0.76	12.2°	50	6	2	●	1	2.8	2.9	3	3.3
	R0040N030	0.4	0.8	0.8	3	0.76	10.2°	50	4	2	●	1	3.4	3.5	3.7	4
	R0040N030S06	0.4	0.8	0.8	3	0.76	11.6°	50	6	2	●	1	3.4	3.5	3.7	4
	R0040N040	0.4	0.8	0.8	4	0.76	9.2°	50	4	2	●	1	4.4	4.6	4.9	5.2
	R0040N040S06	0.4	0.8	0.8	4	0.76	10.8°	50	6	2	●	1	4.4	4.6	4.9	5.2
	R0040N050	0.4	0.8	0.8	5	0.76	8.4°	50	4	2	●	1	5.5	5.6	6	6.5
	R0040N060	0.4	0.8	0.8	6	0.76	7.7°	50	4	2	●	1	6.5	6.7	7.2	7.7
	R0040N060S06	0.4	0.8	0.8	6	0.76	9.5°	50	6	2	●	1	6.5	6.7	7.2	7.7
	R0040N070	0.4	0.8	0.8	7	0.76	7.1°	50	4	2	●	1	7.5	7.8	8.3	9
	R0040N080	0.4	0.8	0.8	8	0.76	6.6°	50	4	2	●	1	8.6	8.8	9.5	10.2
High Helix	R0040N080S06	0.4	0.8	0.8	8	0.76	8.4°	50	6	2	●	1	8.6	8.8	9.5	10.2
	R0040N100	0.4	0.8	0.8	10	0.76	5.8°	50	4	2	●	1	10.6	11	11.8	12.7
	R0040N100S06	0.4	0.8	0.8	10	0.76	7.6°	50	6	2	●	1	10.6	11	11.8	12.7
	R0040N120	0.4	0.8	0.8	12	0.76	5.2°	50	4	2	●	1	12.7	13.1	14.1	15.2
	R0050N030	0.5	1	1	3	0.94	9.9°	50	4	2	●	1	3.5	3.7	3.9	4.2
	R0050N030S06	0.5	1	1	3	0.94	11.5°	50	6	2	●	1	3.5	3.7	3.9	4.2
	R0050N040	0.5	1	1	4	0.94	8.9°	50	4	2	●	1	4.6	4.7	5.1	5.4
	R0050N040S06	0.5	1	1	4	0.94	10.6°	50	6	2	●	1	4.6	4.7	5.1	5.4
	R0050N050	0.5	1	1	5	0.94	8.1°	50	4	2	●	1	5.6	5.8	6.2	6.7
	R0050N050S06	0.5	1	1	5	0.94	9.9°	50	6	2	●	1	5.6	5.8	6.2	6.7
For Small Automatic Lathe	R0050N060	0.5	1	1	6	0.94	7.4°	50	4	2	●	1	6.7	6.9	7.4	7.9
	R0050N060S06	0.5	1	1	6	0.94	9.3°	50	6	2	●	1	6.7	6.9	7.4	7.9
	R0050N070	0.5	1	1	7	0.94	6.8°	50	4	2	●	1	7.7	7.9	8.5	9.2
	R0050N080	0.5	1	1	8	0.94	6.3°	50	4	2	●	1	8.7	9	9.7	10.4
	R0050N080S06	0.5	1	1	8	0.94	8.2°	50	6	2	●	1	8.7	9	9.7	10.4
	R0050N090	0.5	1	1	9	0.94	5.9°	50	4	2	●	1	9.8	10.1	10.8	11.7
	R0050N100	0.5	1	1	10	0.94	5.5°	50	4	2	●	1	10.8	11.2	12	12.9
	R0050N100S06	0.5	1	1	10	0.94	7.4°	50	6	2	●	1	10.8	11.2	12	12.9
General Use																
Long Neck																
Taper																

● : Inventory maintained.

Unit : mm

Order Number	Radius of Ball Nose	Dia.	Length of Cut	Neck Length	Neck Dia.	Cutting Edge to Shank Angle	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	ap	L3	D5	B2	L1	D4	N			30°	1°	2°	3°
MS2XLBR0050N120	0.5	1	1	12	0.94	4.9°	50	4	2	●	1	12.9	13.3	14.3	15.4
R0050N120S06	0.5	1	1	12	0.94	6.7°	55	6	2	●	1	12.9	13.3	14.3	15.4
R0050N140	0.5	1	1	14	0.94	4.4°	50	4	2	●	1	14.9	15.4	16.6	17.9
R0050N160	0.5	1	1	16	0.94	4°	55	4	2	●	1	17	17.6	18.9	20.4
R0050N160S06	0.5	1	1	16	0.94	5.7°	60	6	2	●	1	17	17.6	18.9	20.4
R0050N180	0.5	1	1	18	0.94	3.7°	55	4	2	●	1	19.1	19.7	21.2	22.8
R0050N200	0.5	1	1	20	0.94	3.4°	55	4	2	●	1	21.1	21.9	23.5	25.3
R0050N200S06	0.5	1	1	20	0.94	4.9°	60	6	2	●	1	21.1	21.9	23.5	25.3
R0060N036S06	0.6	1.2	1.2	3.6	1.14	10.9°	50	6	2	●	1	4.2	4.3	4.6	4.9
R0060N060	0.6	1.2	1.2	6	1.14	7.2°	50	4	2	●	1	6.7	6.9	7.3	7.9
R0060N060S06	0.6	1.2	1.2	6	1.14	9.2°	50	6	2	●	1	6.7	6.9	7.3	7.9
R0060N080	0.6	1.2	1.2	8	1.14	6.1°	50	4	2	●	1	8.7	9	9.6	10.4
R0060N080S06	0.6	1.2	1.2	8	1.14	8.1°	50	6	2	●	1	8.7	9	9.6	10.4
R0060N100	0.6	1.2	1.2	10	1.14	5.3°	50	4	2	●	1	10.8	11.1	11.9	12.9
R0060N100S06	0.6	1.2	1.2	10	1.14	7.3°	50	6	2	●	1	10.8	11.1	11.9	12.9
R0060N120	0.6	1.2	1.2	12	1.14	4.7°	50	4	2	●	1	12.9	13.3	14.2	15.4
R0060N120S06	0.6	1.2	1.2	12	1.14	6.6°	55	6	2	●	1	12.9	13.3	14.2	15.4
R0060N140	0.6	1.2	1.2	14	1.14	4.2°	50	4	2	●	1	14.9	15.4	16.5	17.8
R0060N160	0.6	1.2	1.2	16	1.14	3.8°	55	4	2	●	1	17	17.6	18.8	20.3
R0060N160S06	0.6	1.2	1.2	16	1.14	5.6°	60	6	2	●	1	17	17.6	18.8	20.3
R0060N180	0.6	1.2	1.2	18	1.14	3.5°	55	4	2	●	1	19.1	19.7	21.1	22.8
R0060N240	0.6	1.2	1.2	24	1.14	2.8°	65	4	2	●	1	25.3	26.1	28	No interference
R0070N080	0.7	1.4	1.4	8	1.34	5.9°	50	4	2	●	1	8.7	9	9.6	10.4
R0070N120	0.7	1.4	1.4	12	1.34	4.5°	50	4	2	●	1	12.9	13.3	14.2	15.3
R0070N160	0.7	1.4	1.4	16	1.34	3.6°	55	4	2	●	1	17	17.6	18.8	20.3
R0075N045S06	0.75	1.5	1.5	4.5	1.44	10.1°	50	6	2	●	1	5.1	5.3	5.6	6
R0075N060	0.75	1.5	1.5	6	1.44	6.9°	50	4	2	●	1	6.6	6.9	7.3	7.9
R0075N060S06	0.75	1.5	1.5	6	1.44	9°	50	6	2	●	1	6.6	6.9	7.3	7.9
R0075N075S06	0.75	1.5	1.5	7.5	1.44	8.2°	50	6	2	●	1	8.2	8.5	9	9.7
R0075N080	0.75	1.5	1.5	8	1.44	5.8°	50	4	2	●	1	8.7	9	9.6	10.3
R0075N080S06	0.75	1.5	1.5	8	1.44	8°	50	6	2	●	1	8.7	9	9.6	10.3
R0075N100	0.75	1.5	1.5	10	1.44	5°	50	4	2	●	1	10.8	11.1	11.9	12.8
R0075N100S06	0.75	1.5	1.5	10	1.44	7.1°	50	6	2	●	1	10.8	11.1	11.9	12.8
R0075N120	0.75	1.5	1.5	12	1.44	4.4°	50	4	2	●	1	12.9	13.3	14.2	15.3
R0075N120S06	0.75	1.5	1.5	12	1.44	6.4°	55	6	2	●	1	12.9	13.3	14.2	15.3
R0075N140	0.75	1.5	1.5	14	1.44	3.9°	50	4	2	●	1	14.9	15.4	16.5	17.8
R0075N140S06	0.75	1.5	1.5	14	1.44	5.8°	55	6	2	●	1	14.9	15.4	16.5	17.8
R0075N160	0.75	1.5	1.5	16	1.44	3.5°	55	4	2	●	1	17	17.6	18.8	20.3
R0075N160S06	0.75	1.5	1.5	16	1.44	5.4°	60	6	2	●	1	17	17.6	18.8	20.3
R0075N180	0.75	1.5	1.5	18	1.44	3.2°	55	4	2	●	1	19.1	19.7	21.1	22.8
R0075N200	0.75	1.5	1.5	20	1.44	3°	55	4	2	●	1	21.1	21.8	23.4	No interference
R0075N200S06	0.75	1.5	1.5	20	1.44	4.6°	60	6	2	●	1	21.1	21.8	23.4	25.3
R0075N220	0.75	1.5	1.5	22	1.44	2.8°	60	4	2	●	1	23.2	24	25.7	No interference
R0075N300	0.75	1.5	1.5	30	1.44	2.1°	70	4	2	●	1	31.5	32.5	34.9	No interference
R0080N080	0.8	1.6	1.6	8	1.54	5.7°	50	4	2	●	1	8.7	9	9.6	10.3
R0080N120	0.8	1.6	1.6	12	1.54	4.3°	50	4	2	●	1	12.9	13.3	14.2	15.3
R0080N160	0.8	1.6	1.6	16	1.54	3.4°	55	4	2	●	1	17	17.6	18.8	20.3
R0080N200	0.8	1.6	1.6	20	1.54	2.9°	55	4	2	●	1	21.1	21.8	23.4	No interference

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL
Long NeckRADIUS
Long Neck

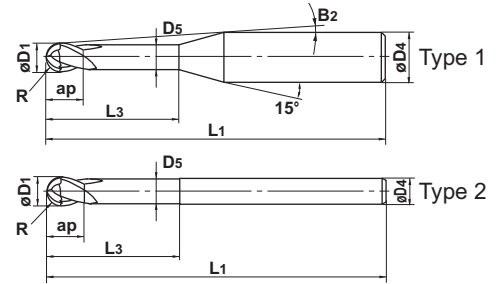
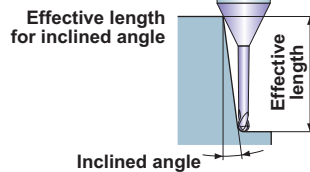
High Helix

TAPER
For Rib Processing

MSTAR END MILLS

MS2XLB

Ball nose end mill, Short cut length, 2 flute, Long neck



● 2 flute long neck ball nose end mill.

Unit : mm

	Order Number	Radius of Ball Nose	Dia.	Length of Cut	Neck Length	Neck Dia.	Cutting Edge to Shank Angle	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
		R	D1	ap	L3	D5	B2	L1	D4	N			30°	1°	2°	3°
General Use	MS2XLB R0090N080	0.9	1.8	1.8	8	1.74	5.4°	50	4	2	●	1	8.7	9	9.6	10.3
	R0090N120	0.9	1.8	1.8	12	1.74	4°	50	4	2	●	1	12.8	13.3	14.2	15.3
	R0090N160	0.9	1.8	1.8	16	1.74	3.2°	55	4	2	●	1	17	17.5	18.8	20.3
	R0090N200	0.9	1.8	1.8	20	1.74	2.7°	55	4	2	●	1	21.1	21.8	23.4	No interference
	R0100N040	1	2	2	4	1.9	7.8°	50	4	2	●	1	4.6	4.8	5.1	5.4
	R0100N040S06	1	2	2	4	1.9	10.2°	50	6	2	●	1	4.6	4.8	5.1	5.4
	R0100N060	1	2	2	6	1.9	6.1°	50	4	2	●	1	6.7	6.9	7.4	7.9
	R0100N060S06	1	2	2	6	1.9	8.7°	50	6	2	●	1	6.7	6.9	7.4	7.9
	R0100N080	1	2	2	8	1.9	5.1°	50	4	2	●	1	8.8	9.1	9.7	10.4
	R0100N080S06	1	2	2	8	1.9	7.6°	50	6	2	●	1	8.8	9.1	9.7	10.4
Long Neck	R0100N100	1	2	2	10	1.9	4.3°	50	4	2	●	1	10.9	11.2	12.0	12.9
	R0100N100S06	1	2	2	10	1.9	6.7°	50	6	2	●	1	10.9	11.2	12.0	12.9
	R0100N120	1	2	2	12	1.9	3.8°	50	4	2	●	1	12.9	13.3	14.3	15.4
	R0100N120S06	1	2	2	12	1.9	6°	55	6	2	●	1	12.9	13.3	14.3	15.4
	R0100N140	1	2	2	14	1.9	3.4°	50	4	2	●	1	15	15.5	16.6	17.8
	R0100N140S06	1	2	2	14	1.9	5.5°	55	6	2	●	1	15	15.5	16.6	17.8
	R0100N160	1	2	2	16	1.9	3°	55	4	2	●	1	17.1	17.6	18.9	No interference
	R0100N160S06	1	2	2	16	1.9	5°	60	6	2	●	1	17.1	17.6	18.9	20.3
	R0100N180	1	2	2	18	1.9	2.7°	55	4	2	●	1	19.1	19.8	21.2	No interference
	R0100N180S06	1	2	2	18	1.9	4.6°	60	6	2	●	1	19.1	19.8	21.2	22.8
High Helix	R0100N200	1	2	2	20	1.9	2.5°	60	4	2	●	1	21.2	21.9	23.5	No interference
	R0100N200S06	1	2	2	20	1.9	4.3°	60	6	2	●	1	21.2	21.9	23.5	25.3
	R0100N220	1	2	2	22	1.9	2.3°	60	4	2	●	1	23.3	24	25.8	No interference
	R0100N250	1	2	2	25	1.9	2.1°	65	4	2	●	1	26.4	27.2	29.3	No interference
	R0100N250S06	1	2	2	25	1.9	3.6°	65	6	2	●	1	26.4	27.2	29.2	31.5
	R0100N300	1	2	2	30	1.9	1.8°	70	4	2	●	1	31.5	32.6	No interference	No interference
	R0100N300S06	1	2	2	30	1.9	3.1°	70	6	2	●	1	31.5	32.6	35.0	37.7
	R0100N350	1	2	2	35	1.9	1.5°	70	4	2	●	1	36.7	37.9	No interference	No interference
	R0100N350S06	1	2	2	35	1.9	2.8°	80	6	2	●	1	36.7	37.9	40.7	No interference
	R0125N060S06	1.25	2.5	2.5	6	2.4	8.4°	50	6	2	●	1	6.7	6.9	7.3	7.8
For Small Automatic Lathe	R0125N075S06	1.25	2.5	2.5	7.5	2.4	7.5°	50	6	2	●	1	8.3	8.5	9.1	9.7
	R0125N100S06	1.25	2.5	2.5	10	2.4	6.3°	50	6	2	●	1	10.8	11.2	11.9	12.8
	R0125N125S06	1.25	2.5	2.5	12.5	2.4	5.5°	50	6	2	●	1	13.4	13.9	14.8	15.9
	R0125N160S06	1.25	2.5	2.5	16	2.4	4.6°	60	6	2	●	1	17	17.6	18.8	20.3
	R0125N200S06	1.25	2.5	2.5	20	2.4	3.9°	60	6	2	●	1	21.2	21.9	23.4	25.2
	R0125N250S06	1.25	2.5	2.5	25	2.4	3.3°	65	6	2	●	1	26.4	27.2	29.2	31.5
	R0125N300S06	1.25	2.5	2.5	30	2.4	2.8°	70	6	2	●	1	31.5	32.6	34.9	No interference
	R0125N350S06	1.25	2.5	2.5	35	2.4	2.5°	80	6	2	●	1	36.7	37.9	40.7	No interference
	R0125N060S06	1.25	2.5	2.5	6	2.4	8.4°	50	6	2	●	1	6.7	6.9	7.3	7.8
	R0125N075S06	1.25	2.5	2.5	7.5	2.4	7.5°	50	6	2	●	1	8.3	8.5	9.1	9.7
TAPER	R0125N100S06	1.25	2.5	2.5	10	2.4	6.3°	50	6	2	●	1	10.8	11.2	11.9	12.8
	R0125N125S06	1.25	2.5	2.5	12.5	2.4	5.5°	50	6	2	●	1	13.4	13.9	14.8	15.9
	R0125N160S06	1.25	2.5	2.5	16	2.4	4.6°	60	6	2	●	1	17	17.6	18.8	20.3
	R0125N200S06	1.25	2.5	2.5	20	2.4	3.9°	60	6	2	●	1	21.2	21.9	23.4	25.2
	R0125N250S06	1.25	2.5	2.5	25	2.4	3.3°	65	6	2	●	1	26.4	27.2	29.2	31.5
	R0125N300S06	1.25	2.5	2.5	30	2.4	2.8°	70	6	2	●	1	31.5	32.6	34.9	No interference
	R0125N350S06	1.25	2.5	2.5	35	2.4	2.5°	80	6	2	●	1	36.7	37.9	40.7	No interference
	R0125N060S06	1.25	2.5	2.5	6	2.4	8.4°	50	6	2	●	1	6.7	6.9	7.3	7.8
	R0125N075S06	1.25	2.5	2.5	7.5	2.4	7.5°	50	6	2	●	1	8.3	8.5	9.1	9.7
	R0125N100S06	1.25	2.5	2.5	10	2.4	6.3°	50	6	2	●	1	10.8	11.2	11.9	12.8

● : Inventory maintained.

Unit : mm

Order Number	Radius of Ball Nose	Dia.	Length of Cut	Neck Length	Neck Dia.	Cutting Edge to Shank Angle	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	ap	L3	D5	B2	L1	D4	N			30°	1°	2°	3°
MS2XLBR0150N080	1.5	3	3	8	2.9	6.8°	60	6	2	●	1	8.8	9	9.6	10.3
R0150N100	1.5	3	3	10	2.9	5.9°	60	6	2	●	1	10.8	11.2	11.9	12.7
R0150N120	1.5	3	3	12	2.9	5.2°	60	6	2	●	1	12.9	13.3	14.2	15.2
R0150N140	1.5	3	3	14	2.9	4.6°	60	6	2	●	1	15	15.4	16.5	17.7
R0150N160	1.5	3	3	16	2.9	4.2°	60	6	2	●	1	17	17.6	18.8	20.2
R0150N200	1.5	3	3	20	2.9	3.5°	70	6	2	●	1	21.2	21.9	23.4	25.2
R0150N250	1.5	3	3	25	2.9	2.9°	70	6	2	●	1	26.3	27.2	29.1	No interference
R0150N300	1.5	3	3	30	2.9	2.5°	70	6	2	●	1	31.5	32.6	34.9	No interference
R0150N350	1.5	3	3	35	2.9	2.2°	80	6	2	●	1	36.7	37.9	40.6	No interference
R0150N400	1.5	3	3	40	2.9	2°	90	6	2	●	1	41.8	43.3	No interference	No interference
R0200N100	2	4	4	10	3.9	4.7°	70	6	2	●	1	10.8	11.1	11.8	12.6
R0200N120	2	4	4	12	3.9	4°	70	6	2	●	1	12.9	13.3	14.1	15.1
R0200N140	2	4	4	14	3.9	3.5°	70	6	2	●	1	15	15.4	16.4	17.6
R0200N160	2	4	4	16	3.9	3.2°	70	6	2	●	1	17	17.5	18.7	20.1
R0200N200	2	4	4	20	3.9	2.6°	70	6	2	●	1	21.2	21.8	23.3	No interference
R0200N250	2	4	4	25	3.9	2.1°	70	6	2	●	1	26.3	27.2	29.1	No interference
R0200N300	2	4	4	30	3.9	1.8°	70	6	2	●	1	31.5	32.5	No interference	No interference
R0200N350	2	4	4	35	3.9	1.6°	80	6	2	●	1	36.7	37.9	No interference	No interference
R0200N400	2	4	4	40	3.9	1.4°	90	6	2	●	1	41.8	43.2	No interference	No interference
R0200N450	2	4	4	45	3.9	1.3°	90	6	2	●	1	47	48.6	No interference	No interference
R0200N500	2	4	4	50	3.9	1.1°	100	6	2	●	1	52.2	53.9	No interference	No interference
R0250N200	2.5	5	5	20	4.9	1.5°	70	6	2	●	1	21.1	21.8	No interference	No interference
R0250N250	2.5	5	5	25	4.9	1.2°	70	6	2	●	1	26.3	27.1	No interference	No interference
R0250N300	2.5	5	5	30	4.9	1°	80	6	2	●	1	31.5	No interference	No interference	No interference
R0250N350	2.5	5	5	35	4.9	0.9°	80	6	2	●	1	36.6	No interference	No interference	No interference
R0300N300	3	6	6	30	5.85	—	80	6	2	●	2	No interference	No interference	No interference	No interference
R0300N500	3	6	6	50	5.85	—	120	6	2	●	2	No interference	No interference	No interference	No interference

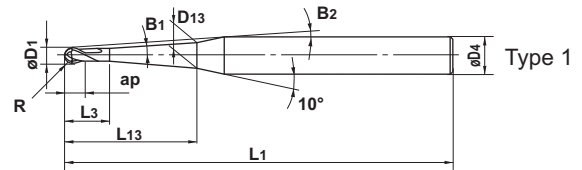
The diameter tolerance is only applied to items produced after July 2006.

TAPER	For Rib Processing	General Use	RADIUS	High Helix	BALL	Long Neck	SQUARE	Long Neck	General Use

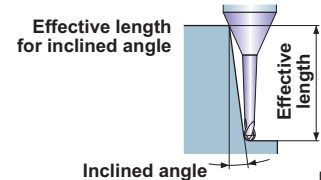
MSTAR END MILLS

MS2XB

Ball nose end mill, 2 flute, Taper neck



● 2 flute taper neck ball nose end mill.



