

MIRACLE END MILL SERIES

VC-SFPR

Expand



MIRACLE
Roughing End Mill

For heavy milling from general steel to
difficult-to-cut and high-hardened materials.

MIRACLE END MILL SERIES

VC-SFPR

Roughing end mill, Short cut length, 3—4 flute

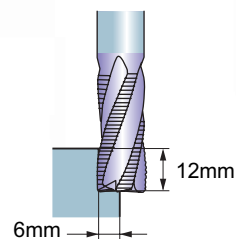
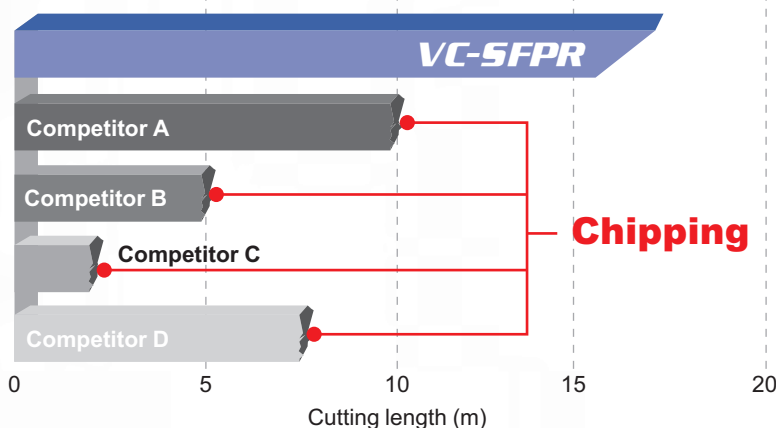
Feature

Miracle Roughing End Mills for heavy milling from general steel to difficult-to-cut and high-hardened materials.

High efficient milling is realized by original geometry profile with great chip disposability and new design with superior chipping resistance.

Abundant lineup from Dia.3mm to 20mm. Lineup of 15 size in total.

Long tool life



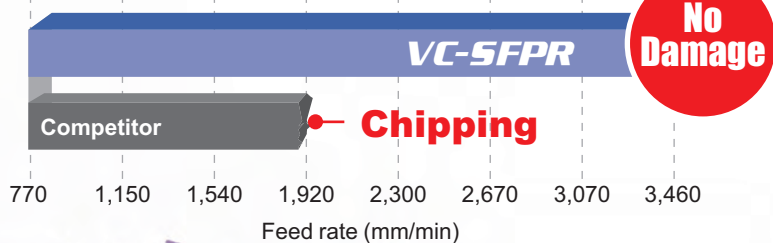
Cutting conditions

End mill	VC-SFPR $\phi 12$
Work material	SUS304
Revolution	1,600min ⁻¹
Feed rate	320mm/min
Cutting method	Climb cut, Air blow

Machining example

Example 1

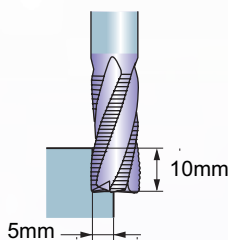
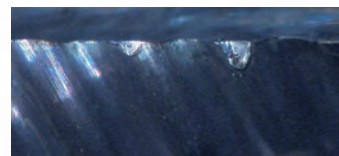
High feed rate



VC-SFPR



Competitor



Cutting conditions

End mill	VC-SFPR $\phi 10$
Work material	S55C(200HB)
Revolution	4,800min ⁻¹ (150m/min)
Cutting method	Climb cut, Air blow

MIRACLE END MILLS

VC-SFPR Expand

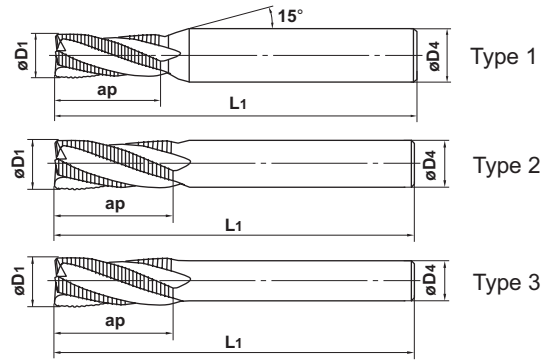
Roughing end mill, Short cut length, 3–4 flute



$D_1 < 8$

$8 \leq D_1$

● For heavy milling from general steel to difficult-to-cut and high-hardened materials.



