



SECTION A-A

# Valves for the Oil and Gas Industry

Critical Service Solutions

**VALV**TECHNOLOGIES®

# Critical Service Valve Applications

ValvTechnologies' valves are built to withstand the most severe applications. High-temperature, low-pressure cryogenic, high-pressure, high-cycling, abrasive, corrosive and caustic media have all been considered in the design of our product line.

In the oil and gas industry, valve performance can be compromised by combinations of process conditions such as high-temperature, high-pressure, high-solids or high-cycles. The ValvTechnologies' design is quite unlike that found in floating and trunnion-style ball valves and is a complete departure from the traditional gate and plug valves found in this industry.

ValvTechnologies uses an integral seat rather than loose seats. The integral seat provides a stable platform onto which the ball is constantly loaded with very high force, making it impossible to trap solids between the ball and seat. When the ball is in the open position, the seats are protected from the flow. The integral seat also eliminates the potential for leakage between a loose seat and the valve body.

The ball and integral seat are hard coated with chrome carbide or tungsten carbide using ValvTechnologies' proprietary HVOF process called RiTech®, or Robotically Integrated Technology. This increases the surface hardness by nearly an order of magnitude beyond that of conventional weld-overlay hardening techniques.

High-surface hardness makes the sealing surfaces impervious to erosion and abrasion. The base metal is not altered by the hard coating, and maintains compliance with the hardness requirements of NACE MRO175.

A high-strength Belleville® spring provides force to load the ball into the seat. This design solves many of the problems related to buildup and corrosion in trunnion bearings and eliminates free space between the ball and seat. Unlike the floating-type ball valves, the ValvTechnologies' design does not require upstream pressure to provide tight sealing. The spring also makes the valve inherently self-relieving and provides anti-static protection.

The non-pinned, blowout-proof stem provides a measure of safety and reliability that is essential in critical service valves. The stem is inserted internally when the valve is assembled. Live-loaded Grafoil® and stainless steel packing guarantees zero emissions to ISO 15848. The valves are available in a wide variety of sizes and materials and in ANSI pressure classes 150-4500 and API 5,000 – 20,000.

Bi-directional double block-and-bleed and double isolation configurations are available. ValvTechnologies' valves used in oil and gas applications are guaranteed to be zero-leakage and zero emissions.

# Critical Service Valve Applications

The ValvTechnologies' severe service valve design is a departure from traditional products found in the upstream and midstream sectors of the oil and gas industry.



## Downstream and Chemical Processing

Coking (delayed and flexi)

- Switching
- Feed isolation
- Overhead vapor line
- Cutting water isolation

Fluidized catalytic cracking

- Catalyst handling
- Slurry isolation and control steam

Ethylene

- Steam decoke isolation
- Furnace isolation
- Steam vent
- Quench oil isolation and control

Polyethylene

- Isolation
- High cycle (PTO)
- Reactor block

Heavy oil upgrading and hydrocracking

(H-oil and LC fining)

- Catalyst addition and withdrawal
- Filter and pump isolation
- Overhead vapor isolation and control
- High  $\Delta P$  isolation and control

Reforming (CCR)

- Lockhopper
- Isolation

## Upstream Oil and Gas

- Wellhead choke isolation
- HIPPS
- Emergency shutdown (ESD)
- Compressor recycle and isolation
- Sour gas isolation and control
- Steam, water and gas injection
- Steam chokes
- SAG-D isolation
- Pig launcher and receiver
- Mud drilling isolation and check
- Molecular sieve applications
- First and second stage separator isolation
- Lateral lines
- Manifolds
- Trunklines
- LNG liquefaction
- Subsea

***ValvTechnologies provides field-proven solutions for severe service applications.***

# V Series Metal Seated Ball Valves

The flagship of the ValvTechnologies' product line

## 1. Integral metal seat

With our patented HVOF RiTech® coating technology, the integral seat in ValvTechnologies' valves is resistant to the attack of abrasive and corrosive production applications.

