High Integrity Top Entry Ball Valves

SWI Valve Co., Ltd.

Reliable Performance In Extreme Conditions

www.swivalve.com

We Manufacture Critical Service Valves For The Worlds Industries

SWI Global Footprint

Wherever industrial valves are needed in the world, SWI is nearby. We maintain strong partnerships with authorized stocking distributors on every continent. For your nearest authorized stocking distributor or representative, full contact details can be obtained from our web site: www.swivalve.com

Foreword

SWI Valve Co., Ltd. is a leading industrial valve manufacturing company, specializing in the design and manufacture of Ball, Gate, Globe, Check, Cryogenic and Bellows Seal valves.

Our facilities incorporate all aspects of valve design, development and manufacture ensuring that SWI can offer a degree of flexibility rarely encountered elsewhere.

At SWI, we stand for three values - quality, innovation and service. We know the worlds Oil, Chemical, Petrochemical and Process industries require precision flow control products. We have dedicated ourselves to supplying that need with an extensive range of industrial valves, manufactured in our own factories and designed for environmental sensitivity.

The Quality Policy of SWI Valve Co., Ltd. is to consistently provide product that meets customer and applicable regulatory requirements, with the aim to enhance customer satisfaction by providing exactly what has been agreed contractually, to the required quality and time stated.

The company operates under the Quality Assurance Scheme which is in accordance with ISO 9001 and API Monogram.

We are pleased to introduce our range of High Integrity Top Entry Trunnion Mounted Ball Valves and trust this catalogue will assist our customers in the selection and application of SWI

High Integrity Top Entry Trunnion Mounted Ball Valves

DESIGN FEATURES

TOP ENTRY TRUNNION MOUNTED BALL VALVES FOR THE CHEMICAL, PETROCHEMICAL, OIL & GAS AND ALLIED INDUSTRIES.

SWI Top Entry trunnion mounted ball valves have been designed for Severe Service and generally used in the Petrochemical, Refining, Upstream Oil and Gas, Power and Chemical applications. The designs incorporate many technically advanced features which ensure reliable and repeatable shut off performance whilst providing the highest levels of safety as demanded by these industries.

TECHNICAL SPECIFICATIONS

Size Range	: DN50 (2") to DN1200 (48")
Pressure Rating	: ANSI Class 150 to Class 2500
Connection	: Butt-weld ends to ASME B16.25 Flanged to ASME B16.5 (2" ~ 24") and ASME B16.47 Series A (26" and above) Clamp / Hub ends on request.
Body Materials	: Carbon steel, ITCS, Stainless steel, Duplex, Super Duplex, Inconel 625 and other special alloys.
Top Mounting	: ISO 5211 / EN15081
Temp. Range	: -196°C to +200°C (-320°F to +392°F)
Design	: API 6D / ASME B16.34 / ISO 14313
Face to Face	: ASME B16.10* / API 6D
Fire Testing	: API 607 6th Edition / ISO 10497
Pressure Testing	: API 598 / API 6D / EN 12266-1/ISO 5208
Certification	: EN 10204 / ISO 10474 / EN 29001/ NACE MR 0175 / ISO 15156 / MR 0103 Directives PED 97/23/EC & ATEX 94/9/EC ISO 15848 Part 1 & 2, API 622
Quality Assurance	: ISO 9001 /API Spec Q1/ API Monogram

* Class 600# dimensions apply for 150# & 300#.

KEY FEATURES

- Design, manufacture and materials conform to the essential requirements of API 6D, ISO 14313, ASME B16.34, ASME VIII and Directives PED 97/23/EC and ATEX 94/9/EC.
- Certified firesafe in accordance with API 607 6th Edition / ISO 10497.
- Anti-static design (10Ω under 12 Volt).
- Fully contained cover gasket, graphite seal is protected from the working fluid by primary elastomeric seal for soft seated.
- Body wall thickness exceeds the minimum requirements of ASME B16.34.
- Full and reduced bore designs available.
- Trunnion supported ball design for superior bi-directional shut off performance across a wide range of pressures.
- Single piece body TOP ENTRY construction for in-line and on-site maintenance.
- Internally assembled blow-out proof stem design. Bottom entry stem shouldered directly to the body cover and not to any other intermediate bolted part.
- Standard valve features High integrity stem sealing system in compliance with ISO 15848 Class AH & API 622 suitable for high vacuum service and technically emission free.
- In line maintainable stem sealing system. Replaceable without the need for valve disassembly or removal of stem.
- Bi-directional, double block & bleed design allowing the venting and draining of the body in the open & closed position.
- Pressure and spring assisted seat design is of the single piston effect as standard. Double piston effect available.
- Positive cavity relief via single piston effect spring loaded seat design, relief is always to the low pressure side.
- Large guided stem (bearings) with hardness control between parts to minimize operational torques.
- Positive seat sealing at high and low differential pressures.
- Emergency sealant injection provision to seat and stem seal is available.
- Metal seated designs for CRITICAL or SEVERE service applications.
- Low and high temperature service designs available.
- Testing and marking to API 6D & PED (as required).
- Available with pneumatic, hydraulic or electric actuators.

Quality Assurance

SWI operate under a Quality Assurance system which is approved by Bureau Veritas to ISO 9001:2008 / KS Q ISO 9001: 2009 / KEPIC-MN and the company is licensed to use the API Monogram in respect of API 6D ball valves. In line with the companies high reputation for quality of design and manufacture, SWI products have been independently accredited by Bureau Veritas for design, manufacture and materials compliant with the safety requirements of the Directive 97/23/EC (PED).

High Integrity Top Entry Trunnion Mounted Ball Valves

DESIGN FEATURES

SWI's range of Top Entry trunnion mounted ball valve design incorporates some of the most advanced features, including many major Owner & Operating Company specification preferences, whilst fully conforming to the design requirements of ISO 14313 / API 6D & ASME B16.34 codes.

Trunnion mounted design provides reliable bi-directional sealing through spring and pressure assisted seats. The rigidly supported fixed ball via large bearings housed within the body and body cover has two independent spring assisted seat rings which are free to move along the valve axis providing bubble tight and bi-directional sealing capability. The seal is formed by the seat ring assembly being spring loaded & pressure energized against the ball as a result of the piston effect created by the fluid pressure. At low pressures, the sealing is maintained by the force provided by the seat springs.

All these design features contribute towards the valves capability to provide the highest levels of performance and reliability, whilst ensuring repeatable shut off, positive sealing of all external leak paths and a high degree of safety for both plant and personnel.

THE RANGE

FULL BORE

SIZE (Ins)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	28"	30"	36"	40"
ANSI 150	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
ANSI 300	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
ANSI 600	■	■	■	■	■	■	■	■	■	■	■	■					
ANSI 900	■	■	■	■	■	■	■	■	■								
ANSI 1500	■	■	■	■	■	■	■	■	■								
ANSI 2500	■	■	■	■	■	■	■										

REDUCED BORE

SIZE (Ins)	2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	28"	30"	36"	48"
ANSI 150	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
ANSI 300	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
ANSI 600	■	■	■	■	■	■	■	■	■	■	■	■	■				
ANSI 900	■	■	■	■	■	■	■	■	■	■							
ANSI 1500	■	■	■	■	■	■	■	■	■	■							
ANSI 2500	■	■	■	■	■	■	■	■									

Larger sizes available on request.

■ TE Series

BOLTED COVER

Designs are of the single piece TOP ENTRY body design with bolted cover engineered for critical service applications combined with true in-line and field maintenance / reparability whilst being designed to withstand severe pipeline stresses.

The double sealing action of the primary o-ring and fully contained graphite seal ensures zero leakage and fire safety assurance irrespective of any pipeline stresses being directed against the rigid single piece body and no intermediate bolted joint as associated with side entry valves. Alternative designs using SWG gaskets is available on request.

Cover bolting calculations satisfy the requirements of ASME B16.34 and in particular allowable bolt stress do not exceed the maximum value of either 7,000 or 9,000 psi respectively whichever bolt material is used.

The design complies with the requirements of ASME B16.34. Other codes (in particular ASME VIII Division 1) are only used as a supplement to ASME B16.34 for additional calculations not already covered in ASME B16.34.

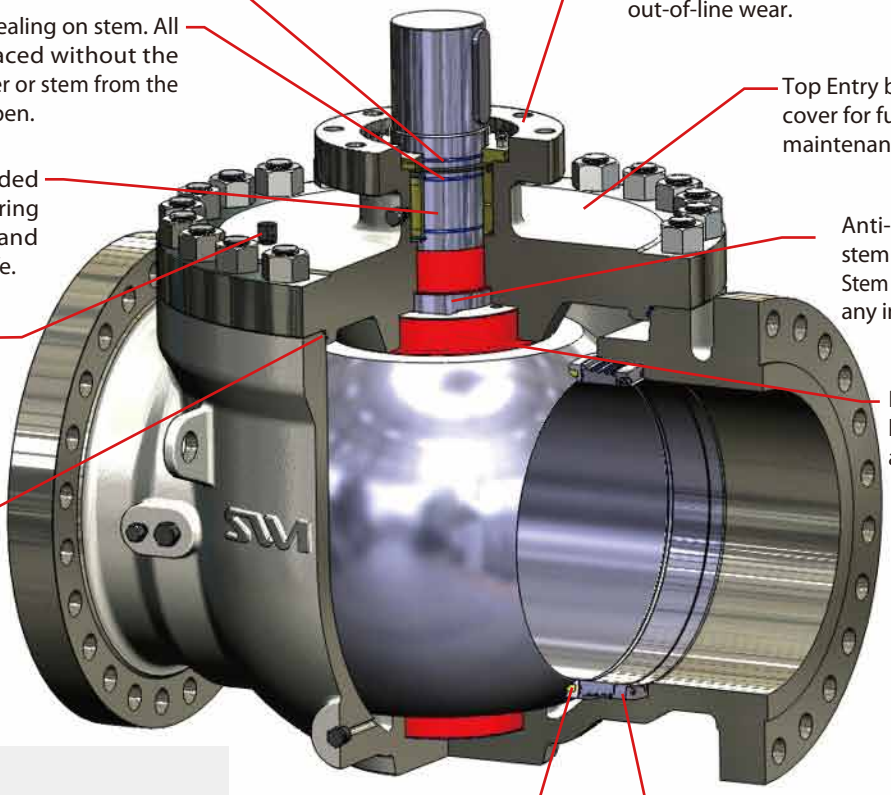
High Integrity Top Entry Trunnion Mounted Ball Valves

DESIGN FEATURES

SWI's range of Top Entry ball valves are available in a wide range of materials and configurations to meet your specific requirements. Some options available include;

- Local weld overlay with corrosion resistant material to critical seal areas.
- Sealant injection to seat and / or stem area.
- Metal seated or primary metal seat with secondary soft insert.
- Transition pup pipes for weld end valves & designs suitable for pigging.
- Drain and Vent Connections with thread protection or valved (Gate / Ball…..) vent & drain valve fitted.
- Pneumatic, Electric or Hydraulic Automation.
- Emergency Shut Down applications.
- Extended bonnets for low or high temperature service.
- Extended stem for underground (buried) installation.
- Locking & interlocking facilities.

ISO 15848-1 Class AH & API 622 Certified



Weatherproof wiper seal to prevent environmental contamination to stem sealing element.

Double o-ring primary sealing on stem. All seals can be field replaced without the need to remove the cover or stem from the valve with vent valve open.

Stem design is not loaded by ball side thrust ensuring low operating torque and extended operational life.

Vent valve for block & bleed function and seat integrity verification.

Firesafe cover gasket protected by o-ring primary seal.

ISO 5211 mounting pad. Allows precise mounting of actuator, mounting bolts are independent from bonnet and exact alignment prevents side load and out-of-line wear.

Top Entry body design with bolted cover for full in-line and field maintenance / reparability.

Anti-blow-out bottom entry stem shouldered to the body. Stem retention does not rely on any intermediate bolted part.

Large self lubricating steel bearings for smooth operation and lower operating torques.

Single piston effect pressure & spring assisted seat design for bi-directional positive sealing at high and low pressures with positive cavity relief.

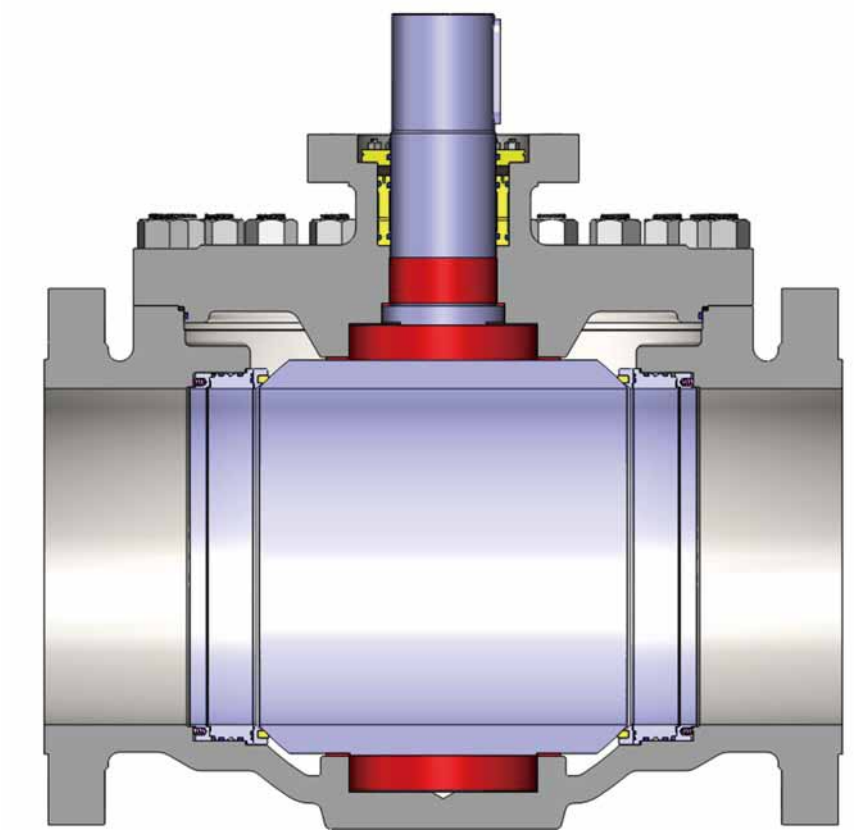
Standard insert materials include Reinforced PTFE, DEVLON V-API or PEEK combined with a Secondary Metal to Metal Firesafe Seat.