Inclined angle Unit : mm

Order Number	Radius of Ball Nose	Dia.	Taper Angle One Side	Length of Cut	Neck Length	Length of Straight Neck	Cutting Edge to Shank Angle	Neck Dia.	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	B1	ap	L13	L3	B2	D13	L1	D4	N			30°	1°	2°	3°
MS2XBR0010T0030L015	0.1	0.2	30°	0.2	1.5	0.6	8.8°	0.19	50	4	2	●	1	1.7	1.8	2.0	2.3
R0010T0030L020	0.1	0.2	30°	0.2	2	0.6	8.5°	0.20	50	4	2	●	1	2.2	2.4	2.6	3.0
R0010T0100L015	0.1	0.2	1°	0.2	1.5	0.6	8.8°	0.21	50	4	2	●	1	—	1.8	2.0	2.2
R0010T0100L020	0.1	0.2	1°	0.2	2	0.6	8.5°	0.22	50	4	2	●	1	—	2.3	2.5	2.9
R0010T0130L015	0.1	0.2	1°30'	0.2	1.5	0.6	8.9°	0.22	50	4	2	●	1	—	—	1.9	2.2
R0010T0130L020	0.1	0.2	1°30'	0.2	2	0.6	8.6°	0.25	50	4	2	●	1	—	—	2.4	2.8
R0010T0200L015	0.1	0.2	2°	0.2	1.5	0.6	8.9°	0.24	50	4	2	●	1	—	—	1.8	2.1
R0010T0200L020	0.1	0.2	2°	0.2	2	0.6	8.6°	0.27	50	4	2	●	1	—	—	2.3	2.6
R0010T0300L015	0.1	0.2	3°	0.2	1.5	0.6	9.0°	0.27	50	4	2	●	1	—	—	—	1.9
R0010T0300L020	0.1	0.2	3°	0.2	2	0.6	8.7°	0.32	50	4	2	●	1	—	—	—	2.4
R0010T0500L020	0.1	0.2	5°	0.2	2	0.6	9.0°	0.42	50	4	2	●	1	—	—	—	—
R0015T0030L030	0.15	0.3	30°	0.3	3	0.7	7.9°	0.32	50	4	2	●	1	3.2	3.4	3.8	4.3
R0015T0100L030	0.15	0.3	1°	0.3	3	0.7	7.9°	0.36	50	4	2	●	1	—	3.3	3.7	4.2
R0015T0130L030	0.15	0.3	1°30'	0.3	3	0.7	8.0°	0.40	50	4	2	●	1	—	—	3.5	4.0
R0015T0200L030	0.15	0.3	2°	0.3	3	0.7	8.1°	0.44	50	4	2	●	1	—	—	3.3	3.8
R0015T0300L030	0.15	0.3	3°	0.3	3	0.7	8.2°	0.52	50	4	2	●	1	—	—	—	3.4
R0015T0500L030	0.15	0.3	5°	0.3	3	0.7	8.6°	0.68	50	4	2	●	1	—	—	—	—
R0020T0030L020	0.2	0.4	30°	0.4	2	1.2	8.4°	0.38	50	4	2	●	1	2.3	2.4	2.7	3.0
R0020T0030L030	0.2	0.4	30°	0.4	3	1.2	7.8°	0.40	50	4	2	●	1	3.3	3.5	3.9	4.4
R0020T0030L040	0.2	0.4	30°	0.4	4	1.2	7.3°	0.41	50	4	2	●	1	4.3	4.5	5.1	5.7
R0020T0030L050	0.2	0.4	30°	0.4	5	1.2	6.8°	0.43	50	4	2	●	1	5.3	5.6	6.2	7.1
R0020T0100L020	0.2	0.4	1°	0.4	2	1.2	8.4°	0.39	50	4	2	●	1	—	2.3	2.6	3.0
R0020T0100L030	0.2	0.4	1°	0.4	3	1.2	7.9°	0.43	50	4	2	●	1	—	3.3	3.7	4.2
R0020T0100L040	0.2	0.4	1°	0.4	4	1.2	7.4°	0.46	50	4	2	●	1	—	4.3	4.9	5.5
R0020T0100L050	0.2	0.4	1°	0.4	5	1.2	6.9°	0.50	50	4	2	●	1	—	5.3	6.0	6.8
R0020T0130L020	0.2	0.4	1°30'	0.4	2	1.2	8.5°	0.41	50	4	2	●	1	—	—	2.5	2.9
R0020T0130L030	0.2	0.4	1°30'	0.4	3	1.2	7.9°	0.46	50	4	2	●	1	—	—	3.6	4.1
R0020T0130L040	0.2	0.4	1°30'	0.4	4	1.2	7.5°	0.51	50	4	2	●	1	—	—	4.7	5.3
R0020T0130L050	0.2	0.4	1°30'	0.4	5	1.2	7.0°	0.56	50	4	2	●	1	—	—	5.7	6.5
R0020T0200L020	0.2	0.4	2°	0.4	2	1.2	8.5°	0.42	50	4	2	●	1	—	—	2.5	2.8
R0020T0200L030	0.2	0.4	2°	0.4	3	1.2	8.0°	0.49	50	4	2	●	1	—	—	3.5	4.0
R0020T0200L040	0.2	0.4	2°	0.4	4	1.2	7.5°	0.56	50	4	2	●	1	—	—	4.5	5.1
R0020T0200L050	0.2	0.4	2°	0.4	5	1.2	7.1°	0.63	50	4	2	●	1	—	—	5.5	6.2
R0025T0030L030	0.25	0.5	30°	0.5	3	1.5	7.8°	0.49	50	4	2	●	1	3.3	3.5	3.9	4.4
R0025T0030L050	0.25	0.5	30°	0.5	5	1.5	6.8°	0.53	50	4	2	●	1	5.3	5.6	6.2	7.1
R0025T0100L030	0.25	0.5	1°	0.5	3	1.5	7.8°	0.52	50	4	2	●	1	—	3.4	3.8	4.3
R0025T0100L050	0.25	0.5	1°	0.5	5	1.5	6.9°	0.59	50	4	2	●	1	—	5.4	6.0	6.8
R0025T0130L030	0.25	0.5	1°30'	0.5	3	1.5	7.9°	0.54	50	4	2	●	1	—	—	3.7	4.1

● : Inventory maintained.

Unit : mm

Order Number	Radius of Ball Nose	Dia.	Taper Angle One Side	Length of Cut	Neck Length	Length of Straight Neck	Cutting Edge to Shank Angle	Neck Dia.	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	B1	ap	L13	L3	B2	D13	L1	D4	N			30°	1°	2°	3°
MS2XBR0025T0130L050	0.25	0.5	1°30'	0.5	5	1.5	7.0°	0.65	50	4	2	●	1	—	—	5.8	6.6
R0025T0200L030	0.25	0.5	2°	0.5	3	1.5	7.9°	0.57	50	4	2	●	1	—	—	3.5	4.0
R0025T0200L050	0.25	0.5	2°	0.5	5	1.5	7.1°	0.71	50	4	2	●	1	—	—	5.5	6.3
R0030T0030L050	0.3	0.6	30'	0.6	5	1.6	6.8°	0.62	50	4	2	●	1	5.3	5.6	6.2	7.1
R0030T0030L080	0.3	0.6	30'	0.6	8	1.6	5.7°	0.68	50	4	2	●	1	8.3	8.7	9.8	11.1
R0030T0100L050	0.3	0.6	1°	0.6	5	1.6	6.8°	0.68	50	4	2	●	1	—	5.4	6.0	6.8
R0030T0100L080	0.3	0.6	1°	0.6	8	1.6	5.8°	0.79	50	4	2	●	1	—	8.4	9.4	10.7
R0030T0100L100	0.3	0.6	1°	0.6	10	1.6	5.2°	0.86	50	4	2	●	1	—	10.4	11.6	13.2
R0030T0100L120	0.3	0.6	1°	0.6	12	1.6	4.8°	0.93	50	4	2	●	1	—	12.4	13.9	15.8
R0030T0100L150	0.3	0.6	1°	0.6	15	1.6	4.2°	1.03	50	4	2	●	1	—	15.4	17.2	19.6
R0030T0130L050	0.3	0.6	1°30'	0.6	5	1.6	6.9°	0.74	50	4	2	●	1	—	—	5.8	6.6
R0030T0130L080	0.3	0.6	1°30'	0.6	8	1.6	5.9°	0.90	50	4	2	●	1	—	—	9.0	10.2
R0030T0200L060	0.3	0.6	2°	0.6	6	1.6	6.6°	0.87	50	4	2	●	1	—	—	6.6	7.4
R0030T0200L080	0.3	0.6	2°	0.6	8	1.6	6.0°	1.01	50	4	2	●	1	—	—	8.6	9.7
R0040T0030L080	0.4	0.8	30'	0.8	8	1.8	5.5°	0.87	50	4	2	●	1	8.3	8.7	9.8	11.1
R0040T0030L120	0.4	0.8	30'	0.8	12	1.8	4.5°	0.94	60	4	2	●	1	12.3	13.0	14.5	16.5
R0040T0100L080	0.4	0.8	1°	0.8	8	1.8	5.6°	0.98	50	4	2	●	1	—	8.4	9.4	10.7
R0040T0100L120	0.4	0.8	1°	0.8	12	1.8	4.6°	1.12	60	4	2	●	1	—	12.4	13.9	15.8
R0040T0130L080	0.4	0.8	1°30'	0.8	8	1.8	5.8°	1.09	50	4	2	●	1	—	—	9.0	10.2
R0040T0130L120	0.4	0.8	1°30'	0.8	12	1.8	4.8°	1.30	60	4	2	●	1	—	—	13.2	15.0
R0040T0200L080	0.4	0.8	2°	0.8	8	1.8	5.9°	1.20	60	4	2	●	1	—	—	8.6	9.7
R0040T0300L120	0.4	0.8	3°	0.8	12	1.8	5.2°	1.83	60	4	2	●	1	—	—	—	12.8
R0050T0030L100	0.5	1	30'	1	10	2.5	6.1°	1.08	60	6	2	●	1	10.4	10.9	12.2	13.9
R0050T0030L150	0.5	1	30'	1	15	2.5	5.1°	1.16	60	6	2	●	1	15.4	16.2	18.2	20.7
R0050T0030L200	0.5	1	30'	1	20	2.5	4.4°	1.25	70	6	2	●	1	20.4	21.5	24.1	27.4
R0050T0030L250	0.5	1	30'	1	25	2.5	3.8°	1.34	70	6	2	●	1	25.4	26.8	30.0	34.2
R0050T0030L300	0.5	1	30'	1	30	2.5	3.4°	1.42	70	6	2	●	1	30.4	32.0	35.9	41.0
R0050T0100L100	0.5	1	1°	1	10	2.5	6.2°	1.21	60	6	2	●	1	—	10.5	11.8	13.4
R0050T0100L150	0.5	1	1°	1	15	2.5	5.2°	1.38	60	6	2	●	1	—	15.5	17.4	19.8
R0050T0100L200	0.5	1	1°	1	20	2.5	4.5°	1.56	70	6	2	●	1	—	20.5	23.0	26.2
R0050T0100L250	0.5	1	1°	1	25	2.5	3.9°	1.73	70	6	2	●	1	—	25.5	28.6	32.6
R0050T0100L300	0.5	1	1°	1	30	2.5	3.5°	1.91	70	6	2	●	1	—	30.5	34.2	39.0
R0050T0100L350	0.5	1	1°	1	35	2.5	3.2°	2.08	80	6	2	●	1	—	35.5	39.8	45.4
R0050T0130L100	0.5	1	1°30'	1	10	2.5	6.3°	1.34	60	6	2	●	1	—	—	11.3	12.8
R0050T0130L150	0.5	1	1°30'	1	15	2.5	5.3°	1.60	60	6	2	●	1	—	—	16.6	18.9
R0050T0130L200	0.5	1	1°30'	1	20	2.5	4.6°	1.86	70	6	2	●	1	—	—	21.9	24.9
R0050T0200L150	0.5	1	2°	1	15	2.5	5.4°	1.82	60	6	2	●	1	—	—	15.8	18.0
R0050T0200L200	0.5	1	2°	1	20	2.5	4.7°	2.17	70	6	2	●	1	—	—	20.8	23.7
R0050T0300L200	0.5	1	3°	1	20	2.5	5.0°	2.78	70	6	2	●	1	—	—	—	21.2
R0050T0300L400	0.5	1	3°	1	40	2.5	3.4°	4.88	80	6	2	●	1	—	—	—	41.2
R0050T0500L200	0.5	1	5°	1	20	2.5	5.7°	4.01	70	6	2	●	1	—	—	—	—
R0060T0030L120	0.6	1.2	30'	1.2	12	2.7	5.6°	1.31	60	6	2	●	1	12.4	13.1	14.6	16.6
R0060T0030L240	0.6	1.2	30'	1.2	24	2.7	3.8°	1.52	70	6	2	●	1	24.4	25.7	28.8	32.8
R0060T0100L120	0.6	1.2	1°	1.2	12	2.7	5.7°	1.47	60	6	2	●	1	—	12.5	14.0	15.9
R0060T0100L240	0.6	1.2	1°	1.2	24	2.7	3.9°	1.89	70	6	2	●	1	—	24.5	27.5	31.3
R0060T0130L120	0.6	1.2	1°30'	1.2	12	2.7	5.8°	1.63	60	6	2	●	1	—	—	13.4	15.2
R0060T0130L240	0.6	1.2	1°30'	1.2	24	2.7	4.1°	2.26	70	6	2	●	1	—	—	26.2	29.8
R0060T0200L120	0.6	1.2	2°	1.2	12	2.7	5.9°	1.79	60	6	2	●	1	—	—	12.8	14.6

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

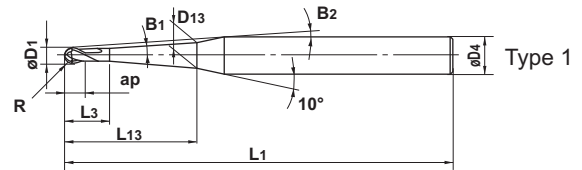
BALL
Long NeckRADIUS
General UseTAPER
General Use

For Rib Processing

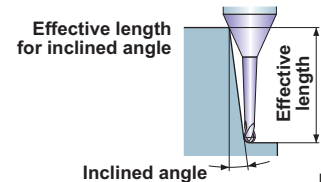
MSTAR END MILLS

MS2XB

Ball nose end mill, 2 flute, Taper neck



● 2 flute taper neck ball nose end mill.



Inclined angle Unit : mm

Order Number	Radius of Ball Nose	Dia.	Taper Angle One Side	Length of Cut	Neck Length	Length of Straight Neck	Cutting Edge to Shank Angle	Neck Dia.	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	B1	ap	L13	L3	B2	D13	L1	D4	N			30°	1°	2°	3°
MS2XBR0060T0200L240	0.6	1.2	2°	1.2	24	2.7	4.2°	2.63	70	6	2	●	1	—	—	24.8	28.3
R0075T0030L100	0.75	1.5	30'	1.5	10	3	5.9°	1.57	60	6	2	●	1	10.4	10.9	12.2	13.8
R0075T0030L150	0.75	1.5	30'	1.5	15	3	4.9°	1.65	60	6	2	●	1	15.4	16.2	18.1	20.6
R0075T0030L300	0.75	1.5	30'	1.5	30	3	3.2°	1.92	70	6	2	●	1	30.4	32.0	35.9	40.9
R0075T0100L100	0.75	1.5	1°	1.5	10	3	6.0°	1.69	60	6	2	●	1	—	10.5	11.8	13.3
R0075T0100L150	0.75	1.5	1°	1.5	15	3	5.0°	1.86	60	6	2	●	1	—	15.5	17.4	19.7
R0075T0100L200	0.75	1.5	1°	1.5	20	3	4.2°	2.04	70	6	2	●	1	—	20.5	23.0	26.1
R0075T0100L300	0.75	1.5	1°	1.5	30	3	3.3°	2.39	70	6	2	●	1	—	30.5	34.2	39.0
R0075T0130L100	0.75	1.5	1°30'	1.5	10	3	6.1°	1.81	60	6	2	●	1	—	—	11.3	12.8
R0075T0130L150	0.75	1.5	1°30'	1.5	15	3	5.1°	2.07	60	6	2	●	1	—	—	16.6	18.9
R0075T0130L300	0.75	1.5	1°30'	1.5	30	3	3.4°	2.86	70	6	2	●	1	—	—	32.5	37.0
R0075T0200L100	0.75	1.5	2°	1.5	10	3	6.2°	1.93	60	6	2	●	1	—	—	10.9	12.3
R0075T0200L150	0.75	1.5	2°	1.5	15	3	5.2°	2.28	60	6	2	●	1	—	—	15.9	18.0
R0075T0200L300	0.75	1.5	2°	1.5	30	3	3.5°	3.33	70	6	2	●	1	—	—	30.9	35.1
R0100T0030L200	1	2	30'	2	20	4	3.9°	2.18	60	6	2	●	1	20.7	21.7	24.3	27.6
R0100T0030L300	1	2	30'	2	30	4	2.9°	2.36	70	6	2	●	1	30.7	32.3	36.2	No interference
R0100T0030L400	1	2	30'	2	40	4	2.4°	2.53	80	6	2	●	1	40.7	42.8	48.0	No interference
R0100T0100L200	1	2	1°	2	20	4	4.0°	2.46	60	6	2	●	1	—	20.8	23.3	26.4
R0100T0100L250	1	2	1°	2	25	4	3.4°	2.64	60	6	2	●	1	—	25.8	28.9	32.9
R0100T0100L300	1	2	1°	2	30	4	3.0°	2.81	70	6	2	●	1	—	30.8	34.5	39.3
R0100T0100L350	1	2	1°	2	35	4	2.7°	2.99	80	6	2	●	1	—	35.8	40.1	No interference
R0100T0100L400	1	2	1°	2	40	4	2.5°	3.16	80	6	2	●	1	—	40.8	45.8	No interference
R0100T0100L500	1	2	1°	2	50	4	2.1°	3.51	90	6	2	●	1	—	50.8	57.0	No interference
R0100T0130L200	1	2	1°30'	2	20	4	4.1°	2.74	60	6	2	●	1	—	—	22.3	25.3
R0100T0130L300	1	2	1°30'	2	30	4	3.1°	3.27	70	6	2	●	1	—	—	32.9	37.4
R0100T0130L400	1	2	1°30'	2	40	4	2.6°	3.79	80	6	2	●	1	—	—	43.5	No interference
R0100T0200L300	1	2	2°	2	30	4	3.3°	3.72	70	6	2	●	1	—	—	31.3	35.5
R0100T0200L400	1	2	2°	2	40	4	2.7°	4.42	80	6	2	●	1	—	—	41.3	No interference
R0100T0300L300	1	2	3°	2	30	4	3.5°	4.63	70	6	2	●	1	—	—	—	31.8
R0100T0300L400	1	2	3°	2	40	4	2.9°	5.68	80	6	2	●	1	—	—	—	No interference
R0100T0500L200	1	2	5°	2	20	4	5.1°	4.70	60	6	2	●	1	—	—	—	—
R0100T0500L380	1	2	5°	2	38	4	4.6°	7.85	80	8	2	●	1	—	—	—	—
R0150T0030L300	1.5	3	30'	3	30	6	2.4°	3.32	70	6	2	●	1	30.7	32.3	36.2	No interference
R0150T0030L400	1.5	3	30'	3	40	6	1.9°	3.50	80	6	2	●	1	40.7	42.9	No interference	No interference
R0150T0030L500	1.5	3	30'	3	50	6	1.6°	3.67	90	6	2	●	1	50.7	53.4	No interference	No interference
R0150T0100L300	1.5	3	1°	3	30	6	2.5°	3.74	70	6	2	●	1	—	31.0	34.7	No interference
R0150T0100L400	1.5	3	1°	3	40	6	2.0°	4.09	80	6	2	●	1	—	41.0	45.9	No interference
R0150T0100L500	1.5	3	1°	3	50	6	1.7°	4.44	90	6	2	●	1	—	51.0	No interference	No interference

● : Inventory maintained.

Unit : mm

Order Number	Radius of Ball Nose	Dia.	Taper Angle One Side	Length of Cut	Neck Length	Length of Straight Neck	Cutting Edge to Shank Angle	Neck Dia.	Overall Length	Shank Dia.	No. of Flutes	Stock	Type	Effective length for inclined angle			
	R	D1	B1	ap	L13	L3	B2	D13	L1	D4	N			30°	1°	2°	3°
MS2XBR0150T0130L300	1.5	3	1°30'	3	30	6	2.6°	4.16	70	6	2	●	1	—	—	33.1	No interference
R0150T0130L400	1.5	3	1°30'	3	40	6	2.1°	4.69	80	6	2	●	1	—	—	43.8	No interference
R0150T0130L500	1.5	3	1°30'	3	50	6	1.7°	5.21	90	6	2	●	1	—	—	No interference	No interference
R0150T0200L300	1.5	3	2°	3	30	6	2.7°	4.58	70	6	2	●	1	—	—	31.6	No interference
R0150T0200L480	1.5	3	2°	3	48	6	1.9°	5.84	90	6	2	●	1	—	—	No interference	No interference
R0150T0300L300	1.5	3	3°	3	30	6	2.9°	5.42	70	6	2	●	1	—	—	—	No interference
R0150T0300L500	1.5	3	3°	3	50	6	2.9°	7.52	90	8	2	●	1	—	—	—	No interference
R0200T0030L600	2	4	30'	4	60	7	1.0°	4.83	110	6	2	●	1	60.8	64.0	No interference	No interference
R0200T0100L600	2	4	1°	4	60	7	1.0°	5.76	110	6	2	●	1	—	61.1	No interference	No interference

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL

Long Neck

RADIUS

Long Neck

TAPER

For Rib Processing

MSTAR END MILLS

MS2MRB

Corner radius end mill, Medium cut length, 2 flute

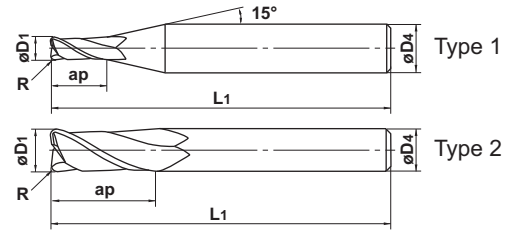


0 -0.020



$D1 < 3$

$3 \leq D1$



Type 1

Type 2

● 2 flute corner radius end mill for general use.

