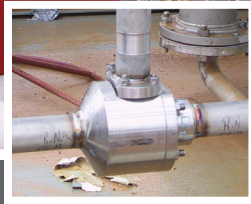
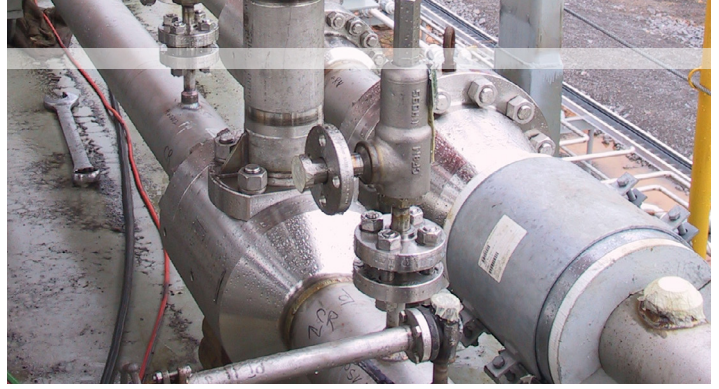


**VALV**TECHNOLOGIES®



# Cryogenic Valves for LNG Service

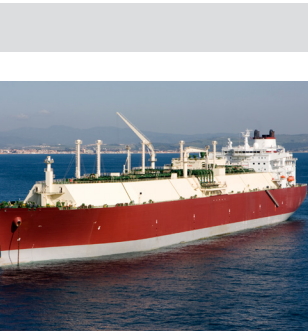
Engineered Products for Severe Service Applications™



## Applications.

ValvTechnologies' cryogenic valves are built to withstand the most severe applications. This solution represents an important step forward in cryogenic technology by providing absolute zero-leakage thanks to the RiTech® coated integral seat, live-loaded fugitive emissions and fire safe tested design.

- Liquefied natural gas (LNG)
- Air separation



## Cryogenic Valves

Fire tested to API 607

ValvTechnologies' metal seated cryogenic valves are available in a variety of materials suited for extremely low temperatures.

- 1/4 - 36"
- ANSI/ASME Class 150 - 4500





## The Right Specification.

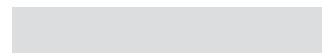
According to most specifications, cryogenic valves for LNG service must be fire tested.

Unfortunately, the soft goods in most cryogenic ball valves will not pass the industry standard fire tests. Additionally, some metal seated valves which claim to be “inherently fire safe” have not actually been fire tested.

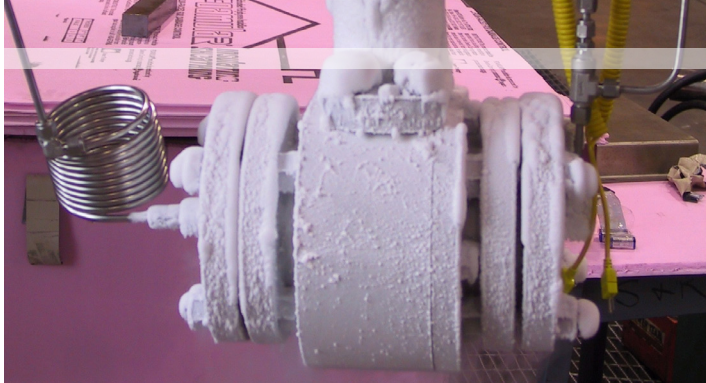
Contrary to conventional ball valve designs that attempt to adapt hard seats to a soft seated design, ValvTechnologies’ valves were designed from the beginning to be metal seated.

The ValvTechnologies’ design is centered around a seat that is machined as one piece integral to the end connector. This provides a stable platform onto which the ball is loaded with the high force of a Belleville® spring. The proprietary RiTech® carbide coating on the ball and integral seat are mated lapped, which, in combination with the spring, provide a tight metal seal at all differential pressures and temperatures. In addition, all ValvTechnologies’ valves feature live-loaded fugitive emissions and fire safe stem packing.

ValvTechnologies’ ball valves do not use any elastomers. As such, the valves are inherently fire safe by design. Pressure and temperature parameters are dictated by the grade of steel used in construction of the valve, not by o-rings.







## Research and Development

ValvTechnologies' in-house cryogenic research, development and testing facilities include conventional submersion tanks as well as state-of-the-art proprietary vacuum test apparatus that enable accurate process simulation with real-time data logging capabilities. This commitment to advancing the design and performance of ValvTechnologies' products ensures that it continues to be the superior valve solution.

## Testing

ValvTechnologies' cryogenic valves undergo exhaustive process simulation testing.

