# Crane's New Sleeved Plug Valve Design – An An

## Introducing the first-ever **soft seated plug valve** able to pass

*When it comes to monitoring and measuring fugitive emissions levels in valves, the regulations have evolved from vague, regional methods to more descriptive, globally recognized standards. This evolution offers chemical companies the opportunity to better define performance requirements for specific applications, and valve manufacturers the ability to design new products that better meet the performance requirements of the market.*

Type testing of valves and packing has increasingly become more important as standards have been introduced, largely driven by the EPA in the United States and ISO globally, for environmental and safety regulations. Although fugitive emissions can come from numerous sources, a large portion, in any given plant are emitted through industrial valves and flange connections. To directly address this concern, many organizations and companies published their own valve standards and the EPA developed a leak detection method. However, the most widely accepted standards have been provided by the International Standards Organization (ISO).

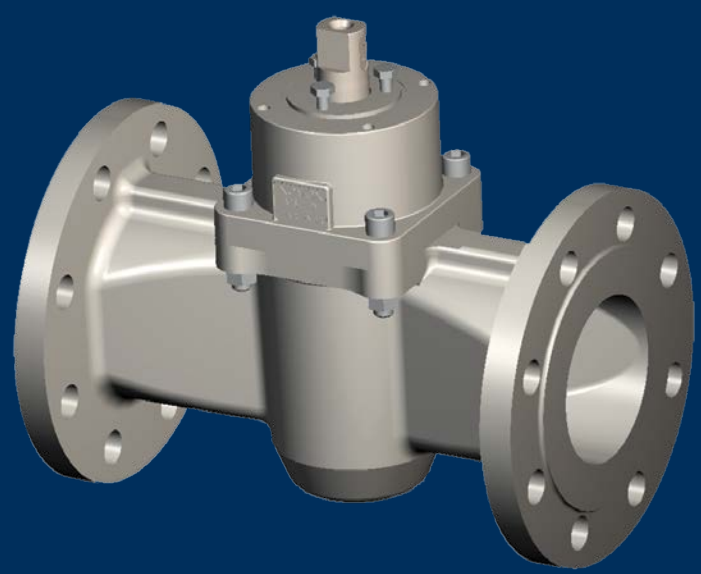
### EPA Method 21

The leak-detection method that was introduced by the Environmental Protection Agency is known as EPA Method 21. It provides a sniffing method intended to help standardize the process companies use to detect volatile organic compound (VOC) leaks in and around process equipment and valves. For the last several decades, valve manufacturers in the United States have provided end users with Method 21 leak rates and self-certification letters to communicate relative low-leak performance of their valves. A typical certification letter would include verbiage like "X ppm at 50,000 cycles." While helpful to compare performance of valves leaving a factory, it is important to note that Method 21 is not a test standard, and as such, does not have any requirements regarding the number of thermal or mechanical cycles. There is no pass or fail identification involved and there are no outlined leakage requirements. EPA Method 21 can only offer a way to compare valves performing in a laboratory setting and does not consider any of the stresses a valve will see once installed. As a result, chemical companies have begun to adopt new standards that more clearly define the performance requirements they expect emissions-grade valves to meet.

### ISO 15848-1

First published in 2006 and later updated in 2017, ISO's Standard 15848 was the product of more than 10 years of development and research that focused on defining a standard test methodology to measure and specify the external escape of stem packing in on-off valves, control valves and body gaskets intended for use in contact with volatile atmospheric pollutants and dangerous fluids. Its introduction defined a classification system that could differentiate between valve designs when assessing sealing levels, including specific thresholds for thermal cycle, mechanical cycle (endurance class), and ease of use (number of required adjustments for stem sealing). ISO 15848 can be used with both methane and helium. For validation, helium is the more widely used test molecule due to its small size and difficulty to contain, resulting in a more difficult test. This test is recommended for chemical companies because of the ability to select from a combination of thermal and mechanical cycles when writing valve specifications. This allows the operator to dial in precise emissions requirements for specific chemical services, and that same standard / requirement can be leveraged broadly across a global manufacturing footprint.

