

# Ideal for high efficiency machining of moulds!

Unique 4 flute ball nose geometry offers precision and high efficiency machining!



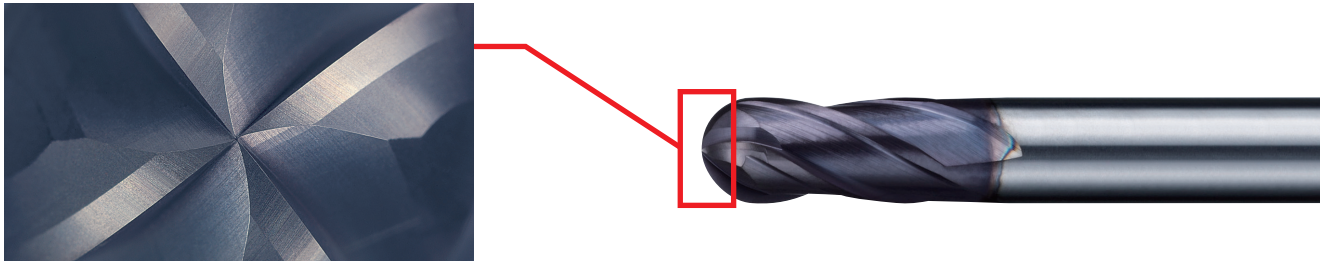
# IMPACT MIRACLE end mill series

4 flute Impact Miracle ball nose end mill (M)

# VF4MB

## Features

- The full 4 flute end mill geometry ensures high feed, high precision profiling.



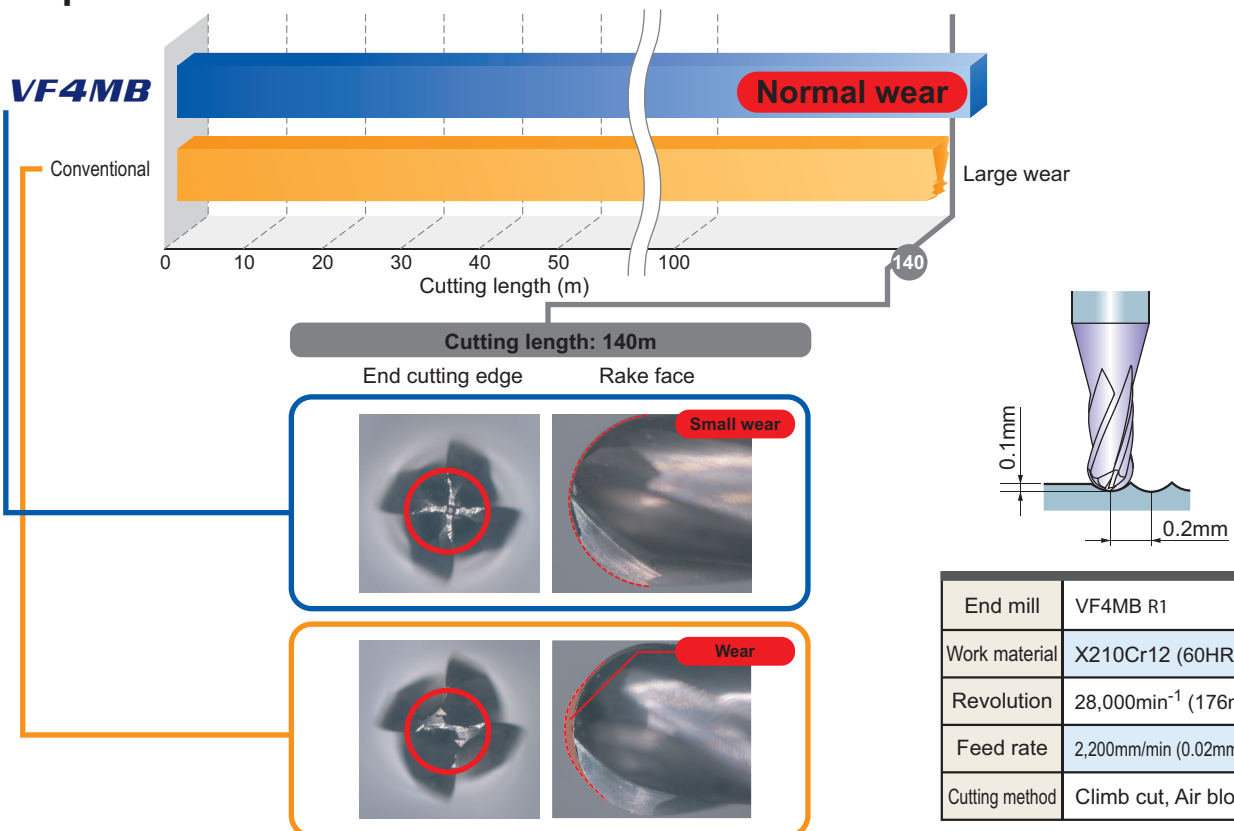
- Impact Miracle coating with superior heat resistance is used, enabling the machining of materials from hardened steels over 60HRC through to pre-hardened and general steels.

