

API 6A Valves



B.F.E. s.r.l.

BONNEY FORGE

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BONNEY FORGE

RP&C Valve

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SECTION A

GATE VALVES

B-1

B-4

P&ID SYMBOL



Gate valves are primarily designed for on-off services when a straight-line flow of fluid and minimum restriction is desired. The closure member of gate valves either stops or allows flow through the valve and acts somewhat like the opening or closing of a gate and is called, appropriately, the gate valve.

SLAB GATE VALVES

Slab Gate valves use the resultant force from line pressure to help to have a mechanical and tight sealing in downstream side when high differential pressure occurs. Low pressure sealing is achieved by the seat design assisting in pushing the seat ring against the gate to obtain the seal. The high performance one-piece, solid gate which consistently delivers best-in-class sealing

performance throughout a wide range of conditions, including corrosive and abrasive fluid environments. The smooth, continuous bore minimizes turbulence within the valve and when in the open position it produces a pressure drop equivalent to a portion of pipe of same length and diameter. The seat faces are outside the flow stream and therefore protected from the erosive action of the flow.

EXPANDING GATE VALVES

Expanding gate valves are high performance gate valves that possess functions of double & bi-directional sealing. The 2-piece (gate + segment) obturator designed for a positive, bubble tight shut off upstream and downstream under both low and high differential pressure. Double block and bleed capability and high robustness are standard features of this seat design, the gate and segment units collapse against each other for travel, and separate when the valve is fully opened or fully closed, to affect a mechanical

seal. No matter if the valve is fully open or fully closed, the fluid is insulated from valve cavity, this feature allows the operator to release the pressure through vent & drain fittings in an emergency situation. The smooth, continuous bore minimizes turbulence within the valve and when in the open position it produces a pressure drop equivalent to a portion of pipe of same length and diameter. The seat faces are outside the flow stream and therefore protected from the erosive action of the flow.

OS&Y SLAB GATE VALVES

API 6A slab gate valves are normally preferred with Inside-Screw Compact design but they can be supplied with an OS&Y bonnet

with the classical API 600 / API 6D configuration where the stem is in back seat position when the valve is fully open.

MUD SERVICE GATE VALVES

Mud-Service gate valves are designed for dependable service in high pressure pump and standpipe manifold systems. The seats are designed to provide a positive, tight shut off at every closing cycle, even after long exposure to abrasion and scoring. The closure member is slab type with a "T" slot stem connection which allows the gate to float to the seat, providing high sealing performances. The seat is one-piece seat design with two metallic

inserts to which a resilient elastomer is permanently bonded with close-die vulcanization technology. The elastomer provides tight shutoff after long use in abrasive service. The bonnet is easily removed for internal parts inspection and/or replacement without removing the valve from the line. This design simplicity permits fast and easy service without the need for special tools. The one-piece seat design makes field replacement easy.

SECTION B

BALL VALVES

C-1

C-2

P&ID SYMBOL



The trunnion ball valve is a form of quarter-turn valve which uses a hollow, perforated and fixed/ supported ball to control flow through it. A trunnion mounted valve means that the ball is constrained by bearings and is only allowed to rotate, the majority of the hydraulic load is supported by the System constraints, resulting in low bearing pressure and no shaft fatigue. The line pressure drives the upstream seat against the stationary ball so that the line pressure forces the upstream seat onto the ball causing it to seal. The mechanical anchoring of the ball absorbs the thrust from the line pressure, preventing excess friction between the ball and seats, so even at full rated working pressure operating torque remains low. This is particularly advantageous when the ball valve is actuated because it reduces the size of the actuator and hence the overall costs of the valve actuation package. Advantages of trunnion ball design is the lower operating torque, ease of operation, minimized seat wear (Stem/ball isolation prevents side loading and wear of downstream seats improving performance and service life), superior sealing performance at both high and low pressure (a separate spring mechanism and upstream line pressure is used as the sealing against the stationary ball for low pressure and high pressure applications). The trunnion is available for all sizes and for all pressure classes but they are not suitable for throttling purposes.

Continued on the next page

SECTION C

SIDE ENTRY TRUNNION BALL VALVES

Side entry ball valves are valves where the ball is assembled from the side part. The body construction comes in 2 or 3-pieces depending on the size/class. The combination of trunnion mounted balls and unique spring-loaded upstream

sealing, provides bubble-tight shut-off and low operating torques, even at extremely high shut-off pressure. Side entry ball valves are the marked standard of ball valve types and should be the default choice for general service.

TOP ENTRY TRUNNION BALL VALVES

Top entry ball valves are valves where the ball is assembled from top side part. The top entry design enables maintenance keeping the valve in service: the valve internal parts can be inspected and repaired without removing the

valve off the pipeline. The top entry ball valves are used at an application that requires a minimal disassembly for in-line maintenance such as high pressure application that requires in-frequent maintenance or in case of butt welding end.

Continued from previous page

CHECK VALVES

D-1

D-2

P&ID SYMBOL



Check valves, are used to prevent back flow in the line. The pressure of the fluid passing through a system opens the valve, while any reversal of flow will close the valve.

SWING CHECK VALVES

The swing check valve functions by allowing flow forces to move the closure element, it is a hinged clapper which swings or rotates around a supporting shaft. The disk swings away from the valve-seat to allow flow in the forward direction, and returns to the valve-seat when upstream flow

is stopped, to prevent backflow. These valves produce the lowest pressure drop, when compared with other check valves of the same size, the internal contours and shapes allow them to fully open at low fluid velocities and create a smooth flow path through the valve.

"T"-PATTERN PISTON CHECK VALVES

In Piston, or lift, check valves a body-guided disc moves within the body bore. The body guide ensures alignment of the seat and disc when the valve closes. The valve is installed with the flow under the disc, so that the inlet line pressure and flow rate will force the disc to "lift" off the seat and allow the line fluid to flow through the valve. Should the flow suddenly reverse itself, the disc will automatically

and quickly, assisted by the weight of the disc, be forced to the closed position, preventing the line fluid from returning. Standard valve design has no spring in order to minimize cracking pressure and pressure drop, it will only function properly when installed in a horizontal line. As an option the designs can include a spring to assist closing and for use in 90-degree styles installed in vertical lines.

ALTERNATIVE DESIGN SOLUTIONS

E-1

E-2

API 6A native design is available for the products acc.to sections of this index only. BFE can also extend the API 6A design concept to the following design:

- "T"-PATTERN GLOBE VALVES
- GATE WEDGE VALVES
- HIGH EROSION-RESISTANT GATE VALVE FOR GEOTHERMAL SYSTEM
- DOUBLE BLOCK AND BLEED BALL VALVES
- DOUBLE BLOCK AND BLEED NEEDLE VALVES
- OTHER DESIGN ON REQUEST

AVAILABLE OPTION

F-1

F-6

- CRA WELD OVERLAY
- DIRECT AND REVERSE ACTION
- PISTON EFFECT PRINCIPLE
- SPECIAL DRAIN AND VENT DESIGN
- STEM EMERGENCY SEAL RESTORATION
- STEM EXTENSION

BFE AVAILABLE CATALOGUES

BFE - BONNEY FORGE: VALVE PRODUCTS FOR EVERY INDUSTRY INFRASTRUCTURE

BFE is proud to offer the widest variety of high-quality products and unmatched services. Search our catalogs, search for a product, or contact us for help with your order.



Forged Valves



Forged Pressure Seal Valves



API 6A Valves



Cast Steel Valves



Trunnion Mounted Ball Valves



Forged Floating Ball Valves



Double Block & Bleed Valves

THE COMPANY BEHIND THE BRAND

BFE: EXPERIENCE AND EXPERTISE AT YOUR SERVICE

More than 50 years of experience, expertise and know how strengthen BFE's leadership in the production and commercialization of valves for oil and gas, mining industry, petrochemical, power generation and utilities. This solid and dynamic business strategy allows BFE to identify and provide solutions to meet specific needs, and aims to achieve complete customer satisfaction which today turns out to be of great value.

BONNEY FORGE: THE NAME YOU TRUST FOR FORGED STEEL VALVES

Bonney Forge's forged steel valves and piping components have led the way for over eighty years in state-of-the-art design and dependable performance. It is qualities like these, combined with a customer-driven culture, that maintains Bonney Forge's leadership position within the industry for exceeding customer expectations. Our goal is to make Bonney Forge your number one world-wide choice for forged valves.

OUR MISSION

To be, today and in the future, the recognized leader in our industry, marketing and manufacturing forged steel valves, cast steel valves, forged fittings, branch connections and other related products to satisfy our customer's expectations.

To be cost effective through Total Quality performance of these operations, and thus provide the resources required to support our commitment to improve our products, processes and customer service.

To be a law abiding corporate citizen respecting the rights of individuals, contributing to the needs of the community and conserving the state of the environment.

OUR CREED

- Continuously improving quality, processes and customer service.
- Eliminating delays, errors and defects in materials and workmanship.
- Providing customers with access to statistical evidence that quality is incorporated in our products and production processes.
- Requiring suppliers to provide statistical evidence of quality in products and process capabilities.
- Sharing with the organization the cost of poor quality in products and services.
- Driving out fear and bringing problems to light for all to see.
- Working together to address specific problems and establish goals and solutions as a team.
- Controlling manufacturing processes which determine the final cost and quality of our products.
- Removing barriers which stand between employees and their pride of workmanship, and implementing ongoing training, supervision and employee development programs.
- Good housekeeping, which reflects on the company, its operating philosophy and our people.



BFE is specialized in the production of industrial valves for use in oil & gas, chemical, petrochemical, power, onshore and offshore industries. BFE has two main division:

- Albano Sant'Alessandro - BG - Italy: The management sales and operative offices are located here, as well as the machining, assembly and final testing workshop for forged valves
- BFE forging plant - BG - Italy: The main components for forged valves are forged and represent BFE's first basic factor of global quality, seeing that the entire manufacturing process is controlled and guaranteed by the Company Quality System.



Bonney Forge is an industry leader in marketing and manufacturing forged steel fittings and unions, branch connections, forged steel valves, cast steel valves and specialty products.

For more than a century, Bonney Forge has achieved manufacturing excellence through the detailed attention to customer's needs and producing consistently superior flow control products. Today, the Bonney Forge name is synonymous with quality that exceeds all industry standards.



WFI International, a Bonney Forge Company, is a leading manufacturer of ferrous and non-ferrous branch connection fittings, specialty flanges, and seamless fittings for use in piping systems and on pressure vessels. WFI and Bonney Forge are the world's leading manufacturers of integrally reinforced branch connection fittings.



Bonney Forge acquired RP&C Valve in 2004. RP&C traces its' origin back to 1878 with the Steam Boiler Appliance Company. RP&C products consist of Forged Steel Valves used in the chemical processing, pulp and paper, petroleum, power, and residential and commercial construction markets.

COMPANY BACKGROUND

BONNEY FORGE CORPORATION ACQUIRES BFE

Bonney Forge Corporation has expanded its global footprint in manufacturing industrial valves and fittings by completing the purchase of BFE. As one of the world's leading manufacturers of forged steel valves, cast steel valves, forged steel fittings, unions and branch connections, our commitment to excellence in producing the highest quality products makes this acquisition a significant alliance in the international market.

2013

SECURING OUR GLOBAL PRESENCE BY INVESTING IN OURSELVES.



BONNEY FORGE

ENHANCED APPROACHES TO ENVIRONMENTAL AND ECOLOGICAL MANAGEMENT

As well as guaranteeing maximum functionality, all valves made by B.F.E. S.p.A. fully comply with international and EU norms to reduce atmospheric pollution and leakage also under critical conditions such as high pressures, temperatures and the presence of aggressive products, etc.

2004



DYNAMISM, INNOVATION AND GROWTH

A significant year for B.F.E. S.p.A. Bonney Forge Valve Licensee as Acciaierie Valbruna di Vicenza, one of the world's largest steel companies, comes in as controlling shareholder. The US-based Bonney Forge Corporation continues to maintain its position as a shareholder and licensor.

1996

BONNEY FORGE EUROPE BECOMES B.F.E. S.P.A.

In 1987 the current B.F.E. S.p.A. Bonney Forge Valve Licensee is created: the company was acquired from Bonney Forge Corporation; however the latter remains a shareholder and licensor.

1987



1966

BONNEY FORGE EUROPE IS FOUNDED

December 1966. Bonney Forge Europe S.p.A. is officially incorporated. The Firm continues to operate mainly in energy production and the petrolchemical industry. In order to meet increasingly sophisticated and complex market demands, Bonney Forge Europe buys a production plant exclusively dedicated to forging.

1955

FIRST DAYS, A PROMISE OF QUALITY AND COMMITMENT

Forged valves production first started as long ago as 1955 in a converted warehouse in Albano S. Alessandro originally built as a barn. The production was the responsibility of four people but in just a few years there were thirty on the payroll - thanks to a policy of steadfast commitment and the winning of a series of important orders from Italy's fast growing chemical and petrolchemical industries.

O.M.B.A.
Engines

VALVOLE &
RACCORDI
FORGIATI

B A-3

... in questo Catalogo

TAKING QUALITY TO THE NEXT LEVEL

ENGINEERING IN A QUALITY DRIVEN MARKET

Our extensive, uncompromising, company-wide quality control system carefully monitors our manufacturing processes to assure a product that performs to the highest industry standards.

Quality assurance procedures include 100% hydrostatic and pneumatic testing of all valves in full conformance to applicable API standards and industry codes.



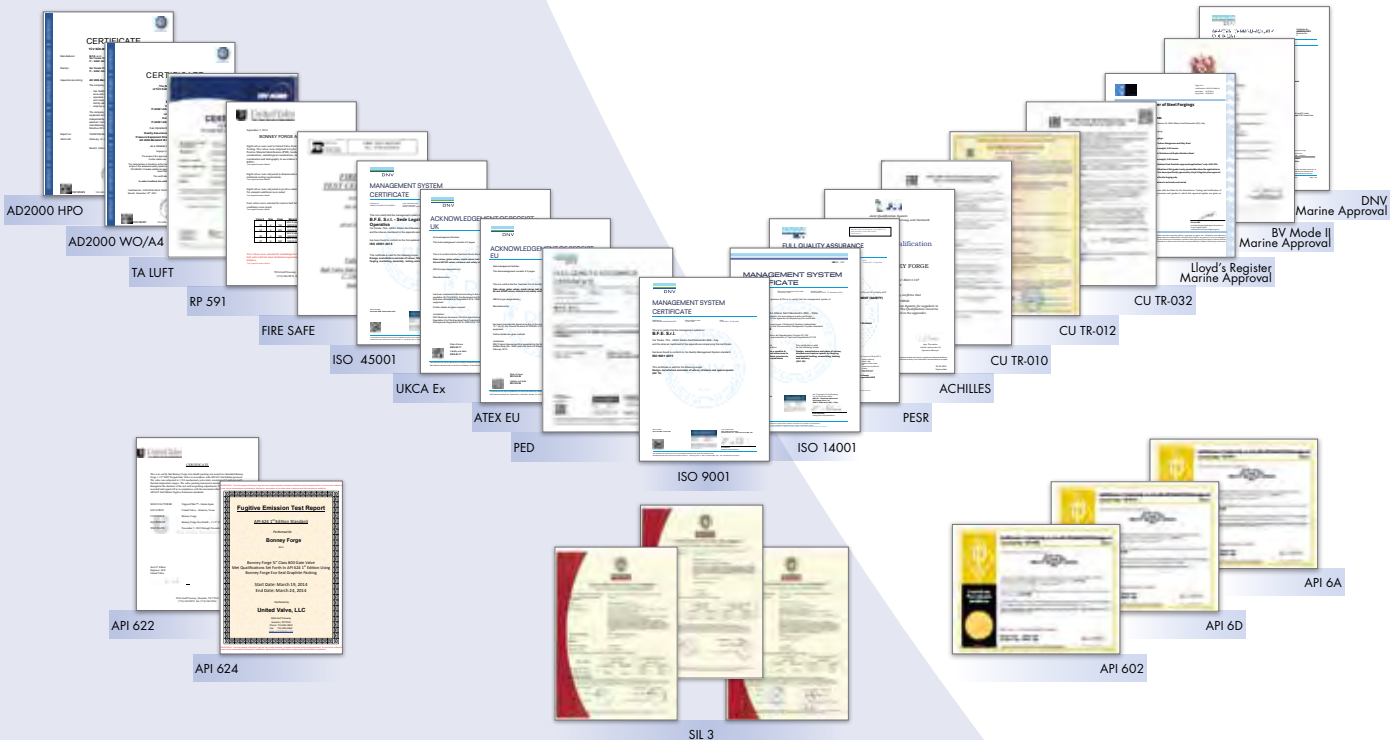
QUALITY THAT YOU CAN COUNT ON

BFE products are manufactured and tested in strict accordance to ASTM, ASME, ANSI, API and other applicable industry codes and specifications.

Chemical and mechanical properties of all Bonney Forge products are fully traceable to the original forging lot and raw material heat. Requirements of the market are in a state of constant evolution, and customers' quality needs are met and exceeded by the complete business process.

THE ASSURANCE YOU NEED

It is our policy to supply only quality products that conform fully to customer and statutory or regulatory requirements including codes and standards. To help meet our objective we operate an exacting quality control system, which has been audited and assessed by numerous customers and external authorities for compliance with all market standards.



CONFIDENCE IN STEEL FORGING

WHY FORGINGS?

Forging offers uniformity of composition and structure. Forging results in metallurgical recrystallisation and grain refinement as a result of the thermal cycle and deformation process.

This strengthens the resulting steel product particularly in terms of impact and shear strength. Forged steel is generally stronger and more reliable than castings and plate steel due to the fact that the grain flows of the steel are altered, conforming to the shape of the part.

WHAT YOU GAIN WHEN YOU SELECT OUR FORGING

- Dimensional uniformity and close dimensional tolerances.
- High Strength.
- Tougher than alternatives.
- Better response to heat treatment than alternatives.
- Will handle impact better than alternatives.
- The nature of forging excludes the occurrence of porosity, shrinkage, cavities and cold pour issues.
- The tight grain structure of forgings making it mechanically strong.
- The tight grain structure offers great wear resistance.

IN-HOUSE FORGING PRODUCTION

Thanks to constant search of efficient solutions the plant has the most modern forging production built on basis of semi-automatic and continuous forging line. High quality of forging is provided by the modern production accessories of the plant and usage of software for modeling the process of forging.



HIGHEST POSSIBLE MATERIAL QUALITY

BFE uses only high-quality materials inspected & tested to International Standards and utilizes advanced manufacturing technology with special emphasis on safety, quality, and long service life of our products, to ensure that our clients receive the "best in class" products available from us at a competitive price and delivered on time.