ValvTechnologies' cryogenic design exceeds the test requirements of BS 6364 and also meets the fire safe requirements of API 607. ValvTechnologies' cryogenic laboratory uses a proprietary vacuum test chamber as well as the more common immersion testing tanks. The vacuum chamber allows accurate process simulation that is not possible with the industry-standard test apparatus.



## Global Experience

Since 1987, ValvTechnologies has maintained a culture of innovation by continuously expanding its design, production and technology capabilities. ValvTechnologies provides an unsurpassed level of reliability to customers in the fossil power, nuclear generation, oil and gas, mining, hydrocarbon, pulp and paper and various specialty industries. ValvTechnologies globally spans across 217,000 square feet (20,160 square meters) of manufacturing and office space which includes research and development, production, a complete machining facility, certified welding department and testing. These resources, together with a large inventory of parts and stock valves, allow ValvTechnologies to have complete control of all aspects of the manufacturing process, even for the most demanding projects.

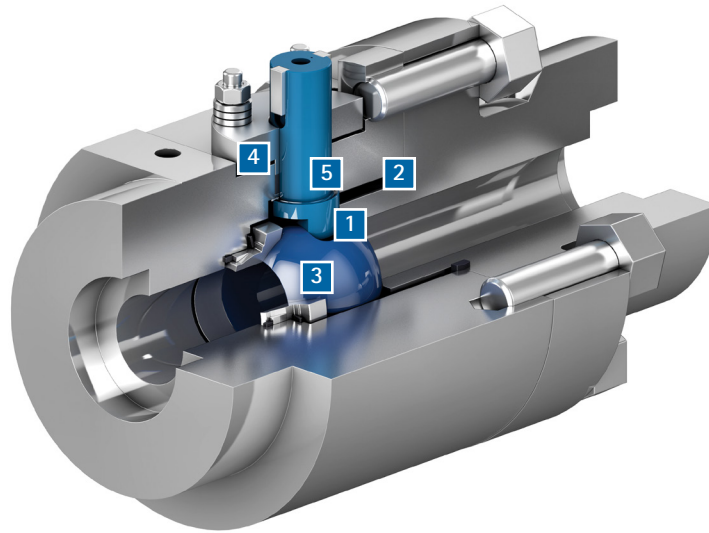
ValvTechnologies' reputation as a solution-provider for the most difficult and problem service conditions is what continues to attract EPCs and end users to inquire about options for their applications. When one of the most respected engineering, construction and project management companies in the world approached ValvTechnologies to supply cryogenic ball valves for a Trinidad LNG project, the close cooperation resulted in the ValvTechnologies exceeding the client's product performance expectations. This is a typical example of how ValvTechnologies solves some of the most severe service applications in the industry.

**We work directly with customers to develop solutions that meet their unique process requirements and specialty applications.**

# V Series Metal Seated Ball Valves.

The flagship of the ValvTechnologies' product line

ValvTechnologies' design features are the implementation of extensive industry experience.



## **1 Integral metal seat.**

With our patented HVOF RiTech® coating technology, the integral seat in ValvTechnologies' valves is resistant to the attack of abrasive magnetite and ferrous oxides that may be seen in the steam flow.

## **2 Body seal ring.**

ValvTechnologies employs a field proven seal ring technology to ensure sealing under all operating conditions, up to 1400°F. The body seal ring is loaded at a pressure higher than 20,000 psi. In addition, valves sized 3" and above contain a secondary Grafoil® seal to further guarantee reliability.

## **3 Patented coating process.**

The sealing surfaces are overlaid with tungsten or chromium carbide using our HVOF RiTech® coating process. These surfaces have a hardness of 68 - 72 Rc to provide uninterrupted operation in the most severe conditions.