|                         | IMPACT MIRACLE | (Al,Ti,Si)N | (Al,Ti)N |
|-------------------------|----------------|-------------|----------|
| Hardness                | <b>3700HV</b>  | 3200HV      | 2800HV   |
| Adhesion                | <b>100N</b>    | 80N         | 80N      |
| Oxidation temperature   | <b>1300°C</b>  | 1100°C      | 840°C    |
| Coefficient of friction | <b>0.48</b>    | 0.53        | 0.58     |

## Cutting Performance

### Wear resistance comparison

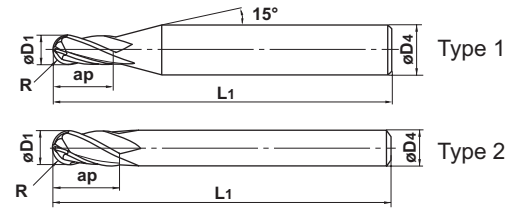
VF4MB delivers higher wear resistance and longer tool life in comparison to conventional end mills.



# VF4MB

**NEW**

Ball nose, Medium cut length, 4 flute



● 4 flute ball nose end mill for high-speed machining of hardened steel.

Unit : mm

| Order Number      | Radius of ball nose<br>R | Dia.<br>D1 | Length of Cut<br>ap | Overall Length<br>L1 | Shank Dia.<br>D4 | No. of Flutes<br>N | Stock | Type |
|-------------------|--------------------------|------------|---------------------|----------------------|------------------|--------------------|-------|------|
| <b>VF4MBR0050</b> | 0.5                      | 1          | 2.5                 | 50                   | 6                | 4                  | ★     | 1    |
| <b>R0100</b>      | 1                        | 2          | 6                   | 60                   | 6                | 4                  | ★     | 1    |
| <b>R0150</b>      | 1.5                      | 3          | 8                   | 70                   | 6                | 4                  | ★     | 1    |
| <b>R0200</b>      | 2                        | 4          | 8                   | 70                   | 6                | 4                  | ★     | 1    |
| <b>R0250</b>      | 2.5                      | 5          | 12                  | 80                   | 6                | 4                  | ★     | 1    |
| <b>R0300</b>      | 3                        | 6          | 12                  | 80                   | 6                | 4                  | ★     | 2    |
| <b>R0400</b>      | 4                        | 8          | 14                  | 90                   | 8                | 4                  | ★     | 2    |
| <b>R0500</b>      | 5                        | 10         | 18                  | 100                  | 10               | 4                  | ★     | 2    |
| <b>R0600</b>      | 6                        | 12         | 22                  | 110                  | 12               | 4                  | ★     | 2    |

★ : Inventory maintained in Japan.