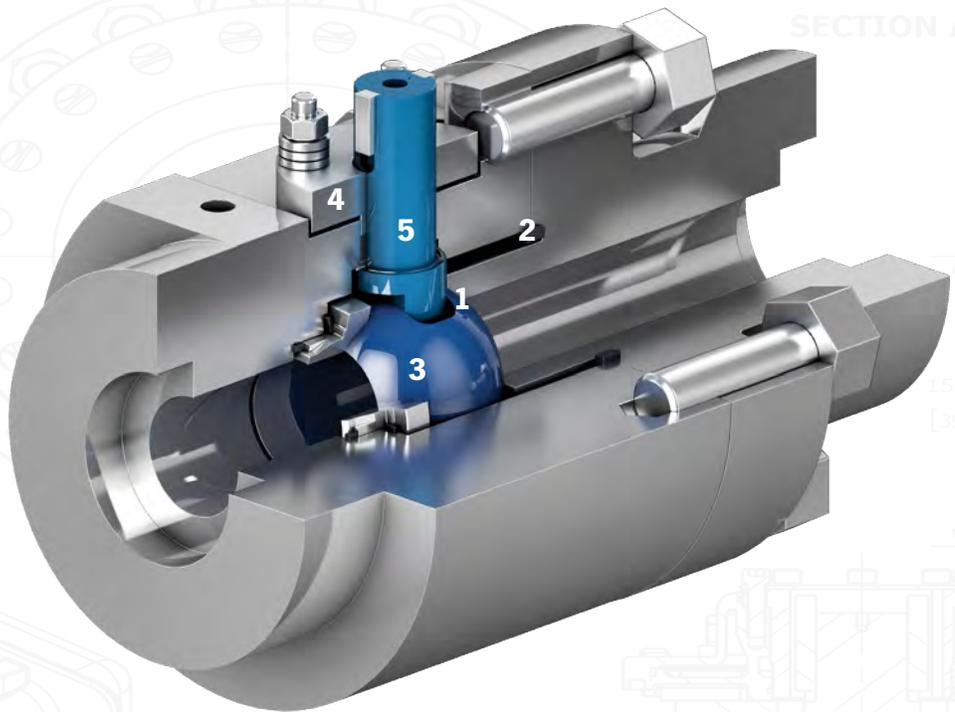
## 2. Body seal ring

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 with zero-leakage.

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



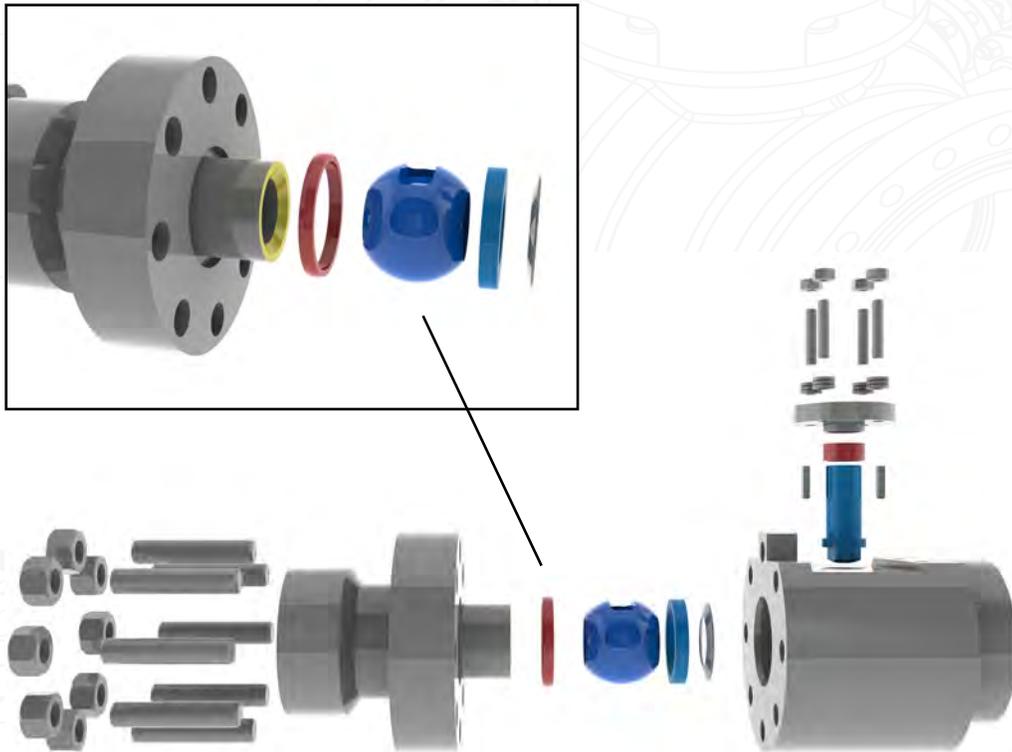
## 4. Live-loaded gland area

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.