Unit : mm

	Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type
		D1	ap	L1	D4	R	N	Stock	Type
General Use	MS2MRBD0100R010	1	2	40	4	0.1	2	●	1
	D0100R020	1	2	40	4	0.2	2	●	1
	D0100R030	1	2	40	4	0.3	2	●	1
	D0150R010	1.5	3	40	4	0.1	2	●	1
	D0150R020	1.5	3	40	4	0.2	2	●	1
	D0150R030	1.5	3	40	4	0.3	2	●	1
	D0150R050	1.5	3	40	4	0.5	2	●	1
	D0200R010	2	4	40	4	0.1	2	●	1
	D0200R020	2	4	40	4	0.2	2	●	1
	D0200R030	2	4	40	4	0.3	2	●	1
Long Neck	D0200R050	2	4	40	4	0.5	2	●	1
	D0250R010	2.5	5	40	4	0.1	2	●	1
	D0250R020	2.5	5	40	4	0.2	2	●	1
	D0250R030	2.5	5	40	4	0.3	2	●	1
	D0250R050	2.5	5	40	4	0.5	2	●	1
	D0300R010	3	6	50	6	0.1	2	●	1
	D0300R020	3	6	50	6	0.2	2	●	1
	D0300R030	3	6	50	6	0.3	2	●	1
	D0300R050	3	6	50	6	0.5	2	●	1
	D0300R100	3	6	50	6	1	2	●	1
High Helix	D0400R010	4	8	50	6	0.1	2	●	1
	D0400R020	4	8	50	6	0.2	2	●	1
	D0400R030	4	8	50	6	0.3	2	●	1
	D0400R050	4	8	50	6	0.5	2	●	1
	D0400R100	4	8	50	6	1	2	●	1
	D0500R010	5	10	50	6	0.1	2	●	1
	D0500R020	5	10	50	6	0.2	2	●	1
	D0500R030	5	10	50	6	0.3	2	●	1
	D0500R050	5	10	50	6	0.5	2	●	1
	D0500R100	5	10	50	6	1	2	●	1
For Small Automatic Lathe	D0600R010	6	12	50	6	0.1	2	●	2
	D0600R020	6	12	50	6	0.2	2	●	2
	D0600R030	6	12	50	6	0.3	2	●	2
	D0600R050	6	12	50	6	0.5	2	●	2
	D0600R100	6	12	50	6	1	2	●	2
	D0600R150	6	12	50	6	1.5	2	●	2
	D0600R200	6	12	50	6	2	2	●	2
	D0800R020	8	16	60	8	0.2	2	●	2
General Use									
Long Neck									
Taper									

● : Inventory maintained.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type
MS2MRBD0800R030	8	16	60	8	0.3	2	●	2
D0800R050	8	16	60	8	0.5	2	●	2
D0800R100	8	16	60	8	1	2	●	2
D0800R150	8	16	60	8	1.5	2	●	2
D0800R200	8	16	60	8	2	2	●	2
D0800R250	8	16	60	8	2.5	2	●	2
D0800R300	8	16	60	8	3	2	●	2
D1000R020	10	20	70	10	0.2	2	●	2
D1000R030	10	20	70	10	0.3	2	●	2
D1000R050	10	20	70	10	0.5	2	●	2
D1000R100	10	20	70	10	1	2	●	2
D1000R150	10	20	70	10	1.5	2	●	2
D1000R200	10	20	70	10	2	2	●	2
D1000R250	10	20	70	10	2.5	2	●	2
D1000R300	10	20	70	10	3	2	●	2
D1200R020	12	24	75	12	0.2	2	●	2
D1200R030	12	24	75	12	0.3	2	●	2
D1200R050	12	24	75	12	0.5	2	●	2
D1200R100	12	24	75	12	1	2	●	2
D1200R150	12	24	75	12	1.5	2	●	2
D1200R200	12	24	75	12	2	2	●	2
D1200R250	12	24	75	12	2.5	2	●	2
D1200R300	12	24	75	12	3	2	●	2

The diameter tolerance is only applied to items produced after July 2006.

SQUARE	General Use	
	Long Neck	High Helix
BALL	For Small Automatic Lathe	
	Long Neck	General Use
RADIUS	General Use	
	Long Neck	High Helix
TAPER	General Use	
	Ball	For Rib Processing

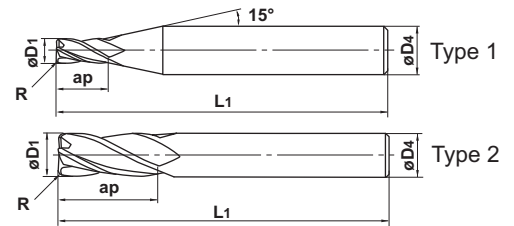
MSTAR END MILLS

MS4MRB

Corner radius end mill, Medium cut length, 4 flute



$D1 \leq 12$ 0 — 0.020
 $12 < D1$ 0 — 0.030



● 4 flute corner radius end mill for general use.

Unit : mm

	Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type
		D1	ap	L1	D4	R	N	Stock	Type
General Use	MS4MRBD0300R010	3	8	45	6	0.1	4	●	1
	D0300R020	3	8	45	6	0.2	4	●	1
	D0300R030	3	8	45	6	0.3	4	●	1
	D0300R050	3	8	45	6	0.5	4	●	1
	D0300R100	3	8	45	6	1	4	●	1
Long Neck	D0400R010	4	11	45	6	0.1	4	●	1
	D0400R020	4	11	45	6	0.2	4	●	1
	D0400R030	4	11	45	6	0.3	4	●	1
	D0400R050	4	11	45	6	0.5	4	●	1
	D0400R100	4	11	45	6	1	4	●	1
High Helix	D0500R010	5	13	50	6	0.1	4	●	1
	D0500R020	5	13	50	6	0.2	4	●	1
	D0500R030	5	13	50	6	0.3	4	●	1
	D0500R050	5	13	50	6	0.5	4	●	1
	D0500R100	5	13	50	6	1	4	●	1
For Small Automatic Lathe	D0600R010	6	13	50	6	0.1	4	●	2
	D0600R020	6	13	50	6	0.2	4	●	2
	D0600R030	6	13	50	6	0.3	4	●	2
	D0600R050	6	13	50	6	0.5	4	●	2
	D0600R100	6	13	50	6	1	4	●	2
General Use	D0600R150	6	13	50	6	1.5	4	●	2
	D0600R200	6	13	50	6	2	4	●	2
	D0800R020	8	19	60	8	0.2	4	●	2
	D0800R030	8	19	60	8	0.3	4	●	2
	D0800R050	8	19	60	8	0.5	4	●	2
Long Neck	D0800R100	8	19	60	8	1	4	●	2
	D0800R150	8	19	60	8	1.5	4	●	2
	D0800R200	8	19	60	8	2	4	●	2
	D0800R250	8	19	60	8	2.5	4	●	2
	D0800R300	8	19	60	8	3	4	●	2
High Helix	D1000R020	10	22	70	10	0.2	4	●	2
	D1000R030	10	22	70	10	0.3	4	●	2
	D1000R050	10	22	70	10	0.5	4	●	2
	D1000R100	10	22	70	10	1	4	●	2
	D1000R150	10	22	70	10	1.5	4	●	2
General Use	D1000R200	10	22	70	10	2	4	●	2
	D1000R250	10	22	70	10	2.5	4	●	2
	D1000R300	10	22	70	10	3	4	●	2
Ball	D1000R020	10	22	70	10	0.2	4	●	2
	D1000R030	10	22	70	10	0.3	4	●	2
	D1000R050	10	22	70	10	0.5	4	●	2
	D1000R100	10	22	70	10	1	4	●	2
	D1000R150	10	22	70	10	1.5	4	●	2
Taper	D1000R200	10	22	70	10	2	4	●	2
	D1000R250	10	22	70	10	2.5	4	●	2
	D1000R300	10	22	70	10	3	4	●	2
	D1000R020	10	22	70	10	0.2	4	●	2
	D1000R030	10	22	70	10	0.3	4	●	2

● : Inventory maintained.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type
MS4MRBD1200R020	12	26	75	12	0.2	4	●	2
D1200R030	12	26	75	12	0.3	4	●	2
D1200R050	12	26	75	12	0.5	4	●	2
D1200R100	12	26	75	12	1	4	●	2
D1200R150	12	26	75	12	1.5	4	●	2
D1200R200	12	26	75	12	2	4	●	2
D1200R250	12	26	75	12	2.5	4	●	2
D1200R300	12	26	75	12	3	4	●	2
D1600R050	16	32	90	16	0.5	4	●	2
D1600R100	16	32	90	16	1	4	●	2
D1600R150	16	32	90	16	1.5	4	●	2
D1600R200	16	32	90	16	2	4	●	2
D1600R250	16	32	90	16	2.5	4	●	2
D1600R300	16	32	90	16	3	4	●	2
D2000R050	20	38	100	20	0.5	4	●	2
D2000R100	20	38	100	20	1	4	●	2
D2000R150	20	38	100	20	1.5	4	●	2
D2000R200	20	38	100	20	2	4	●	2
D2000R250	20	38	100	20	2.5	4	●	2
D2000R300	20	38	100	20	3	4	●	2

TAPER	RADIUS		BALL		SQUARE	
	General Use	High Helix	Long Neck	General Use	For Small Automatic Lathe	High Helix
For Rib Processing	Ball					
					</	

MSTAR END MILLS

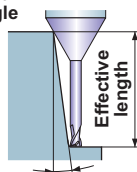
MS2XLRB

Corner radius end mill, Short cut length, 2 flute, Long neck

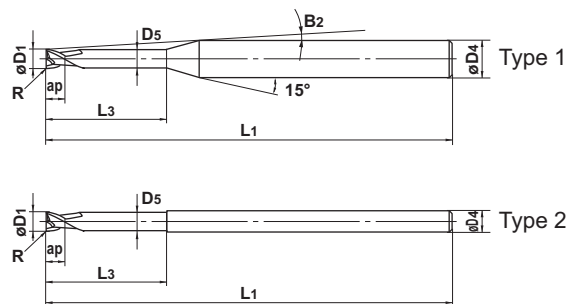


$D_1 < 3$

$3 \leq D_1$



Inclined angle



● 2 flute long neck corner radius end mill.

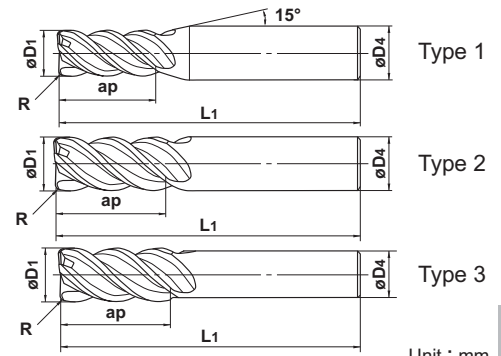
Unit : mm

Order Number	Dia. D1	Corner R R	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle			
												30°	1°	2°	3°
MS2XLRBD0100R010N020	1	0.1	1	2	0.94	12.1	60	6	2	●	1	2.5	2.6	2.8	3
D0100R010N050	1	0.1	1	5	0.94	9.7	60	6	2	●	1	5.6	5.8	6.3	6.8
D0200R010N040	2	0.1	2	4	1.9	9.5	60	6	2	●	1	4.7	4.8	5.2	5.6
D0200R010N100	2	0.1	2	10	1.9	6.4	60	6	2	●	1	10.9	11.3	12.1	13.1
D0200R030N040	2	0.3	2	4	1.9	9.7	60	6	2	●	1	4.7	4.8	5.2	5.6
D0200R030N100	2	0.3	2	10	1.9	6.5	60	6	2	●	1	10.9	11.2	12.1	13
D0300R010N060	3	0.1	3	6	2.9	7.1	50	6	2	●	1	6.7	7	7.5	8.1
D0300R010N150	3	0.1	3	15	2.9	4.1	60	6	2	●	1	16.1	16.6	17.9	19.3
D0300R030N060	3	0.3	3	6	2.9	7.2	50	6	2	●	1	6.7	7	7.5	8.1
D0300R030N150	3	0.3	3	15	2.9	4.2	60	6	2	●	1	16	16.6	17.8	19.2
D0400R010N080	4	0.1	4	8	3.9	4.7	50	6	2	●	1	8.8	9.1	9.8	10.6
D0400R010N200	4	0.1	4	20	3.9	2.4	60	6	2	●	1	21.2	22	23.6	No interference
D0400R030N080	4	0.3	4	8	3.9	4.8	50	6	2	●	1	8.8	9.1	9.8	10.5
D0400R030N200	4	0.3	4	20	3.9	2.4	60	6	2	●	1	21.2	21.9	23.6	No interference
D0400R050N080	4	0.5	4	8	3.9	4.9	50	6	2	●	1	8.8	9.1	9.7	10.5
D0400R050N200	4	0.5	4	20	3.9	2.5	60	6	2	●	1	21.2	21.9	23.5	No interference
D0600R010N120	6	0.1	6	12	5.85	—	50	6	2	●	1	No interference	No interference	No interference	No interference
D0600R010N300	6	0.1	6	30	5.85	—	70	6	2	●	1	No interference	No interference	No interference	No interference
D0600R030N120	6	0.3	6	12	5.85	—	50	6	2	●	1	No interference	No interference	No interference	No interference
D0600R030N300	6	0.3	6	30	5.85	—	70	6	2	●	1	No interference	No interference	No interference	No interference
D0600R050N120	6	0.5	6	12	5.85	—	50	6	2	●	2	No interference	No interference	No interference	No interference
D0600R050N300	6	0.5	6	30	5.85	—	70	6	2	●	2	No interference	No interference	No interference	No interference

The diameter tolerance is only applied to items produced after July 2006.



● 4 flute high power corner radius end mill.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type
MSMHDRBD0200R020	2	4	45	4	0.2	4	●	1
D0200R030	2	4	45	4	0.3	4	●	1
D0300R020	3	8	45	6	0.2	4	●	1
D0300R030	3	8	45	6	0.3	4	●	1
D0300R050	3	8	45	6	0.5	4	●	1
D0400R020	4	11	45	6	0.2	4	●	1
D0400R030	4	11	45	6	0.3	4	●	1
D0400R050	4	11	45	6	0.5	4	●	1
D0500R020	5	13	50	6	0.2	4	●	1
D0500R030	5	13	50	6	0.3	4	●	1
D0500R050	5	13	50	6	0.5	4	●	1
D0500R100	5	13	50	6	1	4	●	1
D0600R030	6	13	50	6	0.3	4	●	2
D0600R050	6	13	50	6	0.5	4	●	2
D0600R100	6	13	50	6	1	4	●	2
D0800R030	8	19	60	8	0.3	4	●	2
D0800R050	8	19	60	8	0.5	4	●	2
D0800R100	8	19	60	8	1	4	●	2
D0800R150	8	19	60	8	1.5	4	●	2
D1000R030	10	22	70	10	0.3	4	●	2
D1000R050	10	22	70	10	0.5	4	●	2
D1000R100	10	22	70	10	1	4	●	2
D1000R150	10	22	70	10	1.5	4	●	2
D1000R200	10	22	70	10	2	4	●	2
D1200R050S10	12	26	75	10	0.5	4	●	3
D1200R100S10	12	26	75	10	1	4	●	3
D1200R150S10	12	26	75	10	1.5	4	●	3
D1200R200S10	12	26	75	10	2	4	●	3
D1200R300S10	12	26	75	10	3	4	●	3
D1200R050	12	26	75	12	0.5	4	●	2
D1200R100	12	26	75	12	1	4	●	2
D1200R150	12	26	75	12	1.5	4	●	2
D1200R200	12	26	75	12	2	4	●	2
D1200R300	12	26	75	12	3	4	●	2
D1600R100	16	35	90	16	1	4	●	2
D1600R150	16	35	90	16	1.5	4	●	2
D1600R200	16	35	90	16	2	4	●	2
D1600R300	16	35	90	16	3	4	●	2

General Use

SQUARE
Long Neck

High Helix

For Small
Automatic Lathe

BALL
Long Neck

RADIUS
Long Neck

TAPER
Ball Processing

MSTAR END MILLS

MSMHDRB

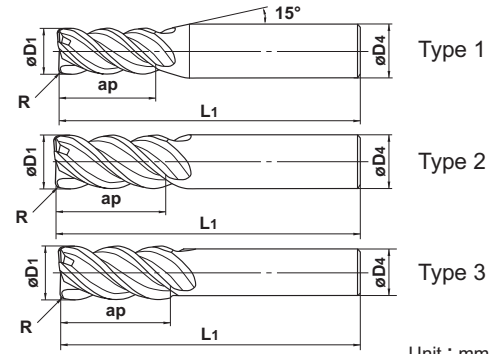
High power, Corner radius, Medium cut length, 4 flute



$D_1 \leq 12$ 0 — -0.020
 $12 < D_1$ 0 — -0.030



● 4 flute high power corner radius end mill.



Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type
MSMHDRBD1800R100	18	40	100	16	1	4	●	3
D1800R150	18	40	100	16	1.5	4	●	3
D1800R200	18	40	100	16	2	4	●	3
D1800R300	18	40	100	16	3	4	●	3
D2000R100	20	45	110	20	1	4	●	2
D2000R150	20	45	110	20	1.5	4	●	2
D2000R200	20	45	110	20	2	4	●	2
D2000R300	20	45	110	20	3	4	●	2

General Use

Long Neck

High Helix

For Small
Automatic Lathe

General Use

Long Neck

General Use

High Helix

For Rib
Processing

SQUARE

BALL

RADIUS

TAPER



$D1 < 0.5$ 0 - -0.020
 $0.5 \leq D1$ 0 - -0.030



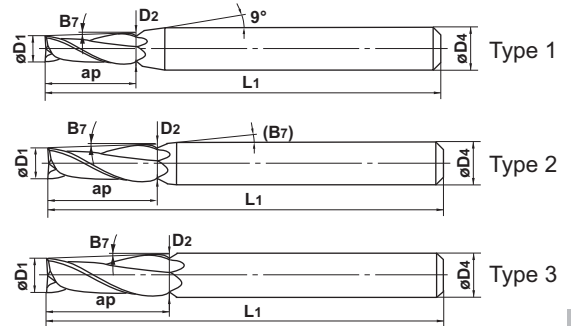
$\pm 5'$



$D1 < 0.4$

$0.4 \leq D1$

● 2 flute taper end mill for general use.



Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MTD0020T0030	0.2	30'	0.21	0.8	45	4	2	●	1
D0020T0100	0.2	1°	0.23	0.8	45	4	2	●	1
D0020T0130	0.2	1°30'	0.24	0.8	45	4	2	●	1
D0020T0200	0.2	2°	0.26	0.8	45	4	2	●	1
D0020T0300	0.2	3°	0.28	0.8	45	4	2	●	1
D0020T0400	0.2	4°	0.31	0.8	45	4	2	●	1
D0020T0500	0.2	5°	0.34	0.8	45	4	2	●	1
D0020T0700	0.2	7°	0.4	0.8	45	4	2	●	1
D0020T1000	0.2	10°	0.48	0.8	45	4	2	●	2
D0030T0030	0.3	30'	0.32	1.2	45	4	2	●	1
D0030T0100	0.3	1°	0.34	1.2	45	4	2	●	1
D0030T0130	0.3	1°30'	0.36	1.2	45	4	2	●	1
D0030T0200	0.3	2°	0.38	1.2	45	4	2	●	1
D0030T0300	0.3	3°	0.43	1.2	45	4	2	●	1
D0030T0400	0.3	4°	0.47	1.2	45	4	2	●	1
D0030T0500	0.3	5°	0.51	1.2	45	4	2	●	1
D0030T0700	0.3	7°	0.59	1.2	45	4	2	●	1
D0030T1000	0.3	10°	0.72	1.2	45	4	2	●	2
D0040T0030	0.4	30'	0.43	1.6	45	4	2	●	1
D0040T0100	0.4	1°	0.46	1.6	45	4	2	●	1
D0040T0130	0.4	1°30'	0.48	1.6	45	4	2	●	1
D0040T0200	0.4	2°	0.51	1.6	45	4	2	●	1
D0040T0300	0.4	3°	0.57	1.6	45	4	2	●	1
D0040T0400	0.4	4°	0.62	1.6	45	4	2	●	1
D0040T0500	0.4	5°	0.68	1.6	45	4	2	●	1
D0040T0700	0.4	7°	0.79	1.6	45	4	2	●	1
D0040T1000	0.4	10°	0.96	1.6	45	4	2	●	2
D0050T0030	0.5	30'	0.53	2	45	4	2	●	1
D0050T0100	0.5	1°	0.57	2	45	4	2	●	1
D0050T0130	0.5	1°30'	0.6	2	45	4	2	●	1
D0050T0200	0.5	2°	0.64	2	45	4	2	●	1
D0050T0300	0.5	3°	0.71	2	45	4	2	●	1
D0050T0400	0.5	4°	0.78	2	45	4	2	●	1
D0050T0500	0.5	5°	0.85	2	45	4	2	●	1
D0050T0700	0.5	7°	0.99	2	45	4	2	●	1
D0050T1000	0.5	10°	1.21	2	45	4	2	●	2
D0060T0030	0.6	30'	0.63	2	45	4	2	●	1
D0060T0100	0.6	1°	0.67	2	45	4	2	●	1

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL
Long Neck

RADIUS
Long Neck

High Helix

TAPER
Ball Processing

MSTAR END MILLS

MS2MT

Taper end mill, Medium cut length, 2 flute



$D1 < 0.5$ 0 - -0.020
 $0.5 \leq D1$ 0 - -0.030



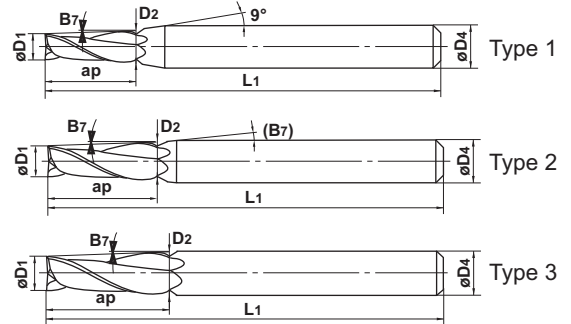
$\pm 5'$



$D1 < 0.4$

$0.4 \leq D1$

● 2 flute taper end mill for general use.



