Keywords: Fire safe • Non-graphite • Stem seal

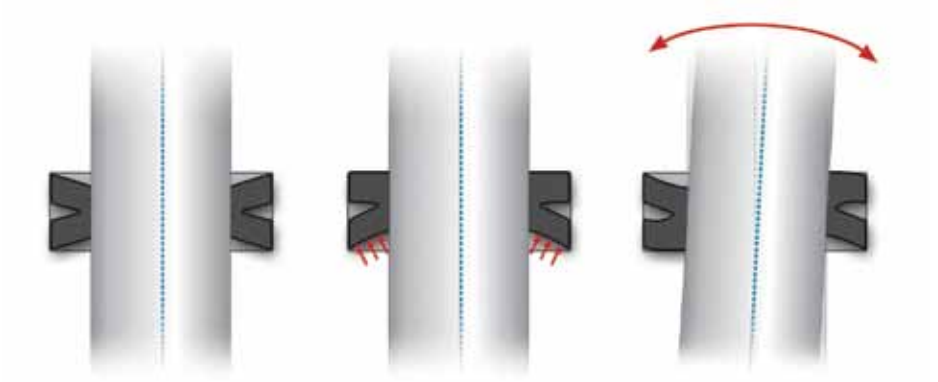
HermetiX fire safe series:

Non-graphite valve stem seal for fire safe applications

The "Clean Air Act Amendment" of 1990 was introduced by the U.S. Environmental Protection Agency (EPA), which required manufacturers to improve performance of valve stem sealing systems, i.e. low friction, resistance to wear, together with improved sealing. Habonim addressed these requirements and environmental concerns by reducing hazardous emissions and reducing product losses through a better valve seal material.

By Gaby Jaccoby, Habonim Industrial Valves & Actuators

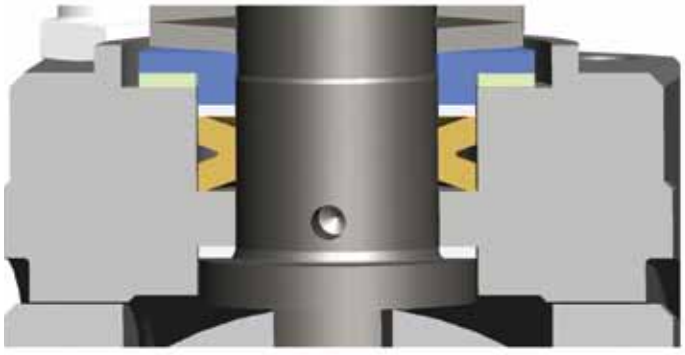
Back in 2008, Habonim developed the patented HermetiX stem seal named for its distinctive "X"-shaped design which delivers on the promise of 'zero stem leak' and longer valve life than conventional stem seals allow. The flexible "X" shape creates a dynamic sealing arrangement so that even as fluid pressure or side load increases the HermetiX dynamically adjusts to prevent fugitive emissions.
This design was tested, witnessed by a third party and certified to ISO 15848-1 standard (measurement, test and qualification procedures for valve fugitive emissions).



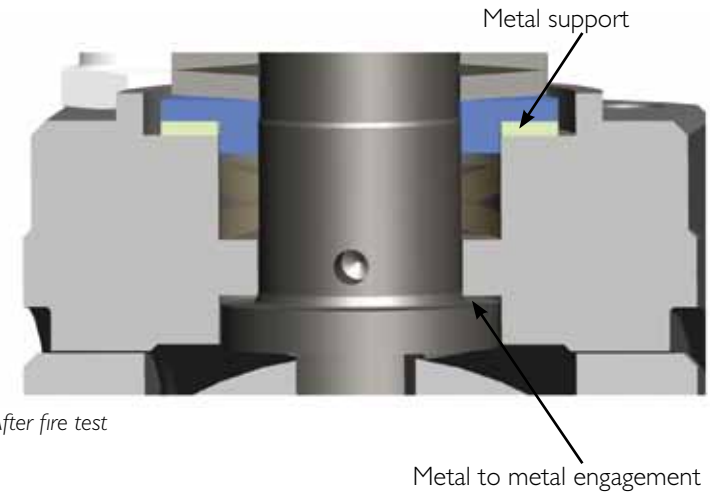
No pressure *Under Pressure* *Side Load*

Today there is an increasing demand for improved stem packing for hazardous environments which require fire safe certification. Therefore the company assigned an R & D team to address the problem. The traditional solutions for fire safe applications have used graphite-based materials to withstand heat. Graphite cannot withstand even moderate cycle loads and breaks down. This contaminates the media and is then rendered impotent as a sealing material.
Habonim tried to improve upon graphite-based materials, such as PTFE impregnated graphite and reinforced graphite with metal netting in order to withstand wear and tear but with no significant success.

After only a few thousand cycles, the graphite lost integrity, causing leaks. It was quickly understood that graphite is not the anti-erosion solution that is required to comply with international standards and industry regulations.
Habonim then took a different approach by investigating how the valve stem components react during fire testing and after cooling. It was known that during the fire test, pressure pushes the stem upwards causing a metal-to-metal engagement between stem fire lip and valve body. During the fire test, the role of the graphite in the stem is insignificant for sealing purposes. It functions only as a bearing to hold the stem parts in alignment. This is crucial after cooling, in order to allow valve rotation to the open position.



