

Problem: Annoying Cylinder Seal Failure

A cold-forming press operation used a 36" bore cylinder with 2,700 PSI. The press developed 1,400 tons of force to form 2"-thick steel plates for water towers. The cylinder was built with a removable cap on the blind end. The thick wall of the cylinder tube was drilled and tapped for approximately 24 cap screws 1-1/4" in diameter to fasten the end cap. In addition to the tapped holes in the tube end, there was a "U" shaped groove for insertion of a high-pressure static seal.

The removable cap seal started to leak, and we were called out to service the cylinder. We purchased a factory-supplied seal kit and installed it as instruct-

ed, torquing the circular row of 1-1/4" grade 8 cap screws to the specified torque.

Start-up went well, and everyone was sure the repair was successful. Six weeks later, we were called back for the same problem. Sure enough, the seal had extruded and failed the same as the last time. We again cleaned up the areas affected, replaced with a factory seal and torqued the cap screws. We then installed a "Dry" type 10,000 PSI pressure gage with a small check valve that would trap the pressure in the gage. After several cycles, the most the gage would read was 3,300 PSI. This told us the safety relief was

protecting the system from pump pressure spikes. But, four weeks later, the seal failed again.

We felt the seal material was too soft and had a custom seal designed and fabricated by a respectable seal house. But it also failed five weeks later.



Any idea what could be the problem?



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Previous Solution: Fluctuating Pressure Problems

When one hydraulic unit supplies two molds and the molds open independently of each other, flow controls are needed to maintain system pressure on the closed mold. When one cylinder retracts, the flow returning to the tank is approximately 2.78 times larger than the flow going into the rod end. This high flow into the tank line has to pass through a return line filter and heat exchanger, resulting in 125 PSI of back pressure.

Relief valve spring chambers are normally drained internally to the tank line. Any back pressure in the return line is additive to the spring setting of 1,000 PSI. The 125 PSI of back pressure added to the spring set-

ting of 1,000 PSI causes the relieving pressure of the main relief to open at 1,125 PSI, adding approximately 20 tons of additional clamping force, distorting the product. The solution was to install a sequence head on the relief valve, converting it to an externally drained valve. This removed any influence from the return line back pressure.



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