24" Class 600#
High Integrity Top Entry Trunnion Mounted Ball Valve

TRUNNION MOUNTED CONSTRUCTION

The trunnion mounted ball supported by the body with its floating seat rings allows easy and smooth operation even at high pressures. The differential load, produced by line pressure acting on the ball is carried by the large body and cover trunnion bearings. These self lubricating bearings maintain low operating torque and maximizes service life.

High temperature valves utilize solid metal bearings specially treated to ensure anti-galling and low friction characteristic.



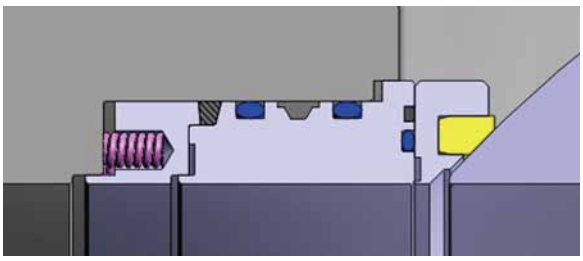
DOUBLE BLOCK & BLEED

SWI ball valve upstream and downstream positive sealing system allows for installation in services requiring double block and bleed facility for bleeding of the cavity or checking of the sealing integrity in the open or closed position.

When fitted, bleed valves or combined anti-blow-out vent & drain facility may be opened to check seat integrity with the main valve in either the fully open or closed position. Since there is no leak path from the pipeline to the body cavity other than via the seats or seat seals, bleeding the body cavity will indicate any leakage.

Seat / seal integrity may therefore be checked if needed PRIOR to affecting a pipeline shutdown.

SELF RELIEVING FLOATING SEAT RINGS



Standard Seat Design

Two independent single piston effect self relieving floating seat rings specially designed to minimize operational torque, ensure bi-directional tightness of the valve from zero differential pressure to the valves maximum rated pressure.

Double O-ring and Anti-extrusion rings are fitted as standard for class 2500 valves, and are optional for lower pressure classes.

To retain adequate sealing in the event of fire damage to the elastomeric primary seals, each is backed up by Graphite. In the case of Soft Seated valves, destruction of the soft insert material will lead to the seat spring energizing the metal seat ring to form a metal to metal seal against the ball.

POSITIVE CAVITY RELIEF

In the event of excessive pressure build-up in the body cavity (whilst the valve is fully open or closed) due to rapid thermal expansion of the trapped fluid, the excess will be relieved to the pipeline as the seat spring is overcome on the lowest differential pressure side.

DESIGN FEATURES

SPRING & PRESSURE ASSISTED SEALING

The high pressure side seal is formed by the seat ring assembly being pressure energized against the ball as a result of the spring loaded seat combined with the single piston action created by the line pressure.

Live loading of the seat rings by springs assures sealing capability at low pressures.

STEM SEALING

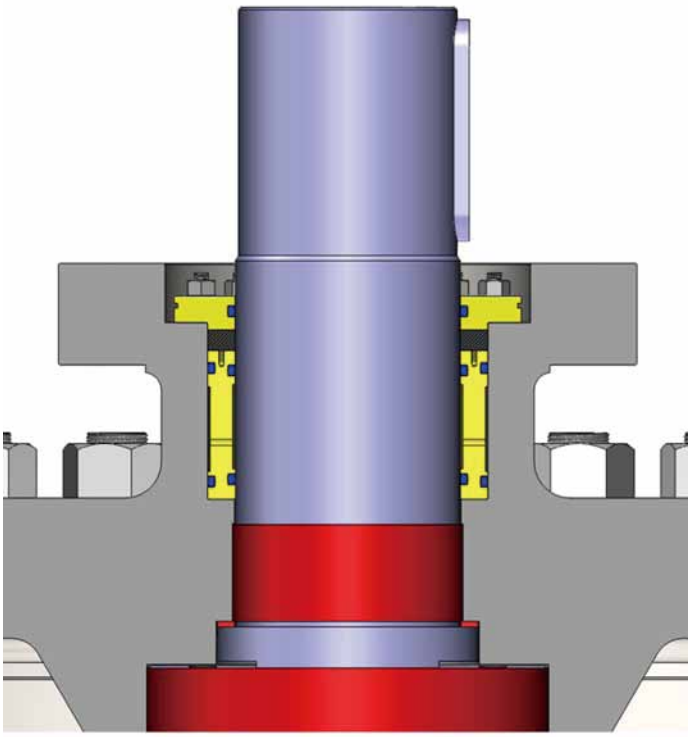
Precision machining of the stem which is rigidly supported between bearings, combined with hardness control between metallic parts and double o-rings backed up by a tertiary graphite seal, ensures reliable operation with the highest levels of sealing integrity.

SWI's standard sealing system which complies with the requirements of ISO 15848-1 Class AH and API 622 features a removable stem cartridge which houses the elastomeric primary seals.

This high integrity stem sealing system which is technically emission free can be replaced without the need to remove the stem from the valve or remove the valve from the pipeline provided the cavity is vented.

Other designs incorporating PTFE / Inconel Lip Seals, high integrity mechanically energized graphite or a combination of both, ensures sealing designs suitable for services from -200°C to + 538°C (-328°F to +1000°F), including low fugitive emission control for VOC, Hazardous and Lethal service applications.

ISO 15848-1 Class AH & API 622 Certified



Standard Stem Sealing System

ANTI-BLOW-OUT STEM

The stem is of one piece bottom entry shouldered directly to the body cover as standard. No portion of the stem relies on any other intermediate bolted part for its final positioning or anti-blow-out feature whilst the weakest point of the stem is maintained outside of the pressure boundary.

This feature combined with greater stem diameter & drive chain strength compared to may other manufacturers, ensures the stem drive train assembly is suitable for ESD applications as standard.

EXPLOSIVE DECOMPRESSION

Wherever valves are used on high pressure gas applications, there is a possibility of gas being absorbed into the molecular structure of elastomeric o-rings. If the valve is then subject to sudden decompression, the gas will expand rapidly and may damage the o-ring.

To eliminate this possibility, SWI can offer special ED resistant o-ring seals (Type Test Certified by Independent Test Laboratory) which have been extensively tested in accordance with NORSOK specification M-710 and / or TOTAL specification GS PVV 142. These specialist seals are also available tested in accordance with NACE TM0297 & TM0187 on request.

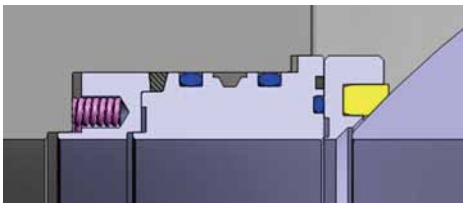
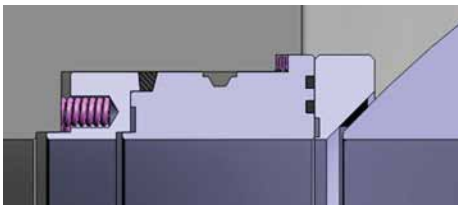
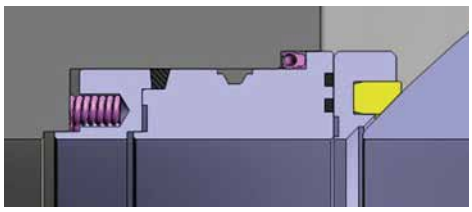
Where primary elastomeric seals are prohibited, alternative seals such as PTFE/Inconel Lip Seals suitable for such service conditions are available on request.

High Integrity Top Entry Trunnion Mounted Ball Valves

DESIGN FEATURES

SEAT DESIGNS & MAIN MATERIALS

Standard	High Temp. & Severe Service	Low Temperature

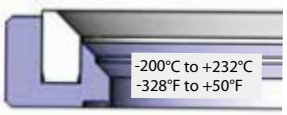
PERFORMANCE FOR ANY PROCESS

SWI recognizes the vital role correct seat material selection plays in delivering the highest levels of sealing performance and longevity of service which are directly effected by the process and operational requirements.

With a wide variety of SOFT & METAL seat materials to suit an extensive range of applications combined with advanced technology in design and construction, SWI offers dependable operation combined with pressure integrity and endurance over the valves service life. The below outlines commonly used seat materials; other grades are available on request.

R-PTFE < Reinforced Polytetrafluoroethylene >

This seating material has excellent chemical resistance over a wide range of chemicals and offers the lowest operational torques due to its lower coefficient of friction. Mechanical properties are enhanced by adding 25% percent glass fiber filler material to provide improved strength, stability and wear resistance.



NYLON 6.12 / DEVLON V-API < High Molecular Polyamide Thermoplastic>

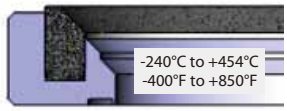
Devlon® V-API is a high molecular weight polyamide that is specifically tailored for high temperature/pressure applications in the offshore oil and gas sector. It is yellow in colour. The particularly low moisture absorption of this grade provides high dimensional stability combined with excellent impact wear characteristics to make this material invaluable for offshore applications.

PEEK < Polyetheretherketone >

Peek Polymer offers a unique combination of chemical, mechanical and thermal properties where high strength and high temperature is required in corrosive applications. Excellent for water and steam application at elevated temperatures and possesses excellent resistance to radiation and abrasion compared to PTFE's.

Metalized Carbon Insert

Metalized Carbon is a proprietary product for applications where traditional SOFT seating materials cannot be utilized. This material has exceptional capabilities and is suitable for use in a variety of SEVERE SERVICE applications ranging from high temperatures to cryogenic temperatures, harsh caustics and strong acids, dry service, whilst providing one of the lowest operational torques (coefficient of friction 0.1~0.2) due to its self-lubricating & non-galling characteristics. Being a solid and homogeneous material throughout; there are no coatings, plating or surface treatments needed.

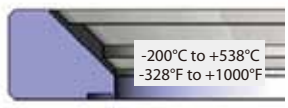


Solid Metal Seats

The complete failure of a valve in service is often due to the deterioration of its sealing element or one of the operating parts impairing its operation. Solid metal seats should be adopted for hostile conditions, CRITICAL and SEVERE applications, particularly when the service is dirty, abrasive, highly corrosive, at elevated temperature or a combination of all.

SWI offer a range of solid metal seating with various surface treatments such as NITRIDING or hard facing by thermal-spraying of STELLITE or TUNGSTEN CARBIDE or HARD NICKEL ALLOY to suit almost any application or base material. Stellite & Nickel Alloy coating can additionally be fully fused to the base metal to form a metallurgical bond providing the highest integrity sealing surface, virtually porous free with hardness up to 60 ~ 65 Hrc, dependant on alloy.

Precision lapping of ball & seat results in superior interfacing for tight shut-off.



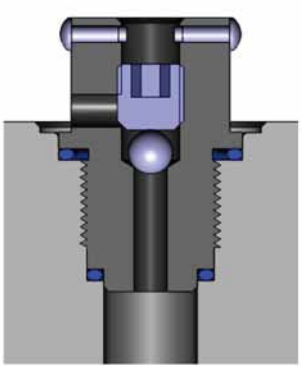
Applications
- Slurries, pulp stock, scaling liquids
- Saturated & Superheated steam
- Fluids containing entrained particles, dirty service
- High pressure & high temperature applications
- Abrasive and erosive service applications

DESIGN FEATURES

VENT & DRAIN FACILITY

Each valve is supplied with an ANTI-BLOW-OUT design vent valve and plugged drain connection according to ASME B16.34 / API 6D located at the upper and lower part of the body. As standard, vent & drain connections are NPT thread. Where thread protection is specified or required, vent and drain connections are provided with NPS thread plus double o-ring seal to protect the thread in the body from service media.

Alternative vent & drain designs incorporating fully welded flange or a pad type flange connection fitted with blind flange or gate or ball valve/s are available.

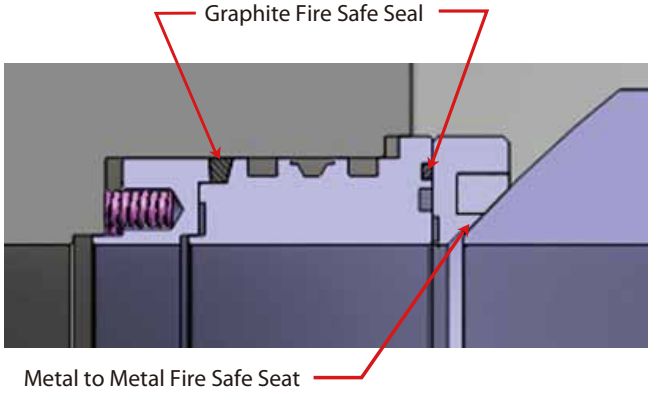


FIRE SAFETY

All SWI ball valves which incorporate polymeric or elastomeric seals are covered by Fire Test Certification in accordance with API 607 6th Edition / ISO 10497 and / or API 6FA. Metal seated valves with all graphite sealing elements are inherently firesafe by design.