Before fire test



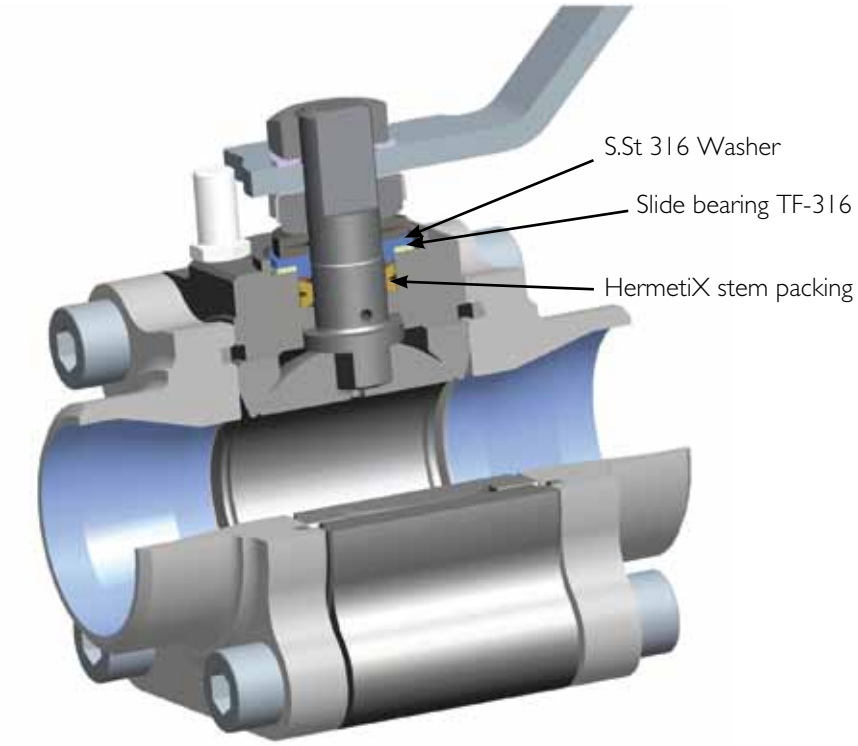
After fire test

Then the way forward was clear; design a bearing that will keep stem parts aligned at all times; during normal valve operation and in the event of a fire. Certain design characteristics of the materials are important at this point: Low coefficient of friction, erosion-proof (withstanding 500K cycles minimum), corrosion-proof and anti-galling. The engineers then conducted numerous tests to determine which materials best answered those needs and came up with a PTFE impregnated, sintered stainless steel bearing (TF-316). Without the need for graphite as a sealing material, the company can then use the proven HermetiX stem seal, integrated with the TF-316 bearing to offer the ultimate, leak-proof and fire safe solution. This exclusive design answers the rigorous demands and environmental standards of today's chemical, petrochemical, oil & gas and pharmaceutical industries.

A fire safe solution

The HermetiX fire safe valve offers the ultimate solution; an exclusive graphite-free stem seal that eliminates the risk of graphite contamination after prolonged stem wear or fire protecting both line materials and air quality. In case of fire, the specially engineered packing components allow the stem to stay in position. After cooling, it remains aligned and operable, even though the soft materials are melted. Currently and more than ever there is an increased demand for quality valves because of the rising cost of insurance for liability due to personnel injury or loss of life, property damage, tighter environmental and safety regulations, loss of materials through leakage, the high cost of system shutdown, clean-up and replacement parts to name a few. The HermetiX fire safe valve meets industrial requirements by certifying to the fire-safe API 607 / ISO 10497 standards, as well as holding certification for the stringent ISO 15848-1 standard.

The HermetiX fire safe series promises to deliver the most comprehensive solution on the market today for fugitive emissions, fire safe and critical applications.



Innovations keep on coming

Innovation after innovation, Habonim has a long tradition of solving some of the industry's toughest engineering problems. The company's most recent marketing initiatives are based on turning high-end custom design solutions into "commodity", off-the-shelf products that are setting new standards for reliability and affordability worldwide. It embraces every challenge, and the HermetiX fire safe represents a perfect example of how the company is geared up to deliver outstanding design solutions by thinking 'outside the flanges'.

Since 1963, Habonim has built up a reputation for being quick to respond to market needs and quick to get those solutions into the market. In this way, Habonim supports leading customers in many of the world's most demanding industries such as oil & gas, pharmaceutical, chemical, petrochemical and more. Habonim has launched the Hermetix solution worldwide with a great success and increasing market demand.

The HermetiX fire safe series will be showcased at the forthcoming exhibitions: ACHEMA 2012 (in June in Frankfurt, Germany), and Valve World 2012 (in November in Dusseldorf, Germany). For more information about the HermetiX fire safe, visit the company website at www.habonim.com

About the author

Gaby Jaccoby is the Engineering and R&D Manager at Habonim Industrial Valves & Actuators. With extensive experience in engineering, management, R&D and troubleshooting, Jaccoby is a leading influence bringing innovation to the forefront at Habonim for the past 11 years.

An expert in hydraulic and pneumatic systems, Jaccoby received his BA in mechanical engineering from the Technion - Israel Institute of Technology. He was previously employed at Mekorot, one of the world's most technologically advanced water companies, where he designed regional water systems and water and sewage treatment facilities.