# V Series Features and Benefits



V Series Key Performance Features and Benefits	
Features	Benefits
Guaranteed zero-leakage shut-off	Enhanced process safety
Quarter-turn operation - readily automated	Increased safety, ease of operation, reduced space requirements
Metal-by-metal seat	Good for highly abrasive service, resistant to solids, reduced maintenance costs, minimum downtime
Custom engineered	Process optimization
Dimensions to ANSI B16.10	Interchangeable with equivalent valves
Single piece anti blow-out stem design	Enhanced personnel safety
Certified to use in SIL-3 and SIL-4 loops	Enhanced process safety
Live-loaded gland system (four-stud design)	Reduced emissions
Stem fugitive emissions per ISO 15848-1 Class B	Reduced emissions, enhanced process safety
Fire safe certification: API-607/API-6FA	Enhanced process safety
Protected seat design	Reduced maintenance costs, minimum downtime
Live-loaded seats	Low-pressure sealing
No elastomers or thermal plastics	Long field life
Double block-and-bleed capable	Enhanced process safety

# NexTech® Trunnion Metal Seated Ball Valves.

## The next generation in trunnion technology™

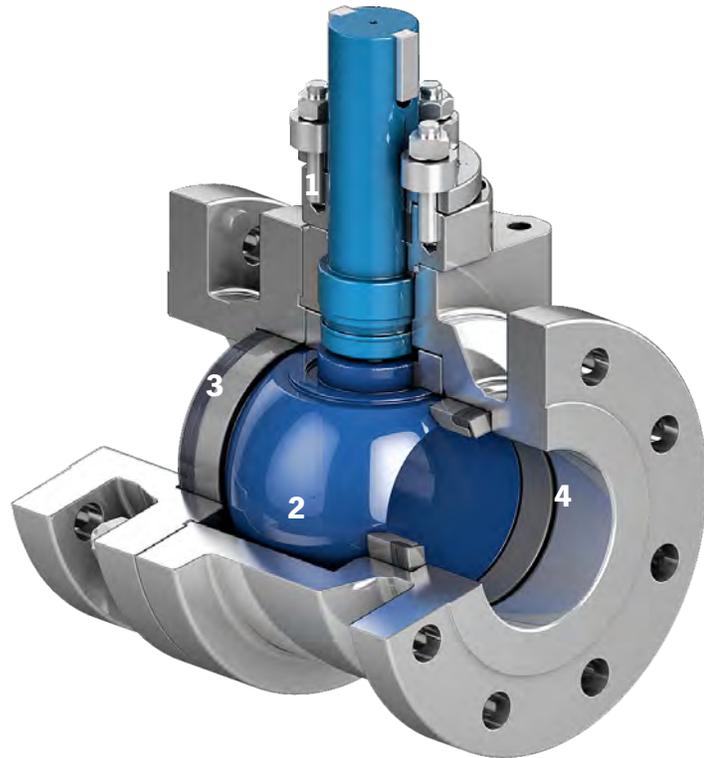
### 1. Live-loaded gland area

The NexTech® gland packing design features a four stud, live-loaded assembly designed for heavy industrial applications. The packing material is high purity Grafoil® surrounded by carbon fiber/Inconel 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.

### 2. Carbide sealing surfaces

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

***The NexTech®  
trunnion design  
provides a severe  
service solution for  
tough, high-cycling  
applications.***



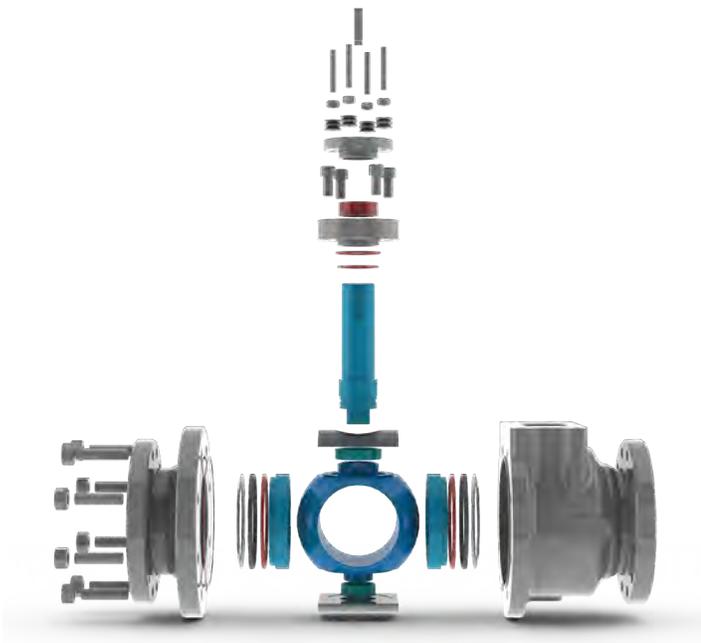
### 3. High-integrity seat surfaces

To prevent leaks around the seats, ValvTechnologies has developed an innovative double seal design for high-temperature operation and/or high-cycling applications. In low temperature, high-cycling service, a secondary elastomer seal is installed on the seat perimeter.