CHALLENGING MATERIALS FOR THE MOST CRITICAL APPLICATIONS

Forging material has increased strength under maximum rated operation pressure compared with cast. Other forging properties include greater impact resistance, resistance to fatigue cracking, particularly when cycling at either high or cryogenic temperature.



UNIQUE EXPERTISE FOR VALVE ENGINEERING

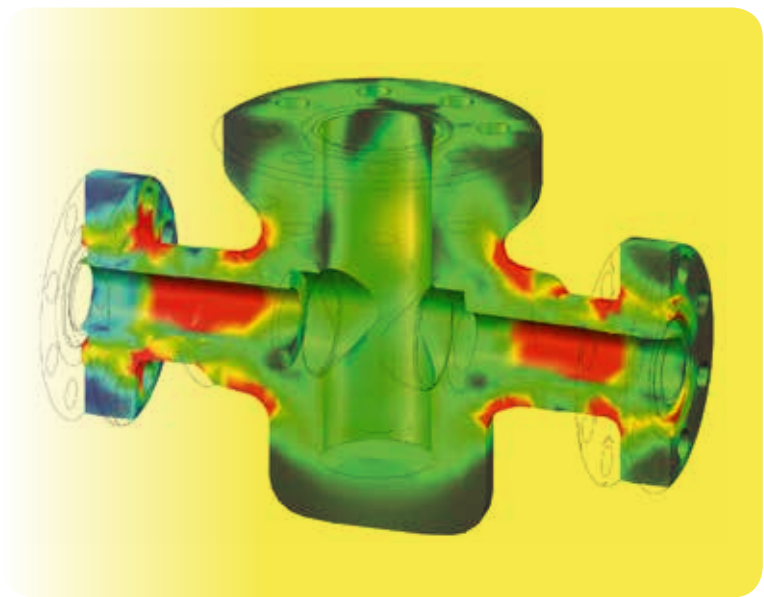
BFE offers extensive expertise in the design that provide the advantage of sophisticated product development with fast and cost-effective manufacturing capabilities.

Our approach ensures that you receive the lowest cost, and highest efficiency solution with a quick turn-around.

Bonney Forge represent decades of design experience across all market sectors. Using the latest software and design technologies, our Engineering can take your requirements and develop a specific custom solution.

BFE Engineering Department operates state of the art design tools with last generation solid modeling, linear and non linear finite element analysis and computational fluid dynamic analysis.

FMEA and FMECA tools are used to minimize the development risks and increase product reliability during the development of new products.



PRODUCTION CAPABILITIES THAT MEET YOUR DEMANDS

BFE is an integrated supplier with in-house forging, machining and assembly-test operations.

Continuous investment in computerized systems and integrated machining centres ensure the highest level of component repeatability, high volume capabilities with uncompromising quality.

BFE experience in managing the complete production process for complex and highly variable requirements benefits our customers by achieving a high rate of on-time delivery and the ability to meet some of the most demanding fast track shipments.

Combined with unlimited local qualified third party capabilities, BFE production system is constantly expanding to handle steady growth rates and complex customer requirements.

GENERAL PRODUCT FEATURES

API 6A VALVE DESCRIPTION

API 6A standard were initially developed to cover all christmas tree and wellhead equipments but today they are used for a large part of the upstream oil and gas industry. Valves covered by this specification are in general components for use in upstream oil and gas exploration, production and incorporate all the activities associated with the installation of this equipment. They can serve the purpose of providing a control mechanism while taking returns during drilling operations or they can also be used during other operations, including gas lift and well kills. Equipment ranges from 2000 to 15000 psi working pressure and in general the design can includes single or multiple completions, high and low temperatures and all types of service conditions. 6A valves general features include in-line repairability, protected long-life seats and sealing without lubrication. Native 6A design include gate, ball, swing check and piston check. Users in general request gate valves with full bore and thru-conduit design, non-rising stem, slab gate, floating seat ring body bushing design to provide safe dependable service. Ball valves are in general trunnion mounted type only. Industry requiremens for API 6A product are the most severe: reliability, high efficiency, only trusted components can normally be considered.

PRODUCT FEATURES

1. Standard construction of body-bonnet (or closure for ball valves) connections is bolted type.
2. Full die forged structure for all pressure containing parts.
3. Flanged valves are provided with flanged integral with the body forgings.
4. Standard body-bonnet gasket design is ring joint type.
5. High quality packing for reliable tightness and low emission performance.
6. Sealing surfaces are machined to the tightest tolerances and lowest roughness to ensure reliable sealing & long service life.
7. Best-in-Class CV values.
8. Inside screw API 6A typical design available.
9. Low operation torque design.
10. Temperature ratings from K to V, special low temperature application and high temperature design acc.to API 6A - Annex G on request.
11. Material class from AA to HH, .ost common covered services are sweet/general, sour/NACE, steam, CO2, water flood, mud, corrosion resistant alloys (CRA).

Applicable Standards

DESIGN	API 6A
INSPECTION & TESTING	API 6A
MARKING	API 6A
RATING	API 6A "Standard product applicable to 6A ratings from K to V (API 6A Table 2), high temperature rating X/Y acc.to API 6A Annex G or special ratings are available on request".
FUGITIVE EMISSION	API 6A

APPLICABLE ON



GATE SLAB ISNRS

ISNRS SLAB GATE VALVES

- Non-rising stem design to permit smart valve installation.
- Full open through conduit construction to eliminate turbulence and pressure drop.
- Simple one-piece, forged & solid closure member design.
- Body cavity self relieving design.
- Metal-to-Metal sealing.
- Shear Pin that protect the valve from damage due overtorque.
- Metal backseat with conical seal surface against stem allows stem seal replacement under pressure.
- Upper grease injection that provides access for lubrication of the stem area and provide a means to verify the backseat seal.
- Bi-Directional design.

APPLICABLE ON



GATE EXPANDING

EXPANDING GATE VALVES

- Outside Screw and Yoke design (OS&Y).
- Full open through conduit construction to eliminate turbulence and pressure drop.
- Positive Sealing (Capability of improving seal tightness by increasing the stem thrust).
- Double seal (both up and downstream seats contribute to guarantee tight seal).
- Metal-to-Metal sealing.
- Tight mechanical seal regardless of service pressure variations.
- Double block and bleed capability.
- Metal back seat with conical seal surface against stem allows stem seal replacement under pressure.
- Bi-Directional design with preferred flow direction.

APPLICABLE ON



GATE SLAB OS&Y

OS&Y SLAB GATE VALVES

- Outside Screw and Yoke design (OS&Y).
- Full open through conduit construction to eliminate turbulence and pressure drop.
- Positive Sealing (Capability of improving seal tightness by increasing the stem thrust).
- Double seal (both up and downstream seats contribute to guarantee tight seal).
- Metal-to-Metal sealing.
- Tight mechanical seal regardless of service pressure variations.
- Double block and bleed capability.
- Metal back seat with conical seal surface against stem allows stem seal replacement under pressure.
- Bi-Directional design with preferred flow direction.

APPLICABLE ON



GATE MUD SERVICE

MUD SERVICE GATE VALVES

- Special Design made for high-pressure modern drilling mud systems.
- In the case of dynamic pressure lifetime of the trim designed according to the most severe frequency & amplitude conditions at 7500psi series with modern triplex mud pumps.
- Soft Seat maximal rating up to 7500psi. For API 10000 and above the applicable design is the slab type.
- Typical internal fluid types are mud, cement, fracturing and water service.
- High structural strength: All valves have the pressure retaining parts (Body and Bonnet) only in FORGED STEEL.
- Self energized packing. The Packing doesn't require initial compression or periodical adjustments.
- Quality level according to API 6A - PSL 1, 2 or 3 only (no gas service).
- Bi-Directional design.

APPLICABLE ON



BALL SIDE ENTRY

SIDE ENTRY & TOP ENTRY TRUNNION BALL VALVES

- Standard double block sealing performance.
- Full die forged structure for all pressure containing parts.
- Flanged valves are provided with flanged integral with closure member.
- Standard primary gasket design is OR AED type, secondary emergency seal always provided for fire-safe purpose.
- High quality stem gasket for reliable tightness and low emission performance.
- Use of low seat-ball friction materials and surface finish for reliable sealing and long service life.
- Best-in-Class CV values.
- Standard split & bolted design for body-closure connection.
- Low operation torque design.
- Static conduction spring is used as standard between the stem and the ball (Anti-Static Device).
- Anti blow-out proof stem design.

APPLICABLE ON



BALL TOP ENTRY

APPLICABLE ON



SWING CHECK

SWING CHECK VALVES

- Center-of-gravity location of the disc and swing arm assembly designed in order to minimize pressure drop and suitable for vertical installation as standard: the valve will return to the closed position should flow become interrupted or reversed even with vertical installation (flow must be in an up-flow direction).
- Internal hinge pin design eliminates additional leakage points.
- High flow capacity port sizes and disc retraction to minimize flow velocities and maximize valve service life.
- Design of disc and hinge assembly to generate a closing moment to provide adequate closure and sealing at low pressures.
- Sealing surfaces are machined to the tightest tolerances and lowest roughness to ensure trouble free shut off and cycling.
- Best-in-Class CV values.
- Low cracking pressure design.
- Swing check nut positively secured to prevent disassembly during service by permanent cold deformation of the closure member. No additional cotter pin or other small parts are used as locking system.

APPLICABLE ON



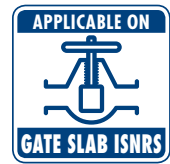
PISTON CHECK

"T"-PATTERN PISTON CHECK VALVES

- Sealing surfaces are machined to the tightest tolerances and lowest roughness to ensure trouble free shut off.
- Body-guided disc for perfect seat and disc alignment.
- Disc is machined to the tightest tolerances to ensure trouble free shutoff and cycling.
- Precision guided closure member for perfect seating surfaces alignment.
- Closure member can be spring loaded for positive closure in any position.
- High flow capacity port sizes and disc retraction to minimize flow velocities and maximize valve service life.
- Low cracking pressure design.
- Fast response time to prevent backflow and adequate valve seating to prevent seat slamming.

GATE VALVES

ISNRS SLAB GATE VALVES BASIC CONFIGURATION API 6A INTEGRAL FLANGED ENDS

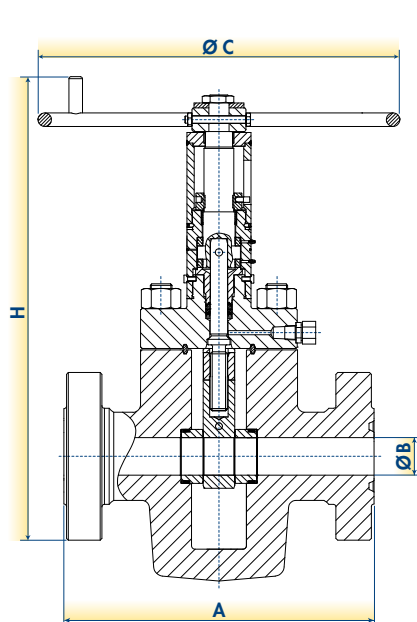


WORKING PRESSURE RATING	SIZE		STANDARD DESIGN TYPE	A		B		C		H		WEIGHT		FIGURE
	INCH	mm		mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
API 2000	2-1/16"	52	SH1	295	11.62	52.4	2.06	400	15.7	500	19.7	90	198	2APITC 008
	2-9/16"	65	SH1	333	13.12	65.1	2.56	490	19.3	525	20.7	110	243	2APITC 009
	3-1/8"	79	SH1	359	14.12	79.4	3.12	490	19.3	550	21.7	140	309	2APITC 0011
	4-1/16"	103	SG1	435	17.12	103.2	4.06	490	19.3	630	24.8	210	463	2APITC 0012
	5-1/8"	130	SG1	562	22.12	130.2	5.12	600	23.6	700	27.6	420	926	2APITC 0013
	7-1/16"	179	SG2	664	26.12	179.4	7.06	500	19.7	1000	39.4	830	1830	2APITC 0015
API 3000	2-1/16"	52	SH1	371	14.62	52.4	2.06	490	19.3	500	19.7	95	209	3APITC 008
	2-9/16"	65	SH1	422	16.62	65.1	2.56	490	19.3	525	20.7	120	265	3APITC 009
	3-1/8"	79	SH1	435	17.12	79.4	3.12	490	19.3	550	21.7	155	342	3APITC 0011
	4-1/16"	103	SG1	511	20.12	103.2	4.06	600	23.6	630	24.8	230	507	3APITC 0012
	5-1/8"	130	SG1	613	24.12	130.2	5.12	500	19.7	850	33.5	470	1036	3APITC 0013
	7-1/16"	179	SG2	714	28.12	179.4	7.06	600	23.6	1050	41.3	870	1918	3APITC 0015
API 5000	2-1/16"	52	SH1	371	14.62	52.4	2.06	490	19.3	500	19.7	95	209	5APITC 008
	2-9/16"	65	SH1	422	16.62	65.1	2.56	490	19.3	525	20.7	120	265	5APITC 009
	3-1/8"	79	SH1	473	18.62	79.4	3.12	490	19.3	550	21.7	160	353	5APITC 0011
	4-1/16"	103	SG1	549	21.62	103.2	4.06	600	23.6	630	24.8	250	551	5APITC 0012
	5-1/8"	130	SG1	727	28.62	130.2	5.12	500	19.7	850	33.5	500	1102	5APITC 0013
	7-1/16"	179	SG2	813	32.00	179.4	7.06	600	23.6	1050	41.3	950	2094	5APITC 0015
	9"	228	SG2	1041	41.00	228.6	9.00	600	23.6	1050	41.3	1450	3197	5APITC 0016
API 10000	1-13/16"	46	SH1	464	18.25	46.0	1.81	490	19.3	505	19.9	120	265	10APITC 007
	2-1/16"	52	SH1	521	20.05	52.4	2.06	490	19.3	505	19.9	130	287	10APITC 008
	2-9/16"	65	SH1	565	22.25	65.1	2.56	490	19.3	540	21.3	175	386	10APITC 009
	3-1/16"	78	SH1	619	24.38	77.8	3.06	600	23.6	560	22.0	230	507	10APITC 0010
	4-1/16"	103	SG1	670	26.38	103.2	4.06	500	19.7	800	31.5	440	970	10APITC 0012
	5-1/8"	130	SG1	737	29.00	130.2	5.12	500	19.7	900	35.4	800	1764	10APITC 0013
	7-1/16"	179	SG2	889	35.00	179.4	7.06	600	23.6	1150	45.3	1300	2866	10APITC 0015
API 15000	1-13/16"	46	SG2	457	18.00	46.0	1.81	490	19.3	550	21.7	140	309	15APITC 007
	2-1/16"	52	SG2	483	19.00	52.4	2.06	490	19.3	560	22.0	150	331	15APITC 008
	2-9/16"	65	SG2	533	21.00	65.1	2.56	600	23.6	580	22.8	260	573	15APITC 009
	3-1/16"	78	SG2	598	23.56	77.8	3.06	500	19.7	700	27.6	430	948	15APITC 0010
	4-1/16"	103	SG2	737	29.00	103.2	4.06	500	19.7	940	37.0	750	1653	15APITC 0012
	5-1/8"	130	SG2	889	35.00	130.2	5.12	600	23.6	1050	41.3	1400	3086	15APITC 0013

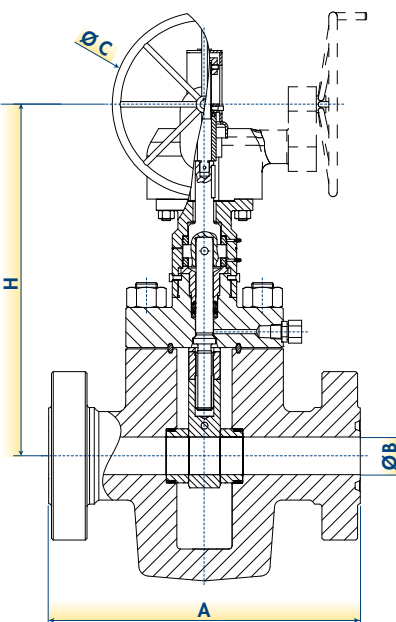
PRODUCT FEATURES:

- Bidirectional Sealing.
- Inside screw / Non-rising stem design.
- Grease injection port above backseat.
- Full bore, Through-Conduit & Piggable design.

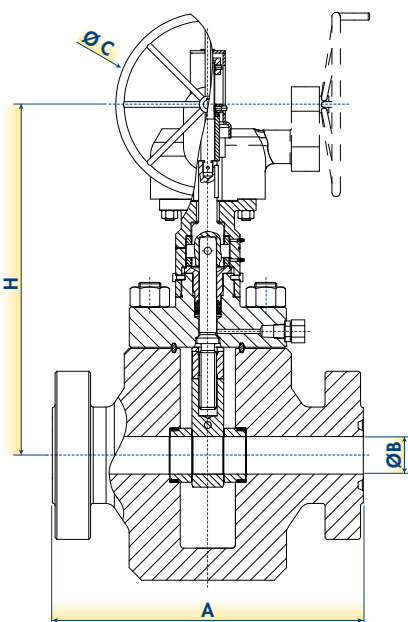
DESIGN TYPE SH1
CLOSE DIE FORGED BODY
HANDWHEEL OPERATED



DESIGN TYPE SG1
CLOSE DIE FORGED BODY
GEAR OPERATED

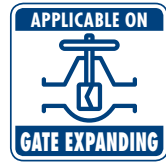


DESIGN TYPE SG2
OPEN DIE FORGED BODY
GEAR OPERATED



B/E reserves the right to change designs, dimensions or specifications without notice.

