

Ask the Expert



We are pleased to introduce a new column to Valve World Americas. The *Ask The Expert* column will give readers the opportunity to have their valve concerns addressed, find out the answers to their pressing valve challenges and ask for feedback on application issues. If you have a question that you need answered, please feel free to contact s.bradley@kci-world.com with the email subject: Ask The Expert. If you are an individual with extensive valve expertise that you believe the Valve World readership could benefit from, please contact our Editor to become a future featured Expert.

This month our Expert is Jason Chisholm, Marketing and Communications Coordinator for Sealweld Corporation. Jason has been with Sealweld for almost 15 years and has worked in many different roles from the production floor to field services and technical sales to communications.

Q How does a technician calculate a safe injection pressure when servicing a valve that's online?

A Seasoned valve technicians have refined a technique to find "zero", the pressure required to overcome the restriction of the sealant hose, injection fitting, inner-check valve and operating pressure inside the valve. Depending on what kind of product you're injecting (light lubricant, semi-sealant or heavy sealant) and the length/inner diameter of the sealant hose, the pressure required just to get the product out of the coupler could register several thousand PSI. Let's speculate that this requires 3000 PSI - note this pressure.

The injection pressure required to unseat the ball check of an injection fitting is almost negligible, approximately 200 PSI. The prime concern will be overcoming the inner-check fitting which contains full operating pressure. Say a 600 class ball valve in a natural gas pipeline operates at 1000 PSI, simply add all of these factors together.

3000 to pump through the hose and coupler
+ 200 to offset the fitting check valve
+ 1000 of line pressure
= 4200 PSI is your "zero"

New hires and junior technicians may mistake the pressure registered on the injection pump gauge for a real time reading of the sealant system and will hesitate to go beyond the valve's MOP. In all reality, you'll need to inject over 6000 PSI just to deliver lubricant or sealant to the seat ring and sealing areas. The most important thing to watch for is a pressure drop on the gauge. As long as the needle continues to drop once you stop injecting, you can verify the sealant passages are free of debris and the system is accepting product as designed. Be diligent, make sure the pressure doesn't spike and you will be successful.

Q Why is seat seal testing important through delivery, installation and start-up?

A A valve can take a beating between the time it leaves the manufacturing plant and when it's ready for operation. Even the vibration from being transported can cause the closure element to slowly "creep" from open to closed or vice versa. Anytime a valve gets partially cycled there's a huge potential for debris to enter the valve body and critical sealing areas. Once you sign off on the delivery it becomes YOUR valve so it might be worth doing a low pressure, inside out air test before accepting full responsibility of it.

To perform this test, construct an assembly using a three or four-way coupling that can be threaded into a valve body port, has an air nipple, isolation valve and a low pressure gauge. Simply inject compressed air into the body cavity to approximately 120 PSI, isolate the assembly and watch for any pressure drop. The seats will seal in the fully open or closed position with the exception of a few ball valve models that utilize an equalization port drilled through the closure element. Repeat this test through every stage that involves welding or cutting to ensure the seats haven't been damaged. Bleeding the air from the valve body will also help purge any remaining test fluid that way have collected inside.

Q What are the best valve design features?

A Over hundreds of years of evolution, there have been countless unique valve designs incorporated throughout the manufacturing industry. Here are a couple that greatly improve the ability to maintain seal integrity and ability.

One design that helps increase a valve's service life is the rotating seat ring. When the valve is cycled, a 'dog' affixed to the ball face engages a groove on the side of the seat ring that rotates it by 15 degrees. The seat reaches its original position after 24 cycles (15 degrees x 24 = 360). As the valve ages and damage occurs to the sealing surface and the ball face, each cycle will assure the damaged section of the seat ring is moved to a different part of the ball, improving the ability to seal.

Another unique feature is the offset machined into the bottom of a stem that allows the ball plug to move laterally away from the seat when cycling. Conventional designs allow for debris caught in the soft material of the seat ring to score the sealing face of the ball because they are meant to form such a tight seal. This offset eliminates the typical friction associated with cycling trunnion-mounted, and particularly, floating style ball valves.

The best design features often extend valve life and make routine maintenance and emergency sealing much easier. Every valve will inevitably leak and the integrity depends on your ability to properly service it.

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