### 4. Solids resistance

In addition to the carbide coatings which will allow the valve to function in highly abrasive applications, the individual valve parts have additional seals to prevent interference from solids in the system. This provides for outstanding performance in catalyst systems, streams with solids contamination and polymers.

# NexTech® Features and Benefits



NexTech® Key Performance Features and Benefits	
Features	Benefits
Guaranteed tight shut-off	Enhanced process safety, repeatable sealing
True metal-to-metal sealing without using secondary elastomeric seals	Inherent fire safety
Solid-proofed by design	Process reliability
HVOF RiTech® coating technology	Extended life, reduced maintenance costs
High-density Grafoil® seals	Reduced maintenance costs
Double block-and-bleed capability	Enhanced process safety
High-cycling capability	Process reliability
Bi-directional sealing by design	Enhanced process safety, lower maintenance, less downtime
Single piece anti-blow-out stem design	Enhanced process safety
Impervious to high thermal cycling	Enhanced process safety
Certified to use in SIL-3 and SIL-4 loops	Enhanced process safety
Live-load gland system (four stud design)	Lower emissions
Stem fugitive emissions per ISO 15848-1 Class B	Lower emissions, enhanced process safety
Fire safe certification: API-607/API-6FA	Enhanced process safety
Low emission packing: API 622	Most effective technology
FE per ISO 15848	Zero stem leakage

# TrunTech® Trunnion Metal Seated Ball Valves.

## The next generation in trunnion technology™

The advantages of the trunnion-mounted ball valve include: low operating torque, very high flow rates (Cv), protected sealing surfaces when in the open and closed position and the ability to operate in the presence of solids and other contamination. The TrunTech® design from ValvTechnologies withstands severe thermal swings, meets stringent emission requirements and provides long life in abrasive and erosive conditions.

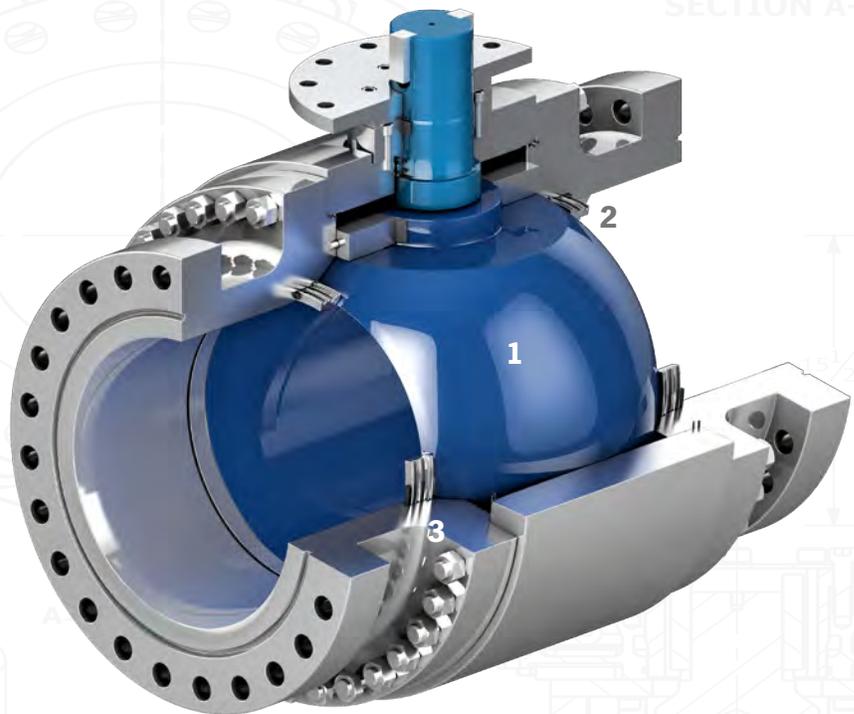
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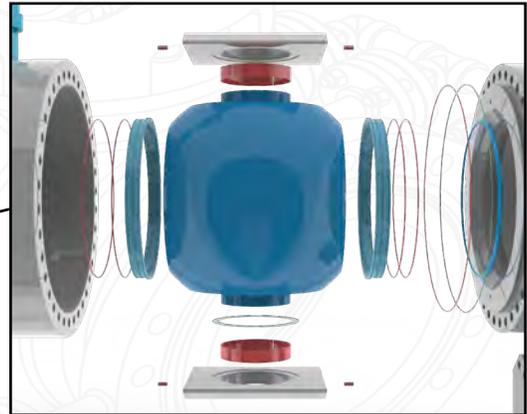
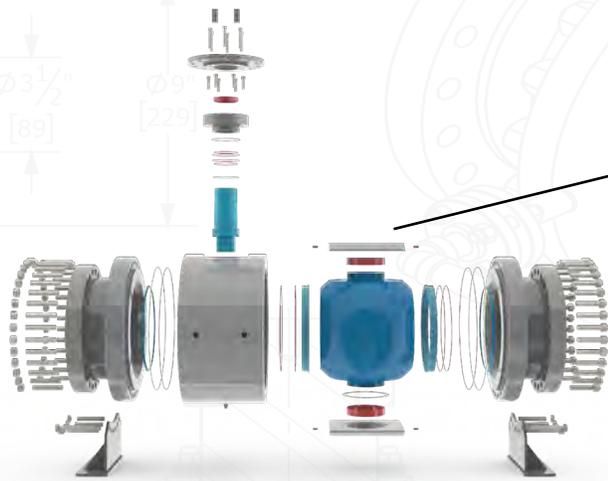
***The TrunTech®  
trunnion design  
provides a severe  
service solution for  
tough, high-cycling  
applications.***



