

# AMERICAN TOOL, DIE & Stamping NEWS

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## Dayton Delivers New Type of “Special” Tooling to Manufacturers

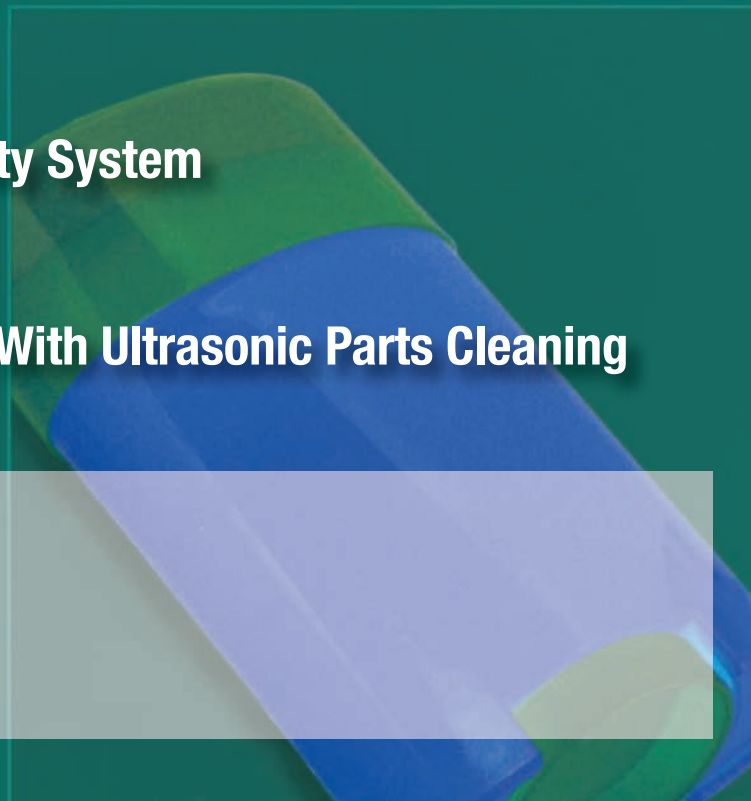


### *Dave Smith Solutions:*

The Origin of the Toyoya Quality System

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# Precision, Perfection and Enhanced Productivity for Small Parts Manufacturing

*Proper brush selection allows manufacturers to reduce cycle time, automate intricate surface finishing operations and deliver consistent quality*

By Ed Sullivan

**S**mall parts requiring deburring, edge blending or other surface finishing can present production challenges to manufacturers. Often, production is taken off-stream where hand-held tools are necessary to perform the intricate secondary finishing many of these components require. This action frequently results in reduced productivity and inconsistent product quality. Even in instances where the process is fully automated, specifying the appropriate finishing brush for the application plays an integral role in improving the tool's overall performance and life span.

A miniature deburring brush can solve both the productivity and quality challenges involved when manufacturing parts of various small sizes, contours and materials. These tools are generally best suited to address tight tolerances, edge blending, deburring and other finishing requirements that have a direct impact on overall functionality.

Precision Planting, Inc. (Tremont, IL), an industry leader in agricultural seed planting equipment, manufactures a variety of systems that are designed to solve exact seed spacing and placement issues. Because the accuracy of seed placement is heavily reliant on precise timing, it is critical that the surface finish of the seed ejection component be void of even the slightest variations and irregularities.

"One of our newest systems has tubes that are injection molded, and we had great concern about removing the residual flashing that was created by the molding process," explained Precision Planting engineer Derek Sauder. "It may be only .002 to .005 inches thick. While not very long, the ridge of the flashing is rough and

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The Flex-Hone is available in 8 different abrasive types and 11 different grit selections in diameters from 4mm (0.156") to 36" standard. It is the preferred tool for applications with a bore size of 4mm or greater.

would cause problems in the performance of our part."

Mr. Sauder explained that the component is used in planting seed for corn, beans and other crops. In operation, the part has a vacuum applied to one side, and the other side contains

the seed. "The seed is held by vacuum against a hole in the part," he said. "If we didn't remove the flashing, it may grab onto the seed and cause it not to release properly."

In the initial phase of development, the part would not perform without the flashing being removed. Getting the seeds to accurately release was only achieved when an abrasive nylon brush from Brush Research Manufacturing (Los Angeles, CA) was incorporated into the manufacturing process.

"So, we knew the miniature nylon brush was necessary," said Mr. Sauder. "It worked quite well, so I was confident that we had a good solution. We had tried the injection molded piece without the nylon brush, and it didn't work as well."

Mr. Sauder added that while the nylon clean-out brush does not speed up part production, it is automated and therefore highly efficient.

"It has allowed our products to become the most accurate planting equipment in the market," he said. "Our product is well-known and has a fine reputation in the marketplace, and this process helps us attain that. It is economical and gives us good results."

