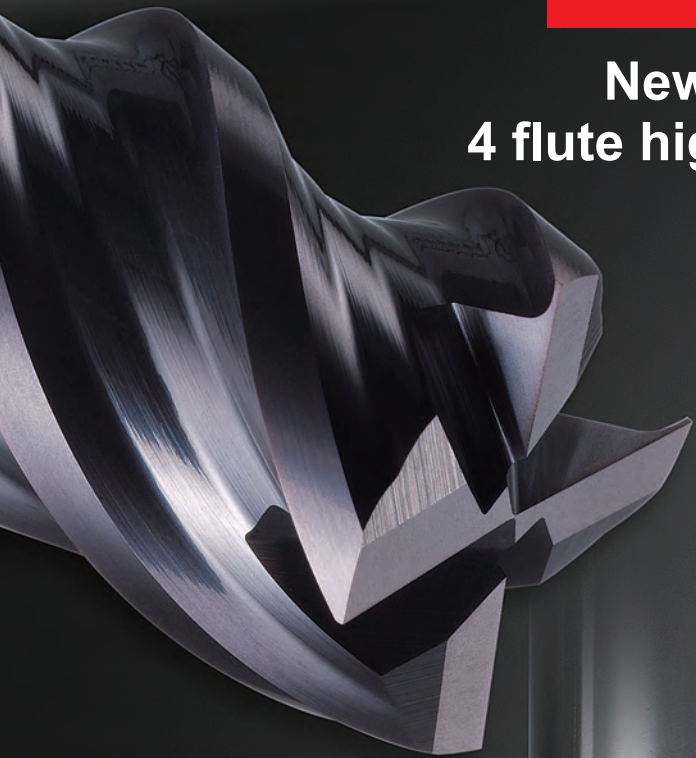


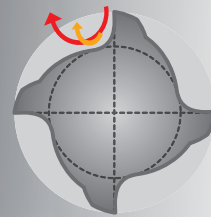
MSTAR 4 flute high power end mill

MSMHD

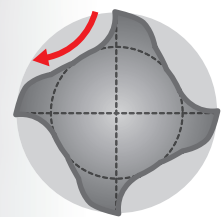
New addition to the **MSTAR** series.
4 flute high power end mills now available.



■ A new flute geometry for slotting,
for excellent chip disposability.

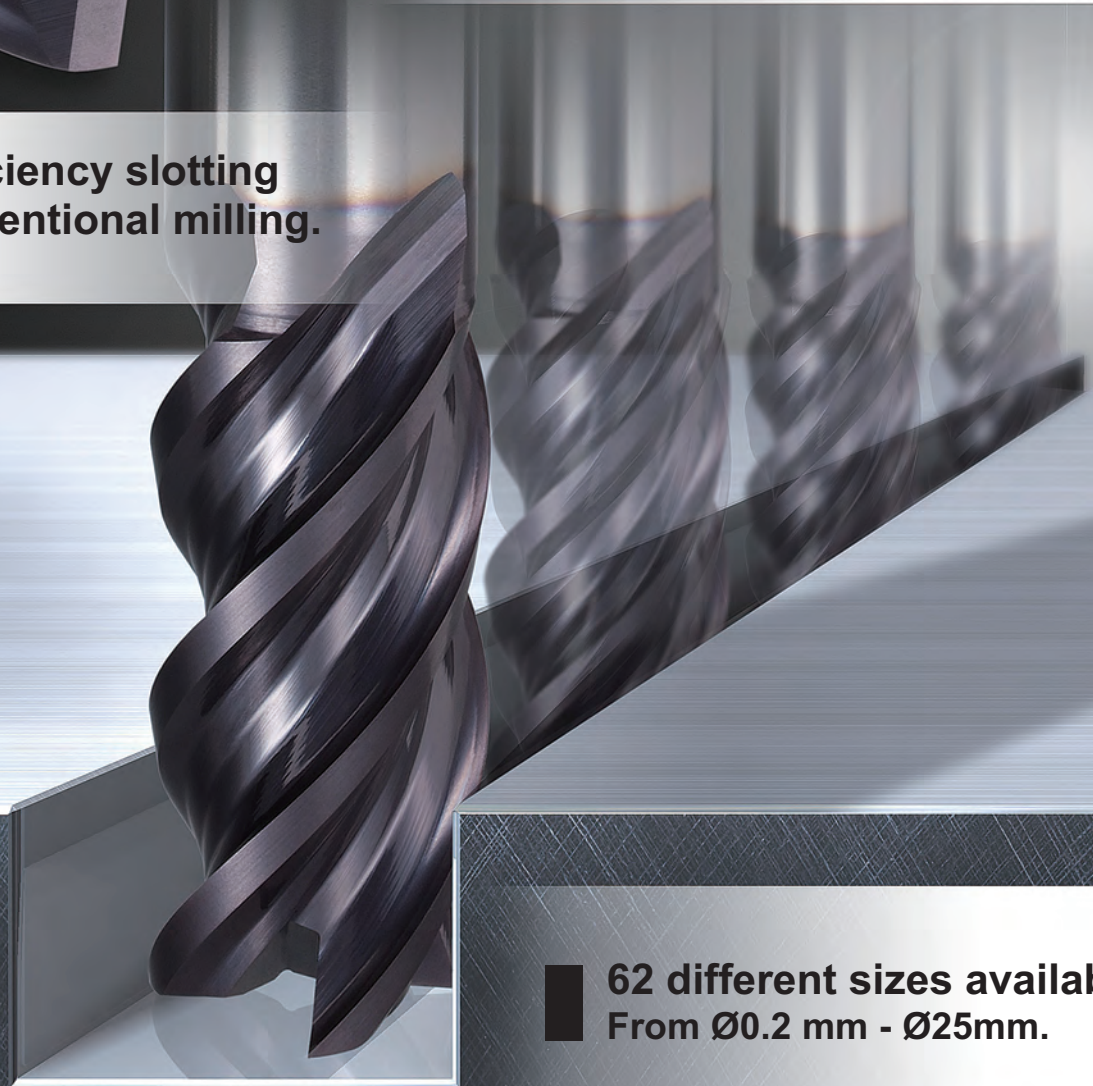


Conventional geometry



MSMHD

■ High efficiency slotting
and conventional milling.