### 3. Solids Resistance

In addition to the HVOF RiTech® carbide coatings which will allow the valve to function in highly abrasive applications, the individual valve parts have additional seals to prevent interference from solids in the system. This provides for outstanding service in severe-service isolation applications with high particle content from sand, elemental sulfur, hydrate, perforation shrapnel, molecular sieve catalyst and pipe corrosion products.

# TrunTech® Features and Benefits



TrunTech® Key Performance Features and Benefits	
Features	Benefits
Guaranteed tight shut-off	Enhanced process safety and repeatable sealing allows operation under process excursions
True metal-to-metal sealing without using secondary elastomeric seals	Inherent fire safety
Solid-proofed by design	Process reliability
Exclusive HVOF RiTech® coating technology	Extended life
Grafoil® fire-safe seals	Good for high-temperature service
Double block and bleed capability	Enhanced process safety
High cycling capability	Process reliability
Bi-directional sealing by design	Enhanced process safety, lower maintenance, less downtime
Single-piece anti blow-out stem design	Enhanced process safety
Impervious to high thermal cycling	Enhanced process safety
Certified to use in SIL-3 loop in single-valve and SIL-4 loop in two-valve with minimum MTBF 1,280 years	Enhanced process safety
Fire safe certification: API-607 / API 6FA	Enhanced process safety
Stem fugitive emissions per ISO 15848-1 Class B	Lower emissions and enhanced process safety

# V Series Metal Seated Ball Valves

## Demand the original™

The flagship of the ValvTechnologies' product line, the V1-1, is the valve by which all other severe service metal-seated ball valves are measured. The V1-1 design includes integral seats, RiTech® hard coatings, blowout-proof stem and live-loaded packing. Primarily used in severe service applications, V1-1 valves are manufactured to each customer's unique specifications.

The V Series' proven seat supported design provides improved performance, far beyond the capability of linear operated valves which feature obstructed and torturous flow paths. ValvTechnologies' design and construction delivers the extra safety margin so crucial to maintaining productivity: customers benefit by realizing increased security, less downtime and lower maintenance.

V1-1's are engineered to be leak-free, maximize flow and reduce the overall cost of ownership. So confident of their performance, only ValvTechnologies' V1-1 valves are backed by the best zero-leakage warranty in the industry.

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### V1-1

Forged, high-pressure valves  
Four-year, zero-leakage warranty\*

- 1/4 - 4"
- ANSI/ASME Class 900 - 4500

\*steam and water applications

## V1-2

Get outstanding flexibility and reliability in the lower pressure class range. ValvTechnologies' V1-2 flanged valves come in more sizes and virtually any cast or forged material, ensuring superior performance and long life. Specify them with special end connections, purge ports, cavity fillers, cryogenic stem extensions, fugitive emission bonnets...all these options can be added to the valves that feature HVOF RiTech® hard coatings as standard – and absolute zero-leakage guarantee.