EXPANDING GATE VALVES BASIC CONFIGURATION API 6A INTEGRAL FLANGED ENDS



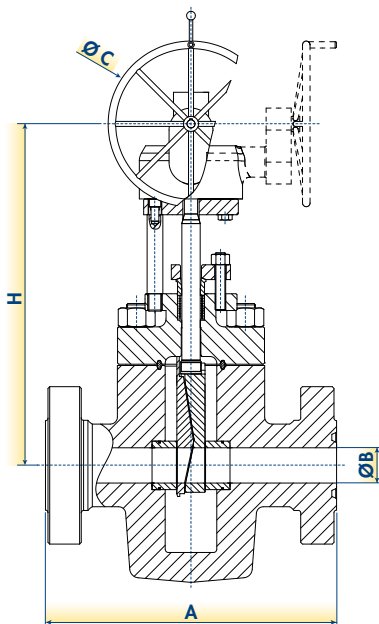
WORKING PRESSURE RATING	SIZE		STANDARD DESIGN TYPE	A		B		C		H		WEIGHT		FIGURE
	INCH	mm		mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
API 2000	2-1/16"	52	EG1	295	11.62	52.4	2.06	300	11.8	650	25.6	130	287	2APIG 108
	2-9/16"	65	EG1	333	13.12	65.1	2.56	400	15.7	675	26.6	150	331	2APIG 109
	3-1/8"	79	EG1	359	14.12	79.4	3.12	400	15.7	725	28.5	200	441	2APIG 1011
	4-1/16"	103	EG1	435	17.12	103.2	4.06	500	19.7	825	32.5	270	595	2APIG 1012
	5-1/8"	130	EG1	562	22.12	130.2	5.12	600	23.6	900	35.4	550	1213	2APIG 1013
	7-1/16"	179	EG2	664	26.12	179.4	7.06	600	23.6	1300	51.2	1080	2381	2APIG 1015
API 3000	2-1/16"	52	EG1	371	14.62	52.4	2.06	300	11.8	650	25.6	130	287	3APIG 108
	2-9/16"	65	EG1	422	16.62	65.1	2.56	400	15.7	675	26.6	170	375	3APIG 109
	3-1/8"	79	EG1	435	17.12	79.4	3.12	400	15.7	725	28.5	220	485	3APIG 1011
	4-1/16"	103	EG1	511	20.12	103.2	4.06	500	19.7	825	32.5	300	661	3APIG 1012
	5-1/8"	130	EG1	613	24.12	130.2	5.12	600	23.6	1100	43.3	610	1345	3APIG 1013
	7-1/16"	179	EG2	714	28.12	179.4	7.06	600	23.6	1375	54.1	1130	2491	3APIG 1015
API 5000	2-1/16"	52	EG1	371	14.62	52.4	2.06	400	15.7	650	25.6	130	287	5APIG 108
	2-9/16"	65	EG1	422	16.62	65.1	2.56	400	15.7	675	26.6	170	375	5APIG 109
	3-1/8"	79	EG1	473	18.62	79.4	3.12	400	15.7	725	28.5	220	485	5APIG 1011
	4-1/16"	103	EG1	549	21.62	103.2	4.06	600	23.6	825	32.5	330	728	5APIG 1012
	5-1/8"	130	EG1	727	28.62	130.2	5.12	600	23.6	1100	43.3	650	1433	5APIG 1013
	7-1/16"	179	EG2	813	32.00	179.4	7.06	600	23.6	1375	54.1	1240	2734	5APIG 1015
	9"	228	EG2	1041	41.00	228.6	9.00	600	23.6	1375	54.1	1890	4167	5APIG 1016
API 10000	1-13/16"	46	EG1	464	18.25	46.0	1.81	400	15.7	650	25.6	170	375	10APIG 107
	2-1/16"	52	EG1	521	20.05	52.4	2.06	400	15.7	650	25.6	180	397	10APIG 108
	2-9/16"	65	EG1	565	22.25	65.1	2.56	400	15.7	700	27.6	250	551	10APIG 109
	3-1/16"	78	EG1	619	24.38	77.8	3.06	600	23.6	725	28.5	300	661	10APIG 1010
	4-1/16"	103	EG1	670	26.38	103.2	4.06	600	23.6	1050	41.3	570	1257	10APIG 1012
	5-1/8"	130	EG1	737	29.00	130.2	5.12	600	23.6	1175	46.3	1040	2293	10APIG 1013
	7-1/16"	179	EG2	889	35.00	179.4	7.06	600	23.6	1500	59.1	1690	3726	10APIG 1015
API 15000	1-13/16"	46	EG2	457	18.00	46.0	1.81	400	15.7	725	28.5	200	441	15APIG 107
	2-1/16"	52	EG2	483	19.00	52.4	2.06	400	15.7	725	28.5	210	463	15APIG 108
	2-9/16"	65	EG2	533	21.00	65.1	2.56	400	15.7	750	29.5	360	794	15APIG 109
	3-1/16"	78	EG2	598	23.56	77.8	3.06	600	23.6	900	35.4	560	1235	15APIG 1010
	4-1/16"	103	EG2	737	29.00	103.2	4.06	600	23.6	1225	48.2	980	2161	15APIG 1012
	5-1/8"	130	EG2	889	35.00	130.2	5.12	600	23.6	1375	54.1	1820	4012	15APIG 1013

BHF reserves the right to change designs, dimensions or specifications without notice.

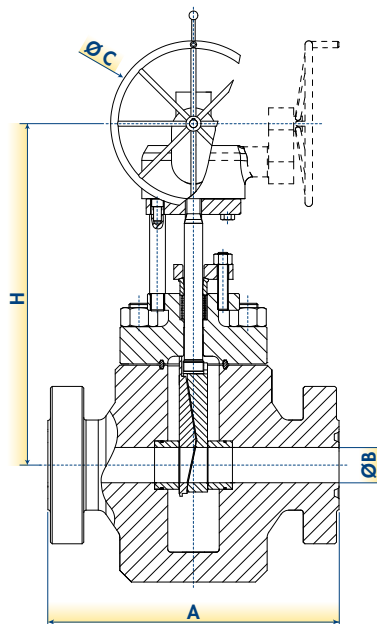
PRODUCT FEATURES:

- Bidirectional sealing with preferred direction.
- OS&Y / Rising stem design.
- Tight positive mechanical seal.
- Full bore, Through-Conduit & Piggable design.

**DESIGN TYPE EG1
OPEN DIE FORGED BODY
GEAR OPERATED**



**DESIGN TYPE EG2
OPEN DIE FORGED BODY
GEAR OPERATED**



GATE VALVES

OS&Y SLAB GATE VALVES BASIC CONFIGURATION API 6A INTEGRAL FLANGED ENDS



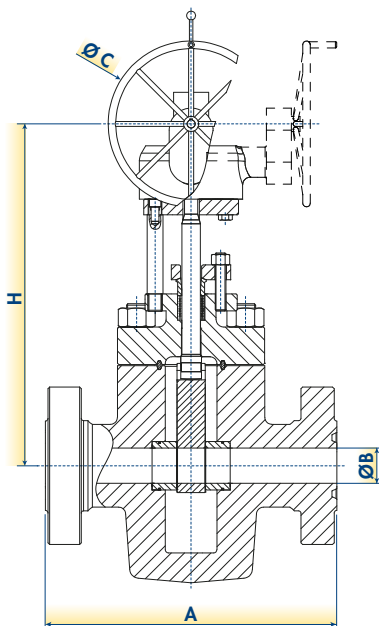
WORKING PRESSURE RATING	SIZE		STANDARD DESIGN TYPE	A		B		C		H		WEIGHT		FIGURE
	INCH	mm		mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
API 2000	2-1/16"	52	GG1	295	11.62	52.4	2.06	300	11.8	650	25.6	130	287	2APITC 108
	2-9/16"	65	GG1	333	13.12	65.1	2.56	400	15.7	675	26.6	150	331	2APITC 109
	3-1/8"	79	GG1	359	14.12	79.4	3.12	400	15.7	725	28.5	200	441	2APITC 1011
	4-1/16"	103	GG1	435	17.12	103.2	4.06	500	19.7	825	32.5	270	595	2APITC 1012
	5-1/8"	130	GG1	562	22.12	130.2	5.12	600	23.6	900	35.4	550	1213	2APITC 1013
	7-1/16"	179	GG2	664	26.12	179.4	7.06	600	23.6	1300	51.2	1080	2381	2APITC 1015
API 3000	2-1/16"	52	GG1	371	14.62	52.4	2.06	300	11.8	650	25.6	130	287	3APITC 108
	2-9/16"	65	GG1	422	16.62	65.1	2.56	400	15.7	675	26.6	170	375	3APITC 109
	3-1/8"	79	GG1	435	17.12	79.4	3.12	400	15.7	725	28.5	220	485	3APITC 1011
	4-1/16"	103	GG1	511	20.12	103.2	4.06	500	19.7	825	32.5	300	661	3APITC 1012
	5-1/8"	130	GG1	613	24.12	130.2	5.12	600	23.6	1100	43.3	610	1345	3APITC 1013
	7-1/16"	179	GG2	714	28.12	179.4	7.06	600	23.6	1375	54.1	1130	2491	3APITC 1015
API 5000	2-1/16"	52	GG1	371	14.62	52.4	2.06	400	15.7	650	25.6	130	287	5APITC 108
	2-9/16"	65	GG1	422	16.62	65.1	2.56	400	15.7	675	26.6	170	375	5APITC 109
	3-1/8"	79	GG1	473	18.62	79.4	3.12	400	15.7	725	28.5	220	485	5APITC 1011
	4-1/16"	103	GG1	549	21.62	103.2	4.06	600	23.6	825	32.5	330	728	5APITC 1012
	5-1/8"	130	GG1	727	28.62	130.2	5.12	600	23.6	1100	43.3	650	1433	5APITC 1013
	7-1/16"	179	GG2	813	32.00	179.4	7.06	600	23.6	1375	54.1	1240	2734	5APITC 1015
	9"	228	GG2	1041	41.00	228.6	9.00	600	23.6	1375	54.1	1890	4167	5APITC 1016
API 10000	1-13/16"	46	GG1	464	18.25	46.0	1.81	400	15.7	650	25.6	170	375	10APITC 107
	2-1/16"	52	GG1	521	20.05	52.4	2.06	400	15.7	650	25.6	180	397	10APITC 108
	2-9/16"	65	GG1	565	22.25	65.1	2.56	400	15.7	700	27.6	250	551	10APITC 109
	3-1/16"	78	GG1	619	24.38	77.8	3.06	600	23.6	725	28.5	300	661	10APITC 1010
	4-1/16"	103	GG1	670	26.38	103.2	4.06	600	23.6	1050	41.3	570	1257	10APITC 1012
	5-1/8"	130	GG1	737	29.00	130.2	5.12	600	23.6	1175	46.3	1040	2293	10APITC 1013
	7-1/16"	179	GG2	880	35.00	179.4	7.06	600	23.6	1500	59.1	1690	3726	10APITC 1015
API 15000	1-13/16"	46	GG2	457	18.00	46.0	1.81	400	15.7	725	28.5	200	441	15APITC 107
	2-1/16"	52	GG2	483	19.00	52.4	2.06	400	15.7	725	28.5	210	463	15APITC 108
	2-9/16"	65	GG2	533	21.00	65.1	2.56	400	15.7	750	29.5	360	794	15APITC 109
	3-1/16"	78	GG2	598	23.56	77.8	3.06	600	23.6	900	35.4	560	1235	15APITC 1010
	4-1/16"	103	GG2	737	29.00	103.2	4.06	600	23.6	1225	48.2	980	2161	15APITC 1012
	5-1/8"	130	GG2	889	35.00	130.2	5.12	600	23.6	1375	54.1	1820	4012	15APITC 1013

PRODUCT FEATURES:

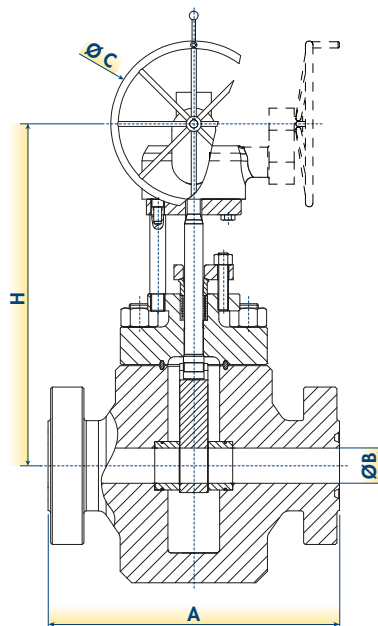
- Bidirectional sealing.
- OS&Y / Rising stem design.
- Full bore, Through-Conduit & Piggable design.

B&E reserves the right to change designs, dimensions or specifications without notice.

DESIGN TYPE GG1 CLOSE DIE FORGED BODY GEAR OPERATED



DESIGN TYPE GG2 OPEN DIE FORGED BODY GEAR OPERATED



MUD SERVICE GATE VALVES BASIC CONFIGURATION API 6A INTEGRAL FLANGED ENDS



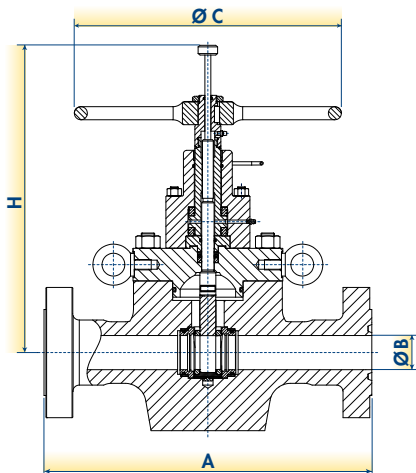
WORKING PRESSURE RATING	SIZE		STANDARD DESIGN TYPE	A		B		C		H		WEIGHT		FIGURE
	INCH	mm		mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
API 2000	2-1/16"	52	MH1	295	11.62	52.4	2.06	400	15.7	500	19.7	80	176	2MD 108
	2-9/16"	65	MH1	333	13.12	65.1	2.56	490	19.3	525	20.7	90	198	2MD 109
	3-1/8"	79	MH1	359	14.12	79.4	3.12	490	19.3	550	21.7	120	265	2MD 1011
	4-1/16"	103	MG1	435	17.12	103.2	4.06	490	19.3	630	24.8	180	397	2MD 1012
	5-1/8"	130	MG1	562	22.12	130.2	5.12	600	23.6	700	27.6	350	772	2MD 1013
	7-1/16"	179	MG2	664	26.12	179.4	7.06	500	19.7	1000	39.4	700	1543	2MD 1015
API 3000	2-1/16"	52	MH1	371	14.62	52.4	2.06	490	19.3	500	19.7	80	176	3MD 108
	2-9/16"	65	MH1	422	16.62	65.1	2.56	490	19.3	525	20.7	100	220	3MD 109
	3-1/8"	79	MH1	435	17.12	79.4	3.12	490	19.3	550	21.7	130	287	3MD 1011
	4-1/16"	103	MG1	511	20.12	103.2	4.06	600	23.6	630	24.8	190	419	3MD 1012
	5-1/8"	130	MG1	613	24.12	130.2	5.12	500	19.7	850	33.5	400	882	3MD 1013
	7-1/16"	179	MG2	714	28.12	179.4	7.06	600	23.6	1050	41.3	730	1609	3MD 1015
API 5000	2-1/16"	52	MH1	371	14.62	52.4	2.06	490	19.3	500	19.7	80	176	5MD 108
	2-9/16"	65	MH1	422	16.62	65.1	2.56	490	19.3	525	20.7	100	220	5MD 109
	3-1/8"	79	MH1	473	18.62	79.4	3.12	490	19.3	550	21.7	135	298	5MD 1010
	4-1/16"	103	MG1	549	21.62	103.2	4.06	600	23.6	630	24.8	210	463	5MD 1012
	5-1/8"	130	MG1	727	28.62	130.2	5.12	500	19.7	850	33.5	420	926	5MD 1013
	7-1/16"	179	MG2	813	32.00	179.4	7.06	600	23.6	1050	41.3	800	1764	5MD 1015
	9"	228	MG2	1041	41.00	228.6	9.00	600	23.6	1050	41.3	1250	2756	5MD 1016
API 7500 (SEE NOTE 1)	1-13/16"	46	MH1	464 ⁽¹⁾	18.25 ⁽¹⁾	46.00	1.81	490	19.3	505	19.9	100	220	75MD 107
	2-1/16"	52	MH1	521 ⁽¹⁾	20.05 ⁽¹⁾	52.4	2.06	490	19.3	505	19.9	110	243	75MD 108
	2-9/16"	65	MH1	565 ⁽¹⁾	22.25 ⁽¹⁾	65.1	2.56	490	19.3	540	21.3	150	331	75MD 109
	3-1/16"	78	MH1	619 ⁽¹⁾	24.38 ⁽¹⁾	77.8	3.06	600	23.6	560	22.0	200	441	75MD 1010
	4-1/16"	103	MG1	670 ⁽¹⁾	26.38 ⁽¹⁾	103.2	4.06	500	19.7	800	31.5	380	838	75MD 1012
	5-1/8"	130	MG1	737 ⁽¹⁾	29.00 ⁽¹⁾	130.2	5.12	500	19.7	900	35.4	680	1499	75MD 1013
	7-1/16"	179	MG2	889 ⁽¹⁾	35.00 ⁽¹⁾	179.4	7.06	600	23.6	1150	45.3	1105	2436	75MD 1015

B/E reserves the right to change designs, dimensions or specifications without notice.

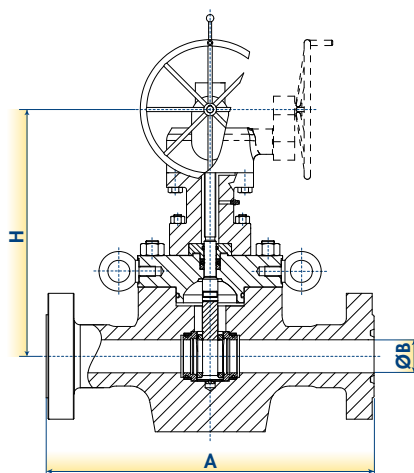
PRODUCT FEATURES:

- Bidirectional sealing. • Outside Screw and rising stem design. • Full bore & Piggable design. • Body cavity geometry and volume designed to allow continuous "flushing" and prevent fluid solidification and sanding-up.
- NOTE 1: API 6A does not specify any value, selected Face-to-Face acc.to API 10K.

