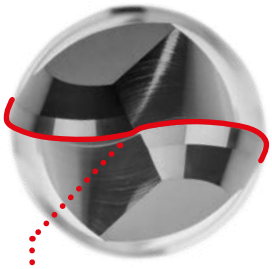
VFR END MILLS SERIES EXPANSION –
SUPER SMALL DIAMETERS 0.2 MM – 0.5 MM

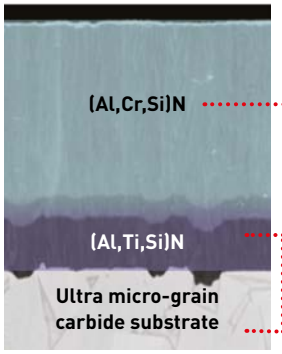
When it comes to the machining of hardened steel, Mitsubishi Materials already has a reputation that places the cutting tool manufacturer as one of the leaders in this market sector. Further cementing this market position, the company has expanded its VFR2XLB series of ball nosed long neck end mills. These new sizes are in the micro range of diameters from Ø0.2 mm to Ø0.5 mm and the complete range extends up Ø6.0 mm.

The newly developed (AlCrSi)N multi-layer PVD coating offers higher oxidation resistance and better lubricity, as well as improved wear resistance and adhesion strength. The new end mills are ideal for milling extremely hard materials up to 70 HRC. This next generation of end mills are manufactured from an ultra-micro grain carbide substrate that has an (AlTiSi)N sub-layer coating that enhances wear resistance and improves adhesion strength for significantly improved tool life. The result of all these features is tool life performance that extends machine utilisation whilst providing CNC programmers with the confidence to run unmanned machining on the hardest materials, for periods that far exceed that of competitors products.



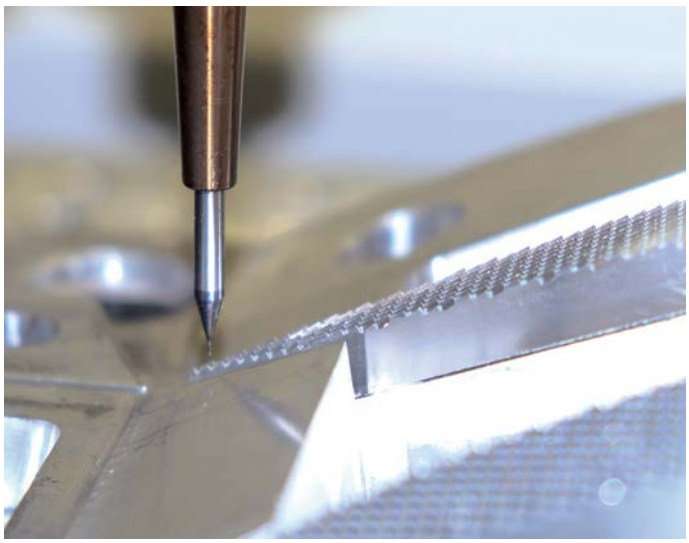
Optimised ball nose geometry

Strong back taper
Reduces chatter and vibration when machining vertical walls



- Improved oxidation resistance
- Higher lubricity

- Increased wear resistance
- Improved adhesion strength



The VFR2XLB type is part of the VFR end mill family that provides end users with a wide choice of sizes and geometries to cover a large range of hard material machining applications.

Precise machining of vertical walls is possible with the long neck type due to a back taper. This reduces chatter and vibrations that are commonly associated with long overhang machining and when machining vertical walls. In addition, the ball nose is optimised with an ideal centre flute geometry for fine finish machining and features a strong, seamless ball nose cutting edge geometry. Additional geometric features such as the optimsation of the rake angle provide a sharp edge together with good fracture resistance that enables excellent surface finishes.

Other VFR series end mills
The VFR2SBF finishing tool incorporates Mitsubishi's Zero-μ surface technology and a unique radius geometry that demonstrates impressive centre cutting credentials whilst the polished 30 degree flute helix rapidly evacuates swarf. The two flute finishing ball nose has a short cut length for maximum rigidity that optimises performance when cutting carbon steel, alloy steel, pre-hardened steel and hardened steels. The VFR2SBF is offered in diameters of 1 mm through to 6 mm diameters.

The more flexible VFR2SB type for high precision pre-finishing and finish machining of hard materials is available with four shank variants to suit the exact needs of the end user. This impressive new all-rounder is available in diameters from 0.2 mm through to 20 mm with a cut length from 0.2 to 38 mm.