- **Flanged, low-pressure valves**
- **1/2 - 36"**
- **ANSI/ASME Class 150 - 600**



## V1-3

ValvTechnologies' investment cast version of the V1-1 severe service isolation valves pay off in low-pressure applications with the elimination the typical high-maintenance linear valves and allows the customer to take advantage of the benefits that come standard with the zero-leakage guarantee, ensuring long service life.

The V1-3 is available in both full and reduced-port models and, like all of our V series products and just as important, our HVOF RiTech® hard coatings enables the same critical mated lapped sealing surfaces, making the valve impervious to erosive, corrosive and abrasive services.

- **Small bore, low and intermediate pressure investment cast valves**
- **1/2 - 2"**
- **ANSI/ASME 150 - 600**



## V1-4

ValvTechnologies' V1-4 severe service metal seated ball valve extends our core design concepts to large diameter and higher pressure applications. This valve is the result of the evolution of the latest in manufacturing techniques and hard coating technologies, expanding of all of the features and benefits of the V1-1 design in large-diameters for oil and gas applications worldwide.

This valve is designed for critical isolation applications in industries requiring high-performance solutions. All ValvTechnologies' valves can be custom designed to meet the demands of your specific application. This large, robust bore is ready when the pressure is on. Our absolute zero-leakage guarantee and proven low cost of ownership are second to none.

- **Large bore, high pressure valves**
- **4 - 36"**
- **ANSI/ASME Class 900 - 4500**



# Trunnion Metal Seated Ball Valves

## NexTech®

Severe service trunnion  
Low torque, bi-directional shut-off

The NexTech® valve is a true, engineered-to-spec specialty valve with materials selected to meet the needs of the most demanding applications. Utilizing the same coating and live-loading technology that built the V Series product line, but in a lower-torque, inherently bi-directional package, NexTech® valves are designed and configured to handle corrosive, high-temperature, high-cycle, high-solid applications requiring tight shut-off. This valve represents the state-of-the-art in severe service metal seated ball valve technology.

- 2 - 42"
- ASME/ANSI Class 300 - 2500



## TrunTech®

Designed to API-6D and API-6A

ValTechnologies' TrunTech® is designed to address the severe service demands of the upstream and midstream oil and gas industries. Its protected seat seals design provides long life and tight shut-off in abrasive/erosive conditions and meets stringent fugitive emission requirements.

- 2 - 36"
- ANSI/ASME Class 150 - 2500
- API 5000 - 15000
- Sized per API 6A and 6D



## IsoTech®

Parallel slide gate valve

Bi-directional, zero-leakage isolation

The IsoTech® addresses the need for true in-line repairability in large diameter, high-energy piping systems. Specifically designed for steam and feedwater applications, the IsoTech® provides bi-directional, zero-leakage shutoff using our HVOF RiTech® coating process.

- 4 - 36"
- ANSI/ASME Class 600 - 4500
- Four-year, zero-leakage warranty
- Delamination guarantee



## Xactrol®

Characterized and stacked disc trim  
Leak-free isolation and control in one

- 1/2 – 36"
- ANSI/ASME Class 150 - 4500
- Integral, characterized downstream seat
- Upstream disc inserts for modulation

The Xactrol® product group couples ValvTechnologies' zero-leakage technology with special designs that allow rotary modulating control. From the Mark I's design that features a characterized upstream seat to the Mark III's precision engineered stacked discs, the Xactrol® allows the customer to combine precise flow control with tight shut-off. The Xactrol® is typically used in applications where minimum flow and relatively high differential pressures are required.

# Low Emission, Metal Seated Ball Valves

## The next generation in emission reduction technology™



### PulseJet

Fast-acting, high-cycle isolation and control-in-one

ValvTechnologies' pulsejet valve is a fast-acting, high-cycle fugitive emissions valve designed to send a pulse of gas through a pipeline system. A trunnion-mounted ball valve, capable of 90° or 180° rotation in speeds as low as 0.5 seconds or faster, this fast actuation speed is what creates the gas "pulse" through the pipeline system. Pulsejet systems can be used to clean system filters, spray chemicals in an injection type system, or pulse debris/media through a pipeline to prevent clogging. This technology is unmatched in the industry.

