

# Cutting Better THREADS

Thread milling comes into its own as a productive process

BY JIM BARNES

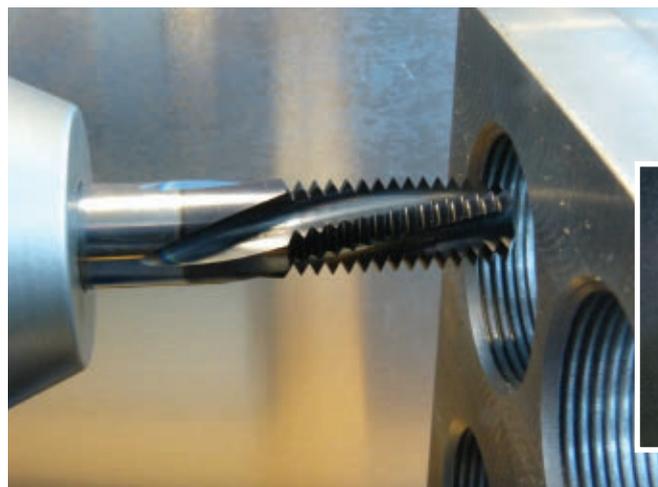
**T**HREAD MILLING HAS gained a lot of traction in industries across Canada as sophisticated CNC machines become common, users adapt to the programming and shops upgrade for competitiveness.

Demands for threading are changing. “A lot of shops are working with more complex parts today. They’re working in smaller lots and they have put a lot of cost into these components,” notes Mark Hatch, product director, taps and thread mills, Emuge Corp., West Bolyston, MA. “Companies that had been working with cast iron, aluminum and common steels are calling us and asking how to work with titanium, Inconels and so forth.”

## Get with the program

While most CNC machines are capable of the three axis interpolation required for thread milling, programming is intimidating for some.

“Programming is the greatest hurdle



Left: Emuge ACME insert.

Inset image below:  
Emuge's NPT insert.



to moving over to thread milling. “Programming a thread mill is a three axis move. With some of them, you have to understand how to arc into the cut correctly,” says John Kollenbroich, technical manager, Horn USA Inc., Franklin, TN.

Vendors supply programming support. “We have on-staff programmers who go in directly and work with our customers. We set up on-site training programs. We write programming instructions for them,” says Hatch.

Iscar’s website provides detailed support for programming. In fact, it can actually write the programs. “All the G codes are right there, all you have to do is plug-and-play on your computer,” says Tom Hagan, milling product manager, Iscar Tools Inc., Oakville, ON.

The industry is gradually getting over the basics.

“The questions now tend to be all driven by specific applications,” says Nathan Preiss, product manager,



→ → → → continued from page 37

Ingersoll Cutting Tools Corp. Rockford IL. Users want to know how to handle specific materials and jobs.

### Multi-flute versus single point

One debate seems to be between multi-flute and single-point thread mills.

“Both multi-flute and single point thread mills serve their purposes. Each has their own benefits,” notes Ingersoll’s Preiss.



Iscar's MillThread tooling.

Deflection and cycle time are part of the equation.

“A single-pitch tool will deflect too, but the deflection from the bottom to the top is going to be identical. The tool deflected and ran at a smaller diameter, but it is the same smaller diameter from top to bottom. The single-pitch tools allow you to run a range of pitches, be it 18 to 32 or whatever you want, but it gives you the ability to produce a straighter thread in a single pass,” says

Horn USA's Kollenbroich.

Iscar's Hagan says “for the long, deep threads I would definitely look at single-point. You are going to get more rigidity and less deflection. I’d use single-point for high overhangs, too, just because of the rigidity. ”

Versatility might be another consideration manufacturers should take into account.

“A multi-flute thread mill will only cover one particular pitch. A single-flute tool can cover a range of pitches. That can help reduce tool inventory,” says Kollenbroich.

“For anything in a short-to medium-thread, definitely look at a multi-flute. The cycle time is key and you’ll get more productivity out of the multi over the single,” says Iscar's Hagan.

“The only drawback to single tooth is cycle time,” says Preiss.

### When to tap

Tapping still has an important place in the shop. “A combination of thread milling and modern tapping techniques enables manufacturers to machine more complex parts in more difficult materials,” says Hatch. “Many shops incorporate both taps and thread mills because they are different processes.”

Costs are one confusing issue in choosing between taps and thread mills. Where a tap might cost as little as \$15, you could pay \$400 for a multi-pitch thread mill.

However, there is more to the cost equation. A high end tap that performs well and runs faster than a conventional one could cost \$100, notes Kollenbroich. The toolholder is another cost. “If you’re



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Ingersoll's Rapid Thread indexable helical inserts.



looking at a good tension/compression tap, that can easily be a \$700 holder. You can put a thread mill in a good colleting system," he adds.

The biggest cost is undoubtedly tap breakage. Snapping a tap off in an expensive piece of metal might have major cost repercussions in scrap, repair and downtime.

"If somehow you snap an thread mill, there is no scrap rate. There is no EDM. The next tool you put in will pick up exactly where the last tool left off," notes Preiss.

Long chips can be an issue with some taps.

"Thread milling is the ultimate chip breaker," says Hatch. "It's an interrupted cutting process which means you get a sharp, broken chip regardless of the material." Adding through-tool coolant to the process means chips can be flushed out of the work area quickly.

Thread mills also cut costs through their versatility.

"With tapping, you need a single tap for each diameter you have. With thread milling, whether it be solid or indexable, you have the versatility to generate any diameter, as long as the tool can fit with the correct amount of clearance," says Preiss.

When are taps appropriate? "It all depends on what kind of thread the customer is looking to generate," says Preiss. "If it's a basic thread where they don't care about tolerances or fit class, it's up to the customer. Thread milling is more of a precise thread. It's going to give you the exact minor diameter, the exact major diameter, and the pitch diameter for specific applications." SMT

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