

Bar Feed System Helps Medical Component Supplier Improve Swiss Turning Productivity

In the extremely competitive medical device manufacturing industry, even slight improvements in throughput can mean the difference between success and failure.

At **MedSource** Technologies, Inc., Minneapolis, Minnesota, the addition of compact bar feeders to Swiss-type turning machines has helped the company improve manufacturing throughput for a variety of medical device components.

MedSource Technologies, Inc., a leading provider of manufacturing services and supply-chain management solutions to the medical device industry, has a long history of producing small, intricately machined components. The Brooklyn Park facility in Minneapolis offers prototype to full production capabilities and can machine complex components from micro-miniature to 1" diameter in a wide range of materials including stainless steel, titanium, platinum, and MP35N. Currently, the company is manufacturing a number of critical components for pacemakers, defibrillators and dental implants. Most of these parts begin as 1/8" diameter stock and have finished diameters of .030" to .090". Tolerances to .0001" are held on a production basis, with finishes averaging 32 RMS.



Reducing Vibration

One of the reasons that **MedSource** Technologies has been able to reach this high level of precision is the addition of bar feed systems that have significantly reduced stock vibration during machining operations on the company's seventy CNC Swiss-type Nomura and Citizen turning machines.

Over a two-year period, **MedSource** Technologies installed 12 Mini-RHINOBAR[®] single-tube hydrodynamic bar feeders designed and manufactured by Lexair, Inc., Lexington, Kentucky. Since the initial installation they have installed 18 more. The economical Mini-RHINOBAR[®] system is engineered especially for Swiss-type CNC turning machines and small, fixed head CNC lathes. It can be equipped with as many as 16 feed tubes in 1/8" increments to handle bars from 1/8" to 1-5/8" diameter and is available in models that can handle 6' or 12' bar lengths. At **MedSource** Technologies, stock sizes run from 1/8" to 1/4" with some 1/2" titanium stock being used as well.

"Prior to installing the bar feeders, we used a gravity feed system to supply stock to each machine," said Dave Thomas, **MedSource** Technologies First Operations Foreman. Thomas explained that with the gravity feed system, weights are used to keep the bar against the tool. "With the gravity feed system, you reach a certain RPM and the bar starts whipping around, and that inhibits your ability to hold tight tolerances and finishes."

Because the bar feed system improved bar stability, **MedSource** Technologies was able to increase machine RPM. "The primary benefit that we saw going to the bar feeders was the stock stability that it provided our CNC machines that are equipped with rotary guide bushings. The rotary bushing on the machine rotates with the bar, allowing us to increase our RPMs, which, of course, increased productivity."

The Lexair Mini-RHINOBAR[®] is designed to improve bar stock stability and reduce shop noise levels. Oil fills the gap between the bar stock and the feed tube, acting as a noise dampening support. As the bar begins to turn, hydrodynamic forces move it toward the center of the feed tube. Centering forces increase as bar speed increases, reducing vibration. Oil flow and pressure are controlled with a single Lexair valve which helps minimize setup time. The front swing out mechanism includes a large barrel clamp to help reduce bar vibration. Ergonomically placed controls and a safety interlock switch help facilitate system operation.

Thomas estimates that operators were able to increase the turning speeds on the Swiss machines by 50 percent for certain jobs, with 30 percent being the average. The resulting overall productivity improvement is about 20 percent.

Taking Advantage of Swiss Improvements

Today's Swiss-type turning machines have faster cycle times and can hold closer tolerances than their predecessors of only a few years ago. For example, Citizen L-20 machines use advanced servo technology for cycle time improvements of up to 20 percent, making the bar feed system a critical component in the production installation.

The key to productivity in this type of manufacturing operation is the single setup capability that the combination turning center and bar feed system allow. The Mini-RHINOBAR[®] system can be operated using a remote pendant. An end-of-bar signal and auto pusher retraction permit the Mini-RHINOBAR[®] system to operate unattended.

"When the end of the bar is reached, an alarm sounds and an operator pulls out the remnant, loads a new bar, runs it in and tests the draw bushing for tightness," Thomas said. "The total bar changeover time is about three minutes."

The compact size of the Mini-RHINOBAR[®] makes it suitable for large or small shops. The model used by MedSource Technologies has an overall length of about 17'.



"We've found that the bar feeders are critical to maintaining high productivity," Thomas said. "The floor space that they require is simply an issue that has to be planned in advance. The Mini-RHINOBAR[®] takes minimal floor space, and that's an advantage."
