

Cincinnati Cylinder Company Fights Price Pressure With Multi-Tasking Technology

(CINCINNATI) – If there's one thing Sheffer Corp. has in the cylinder business, it's experience. Brothers Don and Harvey Sheffer, ex-G.E. engineers, established the company in Cincinnati in 1952. Now owned by another Cincinnati firm, Ralph J. Stolle Co., Sheffer Corp. has grown to 135 employees at two manufacturing plants in Cincinnati and Atlanta.

Since 1952, Sheffer has concentrated solely on the cylinder business. "We do over 150,000 cylinders a year," says Sheffer President Jeff Norris. Sheffer hydraulic and pneumatic cylinders find their way into numerous fluid- and pneumatic-power applications in virtually every industry.

In fact, the cylinder business has grown so competitive that Sheffer has evolved a company production challenge. For orders on standard cylinders from customers in the company's free-membership Gold Program, it's "three or free." This means Sheffer basically guarantees to ship the order within three days of receipt or it's free.

This is no idle guarantee, as upwards of eight million product configurations are possible from Sheffer's cylinder product lines. Granted, not all of these configurations qualify for the "three or free" program, but even standard features on most Sheffer cylinders require machining expertise. Chamfered ends, for example, are machined into the end of each Sheffer piston tube. If the piston and rod have been removed to repair seals, for example, the chamfer physically compresses the seal into the piston when the piston is pushed back in. Most Sheffer cylinders also are produced with four full wrench

flats, meaning most cylinders present a flat for installation or adjustment with normal tools.

In addition to such levels of care in product design and commitment to customer satisfaction, Sheffer continued to look for ways to separate itself from the competition. “Business has picked up quite a bit, but mill prices are up, and pressure to reduce prices from customers is constant,” says Norris. “Actually, price pressures have been going on for quite a while, but in the past year, price-reduction demands from customers have been anywhere from 5% on up.”

In response, Sheffer Corp. instituted a lean manufacturing program eight months ago. The company’s goal is to move from batch manufacturing, which involves constantly staging a certain amount of work-in-process inventory on the production floor, to a make-to-order system, where plant production is efficiently manufacturing for orders already received. Doing so (and making a profit while doing so) requires the ability to respond and produce quickly.

Re-configuring production lines into quick-response cells yielded a certain amount of benefits for Sheffer, but the biggest culprit in Norris’s estimation was setup time.

And although “three or free” proves the company can respond quickly on standard configurations, so can Sheffer’s competitors. Where the biggest opportunities lie, in Norris’s view, are in orders for specialty cylinders, a fraction of the company’s business at present, but an area Norris emphasizes will play a large role in the company’s future.

“On our specials, we feel we and our competitors were in the same boat,” he says. “No one was distinguishing themselves on performance. Even for a single one-off specialty cylinder, a six- to eight-week lead time is average. We saw this as a great opportunity to attack setup and lead time.”

Making even a single specialty cylinder involves making anywhere from seven to 10 components with four or five separate production operations involved in each. Cylinder heads and caps, for example, could require turning, machining on multiple faces, holmaking, and threading on multiple faces, followed by finishing.

Sheffer had been investigating Integrex multi-tasking machine tool technology from Mazak (Florence, KY), where cylinder components could be turned, milled, drilled, threaded, and finished all in a single setup on a single machine, for five or so years. “We thought Mazak was years ahead of their competition on multi-tasking technology, but it was taking some time for the Integrex to get up into the size range we needed,” Norris explained.

Then in 2002, Mazak introduced the mid-sized Integrex 300-IISY. With its second spindle for back-end operation, parts no longer have to move from machine to machine with multiple setups. Completing parts in one setup on one machine offered Sheffer the benefits of reduced throughput time plus cost reductions in labor, fixtures, tooling and an increase in dimensional quality. If a turned part needs to be machined on its back side, the Integrex 300-IISY automatically transfers the part to the second spindle for additional machining without operator involvement.

High Performance Means High Productivity

Advanced turret design with a 20 HP, 10,000 RPM milling spindle incorporated into a CNC turning center delivers significant power to rotational tools, making Sheffer’s Integrex capable of off-center turning, cross-cut and angular milling, precision contouring, drilling, boring, and tapping, all in a single setup. Complex cylinder parts that required separate machines are now “done in one.” The turret also has 9.06” Y-axis movement and 225° B-axis travel range with continuous motion together with the C-axis

capability of the main spindle greatly increase the machine's metalcutting capabilities. Maximum machining diameter is 24", and swing over carriage of 13.77".

Norris's opinion of the Integrex? "Really, there was no alternative," he says. "We've run CNC equipment for a long time, and Mazak is years ahead of the competition, much farther along the learning curve in multi-tasking. And our operators prefer running Mazaks. The conversational programming is a lot more user friendly."