Seals: - To retain adequate sealing in the event of fire damaging to the elastomeric primary seals, each is backed up by secondary Graphite fire safe seal.

Seats: - Destruction of the soft seat insert material will lead to the seat spring energizing the metal seat ring assembly to form a Metal to Metal seal againstthe ball.



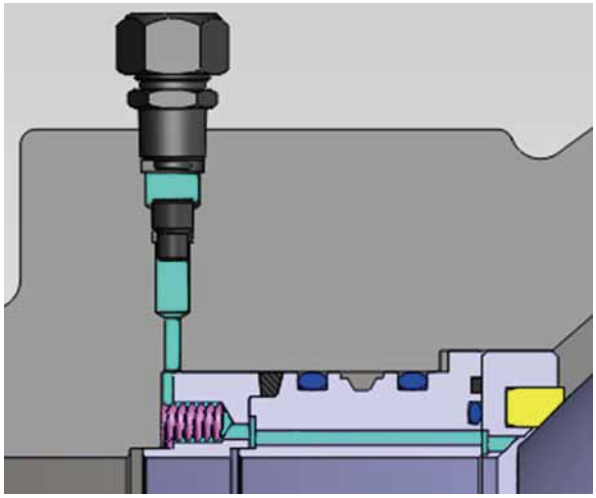
Seat Assembly After Fire

SEAT & STEM EMERGENCY SEALANT INJECTION

Valves can be supplied with grease or emergency sealant injectors to the seat and / or stem seal area if required.

Grease or special sealant can be injected through fittings that are located between the double o-ring arrangement of the stem seals or directly to the seat / seal assembly area to restore sealing integrity.

Emergency injection facility is not available on valves in low temperature service below -50°C (-58°F) or high temperature valves.



Sealant Injection - Seat Area

END CONNECTIONS

SWI ball valves can be supplied with ends flanged (RF or RTJ), prepared for welding (BW), fitted with transition pups for welded ends or with special ends such as Hub Ends for clamped connections as per customer specifications.

Flanged RF or RTJ connections are according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" and larger. Other drillings available on request.

Butt weld end connections are according to ASME B16.25 as standard.

High Integrity Top Entry Trunnion Mounted Ball Valves

DESIGN FEATURES

FEATURES	TE Series
Trunnion mounted	Standard
Independent stem and ball	Standard
Independent floating seats	Standard
Stem sealing system replaceable with valve on stream	Standard
Primary soft seat / secondary metal seat	Standard
Primary metal seat / secondary soft seat	Optional
Metal to metal seating	Optional
Self relieving seats - cavity relief	Standard
Single piston effect seat design	Standard
Double piston effect seat design	Optional
API 6D / ISO 14313 / ASME B16.34 design & construction	Standard
API 6D / ANSI B16.10 end to end dimensions (1)	Standard
Firesafe design API 607 6th Edition / ISO 10497	Standard
Anti-static design (10Ω under 12 Volt).	Standard
Internally assembled blow-out proof stem design.	Standard
Double block and bleed (DBB)	Standard
Possibility to check seat / seal integrity in line with ball in open or closed position	Standard
Full or Reduced bore	As required
Flanged ends - weld ends - hub ends or combination	As required
Transition pup pipes for weld end valves	Optional / As required
Double body seals	Standard
High integrity triple stem sealing system	Standard
Stem sealing compliant with ISO 15848-1 / API622 (2)	Standard
Vent valve	Standard
Drain plug	Standard
Drain valve (Ball or Gate as per client request)	Optional
Double seal thread protection for vent & drain threads	Optional
Flanged or pad type vent & drain connections	Optional
Emergency sealant injection - stem - seat area	Optional
Local weld overlay with corrosion resistant material to critical seal areas.	Optional
Extended stem - underground service	Optional / As required
Extended bonnet - low or high temperature service	Optional / As required
Lifting lugs - valves 75 kg and over	Standard
Supporting feet - valves DN150 (6") and over	Reduced Port: Standard Full Port: Optional
Manual - pneumatic - motorized - hydraulic operated	As required
In-line maintenance	Standard
On site maintenance	Standard

(1) Class 600# dimensions apply for 150# & 300#.
(2) For SWI standard valves fitted with double FKM O-ring primary and tertiary Graphite stem sealing system.

LOW OPERATING TORQUE

The low operating torque and the long trouble-free service life of the SWI Top Entry Valves are the result of:

- The design of the independent stem which is free of any side load thrust;
- Two (upper and lower) rigid, large diameter, trunnions which are integral with the ball and directly supported via the body / cover ensuring the stem remains free from any side load due to differential pressure;
- Large Self lubricating sleeve and thrust bearings.

TRUE FULL IN-LINE MAINTENANCE

SWI Top Entry ball valve are true in-line maintainable regardless of seating arrangement.

The high integrity stem sealing system may be replaced without the need for removal of the bolted cover or whilst on stream with the valve in the fully open or closed position and vent valve open.

The bolted Top Entry construction allows easy access to the valve internals for on-site inspection or replace -ment of parts.

Removal of the bolted cover from the valve body provides full access to all the internal parts which can be removed with special maintenance tools, designed by SWI.

DESIGN FEATURES

UNDERGROUND / EXTENDED OPERATOR

Operator extensions may be required where valves are to be installed in underground (buried service) locations or whereby extended operators are required for ease of accessibility of operator. SWI can offer a full range of extensions in a wide range of materials, from simple spindle type extensions to fully enclosed and oil filled type extensions.

Extensions and lengths are manufactured according to client requirements combined with vent, drain and sealant injection facilities (where fitted) suitable piped for convenient accessibility near the operator if required.

LOW TEMPERATURE & CRYOGENIC SERVICE

Top Entry ball valves have been widely used in low temperature and cryogenic applications, including LNG (Liquefied Natural Gas) plants by major users and engineering contractors worldwide. SW I valve designs are available with extended bonnets and special preparation for applications in extreme temperature service conditions.

Extended bonnets are recommended for valves which are required to be operated (cycled open & closed) for service at temperatures below -30 °C (-22 °F) down to -196°C (-320 °F).

SWI low temperature and cryogenic valves are designed with special consideration in the following areas.

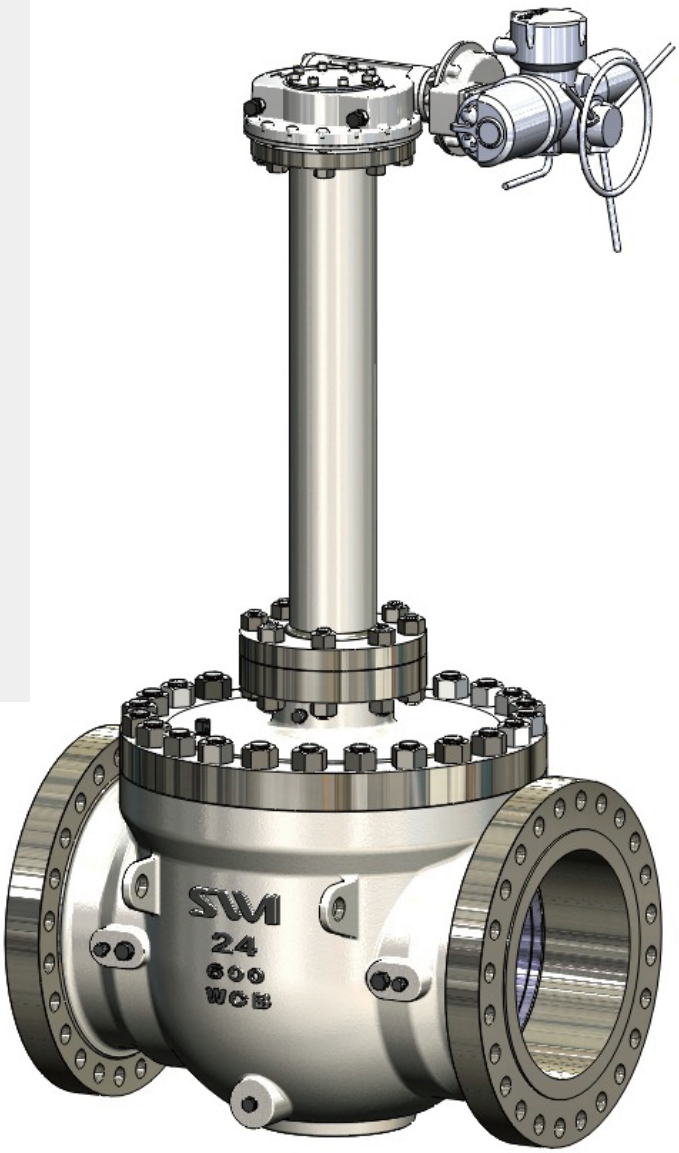
- Vapour space extended bonnet to relocate the stem seals outside of the cold zone.
- Excellent seat & seal design to minimize potential for leakage
- Bi-directional service capability with positive cavity relief.
- Lower operational torque for reliable and smoother operation.
- Rigid body construction to minimize effects of thermal shock.
- Fugitive emission compliance as standard.
- Modular design with ease of maintenance.
- Firesafe design.
- Drip collar, optional when specified.

EXTENDED BONNET

Extended bonnet designs are of the bolted fully enclosed vapour space type with an internally assembled anti-blow-out stem design whereby all stem seals are located at the top of the bonnet away from the cold zone.

The one-piece bonnet design provides for a pressurized column in which the cold liquid phase is changed, by heat transfer with the environment, to the gaseous phase forming a gas gap under the primary stem seals which protects the valve from malfunctioning due to freezing.

SWI offer two extension lengths for each size of valve in accordance with internationally recognized practices such as Shell GSI MESC, BS6364 and MSS SP-134.
- Short Bonnet for temperatures between -30°C ~ -100°C
- Long Bonnet for temperatures below -101°C

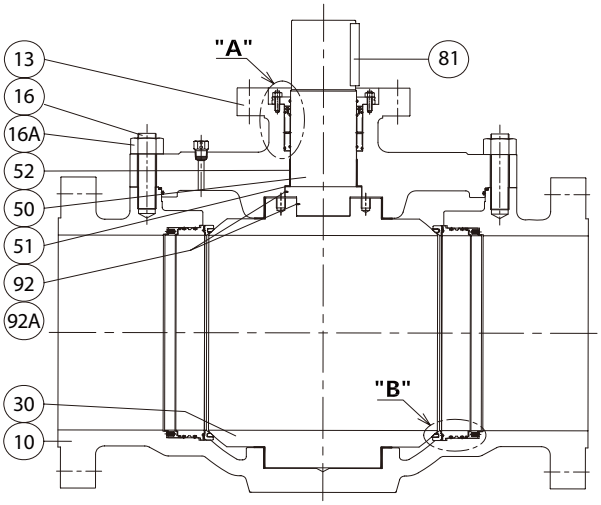


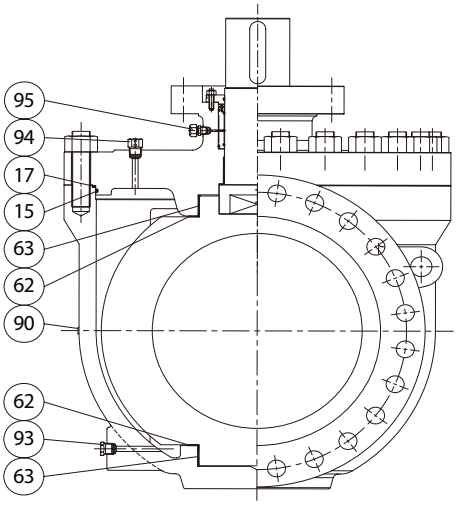
Rigid Type Extended Operator

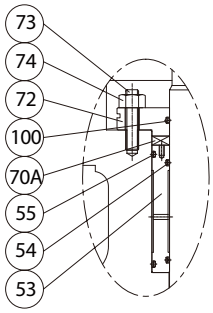
The length of the extensions offered are sufficient to maintain the stem packing at a temperature high enough to permit operation within the normal temperature range of the stem sealing system.

