



Machining

## Kennametal 'Goes Small' with Micromachining Tools Expansion

James Langford | Apr 01, 2025

With an array of precision tools from micro-drills to Swiss-type turning inserts, Kennametal goes about as small as a toolmaker can go.

Which is an increasingly big deal in machine tooling, as demand rises for very tiny parts with tight tolerances in industries from medical devices to *aerospace* and electronics.

"These industries are continually pushing the limits of what can be achieved in micromachining," says Scott DeVinney, senior global product manager for medical and small parts machining at toolmaker Kennametal. "Designing very small and complex components often leads to increased manufacturing time, but designers do this because the complex design allows seamless fit and function within a medical operating room, easier assembly at the electronics factory, and longer component life in an aerospace application."

The global market for Swiss turning systems, introduced in the late 19<sup>th</sup> century to make tiny components for Swiss watches, is expected to grow 7.4 percent a year through 2030, reaching \$8.1 billion a year, according to *Strategic Market Research*.

As a result of the growing demand, Kennametal, a leader in industrial technology for more than 80 years, is "focused heavily on expanding our offerings for small parts machining," DeVinney explains.

In mid-2024, the Pittsburgh-based company introduced its Top Swiss™ Turning Inserts portfolio, engineered to deliver better chip evacuation and surface finishing in low-feed, high-depth-of-cut applications.

The lineup, which featured four new carbide grades, one new cermet grade and seven new geometries, also offers straight and curved cutting edges for stable cuts and smooth chip flow, polished finishing geometries for increased welding resistance and medium and finishing wiper geometries for increased feed rates and superior surface quality.

Kennametal also offers TopSwiss™ MBS, or Micro Boring Solid; the KenCut Micro high-performance MEMM series of end mills, being introduced today; and the KenDrill Micro, its first comprehensive

micro-drilling line for short- and deep-hole applications

## **Expanding the KenDrill Micro Line**

Launched about two years ago, KenDrill Micro initially offered drills from 1mm to 2.9mm in diameter, expanding on an already strong line of diameters from 3mm and higher, DeVinney says. A few months ago, Kennametal broadened the line, adding drills as small as 0.5mm.

"Just two years ago, our offering of coolant-through micro drills under 3mm had the usual, standard lengths of cut," DeVinney says. "Now, we've added lengths of cut ranging from 2xD to 50xD, as well as adding diameters all the way down to half a millimeter. Sometimes, I remind these guys that there is such a thing as zero."

The KenDrill Micro line provides powerful coolant supply to improve chip evacuation and curb tool breakage and comes in diameter increments of 0.1mm. "There are very long lengths, even on the very small parameters," DeVinney notes.

The toolmaker's new KenCut Micro high-performance MEMM end mills respond directly to the high demand for precision tools in medical implant production, delivering clean, precise, burr-free cuts in stainless steel and titanium bone screws.

The line's features include advanced three- and four-flute designs for higher metal removal rates, an optimized carbide grade for increased fracture resistance and reduced deflection and an extended neck geometry for better reach and stability in smaller spaces, Kennametal says. Standard diameters run from 0.2mm to 1mm, with custom sizes available on request.

## **TopSwiss™ Micro Boring Solid**

The TopSwiss™ MBS line, meanwhile, is a versatile solution for internal turning that includes nearly 200 toolholders across three levels of precision: standard, premium and high performance, which has repeatability to centerline of plus or minus 5 microns (0.0004 inch), the company says. Its micro boring inserts have four high-performance, material-specific coatings to enable aggressive cutting parameters and long tool life for machinists working with high-temperature alloys, stainless steels, steel and hardened materials.

Available in diameters starting from minimum bores of 0.3mm (0.012 inch), TopSwiss™ Micro Boring Solid tools are engineered for applications including boring, profiling, threading, grooving and chamfering.

A primary advantage of Swiss-style machining, which uses a guide bushing and sliding headstock to support workpieces as they're maneuvered against stationary cutting tools, is that setup rigidity allows highly precise cuts of parts with long length-to-diameter ratios.

Those cuts, however, tend to produce long, stringy chips, and the resulting buildup may be worsened by oil-based cutting fluids often used in the process.

## TopSwiss™ ISO Turning Inserts

"You need to have consistent chip formation and chip control from your first setup piece to the final finished part, regardless of how large the production order is," DeVinney explains. TopSwiss™ ISO turning inserts are designed to deliver that, supporting applications with low feed and high depths of cut while still delivering optimal surface finishes and precision tolerances.

Kennametal says its TopSwiss™ insert grades include:

- **KTP25S:**
  - Multilayer coated cermet grade designed specifically for Swiss-type turning
  - Ideal for machining steels and stainless steels with oil or water-soluble coolants
  - Superior fracture and thermal shock resistance
  - Best-in-class tool life at lower speeds and higher depths of cut
  - Wiper geometries for high feed rates while maintaining excellent surface quality
- **KCM25S:**
  - Multilayer coating: aluminum titanium nitride (AlTiN) and aluminum chromium nitride (AlCrN) applied to cemented carbide for stainless steels
  - Superior protection against heat generation and built-up edge
  - Geometries available for fine finishing, light finishing and larger depths of cut parallel positive
  - Straight cutting edge (with light finishing geometry) that offers high strength, fracture resistance
  - Highly polished tool (with fine finishing geometry) that improves chip evacuation and provides superior surface quality
- **KCS25S:**
  - Enriched multilayer coating applied to cemented carbide for high-temperature alloys
  - Superior chipping and crater resistance
  - Optimum coating and substrate for using controlled vibration (oscillation) turning cycles
  - Geometries available for fine finishing, light finishing, and larger depths of cut parallel positive (PPS)
  - Sharp cutting edge (with PPS) reduces material adhesion and provides superior surface finish
- **KCP20S:**
  - Multilayer titanium carbonitride (TiCN) coating applied to cemented carbide for carbon steels
  - Superior protection against heat generation and built-up edge
  - Geometries available for light finishing (LFS) and larger depths of cut parallel positive (PPS)
  - Straight cutting edge (LFS) that offers high strength and fracture resistance
  - Sharp cutting edge (PPS) that reduces material adhesion and provides superior surface finish
- **KN10S:**
  - Uncoated, fine-grain carbide for nonferrous materials
  - Precision ground periphery as well as top and bottom insert faces
  - Nose radii from 0.000 inch (sharp) up to 0.031 inch
  - Offers superior protection against edge wear and depth-of-cut notching
  - Sharp cutting edge (PPS) that reduces material adhesion and provides superior surface finish

How do advances in Swiss machine tools benefit your shop? Tell us in the comments below.