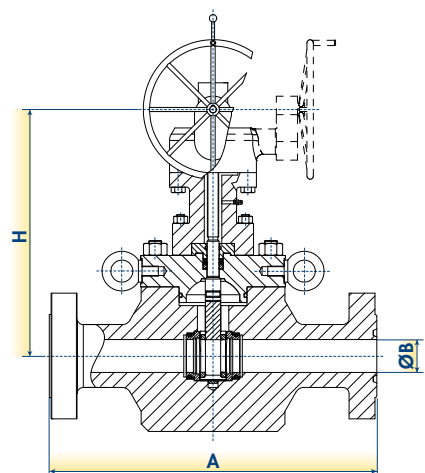
DESIGN TYPE MH1
CLOSE DIE FORGED BODY
HANDWHEEL OPERATED



DESIGN TYPE MG1
CLOSE DIE FORGED BODY
GEAR OPERATED



DESIGN TYPE MG2
OPEN DIE FORGED BODY
GEAR OPERATED



BALL VALVES

SIDE ENTRY TRUNNION BALL VALVES BASIC CONFIGURATION API 6A INTEGRAL FLANGED ENDS

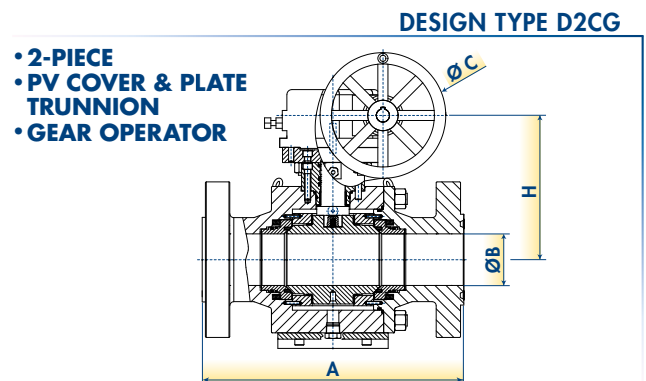
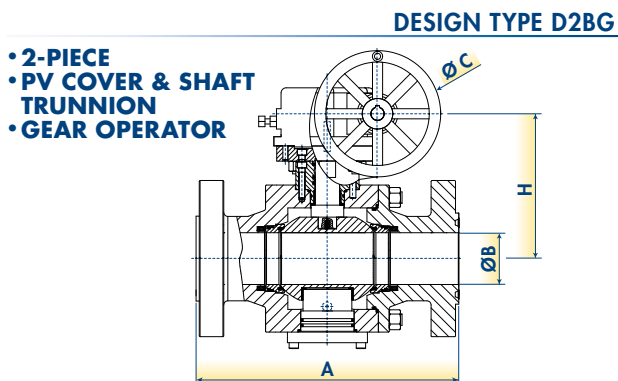
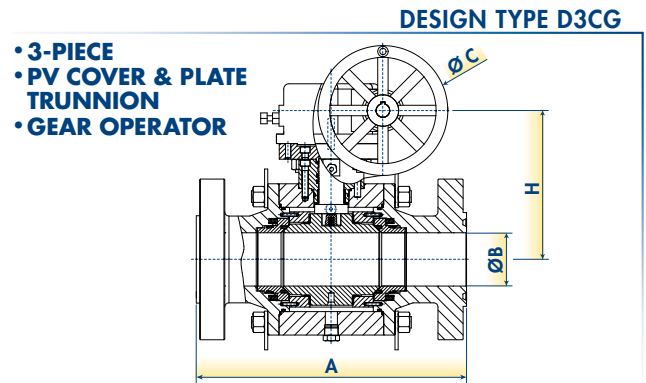
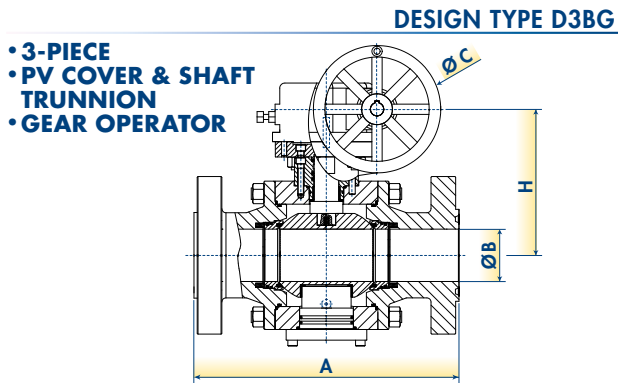


WORKING PRESSURE RATING	SIZE		STANDARD DESIGN TYPE	A		B		C		H		WEIGHT		FIGURE
	INCH	mm		mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
API 2000 (SEE NOTE 1)	2-1/16"	52	D3BG	295	11.62	52.4	2.06	300	11.8	215	8.5	60	132	A2 8A2
	2-9/16"	65	D3BG	333	13.12	65.1	2.56	300	11.8	230	9.1	80	176	A2 8A3
	3-1/8"	79	D3BG	359	14.12	79.4	3.12	300	11.8	250	9.8	100	220	A2 8A5
	4-1/16"	103	D3BG	435	17.12	103.2	4.06	400	15.7	280	11.0	210	463	A2 8A6
	5-1/8"	130	D3CG	737 ⁽¹⁾	29.00 ⁽¹⁾	130.2	5.12	600	23.6	320	12.6	360	794	A2 8A7
API 3000 (SEE NOTE 1)	2-1/16"	52	D3BG	371	14.62	52.4	2.06	300	11.8	215	8.5	80	176	A3 8A2
	2-9/16"	65	D3BG	422	16.62	65.1	2.56	400	15.7	230	9.1	105	231	A3 8A3
	3-1/8"	79	D3BG	384	15.12	79.4	3.12	400	15.7	250	9.8	130	287	A3 8A5
	4-1/16"	103	D3BG	460	18.12	103.2	4.06	600	23.6	280	11.0	250	551	A3 8A6
	5-1/8"	130	D3CG	737 ⁽¹⁾	29.00 ⁽¹⁾	130.2	5.12	800	31.5	340	13.4	430	948	A3 8A7
API 5000 (SEE NOTE 1,2)	2-1/16"	52	D3BG	371	14.62	52.4	2.06	400	15.7	225	8.9	120	265	A5 8A2
	2-9/16"	65	D3BG	473	18.62	65.1	2.56	400	15.7	240	9.4	160	353	A5 8A3
	3-1/8"	79	D3BG	473	18.62	79.4	3.12	600	23.6	265	10.4	220	485	A5 8A5
	4-1/16"	103	D3BG	549	21.62	103.2	4.06	600	23.6	290	11.4	350	772	A5 8A6
	5-1/8"	130	D2CG	737 ⁽¹⁾	29.00 ⁽¹⁾	130.2	5.12	800	31.5	350	13.8	570	1257	A5 8A7
API 10000	7-1/16"	179	D2CG	889 ⁽¹⁾	35.00 ⁽¹⁾	179.4	7.06	800	31.5	440	17.3	800	1764	A5 8A8
	9"	228	D2CG	1143 ⁽²⁾	45.00 ⁽²⁾	228.6	9.00	800	31.5	710	28.0	1100	2425	A5 8A9
	1-13/16"	46	D2BG	464	18.25	46.0	1.81	600	23.6	260	10.2	145	320	A10 8A1
	2-1/16"	52	D2BG	521	20.05	52.4	2.06	600	23.6	280	11.0	190	419	A10 8A2
	2-9/16"	65	D2CG	565	22.25	65.1	2.56	600	23.6	310	12.2	300	661	A10 8A3
	3-1/16"	78	D2CG	619	24.38	77.8	3.06	800	31.5	330	13.0	390	860	A10 8A4
	4-1/16"	103	D2CG	670	26.38	103.2	4.06	800	31.5	380	15.0	510	1124	A10 8A6
API 15000 (SEE NOTE 2)	5-1/8"	130	D2CG	737	29.00	130.2	5.12	800	31.5	440	17.3	800	1764	A10 8A7
	7-1/16"	179	D2CG	889	35.00	179.4	7.06	800	31.5	730	28.7	1400	3086	A10 8A8
	1-13/16"	46	D2BG	521 ⁽²⁾	20.05 ⁽²⁾	46.0	1.81	600	23.6	350	13.8	180	397	A15 8A1
	2-1/16"	52	D2BG	565 ⁽²⁾	22.25 ⁽²⁾	52.4	2.06	600	23.6	390	15.4	250	551	A15 8A2
	2-9/16"	65	D2CG	619 ⁽²⁾	24.38 ⁽²⁾	65.1	2.56	600	23.6	420	16.5	400	882	A15 8A3
	3-1/16"	78	D2CG	670 ⁽²⁾	26.38 ⁽²⁾	77.8	3.06	800	31.5	450	17.7	500	1102	A15 8A4
	4-1/16"	103	D2CG	737 ⁽²⁾	29.00 ⁽²⁾	103.2	4.06	800	31.5	500	19.7	660	1455	A15 8A6
	5-1/8"	130	D2CG	889 ⁽²⁾	35.00 ⁽²⁾	130.2	5.12	800	31.5	600	23.6	1050	2315	A15 8A7

PRODUCT FEATURES:

- Bidirectional Sealing. • Standard O-Rings in Viton with AED properties. • Stem Emergency seal restoration feature standard for size 5-1/8". • Full bore, Through-Conduit & Piggable design.

NOTE 1: API 6A does not specify any value, selected Face-to-Face acc. to API 10K. NOTE 2: API 6A does not specify any value, selected Face-to-Face acc. to Manufacturer Standard.



B/E reserves the right to change designs, dimensions or specifications without notice.

TOP ENTRY TRUNNION BALL VALVES BASIC CONFIGURATION API 6A INTEGRAL FLANGED ENDS



WORKING PRESSURE RATING	SIZE		STANDARD DESIGN TYPE	A		B		C		H		WEIGHT		FIGURE
	INCH	mm		mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
API 2000 (SEE NOTE 1)	2-1/16"	52	D3BG	295	11.62	52.4	2.06	300	11.8	430	16.9	90	198	A2 BA2
	2-9/16"	65	D3BG	333	13.12	65.1	2.56	300	11.8	450	17.7	120	265	A2 BA3
	3-1/8"	79	D3BG	359	14.12	79.4	3.12	300	11.8	480	18.9	140	309	A2 BA5
	4-1/16"	103	D3BG	435	17.12	103.2	4.06	400	15.7	500	19.7	300	661	A2 BA6
	5-1/8"	130	D3CG	737 ⁽¹⁾	29.00 ⁽¹⁾	130.2	5.12	600	23.6	550	21.7	500	1102	A2 BA7
	7-1/16"	179	D3CG	889 ⁽¹⁾	35.00 ⁽¹⁾	179.4	7.06	600	23.6	600	23.6	620	1367	A2 BA8
API 3000 (SEE NOTE 1)	2-1/16"	52	D3BG	371	14.62	52.4	2.06	300	11.8	430	16.9	120	265	A3 BA2
	2-9/16"	65	D3BG	422	16.62	65.1	2.56	400	15.7	450	17.7	150	331	A3 BA3
	3-1/8"	79	D3BG	384	15.12	79.4	3.12	400	15.7	480	18.9	180	397	A3 BA5
	4-1/16"	103	D3BG	460	18.12	103.2	4.06	600	23.6	500	19.7	350	772	A3 BA6
	5-1/8"	130	D3CG	737 ⁽¹⁾	29.00 ⁽¹⁾	130.2	5.12	800	31.5	580	22.8	600	1323	A3 BA7
	7-1/16"	179	D3CG	889 ⁽¹⁾	35.00 ⁽¹⁾	179.4	7.06	800	31.5	660	26.0	780	1720	A3 BA8
API 5000 (SEE NOTE 1,2)	2-1/16"	52	D3BG	371	14.62	52.4	2.06	400	15.7	450	17.7	180	397	A5 BA2
	2-9/16"	65	D3BG	473	18.62	65.1	2.56	400	15.7	470	18.5	240	529	A5 BA3
	3-1/8"	79	D3BG	473	18.62	79.4	3.12	600	23.6	520	20.5	300	661	A5 BA5
	4-1/16"	103	D3BG	549	21.62	103.2	4.06	600	23.6	550	21.7	500	1102	A5 BA6
	5-1/8"	130	D2CG	737 ⁽¹⁾	29.00 ⁽¹⁾	130.2	5.12	800	31.5	600	23.6	800	1764	A5 BA7
	7-1/16"	179	D2CG	889 ⁽¹⁾	35.00 ⁽¹⁾	179.4	7.06	800	31.5	700	27.6	1040	2293	A5 BA8
API 10000	9"	228	D2CG	839 ⁽²⁾	45.00 ⁽²⁾	228.6	9.00	800	31.5	1400	55.1	1430	3153	A5 BA9
	1-13/16"	46	D2BG	464	18.25	46.0	1.81	600	23.6	520	20.5	220	485	A10 BA1
	2-1/16"	52	D2BG	521	20.05	52.4	2.06	600	23.6	560	22.0	280	617	A10 BA2
	2-9/16"	65	D2CG	565	22.25	65.1	2.56	600	23.6	600	23.6	450	992	A10 BA3
	3-1/16"	78	D2CG	619	24.38	77.8	3.06	800	31.5	650	25.6	550	1213	A10 BA4
	4-1/16"	103	D2CG	670	26.38	103.2	4.06	800	31.5	700	27.6	700	1543	A10 BA6
	5-1/8"	130	D2CG	737	29.00	130.2	5.12	800	31.5	800	31.5	1120	2469	A10 BA7
	7-1/16"	179	D2CG	889	35.00	179.4	7.06	800	31.5	950	37.4	1820	4012	A10 BA8
API 15000 (SEE NOTE 2)	1-13/16"	46	D2BG	521	20.05 ⁽²⁾	46.0	1.81	600	23.6	600	23.6	250	551	A15 BA1
	2-1/16"	52	D2BG	565 ⁽²⁾	22.25 ⁽²⁾	52.4	2.06	600	23.6	650	25.6	350	772	A15 BA2
	2-9/16"	65	D2CG	619 ⁽²⁾	24.38 ⁽²⁾	65.1	2.56	600	23.6	700	27.6	560	1235	A15 BA3
	3-1/16"	78	D2CG	670 ⁽²⁾	26.38 ⁽²⁾	77.8	3.06	800	31.5	750	29.5	700	1543	A15 BA4
	4-1/16"	103	D2CG	737 ⁽²⁾	29.00 ⁽²⁾	103.2	4.06	800	31.5	880	34.6	930	2050	A15 BA6
	5-1/8"	130	D2CG	889 ⁽²⁾	35.00 ⁽²⁾	130.2	5.12	800	31.5	1000	39.4	1500	3307	A15 BA7

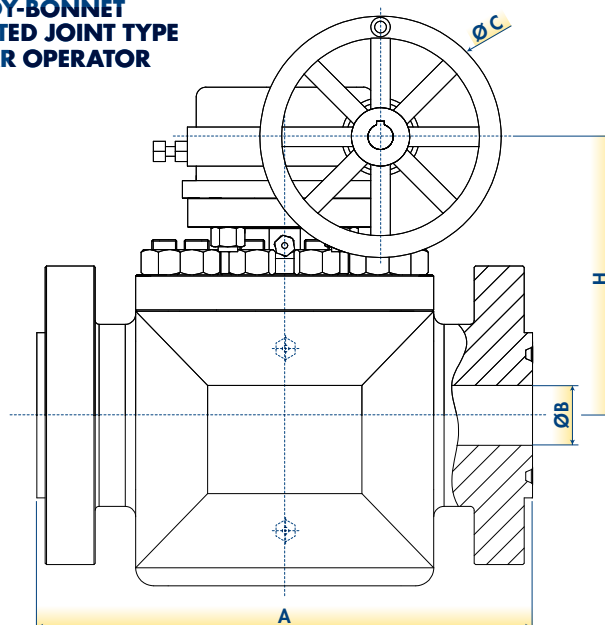
B/E reserves the right to change designs, dimensions or specifications without notice.

PRODUCT FEATURES:

- Bidirectional Sealing. • Standard O-Rings in Viton with AED properties. • Stem Emergency seal restoration feature standard for size 5-1/8". • Full bore, Through-Conduit & Piggable design.
- NOTE 1: API 6A does not specify any value, selected Face-to-Face acc. to API 10K. NOTE 2: API 6A does not specify any value, selected Face-to-Face acc. to Manufacturer Standard.

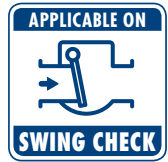
DESIGN TYPE PITG

- ONE PIECE BODY
- BODY-BONNET BOLTED JOINT TYPE
- GEAR OPERATOR



CHECK VALVES

SWING CHECK VALVES BASIC CONFIGURATION API 6A INTEGRAL FLANGED ENDS



WORKING PRESSURE RATING	SIZE		STANDARD DESIGN TYPE	A		B		C		H		WEIGHT		FIGURE
	INCH	mm		mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
API 2000	2-1/16"	52	W01	295	11.62	52.5	2.067	N.A.	N.A.	200	7.9	55	121	2API 608
	2-9/16"	65	W01	333	13.12	62.7	2.469	N.A.	N.A.	220	8.7	70	154	2API 609
	3-1/8"	79	W01	359	14.12	77.9	3.068	N.A.	N.A.	270	10.6	90	198	2API 611
	4-1/16"	103	W01	435	17.12	102.3	4.026	N.A.	N.A.	330	13.0	150	331	2API 612
	7-1/16"	179	W02	562	22.12	146.3	5.716	N.A.	N.A.	400	15.7	400	882	2API 615
	9"	228	W02	664	26.12	198.5	7.813	N.A.	N.A.	630	24.8	650	1433	2API 616
	11"	279	W02	790	31.12	247.7	9.750	N.A.	N.A.	750	29.5	1030	2271	2API 617
API 3000 (SEE NOTE 1)	2-1/16"	52	W01	371	14.62	49.3	1.939	N.A.	N.A.	220	8.7	65	143	3API 608
	2-9/16"	65	W01	422	16.62	59.0	2.323	N.A.	N.A.	240	9.4	95	209	3API 609
	3-1/8"	79	W01	384 ⁽¹⁾	15.12 ⁽¹⁾	73.7	2.900	N.A.	N.A.	300	11.8	110	243	3API 611
	4-1/16"	103	W01	460 ⁽¹⁾	18.12 ⁽¹⁾	97.2	3.826	N.A.	N.A.	360	14.2	225	496	3API 612
	7-1/16"	179	W02	613	24.12	146.3	5.761	N.A.	N.A.	450	17.7	430	948	3API 615
	9"	228	W02	740	29.12	189.0	7.439	N.A.	N.A.	700	27.6	800	1764	3API 616
	11"	279	W02	841	33.12	236.6	9.314	N.A.	N.A.	800	31.5	1200	2646	3API 617
API 5000 (SEE NOTE 1)	2-1/16"	52	W01	371	14.62	42.9	1.689	N.A.	N.A.	250	9.8	75	165	5API 608
	2-9/16"	65	W01	422	16.62	54.0	2.125	N.A.	N.A.	270	10.6	115	254	5API 609
	3-1/8"	79	W01	473	18.62	66.6	2.624	N.A.	N.A.	330	13.0	130	287	5API 611
	4-1/16"	103	W01	549	21.62	87.3	3.438	N.A.	N.A.	400	15.7	300	661	5API 612
	7-1/16"	179	W02	711 ⁽¹⁾	28.00 ⁽¹⁾	131.8	5.189	N.A.	N.A.	500	19.7	560	1235	5API 615
	9"	228	W02	841	33.12	173.1	6.813	N.A.	N.A.	750	29.5	890	1962	5API 616
	11"	279	W02	1000	39.38	215.9	8.500	N.A.	N.A.	870	34.3	1340	2954	5API 617
API 10000 (SEE NOTE 2, 3)	1-13/16"	46	W01	464	18.25	37.7 ⁽³⁾	1.484 ⁽³⁾	N.A.	N.A.	255	10.0	98	216	10API 607
	2-1/16"	52	W01	521	20.50	42.9 ⁽²⁾	1.689 ⁽²⁾	N.A.	N.A.	280	11.0	130	287	10API 608
	2-9/16"	65	W01	565	22.25	54.0 ⁽²⁾	2.125 ⁽²⁾	N.A.	N.A.	300	11.8	175	386	10API 609
	3-1/16"	78	W01	619	24.38	65.4 ⁽³⁾	2.575 ⁽³⁾	N.A.	N.A.	360	14.2	207	456	10API 610
	4-1/16"	103	W01	670	26.38	87.3 ⁽²⁾	3.438 ⁽²⁾	N.A.	N.A.	450	17.7	450	992	10API 612
	5-1/8"	130	W01	737	29.00	110.3 ⁽³⁾	4.343 ⁽³⁾	N.A.	N.A.	480	18.9	600	1323	10API 613
	7-1/16"	179	W02	889	35.00	131.8 ⁽²⁾	5.189 ⁽²⁾	N.A.	N.A.	600	23.6	940	2072	10API 615
API 15000 (SEE NOTE 2, 3)	1-13/16"	46	W02	457	18.00	37.7 ⁽³⁾	1.484 ⁽³⁾	N.A.	N.A.	310	12.2	190	419	10API 607
	2-1/16"	52	W02	483	19.00	42.9 ⁽²⁾	1.689 ⁽²⁾	N.A.	N.A.	340	13.4	230	507	10API 608
	2-9/16"	65	W02	533	21.00	54.0 ⁽²⁾	2.125 ⁽²⁾	N.A.	N.A.	360	14.2	290	639	10API 609
	3-1/16"	78	W02	598	23.56	65.4 ⁽³⁾	2.575 ⁽³⁾	N.A.	N.A.	450	17.7	380	838	10API 610
	4-1/16"	103	W02	737	29.00	87.3 ⁽²⁾	3.438 ⁽²⁾	N.A.	N.A.	550	21.7	500	1102	10API 612