High Integrity Top Entry Trunnion Mounted Ball Valves

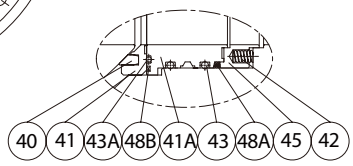
Series TE - Top Entry
Class 150 ~ 2500



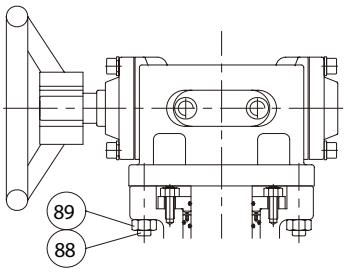




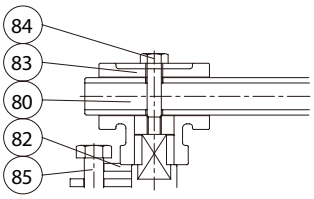
DETAIL 'A'



DETAIL 'B'



GEAR OPERATOR



T-BAR OPERATOR

BILL OF MATERIALS (1)

No.	Part Description	Qty.	CS	ITCS	SS	Spares	Notes
10	BODY	1	A216-WCB	A352-LCB	A351-CF8M		
13	BONNET	1	A216-WCB	A352-LCB	A351-CF8M		
15	BONNET O-RING	1	FKM	FKM-GLT	FKM	S	3 & 4
16	BONNET BOLT	1 Set	A193-B7	A320-L7	A193-B8M		2 & 5
16A	BONNET NUT	1 Set	A194-2H	A194-4	A194-8M		2 & 5
17	BONNET GASKET	1	INHIBITED FLEXIBLE GRAPHITE			S	
30	BALL (Integral Trunnion)	1	A182-F316 / A351-CF8M				
40	SEAT (Soft Insert)	2	RTFE or NYLON 6.12 or PEEK			S	6
41	SEAT HOLDER / RING	2	316 STAINLESS STEEL			S	
41A	SEAT BACK-UP RING	2	316 STAINLESS STEEL				
42	SEAT SPRING	1 Set	INCONEL X750				2
43	O-RING (Seal - A)	1 Set	FKM	FKM-GLT	FKM	S	2, 3 & 4
43A	O-RING (Seal - B)	2	FKM	FKM-GLT	FKM	S	3 & 4
45	SPRING HOLDER	2	316 STAINLESS STEEL				
48A	FIRE SAFE SEAL (Seal - A)	2	INHIBITED FLEXIBLE GRAPHITE			S	
48B	FIRE SAFE SEAL (Seal - B)	2	INHIBITED FLEXIBLE GRAPHITE			S	
50	STEM	1	316 STAINLESS STEEL				
51	STEM THRUST BEARING	1	316 STAINLESS STEEL + PTFE				
52	STEM BEARING	1	316 STAINLESS STEEL + PTFE				
53	STEM BUSH	1	316 STAINLESS STEEL + ENP				
54	BUSH INNER O-RING	2	FKM	FKM-GLT	FKM	S	3 & 4
55	BUSH OUTER O-RING	2	FKM	FKM-GLT	FKM	S	3 & 4
62	THRUST BEARING	1	316 STAINLESS STEEL + PTFE				
63	BEARING	1	316 STAINLESS STEEL + PTFE				
70A	STEM FIRE SAFE SEAL	1	INHIBITED FLEXIBLE GRAPHITE			S	
72	STEM COVER	1	A105N	A350-LF2	A182-F316		
73	STEM COVER BOLT	1 Set	A193-B7	A320-L7	A193-B8M		2 & 5
74	STEM COVER NUT	1 Set	A194-2H	A194-4	A194-8M		2 & 5
80	T-BAR TUBE	1	A53 GALVANIZED				
81	KEY	1	AISI 1025				
82	STOP PLATE	1	316 STAINLESS STEEL				
83	T-BAR SOCKET	1	A395 + BLACK PAINT				
84	T-BAR BOLT	1	A193-B8M				
85	STOP BOLT	1	A193-B8M				
87	WORM GEAR OPERATOR	1	COMMERCIAL				
88	GEAR MOUNTING BOLT	1 Set	A193-B7	A320-L7	A193-B8M		2 & 5
89	GEAR MOUNTING NUT	1 Set	A194-2H	A194-4	A194-8M		2 & 5
90	NAME PLATE	1	316 STAINLESS STEEL				
92	ANTI-STATIC DEVICE	2	316 STAINLESS STEEL				
92A	ANTI-STATIC PLUNGER	2	316 STAINLESS STEEL				
93	DRAIN PLUG	1	316 STAINLESS STEEL				2 & 7
94	VENT VALVE	1	316 STAINLESS STEEL				2 & 7
95	INJECTOR (Stem)	1	316 STAINLESS STEEL				
96	INJECTOR (Seat Area)	1 Set	316 STAINLESS STEEL				2
100	WIPER SEAL	1	NBR			S	

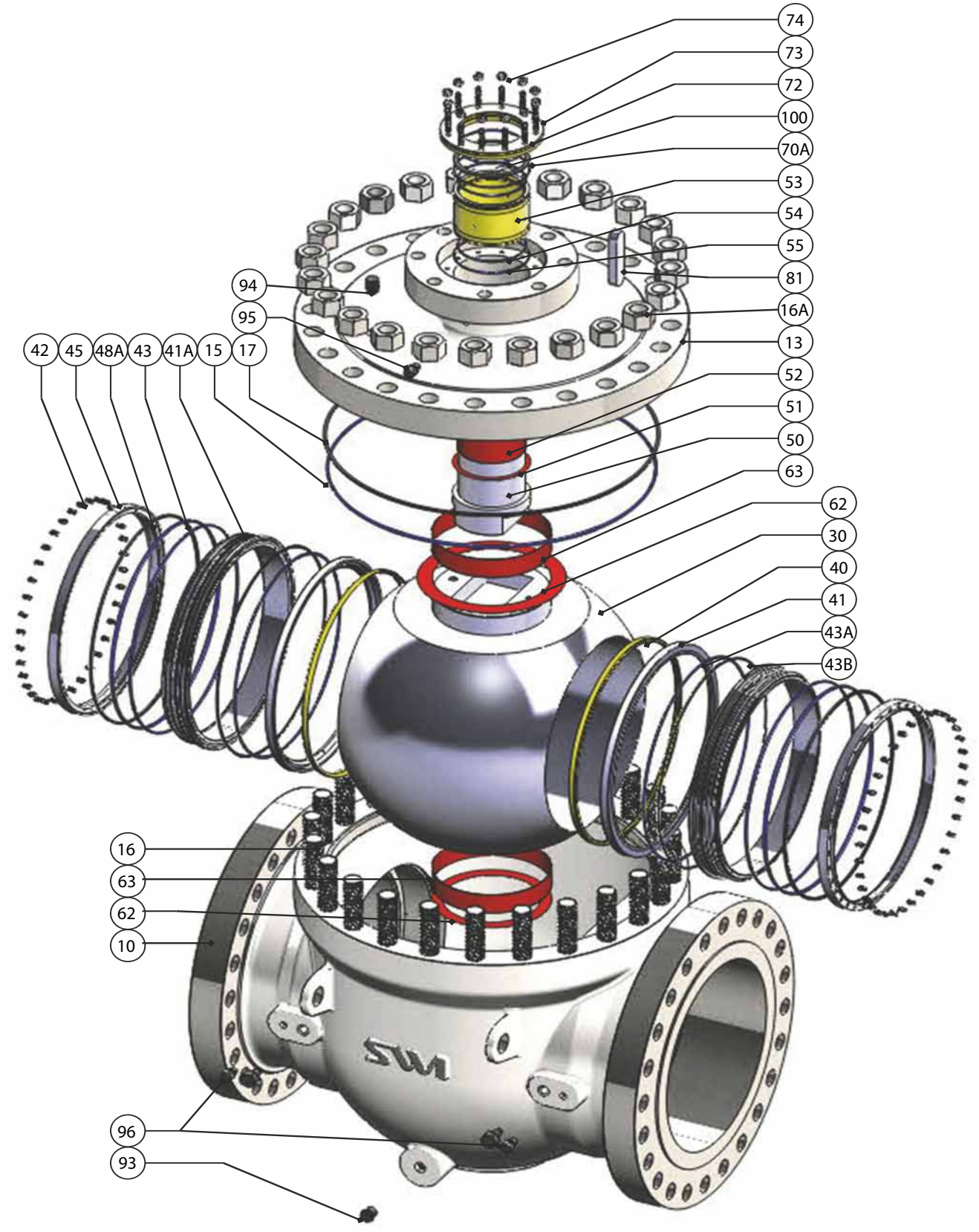
NOTES

1. Typical materials for standard valves.
2. Quantity is according to valve size & rating.
3. ED grade on request.
4. Double O-ring & anti-extrusion ring is optional for Classes below 2500#.
5. For NACE grade 'M' applied.
6. RTFE seat insert limited to Classes 150# ~ 600#.
7. O-ring thread protection is optional. Elastomeric seal material is same as for main valve.

S = Recommended spares.

Drawings are illustrations only. Parts may vary according to design and alternative material selections.

Series TE - Top Entry
Class 150 ~ 2500



Valve Assembly - Main Parts

METAL SEATING COMBINATIONS

The complete failure of a valve in service is often due to the deterioration of its sealing element or one of the operating parts impairing its operation.

Valves in dirty or severe service are often subjected to one or a combination of the following conditions, which are destructive forces especially when acting simultaneously, accelerating its eventual failure.

- ❑ High temperature
- ❑ Corrosion
- ❑ Erosion
- ❑ Abrasion
- ❑ Fretting
- ❑ Cavitation
- ❑ Galling

Increasingly stringent demands on equipment require the continual development of materials resistant to such hostile conditions. In some circumstances involving elevated temperatures, highly corrosive or abrasive fluids, only metallic or ceramic coatings are adequate. In situations where operations can be limited by surface-related wear problems, the use of an appropriate coating system my present the only real solution.

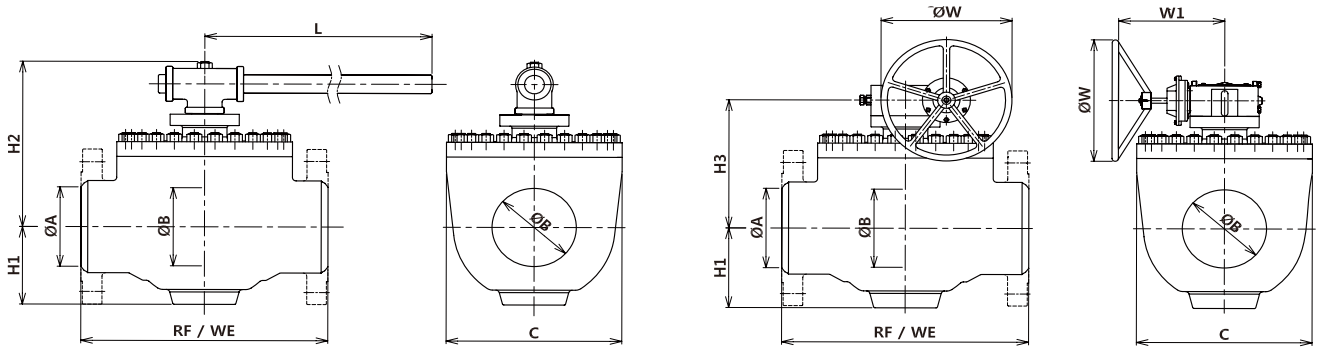
Advances in protective coatings and application methods allow SWI to protect these surfaces from accelerated destruction with retained ultimate wear-resistance.

METAL SEATING COMBINATIONS

BALL Hardness / Composition	SEAT RING Hardness / Composition	APPLICATION METHOD	BOND STRENGTH psi	TEMP. RANGE	POROSITY [Average]	APPLICATIONS	CHARACTERISTICS / RESISTANCE TO
ELECTROLESS NICKEL + HEAT TREATMENT (ENC+HT) 62 ~ 63 HRC	STELLITE 6 ALLOY [STL'6] 37 ~ 42 HRC Cr (28%) /W (4%) /C(1%) /Fe (<3%) / Si (<2%) /Ni (<3%) / Co (balance)	Plating & Surface Treatment / HVOF (High Velocity Oxygen Fuel process) & Fusion Process	ENC -Plating / STL'6 - Metallurgical bond to base material	Up to +320°C	0%	LIQUID + GASEOUS MEDIA , PARTIAL ENTRAINED PARTICLES (moderate operating cycles)	ENP provides good resistance to strongly acidic corrosive environments like oil drilling and coal mining combined with excellent wear resistance of STELLITE 6.
PLASMA NITRIDE 52 ~ 70 HRC (Depending on base metal)	PLASMA NITRIDE 52 ~ 70 HRC (Depending on base metal)	Surface Treatment	Metallurgical bond to base material	Up to +450°C	0%	LIQUID + GASEOUS MEDIA WITH PARTIAL ENTRAINED PARTICLES / SUSPENDED SOLIDS (moderate operating cycles)	High wear resistant, excellent anti-galling properties and can be applied to virtually any metal. Not resistant to mineral acids and subject to rapid corrosion when exposed to halogen compounds.
STELLITE 12 ALLOY [STL'12] 47 ~ 48 HRC Cr (29%) /W (8%) /C(1.35%) /Fe (<3%) / Si (<2%) /Ni (<3%) / Co (balance)	STELLITE 6 ALLOY [STL'6] 37 ~ 42 HRC Cr (28%) /W (4%) /C(1%) /Fe (<3%) / Si (<2%) /Ni (<3%) / Co (balance)	HVOF (High Velocity Oxygen Fuel process) & Fusion Process	Metallurgical bond to base material	Up to +720°C	0%	LIQUID + GASEOUS MEDIA WITH ENTRAINED PARTICLES / SOLIDS (moderate operating cycles)	Most widely used cobalt based alloy in the industry with excellent wear and resistance to many forms of mechanical and chemical degradation whilst retaining a reasonable level of hardness up to 500°C
HARD NICKEL ALLOY [M16C] 58 ~ 62 HRC Cr (16%)/Fe (2.5%)/ Si (4.0%)/B (4.0%)/C (0.5%) / Mo (3.0%) / Cu (3.0%) / Ni (balance)	HARD NICKEL ALLOY [M16C] 58 ~ 62 HRC Cr (16%)/Fe (2.5%)/ Si (4.0%)/B (4.0%)/C (0.5%) / Mo (3.0%) / Cu (3.0%) / Ni (balance)	HVOF (High Velocity Oxygen Fuel process) & Fusion Process	Metallurgical bond to base material	Up to +500°C	0%	CORROSIVE LIQUID + GASEOUS MEDIA WITH ENTRAINED PARTICLES / SOLIDS (high operating cycles)	Excellent resistance to abrasion, particle erosion, fretting and is stable to roll-wear, grain-wear and steel- wear whilst possessing high strength at elevated temperatures combined with excellent corrosion resistance
TUNGSTEN CARBIDE [TC] 69 ~ 72 HRC WC (86%) /Co (10%) /Cr (4%)	TUNGSTEN CARBIDE [TC] 69 ~ 72 HRC WC (86%) /Co (10%) /Cr (4%)	HVOF (High Velocity Oxygen Fuel process)	>10,000	Up to +482°C	≤ 1%	LIQUID + GASEOUS MEDIA WITH ENTRAINED PARTICLES / SOLIDS (high operating cycles)	Ideal for severe wear protection from multiple modes of abrasion, erosion, corrosion or any combination of the three.

