

Production Machining Case in Point Article

Davenport Tapped for Single-Operation Solution

Anderson Fittings, Inc., opened its doors to manufacture brass fittings, valves, and accessories for a variety of industries over 50 years ago in 1947. Since then, the company has steadily grown in its Chicago-area location, expanding its product line to include air brake and pneumatic fittings, and now employs over 200 people. "Providing practical and complete fitting and valve solutions with rigorous quality standards—that's how we got to where we are today," says Dan Crapia, Director of Technical Services. "It all comes down to delivering quality product based on customer budget and scheduling needs."

As with many manufacturers today, streamlining production to stay competitive in the global market has become increasingly important at Anderson Fittings. The company had already introduced concepts such as machine cells to their floor, where production of a particular part never leaves a dedicated area of machines, to aid in this goal, but new solutions were still being sought. "We're always looking for new ways to manufacture our parts more efficiently," explains Crapia. "That's why we wanted to see if we could produce one of our double-ended pipe fittings in a single operation as opposed to having to do the back-tapping in an entire second operation, which was how we were doing it. And that was the capability that we were looking to Davenport for."

Setting the Challenge

Deciding to contact Davenport Machine, Inc. about eliminating the second-operation tapping for this part was an easy decision. "We have 22 Davenport machines currently in our shop, two of them being Servo Bs, so the Davenport name was already in our minds," Crapia explains. "In fact, we had purchased a used Servo B for short, complex runs, and we were very pleased with the machine. Since we knew this part was definitely the right size to fit the Servo B's capability, we decided to ask Davenport about this challenge first. As it happens, we never needed to ask anyone else."

After communicating their need directly to Davenport, blueprints for the double-ended fitting were sent for evaluation to Donna Foley, Sales Engineer, and Doug Larson, Applications Engineer. Larson quickly began to assess the plans. "The first thing we had to determine was if the two-position back working attachment was robust enough to handle a large tapered pipe tap. Then we had to establish if there were enough spindle positions to accomplish the job. Only when we were confident that we could do this would we provide a quote for the part. Ultimately, we did—and with an estimated cycle time of 11 to 13 seconds per part."

"That's not to say there weren't other challenges involved," Larson adds. "There was a family of parts quoted for this process, so there was going to be some quick-change tooling involved that had to be taken into consideration in our setup. Plus, we had to have special form drills produced for us to open the taper of the part even before we started testing. But eventually everything came into place."

Proving Their Capability

Once his analysis of the job requirements was completed, Larson settled on a Davenport Servo B machine with servo burring, hex aligning and two-position back working to produce the part. "For this process, the servo burring spindle must change speeds five times, change directions twice and stop to eject. Then the spindle must orient to the hex material and slave with the main spindles. The part is cut off when the burring spindle is holding on the hex, after which the spindle changes direction for the first tool to back-drill with a right-hand cut drill. The second tool is then introduced (1/4-18 NPTF) and the burring spindle changes speed to cut the thread in and then changes its direction and speed to back the tap out. Once the tapping is complete, the spindle stops to eject the completed part and synchronizes with the hex material and main spindle speed for the next part," explains Larson. "What was particularly demanding about this setup was that in order to complete the part in one operation, we had to obtain hex alignment on the burring spindle—and we could only accomplish this with servo burring because the spindle had to change direction multiple times during the process."

Larson's final five-spindle plan provides further details: In the first spindle position, Alloy 360 Brass Round was centered and formed, with the form tool coming in from the side to rough form the outside configuration and then wrap around the part to face it and hold the overall length. In the second position, the part was drilled halfway through, the outside shaved to the finished dimension, and the inserts polished. The third position completed drilling the part through with the special forming drill ground to a configuration that opened up the taper. The tapping was then completed in the fourth position with a special short projection pipe tap (1/4-18 NPTF +/- a quarter of a turn). Finally, the back working was completed in the last position, where the servo burring oriented itself to the hex of the part to hold and cut it off. "That we were able to pick up on the hex shape as well as orient on different shapes was a great advancement for us," says Larson. "Especially now that we can offer this same functionality to other companies."

With all of the specifications calculated and tools in place, a two-hour run-off was scheduled at Davenport Machine, in Rochester, NY. Randy Warren, Manufacturing Engineer, and Davenport setup operators Jerry Huczek, Chris Swider and Edwardo Marquez made the trip from Anderson Fittings to observe the test firsthand. The result: a trouble-free, consistent part run with an average cycle time of 11 seconds per part.

"We were very satisfied with the outcome," says Crapia. With the help of Davenport representative Tony Key and Dan Monks of NNT Corporation, distributor representative for Davenport at Anderson Fittings, the purchase was subsequently finalized.

Creating Competitive Efficiency

Anderson Fittings estimates that they've easily saved over 200 hours annually on setup time alone with Davenport's solution, plus another 600 to 700 hours by eliminating the second operation. "The efficiencies we've gained for the company have been substantial," says Mark Nagengast, Business Unit Manager at Anderson. "We estimate that in two years or less, we'll have earned a complete return on our investment—and that's not including the productivity we've gained."

Along with realizing further savings by eliminating scrap from a second operation, Davenport's solution has opened up doors to future opportunities as well: "Now that we are using the Servo B and we have more control over feeds and speeds and we see an improvement with the rigidity of the machine, we plan on looking into purchasing carbide tooling over high speed which will improve our machining operation for this part even more."

All of which goes to putting Anderson Fittings in a better competitive position, especially against overseas companies, than ever before.

For more information about the Davenport Servo B machine, call (800) 344-5748 or visit www.davenportmachine.com.

[IMAGE #1: Floor shot of Davenport Servo B machine at Anderson Fittings]

CAPTION #1: Anderson Fittings already had a Davenport Servo B machine at their Oak Forest, IL facility so they were already aware of its potential.

DONE:

[IMAGE #2: Close-up of pipe fittings made at Anderson on the Servo B machine]

CAPTION #2: To back-tap these 7/8" double-ended pipe fittings in a single operation, alignment on the hex had to be obtained on the Davenport's burring spindle during the process.

DONE:

[IMAGE #3: Photo of the Servo B back working attachment]

CAPTION #3: The capability of the Servo B machine's back working attachment was a key factor in Anderson Fittings' decision to ask Davenport about producing their part.