The application will certainly affect the choice of miniature brushes and includes variables such as contours required, the type of material, and the

amount of material to be removed. Other factors that apply to brushes used in automated applications include RPM of the machine tool, feed rates, and optimum wear-life of the brushes.

Brush Research Manufacturing designs and produces miniature finishing brushes in an assortment of designs, sizes and materials. While customers typically know what size of brushes are required for their applications, Brush Research Manufacturing's engineering department is available for consultation to ensure that the most suitable style of brush is selected for any given application.

There are several types of miniature brushes available today that vary not just in size, but also in filament type. Carbon steel, stainless steel, brass, nylon and abrasive filled nylon are commonly used. Abrasive filled nylon can contain silicon carbide, aluminum oxide or diamond abrasive.

### GENERAL PARAMETERS

"Overall, the specification of a brush involves the task at hand, (e.g., deburring or surface finishing) the speed at which it must be accomplished, the size of the feature being worked, and the material the brush is working on," explained Mike Miller of Brush Research Manufacturing.

Mr. Miller said his firm manufactures miniature brushes for bores ranging in size from as small as 0.024 inches and varying in lengths and tip styles. Filaments options include nylon, carbon steel, stainless steel, brass and abrasive filled nylon. Brush Research Manufacturing's newest brush is filled with diamond abrasive nylon and will cut harder materials, deburr faster and last longer, providing a unique level of flexibility and longer tool life.

The popular Brush Research Manufacturing Flex-Hone® is available in miniature sizes as small as 4 mm (0.156 in.). Sometimes referred to as the "dingleberry hone," the Flex-Hone is a ball-style hone that features globules or balls of abrasive grit permanently laminated to the end of nylon filaments.

"For any application with a bore size

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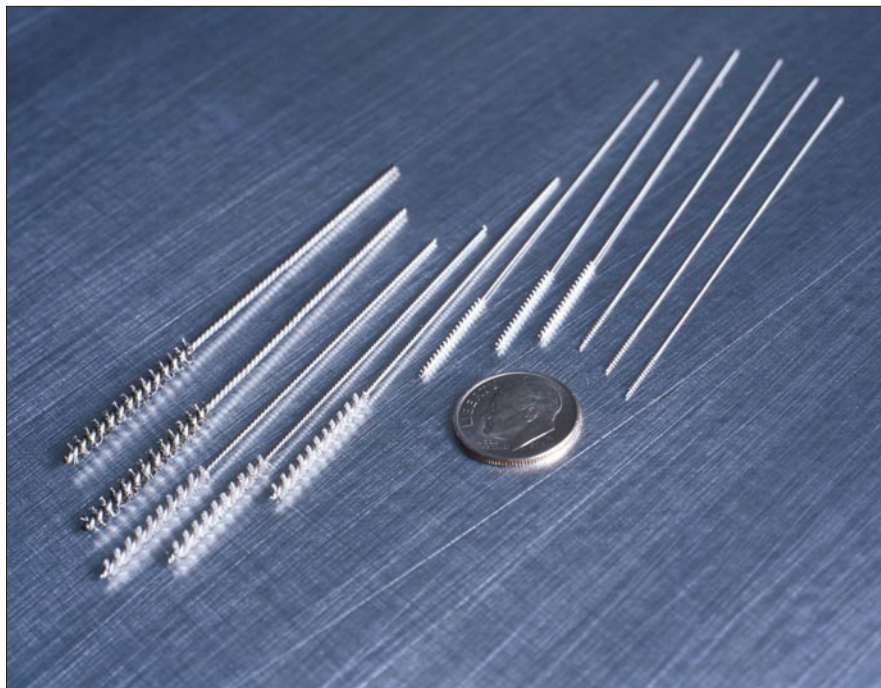
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of 4 millimeters or greater, this is almost always the preferred tool," Mr. Miller said. "One reason is that it is more abrasive at the point of attack, whereas an abrasive nylon brush will have abrasive grit particles interspersed throughout the filament. The ball-style hone is about 95% pure grain abrasive right at the point of need, so it really does an effective job."

Miller added that the ball-style hone is not recommended for working on threads, whereas abrasive nylon is very effective for removing burrs and polishing thread peaks and flank angles, particularly in tapped aluminum holes.

"This type of operation can be automated," Mr. Miller said, "although sizes 1/16 in. and smaller may best be cleaned up by hand with an abrasive nylon or stainless steel brush. Small diameter brushes are not usually rotated under power because the brush stem wires are very fine and may bend. However, there is a series of holders and pin



Brush Research manufactures miniature brushes ranging in sizes from 0.024 in. to 0.500 in. in various filament types.