Unit : mm

	Order Number	Small Mill Dia.	Taper Angle One Side	Large Mill Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		D1	B7	D2	ap	L1	D4	N		
General Use	MS2MTD0060T0130	0.6	1°30'	0.7	2	45	4	2	●	1
	D0060T0200	0.6	2°	0.74	2	45	4	2	●	1
	D0060T0230	0.6	2°30'	0.77	2	45	4	2	●	1
	D0060T0300	0.6	3°	0.81	2	45	4	2	●	1
	D0060T0400	0.6	4°	0.88	2	45	4	2	●	1
	D0060T0500	0.6	5°	0.95	2	45	4	2	●	1
	D0060T0700	0.6	7°	1.09	2	45	4	2	●	1
	D0060T1000	0.6	10°	1.31	2	45	4	2	●	2
	D0070T0030	0.7	30'	0.73	2	45	4	2	●	1
	D0070T0100	0.7	1°	0.77	2	45	4	2	●	1
Long Neck	D0070T0130	0.7	1°30'	0.8	2	45	4	2	●	1
	D0070T0200	0.7	2°	0.84	2	45	4	2	●	1
	D0070T0300	0.7	3°	0.91	2	45	4	2	●	1
	D0070T0400	0.7	4°	0.98	2	45	4	2	●	1
	D0070T0500	0.7	5°	1.05	2	45	4	2	●	1
	D0070T0700	0.7	7°	1.19	2	45	4	2	●	1
	D0070T1000	0.7	10°	1.41	2	45	4	2	●	2
	D0080T0030	0.8	30'	0.85	3	45	4	2	●	1
	D0080T0100	0.8	1°	0.9	3	45	4	2	●	1
	D0080T0130	0.8	1°30'	0.96	3	45	4	2	●	1
High Helix	D0080T0200	0.8	2°	1.01	3	45	4	2	●	1
	D0080T0230	0.8	2°30'	1.06	3	45	4	2	●	1
	D0080T0300	0.8	3°	1.11	3	45	4	2	●	1
	D0080T0400	0.8	4°	1.22	3	45	4	2	●	1
	D0080T0500	0.8	5°	1.32	3	45	4	2	●	1
	D0080T0700	0.8	7°	1.54	3	45	4	2	●	1
	D0080T1000	0.8	10°	1.86	3	45	4	2	●	2
	D0090T0030	0.9	30'	0.95	3	45	4	2	●	1
	D0090T0100	0.9	1°	1	3	45	4	2	●	1
	D0090T0130	0.9	1°30'	1.06	3	45	4	2	●	1
For Small Automatic Lathe	D0090T0200	0.9	2°	1.11	3	45	4	2	●	1
	D0090T0300	0.9	3°	1.21	3	45	4	2	●	1
	D0090T0400	0.9	4°	1.32	3	45	4	2	●	1
	D0090T0500	0.9	5°	1.42	3	45	4	2	●	1
	D0090T0700	0.9	7°	1.64	3	45	4	2	●	1
	D0090T1000	0.9	10°	1.96	3	45	4	2	●	2
	D0100T0030	1	30'	1.07	4	45	4	2	●	1
	D0100T0100	1	1°	1.14	4	45	4	2	●	1
TAPER										

● : Inventory maintained.

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MTD0100T0130	1	1°30'	1.21	4	45	4	2	●	1
D0100T0200	1	2°	1.28	4	45	4	2	●	1
D0100T0230	1	2°30'	1.35	4	45	4	2	●	1
D0100T0300	1	3°	1.42	4	45	4	2	●	1
D0100T0400	1	4°	1.56	4	45	4	2	●	1
D0100T0500	1	5°	1.7	4	45	4	2	●	1
D0100T0700	1	7°	1.98	4	45	4	2	●	1
D0100T1000	1	10°	2.41	4	45	4	2	●	2
D0150T0030	1.5	30'	1.59	5	45	4	2	●	1
D0150T0100	1.5	1°	1.67	5	45	4	2	●	1
D0150T0130	1.5	1°30'	1.76	5	45	4	2	●	1
D0150T0200	1.5	2°	1.85	5	45	4	2	●	1
D0150T0230	1.5	2°30'	1.94	5	45	4	2	●	1
D0150T0300	1.5	3°	2.02	5	45	4	2	●	1
D0150T0400	1.5	4°	2.2	5	45	4	2	●	1
D0150T0500	1.5	5°	2.37	5	45	4	2	●	1
D0150T0700	1.5	7°	2.73	5	45	4	2	●	1
D0150T1000	1.5	10°	3.26	5	45	4	2	●	2
D0200T0030	2	30'	2.1	6	45	4	2	●	1
D0200T0100	2	1°	2.21	6	45	4	2	●	1
D0200T0130	2	1°30'	2.31	6	45	4	2	●	1
D0200T0200	2	2°	2.42	6	45	4	2	●	1
D0200T0230	2	2°30'	2.52	6	45	4	2	●	1
D0200T0300	2	3°	2.63	6	45	4	2	●	1
D0200T0400	2	4°	2.84	6	45	4	2	●	1
D0200T0500	2	5°	3.05	6	45	4	2	●	1
D0200T0700	2	7°	3.47	6	45	4	2	●	2
D0200T1000	2	10°	4.12	6	50	6	2	●	2
D0250T0030	2.5	30'	2.64	8	45	4	2	●	1
D0250T0100	2.5	1°	2.78	8	45	4	2	●	1
D0250T0130	2.5	1°30'	2.92	8	45	4	2	●	1
D0250T0200	2.5	2°	3.06	8	45	4	2	●	1
D0250T0230	2.5	2°30'	3.2	8	45	4	2	●	1
D0250T0300	2.5	3°	3.34	8	45	4	2	●	1
D0250T0400	2.5	4°	3.62	8	45	4	2	●	2
D0250T0500	2.5	5°	3.9	8	45	4	2	●	2
D0250T0700	2.5	7°	4.46	8	50	4	2	●	3
D0250T1000	2.5	10°	5.32	8	50	6	2	●	2
D0300T0030	3	30'	3.17	10	50	6	2	●	1
D0300T0100	3	1°	3.35	10	50	6	2	●	1
D0300T0130	3	1°30'	3.52	10	50	6	2	●	1
D0300T0200	3	2°	3.7	10	50	6	2	●	1
D0300T0300	3	3°	4.05	10	50	6	2	●	1
D0300T0400	3	4°	4.4	10	50	6	2	●	1
D0300T0500	3	5°	4.75	10	50	6	2	●	1
D0300T0700	3	7°	5.46	10	50	6	2	●	2
D0300T1000	3	10°	6.53	10	50	6	2	●	3
D0400T0030	4	30'	4.26	15	50	6	2	●	1

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL
Long NeckRADIUS
Long NeckTAPER
Ball Processing

CUTTING CONDITIONS

P.81

MSTAR END MILLS

MS2MT

Taper end mill, Medium cut length, 2 flute



$D1 < 0.5$ 0 - -0.020
 $0.5 \leq D1$ 0 - -0.030



$\pm 5'$

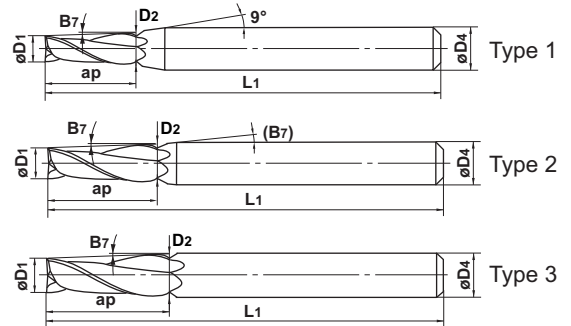


$D1 < 0.4$



$0.4 \leq D1$

● 2 flute taper end mill for general use.



Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MTD0400T0100	4	1°	4.52	15	50	6	2	●	1
D0400T0130	4	1°30'	4.79	15	50	6	2	●	1
D0400T0200	4	2°	5.05	15	50	6	2	●	1
D0400T0300	4	3°	5.57	15	50	6	2	●	1
D0400T0400	4	4°	6.1	15	55	6	2	●	3
D0400T0500	4	5°	6.62	15	55	6	2	●	3
D0400T0700	4	7°	7.68	15	55	6	2	●	3
D0400T1000	4	10°	9.29	15	60	8	2	●	3
D0500T0030	5	30'	5.35	20	55	6	2	●	1
D0500T0100	5	1°	5.7	20	55	6	2	●	1
D0500T0130	5	1°30'	6.05	20	55	6	2	●	3
D0500T0200	5	2°	6.4	20	55	6	2	●	3
D0500T0300	5	3°	7.1	20	55	6	2	●	3
D0500T0400	5	4°	7.8	20	60	6	2	●	3
D0500T0500	5	5°	8.5	20	60	8	2	●	3
D0500T0700	5	7°	9.91	20	70	10	2	●	2
D0500T1000	5	10°	12.05	20	80	12	2	●	3
D0600T0030	6	30'	6.35	20	60	6	2	●	3
D0600T0100	6	1°	6.7	20	60	6	2	●	3
D0600T0130	6	1°30'	7.05	20	60	6	2	●	3
D0600T0200	6	2°	7.4	20	60	6	2	●	3
D0600T0300	6	3°	8.1	20	65	8	2	●	3
D0600T0500	6	5°	9.5	20	70	8	2	●	3
D0800T0030	8	30'	8.44	25	70	8	2	●	3
D0800T0100	8	1°	8.87	25	70	8	2	●	3
D0800T0130	8	1°30'	9.31	25	70	8	2	●	3
D0800T0200	8	2°	9.75	25	70	8	2	●	3
D0800T0300	8	3°	10.62	25	75	10	2	●	3
D0800T0500	8	5°	12.37	25	95	12	2	●	3
D1000T0030	10	30'	10.61	35	90	10	2	●	3
D1000T0100	10	1°	11.22	35	90	10	2	●	3
D1000T0130	10	1°30'	11.83	35	90	10	2	●	3
D1000T0200	10	2°	12.44	35	95	12	2	●	3
D1000T0300	10	3°	13.67	35	95	12	2	●	3
D1000T0500	10	5°	16.12	35	95	16	2	●	3

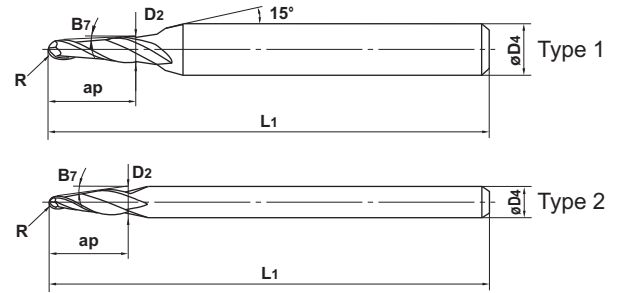
● : Inventory maintained.

CUTTING CONDITIONS





● 2 flute taper ball nose end mill.



Unit : mm

Order Number	Radius of Ball Nose R	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS2MTBR0020T0300	0.2	3°	0.69	3	40	4	2	●	1
R0020T0500	0.2	5°	0.89	3	40	4	2	●	1
R0020T0700	0.2	7°	1.09	3	40	4	2	●	1
R0020T1000	0.2	10°	1.39	3	40	4	2	●	1
R0030T0300	0.3	3°	0.88	3	40	4	2	●	1
R0030T0500	0.3	5°	1.07	3	40	4	2	●	1
R0030T0700	0.3	7°	1.27	3	40	4	2	●	1
R0030T1000	0.3	10°	1.56	3	40	4	2	●	1
R0050T0030	0.5	30'	1.04	3	40	4	2	●	1
R0050T0100	0.5	1°	1.09	3	40	4	2	●	1
R0050T0130	0.5	1°30'	1.13	3	40	4	2	●	1
R0050T0200	0.5	2°	1.18	3	40	4	2	●	1
R0050T0300	0.5	3°	1.26	3	40	4	2	●	1
R0050T0500	0.5	5°	1.44	3	40	4	2	●	1
R0050T0700	0.5	7°	2.36	6	45	4	2	●	1
R0075T0030	0.75	30'	1.59	6	40	4	2	●	1
R0075T0100	0.75	1°	1.68	6	40	4	2	●	1
R0075T0130	0.75	1°30'	1.78	6	40	4	2	●	1
R0075T0200	0.75	2°	1.87	6	40	4	2	●	1
R0075T0300	0.75	3°	2.05	6	40	4	2	●	1
R0075T0700	0.75	7°	2.8	6	40	4	2	●	1
R0100T0030	1	30'	2.12	8	45	4	2	●	1
R0100T0100	1	1°	2.24	8	45	4	2	●	1
R0100T0130	1	1°30'	2.37	8	45	4	2	●	1
R0100T0200	1	2°	2.49	8	45	4	2	●	1
R0100T0300	1	3°	2.74	8	45	4	2	●	1
R0100T0400	1	4°	2.98	8	45	4	2	●	1
R0100T0500	1	5°	3.23	8	45	4	2	●	1
R0100T0700	1	7°	3.73	8	50	6	2	●	1
R0125T0030	1.25	30'	2.65	10	45	4	2	●	1
R0125T0100	1.25	1°	2.81	10	45	4	2	●	1
R0125T0130	1.25	1°30'	2.96	10	45	4	2	●	1
R0125T0200	1.25	2°	3.11	10	45	4	2	●	1
R0125T0300	1.25	3°	3.42	10	45	4	2	●	1
R0125T0400	1.25	4°	3.73	10	50	6	2	●	1
R0125T0500	1.25	5°	4.04	10	50	6	2	●	1
R0125T0700	1.25	7°	5.77	14.5	60	6	2	●	2
R0150T0700	1.5	7°	5.72	12.5	60	6	2	●	2

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL
Long Neck

RADIUS
Long Neck

TAPER
Ball

For Rib Processing

MSTAR END MILLS

MS4LT

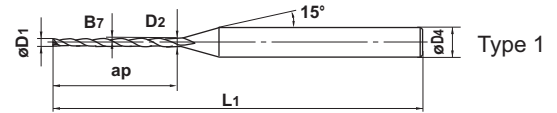
Taper end mill, Long cut length, 4 flute



$D_1 < 0.5$ 0 — -0.020
 $0.5 \leq D_1$ 0 — -0.040



±5'



$D_1 < 3$



$3 \leq D_1$

● 4 flute taper end mill for rib milling.

Unit : mm

	Order Number	Small Mill Dia.	Taper Angle One Side	Large Mill Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		D1	B7	D2	ap	L1	D4	N		
General Use	MS4LTD0020T0030L02	0.2	30'	0.23	2	40	3	4	●	1
	D0020T0100L02	0.2	1°	0.27	2	40	3	4	●	1
	D0020T0130L02	0.2	1°30'	0.3	2	40	3	4	●	1
	D0020T0200L02	0.2	2°	0.34	2	40	3	4	●	1
	D0030T0030L03	0.3	30'	0.35	3	40	3	4	●	1
	D0030T0100L03	0.3	1°	0.4	3	40	3	4	●	1
	D0030T0130L03	0.3	1°30'	0.46	3	40	3	4	●	1
	D0030T0200L03	0.3	2°	0.51	3	40	3	4	●	1
	D0040T0030L04	0.4	30'	0.47	4	40	3	4	●	1
	D0040T0100L04	0.4	1°	0.54	4	40	3	4	●	1
	D0040T0130L04	0.4	1°30'	0.61	4	40	3	4	●	1
	D0040T0200L04	0.4	2°	0.68	4	40	3	4	●	1
Long Neck	D0050T0030L04	0.5	30'	0.57	4	40	3	4	●	1
	D0050T0030L06	0.5	30'	0.6	6	40	3	4	●	1
	D0050T0100L04	0.5	1°	0.64	4	40	3	4	●	1
	D0050T0100L06	0.5	1°	0.71	6	40	3	4	●	1
	D0050T0130L04	0.5	1°30'	0.71	4	40	3	4	●	1
	D0050T0130L06	0.5	1°30'	0.81	6	40	3	4	●	1
	D0050T0200L04	0.5	2°	0.78	4	40	3	4	●	1
	D0050T0200L06	0.5	2°	0.92	6	40	3	4	●	1
	D0060T0030L04	0.6	30'	0.67	4	40	3	4	●	1
	D0060T0030L06	0.6	30'	0.7	6	40	3	4	●	1
	D0060T0100L04	0.6	1°	0.74	4	40	3	4	●	1
	D0060T0100L06	0.6	1°	0.81	6	40	3	4	●	1
High Helix	D0060T0130L04	0.6	1°30'	0.81	4	40	3	4	●	1
	D0060T0130L06	0.6	1°30'	0.91	6	40	3	4	●	1
	D0060T0200L04	0.6	2°	0.88	4	40	3	4	●	1
	D0060T0200L06	0.6	2°	1.02	6	40	3	4	●	1
	D0070T0030L06	0.7	30'	0.8	6	40	3	4	●	1
	D0070T0030L08	0.7	30'	0.84	8	45	3	4	●	1
	D0070T0100L06	0.7	1°	0.91	6	40	3	4	●	1
	D0070T0100L08	0.7	1°	0.98	8	45	3	4	●	1
	D0070T0130L06	0.7	1°30'	1.01	6	40	3	4	●	1
	D0070T0130L08	0.7	1°30'	1.12	8	45	3	4	●	1
	D0070T0200L06	0.7	2°	1.12	6	40	3	4	●	1
	D0070T0200L08	0.7	2°	1.26	8	45	3	4	●	1
For Rib Processing	D0080T0015L04	0.8	15'	0.83	4	45	4	4	●	1
	D0080T0015L06	0.8	15'	0.85	6	45	4	4	●	1

● : Inventory maintained.

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTD0080T0015L08	0.8	15'	0.87	8	45	4	4	●	1
D0080T0015L10	0.8	15'	0.89	10	45	4	4	●	1
D0080T0030L04	0.8	30'	0.87	4	45	4	4	●	1
D0080T0030L06	0.8	30'	0.9	6	45	4	4	●	1
D0080T0030L08	0.8	30'	0.94	8	45	4	4	●	1
D0080T0030L10	0.8	30'	0.97	10	45	4	4	●	1
D0080T0030L12	0.8	30'	1.01	12	50	4	4	●	1
D0080T0100L04	0.8	1°	0.94	4	45	4	4	●	1
D0080T0100L06	0.8	1°	1.01	6	45	4	4	●	1
D0080T0100L08	0.8	1°	1.08	8	45	4	4	●	1
D0080T0100L10	0.8	1°	1.15	10	45	4	4	●	1
D0080T0100L12	0.8	1°	1.22	12	50	4	4	●	1
D0080T0130L04	0.8	1°30'	1.01	4	45	4	4	●	1
D0080T0130L06	0.8	1°30'	1.11	6	45	4	4	●	1
D0080T0130L08	0.8	1°30'	1.22	8	45	4	4	●	1
D0080T0130L10	0.8	1°30'	1.32	10	45	4	4	●	1
D0080T0130L12	0.8	1°30'	1.43	12	50	4	4	●	1
D0080T0200L04	0.8	2°	1.08	4	45	4	4	●	1
D0080T0200L06	0.8	2°	1.22	6	45	4	4	●	1
D0080T0200L08	0.8	2°	1.36	8	45	4	4	●	1
D0080T0200L10	0.8	2°	1.5	10	45	4	4	●	1
D0080T0200L12	0.8	2°	1.64	12	50	4	4	●	1
D0100T0015L06	1	15'	1.05	6	45	4	4	●	1
D0100T0015L08	1	15'	1.07	8	45	4	4	●	1
D0100T0015L10	1	15'	1.09	10	45	4	4	●	1
D0100T0015L12	1	15'	1.1	12	50	4	4	●	1
D0100T0030L06	1	30'	1.1	6	45	4	4	●	1
D0100T0030L08	1	30'	1.14	8	45	4	4	●	1
D0100T0030L10	1	30'	1.17	10	45	4	4	●	1
D0100T0030L12	1	30'	1.21	12	50	4	4	●	1
D0100T0100L06	1	1°	1.21	6	45	4	4	●	1
D0100T0100L08	1	1°	1.28	8	45	4	4	●	1
D0100T0100L10	1	1°	1.35	10	45	4	4	●	1
D0100T0100L12	1	1°	1.42	12	50	4	4	●	1
D0100T0100L16	1	1°	1.56	16	55	4	4	●	1
D0100T0130L06	1	1°30'	1.31	6	45	4	4	●	1
D0100T0130L08	1	1°30'	1.42	8	45	4	4	●	1
D0100T0130L10	1	1°30'	1.52	10	45	4	4	●	1
D0100T0130L12	1	1°30'	1.63	12	50	4	4	●	1
D0100T0130L16	1	1°30'	1.84	16	55	4	4	●	1
D0100T0200L06	1	2°	1.42	6	45	4	4	●	1
D0100T0200L08	1	2°	1.56	8	45	4	4	●	1
D0100T0200L10	1	2°	1.7	10	45	4	4	●	1
D0100T0200L12	1	2°	1.84	12	50	4	4	●	1
D0100T0200L16	1	2°	2.12	16	55	4	4	●	1
D0120T0015L06	1.2	15'	1.25	6	45	4	4	●	1
D0120T0015L10	1.2	15'	1.29	10	45	4	4	●	1
D0120T0015L12	1.2	15'	1.3	12	50	4	4	●	1

General Use

SQUARE
Long Neck

High Helix

For Small Automatic Lathe

BALL
Long NeckRADIUS
Long NeckTAPER
Ball

For Rib Processing

MSTAR END MILLS

MS4LT

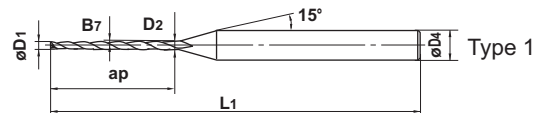
Taper end mill, Long cut length, 4 flute



$D_1 < 0.5$ 0 - -0.020
 $0.5 \leq D_1$ 0 - -0.040



$\pm 5'$



$D_1 < 3$



$3 \leq D_1$

● 4 flute taper end mill for rib milling.

