



**WALWORTH<sup>®</sup>**  
*Since 1842*

**TRUNNION MOUNTED BALL VALVE**

# CATALOG



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6D-0097



YARMOUTH RESEARCH AND TECHNOLOGY



# WALWORTH

WALWORTH is one of the world's most comprehensive industrial valve manufacturers. Founded in 19th century by James Walworth, the Company has consistently dedicated itself to improvements in design and manufacturing of an array of valves exceptionally suited for the world's fluid control sector. We satisfy all end use industries and comprehensive customer requirements by adhering to the most demanding quality standards.

WALWORTH relies on its broad experience in supplying valves to the petrochemical, oil & gas, petroleum, power generation, pulp and paper, cryogenic and geothermal industries, among others.

Over the years, Walworth has produced over 40,000 different types of products and serves as a global supplier to various markets utilizing the expertise of over 500 trained employees.

Our manufacturing system includes: utilization of Company directed raw material warehouses; modern and newly acquired specialized machinery; welding processes such as SMAW, GMAW, SAW, PAW; assembly testing for all low pressure, high pressure, and at low or high temperatures; painting and coating processes; export crating and shipment.

WALWORTH is capable of providing the world's most comprehensive industrial valve line to the North American, Central American, South American, European and African markets. WALWORTH is proud to meet and satisfy the precise demands of our customers throughout the world by providing a quality product, competitive cost, and excellent service.



## WALWORTH VALUES

### MISSION

WALWORTH manufactures and supplies world-class valves and components for the flow control industry through exceptional service, competitive pricing, and consistently, on-time deliveries.



### VISION

To be the world leader of unparalleled valve manufacturing and supply, WALWORTH:

- Set the standard for product quality in the flow control industry.
- Exceed the service expectations of our customers.
- Forge enduring relationships with customers, team members, and community.
- Hire, develop, and retain experienced and dedicated team members.

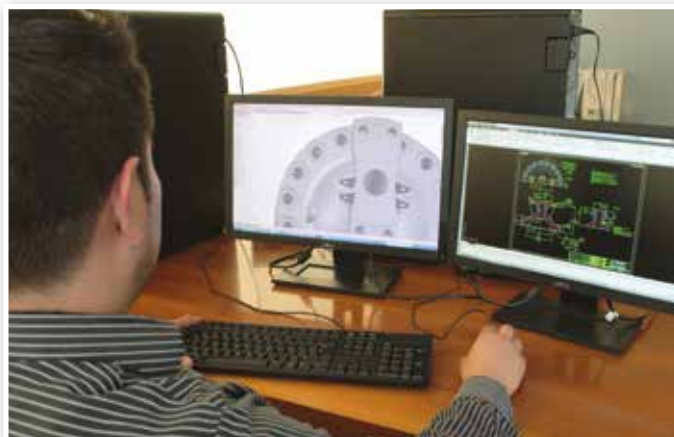




## WALWORTH ENGINEERING CONTROL

WALWORTH products are manufactured following the strict international standards recognized all over the world, such as API, ANSI, ASME, ASTM, MSS, NACE, AWWA, BSI, CSA, among others. Our Engineering team consistently monitors updates to these standards and incorporates any applicable changes that affect the design, regulations and/or performance of our products.

Our designs are made using the most advanced technology and equipment, finite elements, and CAD system programs to ensure proper assembly and performance. From conception to calculation to detailed drawings for manufacturers, WALWORTH is a leader in development of new products that meet the needs of the current valve market.”



## WALWORTH QUALITY SYSTEM

Throughout the years, WALWORTH has developed its Quality System which is an integral part of our manufacturing policy. Our primary goal is to provide products that meet and exceed market standards. In this sense, WALWORTH is an ISO-9001 Audited and Certified Company that has achieved major certifications worldwide. Our system includes the selection of raw materials from approved vendors, and rigorous oversight of our manufacturing process that is vital to quality control. The use of serial numbers allows WALWORTH the ability to not only ensure the quality of components used but to monitor and trace the fabrication process as well.



### Certificate API-6D No. 6D-0097

Issued by American Petroleum Institute to apply on Gate valves, Plug valves, Ball valves and Check valves manufactured in accordance with API-6D specification.



### Certificate API-6A No. 6A-0234

From American Petroleum Institute to apply on valves at PSI, 1 through 4.



**Certificate API-594 No. 594-0007**  
Issued by American Petroleum Institute to apply on Check Valves-Type A; Check Valves Type B manufactured in accordance with API-594 specification.



**API-600 Certificate No. 600-0109**  
Issued by American Petroleum Institute to apply on Bolted Bonnet Steel Gate Valves manufactured in accordance with API-600 specification.



**API-602 Certificate No. 602-0024**  
Issued by American Petroleum Institute to apply on Compact Steel Gate Valves, Compact Steel Globe Valves, and Compact Steel Check Valves manufactured in accordance with API-602 specification.



**Certificate ISO-9001 No. 0038**  
Issued by American Petroleum Institute since April 1999.



**Certificate as per PED 97/23/EC Module H**  
To stamp CE products.



**Supplier Qualification Certificate NO. 279/13**  
Issued by the Equipment and Materials Testing Laboratory, CFE (LAPEM in Spanish)



**Certificate NMX-CC-9001 (Mexican Standards ISO-9001) No. 0552/2007** Issued by PEMEX in accordance with ISO-9001 Quality Assurance System.

# PRODUCT CERTIFICATIONS



**Emissions after 500 cycles at ambient and 350 °F** Issued by Yarmouth Research and Technology Lab for 3 inch Class 300 Gate Valve After 500 cycles the measurement result was less than 50 ppm.



**Emissions after 500 cycles at ambient and 350 °F** Issued by Yarmouth Research and Technology Lab for 8 inch Class 300 Gate Valve After 500 cycles the measurement result was less than 50 ppm.



**Emissions after 500 cycles at ambient and 350 °F** Issued by Yarmouth Research and Technology Lab for 16 inch Class 150 Gate Valve After 500 cycles the measurement result was less than 50 ppm.



**Certificates of Ultra Low Fugitive Emissions No. 20985-3, 8 & 16 in accordance with ISO-15848-1 "Industrial Valves" Measurement, Test and Qualification Procedures for Fugitive Emissions "Part 1: Classification System and Qualification Procedures for Type Testing of Valves".**



**TÜV Rheinland Certificate No. TRASA 700-13-0019 API-6D** Trunnion mounted bolted body ball valves, carbon steel (A105-WCB) construction, double block and bleed service, primarily used but not limited to the oil and gas standard and severe applications.



**Fire Test Certificate No. 01-1/05** In accordance with API-6FA and API Standard API-607 for Trunnion Ball Valves in accordance with API-6D.

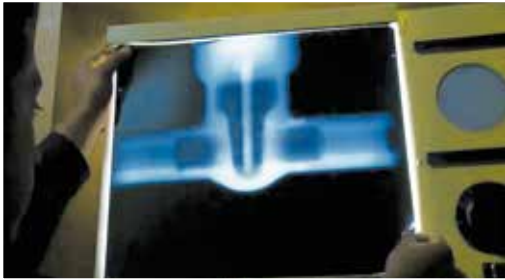


**TA Luft Certificate (Fugitive Emission) Approval ISO-5211** Top Flange, Anti-Static Device.



## QUALITY CONTROL EQUIPMENT

In order to assure that WALWORTH products comply with international quality standards, in-house equipment is kept for monitoring control. Some of this equipment includes:



**X-Ray Examination Equipment.** WALWORTH has its own Ir-92 source in-house for the radiographic examination (RT) of castings from 0.100" up to 2 1/2" wall thickness to verify the soundness of the casting raw material.



**PMI Equipment.** A new generation of Positive Material Identification Equipment gives WALWORTH the capability to perform quick chemical analysis on incoming raw materials and on pieces after assembly, to certify that materials used were produced and assembled in accordance with WALWORTH's and our Customer's specifications.



**Magnetic Particle Test.** On a random basis for standard products or when a Customer requests MT Certification, WALWORTH has Magnetic Particle Test Equipment to perform on ferromagnetic materials.



**Penetrant Test Examination.** WALWORTH has the personnel and materials to perform PT examination by solvent removable or water washable techniques. NDT personnel are ASNT Certified.



**Test Loop.** A complete Laboratory Test loop exists for design validation of WALWORTH products. The test is performed at maximum design pressure, advances the valves from 3000 to 5000 cycles, and requires more than four months to complete.



**Pressure Gradient Test Loop.** This test exposes Plug valves to the extremes of both positive and negative pressure gradients to verify that the plug in a balanced plug design will prevent lock-up in the body.





**Metrology Laboratory.** WALWORTH developed a calibration and/or verification system in all of the equipment used in its facilities. This ensures our ability to trace measurements, control products, and comply with international standards.

**Fire Test Facilities.** WALWORTH has the facilities to perform fire tests in accordance with API requirements. The test exposes the valve to a fire flame at 1400 to 1800 °F (761 to 980 °C) to verify proper seal of the valve.



**Low Fugitive Emissions Test.** This test is performed when a Customer requires low fugitive emissions certification. Our Lab has its own LFE test equipment that is capable of measuring less than 20 ppm in both static and mechanical conditions at either ambient temperature or thermal cycle operations.

**Ultrasonic Testing Equipment.** Using ultrasonic techniques, we can detect sub surface flaws in materials and evaluate castings and forgings that cannot be radiographed. In addition, we utilize these techniques to measure the wall thickness of castings and forgings.



**Tensile Test Equipment.** We use this equipment to verify the mechanical properties of materials used for manufacturing. WALWORTH tests samples on a random basis even though we receive MTRs from our suppliers and foundries.

**Hardness Test Equipments.** - In both lab and shop tests, WALWORTH uses hardness tester equipment, such as Rockwell B, C Brinell or Vickers, to ensure compliance with specifications.



# WALWORTH TRUNNION MOUNTED BALL VALVES

## EXTRACTION & REFINING OF CRUDE OIL

Trunnion Mounted Ball Valves are primarily used but not limited to the oil & gas industry to provide reliable block and bleed service. WALWORTH Trunnion Mounted Ball Valve Design features provide solutions for any application within the extraction & refining of crude oil market. These features ensure durability, safety & long term performance on and off shore. Walworth engineering product development is subject to API 6D, ISO 14313, ASME B16.34, ASME VIII. ANSI 150 to 2500 pressure class are available and do come in reduced and full port; the latter facilitates the running of cleaning tools through conduit, avoids turbulence & decrements in pressure. WALWORTH offers an array of standard materials for body and interiors e.g.

1. Carbon Steels (A 105 - WCB).
2. Low Carbon Steels (LF2, LF3 - LCB, LCC).
3. Stainless Steels (F316, F347 - CF8M, CF8C).
4. Duplex Stainless Steel (F51 - CD3MN).
5. Super Duplex Stainless Steel (F55 - CD3MWCuN).

Special materials are suggested as unique conditions require.

WALWORTH Interiors Trim Arrangement includes materials from tables listed in API-6D. High Tensile Strength materials such as 17-4pH, duplex & super duplex steels (UNS S31803 or UNS S32750), high nickel alloys (Monel, Inconel, Incoloy, Hastelloy.) are also available. Soft Seat Elastomer & Thermoplastic, ( Viton ,PTFE, NYLON, DEVLON, PEEK) special inserts are also available.

### Design Features

- Trunnion Mounted Valves in accordance with API-6D
- Manufactured with forged materials to achieve uniform fine grain structure and toughness.
- Bolted or welded body
- Hardfacing coating: ENP, stellite 6 & tungsten carbide
- Internal cladding available: carbon steel body + inconel 625
- Obeys to API-6FA, API-607 fire tests
- Through conduit, full bore, negligible pressure drop, no turbulence, suitable for pigging operations (reduced port upon request).
- Flange dimensions in accordance ASME B16.5 for valves up to 24" in nominal diameter.
- Flange dimensions in accordance MSS-SP-44, ASME/ANSI B16.47 series A or B for valves over 26" in nominal diameter.
- Manual (lever or gear operator), electric, hydraulic & pneumatic actuation.
- Double block and bleed service that comes with bleed plug to body cavity.
- Bi-directional flow
- Anti-static device
- Spring loaded seats
- Blow out proof system
- NACE service subject to MR-01-75 or MR-01-03
- Test in accordance API-6D
- Special constructions available for high and low temperature



### Product Range

Type	Size	Pressure Class as per ASME/ANSI B16.34	Ends
Trunnion ball valve, bolted body	2" a 60"	150, 300, 600, 900, 1500 & 2500#	RF, RTJ o BW
Trunnion ball valve, welded body	2" a 60"	150, 300, 600, 900, 1500 & 2500#	RF, RTJ o BW

# BODY MATERIALS & TRIM ARRANGEMENTS

## STANDARD MATERIALS. BODY AND ENDS MATERIALS

Material ASTM	Carbon Steel General & Sour Service		Carbon Steel Low temperature		Low Alloy High Temperature		Stainless Steel Corrosion Resistant		Duplex SS Corrosion Resistant	
Casting	WCB	WCC	LCB	LCC	WC6	C12A	CF8M	CF3M	UNS S31803	UNS S31254
Forged	A105N		LF2		F11	F91	F316	F316L	F51	F44

Note: Other Material are available

## BALL MATERIALS FOR SOFT SEATS (TABLE A)

CLASE	2" to 8"	10" to 16"	18" to 24"	26" to 48"
150	SS 316	SS 316	SS 316	SS 316
300	SS 316	SS 316	SS 316	SS 316
600	SS 316	SS 316	SS 316	17-4PH
900	17-4PH	17-4PH	17-4PH	17-4PH
1500	17-4PH	17-4PH	17-4PH	17-4PH
2500	17-4PH	17-4PH		

ENP: 0.003" (75 µm) Electroless Nickel Plated (ENP), on all external and internal surfaces

Notes: (1).- SS 316+0.003" ENP Stem for Class 150,300 & 600, 17-4PH+0.003" ENP Stem for Class 900,1500 & 2500

## TRIM MATERIALS FOR SOFT SEATS ARRANGEMENT

TRIM	Ball	Stem	Trunnion	Seat Rings	Back Seat Ring	Seat Insert
T1 STD	A105+ENP	AISI 4140+ENP / A182 F6	AISI 4140+ENP / A182 F6	A105+ENP / A182 F6	A105+ENP	See Table B
T2 SS 410	A182 F6A+ENP	A182 F6A	A182 F6A	A182 F6A	A182 F6A	See Table B
T3 SS 316	See Table A (1)	A182 F316 (1)	A182 F316 (1)	A182 F316	A182 F316	See Table B
T4 SS 304	See Table A (2)	A182 F304 (2)	A182 F304 (2)	A182 F304	A182 F304	See Table B

ENP: 0.003" (75 µm) Electroless Nickel Plated (ENP), on all external and internal surfaces

Notes: (1).- SS 316 Stem for Class 150,300 & 600, 17-4PH Stem for Class 900,1500 & 2500

(2).- SS 304 Stem for Class 150,300 & 600, 17-4PH Stem for Class 900,1500 & 2500

## TRIM MATERIALS FOR METAL-TO-METAL SEATS ARRANGEMENT

TRIM	Ball	Stem	Trunnion	Seat Rings	Back Seat Ring
T5 SS 410+TC	A105+TC / A182 F6A+TC	AISI 4140+TC / A182 F6+TC	AISI 4140+TC / A182 F6+TC	A182 F6A+TC	A182 F6A
T6 SS 316+TC	A182 F316+TC / 17-4PH+TC	17-4PH	17-4PH	A182 F316+TC / 17-4PH+TC	A182 F316
T7 SS 316 + ST #6	A182 F316+ST#6 / 17-4PH+ST#6	17-4PH	17-4PH	A182 F316+ST#6 / 17-4PH+ST#6	A182 F316

TC 0.008" (200 µm) Tungsten Carbide Hardfacing (TC), on all Seal surfaces

ST #6 0.010" (250 µm) Stellite #6 Hardfacing (TC), on all Seal surfaces

## SOFT SEAT INSERT MATERIALS (PRESSURE-TEMPERATURE)

CLASS	Size	TEMPERATURE °F (°C)					
		100 (38)	200 (93)	300 (149)	400 (204)	500 (260)	600 (316)
150	All	RPTFE-15%	RPTFE-15%	RPTFE-15%	RPTFE-15%	RPTFE-15%	RPTFE-15%
300	2 to 24	RPTFE-15%	RPTFE-15%	RPTFE-15%	RPTFE-15%	PEEK	PEEK
300	24 and up	NYLON 6	NYLON 6	MOLON	MOLON	PEEK	PEEK
600	2 to 12	RPTFE-15%	RPTFE-15%	MOLON	MOLON	PEEK	PEEK
600	14 and up	NYLON 6	NYLON 6	MOLON	MOLON	PEEK	PEEK
900	All	NYLON 6	NYLON 6	MOLON	PEEK	PEEK	PEEK
1500	All	NYLON 6	NYLON 6	PEEK	PEEK	PEEK	PEEK

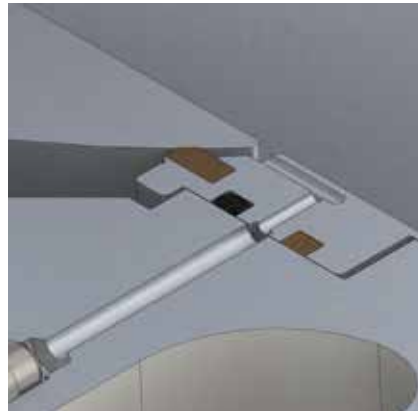
■ "O"-Ring HNBR (AED) must be used as secondary seal ■ "O"-Ring VITON A&B FKM (AED) must be used as secondary seal

■ PEEK/RPTFE seals must be used as secondary seal



# METAL-TO-METAL SOFT SEAT COMPARISON

## SOFT SEATS ARRANGEMENT



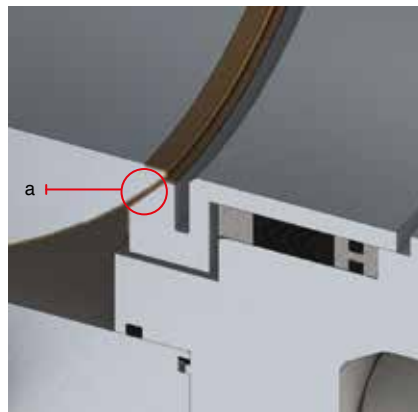
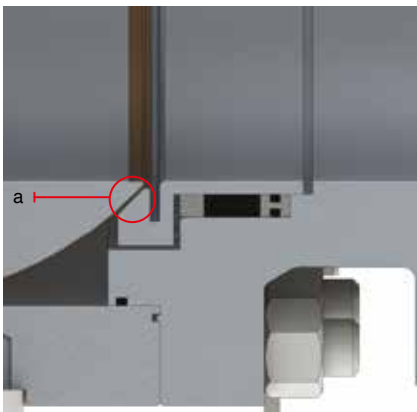
### SOFT SEAT INSERTS

Stringent limitations on ball valve designing along with operating conditions have resulted in the use of several thermoplastic materials to meet the required operating range for ball valve seat inserts thus, WALWORTH offers soft seats such as RPTFE, NYLON, DEVLON, PEEK ETC to guarantee zero leakage at low and high pressures at different temperatures these can be used for several services in any industry, they are also preferred and supplied to Oil and Gas producers. Soft seat inserts reduce friction which result in less torque when operating the valve.

### FIRE SAFE DESIGN

Internal leakage prevention: whenever Seat Inserts and O'rings worn off or get damaged the line pressure collectively with Live-Load set of springs push the metal seat towards the ball surface allowing the component to achieve closure these shut off the line stopping the flow preventing internal leakage. WALWORTH VALVES are fitted with Graphite packing which avoids any leakage between valve body and Seat Ring.

## METAL-TO-METAL SEATS ARRANGEMENT



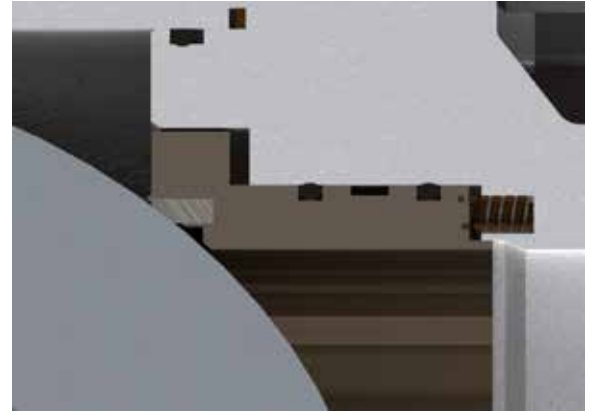
Design is suitable for tough applications; as a result WALWORTH offers Tungsten Carbide or Stellite 6 coatings(a) applied on both the seat and obturator ensuring appropriate hardness for each of the two components, all this is achieved with the aid of the latest technologies that allow our product to withstand:

- High temperature & abrasive services
- Harsh, hazardous & corrosive fluids
- Coal gasification
- Slurry fluids
- Sub sea services
- Produced water (brine) services

# WALWORTH TRUNNION MOUNTED BALL VALVES

## SAFETY FEATURES

### DYNAMIC SEAT RINGS

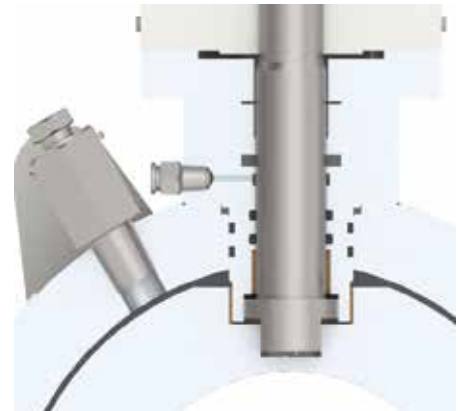
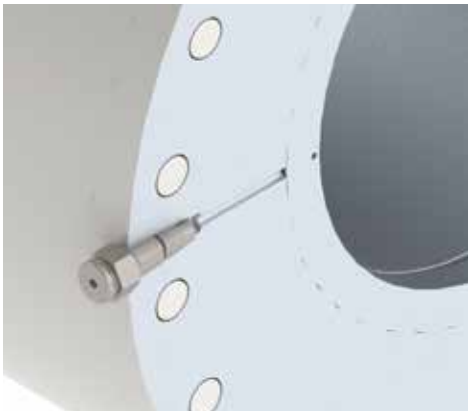


Spring loaded seats achieve low operating torque at different positions under high working pressures. Each seat ring is placed at each end of the ball in a way that the components achieve alignment whenever the valve is fully opened; the rings are pushed towards the obturator by a set of coil springs which ensure appropriate sealing at low pressure before piston action effect takes place.

WALWORTH seat arrangement has been designed to meet what is called a piston effect: As pressure increases, the seat differential area creates a piston effect that pushes the seat towards the ball surface that makes the mechanism attaining tight seal (upstream seat), such action reverses automatically as the pressure increases, thus, overpressure between upstream and downstream seats (body cavity) could be released.

WALWORTH is able to manufacture special Trunnion Mounted Ball Valves with seat arrangements that allow double piston effect which make use of the downstream seat acting as a secondary seal. Relieving over pressure built up in the body cavity shall be achieved by means of an extra valve.

### EMERGENCY SHUT OFF INJECTION GREASE FITTING FOR STEM AND SEATS AREA

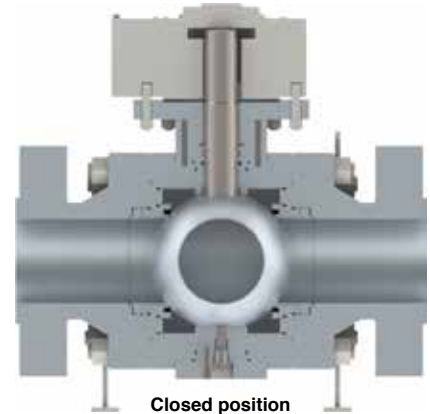
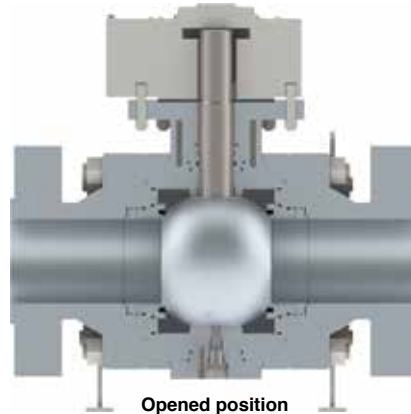
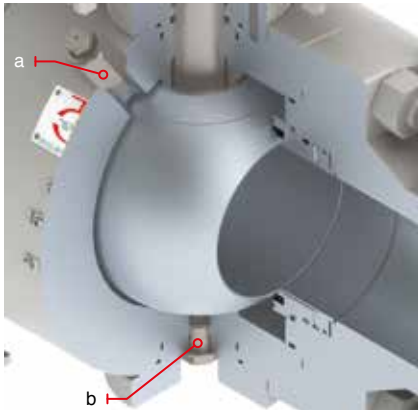


WALWORTH offers an optional feature that consists in fitting an emergency seat which enables the injection of a viscous sealant backup acting as a security agent in the event of any failure suffered by the insert; this system sustains temporary seal until maintenance takes place. The sealant is injected into the valve through a plug insert, which passes through a specific and specially designed groove to obtain an efficient auxiliary seal. This fitting acts as a ball check valve only allowing the sealant to enter and no other things of excess to come out. An injection fitting is another safety feature that allows the stem to restore integrity in the event of any failure around the sealing area.

# WALWORTH TRUNNION MOUNTED BALL VALVES

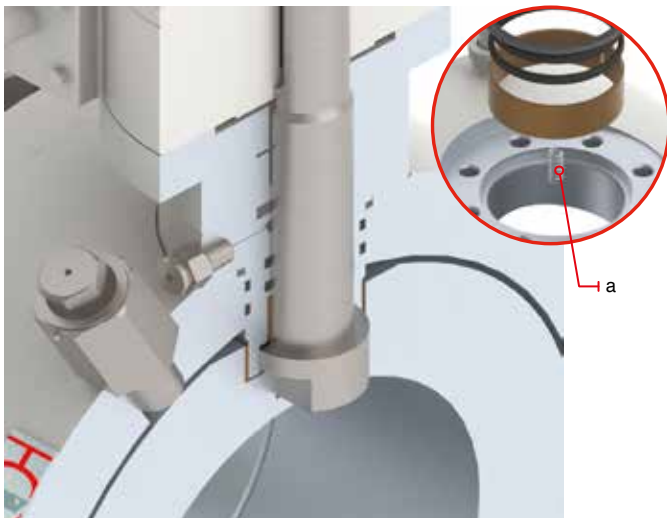
## SAFETY FEATURES

### DOUBLE BLOCK & BLEED (DBB)



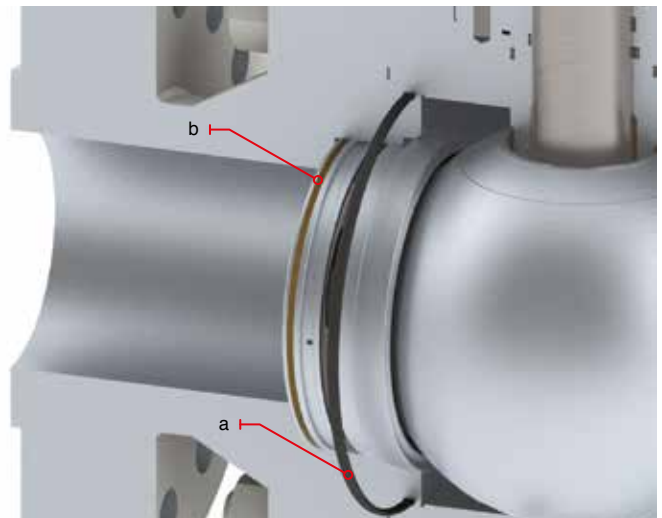
WALWORTH Trunnion - Mounted ball valves have been designed with two seating surfaces (Upstream & Downstream Seats), each of them in the close position achieve sealing against pressure coming from a single source. Anti-blow-out(a) vent & drain plug(b) allow Bi-Directional Valves to vent and drain the body cavity in both open and closed positions, this feature helps to de-pressurize the line downstream to open up and work on it.

### BLOW OUT PROOF STEM DESIGN & ANTISTATIC STRUCTURE



To reinforce safety, WALWORTH have fitted the product with a T-Shaped blowout proof stem back seat that significantly extends stem seal life and prevents it to come out from the body structure. It also includes an antistatic device(a) that lowers coefficient of friction between seat and ball when operating the valve. Friction could cause electrostatic charges (sparks) that could cause fire when mixing with fluid. Leakage from the valve stem is prevented with the aid of two O-rings and a Gasket that work together with the graphite packing.

### BODY SEALING



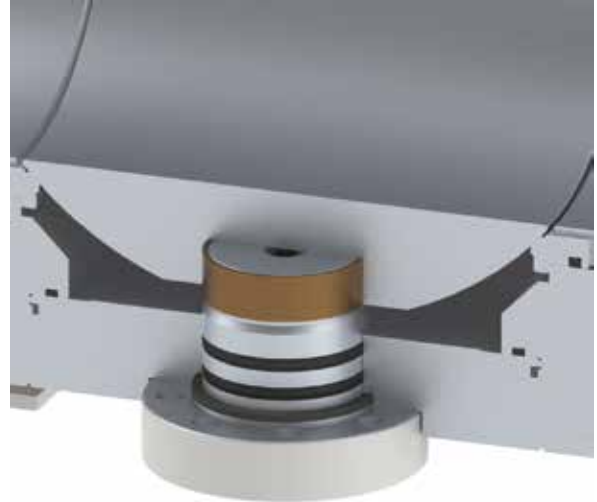
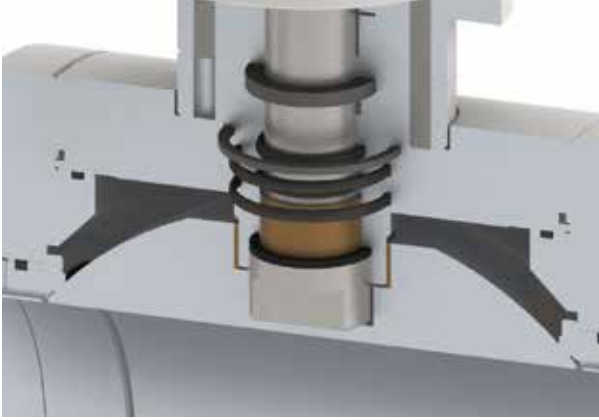
Double sealing action of O-rings(a) and graphite filled gasket(b) in the static joints of the body components ensure zero leakage.



# WALWORTH TRUNNION MOUNTED BALL VALVES

## SAFETY FEATURES

### UPPER & LOWER TRUNNIONS



The ball is held by two cylindrical protrusions that anchor the sphere from top and bottom, their main function is to avoid the ball moving off the pivot axis making it easy to operate.

### THROUGH CONDUIT



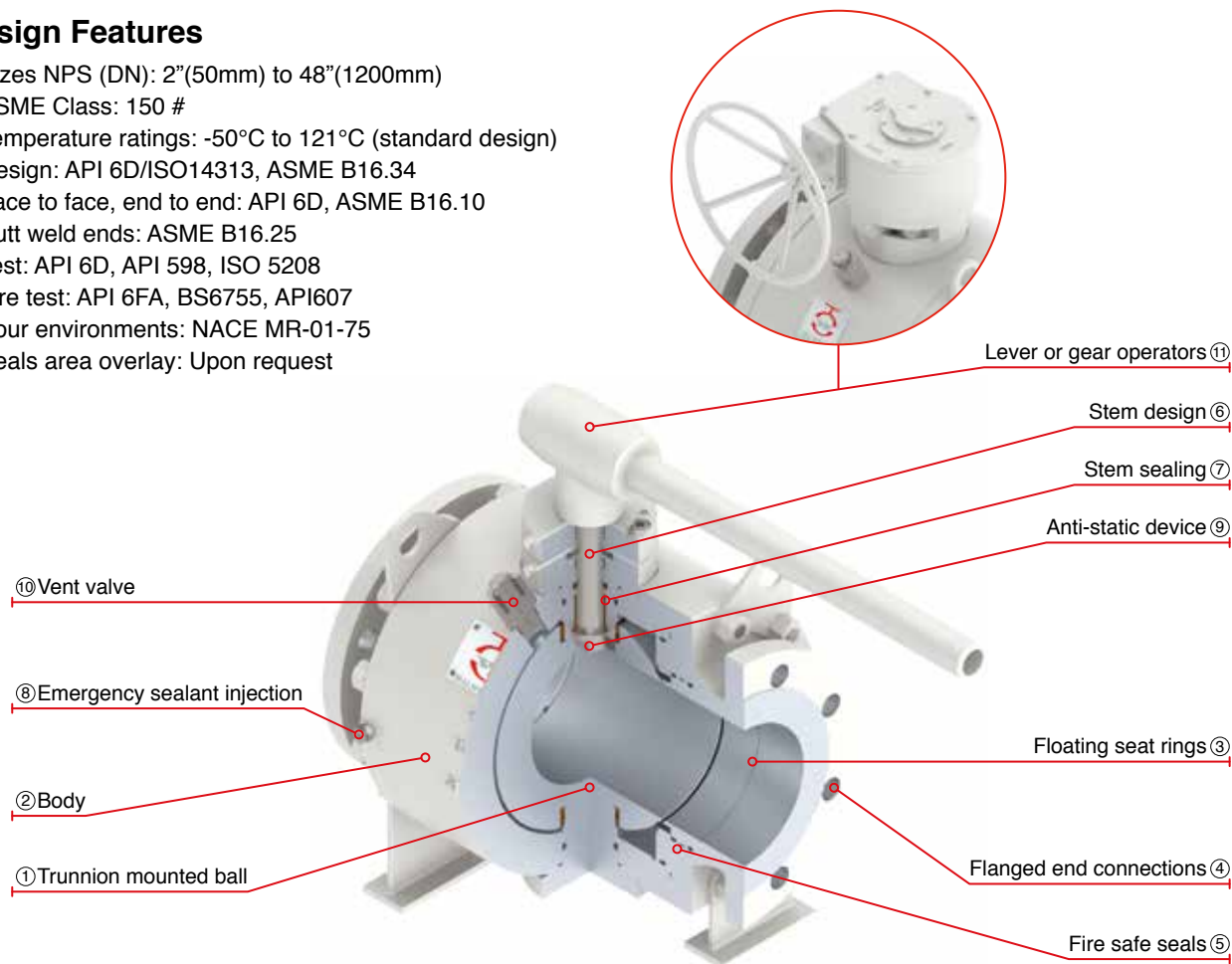
Whenever a pipe line requires maintenance or inspection, the use of gauges or pigs is necessary. WALWORTH full port ball valve eases the passing of such devices without the need to shut down the flow of the fluid.

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 150

Trunnion Mounted Ball Valves are designed and manufactured in conformance with API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

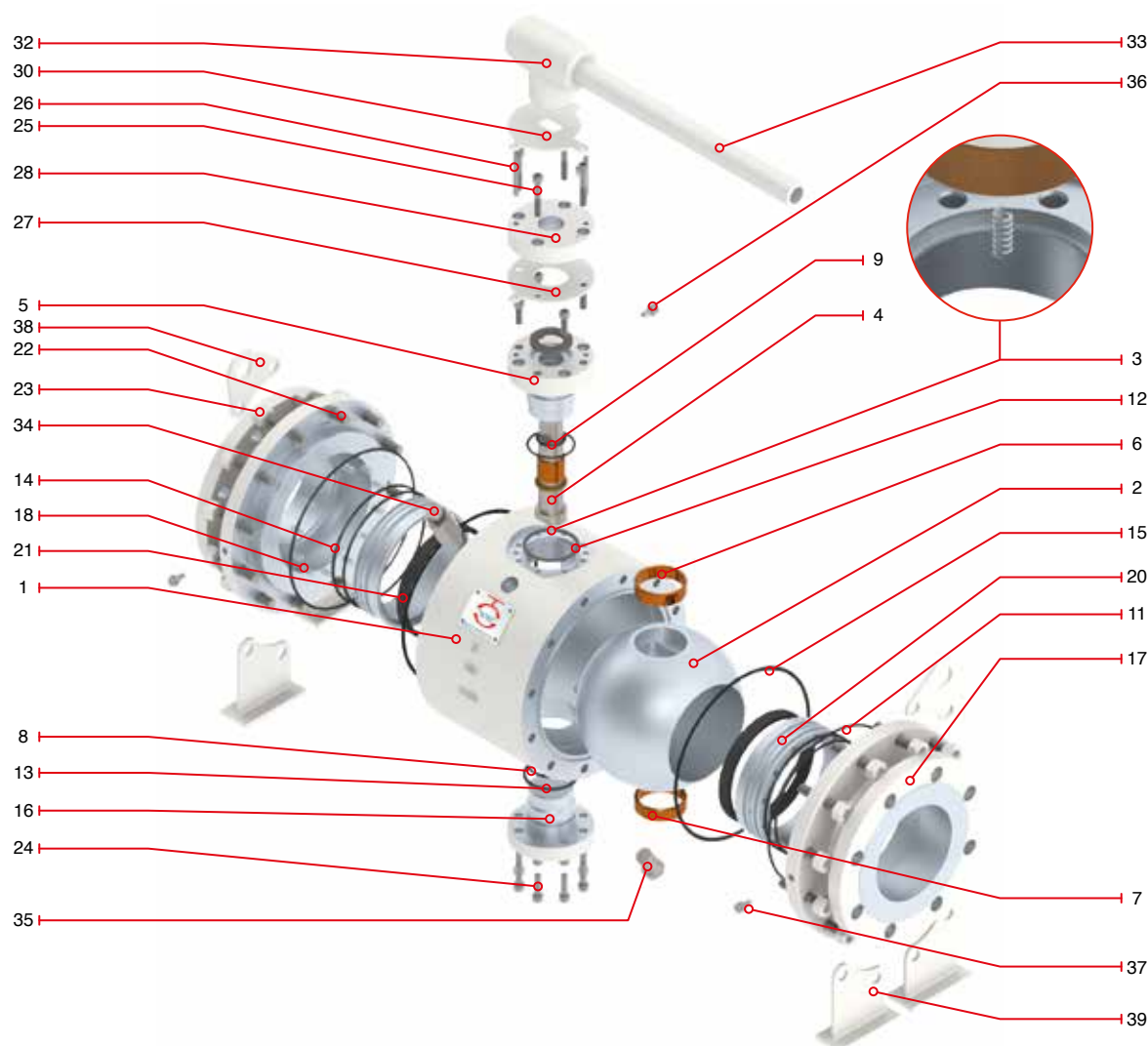
## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"(1200mm)
- ASME Class: 150 #
- Temperature ratings: -50°C to 121°C (standard design)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: Upon request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) coating control the hardness amongst stem, metallic components & double O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (6" & Larger): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 150 (LEVER OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	RPTFE (2 to 12"); Nylon (14 to 24"); Molon (26 to 48")
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	Carbon Steel
7	Lower bearing	C.S.+ PTFE LINING	27	Locking device	A36
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt *	ASTM A193 B7M
10	On seat O'ring *	Viton	30	Stop plate	A36
11	Back up O'ring	Viton	31	Retainer *	AISI 1070
12	Upper fire safe gasket	Graphite	32	Handle nut	ASTM A216 WCB
13	Lower fire safe gasket	Graphite	33	Handle	ASTM A53
14	Fire safe gasket On seat	Graphite	34	Vent valve	Carbon Steel
15	Ends flange fire safe gasket	Graphite	35	Drain plug	Carbon Steel
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Stem grease fitting	AISI 4140
17	Flanged ends	A105N	37	Grease fitting	AISI 4140
18	Seat spring	INCONEL X-750	38	Lifting lug	A36
19	Back up seat ring *	ASTM A105+75µm ENP / AISI 410	39	Support leg	A36
20	Seat ring	ASTM A105+75µm ENP / AISI 410			

\* Not shown



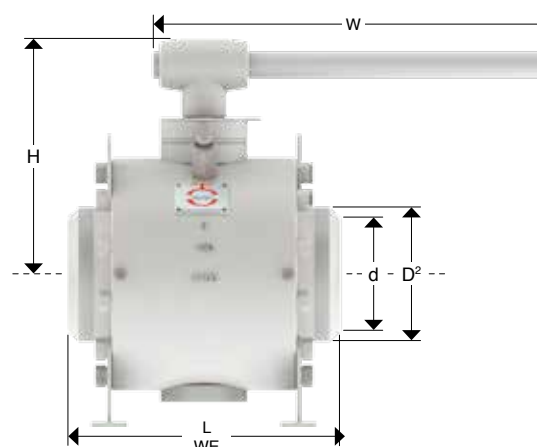
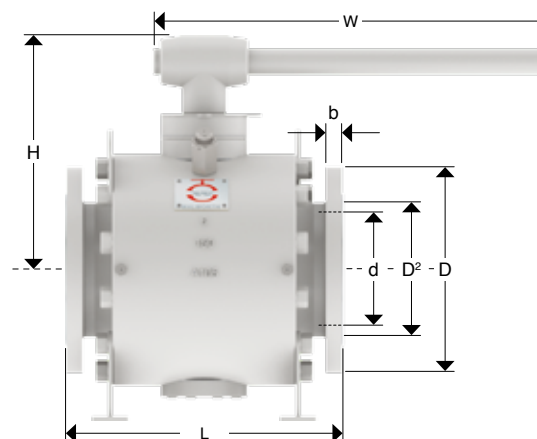
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 150 (LEVER OPERATED)

## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"(1200mm)
- ASME Class: 150 #
- Temperature ratings: -50°C to 121°C (standard design)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: Upon request



Catalog Figure No.	Type of Ends
8112	Raised Face (RF)
8113	Ring Type Joint (RTJ)
8114	Buttweld (WE)



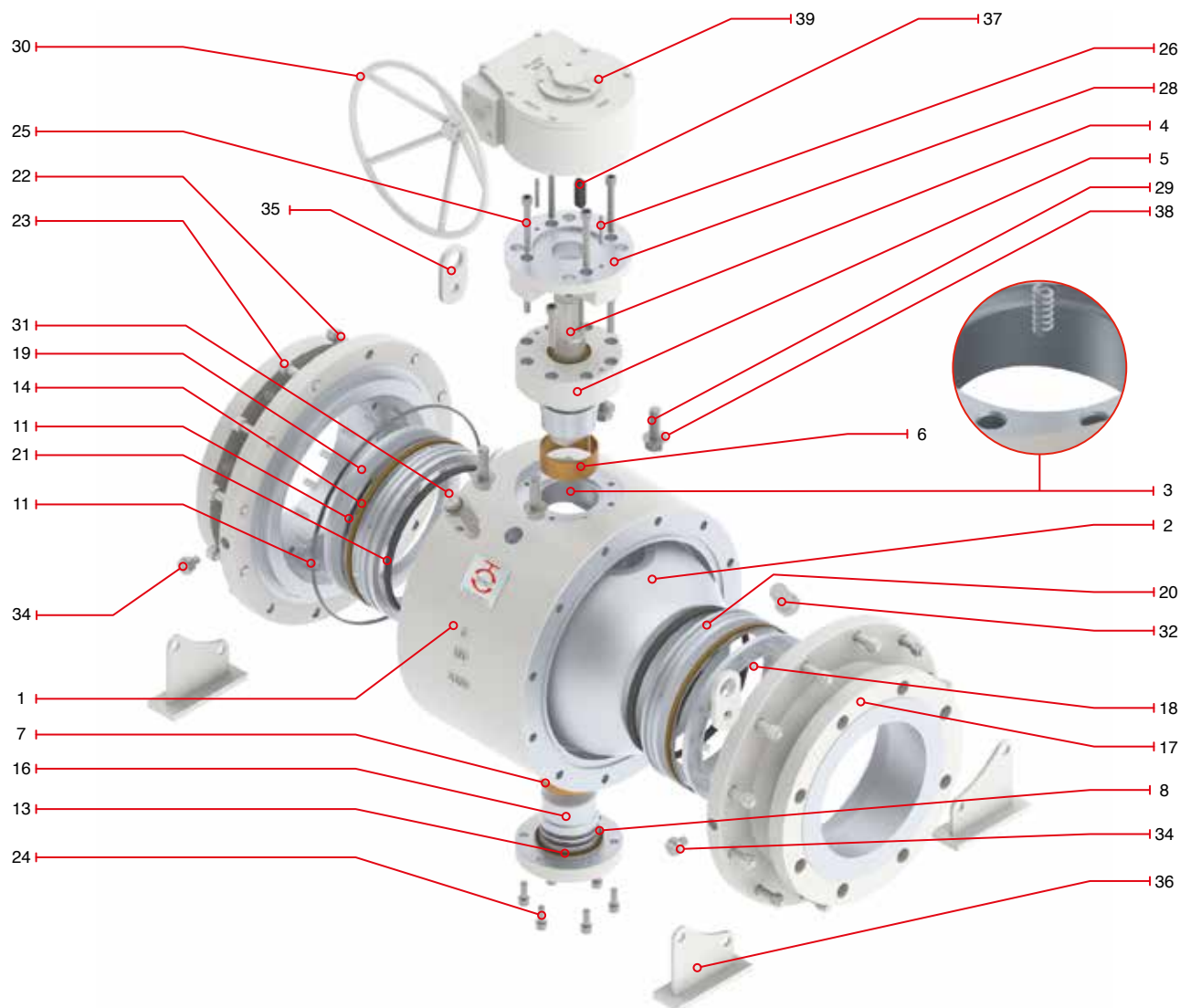
## Dimensions and Weights

D Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"	100 4"
d	mm in	49 1.93	62 2.44	74 2.91	100 3.94
D	mm in	150 5.98	180 7	190 7.48	230 9.02
D2	mm in	92 3.62	105 4.13	127 5	157 6.18
b	mm in	16 0.63	18 0.71	19 0.75	24 0.94
L	mm in	178 7	191 7.48	203 8	229 9.02
L (WE)	mm in	216 8.5	241 9.48	283 11.14	305 12
H	mm in	172 6.79	210 8.28	241 9.50	275 10.84
ØW	mm in	*350 13.78	*350 13.78	*400 15.75	*450 17.72
Weight (RF - RTJ)	kg Lb	20 44	32 70	43 95	65 143