TECHNICAL DATA

STANDARD VALVE DIMENSIONS - Class 150

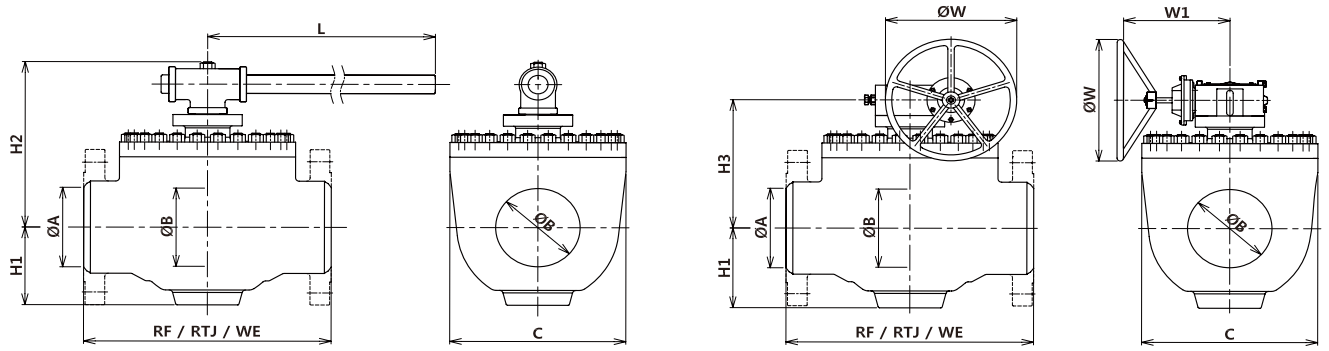


SIZE	BORE	ØA	ØB	RF	WE	C	H1	H2	L	H3	ØW	W1	WEIGHT Kg
2" DN50	FB	49(1.93")	49(1.93")	292(11.50")	292(11.50")	192(7.56")	88(3.46")	225(8.86")	250(9.84")				32
	RB	49(1.93")	38(1.50")	292(11.50")	292(11.50")	176(6.93")	80(3.15")	190(7.48")	250(9.84")				27
3" DN80	FB	74(2.91")	74(2.91")	356(14.02")	356(14.02")	241(9.49")	110(4.33")	245(9.65")	400(15.75")				60
	RB	74(2.91")	49(1.93")	356(14.02")	356(14.02")	192(7.56")	88(3.46")	225(8.86")	250(9.84")				42
4" DN100	FB	100(3.94")	100(3.94")	432(17.01")	432(17.01")	280(11.02")	133(5.24")	265(10.43")	600(23.62")				114
	RB	100(3.94")	74(2.91")	432(17.01")	432(17.01")	241(9.49")	110(4.33")	245(9.65")	400(15.75")				80
6" DN150	FB	150(5.91")	150(5.91")	559(22.01")	559(22.01")	355(13.98")	180(7.09")			344(13.54")	300(11.81")	257(10.12")	222
	RB	150(5.91")	100(3.94")	559(22.01")	559(22.01")	280(11.02")	180(7.09")	265(10.43")	600(23.62")				136
8" DN200	FB	201(7.91")	201(7.91")	660(25.98")	660(25.98")	430(16.93")	215(8.46")			377(14.84")	450(17.72")	297(11.69")	410
	RB	201(7.91")	150(5.91")	660(25.98")	660(25.98")	355(13.98")	215(8.46")			344(13.54")	300(11.81")	257(10.12")	253
10" DN250	FB	252(9.92")	252(9.92")	787(30.98")	787(30.98")	516(20.31")	248(9.76")			441(17.36")	450(17.72")	297(11.69")	548
	RB	252(9.92")	201(7.91")	787(30.98")	787(30.98")	430(16.93")	248(9.76")			377(14.84")	450(17.72")	297(11.69")	436
12" DN300	FB	303(11.93")	303(11.93")	838(32.99")	838(32.99")	604(23.78")	285(11.22")			481(18.94")	450(17.72")	330(12.99")	742
	RB	303(11.93")	252(9.92")	838(32.99")	838(32.99")	516(20.31")	285(11.22")			441(17.36")	450(17.72")	297(11.69")	599
14" DN350	FB	334(13.15")	334(13.15")	889(35.00")	889(35.00")	656(25.83")	318(12.50")			506(19.92")	500(19.69")	380(14.96")	870
	RB	334(13.15)	252(9.92")	889(35.00")	889(35.00")	516(20.31")	318(12.52")			441(17.36")	450(17.72")	297(11.69")	652
16" DN400	FB	385(15.16")	385(15.16")	991(39.02")	991(39.02")	742(29.21")	355(13.98")			536(21.10")	560(22.05")	420(16.55")	1230
	RB	385(15.16")	303(11.93")	991(39.02")	991(39.02")	604(23.78")	355(13.98")			481(18.94")	450(17.72")	330(12.99")	844
18" DN450	FB	436(17.17")	436(17.17")	1092(42.99")	1092(42.99")	818(32.20")	385(15.16")			591(23.27")	630(24.80")	435(17.13")	1568
	RB	436(17.17")	334(13.15")	1092(42.99")	1092(42.99")	656(25.83")	385(15.16")			506(19.92")	500(19.69")	380(14.96")	965
20" DN500	FB	487(19.17")	487(19.17")	1194(47.01")	1194(47.01")	904(35.59")	418(16.46")			774(30.47")	630(24.80")	413(16.26")	2120
	RB	487(19.17")	385(15.16")	1194(47.01")	1194(47.01")	742(29.21")	418(16.46")			536(21.10")	560(22.05")	420(16.55")	1334
24" DN600	FB	589(23.19")	589(23.19")	1397(55.00")	1397(55.00")	1088(42.83")	488(19.21")			832(32.76")	630(24.80")	443(17.44")	3560
	RB	589(23.19")	487(19.17")	1397(55.00")	1397(55.00")	904(35.59")	488(19.21")			774(30.47")	630(24.80")	413(16.26")	2250
26" DN650	FB	633(24.92")	633(24.92")	1448(57.01")	1448(57.01")	1108(43.62")	535(21.06")			859(33.82")	630(24.80")	443(17.44")	4540
	RB	633(24.92")	487(19.17")	1448(57.01")	1448(57.01")	904(35.59")	535(21.06")			774(30.47")	630(24.80")	413(16.26")	2308
28" DN700	FB	684(26.93")	684(26.93")	1549(60.98")	1549(60.98")	1189(46.81")	568(22.36")			1066(41.97")	630(24.80")	552(21.73")	5623
	RB	684(26.93")	589(23.19")	1549(60.98")	1549(60.98")	1088(42.83")	568(22.36")			832(32.76")	630(24.80")	443(17.44")	4187
30" DN750	FB	735(28.94")	735(28.94")	1651(65.00")	1651(65.00")	1270(50.00")	645(25.39")			1096(43.15")	630(24.80")	552(21.73")	6890
	RB	735(28.94")	589(23.19")	1651(65.00")	1651(65.00")	1088(42.83")	645(25.39")			832(32.76")	630(24.80")	443(17.44")	4287
36" DN900	FB	874(34.41")	874(34.41")	2083(82.01")	2083(82.01")	1492(58.74")	785(30.91")			1019(40.12")	630(24.80")	629(24.76")	11200
	RB	874(34.41")	735(28.94")	2083(82.01"")	2083(82.01"")	1270(50.00")	785(30.91")			1096(43.15")	630(24.80")	552(21.73")	7326
40" DN1000	FB	976(38.43")	976(38.43")	2337(92.01")	2337(92.01")	1649(64.92")	895(35.24")			1120(44.09")	630(24.80")	629(24.76")	14680
	RB	976(38.43")	874(34.41")	2337(92.01")	2337(92.01")	1492(58.74")	895(35.24")			1019(40.12")	630(24.80")	552(21.73")	11445
48" DN1200	FB												
	RB	1166(45.91")	976(38.43")	2768(108.98")	2768(108.98")	1649(64.92")	983(38.70")			1120(44.09")	630(24.80")	629(24.76")	15425

GENERAL NOTES - Applies to dimensional tables for all classes.

1) End to end dimensions for Class 150# & Class 300# valves are according to Class 600#
2) H1 dimension for reduced port 6" valves and above is to bottom of support feet (not shown).
3) Weld ends according to pipe schedule and ANSI B16.25
4) Manual operators sized in accordance with EN 12570 .
5) Weight figures are relevant to flanged valves and approximate.
6) SWI reserves the right to change details without notice.

STANDARD VALVE DIMENSIONS - Class 300



SIZE	BORE	ØA	ØB	RF	WE	C	H1	H2	L	H3	ØW	W1	WEIGHT Kg
2" DN50	FB	49(1.93")	49(1.93")	292(11.50")	292(11.50")	192(7.56")	88(3.46")	233(9.17")	250(9.84")				34
	RB	49(1.93")	38(1.50")	292(11.50")	292(11.50")	176(6.93")	80(3.15")	205(8.07")	250(9.84")				29
3" DN80	FB	74(2.91")	74(2.91")	356(14.02")	356(14.02")	241(9.49")	110(4.33")	255(10.04")	500(19.69")				66
	RB	74(2.91")	49(1.93")	356(14.02")	356(14.02")	192(7.56")	88(3.46")	233(9.17")	250(9.84")				48
4" DN100	FB	100(3.94")	100(3.94")	432(17.01")	432(17.01")	280(11.02")	133(5.24")	278(10.94")	800(31.50")				123
	RB	100(3.94")	74(2.91")	432(17.01")	432(17.01")	241(9.49")	110(4.33")	255(10.04")	500(19.69")				89
6" DN150	FB	150(5.91")	150(5.91")	559(22.01")	559(22.01")	355(13.98")	180(7.09")			364(14.33")	300(11.81")	257(10.12")	240
	RB	150(5.91")	100(3.94")	559(22.01")	559(22.01")	280(11.02")	180(7.09")	278(10.94")	800(31.50")				154
8" DN200	FB	201(7.91")	201(7.91")	660(25.98")	660(25.98")	430(16.93")	215(8.46")			394(15.51")	300(11.81")	297(11.69")	437
	RB	201(7.91")	150(5.91")	660(25.98")	660(25.98")	355(13.98")	215(8.46")			364(14.33")	300(11.81")	257(10.12")	280
10" DN250	FB	252(9.92")	252(9.92")	787(30.98")	787(30.98")	516(20.31")	248(9.76")			461(18.15")	450(17.72")	330(12.99")	595
	RB	252(9.92")	201(7.91")	787(30.98")	787(30.98")	430(16.93")	248(9.76")			394(15.51")	300(11.81")	297(11.69")	476
12" DN300	FB	303(11.93")	303(11.93")	838(32.99")	838(32.99")	604(23.78")	285(11.22")			498(19.61")	450(17.72")	330(12.99")	795
	RB	303(11.93")	252(9.92")	838(32.99")	838(32.99")	516(20.31")	285(11.22")			461(18.15")	450(17.72")	330(12.99")	659
14" DN350	FB	334(13.15")	334(13.15")	889(35.00")	889(35.00")	656(25.83")	318(12.52")			531(20.91")	630(24.80")	370(14.57")	987
	RB	334(13.15)	252(9.92")	889(35.00")	889(35.00")	516(20.31")	318(12.52")			461(18.15")	450(17.72")	330(12.99")	744
16" DN400	FB	385(15.16")	385(15.16")	991(39.02")	991(39.02")	742(29.21")	355(13.98")			563(22.17")	630(24.80")	420(16.54")	1361
	RB	385(15.16")	303(11.93")	991(39.02")	991(39.02")	604(23.78")	355(13.98")			498(19.61")	450(17.72")	330(12.99")	943
18" DN450	FB	436(17.17")	436(17.17")	1092(42.99")	1092(42.99")	818(32.20")	385(15.16")			628(24.72")	630(24.80")	463(18.23")	1721
	RB	436(17.17")	334(13.15")	1092(42.99")	1092(42.99")	656(25.83")	385(15.16")			531(20.91")	630(24.80")	370(14.57")	1124
20" DN500	FB	487(19.17")	487(19.17")	1194(47.01")	1194(47.01")	904(35.59")	418(16.46")			722(28.43")	630(24.80")	493(19.41")	2304
	RB	487(19.17")	385(15.16")	1194(47.01")	1194(47.01")	742(29.21")	418(16.46")			563(22.17")	630(24.80")	420(16.54")	1524
24" DN600	FB	589(23.19")	589(23.19")	1397(55.00")	1397(55.00")	1088(42.83")	488(19.21")			792(31.18")	630(24.80")	552(21.73")	3873
	RB	589(23.19")	487(19.17")	1397(55.00")	1397(55.00")	904(35.59")	488(19.21")			722(28.43")	630(24.80")	493(19.41")	2504
26" DN650	FB	633(24.92")	633(24.92")	1448(57.01")	1448(57.01")	1108(43.62")	535(21.06")			819(32.24")	630(24.80")	602(23.70")	4902
	RB	633(24.92")	487(19.17")	1448(57.01")	1448(57.01")	904(35.59")	535(21.06")			722(28.43")	630(24.80")	493(19.41")	2611
28" DN700	FB	684(26.93")	684(26.93")	1549(60.98")	1549(60.98")	1189(46.81")	568(22.36")			1135(44.69")	630(24.80")	552(21.73")	5987
	RB	684(26.93")	589(23.19")	1549(60.98")	1549(60.98")	1088(42.83")	568(22.36")			792(31.18")	630(24.80")	552(21.73")	4636
30" DN750	FB	735(28.94")	735(28.94")	1651(65.00")	1651(65.00")	1270(50.00")	645(25.39")			993(39.09")	630(24.80")	679(26.73")	7423
	RB	735(28.94")	589(23.19")	1651(65.00")	1651(65.00")	1088(42.83")	645(25.39")			792(31.18")	630(24.80")	552(21.73")	4799
36" DN900	FB	874(34.41")	874(34.41")	2083(82.01")	2083(82.01")	1492(58.74")	785(30.91")			1083(42.64")	630(24.80")	629(24.76")	11792
	RB	874(34.41")	735(28.94")	2083(82.01"")	2083(82.01"")	1270(50.00")	785(30.91")			993(39.09")	630(24.80")	679(26.73")	8009
40" DN1000	FB	976(38.43")	976(38.43")	2337(92.01")	2337(92.01")	1649(64.92")	895(35.24")			1125(44.29")	630(24.80")	787(30.98")	15556
	RB	976(38.43")	874(34.41")	2337(92.01")	2337(92.01")	1492(58.74")	895(35.24")			1083(42.64")	630(24.80")	629(24.76")	12065
48" DN1200	FB												
	RB	1166(45.91")	976(38.43")	2768(108.98")	2768(108.98")	1649(64.92")	983(38.70")			1125(44.29")	630(24.80")	787(30.98")	16796

