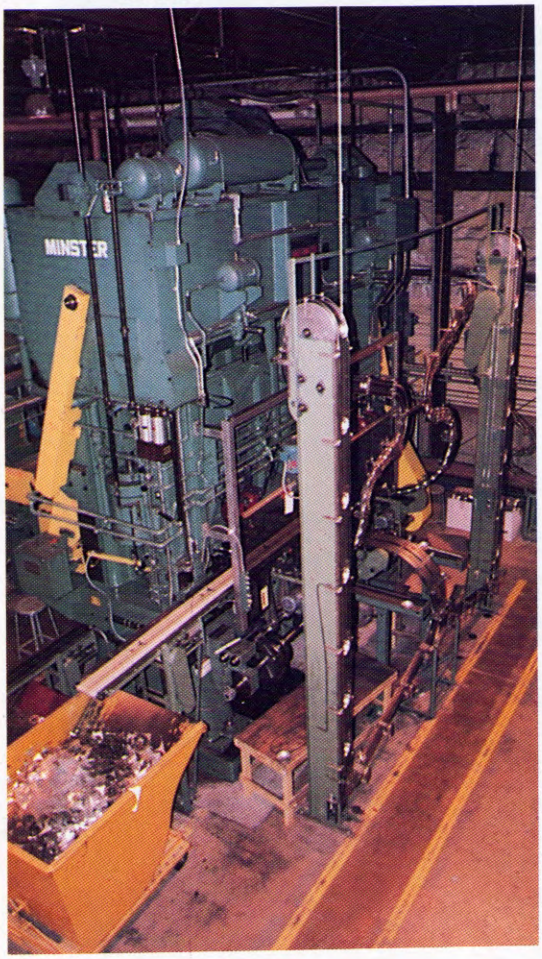
Forming Finer Filters Faster

Smarter forming and manufacturing techniques allow one press to do the work of four

A 300-ton Minster press producing 6000 automotive filter bodies an hour



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A three-point program to improve production combines a new press with just-in-time (JIT) manufacturing and statistical process control (SPC) to forever change the manufacturing of automotive oil filter bodies at Allied Automotive, Fram Div., Greenville, OH.

One 300-ton straight-side press is replacing four 60-ton presses to produce 5000 to 6000 oil filters an hour. The Model DAC-300-132 press from Minster Machine Co., Minster, OH, forms .015-in.-thick coil into 3-in.-dia. filter bodies in three lengths ranging from 3.3 to 5.5 in. for small engines.

"The $2 million purchase was a twofold business plan to reduce costs and improve filter body quality," says Donald A. Jenkins, plant manager. "We expect to realize annual savings of $400,000 in reduced labor, materials handling, scrap and inventory. That's because we adapted a JIT program to manufacture filters with the installation of this press, which we felt was an important step. We maintain a 20-minute bank of 3000 to 4000 filter bodies compared to 200,000 to 300,000 previously inventoried. Reduced inventories and elimination of three machines opened up more floor space for other operations."

This operation is forward thinking because filter bodies are directly conveyed 35 to 40 ft to the finished goods assembly line. Previously, formed bodies were placed in baskets, moved to inventory, retrieved from inventory when a specific model ran, brought to the line and removed from the basket. It was an expensive way to move materials into places where they didn't need to be.

The new press runs strictly as the production line runs. One filter model typically runs for a week. Then, tooling is changed for model changeover on third shift or the weekend to help ensure uninterrupted production. This, coupled with an effective preventive maintenance program, results in anticipated uptime exceeding 97 percent.

Job 1. Another reason for the press purchase is improved quality, especially consistency in filter ID, flange OD and filter height. Flange consistency is important because a seaming operation joins filter bodies with bottom assemblies to form a pressurized container.