■ 62 different sizes available.
From $\varnothing 0.2$ mm - $\varnothing 25$ mm.

MSTAR END MILL

MSMHD

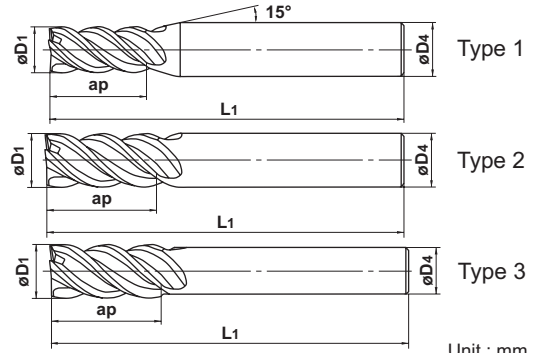
High power, Medium cut length, 4 flute



D1 ≤ 12 0 - -0.02
12 < D1 0 - -0.03



● 4 flute high helix end mill for heavy duty milling



Unit : mm

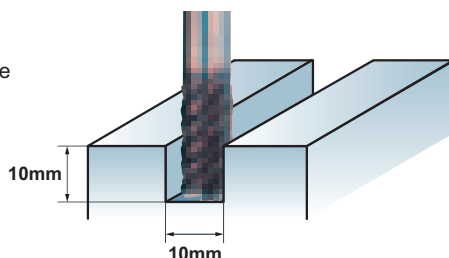
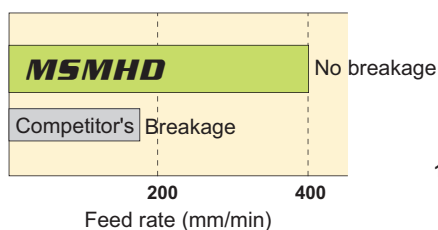
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
MSMHDD0200	2	4	45	4	4	●	1
D0210	2.1	5	45	4	4	●	1
D0220	2.2	5	45	4	4	●	1
D0230	2.3	5	45	4	4	●	1
D0240	2.4	5	45	4	4	●	1
D0250	2.5	5	45	4	4	●	1
D0260	2.6	6	45	4	4	●	1
D0270	2.7	6	45	4	4	●	1
D0280	2.8	6	45	4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

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

Machining Example

Slotting

Newly designed geometry for excellent chip disposability during slotting.



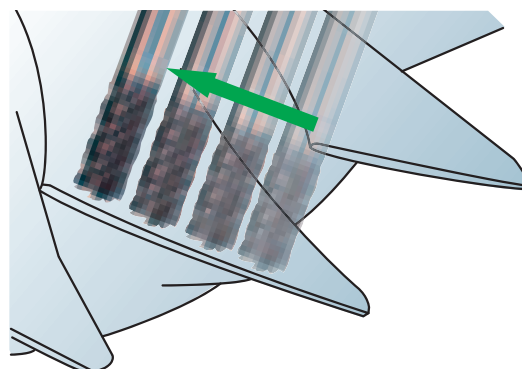
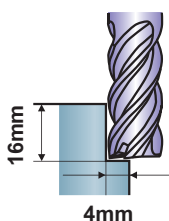
End mill	MSMHD $\phi 10$
Work material	Stainless steel (SUS304)
Revolution	$1,600\text{min}^{-1}$ (50m/min)
Feed rate	50—400mm/min
Cutting method	Slotting, Air blow

Side milling of aircraft component

Higher efficiency than conventional end mills.

Feed rate: Increased x 1.7

End mill	MSMHD $\phi 16$	Competitor's
Work material	Stainless steel (SUS304)	
Revolution	600min^{-1} (30m/min)	360min^{-1} (18m/min)
Feed rate	85mm/min (0.035mm/tooth)	50mm/min (0.035mm/tooth)
Cutting method	Climb cut, Emulsion	



MSTAR END MILL

Side milling

Work material	Carbon steel, Alloy steel (-30HRC) SS400, S50C, SCM Cast iron FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) SKD61, NAK		Austenitic stainless steel SUS304, SU316		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)
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	0.2D		0.1D		0.05D	
	1.5D		1.5D		1.5D	

D: Dia.

Slotting

Work material	Carbon steel, Alloy steel (-30HRC) SS400, S50C, SCM Cast iron FC250		Alloy steel, Tool steel Pre-hardened steel (30-45HRC) SKD61, NAK		Austenitic stainless steel SUS304, SU316		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)
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	1D		0.5D		0.2D	
	1D (MAX. 12mm)		0.5D		0.2D	

D: Dia.

- 1) When cutting austenitic steels, the use of water-soluble fluid is recommended.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) If the rigidity of the machine or the work material installation is very low, or chattering is generated, please reduce the revolution and feed rate proportionately, or set a smaller depth of cut.
- 4) For side milling, climb cutting is recommended.

MITSUBISHI MATERIALS KOBE TOOLS



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