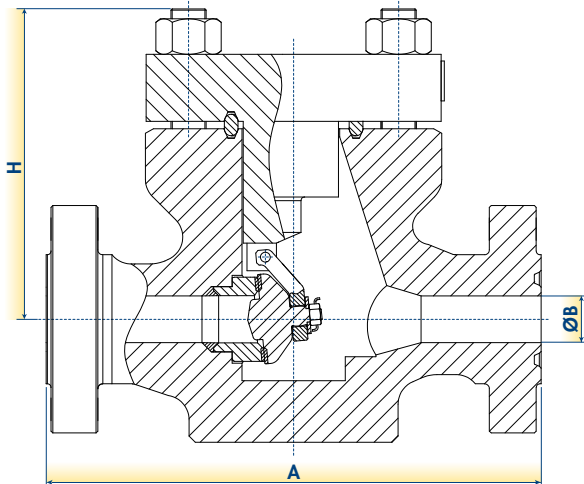
PRODUCT FEATURES:

- Internal hinge pin design.
- Suitable for horizontal and vertical installation (flow with up-flow direction).
- Maximized disc retraction.

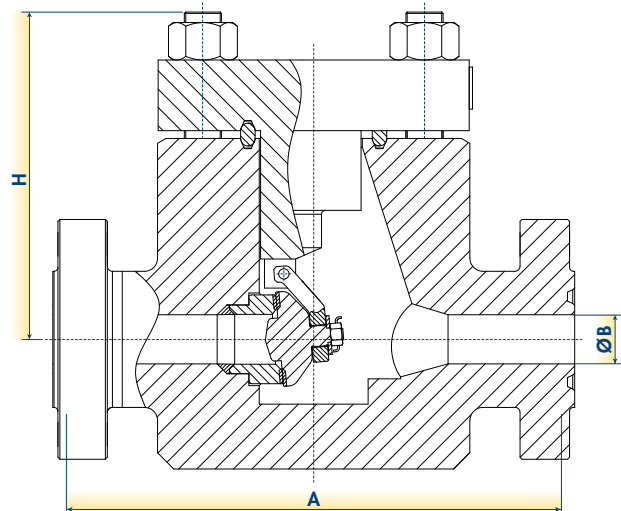
NOTE 1: Face-to-Face acc. to API 6A - Short Pattern. NOTE 2: API 6A does not specify any value, selected bore acc. to API 5K. NOTE 3: API 6A does not specify any value, selected bore acc. to Manufacturer Standard.

BFE reserves the right to change designs, dimensions or specifications without notice.

**DESIGN TYPE W01
CLOSE DIE FORGED BODY**



**DESIGN TYPE W02
OPEN DIE FORGED BODY**



"T"-PATTERN PISTON CHECK VALVES BASIC CONFIGURATION API 6A INTEGRAL FLANGED ENDS



WORKING PRESSURE RATING	SIZE		STANDARD DESIGN TYPE	A		B		C		H		WEIGHT		FIGURE
	INCH	mm		mm	inch	mm	inch	mm	inch	mm	inch	kg	lbs	
API 2000	2-1/16"	52	P01	295	11.62	52.5	2.067	N.A.	N.A.	200	7.9	55	121	2API 408
	2-9/16"	65	P01	333	13.12	62.7	2.469	N.A.	N.A.	220	8.7	70	154	2API 409
	3-1/8"	79	P01	359	14.12	77.9	3.068	N.A.	N.A.	270	10.6	90	198	2API 411
	4-1/16"	103	P01	435	17.12	102.3	4.026	N.A.	N.A.	330	13.0	150	331	2API 412
	7-1/16"	179	P02	562	22.12	146.3	5.716	N.A.	N.A.	400	15.7	400	882	2API 415
	9"	228	P02	664	26.12	198.5	7.813	N.A.	N.A.	630	24.8	650	1433	2API 416
	11"	279	P02	790	31.12	247.7	9.750	N.A.	N.A.	750	29.5	1030	2271	2API 417
API 3000 (SEE NOTE 1)	2-1/16"	52	P01	371	14.62	49.3	1.939	N.A.	N.A.	220	8.7	65	143	3API 408
	2-9/16"	65	P01	422	16.62	59.0	2.323	N.A.	N.A.	240	9.4	95	209	3API 409
	3-1/8"	79	P01	384 ⁽¹⁾	15.12 ⁽¹⁾	73.7	2.900	N.A.	N.A.	300	11.8	110	243	3API 411
	4-1/16"	103	P01	460 ⁽¹⁾	18.12 ⁽¹⁾	97.2	3.826	N.A.	N.A.	360	14.2	225	496	3API 412
	7-1/16"	179	P02	613	24.12	146.3	5.761	N.A.	N.A.	450	17.7	430	948	3API 415
	9"	228	P02	740	29.12	189.0	7.439	N.A.	N.A.	700	27.6	800	1764	3API 416
	11"	279	P02	841	33.12	236.6	9.314	N.A.	N.A.	800	31.5	1200	2646	3API 417
API 5000 (SEE NOTE 1)	2-1/16"	52	P01	371	14.62	42.9	1.689	N.A.	N.A.	250	9.8	75	165	5API 408
	2-9/16"	65	P01	422	16.62	54.0	2.125	N.A.	N.A.	270	10.6	115	254	5API 409
	3-1/8"	79	P01	473	18.62	66.6	2.624	N.A.	N.A.	330	13.0	130	287	5API 411
	4-1/16"	103	P01	549	21.62	87.3	3.438	N.A.	N.A.	400	15.7	300	661	5API 412
	7-1/16"	179	P02	711 ⁽¹⁾	28.00 ⁽¹⁾	131.8	5.189	N.A.	N.A.	500	19.7	560	1235	5API 415
	9"	228	P02	841	33.12	173.1	6.813	N.A.	N.A.	750	29.5	890	1962	5API 416
	11"	279	P02	1000	39.38	215.9	8.500	N.A.	N.A.	870	34.3	1340	2954	5API 417
API 10000 (SEE NOTE 2, 3)	1-13/16"	46	P01	464	18.25	37.7 ⁽³⁾	1.484 ⁽³⁾	N.A.	N.A.	255	10.0	98	216	10API 407
	2-1/16"	52	P01	521	20.50	42.9 ⁽²⁾	1.68 ⁽²⁾	N.A.	N.A.	280	11.0	130	287	10API 408
	2-9/16"	65	P01	565	22.25	54.0 ⁽²⁾	2.125 ⁽²⁾	N.A.	N.A.	300	11.8	175	386	10API 409
	3-1/16"	78	P01	619	24.38	65.4 ⁽³⁾	2.575 ⁽³⁾	N.A.	N.A.	360	14.2	207	456	10API 410
	4-1/16"	103	P01	670	26.38	87.3 ⁽²⁾	3.438 ⁽²⁾	N.A.	N.A.	450	17.7	450	992	10API 412
	5-1/8"	130	P01	737	29.00	110.3 ⁽³⁾	4.343 ⁽³⁾	N.A.	N.A.	480	18.9	600	1323	10API 413
	7-1/16"	179	P02	889	35.00	131.8 ⁽²⁾	5.189 ⁽²⁾	N.A.	N.A.	600	23.6	940	2072	10API 415
API 15000 (SEE NOTE 2, 3)	1-13/16"	46	P02	457	18.00	37.7 ⁽³⁾	1.484 ⁽³⁾	N.A.	N.A.	310	12.2	190	419	10API 407
	2-1/16"	52	P02	483	19.00	42.9 ⁽²⁾	1.689 ⁽²⁾	N.A.	N.A.	340	13.4	230	507	10API 408
	2-9/16"	65	P02	533	21.00	54.0 ⁽²⁾	2.125 ⁽²⁾	N.A.	N.A.	360	14.2	290	639	10API 409
	3-1/16"	78	P02	598	23.56	65.4 ⁽³⁾	2.575 ⁽³⁾	N.A.	N.A.	450	17.7	380	838	10API 410
	4-1/16"	103	P02	737	29.00	87.3 ⁽²⁾	3.438 ⁽²⁾	N.A.	N.A.	550	21.7	500	1102	10API 412

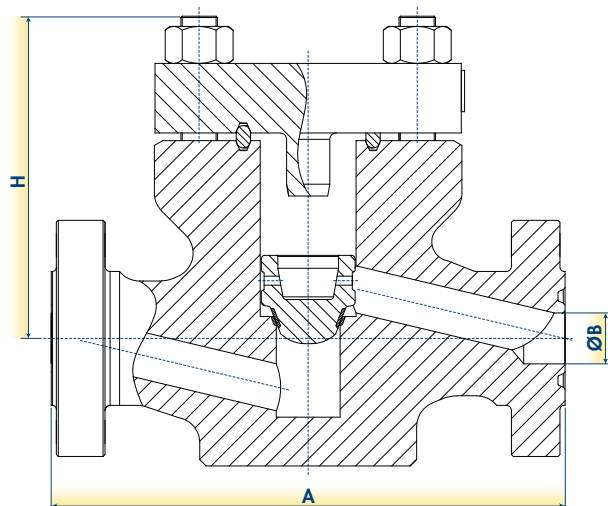
PRODUCT FEATURES:

- Integral seat design.
- Fast response time to prevent backflow.
- Adequate valve seating to prevent seat slamming.

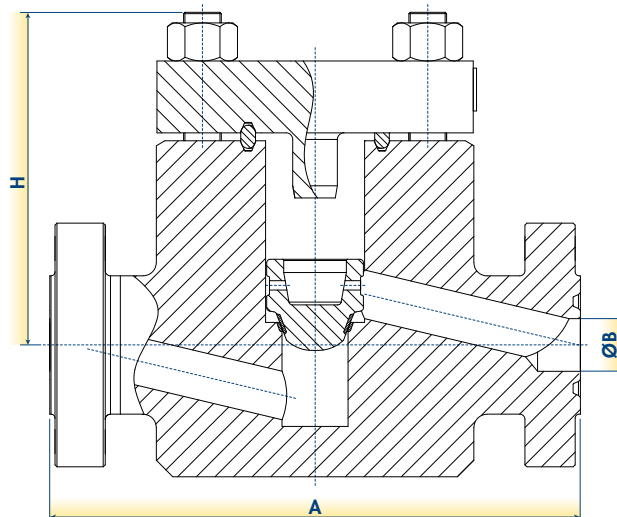
NOTE 1: Face-to-Face acc. to API 6A - Short Pattern. NOTE 2: API 6A does not specify any value, selected bore acc. to API 5K. NOTE 3: API 6A does not specify any value, selected bore acc. to Manufacturer Standard.

BFE reserves the right to change designs, dimensions or specifications without notice.

**DESIGN TYPE P01
CLOSE DIE FORGED BODY**



**DESIGN TYPE P02
OPEN DIE FOGED BODY**

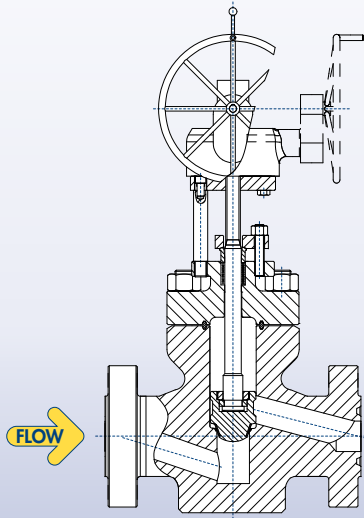


ALTERNATIVE DESIGN SOLUTIONS

There are a large variety of available valves and valve configurations for a wide variety of purposes and conditions not tabulated in this catalogue. Some example are listed below. Other valve designs or customised configurations are available on request, contact BFE for special requirements.

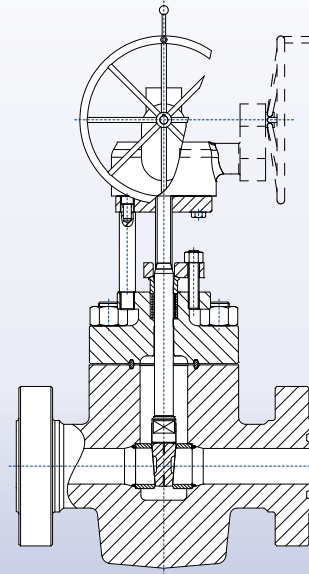
"T"-PATTERN GLOBE VALVES

Globe valves are used to regulate the fluid flowing through the pipeline or in applications that require a frequent and quick opening/closing of the flow. This design is available in various models to cover the various requirements in terms of fluids, working temperatures and pressures. Globe valve design is not common for API 6A upstream application but if required by process operations or specifications it can be performed fully according to the 6A requirements.



GATE WEDGE VALVES

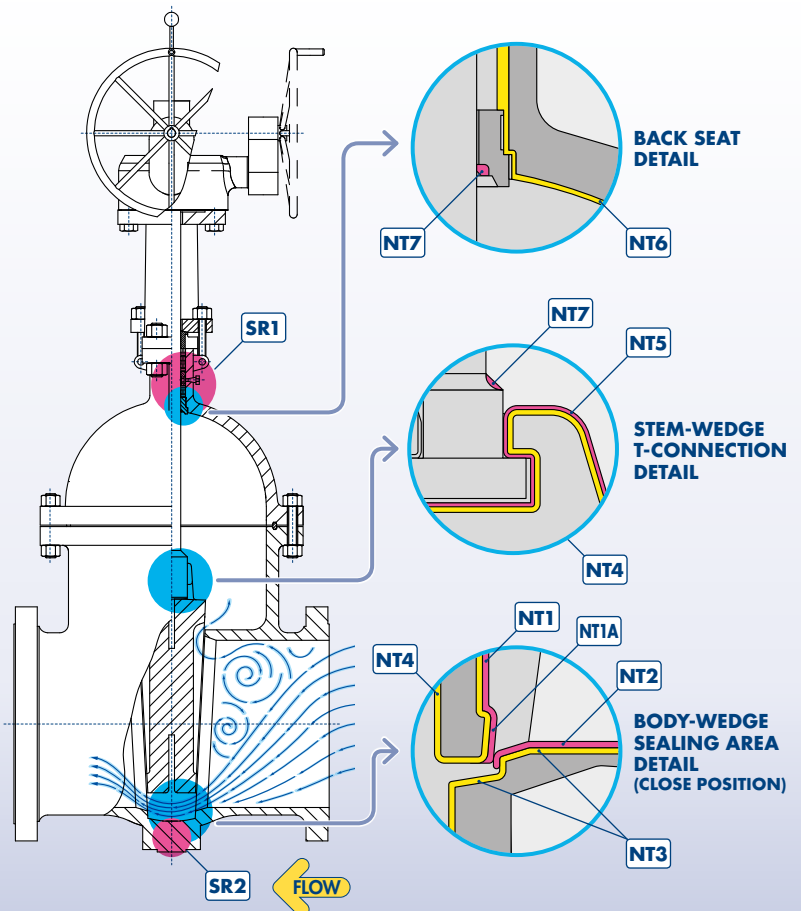
Gate wedge valve design is not common for API 6A upstream application because there is no through conduit feature but it can be required by process operations or specifications when positive sealing is required (Capability of improving seal tightness by increasing the stem thrust) but double block feature is not necessary. In this case the use of expanding gate design can be avoided with benefits directly as a result of cost-saving.



HIGH EROSION-RESISTANT GATE VALVES FOR GEOTHERMAL SYSTEM

Conventional gate valves are not designed for flow rate control with severe problems of erosion with the opening from the small to the half and also corrosion problems because of the type of fluids and chemicals involved. BFE design modified the internal of gate wedge in order to match the requirements of geothermal gathering system. This modification made it possible to develop a high erosion-resistant gate valve with good flow rate controllability for geothermal gathering system. Key features are the full internal cladding of all wetted surfaces with CRA and full hardfaced with wear resistance alloy specifically selected for geothermal fluids (In geothermal gathering system, it is normally required to control the flow rate with the opening from the small to the half during the well test, start up and heat up operation).

- NT1** Hardfacing on the entire wedge surface facing the flow passage (e.g. Stellite® 706).
- NT1A** Hardfacing on the wedge sealing surface (e.g. Stellite® 712).
- NT2** Hardfacing on the entire body surface of the valve bore and body sealing surface (e.g. Stellite® 706).
- NT3** Full cladding of the body wetted surface (e.g. SS-309L).
- NT4** Full cladding of the wedge wetted surface (e.g. SS-309L).
- NT5** Hardfacing or cladding of the stem connection area of the wedge (e.g. Stellite® 706 or UNS N06022).
- NT6** Full cladding of the bonnet wetted surface (e.g. SS-309L).
- NT7** Hardfacing on the backseat sealing surface (e.g. Stellite® 712).
- SR1** Lanern ring and stem injection point.
- SR2** Cast boss in ASME B16.34 "G"-position with geometry ready for flanged drain execution.



