

MITSUBISHI

MITSUBISHI CARBIDE

TOOL NEWS

B059A

MIRACLE COATED 3 FLUTE BALL NOSE END MILLS

VC-3MB VC-3LB

Ultra precision, ultra efficient milling



MIRACLE COATED BALL NOSE END MILL SERIES

VC-3MB VC-3LB

Feature 1

Ultra efficient milling is achieved by unique 3 flute geometry.

A sharp center cutting edge with excellent chip evacuation properties has been achieved by the use of a unique 3-flute shape.



Feature 2

Ultra precision topography.

For cost effective roughing and finishing, precision milling is achieved by a close manufacturing R tolerance.

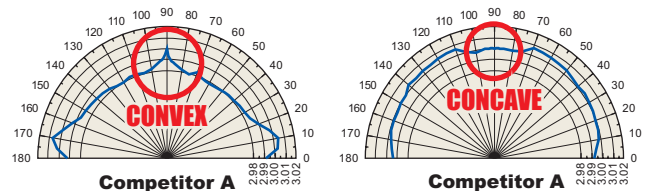
Feature 3

Long shank type.

Long shank type is available in addition to the medium cutting length type.

High accuracy

Superior radial accuracy for all 3 cutting edges is achieved by an original top-center design (PAT.pending).

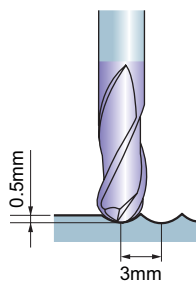


Machining example

Example 1

Cost effective milling with long tool life.

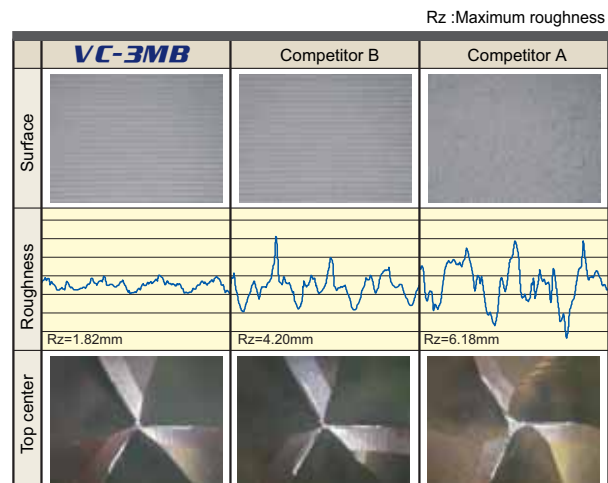
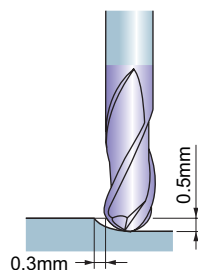
End mill	VC-3MB R3
Work material	SKD61(50HRC)
Revolution	10,000min ⁻¹
Cutting speed	104m/min
Feed rate	4,000mm/min (0.13mm/tooth)
Cutting method	Climb cut, Air blow



Example 2

Superior accuracy and surface finish.

End mill	VC-3MB R3
Work material	PX5
Revolution	20,000min ⁻¹
Cutting speed	135m/min
Feed rate	6,000mm/min (0.1mm/tooth)
Cutting method	Climb cut, Air blow



After cutting 700m

VC-3MB

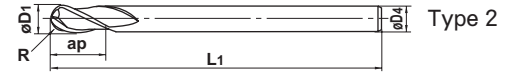
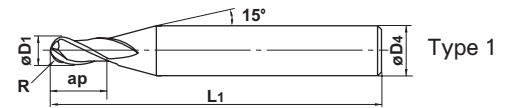
Ball Nose, Medium cut length, 3 flute



$R \leq 6 \pm 0.01$
 $8 \leq R \pm 0.02$



$D_1 < 4 \quad 0 - -0.02$
 $4 \leq D_1 < 6 \quad 0 - -0.038$
 $6 \leq D_1 \quad 0 - -0.038$



● Efficient milling achieved with original 3 flute geometry.

