

IMPACT MIRACLE vibration control end mill series

VF-45VB

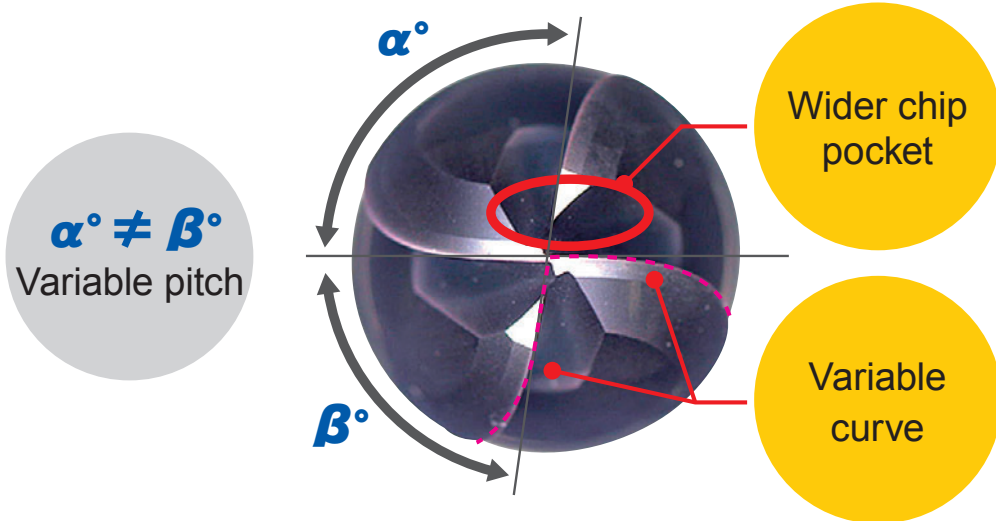
**“Variable curve” ball nose end mill
for difficult to cut materials.**



IMPACT MIRACLE vibration control end mill series

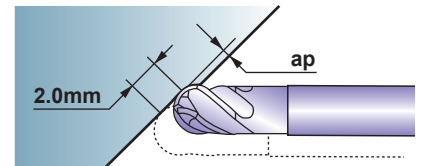
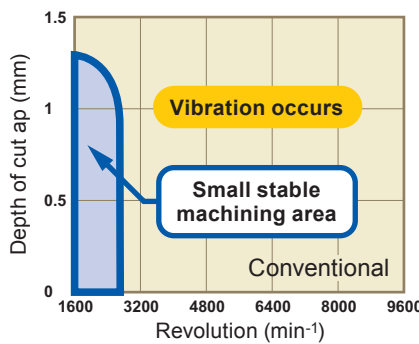
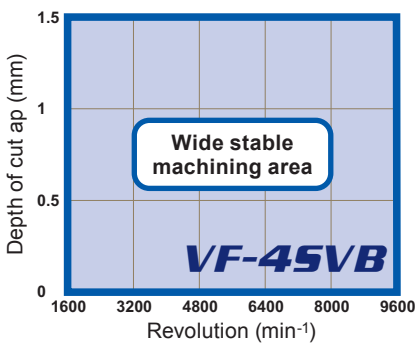
VF-45VB

Features



- Newly designed radius cutting edges reduce vibration.
- Suitable for difficult-to-cut materials and thin plate machining.

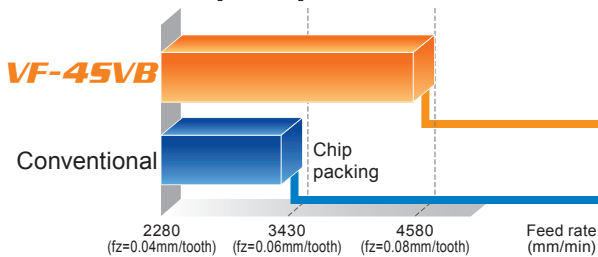
Vibration Resistance Comparison



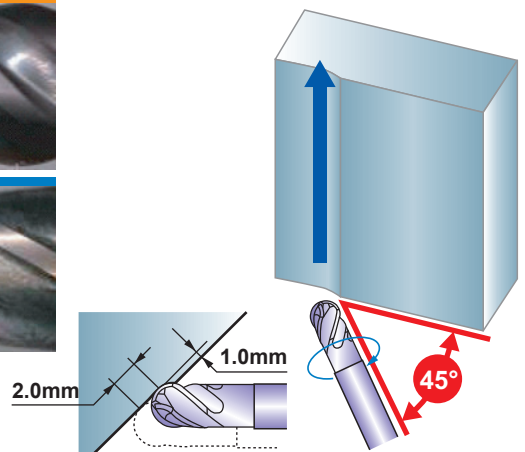
End mill	VF4SVBR0500 (R5)
Work material	SUS304
Revolution	1600-9600min ⁻¹
Feed rate	580-2300mm/min (0.06mm/tooth)
Cutting fluid	Emulsion

Cutting Performance

Excellent chip disposal!



