



Cutting tools: standard or custom?

Every successful micromachining operation depends on identifying the right tools for the job. “Right,” in this case, means more than tools just performing as expected. They also must be delivered on time and at the agreed-upon price.

Whether the tool is used for machining a prototype or an established product line that is being redesigned for greater efficiency, the first decision a user must make is whether to

solicit quotes for tools that might optimize machining performance.

Readily available from a variety of sources, standard tools come in an array of sizes, depths, geometries and radii—all in stock and ready to ship. Standard tools allow users to choose which factor is most important to them: price, delivery time or consistent quality.

This “standard tool triangle” usually results in a trade-off, though, with two factors taking precedence over the third. For example, price is often the least-important factor to those who machine prototypes because they need tools delivered on short notice. They tend to choose vendors that are able to provide consistently reliable tools that are always in stock.

A standard tool is the first choice when delivery time is the top priority.

In an effort to reduce manufacturing costs, many companies focus on optimizing their operations. They often look to their cutting tools and machines’ tool stations to do this. A custom tool or a modified standard that even slightly reduces tool wear or tool-change time can significantly improve operational efficiency. Factors that influence tool performance include geometry, length and coating, all of which can be easily modified to meet the requirements of a specific job.

When tools on a machine wear at the same rate, they can be replaced at the same time. This reduces machine downtime for tool replacement and requalification, which can make a significant difference when scaling up for long production runs.

To illustrate, consider a 100,000-piece job that requires the tool to be changed and requalified every 100 parts. A 2-second reduction in tool-change time would save more than 33 minutes of machining time.

Some machining tasks cannot be



All images: Midwest Industrial Tool Grinding

order a standard or custom tool.

Standard tools provide an immediate manufacturing solution. A standard is the first choice when delivery time is the top priority.

For example, prototyping typically requires fast turnarounds and short procurement schedules. And the adoption of lean manufacturing principles and a just-in-time delivery mentality often eliminates the time needed for shops to research and

ABOUTtooling

completed with a single standard tool. Many times these jobs can be accomplished with an intersecting form tool or custom combination tool.

One of the benefits of form tools is they allow the user to produce an inside corner having a zero radius, an operation made possible by dividing the required forms and applying them to alternating flutes. Without the use of an intersecting form tool, it would be physically impossible to make a perfectly sharp inside corner.

Combining multiple cutting functions in one tool allows a user to perform numerous tasks in a single machining pass. Reducing the number of tools needed to produce a part reduces machining variables and potential variances. As a result, a combination tool delivers greater precision and repeatability than multiple single-function tools.

Limited tool-station space also



A standard drill (left) was modified and entered service as a special (right).

causes users to choose a special combination tool. Because a single multipurpose tool occupies one tool-changer pocket, it frees up pockets for other tools. Additionally, a combination tool can save 20 to 30 percent on the cost of buying multiple single-purpose tools.

When deciding whether to use a standard or special tool, users should ask themselves these questions:

- How complex is the part?
- What's the scale of the project?
- Would changing from a standard tool to a special or modified standard increase tool life or improve the operation

High performance drill \varnothing 1.5 mm, flute length 150 xd, coolant holes \varnothing 0.05 mm, lip height variations $< 2\mu\text{m}$, setup time less than 15 minutes. Ground with the new GrindSmart[®]528XF.

The smart choice.



ROLLOMATIC[®]
www.rollomaticusa.com solutions@rollomaticusa.com



by freeing up tool-station space?

Supplier selection

Whether a job requires a standard or special tool, no one likes waiting for a toolmaker to ship an order. For standard tools, the vendor with an in-stock tool is the one most likely to get the order.

When it comes to custom tools, long lead times continue to be a problem. Vendors that react quickly to bids and can readily produce complex tool geometries will do well in the specials market.

Once users select tools and establish quality-assurance protocols, they really don't want to change and requalify an operation. Doing that consumes valuable time, making selection of the initial vendor very important.

Prospective customers of Midwest Industrial Tool Grinding tell us that the biggest hurdle they face is finding a partner that can provide consistent, repeatable quality. As for tool suppliers, setting high quality standards ensures they meet their own QA protocols.

Many factors drive the tool-purchasing decision, including the complexity of the job, delivery schedule

and scale of production. By leveraging all the available resources, a toolmaker and its customer can work together to identify the best tool for a particular job. In the process, they create an innovative environment that often drives discovery of a manufacturing advantage. ■

About the author: Jennie Nelson is director of marketing and media at Midwest Industrial Tool Grinding Inc., a manufacturer of standard and custom cutting tools located in Hutchinson, Minn. Telephone: (320) 455-0535. E-mail: jennie.nelson@mitgi.us. Web: www.mitgi.us.



Micro / Nano Solutions for Medical Part Manufacturing

NC / CNC LATHE & AUTOMATION SOLUTIONS

Electric Powered

iSpeed3

The "iSpeed3" series of electric spindles satisfies your every need for precision live spindles on Swiss-type automatic and super-compact machines.



Speeds up to

80,000 rpm

Accuracy less than

1 μ m (T.I.R.)

Power up to

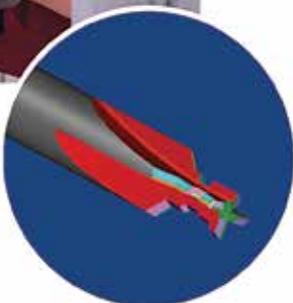
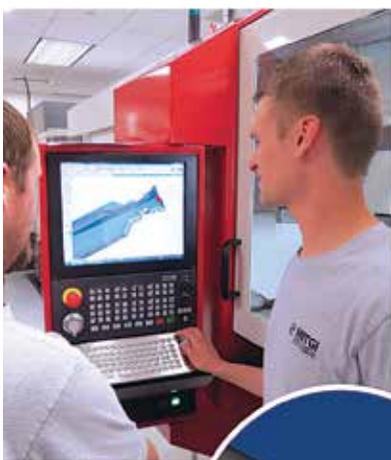
150 W

For More Information Please Visit Our Website

www.nskamericacorp.com

NSK America Corp

1800 Global Parkway Hoffman Estates, IL 60192, USA
TEL: (800)-585-4675 Email: info@nskamericacorp.com



One benefit of form tools is they allow the user to produce an inside corner with a zero radius.