**XP3 & XP4D – INTERNALLY LIVE-LOADED STEM IMPROVES SEALING & REDUCES MAINTENANCE**



When a Soft Seated Plug Valve undergoes a significant amount of mechanical cycles (i.e. 50,000 cycles) it can experience wear. Crane's XP3 and XP4D valves maintain their seal integrity ensured by the live loading. This feature extends the service life of the valve and helps to reduce unscheduled shutdowns.

### New SPV Design Combats Fugitive Emissions

Crane ChemPharma & Energy, a business of Crane Co., is proud to introduce two brand new valves to market, the XOMOX® XP3 and XOMOX® XP4D Sleeved Plug Valves, which meet the highest lifecycle and emissions standards of ISO 15848-1. The ISO-15848-1 standard was built to ensure that valves are not just operating at an optimal level after initial installation, but also hold these emissions standards through simulated real-world conditions.

# swer to changes in Fugitive Emissions Standards

## ISO-15848-1 BH-C03 at 200°C without the need for adjustments.

### What ISO Represents for Real World Services

There are many components to the ISO test, however the following critical variables can help predict a valve's performance in the field.

The first is the number of mechanical cycles a valve is tested. This provides data supporting a valve's ability to operate over a long period of mechanical stresses that could cause wear on the sleeve and sealing surfaces. For many valves, the stem-sealing surfaces can fail due to mechanical wear. However, the Xomox Sleeved Plug Valve can easily pass this cycle testing due to the robustness of its primary seal (sleeve), as contained by as-cast pressure ribs and 360 degree port lips, in addition to the top sealing mechanisms.

The second important variable in the ISO 15848-1 test is the full temperature range the valve is exposed to during testing. Any valve that utilizes plastic parts is open to material cold flow, the process whereby plastic expands, contracts, and even moves within a valve. When the plastic is not properly contained this movement can cause leak points and valve failures. These failures could happen with the sleeve as it extrudes into the waterway, or even with the top diaphragm, as there are cover leaks. Some valve designs optimize the containment of the plastic parts. This maximizes the temperature range of the materials utilized to withstand a higher range of thermal stress. The Xomox Sleeved Plug Valve can operate up to 400 degrees Farenheight while utilizing PTFE, and 600 degrees Farenheight when utilizing its patented XeniTh. Xomox can capture this temperature capability due to its 360 port lips and in cast pressure boundary ribs that influence how the plastic behaves under these conditions.

The third variable to review in the ISO test is the number of thermal cycles to which a valve is exposed. Each time a soft seated valve is run through a thermal cycle it opens itself up to the same cold flow conditions discussed before. Thermal cycling is where many leaks occur in the field due to this expansion and contraction of material. This is especially true when a hot system is taken down to ambient temperature for a shut down before starting back up. During this time, the plastics have a chance to move away from the designated positioning which can cause leaks. To remedy this, many valves have been designed with adjustments to compress the plastics and eliminate leaks. However, in many applications, the ability to adjust when needed is limited. Thus, Crane's XP3 and XP4D Sleeved Plug Valves were designed to provide a patented internally contained live-loaded top seal that can withstand the challenging thermal cycling environment. In fact, this is the first-ever soft seated plug valve able to pass ISO-15848-1 BH-C03 at 200 degrees Celsius, without the need for adjustments. Additionally, the all new XP3 from Xomox provides the same internal sealing features of a legacy sleeved plug valve with a patented internal live loaded stem seal. This valve can be configured to meet a wide range of fugitive emissions requirements in a variety of alloys up to operating temperatures of 600 degrees Fahrenheit.

### Foremost Fugitive Emissions Protection

Fugitive emission standards are only becoming more stringent and the EPA is applying a lot of pressure on chemical manufacturers. Crane ChemPharma & Energy has focused on reducing the amount of fugitive emissions released, not only to meet the established standards, but to provide operators with added value and a high level of protection. By offering a valve that is tested to the highest global emission standard, uptime can be increased and maintenance cost reduced. In the most stringent chemical applications, fugitive emissions cannot be tolerated, and XOMOX® has and continues to be a leader in manufacturing valves that offer protection against it. As valve design and production evolves to meet the fugitive emissions standards that are being published, customers, in turn, are being provided with higher quality products for their applications in the chemical markets.

The views and opinions expressed in this article are those of the profiled company and do not reflect the position of Valve World Americas.