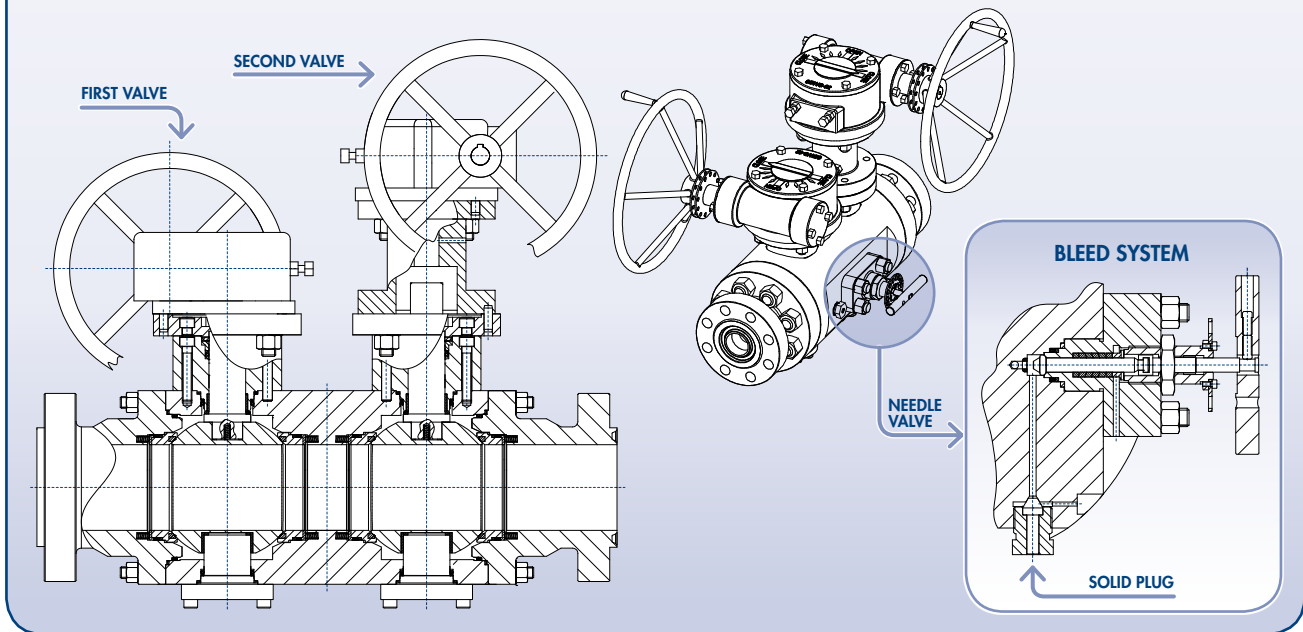
ALTERNATIVE DESIGN SOLUTIONS

DOUBLE BLOCK AND BLEED BALL VALVES

The increased activity in the offshore sector of the energy industry has led to additional factors that have to be taken into consideration when designing piping systems. Space in these modern locations is always at a premium and the design of piping systems and their associated components must therefore be more compact. There are structural constraints that are also very important, such as keeping the structure as light as possible, and there are obvious benefits from making components smaller and lighter. Construction site work is also very expensive and any reduction in installation manpower is also beneficial. The above situation has led to the modification of the patterns of valve components to incorporate savings in space, weight, and labor costs where possible, while still retaining the original function of the valve. The greatest savings are to be seen in the reduction of leak to atmosphere because the potential leak points are minimized compared to the conventional design. Process isolation philosophy has become more complex as safety issues have to be addressed and the requirement for double block and bleed isolation valves has become more commonly used. Double Block and Bleed isolation requires two in-line isolation valves and a bleed valve, used to drain or vent trapped fluid between the two closure elements. Double block and bleed valves replace existing traditional techniques employed by pipeline engineers to generate a double block and bleed configuration in the pipeline. Conventionally, in order to achieve a double block and bleed system, engineers would install two standard isolation valves and a separate facility for bleeding the cavity in between. Space is usually at a premium in the refinery environment, and this approach requiring an additional valve unit to be installed as well as a "T"-junction to allow the cavity to be bled more than doubles the space required compared with a single valve system. This increase in size can often make the installation unfeasible, especially where multiple valves along the line are to be upgraded.

DOUBLE BLOCK AND BLEED MAIN FUNCTIONS

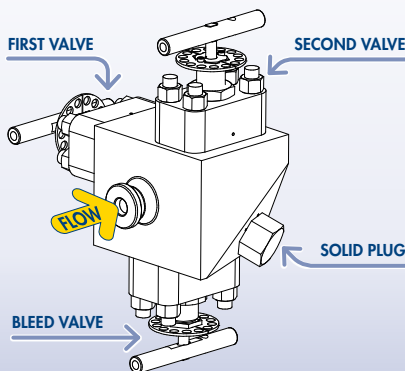
INSTRUMENT DOUBLE BLOCK AND BLEED FOR CHEMICAL INJECTION & SAMPLING	Double Block and Bleed valves for chemical injection & sampling require an additional straight tubing onto the bore of the valve inlet flange face. This quill enters into the process flow and chemicals can be introduced through the valve. Incorporated in the valve design an additional check valve is required for this application in order to prevent reverse flow and process fluid contaminating the chemical source. For sampling the reverse is applied.
INSTRUMENT DOUBLE BLOCK AND BLEED FOR PRESSURE CONNECTIONS	Double Block and Bleed valves for pressure connections are generally used to isolate instrumentation such as pressure indicators and lever gauges.
IN-LINE DOUBLE BLOCK AND BLEED FOR PROCESS ISOLATION	Double Block and Bleed valves for process isolation are located in the primary process stream.



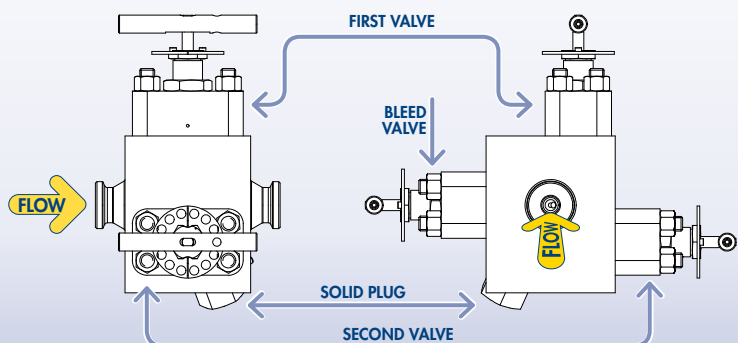
DOUBLE BLOCK AND BLEED NEEDLE VALVES

API 6A Double Block and bleed needle valves have been designed to replace multi-valve assemblies with a single manifold. Main advantages over a typical system include compactness and weight saving which leads to reduced stresses from loading and vibration, fewer potential leak points and a reduction in installation and maintenance times. End finish can be clamp, screwed or welded type.

3D SKETCH



ORTHOGONAL PROJECTION



AVAILABLE OPTIONS

OTHER VALVE OPTIONS OR CUSTOMIZED VERSIONS ARE AVAILABLE ON REQUEST, CONTACT BFE FOR SPECIAL REQUIREMENTS.

CRA WELD OVERLAY

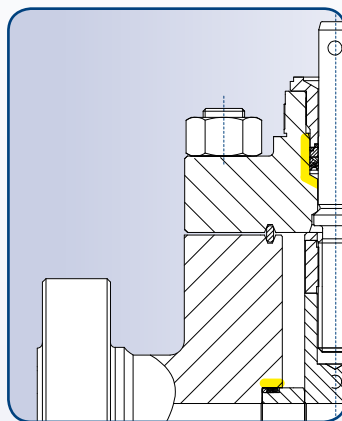
Cladding is defined as the act or process of bonding one metal to another, usually to protect the inner metal from corrosion. The main reason for utilizing this process on valves is to allow for a less expensive base material to have the corrosion properties of a much more expensive material at the surface. The benefits are that the wetted surfaces have the corrosion resistance of the clad material with an overall cost closer to that of the base material and assuring a better performance than solid exotic materials due to better resistance to deformation of base (carbon steel) material. Weld cladding is today a very efficient & cost effective solution for the surface treatment of valves used in highly corrosive & erosive metal loss environment. BFE provide fully project managed customer solutions for the oil and gas industry corrosion resistant overlay applications such as Inconel 625 and SS316 utilising the latest industry techniques and equipment. The base materials utilised in the production process are normally carbon steel or low alloy steel. Valve are available partially or fully clad as shown below, special cladding configurations or materials are available on request.



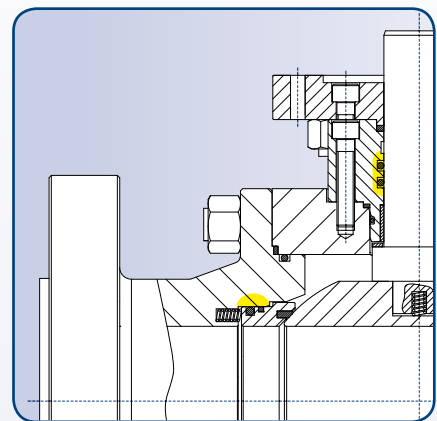
CRA OVERLAY ON DYNAMIC SEALS

Cladding only on the seal surfaces that prevent leakage past parts which are in relative motion. Typically for trunnion design dynamic seals are the stem and seat gasket.

EXAMPLE FOR SLAB ISNRS GATE VALVE

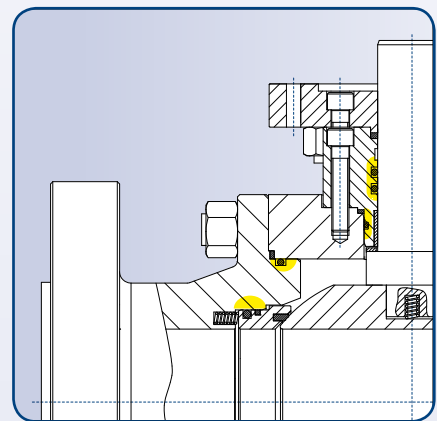
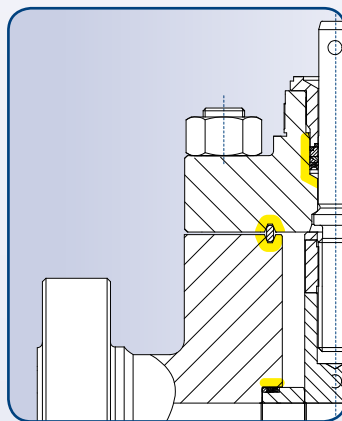


EXAMPLE FOR SIDE ENTRY BALL VALVE



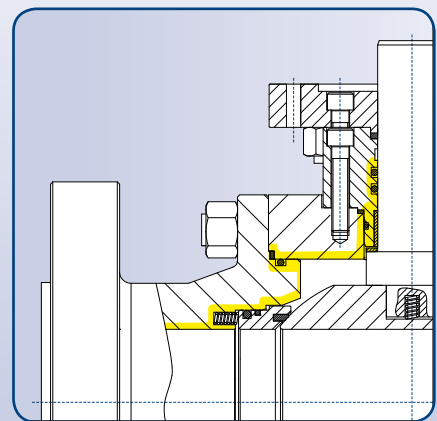
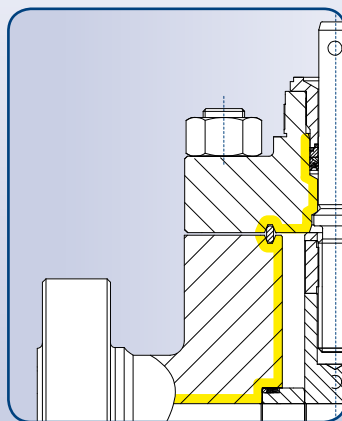
CRA OVERLAY ON STATIC & DYNAMIC SEALS

Cladding on all seal surfaces that prevent any type of leakage of the valve, static or dynamic. The connection to the line is not cladded as standard (it is considered part of the line), any pipe connection can also be cladded upon request.



CRA OVERLAY ALL ON WETTED SURFACES

Full cladding includes all wetted areas of the valve.



AVAILABLE OPTIONS

DIRECT AND REVERSE ACTION

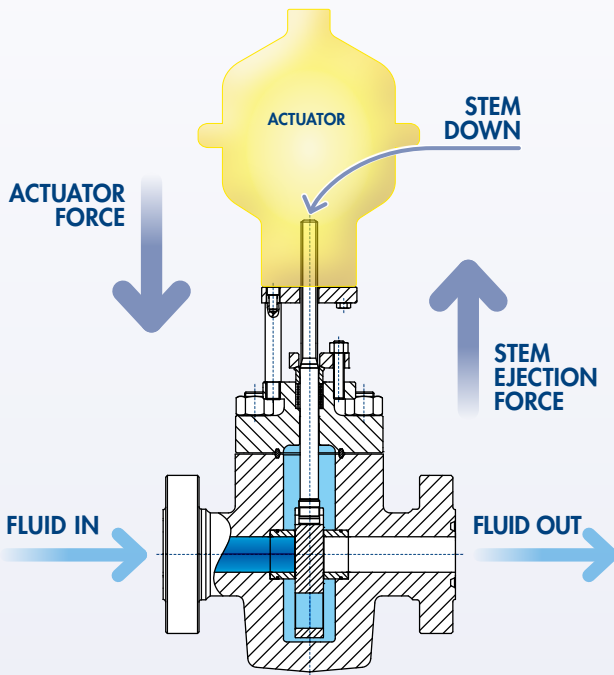
The Slab Gate Valve is designed and manufactured with the rising stem to accommodate the floating movement of the gate. During the valve operation, the line fluid fills the bore cavity. The fluid pressure in the bore cavity generates a vertical force on the stem that pushes the trim from bottom to top. In case of emergency this force is used to assist the actuator spring to bring the valve gate to the required failure mode position.



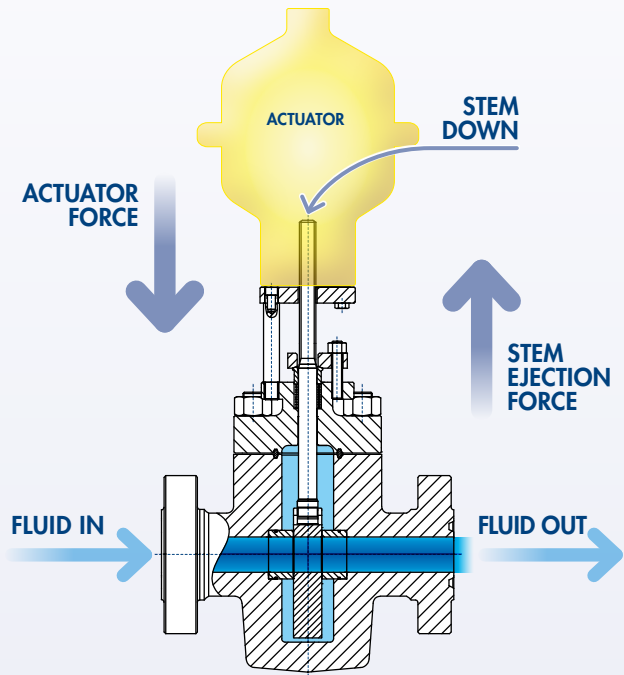
DIRECT ACTING SLAB GATE (STANDARD DESIGN)

Standard acting (BFE Standard if not otherwise required). The standard acting design means the valve is closed with the gate/stem downwards, and is common for fail open configuration, because the "stem ejection force" assists the actuator spring to open the valve.

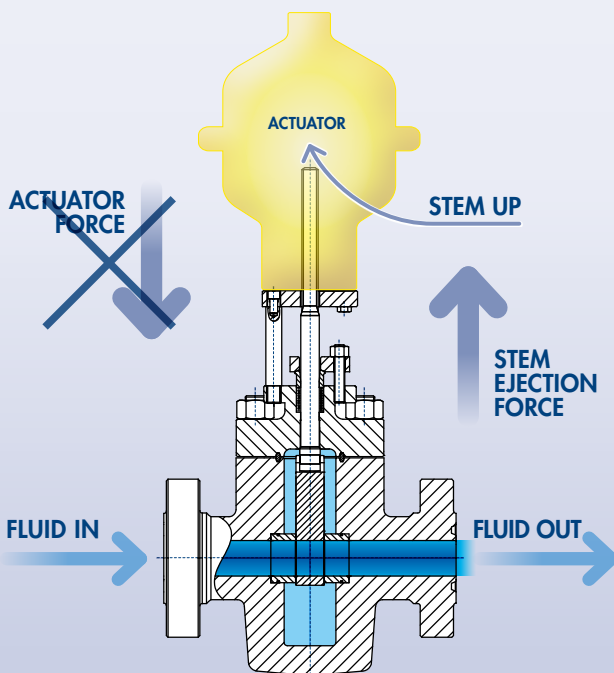
CLOSED POSITION



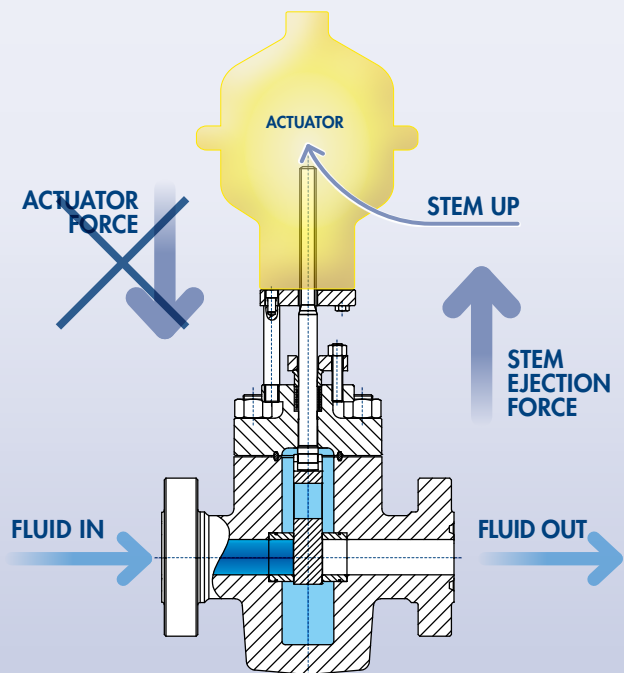
OPEN POSITION



OPEN POSITION



CLOSED POSITION

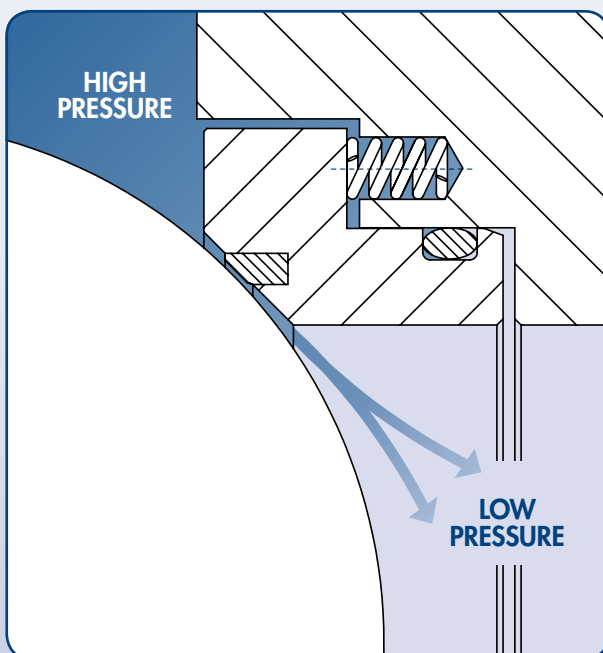
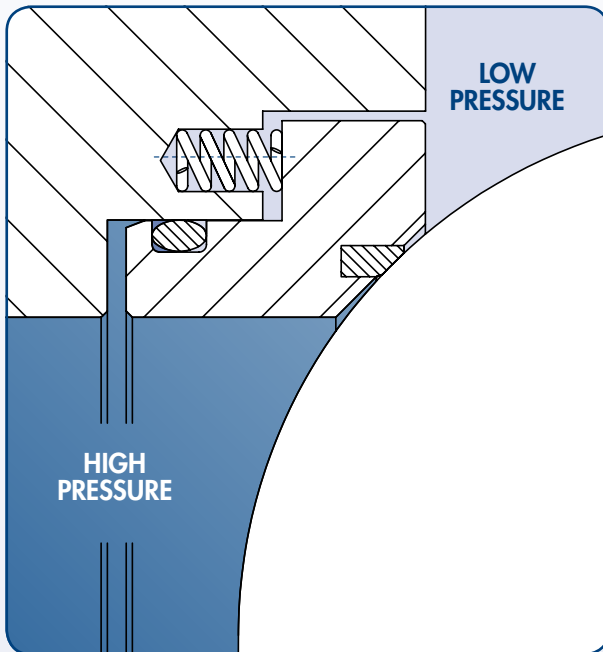
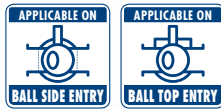


