

# Why Mechanical Packing has Become the EPAcenter of Fugitive Emission Control

For as long as the term “Fugitive Emission” has been discussed, it has always been reported that the largest concentration of leaks has been from valves. More specifically, the leaks found to be coming from valves are most commonly found to be emitting from the stuffing box area, which contains the stem seal, typically some form of mechanical packing.

The information reported by the US Environmental Protection Agency pertaining to leaks they find when performing their audit duties of industrial facilities, places the percentage of overall leaks detected at 60% from valves, and the other 40% from flanges and pumps etc.

Because of this information, end users, packing manufacturers and valve manufacturers have continually looked for ways to qualify both valves and mechanical packing products to meet the needs of the ever changing environmental compliance initiatives that really took hold following the signing of the “Clean Air Act of 1990”.

Beginning with the test protocol developed by the Petroleum Environment Research Forum (Perf) which was made up of a group of major refining end users, such as Exxon, Texaco, ARCO etc. and then followed by test protocols developed by independent end users such as Akzo Nobel and Chevron, there

seemed to be an unending cycle of tests to be performed that all had their own individual requirements that may or may not be acceptable to other end users searching for answers regarding a valve or mechanical packing products suitability for specific applications.

It was because of the wide range of test protocols that had been developed and the need for manufacturers to test and pass so many different tests that in 2006 the American Petroleum Institute developed and released “API 622: Type Testing Process Valve Packing for Fugitive Emissions”, which initially allowed for the testing to be performed in either the fixture used today or a specific valve. Consequently with the release of the Second Edition of API 622 in 2011, the ability to test the packing in a valve was removed from the standard, leaving the test to be performed in only the fixture creating a test that would be seen as completely neutral. With the test protocol and conditions controlled, each packing materials performance could be evaluated independently of the variables introduced by varying valve designs. Additionally, API 622 is currently under Task Force review and has been sent out for ballot to publish and release the 3rd Edition later this year. A few changes have been proposed, such as the allowable leakage being reduced

and the ability to re-torque the packing being removed, as well as the addition of a 1/8” packing cross section test being added to the current 1/4” cross section test fixture.

As a follow up to the decision to remove the ability to test the packing in a valve, the API has published and released “API 624: Type Testing of Rising Stem Valves Equipped with Graphite Packing for Fugitive Emissions” and “API 641: Type Testing of Quarter-turn Valve for Fugitive Emissions” to complete the series of testing protocols to cover all of the valve standards developed by and for the Downstream refining sector of the API.

With the development of the API testing standards and the addition of API 624 compliance being added to API design standards such as “API: 600 Steel Gate Valves—Flanged and Butt-welding Ends, Bolted Bonnets” & “API: 602 Gate, Globe, and Check Valves for Sizes DN 100 (NPS 4) and Smaller for the Petroleum and Natural Gas Industries”, with the same language and requirements potentially being added to “API 603: Corrosion-resistant, Bolted Bonnet Gate Valves—Flanged and Butt-welding Ends” & “API 623: Steel Globe Valves—Flanged and Butt-welding Ends, Bolted Bonnets”, which are both currently under task force review for updating and re-publishing. With the introduction of the testing standards and the addition of the test requirements being added to the valve manufacturing standards those of us involved in the API standards development process are confident end users of all types will be capable of meeting Consent Decree compliance requirements driving leakage levels to less than 100 ppm.

Ultimately, the area of most concern when performing these test on the various valve types is the stuffing box area of the valve and more specifically the packing/stem seal itself. However, it must be mentioned that merely choos-



In this monthly column, Strategic Account Manager – Stationary Equipment for A. W. Chesterton, Rodney Roth will focus on the essentials of Low-E compliance and modern valve sealing technologies.

ing the right packing capable of meeting the “Low E” requirements will not guarantee a valves ability to pass fugitive emission testing protocols, but by making the right packing choice and working closely with the packing manufacturer, valve OEM’s have been and continue to be able to manufacture valves which are capable of passing the tests and meeting the stringent low leak definitions being included in recently negotiated Consent Decrees.

In closing, all of this leads us to the conclusion that the mechanical packing/stem seal and all of the components, valve parts (stem, box bore, box depth, gland, gland flange, gland flange studs & nuts, packing selection, lubrication etc.) and workmanship associated with the stuffing box area of the valve shines a very bright spotlight on the packing and thus makes mechanical packing the “EPAcenter” of fugitive emission control with regard to valves of all types for all industries effected.



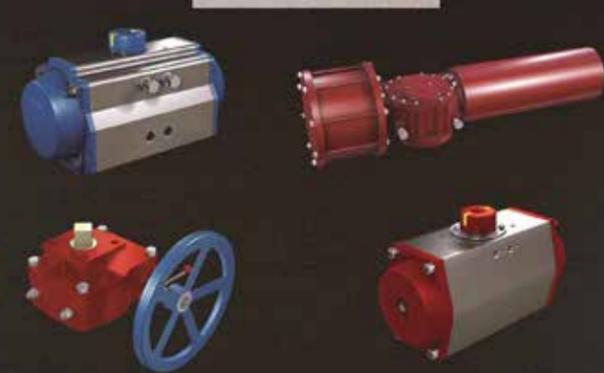
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