Unit : mm

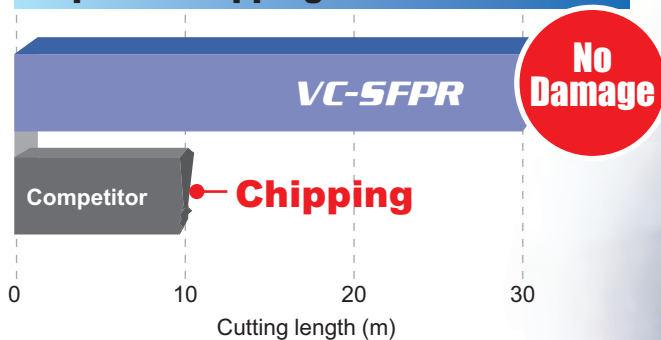
Order Number	Dia.	Length of Cut	Overall Length	Shank Dia.	No. of Flutes N	Stock	Type
	D1	ap	L1	D4			
VCSFPRD0300	3	6	50	6	3	●	1
D0400	4	8	50	6	3	●	1
D0500	5	10	50	6	3	●	1
D0600	6	12	50	6	3	●	2
D0700	7	17	60	8	3	●	1
D0800	8	17	60	8	4	●	2
D0900	9	22	70	10	4	●	1
* D1000S08	10	22	90	8	4	●	3
D1000	10	22	70	10	4	●	2
* D1200S10	12	27	100	10	4	●	3
D1200	12	27	75	12	4	●	2
D1400	14	27	75	12	4	●	2
D1600	16	33	90	16	4	●	2
D1800	18	33	90	16	4	●	2
D2000	20	38	100	20	4	●	2

* Expand

● : Inventory maintained.

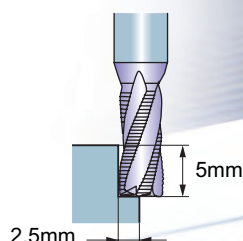
Example 2

Superior chipping resistance



Cutting conditions

End mill	VC-SFPR $\phi 5$
Work material	SUS304
Revolution	$3,800\text{min}^{-1}$ (60m/min)
Feed rate	260min/min (0.07mm/rev)
Cutting method	Climb cut, Air blow



MIRACLE END MILLS

VC-SFPR

Roughing end mill, Short cut length, 3—4 flute

Side milling

Work material	Structural steel, Carbon steel (-30HRC) SS400, AISI 1050, SCM Cast iron, FC250		Alloy steel, Tool steel Pre-hardened steel (30-35HRC) AISI H13, AISI D2		Austenitic stainless steels AISI 304, AISI 316		Hardened steel (45-55HRC) SKD61 etc.		Heat resistant alloy Inconel etc.		
	Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	16,000	960	13,000	640	6,400	260	5,300	100	4,200	70	70
4	12,000	960	9,500	640	4,800	260	4,000	100	3,200	70	70
5	9,500	960	7,600	640	3,800	260	3,200	100	2,500	70	70
6	8,000	960	6,400	680	3,200	290	2,700	110	2,100	75	75
8	6,000	1,050	4,800	760	2,400	340	2,000	140	1,600	95	95
10	4,800	1,050	3,800	760	1,900	340	1,600	150	1,300	105	105
12	4,000	960	3,200	700	1,600	320	1,300	150	1,100	110	110
16	3,000	840	2,400	620	1,200	300	1,000	150	800	110	110
20	2,400	760	1,900	560	1,000	300	800	140	600	100	100

≤0.5D
≤1.5D

≤0.3D
≤1D

D:Dia.

Slotting

Work material	Structural steel, Carbon steel (-30HRC) SS400, AISI 1050, SCM Cast iron, FC250		Alloy steel, Tool steel Pre-hardened steel (30-35HRC) AISI H13, AISI D2		Austenitic stainless steels AISI 304, AISI 316		Hardened steel (45-55HRC) SKD61 etc.		Heat resistant alloy Inconel etc.		
	Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	13,000	720	11,000	480	4,800	190	3,200	50	2,100	25	25
4	9,500	720	8,000	480	3,600	190	2,400	50	1,600	25	25
5	7,600	720	6,400	480	3,200	190	1,900	50	1,300	25	25
6	6,400	720	5,300	480	2,700	200	1,600	55	1,100	30	30
8	4,800	800	4,000	520	2,000	220	1,200	70	800	35	35
10	3,800	800	3,200	520	1,600	220	1,000	70	600	35	35
12	3,200	750	2,700	520	1,300	210	800	75	500	40	40
16	2,400	620	2,000	450	1,000	180	600	75	400	45	45
20	1,900	540	1,600	400	800	160	500	70	300	40	40

D
≤1D

D
≤0.5D

D:Dia.

- 1) In cutting austenitic stainless steels and heat resistant alloys, the use of non-water-soluble cutting fluid is especially effective.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) If the rigidity of the machine or the work material installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately. Or please reduce the depth of cut.
- 4) Climb cut is recommended for side milling.



JQA-2522
JQA-EM0941

MITSUBISHI MATERIALS KOBE TOOLS

MITSUBISHI MATERIALS CORPORATION MARKETING DEPT.

KFC bldg., 8F, 1-6-1, Yokoami, Sumida-ku, Tokyo 130-0015, Japan
TEL 81-3-5819-8772 FAX 81-3-5819-8774

MMC HARTMETALL GmbH

Comeniusstr.2, 40670, Meerbusch GERMANY
TEL 49-2159-9189-0 FAX 49-2159-50462

MITSUBISHI MATERIALS U.S.A. CORPORATION Headquarters

17401, Eastman Street, Irvine, California, 92614, USA
TEL 1-949-862-5100 FAX 1-949-862-5180

MMC METAL SINGAPORE PTE LTD.

10, Arumugam Road, #04-00 Lion Industrial Bldg., 409957, SINGAPORE
TEL 65-6743-9370 FAX 65-6749-1469