AVAILABLE OPTIONS

PISTON EFFECT PRINCIPLE

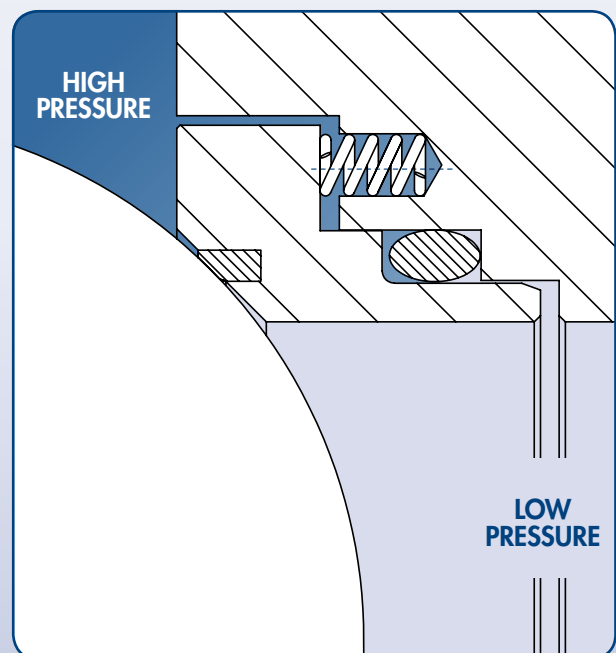
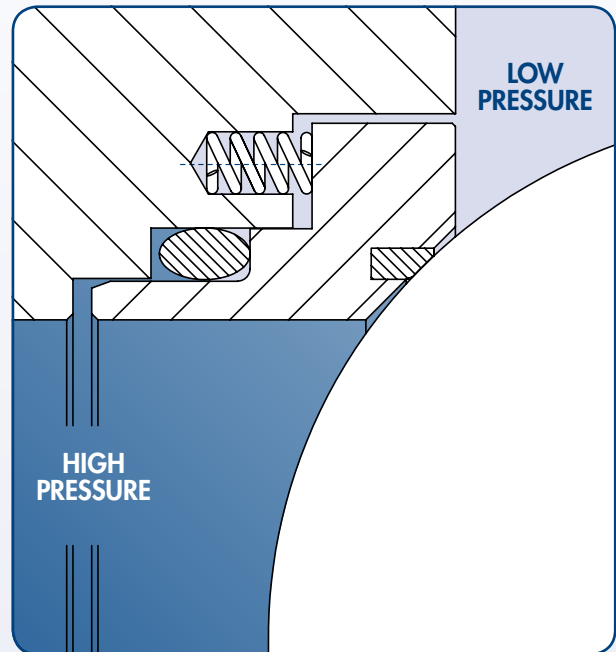
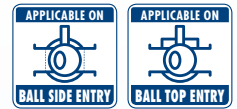
STANDARD SINGLE PISTON EFFECT

In the standard design of Trunnion Mounted Ball Valves, each seat ring performs the "Single Piston" action. In this case the pressure acting on the external side of the seat ring pushes it against the ball while the pressure acting on the internal side of the seat rings pushes it away from the ball. Therefore, while both seat-rings grant the required tightness, when the pressure is applied on their external side, they are defined "Self Relieving", allowing any over pressure acting in the body cavity to be discharged in the line as soon as the force caused by the pressure overcomes the one provided by the springs.



OPTIONAL DOUBLE EFFECT

On request the seat rings design may be modified to perform the "Double Piston Effect" action. In this case the pressure acting on both the external and internal side of the seat rings, results in a force pushing it against the ball, therefore each seat ring grants the required tightness even if the pressure is applied in the body cavity. This feature assures dead-tight sealing simultaneously on both sides of the ball and in order to release any possible over-pressure which develops in the body cavity it is necessary to use an external safety relief valve.



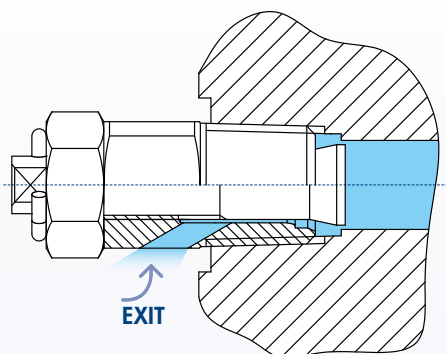
AVAILABLE OPTIONS

SPECIAL DRAIN AND VENT DESIGN

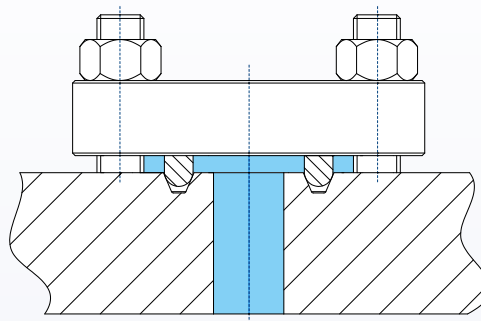
BFE standard drain and vent design is with a standard NPT hex plug according to ASME B16.11. However special requirement for drain and vent design can be supplied as an option, the most common customized versions are shown here.



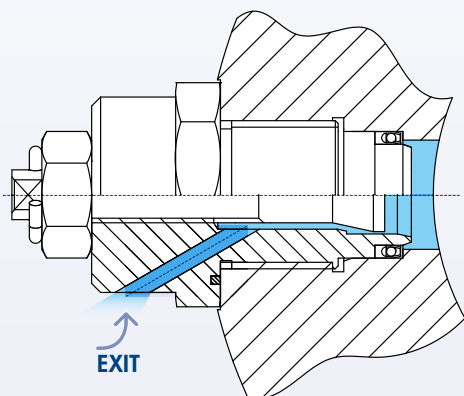
ANTI-BLOWOUT PLUG



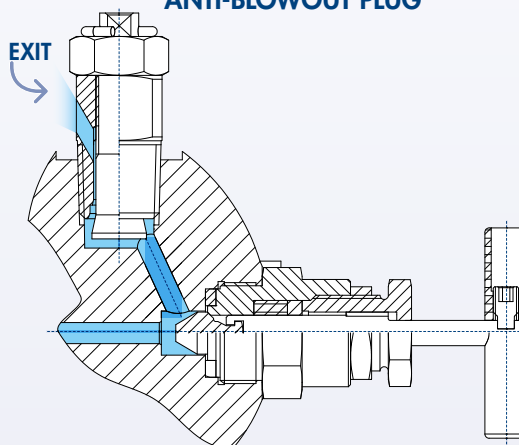
FLANGED CONNECTION



ANTI-BLOWOUT PLUG WITH EXTERNAL GASKET SYSTEM

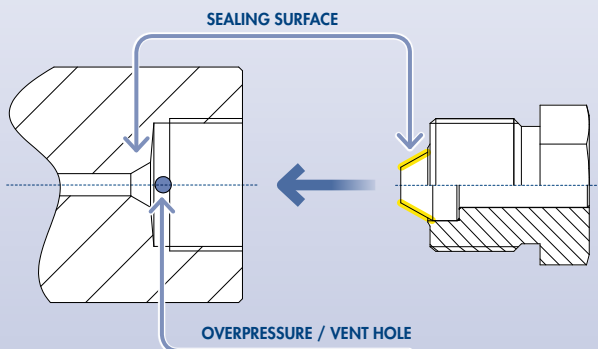


NEEDLE VALVE AND ANTI-BLOWOUT PLUG



AUTOCLAVE PLUG

BFE can supply valve with drain and vent plugs according to API 6A Figure-19 d) or any Autoclave for "Quick Set System" size and pressure designation. Those connections are normally used for process instrumentation at the valve outlet in high pressure process instrumentation equipment with advanced single bite-type compression sleeve fitting system called QSS (Quick Set System). Autoclave connection can be preferred for high pressure instrument because it creates a uniform mechanical sealing surface not affected by surface scratches that can cause issues with more traditional quick connections that can prevent the equipment extraction at these very high pressures. This connection is a vibration resistant design is typically capable of working in the API 6A temperature range. The screw is never under pressure because of the presence of the overpressure hole.



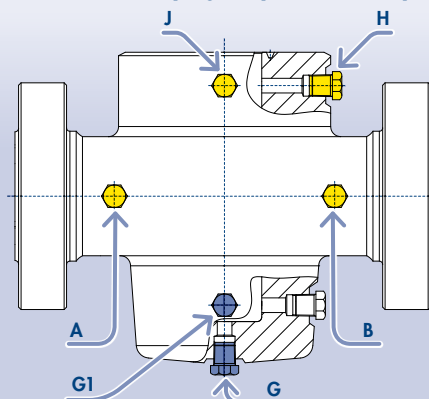
PLUG LOCATION

Valves can be supplied with vent and drain to release trapped body pressure and liquids.

API 7500 and below: Standard drain connections consist of a drilled, tapped, and plugged hole at the "G" or "G1" location. Tapered thread is capable of providing a seal and comply with ASME B1.20.1.

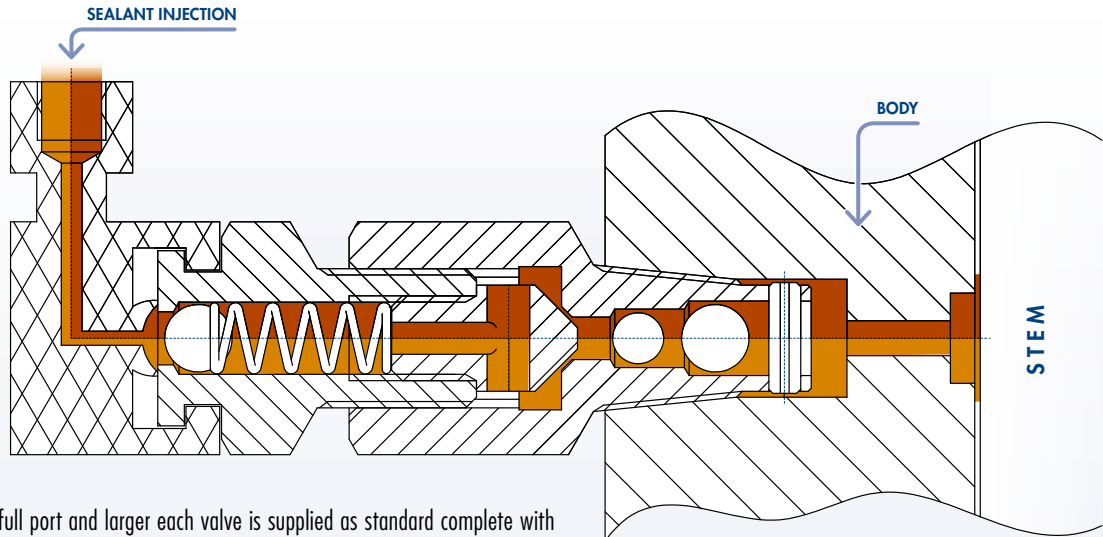
API 10000 and above: Standard drain connections consist of an autoclave plug at the "G" or "G1" location. However special requirements for vent and drain design and location can be performed on request.

NOTE: Valves with double block capabilities are supplied with at least one drain plug for pressure test purpose.



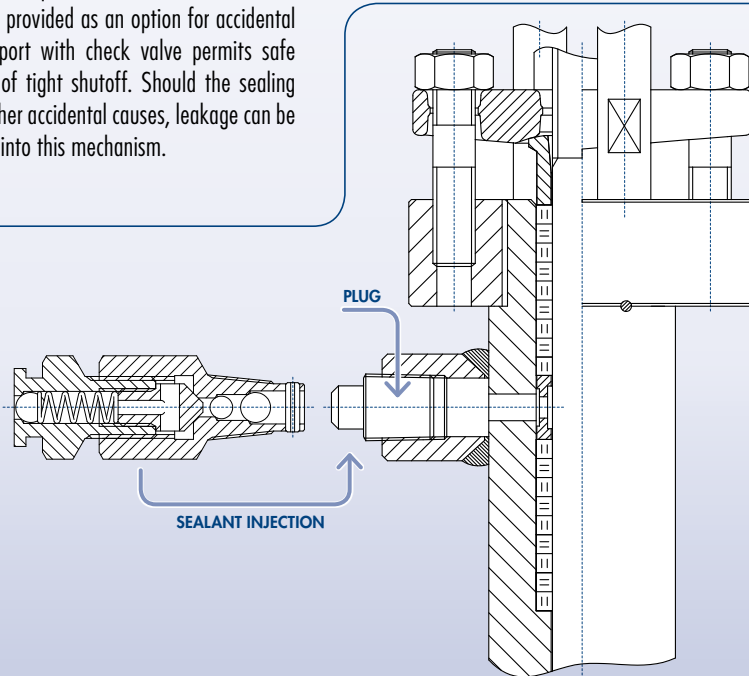
AVAILABLE OPTIONS

STEM EMERGENCY SEAL RESTORATION



For NPS 5"-1/8 full port and larger each valve is supplied as standard complete with emergency stem sealant injection feature. When required and not in the standard NPS range the sealant supply mechanism can be provided as an option for accidental leakage from the stem sealing area. Sealant port with check valve permits safe injection of sealant for fast, simple restoration of tight shutoff. Should the sealing material be damaged or decomposed by fire or other accidental causes, leakage can be temporarily prevented by injection of the sealant into this mechanism.

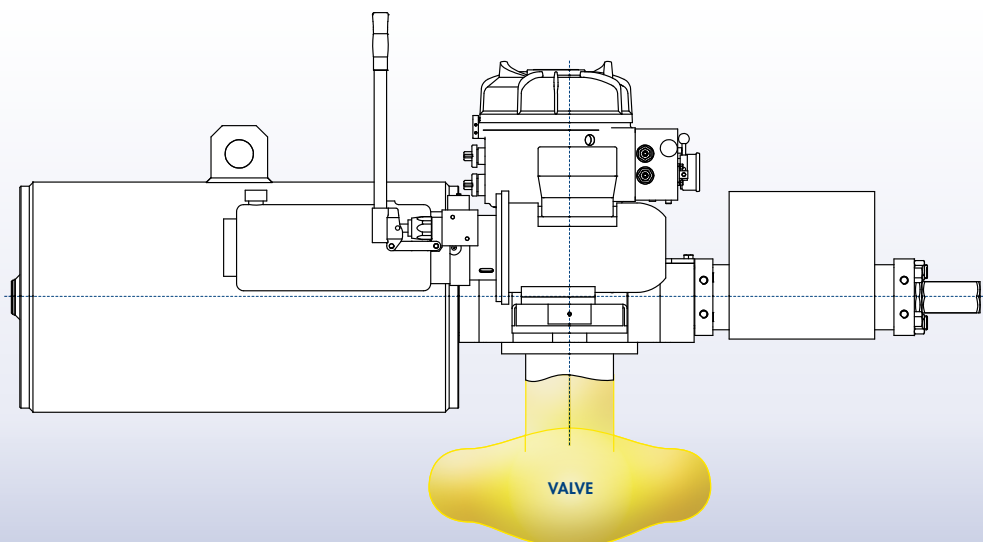
Stem double seals are fitted to valves when hazardous fluids are handled or when external lubrication is used. The most usual form of double seal is two sets of packing, the lantern ring can provide extra stem guidance. BFE can supply the lantern ring version with standard plug or with injector (double ball check type). Other special configurations are available on request.



PNEUMATIC, HYDRAULIC OR ELECTRIC ACTUATORS



Motorized controls can be applied to valves of any size for operation in any position or location. BFE valves are available with pre-assembled valve/actuator packages. BFE standard design allows users to mount most brands of valve actuators with the need of an additional bracket always available in the factory.