Increased throughput and uptime of the Integrex 300-IISY are ensured by the Mazatrol Fusion 640 CNC control. Its 64-bit RISC processor executes faster processing speed than 32-bit systems and the powerful Mazatrol conversational or EIA/ISO format can be used for CNC programming. What's more the Mazatrol Fusion 640 CNC architecture fuses advanced CNC with PC technology to provide new levels of shop floor communication and efficiency in real time. Shop-floor programming tools include: Mazatrol interactive programming; tool libraries with cutting parameters; realistic 3D graphics for solid model part cutting and tool path simulation; and a navigation function that suggests optimized cutting conditions to slash lead and setup times.

In Norris's estimation, making specialty cylinder components on the Integrex 300-IISY cuts at least two full weeks out of the lead time for specialty cylinders while matching the output of four separate machines. "Not only do we reduce work-in-process, we are cutting out what we call quality gaps because the part isn't repositioned three or four times on separate machines," Norris says. "I would not look at another separate lathe and horizontal machining center setup for new equipment unless business absolutely dictated it."

New technology backed by more than a half-century of experience makes Sheffer's goal of 100% customer satisfaction more than mere talk. Multi-tasking production technology and lean manufacturing principles are laying the foundation of Sheffer's future.

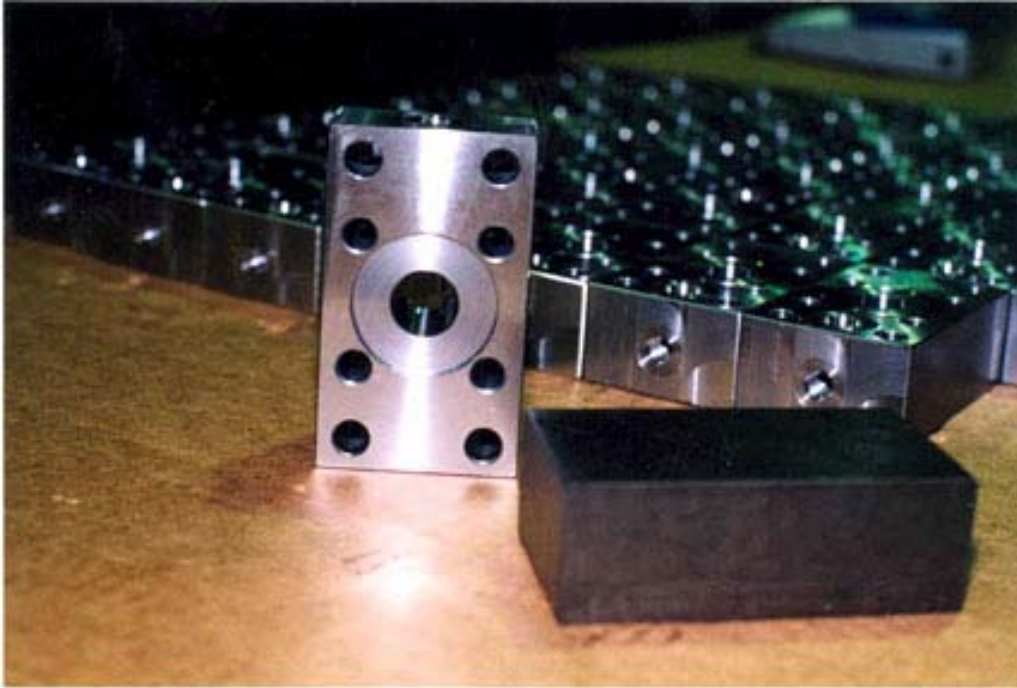
30 Years of Machine Tool Innovation

In July 2004, Mazak Corp. celebrates its 30th anniversary at its Florence, KY, complex. In 1968, Mazak opened its first sales office in Long Island, NY, and moved to Greater Cincinnati in 1974. Expanding 12 times since then, the complex is now fully ISO 9001:2000 certified and includes a Lean Manufacturing Facility, National Technology Center, and Optimum Customer Support Center. Also established are Technology Centers in such major market areas as Los Angeles, Houston, Chicago, Atlanta, Hartford, and Mexico. These facilities provide complete customer support in manufacturing solutions, process applications, service, parts, and customer training. Mazak produces more than 30 innovative models of machine tools at its Florence facility. The Nexus series of CNC turning centers and vertical machining centers is the latest and most successful high-performance Mazak machine tools manufactured in the United States. For more information, visit the Mazak website at www.mazakusa.com.

Photo caption: Sheffer cylinders are complex products with components requiring multiple separate machining operations. The company cuts lead time in half with multi-tasking machine tool technology from Mazak that produces such components in a single setup.



Caption: A cylinder body that needs milling on multiple faces, drilling holes on multiple sides, and threading is shown next to the block of steel it started from. Done in one setup on Sheffer's Integrex 300-IISY, this would have required setups and production on four separate machines.



Caption: The Integrex 300-IISY from Mazak on Sheffer's Cincinnati production floor.



Caption: Specialty cylinders from Sheffer can be found anywhere from small pieces of equipment to nuclear power plants.

