

Ask the Expert

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 questions 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-in-Chief to become a future featured Expert.

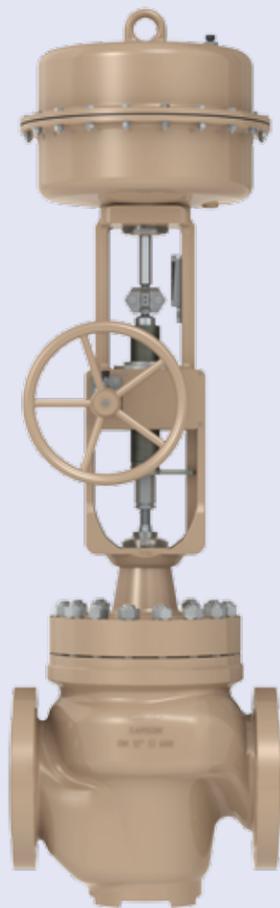
This month our Experts are Rodney Roth, Strategic Account Manager/Stationary Equipment – A.W. Chesterton & Vance St. Jean: Senior Specialist/Stationary Equipment – A.W. Chesterton.



Q How can high frequency actuation adversely affect the valve packing sets?

A High frequency actuation is used for various types of valves, such as Ball valves, Butterfly valves etc. The actuation can be motor operated, air operated, electric or hydraulic. The stem motion, whether it be rising or rotating is something to be considered as both introduce different stresses on the packing set. The rising stem application can cause the stem to grow thermally as temperature increases. The growth rate for most stainless materials is .001" per inch of stem per 100 degrees rise in temperature. This is also a factor in cold applications causing the stem to shrink. To insure sealability as the stem diameter changes, the packing set must be resilient to maintain the seal under the same gland load. Graphite packing designs work well but the question becomes, how long and for how many cycles? We have uniform packing testing protocols for we use: 1,510 cycles (API 622) and some end users have tested to 5,000 cycles (Chevron), however in high cycle applications; this can be exceeded in weeks or months. In the case of required testing for high cycle applications, we then resort to using ISO 15848-1 which has cycle levels as high as 100,000 cycles and is done in the actual valve.

Additionally, when working to seal these types of applications, you must have an understanding of the increased consolidation of the packing set. As the packing set compresses under operating pressure and high cycle volumes, packing gland adjustments can be needed more often. To reduce the need for physical adjustments of the packing by maintenance personnel, the use of Live Load Springs on the Gland Bolts is an excellent option. This allows the packing set to self-adjust to the operating conditions and potential packing consolidation improving packing performance in high cycle applications.



Q How does vibration contribute to packing leakage?

A A major cause of packing leakage is system vibration. It occurs due to changes in system pressures and can cause the stem to move back and forth, constantly changing the inner diameter on the packing set. Within most industrial units, vibration exists and over time can lead packing leakage. Once again, the use of live loading is an excellent solution to help alleviate the inherent problems with vibration. In this case, the Live Load Springs act as a vibration dampening device allowing the packing set to perform effectively by maintaining the recommended gland load over a longer interval. We have experience some applications where even this requires a "preventive maintenance" program requiring the gland loads to be physically checked. The underlying issue we are trying to prevent is the infiltration of the packing area by product. If we can prevent this from occurring we have a much better chance of limiting the leakage levels over the life of the valve.

Q How does stem alignment through the packing box affect the packing sets ability to seal long term?

A Stem alignment in high cycle applications is critical to good packing performance. We have seen applications where the actuator and stuffing box are severely misaligned, causing side loading on the packing set. Left unchecked this can cause a bent stem to occur over time, as well as over compressing the packing to one side leading to

premature packing failure. This can also occur in horizontally mounted valves leading to the stem sagging over time causing packing leaks to arise. In addition, the way the setup of the actuator can cause issues with the packing set. If the settings are wrong and too much force is used to close the valve, the seat can bottom out leading to stem deflection off center causing packing failures over time. One solution to this situation is the use of carbon bushings in the packing box. The use of carbon bushings reduces the number of packing rings while limiting the amount of misalignment taking place. To have this work correctly, you will need to check with the valve and packing manufacturer to get the bushing tolerances correct.



Q What steps can you take to get the best packing performance on actuated valves?

A In summary;

1. To ensure the best packing performance in actuated valves you must select the correct packing design for your application.
2. Look closely at all the potential factors potentially affecting packing performance as were discussed earlier.
3. You must make sure your equipment is properly designed/engineered and installed for the application.
4. It is our experience most high cycle applications tend to be critical path and spending the necessary time upfront will yield better equipment performance, but, most of all, increased reliability.



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