

Tooling for shaping hard and abrasive materials

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Related Glossary Terms

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[hardness](#) [milling](#) [milling machine \(mill\)](#) [tolerance](#)



In tool and mold construction, highly abrasive graphite materials and extremely hard materials such as alloy steels of up to 65 HRC or more are dominating the industry. The cost-effective creation of 3D contours and shaped elements impose demanding requirements on the mills and on process management.

Inovatools USA LLC, a Germany-based company with U.S. offices in Hartland, Michigan, offers a broad product range of high-performance solid carbide mills that meet the exacting requirements in mold, fixture and die manufacturing.

“Our special range of mill products is designed for the most varied of applications in this machining segment,” said Douglas Kline, managing director of Inovatools USA LLC. “The tools have been adapted for the relevant applications and materials in terms of substrate, geometry, chip control and coating.”

The tools include universal, roughing, finishing and special mill series’ such as mini-shank, copying and full-radius end mills in an array of designs and dimensions and featuring application-optimized high-performance coatings.

Make the First Choice



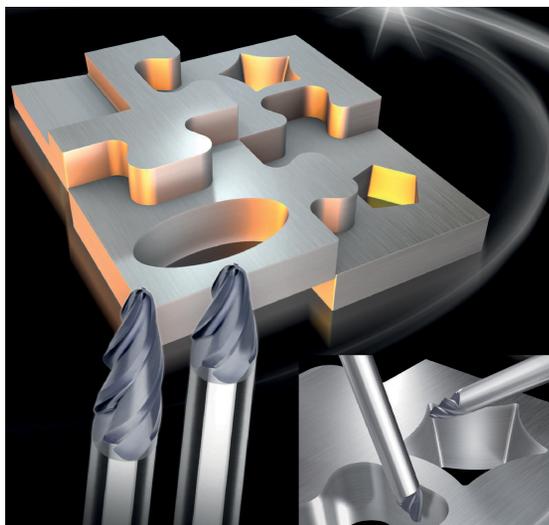
With its First Choice Inovatools designations, the tooling specialist offers users the opportunity to identify tailor-made tools for a company’s specific cutting requirements. One example is machining stainless steel. First Choice can identify top tools in the Inovatools online shop or in its main catalog, including for tool and mold construction.

Another search function is the InoCut cutting data program. The program allows users to search for tools by the application and specified cutting values. In the complete catalog, the tools are marked as ‘First Choice’ accordingly.

Available tooling that can be marked as First Choice includes the 525-ball nose end mill (0.2 mm to 6.0 mm) and 570 bull nose copying end mill (0.4 mm to 6.0 mm) mold construction tools for HSC operation in steel material hardness’ from 52 to 65 HRC. They feature state-of-the-art cutting-edge geometries, stable release mechanisms with a balancing effect, defined edge preparation and optimized microgeometry ensure top performance, maximum precision and process reliability. Smooth, high-performance coatings such as VaroCon (525) or NanoCon (570) support rapid chip clearance.

For steel processing, Inovatools offers the FightMax and FightMax INOX mill series (for stainless steels). With a high-performance coating that provides a high resistance to heat, FightMax mills can withstand high levels of tool wear over very long periods, even at high feed rates and cutting speeds.

The solid carbide curve segment cutting (CSC) mills in the CurveMax series are an example of Inovatools tool technology with adapted process technology for copy milling. In tool and mold construction, the solid carbide curve segment mills in tangential and conical form shorten the process times required for finishing complex, freeform surfaces in a wide variety of materials.



The CurveMax has a special geometry that permits bigger path distances and line jumps during pre-finishing and finishing. Although the working radius is larger than that of a traditional full-radius mill, the tool still has the same diameter, which leads to a reduction in process times. The larger engagement width means the cutting edge does not suffer from wear at any point. Combined with the extremely smooth, high-performance VaroCon coating, this helps to increase the tool's service life. The larger and flatter overlap reduces roughness and ensures surface finishes even better than those created by traditional full-radius mills. Inovatools offers the CSC-CurveMax mills in conical and tangential form as four-edged cutters for finishing in different sizes and radii.

The curve segment milling technology also opens up production options. For example, undercuts, freeform surfaces and variable setting angles can be reliably created. In addition, complex contours can be pre-finished and finished, even on narrow inside radii.

According to Kline, "HSC machining of graphite electrodes, for example, using diamond-coated tools is the method of choice in tool and mold construction. Only using high-quality,

robust tools can cutters comply with narrow tolerance zones while milling materials quickly and cost-effectively.”

Diamond edition

Inovatools has copying and ball nose end mills featuring the Dia-Dur coating in its range for machining graphite electrodes. The excellent adhesion properties of CVD high-performance Dia-Dur coating gives the Diamond edition tools similarly good physical and chemical properties to that of natural diamond. The tools feature extreme hardness and smoothness, high chemical resistance, excellent thermal conductivity and abrasion resistance.

With the Diamond edition, Inovatools highlights its comprehensive expertise in this area. For example, the end mills (tolerance H5) with radius tolerances of ± 0.003 mm are ground with extreme precision, and the concentricity of the full and corner radius end mills is 0.005 mm. Selected carbide grades are essential to ensure consistently high quality.

For more information on Inovatools USA LLC, phone (810) 991-4716 or visit <https://inovatools.com/V3/en/>

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