

## VQ - VIBRATION CONTROL END MILLS FOR MACHINING DIFFICULT TO CUT MATERIALS

VQ, the top of the range series of end mills from Mitsubishi Materials has recently been expanded to include 3 new types. The latest additions include a roughing type, a semi long cut length and a small diameter 4 flute long neck type, bringing the total number in the series up to nine. The end mills are designed primarily for high performance machining of difficult to cut materials, Inconel and stainless steels but are also suitable for side and full slot machining of carbon and alloy steels, hardened steels and copper alloys.



### Coating

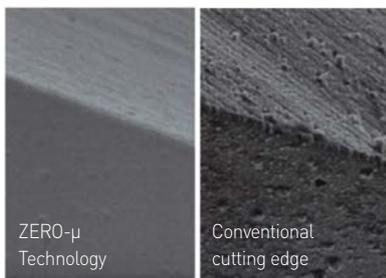
VQ solid carbide end mills have been treated with a newly developed (Al, Cr)N group MIRACLE SIGMA based coating which delivers substantially improved wear resistance. The surface of the coating has been given a smoothening treatment resulting in better machined surfaces, reduced cutting resistance and an increased chip discharge capacity. The extreme heat and oxidation resistance and lower coefficient of friction of the new coating means this next generation of end mills can maximise performance and help prevent tool wear even under the harshest of cutting conditions when machining difficult to cut materials, stainless and general steels.

### Anti Vibration Geometry

The use of irregular pitch flutes with varied helix angles significantly reduces the occurrence of vibration that leads to an increase in reliability and productivity. In addition to the irregular helix design, flutes with a wide chip pocket for improved chip disposal is used across the range. This feature is especially useful when full width slotting.

### ZERO-μ Surface

With the unique ZERO-μ Surface, the cutting edge retains its sharpness. While previous technologies often resulted in diminished sharpness, the ZERO-μ Surface achieves both smoothness and sharpness, as well as longer tool life.



## ZERO-μ

### SHARPNESS ON THE EDGE

Extremely smooth and dense surface.

Sharp cutting edges with low friction coefficient.

### Improved Gash Shape

In addition to employing a conventional 2-stage gash, the bottom of the gash has been rounded to avoid stress fractures. This is an essential improvement considering the loads exerted during full width slotting. The gash geometry has also been optimised to improve chip flow, also a necessary feature for successful full width slotting.

### 3 new types

Ø2 - Ø20 End mill, semi long cut length

Ø0.2 - Ø1 Small diameter end mill, 4 flute long neck type

Ø3 - Ø20 Roughing end mill, 4 flute