Prior to press acceptance, an SPC analysis established that the Minster press was capable of keeping parts within a specified range established for the process. SPC has since been implemented plantwide. On this process an operator typically samples four consecutive filter bodies an hour for height, ID and flange dimensions. The control chart verifies

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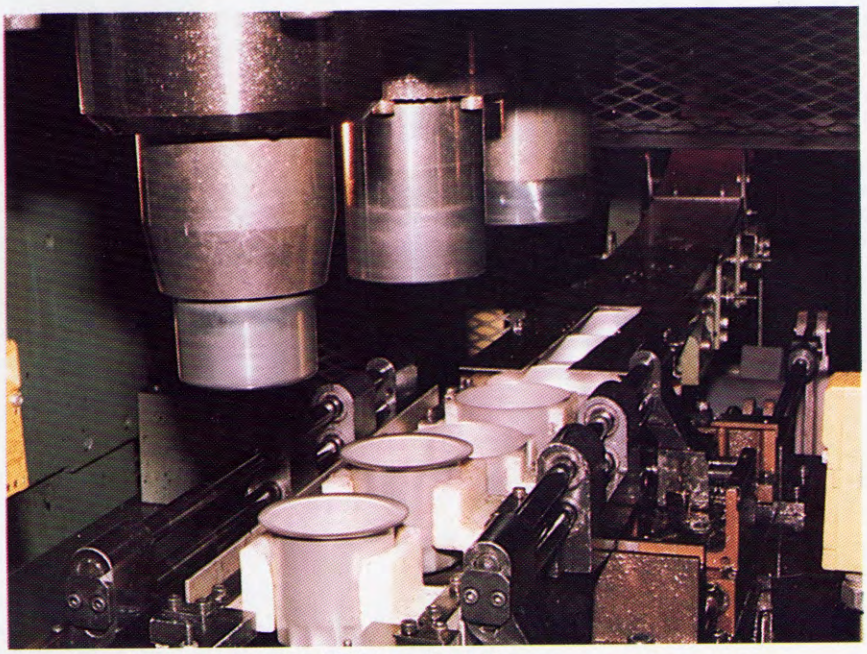
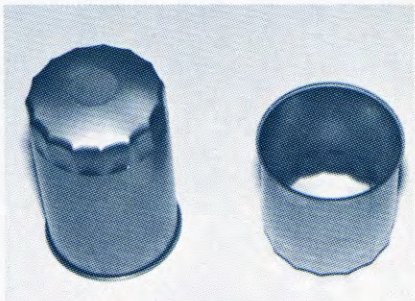


Progressive drawing forms final filter configuration

that filter bodies are made to tight tolerances within the capability of the system. By comparison, SPC observations made at the previous line and at another line running larger filters for V-8 engines only dramatize the small filter body consistency now produced.

"Quality has never been better and it is a quantum leap above anything we produced previously," reports Patrick F. Slosek, manager of engineering. "We want to fully implement SPC as a state-of-mind, a philosophy that says every part must be exactly the same as the first part and the last part. Our SPC program is just one year old and machine operators are just beginning to use it. But they are not yet at the point that they stop the press and make a change when the process is off the mean."

First-of-a-Kind. The press is unique in two respects. First, it is a double-action press in which blanking and drawing are performed in the same press but controlled independently by different mechanisms. This compares favorably with traditional presses that either blank or draw. Two blanking/cupping operations are performed in this same press stroke in the center section. One cup moves to the press's right side, the other to the left. Here, two-stage drawing is completed independently at a different rate. Drawing forms the final length and dome configuration with 15 flutes and a flat to facilitate assembly. A flange trimming operation follows.



A 4.9- and 3.3-in. high filter body, each formed with 15 flutes and a flat on the dome end

The press typically runs at 50 strokes per minute producing 100 filter bodies per minute. However, press speed varies to match production. The finished goods line presently runs production at 5000 to 6000 an hour and it is anticipated that the press, which has capacity to run 75 strokes per minute, will easily match an upcoming production increase to 6000 to 7000 an hour.

The other unique press feature is that two kinds of filter bodies can be made at the same time. To do that everything doubles, including replacing the present single lane die with a double lane die.

"We can double production simply by retooling to blank four filter bodies at a time and run two lanes on each side," Slosek explains. "We don't have the production requirements now but in the future we will. This was part of the long-range strategy for purchasing the press."

Targeting the Future. Quick-change dies are a priority on the company's things-to-do list. The plan calls for a 5 to 10-minute die changeover to replace the current four-hour tooling changeover. The plan envisions tooling to be fixtured rather than bolted in place. A custom material handling system will move 15,000-lb tooling sets in and out on rollers, automating the procedure as much as possible.

"We are at a point of transition, experimentation, learning and implementation," concludes Slosek. "We proved that you can produce small floats and run effectively. Its success is now being implemented in our air cleaner operation. In addition, we proved that one press with current technological concepts combined with SPC and JIT can outperform four presses in terms of quality and quantity. These factors are the blueprint to our future success." ■