## **4 Live-loaded gland area.**

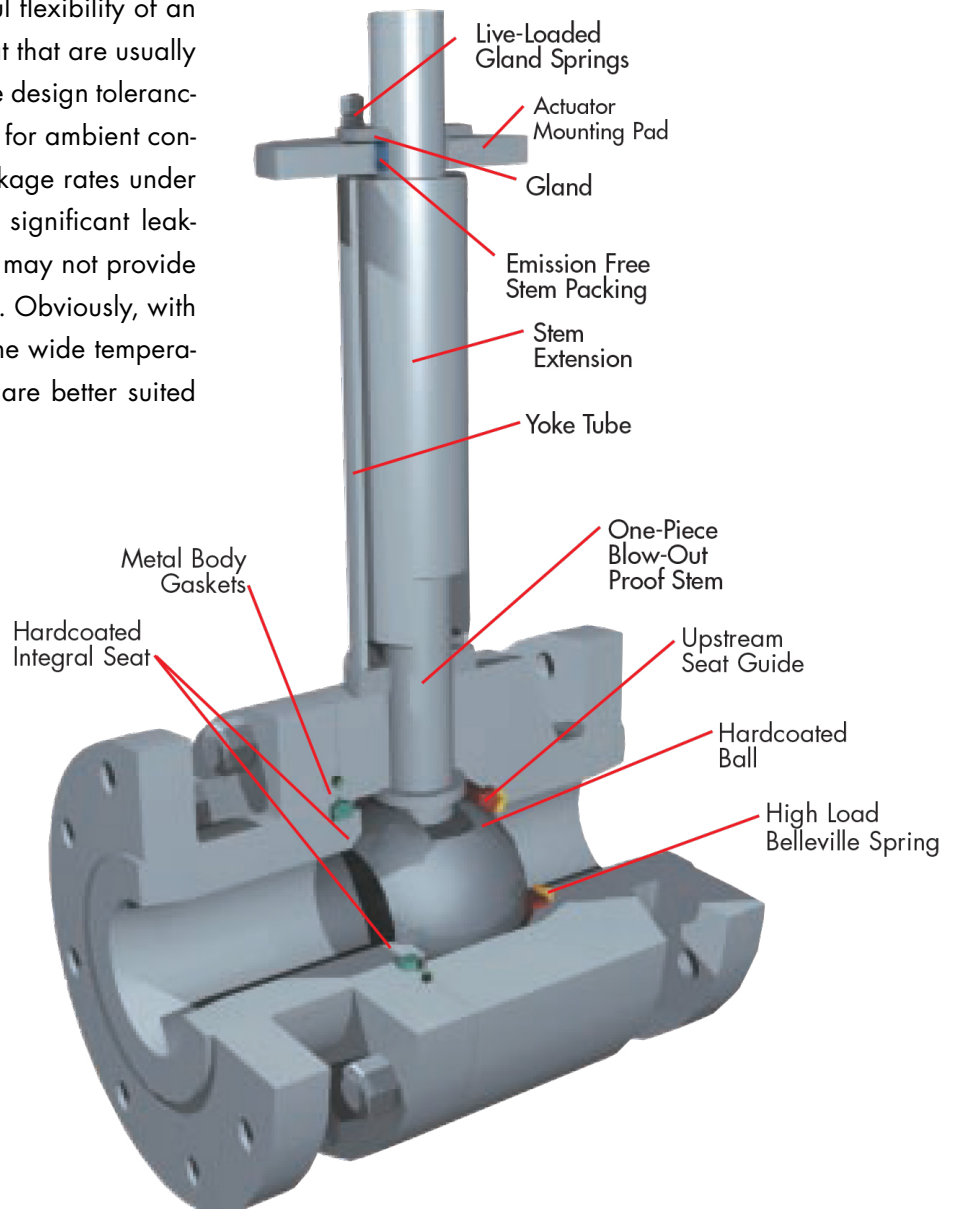
The V Series' sealing design features a four stud, live-loaded assembly designed for heavy industrial applications. The sealing material is high purity Grafoil® surrounded by stainless steel wire mesh anti-extrusion rings. The six Belleville® springs (per stud) provide constant load pressure through extreme thermal shocks and prevent wear leaks in high-cycle service.

## **5 Blow-out proof stem.**

ValvTechnologies' design utilizes a one-piece, hard-coated, blow-out proof stem that is inserted through the inside of the body cavity eliminating the possibility of blow-out through the gland area. There are no pins, collars or other devices used to retain the stem in the valve body.

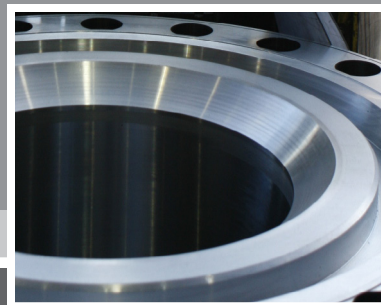
### Solving Unique Challenges.

The increasing awareness of fire safe requirements in cryogenic systems is calling on valves to handle both extremes of the temperature spectrum equally well. Conventional soft-seated ball valves are less suitable for cryogenic services since they attempt to extend the useful flexibility of an elastomer seal into regions of cold and heat that are usually beyond their original design properties. The design tolerances for these valves are commonly calculated for ambient conditions and thus barely meet allowable leakage rates under cryogenic test conditions. In addition, the significant leakage rate allowed by the first test standards may not provide the shut off necessary in an upset condition. Obviously, with the current state of elastomer technology, the wide temperature fluctuations of cryogenic applications are better suited to metal seated valve designs.





# Zero-leakage Valve Solutions.



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