

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 Experts are Luke Chou – Neway Valve International, Inc, Rodney Roth – AW Chesterton and Scott Boyson – AW Chesterton. Their combined experience in the valve & sealing business is now available to the Valve World America's community under this month's *Ask the Experts* column.

Q What is meant by the term low emission valves?

A The term low emission valve is used to identify valves that have features integrated into the valve to reduce leakage from valve stems. Often this leakage is fugitive emission leakage of volatile organic compounds (VOC's) or volatile hazardous air pollutants (VHAPS). Fugitive emissions are a term that industry uses to define emissions from non-point single point sources such as stacks and vents. Leaks from equipment such as pumps, valves, and pipe flanges are considered fugitive emissions as they are not centralized and difficult to collect.

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There is a large range of technology options to choose from and various degrees of low emissions performance when it comes to low emission valves. As regulations increase demanding lower and lower leakage rates, what was once a low emission valve may no longer be low enough. For instance, the US Environmental Protection Agency is now defining low emission valves as those valves that have been tested to generally accepted engineering practices so that they can be guaranteed for lower than 100 ppmv of leakage performance over a five year period.

The American Petroleum Industry (API) has finalized and published API 624 which is a low emission valve standard to assist manufacturers and end-users in defining a low emission gate and globe valve. This standard specifies the requirements and acceptance criteria (100 ppmv) for fugitive emission type testing of rising and rising-rotating stem valves equipped with packing previously tested in accordance with API 622. Packing shall be suitable for use at service temperatures °29 °C to 538 °C (°20 °F to 1000 °F). The type testing requirements are based upon elements of EPA Method 21 using methane as a test media. Documentation requirements from the standard require test measurements, component inspection and the API 622 packing performance test to be submitted for evaluation. This standard is rapidly increasing in its use and will see widespread adoption due to its API designation and strong correlation to emissions regulations.

While the API 624 standard is for rising stem and rising-rotating stem valves with graphitic packing, the standard is already being used as a base standard and modified for use with other valves such as ¼ turn valves, valves using PTFE stem seals, and control valves.

Other tests also exist to identify low emission valves such as the ISO 15848-1 and 2 published by the International Standards Organization. The standard uses a variety of techniques to measure leakage from valves such as bagging, vacuum and sniffing methods. The test media can either be helium and methane. Unlike the API 624 standard which allows for no retightening of the valve during the test, the ISO 15848-1 test allows for one retightening due to excessive leakage.

Other standards also exist such as TA-Luft and FCI to measure and quantify low emission valves. End-users also take existing standards and customize them for their own use. So company specific requirements such as reducing the API 624 100 ppmv performance level to 50 ppmv to increase the safety factor and testing with a greater number of mechanical cycles are already in existence and will likely continue.

When defining low emissions, it will be important to always understanding the context and requirements for the valve. Is it for specific end-user corporation with current standards, API based end-users, and/or specific regions and their governing regulations. Having a depth of knowledge of these standards, their uses and implementation when defining what a low emission valve is will continue to be helpful.

Q Can I repack (modify) an existing valve to make it a low emissions valve?

A Yes, one can modify an existing non-low emission valve to a valve capable of achieving fugitive emission of "Class A" or "50ppm". New spacers for

valves can be made to accommodate incorrect stuffing box depths, new stems can be made to replace ones with excessive runout, a new stem bushing made with brass type material and surface may be re-machined to have desired tolerances. Combine these modifications with currently available low emissions packing technologies such as the braided packing installed in the field that are more accommodating to minor non-ideal dimensioning, most valves will be able to achieve low emission status.

However, to be realistic and ruling out fabrication of new valve parts as well as machining, various type of smaller modification are used to combat non-ideal conditions. Incorrect stuffing box dimensions may be compensated by using non-standard size packing, horizontal stem movement can be accommodated through usage of a forgiving packing type, live loading and packing bushing. Debris can be removed from stems by soft wore brush and then hand polishing with high grit sand paper to create the desired roughness for the specific packing type. Additional loading cycles may be added to the installation procedure to ensure proper compression of the packing.

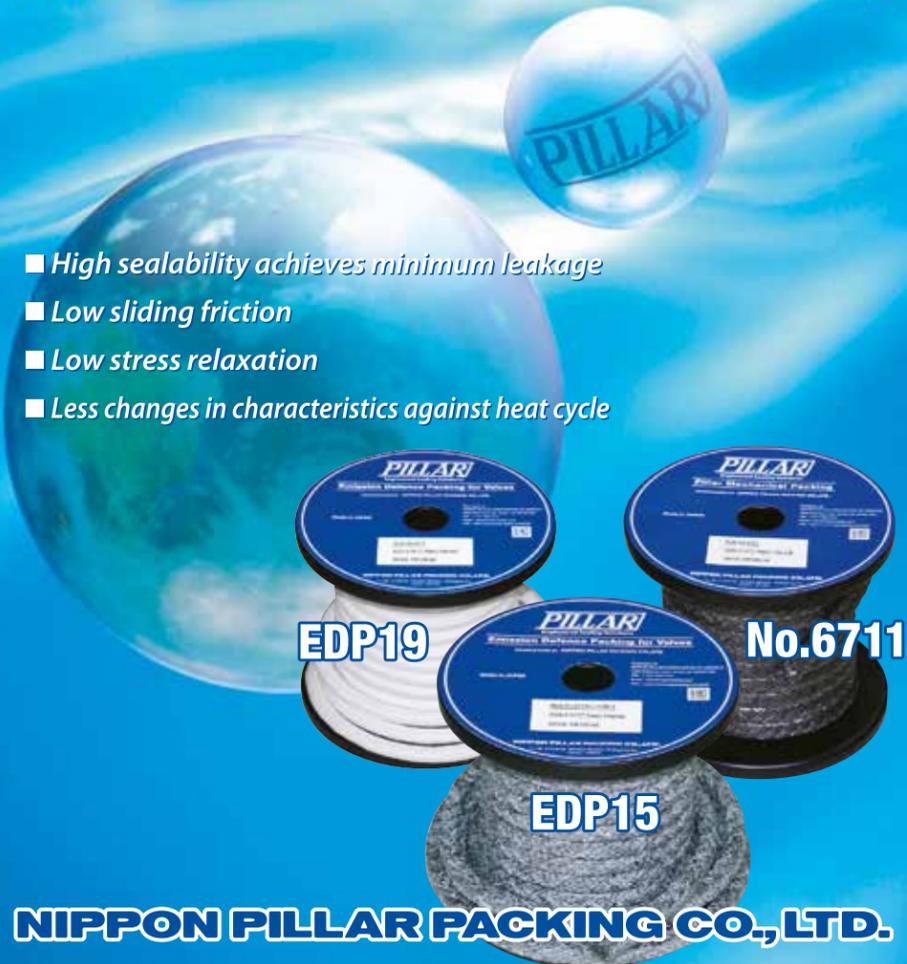
The low emission packing chosen to be used usually will be the braided type that can be cut and field installed by a trained technician. It should be noted that not all packing are created equal and should be evaluated through the use of the API 622 standard, this is a packing type test that validates a packing's characteristic through different corrosion and weight loss tests as well as performance in low fugitive emission.

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