Unit : mm

	Order Number	Small Mill Dia.	Taper Angle One Side	Large Mill Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		D1	B7	D2	ap	L1	D4	N		
General Use	MS4LTD0120T0015L16	1.2	15'	1.34	16	55	4	4	●	1
	D0120T0030L06	1.2	30'	1.3	6	45	4	4	●	1
	D0120T0030L10	1.2	30'	1.37	10	45	4	4	●	1
	D0120T0030L12	1.2	30'	1.41	12	50	4	4	●	1
	D0120T0030L16	1.2	30'	1.48	16	55	4	4	●	1
	D0120T0100L06	1.2	1°	1.41	6	45	4	4	●	1
	D0120T0100L10	1.2	1°	1.55	10	45	4	4	●	1
	D0120T0100L12	1.2	1°	1.62	12	50	4	4	●	1
	D0120T0100L16	1.2	1°	1.76	16	55	4	4	●	1
	D0120T0100L20	1.2	1°	1.9	20	55	4	4	●	1
Long Neck	D0120T0130L06	1.2	1°30'	1.51	6	45	4	4	●	1
	D0120T0130L10	1.2	1°30'	1.72	10	45	4	4	●	1
	D0120T0130L12	1.2	1°30'	1.83	12	50	4	4	●	1
	D0120T0130L16	1.2	1°30'	2.04	16	55	4	4	●	1
	D0120T0130L20	1.2	1°30'	2.25	20	55	4	4	●	1
	D0120T0200L06	1.2	2°	1.62	6	45	4	4	●	1
	D0120T0200L10	1.2	2°	1.9	10	45	4	4	●	1
	D0120T0200L12	1.2	2°	2.04	12	50	4	4	●	1
	D0120T0200L16	1.2	2°	2.32	16	55	4	4	●	1
	D0120T0200L20	1.2	2°	2.6	20	55	4	4	●	1
High Helix	D0130T0030L12	1.3	30'	1.51	12	50	4	4	●	1
	D0130T0100L12	1.3	1°	1.72	12	50	4	4	●	1
	D0130T0130L12	1.3	1°30'	1.93	12	50	4	4	●	1
	D0130T0200L12	1.3	2°	2.14	12	50	4	4	●	1
	D0140T0030L12	1.4	30'	1.61	12	50	4	4	●	1
	D0140T0100L12	1.4	1°	1.82	12	50	4	4	●	1
	D0140T0130L12	1.4	1°30'	2.03	12	50	4	4	●	1
	D0140T0200L12	1.4	2°	2.24	12	50	4	4	●	1
	D0150T0015L06	1.5	15'	1.55	6	45	4	4	●	1
	D0150T0015L08	1.5	15'	1.57	8	45	4	4	●	1
For Small Automatic Lathe	D0150T0015L10	1.5	15'	1.59	10	45	4	4	●	1
	D0150T0015L12	1.5	15'	1.6	12	50	4	4	●	1
	D0150T0015L16	1.5	15'	1.64	16	55	4	4	●	1
	D0150T0015L20	1.5	15'	1.67	20	55	4	4	●	1
	D0150T0030L06	1.5	30'	1.6	6	45	4	4	●	1
	D0150T0030L08	1.5	30'	1.64	8	45	4	4	●	1
	D0150T0030L10	1.5	30'	1.67	10	45	4	4	●	1
	D0150T0030L12	1.5	30'	1.71	12	50	4	4	●	1

Unit : mm

Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTD0150T0030L16	1.5	30'	1.78	16	55	4	4	●	1
D0150T0030L20	1.5	30'	1.85	20	55	4	4	●	1
D0150T0100L06	1.5	1°	1.71	6	45	4	4	●	1
D0150T0100L08	1.5	1°	1.78	8	45	4	4	●	1
D0150T0100L10	1.5	1°	1.85	10	45	4	4	●	1
D0150T0100L12	1.5	1°	1.92	12	50	4	4	●	1
D0150T0100L16	1.5	1°	2.06	16	55	4	4	●	1
D0150T0100L20	1.5	1°	2.2	20	55	4	4	●	1
D0150T0100L25	1.5	1°	2.37	25	60	4	4	●	1
D0150T0130L06	1.5	1°30'	1.81	6	45	4	4	●	1
D0150T0130L08	1.5	1°30'	1.92	8	45	4	4	●	1
D0150T0130L10	1.5	1°30'	2.02	10	45	4	4	●	1
D0150T0130L12	1.5	1°30'	2.13	12	50	4	4	●	1
D0150T0130L16	1.5	1°30'	2.34	16	55	4	4	●	1
D0150T0130L20	1.5	1°30'	2.55	20	55	4	4	●	1
D0150T0130L25	1.5	1°30'	2.81	25	60	4	4	●	1
D0150T0200L06	1.5	2°	1.92	6	45	4	4	●	1
D0150T0200L08	1.5	2°	2.06	8	45	4	4	●	1
D0150T0200L10	1.5	2°	2.2	10	45	4	4	●	1
D0150T0200L12	1.5	2°	2.34	12	50	4	4	●	1
D0150T0200L16	1.5	2°	2.62	16	55	4	4	●	1
D0150T0200L20	1.5	2°	2.9	20	55	4	4	●	1
D0150T0200L25	1.5	2°	3.25	25	60	4	4	●	1
D0160T0030L08	1.6	30'	1.74	8	45	4	4	●	1
D0160T0030L12	1.6	30'	1.81	12	50	4	4	●	1
D0160T0030L16	1.6	30'	1.88	16	55	4	4	●	1
D0160T0030L20	1.6	30'	1.95	20	55	4	4	●	1
D0160T0100L08	1.6	1°	1.88	8	45	4	4	●	1
D0160T0100L12	1.6	1°	2.02	12	50	4	4	●	1
D0160T0100L16	1.6	1°	2.16	16	55	4	4	●	1
D0160T0100L20	1.6	1°	2.3	20	55	4	4	●	1
D0160T0130L08	1.6	1°30'	2.02	8	45	4	4	●	1
D0160T0130L12	1.6	1°30'	2.23	12	50	4	4	●	1
D0160T0130L16	1.6	1°30'	2.44	16	55	4	4	●	1
D0160T0130L20	1.6	1°30'	2.65	20	55	4	4	●	1
D0160T0200L08	1.6	2°	2.16	8	45	4	4	●	1
D0160T0200L12	1.6	2°	2.44	12	50	4	4	●	1
D0160T0200L16	1.6	2°	2.72	16	55	4	4	●	1
D0160T0200L20	1.6	2°	3	20	55	4	4	●	1
D0180T0015L08	1.8	15'	1.87	8	45	4	4	●	1
D0180T0015L16	1.8	15'	1.94	16	55	4	4	●	1
D0180T0015L24	1.8	15'	2.01	24	60	4	4	●	1
D0180T0030L08	1.8	30'	1.94	8	45	4	4	●	1
D0180T0030L16	1.8	30'	2.08	16	55	4	4	●	1
D0180T0030L24	1.8	30'	2.22	24	60	4	4	●	1
D0180T0100L08	1.8	1°	2.08	8	45	4	4	●	1
D0180T0100L16	1.8	1°	2.36	16	55	4	4	●	1
D0180T0100L24	1.8	1°	2.64	24	60	4	4	●	1

General Use

SQUARE
Long Neck

High Helix

For Small
Automatic LatheBALL
Long NeckRADIUS
General Use

High Helix

TAPER
For Rib
Processing

MSTAR END MILLS

MS4LT

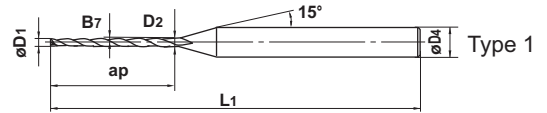
Taper end mill, Long cut length, 4 flute



D1<0.5 0 - -0.020
0.5≤D1 0 - -0.040



±5°



D1<3

3≤D1

● 4 flute taper end mill for rib milling.

Unit : mm

	Order Number	Small Mill Dia.	Taper Angle One Side	Large Mill Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes	Stock	Type
		D1	B7	D2	ap	L1	D4	N		
General Use	MS4LTD0180T0130L08	1.8	1°30'	2.22	8	45	4	4	●	1
	D0180T0130L16	1.8	1°30'	2.64	16	55	4	4	●	1
	D0180T0130L24	1.8	1°30'	3.06	24	60	4	4	●	1
	D0180T0200L08	1.8	2°	2.36	8	45	4	4	●	1
	D0180T0200L16	1.8	2°	2.92	16	55	4	4	●	1
	D0180T0200L24	1.8	2°	3.48	24	60	4	4	●	1
Long Neck SQUARE	D0200T0015L08	2	15°	2.07	8	45	4	4	●	1
	D0200T0015L10	2	15°	2.09	10	45	4	4	●	1
	D0200T0015L12	2	15°	2.1	12	50	4	4	●	1
	D0200T0015L16	2	15°	2.14	16	55	4	4	●	1
	D0200T0015L20	2	15°	2.17	20	55	4	4	●	1
	D0200T0015L25	2	15°	2.22	25	60	4	4	●	1
High Helix	D0200T0030L08	2	30°	2.14	8	45	4	4	●	1
	D0200T0030L10	2	30°	2.17	10	45	4	4	●	1
	D0200T0030L12	2	30°	2.21	12	50	4	4	●	1
	D0200T0030L16	2	30°	2.28	16	55	4	4	●	1
	D0200T0030L20	2	30°	2.35	20	55	4	4	●	1
	D0200T0030L25	2	30°	2.44	25	60	4	4	●	1
For Small Automatic Lathe	D0200T0030L30	2	30°	2.52	30	65	4	4	●	1
	D0200T0100L08	2	1°	2.28	8	45	4	4	●	1
	D0200T0100L10	2	1°	2.35	10	45	4	4	●	1
	D0200T0100L12	2	1°	2.42	12	50	4	4	●	1
	D0200T0100L16	2	1°	2.56	16	55	4	4	●	1
	D0200T0100L20	2	1°	2.7	20	55	4	4	●	1
Long Neck BALL	D0200T0100L25	2	1°	2.87	25	60	4	4	●	1
	D0200T0100L30	2	1°	3.05	30	65	4	4	●	1
	D0200T0130L08	2	1°30'	2.42	8	45	4	4	●	1
	D0200T0130L10	2	1°30'	2.52	10	45	4	4	●	1
	D0200T0130L12	2	1°30'	2.63	12	50	4	4	●	1
	D0200T0130L16	2	1°30'	2.84	16	55	4	4	●	1
Long Neck RADIUS	D0200T0130L20	2	1°30'	3.05	20	55	4	4	●	1
	D0200T0130L25	2	1°30'	3.31	25	60	4	4	●	1
	D0200T0130L30	2	1°30'	3.57	30	65	4	4	●	1
	D0200T0200L08	2	2°	2.56	8	45	4	4	●	1
	D0200T0200L10	2	2°	2.7	10	45	4	4	●	1
	D0200T0200L12	2	2°	2.84	12	50	4	4	●	1
For Rib Processing TAPER	D0200T0200L16	2	2°	3.12	16	55	4	4	●	1
	D0200T0200L20	2	2°	3.4	20	55	4	4	●	1

● : Inventory maintained.

Unit : mm

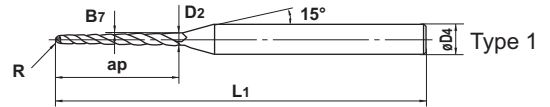
Order Number	Small Mill Dia. D1	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTD0200T0200L25	2	2°	3.75	25	60	4	4	●	1
D0200T0200L30	2	2°	4.1	30	65	6	4	●	1
D0200T0300L12	2	3°	3.26	12	50	4	4	●	1
D0200T0300L16	2	3°	3.68	16	55	4	4	●	1
D0200T0300L20	2	3°	4.1	20	55	6	4	●	1
D0200T0300L25	2	3°	4.62	25	60	6	4	●	1
D0200T0300L30	2	3°	5.14	30	65	6	4	●	1
D0250T0030L10	2.5	30'	2.67	10	45	4	4	●	1
D0250T0030L16	2.5	30'	2.78	16	50	4	4	●	1
D0250T0030L20	2.5	30'	2.85	20	55	4	4	●	1
D0250T0030L25	2.5	30'	2.94	25	60	4	4	●	1
D0250T0030L30	2.5	30'	3.02	30	65	4	4	●	1
D0250T0100L10	2.5	1°	2.85	10	45	4	4	●	1
D0250T0100L16	2.5	1°	3.06	16	50	4	4	●	1
D0250T0100L20	2.5	1°	3.2	20	55	4	4	●	1
D0250T0100L25	2.5	1°	3.37	25	60	4	4	●	1
D0250T0100L30	2.5	1°	3.55	30	65	4	4	●	1
D0250T0130L10	2.5	1°30'	3.02	10	45	4	4	●	1
D0250T0130L16	2.5	1°30'	3.34	16	50	4	4	●	1
D0250T0130L20	2.5	1°30'	3.55	20	55	4	4	●	1
D0250T0130L25	2.5	1°30'	3.81	25	60	4	4	●	1
D0250T0130L30	2.5	1°30'	4.07	30	65	6	4	●	1
D0250T0200L10	2.5	2°	3.2	10	45	4	4	●	1
D0250T0200L16	2.5	2°	3.62	16	50	4	4	●	1
D0250T0200L20	2.5	2°	3.9	20	55	4	4	●	1
D0250T0200L25	2.5	2°	4.25	25	60	6	4	●	1
D0250T0200L30	2.5	2°	4.6	30	65	6	4	●	1
D0300T0030L25	3	30'	3.44	25	65	6	4	●	1
D0300T0030L40	3	30'	3.7	40	80	6	4	●	1
D0300T0100L25	3	1°	3.87	25	65	6	4	●	1
D0300T0100L40	3	1°	4.4	40	80	6	4	●	1
D0300T0130L25	3	1°30'	4.31	25	65	6	4	●	1
D0300T0130L40	3	1°30'	5.09	40	80	6	4	●	1
D0300T0200L25	3	2°	4.75	25	65	6	4	●	1
D0300T0200L40	3	2°	5.79	40	80	6	4	●	1

TAPER	For Rib Processing	General Use	RADIUS			BALL			SQUARE			General Use
			High Helix	Long Neck	General Use	High Helix	Long Neck	General Use	Long Neck	General Use	General Use	

MSTAR END MILLS

MS4LTB

Ball nose, 4 flute, Taper, For rib milling



● 4 flute taper ball nose end mill for rib milling.

Unit : mm

	Order Number	Radius of	Taper Angle	Large	Length of	Overall	Shank	No. of	Stock	Type
		Ball Nose	One Side	Mill Dia.	Cut	Length	Dia.	Flutes		
		R	B7	D2	ap	L1	D4	N		
General Use	MS4LTBR0030T0030L04	0.3	30'	0.66	4	45	4	4	●	1
	R0030T0030L06	0.3	30'	0.70	6	45	4	4	●	1
	R0030T0100L04	0.3	1°	0.73	4	45	4	4	●	1
	R0030T0100L06	0.3	1°	0.80	6	45	4	4	●	1
	R0030T0130L04	0.3	1°30'	0.79	4	45	4	4	●	1
	R0030T0130L06	0.3	1°30'	0.90	6	45	4	4	●	1
	R0030T0200L04	0.3	2°	0.86	4	45	4	4	●	1
	R0030T0200L06	0.3	2°	1.00	6	45	4	4	●	1
	R0040T0030L06	0.4	30'	0.90	6	50	4	4	●	1
	R0040T0030L08	0.4	30'	0.93	8	50	4	4	●	1
Long Neck	R0040T0030L10	0.4	30'	0.97	10	50	4	4	●	1
	R0040T0100L06	0.4	1°	1.00	6	50	4	4	●	1
	R0040T0100L08	0.4	1°	1.07	8	50	4	4	●	1
	R0040T0100L10	0.4	1°	1.14	10	50	4	4	●	1
	R0040T0130L06	0.4	1°30'	1.09	6	50	4	4	●	1
	R0040T0130L08	0.4	1°30'	1.20	8	50	4	4	●	1
	R0040T0130L10	0.4	1°30'	1.30	10	50	4	4	●	1
	R0040T0200L06	0.4	2°	1.19	6	50	4	4	●	1
	R0040T0200L08	0.4	2°	1.33	8	50	4	4	●	1
	R0040T0200L10	0.4	2°	1.47	10	50	4	4	●	1
High Helix	R0050T0030L08	0.5	30'	1.13	8	50	4	4	●	1
	R0050T0030L10	0.5	30'	1.17	10	50	4	4	●	1
	R0050T0030L12	0.5	30'	1.20	12	50	4	4	●	1
	R0050T0030L16	0.5	30'	1.27	16	55	4	4	●	1
	R0050T0100L08	0.5	1°	1.26	8	50	4	4	●	1
	R0050T0100L10	0.5	1°	1.33	10	50	4	4	●	1
	R0050T0100L12	0.5	1°	1.40	12	50	4	4	●	1
	R0050T0100L16	0.5	1°	1.54	16	55	4	4	●	1
	R0050T0130L08	0.5	1°30'	1.39	8	50	4	4	●	1
	R0050T0130L10	0.5	1°30'	1.50	10	50	4	4	●	1
For Small Automatic Lathe	R0050T0130L12	0.5	1°30'	1.60	12	50	4	4	●	1
	R0050T0130L16	0.5	1°30'	1.81	16	55	4	4	●	1
	R0050T0200L08	0.5	2°	1.52	8	50	4	4	●	1
	R0050T0200L10	0.5	2°	1.66	10	50	4	4	●	1
	R0050T0200L12	0.5	2°	1.80	12	50	4	4	●	1
	R0050T0200L16	0.5	2°	2.08	16	55	4	4	●	1
	R0060T0030L08	0.6	30'	1.33	8	50	4	4	●	1
	R0060T0030L10	0.6	30'	1.36	10	50	4	4	●	1
TAPER										

● : Inventory maintained.

Unit : mm

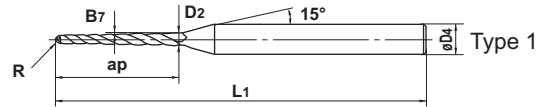
Order Number	Radius of Ball Nose R	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTBR0060T0030L12	0.6	30'	1.40	12	50	4	4	●	1
R0060T0030L16	0.6	30'	1.47	16	55	4	4	●	1
R0060T0100L08	0.6	1°	1.46	8	50	4	4	●	1
R0060T0100L10	0.6	1°	1.53	10	50	4	4	●	1
R0060T0100L12	0.6	1°	1.60	12	50	4	4	●	1
R0060T0100L16	0.6	1°	1.74	16	55	4	4	●	1
R0060T0130L08	0.6	1°30'	1.59	8	50	4	4	●	1
R0060T0130L10	0.6	1°30'	1.69	10	50	4	4	●	1
R0060T0130L12	0.6	1°30'	1.80	12	50	4	4	●	1
R0060T0130L16	0.6	1°30'	2.01	16	55	4	4	●	1
R0060T0200L08	0.6	2°	1.72	8	50	4	4	●	1
R0060T0200L10	0.6	2°	1.86	10	50	4	4	●	1
R0060T0200L12	0.6	2°	2.00	12	50	4	4	●	1
R0060T0200L16	0.6	2°	2.28	16	55	4	4	●	1
R0075T0030L08	0.75	30'	1.63	8	50	4	4	●	1
R0075T0030L10	0.75	30'	1.66	10	50	4	4	●	1
R0075T0030L12	0.75	30'	1.70	12	50	4	4	●	1
R0075T0030L16	0.75	30'	1.77	16	55	4	4	●	1
R0075T0030L20	0.75	30'	1.84	20	60	4	4	●	1
R0075T0100L08	0.75	1°	1.75	8	50	4	4	●	1
R0075T0100L10	0.75	1°	1.82	10	50	4	4	●	1
R0075T0100L12	0.75	1°	1.89	12	50	4	4	●	1
R0075T0100L16	0.75	1°	2.03	16	55	4	4	●	1
R0075T0100L20	0.75	1°	2.17	20	60	4	4	●	1
R0075T0130L08	0.75	1°30'	1.88	8	50	4	4	●	1
R0075T0130L10	0.75	1°30'	1.98	10	50	4	4	●	1
R0075T0130L12	0.75	1°30'	2.09	12	50	4	4	●	1
R0075T0130L16	0.75	1°30'	2.30	16	55	4	4	●	1
R0075T0130L20	0.75	1°30'	2.51	20	60	4	4	●	1
R0075T0200L08	0.75	2°	2.01	8	50	4	4	●	1
R0075T0200L10	0.75	2°	2.15	10	50	4	4	●	1
R0075T0200L12	0.75	2°	2.29	12	50	4	4	●	1
R0075T0200L16	0.75	2°	2.57	16	55	4	4	●	1
R0075T0200L20	0.75	2°	2.84	20	60	4	4	●	1
R0090T0030L08	0.9	30'	1.92	8	50	4	4	●	1
R0090T0030L10	0.9	30'	1.96	10	50	4	4	●	1
R0090T0030L12	0.9	30'	1.99	12	50	4	4	●	1
R0090T0030L16	0.9	30'	2.06	16	55	4	4	●	1
R0090T0030L20	0.9	30'	2.13	20	60	4	4	●	1
R0090T0100L08	0.9	1°	2.05	8	50	4	4	●	1
R0090T0100L10	0.9	1°	2.12	10	50	4	4	●	1
R0090T0100L12	0.9	1°	2.19	12	50	4	4	●	1
R0090T0100L16	0.9	1°	2.33	16	55	4	4	●	1
R0090T0100L20	0.9	1°	2.47	20	60	4	4	●	1
R0090T0130L08	0.9	1°30'	2.17	8	50	4	4	●	1
R0090T0130L10	0.9	1°30'	2.28	10	50	4	4	●	1
R0090T0130L12	0.9	1°30'	2.38	12	50	4	4	●	1
R0090T0130L16	0.9	1°30'	2.59	16	55	4	4	●	1

TAPER	RADIUS			BALL		SQUARE	
	Ball	General Use	High Helix	Long Neck	General Use	High Helix	Long Neck
		Long Neck	General Use	Long Neck	General Use		
		General Use	Long Neck	General Use	Long Neck		
For Rib Processing							

MSTAR END MILLS

MS4LTB

Ball nose, 4 flute, Taper, For rib milling



● 4 flute taper ball nose end mill for rib milling.