TECHNICAL DATA

STANDARD VALVE DIMENSIONS - Class 600

SIZE	BORE	ØA	ØB	RF & WE	RTJ	C	H1	H2	L	H3	ØW	W1	WEIGHT Kg
2" DN50	FB	49(1.93")	49(1.93")	292(11.50")	295(11.62")	192(7.56")	88(3.46")	233(9.17")	400(15.7")				41
	RB	49(1.93")	38(1.50")	292(11.50")	295(11.62")	176(6.93")	80(3.15")	205(8.07")	250(9.8")				35
3" DN80	FB	74(2.91")	74(2.91")	356(14.02")	359(14.13")	229(9.02")	110(4.33")	259(10.20")	720(28.3")				76
	RB	74(2.91")	49(1.93")	356(14.02")	359(14.13")	192(7.56")	88(3.46")	233(9.17")	400(15.7")				55
4" DN100	FB	100(3.94")	100(3.94")	432(17.01")	435(17.13")	280(11.02")	143(5.24")			317(12.48")	300(11.81")	257(10.12")	165
	RB	100(3.94")	74(2.91")	432(17.01")	435(17.13")	229(9.02")	110(4.33")	259(10.20")	720(28.3")				112
6" DN150	FB	150(5.91")	150(5.91")	559(22.01")	562(22.13")	365(14.37")	198(7.80")			382(15.04")	450(17.72")	297(11.69")	320
	RB	150(5.91")	100(3.94")	559(22.01")	562(22.13")	280(11.02")	198(7.80")			317(12.48")	300(11.81")	257(10.12")	226
8" DN200	FB	201(7.91")	201(7.91")	660(25.98")	664(26.14")	452(17.80")	235(9.25")			414(16.30")	450(17.72")	330(12.99")	549
	RB	201(7.91")	150(5.91")	660(25.98")	664(26.14")	365(14.37")	235(9.25")			382(12.48")	450(17.72")	297(11.69")	380
10" DN250	FB	252(9.92")	252(9.92")	787(30.98")	791(31.14")	538(21.18")	280(11.02")			493(19.41")	630(24.80")	370(14.57")	793
	RB	252(9.92")	201(7.91")	787(30.98")	791(31.14")	452(17.80")	280(11.02")			414(16.30")	450(17.72")	330(12.99")	658
12" DN300	FB	303(11.93")	303(11.93")	838(32.99")	841(33.11")	614(24.17")	305(12.01")			564(22.20")	710(27.95")	370(14.57")	1019
	RB	303(11.93")	252(9.92")	838(32.99")	841(33.11")	538(21.18")	305(12.01")			493(19.41")	630(24.80")	370(14.57")	892
14" DN350	FB	334(13.15")	334(13.15")	889(35.00")	892(35.12")	678(26.69")	328(12.91")			587(23.11")	630(24.80")	413(16.26")	1272
	RB	334(13.15)	252(9.92")	889(35.00")	892(35.12")	538(21.18")	328(12.91")			493(19.41")	630(24.80")	370(14.57")	1041
16" DN400	FB	385(15.16")	385(15.16")	991(39.02")	994(39.13")	764(30.08")	373(14.69")			627(24.69")	630(24.80")	443(17.44")	1816
	RB	385(15.16")	303(11.93")	991(39.02")	994(39.13")	614(24.17")	373(14.69")			564(22.20")	630(24.80")	370(14.57")	1351
18" DN450	FB	436(17.17")	436(17.17")	1092(42.99")	1095(43.11")	852(33.54")	403(15.87")			682(26.85")	630(24.80")	552(21.73")	2307
	RB	436(17.17")	334(13.15")	1092(42.99")	1095(43.11")	678(26.69")	403(15.87")			587(23.11")	630(24.80")	413(16.26")	1591
20" DN500	FB	487(19.17")	487(19.17")	1194(47.01")	1200(47.24")	938(36.93")	438(17.24")			742(29.21")	630(24.80")	552(21.73")	3025
	RB	487(19.17")	385(15.16")	1194(47.01")	1200(47.24")	764(30.08")	438(17.24")			627(24.69")	630(24.80")	443(17.44")	2145
24" DN600	FB	589(23.19")	589(23.19")	1397(55.00")	1407(55.39")	1122(44.17")	520(20.47")			820(32.28")	630(24.80")	629(24.76")	4989
	RB	589(23.19")	487(19.17")	1397(55.00")	1407(55.39")	938(36.93")	520(20.47")			742(29.21")	630(24.80")	552(21.73")	3483
26" DN650	FB												
	RB	633(24.92")	487(19.17")	1448(57.01")	1461(57.52")	938(36.93")	558(21.97")			742(29.21")	630(24.80")	629(24.76")	3614

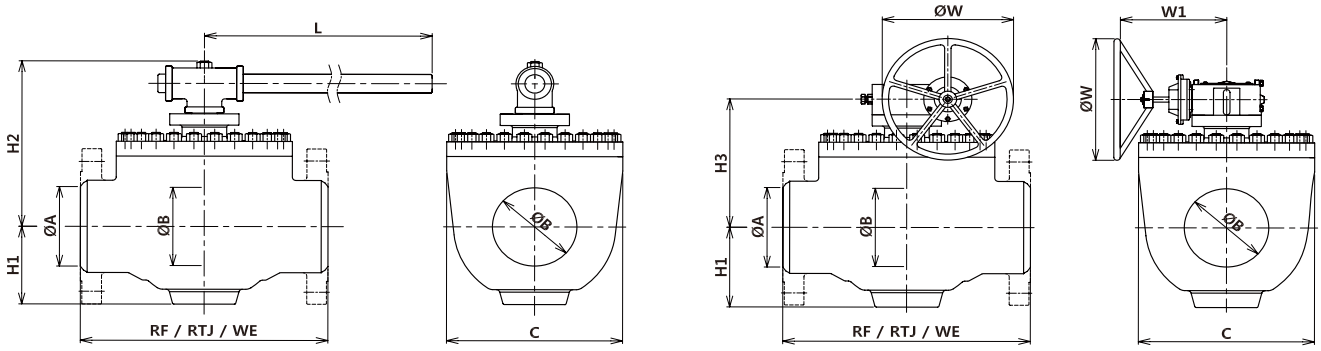
STANDARD VALVE DIMENSIONS - Class 900

SIZE	BORE	ØA	ØB	RF & WE	RTJ	C	H1	H2	L	H3	ØW	W1	WEIGHT Kg
2" DN50	FB	49(1.93")	49(1.93")	368(14.49")	371(14.61")	204(8.03")	113(4.45")	258(10.16")	500(19.7")				63
	RB	49(1.93")	38(1.50")	368(14.49")	371(14.61")	198(7.80")	87(3.43")	217(8.54")	400(15.7")				56
3" DN80	FB	74(2.91")	74(2.91")	381(15.00")	384(15.12")	241(9.49")	125(4.92")			274(10.79")	300(11.81")	257(10.12")	115
	RB	74(2.91")	49(1.93")	381(15.00")	384(15.12")	204(8.03")	113(4.45")	258(10.16")	500(19.7")				77
4" DN100	FB	100(3.94")	100(3.94")	457(17.99")	460(18.11")	302(11.89")	150(5.91")			324(12.76")	450(17.72")	297(11.69")	218
	RB	100(3.94")	74(2.91")	457(17.99")	460(18.11")	241(9.49")	125(4.92")			274(10.79")	300(11.81")	257(10.12")	160
6" DN150	FB	150(5.91")	150(5.91")	610(24.02")	613(24.13")	377(14.84")	210(8.27")			440(17.32")	450(17.72")	297(11.69")	408
	RB	150(5.91")	100(3.94")	610(24.02")	613(24.13")	302(11.89")	210(8.27")			324(12.76")	450(17.72")	297(11.69")	302
8" DN200	FB	201(7.91")	201(7.91")	737(29.02")	740(29.13")	474(18.66")	260(10.24")			485(19.09")	560(22.05")	330(12.99")	730
	RB	201(7.91")	150(5.91")	737(29.02")	740(29.13")	377(14.84")	260(10.24")			440(17.32")	450(17.72")	297(11.69")	524
10" DN250	FB	252(9.92")	252(9.92")	838(32.99")	841(33.11")	550(21.65")	298(11.73")			548(21.57")	630(24.80")	413(16.26")	1037
	RB	252(9.92")	201(7.91")	838(32.99")	841(33.11")	474(18.66")	298(11.73")			485(19.09")	560(22.05")	330(12.99")	862
12" DN300	FB	303(11.93")	303(11.93")	965(37.99")	968(38.11")	626(24.65")	335(13.19")			589(23.19")	630(24.80")	443(17.44")	1420
	RB	303(11.93")	252(9.92")	965(37.99")	968(38.11")	550(21.65")	335(13.19")			548(21.57")	630(24.80")	413(16.26")	1232
14" DN350	FB	322(12.68")	322(12.68")	1029(40.51")	1038(40.87")	688(27.09")	370(14.57")			604(23.78")	630(24.80")	443(17.44")	1753
	RB	322(12.68")	252(9.92")	1029(40.51")	1038(40.87")	550(21.65")	370(14.57")			548(21.57")	630(24.80")	413(16.26")	1457
16" DN400	FB	373(14.69")	373(14.69")	1130(44.49")	1140(44.88")	776(30.55")	403(15.87")			637(25.08")	630(24.80")	552(21.73")	2549
	RB	373(14.69")	303(11.93")	1130(44.49")	1140(44.88")	626(24.65")	403(15.87")			589(23.19")	630(24.80")	443(17.44")	1862
18" DN450	FB												
	RB	423(16.65")	322(12.68")	1219(47.99")	1232(48.50")	688(27.09")	443(17.44")			604(23.78")	630(24.80")	443(17.44")	2439

