



The Essential Guide to Deburring: Tools, Techniques and Tips

Kip Hanson | Aug 19, 2025

For as long as there have been machine tools, the responsibility for deburring the parts coming off them has largely fallen to the operator.

On a manual knee mill or engine lathe, for example, the machinist picks up a file, scraper or bit of sandpaper and gets to work smoothing the edges and chamfering holes until the part meets the customer's quality requirements.

That paradigm changed somewhat with the introduction of CNC lathes and machining centers. Because these automated machines can do much of the deburring and edge rounding, operators have more time to spend on tasks like checking parts or preparing for the next job, freeing them from at least some of the tedium of manual deburring—but not all of it.

No matter how capable the CNC machine or its cutting tools are, some burrs will remain. Surfaces may be rougher than desired, holes sharper than customer specifications allow and intersections ragged and ugly. Here again, a skilled machine operator will have no problem removing these burrs, especially when supplied with the hand tools and advanced abrasives we'll discuss in a moment. But what happens when there's no operator available?

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Nick Manor
3M

Weld Prep, Deburring Tools and More

As everyone knows, the industry is suffering from a skilled labor shortage. Fixing it will take years, which is why many shops are either seeking more effective ways to deburr parts while they're still in the machine or investing in robots and *cobots* to augment their existing labor force. Either way, shops must optimize their deburring methods if they want to remain competitive.

Michael Radaelli is a senior product manager for **Norton / Saint-Gobain Abrasives**. He agrees that some deburring operations are still performed manually but notes that robots are gaining popularity. Either way, he says, humans and robots alike have a common goal: to remove burrs, die lines and other surface defects, and blend the finish within dimensional tolerance and Ra (roughness average) requirements.

What happens if you're using an abrasive product to accomplish this goal? "If the pressure is too hard, then the potential of putting too large of a radius or flat spot exists. This can lead to expensive rework or, even worse, scrapped parts," Radaelli says. "One way to minimize this risk is by switching to a nonwoven disc or belt."

Radaelli points to some *insights* he shared recently with Rafael Guerrero, editor of *The Welder* magazine. There, he describes the **Norton Vortex Rapid Blend line**, which is said to offer a consistent, uniform finish, reduce the risk of part gouging and make operations easier to automate.

"A shop may not know what is available or may have a procedure in place where they write up a process sheet identifying what can or cannot be used," Radaelli says. "New grains and resins developed by research and development departments can help shops skip process steps and save time and money. They also can help shops identify which types of abrasives work best for specific applications."

Aligning the Abrasive Stars for Better Deburring

The takeaway? Reach out to your abrasives provider regularly for advice on the latest product developments. Doing so can save your shop significant time and money, while making your job easier and more productive.

One of these providers is 3M, where Application Engineer Nick Manor notes that, as previously mentioned, deburring has historically been a manual process, but due to the performance characteristics of the company's nonwovens and Scotch-Brite products, abrasives are becoming "a really good fit for automation."

"We're definitely seeing a trend," Manor says. "Shops are either looking for ways to utilize their CNC equipment to deburr machined parts or wondering if they can move their hand deburring to a robotic cell external to the machine."

Bits of spent abrasive floating around in the coolant, possibly getting into the bearings and precision way surfaces in a CNC machine tool? It's a scary thought, but Manor says the concern can easily be managed.

"One important consideration when introducing abrasive media into an in-machine deburring setup is managing the swarf," he explains. "As the abrasive material breaks down, the leftover particles can enter the coolant system. Without proper filtration, that debris can cause premature wear on pumps or other components, which is why it's critical to have the right filtration system in place to protect your equipment and maintain coolant quality."

Adjusting for wear is another concern. As Manor points out, wheels decrease in diameter over time. Humans compensate for this automatically and know, by experience, when to dress a Scotch-Brite wheel or grab a new hand pad. Not so with CNC machines and robots: If you don't have some kind of automatic force control in place or have a way to measure wheel wear and make the appropriate offsets, he says, the deburring train can quickly go off the tracks.

"One of the products that's very popular in these applications is our **Scotch-Brite Radial Bristle** line, which offers a broad range of shapes and abrasive characteristics," says Manor. "For instance, we have one with a curved bristle that's very compliant. You don't have to worry about pushing it too hard because it just deflects out of the way and won't gouge or cut the workpiece like some other products

can. It's a great way to deburr parts and leave a gentle edge break in any automated process, or maybe where you have a less skilled operator doing manual deburring and finishing."

Manual Deburring Remains Alive and Well

This statement is as true today as it was in 2020, when Avi Widovski, director of marketing and sales at NOGA Engineering and Technology Ltd., explained that many shops prefer to use their expensive CNC equipment to make parts rather than debur them. "Hand deburring is on the rise because of, not in spite of, the advancements in machining and automation," he told **MSC Industrial**.

Since then, the machining environment has changed. NOGA has continued to add new products; among them, the Noga MT UBURR and Ultimate Back (UBACK) deburring and chamfering tools, as well as the **UFIBER** line of advanced ceramic fiber brushes. Where the first two are intended for machine applications, the UFIBER is designed for CNC and manual use alike. According to Widovski, the use of ceramic brushes in the UFIBER reduces processing time by 20 percent compared with conventional abrasive nylon brushes. They also deliver finer surface finishes and longer life, and support automation in deburring and tool mark removal without frequent shape changes.

"The UFIBER brushes leverage cutting-edge nanotechnology, offering superior control over surface roughness, outstanding wear resistance and extended tool life," he adds. "This leads to fewer tool changes, longer operation times and reduced production costs."

Along with the company's other products, the UFIBER provides a significant improvement over legacy methods. Says Widovski: "When we first started developing deburring tools, it took a long time to educate end users. In the past, people would remove burrs using makeshift methods—razor blades, utility knives, or even sharp objects they fashioned themselves. Over the last six decades, however, we've worked to change that mindset by offering purpose-built solutions for safer, faster and more consistent deburring. The UFIBER is just the latest in a long history of deburring advancements."

Which deburring tools or techniques have made the biggest difference in your workflow? Tell us in the comments below.

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