- 2 - 6"
- ANSI/ASME Class 150 - 1500

### EcoPack®

For the reduction of fugitive emissions

Reducing fugitive emissions is a leading concern in the fight against climate change. The EPA estimates that the production segment of the oil and natural gas industry is responsible for 45% of total methane emissions. In 2015, the first-ever plan to regulate emissions from this industry was launched: because valve leakage is responsible for more than 50% of total fugitive emissions, valves have been a considerable focus in the effort to reduce fugitive emissions. ValvTechnologies is leading the charge in the reduction of fugitive emissions with the development of the EcoPack®: a superior stem packing solution for high-cycle, fast-acting valves that meets stringent fugitive emissions requirements.

- Meets ISO-15848-1 testing requirements for fugitive emissions
- Packing requires zero adjustment or maintenance
- Capable of 500,000+ cycles
- Durable packing solution for extremely fast-cycle speeds of less than 0.5 seconds

# Isolation Valves for Coking Service

The delayed coker process is one of the most hostile environments in the refinery due to the abrasive and erosive properties of the coke by-product and is crucial to a refinery's profitability. Valves are cycled frequently and failure can lead to the complete shutdown of a unit, resulting in large process and financial costs. Optimizing valve life-cycle is critical to operational efficiency.

## Coking Valves

Avoid unscheduled downtime and lost production

The ValvTechnologies' isolation valve for coking services provides process improvements and reliability through turn-arounds. The simple, yet wear and erosion-resistant design, ensures reduced maintenance time and costs for customers in these severe service applications.

- 1 - 36"
- ANSI/ASME Class 300 - 2500



## Switch Valves

Delayed coker service solution  
Mechanically-loaded design that eliminates steam bellows

Improve reliability, decrease unscheduled downtime and production losses with ValvTechnologies' switch valve. Enjoy a decade or more between major maintenance requirements and peace-of-mind through tight shut-off with preventative maintenance continuous purge systems.

- 8 - 18"
- ANSI/ASME Class 600 - 900



# Speciality Valve Solutions

## Double Block-and-Bleed

ValvTechnologies' valves can be configured for double block-and-bleed and double isolation service for lateral lines manifolds, ESD and critical applications

The double block-and-bleed configuration features a bi-directional upstream seat system as well as a bleed connection with a standard ValvTechnologies' isolation valve. Standard double block-and-bleed valves are available in a variety of materials and end connections. Double block-and-bleed service can also be applied to both the high pressure and low pressure NexTech® trunnion valves as well as the cryogenic valve.

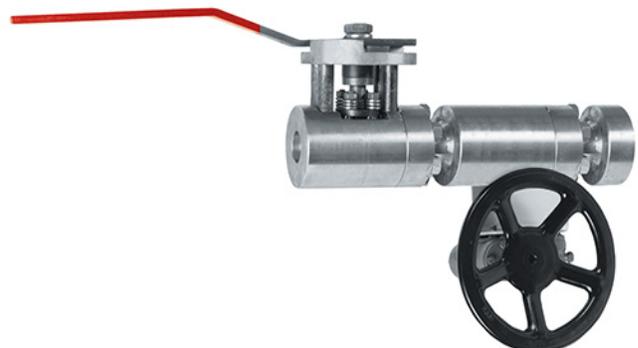


## Double Isolation / Twin Ball

ValvTechnologies also offers a double isolation, block-and-bleed valve configuration. The integral metal seat of the double isolation, double block-and-bleed configuration provides key safety solutions to isolating large equipment areas safely and effectively.

The design features a primary and secondary bleed port as well as a secondary back-up safety integral metal seat. The integral seat features RiTech® 31 hardcoating that is hand-matte lapped to the ball providing metal to metal sealing and zero-leakage. With a secondary bleed point in a double isolation valve, the maintenance technician has guaranteed security of two sealing seats between him and the process.

- **Extra safety with primary and secondary bleed ports, secondary bleed point in double-isolation models**
- **Integral metal seat comes with secondary, back-up seat**
- **Metal-to-metal sealing: HVOF RiTech® hard coating hand-matte lapped to ball – delivers guaranteed zero-leakage**
- **Flexible configurations: Apply to any high-pressure and low-pressure NexTech® trunnion valves or ValvTechnologies' cryogenic valve**



## Subsea Valves

The NexTech® trunnion design is an effective solution for subsea applications.

The one-piece body design handles solids and requires minimum maintenance. Additionally, an option for hyperbaric testing by an independent lab offering a 12,000 feet certificate is available.

The NexTech® subsea valve has been independently certified to 12,000 feet below sea level.

- **API 5000, 10000, 15000**
- **ASME/ANSI Class 900 - 4500**
- **2 - 36"**
- **End and top entry designs**



## Cryogenic Valves

Built and tested in accordance with BS 6364 valves for cryogenic service and fire tested to API 607 / 6FA.