Unit : mm

Order Number	Radius of Ball Nose R	Taper Angle One Side B7	Large Mill Dia. D2	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MS4LTBR0090T0130L20	0.9	1°30'	2.80	20	60	4	4	●	1
R0090T0200L08	0.9	2°	2.30	8	50	4	4	●	1
R0090T0200L10	0.9	2°	2.44	10	50	4	4	●	1
R0090T0200L12	0.9	2°	2.58	12	50	4	4	●	1
R0090T0200L16	0.9	2°	2.86	16	55	4	4	●	1
R0090T0200L20	0.9	2°	3.13	20	60	4	4	●	1
R0100T0030L10	1	30°	2.16	10	50	4	4	●	1
R0100T0030L12	1	30°	2.19	12	50	4	4	●	1
R0100T0030L16	1	30°	2.26	16	55	4	4	●	1
R0100T0030L20	1	30°	2.33	20	60	4	4	●	1
R0100T0030L25	1	30°	2.42	25	65	4	4	●	1
R0100T0030L30	1	30°	2.51	30	65	4	4	●	1
R0100T0100L10	1	1°	2.31	10	50	4	4	●	1
R0100T0100L12	1	1°	2.38	12	50	4	4	●	1
R0100T0100L16	1	1°	2.52	16	55	4	4	●	1
R0100T0100L20	1	1°	2.66	20	60	4	4	●	1
R0100T0100L25	1	1°	2.84	25	65	4	4	●	1
R0100T0100L30	1	1°	3.01	30	65	4	4	●	1
R0100T0130L10	1	1°30'	2.47	10	50	4	4	●	1
R0100T0130L12	1	1°30'	2.58	12	50	4	4	●	1
R0100T0130L16	1	1°30'	2.79	16	55	4	4	●	1
R0100T0130L20	1	1°30'	3.00	20	60	4	4	●	1
R0100T0130L25	1	1°30'	3.26	25	65	6	4	●	1
R0100T0130L30	1	1°30'	3.52	30	65	6	4	●	1
R0100T0200L10	1	2°	2.63	10	50	4	4	●	1
R0100T0200L12	1	2°	2.77	12	50	4	4	●	1
R0100T0200L16	1	2°	3.05	16	55	4	4	●	1
R0100T0200L20	1	2°	3.33	20	60	4	4	●	1
R0100T0200L25	1	2°	3.68	25	65	6	4	●	1
R0100T0200L30	1	2°	4.03	30	65	6	4	●	1

General Use

Long Neck

High Helix

For Small Automatic Lathe

General Use

Taper Neck

General Use

Long Neck

High Helix

General Use

For Rib Processing

Ball

TAPER

SQUARE

BALL

RADIUS

Tool: **MS2SB** : Tool life comparative trial

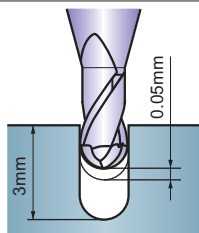
Double Tool Life !
2.5 times cutting efficiency.

Less burrs and faster finishing time.

<Shape>

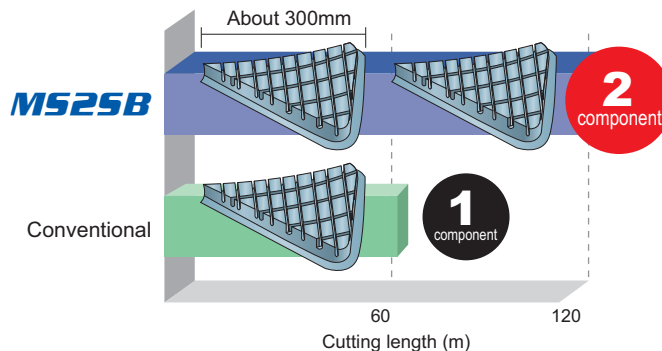


<Depth of cut>



Axial depth of cut
MS2SB : 0.05mm
Conventional : 0.015mm

<Machining data>

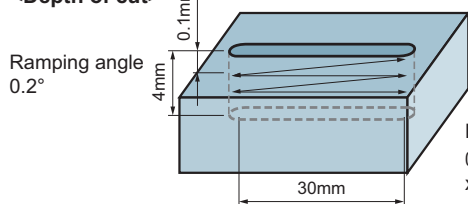


End mill	MS2SB R1
Workpiece	PX5
Revolution	30,000min ⁻¹ (188m/min)
Feed rate	1,500mm/min (0.025mm/tooth) (Conventional : 1,000mm/min)
Machining method	Air blow

Tool: **MS2MS** : Ramping and slotting

Compared with conventional end mill, MS2MS shows excellent chipping resistance.

<Depth of cut>



Depth of cut
0.1mm (ramping)
x40 lap

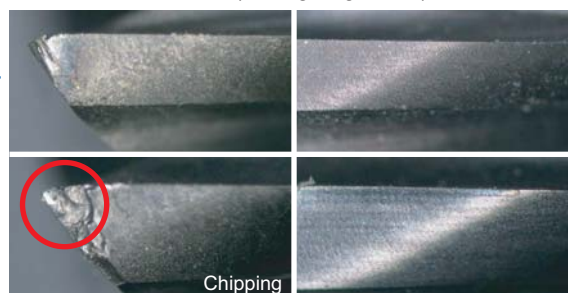
<Shape>



<Machining data>

20 slot (Cutting length 60m)

MS2MS



Conventional

Chipping

End mill	MS2MS $\phi 3$
Workpiece	NAK80 (40HRC)
Revolution	20,000min ⁻¹ (188m/min)
Feed rate	2,300mm/min (0.057mm/tooth)
Machining method	Air blow

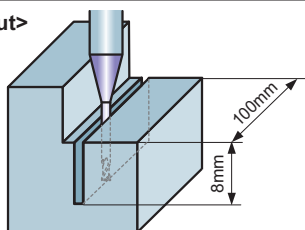
Tool: **MS2XL** : Tool life comparative trial

Excelent long tool life !

<Shape>



<Depth of cut>

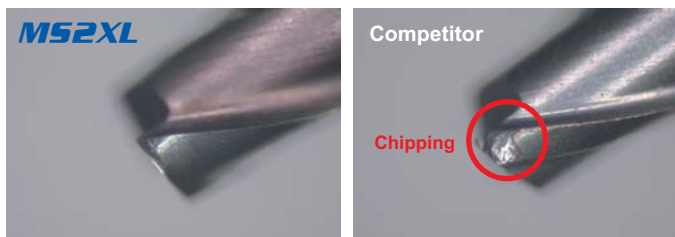


Depth of cut
0.02mm x 400 times
(Slotting)

<Machining data>

MS2XL

Competitor



Chipping

End mill	MS2XL $\phi 1 \times 12$
Workpiece	NAK80 (38HRC)
Revolution	20,000min ⁻¹ (62m/min)
Feed rate	500mm/min (0.01mm/tooth)
Machining method	Oil

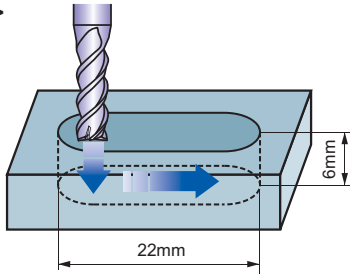
Tool: **MSMHZD** : Slotting

Compared with conventional end mill, MSMHZD shows 5 times longer tool life!

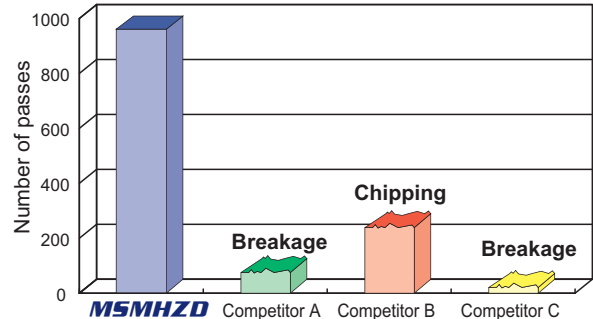
<Shape>



<Depth of cut>



<Machining data>



End mill	MSMHZD $\phi 6$
Workpiece	JIS S55C
Revolution	4,800min ⁻¹
Feed rate	Plunging 300mm/min, Slotting 720mm/min
Machining method	Air blow

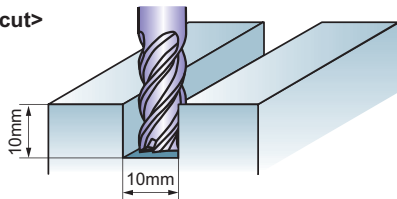
Tool: **MSMHD** : Slotting

Newly designed geometry for excellent chip disposability during slotting.

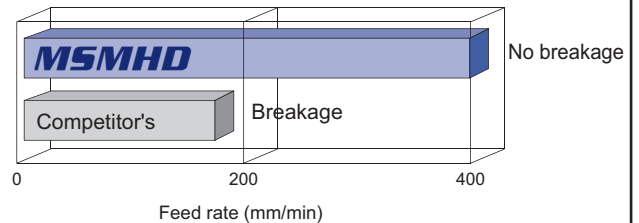
<Shape>



<Depth of cut>



<Machining data>



End mill	MSMHD $\phi 10$
Workpiece	Stainless steel (JIS SUS304)
Revolution	1,600min ⁻¹ (50m/min)
Feed rate	50—400mm/min
Machining method	Slotting, Air blow

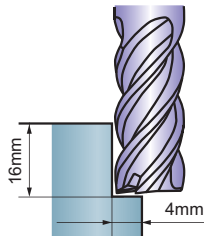
Tool: **MSMHD** : Side milling of aircraft component

Higher efficiency than conventional end mills.

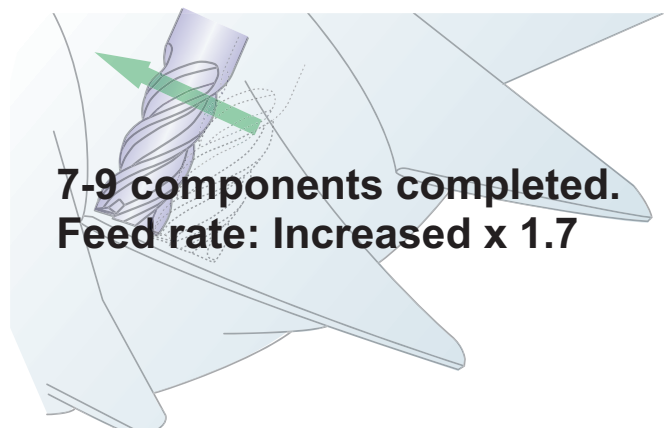
<Shape>



<Depth of cut>



<Machining data>



End mill	MSMHD $\phi 16$	Competitor
Workpiece	Stainless steel (JIS SUS304)	
Revolution	600min ⁻¹ (30m/min)	360min ⁻¹ (18m/min)
Feed rate	85mm/min (0.035mm/tooth)	50mm/min (0.035mm/tooth)
Machining method	Climb cut, Emulsion	

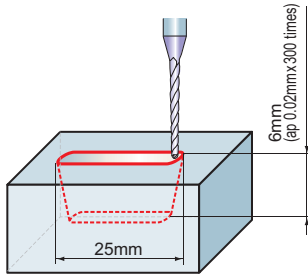
Tool: **MS4LTB**: Compare surface finish and tool wear

Realize ideal surface finish!

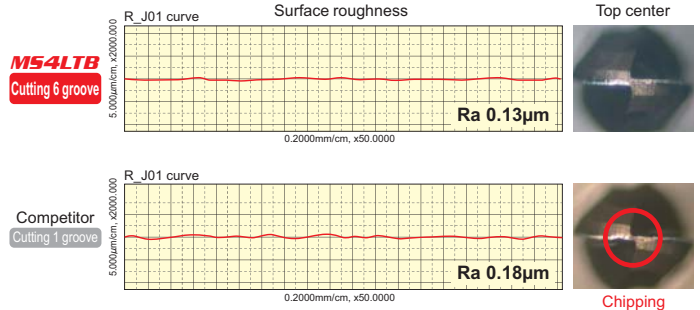
<Shape>



<Depth of cut>



<Machining data>



End mill	MS4LTB R0.4 x 30' x 8
Workpiece	JIS SKD61 (50HRC)
Revolution	20,000min ⁻¹ (50m/min)
Feed rate	500mm/min (0.013mm/tooth)
Machining method	Blind rib (Flute length 25mm), Non water soluble cutting fluid

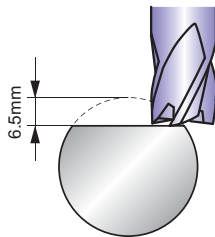
Tool: **MS4EC**: Stainless steel (SUS303)

Long tool life without burrs.

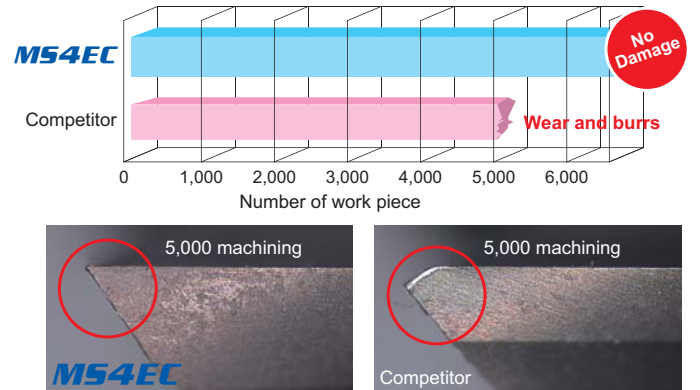
<Shape>



<Depth of cut>



<Machining data>



End mill	MS4EC ø6
Workpiece	JIS SUS303
Revolution	2,900min ⁻¹ (55m/min)
Feed rate	140mm/min (0.01mm/tooth)
Machining method	Emulsion

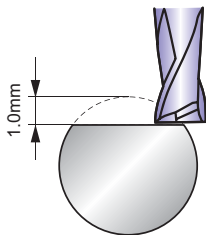
Tool: **MS3ES**: Carbon steel (S45C)

Controlling vibrating with 3 flute geometry of individual development!

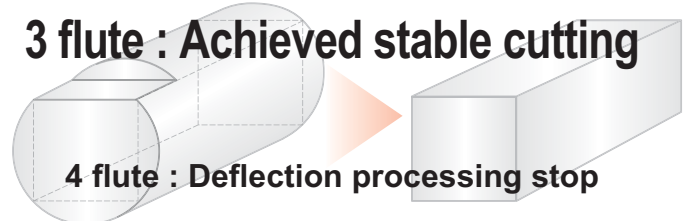
<Shape>



<Depth of cut>



<Machining data>



End mill	MS3ES ø8
Workpiece	JIS S45C
Revolution	2,000min ⁻¹ (50m/min)
Feed rate	150mm/min (0.025mm/tooth)
Machining method	Coolant

MSTAR END MILLS

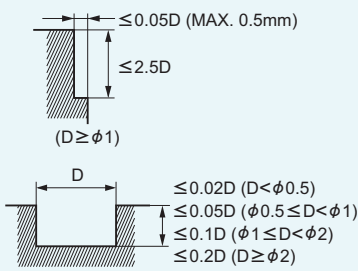
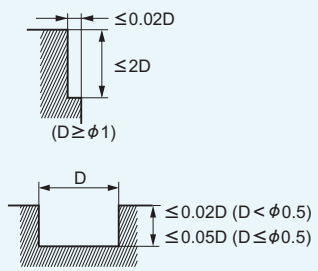
End mill, Short cut length, 2 flute **MS2SS**

End mill, Medium cut length, 2 flute **MS2MS**

Corner radius end mill, Medium cut length, 2 flute **MS2MRB**

Work Material	Carbon steel, Alloy steel, Tool steel Pre-hardened steel (~45HRC) JIS S50C, JIS SCM, JIS SKD			Alloy steel, Tool steel (45~55HRC) JIS SKD61, STAVAX		
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
0.1	40,000	40	0.001	40,000	40	0.001
0.2	40,000	100	0.002	40,000	100	0.002
0.3	40,000	200	0.005	40,000	200	0.005
0.4	40,000	600	0.01	40,000	600	0.01
0.5	40,000	1,000	0.015	40,000	960	0.015
0.6	40,000	1,200	0.02	40,000	1,200	0.02
0.7	40,000	1,400	0.02	40,000	1,400	0.02
0.8	40,000	1,600	0.03	40,000	1,600	0.03
0.9	40,000	1,800	0.04	40,000	1,600	0.04
1	40,000	2,000	0.06	32,000	1,600	0.06
1.5	40,000	3,000	0.12	32,000	1,900	0.08
2	30,000	3,000	0.18	24,000	1,900	0.10
2.5	24,000	2,600	0.25	19,000	1,600	0.13
3	20,000	2,300	0.30	16,000	1,400	0.15
4	15,000	2,000	0.40	12,000	1,200	0.20
5	12,000	1,600	0.50	9,000	900	0.25
6	10,000	1,400	0.60	7,000	700	0.30
8	8,000	1,000	0.80	5,600	550	0.40
10	6,400	900	1.00	4,500	500	0.50
12	5,400	820	1.00	3,800	450	0.50
16	2,400	380	≤3	1,200	100	≤0.8
20	1,900	320	≤4	1,000	80	≤1
Depth of Cut	≤ Please refer to the list above for depth of cut. ≤ Please refer to the list above for depth of cut. D: Dia.					

- 1) 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.
- 2) When slotting with end mills with $\phi 3$ or larger, reduce the revolution to 50—70% and the feed rate to 40—60%.
- 3) When drilling, reduce the feed rate by 70%.

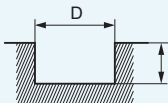
Work Material	Carbon steel (-30HRC) JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45-55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
0.1	40,000	— (40)	40,000	— (40)	40,000	— (35)	40,000	— (25)
0.2	40,000	— (45)	40,000	— (45)	40,000	— (35)	32,000	— (25)
0.3	40,000	— (55)	32,000	— (45)	27,000	— (35)	21,000	— (25)
0.4	32,000	— (60)	24,000	— (45)	20,000	— (35)	16,000	— (25)
0.5	25,000	— (60)	19,000	— (45)	16,000	— (35)	13,000	— (25)
0.6	21,000	— (60)	16,000	— (45)	13,000	— (35)	11,000	— (25)
0.7	18,000	— (60)	14,000	— (45)	11,000	— (35)	9,100	— (25)
0.8	16,000	— (60)	12,000	— (45)	9,900	— (35)	8,000	— (25)
0.9	14,000	— (60)	11,000	— (45)	8,800	— (35)	7,100	— (25)
1	13,000	60 (60)	9,500	45 (45)	8,000	35 (35)	6,400	25 (25)
1.5	8,500	60 (60)	6,400	45 (45)	5,300	35 (35)	4,200	25 (25)
2	6,400	60 (60)	4,800	45 (45)	4,000	35 (35)	3,200	25 (25)
2.5	5,100	60 (60)	3,800	45 (45)	3,200	40 (40)	2,500	25 (25)
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)
Depth of Cut								

() : Indicates standard revolution and feed rate for slotting.

D: Dia.

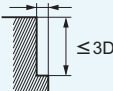
- 1) Please use 4 fluted end mills for workpiece of 55-60HRC.
- 2) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
- 3) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and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

Slotting

Work Material	Carbon steel (~30HRC) JIS S50C, JIS SCM Cast iron, JIS FC250			Alloy steel, Tool steel Pre-hardened steel (30~45HRC) JIS SKD61, NAK, HPM		
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)
0.2	40,000	400	0.001	30,000	250	0.001
0.3	40,000	600	0.005	35,000	420	0.005
0.4	40,000	700	0.007	30,000	420	0.007
0.5	40,000	800	0.01	24,000	380	0.01
0.6	33,000	800	0.015	21,000	480	0.01
0.7	28,000	800	0.015	18,000	480	0.015
0.8	25,000	800	0.02	16,000	480	0.02
0.9	22,000	800	0.03	15,000	500	0.03
1	20,000	800	0.04	13,000	500	0.04
1.5	13,000	800	0.10	9,000	500	0.10
2	10,000	800	0.15	6,700	500	0.15
2.5	9,000	800	0.20	6,000	500	0.20
3	8,000	800	0.20	5,200	460	0.20
4	6,000	600	0.20	4,000	340	0.20
5	4,800	480	0.30	3,200	280	0.20
6	4,000	400	0.30	2,600	210	0.20
8	3,000	300	0.30	2,000	170	0.30
10	2,400	240	0.30	1,600	140	0.30
12	2,000	200	0.30	1,300	110	0.30
Depth of Cut	 ≤Please refer to the list above for depth of cut.					

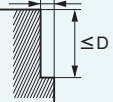
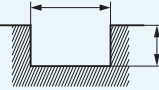
D:Dia.

Side milling

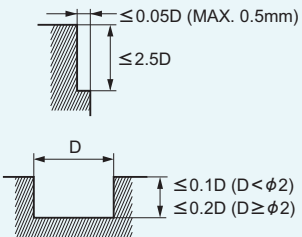
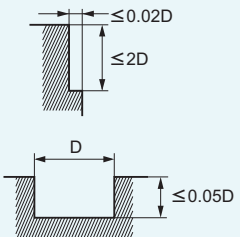
Work Material	Carbon steel (~30HRC) JIS S50C, JIS SCM Cast iron, JIS FC250			Alloy steel, Tool steel Pre-hardened steel (30~45HRC) JIS SKD61, NAK, HPM		
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)
3	3,500	370	0.05	2,600	250	0.03
4	2,800	370	0.06	2,100	200	0.03
5	2,200	330	0.06	1,700	160	0.03
6	1,800	300	0.06	1,500	140	0.03
8	1,600	270	0.08	1,100	140	0.04
10	1,400	240	0.10	900	140	0.05
12	1,200	200	0.10	750	120	0.06
Depth of Cut	≤Please refer to the list above for depth of cut.  ≤3D					

D:Dia.

- 1) Please use VC-LD for workpiece of 45HRC.
- 2) Vibration is liable to occur in the initial stages of machining, but after machining 1~2m the machining becomes stable and vibration could disappear.
- 3) Side milling with large depth of cuts with end mills less than $\phi 3$ is not recommended. When side milling, divide the cutting depth into several times paths.
- 4) If chattering occurs, reduce the revolution and the feed rate proportionately and also reduce the depth of cut.
- 5) When drilling, reduce the feed rate by 70%.

Work Material	Carbon steel, Alloy steel, Tool steel Pre-hardened steel (~45HRC) JIS S50C, JIS SCM, JIS SKD			Alloy steel, Tool steel (45~55HRC) JIS SKD61, STAVAX		
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
1	40,000	3,000	0.06	32,000	2,400	0.06
1.5	40,000	4,500	0.12	32,000	3,600	0.08
2	30,000	4,500	0.18	24,000	3,600	0.10
2.5	24,000	3,900	0.25	19,000	3,000	0.13
3	20,000	3,500	0.30	16,000	2,700	0.15
4	15,000	3,000	0.40	12,000	2,400	0.20
5	12,000	2,400	0.50	9,000	1,800	0.25
6	10,000	2,100	0.60	7,000	1,400	0.30
8	8,000	1,500	0.80	5,600	1,100	0.40
10	6,400	1,400	1.00	4,500	950	0.50
12	5,400	1,200	1.00	3,800	860	0.50
16	2,400	550	≤3	1,200	120	≤0.8
20	1,900	480	≤4	1,000	100	≤1
Depth of Cut	≤Please refer to the list above for depth of cut.  ≤D  ≤Please refer to the list above for depth of cut. D:Dia.					

