Needle Sharpener Keeps Phoenix on Point

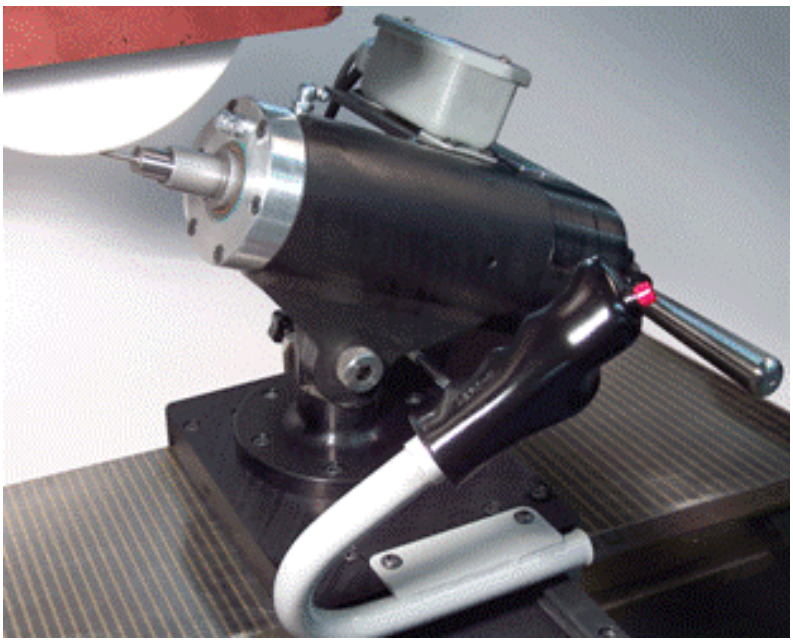
Kris Drennen

Thanks to a special needle design from Advanced Machine & Engineering (AME), Phoenix Medical Products has seen a 40% improvement in production and a 10% decrease in scrap. Phoenix can now safely rely on the AME needle sharpener for its needle design, production, sterilization, and packaging needs.

Phoenix Medical Products [1] is a Mountain City, Tennessee contract manufacturer of various devices used in the soft and hard tissue biopsy, thoracic, laparoscopic, arthroscopic, gastrointestinal, and cardiovascular areas of the medical and research markets. As such, their watchword is precision at every turn. In addition to mold design, injection molding and various machining services such as milling, turning, grinding, and drilling, Phoenix also maintains a complete Class 10,000 cleanroom packaging and labeling facility. They offer their customers a competitive edge by being a turnkey operation, from CAD through rapid prototype, validation, production, and packaging. Even product printing, etching, and laser marking are done there, along with catheter tipping and Nitinol wire forming and crimping. Accordingly, Phoenix is a true one-stop shop for most customers.

As with all such operations, a bottleneck at any stage can create both upstream and downstream problems. With a wide variety of demanding customers and diverse jobs that all require the ultimate care in precision handling, this 20-year-old, 107,000 sq. ft. shop is constantly on the lookout for newer, better ways to produce their products.

One department at Phoenix is devoted entirely to needle design, production, sterilization, and packaging, as this work has a unique set of challenges and all the attendant concerns of any machine shop that does work in the medical market. As David Hannah, general manager for needle production explains, “Our former method for one type of needle production involved sharpening with a 5-axis CNC grinder and manual fixture. The needles needed to be end-swaged down to a particular and different diameter, which was not a very precise process. When we’d set up the CNC grind, we’d often need to run some parts two or three times to get the desired edge because the swage did not leave us enough usable material.”



Needle sharpener built by Advanced Machine and Engineering for Phoenix Medical Products of Mountain City, Tennessee, a contract manufacturer of needle assemblies used in various sectors of the medical market.

Hannah and Phoenix engineering manager, Chris Blake, set out to find a solution. As Hannah discusses, “We first did a web search, and after a couple of calls, found Advanced Machine & Engineering (AME) [2], a new supplier for us. After speaking to their engineers several times, I knew we had a good match. The entire process with them was very simple and straightforward. They sent an engineer down to see our process and our current manufacturing, which we appreciated.”

That engineer was AME’s Dan Lapp, vice president of sales for the company. After the initial visit, the AME design department went to work. After a series of discussions, the SolidWorks model was ready for review. Only minor modifications were required by the Phoenix team before the first unit was built at AME, which is a contract machine builder with decades of experience in the metalworking market. In addition, the company designs and manufactures extensive lines of carbide sawing equipment. Machine tool components, such as spindle interfaces, gears, workholding devices, machine covers, chip conveyors, and custom fixturing are also designed, along with a complete line of safety products, including rod locks and safety catchers for fall protection.

Once the first machine was built, it underwent extensive testing on Phoenix needle products, using an in-house grinder at AME to test accuracy, surface finish, part-to-part time, and the machine assembly itself. Upon shipment and commissioning at Phoenix, the machine was immediately put into production. To the great satisfaction of the customer’s production team, the needle sharpener was found to be highly productive from the outset. As Hannah notes, “With this new fixture, we were able to set the products up on our manual grinder and a surface plate. Using our video

system, the operator could observe each needle being ground and achieve the correct point on the first cycle, every time. As a result, in a very short time, we were able to track a 40% increase in our production plus a 5-10% decrease in scrap." The latter number is quite significant, as the raw material for such needles is typically an expensive 304 or 17-7 stainless steel. Hannah further claims that the entire operation was now simpler and much easier for the operator to execute, with less set-up time and reduced maintenance. Since its start-up at Phoenix, the needle sharpener has needed only one routine cleaning.

Typical needle produced by Phoenix using the new sharpening fixture built by Advanced Machine & Engineering.

In production, the AME needle sharpener enables a double loup conical point to be machined. It was also designed to allow Phoenix the latitude to change cam plates and grind a variety of style points. The needle sharpener provides workpiece rotation and axial motion (oscillation) simultaneously. Rotation is provided by a dustproof, watertight gear motor through a drive system. Oscillation is provided through the built-in cams. The typical needle workpiece oscillates twice for .025"/.028" per rotation. The spindle assembly tilts from 0º-40º around the pivot point (shoulder bolt screw), and locks in any position to provide an optimum sharp edge on the workpiece. Tolerances are routinely held to the Phoenix standards, namely, +/- .001" on straight grinds, +/- .002" on double loup grinds.

The original machine purchased was designed for a line of Phoenix needle products that was subsequently modified but the needle sharpener was quickly adjusted and back in production in a very short time, according to Hannah, who notes he would have "zero reservations" about recommending AME for future work at his company. ***Kris Drennen*** *is the media correspondent at Advanced Machine & Engineering Co. She can be reached at 815-316-5277 or* info@ame.com *[3].*

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