End mill	VF4SVBR0500 (R5)
Work material	JIS Ti-6Al-4V
Revolution	14300min ⁻¹
Feed rate	2280-4580mm/min
Cutting fluid	Emulsion



IMPACT MIRACLE END MILLS

VF-4SVB

Ball nose, Short cut length, 4 flute, Variable curve



R ≤ 6 ±0.01
R > 6 ±0.02

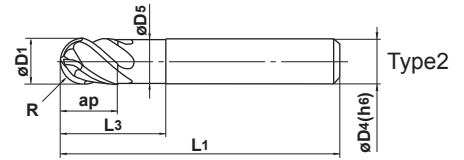
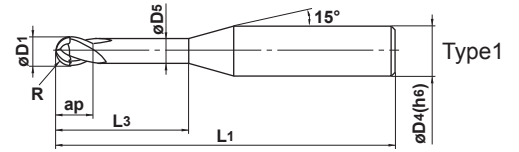


D1 ≤ 12 0 - -0.02
D1 > 12 0 - -0.03



D4 = 6 0 - -0.008
8 ≤ D4 ≤ 10 0 - -0.009
12 ≤ D4 ≤ 16 0 - -0.011
D4 = 20 0 - -0.013

Carbon Steel, Alloy Steel, Cast Iron (<30HRC)	Tool Steel, Pre-Hardened Steel, Hardened Steel (≤45HRC)	Hardened Steel (≤55HRC)	Hardened Steel (>55HRC)	Austenitic Stainless Steel	Titanium Alloy, Heat Resistant Alloy	Copper Alloy	Aluminium Alloy
○	○			◎	◎		



Helix angle

- Impact Miracle ball nose end mill with variable curve ensures stable machining of difficult-to-cut materials.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type
NEW VF4SVBR0100	1	2	3	5	1.9	50	6	4	●	1
NEW R0150	1.5	3	4.5	7.5	2.9	50	6	4	●	1
NEW R0200	2	4	6	10	3.9	50	6	4	●	1
NEW R0250	2.5	5	7.5	12.5	4.9	50	6	4	●	1
R0300	3	6	9	15	5.85	50	6	4	●	2
R0400	4	8	12	20	7.85	60	8	4	●	2
R0500	5	10	15	25	9.7	70	10	4	●	2
R0600	6	12	18	30	11.7	75	12	4	●	2
R0800	8	16	24	40	15.5	90	16	4	●	2
R1000	10	20	30	50	19.5	100	20	4	●	2

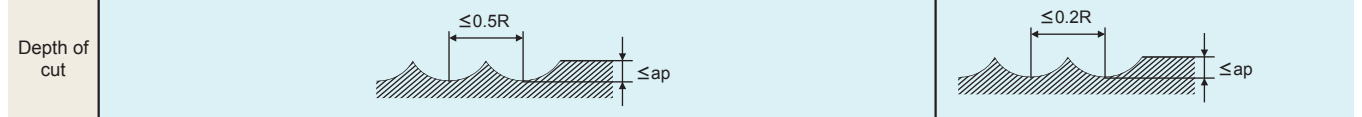
● : Inventory maintained.

IMPACT MIRACLE END MILLS

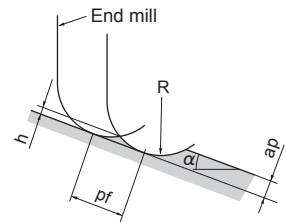
VF-45VB

Ball nose, Short cut length, 4 flute, Variable curve

Work material	Carbon steel, Alloy steel (-45HRC) JIS S55C, SCM						Austenitic stainless steel JIS SUS304, SUS316 Titanium alloy JIS Ti-6Al-4V						Heat resistant alloys Inconel etc.					
	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		Depth of cut ap (mm)	Pick feed pf (mm)	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		Depth of cut ap (mm)	Pick feed pf (mm)	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		Depth of cut ap (mm)	Pick feed pf (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)	Revolution (min ⁻¹)	Feed rate (mm/min)		
R 1	40000	8000	32000	3800	0.17	≤0.5	36000	6500	24000	2900	0.17	≤0.5	9600	960	6400	510	0.08	≤0.2
R 1.5	32000	7700	21000	3200	0.25	≤0.75	24000	4800	16000	1900	0.25	≤0.75	6400	640	4200	340	0.13	≤0.3
R 2	24000	5800	16000	2800	0.33	≤1	18000	4000	12000	1700	0.33	≤1	4800	580	3200	260	0.17	≤0.4
R 2.5	19000	5300	12700	2600	0.42	≤1.25	14400	3500	9600	1500	0.42	≤1.25	3800	530	2500	250	0.21	≤0.5
R 3	16000	4800	10600	2100	0.5	≤1.5	12000	3200	8000	1400	0.5	≤1.5	3200	500	2100	210	0.25	≤0.6
R 4	12000	4300	8000	1900	0.8	≤2	9000	3200	6000	1400	0.8	≤2	2400	430	1600	190	0.4	≤0.8
R 5	9600	4100	6400	1800	1	≤2.5	7200	3000	4800	1300	1	≤2.5	2000	420	1300	180	0.5	≤1
R 6	8000	4000	5300	1800	1.2	≤3	6000	3000	4000	1300	1.2	≤3	1700	350	1100	150	0.6	≤1.2
R 8	6000	3200	4000	1400	1.6	≤4	4500	2500	3000	1100	1.6	≤4	1200	300	800	130	0.8	≤1.6
R10	4800	3000	3200	1300	2	≤5	3600	2300	2400	1000	2	≤5	1000	250	640	100	1	≤2



- 1) When cutting austenitic stainless steels, the use of water-soluble cutting fluid is effective. R:Radius
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) The irregular helix flute end mill has a larger effect on controlling vibration when compared to standard end mills. However, if the rigidity of the machine or the workpiece installation is poor, vibration or abnormal sound can occur. In this case, please reduce the revolution and feed rate proportionately, or set a lower depth of cut.
- 4) α is the inclination angle of the machined surface.



For Your Safety

- Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When attaching inserts or spare parts, please use only the correct wrench or spanner. ●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

MITSUBISHI MATERIALS CORPORATION

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