

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 & Phil Mahoney, Design Engineering Manager for Sealing Products – A.W. Chesterton.

Q What are the globally recognized testing protocols to certify Packing and Valves for Low Emissions Service (Low E)?

A There are several commonly being used today, but you must understand where it is the testing will be used and in what part of the world you may be seeking end user acknowledgement/approvals. The American Petroleum Institute (API) currently has both the 622 & 624 standards published.

API 622 is a packing only standard designed to allow for the evaluation of packing performance for leakage, weight loss and corrosion resistance. The current edition of this standard is not considered a pass or fail, but it is currently being updated by a task group and should be a pass or fail test when the newest edition is published.

API 624 is a valve type test standard to certify rising and rising rotating stems for Low E with the use of graphite packing. The valves are required to complete the 310 mechanical cycles and 3 thermal cycles with leakage below 100 ppm without any re-tightening of the packing gland flange bolts. In addition to these requirements, the packing must have completed the required elements of API 622 prior to the valve being tested to 624. API 624 qualification is currently required by API 600 & 602 valve specifications for the valves to be tagged as API 600 or 602 valves.

API is currently drafting a new standard, 641, which, will be the required valve type test standard for quarter turn valves. There is a task force currently working diligently to complete this standard which has been balloted multiple times for vote and comment.

Another frequently referenced standard is ISO 15848-1, "Part 1 – Classification system and qualification procedures for the type testing of valves". This is the second edition of 15848-1. This edition allows for the use of Methane as a test media, due to the US EPA being unwilling to acknowledge testing performed with helium (vs. methane which is an actual VOC) because it is not considered to have been tested "pursuant to generally-accepted good engineering practices for testing fugitive emissions".

An additional issue of concern with 15848-1 is there is no stand-alone test to qualify the packing exclusive of the valve; this is important because valve design and design tolerances has a lot to do with how well the packing performs. The ISO 15848-1 is a valve type test standard so packing manufacturers has to test their packing products in each valve manufacturer's valve model for which they seek to be approved for Low E service. Another difference between this standard and the API 624 type test standard is the allowance of packing adjustments. As listed above, API 624 does not allow for any adjustments; the ISO standard allows for a maximum of one packing gland adjustment per thermal cycle.

Ta Luft is an additional test protocol used to qualify packing. The usage of TA Luft as a packing evaluation protocol is almost exclusively used in Germany; however, because there is a need to provide the data to end users, most major packing manufacturers have the TA Luft testing performed as an additional data point to support the suitability of their products for critical applications. However, the protocol is very nondescript and devoid of detail, leading too many different interpretations of what the actual test being performed should actually look like.

Finally, there is American National Standard ANSI/FCI 91-1-2010 "Standard for Qualification of Control Valve Packing Stem Seals" was created for Control Valves without "bellows, diaphragms or tubular seal designs". The test media is Methane and to achieve Class A1, 100,000 mechanical cycles, three thermal cycles and leakage below 100 ppm without packing adjustments is required. This test protocol is not widely used, because, most valve and packing companies have used ISO 15848-1 in the past, but, as mentioned above, the EPA does not recognize testing with Helium as the test media, so, the use of this test standard has become more widespread.

Q Will API 624 continue to be added as a requirement for API standards such as 603 & 623?

A There is a list of "suggested valves for testing: outlined in API 624 Annex B which includes a list of 603 & 623 valves. However, because

these standards were published before the actual publishing date of 624, the standards do not require API 624 certification. Based on the language used in API 600 & 602, the addition of API 624 qualification to these two standards should be a mere formality and will be likely be included in future versions of other relevant valve standards.

Q What changes can be expected for API 622?

A 622 does not currently have a pass or fail requirement. The next edition will most likely be changed to a pass fail. The allowable leakage to pass API 622 will be reduced to 100 ppm (maximum) and packing adjustments will not be allowed to align the packing test standard with the requirements of API 624. Another potential change is the addition of a test fixture designed dimensionally to allow for the testing of 1/8" cross section packing, a gasket. Knowledge of the many factors that can affect gasket performance can allow one to mitigate the risk of gasket failure.



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