High Integrity Top Entry Trunnion Mounted Ball Valves

TECHNICAL DATA

STANDARD VALVE DIMENSIONS - Class 1500

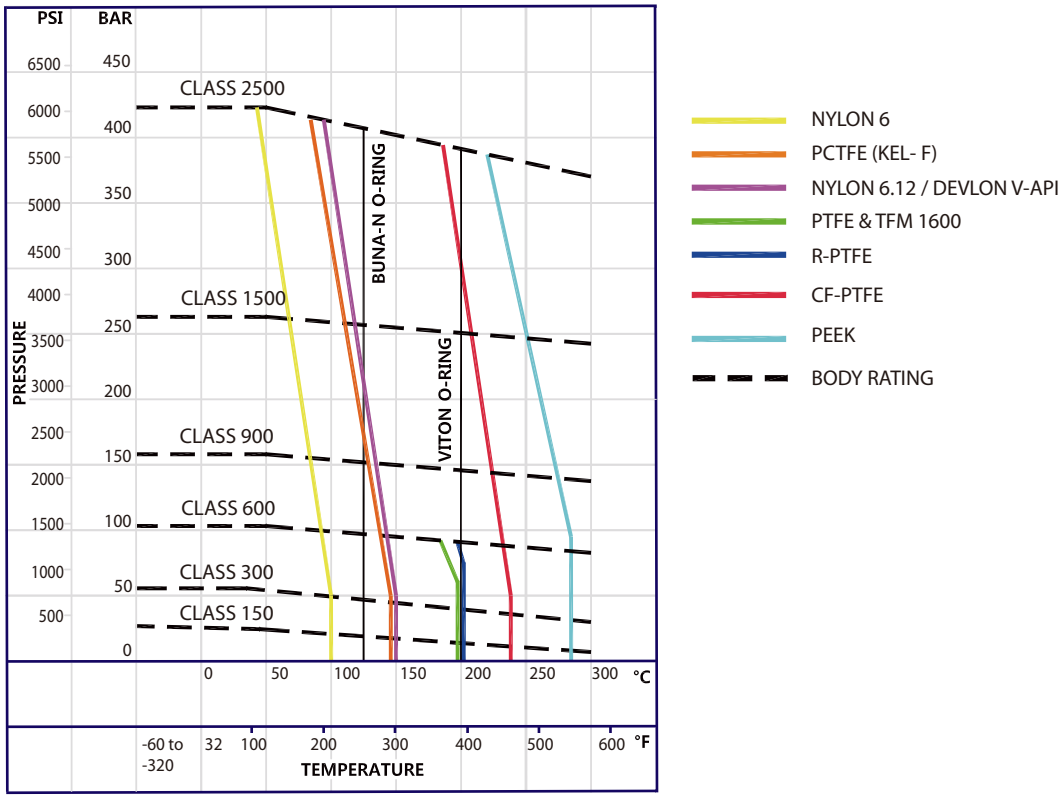


SIZE	BORE	ØA	ØB	RF & WE	RTJ	C	H1	H2	L	H3	ØW	W1	WEIGHT Kg
2" DN50	FB	49(1.93")	49(1.93")	368(14.49")	371(14.61")	204(8.03")	113(4.45")	258(10.16")	600(23.6")				76
	RB	49(1.93")	38(1.50")	368(14.49")	371(14.61")	198(7.80")	87(3.43")	217(8.54")	400(15.7")				68
3" DN80	FB	74(2.91")	74(2.91")	470(18.50")	473(18.62")	263(10.35")	138(5.43")			287(11.30")	300(11.81")	257(10.12")	149
	RB	74(2.91")	49(1.93")	470(18.50")	473(18.62")	204(8.03")	113(4.45")	258(10.16")	600(23.6")				103
4" DN100	FB	100(3.94")	100(3.94")	546(21.50")	549(21.61")	312(12.28")	160(6.30")			334(13.15")	450(17.72")	297(11.69")	293
	RB	100(3.94")	74(2.91")	546(21.50")	549(21.61")	263(10.35")	138(5.43")			287(11.30")	300(11.81")	257(10.12")	210
6" DN150	FB	144(5.67")	144(5.67")	705(27.76")	711(27.99")	399(15.71")	218(8.58")			448(17.64")	560(22.05")	330(12.99")	610
	RB	144(5.67")	100(3.94")	705(27.76")	711(27.99")	312(12.28")	218(8.58")			334(13.15")	450(17.72")	297(11.69")	435
8" DN200	FB	192(7.56")	192(7.56")	832(32.76")	841(33.11")	496(19.53")	268(10.55")			493(19.41")	630(24.80")	413(16.26")	1046
	RB	192(7.56")	144(5.67")	832(32.76")	841(33.11")	399(15.71")	268(10.55")			448(17.64")	560(22.05")	330(12.99")	739
10" DN250	FB	239(9.41")	239(9.41")	991(39.02")	1000(39.37")	594(23.39")	318(12.52")			568(22.36")	630(24.80")	443(17.44")	1540
	RB	239(9.41")	192(7.56")	991(39.02")	1000(39.37")	496(19.53")	318(12.52")			493(19.41")	630(24.80")	413(16.26")	1280
12" DN300	FB	287(11.30")	287(11.30")	1130(44.49")	1146(45.12")	680(26.77")	368(14.49")			622(24.49")	630(24.80")	552(21.73")	2334
	RB	287(11.30")	239(9.41")	1130(44.49")	1146(45.12")	594(23.39")	368(14.49")			568(22.36")	630(24.80")	443(17.44")	1856
14" DN350	FB	315(12.40")	315(12.40")	1257(49.49")	1276(50.24")	754(29.69")	425(16.73")			659(25.94")	800(31.50")	552(21.73")	2906
	RB	315(12.40")	239(9.41")	1257(49.49")	1276(50.24")	594(23.39")	425(16.73")			568(22.36")	630(24.80")	443(17.44")	2180
16" DN400	FB	360(14.17")	360(14.17")	1384(54.49")	1407(55.39")	874(34.41")	463(18.23")			697(27.44")	630(24.80")	629(24.76")	4200
	RB	360(14.17")	287(11.30")	1384(54.49")	1407(55.39")	680(26.77")	463(18.23")			622(24.49")	800(31.50")	552(21.73")	3387
18" DN450	RB	406(15.98")	315(12.40")	1537(60.51")	1559(61.38")	754(29.69")	508(20.00")			659(25.94")	630(24.80")	629(24.76")	3837

STANDARD VALVE DIMENSIONS - Class 2500

SIZE	BORE	ØA	ØB	RF & WE	RTJ	C	H1	H2	L	H3	ØW	W1	WEIGHT Kg
2" DN50	FB	42(1.65")	42(1.65")	451(17.76")	454(17.87")	239(9.41")	123(4.84")	268(10.55")	900(35.43")				110
	RB	42(1.65")	38(1.50")	451(17.76")	454(17.87")	235(9.25")	94(3.70")	230(9.06")	600(23.62")				98
3" DN80	FB	62(2.44")	62(2.44")	578(22.76")	584(22.99")	298(11.73")	158(6.22")			316(12.44")	450(17.72")	297(11.69")	251
	RB	62(2.44")	42(1.65")	578(22.76")	584(22.99")	239(9.41")	123(4.84")	268(10.55")	900(35.43")				170
4" DN100	FB	87(3.43")	87(3.43")	673(26.50")	683(26.89")	349(13.74")	183(7.20")			366(14.41")	500(19.69")	297(11.69")	491
	RB	87(3.43")	62(2.44")	673(26.50")	683(26.89")	298(11.73")	158(6.22")			316(12.44")	450(17.72")	297(11.69")	342
6" DN150	FB	131(5.16")	131(5.16")	914(35.98")	927(36.50")	478(18.82")	263(10.35")			456(17.95")	630(24.80")	413(16.26")	1044
	RB	131(5.16")	87(3.43")	914(35.98")	927(36.50)	349(13.74")	263(10.35")			366(14.41")	500(19.69")	297(11.69")	726
8" DN200	FB	179(7.05")	179(7.05")	1022(40.24")	1038(40.87")	553(21.77")	300(11.81")			534(21.02")	630(24.80")	443(17.44")	1850
	RB	179(7.05")	131(5.16")	1022(40.24")	1038(40.87")	478(18.82")	300(11.81")			456(17.95")	630(24.80")	413(16.26")	1320
10" DN250	FB	223(8.78")	223(8.78")	1270(50.00")	1292(50.87")	695(27.36")	368(14.49")			638(25.12")	800(31.50")	552(21.73")	2887
	RB	223(8.78")	179(7.05")	1270(50.00")	1292(50.87")	553(21.77")	368(14.49")			534(21.02")	630(24.80")	443(17.44")	2325
12" DN300	FB	265(10.43")	265(10.43")	1422(55.98")	1445(56.89")	801(31.54")	410(16.14")			755(29.72")	900(35.43")	602(23.70")	4494
	RB	265(10.43")	223(8.78")	1422(55.98")	1445(56.89")	695(27.36")	410(16.14")			638(25.12")	800(31.50")	552(21.73")	3587
14" DN350	RB	292(11.50")	223(8.78")	1540(60.63")	1569(61.77")	695(27.36")	453(17.83")			638(25.12")	800(31.50")	552(21.73")	3956

PRESSURE / TEMPERATURE LIMITS FOR SOFT SEATS & SEALS



PRESSURE/TEMPERATURE RATINGS (SOFT SEAT AND SEALS)

SOFT SEAT / SEAL MATERIAL SELECTION & LIMITS

MATERIAL	STATIC / SHORT PERIODS				OPERATING CONDITIONS				MAX. CLASS / RATING	
	TEMP. ° C		TEMP. ° F		TEMP. ° C		TEMP. ° F			
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	SEAT	SEAL
NYLON 6	-40	120	-40	248	-40	100	-40	212	2500	N/A
NYLON 6.12 / DEVLON V-API	-100	190	-148	374	-100	150	-148	302	2500	N/A
PEEK	-100	300	-148	572	-100	270	-148	518	2500	N/A
R-PTFE (25% Filled)	-200	232	-328	450	-200	204	-328	399	600	N/A
PTFE & TFM 1600	-200	232	-328	450	-200	204	-328	399	600	N/A
CF-PTFE (Carbon Graphite Filled)	-100	288	-148	550	-100	240	-148	464	900	N/A
PCTFE (KEL-F)	-250	160	-418	320	-250	150	-418	302	2500	N/A
FKM A & B (Viton)	-20	230	-4	446	-15	200	5	392	N/A	2500
FKM GLT (Viton Grade Low temp.)	-46	210	-51	410	-40	180	-40	356	N/A	2500
NITRILE	-30	150	-22	302	-30	120	-22	248	N/A	2500
HNBR	-46	200	-51	392	-25	180	-13	356	N/A	2500
SILICONE	-60	250	-76	482	-60	200	-76	392	N/A	2500
FLUOROSILICONE	-60	200	-76	392	-60	180	-76	356	N/A	2500
PTFE - INCONEL (Lip Seal)	-200	230	-328	446	-200	200	-328	392	N/A	2500

NOTES

1) Temperature limitations may vary between manufacturer grades; always consult with SWI Technical if in doubt.
2) Valves Pressure~ temperature (P~T) ratings are limited by the body ratings according to ASME B16.34 or seat and seal material limitations.
3) Metal seated valves seat P~T ratings are equal to the body ratings or seals where fitted with elastomeric seal material.
4) The P~T ratings advised for seats & seals are a general guide; always consult with SWI Technical for specific recommendations.
5) Body ratings indicated are for Carbon Steel Material Group 1.1 according to ASME B16.34

VALVE TORQUES

To calculate the valve required torque at any pressure use the formula in the below table.
Example: 6" Full Bore Class 600# Valve fitted with R-PTFE Seats at 1480 psi = 555 + (0.51 x 1,480) = 1,310 Nm

NOMINAL INTERNAL PORT SIZE	BALL VALVE OPERATING TORQUES (Nm)																				
	RTFE SEAT					RTFE SEAT					NYLON SEAT					NYLON SEAT					NYLON SEAT				
	CL 150# & CL 300#					CL 600#					CL 900#					CL 1500#					CL 2500#				
	ΔP (Psi)				285	740	ΔP (Psi)				1480	ΔP (Psi)				2220	ΔP (Psi)			3705	ΔP (Psi)			6170
1½"	46	+ 0.02	*ΔP		52	61	51	+ 0.02	*ΔP		81	56	+ 0.03	*ΔP		123	61	+ 0.03	*ΔP	172	66	+ 0.04	*ΔP	313
2"	65	+ 0.04	*ΔP		76	95	78	+ 0.04	*ΔP		137	85	+ 0.05	*ΔP		196	92	+ 0.05	*ΔP	277	98	+ 0.06	*ΔP	468
3"	148	+ 0.10	*ΔP		177	222	178	+ 0.12	*ΔP		356	193	+ 0.15	*ΔP		526	209	+ 0.18	*ΔP	876	222	+ 0.19	*ΔP	1394
4"	250	+ 0.19	*ΔP		304	391	301	+ 0.23	*ΔP		641	326	+ 0.29	*ΔP		970	353	+ 0.35	*ΔP	1650	375	+ 0.36	*ΔP	2596
6"	458	+ 0.43	*ΔP		581	776	555	+ 0.51	*ΔP		1310	594	+ 0.64	*ΔP		2015	642	+ 0.76	*ΔP	3458	680	+ 0.79	*ΔP	5554
8"	639	+ 0.80	*ΔP		867	1231	768	+ 0.95	*ΔP		2174	830	+ 1.19	*ΔP		3472	897	+ 1.41	*ΔP	6121	951	+ 1.46	*ΔP	9959
10"	956	+ 1.26	*ΔP		1315	1888	1147	+ 1.49	*ΔP		3352	1239	+ 1.87	*ΔP		5390	1339	+ 2.21	*ΔP	9527	1420	+ 2.30	*ΔP	15611
12"	1275	+ 1.84	*ΔP		1799	2637	1530	+ 2.18	*ΔP		4756	1652	+ 2.73	*ΔP		7713	1784	+ 3.23	*ΔP	13751	1891	+ 3.35	*ΔP	22561
14"	1458	+ 2.26	*ΔP		2102	3131	1750	+ 2.67	*ΔP		5702	1890	+ 3.34	*ΔP		9305	2042	+ 3.95	*ΔP	16677				
16"	1936	+ 3.10	*ΔP		2819	4230	2324	+ 3.66	*ΔP		7741	2510	+ 4.58	*ΔP		12678	2711	+ 5.41	*ΔP	22755				
18"	2430	+ 4.60	*ΔP		3741	5834	2917	+ 5.43	*ΔP		10953													
20"	3335	+ 6.30	*ΔP		5130	7997	4002	+ 7.44	*ΔP		15013													
22"	4068	+ 7.80	*ΔP		6291	9840	4881	+ 9.20	*ΔP		18497													
24"	5226	+ 9.20	*ΔP		7848	12034	6272	+ 10.86	*ΔP		22345													

For sizes above 24" consult SWI Engineering

SIZE	BORE	FLOW COEFFICIENT (Cv) RATING					
		CL 150#	CL 300#	CL 600#	CL 900#	CL1500#	CL 2500#
2"	FB	400	400	400	340	340	290
2"x 1½"	RB	108	108	108	106	106	103
3"	FB	1100	1100	1100	950	850	750
3"x 2"	RB	190	190	190	170	150	128
4"	FB	1850	1850	1850	1800	1650	1300
4"x 3"	RB	484	484	484	418	374	330
6"	FB	4500	4500	4500	4400	4000	2500
6"x 4"	RB	814	814	814	792	726	572
8"	FB	9000	9000	9000	8400	7900	5300
8"x 6"	RB	1980	1980	1980	1936	1760	1100
10"	FB	14500	14500	14500	14200	12000	8500
10"x 8"	RB	3960	3960	3960	3696	3476	2332
12"	FB	22000	22000	22000	21000	18190	12750
12"x 10"	RB	6380	6380	6380	6248	5280	3740
14"	FB	28000	28000	28000	26000	23000	
14"x 10"	RB	5655	5655	5655	5538	4680	
16"	FB	38000	38000	38000	35000	30000	
16"x 12"	RB	9680	9680	9680	9240	8004	
18"	FB	50000	50000	50000			
18"x 14"	RB	10920	10920	10920	10140	8970	
20"	FB	60000	60000	60000			
20"x 16"	RB	14820	14820	14820			
24"	FB	94000	94000	94000			
24"x 20"	RB	25200	25200	25200			
26"	FB	106000	106000	106000			
26"x 20"	RB	25350	25350	25350			
28"	FB	120000	120000	120000			
28"x 24"	RB	44000	44000	44000			
30"	FB	145000	145000	145000			
30"x 24"	RB	37000	37000	37000			
36"	FB	208000	208000	208000			
36"x 30"	RB	65000	65000	65000			
40"	FB	268000	268000	268000			
40"x 36"	RB	98600	98600	98600			
	FB						
48"x 40"	RB	108000	108000	108000			

BALL VALVE TORQUE NOTES

1) Torque values advised are for new valves, based on clean water / lubricated service.
2) No additional safety factors have been included.
3) For actuated valves, it is recommended a minimum of 30% safety is applied, unless advised or required otherwise by client.
4) For infrequent use i.e. less than once per month, a minimum of 50% safety is recommended.
5) For lubricated service with oil, torques may be reduced between 10%~20% dependant upon the application.
6) For Dry Gas torques should be increased by 25%.
7) For Paste, Resin, Slurry, & Pulp, torques should be increased by 50%.
8) For fluids carrying dust, powder and entrained particles, dirty service, metal seated valves should be considered.
9) Temperatures below -29°C and above 120°C, consult SWI Engineering.
10) For stem mast maximum allowable torque, consult SWI Engineering.
11) For alternative seat materials (i.e. PEEK) and Metal Seats, consult SWI Engineering.
12) If in doubt, always consult SWI Engineering.