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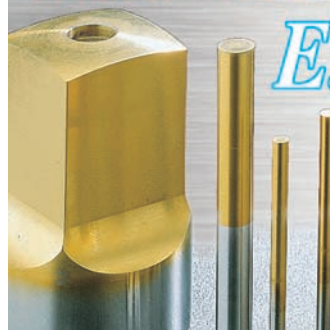


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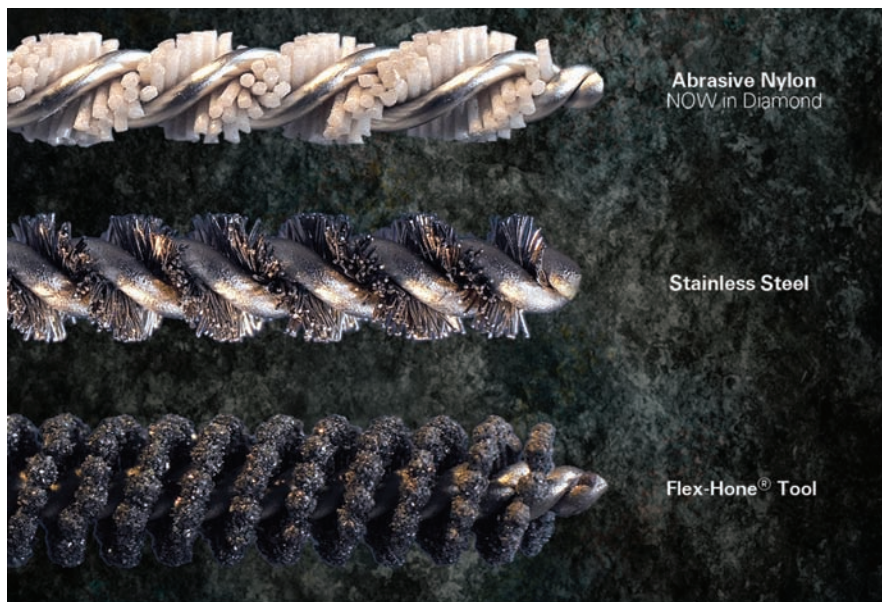
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Miniature brushes range in size, but also filament type. Filament choices include carbon steel, stainless steel, brass, nylon and abrasive nylon. Abrasive nylon brushes are available in silicate, silicon carbide, aluminum oxide and now diamond in diameters as small as .032". These tools are best suited to tight tolerances, edge blending, deburring and other finishing requirements for bores as small as 0.024"

vises that is commercially available to grip the small diameter brushes."

Abrasive nylon brushes have gained in popularity. To begin with, nylon is not reactive, Mr. Miller explained, so the brush will not impart carbon impurities onto the surface of the product. Nylon doesn't oxidize, and therefore doesn't rust or cause rust. Safety is an-

other issue because metal filaments can develop wire fatigue over a period of time. If you are using a wire brush incorrectly, that could happen in a short period of time.

Grit selection is another important variable that may require supplier technical support. For example, products that have very fine finish requirements may benefit from brushes with finer grit material. Hard materials such as ceramics and glass may require diamond grit.

"That is not to discount the effectiveness of metal brush filaments," Mr. Miller added. "One of the popular miniature models is our all stainless steel brush, which features stainless steel filaments and a stainless steel stem. This model is available in diameters down to 0.024 inches and is very popular for clearing chips out of holes or clearing protruding and break-through burrs."

"It depends on the surface finish spec or whether they have an issue where they need a little more aggressive brush for more deburring power," Mr. Miller advised. "Sometimes you have a

combination of needs such as cross-hole deburring and achieving a fine surface finish. It is not always best to try to accomplish both with the same brush. You may want to use a coarser Flex-Hone or brush first to remove the burr and a second, finer brush to achieve the required finish or contour."

## GETTING HELP WITH SPECS

According to Mr. Miller, customers may have several concerns about specifying brushes. Whether to automate the brush operation is a primary concern, although it quickly becomes obvious to most users that automating a process and avoiding secondary operations are significant benefits in terms of both productivity and consistency.

"With a very broad selection of miniature brushes available, there are customers who have a lot of questions about the operating parameters, especially the first time," he said. "So we encourage them to get assistance from our engineering department. Also, we have a surface-finishing laboratory, and we encourage customers to send the parts in question to us—the parts they would like to deburr or finish with our products. We analyze the parts and then select the tools we think will provide the best solution, and then we run tests. We then return the part to them with our best recommendations regarding the selection of the tool, the operating parameters, and surface finishing measurements, if required. This has been an important resource for a lot of our customers."

Established in 1958, Brush Research Manufacturing has been solving difficult finishing problems with brushing technology in general industrial applications as well as in sophisticated environments such as nuclear energy, aerospace and computer technology. ■

For more information contact:  
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