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

- **1/4 - 36"**
- **ANSI/ASME Class 150 - 4500**
- **Rated to -196°**



## High Integrity Pressure Protection Systems (HIPPS)

HIPPS are used to reduce the risk of damaging upstream piping in situations where operating pressure exceed design pressures.

Unfortunately, mechanical relief systems cannot be used in high pressures and flow rates are present. Environmental complaints and strict plant safety requirements are greater than normal. The use of a logic solver system with instrumentation protection is the preferred solution. Special materials, stringent testing and over sized actuation are key elements to ensure the valves will isolate in an emergency. ValTechnologies' zero-leakage metal seated ball valves are suitable for these requirements and the system exceeds SIL 1 requirements.

The system includes:

- **State-of-the-art software package with a logic solver**
- **Instrumentation**
- **Chemical injection system**
- **Choke control**
- **ValTechnologies' quick closing zero-leakage ball valves**

## Molsieve Valves

Customers in molecular sieve applications require safety and absolute zero-leakage to the environment. ValvTechnologies' V Series solution is simple, robust and reliable for lower cost of ownership, higher process efficiency and plant availability.

Molecular sieves are often utilized in the petroleum industry, especially for the purification of gas streams. Valves leading into and out of molecular sieves cycle frequently and leakage in these critical areas can make it difficult or impossible to meet product purification requirements. Sour gas dehydration is of particular interest because of the complexity introduced by the acidic and corrosive nature of H<sub>2</sub>S and CO<sub>2</sub>. The challenge for dehydration units to maintain their reliability when a valve fails to isolate and/or operate due to the abrasive wear is costly. A single, carefully selected valve can answer a large number of concerns.

- 4 - 36"
- ANSI/ASME Class 900 - 2500
- Absolute zero-leakage shutoff



SECTION A-A

## Pigging Valves

ValvTechnologies metal-seated design eliminates the problems caused by soft-seated valves

ValvTechnologies metal-seated valves solve the serious problems that are caused by soft-seated valves in pig recovery, as well as in the dump and low-point drain lines. Our super-hard RiTech® coatings are impervious to the scale and debris that are carried with the pig into the receiving dock. The ValvTechnologies' design provides repeatable zero-leakage isolation, allowing you to hold pressure in the system after multiple pigging cycles. If the installation is in a cold-weather region, we can use cavity fillers to prevent damage caused by freezing condensate.

- 2-36"
- ANSI/ASME Class 150 - 2500
- API 6D / Q1
- API 6FA / 607
- API 6D double block-and-bleed



# Specialty Valve and Actuator Solutions



## ValvXpress®

Quality and dependability in one package - guaranteed

ValvXpress® is perfect for customers who demand quick delivery of a zero-leakage automated valve solution for severe service steam and water applications. The package includes the superior quality of the V1-1 valve and ValvTechnologies' actuator, backed with the best four-year warranty in the industry. ValvXpress® pre-engineered, automated packages are compact, robust and ready to ship.

Pre-engineered package includes:

- 1/2 - 4" metal seated V1-1 ball valve
- Socket weld and butt weld end connections
- A105, F22, F91 body materials
- ANSI/ASME Class 900 - 4500 pressure classes
- Valve operating conditions to 1400°F (760°C)
- High-cycle pneumatic rack and pinion actuator
- High-cycle mounting hardware
- Limit switch with position indicator - 2-SPDT, quick set cam, IP67, NEMA 4/4X
- NAMUR solenoid - 110V/120V, 230V, 24VDC coils
- Filter/regulator with gauge
- Retainer prevents stem driving into ball



## ValvXpress® Actuator

The actuators utilize a rack and pinion design which provides constant torque output in a compact package. The torque output is proportional to the air supply pressure. Twin horizontally opposed cylinders incorporate piston guides to ensure engagement between the rack and pinion.

- Hard anodized body with high-temperature Viton® seals
- Maximum working pressure 142 psi/10 bar
- Maximum working temperature 320oF/160oC

# Zero-leakage Valve Solutions



## Worldwide Office Locations

**Australia**

**Brazil**

**Canada**

**Chile**

**China**

**Colombia**

**India**

**Japan**

**Kazakhstan**

**Malaysia**

**Poland**

**Saudi Arabia**

**Singapore**

**South Korea**

**Spain**

**Thailand**

**Turkey**

**United Arab Emirates**

**United Kingdom**

**United States**

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