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 150 (GEAR OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	RPTFE (2 to 12"); Nylon (14 to 24"); Molon (26 to 48")
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	ASTM A276 T410
7	Lower Bearing	C.S.+ PTFE LINING	27	Packing gland bushing*	AISI 410
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring *	Viton	29	Hex. Bolt	ASTM A193 B7M
10	Seat O'ring *	Viton	30	Handwheel	ASTM A53
11	Back up O'ring	Viton	31	Vent valve	AISI 4140
12	Upper fire safe gasket*	Graphite	32	Drain plug	AISI 4140
13	Lower fire safe gasket	Graphite	33	Stem grease fitting *	AISI 4140
14	On seat fire safe gasket	Graphite	34	Ends grease fitting	AISI 4140
15	Fire safe gasket*	Graphite	35	Lifting lug	A36
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Support leg	A36
17	Flanged ends	A105N	37	Key	Carbon Steel
18	Seat spring	INCONEL X-750	38	Spring lock washer	Carbon Steel
19	Back up seat ring	ASTM A105+75µm ENP / AISI 410	39	Gear box	Commercial steel
20	Seat ring	ASTM A105+75µm ENP / AISI 411			

\* Not shown

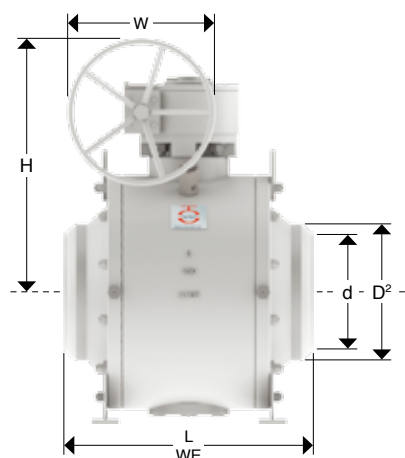
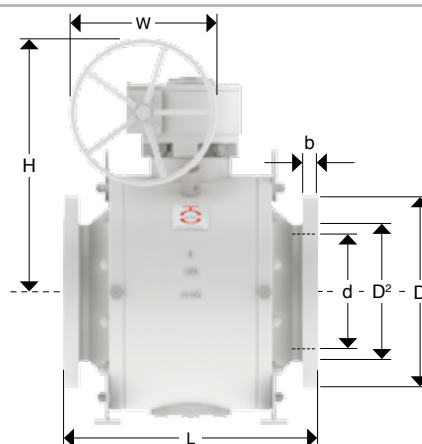
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 150 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 150 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8122	Raised Face (RF)
8123	Ring Type Joint (RTJ)
8124	Buttweld (WE)



## Dimensions and Weights

D Nominal Diameter	mm in	150 6"	200 8"	250 10"	300 12"	350 14"	400 16"	450 18"	500 20"	610 24"	660 26"	711 28"	762 30"	813 32"	864 34"	914 36"
d	mm in	150 5.91	201 7.91	252 9.92	303 11.93	334 13.15	385 15.16	436 17.17	487 19.17	589 23.19	633 24.92	684 26.92	735 28.93	779 30.66	830 32.67	874 34.40
D	mm in	280 10.98	345 13.50	405 15.98	485 19.02	535 20.98	595 23.50	635 25	700 27.52	815 32.01	870 34.25	925 32.01	985 36.41	1060 41.73	1110 43.70	1170 46.06
D2	mm in	216 8.50	270 10.63	324 12.76	381 15	413 16.26	470 18.50	533 20.98	584 23	692 27.24	749 29.48	800 31.49	857 33.74	914 35.98	965 37.99	1022 40.23
b	mm in	26 1.02	29 1.14	31 1.22	32 1.26	33.4 1.34	35 1.37	38 1.4	41 1.61	46 1.81	67 2.63	70 2.75	73 2.87	80 3.14	81 3.18	89 3.50
L	mm in	394 15.51	457 18	568 20.98	648 24.02	686 27	762 30	864 34.02	914 35.98	1067 42.01	1143 45	1245 49	1295 50.98	1372 54	1473 57.99	1524 60
L (WE)	mm in	457 17.99	521 20.51	559 22	635 25	762 30	838 32.99	914 35.98	991 39	1143 45	1245 49	1346 53	1397 55	1524 60	1626 64	1727 68
H	mm in	590 23.23	657 25.9	824 32.44	856 33.7	875 34.45	937 36.89	1010 39.77	1090 42.92	1180 46.46	1180 46.46	1180 46.46	1180 46.46	1180 46.46	1180 46.46	1180 46.46
ØW	mm in	600 23.62	600 23.62	800 31.50	800 31.50	800 31.50	800 31.50	800 31.50	800 31.50	800 31.50	800 31.50	APM	APM	APM	APM	APM
Weight (RF - RTJ)	kg Lb	175 386	280 617	460 1014	660 1455	960 2116	1320 2910	1710 3770	2150 4740	3280 7231	3930 8664	4500 9921	5370 11839	5940 13095	6615 14583	7540 16622

APM = As per manufacturer

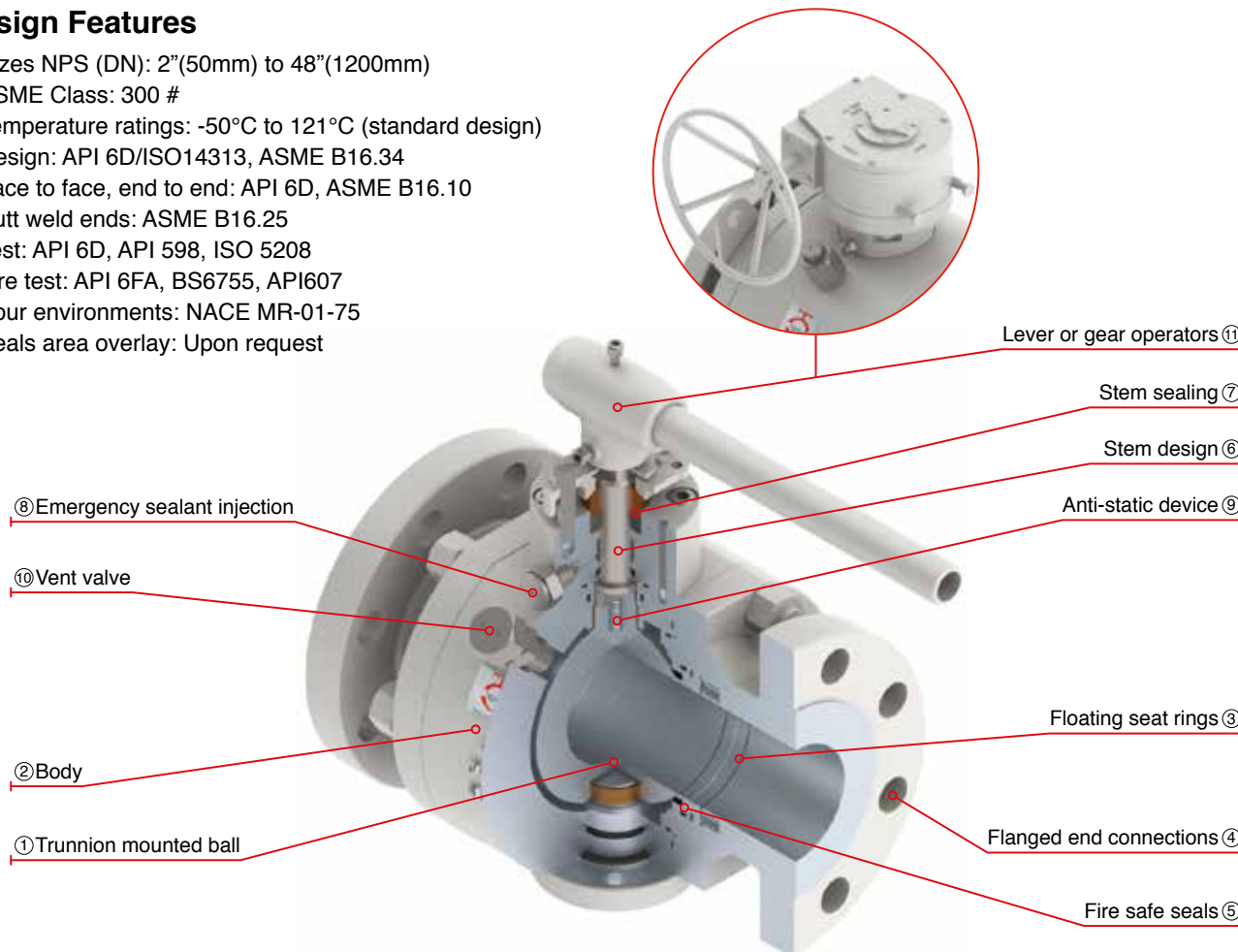


# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 300

Trunnion Mounted Ball Valves are designed and manufactured in conformance with API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

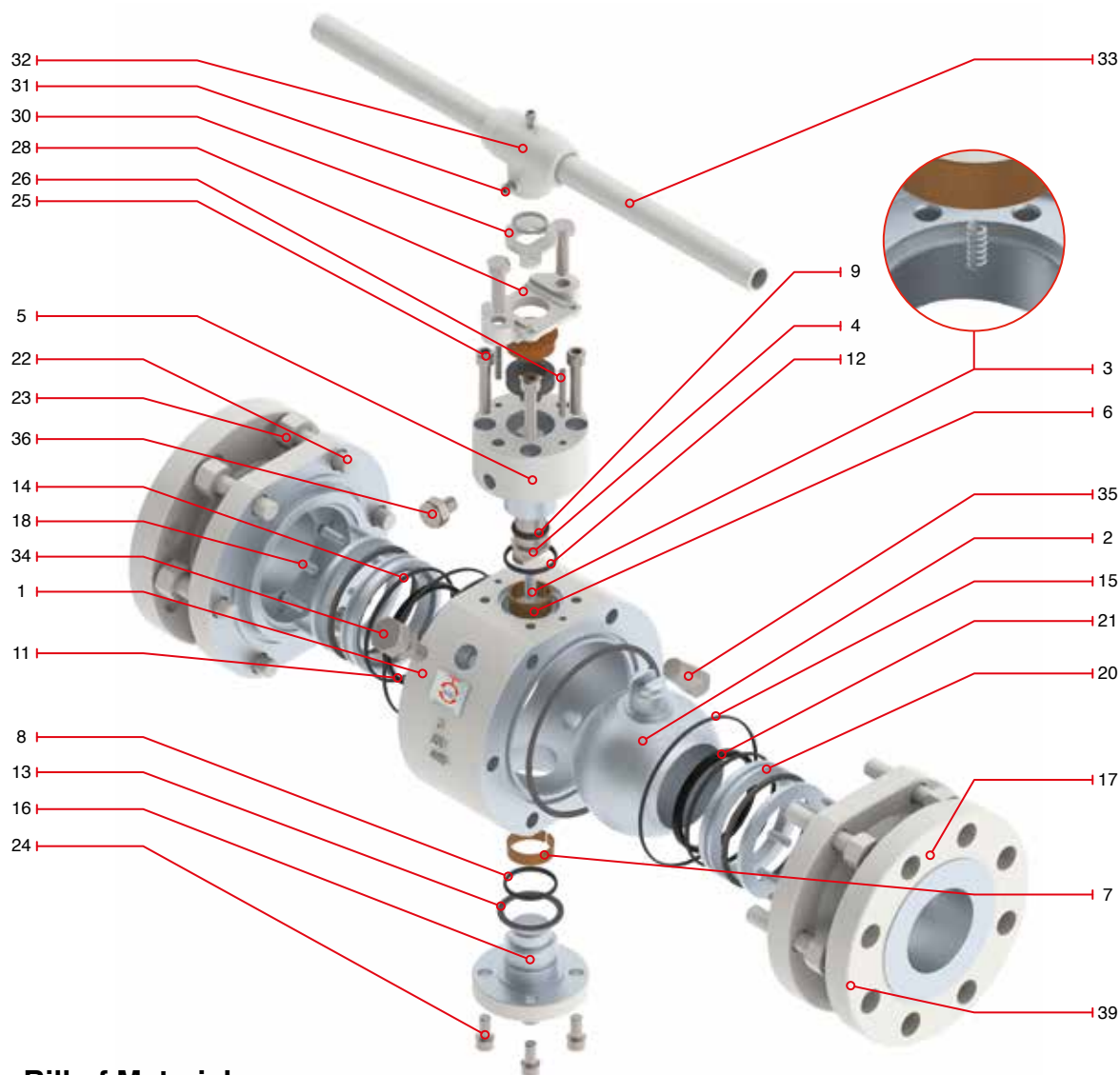
## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"(1200mm)
- ASME Class: 300 #
- Temperature ratings: -50°C to 121°C (standard design)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: Upon request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) coating control the hardness amongst stem, metallic components & double O-rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (6" & larger): Valves are supplied with emergency sealant Injectors located between the double O-ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity. Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 300 (LEVER OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	RPTFE (2 to 12"); Nylon (14 to 24"); Molon (26 to 48")
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	Carbon Steel
7	Lower bearing	C.S.+ PTFE LINING	27	Locking device*	A36
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt*	ASTM A193 B7M
10	On seat O'ring*	Viton	30	Stop plate	A36
11	Back up O'ring	Viton	31	Retainer	AISI 1070
12	Upper fire safe gasket	Graphite	32	Handle nut	ASTM A216 WCB
13	Lower fire safe gasket	Graphite	33	Handle	ASTM A53
14	On seat fire safe gasket	Graphite	34	Vent valve	Carbon Steel
15	Ends flange fire safe gasket	Graphite	35	Drain plug	Carbon Steel
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Stem grease fitting	AISI 4140
17	Flanged ends	A105N	37	Flanged end grease fitting*	AISI 4140
18	Seat spring	INCONEL X-750	38	Lifting lug*	A36
19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	39	Support leg*	A36
20	Seat ring	ASTM A105+75µm ENP / AISI 410			

\*Not shown

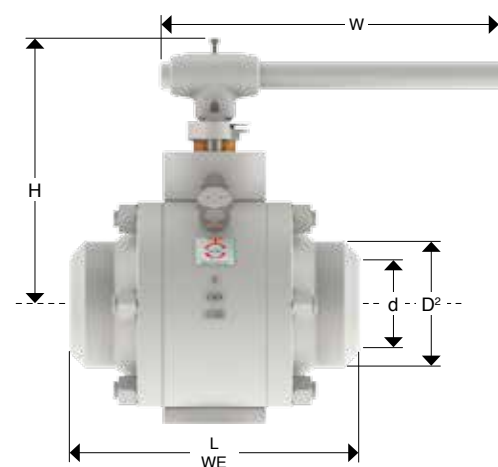
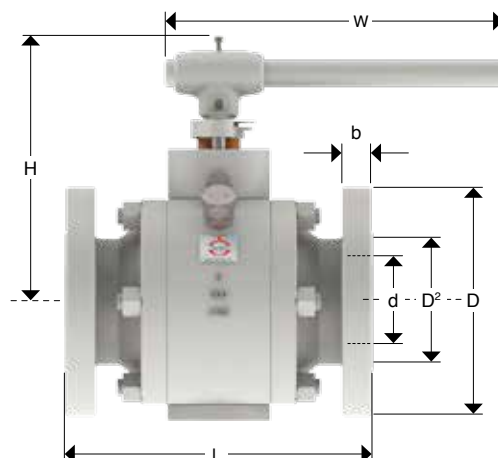
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 300 (LEVER OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 150 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8312	Raised Face (RF)
8313	Ring Type Joint (RTJ)
8314	Buttweld (WE)



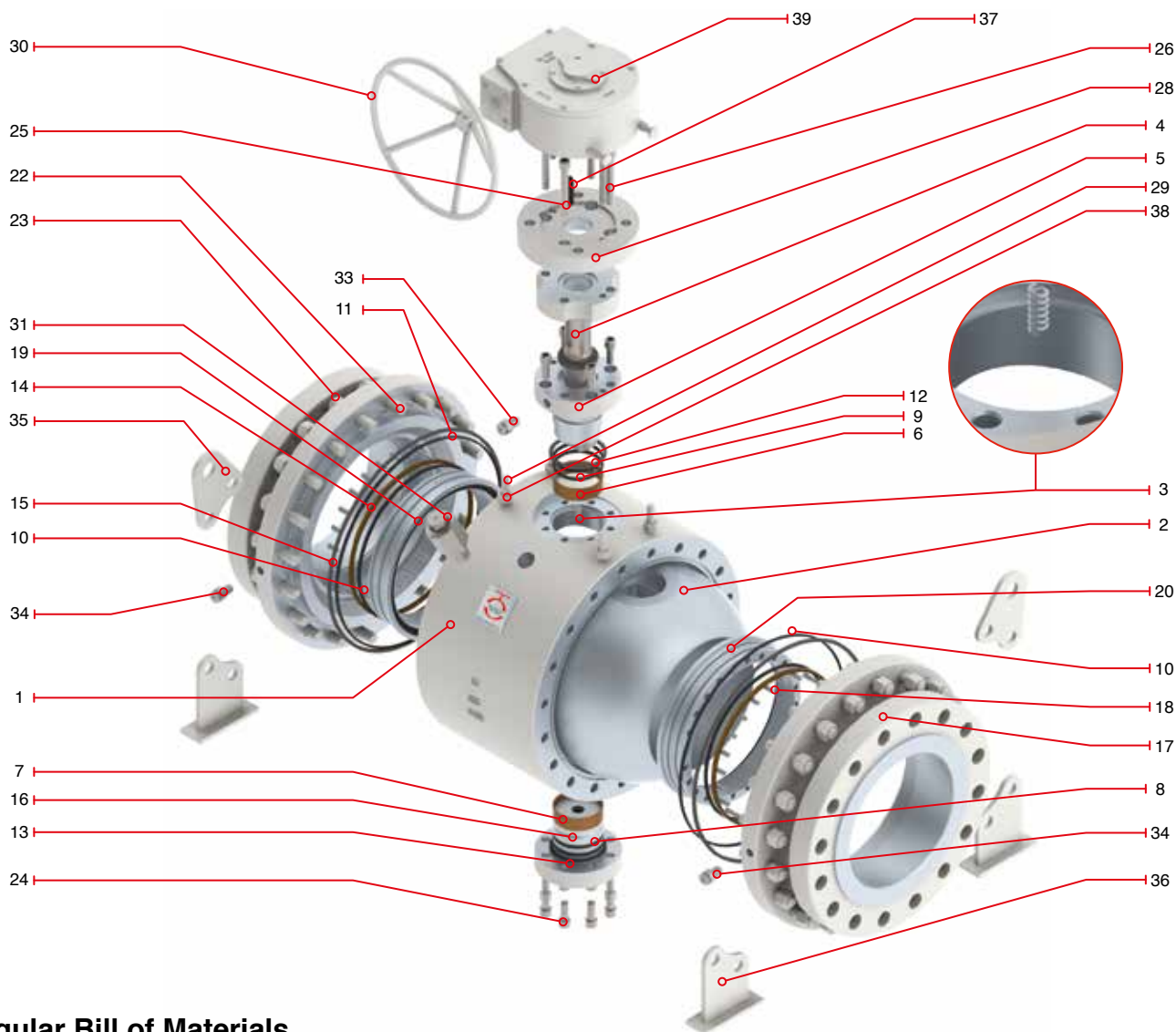
## Dimensions and Weights

Nominal Diameter	mm	50	65	80	100
	in	2"	2 1/2"	3"	4"
d	mm	49	62	74	100
	in	1.93	2.44	2.91	3.94
D	mm	165	190	210	254
	in	6.50	7.48	8.27	9.02
D2	mm	92	105	127	157
	in	3.62	4.13	5	6.18
b	mm	23	26	29	32
	in	0.63	1.02	1.14	0.94
L	mm	216	241	283	305
	in	8.50	9.49	11.14	9.02
L (WE)	mm	216	241	283	305
	in	8.5	9.48	11.14	12
H	mm	172	210	241	275
	in	6.79	8.28	9.50	10.84
ØW	mm	350	450	500	600
	in	13.78	17.72	19.69	23.62
Weight (RF - RTJ)	kg	23	34	45	76
	Lb	50.6	74.8	99	167.2

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

## TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 300 (GEAR OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert*	RPTFE (2 to 12"); Nylon (14 to 24"); Molon (26 to 48")
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	ASTM A276 T410
7	Lower Bearing	C.S.+ PTFE LINING	27	Packing gland bushing*	AISI 410
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt	ASTM A193 B7M
10	Seat O'ring	Viton	30	Handwheel	ASTM A53
11	Back up O'ring	Viton	31	Vent valve	AISI 4140
12	Upper fire safe gasket	Graphite	32	Drain plug*	AISI 4140
13	Lower fire safe gasket	Graphite	33	Stem grease fitting	AISI 4140
14	On seat fire safe gasket	Graphite	34	Ends grease fitting	AISI 4140
15	Fire safe gasket	Graphite	35	Lifting lug	A36
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Support leg	A36
17	Flanged ends	A105N	37	Key	Carbon Steel
18	Seat spring	INCONEL X-750	38	Spring lock washer	Carbon Steel
19	Back up seat ring	ASTM A105+75µm ENP / AISI 410	39	Gear box	Commercial steel
20	Seat ring	ASTM A105+75µm ENP / AISI 411			

\*Not shown



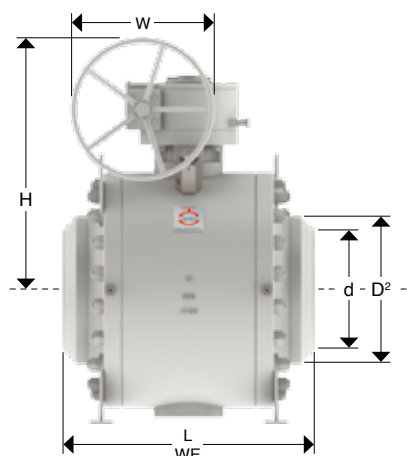
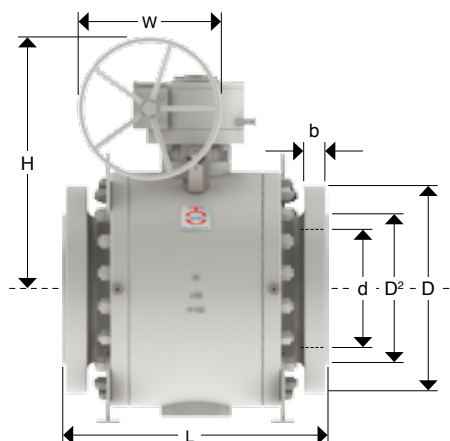
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 300 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 300 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8322	Raised Face (RF)
8323	Ring Type Joint (RTJ)
8324	Buttweld (WE)



## Dimensions and Weights

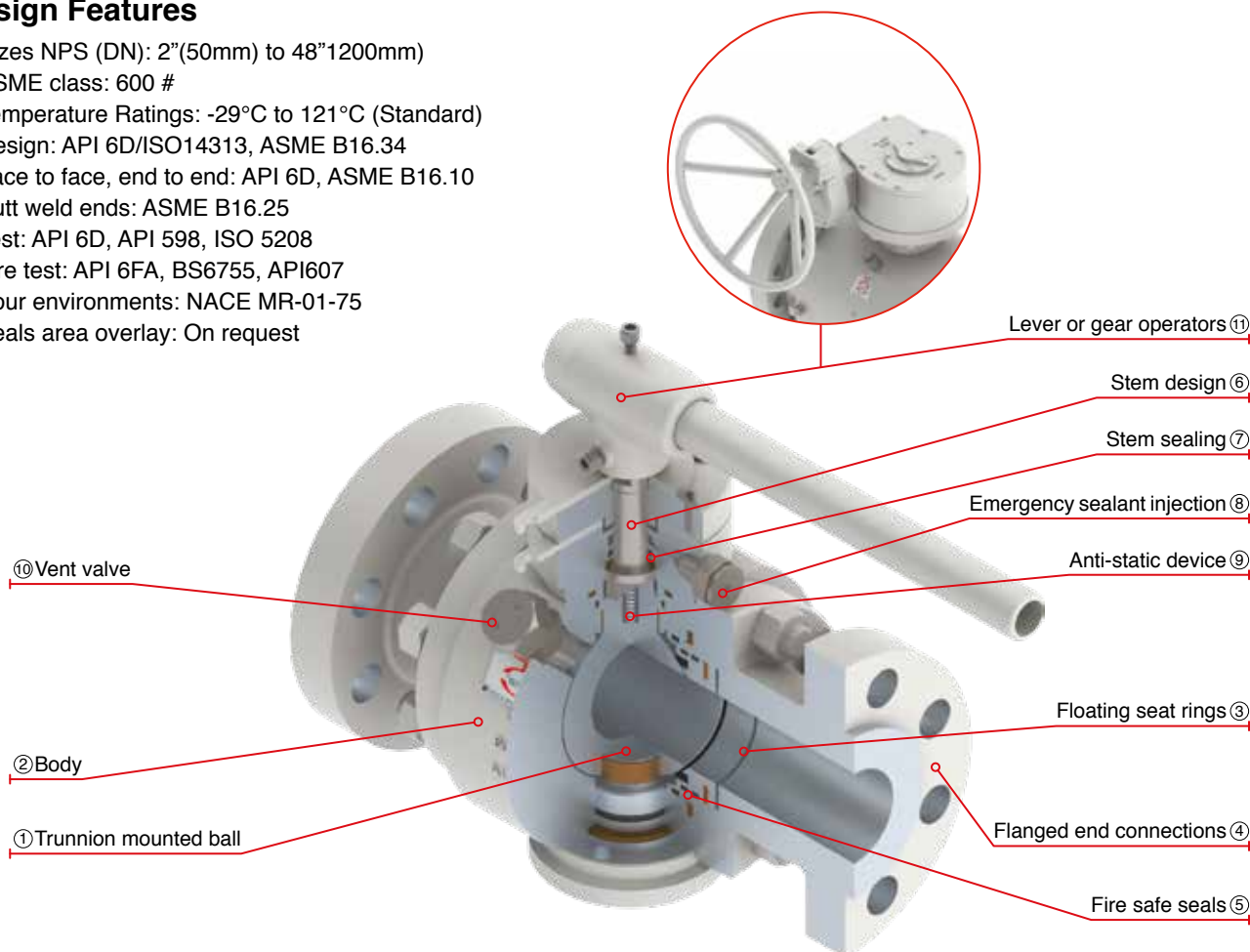
Nominal Diameter	mm	150	200	250	300	350	400	450	500	610	660	711	762	813	864	914
	in	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	28"	30"	32"	34"	36"
d	mm	150	201	252	303	334	385	436	487	589	633	684	735	779	830	874
	in	5.91	7.91	9.92	11.93	13.15	15.16	17.17	19.17	23.19	24.92	26.92	28.93	30.66	32.67	34.40
D	mm	318	381	445	521	585	650	710	775	915	970	1035	1090	1150	1205	1270
	in	12.52	15	17.52	20.51	23	25.59	27.95	30.51	36.02	38.18	40.74	42.91	45.27	47.44	50
D2	mm	216	270	324	381	413	470	533	584	692	749	800	857	914	965	1022
	in	8.50	10.63	12.76	15	16.25	18.50	20.98	23	27.24	29.48	31.49	33.74	35.98	37.99	40.23
b	mm	37	42	48	51	52.4	55.6	58.8	62	68.3	77.8	84.2	90.5	96.9	100.1	103.2
	in	1.46	1.65	1.89	2.01	2.13	2.18	2.31	2.44	2.68	3.06	3.31	3.56	3.81	3.94	4.06
L	mm	403	502	568	648	762	838	914	991	1143	1245	1346	1397	1524	1626	1727
	in	15.86	19.76	22.36	25.51	30	33	35.98	39	45	49	53	55	60	64	68
L (WE)	mm	403	521	559	635	762	838	914	991	1143	1245	1346	1397	1524	1626	1727
	in	15.86	20.51	22	25	30	33	35.98	39	45	49	53	55	60	64	68
H	mm	590	657	824	856	770	937	1010	1090	1180	937	937	937	937	937	937
	in	23.23	25.9	32.44	33.7	30.31	36.89	39.77	42.92	46.46	36.89	36.89	36.89	36.89	36.89	36.89
ØW	mm	600	600	800	800	800	800	800	800	800	800	800	800	800	800	800
	in	23.62	23.62	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50
Weight	kg	185	320	510	730	1130	1490	1910	2340	3420	4340	4960	5950	6760	8280	9640
(RF - RTJ)	Lb	407	704	1122	1606	2486	3278	4202	5148	7524	9548	10912	13112	14872	18216	21208

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 600

Trunnion mounted ball valves are designed and manufactured in conformance with the specification of API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

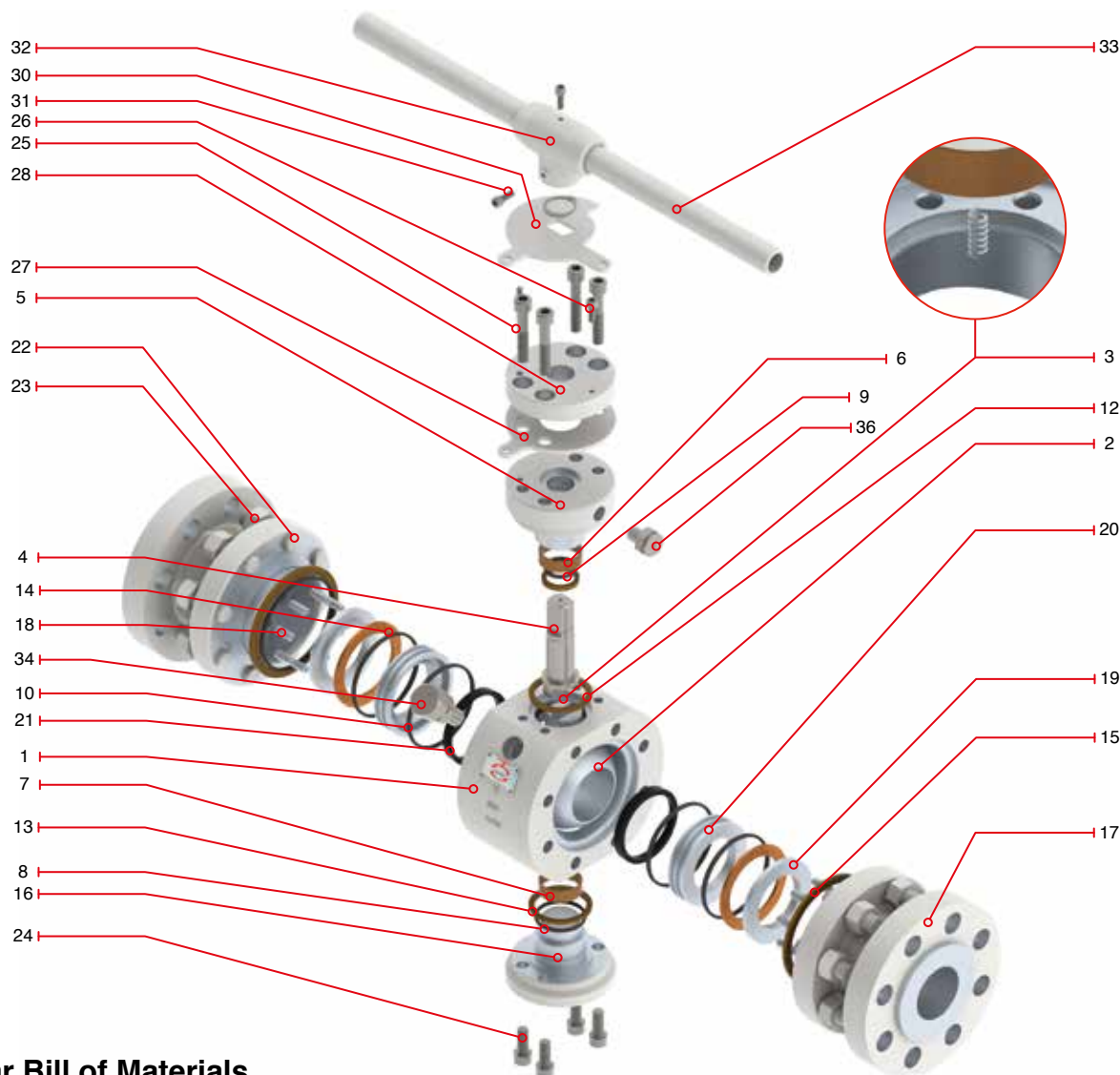
## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"1200mm)
- ASME class: 600 #
- Temperature Ratings: -29°C to 121°C (Standard)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: On request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) double explosive decompression resistant (EDR) O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (4" & larger): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 600 (LEVER OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	Nylon or Molon (2 to 16"); Molon (18 to 48")
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	Carbon Steel
7	Lower bearing	C.S.+ PTFE LINING	27	Locking device	A36
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt*	ASTM A193 B7M
10	On seat O'ring*	Viton	30	Stop plate	A36
11	Back up O'ring*	Viton	31	Retainer	AISI 1070
12	Upper fire safe gasket	Graphite	32	Handle nut	ASTM A216 WCB
13	Lower fire safe gasket	Graphite	33	Handle	ASTM A53
14	On seat fire safe gasket	Graphite	34	Vent valve	Carbon Steel
15	Ends flange fire safe gasket	Graphite	35	Drain plug*	Carbon Steel
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Stem grease fitting*	AISI 4140
17	Flanged ends	A105N	37	Grease fitting*	AISI 4140
18	Seat spring	INCONEL X-750	38	Lifting lug*	A36
19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	39	Support leg*	A36
20	Seat ring	ASTM A105+75µm ENP / AISI 410			

\* Not shown

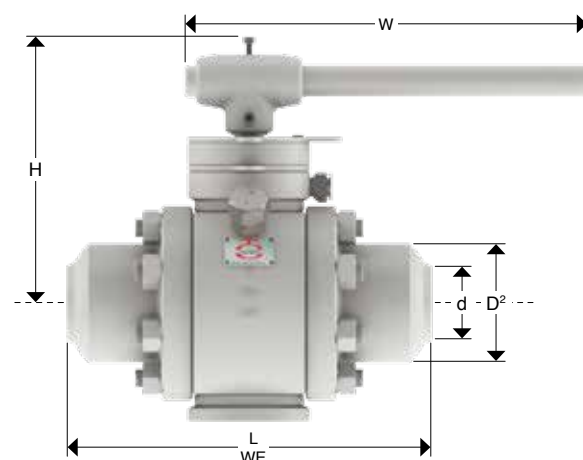
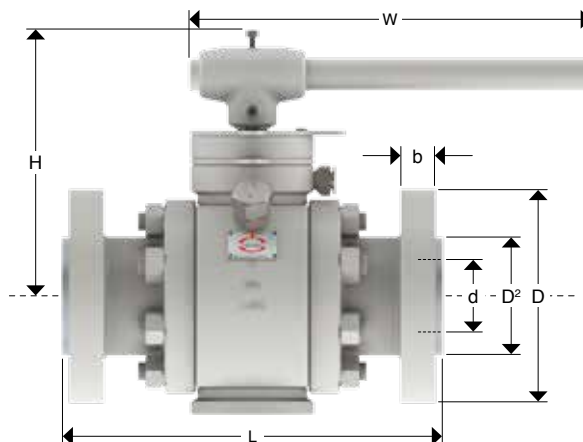
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 600 (LEVER OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 600 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8612	Raised Face (RF)
8613	Ring Type Joint (RTJ)
8614	Buttweld (WE)



## Dimensions and Weights

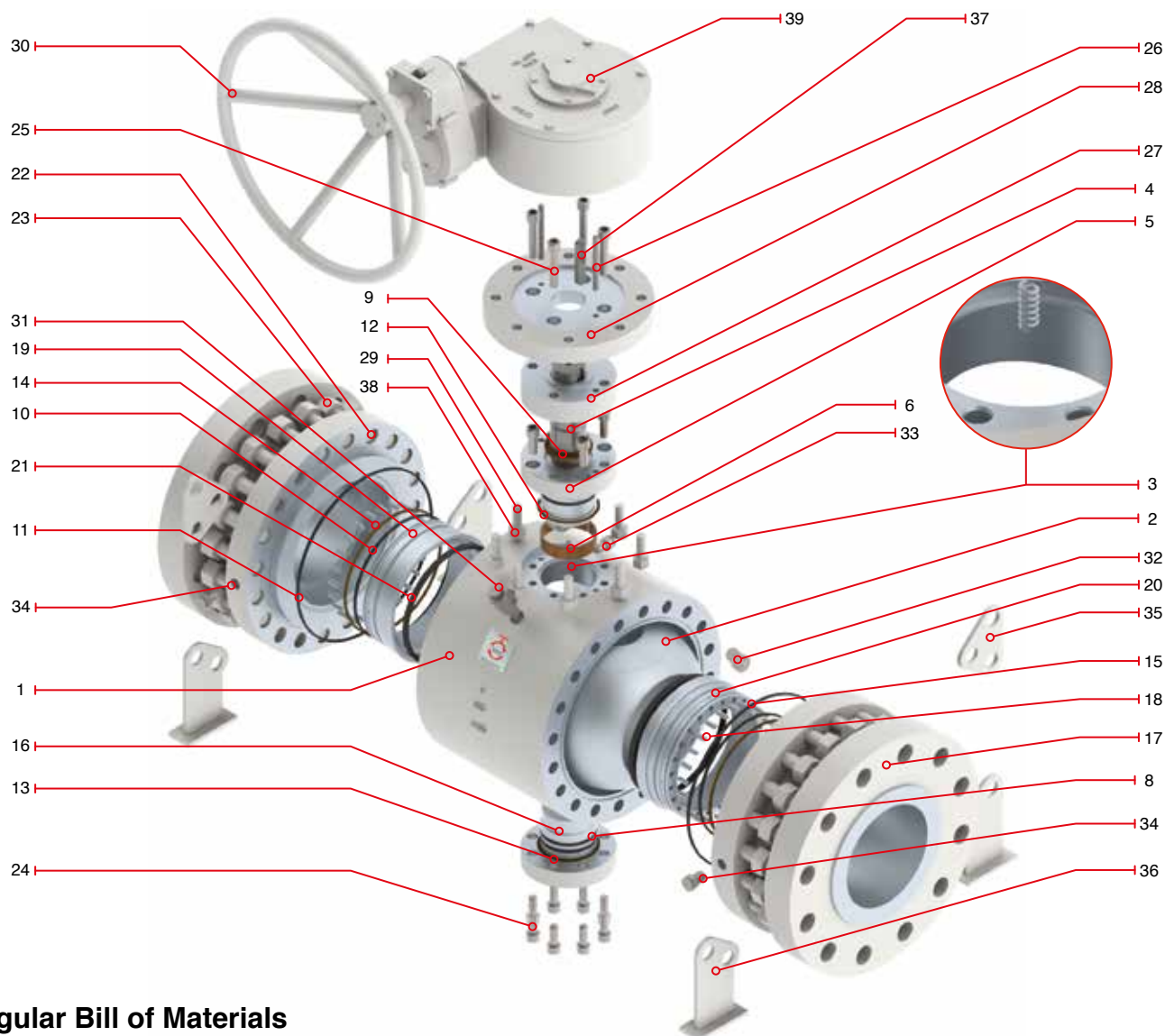
Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"	100 4"
d	mm in	49 1.93	62 2.44	74 2.91	100 3.94
D	mm in	165 6.50	190 7.48	210 8.27	275 10.75
D2	mm in	92 3.62	105 4.13	127 5	157 6.18
b	mm in	26 1.02	29 1.14	32 1.26	38 1.50
L	mm in	292 11.50	330 13	356 14.02	432 17.01
L (WE)	mm in	292 11.50	330 13	356 14.02	432 17.01
H	mm in	203 8.01	220 8.68	220 8.68	255 10.06
ØW	mm in	500 19.69	600 23.62	700 27.56	800 31.50
Weight (RF - RTJ)	kg Lb	34 74,8	51 112,4	67 147,7	150 330,69

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight



# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 600 (GEAR OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	Nylon or Molon (2 to 16"); Molon (18 to 48")
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	ASTM A276 T410
7	Lower Bearing*	C.S.+ PTFE LINING	27	Packing gland bushing	AISI 410
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt	ASTM A193 B7M
10	Seat O'ring	Viton	30	Handwheel	ASTM A53
11	Back up O'ring	Viton	31	Vent valve	AISI 4140
12	Upper fire safe gasket	Graphite	32	Drain plug	AISI 4140
13	Lower fire safe gasket	Graphite	33	Stem grease fitting	AISI 4140
14	On seat fire safe gasket	Graphite	34	Ends grease fitting	AISI 4140
15	Fire safe gasket	Graphite	35	Lifting lug	A36
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Support leg	A36
17	Flanged ends	A105N	37	Key	Carbon Steel
18	Seat spring	INCONEL X-750	38	Spring lock washer	Carbon Steel
19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	39	Gear box	Commercial steel
20	Seat ring	ASTM A105+75µm ENP / AISI 411			

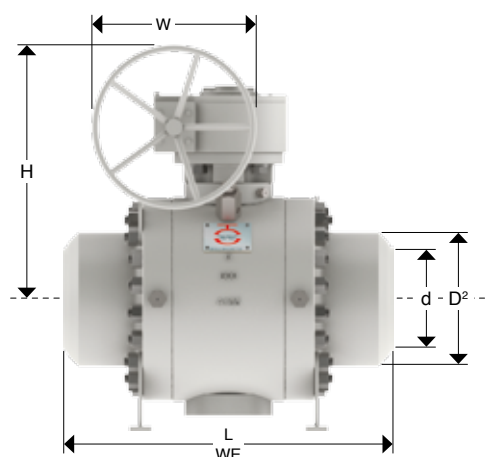
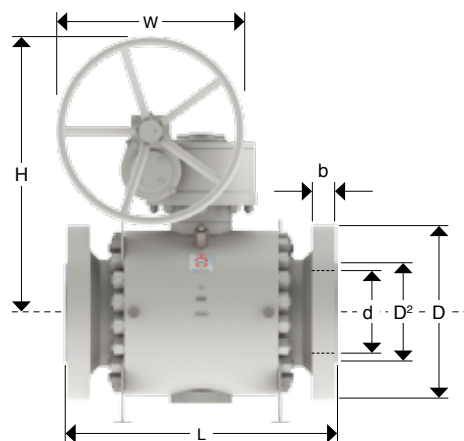
\* Not shown

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 600 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 600 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug

Catalog Figure No.	Type of Ends
8622	Raised Face (RF)
8623	Ring Type Joint (RTJ)
8624	Buttweld (WE)



