

# Gas-Spring Octet

## Connected Without Hoses or Fittings

Progressive-die designer and builder Performance Tool & Die committed three years ago to 3D designs, to keep up with market demand for increased part complexity, according to engineering manager Ron Barnes. And the move has paid off.

"We've been busy and have experienced steady growth since," Barnes says, noting that the company's sales grew from \$5.4 million in 2007 to \$6 million in 2008. "We've positioned the compa-

ny to handle the most complex types of parts, for new programs or for after-market," adds Barnes. "In particular, we work on a lot of parts with complex contours and irregular forms. It's one reason we've stayed busy."

A recent example he cites: a 17-station die for manufacturing automotive spring seats. "The die has two draw stations," explains Barnes. "The customer wanted the ability to gather material prior to the main form station, to help avoid the potential for tearing the steel during final drawing. Also, for this pre-draw station the customer wanted the ability to adjust pad pressure, which required that we plumb the gas springs in that station together. So we evaluated possible solutions, hoping, in addition to offering the customer its desire for flexibility, to also design a neat,

A predrilled base plate allows connection of eight nitrogen-gas springs without using hoses or fittings. The setup, for predrawing automotive spring seats, also allows the stamper to adjust gas pressure during setup and production to optimize quality.

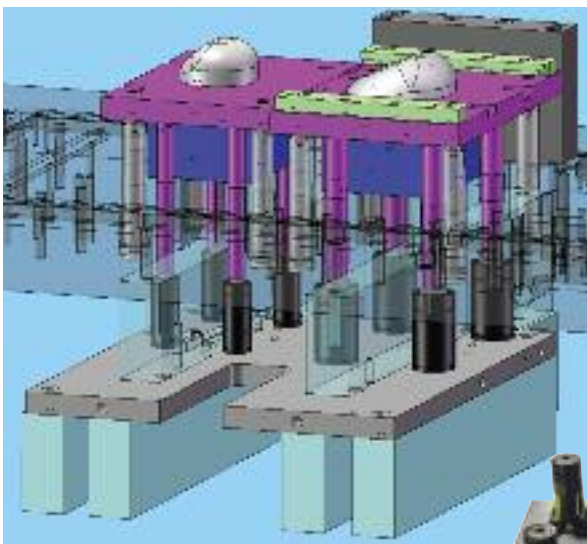
BY BRAD F. KUVIN, EDITOR

easy to install and maintain die section with the least likelihood for pressure leaks."

### No Hoses, No Fittings Needed

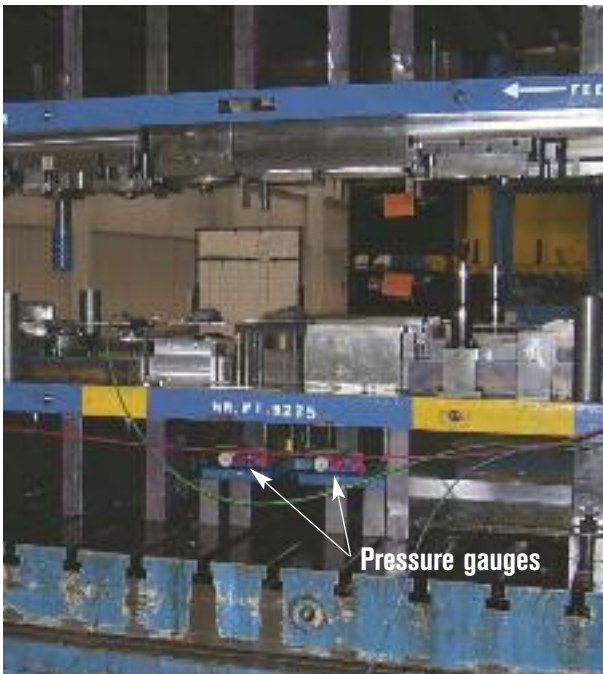
Performance Tool & Die operates out of a 26,000-sq.-ft. shop in Lakeville, MN, staffed with six designers and 10 toolmakers. Its equipment list includes six CNC machining centers and three wire-EDM machines, as well as six try-out presses from 150 to 600 tons. When I spoke with Barnes, the shop had work in various stages of completion—from design to tryout—for 37 different parts.

For the spring-seat application, Barnes and his team designed and developed, along with the help of an engineering team from nitrogen-spring manufacturer Dadco, Plymouth, MI, a base plate encompassing two die stations with a set of nitrogen-gas cylinders mounted to it. The package—designed using the Dadco SMS-i (Sectional Mounting System—Internal) system—calls for connecting a set of springs by drilling passages throughout the base plate. It avoids the need for external hoses and fittings, and



Performance Tool & Die designed this complete nitrogen package for a recent 17-station progressive die built for an automotive customer. The setup, built using the Dadco SMS-i system, features eight nitrogen-gas springs mounted to a common base plate that occupies two of the 17 stations. A series of passages drilled into the plate connect the springs.





The SMS-i system mounts underneath the die and, thanks to the easily accessible pressure gauges and regulators, enables the end user to monitor and adjust pressure as needed across the system.

the bottom carrier plate of the die are easily accessed by the press operator or die setter to provide the level of control required by our customer.”

### **Eight Gas Springs, Two Different Sizes**

The SMS-i setup designed by Barnes and his team encompasses eight nitrogen-gas springs, all Dadco UltraForce high-force low-profile models. In the first of the two die stations covered by the SMS-i plate resides four heavier die springs—U.1200 models with 50-mm-dia. body and 1.2-ton pressure capacity. In the second die station sit four U.0400 Ultra-

Force springs—32-mm-dia. body, 0.33-ton force capacity.

In addition to drilling out the base plate to connect the springs together, Dadco also installed two mini control panels and pressure regulators to allow the end user to monitor and vary gas pressure across the system. The gas springs attach through a bottom port, and the SMS-i allows for convenient filling and draining as needed.

“This setup beats the alternative,” adds Barnes, “which would have been the use of a bunch of extra parts and hoses that could potentially leak. Instead we avoided having to design and build a complex plumbing system. It was fast to order, fast to build—Dadco delivered the package in two weeks after ordering—and saved us several hours at the design stage.”

**MF**

results in an inexpensive setup that is relatively simple to install and maintain, says Barnes.

“The base plate mounts under the die on the carrier plate, down by the risers,” he explains. “Pins extend from the springs up through the die set to the pressure pads. Valves right in front on

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