Unit : mm

Order Number	Radius of ball nose R	Dia. D ₁	Length of Cut ap	Overall Length L ₁	Shank Dia. D ₄	No. of Flute N	Stock	Type
VC3MBR0100	1	2	6	60	6	3	●	1
VC3MBR0150	1.5	3	8	70	6	3	●	1
VC3MBR0200	2	4	8	70	6	3	●	1
VC3MBR0250	2.5	5	12	80	6	3	●	1
VC3MBR0300	3	6	12	80	6	3	●	2
VC3MBR0400	4	8	14	90	8	3	●	2
VC3MBR0500	5	10	18	100	10	3	●	2
VC3MBR0600	6	12	22	110	12	3	●	2
VC3MBR0800	8	16	30	140	16	3	●	2
VC3MBR1000	10	20	38	160	20	3	●	2

VC-3LB

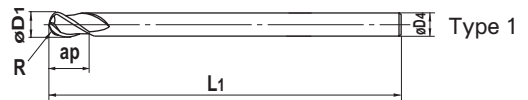
Ball Nose, Medium cut length, 3 flute, Long Shank



$R \leq 6 \pm 0.01$
 $8 \leq R \pm 0.02$



$D_1 < 6 \quad 0 - -0.028$
 $6 \leq D_1 \quad 0 - -0.038$



● Long shank version of VC-3MB.

Unit : mm

Order Number	Radius of ball nose R	Dia. D ₁	Length of Cut ap	Overall Length L ₁	Shank Dia. D ₄	No. of Flute N	Stock	Type
VC3LBR0200	2	4	8	120	4	3	●	1
VC3LBR0300	3	6	12	140	6	3	●	1
VC3LBR0400	4	8	14	150	8	3	●	1
VC3LBR0500	5	10	18	180	10	3	●	1
VC3LBR0600	6	12	22	200	12	3	●	1
VC3LBR0800	8	16	30	230	16	3	●	1
VC3LBR1000	10	20	38	250	20	3	●	1

● : Inventory maintained.

VC-3MB

Ball Nose, Medium cut length, 3 flute

Roughing

Work material	Alloy steel, Tool steel, Pre-hardened steel (-45HRC) SCM, AISI H13, AISI D2 etc.				Hardened steel (45-55HRC) AISI H13 etc.			
	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		$\alpha \leq 15^\circ$		$\alpha > 15^\circ$	
	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)
R1	32,000	3,000	25,000	1,170	18,000	1,440	16,000	640
R2	18,500	3,700	14,500	1,460	11,000	1,760	9,200	740
R3	13,000	4,000	10,000	1,500	7,700	1,920	6,400	800
R4	10,000	5,000	8,000	2,000	6,000	2,300	4,800	920
R5	8,000	5,000	6,500	2,000	4,800	2,200	3,800	870
R6	6,600	4,600	5,300	1,800	4,000	2,100	3,200	840
R8	5,000	4,000	4,000	1,600	3,000	1,700	2,400	680
R10	4,000	3,600	3,200	1,440	2,400	1,400	1,900	550

Depth of cut

Finishing

Work material	Alloy steel, Tool steel, Pre-hardened steel (-45HRC) SCM, AISI H13, AISI D2 etc.				Hardened steel (45-55HRC) AISI H13 etc.			
	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		$\alpha \leq 15^\circ$		$\alpha > 15^\circ$	
	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)
R1	32,000	3,200	32,000	1,500	25,000	2,000	20,000	800
R2	25,500	5,000	20,000	2,000	17,000	2,700	13,000	1,000
R3	20,000	6,100	15,000	2,200	13,000	3,200	10,000	1,200
R4	15,000	7,500	11,000	2,700	10,000	3,800	7,500	1,400
R5	12,000	7,500	9,000	2,700	8,000	3,700	6,000	1,400
R6	10,000	7,000	7,500	2,500	6,600	3,500	5,000	1,300
R8	7,500	6,000	5,600	2,200	5,000	2,800	3,700	1,000
R10	6,000	5,400	4,500	2,000	4,000	2,300	3,000	900

Depth of cut

- 1) α is the inclination of the machined surface.
- 2) Please use VC-2SB or VC-4MB for work materials of 55 HRC or above.
- 3) If rigidity of the machine or work material installation is low or chattering and noise are generated, please reduce the revolution and feed rate proportionately.
When high machining accuracy is needed, we recommend lowering the feed rate.
- 4) Cutting conditions may differ considerably due to the overhang, depth of cut, and machine tool condition.
Please use the table above as a reference starting point.
- 5) VC-2MDB is recommended when an end mill with a long overhang, for low rigidity, deep slotting on high hardness materials is needed.
- 6) If the depth of cut is shallow, the revolution and feed rate can be increased.

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(Tools specifications subject to change without notice.)