## Dimensions and Weights

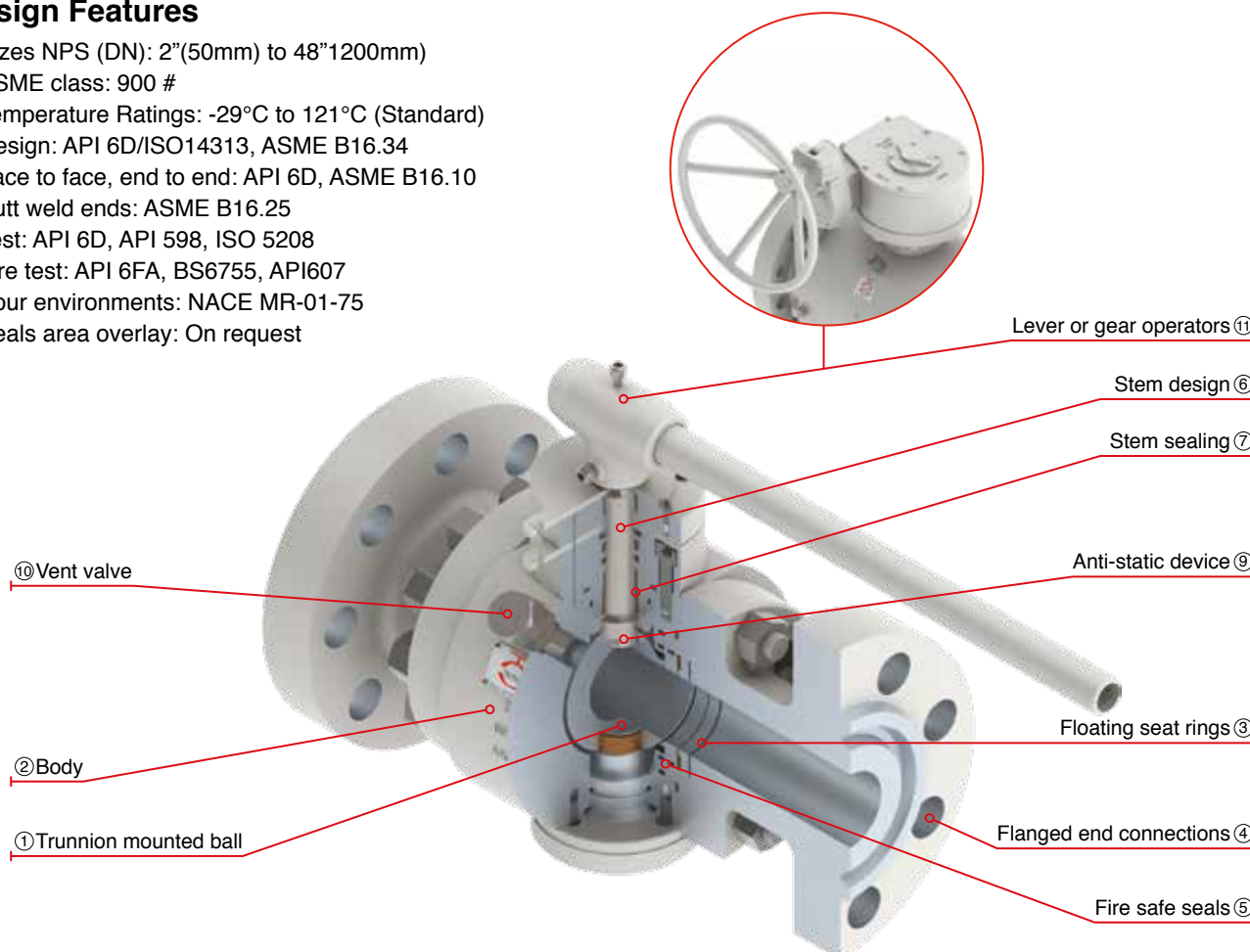
Nominal Diameter	mm	150	200	250	300	350	400	450	500	610	660	711	762	813	864	914
	in	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	28"	30"	32"	34"	36"
d	mm	150	201	252	303	334	385	436	487	589	633	684	735	779	830	874
	in	5.91	7.91	9.92	11.93	13.15	15.16	17.17	19.17	23.19	24.92	26.92	28.93	30.66	32.67	34.40
D	mm	355	420	510	560	605	685	745	815	940	1015	1075	1130	1195	1245	1315
	in	14.02	16.50	20	22.01	23.81	26.96	29.33	32.08	37	40	42.32	44.48	47.04	49.01	51.71
D2	mm	216	270	324	381	413	470	533	584	692	749	800	857	914	965	1022
	in	8.50	10.63	12.76	15	16.26	18.50	20.98	23	27.24	29.48	31.49	33.74	35.98	37.99	40.23
b	mm	48	56	64	67	70	76.2	83	89	102	108	111	114	117	121	124
	in	1.89	2.20	2.52	2.64	2.76	3	3.25	3.5	4.02	4.02	4.37	4.48	4.60	4.76	4.88
L	mm	559	660	787	838	889	991	1092	1194	1397	1448	1549	1651	1778	1930	2083
	in	22.01	25.98	30.98	33	35	39.02	43	47.01	55	57	60.98	65	70	75.98	82
L (WE)	mm	559	660	787	838	889	991	1092	1194	1397	1448	1549	1651	1778	1930	2083
	in	22.01	25.98	30.98	33	35	39.02	43	47.01	55	57	60.98	65	70	75.98	82
H	mm	510	580	750	790	790	833	879	919	1020	1058	1118	1153	1206	1248	1294
	in	20.07	22.83	29.53	31.1	31.1	32.79	34.6	36.18	40.15	41.65	44.01	45.39	47.48	49.13	50.94
ØW	mm	400	400	600	600	800	POA	POA	POA	POA	POA	POA	POA	POA	POA	POA
	in	15.75	15.75	23.62	23.62	31.50	POA	POA	POA	POA	POA	POA	POA	POA	POA	POA
Weight	kg	320	510	810	1060	1350	1940	2510	3250	4940	5830	6700	7450	8470	10360	12080
(RF - RTJ)	Lb	705,47	1124,35	1786	2337	2976	4277	5534	7165	10891	12853	14770	16424	18673	22839	26631

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 900

Trunnion Mounted Ball Valves are designed and manufactured in conformance with API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

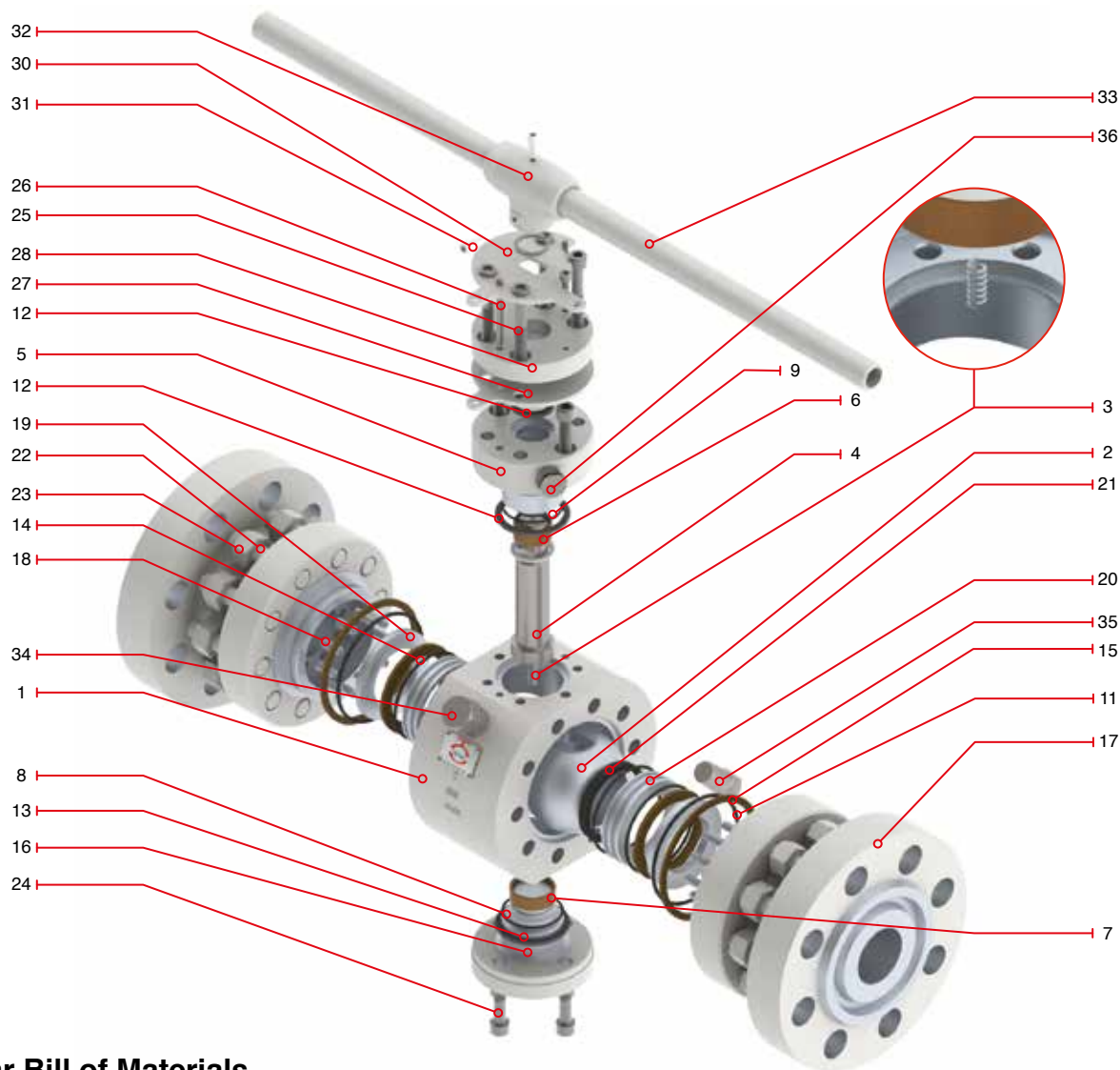
## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"1200mm)
- ASME class: 900 #
- Temperature Ratings: -29°C to 121°C (Standard)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: On request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) double explosive decompression resistant (EDR) O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (4" & larger): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

## TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 900 (LEVER OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	Molon or Devlon
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	Carbon Steel
7	Lower bearing	C.S.+ PTFE LINING	27	Locking device	A36
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt*	ASTM A193 B7M
10	On seat O'ring*	Viton	30	Stop plate	A36
11	Back up O'ring	Viton	31	Retainer	AISI 1070
12	Upper fire safe gasket	Graphite	32	Handle nut	ASTM A216 WCB
13	Lower fire safe gasket	Graphite	33	Handle	ASTM A53
14	On seat fire safe gasket	Graphite	34	Vent valve	Carbon Steel
15	Ends flange fire safe gasket	Graphite	35	Drain plug	Carbon Steel
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Stem grease fitting	AISI 4140
17	Flanged ends	A105N	37	Flanged end grease fitting*	AISI 4140
18	Seat spring	INCONEL X-750	38	Lifting lug*	A36
19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	39	Support leg*	A36
20	Seat ring	ASTM A105+75µm ENP / AISI 410			

\* Not shown



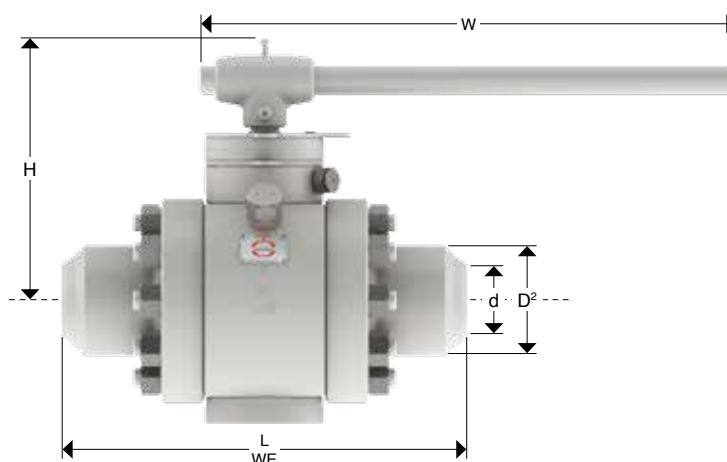
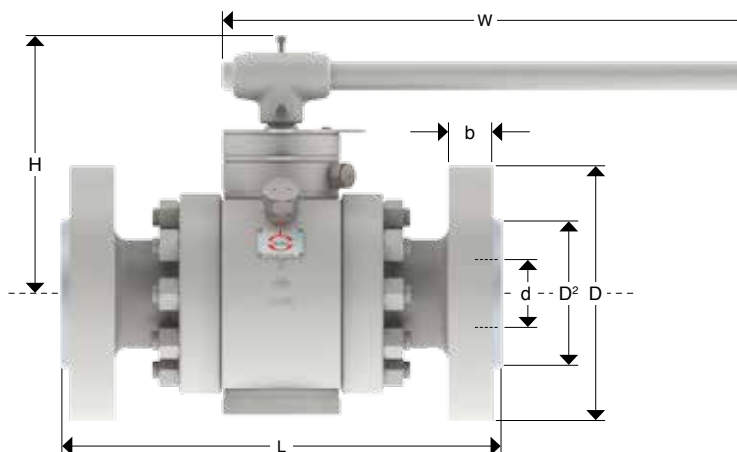
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 900 (LEVER OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 900 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8912	Raised Face (RF)
8913	Ring Type Joint (RTJ)
8914	Buttweld (WE)



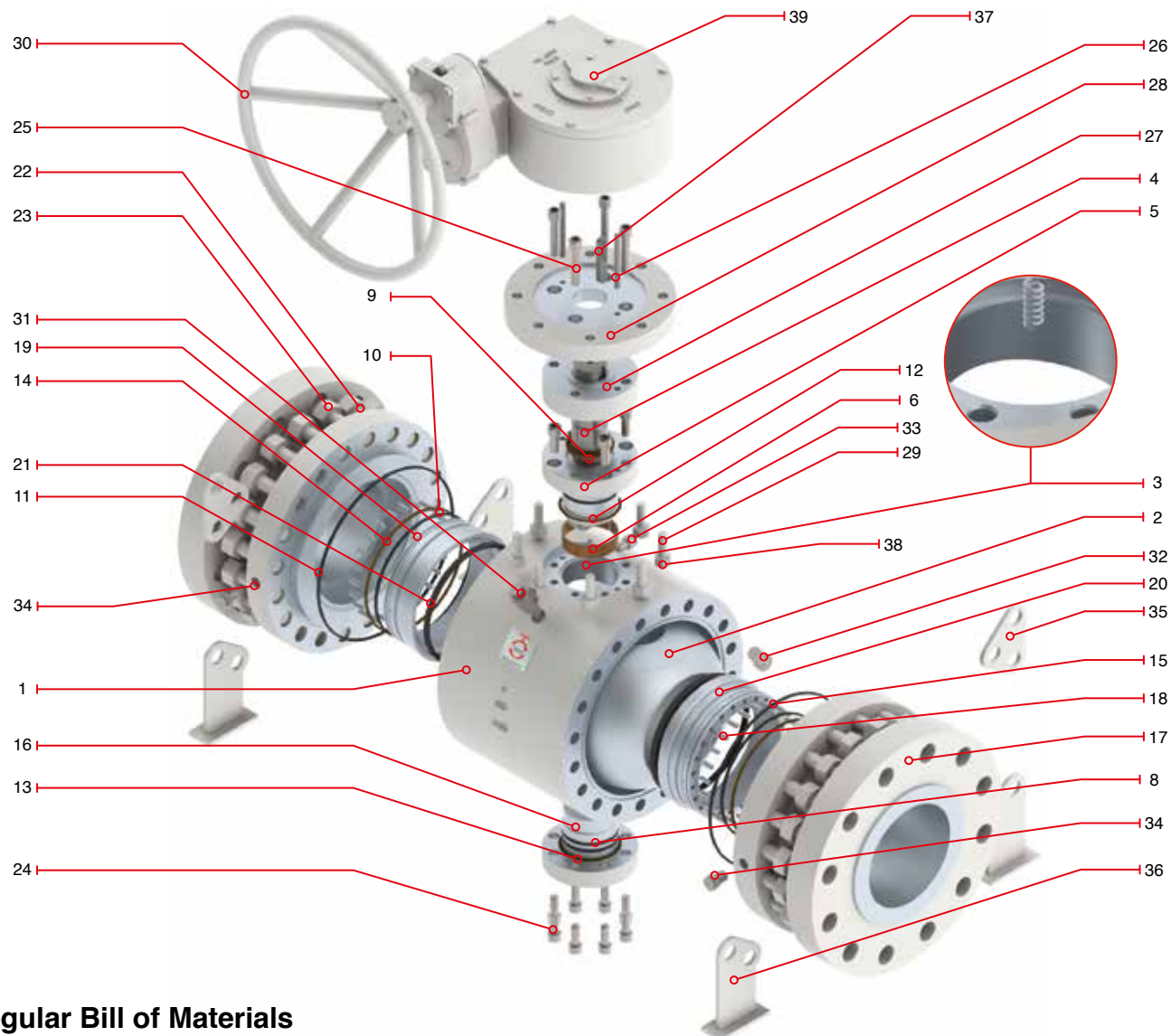
## Dimensions and Weights

Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"	100 4"
d	mm in	49 1.93	62 2.44	74 2.91	100 3.94
D	mm in	216 8.50	244 9.61	241 8.27	292 11.50
D2	mm in	92 3.62	105 4.13	127 5	157 6.18
b	mm in	38.5 1.52	41.5 1.63	38.5 1.26	44.5 1.75
L	mm in	368 14.50	419 16.50	381 14.02	457 18
L (WE)	mm in	368 14.50	419 16.50	381 14.02	457 18
H	mm in	213 8.37	220 8.68	220 8.68	275 10.84
ØW	mm in	700 27.56	800 23.62	800 27.56	POA
Weight (RF - RTJ)	kg Lb	57 126	75 165	83 183	146 322

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

## TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 900 (GEAR OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	Molon or Devlon
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	ASTM A276 T410
7	Lower Bearing*	C.S.+ PTFE LINING	27	Packing gland bushing*	AISI 410
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt	ASTM A193 B7M
10	Seat O'ring	Viton	30	Handwheel	ASTM A53
11	Back up O'ring	Viton	31	Vent valve	AISI 4140
12	Upper fire safe gasket	Graphite	32	Drain plug	AISI 4140
13	Lower fire safe gasket	Graphite	33	Stem grease fitting*	AISI 4140
14	On seat fire safe gasket	Graphite	34	Ends grease fitting	AISI 4140
15	Fire safe gasket	Graphite	35	Lifting lug	A36
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Support leg	A36
17	Flanged ends	A105N	37	Key	Carbon Steel
18	Seat spring	INCONEL X-750	38	Spring lock washer	Carbon Steel
19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	39	Gear box	Commercial steel
20	Seat ring	ASTM A105+75µm ENP / AISI 411			

\* Not shown

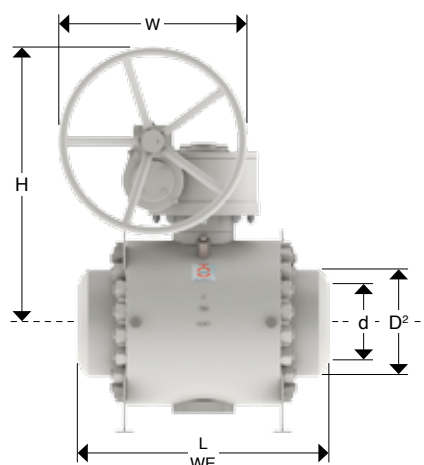
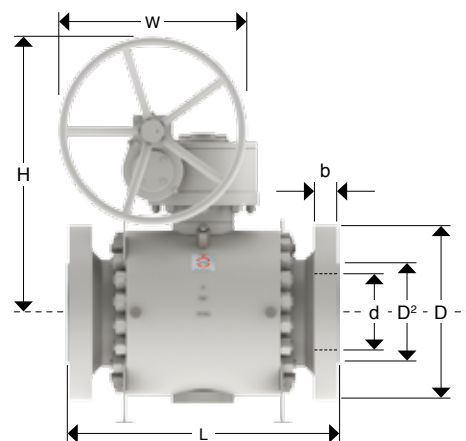
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 900 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 900 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8922	Raised Face (RF)
8923	Ring Type Joint (RTJ)
8924	Buttweld (WE)



## Dimensions and Weights

Nominal Diameter	mm	150	200	250	300	350	400	450	500	610	660	711	762	813	864	914
	in	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	28"	30"	32"	34"	36"
d	mm	150	201	252	303	322	373	423	471	570	617	665	712	760	808	855
	in	5.91	7.91	9.92	11.93	13.15	14.69	16.65	18.54	22.44	24.29	26.18	28.03	30	32	34
D	mm	381	470	546	610	640	705	785	855	1040	1085	1170	1230	1315	1395	1460
	in	15	18.50	21.50	24.02	25.19	27.76	31	33.66	40.94	42.71	46.06	48.42	51.77	54.92	57.48
D2	mm	216	270	324	419	467	524	594	648	772	832	889	946	1003	1067	1124
	in	8.50	10.63	12.76	15	18.38	20.67	23.38	25.51	30.39	32.75	35	37.24	39.48	42	44.25
b	mm	56	63.5	70	79.5	86	89	102	108	140	140	143	149	159	165	172
	in	2.20	2.50	2.76	3.13	3.39	3.50	3.27	4.25	5.51	5.51	5.62	5.86	6.25	6.5	6.7
L	mm	610	737	838	968	1029	1130	1219	1321	1549	1651	1880	1880	APM	APM	2286
	in	24.02	29.02	33	38	40.51	44.49	43	52.01	60.98	65	74	74	APM	APM	90
L (WE)	mm	610	737	838	968	1029	1130	1219	1321	1549	APM	APM	APM	APM	APM	APM
	in	24.02	29.02	33	38	40.51	44.49	43	52.01	60.98	APM	APM	APM	APM	APM	APMS
H	mm	690	758	824	856	875	937	1020	1080	1295	APM	APM	APM	APM	APM	APMS
	in	27.17	29.84	32.44	33.7	34.45	36.89	40.16	42.52	51	APM	APM	APM	APM	APM	APMS
ØW	mm	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800
	in	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50
Weight	kg	335	620	960	1280	1720	2250	3070	4050	6100	7070	8070	9680	11000	13470	15700
(RF - RTJ)	Lb	739	1367	2117	2822	3792	4961	6768	8929	13448	15587	17791	21341	24251	29696	34613

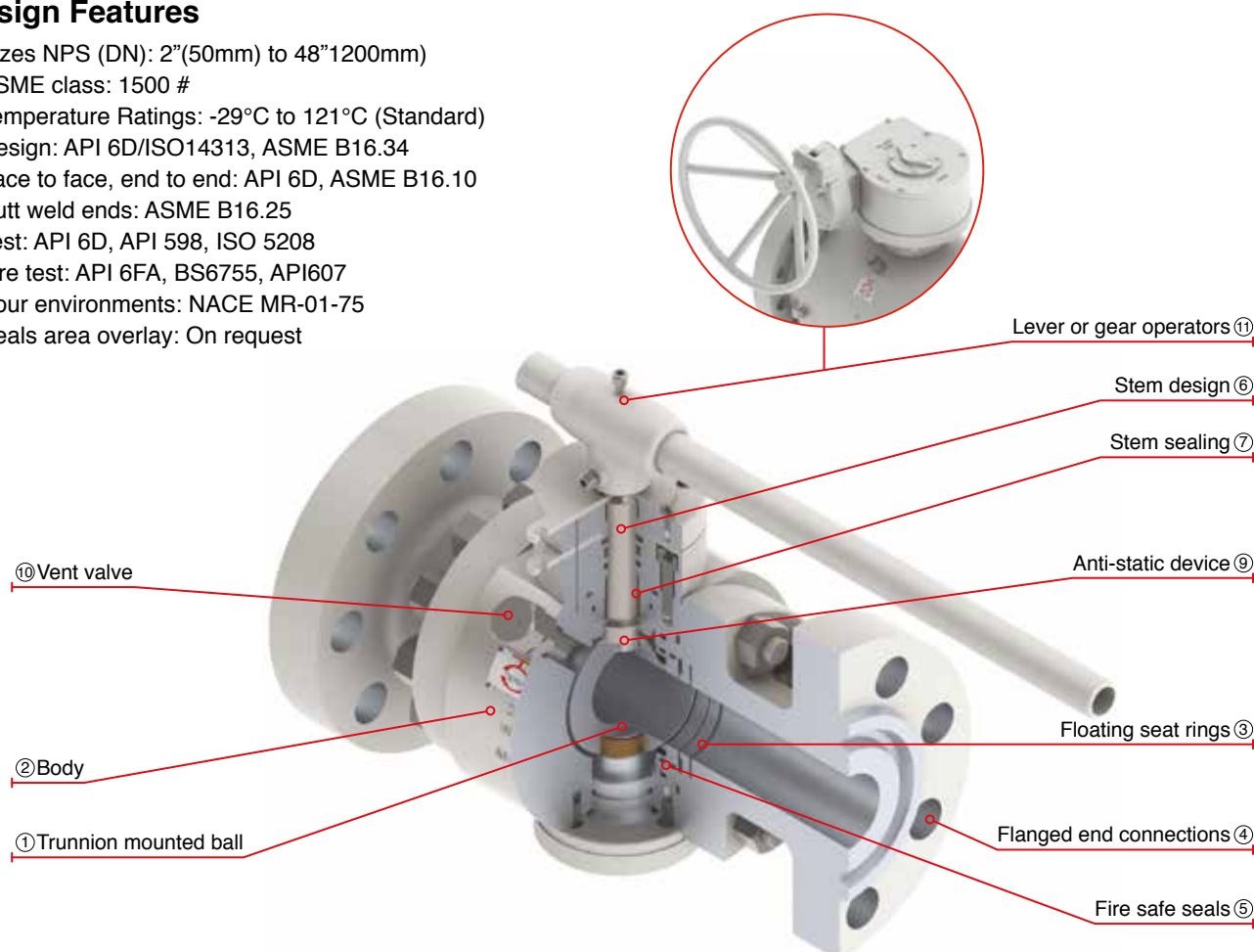
APM = As per manufacturer

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 1500

Trunnion Mounted Ball Valves are designed and manufactured in conformance with API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

## Design Features

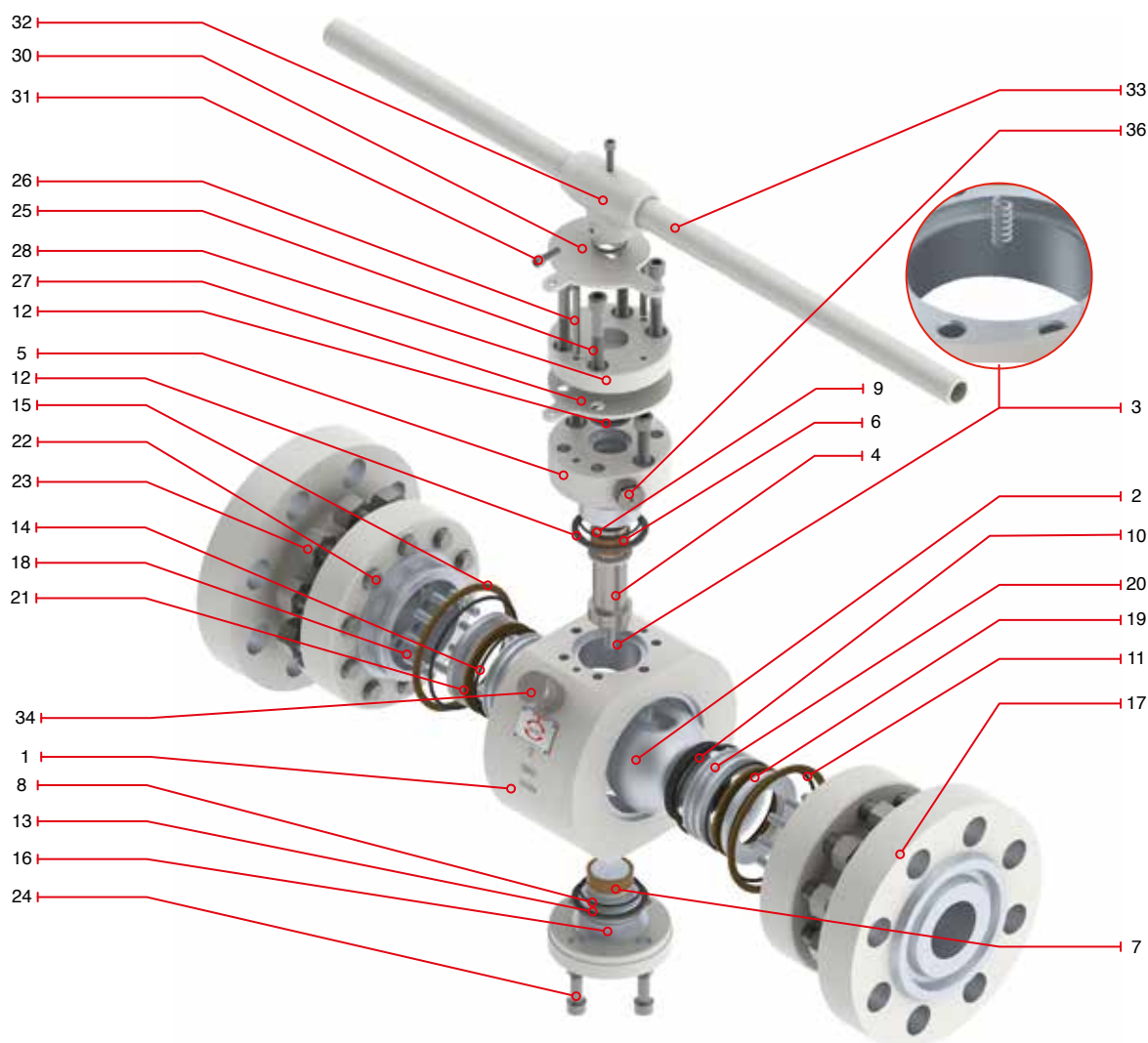
- Sizes NPS (DN): 2"(50mm) to 48"1200mm)
- ASME class: 1500 #
- Temperature Ratings: -29°C to 121°C (Standard)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: On request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) double explosive decompression resistant (EDR) O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (4" & larges): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.



# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 1500 (LEVER OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	Molon or Devlon (2 to 24"); Molon or Peek (26 to 48")
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	Carbon Steel
7	Lower bearing	C.S.+ PTFE LINING	27	Locking device	A36
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt*	ASTM A193 B7M
10	On seat O'ring*	Viton	30	Stop plate	A36
11	Back up O'ring	Viton	31	Retainer	AISI 1070
12	Upper fire safe gasket	Graphite	32	Handle nut	ASTM A216 WCB
13	Lower fire safe gasket	Graphite	33	Handle	ASTM A53
14	On seat fire safe gasket	Graphite	34	Vent valve	Carbon Steel
15	Ends flange fire safe gasket	Graphite	35	Drain plug	Carbon Steel
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Stem grease fitting	AISI 4140
17	Flanged ends	A105N	37	Flanged end grease fitting*	AISI 4140
18	Seat spring	INCONEL X-750	38	Lifting lug*	A36
19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	39	Support leg*	A36
20	Seat ring	ASTM A105+75µm ENP / AISI 410			

\* Not shown

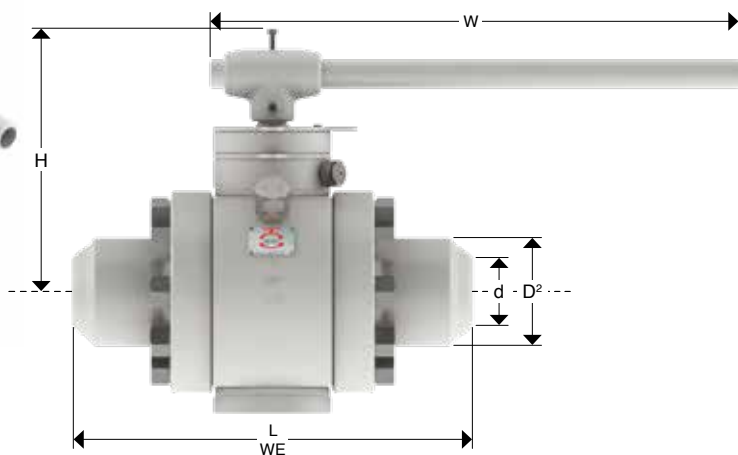
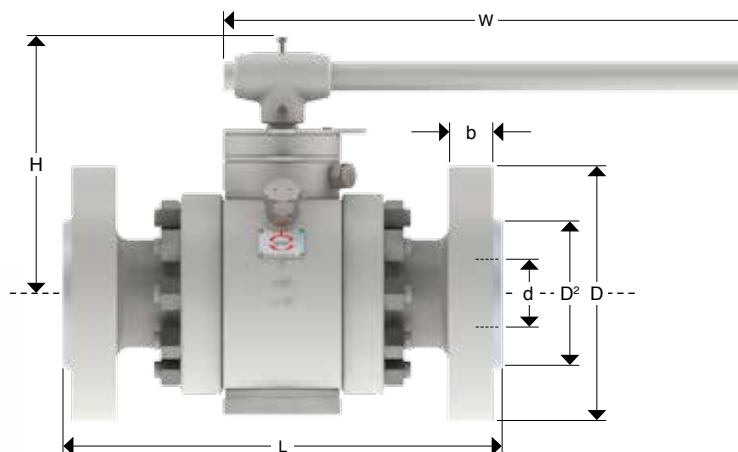
## TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 1500 (LEVER OPERATED)

### Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 1500 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8512	Raised Face (RF)
8513	Ring Type Joint (RTJ)
8514	Buttweld (WE)



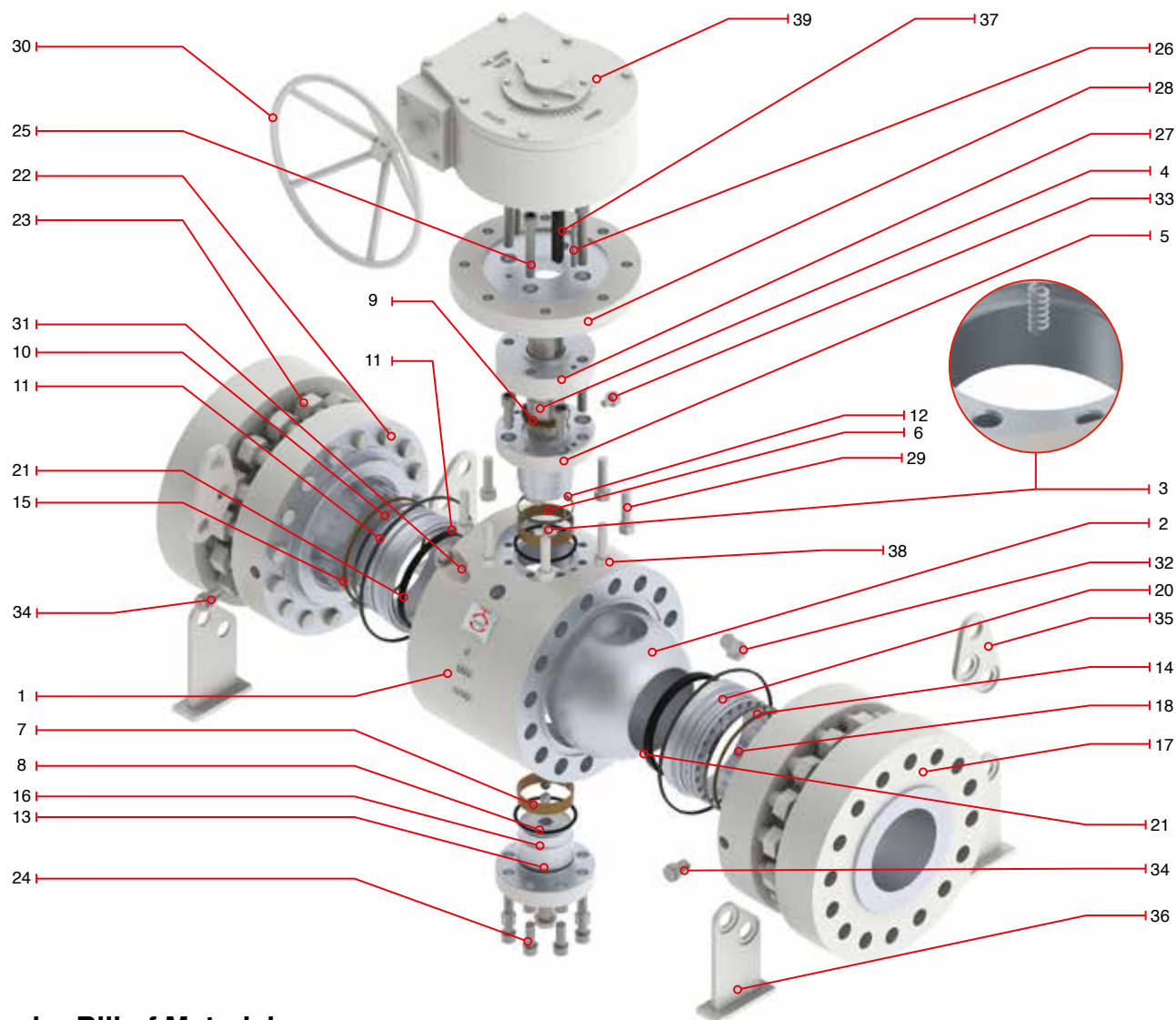
### Dimensions and Weights

Nominal Diameter	mm	50	65	80
	in	2"	2 1/2"	3"
d	mm	49	62	74
	in	1.93	2.44	2.91
D	mm	216	244	267
	in	8.50	9.61	10.51
D2	mm	92	105	127
	in	3.62	4.13	5
b	mm	38.5	41.5	48
	in	1.52	1.63	1.89
L	mm	368	419	470
	in	14.50	16.50	18.50
L (WE)	mm	368	419	381
	in	14.50	16.50	14.02
H	mm	212	220	233
	in	8.37	8.68	9.19
ØW	mm	700	800	900
	in	27.56	23.62	35.43
Weight (RF - RTJ)	kg	65	93	115
	Lb	143	205	254

### Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 1500 (GEAR OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	Molon or Devlon (2 to 24"); Molon or Peek (26 to 48")
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	ASTM A276 T410
7	Lower Bearing	C.S.+ PTFE LINING	27	Packing gland bushing*	AISI 410
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt	ASTM A193 B7M
10	Seat O'ring	Viton	30	Handwheel	ASTM A53
11	Back up O'ring	Viton	31	Vent valve	AISI 4140
12	Upper fire safe gasket	Graphite	32	Drain plug	AISI 4140
13	Lower fire safe gasket	Graphite	33	Stem grease fitting*	AISI 4140
14	On seat fire safe gasket	Graphite	34	Ends grease fitting	AISI 4140
15	Fire safe gasket	Graphite	35	Lifting lug	A36
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Support leg	A36
17	Flanged ends	A105N	37	Key	Carbon Steel
18	Seat spring	INCONEL X-750	38	Spring lock washer	Carbon Steel
19	Back up seat ring	ASTM A105+75µm ENP / AISI 410	39	Gear box	Commercial steel
20	Seat ring	ASTM A105+75µm ENP / AISI 411			

\* Not shown

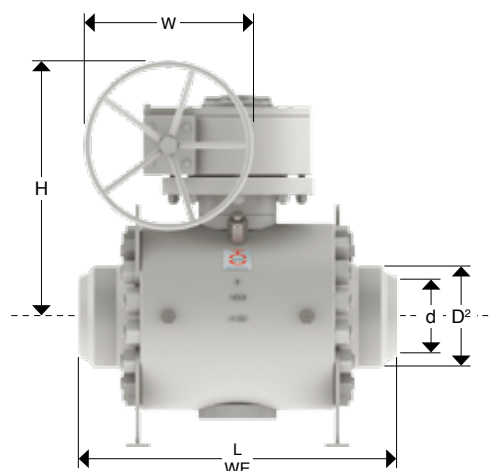
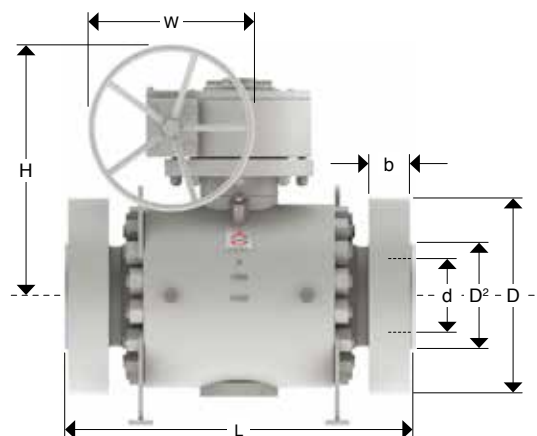
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 1500 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 1500 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8522	Raised Face (RF)
8523	Ring Type Joint (RTJ)
8524	Buttweld (WE)



## Dimensions and Weights

Nominal Diameter	mm	100	150	200	250	300	350	400	450	500	600
	in	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
d	mm	100	144	192	239	287	315	360	406	454	546
	in	3.94	5.67	7.56	9.41	11.30	12.40	14.17	15.98	17.87	21.50
D	mm	311	394	483	585	674	750	825	914	985	1168
	in	12.24	15.51	19.02	23.03	26.54	29.53	32.48	35.98	38.78	45.98
D2	mm	157	216	270	324	381	413	470	533	584	692
	in	6.18	8.50	10.63	12.76	15	16.26	18.50	20.98	23	27.24
b	mm	54	83	92	108	124	134	146.5	162	178	204
	in	2.13	3.27	3.62	4.25	4.88	5.28	5.77	6.38	7.01	8.03
L	mm	546	705	832	991	1130	1257	1384	1537	1664	1943
	in	21.50	27.76	32.76	39.02	44.49	49.49	54.49	60.51	65.51	76.50
L (WE)	mm	457	610	737	838	968	1029	1130	1219	1321	1549
	in	18	24.02	29.02	33	38	40.51	44.49	43	52.01	60.98
H	mm	275	690	758	824	856	775	937	1030	1080	1295
	in	10.84	27.17	29.84	32.44	33.7	30.51	36.89	40.55	42.52	51
ØW	mm	600	800	800	800	800	600	800	800	800	800
	in	23.62	31.50	31.50	31.50	31.50	23.62	31.50	31.50	31.50	31.50
Weight	kg	195	495	870	1520	2250	3200	4400	6035	8077	12357
(RF - RTJ)	Lb	429	1091	1918	3351	4960	7055	9700	13304	17806	27242

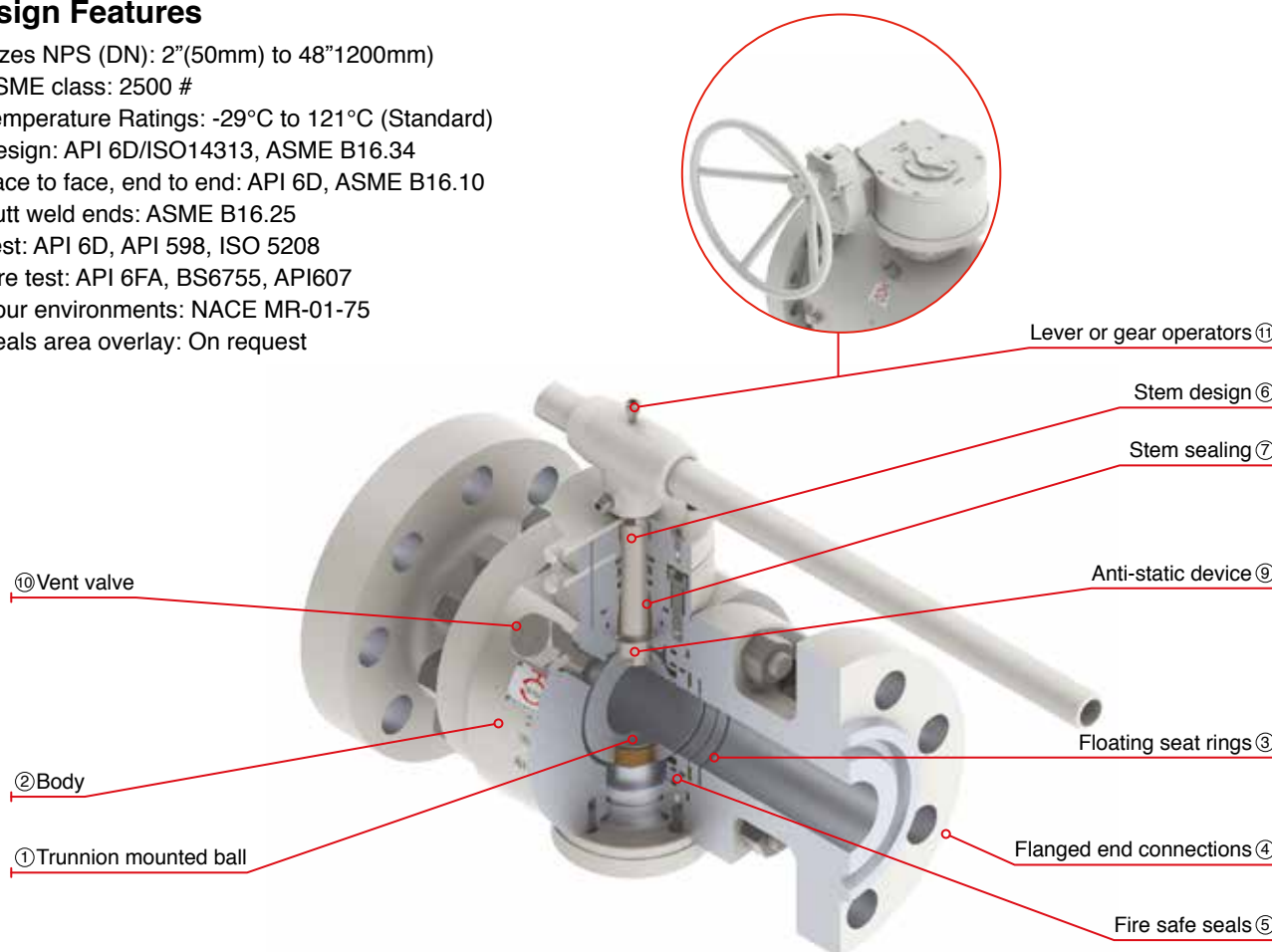


# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 2500

Trunnion Mounted Ball Valves are designed and manufactured in conformance with API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