- 1) 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.
- 2) When slotting with end mills with $\phi 3$ or larger, reduce the revolution to 50—70% and the feed rate to 40—60%.
- 3) When drilling, reduce the feed rate by 70%.

Work Material	Carbon steel (-30HRC) JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45-55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
1	11,100	85	9,500	65	8,000	50	6,400	35
1.5	7,400	85	6,400	90	5,300	50	4,200	35
2	5,600	85	4,800	90	4,000	50	3,200	35
2.5	4,500	85	3,800	90	3,200	55	2,500	35
3	3,700	90	3,400	90	2,600	60	2,100	35
4	3,000	110	2,700	90	2,100	70	1,700	50
5	2,600	140	2,300	110	1,800	85	1,500	55
6	2,300	170	2,000	140	1,500	110	1,300	70
8	1,700	180	1,500	140	1,200	110	1,000	70
10	1,400	180	1,300	140	950	110	800	70
12	1,200	170	1,100	140	800	110	670	70
Depth of Cut								

D: Dia.

- 1) The above table shows cutting conditions for standard side milling. For slotting, please reduce the feed rate only to 50% of the table figure. Please set the revolution at 80% and the feed rate 40% when slotting austenitic stainless steels.
- 2) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
- 3) If the rigidity of the machine or the 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%.

Work Material		Carbon steel Pre-hardened steel (-HRC45) JIS S55C, NAK, HAP		
Dia. (mm)	Neck Length (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
0.2	0.5	40,000	600	0.004
	1	40,000	400	0.001
0.3	1	40,000	650	0.007
	3	40,000	500	0.002
	9	22,000	150	0.001
0.4	2	40,000	800	0.007
	4	40,000	800	0.003
	12	17,000	150	0.001
0.5	2	40,000	950	0.01
	6	40,000	700	0.003
	10	25,000	400	0.002
	15	14,000	150	0.001
0.6	2	40,000	950	0.01
	6	40,000	800	0.005
	10	25,000	450	0.003
	18	12,000	150	0.001
0.7	2	40,000	1,000	0.02
	6	40,000	900	0.01
	10	11,000	300	0.005
0.8	4	40,000	1,200	0.02
	8	40,000	1,000	0.01
	12	25,000	400	0.003
	24	10,000	150	0.001
0.9	6	40,000	1,300	0.02
	10	35,000	1,000	0.01
	15	9,000	400	0.003
1	6	40,000	1,600	0.04
	8	40,000	1,600	0.03
	12	30,000	1,000	0.02
	20	15,000	400	0.005
	30	8,000	150	0.001
1.2	6	40,000	1,900	0.06
	8	40,000	1,900	0.04
	12	25,000	1,000	0.03
	20	6,500	150	0.01

Work Material		Carbon steel Pre-hardened steel (-HRC45) JIS S55C, NAK, HAP		
Dia. (mm)	Neck Length (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
1.5	6	40,000	2,400	0.10
	10	30,000	1,800	0.05
	20	15,000	600	0.02
	30	7,500	300	0.005
	45	5,000	150	0.001
1.6	6	40,000	2,400	0.12
	10	30,000	1,800	0.07
	16	20,000	1,000	0.04
2	6	40,000	2,400	0.18
	10	30,000	1,800	0.10
	16	20,000	1,000	0.06
	30	8,000	500	0.04
	40	6,000	250	0.01
	60	4,200	150	0.003
2.5	8	25,000	2,500	0.20
	16	18,000	1,700	0.10
	20	12,000	1,000	0.08
	40	8,000	400	0.03
3	8	20,000	2,000	0.30
	16	15,000	1,400	0.15
	20	10,000	800	0.10
	40	5,000	250	0.02
4	50	3,700	150	0.010
	12	15,000	3,000	0.30
	20	11,000	2,200	0.22
	30	6,400	1,200	0.12
	40	4,500	400	0.05
5	50	2,800	150	0.018
	16	12,000	2,500	0.35
	35	5,100	750	0.15
6	60	2,200	150	0.02
	20	10,000	2,000	0.40
	40	4,200	800	0.20
	60	1,900	150	0.10

- 1) The above table shows the revolution and feed rate for each neck length. Please reduce the revolution and feed rate when using end mills with a longer neck length.
- 2) 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. Please reduce the feed rate when the surface finish is important.

Work Material		Carbon steel, Alloy steel Tool steel, Pre-hardened steel JIS SS400, JIS S50C, JIS S55C JIS SCM, JIS SK, NAK, HPM			Pre-hardened steel (40–45HRC) JIS SKD61, STAVAX, JIS SUS420		
Dia. (mm)	Neck Length (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
0.3	0.8	40,000	500–1,000	0.01	30,000	300–800	0.01
	1.5			0.007			0.007
0.4	1	40,000	500–1,000	0.015	30,000	300–800	0.015
	2			0.01			0.01
0.5	1.3	40,000	500–1,000	0.02	30,000	300–800	0.02
	2.5			0.013			0.013
0.6	1.5	33,000	500–1,000	0.03	25,000	300–800	0.03
	3			0.018			0.018
0.7	1.8	29,000	500–1,000	0.04	22,000	300–800	0.04
	3.5			0.025			0.025
0.8	2	25,000	500–1,000	0.06	20,000	300–800	0.06
	4			0.03			0.03
0.9	2.3	22,000	500–1,000	0.08	18,000	300–800	0.08
	4.5			0.05			0.05
1	2.5	20,000	500–1,000	0.1	16,000	300–800	0.1
	5			0.07			0.07
1.1	2.8	18,000	500–1,000	0.12	14,000	300–800	0.12
	5.5			0.08			0.08
1.2	3	16,000	500–1,000	0.12	13,000	300–800	0.12
	6			0.08			0.08
1.3	3.3	15,000	500–1,000	0.12	12,000	300–800	0.12
	6.5			0.08			0.08
1.4	3.5	14,000	500–1,000	0.12	11,000	300–800	0.12
	7			0.08			0.08
1.5	3.8	13,000	500–1,000	0.15	10,000	300–800	0.15
	7.5			0.1			0.1
1.6	4	12,000	500–1,000	0.15	10,000	300–800	0.15
	8			0.1			0.1
1.7	4.3	12,000	500–1,000	0.17	9,500	300–800	0.17
	8.5			0.12			0.12
1.8	4.5	11,000	500–1,000	0.17	9,000	300–800	0.17
	9			0.12			0.12
1.9	4.8	10,000	500–1,000	0.17	9,000	300–800	0.17
	9.5			0.12			0.12
2	5	10,000	500–1,000	0.2	9,000	300–800	0.2
	10			0.15			0.15
2.1	5.3	9,800	500–1,000	0.2	9,000	300–800	0.2
	10.5			0.15			0.15
2.2	5.5	9,600	500–1,000	0.2	9,000	300–800	0.2
	11			0.15			0.15
2.3	5.8	9,400	500–1,000	0.2	8,800	300–800	0.2
	11.5			0.15			0.15
2.4	6	9,200	500–1,000	0.25	8,700	300–800	0.25
	12			0.2			0.2
2.5	6.3	9,000	500–1,000	0.25	8,500	300–800	0.25
	12.5			0.2			0.2

- 1) The above table shows the revolution and feed rate for each neck length. Please reduce the feed rate when using end mills with a longer neck length.
- 2) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately. Please reduce the feed rate when the surface finish is important.
- 3) If the depth of cut is shallow or when rib milling, the revolution and feed rate can be increased.

Work Material		Carbon steel Alloy steel, Tool steel Pre-hardened steel JIS SS400, JIS S50C, JIS S55C JIS SCM, JIS SK, NAK, HPM		
Dia. (mm)	Neck Length (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)
1	4	40,000	3,000	0.04
	8	36,000	2,400	0.03
	12	20,000	1,000	0.02
	16	10,000	500	0.005
1.2	6	40,000	3,000	0.05
	10	36,000	2,400	0.04
	12	20,000	1,200	0.03
	16	12,000	600	0.01
1.5	6	40,000	3,200	0.06
	12	32,000	2,400	0.05
	16	16,000	1,100	0.03
	20	10,000	600	0.01
1.8	6	40,000	3,600	0.08
	12	32,000	2,800	0.06
	20	12,000	1,000	0.02
	25	7,000	600	0.01
2	6	40,000	4,000	0.1
	12	32,000	3,200	0.07
	16	24,000	2,400	0.05
	20	12,000	1,200	0.03
	30	5,000	500	0.01
2.5	8	32,000	4,000	0.2
	25	9,000	1,100	0.04
	50	2,500	300	0.005
3	8	25,000	3,600	0.4
	16	18,000	2,500	0.2
	25	12,000	1,700	0.1
	30	7,000	800	0.05

Work Material		Carbon steel Alloy steel, Tool steel Pre-hardened steel JIS SS400, JIS S50C, JIS S55C JIS SCM, JIS SK, NAK, HPM		
Dia. (mm)	Neck Length (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)
3.5	15	20,000	3,000	0.6
	25	11,000	1,600	0.15
	35	5,500	800	0.06
4	12	18,000	3,000	1
	20	12,000	2,000	0.5
	30	8,000	1,300	0.2
	40	4,200	700	0.08
	50	2,400	400	0.03
5	16	14,000	2,700	1
	25	9,500	1,800	0.5
	35	6,400	1,200	0.2
	50	3,200	600	0.05
6	20	11,000	2,200	1.2
	30	8,000	1,600	0.6
	40	5,400	1,100	0.25
	50	3,200	640	0.15
8	30	8,000	1,600	1.6
	50	4,000	800	0.5
	70	2,000	400	0.2
10	40	6,400	1,300	2
	60	3,200	640	0.6
	80	1,600	320	0.3

1) 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. Please reduce the feed rate when the surface finish is important.

Side milling

Work Material	Carbon steel, Alloy steel (-30HRC) JIS S50C JIS SCM, JIS SS		Hardened steel (30-45HRC) JIS SKD61		Stainless steel JIS SUS304 JIS SUS316 Titanium alloy	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
1	19,000	600	13,000	310	10,000	200
1.5	14,000	600	9,000	310	7,500	210
2	11,000	600	7,200	310	6,000	210
3	8,500	770	5,300	380	4,400	220
4	7,200	850	4,400	480	3,700	250
6	5,300	940	3,200	490	2,700	270
8	4,000	1,010	2,400	560	2,000	280
10	3,200	1,000	1,900	480	1,600	300
12	2,700	950	1,600	440	1,300	300
16	2,000	720	1,200	350	1,000	260
20	1,600	600	1,000	290	800	240
Depth of Cut	$\leq 0.2D$ ($D > \phi 3$) $\leq 0.1D$ ($D \leq \phi 3$)		$\leq 0.2D$ ($D > \phi 3$) $\leq 0.1D$ ($D \leq \phi 3$)		$\leq 0.2D$ ($D > \phi 3$) $\leq 0.1D$ ($D \leq \phi 3$)	

D:Dia.

Slotting

Work Material	Carbon steel, Alloy steel (-30HRC) JIS S50C JIS SCM, JIS SS		Hardened steel (30-45HRC) JIS SKD61		Stainless steel JIS SUS304 JIS SUS316 Titanium alloy	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
1	13,000	130	10,000	80	6,000	30
1.5	12,000	250	8,000	150	6,000	60
2	11,000	500	7,200	260	6,000	130
3	8,500	640	5,300	320	4,200	130
4	7,200	650	4,400	370	3,300	140
6	5,300	720	3,200	380	2,200	140
8	4,000	780	2,400	430	1,600	140
10	3,200	770	1,900	370	1,300	150
12	2,700	730	1,600	340	1,100	150
16	2,000	600	1,200	290	800	130
20	1,600	500	1,000	240	640	120
Depth of cut	$\leq 1D$ ($D \geq \phi 2$) $\leq 0.5D$ ($D < \phi 2$)		$\leq 1D$ ($D \geq \phi 2$) $\leq 0.5D$ ($D < \phi 2$)		$\leq 0.5D$ ($D \geq \phi 2$) $\leq 0.2D$ ($D < \phi 2$)	

D:Dia.

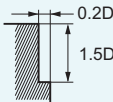
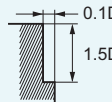
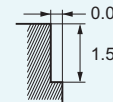
Plunging

Work Material	Carbon steel, Alloy steel (-30HRC) JIS S50C JIS SCM, JIS SS		Hardened steel (30-45HRC) JIS SKD61		Stainless steel JIS SUS304 JIS SUS316 Titanium alloy	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
1	13,000	80	10,000	50	6,000	10
1.5	12,000	120	8,000	80	6,000	20
2	11,000	200	7,200	140	6,000	30
3	8,500	250	5,300	180	4,200	50
4	7,200	300	4,400	210	3,300	60
6	5,300	300	3,200	210	2,200	70
8	4,000	320	2,400	220	1,600	80
10	3,200	340	1,900	240	1,300	70
12	2,700	320	1,600	220	1,100	70
16	2,000	250	1,200	180	800	55
20	1,600	200	1,000	140	640	55
Depth of Cut	$\leq 1D$ ($D \geq \phi 2$) $\leq 0.5D$ ($D < \phi 2$)		$\leq 0.5D$ ($D \geq \phi 2$) $\leq 0.2D$ ($D < \phi 2$)		$\leq 0.5D$ ($D \geq \phi 2$) $\leq 0.2D$ ($D < \phi 2$)	

D:Dia.

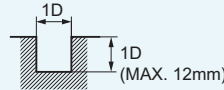
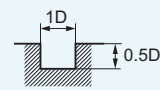
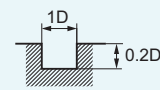
- 1) The above table shows the standard recommended cutting conditions. Adjustments may be needed according to the condition of the machine.
- 2) When slotting, plunging and cutting stainless steels, water-soluble cutting fluid is recommended.
- 3) When plunging of materials such as austenitic stainless steels and titanium alloys, it is recommended to peck feed. (0.1D)

Side milling

Work Material	Carbon steel, Alloy steel (-30HRC) JIS SS400, JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45-55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
2	15,000	550	10,000	340	10,000	320	6,400	160
3	11,000	800	7,400	500	7,400	480	4,800	250
4	8,000	900	5,600	540	5,600	520	3,600	270
5	6,400	1,000	4,500	600	4,500	580	2,900	300
6	5,800	1,100	3,700	640	3,700	600	2,400	320
8	4,400	1,100	2,800	660	2,800	600	1,800	330
10	3,500	1,000	2,200	640	2,200	560	1,400	320
12	2,900	1,000	1,900	640	1,900	530	1,200	320
16	2,200	800	1,400	500	1,400	450	900	250
20	1,800	750	1,100	460	1,100	440	720	230
25	1,400	600	900	400	900	380	570	200
Depth of Cut								

D:Dia.

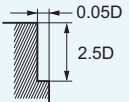
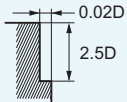
Slotting

Work Material	Carbon steel, Alloy steel (-30HRC) JIS SS400, JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45-55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
2	12,000	400	7,000	200	7,000	100	4,200	80
3	9,000	600	5,300	300	5,300	150	3,200	130
4	7,200	720	4,000	360	4,000	180	2,400	140
5	5,800	720	3,200	360	3,200	180	1,900	150
6	5,000	800	2,700	400	2,700	200	1,600	160
8	3,700	800	2,000	400	2,000	200	1,200	170
10	3,000	720	1,600	360	1,600	180	960	160
12	2,500	720	1,300	360	1,300	180	800	160
16	2,000	600	1,000	280	1,000	150	600	130
20	1,600	540	800	250	800	130	480	120
25	1,300	480	640	220	640	120	380	100
Depth of Cut								

D:Dia.

- 1) When 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 workpiece installation is very low, or chattering is generated, please reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
- 4) Climb cutting is recommended for side milling.

Side milling

Work Material	Carbon steel, Alloy steel (~30HRC) JIS SS400, JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30~45HRC) JIS SKD61, NAK		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45~55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
2	11,000	370	7,000	230	7,000	210	5,000	100
3	8,000	550	5,100	320	5,100	300	3,800	190
4	6,200	620	4,000	350	4,000	340	3,000	210
5	5,000	670	3,200	370	3,200	360	2,400	220
6	4,200	750	2,600	400	2,600	390	2,000	220
8	3,200	780	2,000	420	2,000	400	1,500	230
10	2,500	690	1,600	410	1,600	380	1,200	210
12	2,100	670	1,300	380	1,300	340	1,000	190
16	1,600	570	1,000	320	1,000	280	750	170
20	1,200	470	800	290	800	260	600	150
Depth of Cut								

D:Dia.

- 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
- 2) If the rigidity of the machine or the workpiece set up is very low, or when chattering occurs, reduce the revolution and the feed rate proportionately. Note however if the quality of the workpiece surface is poor, chattering may occur even under the same cutting conditions.
- 3) Climb cutting is recommended.

MS2ES

End mill, 2 flute, For small automatic lathes

MS3ES

End mill, 3 flute, For small automatic lathes

Work Material	Carbon steel (~30HRC) JIS S50C, JIS SCM, Cast iron JIS FC250, Brass		Alloy steel, Tool steel Pre-hardened steel (30~45HRC) JIS SKD, JIS SCM, JIS SKD61		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45~55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
3	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
7	4,500	560	3,000	360	2,700	280	2,300	110
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
Depth of Cut								

D:Dia.

- 1) 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.
- 2) When drilling, reduce the feed rate by 70%.

MS4EC

End mill, 4 flute, For small automatic lathes

Work Material	Carbon steel (~30HRC) S50C, SCM, Cast iron FC250, Brass		Alloy steel, Tool steel Pre-hardened steel (30~45HRC) JIS SCM, JIS SKD61		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45~55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
3	10,000	900	7,000	600	6,000	450	5,000	180
4	7,500	900	5,200	600	4,500	450	4,000	180
5	6,000	900	4,200	600	3,600	450	3,200	180
6	5,000	900	3,500	600	3,000	450	2,700	180
7	4,500	840	3,000	540	2,700	420	2,300	160
8	4,000	780	2,800	520	2,400	390	2,000	160
10	3,200	680	2,200	450	1,900	340	1,600	140
12	2,700	620	1,900	410	1,600	310	1,300	120
14	2,300	550	1,600	350	1,400	280	1,200	120
Depth of Cut								

D:Dia.

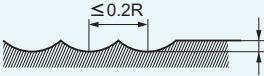
- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.
- 2) When drilling, reduce the feed rate by 70%.

MSTAR END MILLS

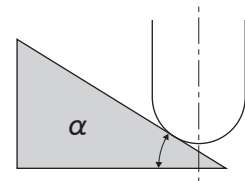
Ball nose end mill, Short cut length, 2 flute **MS2SB**

Ball nose end mill, Medium cut length, 2 flute **MS2MB**

Ball nose taper end mill, Medium cut length, 2 flute **MS2MTB**

Work Material	Alloy steel, Tool steel, Pre-hardened steel (~45HRC) JIS SCM, JIS SKD61, JIS SKD11					Hardened steel (45~55HRC) JIS SKD61				
	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		Depth of Cut ap (mm)	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		Depth of Cut ap (mm)
	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)		Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	
R 0.1	40,000	300	40,000	250	0.003	40,000	300	40,000	250	0.003
R 0.15	40,000	500	40,000	350	0.007	40,000	500	40,000	350	0.007
R 0.2	40,000	1,600	40,000	1,200	0.02	40,000	1,300	40,000	950	0.015
R 0.25	40,000	2,400	40,000	1,400	0.025	40,000	1,900	40,000	1,100	0.020
R 0.3	40,000	3,200	40,000	1,600	0.03	40,000	2,500	40,000	1,300	0.025
R 0.4	40,000	4,800	40,000	2,400	0.05	40,000	4,000	40,000	1,900	0.04
R 0.5	40,000	5,600	40,000	3,200	0.06	40,000	5,600	40,000	3,000	0.05
R 0.75	40,000	6,500	40,000	4,000	0.09	40,000	6,500	32,000	3,200	0.08
R 1	40,000	6,500	39,000	4,700	0.11	40,000	6,500	31,000	3,500	0.11
R 1.25	40,000	7,000	33,000	4,500	0.12	36,000	6,500	26,000	3,500	0.12
R 1.5	40,000	7,500	27,000	4,300	0.13	32,000	6,000	22,000	3,400	0.13
R 2	32,000	7,500	20,000	3,600	0.15	25,000	6,000	16,000	2,700	0.15
R 2.5	25,000	6,000	16,000	2,900	0.20	20,000	5,400	13,000	2,300	0.20
R 3	21,000	5,800	13,000	2,600	0.25	17,000	4,700	10,000	2,000	0.25
R 4	16,000	4,500	10,000	2,000	0.30	13,000	3,600	8,000	1,500	0.30
R 5	13,000	3,600	8,000	1,700	0.50	10,000	2,900	6,400	1,200	0.50
R 6	9,000	2,500	6,000	1,300	0.50	7,200	2,000	4,800	1,000	0.50
Depth of Cut	Please select a pick feed based on the required surface finishes in reference to "Pitch Selection of Pick Feed" on page F023.  ≤ Please refer to the list above for depth of cut. R:Radius									

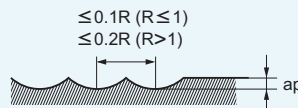
- 1) α is the inclination of machining surface.
- 2) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately. Please reduce the feed rate when the surface finish is important.
- 3) Cutting conditions may differ considerably due to the overhang (milling depth and neck length), depth of cut, and machine tool condition. Please use the above table as a standard starting point.
- 4) If the depth of cut is shallow, the revolution and feed rate can be increased.