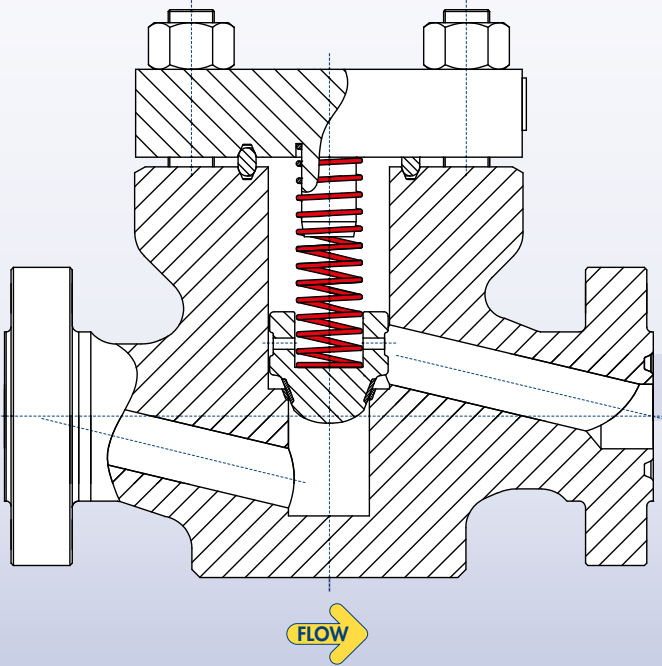
AVAILABLE OPTIONS

SPRING ASSISTED CHECK VALVES



Standard valves have no spring and depend on the weight of the disc to start closure. These are called "horizontal check valves", as they will only function properly when installed in a horizontal line. Spring loaded check valves may be installed in any position, both in horizontal and vertical piping applications. The spring helps reduce noise, minimize the effect of pulsating flow and "water hammer" line shock and assists the closure member in seating faster.

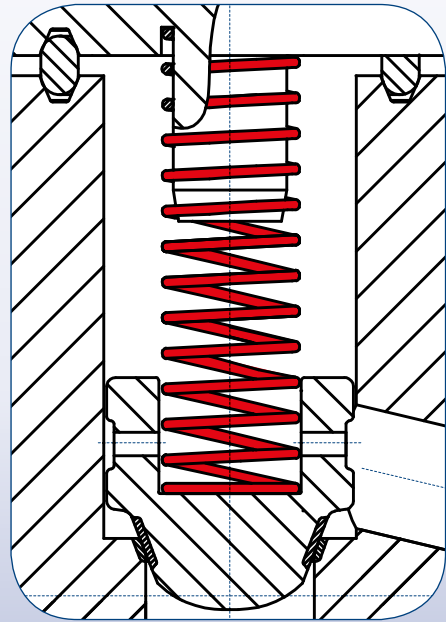
SPRING ASSISTED "T"-PATTERN PISTON CHECK VALVE



CUSTOMIZED CRACKING PRESSURE



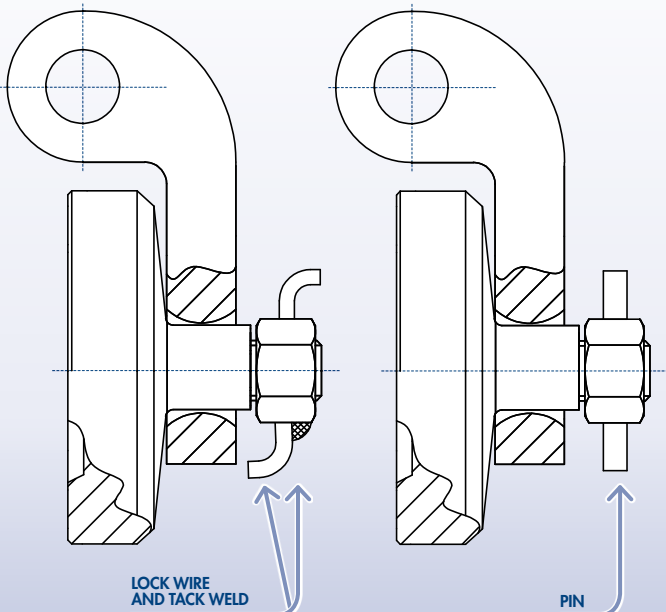
An important concept in check valves is the cracking pressure which is the minimum upstream pressure at which the valve will operate. Static cracking pressure is the minimum pressure at which fluid is by-passed through the valve at the rate of 0.1cc per minute during conditions of increasing pressure supplied by means of a hand pump. Valve cracking pressure can be customized to meet unique performance requirements through the modification of the trim design (closure member geometry, spring force and materials).



ALTERNATIVE CLOSURE MEMBER ANTI-LOOSENING SYSTEM



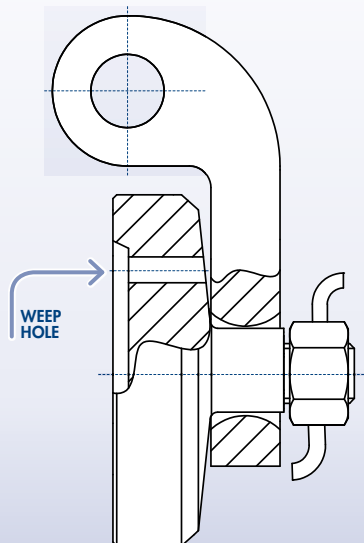
Swing check design must prevent possible unscrewing of the swing check closure member nut. BFE standard design achieves this goal by a lock wire. Alternative solutions are available as option, the most common alternative solution is obtained by an additional weld or pin that prevent loosening in service.



WEEP HOLE

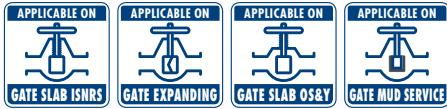


The weep hole, is a small opening that allows the fluid to drain from the downstream side to the upstream in case of closed valve. Purpose of weep hole can depend on the application. In case of weep hole option the valve does not achieve leak-tight closing or keep the differential pressure.



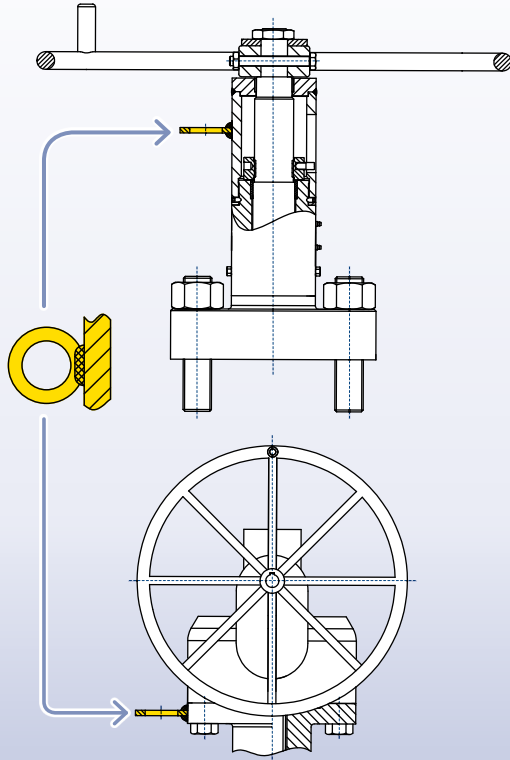
AVAILABLE OPTIONS

LOCKING DEVICE

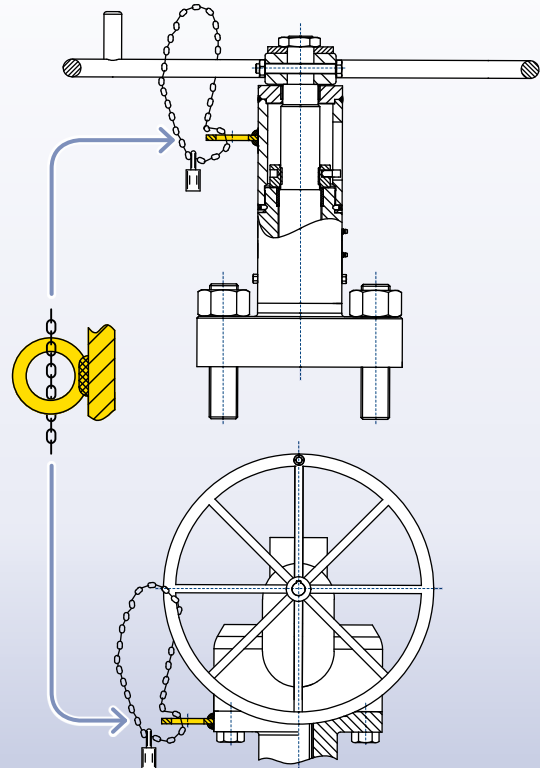


Locking devices designed to help prevent accidental or unwanted operation are built to resist excessive force. All BFE locking device options are simple but secure. Chain and Padlock available on request.

LOCKING FACILITY



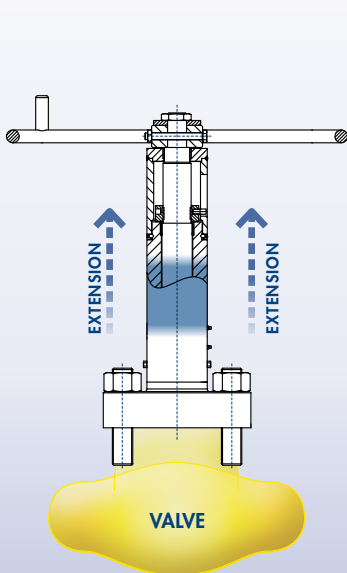
LOCKING FACILITY WITH C&P



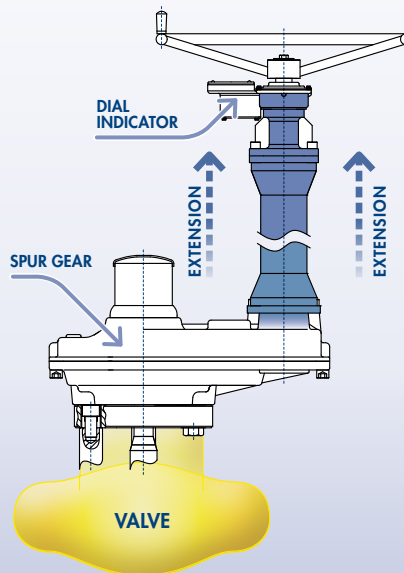
STEM EXTENSION

BFE stem extension is a simple and effective design. This option is designed for installation where pipe insulation would make standard valve inoperable. The stem extension can also be used where a handle needs to be raised above an adjoining obstruction or where the valve is installed behind a panel.

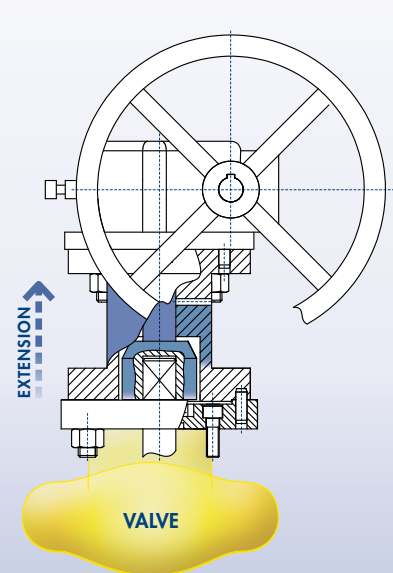
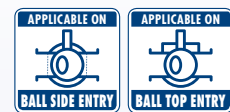
EXTENSION FOR GEAR OPERATED GATE VALVES



EXTENSION FOR HANDWHEEL OPERATED GATE VALVES



EXTENSION FOR GEAR OPERATED BALL VALVES



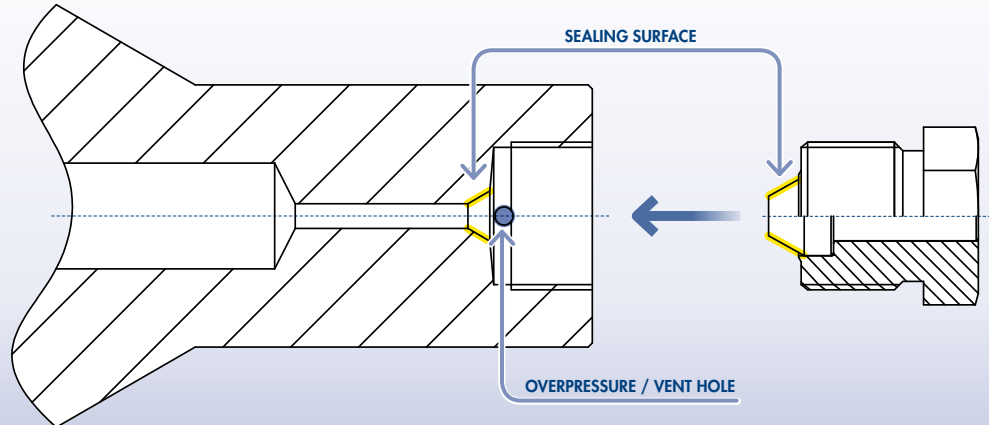
AVAILABLE OPTIONS

AUTOCLAVE END FINISH



BFE can supply valve with test and gauge connections according to API 6A Figure-19 d) or any Autoclave for "Quick Set System" size and pressure designation. Those connections are normally used for process instrumentation at the valve outlet in high pressure process instrumentation equipment with advanced single bite-type compression sleeve fitting system called QSS (Quick Set System). Autoclave connection can be preferred for high pressure instrument

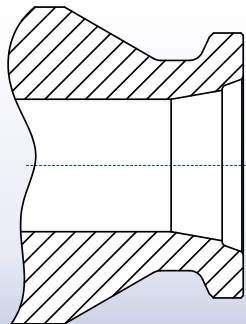
because it creates a uniform mechanical sealing surface not affected by surface scratches that can cause issues with more traditional quick connections that can prevent the equipment extraction at these very high pressures. This connection is a vibration resistant design is typically capable of working in the API 6A temperature range. The screw is never under pressure because of the presence of the overpressure hole.



SPECIAL END FINISH



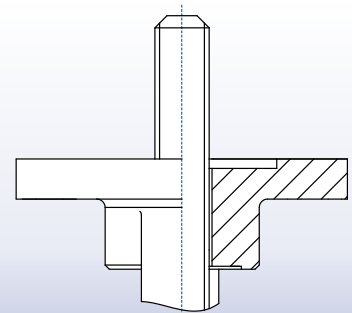
The choice of end connections for connecting a valve to its associated pipe is performed by customers. Common API 6A end finish stated in the catalogue are flanged. BFE is basically able to perform any end finish as required by the customers and other end finishes as follows: hub, butt weld, threaded, socked, etc.



ACTUATOR-READY



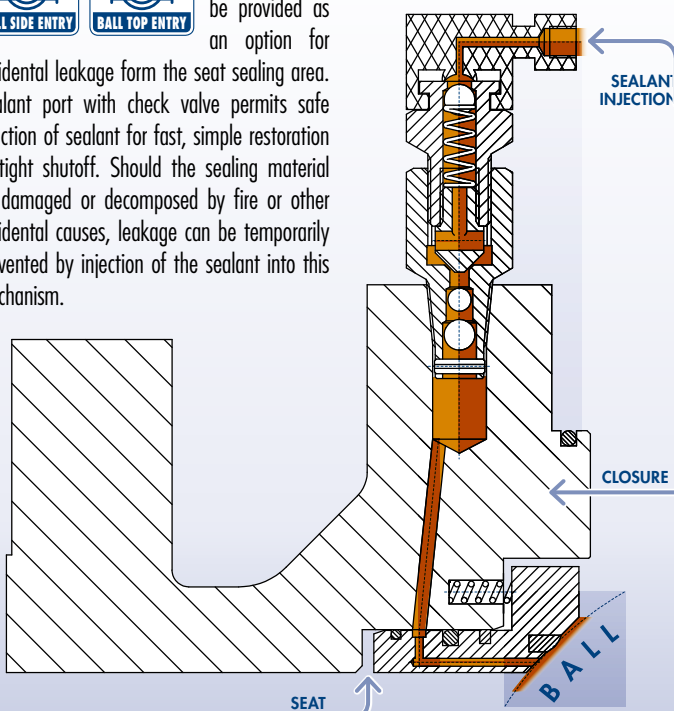
Valves can be supplied ready for actuation without the handwheel or gear box. The mounting connection can be BFE Standard or can suit the choice or type of actuator.



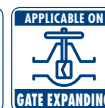
SEAT EMERGENCY SEAL RESTORATION



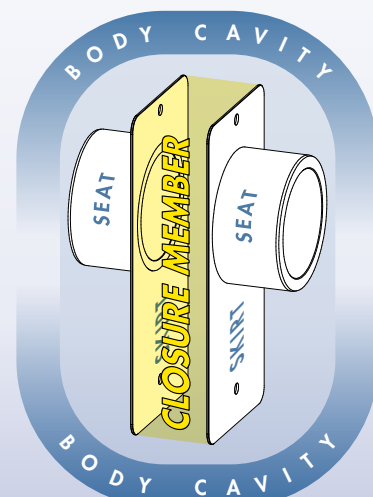
A sealant supply mechanism can be provided as an option for accidental leakage from the seat sealing area. Sealant port with check valve permits safe injection of sealant for fast, simple restoration of tight shutoff. Should the sealing material be damaged or decomposed by fire or other accidental causes, leakage can be temporarily prevented by injection of the sealant into this mechanism.



SEAT SKIRT



Valves can be supplied with protection skirts when the valves are used in dirty fluid applications. To prevent the ingress of solids into the valve body cavity during all stages of disc travel and to maintain the sealing surface of the closure member clean, the seats can be provided with skirts.



Printed in Italy 1st edition.
Revision 02 2023/06/01

GENERAL SALE CONDITIONS

QUOTATION VALIDITY

Unless otherwise agreed, quotations are valid for four weeks from date of issue. The delivery terms are always "ex-works" unless otherwise stated. Prices and sale conditions can be changed without any previous notice.

ORDERS ACCEPTANCE

Orders are considered accepted at our general sale conditions clearly mentioned on order acknowledgment.

GOODS DELIVERY

The Company does not accept any responsibility for delays in delivery which are always intended as indicative and not binding. Transport risks are at receiver's charge also in case of CIF delivery.

GUARANTEE

The Company warrants all its products, from material and/or manufacturing defects, to be used as recommended by standards, and in accordance with approved piping practice and technique, for a period of one year from shipping date, unless otherwise agreed.

The Company liability covers eventual "free of charge" replacements for defective parts or products, providing it has not failed in the observance of above mentioned conditions and in use in compliance with standards, and, anyway, after return of defective goods. Any other liability, neither objective nor subjective will be accepted.

CLAIMS AND ORDER CANCELLATIONS

Claims will be considered only if made within 10 days from goods receipt. Partial or complete cancellations of order can be accepted only upon previous agreement or by written consent and, however, not later than 15 days from order date. Any controversy will be handled by the Court of Milan.

The material in this catalog is for general information. For specific performance data and proper product selection, consult BFE or your BFE representative. BFE reserves the right to change designs, dimensions or specifications without notice.





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RPC Valve

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