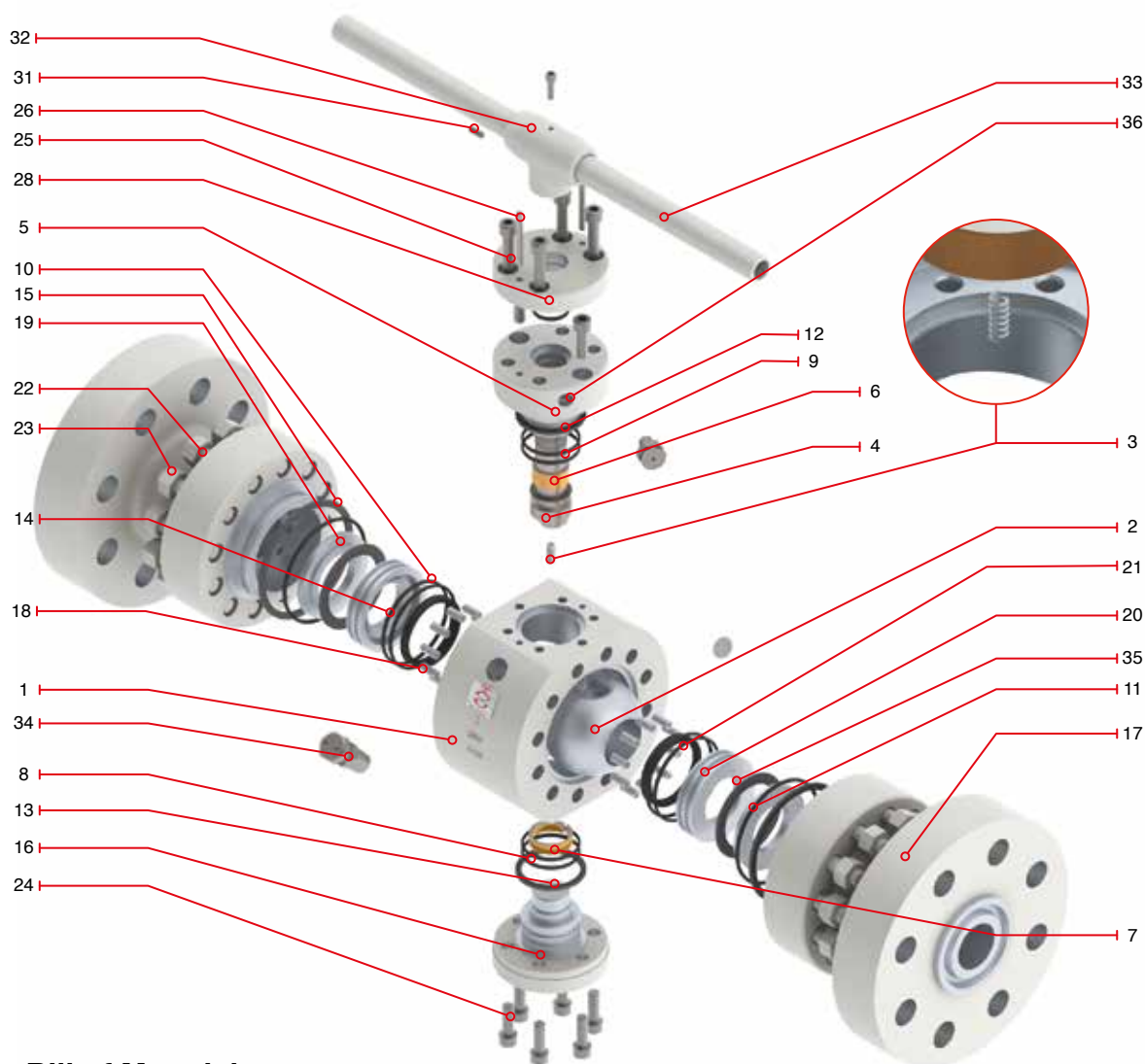
## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"1200mm)
- ASME class: 2500 #
- Temperature Ratings: -29°C to 121°C (Standard)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: On request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) double explosive decompression resistant (EDR) O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (4" & larger): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 2500 (LEVER OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	Peek
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	Carbon Steel
7	Lower bearing	C.S.+ PTFE LINING	27	Locking device*	A36
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt*	ASTM A193 B7M
10	On seat O'ring*	Viton	30	Stop plate*	A36
11	Back up O'ring	Viton	31	Retainer	AISI 1070
12	Upper fire safe gasket	Graphite	32	Handle nut	ASTM A216 WCB
13	Lower fire safe gasket	Graphite	33	Handle	ASTM A53
14	On seat fire safe gasket	Graphite	34	Vent valve	Carbon Steel
15	Ends flange fire safe gasket	Graphite	35	Drain plug	Carbon Steel
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Stem grease fitting	AISI 4140
17	Flanged ends	A105N	37	Flanged end grease fitting*	AISI 4140
18	Seat spring	INCONEL X-750	38	Lifting lug*	A36
19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	39	Support leg*	A36
20	Seat ring	ASTM A105+75µm ENP / AISI 410			

\* Not shown

# **TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 2500** **(LEVER OPERATED)**

## **Design Features**

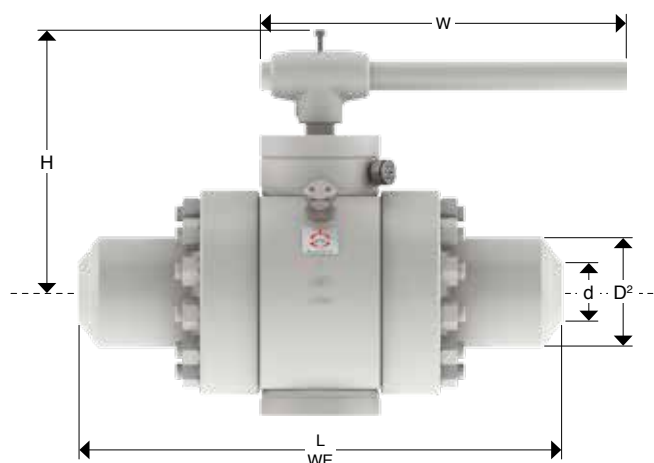
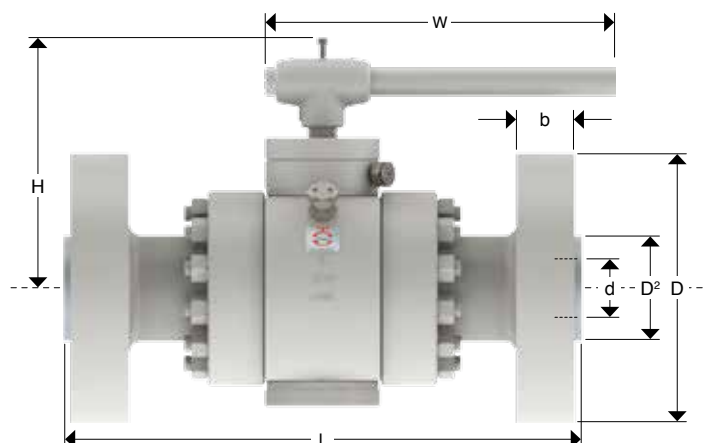
- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 2500 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



## **Dimensions and Weights**

Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"
d	mm inch	42 1.65	52 2.05	62 2.44
D	mm inch	235 9.25	267 10.51	305 12.01
D2	mm inch	133 5.24	149 5.87	168 6.61
P	mm inch	101.6 4	111.12 4.37	127 5
E	mm inch	7.92 0.31	9.52 0.37	9.52 0.37
b	mm inch	51 2.01	58 2.28	67 2.64
L	mm inch	454 17.87	514 20.24	584 23
L (WE)	mm inch	222 8.76	240 9.46	259 10.21
H	mm inch	800 31.50	900 35.43	1000 39.37
ØW	mm inch	800 31.50	900 35.43	1000 39.37
Weight	Kg. Lb.	POA	POA	POA

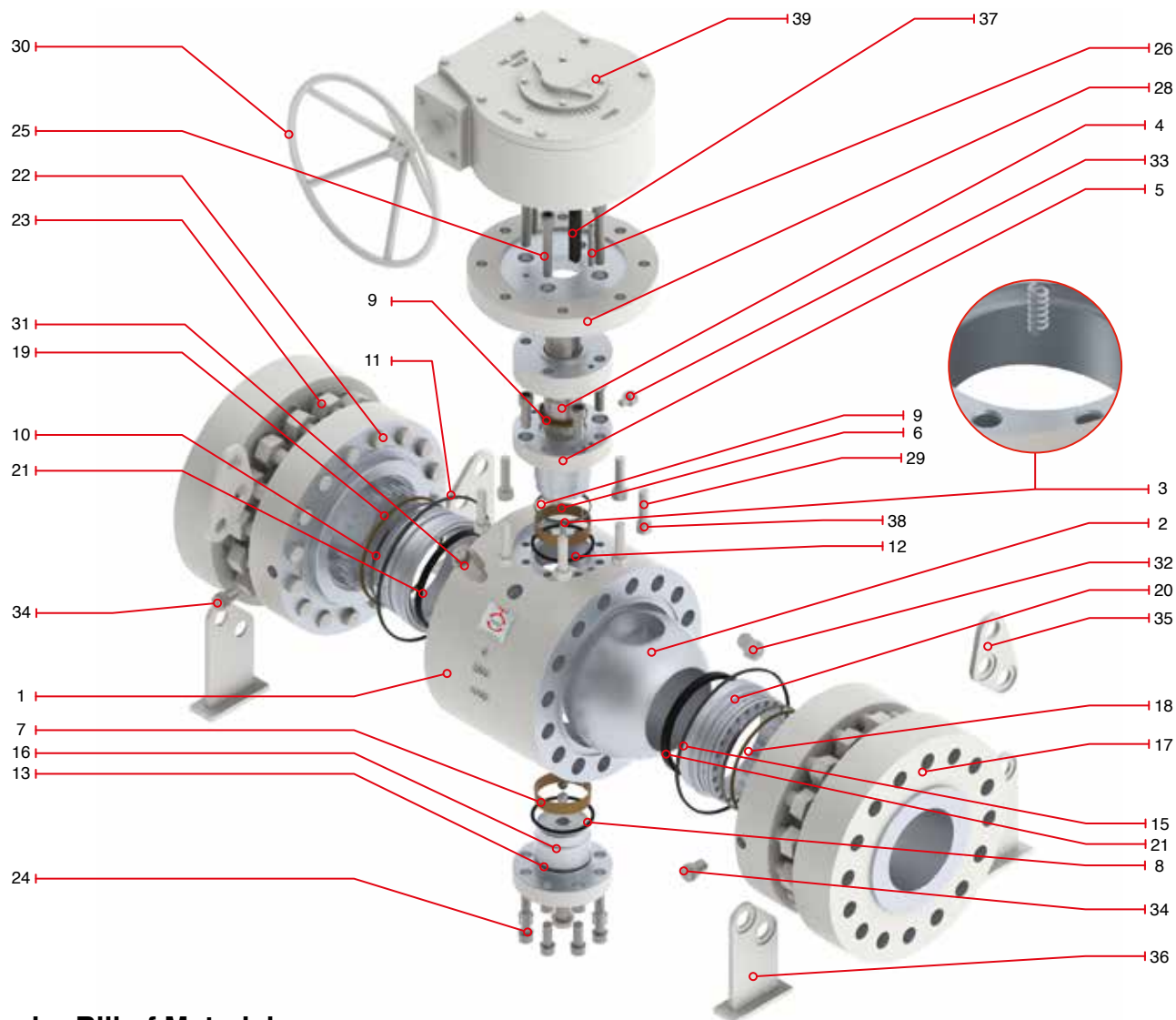
Catalog Figure No.	Type of Ends
8213	Ring Type Joint (RTJ)
8214	Buttweld (WE)



## **Key Parameters**

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

## TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 2500 (GEAR OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	21	Seat insert	Peek
2	Ball	ASTM A105+75µm ENP / AISI 410	22	Stud	ASTM A193 B7M
3	Antistatic spring	INCONEL X-750	23	Nut	ASTM A194 2HM
4	Stem	AISI 4140+75µm ENP / AISI 410	24	Bottom socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	25	Top socket screw	ASTM A193 B7M
6	Upper bearing	C.S.+ PTFE LINING	26	Pin	ASTM A276 T410
7	Lower Bearing	C.S.+ PTFE LINING	27	Packing gland bushing*	AISI 410
8	Lower O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
9	Stem O'ring	Viton	29	Hex. Bolt	ASTM A193 B7M
10	Seat O'ring	Viton	30	Handwheel	ASTM A53
11	Back up O'ring	Viton	31	Vent valve	AISI 4140
12	Upper fire safe gasket	Graphite	32	Drain plug	AISI 4140
13	Lower fire safe gasket	Graphite	33	Stem grease fitting*	AISI 4140
14	On seat fire safe gasket	Graphite	34	Ends grease fitting	AISI 4140
15	Fire safe gasket	Graphite	35	Lifting lug	A36
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	36	Support leg	A36
17	Flanged ends	A105N	37	Key	Carbon Steel
18	Seat spring	INCONEL X-750	38	Spring lock washer	Carbon Steel
19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	39	Gear box	Commercial steel
20	Seat ring	ASTM A105+75µm ENP / AISI 411			

\* Not shown



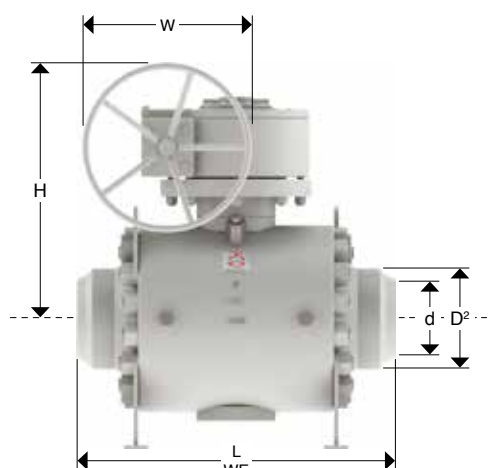
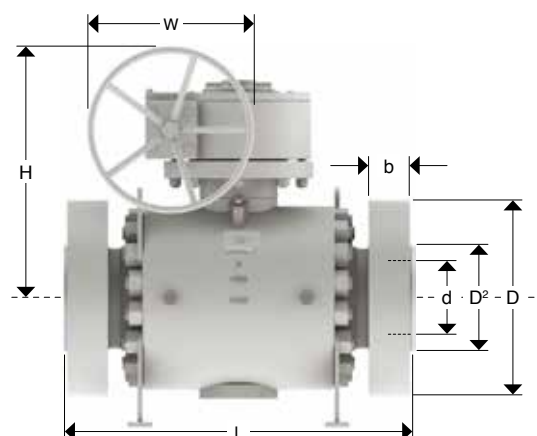
# TRUNNION MOUNTED BALL VALVE BOLTED BODY, CLASS 2500 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 2500 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8223	Ring Type Joint (RTJ)
8224	Buttweld (WE)



## Dimensions and Weights

D Nominal Diameter	mm inch	100 4"	150 6"	200 8"	250 10"	300 12"
d	mm inch	87 3.43	131 5.16	179 7.05	223 8.78	265 10.43
D	mm inch	356 14.02	483 19.02	552 21.73	674 26.54	762 30
D2	mm inch	203 8	279 10.98	340 13.39	426 16.77	495 19.49
P	mm inch	157.18 6.19	228.6 9	279.4 11	342.9 13.50	406.4 16
E	mm inch	11.13 0.44	12.7 0.50	14.27 0.56	17.48 0.69	17.48 0.69
b	mm inch	76.5 3.01	108 4.25	127 5	165 6.50	185 7.28
L	mm inch	683 26.89	927 36.50	1038 40.87	1292 50.87	1445 56.89
L (WE)	mm inch	319 12.57	778 30.63	850 33.47	960 37.80	1080 42.52
H	mm inch	600 23.62	800 31.50	800 31.50	800 31.50	800 31.50
ØW	mm inch	600 23.62	800 31.50	800 31.50	800 31.50	800 31.50
Weight	Kg. Lb.	POA	POA	POA	POA	POA

## Key Parameters

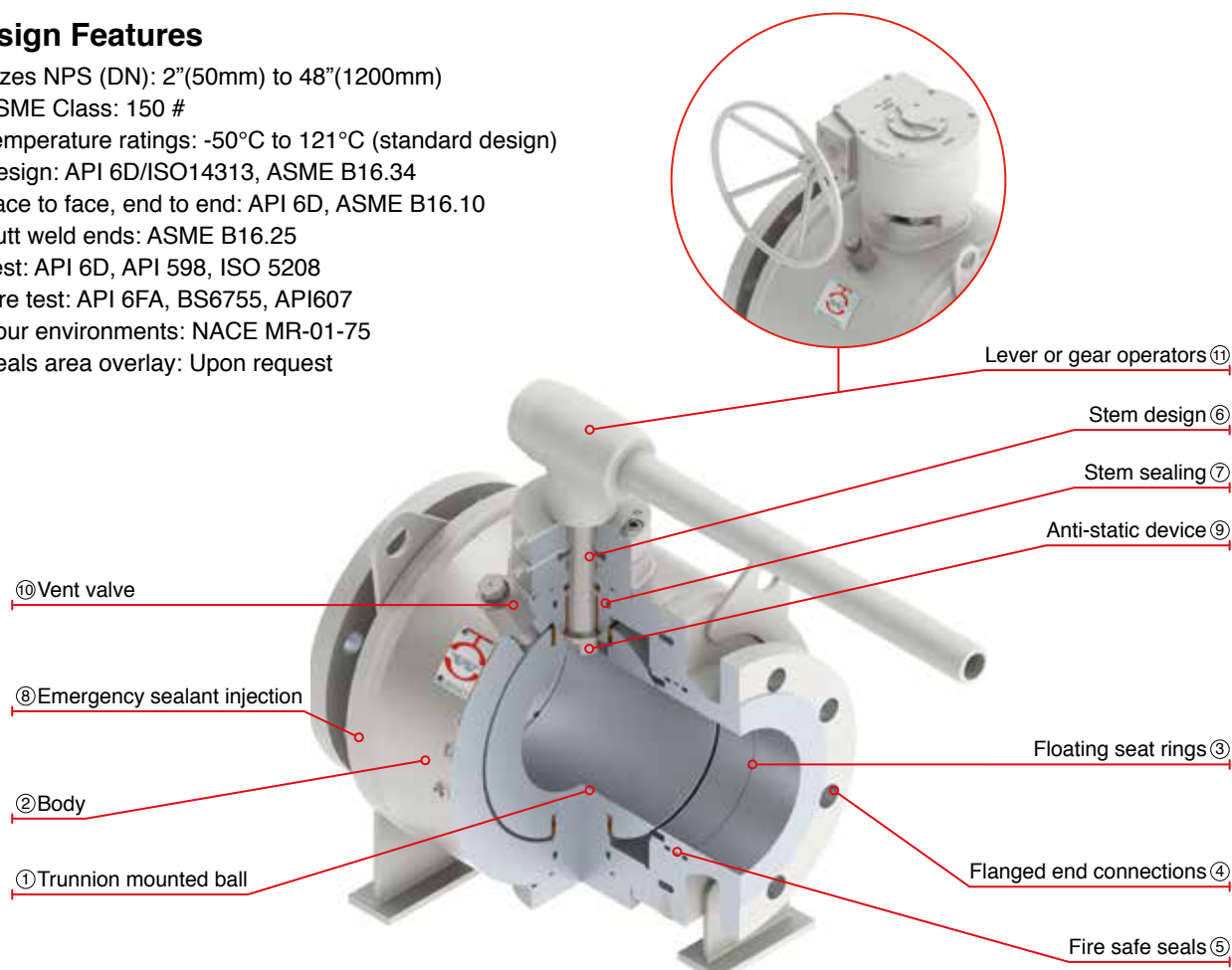
Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 150

Welded Body Ball Valves Metal-to-Metal Seated: Gives it maximum strength and minimum weight and reduce leak possibilities. Are designed and manufactured for Abrasive Service in conformance with the specification of API 6D, ISO 14313, ASME B16.34, ASME B16.25, API 6FA, API 607 & ISO 15156 / NACE MR01-75.

## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"(1200mm)
- ASME Class: 150 #
- Temperature ratings: -50°C to 121°C (standard design)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: Upon request

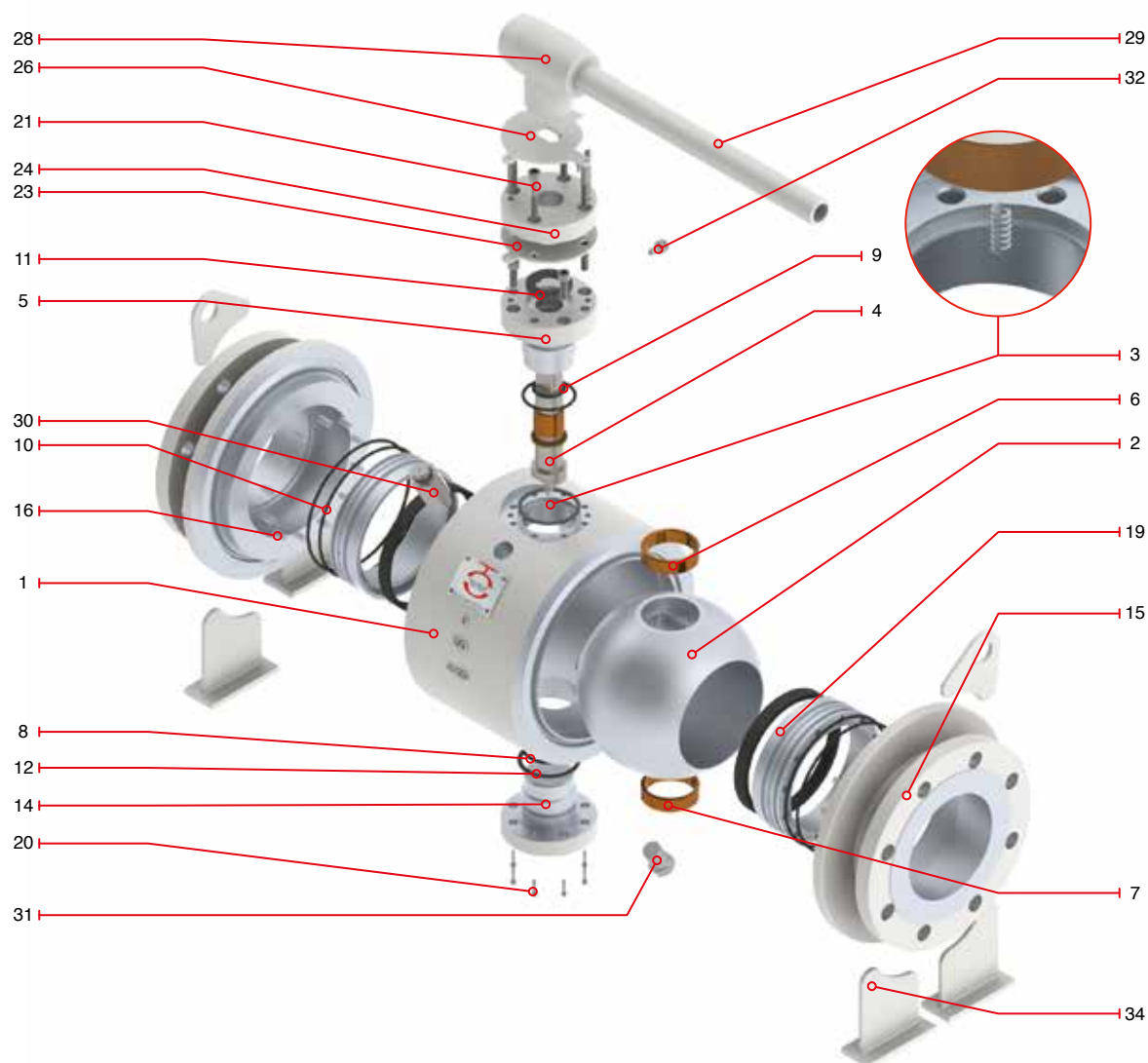


- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Welded Body. Engineered and manufactured particularly for heavy-duty services, such feature allows maximum strength it also saves material which makes it lighter than the flanged model its compact design eliminates body flanges weight reducing the possibility of any leakage.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to

avoid any possible projection due to hazardous conditions.

- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) coating control the hardness amongst stem, metallic components & double O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (6" & Larges): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 150 (LEVER OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	18	Seat ring	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	19	Seat insert	ASTM A105+75µm ENP / AISI 410 RPTFE (2 to 12"); Nylon (14 to 24"); Molon (26 to 48")
3	Antistatic spring	INCONEL X-750	20	Socket screw	ASTM A193 B7M
4	Stem	AISI 4140+75µm ENP / AISI 410	21	Socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	22	Pin	Carbon Steel
6	Upper bearing	C.S.+ PTFE LINING	23	Locking device	A36
7	Lower bearing	C.S.+ PTFE LINING	24	Packing gland flange	ASTM A216 WCB / A105
8	Lower O'ring	Viton	25	Hex. Bolt*	ASTM A193 B7M
9	Upper O'ring	Viton	26	Stop plate	A36
10	Seat O'ring	Viton	27	Retainer*	AISI 1070
11	Stem fire safe gasket	Graphite	28	Handle nut*	ASTM A216 WCB
12	Trunnion fire safe gasket	Graphite	29	Handle	ASTM A53
13	Seat fire safe gasket	Graphite	30	Vent valve	Carbon Steel
14	Trunnion	AISI 4140+75µm ENP / AISI 410	31	Drain plug	Carbon Steel
15	Flanged ends	A105N	32	Grease fitting*	Carbon Steel
16	Seat spring	INCONEL X-750	33	Lifting lug	A36
17	Back up seat ring*	ASTM A105+75µm ENP / AISI 410	34	Support leg	A36

\* Not shown

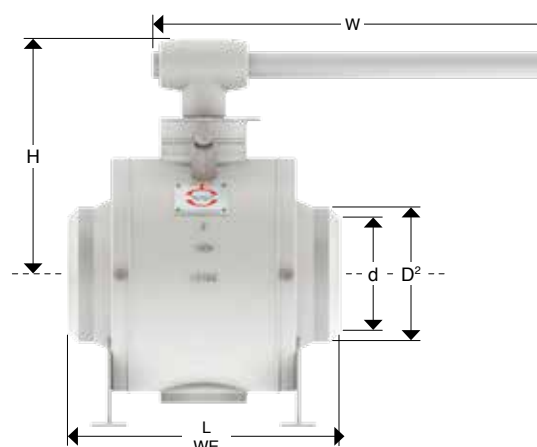
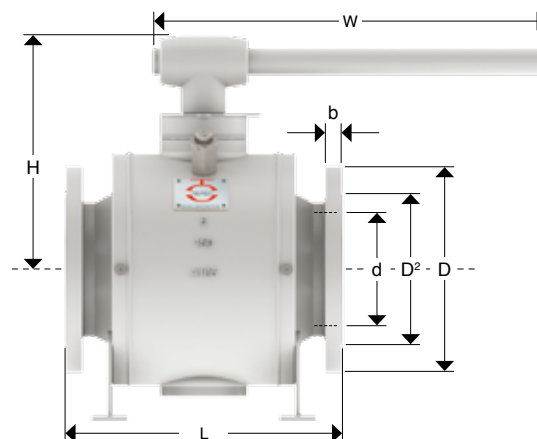
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 150 (LEVER OPERATED)

## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"(1200mm)
- ASME Class: 150 #
- Temperature ratings: -50°C to 121°C (standard design)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: Upon request



Catalog Figure No.	Type of Ends
8112-W	Raised Face (RF)
8113-W	Ring Type Joint (RTJ)
8114-W	Buttweld (WE)



## Dimensions and Weights

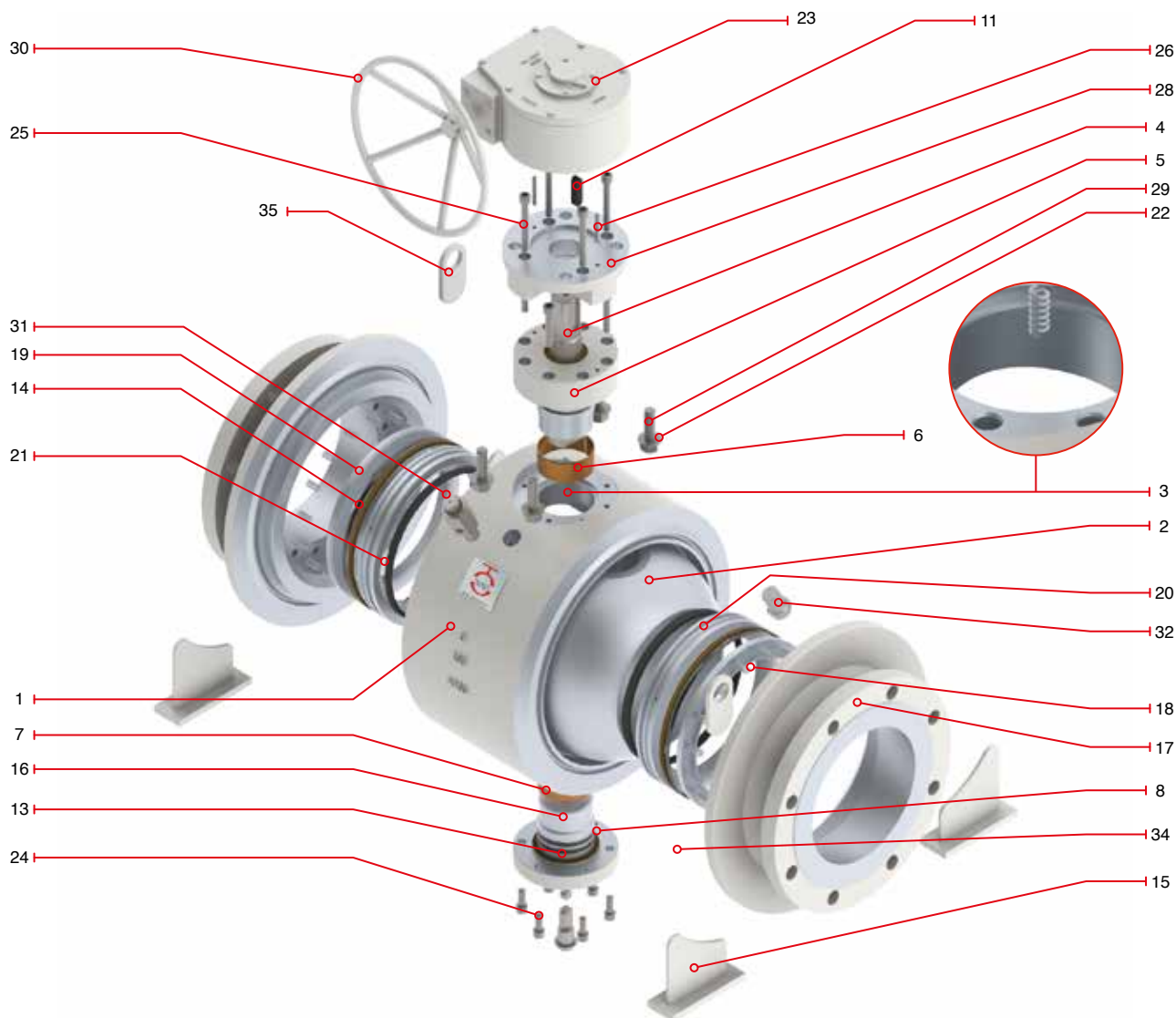
D Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"	100 4"
d	mm in	49 1.93	62 2.44	74 2.91	100 3.94
D	mm in	150 5.98	180 7	190 7.48	230 9.02
D2	mm in	92 3.62	105 4.13	127 5	157 6.18
b	mm in	16 0.63	18 0.71	19 0.75	24 0.94
L	mm in	178 7	191 7.48	203 8	229 9.02
L (WE)	mm in	216 8.5	241 9.48	283 11.14	305 12
H	mm in	172 6.79	210 8.28	241 9.50	275 10.84
ØW	mm in	*350 13.78	*350 13.78	*400 15.75	*450 17.72
Weight (RF - RTJ)	kg Lb	19.60 43.12	31.18 68.60	42.32 93.10	63.70 140.14

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight



# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 150 (GEAR OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	19	Back up seat ring	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	20	Seat ring	ASTM A105+75µm ENP / AISI 411
3	Antistatic spring	INCONEL X-750	21	Seat insert	RPTFE (2 to 12"); Nylon (14 to 24"); Molon (26 to 48")
4	Stem	AISI 4140+75µm ENP / AISI 410	22	Spring lock washer	Carbon Steel
5	Trunnion / bonnet	AISI 4140+75µm ENP	23	Gear box	Commercial steel
6	Upper bearing	C.S.+ PTFE LINING	24	Bottom socket screw	ASTM A193 B7M
7	Lower Bearing	C.S.+ PTFE LINING	25	Top socket screw	ASTM A193 B7M
8	Lower O'ring*	Viton	26	Pin	ASTM A276 T410
9	Stem O'ring*	Viton	27	Packing gland bushing*	AISI 410
10	Seat O'ring*	Viton	28	Packing gland flange	ASTM A216 WCB / A105
11	Key	Carbon Steel	29	Hex. Bolt	ASTM A193 B7M
12	Upper fire safe gasket*	Graphite	30	Handwheel	ASTM A53
13	Lower fire safe gasket	Graphite	31	Vent valve	AISI 4140
14	On seat fire safe gasket	Graphite	32	Drain plug	AISI 4140
15	Support leg	A36	33	Stem grease fitting*	AISI 4140
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	34	Ends grease fitting*	AISI 4140
17	Flanged ends	A105N	35	Lifting lug	A36
18	Seat spring	INCONEL X-750			

\* Not shown

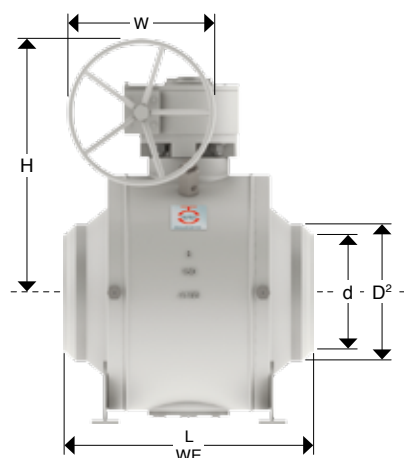
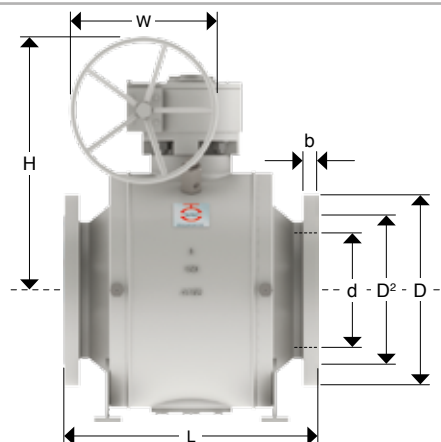
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 150 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 150 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8122-W	Raised Face (RF)
8123-W	Ring Type Joint (RTJ)
8124-W	Buttweld (WE)



## Dimensions and Weights

D Nominal Diameter	mm in	150 6"	200 8"	250 10"	300 12"	350 14"	400 16"	450 18"	500 20"	610 24"	660 26"	711 28"	762 30"	813 32"	864 34"	914 36"
d	mm in	150 5.91	201 7.91	252 9.92	303 11.93	334 13.15	385 15.16	436 17.17	487 19.17	589 23.19	633 24.92	684 26.92	735 28.93	779 30.66	830 32.67	874 34.40
D	mm in	280 10.98	345 13.50	405 15.98	485 19.02	535 20.98	595 23.50	635 25	700 27.52	815 32.01	870 34.25	925 36.01	985 38.41	1060 41.73	1110 43.70	1170 46.06
D2	mm in	216 8.50	270 10.63	324 12.76	381 15	413 16.26	470 18.50	533 20.98	584 23	692 27.24	749 29.48	800 31.49	857 33.74	914 35.98	965 37.99	1022 40.23
b	mm in	26 1.02	29 1.14	31 1.22	32 1.26	33.4 1.34	35 1.37	38 1.4	41 1.61	46 1.81	67 2.63	70 2.75	73 2.87	80 3.14	81 3.18	89 3.50
L	mm in	394 15.51	457 18	568 20.98	648 24.02	686 27	762 30	864 34.02	914 35.98	1067 42.01	1143 45	1245 49	1295 50.98	1473 54	1473 57.99	1524 60
L (WE)	mm in	457 17.99	521 20.51	559 22	635 25	762 30	838 32.99	914 35.98	991 39	1143 45	1245 49	1346 53	1397 55	1524 60	1626 64	1727 68
H	mm in	590 23.23	657 25.9	824 32.44	856 33.7	875 34.45	937 36.89	1010 39.77	1090 42.92	1180 46.46	1180 46.46	1180 46.46	1180 46.46	1180 46.46	1180 46.46	1180 46.46
ØW	mm in	600 23.62	600 23.62	800 31.50	800 31.50	800 31.50	800 31.50	800 31.50	800 31.50	800 31.50	800 31.50	APM	APM	APM	APM	APM
Weight (RF - RTJ)	kg Lb	171.95 378.28	274.85 604.66	451.69 993.72	648.14 1425.90	942.58 2073.68	1296.27 2851.80	1679.36 3694.60	2111.45 4645.20	3221.08 7086.38	3859.42 8490.72	4419.35 9722.58	5273.74 11602.22	5833.23 12833.10	6496.06 14291.34	7404.35 16289.56

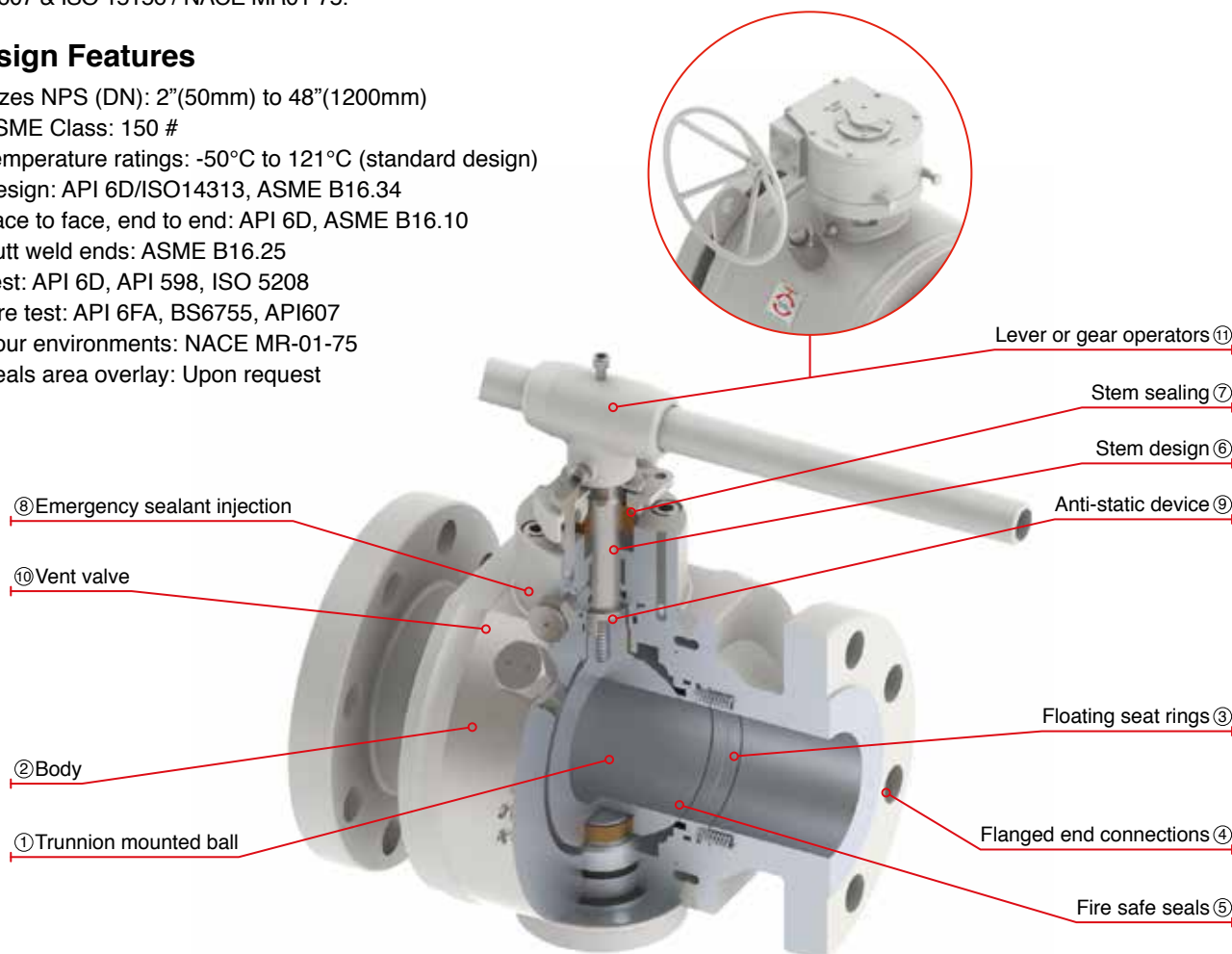
APM = As per manufacturer

# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 300

Welded Body Ball Valves Metal-to-Metal Seated: Gives it maximum strength and minimum weight and reduce leak possibilities. Are designed and manufactured for Abrasive Service in conformance with the specification of API 6D, ISO 14313, ASME B16.34, ASME B16.25, API 6FA, API 607 & ISO 15156 / NACE MR01-75.

## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"(1200mm)
- ASME Class: 150 #
- Temperature ratings: -50°C to 121°C (standard design)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: Upon request

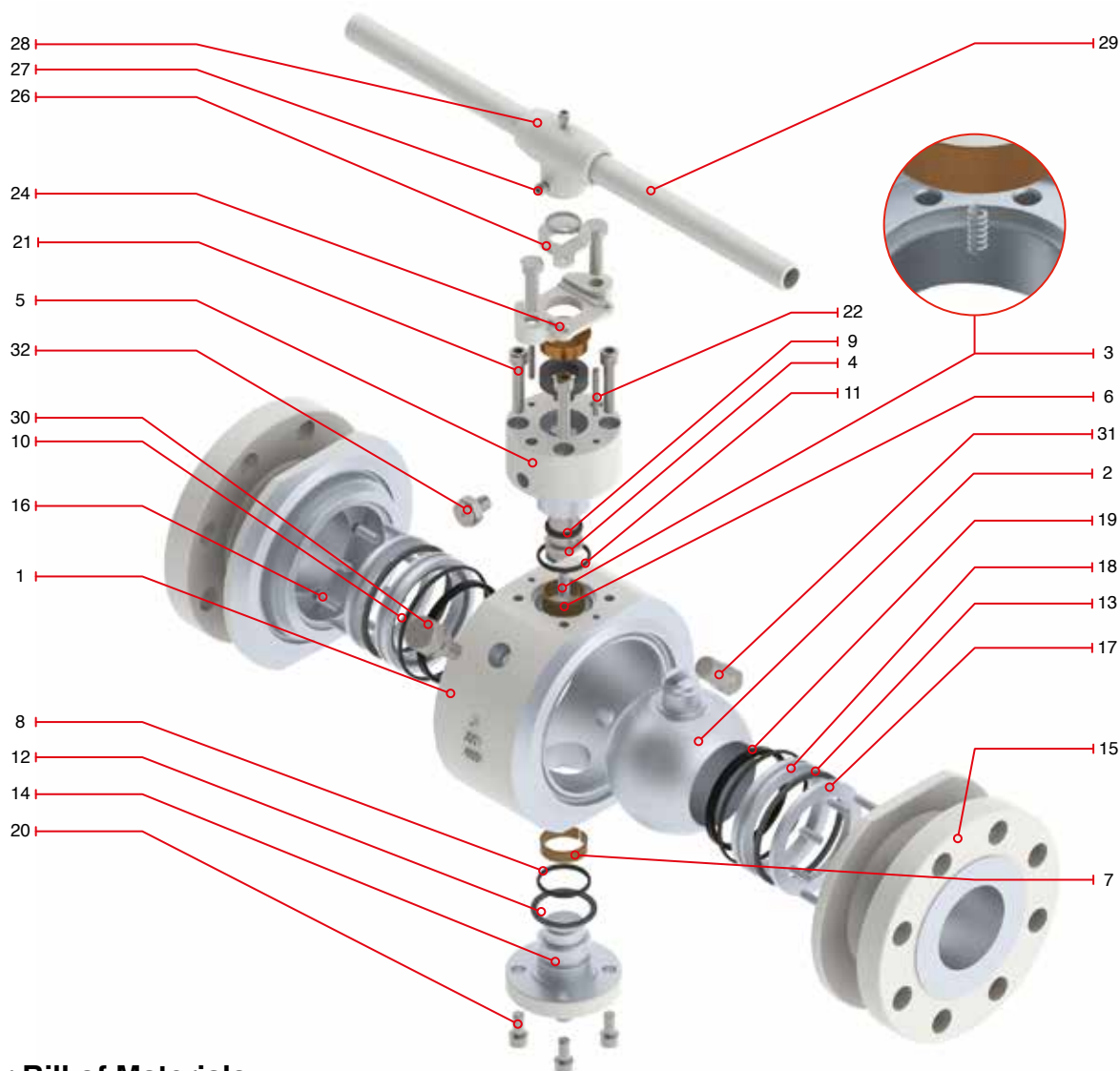


- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Welded Body. Engineered and manufactured particularly for heavy-duty services, such feature allows maximum strength it also saves material which makes it lighter than the flanged model its compact design eliminates body flanges weight reducing the possibility of any leakage.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to

avoid any possible projection due to hazardous conditions.

- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) coating control the hardness amongst stem, metallic components & double O-rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (6" & Larger): Valves are supplied with emergency sealant injectors located between the double O-ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

## TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 300 (LEVER OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	18	Seat ring	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	19	Seat insert	RPTFE (2 to 12"); Nylon (14 to 24"); Molon (26 to 48")
3	Antistatic spring	INCONEL X-750	20	Socket screw	ASTM A193 B7M
4	Stem	AISI 4140+75µm ENP / AISI 410	21	Socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	22	Pin	Carbon Steel
6	Upper bearing	C.S.+ PTFE LINING	23	Locking device*	A36
7	Lower bearing	C.S.+ PTFE LINING	24	Packing gland flange	ASTM A216 WCB / A105
8	Lower O'ring	Viton	25	Hex. Bolt*	ASTM A193 B7M
9	Upper O'ring	Viton	26	Stop plate	A36
10	Seat O'ring	Viton	27	Retainer	AISI 1070
11	Stem fire safe gasket	Graphite	28	Handle nut	ASTM A216 WCB
12	Trunnion fire safe gasket	Graphite	29	Handle	ASTM A53
13	Seat fire safe gasket	Graphite	30	Vent valve	Carbon Steel
14	Trunnion	AISI 4140+75µm ENP / AISI 410	31	Drain plug	Carbon Steel
15	Flanged ends	A105N	32	Grease fitting*	Carbon Steel
16	Seat spring	INCONEL X-750	33	Lifting lug*	A36
17	Back up seat ring	ASTM A105+75µm ENP / AISI 410	34	Support leg*	A36

\* Not shown



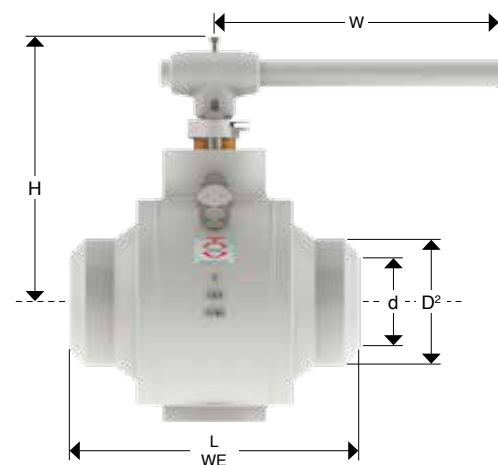
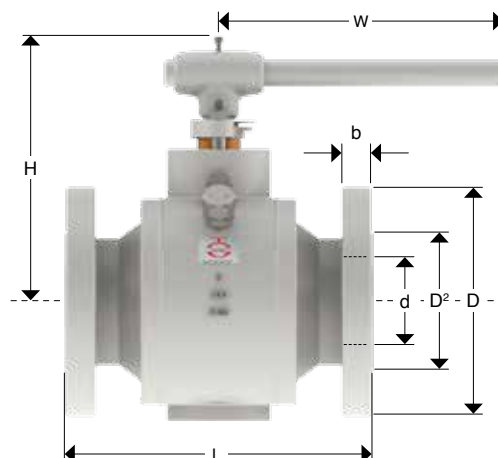
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 300 (LEVER OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 150 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8312-W	Raised Face (RF)
8313-W	Ring Type Joint (RTJ)
8314-W	Buttweld (WE)



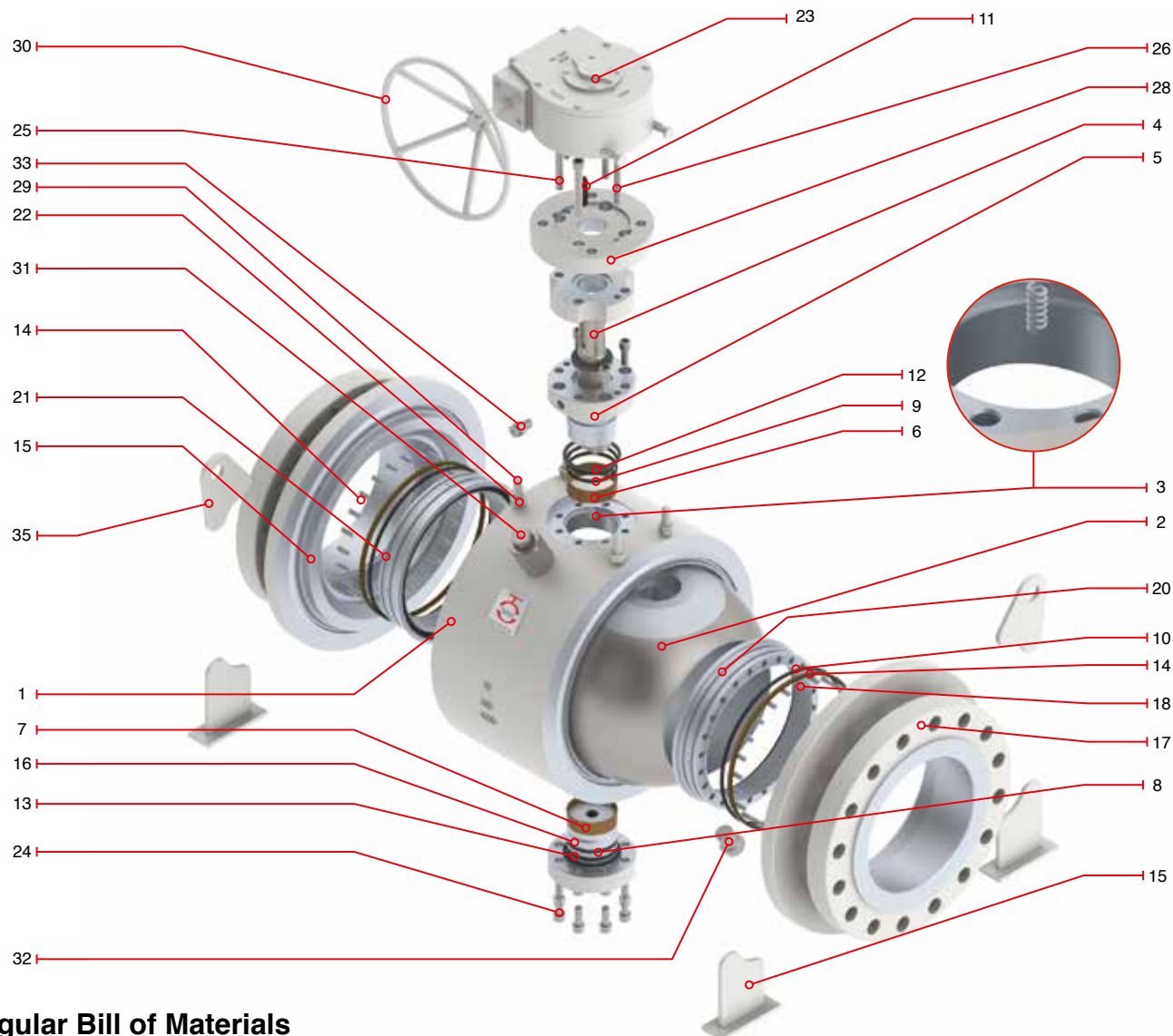
## Dimensions and Weights

Nominal Diameter	mm	50	65	80	100
	in	2"	2 1/2"	3"	4"
d	mm	49	62	74	100
	in	1.93	2.44	2.91	3.94
D	mm	165	190	210	254
	in	6.50	7.48	8.27	9.02
D2	mm	92	105	127	157
	in	3.62	4.13	5	6.18
b	mm	23	26	29	32
	in	0.63	1.02	1.14	0.94
L	mm	216	241	283	305
	in	8.50	9.49	11.14	9.02
L (WE)	mm	216	241	283	305
	in	8.5	9.48	11.14	12
H	mm	172	210	241	275
	in	6.79	8.28	9.50	10.84
ØW	mm	350	450	500	600
	in	13.78	17.72	19.69	23.62
Weight	kg	22.54	33.32	44.10	74.48
(RF - RTJ)	Lb	49.59	73.30	97.02	163.86

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

## TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 300 (GEAR OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	20	Seat ring	ASTM A105+75µm ENP / AISI 411
3	Antistatic spring	INCONEL X-750	21	Seat insert*	RPTFE (2 to 12"); Nylon (14 to 24"); Molon (26 to 48")
4	Stem	AISI 4140+75µm ENP / AISI 410	22	Spring lock washer	Carbon Steel
5	Trunnion / bonnet	AISI 4140+75µm ENP	23	Gear box	Commercial steel
6	Upper bearing	C.S.+ PTFE LINING	24	Bottom socket screw	ASTM A193 B7M
7	Lower Bearing	C.S.+ PTFE LINING	25	Top socket screw	ASTM A193 B7M
8	Lower O'ring	Viton	26	Pin	ASTM A276 T410
9	Stem O'ring	Viton	27	Packing gland bushing*	AISI 410
10	Seat O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
11	Key	Carbon Steel	29	Hex. Bolt	ASTM A193 B7M
12	Upper fire safe gasket*	Graphite	30	Handwheel	ASTM A53
13	Lower fire safe gasket	Graphite	31	Vent valve	AISI 4140
14	On seat fire safe gasket	Graphite	32	Drain plug	AISI 4140
15	Support leg	A36	33	Stem grease fitting	AISI 4140
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	34	Ends grease fitting*	AISI 4140
17	Flanged ends	A105N	35	Lifting lug	A36
18	Seat spring	INCONEL X-750			

\* Not shown

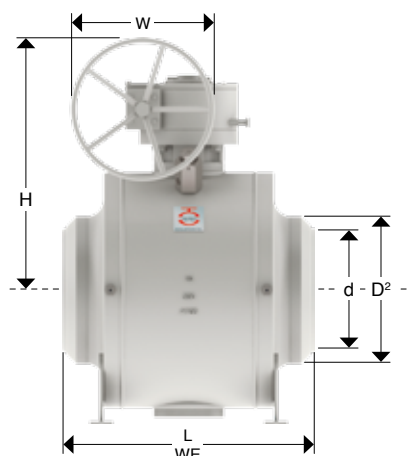
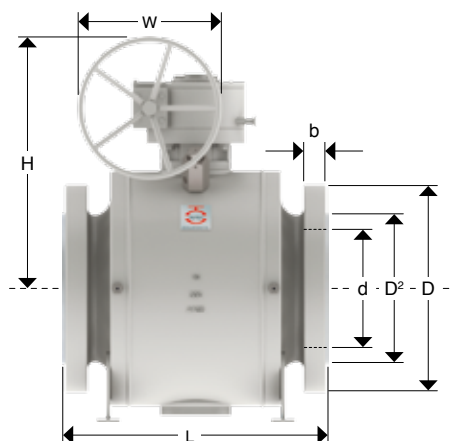
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 300 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 300 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8322-W	Raised Face (RF)
8323-W	Ring Type Joint (RTJ)
8324-W	Buttweld (WE)



## Dimensions and Weights

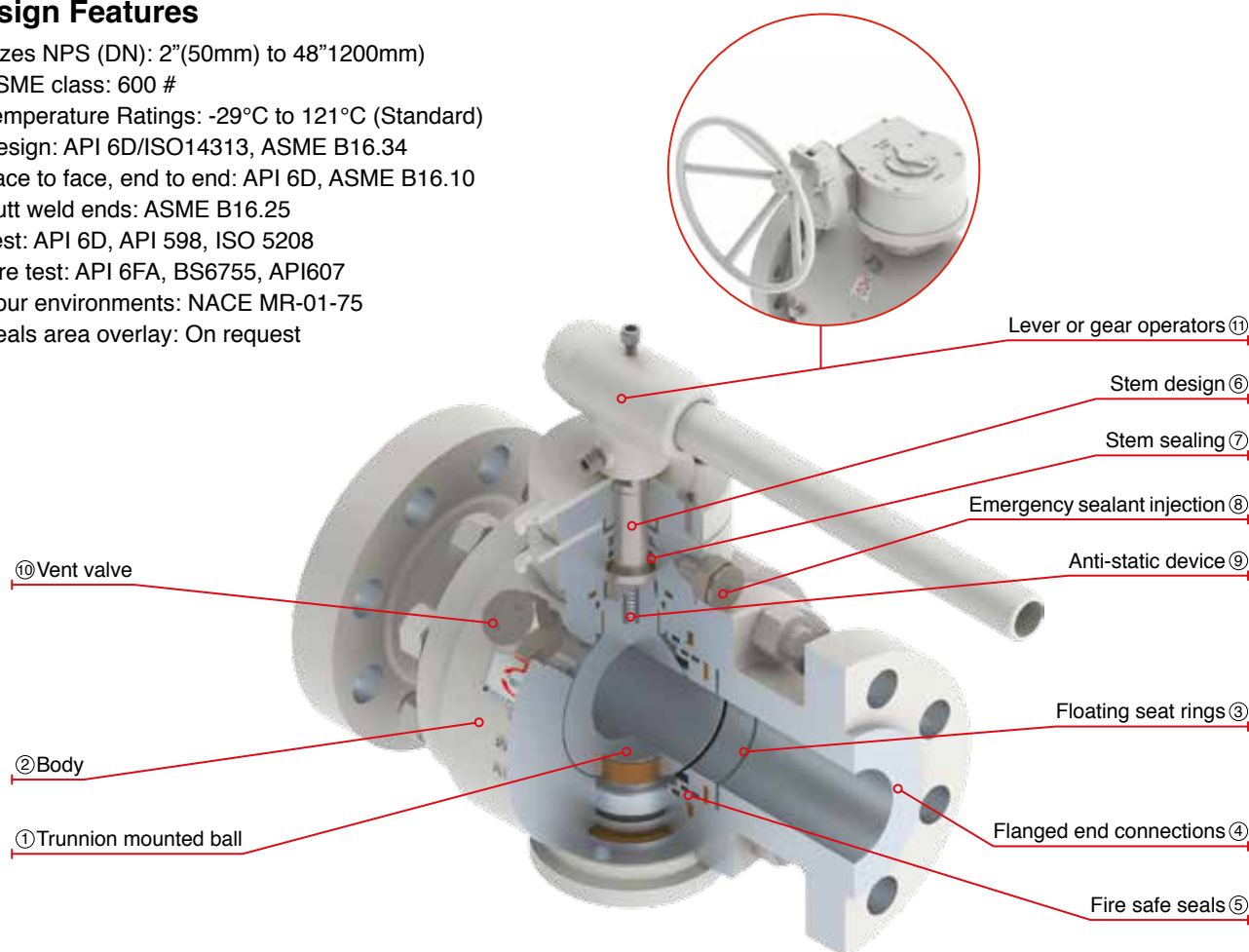
Nominal Diameter	mm	150	200	250	300	350	400	450	500	610	660	711	762	813	864	914
	in	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	28"	30"	32"	34"	36"
d	mm	150	201	252	303	334	385	436	487	589	633	684	735	779	830	874
	in	5.91	7.91	9.92	11.93	13.15	15.16	17.17	19.17	23.19	24.92	26.92	28.93	30.66	32.67	34.40
D	mm	318	381	445	521	585	650	710	775	915	970	1035	1090	1150	1205	1270
	in	12.52	15	17.52	20.51	23	25.59	27.95	30.51	36.02	38.18	40.74	42.91	45.27	47.44	50
D2	mm	216	270	324	381	413	470	533	584	692	749	800	857	914	965	1022
	in	8.50	10.63	12.76	15	16.25	18.50	20.98	23	27.24	29.48	31.49	33.74	35.98	37.99	40.23
b	mm	37	42	48	51	52.4	55.6	58.8	62	68.3	77.8	84.2	90.5	96.9	100.1	103.2
	in	1.46	1.65	1.89	2.01	2.13	2.18	2.31	2.44	2.68	3.06	3.31	3.56	3.81	3.94	4.06
L	mm	403	502	568	648	762	838	914	991	1143	1245	1346	1397	1524	1626	1727
	in	15.86	19.76	22.36	25.51	30	33	35.98	39	45	49	53	55	60	64	68
L (WE)	mm	403	521	559	635	762	838	914	991	1143	1245	1346	1397	1524	1626	1727
	in	15.86	20.51	22	25	30	33	35.98	39	45	49	53	55	60	64	68
H	mm	590	657	824	856	770	937	1010	1090	1180	937	937	937	937	937	937
	in	23.23	25.9	32.44	33.7	30.31	36.89	39.77	42.92	46.46	36.89	36.89	36.89	36.89	36.89	36.89
ØW	mm	600	600	800	800	800	800	800	800	800	800	800	800	800	800	800
	in	23.62	23.62	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50
Weight	kg	181.30	313.60	499.80	715.40	1107.40	1460.20	1871.80	2293.20	3351.60	4253.20	4860.80	5840.80	6624.80	8114.40	9447.20
(RF - RTJ)	Lb	398.86	689.92	1099.56	1573.88	2436.28	3212.44	4117.96	5045.04	7373.52	9357.04	10693.76	12849.76	14574.56	17851.68	20783.84

## TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 600

Trunnion mounted ball valves are designed and manufactured in conformance with the specification of API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

### Design Features

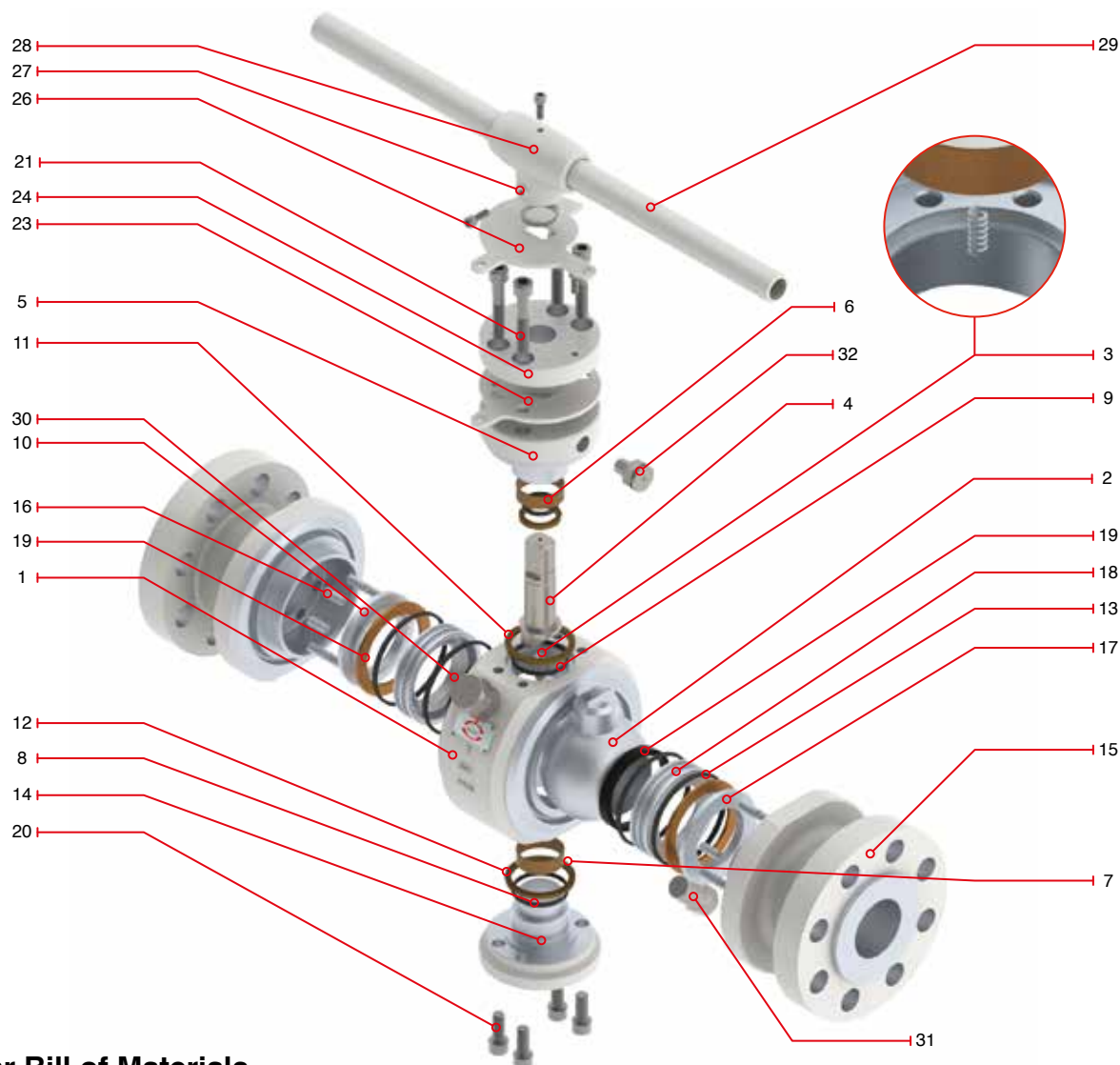
- Sizes NPS (DN): 2"(50mm) to 48"1200mm)
- ASME class: 600 #
- Temperature Ratings: -29°C to 121°C (Standard)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: On request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) double explosive decompression resistant (EDR) O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (4" & larger): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.



# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 600 (LEVER OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	18	Seat ring	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	19	Seat insert	Nylon or Molon (2 to 16"); Molon (18 to 48")
3	Antistatic spring	INCONEL X-750	20	Socket screw	ASTM A193 B7M
4	Stem	AISI 4140+75µm ENP / AISI 410	21	Socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	22	Pin*	Carbon Steel
6	Upper bearing	C.S.+ PTFE LINING	23	Locking device	A36
7	Lower bearing	C.S.+ PTFE LINING	24	Packing gland flange	ASTM A216 WCB / A105
8	Lower O'ring	Viton	25	Hex. Bolt*	ASTM A193 B7M
9	Upper O'ring	Viton	26	Stop plate	A36
10	Seat O'ring	Viton	27	Retainer	AISI 1070
11	Stem fire safe gasket	Graphite	28	Handle nut	ASTM A216 WCB
12	Trunnion fire safe gasket	Graphite	29	Handle	ASTM A53
13	Seat fire safe gasket	Graphite	30	Vent valve	Carbon Steel
14	Trunnion	AISI 4140+75µm ENP / AISI 410	31	Drain plug	Carbon Steel
15	Flanged ends	A105N	32	Grease fitting	Carbon Steel
16	Seat spring	INCONEL X-750	33	Lifting lug*	A36
17	Back up seat ring	ASTM A105+75µm ENP / AISI 410	34	Support leg*	A36

\* Not shown

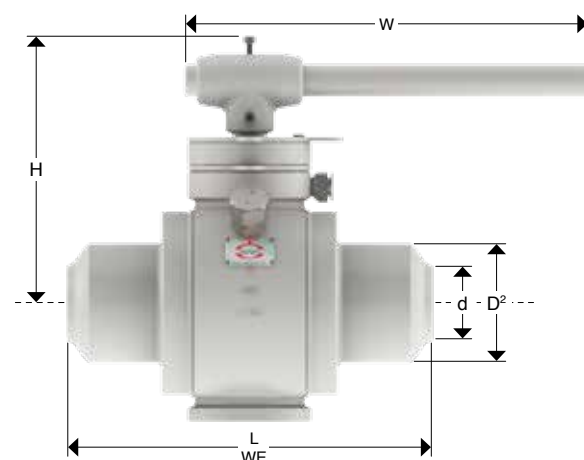
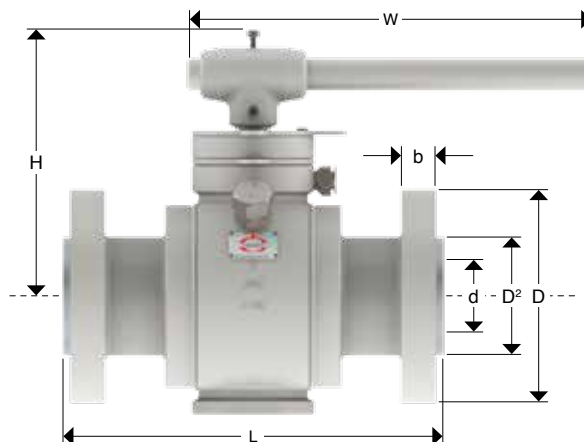
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 600 (LEVER OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 600 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8612-W	Raised Face (RF)
8613-W	Ring Type Joint (RTJ)
8614-W	Buttweld (WE)



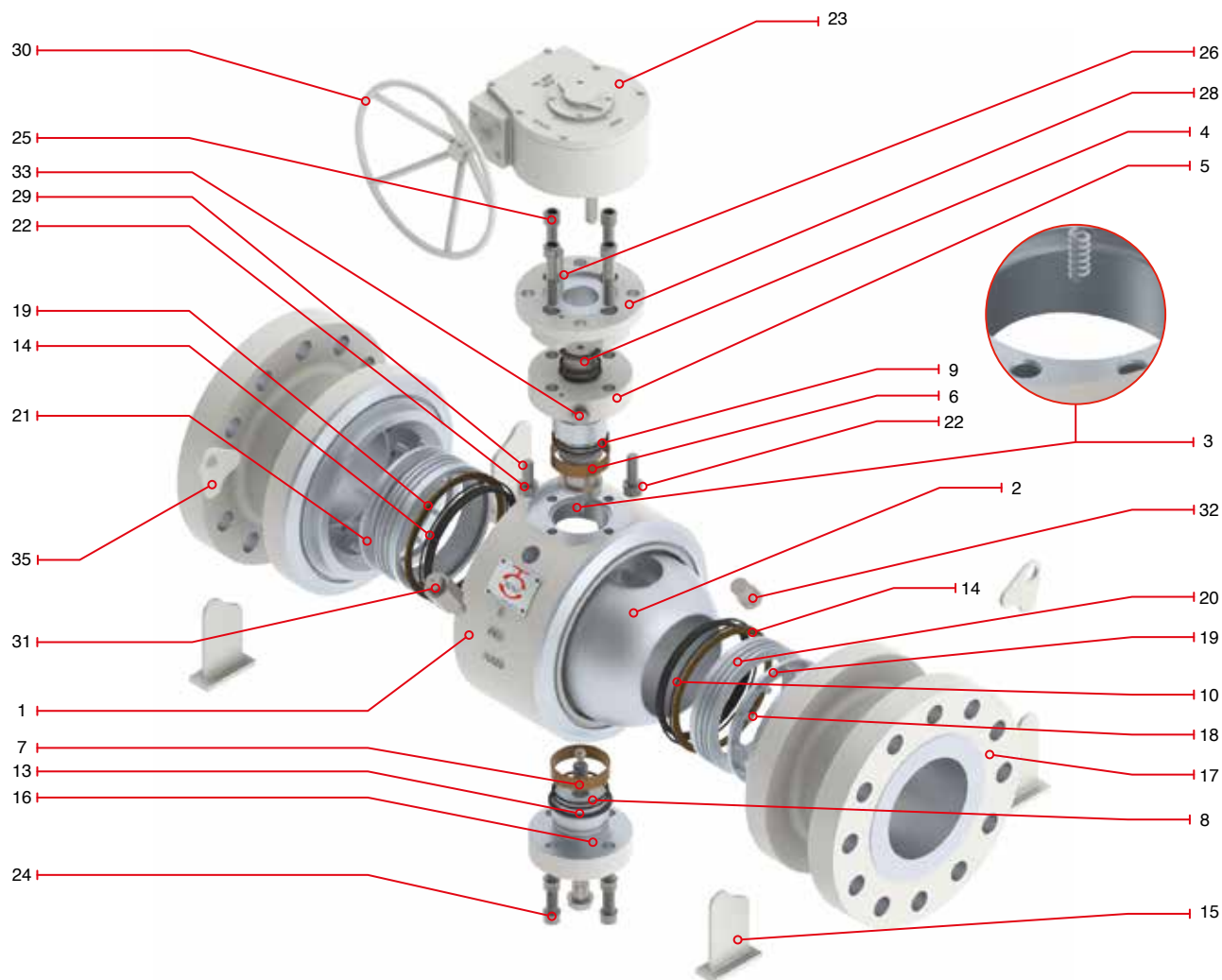
## Dimensions and Weights

Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"	100 4"
d	mm in	49 1.93	62 2.44	74 2.91	100 3.94
D	mm in	165 6.50	190 7.48	210 8.27	275 10.75
D2	mm in	92 3.62	105 4.13	127 5	157 6.18
b	mm in	26 1.02	29 1.14	32 1.26	38 1.50
L	mm in	292 11.50	330 13	356 14.02	432 17.01
L (WE)	mm in	292 11.50	330 13	356 14.02	432 17.01
H	mm in	203 8.01	220 8.68	220 8.68	255 10.06
ØW	mm in	500 19.69	600 23.62	700 27.56	800 31.50
Weight (RF - RTJ)	kg Lb	33.32 73.30	50.07 110.15	65.79 144.75	147.31 324.08

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 600 (GEAR OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	19	Back up seat ring	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	20	Seat ring	ASTM A105+75µm ENP / AISI 411
3	Antistatic spring	INCONEL X-750	21	Seat insert	Nylon or Molon (2 to 16"); Molon (18 to 48")
4	Stem	AISI 4140+75µm ENP / AISI 410	22	Spring lock washer	Carbon Steel
5	Trunnion / bonnet	AISI 4140+75µm ENP	23	Gear box	Commercial steel
6	Upper bearing	C.S.+ PTFE LINING	24	Bottom socket screw	ASTM A193 B7M
7	Lower Bearing	C.S.+ PTFE LINING	25	Top socket screw	ASTM A193 B7M
8	Lower O'ring	Viton	26	Pin	ASTM A276 T410
9	Stem O'ring*	Viton	27	Packing gland bushing*	AISI 410
10	Seat O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
11	Key*	Carbon Steel	29	Hex. Bolt	ASTM A193 B7M
12	Upper fire safe gasket*	Graphite	30	Handwheel	ASTM A53
13	Lower fire safe gasket	Graphite	31	Vent valve	AISI 4140
14	On seat fire safe gasket	Graphite	32	Drain plug	AISI 4140
15	Support leg	A36	33	Stem grease fitting	AISI 4140
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	34	Ends grease fitting*	AISI 4140
17	Flanged ends	A105N	35	Lifting lug	A36
18	Seat spring	INCONEL X-750			

\* Not shown

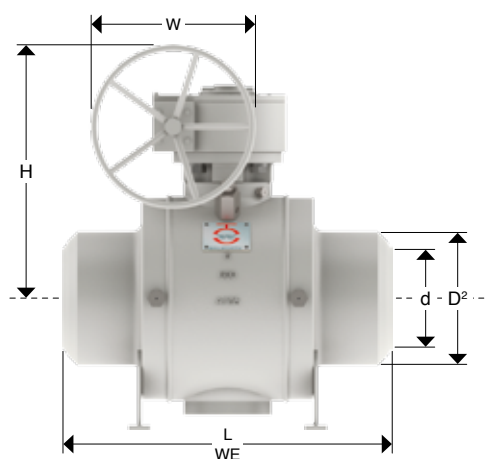
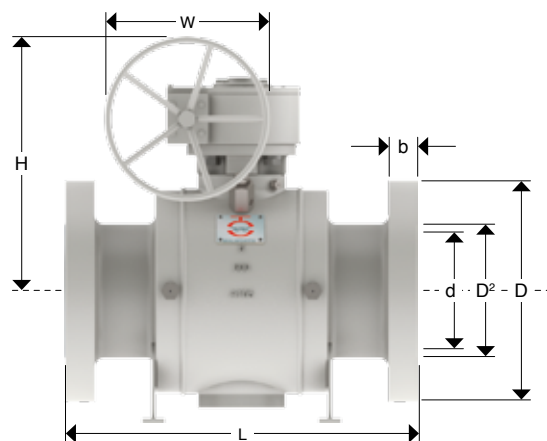
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 600 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 600 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8622-W	Raised Face (RF)
8623-W	Ring Type Joint (RTJ)
8624-W	Buttweld (WE)



## Dimensions and Weights

Nominal Diameter	mm	150	200	250	300	350	400	450	500	610	660	711	762	813	864	914
	in	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	28"	30"	32"	34"	36"
d	mm	150	201	252	303	334	385	436	487	589	633	684	735	779	830	874
	in	5.91	7.91	9.92	11.93	13.15	15.16	17.17	19.17	23.19	24.92	26.92	28.93	30.66	32.67	34.40
D	mm	355	420	510	560	605	685	745	815	940	1015	1075	1130	1195	1245	1315
	in	14.02	16.50	20	22.01	23.81	26.96	29.33	32.08	37	40	42.32	44.48	47.04	49.01	51.71
D2	mm	216	270	324	381	413	470	533	584	692	749	800	857	914	965	1022
	in	8.50	10.63	12.76	15	16.26	18.50	20.98	23	27.24	29.48	31.49	33.74	35.98	37.99	40.23
b	mm	48	56	64	67	70	76.2	83	89	102	108	111	114	117	121	124
	in	1.89	2.20	2.52	2.64	2.76	3	3.25	3.5	4.02	4.02	4.37	4.48	4.60	4.76	4.88
L	mm	559	660	787	838	889	991	1092	1194	1397	1448	1549	1651	1778	1930	2083
	in	22.01	25.98	30.98	33	35	39.02	43	47.01	55	57	60.98	65	70	75.98	82
L (WE)	mm	559	660	787	838	889	991	1092	1194	1397	1448	1549	1651	1778	1930	2083
	in	22.01	25.98	30.98	33	35	39.02	43	47.01	55	57	60.98	65	70	75.98	82
H	mm	510	580	750	790	790	833	879	919	1020	1058	1118	1153	1206	1248	1294
	in	20.07	22.83	29.53	31.1	31.1	32.79	34.6	36.18	40.15	41.65	44.01	45.39	47.48	49.13	50.94
ØW	mm	400	400	600	600	800	800	800	800	800	800	800	800	800	800	800
	in	15.75	15.75	23.62	23.62	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50
Weight	kg	314.25	500.85	795.58	1041.03	1325.67	1905.21	2465.15	3191.68	4851.45	5725.43	6579.36	7316.15	8317.97	10173.74	11862.90
(RF - RTJ)	Lb	691.36	1101.86	1750.28	2290.26	2916.48	4191.46	5423.32	7021.70	10673.18	12595.94	14474.60	16095.52	18299.54	22382.22	26098.38

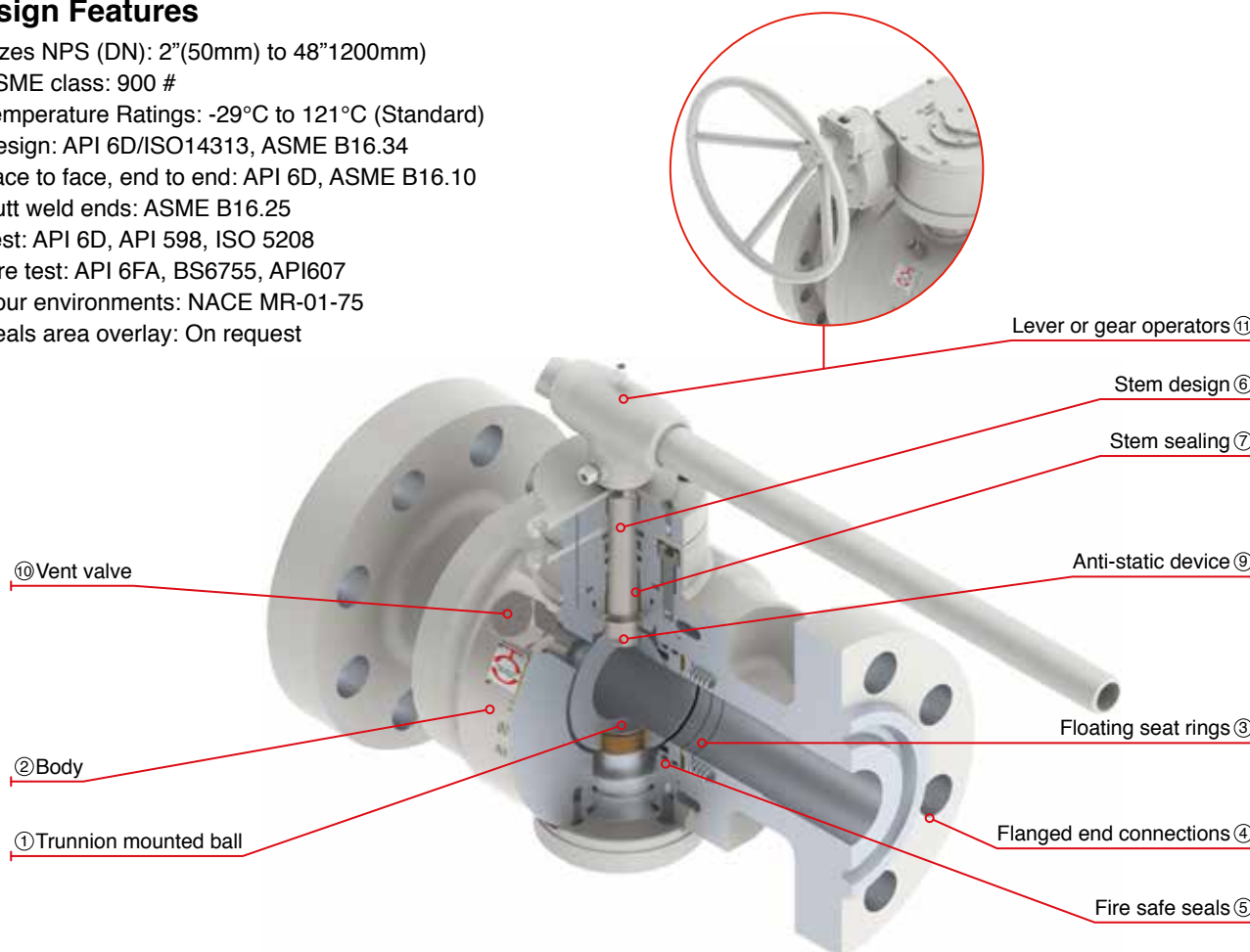


# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 900

Trunnion Mounted Ball Valves are designed and manufactured in conformance with API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

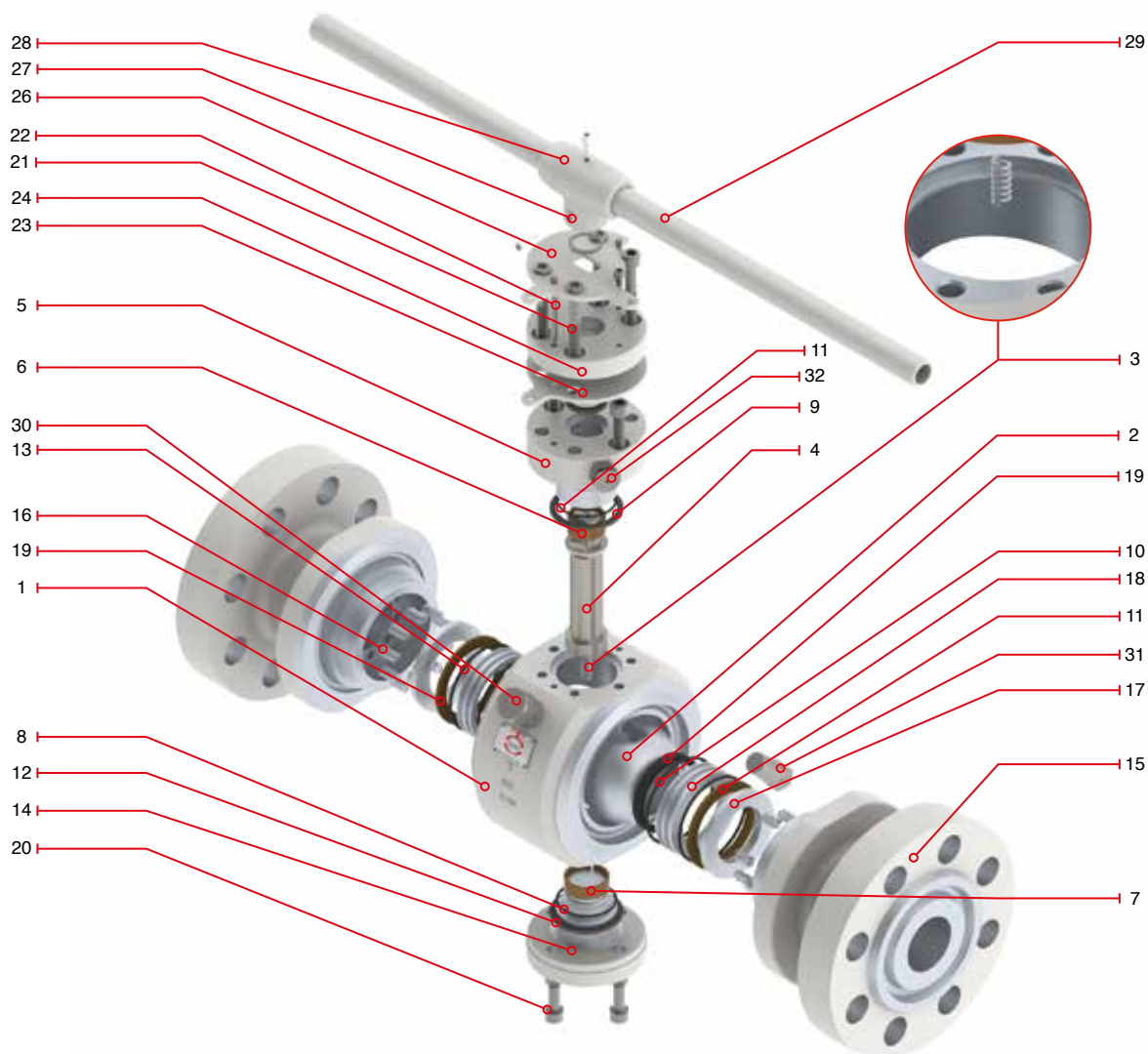
## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"1200mm)
- ASME class: 900 #
- Temperature Ratings: -29°C to 121°C (Standard)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: On request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) double explosive decompression resistant (EDR) O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (4" & larger): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

## TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 900 (LEVER OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	18	Seat ring	ASTM A105+75μm ENP / AISI 410
2	Ball	ASTM A105+75μm ENP / AISI 410	19	Seat insert	Nylon or Devlon
3	Antistatic spring	INCONEL X-750	20	Socket screw	ASTM A193 B7M
4	Stem	AISI 4140+75μm ENP / AISI 410	21	Socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75μm ENP	22	Pin	Carbon Steel
6	Upper bearing	C.S. + PTFE LINING	23	Locking device	A36
7	Lower bearing	C.S. + PTFE LINING	24	Packing gland flange	ASTM A216 WCB / A105
8	Lower O'ring	Viton	25	Hex. Bolt*	ASTM A193 B7M
9	Upper O'ring	Viton	26	Stop plate	A36
10	Seat O'ring	Viton	27	Retainer	AISI 1070
11	Stem fire safe gasket	Graphite	28	Handle nut	ASTM A216 WCB
12	Trunnion fire safe gasket	Graphite	29	Handle	ASTM A53
13	Seat fire safe gasket	Graphite	30	Vent valve	Carbon Steel
14	Trunnion	AISI 4140+75μm ENP / AISI 410	31	Drain plug	Carbon Steel
15	Flanged ends	A105N	32	Grease fitting	Carbon Steel
16	Seat spring	INCONEL X-750	33	Lifting lug*	A36
17	Back up seat ring	ASTM A105+75μm ENP / AISI 410	34	Support leg*	A36