Work Material		Carbon steel Pre-hardened steel (-45HRC) JIS S55C, NAK, HPM			Hardened steel (-52HRC) JIS SKD61, STAVAX		
R (mm)	Neck Length (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
R 0.1	0.5	50,000	400	0.003	50,000	320	0.003
	1	50,000	400	0.002	50,000	320	0.002
	1.5	40,000	300	0.001	40,000	240	0.001
	2	40,000	200	0.001	40,000	160	0.001
	2.5	40,000	100	0.001	40,000	80	0.001
	3	30,000	50	0.001	30,000	40	0.001
R 0.15	1	50,000	600	0.007	50,000	480	0.007
	1.5	50,000	600	0.005	50,000	480	0.005
	2	50,000	600	0.003	50,000	480	0.003
	2.5	40,000	400	0.003	40,000	320	0.003
	3	40,000	300	0.002	40,000	240	0.002
	4	30,000	200	0.002	30,000	160	0.002
R 0.2	1	50,000	1,800	0.015	50,000	1,400	0.015
	2	50,000	1,300	0.01	50,000	1,000	0.01
	3	50,000	900	0.005	50,000	700	0.005
	4	40,000	600	0.004	40,000	480	0.004
	5	40,000	400	0.003	40,000	320	0.003
	6	30,000	200	0.002	30,000	160	0.002
R 0.25	2	50,000	2,500	0.02	50,000	2,000	0.02
	3	50,000	1,500	0.015	50,000	1,200	0.015
	4	45,000	1,200	0.01	45,000	950	0.01
	5	45,000	900	0.007	45,000	700	0.007
	6	36,000	600	0.006	36,000	480	0.006
	7	32,000	400	0.005	32,000	320	0.005
	8	32,000	300	0.003	32,000	240	0.003
R 0.3	10	26,000	200	0.002	26,000	160	0.002
	2	50,000	3,500	0.03	50,000	2,800	0.03
	3	50,000	3,500	0.03	50,000	2,800	0.03
	4	44,000	2,500	0.02	44,000	2,000	0.02
	5	37,000	1,200	0.01	37,000	950	0.01
	6	37,000	1,000	0.008	37,000	800	0.008
	7	35,000	750	0.008	35,000	600	0.008
	8	35,000	600	0.006	35,000	480	0.006
	9	30,000	500	0.004	30,000	400	0.004
	10	30,000	500	0.003	30,000	400	0.003
	11	22,000	300	0.002	22,000	240	0.002
	12	22,000	200	0.002	22,000	160	0.002
R 0.4	2	50,000	4,400	0.04	50,000	3,500	0.04
	3	50,000	4,000	0.04	50,000	3,200	0.04
	4	50,000	4,000	0.02	50,000	3,200	0.02
	5	35,000	2,400	0.02	35,000	1,900	0.02
	6	35,000	2,400	0.02	35,000	1,900	0.02
	7	30,000	1,500	0.015	30,000	1,200	0.015
	8	30,000	1,500	0.01	30,000	1,200	0.01
	10	30,000	700	0.008	30,000	560	0.008
	12	22,000	500	0.006	22,000	400	0.006
R 0.5	3	40,000	4,000	0.05	40,000	3,200	0.05
	4	40,000	4,000	0.05	40,000	3,200	0.05
	6	35,000	3,000	0.03	35,000	2,400	0.03
	8	30,000	2,000	0.02	30,000	1,600	0.02

Work Material		Carbon steel Pre-hardened steel (-45HRC) JIS S55C, NAK, HPM			Hardened steel (-52HRC) JIS SKD61, STAVAX		
R (mm)	Neck Length (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
R 0.5	10	20,000	1,000	0.01	20,000	800	0.01
	12	20,000	1,000	0.01	20,000	800	0.01
	14	18,000	600	0.008	18,000	480	0.008
	16	18,000	500	0.008	18,000	400	0.008
	18	13,000	300	0.005	13,000	240	0.005
	20	13,000	250	0.005	13,000	200	0.005
R 0.6	3.6	40,000	4,400	0.06	40,000	3,500	0.06
	6	40,000	4,400	0.04	40,000	3,500	0.04
	8	40,000	4,000	0.04	40,000	3,200	0.04
	10	27,000	1,900	0.02	27,000	1,500	0.02
	12	16,000	1,400	0.02	16,000	1,100	0.02
	18	15,000	700	0.008	15,000	560	0.008
	24	11,000	300	0.006	11,000	240	0.006
R 0.75	6	40,000	6,000	0.07	36,000	4,300	0.07
	8	40,000	6,000	0.07	36,000	4,300	0.07
	10	40,000	5,000	0.06	36,000	3,600	0.06
	12	32,000	3,400	0.04	29,000	2,400	0.04
	16	15,000	1,400	0.03	15,000	1,100	0.03
	20	12,000	900	0.02	12,000	720	0.02
	30	9,000	400	0.01	9,000	320	0.01
R 1	4	40,000	8,000	0.1	32,000	5,000	0.1
	6	40,000	8,000	0.1	32,000	5,000	0.1
	8	40,000	6,000	0.1	32,000	3,800	0.1
	10	40,000	5,000	0.08	32,000	3,200	0.08
	12	40,000	5,000	0.08	32,000	3,200	0.08
	16	32,000	3,500	0.05	26,000	2,200	0.05
	20	10,000	1,000	0.04	10,000	800	0.04
	25	10,000	1,000	0.04	10,000	800	0.04
	30	10,000	800	0.02	10,000	640	0.02
	35	10,000	600	0.02	10,000	480	0.02
R 1.5	8	32,000	7,000	0.15	26,000	4,500	0.15
	10	32,000	7,000	0.15	26,000	4,500	0.15
	16	32,000	5,000	0.1	26,000	3,200	0.1
	20	27,000	3,800	0.1	22,000	2,400	0.1
	25	21,000	2,700	0.08	17,000	1,700	0.08
	30	6,000	700	0.08	6,000	560	0.08
	35	6,000	700	0.06	6,000	560	0.06
	40	6,000	600	0.04	6,000	480	0.04
R 2	10	24,000	6,000	0.2	19,000	3,800	0.2
	20	24,000	3,800	0.15	19,000	2,400	0.15
	30	20,000	3,000	0.1	16,000	1,900	0.1
	40	12,000	1,700	0.1	12,000	1,400	0.1
	50	8,000	1,000	0.05	8,000	800	0.05
R 2.5	20	22,000	6,000	0.2	18,000	3,800	0.2
	25	22,000	4,400	0.2	18,000	2,800	0.2
	30	22,000	3,800	0.15	18,000	2,400	0.15
	35	22,000	3,600	0.1	18,000	2,300	0.1
R 3	30	20,000	6,000	0.2	16,000	3,800	0.2
	50	20,000	3,000	0.15	16,000	1,900	0.15

Depth of Cut



R:Radius

- 1) If the inclination of machining surface, cutting load is big, please reduce the revolution and feed rate proportionately.
- 2) When using the minimum diameter, we recommend coolant mist.
- 3) If the depth of cut is shallow, the feed rate can be increased.
- 4) Please use VF-2XLB for work materials of 55HRC or above.

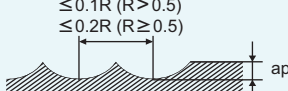
Work Material				Alloy steel, Tool steel Pre-hardened steel (-45HRC) JIS SKD61, JIS SKD11, NAK	
R (mm)	Taper Angle One Side	Neck Length (mm)	Depth of Cut (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)
R0.1	30°	1.5	0.005	30,000	300
	30°	2	0.005		
	1°	1.5	0.005		
	1°	2	0.005		
	2°	1.5	0.01		
	2°	2	0.01		
	3°	1.5	0.01		
	3°	2	0.01		
	5°	2	0.01		
R0.15	30°	3	0.005	30,000	300
	1°	3	0.005		
	2°	3	0.01		
	3°	3	0.01		
	5°	3	0.01		
R0.2	30°	2	0.02	30,000	300
	30°	5	0.01		
	1°	2	0.02		
	1°	5	0.01		
	1°	2	0.02		
	2°	5	0.01		
R0.25	30°	3	0.03	30,000	300
	30°	5	0.02		
	1°	3	0.03		
	1°	5	0.02		
	2°	3	0.03		
	2°	5	0.02		
R0.3	30°	5	0.03	30,000	400
	30°	8	0.02		
	1°	5	0.03		
	1°	10	0.02		
	1°	15	0.01		
	2°	6	0.03		
	2°	8	0.02		
R0.4	30°	8	0.05	30,000	500
	30°	12	0.04		
	1°	8	0.05		
	1°	12	0.04		
	2°	8	0.08		
	3°	12	0.06		

Work Material				Alloy steel, Tool steel Pre-hardened steel (-45HRC) JIS SKD61, JIS SKD11, NAK	
R (mm)	Taper Angle One Side	Neck Length (mm)	Depth of Cut (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)
R0.5	30°	10	0.05	22,000	530
	30°	20	0.02		
	30°	30	0.005		
	1°	10	0.05		
	1°	20	0.02		
	1°	35	0.005		
	2°	20	0.03		
	3°	40	0.05		
	5°	20	0.05		
	R0.6	30°	12		
30°		24	0.02		
1°		12	0.05		
1°		24	0.02		
2°		12	0.06		
2°		24	0.03		
R0.75	30°	10	0.1	20,000	700
	30°	30	0.02		
	1°	10	0.1		
	1°	30	0.05		
	2°	30	0.1		
R1	30°	20	0.05	18,000	1,000
	30°	30	0.03		
	30°	40	0.02		
	1°	20	0.05		
	1°	40	0.03		
	1°	50	0.02		
	2°	40	0.1		
	3°	40	0.1		
	5°	38.2	0.1		
	R1.5	30°	30		
30°		50	0.03		
1°		30	0.1		
1°		50	0.03		
2°		48.9	0.1		
3°		50	0.1		
R2	30°	60	0.1	14,000	1,100
	1°	60	0.1		

Depth of Cut

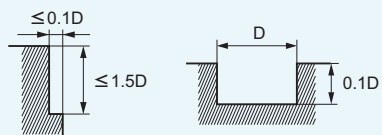
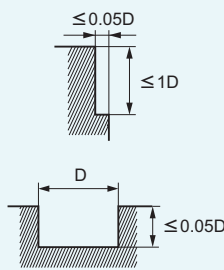
≤0.1R (R>0.5)

≤0.2R (R≥0.5)



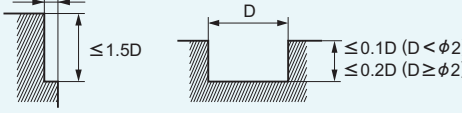
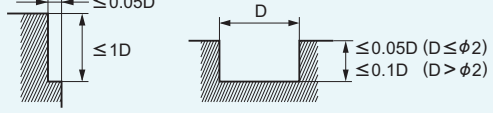
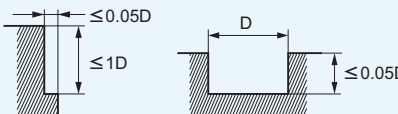
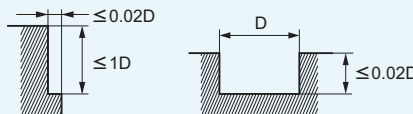
R:Radius

- 1) Please reduce the cutting depth (especially a_p) if chattering and noise are generated, and reduce the feed rate proportionately.
- 2) When high machining accuracy is needed, we recommend reducing the feed rate.

Work Material	Carbon steel (—30HRC) JIS S50C, SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30—45HRC) JIS SKD61, NAK		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45—55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
1	40,000	1,500	30,000	800	22,000	480	24,000	240
1.5	32,000	1,500	20,000	800	15,000	480	16,000	240
2	24,000	1,500	15,000	800	11,000	480	12,000	240
2.5	19,000	1,500	12,000	800	8,800	480	9,600	240
3	16,000	1,500	10,000	800	7,400	480	8,000	240
4	12,000	1,800	8,000	1,000	5,600	600	6,000	240
5	9,600	1,800	6,400	1,000	4,400	600	4,800	240
6	8,000	1,800	5,300	1,000	3,700	600	4,000	240
8	6,000	1,600	4,000	900	2,800	560	3,000	240
10	4,800	1,400	3,200	800	2,200	500	2,400	240
12	4,000	1,200	2,700	700	1,800	430	2,000	230
16	3,000	960	2,000	560	1,400	360	1,500	190
20	2,400	800	1,600	480	1,100	300	1,200	170
Depth of Cut								

D: Dia.

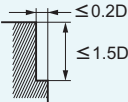
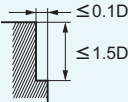
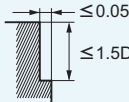
- 1) The above table shows cutting conditions for standard side milling. For slotting, please reduce the feed rate only to 80% of the table figure. Please set the revolution at 70% and the feed rate 60% when slotting austenitic stainless steels.
- 2) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective.
- 3) If the rigidity of the machine or the 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%.

Work Material		Carbon steel (-30HRC) JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45-55HRC) JIS SKD61		
Dia. (mm)	Neck Length (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	
1	2	(2D)	30,000	600	20,000	400	18,000	300	15,000	120
2	4		15,000	600	10,000	400	9,100	300	8,000	120
3	6		10,000	600	7,000	400	6,000	300	5,000	120
4	8		7,500	600	5,200	400	4,500	300	4,000	120
6	12		5,000	600	3,500	400	3,000	300	2,700	120
1	5	(5D)	22,000	350	17,000	280	14,000	200	12,000	100
2	10		11,000	350	8,800	280	7,200	200	6,400	100
3	15		7,400	350	5,800	280	4,800	200	4,200	100
4	20		5,600	350	4,400	280	3,600	200	3,200	100
6	30		3,700	350	2,900	280	2,400	200	2,100	100
Depth of Cut		(Neck length=2D)				(Neck length=2D)				
		$\leq 0.1D$ ($D \leq \phi 3$) $\leq 0.2D$ ($D > \phi 3$)				$\leq 0.05D$ $\leq 1D$				
										
		(Neck length=5D)				(Neck length=5D)				
		$\leq 0.05D$ $\leq 1D$				$\leq 0.02D$ $\leq 1D$				
										

D:Dia.

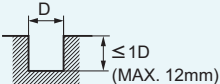
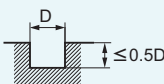
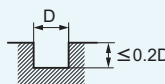
- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately.
- 2) Please reduce the feed rate when precision is important.
- 3) Cutting conditions may differ considerably due to the overhang (milling depth), depth of cut, and machine tools. Please use the above table as a start reference point.
- 4) If the depth of cut is shallow, the feed rate can be increased.

Side milling

Work Material	Carbon steel, Alloy steel (-30HRC) JIS SS400, JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK		Austenitic stainless steel SUS304, SUS316		Hardened steel (45-55HRC) SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
2	15,000	550	10,000	340	10,000	320	6,400	160
3	11,000	800	7,400	500	7,400	480	4,800	250
4	8,000	900	5,600	540	5,600	520	3,600	270
5	6,400	1,000	4,500	600	4,500	580	2,900	300
6	5,900	1,100	3,700	640	3,700	600	2,400	320
8	4,400	1,100	2,800	660	2,800	600	1,800	330
10	3,500	1,000	2,300	640	2,300	560	1,400	320
12	2,900	1,000	1,900	640	1,900	530	1,200	320
16	2,200	800	1,400	500	1,400	450	900	250
18	2,000	800	1,250	480	1,250	450	800	240
20	1,800	750	1,100	460	1,100	440	720	230
Depth of Cut								

D:Dia.

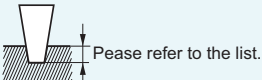
Slotting

Work Material	Carbon steel, Alloy steel (-30HRC) JIS SS400, JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK		Austenitic stainless steel JIS SUS304, JIS SUS316		Hardened steel (45-55HRC) JIS SKD61	
Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
2	12,000	400	7,000	200	7,000	100	4,200	80
3	9,000	600	5,300	300	5,300	150	3,200	130
4	7,200	720	4,000	360	4,000	180	2,400	140
5	5,800	720	3,200	360	3,200	180	1,900	150
6	5,000	800	2,700	400	2,700	200	1,600	160
8	3,700	800	2,000	400	2,000	200	1,200	170
10	3,000	720	1,600	360	1,600	180	960	160
12	2,500	600	1,300	290	1,300	150	800	140
16	2,000	480	1,000	230	1,000	120	600	110
18	1,800	460	900	210	900	110	550	110
20	1,600	430	800	200	800	100	480	100
Depth of Cut								

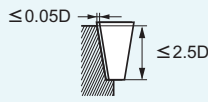
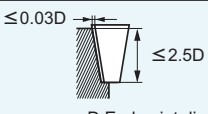
D:Dia.

- 1) When 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 workpiece installation is very low, or chattering is generated, please reduce the revolution and feed rate proportionately, or set the depth of cut smaller.
- 4) Climb cutting is recommended for side milling.

Slotting

Work Material	Carbon steel (-30HRC) JIS S50C, JIS SCM Cast iron, JIS FC250			Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK			Hardened steel (45-55HRC) JIS SKD61		
Small Mill Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut (mm)
0.2	40,000	320	0.005	40,000	180	0.004	40,000	100	0.002
0.3	40,000	400	0.006	40,000	220	0.005	35,000	130	0.003
0.4	40,000	450	0.008	40,000	270	0.006	31,000	150	0.004
0.5	37,000	500	0.010	32,000	320	0.008	25,000	160	0.005
0.6	32,000	530	0.013	26,000	340	0.010	21,000	170	0.006
0.7	27,000	560	0.015	23,000	380	0.011	18,000	180	0.007
0.8	24,000	610	0.018	20,000	410	0.013	16,000	210	0.008
0.9	21,000	610	0.020	18,000	450	0.015	14,000	210	0.009
1	19,000	610	0.025	16,000	450	0.020	13,000	210	0.010
1.5	13,000	720	0.040	11,000	540	0.030	8,500	270	0.015
Depth of Cut									

Side milling

Work material	Carbon steel (-30HRC) JIS S50C, JIS SCM Cast iron, JIS FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) JIS SKD61, NAK		Hardened steel (45-55HRC) JIS SKD61	
Small Mill Dia. (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Revolution (min ⁻¹)	Feed Rate (mm/min)
2	9,500	720	8,000	540	6,400	300
2.5	7,800	800	6,300	540	5,000	300
3	6,400	800	5,300	540	4,200	300
4	4,800	800	4,000	540	3,200	300
5	3,800	800	3,200	540	2,500	300
6	3,200	800	2,600	540	2,100	300
8	2,400	700	2,000	480	1,600	270
10	1,900	600	1,600	410	1,300	240
Depth of Cut						

- 1) 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. Please reduce the feed rate when the surface finish is important.
- 2) Cutting conditions may differ considerably due to the taper angle, depth of cut and machine tool condition. Please use the above table as a start reference point.
- 3) When slotting, please use cutting fluid.

Work Material		Carbon steel, Alloy steel, Pre-hardened steel (—45HRC) JIS S50C, JIS SCM, JIS SK, JIS SKD61 STAVAX, JIS SUS420, NAK, HPM			Hardened steel (45—52HRC) STAVAX, JIS SKD61		
Small Mill Dia. (mm)	Length of Cut (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
0.2	2	20,000—40,000	200—500	0.001	20,000—40,000	150—300	0.001
0.3	3	20,000—40,000	200—500	0.002	20,000—40,000	150—300	0.001
0.4	4	20,000—40,000	200—500	0.003	20,000—36,000	150—300	0.002
0.5	4	20,000—38,000	200—500	0.01	16,000—29,000	200—400	0.005
	6			0.005			0.003
0.6	4	18,000—32,000	250—600	0.01	13,000—24,000	200—400	0.005
	6			0.007			0.004
0.7	6	16,000—27,000	250—600	0.015	11,000—20,000	200—400	0.008
	8			0.01			0.005
0.8	4	14,000—24,000	250—600	0.03	10,000—18,000	200—400	0.015
	8			0.02			0.01
	12			0.013			0.007
1.0	6	11,000—19,000	300—800	0.03	8,000—14,000	200—500	0.015
	10			0.02			0.01
	16			0.015			0.008
1.2	6	9,200—16,000	300—800	0.04	6,600—12,000	200—500	0.02
	10			0.03			0.015
	16			0.02			0.01
	20			0.01			0.007
1.3	12	8,500—15,000	300—800	0.03	6,100—11,000	200—500	0.015
1.4	12	8,000—14,000	300—800	0.035	5,700—10,000	200—500	0.018
1.5	6	7,500—13,000	300—800	0.06	5,300—9,500	200—500	0.03
	10			0.04			0.02
	16			0.03			0.015
	25			0.015			0.008
1.6	8	7,000—12,000	300—800	0.06	5,000—9,000	200—500	0.03
	12			0.045			0.025
	16			0.035			0.02
	20			0.025			0.015
1.8	8	6,200—11,000	300—800	0.08	4,400—8,000	200—500	0.04
	16			0.05			0.03
	24			0.03			0.015
2.0	8	5,500—9,500	300—800	0.1	4,000—7,200	200—500	0.05
	12			0.07			0.04
	20			0.04			0.02
	30			0.02			0.01
2.5	10	4,400—7,600	300—800	0.1	3,200—5,700	200—500	0.05
	20			0.06			0.03
	30			0.03			0.015
3.0	25	3,700—6,400	300—800	0.08	2,700—4,800	200—500	0.04
	40			0.04			0.02

- 1) The above table shows the revolution and feed rate for each neck length. Please reduce the feed rate when using end mills with a longer neck length.
- 2) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately. Please reduce the feed rate when the surface finish is important.

Work Material		Carbon steel, Alloy steel, Pre-hardened steel (-45HRC) S50C, JIS SCM, JIS SK, JIS SKD61 STAVAX, JIS SUS420, NAK, HPM			Hardened steel (45-52HRC) STAVAX, JIS SKD61		
R (mm)	Length of Cut (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)	Revolution (min ⁻¹)	Feed Rate (mm/min)	Depth of Cut ap (mm)
R0.3	4	18,000—32,000	250—600	0.01	13,000—24,000	200—400	0.005
	6			0.007			0.004
R0.4	6	14,000—24,000	250—600	0.025	10,000—18,000	200—400	0.013
	8			0.02			0.01
	10			0.015			0.008
R0.5	8	11,000—19,000	300—800	0.025	8,000—14,000	200—500	0.013
	10			0.02			0.01
	12			0.018			0.009
	16			0.015			0.008
R0.6	8	9,200—16,000	300—800	0.035	6,600—12,000	200—500	0.018
	10			0.03			0.015
	12			0.027			0.013
	16			0.02			0.01
R0.75	8	7,500—13,000	300—800	0.05	5,300—9,500	200—500	0.025
	10			0.04			0.02
	12			0.035			0.018
	16			0.03			0.015
	20			0.02			0.01
R0.9	8	6,200—11,000	300—800	0.08	4,400—8,000	200—500	0.04
	10			0.07			0.035
	12			0.06			0.035
	16			0.05			0.03
	20			0.04			0.02
R1	10	5,500—9,500	300—800	0.08	4,000—7,200	200—500	0.045
	12			0.07			0.04
	16			0.05			0.03
	20			0.04			0.02
	25			0.03			0.015
	30			0.02			0.01

- 1) The above table shows the revolution and feed rate for each neck length. Please reduce the feed rate when using end mills with a longer neck length.
- 2) If the rigidity of the machine or the workpiece installation is very low, or chattering is generated, please reduce the revolution and the feed rate proportionately. Please reduce the feed rate when the surface finish is important.



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 driver. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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(Tools specifications subject to change without notice.)