FLOW COEFFICIENT NOTE

Cv is defined as the volume of water flowing through the valve, in U.S. Gallons per minute at 60°F (15°C), which will result in a pressure drop of 1 psi.

VALVE MODEL NUMBER

CODE TABLE **A B - C D E - F G H J K** (Optional)

Sample Valve Code **TEG - 11S3N4 - W2133**

1-PCE CLASS 900#, WCB BODY, SS316 TRIM, DEVLON V-API SEAT, FKM (ED grade) PRIMARY SEALS, B7/2H BOLTING, BUTT WELD ENDS, FULL PORT, STD. BONNET, GEAR OPERATED, SEALANT INJECTION FACILITY TO STEM & SEAT AREA.

A

VALVE TYPE / SERIES	
TE	1 PIECE TOP ENTRY BODY

B

CLASS	
B	150#
D	300#
E	600#
G	900#
H	1500#
J	2500#
9	OTHER

C

SHELL MATERIAL BODY / BONNET / COVER	
11	A216-WCB / A105
13	A352-LCC / A350-LF2
23	A351-CF8M / A182-F316
24	A351-CF3M / A182-F316L
29	ASTM A890-4A / A182-F51
30	ASTM A890-5A / A182-F53
31	ASTM A890-6A / A182-F55
33	ASTM A494-M35-1 / MONEL 400
35	ASTM A494-CW6MC / INCONEL 625
44	ASTM A351-CK3MCUN / A182-F44
61	ASTM B148 - C95800
99	SPECIAL

D

TRIM MATERIAL	BALL / TRUNNION	SEAT RINGS	STEM
C1	WCB/ENP	A105 / ENP	SS316
S1	SS410	SS410	SS410
S2	SS304	SS304	SS304
S3	SS316	SS316	SS316
S4	SS316L	SS316L	SS316L
S5	SS316	SS316	17/4PH SS
D1	F51 / S31803	F51 / S31803	F51 / S31803
D2	F53 / S32750	F53 / S32750	F53 / S32750
D3	F55 / S32760	F55 / S32760	F55 / S32760
D4	F44/ S31254	F44/ S31254	F44 / S31254
A6	INCONEL 625	INCONEL 625	INCONEL 625
B2	B148-C95800 / NiAlBz	NiAlBz	NiAlBz
99	SPECIAL		

E

SEAL MATERIAL(1&2)	SEAT	PRIMARY SEAL
K1	KEL-F / PCTFE	HNBR
K2	KEL-F / PCTFE	PTFE ELGILOY SEAL
N3	NYLON 6.12 / DEVLON-V	HNBR
N4	NYLON 6.12 / DEVLON-V	FKM -B (Viton)
N5	NYLON 6.12 / DEVLON-V	FKM-GLT (Viton)
P1	PEEK	HNBR
P2	PEEK	FKM-B (Viton)
P3	PEEK	FKM-GLT (Viton)
P4	PEEK	PTFE + ELGILOY SPRING
P5	PEEK	GARLOCK 9000 EVSP
R1	R-PTFE	HNBR
R2	R-PTFE	FKM-B (Viton)
R3	R-PTFE	FKM-GLT (Viton)
R4	R-PTFE	PTFE + ELGILOY SPRING
R5	R-PTFE	GARLOCK 9000 EVSP
M(3)	METAL SEATED	

(1) Elastomeric seals are AED Grade and Secondary seals are Graphite.

(2) Body gaskets are Graphite or Spiral Wound Gaskets.

(3) Metal seating and primary seal selection to suit application.

F

END CONNECTION	
W(4)	BUTT WELD ASME B16.25
R	FLANGED - ASME B16.5 RF
F	FLANGED - ASME B16.5 FF
J	FLANGED - ASME B16.5 RTJ
G(5)	FLANGED - ASME B16.47 RF
H(6)	HUB ENDS

(4) Pipe schedule to be specified

(5) Series A or B to be specified

(6) Customer to specify

G

BORE	
1	REDUCED BORE
2	FULL BORE
9(6)	SPECIAL BORE

H

BONNET	
1	STANDARD BONNET
2	LOW TEMP. -46°C
3	CRYOGENIC -46°C ~ -196°C
4	STEM EXTENSION
5	HEAT DISSIPATION BONNET
6	UNDERGROUND
7	LOW EMISSION SEAL SYSTEM

J

OPERATION	
0	BARE STEM
1	WRENCH OPERATED
2	WRENCH OPERATED - LD
3	GEAR OPERATED
4	GEAR OPERATED - LD
P	PNEUMATIC
E	ELECTRIC (MOV)
H	HYDRAULIC
G	GAS OVER OIL
EH	ELECTRO HYDRAULIC

LD = Open & Closed Locking Facility

K (Optional)

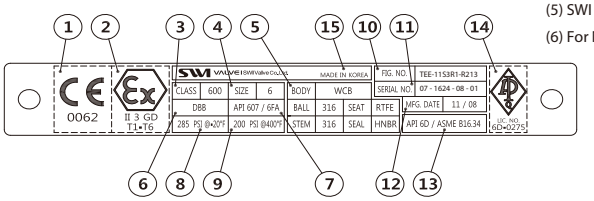
ANCILLARIES	
1	INJECTION FACILITY, STEM AREA
2	INJECTION FACILITY, SEAT AREA
3	INJECTION FACILITY, STEM & SEAT AREA

BOLTING MATERIAL (5 & 6)		
BODY CODE	BOLT	NUT
11	A193-B7	A194-2H
13	A320-L7	A194-4
23	A193-B8	A194-8
24	A193-B8	A194-8
29	A193-B8M CL2	A194-8M
31	A193-B8M CL2	A194-8M
33	A193-B8M CL2	A194-8M
35	A193-B8M CL2	A194-8M
44	A193-B8M CL2	A194-8M
61	A193-B8M	A194-8M

(5) SWI standard bolting unless specified otherwise.

(6) For NACE, Grade 'M' applied

How to Read SWI Valve Name Plate	
1	CE Mark and Notified Body, when applied
2	ATEX mark, when applied
3	ANSI pressure class
4	NPS size (Inches)
5	Materials of construction for main parts
6	Test / Sealing configuration per API 6D
7	Firesafe Standard
8	Valve max. pressure at min. design temperature
9	Valve max. pressure at max. design temperature
10	Valve model / figure number
11	Valve serial number
12	Date of manufacture (Month / Year)
13	Applied design code
14	API 6D Monogram, when applicable.
15	Country of manufacture.



High Integrity Top Entry Trunnion Mounted Ball Valves

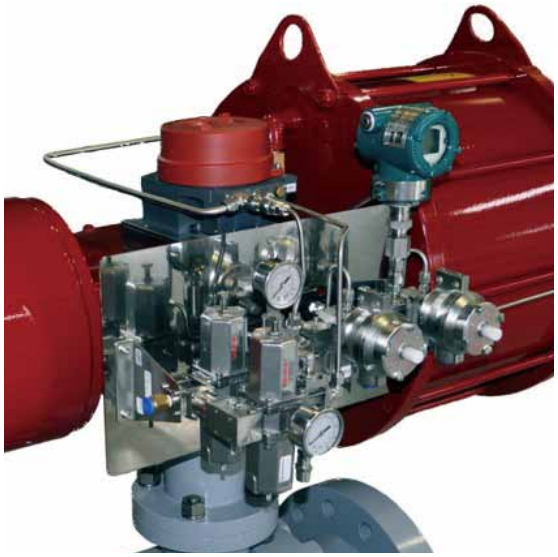
OPTIONS & VARIATIONS

ACTUATION & OPERATION METHODS

SWI's range of valves may be manually operated by lever or gearbox depending on torque requirements, and are built to easily accept pneumatic, hydraulic or electric actuators.

Valve design minimizes operational torque, which normally affects actuator sizing, allowing for economical automation packages. Complete valve / actuator assemblies can be provided fully tested and certified according to customer requirements as a single package, supplied directly from SWI.

Over many years, SWI has built up a reputation for providing high quality valves supported by factory field experts. To maintain and extend our reputation, we have aligned ourselves with highly accredited and respected Automation Manufacturers in the industry. This combined with fully equipped valve automation assembly & test and our extensive knowledge of the valves and actuator requirements, SWI can offer competitive prices, best service and proven products.



SWI's trunnion mounted ball valves are ideal for ESD applications due to the inherently robust design with greater stem to ball drive train strength.

Valves specified as ESD are equipped with actuators which ensure their positive operation in an emergency. In the case of such critical equipment, full details of the application conditions and relevant specifications should always be provided to our technical department.

Dedicated valve / actuator test facilities incorporating torque testing, cycle testing, fugitive emission testing and valve / actuator differential testing ensures automated packages can be correctly tested to Client exact requirements.

Production is centered at our new 14,500 m^2 World Class facility near Seoul with all manufacturing processes covered by the same documentation that ensures compliance to our standardized quality assurance programs. Product quality has been subject to continued enhancements and all products are constantly reviewed so as to improve quality and maintainability.

From general on / off duty with position indication and solenoid control to complete modulating packages with smart positioners, regulators, partial stroke and sophisticated control systems are all available from SWI.

OPTIONS & VARIATIONS

WELD OVERLAY TECHNOLOGY

SWI fully automated robotic welding offers a cost effective solution compared to solid corrosion resistant alloys.

Where highly corrosive or erosive services are involved, the life expectancy of a valve can be considerably extended by the application local weld overlay or full internal cladding to valve internal surfaces.

METAL TO METAL SEATED VALVES

For applications where solid particles may be present in the fluid or involve very high pressure and / or elevated temperature beyond the capability of soft seats, SWI can provide valves with metal to metal seating. SWI achieves the metal to metal seating through the use of various advanced hard facing technologies incorporating Tungsten Carbide coatings, Stellite, Hard Nickel Alloy or alternative processes considering the intended application.

Please consult with our technical department for specific requirements.

SOUR SERVICE

Valves are available conforming to the requirements of the NACE specification MR 01-75 / ISO 15156 / MR 01-03 for use on applications where the presence of wet H_2S generates a risk of stress corrosion cracking. NACE compliance certificates are available on request.

QUALITY ASSURANCE

SWI Valves operate under a Quality Assurance system which is approved by Bureau Veritas to ISO 9001:2008 / KS Q ISO 9001: 2009 / KEPIC-MN and API Q1. The company is licensed to use the API Monogram in respect of API 6D ball valves and our facilities are always open to customer audits.

SWI ball valves have been independently accredited for Design and Fire Safety. In addition, manufacture and materials comply with the essential safety requirements of the Pressure Equip-ment Directive 97/23/EC (PED).

SWI VALVE

Products Manufactured by SWI Include :

- Ball Valves, Soft & Metal Seated
- Forged Steel Gate, Globe & Check Valves
- Cast & Forged Bellows Seal Gate and Globe Valves
- Cryogenic Valves down to minus 196 ℃
- High Alloy Valves
- Top Entry Valves
- Fully Automated Valves, Pneumatic, Electric, Hydraulic & Gas Over Oil Systems

HEAD OFFICE & PLANT 1
SWI Valve Co., Ltd.
1023-2 Gwanyang-dong, Dongan-gu
Anyang-si, Gyeonggi-do
KOREA

Tel:+82 31 421 1831~3
Fax:+82 31 421 1834
Website:www.swivalve.com

PLANT 2
SWI Valve Co., Ltd.
801-2 Goryeom-ri, Cheongbuk-myeon
Pyeongtaek-si, Gyeonggi-do
KOREA

Tel:+82 31 684 2981~3
Fax:+82 31 684 2984

USA OFFICE
SWI Valve Corporation
10101 Harwin Drive, Suite
173 Houston, Texas 77036
USA

Tel:+1 713 266 7033
Fax:+1 713 266 7034