\* Not shown

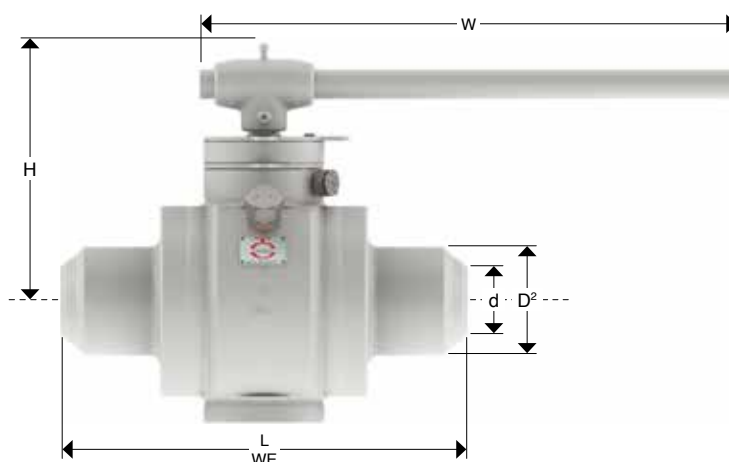
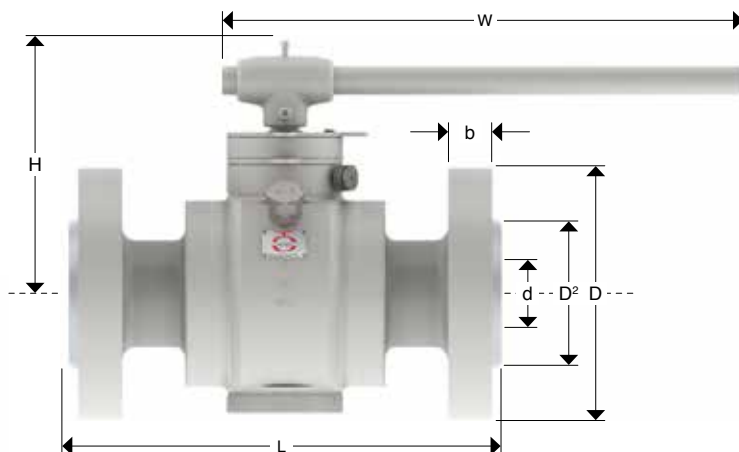
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 900 (LEVER OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 900 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8912-W	Raised Face (RF)
8913-W	Ring Type Joint (RTJ)
8914-W	Buttweld (WE)



## Dimensions and Weights

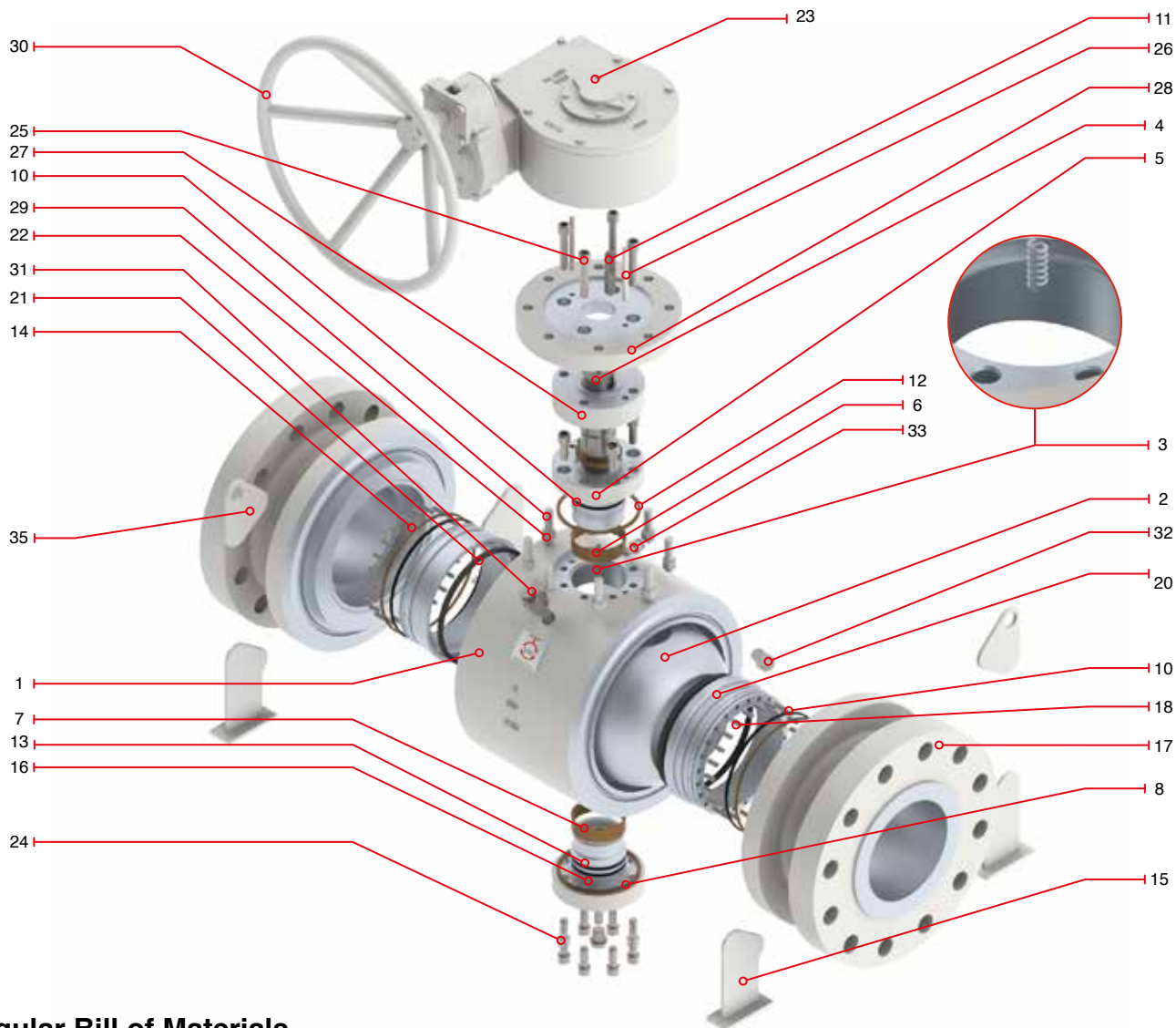
Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"	100 4"
d	mm in	49 1.93	62 2.44	74 2.91	100 3.94
D	mm in	216 8.50	244 9.61	241 8.27	292 11.50
D2	mm in	92 3.62	105 4.13	127 5	157 6.18
b	mm in	38.5 1.52	41.5 1.63	38.5 1.26	44.5 1.75
L	mm in	368 14.50	419 16.50	381 14.02	457 18
L (WE)	mm in	368 14.50	419 16.50	381 14.02	457 18
H	mm in	213 8.37	220 8.68	220 8.68	275 10.84
ØW	mm in	700 27.56	800 23.62	800 27.56	APM
Weight (RF - RTJ)	kg Lb	56.13 123.48	73.50 161.70	81.52 179.34	143.44 315.56

APM = As per manufacturer

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

## TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 900 (GEAR OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	20	Seat ring	ASTM A105+75µm ENP / AISI 411
3	Antistatic spring	INCONEL X-750	21	Seat insert	Nylon or Devlon
4	Stem	AISI 4140+75µm ENP / AISI 410	22	Spring lock washer	Carbon Steel
5	Trunnion / bonnet	AISI 4140+75µm ENP	23	Gear box	Commercial steel
6	Upper bearing	C.S.+ PTFE LINING	24	Bottom socket screw	ASTM A193 B7M
7	Lower Bearing	C.S.+ PTFE LINING	25	Top socket screw	ASTM A193 B7M
8	Lower O'ring	Viton	26	Pin	ASTM A276 T410
9	Stem O'ring*	Viton	27	Packing gland bushing*	AISI 410
10	Seat O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
11	Key	Carbon Steel	29	Hex. Bolt	ASTM A193 B7M
12	Upper fire safe gasket*	Graphite	30	Handwheel	ASTM A53
13	Lower fire safe gasket	Graphite	31	Vent valve	AISI 4140
14	On seat fire safe gasket	Graphite	32	Drain plug	AISI 4140
15	Support leg	A36	33	Stem grease fitting	AISI 4140
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	34	Ends grease fitting*	AISI 4140
17	Flanged ends	A105N	35	Lifting lug	A36
18	Seat spring	INCONEL X-750			

\* Not shown



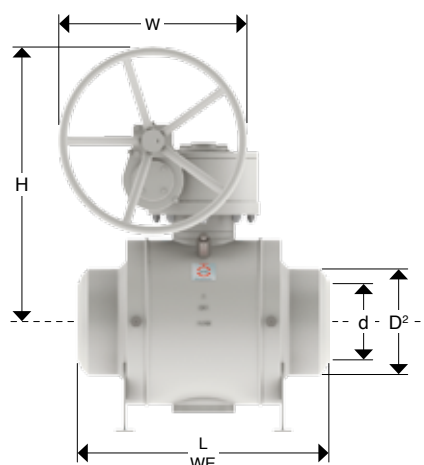
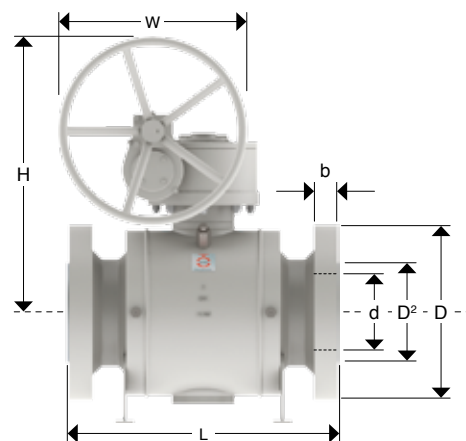
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 900 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 900 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8922-W	Raised Face (RF)
8923-W	Ring Type Joint (RTJ)
8924-W	Buttweld (WE)



## Dimensions and Weights

Nominal Diameter	mm	150	200	250	300	350	400	450	500	610	660	711	762	813	864	914
	in	6"	8"	10"	12"	14"	16"	18"	20"	24"	26"	28"	30"	32"	34"	36"
d	mm	150	201	252	303	322	373	423	471	570	617	665	712	760	808	855
	in	5.91	7.91	9.92	11.93	13.15	14.69	16.65	18.54	22.44	24.29	26.18	28.03	30	32	34
D	mm	381	470	546	610	640	705	785	855	1040	1085	1170	1230	1315	1395	1460
	in	15	18.50	21.50	24.02	25.19	27.76	31	33.66	40.94	42.71	46.06	48.42	51.77	54.92	57.48
D2	mm	216	270	324	419	467	524	594	648	772	832	889	946	1003	1067	1124
	in	8.50	10.63	12.76	15	18.38	20.67	23.38	25.51	30.39	32.75	35	37.24	39.48	42	44.25
b	mm	56	63.5	70	79.5	86	89	102	108	140	140	143	149	159	165	172
	in	2.20	2.50	2.76	3.13	3.39	3.50	3.27	4.25	5.51	5.51	5.62	5.86	6.25	6.5	6.7
L	mm	610	737	838	968	1029	1130	1219	1321	1549	1651	APM	1880	APM	APM	2286
	in	24.02	29.02	33	38	40.51	44.49	43	52.01	60.98	65	APM	74	APM	APM	90
L (WE)	mm	610	737	838	968	1029	1130	1219	1321	1549	APM	APM	APM	APM	APM	APM
	in	24.02	29.02	33	38	40.51	44.49	43	52.01	60.98	APM	APM	APM	APM	APM	APM
H	mm	690	758	824	856	875	937	1020	1080	1295	APM	APM	APM	APM	APM	APM
	in	27.17	29.84	32.44	33.7	34.45	36.89	40.16	42.52	51	APM	APM	APM	APM	APM	APM
ØW	mm	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800
	in	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50
Weight (RF - RTJ)	kg	329.19	608.94	943.03	1257.07	1689.16	2209.90	3014.84	3977.46	5990.47	6943.30	7925.08	9506.45	10802.72	13228.22	15418.52
	Lb	724.22	1339.66	2074.66	2765.56	3716.16	4861.78	6632.64	8750.42	13179.04	15275.26	17435.18	20914.18	23765.98	29102.08	33920.74

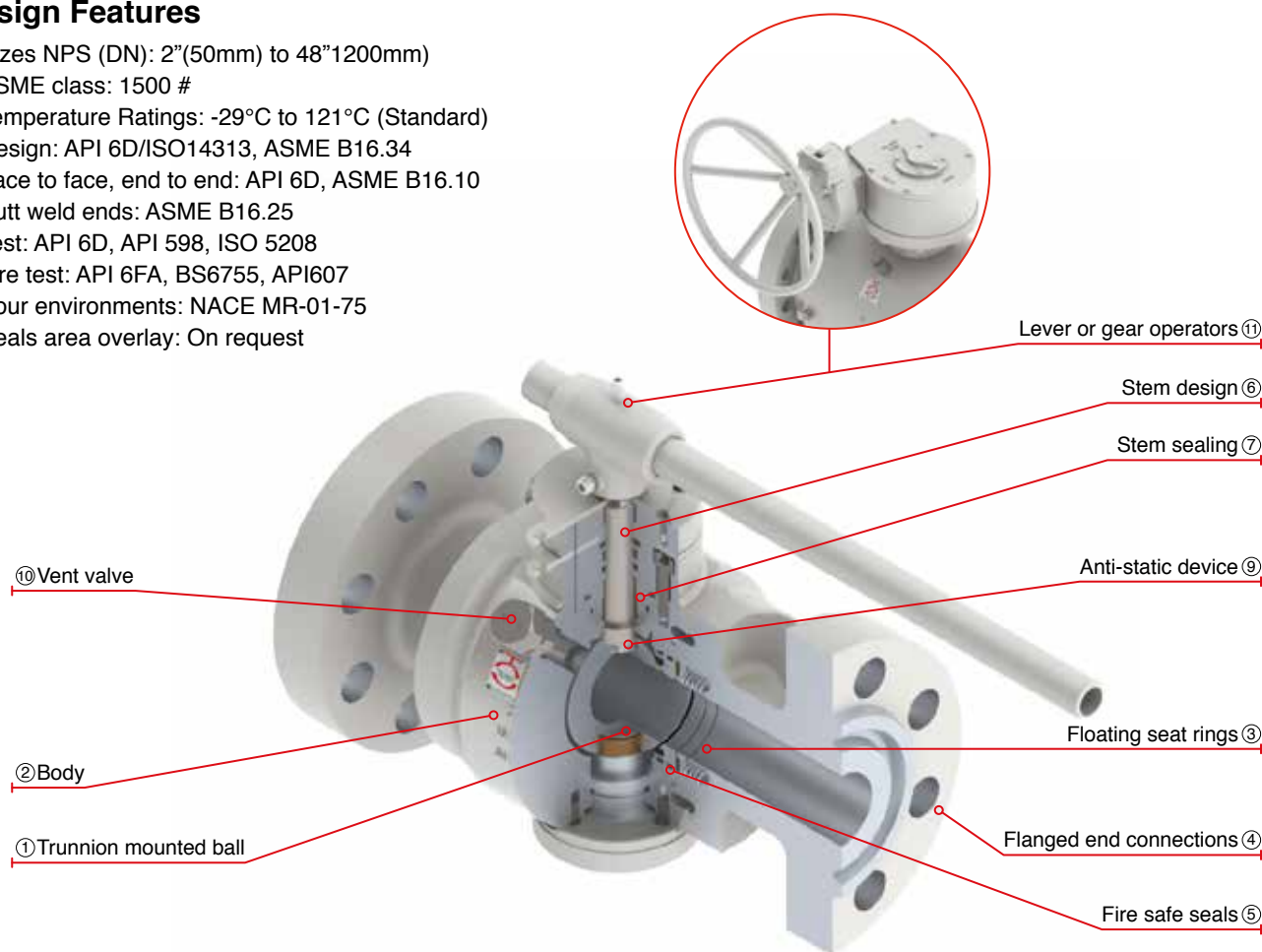
APM = As per manufacturer

# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 1500

Trunnion Mounted Ball Valves are designed and manufactured in conformance with API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

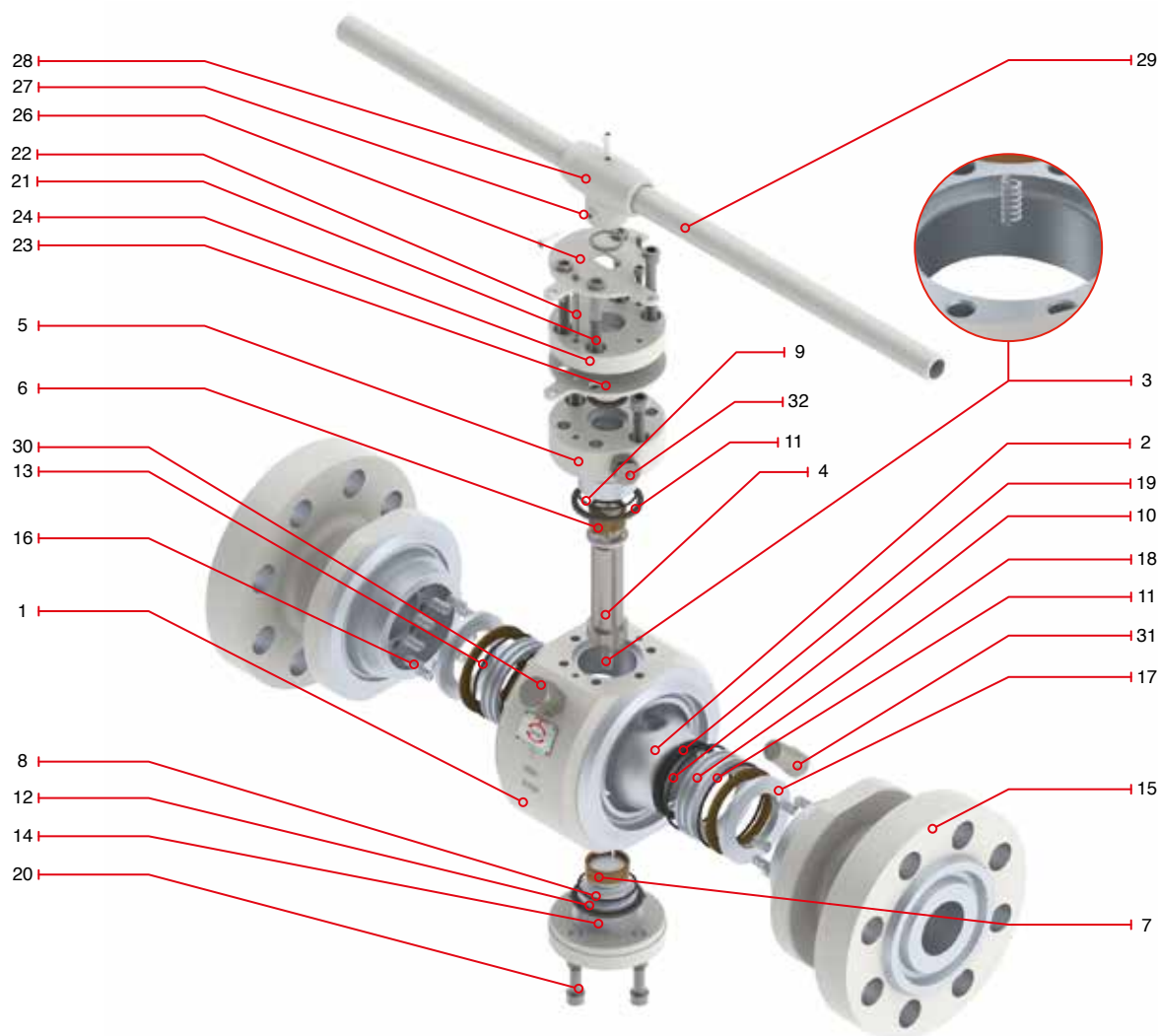
## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"1200mm)
- ASME class: 1500 #
- Temperature Ratings: -29°C to 121°C (Standard)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: On request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) double explosive decompression resistant (EDR) O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (4" & larges): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 1500 (LEVER OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	18	Seat ring	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	19	Seat insert	Nylon or Devlon (2 to 24"); Molon or Peek (26 to 48")
3	Antistatic spring	INCONEL X-750	20	Socket screw	ASTM A193 B7M
4	Stem	AISI 4140+75µm ENP / AISI 410	21	Socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	22	Pin	Carbon Steel
6	Upper bearing	C.S.+ PTFE LINING	23	Locking device	A36
7	Lower bearing	C.S.+ PTFE LINING	24	Packing gland flange	ASTM A216 WCB / A105
8	Lower O'ring	Viton	25	Hex. Bolt*	ASTM A193 B7M
9	Upper O'ring	Viton	26	Stop plate	A36
10	Seat O'ring	Viton	27	Retainer	AISI 1070
11	Stem fire safe gasket	Graphite	28	Handle nut	ASTM A216 WCB
12	Trunnion fire safe gasket	Graphite	29	Handle	ASTM A53
13	Seat fire safe gasket	Graphite	30	Vent valve	Carbon Steel
14	Trunnion	AISI 4140+75µm ENP / AISI 410	31	Drain plug	Carbon Steel
15	Flanged ends	A105N	32	Grease fitting	Carbon Steel
16	Seat spring	INCONEL X-750	33	Lifting lug*	A36
17	Back up seat ring	ASTM A105+75µm ENP / AISI 410	34	Support leg*	A36

\* Not shown

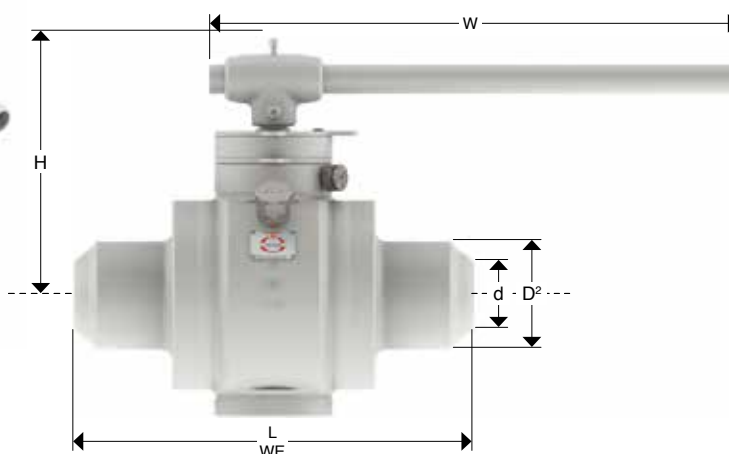
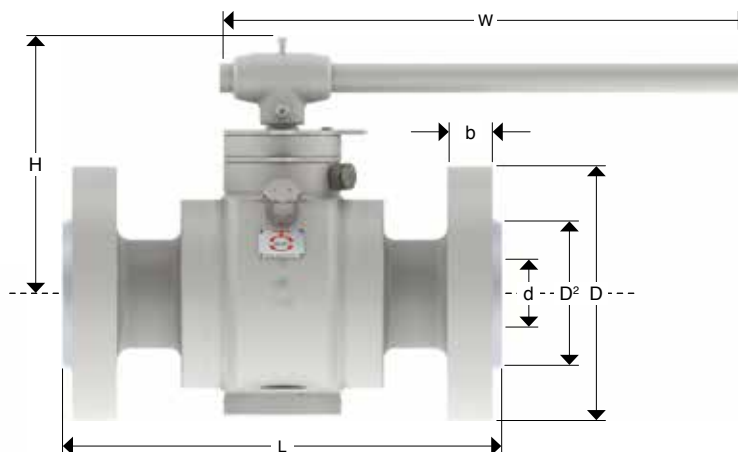
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 1500 (LEVER OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 1500 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8512-W	Raised Face (RF)
8513-W	Ring Type Joint (RTJ)
8514-W	Buttweld (WE)



## Dimensions and Weights

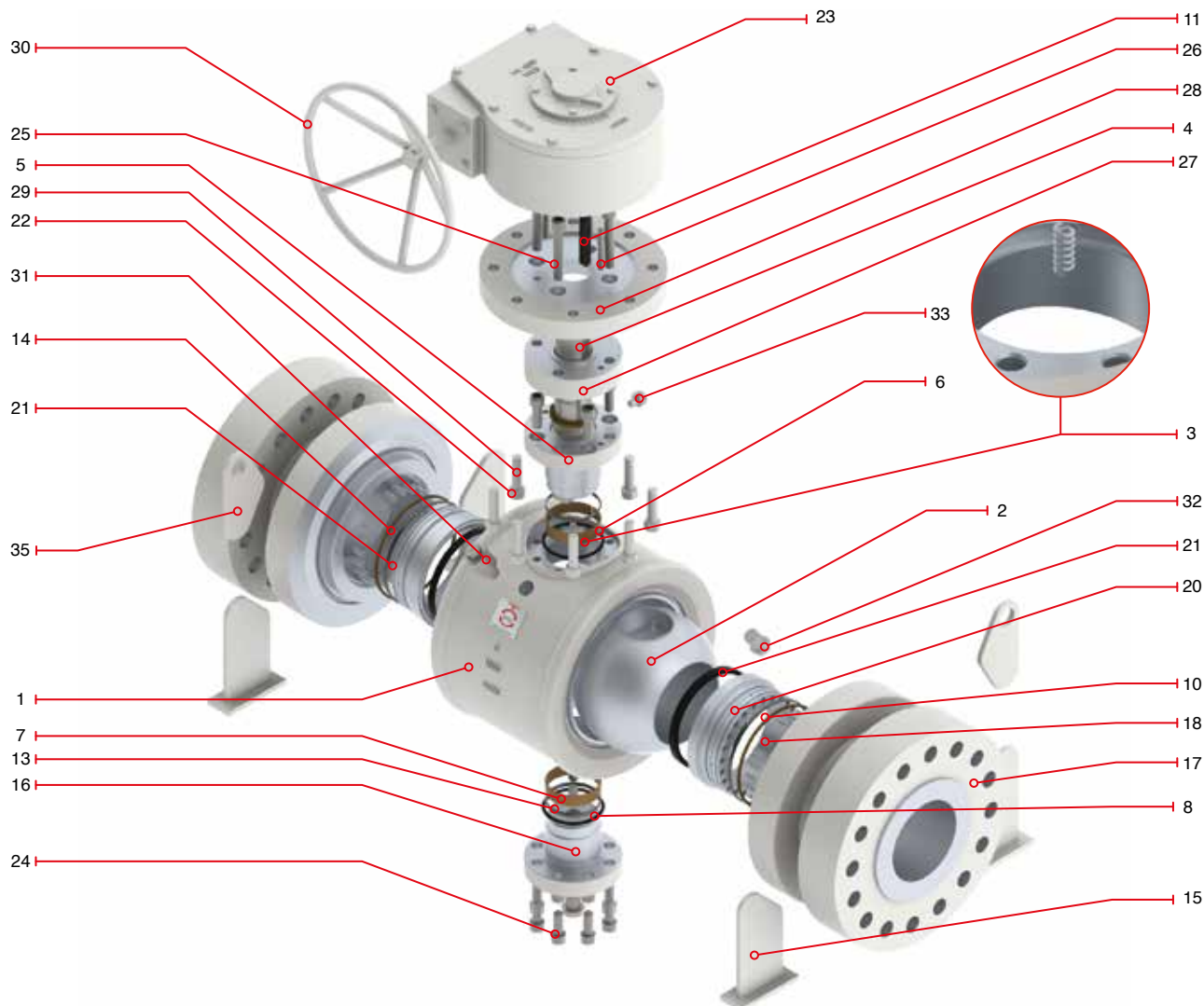
Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"
d	mm in	49 1.93	62 2.44	74 2.91
D	mm in	216 8.50	244 9.61	267 10.51
D2	mm in	92 3.62	105 4.13	127 5
b	mm in	38.5 1.52	41.5 1.63	48 1.89
L	mm in	368 14.50	419 16.50	470 18.50
L (WE)	mm in	368 14.50	419 16.50	381 14.02
H	mm in	212 8.37	220 8.68	233 9.19
ØW	mm in	700 27.56	800 31.50	900 35.43
Weight (RF - RTJ)	kg Lb	63.70 140.14	91.32 200.90	113.15 248.92

## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight



# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 1500 (GEAR OPERATED)



## Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	19	Back up seat ring	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	20	Seat ring	ASTM A105+75µm ENP / AISI 411
3	Antistatic spring	INCONEL X-750	21	Seat insert	Nylon or Devlon (2 to 24"); Molon or Peek (26 to 48")
4	Stem	AISI 4140+75µm ENP / AISI 410	22	Spring lock washer	Carbon Steel
5	Trunnion / bonnet	AISI 4140+75µm ENP	23	Gear box	Commercial steel
6	Upper bearing	C.S.+ PTFE LINING	24	Bottom socket screw	ASTM A193 B7M
7	Lower Bearing	C.S.+ PTFE LINING	25	Top socket screw	ASTM A193 B7M
8	Lower O'ring	Viton	26	Pin	ASTM A276 T410
9	Stem O'ring*	Viton	27	Packing gland bushing*	AISI 410
10	Seat O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
11	Key	Carbon Steel	29	Hex. Bolt	ASTM A193 B7M
12	Upper fire safe gasket*	Graphite	30	Handwheel	ASTM A53
13	Lower fire safe gasket	Graphite	31	Vent valve	AISI 4140
14	On seat fire safe gasket	Graphite	32	Drain plug	AISI 4140
15	Support leg	A36	33	Stem grease fitting	AISI 4140
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	34	Ends grease fitting*	AISI 4140
17	Flanged ends	A105N	35	Lifting lug	A36
18	Seat spring	INCONEL X-750			

\* Not shown

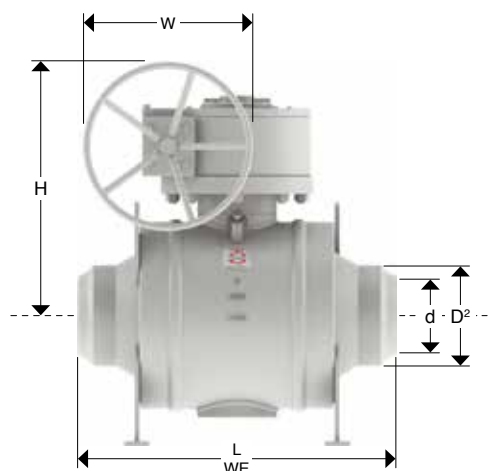
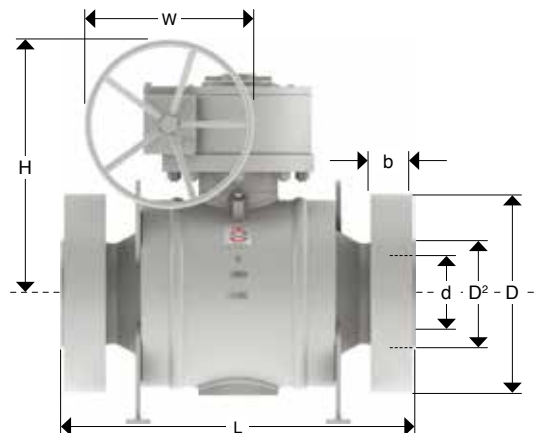
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 1500 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 1500 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8522-W	Raised Face (RF)
8523-W	Ring Type Joint (RTJ)
8524-W	Buttweld (WE)



## Dimensions and Weights

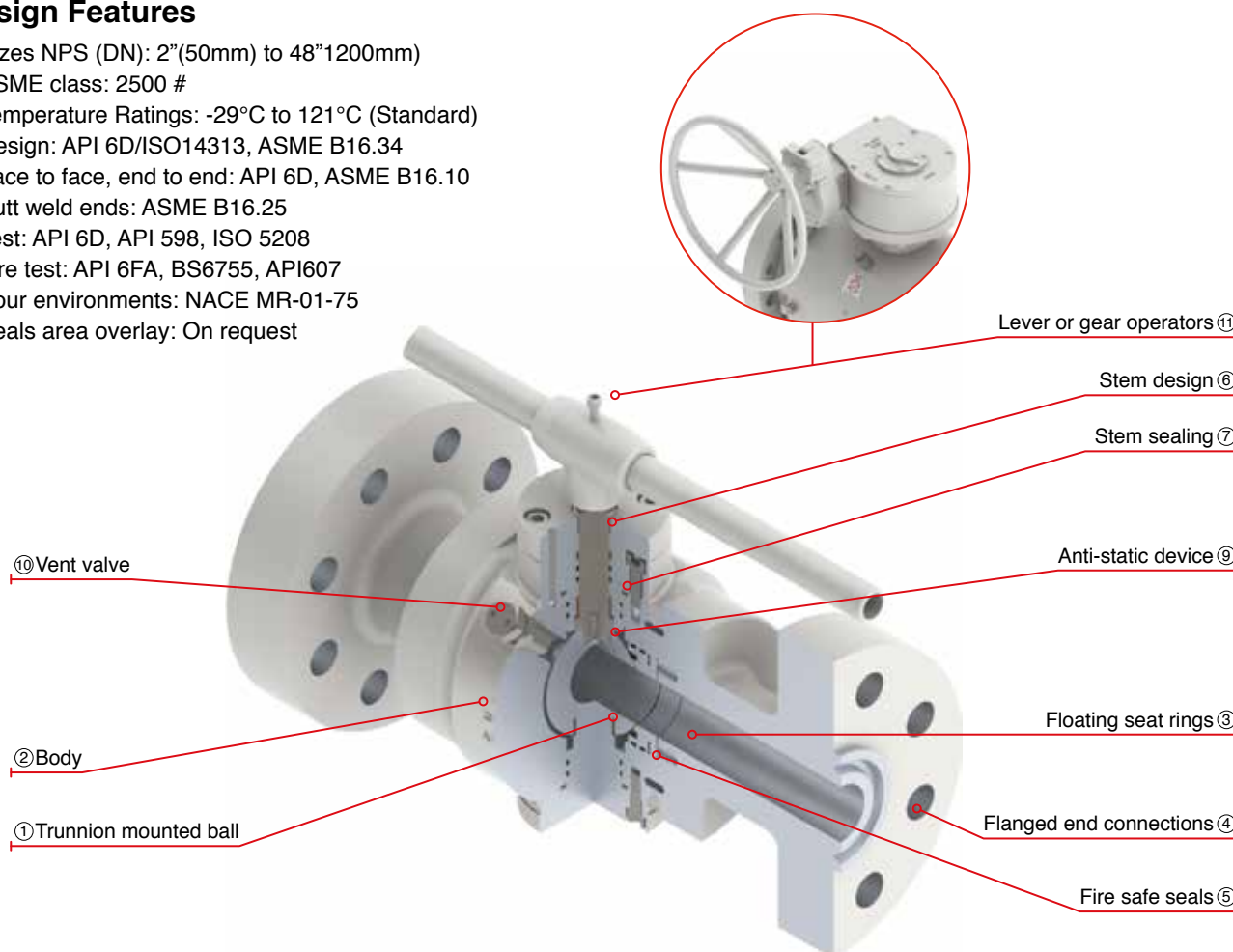
Nominal Diameter	mm	100	150	200	250	300	350	400	450	500	600
	in	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
d	mm	100	144	192	239	287	315	360	406	454	546
	in	3.94	5.67	7.56	9.41	11.30	12.40	14.17	15.98	17.87	21.50
D	mm	311	394	483	585	674	750	825	914	985	1168
	in	12.24	15.51	19.02	23.03	26.54	29.53	32.48	35.98	38.78	45.98
D2	mm	157	216	270	324	381	413	470	533	584	692
	in	6.18	8.50	10.63	12.76	15	16.26	18.50	20.98	23	27.24
b	mm	54	83	92	108	124	134	146.5	162	178	204
	in	2.13	3.27	3.62	4.25	4.88	5.28	5.77	6.38	7.01	8.03
L	mm	546	705	832	991	1130	1257	1384	1537	1664	1943
	in	21.50	27.76	32.76	39.02	44.49	49.49	54.49	60.51	65.51	76.50
L (WE)	mm	457	610	737	838	968	1029	1130	1219	1321	1549
	in	18	24.02	29.02	33	38	40.51	44.49	43	52.01	60.98
H	mm	275	690	758	824	856	775	937	1030	1080	1295
	in	10.84	27.17	29.84	32.44	33.7	30.51	36.89	40.55	42.52	51
ØW	mm	600	800	800	800	800	600	800	800	800	800
	in	23.62	31.50	31.50	31.50	31.50	23.62	31.50	31.50	31.50	31.50
Weight	kg	191.10	486	854.38	1492.72	2209.45	3142.68	4321	5926.33	7931.76	12135.07
(RF - RTJ)	Lb	420.42	1069.18	1879.64	3283.98	4860.80	6913.90	9506	13037.92	17449.88	26697.16

# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 2500

Trunnion Mounted Ball Valves are designed and manufactured in conformance with API 6D, ISO 14313, ASME B16.34, API 6FA, API 607 & NACE MR01-75.

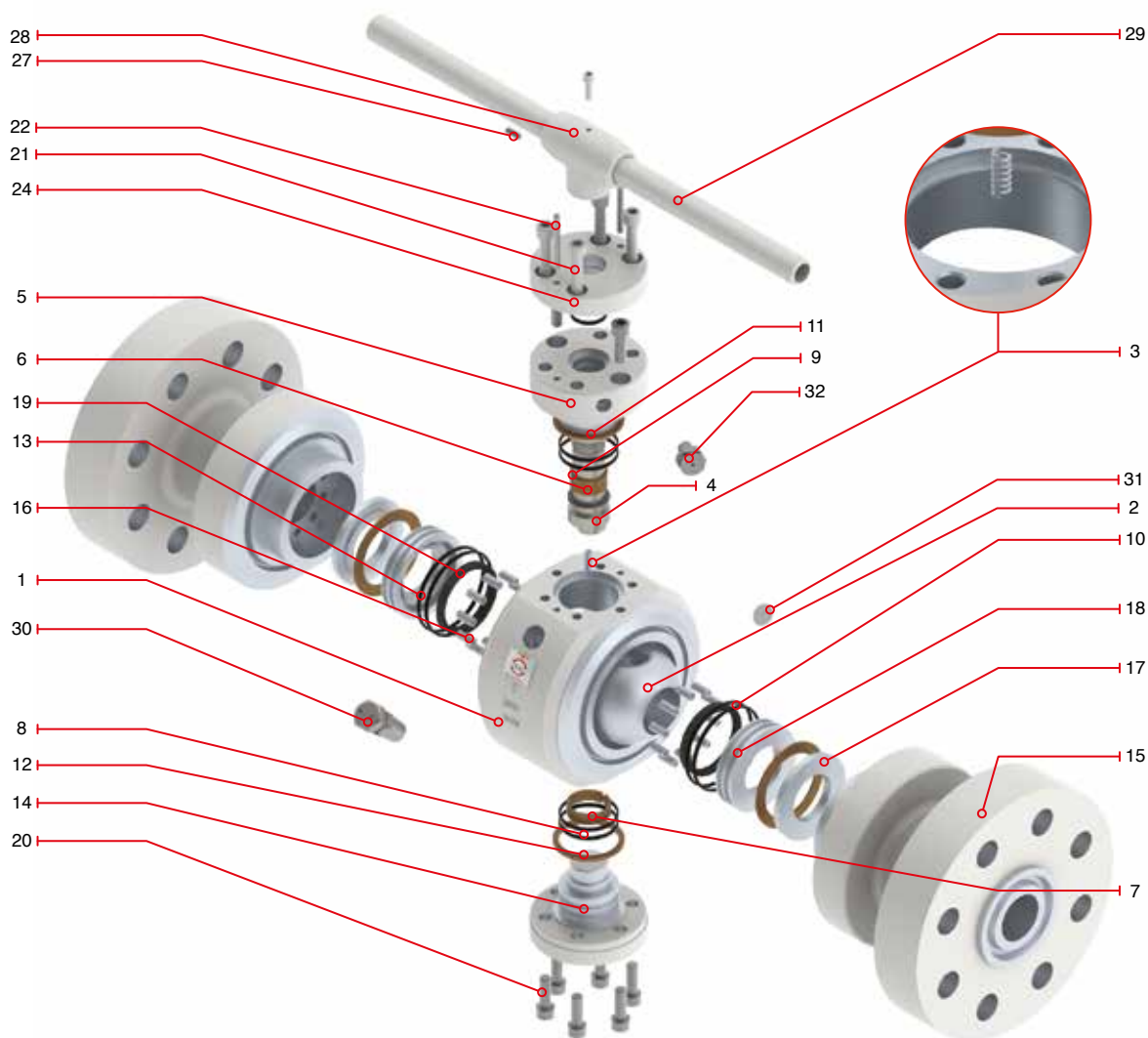
## Design Features

- Sizes NPS (DN): 2"(50mm) to 48"1200mm)
- ASME class: 2500 #
- Temperature Ratings: -29°C to 121°C (Standard)
- Design: API 6D/ISO14313, ASME B16.34
- Face to face, end to end: API 6D, ASME B16.10
- Butt weld ends: ASME B16.25
- Test: API 6D, API 598, ISO 5208
- Fire test: API 6FA, BS6755, API607
- Sour environments: NACE MR-01-75
- Seals area overlay: On request



- ① Trunnion mounted ball: For all sizes & pressure ratings. The ball is fixed by an upper & lower trunnion, seat rings are dynamic which will move freely along the horizontal axis.
- ② Body. Three piece forged steel body for easy disassembly on site. Small cavities between body, seats & ball minimize the quantity of fluid that could get stored in that hollow space.
- ③ Floating seat rings. Two independent dynamic seat rings attain Bi-Directional closure of the valve these Seat. Rings are spring loaded that achieve tight shut-off at considerable low differential pressure.
- ④ Flanged ends connections. Forged steel RF or RTJ connections according to ASME B16.5 up to 24" and ASME B16.47 Series A for 26" & larger.
- ⑤ Fire safe seals: Fire safe design prevents leakage when the elastomeric seals are exposed to very high temperatures.
- ⑥ Stem design: Bottom entry anti blow out stem is made of one piece which is held up by the valve body. It has been design to avoid any possible projection due to hazardous conditions.
- ⑦ Stem sealing: Accurate machining process together with electro less nickel plated (ENP) double explosive decompression resistant (EDR) O'rings, these are supported by a secondary graphite seal which ensure reliable operation at high levels of sealing integrity when operating the valve.
- ⑧ Seats & stem emergency sealant injection (4" & larges): Valves are supplied with emergency sealant Injectors located between the double O'ring arrangement of the seat assembly & stem seal area. A highly viscous sealant is injected through these fittings to restore closure integrity.\*Whenever the valve lifetime has ended or if any of the seats get damaged, the emergency sealant injection system may temporarily be used to achieve tightness before maintenance takes place.
- ⑨ Antistatic device: An inconel spring is placed between body, ball and stem to prevent static continuity.
- ⑩ Block & bleed: Double block & bleed is achieved with the valve in two positions either fully closed or fully opened.
- ⑪ Lever handle: 6" & larger valves supplied with gear operator.

## TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 2500 (LEVER OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	18	Seat ring	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	19	Seat insert	Peek
3	Antistatic spring	INCONEL X-750	20	Socket screw	ASTM A193 B7M
4	Stem	AISI 4140+75µm ENP / AISI 410	21	Socket screw	ASTM A193 B7M
5	Trunnion / bonnet	AISI 4140+75µm ENP	22	Pin	Carbon Steel
6	Upper bearing	C.S.+ PTFE LINING	23	Locking device*	A36
7	Lower bearing	C.S.+ PTFE LINING	24	Packing gland flange	ASTM A216 WCB / A105
8	Lower O'ring	Viton	25	Hex. Bolt*	ASTM A193 B7M
9	Upper O'ring	Viton	26	Stop plate*	A36
10	Seat O'ring	Viton	27	Retainer	AISI 1070
11	Stem fire safe gasket	Graphite	28	Handle nut	ASTM A216 WCB
12	Trunnion fire safe gasket	Graphite	29	Handle	ASTM A53
13	Seat fire safe gasket	Graphite	30	Vent valve	Carbon Steel
14	Trunnion	AISI 4140+75µm ENP / AISI 410	31	Drain plug	Carbon Steel
15	Flanged ends	A105N	32	Grease fitting	Carbon Steel
16	Seat spring	INCONEL X-750	33	Lifting lug*	A36
17	Back up seat ring	ASTM A105+75µm ENP / AISI 410	34	Support leg*	A36

\* Not shown



# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 2500 (LEVER OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 2500 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug

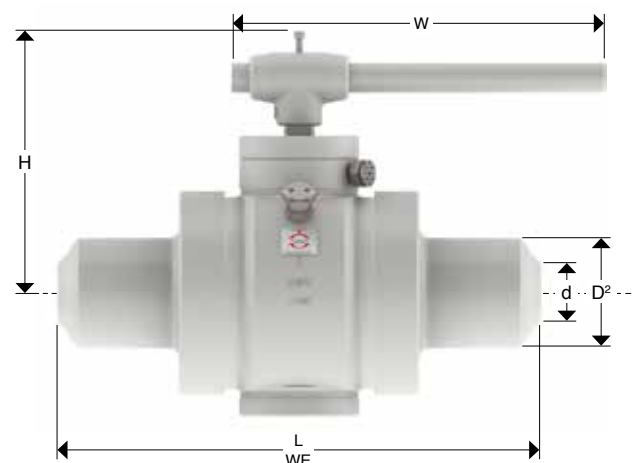
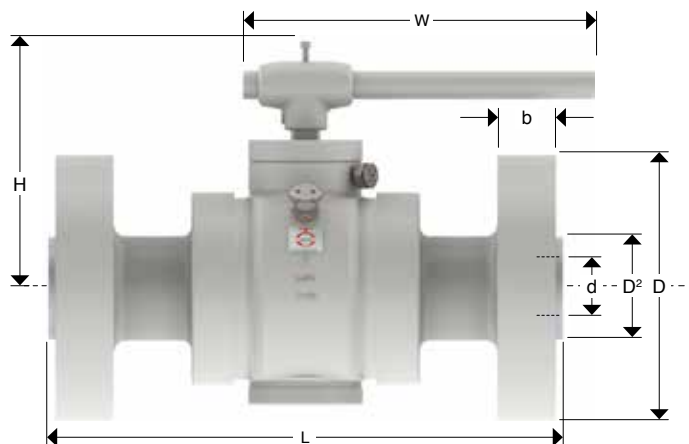


## Dimensions and Weights

Nominal Diameter	mm in	50 2"	65 2 1/2"	80 3"
d	mm inch	42 1.65	52 2.05	62 2.44
D	mm inch	235 9.25	267 10.51	305 12.01
D2	mm inch	133 5.24	149 5.87	168 6.61
P	mm inch	101.6 4	111.12 4.37	127 5
E	mm inch	7.92 0.31	9.52 0.37	9.52 0.37
b	mm inch	51 2.01	58 2.28	67 2.64
L	mm inch	454 17.87	514 20.24	584 23
L (WE)	mm inch	222 8.76	240 9.46	259 10.21
H	mm inch	800 31.50	900 35.43	1000 39.37
ØW	mm inch	800 31.50	900 35.43	1000 39.37
Weight	Kg. Lb.	APM	APM	APM

APM = As per manufacturer

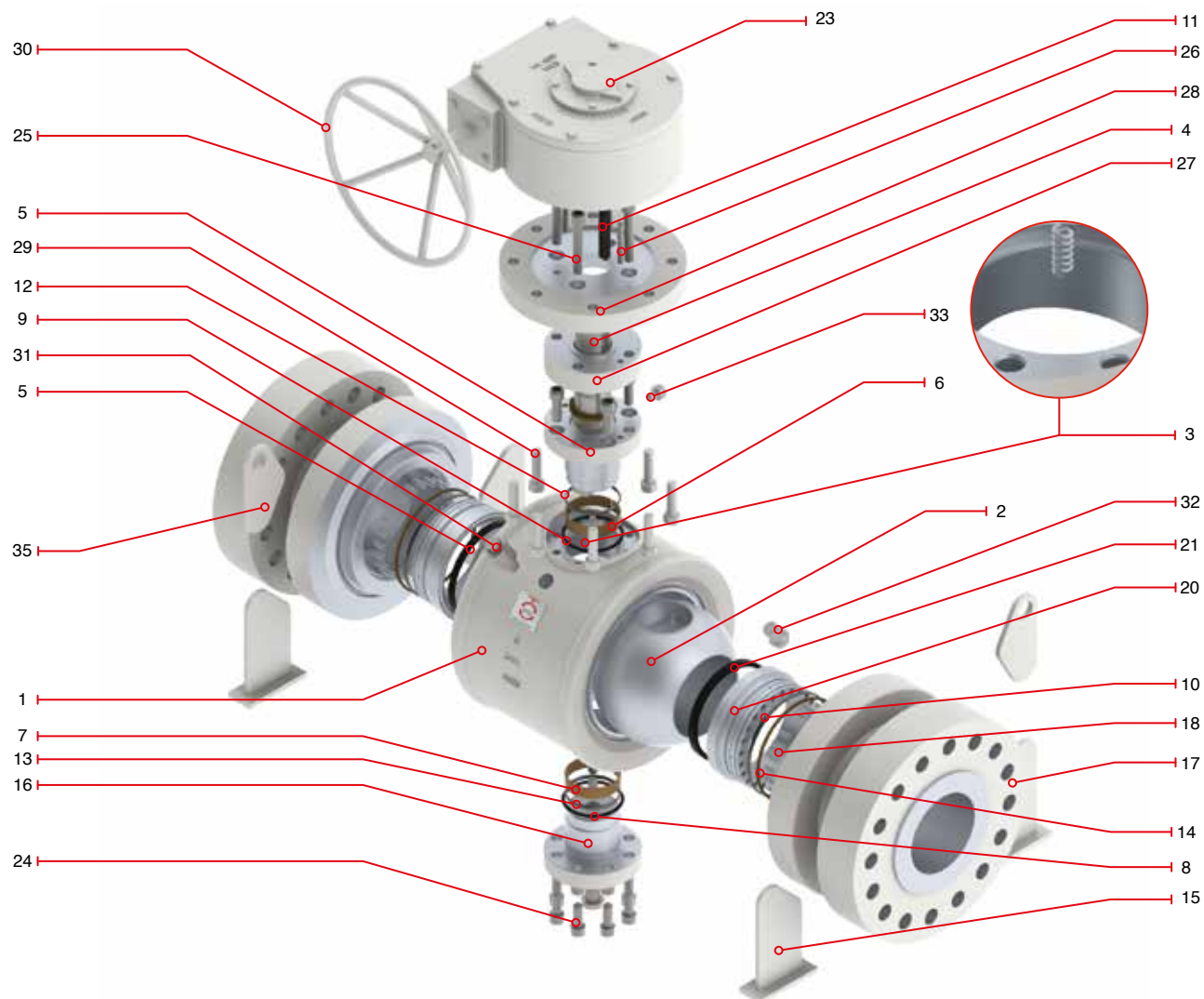
Catalog Figure No.	Type of Ends
8213-W	Ring Type Joint (RTJ)
8214-W	Buttweld (WE)



## Key Parameters

Code	Name
d	Bore diameter
D	Flange diameter
D2	Raised face diameter
b	Flange thickness
L	Raised face and ring type joint face to face
L (WE)	Welded end face to face
H	Height
ØW	Handwheel diameter
Weight	Weight

## TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 2500 (GEAR OPERATED)



### Regular Bill of Materials

No.	Description	ASTM Materials	No.	Description	ASTM Materials
1	Body	ASTM A105N	19	Back up seat ring*	ASTM A105+75µm ENP / AISI 410
2	Ball	ASTM A105+75µm ENP / AISI 410	20	Seat ring	ASTM A105+75µm ENP / AISI 411
3	Antistatic spring	INCONEL X-750	21	Seat insert	Peek
4	Stem	AISI 4140+75µm ENP / AISI 410	22	Spring lock washer*	Carbon Steel
5	Trunnion / bonnet	AISI 4140+75µm ENP	23	Gear box	Commercial steel
6	Upper bearing	C.S.+ PTFE LINING	24	Bottom socket screw	ASTM A193 B7M
7	Lower Bearing	C.S.+ PTFE LINING	25	Top socket screw	ASTM A193 B7M
8	Lower O'ring	Viton	26	Pin	ASTM A276 T410
9	Stem O'ring	Viton*	27	Packing gland bushing	AISI 410*
10	Seat O'ring	Viton	28	Packing gland flange	ASTM A216 WCB / A105
11	Key	Carbon Steel	29	Hex. Bolt	ASTM A193 B7M
12	Upper fire safe gasket	Graphite*	30	Handwheel	ASTM A53
13	Lower fire safe gasket	Graphite	31	Vent valve	AISI 4140
14	On seat fire safe gasket	Graphite	32	Drain plug	AISI 4140
15	Support leg	A36	33	Stem grease fitting	AISI 4140
16	Lower trunnion	AISI 4140+75µm ENP / AISI 410	34	Ends grease fitting	AISI 4140*
17	Flanged ends	A105N	35	Lifting lug	A36
18	Seat spring	INCONEL X-750			

\* Not shown

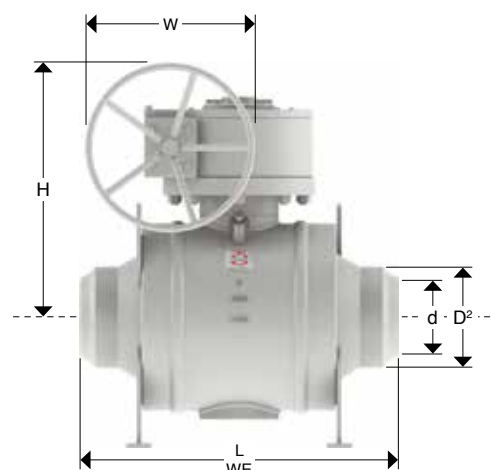
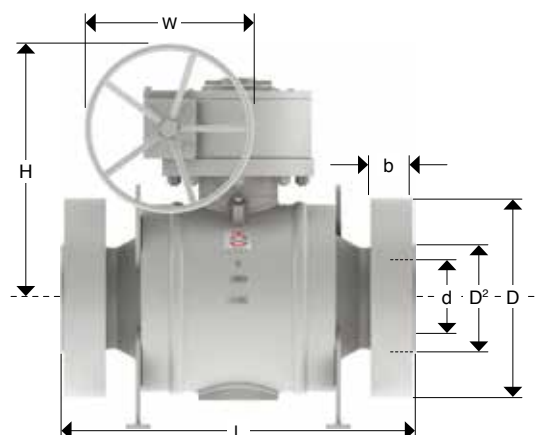
# TRUNNION MOUNTED BALL VALVE WELDED BODY, CLASS 2500 (GEAR OPERATED)

## Design Features

- Side entry
- Blow out proof stem
- Soft & metal - metal seats
- Gear operated from 6" and up starting from Class 2500 #
- Three piece forged body design
- Bleed valve
- Fire safe packing
- Lifting lugs
- Heavy wall thickness
- Secondary seat injection sealant
- Draining plug



Catalog Figure No.	Type of Ends
8223-W	Ring Type Joint (RTJ)
8224-W	Buttweld (WE)



## Dimensions and Weights

D Nominal Diameter	mm inch	100 4"	150 6"	200 8"	250 10"	300 12"
d	mm inch	87 3.43	131 5.16	179 7.05	223 8.78	265 10.43
D	mm inch	356 14.02	483 19.02	552 21.73	674 26.54	762 30
D2	mm inch	203 8	279 10.98	340 13.39	426 16.77	495 19.49
P	mm inch	157.18 6.19	228.6 9	279.4 11	342.9 13.50	406.4 16
E	mm inch	11.13 0.44	12.7 0.50	14.27 0.56	17.48 0.69	17.48 0.69
b	mm inch	76.5 3.01	108 4.25	127 5	165 6.50	185 7.28
L	mm inch	683 26.89	927 36.50	1038 40.87	1292 50.87	1445 56.89
L (WE)	mm inch	319 12.57	778 30.63	850 33.47	960 37.80	1080 42.52
H	mm inch	600 23.62	800 31.50	800 31.50	800 31.50	800 31.50
ØW	mm inch	600 23.62	800 31.50	800 31.50	800 31.50	800 31.50
Weight	Kg. Lb.	APM	APM	APM	APM	APM

APM = As per manufacturer

## TECHNICAL INFORMATION

### STEM EXTENSIONS & CONNECTIONS



There are pipe systems that run underground thus, buried valves that are not easy to reach and operate do require stem extension to facilitate access. This improvement is also recommended for services under extreme temperatures such as - 50°C or lower and 220°C or higher.

### TYPES OF OPERATIONS



**Gear operators**



**Electric operators**



**Pneumatic operators**



**Hydraulic operators**

### FLANGED ENDS GREASE FITTINGS

Upon customer request grease fitting are available to inject grease on seat ring sealing areas.

SIZE	CLASS					
	150	300	600	900	1500	2500
2	NO	NO	NO	NO	NO	NO
3	NO	NO	NO	NO	YES	YES
4	NO	NO	YES	YES	YES	YES
6	YES	YES	YES	YES	YES	YES
8	YES	YES	YES	YES	YES	YES
10	YES	YES	YES	YES	YES	YES
12	YES	YES	YES	YES	YES	YES
14	YES	YES	YES	YES	YES	YES
16	YES	YES	YES	YES	YES	YES
18	YES	YES	YES	YES	YES	YES
20	YES	YES	YES	YES	YES	YES
22	YES	YES	YES	YES	YES	YES
24	YES	YES	YES	YES	YES	YES
26	YES	YES	YES	YES	YES	YES
28	YES	YES	YES	YES	YES	YES
30	YES	YES	YES	YES	YES	YES
32	YES	YES	YES	YES	YES	YES
34	YES	YES	YES	YES	YES	YES
36	YES	YES	YES	YES	YES	YES
40	YES	YES	YES	YES	YES	YES
42	YES	YES	YES	YES	YES	YES
48	YES	YES	YES	YES	YES	YES





# TECHNICAL INFORMATION

## FULL AND REDUCED BORE



### FULL PORT

A Full Bore (Full Port) valve is one where the diameter of the ball is equal in diameter to the hole of the pipe thus, if we were to observe a piece of pipe in a system which contains the valve there would not be any noticeable reduction at the location of it.

**WALWORTH Standard design comes in full port, reduced port can still be supplied nonetheless.**



### REDUCED BORE (REDUCED PORT)

Design where the hole through the ball is smaller than the hole in the pipe; it allows minimizing flow capacity without the need of using reducers.

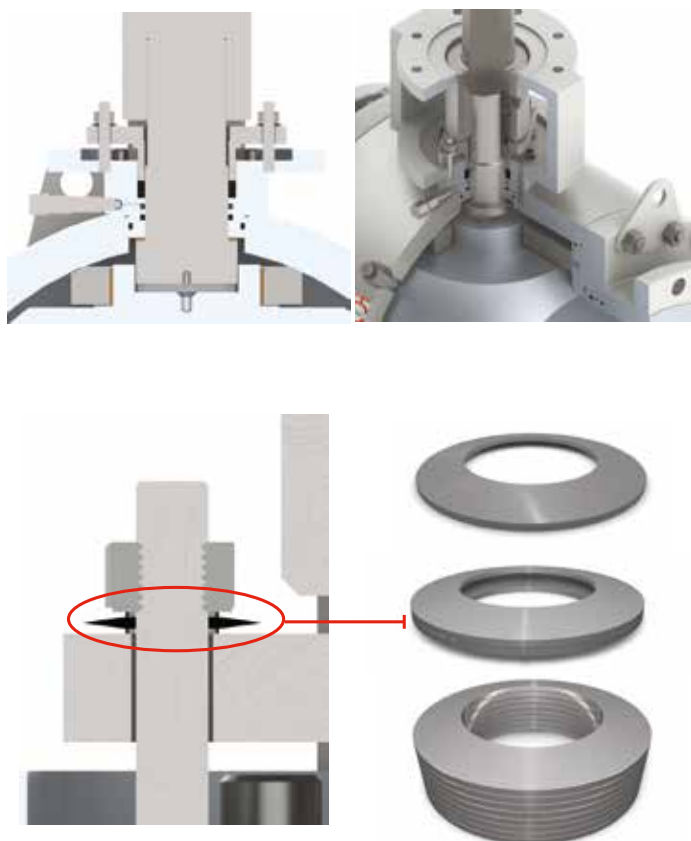
Normally the reduction in diameter is to the next standard size. E.g. a 2" (nominal size) reduced bore valve would have a 1.5" bore in the ball. A 1.5" (nominal size) reduced bore valve would have a 1.25" bore in the ball and so on.

## GLAND FLANGE OPTION & BELLEVILLE WASHERS

In accordance with PEMEX NRF-211 or as per customer request gland flange arrangements option is available including belleville washers for live load system

Live-loading is often installed to apply a constant packing load without requiring continual retightening of the packing bolting. Live-loading is designed to compensate for packing load losses due to consolidation as well as thermal contraction and expansion. If space exists between the gland flange and the adapter flange of the valve, live-loading can be retrofitted on most linear and rotary valves. As illustrated in figure, a typical live-loading design uses disk springs (Belleville washer) above the packing flange to provide a constant load to the packing when properly torqued. The typical disk spring is a metal washer, with the inside diameter formed so that it rises higher than the outside diameter. Two disk springs are placed from inside diameter to inside diameter of bolts and stacked with other sets, allowing for a spring like configuration. Disk springs are normally made from corrosion-resistant stainless steel, although Inconel is sometimes used for highly corrosive environments.

In live-loading, the disk springs are normally compressed by the packing gland-flange, allowing a certain percentage of possible travel (typically 80 to 85 percent). As the packing volume decreases due to extrusion or friction, the disk spring's action continues to provide a load to the packing without retorquing.



# PRESSURE-TEMPERATURE RATINGS

## FORGED STEEL ASTM A 105 (1)(2) AND ASTM 350 GR LF2 (1)

°F Temperature °C		MAXIMUM ALLOWABLE NON-SHOCK WORKING PRESSURE IN PSIG BY CLASS					
		150	300	600	900	1,500	2500
-20 a 100	-29 to 38	285	740	1,480	2,220	3,705	6,170
200	93	260	680	1,360	2,035	3,395	5,655
300	149	230	655	1,310	1,965	3,270	5,450
400	204	200	635	1,265	1,900	3,170	5,280
500	260	170	605	1,205	1,810	3,015	5,025
600	316	140	570	1,135	1,705	2,840	4,730
650	343	125	550	1,100	1,650	2,745	4,575
700	371	110	530	1,060	1,590	2,665	4,425
750	399	95	505	1,015	1,520	2,535	4,230
800	427	80	410	825	1,235	2,055	3,430
850	454	65	320	640	955	1,595	2,655
900	482	50	230	460	690	1,150	1,915
950	510	35	135	275	410	685	1,145
1,000	538	20	85	170	255	430	715

(1) Upon prolonged exposure to temperatures above 425°C, the carbide phase of steel may be converted to graphite. Permissible, but not recommended for prolonged usage above 425°C.

(2) Only killed steel shall be used above 455°C.

(a) Flanged End Valve ratings terminate at 1000°F.

## FORGED STEEL ASTM A 182 GR F11

Temperature °F °C		MAXIMUM ALLOWABLE NON-SHOCK WORKING PRESSURE IN PSIG BY CLASS					
		150	300	600	900	1500	2500
-20 a 100	-29 a 38	290	750	1,500	2,250	3,750	6,250
200	93	260	750	1,500	2,250	3,750	6,250
300	149	230	720	1,445	2,165	3,610	6,015
400	204	200	695	1,385	2,080	3,465	5,775
500	260	170	665	1,330	1,995	3,325	5,540
600	316	140	605	1,210	1,815	3,025	5,040
650	343	125	590	1,175	1,765	2,940	4,905
700	371	110	570	1,135	1,705	2,840	4,730
750	399	95	530	1,065	1,595	2,660	4,430
800	427	80	510	1,015	1,525	2,540	4,230
850	454	65	485	975	1,460	2,435	4,060
900	482	50	450	900	1,350	2,245	3,745
950	510	35	320	640	955	1,595	2,655
1,000	538	20	215	430	650	1,080	1,800
1,050	566	20(*)	145	290	430	720	1,200
1,100	593	20(*)	95	190	290	480	800
1,150	621	20(*)	65	130	195	325	545
1,200	649	15(*)	40	80	125	205	345

(\*) Use normalized and tempered material only.

(\*) Permissible, but not recommended for prolonged use above 595°C.

(a) Flanged End Valve ratings terminate at 1000°F.

## FORGED STEEL ASTM A 182 GR F91

°F Temperature °C		MAXIMUM ALLOWABLE NON-SHOCK WORKING PRESSURE IN PSIG BY CLASS					
		150	300	600	900	1,500	2500
-20 to 100	-29 a 38	290	750	1,500	2,250	3,750	6,250
200	93	260	750	1,500	2,250	3,750	6,250
300	149	230	730	1,455	2,185	3,640	6,070
300	204	200	705	1,410	2,115	3,530	5,880
500	260	170	665	1,330	1,995	3,325	5,540
600	316	140	605	1,210	1,815	3,025	5,040
650	343	125	590	1,175	1,765	2,940	4,905
700	371	110	570	1,135	1,705	2,840	4,730
700	399	95	530	1,065	1,595	2,660	4,430
800	427	80	510	1,015	1,525	2,540	4,230
850	454	65	485	975	1,460	2,435	4,060
900	482	50	450	900	1,350	2,245	3,745
950	510	35	385	775	1,160	1,930	3,220
1,000	538	20	365	725	1,090	1,820	3,030
1,050	566	20 (a)	360	720	1,080	1,800	3,000
1,100	593	20 (a)	300	605	905	1,510	2,515
1,150	621	20 (a)	225	445	670	1,115	1,855
1,200	649	20 (a)	145	290	430	720	1,200

\* At temperatures above 538°C, use only when the carbon content is 0.04% or higher.

(a) Flanged End Valve ratings terminate at 1000°F.

# PRESSURE-TEMPERATURE RATINGS

## FORGED STEEL ASTM A 182 GR F316

°F Temperature °C		MAXIMUM ALLOWABLE NON-SHOCK WORKING PRESSURE IN PSIG BY CLASS					
		150	300	600	900	1,500	2,500
-20 a 100	-29 a 38	275	720	1,440	2,160	3,600	6,000
200	93	235	620	1,240	1,860	3,095	5,160
300	149	215	560	1,120	1,680	2,795	4,660
400	204	195	515	1,025	1,540	2,570	4,280
500	260	170	480	955	1,435	2,390	3,980
600	316	140	450	900	1,355	2,255	3,760
650	343	125	440	885	1,325	2,210	3,680
700	371	110	435	870	1,305	2,170	3,620
750	399	95	425	855	1,280	2,135	3,560
800	427	80	420	845	1,265	2,110	3,520
850	454	65	420	835	1,255	2,090	3,480
900	482	50	415	830	1,245	2,075	3,460
950	510	35	385	775	1,160	1,930	3,220
1,000	538	20	365	725	1,090	1,820	3,030
1,050	566	20	360	720	1,080	1,800	3,000
1,100	593	20(a)	305	610	915	1,525	2,545
1,150	621	20(a)	235	475	710	1,185	1,970
1,200	649	20(a)	185	370	555	925	1,545
1,250	677	20(a)	145	295	440	735	1,230
1,300	704	20(a)	115	235	350	585	970
1,350	732	20(a)	95	190	290	480	800
1,400	760	20(a)	75	150	225	380	630
1,450	788	20(a)	60	115	175	290	485
1,500	816	15(a)	40	85	125	205	345

Note: At temperatures over 1,000°F, use only when the carbon content is 0.04% or higher.

## FORGED STEEL ASTM A 182 GR F316L

Temperature		MAXIMUM ALLOWABLE NON-SHOCK WORKING PRESSURE IN PSIG BY CLASS					
°F	°C	150	300	600	900	1500	2500
-20 a 100	-29 a 38	230	600	1,200	1,800	3,000	5,000
200	93	195	510	1,020	1,535	2,555	4,260
300	149	175	455	910	1,370	2,280	3,800
400	204	160	420	840	1,260	2,100	3,500
500	260	150	395	785	1,180	1,970	3,280
600	316	140	370	745	1,115	1,860	3,100
650	343	125	365	730	1,095	1,825	3,040
700	371	110	360	720	1,080	1,800	3,000
750	399	110	355	705	1,060	1,765	2,940
800	427	80	345	690	1,035	1,730	2,880
850	454	65	340	675	1,015	1,690	2,820

## FORGED STEEL ASTM A 182 GR F44 & F51

Temperature		MAXIMUM ALLOWABLE NON-SHOCK WORKING PRESSURE IN PSIG BY CLASS					
°F	°C	150	300	600	900	1,500	2,500
-20 a 100	-29 a 38	290	750	1,500	2,250	3,750	6,250
200	93	260	745	1,490	2,230	3,720	6,200
300	149	230	665	1,335	2,000	3,335	5,560
400	204	200	615	1,230	1,845	3,070	5,120
500	260	170	580	1,160	1,740	2,905	4,840
600	316	140	555	1,115	1,670	2,785	4,640
650	343	125	545	1,095	1,640	2,735	4,560
700	371	110	540	1,085	1,625	2,710	4,520
750	399	95	530	1,065	1,595	2,660	4,430

\* STEEL ASTM A 182 GR F51 steel may become brittle after service at moderately elevated temperatures. Not to be used over 600°F.

# DESIGN BASIS

All of WALWORTH's valve designs, when applicable, follow one or more of the following standards:

<b>API Standards</b>	<b>American Petroleum Institute:</b>	
	• <b>API-6D</b>	Steel gate, ball and plug valves for pipeline service
	• <b>API-598</b>	Valve inspection and testing
	• <b>API-6FA</b>	Specification for fire test for valves
<b>ANSI Standards</b>	<b>National Standards Institute:</b>	
	• <b>B16.5</b>	Steel pipe flanges and flanged fittings
	• <b>B16.10</b>	Length of ferrous flanged and welding end valves
	• <b>B16.25</b>	Butt-welding ends
	• <b>B18.2</b>	Square and hexagon bolts and nuts
	• <b>B16.47</b>	Larger diameter steel flanges
<b>MSS Standards</b>	<b>Manufacturer's Standardization Society:</b>	
	• <b>MSS SP-6</b>	Standard finishes for contact faces of pipeline flanges and connecting end flanges of valves and fittings
	• <b>MSS SP-9</b>	Spot facing for bronze, iron and steel flanges
	• <b>MSS SP-25</b>	Standard marking system for valves, fittings, flanges and unions
	• <b>MSS SP-44</b>	Steel pipeline flanges
	• <b>MSS SP-45</b>	By-pass and drain connections
	• <b>MSS SP-55</b>	Quality standard for steel castings for valves, flanges and fittings and other piping components - visual method for eval of surface irregularities
<b>ASTM Standards</b>	<b>American Society for Testing and Materials:</b>	
	• <b>ASTM A 105</b>	Standard Specification for Carbon Steel Forgings for Piping Applications
	• <b>ASTM A 193</b>	Standard specification for alloy-steel and stainless steel bolting materials for high temperature service
	• <b>ASTM A 194</b>	Standard specification for carbon and alloy-steel nuts for bolts high-pressure and high-temperature service
	• <b>ASTM A 216</b>	Standard specification for steel castings, carbon, suitable for fusion welding, for high-temperature service
	• <b>ASTM A 276</b>	Standard specification for stainless and heat-resisting steel bars and shapes
	• <b>ASTM A 351</b>	Standard specification for castings, austenitic, austenitic-ferritic (duplex), for pressure-containing parts
	• <b>ASTM A 352</b>	Standard specification for steel castings, ferritic and martensitic, for pressure-containing parts, suitable for low temperature service
	• <b>ASTM A 515</b>	Standard specification for pressure vessel plates, carbon steel, for intermediate and higher-temperature service
<b>NACE Standards</b>	<b>National Association of Corrosion Engineers:</b>	
	• <b>NACE MR0175</b>	Standard material requirements sulfide stress cracking resistant metallic materials for oilfield equipment
<b>ASME Code</b>	<b>American Society of Mechanical Engineers:</b>	
	• <b>ANSI/ASME B31.1</b>	Power piping
	• <b>ANSI/ASME B31.2</b>	Fuel Gas piping
	• <b>ANSI/ASME B31.3</b>	Process piping
	• <b>ANSI/ASME B1.20.1</b>	Pipe threads. General Purpose (inch)
<b>Boiler and pressure vessel code:</b>		
	• <b>Section II</b>	Parts A, B and C
	• <b>Section V</b>	Non destructive examination
	• <b>Section VIII</b>	Rules for construction of pressure vessels, divisions 1 and 2
	• <b>Section IX</b>	Welding and brazing qualifications

## FIGURE CODING FOR TRUNNION BALL VALVES

<div><div>X</div><div>X</div><div>X</div><div>X</div><div>-</div><div>XX</div></div>										
MODEL		ANSI CLASS		ACTUATION			ENDS		SUFFIXES (ADDERS)	
8	Fire Safe Trunnion Ball Valve	1	150	1	Lever		2	Raised Face	R	Reduced Bore
		2	2500	2	Gear Box		3	Ring Type Joint	W	Welded Body
		3	300	3	Actuator		4	Welded Ends	B	Bi-directional seats
		5	1500	4	Double Speed Gear Box				M	Mixed seats
		6	600	5	Bare Stem To Receive Actuation					
		9	900							
EXAMPLES										
8112		Fire Safe Trunnion Ball Valve, 150# Class, Lever Operated, Raised Face Flanged Ends								
8223-R		Fire Safe Trunnion Ball Valve, 2500# Class, Gear Box Operated, Ring Type Joint, Reduced Bore								
8644-WB		Fire Safe Trunnion Ball Valve, 600# Class, Double Speed Gear Box Operated, Welded Ends, Welded Body, Bi-directional Seats								



# HOW TO ORDER

WALWORTH Valves are identified by a figure number which describes main features. Identification procedure is intended to assist customers to specify the sort of valve required according to a specific need.

8 1 2 2 - W - T3 - A105

BODY  
 TRIM (INTERIORS)  
 SUFFIX  
 ENDS  
 OPERATOR  
 PRESSURE CLASS  
 MODEL DESIGN (TRUNNION)

SIZE (INCH)	WALWORTH FIGURE				SUFIXES	TRIM (Ball stem, trunnions & seat rings)	BASE MATERIAL ASTM
2"	8112	150 #	WRENCH	RF	R = Reduced Bore	T1	<b>CARBON STEELS:</b>
3"	8113	150 #	WRENCH	RTJ	B = Bi-Directional Seats	T2	A105N
4"	8114	150 #	WRENCH	WE	W = Welded Ends	T3	A350-LF2
6"	8122	150 #	GEAR OPERATOR	RF	M = Mixed Seats (Metal to Metal - Soft)	T4	A182-F1
8"	8123	150 #	GEAR OPERATOR	RTJ		T5	A182-F5
10"	8124	150 #	GEAR OPERATOR	WE		T6	A182-F5a
12"	8132	150 #	ACTUATOR	RF			A182-F9
14"	8133	150 #	ACTUATOR	RTJ			A182-F11
16"	8134	150 #	ACTUATOR	WE			A182-F22
18"	8312	300 #	WRENCH	RF			<b>LOW CARBON STAINLESS STEELS:</b>
20"	8313	300 #	WRENCH	RTJ			A182-F304L
22"	8314	300 #	WRENCH	WE			A182-F316L
24"	8322	300 #	GEAR OPERATOR	RF			<b>STAINLESS STEELS:</b>
26"	8323	300 #	GEAR OPERATOR	RTJ			A182-F304
28"	8324	300 #	GEAR OPERATOR	WE			A182-F316
30"	8332	300 #	ACTUATOR	RF			<b>LOW CARBON STEELS</b>
32"	8333	300 #	ACTUATOR	RTJ			A350-LF1
34"	8334	300 #	ACTUATOR	WE			A350-LF2
36"	8612	600 #	WRENCH	RF			A350-LF3
	8613	600 #	WRENCH	RTJ			<b>NICKEL ALLOYS:</b>
	8614	600 #	WRENCH	WE			B564-N0 4400 (MONEL 400)
	8622	600 #	GEAR OPERATOR	RF			B564-UNS 8810 (INCOLOY 800H)
	8623	600 #	GEAR OPERATOR	RTJ			<b>B564-UNS 8825 (INCOLOY 825)</b>
	8624	600 #	GEAR OPERATOR	WE			B564-UNS 6600 (INCONEL 600)
	8632	600 #	ACTUATOR	RF			B564-UNS 6625 (INCONEL 625)
	8633	600 #	ACTUATOR	RTJ			B564-N0 6022 (HASTELLOY C22)
	8634	600 #	ACTUATOR	WE			B564-N 10276 (HASTELLOY C276)
	8912	900 #	WRENCH	RF			<b>DUPLEX STAINLESS STEEL:</b>
	8913	900 #	WRENCH	RTJ			A182-F51
	8914	900 #	WRENCH	WE			<b>SUPER DUPLEX STAINLESS STEEL:</b>
	8922	900 #	GEAR OPERATOR	RF			A182-F55
	8923	900 #	GEAR OPERATOR	RTJ			
	8924	900 #	GEAR OPERATOR	WE			
	8932	900 #	ACTUATOR	RF			
	8933	900 #	ACTUATOR	RTJ			
	8934	900 #	ACTUATOR	WE			
	8512	1500 #	WRENCH	RF			
	8513	1500 #	WRENCH	RTJ			
	8514	1500 #	WRENCH	WE			
	8522	1500 #	GEAR OPERATOR	RF			
	8523	1500 #	GEAR OPERATOR	RTJ			
	8524	1500 #	GEAR OPERATOR	WE			
	8532	1500 #	ACTUATOR	RF			
	8533	1500 #	ACTUATOR	RTJ			
	8534	1500 #	ACTUATOR	WE			
	8212	2500 #	WRENCH	RF			
	8213	2500 #	WRENCH	RTJ			
	8214	2500 #	WRENCH	WE			
	8222	2500 #	GEAR OPERATOR	RF			
	8223	2500 #	GEAR OPERATOR	RTJ			
	8224	2500 #	GEAR OPERATOR	WE			
	8232	2500 #	ACTUATOR	RF			
	8233	2500 #	ACTUATOR	RTJ			
	8234	2500 #	ACTUATOR	WE			

## SUPPLEMENTARY REQUIREMENTS

R = Reduced Bore  
 B = Bi-Directional Seats  
 W = Welded Ends  
 M = Mixed Seats (Metal to Metal - Soft)  
 POV= Pneumatic operated valve.  
 LD= Locking device.  
 NACEMR-01-75.  
 NACEMR-01-03  
 NACW for low temperature.  
 SP= Special Paint.  
 SG= Special Gasket.  
 SPK= Special Packing.  
 VOC= Certification of Volatile  
 Organic Compounds  
 GO= Gear operator.  
 MOV= Motor operated valve.

NOTE: ADDITIONAL BASE MATERIALS & TRIMS ARE AVAILABLE UPON REQUEST.

## ENDS

RF = RAISED FACE  
 RTJ = RING TYPE JOINT  
 WE = WELD ENDS

MODEL	PRESSURE	OPERATOR	ENDS	Trim
	1 = 150	1 = WRENCH	2 = RAISED FACED	T1
8 = API-6D BALL	3 = 300	2 = GEAR OPERATOR	3 = RING TYPE JOINT	T3
	6 = 600	3 = ACTUATOR	4 = BUTT WELD	T4
	9 = 900	4 = DOUBLE SPEED GEAR BOX		T5
	5 = 1500	5 = BARE STEM TO RECEIVE ACTUATION		
	2 = 2500			

## THE WALWORTH COMPANY GENERAL TERMS AND CONDITIONS

**ACCEPTANCE:** All quotations are for acceptance within 30 days from date of quotation unless extended in writing. In the event a purchase order is placed after this period of time, the WALWORTH Company reserves the right to requote base prices of all valves offered. All orders and contracts are subject to credit approval and acceptance by the WALWORTH Company.

**FREIGHT:** When prices are f.o.b. point of shipment - no freight allowance - we will attempt to route shipments in the method which will result in the lowest cost unless otherwise instructed. All shipments will be freight charges collect except when stipulated on the purchase order, in which case you will be invoiced for all transportation charges. Delivery of material to a common carrier shall be considered to be delivery to Buyer and shall be at Buyer's risk thereafter. Claims of loss of or damage to material in transit shall be filed by the Buyer directly with the carrier.

**PRICES:** There will be added to all prices quoted sales, use, occupation or any other excise or similar tax which Seller may be required to pay or collect on or in connection with the sale. Seller shall be established by Federal, State or other government regulation with respect to the product(s) topped by the order which shall be lower than the price(s) specified in the order.

**ESCALATION TERMS:** Prices shown in this price schedule reflect the costs in effect at the time of publication. These prices will remain firm on all products with a quoted delivery of twenty-six (26) weeks or less. On products which have a scheduled delivery of more than twenty-six (26) weeks, the goods will be invoiced based on the applicable price sheet in effect at the time of shipment. In no event will the invoiced price be less than the price originally quoted.

**PURCHASED COMPONENTS:** (i.e. motors, gearing, etc.) Prices are quoted on the supplier's price in effect at the time of quotation. Actual invoice price will be adjusted in accordance with the supplier's escalation policy.

**DIFFERED SHIPMENTS:** If for any reason the customer desires to delay shipments more than 30 days after manufacturing is complete, or to place a on hold or stop to the order during the manufacturing cycle, The WALWORTH Company reserves the right to consider the order cancelled and to invoke cancellation charges per the schedule below.

**CANCELLATION:** After order acceptance by WALWORTH, items or completed orders may be cancelled and Buyer will be charged for work performed, based on the following schedule:

- Five percent (5%) of prices of stock items.
- Ten percent (10%) of price of stock items ordered in quantities which exceed normal inventory levels.
- Five percent (5%) of prices prior to drawing submittal on made-to-order items.
- 15% after drawing approval, but prior to the start of castings.
- 30% to 50% during casting cycle, depending on the state of completion.
- 55% to 75% during machining and assembly operations, depending on the state of completion.
- 100% after final assembly and test.

**REMITTANCES:** Remittances must be made to the address indicated on the invoice.

**CREDIT TERMS:** As quoted. Invoices on balances overdue will be subject to a service charge of 1 1/2 % per month on such indebtedness.

**DELIVERIES:** Shipments and deliveries shall at all times be subject to the approval of Seller's Credit Department. If the Buyer shall fail to make any

payments according to the terms of the contract, Seller may, in addition to and not in limitation of its other rights and remedies, at its option, cancel all or any part of Buyer's incomplete contracts with Seller, or may defer shipments of deliveries under Buyer's contracts with Seller except upon receipt of satisfactory security or for cash shipment.

All schedule of shipments are estimated as closely as possible and Seller will use its best efforts to ship within the time scheduled, but does not guarantee to do so. Schedules commence with the date Seller receives authorization to proceed with the order, subject to the provisions of the next sentence. The order will not be released for manufacture until complete specifications and approved drawings (if drawing approval is required) are received at the plant of manufacturer and the estimated schedule of shipment will commence with the date of such receipt.

Seller shall not be liable for any direct, indirect or consequential damage or loss caused by any delay in delivery, regardless of the cause of delay.

Without limiting the generality of the foregoing, Seller assumes no responsibility for delays in delivery resulting from fire, flood, accidents, riots, strikes, transportation delays, labor or material shortages, existing or future laws, acts of any governmental authority, or any other cause beyond Seller's control. Items offered from stock are subject to prior sale.

**INSPECTION:** Final inspection and acceptance of products must be made at the plant of manufacture, unless otherwise provided in the order and/ or in agreed upon specifications. Prices do not include charges for special tests or inspections performed at the request of the Buyer, unless called for in the order and/or in agreed upon specifications.

**RETURNS:** Permission in writing and return tagging instructions must be obtained from Seller before any goods returned for credit or adjustment will be accepted. Where returned goods are accepted, a minimum charge of 25% of the invoice price will be made, plus freight from both directions and costs of reconditioning the material for resale as new.

**WARRANTY:** Seller will replace without charge or refund the purchase price of products manufactured by Seller which prove to be defective in the material or workmanship, provided in each case that the product is properly installed and is used in the service for which Seller recommends it and that a written claim, specifying the alleged defect, is presented to Seller. Seller shall in no event be responsible for (a) claims for labor, expenses or other damages occasioned by defective products or (b) for consequences or secondary damages. THE WARRANTY STATED IN THIS PARAGRAPH IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED. WITH RESPECT TO WARRANTIES, THIS PARAGRAPH STATES BUYER'S EXCLUSIVE REMEDY AND SELLER'S EXCLUSIVE LIABILITY.

**DESIGN, ETC:** Seller reserves the right to change design, materials or specifications without notice. There will be a charge for modifying an order after it has been entered when such change or modification results in additional engineering or clerical work for either The WALWORTH Company or our suppliers.

**MINIMUM CHARGE:** Orders totaling less than \$100.00 net will be billed at a minimum charge of \$100.00. Repair parts will be billed at a minimum charge of \$50.00.

**NOTE:** We reserve the right to correct obvious clerical errors in quotations, invoices, and other contracts.





# **WALWORTH®**

*Since 1842*



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YARMOUTH RESEARCH AND TECHNOLOGY



# WALWORTH

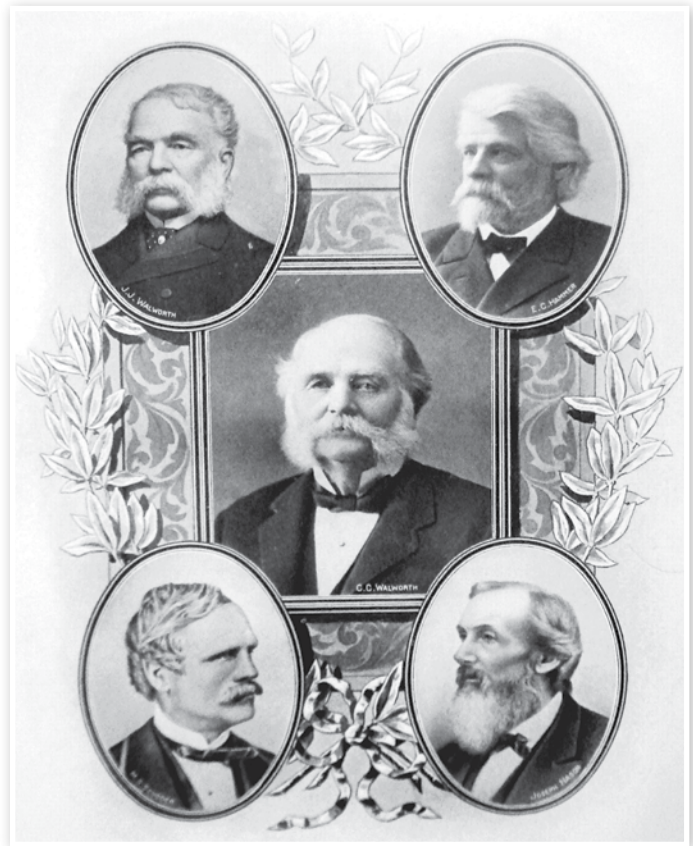
WALWORTH is one of the world's most comprehensive industrial valve manufacturers. Founded in 19th century by James Walworth, the Company has consistently dedicated itself to improvements in design and manufacturing of an array of valves exceptionally suited for the world's fluid control sector. We satisfy all end use industries and comprehensive customer requirements by adhering to the most demanding quality standards.

WALWORTH relies on its broad experience in supplying valves to the petrochemical, oil & gas, petroleum, power generation, pulp and paper, cryogenic and geothermal industries, among others.

Over the years, Walworth has produced over 40,000 different types of products and serves as a global supplier to various markets utilizing the expertise of over 500 trained employees.

Our manufacturing system includes: utilization of Company directed raw material warehouses; modern and newly acquired specialized machinery; welding processes such as SMAW, GMAW, SAW, PAW; assembly testing for all low pressure, high pressure, and at low or high temperatures; painting and coating processes; export crating and shipment.

WALWORTH is capable of providing the world's most comprehensive industrial valve line to the North American, Central American, South American, European and African markets. WALWORTH is proud to meet and satisfy the precise demands of our customers throughout the world by providing a quality product, competitive cost, and excellent service.



## WALWORTH VALUES

### MISSION

WALWORTH manufactures and supplies world-class valves and components for the flow control industry through exceptional service, competitive pricing, and consistently, on-time deliveries.



### VISION

To be the world leader of unparalleled valve manufacturing and supply, WALWORTH:

- Set the standard for product quality in the flow control industry.
- Exceed the service expectations of our customers.
- Forge enduring relationships with customers, team members, and community.
- Hire, develop, and retain experienced and dedicated team members.





## WALWORTH ENGINEERING CONTROL

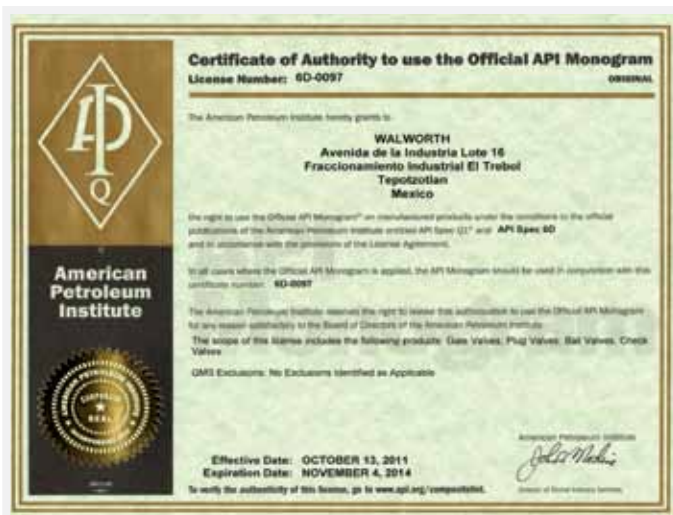
WALWORTH products are manufactured following strictly the most recognized international standards all over the world, such as API, ANSI, ASME, ASTM, MSS, NACE, AWWA, BSI, CSA, among others. Our Engineering team is always studying the new updates of these standards to incorporate any changes that may affect the design, regulations or performance of our products, being leaders in the new developments achieved.

Design is made using the most advanced technology and equipment, using finite elements and CAD system programs to ensure the proper assembly and performance of products since the concept, calculation and detailed drawings for manufacturing. WALWORTH is a leader in the development of new products according to valve market current needs.