# IMPACT MIRACLE END MILL

## VF4MB

Ball nose, Medium cut length, 4 flute

| Work material | Hardened steel (-55HRC)<br>W.Nr. 1.2344(H13) |                    |                                 |                    |                   | Hardened steel (55-62HRC)<br>X210Cr12 |                    |                                 |                    |                   | Hardened steel (62-70HRC)<br>S6-5-2 |                    |                                 |                    |                   |
|---------------|--|--------------------|---------------------------------|--------------------|-------------------|---------------------------------------|--------------------|---------------------------------|--------------------|-------------------|-------------------------------------|--------------------|---------------------------------|--------------------|-------------------|
|               | % < 15°                                      |                    | % > 15°                         |                    | Depth of cut (mm) | % < 15°                               |                    | % > 15°                         |                    | Depth of cut (mm) | % < 15°                             |                    | % > 15°                         |                    | Depth of cut (mm) |
|               | Revolution (min <sup>-1</sup> )              | Feed rate (mm/min) | Revolution (min <sup>-1</sup> ) | Feed rate (mm/min) |                   | Revolution (min <sup>-1</sup> )       | Feed rate (mm/min) | Revolution (min <sup>-1</sup> ) | Feed rate (mm/min) |                   | Revolution (min <sup>-1</sup> )     | Feed rate (mm/min) | Revolution (min <sup>-1</sup> ) | Feed rate (mm/min) |                   |
| <b>R0.5</b>   | 40,000                                       | 10,400             | 40,000                          | 4,200              | 0.050             | 40,000                                | 7,300              | 40,000                          | 3,100              | 0.040             | 40,000                              | 4,700              | 32,000                          | 1,700              | 0.030             |
| <b>R1</b>     | 40,000                                       | 12,500             | 39,000                          | 6,100              | 0.090             | 40,000                                | 10,400             | 24,000                          | 3,100              | 0.080             | 24,000                              | 5,000              | 16,000                          | 1,200              | 0.060             |
| <b>R1.5</b>   | 40,000                                       | 15,600             | 27,000                          | 5,600              | 0.100             | 32,000                                | 10,000             | 16,000                          | 2,900              | 0.100             | 16,000                              | 4,200              | 11,000                          | 1,100              | 0.070             |
| <b>R2</b>     | 32,000                                       | 14,100             | 20,000                          | 4,700              | 0.120             | 24,000                                | 8,100              | 12,000                          | 2,500              | 0.100             | 12,000                              | 3,100              | 8,000                           | 1,000              | 0.080             |
| <b>R2.5</b>   | 25,000                                       | 11,700             | 16,000                          | 3,700              | 0.160             | 19,000                                | 6,900              | 9,600                           | 2,200              | 0.120             | 9,600                               | 2,700              | 6,000                           | 780                | 0.080             |
| <b>R3</b>     | 21,000                                       | 10,900             | 13,000                          | 3,400              | 0.200             | 16,000                                | 6,200              | 8,000                           | 2,100              | 0.160             | 8,000                               | 2,300              | 5,000                           | 780                | 0.090             |
| <b>R4</b>     | 16,000                                       | 8,300              | 10,000                          | 2,600              | 0.240             | 12,000                                | 4,700              | 6,000                           | 1,600              | 0.160             | 6,000                               | 1,900              | 4,000                           | 620                | 0.090             |
| <b>R5</b>     | 13,000                                       | 6,800              | 8,000                           | 2,300              | 0.400             | 10,000                                | 4,200              | 4,800                           | 1,200              | 0.160             | 4,800                               | 1,500              | 3,000                           | 550                | 0.100             |
| <b>R6</b>     | 9,000  | 4,700              | 6,000                           | 1,700              | 0.400             | 7,000                                 | 2,900              | 3,600                           | 940                | 0.240             | 3,600                               | 1,100              | 2,200                           | 400                | 0.100             |

Depth of cut

Please select a pick feed based on the required surface finishes in reference to "Pitch Selection of Pick Feed" in the general catalogue.

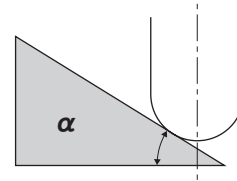
<math>< 0.2R</math>

<math>< 0.2R</math>

Please refer to the list above for depth of cut.

R: Radius

- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.  
When high machining accuracy is needed, we recommend lowering the feed rate.
- 3) % is the inclination of machining surface.



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