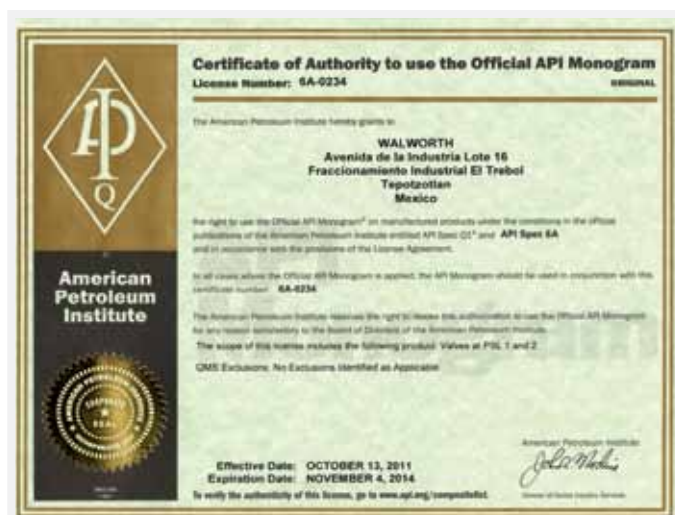
## WALWORTH QUALITY SYSTEM

Throughout the years, WALWORTH has developed its Quality System which is an integral part of our manufacturing policy. Our primary goal is to provide products that meet and exceed market standards. In this sense, WALWORTH is an ISO-9001 Audited and Certified Company that has achieved major certifications worldwide. Our system includes the selection of raw materials from approved vendors, and rigorous oversight of our manufacturing process that is vital to quality control. The use of serial numbers allows WALWORTH the ability to not only ensure the quality of components used but to monitor and trace the fabrication process as well.



### Certificate API-6D No. 6D-0097

Issued by American Petroleum Institute to apply on Gate valves, Plug valves, Ball valves and Check valves manufactured in accordance with API-6D specification.



### Certificate API-6A No. 6A-0234

From American Petroleum Institute to apply on valves at PSI, 1 through 4.



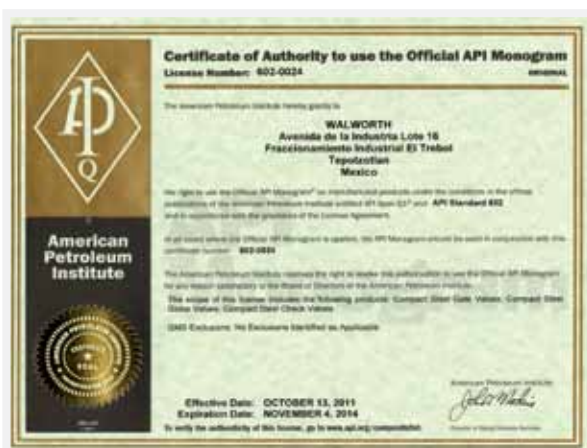
**Certificate API-594 No. 594-0007**

Issued by American Petroleum Institute to apply on Check Valves-Type A; Check Valves Type B manufactured in accordance with API-594 specification.



**API-600 Certificate No. 600-0109**

Issued by American Petroleum Institute to apply on Bolted Bonnet Steel Gate Valves manufactured in accordance with API-600 specification.



**API-602 Certificate No. 602-0024**

Issued by American Petroleum Institute to apply on Compact Steel Gate Valves, Compact Steel Globe Valves, and Compact Steel Check Valves manufactured in accordance with API-602 specification.



**Certificate ISO-9001 No. 0038**

Issued by American Petroleum Institute since April 1999.



**Certificate as per PED 97/23/EC Module H**  
To stamp CE products.





**Supplier Qualification Certificate NO. 279/13**

Issued by the Equipment and Materials Testing Laboratory, CFE (LAPEM in Spanish)



**Certificate NMX-CC-9001 (Mexican Standards ISO-9001) No. 0552/2007** Issued by PEMEX in accordance with ISO-9001 Quality Assurance System.

## PRODUCT CERTIFICATIONS



**Emissions after 500 cycles at ambient and 350 °F**

Issued by Yarmouth Research and Technology Lab for 3 inch Class 300 Gate Valve After 500 cycles the measurement result was less than 50 ppm.



**Emissions after 500 cycles at ambient and 350 °F**

Issued by Yarmouth Research and Technology Lab for 8 inch Class 300 Gate Valve After 500 cycles the measurement result was less than 50 ppm.



**Emissions after 500 cycles at ambient and 350 °F**

Issued by Yarmouth Research and Technology Lab for 16 inch Class 150 Gate Valve After 500 cycles the measurement result was less than 50 ppm.



**YARMOUTH RESEARCH AND TECHNOLOGY**  
**PROJECT SUMMARY**

**Project Number:** 00008  
**Customer:** The Walworth Company  
**Contact:** David Cornelien  
**Date(s) of Test:** 12/9/99 - 12/23/99  
**Product(s) Tested:** One 8" Class 300 Gate Valve with Empak-Mex EAF-100-001 packing.  
**Purpose of Test:** The test was conducted to evaluate the valve's atom sealing performance at ambient and at 350° F as related to the 1990 Amendments to the Clean Air Act requirements. Leakage measurements were conducted in accordance with 40 CFR Part 60, Appendix A, Method 21.  
**Conclusion:** Three thermal cycles from ambient to 350 deg. F were conducted throughout 5000 open/close cycles with the valve presented to 640 psig. The valve was cycled with a 43 RPM gear motor coupled to the handwheel. One packing seal adjustment was required on cycle number 300 to maintain leakage levels below 100 PP50.  
At cycle number 3500, the packing leakage was 25-29 PP50s with the stem static. The packing nuts were tightened from 12/14 B.B. back to 28 B.B. and leakage decreased to about 1 PP50s.  
See the attached data sheets for more information.  
**Test Witness:** Matthew J. Wasieleski, P.E., President  
YARMOUTH RESEARCH AND TECHNOLOGY

Phone or Fax (202) 946-3646  
42 East Elm Street P.O. Box 110 Yarmouth, Maine 04096-0110

**TÜV Rheinland Argentina S.A.**  
Servicios Industriales  
Certificación Control  
San José 53 - 7° Piso  
C1020BAAJ Buenos Aires

**TÜVRheinland®**

**Certificate**

**Certificate No.** TRASA 700-13-0019  
**Customer:** WALWORTH METCO - Industrial de Valinox S.A. de C.V.  
Av. de la Industria Lote 18  
Paseo Industrial El Trebol, Tepic, Jalisco, S.P. 46000  
Tepic, Jalisco, México  
**Product Tested:** API 6D Trunnion mounted double body ball valves, carbon steel (A105-WCB) construction, double block and bleed service, primarily used for oil and gas standard and severe applications.  
**Trademark:** WALWORTH  
**Model / Type:** See table below  

Model / Type	Description
W001A	API 6D Trunnion mounted double body ball valve, carbon steel (A105-WCB) construction, double block and bleed service, primarily used for oil and gas standard and severe applications.
W001B	API 6D Trunnion mounted double body ball valve, carbon steel (A105-WCB) construction, double block and bleed service, primarily used for oil and gas standard and severe applications.
W001C	API 6D Trunnion mounted double body ball valve, carbon steel (A105-WCB) construction, double block and bleed service, primarily used for oil and gas standard and severe applications.
W001D	API 6D Trunnion mounted double body ball valve, carbon steel (A105-WCB) construction, double block and bleed service, primarily used for oil and gas standard and severe applications.
W001E	API 6D Trunnion mounted double body ball valve, carbon steel (A105-WCB) construction, double block and bleed service, primarily used for oil and gas standard and severe applications.
W001F	API 6D Trunnion mounted double body ball valve, carbon steel (A105-WCB) construction, double block and bleed service, primarily used for oil and gas standard and severe applications.

  
**Applicable Standard:** ASME B16.34  
**TUV Report No.:** TRASA 700-13-0019  
**Results:** Successful  
**Safety Function:** The Trunnion Ball valves will meet the design and construction requirements for the intended application. The valve is designed and built to meet the requirements of the ASME B16.34 standard.  
**Specific Requirements:** The Trunnion Ball valves will meet the design and construction requirements for the intended application. The valve is designed and built to meet the requirements of the ASME B16.34 standard.  
**Business Area:** Valves  
**Business Date:** January 23rd, 2014  
**Test Witness:** Matthew J. Wasieleski, P.E., President  
YARMOUTH RESEARCH AND TECHNOLOGY

**Certificates of Ultra Low Fugitive Emissions No. 20985-3, 8 & 16 in accordance with ISO-15848-1 "Industrial Valves"**  
Measurement, Test and Qualification Procedures for Fugitive Emissions "Part 1: Classification System and Qualification Procedures for Type Testing of Valves".

**TÜV Rheinland Certificate No. TRASA 700-13-0019**  
API-6D Trunnion mounted bolted body ball valves, carbon steel (A105-WCB) construction, double block and bleed service, primarily used but not limited to the oil and gas standard and severe applications.

**DACOR SERVICES**  
CONSULTANTS  
ENGINEERING • QUALITY ASSURANCE • MANUFACTURING  
DAVID J. CORNELIEN, P.E., PRESIDENT

**January 22, 2005**


**Ruben Parades**  
Walworth - Inval Facility  
Av. De la Industria Lote 16 Fracc. Industrial El Trebol  
Tepic, Jalisco, Edo. De Mexico  
CP 46000, Mexico


**Reference:** Witness Report - API Spec 6FA Fire Test  
Number 01-1/05

This will certify that the following listed valve successfully passed all requirements of API Specification 6FA Fire Test for Valves, Third Edition dated April 1999 and API Standard 607 Fire Test for Self-Seated Quarter-Turn Valves, Fourth Edition dated May 1993. The tests were made and verified on January 21, 2005.

API 6D Trunnion Mounted Ball Valve, 12-inch Class 150 Figure 8122, Serial Number V05B01.

The successful test of the 12-inch Class 150 API 6D Ball Valve qualifies this design/type of valve as meeting the requirements of API Spec 6FA / API Std 607 for sizes 12-inch through 24-inch in pressure classes 150 and 300.

Sincerely,  
  
David J. Cornelien P.E.  
President



24002 Mathews Drive • Katy, Texas 77494  
Telephone (281) 395-5275 • Telex (281) 395-5275

**tuv CERT** **TÜVRheinland®**  
Precisely Right.

**CERTIFICATE**  
Certificate No.: 01 202 USA-TA-00-79704

**Concerning the Agreement with the Technical Requirements in:**  
**TA-Luft 2002, VDI 2440 Nov. 2000, Sec. 3.3.1.3**

**Test report:** 200140 **Date:** 01 December, 2000  
**Client:** Industrial de Valinox, S.A. de C.V.  
**Manufacturer's Address:** Av. De la Industria Lote 18  
Fracc. Industrial El Trebol,  
Tepic, Jalisco, Edo. De Mexico, CP 46000

The stem sealing system and internal flange connection have been successfully tested to meet the tightness criteria of 0.10<sup>-4</sup> mbar x l/s at a helium mass spectrometer under the following conditions. The SPV Valve with the examined mechanical stuff seals fulfills the requirements of Section 3.3.1.3 of The German Clean Air Act (TA-Luft, Leakage verification) in accordance with Section 3.3.1.3 of VDI 2440 (Rev. 2000).

Kind of Valve:	Walworth API 6D Gate Valve
Valve Type:	4 inch, Class 300, Figure 8122
Sealing System:	WCB Body / CR 13 Stem & Stem / HP Seat
Sealing System:	Graphite Seals
Nominal Size, Nominal Pressure:	4 inch, ANSI 300
Inspection Media/Pressure:	Helium / 81 Bar Temperature = Ambient
Switching Cycles (times):	8 Cycles Total Cycles 800
Leakage Rate (mbar x l/s):	5.2e-7 (mbar x l/s) 5.7e-8 (mbar x l/s)
Testing Method:	Helium Leak Test - VDI 2440, Appendix A

**Testing Laboratory:** TÜV Rheinland North America, Inc.  
Industrial Services Division, Westboro, CT, USA  
Matthew J. Wasieleski, PE  
404 Walnut Hill Road, N. Yarmouth, ME USA  
www.yarmouthresearch.com

  
Matthew J. Wasieleski, P.E.  
President



**Fire Test Certificate No. 01-1/05**  
In accordance with API-6FA and API Standard API-607 for Trunnion Ball Valves in accordance with API-6D.

**TA Luft Certificate (Fugitive Emission) Approval**  
ISO-5211 Top Flange, Anti-Static Device.



## QUALITY CONTROL EQUIPMENT

In order to assure that WALWORTH products comply with quality international standards, in-house equipments are kept for monitoring control, some of this equipment includes:



**X-Ray Examination Equipment.**- WALWORTH has its own Ir-92 source in-house for the radiographic examination (RT) of castings from 0.100" up to 2 1/2" wall thickness to verify the soundness of the casting raw material.

**PMI Equipment.**- New generation of Positive Material Identification Equipment gives WALWORTH the capability to perform quick chemical analysis on incoming raw materials and on pieces after assembly to certify that materials used were produced and assembled in accordance with WALWORTH and the Customer's specifications.



**Magnetic Particle Test.**- In a random basis for standard products or when a Customer request MT Certification, WALWORTH has Magnetic Particle Test Equipment to perform on ferromagnetic materials.

**Penetrant Test Examination.**- WALWORTH has the personnel and materials to perform PT examination by solvent removable or water washable techniques. The NDT personnel are ASNT Certified.



**Test Loop.** A complete Laboratory Test loop exists for design validation of WALWORTH products performing the test at maximum design pressure and cycling the valves from 3000 to 5000 cycles. The test expends more than 4 months to be finished.

**Pressure Gradient Test Loop.**- This test exposes Plug valves to the extremes of both positive and negative pressure gradients to verify that the plug in a balanced plug design will prevent lock-up into the body.





**Metrology Laboratory.**- WALWORTH developed a calibration and/or verification system in all the equipment used in its facilities to ensure the traceability of measurements to international standards. In this way, WALWORTH gets measurement control of its products to comply with international standards.

**Fire Test Facilities.**- Facilities to perform fire test in accordance to API requirements. The test exposes the valve to a fire flame at 1400 to 1800 °F (761 to 980 °C) to verify proper seal of the valve.



**Low Fugitive Emissions Test.**- When a Customer requires low fugitive emissions certification. The Lab has its own LFE Test Equipment capable to measure less than 20 ppm either in both static or Mechanical conditions at ambient temperature or thermal cycle operations.

**Ultrasonic Testing Equipment.**- Using ultrasonic techniques, we can detect sub surface flaws in materials and evaluate castings and forgings that cannot be radiographed. In addition we utilize these techniques to measure the wall thickness of castings and forgings.



**Tensile Test Equipment.**- To verify the mechanical properties of materials used for manufacturing, WALWORTH tests samples on a random basis even though we receive MTR's from our suppliers and foundries.

**Hardness Test Equipments.**- Either lab or shop test, WALWORTH use hardness tester equipments as Rockwell B, C Brinell or Vickers to check compliance against specifications.



# FLOATING BALL VALVES

This product line is used primarily in the Oil & Gas, Building and construction Industries, Chemical and Petrochemical services, among others. WALWORTH offers Floating Ball valves to provide positive shut-off while minimizing pressure drop.

WALWORTH offers an array of materials used for this product line, including but not limited to:

- a) Carbon Steel such as A-105 or WCB, etc.
- b) Stainless Steel such as CF8, CF8M or F316, etc.
- c) Low Carbon Stainless Steel such as CF3, CF3M, CG3M, etc.
- d) Super Stainless Steel such as CN7M (Alloy 20), CN3M (Alloy 20 modified), CT15C, etc.
- e) Brass like B283 grade C37700, Low Temperature Carbon Steel such as LCB, LCC or LF2, etc.

WALWORTH offers a variety of trim materials including but not limited to the following:

- a) Ball and stem made from SS-304, PTFE, RPTFE or Nylon seats, PTFE packing.
- b) Ball and stem made from SS-316, PTFE, RPTFE or Nylon seats, PTFE packing.
- c) Ball and stem made from SS-304, PTFE, RPTFE or Nylon seats and graphite stem packing suitable for fire safe design.
- d) Ball and stem made from SS-316, PTFE, RPTFE or Nylon seats and graphite stem packing suitable for fire safe design.
- e) Other trim materials could be manufactured to match with body materials.

## Design Features

- Standard Floating Ball valves in accordance with API 608, API6D & MSS-SP-72 for flanged and BW ends from 1/2" up to 8". Test in accordance with API 598.
- Standard Floating Ball Valves in accordance with MSS-SP-110 for threaded and socketweld ends from 1/4" up to 4". Test in accordance with MSS-SP-110
- Fire Safe Floating Ball valves in accordance with API-6D & API-608 for flanged and BW ends from 1/2 up to 8". Test in accordance with API-598.
- Fire Safe Floating Ball valves in accordance with API-608 or ASME B16.34 for threaded and socket well ends from 1/2" up to 2". Test in accordance with API-598



## PRODUCT RANGE

Type	Firesafe or Not Firesafe design	Size	Pressure Class	Ends	Figure Nr
Two-Piece Floating Ball Valve	Not Firesafe	1/4" to 2"	600 WOG	Threaded	7711
Three-Piece Floating Ball Valve	Not Firesafe	1/4" to 4"	1000 & 2000 WOG	Threaded or Socket Weld	7011, 7017, 7411, 7417
Two-Piece Floating Ball Valve	Not Firesafe	1/4" to 8"	150 & 300#	Flanged	7112, 7312
Two-Piece Floating Ball Valve	Not Firesafe	1/2" to 4"	600#	Flanged	7612
Two-Piece Floating Ball Valve	Firesafe	1/4" to 8"	150 & 300#	Flanged	7112 Z, 7312 Z
Two-Piece Floating Ball Valve	Firesafe	1/2" to 4"	600#	Flanged	7612 Z
Three-Piece Floating Ball Valve	Firesafe	1/4" to 2"	1500#	Flanged	7512 Z
Three-Piece Floating Ball Valve	Firesafe	1/4" to 2"	800, 1500 & 2500#	Threaded or Socket Weld	7811 Z, 7817 Z, 7511 Z, 7517 Z, 7211 Z, 7217 Z

## STRUCTURAL FEATURES

### Lever Positions

Valves with wrench aligned with the valve is in open position, and wrench in perpendicular to the valve is in closed position.



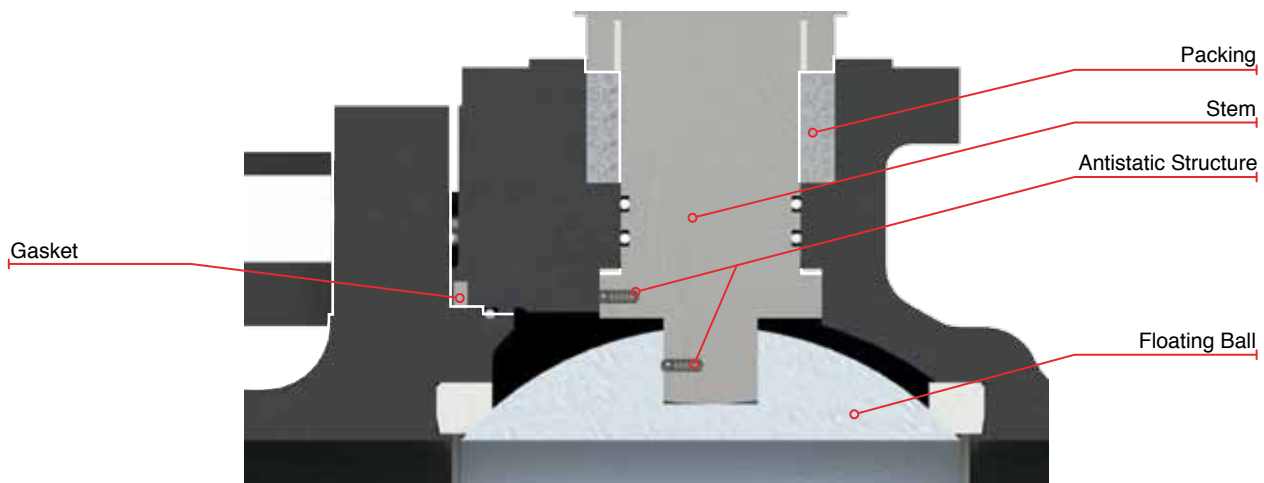
OPEN POSITION



CLOSE POSITION

### Blow Out Proof Stem Design & Antistatic Structure

To reinforce safety, WALWORTH have fitted the product with a T-shaped blowout proof stem back seat that significantly extends stem seal life and prevents it to come out from the body structure. It also includes an antistatic device that lowers coefficient of friction between stem-ball and stem-body ball when operating the valve. Friction could cause electrostatic charges (sparks) that could cause fire when mixing with fluid. Leakage from the valve stem is prevented with the aid of two O-rings and a Gasket that work together with the graphite packing.

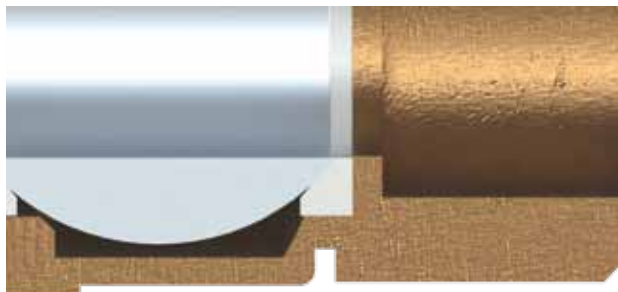




## STRUCTURAL FEATURES

### Soft Seats

Stringent limitations on ball valve designing along with operating conditions have resulted in the use of several thermoplastic materials to meet the required operating range for ball valve seat thus, WALWORTH offers soft seats such as PTFE, RPTFE, Nylon, Molon, PEEK, etc., to guarantee zero leakage in low and high pressures at different temperatures, these can be used for several services in any industry, also preferred and supplied to Oil and Gas producers. Soft seat reduce friction which result in less torque when operating the valve.



### Fire Safe Design

When a fire occurs the valve soft seal areas (packing, gasket and seat) came burnt or could be damaged, to prevent this right and left body are contacted by a gasket made of graphite instead soft seal (figure a) and the same happens on the packing stem where it is made of graphite instead soft seal (figure b). To prevent internal leakage when seat came burnt, the metal seal face of the body will act as a second seal being in contact with the ball (figure c). The design is based on the standards API 607, JB/T6899 and second part of BS6755.

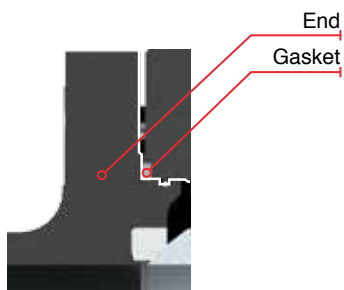


Figure a

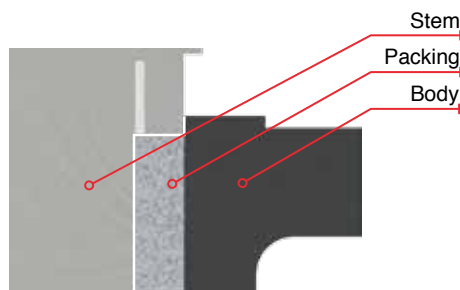


Figure b



Figure c

### Full and Reduced Port

There are two types of port (full and reduced) on WALWORTH floating ball valves for different purposes. The full port design means that the port will be of the same inside diameter as the pipeline, so there will be no resistance for the fluid and this valve could be cleaned by a pig being trough conduit. Reduced port provides resistance to the fluid, the inside diameter is a size smaller than that of the pipeline being a valve not piggable



FULL PORT DESIGN

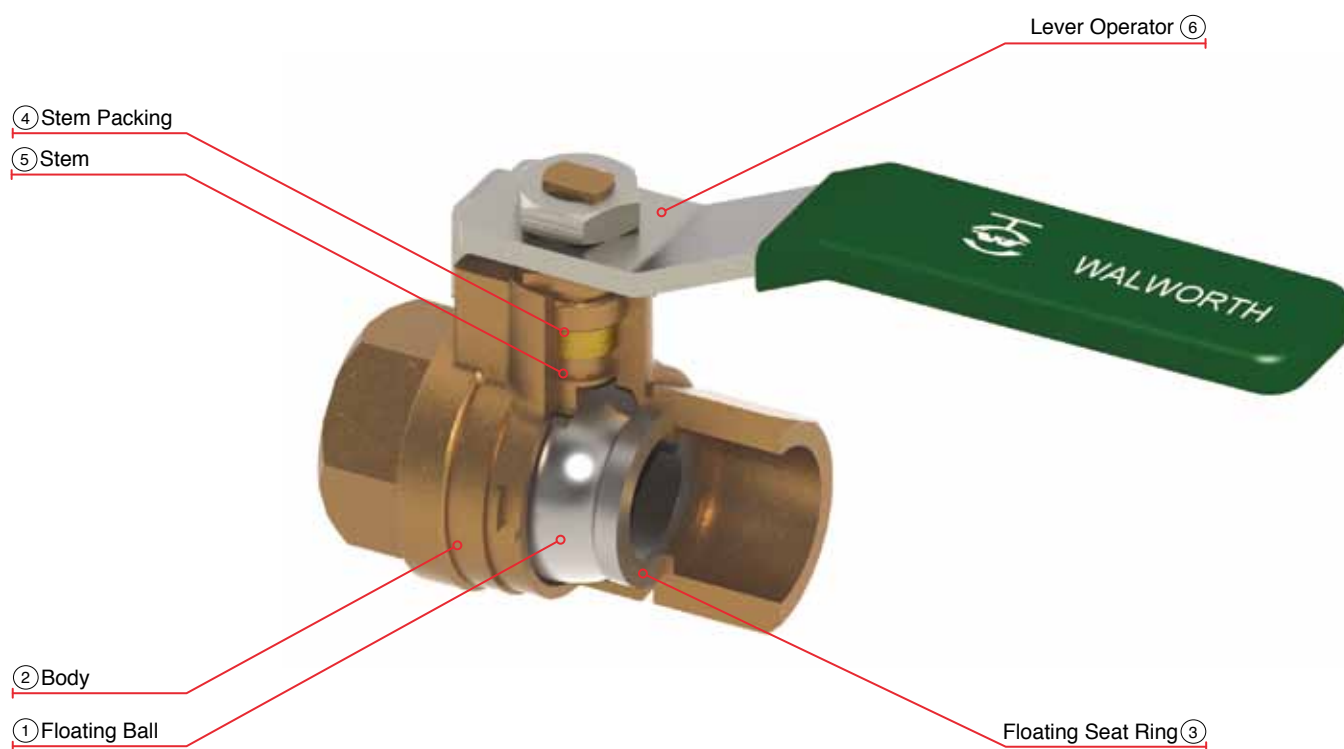


REDUCED PORT DESIGN

## WALWORTH STANDARD FLOATING BALL VALVES CLASS 600 WOG

### Design Features

- Design in accordance with MSS SP110
- CLASS 600 WOG
- Full Port
- Two-piece body
- Brass Construction
- Threaded Body
- Threaded ends as per ASME B1.20.1
- End to end dimensions as per WALWORTH standard



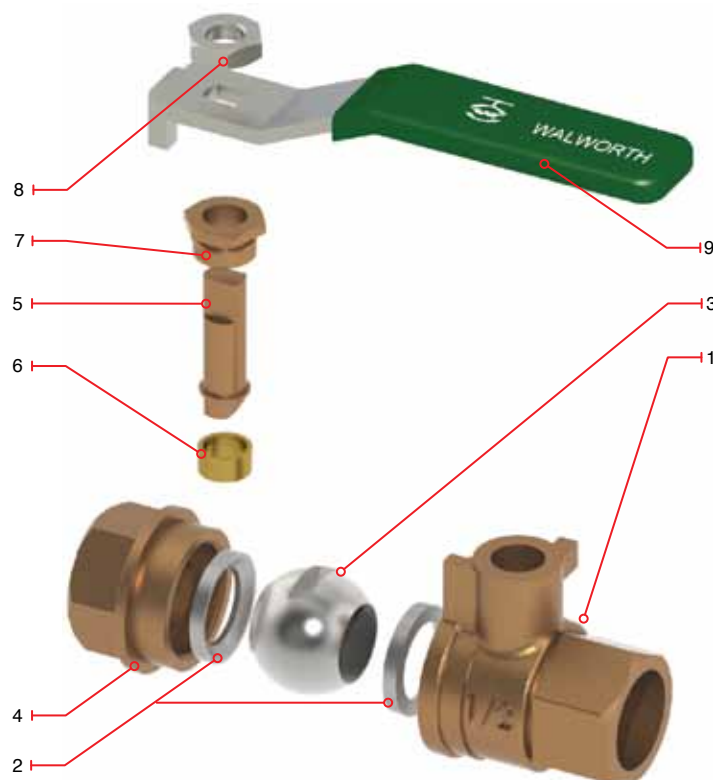
- ① Floating Ball. For all sizes & pressure ratings. The ball is only held by the stem and is in movement with the direction of the fluid in order to seal with the seat rings.
- ② Body. Made of two pieces that includes the central body screwed with the end flanges.
- ③ Floating Seat Ring. Two independent dynamic soft seat rings that get in contact with the floating ball which seal in one side of the valve depending on the fluid direction.

- ④ Stem Packing. It is a soft seal that ensures reliable operation at high levels of sealing integrity when operating the valve.
- ⑤ Stem. The stem design is anti blow out which is held up by the valve body and fits in the bottom with a small cavity in the top part of the floating ball.
- ⑥ Lever operator. It is supplied in all sizes to open and close the valve.

# WALWORTH STANDARD FLOATING BALL VALVES CLASS 600 WOG

## Design Features

- Design in accordance with MSS SP110
- CLASS 600 WOG
- Full Port
- Two-piece body
- Brass Construction
- Threaded Body
- Threaded ends as per ASME B1.20.1
- End to end dimensions as per WALWORTH standard



## Regular Bill of Materials

No.	Description	Brass
1	Body	Brass B283 - C37700
2	Seat Ring	PTFE
3	Ball	Brass B283 - C37700 + Chrome coating
4	End	Brass B283 - C37700
5	Stem	Brass B124 - C37700
6	Packing	PTFE
7	Gland	Brass B124 - C37700
8	Stem Bolt	Steel A-36 + Cadminized coating
9	Lever	Steel A-36 + Cadminized coating

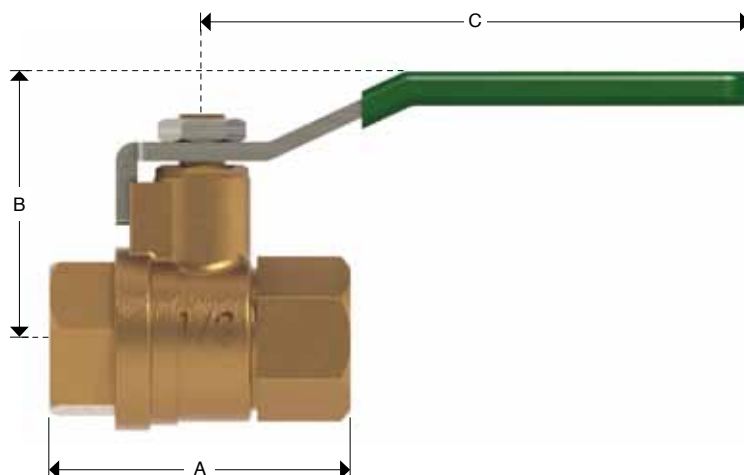
# WALWORTH STANDARD FLOATING BALL VALVES

## CLASS 600 WOG

### Design Features

- Design in accordance with MSS SP110
- CLASS 600 WOG
- Full Port
- Two-piece body
- Brass Construction
- Threaded Body
- Threaded ends as per ASME B1.20.1
- End to end dimensions as per WALWORTH standard

Lever Operator	
Catalog Figure No.	Type of Ends
7711	Threaded ends



### Dimensions and Weights

D Nominal Diameter	mm	15	20	25	32	40	50
	in	1/2	3/4	1	1 1/4	1 1/2	2
A	mm	57	67	77	92	103	122
	in	2.24	2.64	3.03	3.62	4.05	4.8
B	mm	39	57	65	71	140	140
	in	1.53	2.24	2.56	2.79	5.51	5.51
C	mm	90	90	125	125	140	140
	in	3.54	3.54	4.92	4.92	5.51	5.51
Weight 7711	kg	0.22	0.34	0.57	0.85	1.37	2.08
	lb	0.49	0.75	1.26	1.87	3.02	4.59

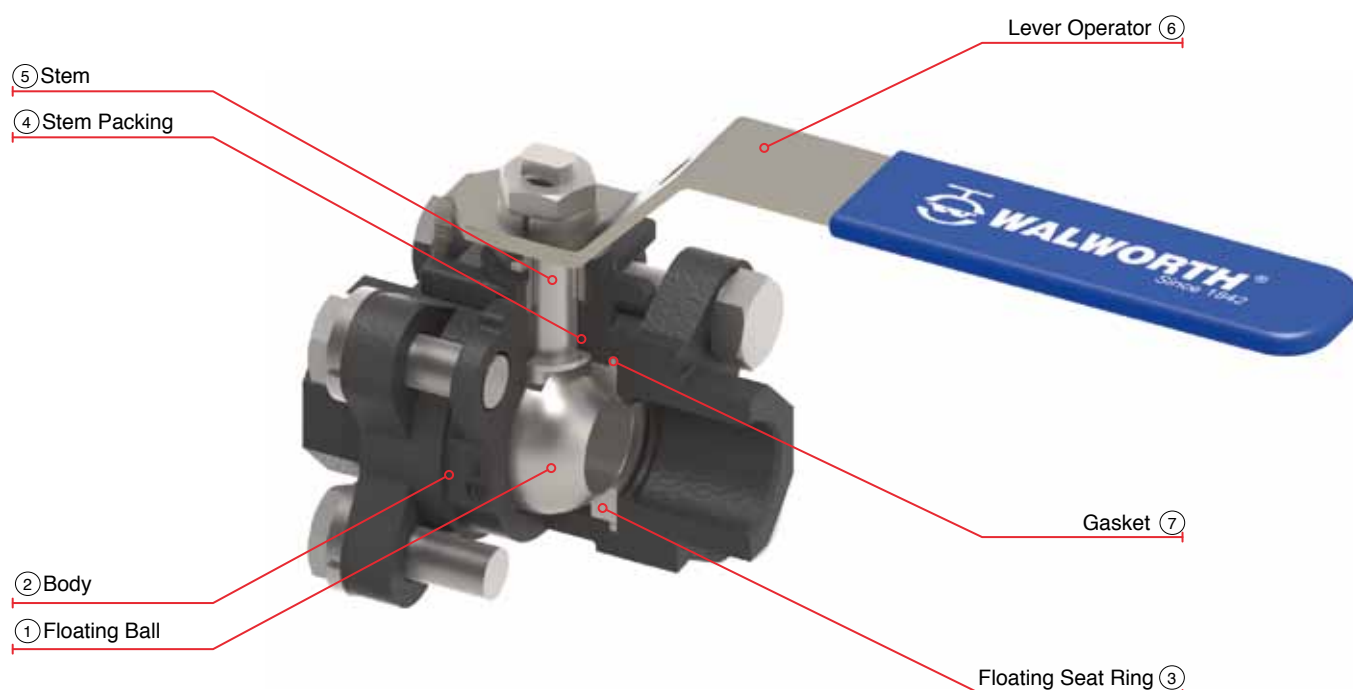


# WALWORTH STANDARD FLOATING BALL VALVES

## CLASS 1000 WOG & 2000 WOG

### Design Features

- Design in accordance with MSS SP110
- CLASS 1000 WOG & 2000 WOG
- Full Port
- Three-piece body
- Investment Cast Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- Socket weld ends as per ASME B16.11
- End to end dimensions as per WALWORTH standard



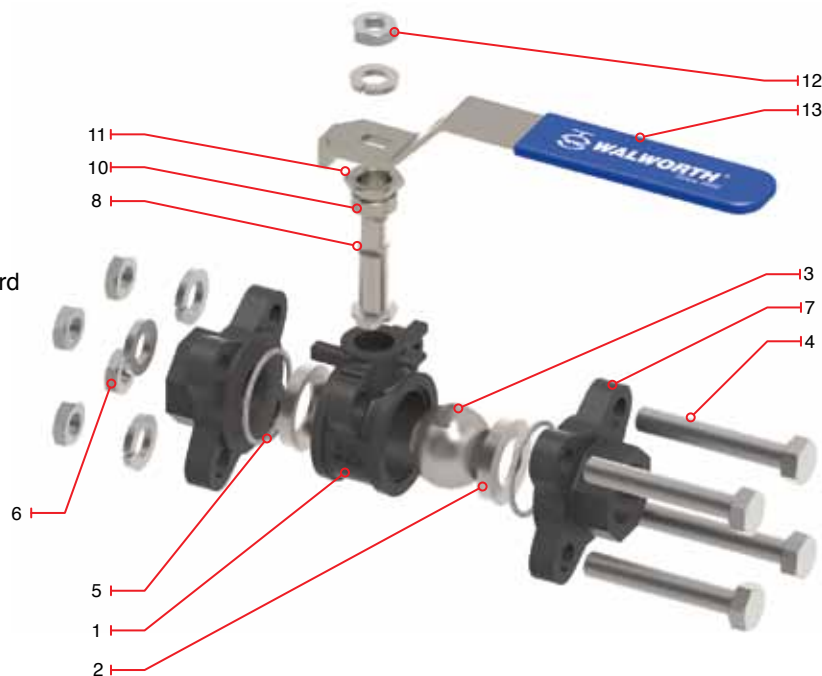
- |   |   |
|---|---|
| <p>① Floating Ball. For all sizes &amp; pressure ratings. The ball is only held by the stem and is in movement with the direction of the fluid in order to seal with the seat rings.</p> <p>② Body. Made of three pieces that includes the central body bolted with the end flanges.</p> <p>③ Floating Seat Ring. Two independent dynamic soft seat rings that get in contact with the floating ball which seal in one side of the valve depending on the fluid direction.</p> <p>④ Stem Packing. It is a soft seal that ensure reliable operation high levels of sealing integrity when operating the valve.</p> | <p>⑤ Stem. The stem design is anti blow out which is held up by the valve body and fits in the bottom with a small cavity in the top part of the floating ball.</p> <p>⑥ Lever operator. It is supplied in all sizes to open and close the valve.</p> <p>⑦ Gasket. It is a soft seal that has a reliable operation with high levels of sealing integrity between body and ends.</p> |
|---|---|

# WALWORTH STANDARD FLOATING BALL VALVES

## CLASS 1000 WOG & 2000 WOG

### Design Features

- Design in accordance with MSS SP110
- CLASS 1000 WOG & 2000 WOG
- Full Port
- Three-piece body
- Investment Cast Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- Socket weld ends as per ASME B16.11
- End to end dimensions as per WALWORTH standard



### Regular Bill of Materials

No.	Description	Carbon Steel with Trim F4 (SS304)	Stainless Steel 316	Carbon Steel Trim F4 (SS304) NACE	Stainless Steel 316 with Trim F3 (SS316) NACE
1	Body	ASTM A216 GR WCB	ASTM A351 GR CF8M	ASTM A216 GR WCB	ASTM A351 GR CF8M
2	Seat Ring	PTFE + Graphite			
3	Ball	SS304	SS316	SS304	SS316
4	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B8	ASTM A193 Gr. B7M	ASTM A193 Gr. B8M
5	Gasket	PTFE			
6	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 8	ASTM A194 Gr. 2HM	ASTM A194 Gr. 8M
7	End	ASTM A216 GR WCB	ASTM A351 GR CF8M	ASTM A216 GR WCB	ASTM A351 GR CF8M
8	Stem	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
*9	Stem Seat	PTFE			
10	Packing	PTFE			
11	Packing Gland	ASTM A216 GR WCB OR SS304	SS304	ASTM A216 GR WCB OR SS304	SS304
12	Stem Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 8	ASTM A194 Gr. 2HM	ASTM A194 Gr. 8M
13	Lever	ASTM A216 GR WCB			
*14	Identification Plate	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel

\* Not Shown

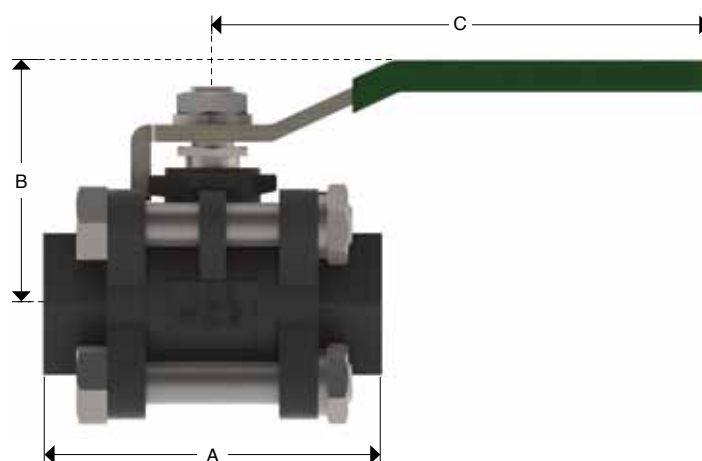
# WALWORTH STANDARD FLOATING BALL VALVES

## CLASS 1000 WOG

### Design Features

- Design in accordance with MSS SP110
- CLASS 1000 WOG
- Full Port
- Three-pieces body
- Investment Cast Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- Socket weld ends as per ASME B16.11
- End to end dimensions as per WALWORTH standard

Lever Operator	
Catalog Figure No.	Type of Ends
7011	Threaded (S)
7017	Socket Weld (SW)



### Dimensions and Weights

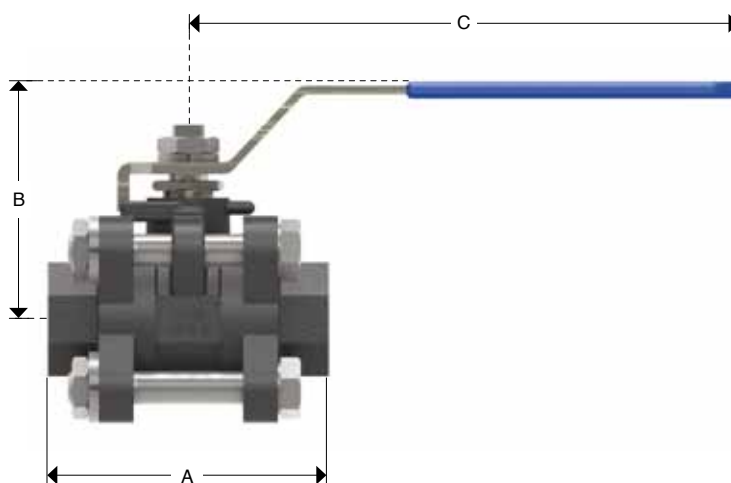
D Nominal Diameter	mm	6	10	15	20	25	32	40	50	65	80	100
	in	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
A	mm	50.4	50.4	61.4	70.2	79.6	93	102	124.2	156.2	179.2	218.4
	in	2	2	2 3/7	2 3/4	3 1/7	3 2/3	4	4 8/9	6 1/7	7	8 3/5
B	mm	42.5	42.5	49.6	58.1	61	78.3	82.5	90.9	114.5	124	176
	in	1 2/3	1 2/3	2	2 2/7	2 2/5	3	3 1/4	3 4/7	4 1/2	4 7/8	7
C	mm	101.5	101.5	101.5	124	124	152	152	190	242	242	327
	in	4	4	4	4 7/8	4 7/8	6	6	7 1/2	9 1/2	9 1/2	12 7/8
Weight 7011	kg	0.41	0.41	0.46	0.87	1.09	1.93	2.6	3.75	9.1	13.23	20.63
	lb	0.90	0.90	1.01	1.92	2.40	4.26	5.73	8.27	20.07	29.17	45.49

## WALWORTH STANDARD FLOATING BALL VALVES CLASS 2000 WOG

### Design Features

- Design in accordance with MSS SP110
- CLASS 2000 WOG
- Full Port
- Three-pieces body
- Investment Cast Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- Socket weld ends as per ASME B16.11
- End to end dimensions as per WALWORTH standard

Lever Operator	
Catalog Figure No.	Type of Ends
7411	Threaded (S)
7417	Socket Weld (SW)



### Dimensions and Weights

D Nominal Diameter	mm	6	10	15	20	25	32	40	50
	in	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
A	mm	63	63	66	83	95	106.6	130	150.6
	in	2 1/2	2 1/2	2 3/5	3 1/4	3 3/4	4 1/5	5 1/8	6
B	mm	54	54	59	63	76	85	91	100
	in	2 1/8	2 1/8	2 1/3	2 1/2	3	3 1/3	3 4/7	4
C	mm	104	104	125	125	155	155	200	200
	in	4	4	5	5	6 1/9	6 1/9	7 7/8	7 7/8
Weight 7411	kg	0.47	0.45	0.64	0.89	1.27	1.99	2.91	4.39
	lb	1.04	0.99	1.41	1.96	2.80	4.39	6.42	9.68



# WALWORTH STANDARD FLOATING BALL VALVES

## CLASS 150, 300 & 600

### Design Features

- Design in accordance with MSS SP-72, API-608 & API-6D
- CLASS 150, 300 & 600 as per ASME B16.34
- Full Port
- Two-piece body
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator (Optional)
- Valves could be supplied with ISO-5211 flange for operator installation (optional)



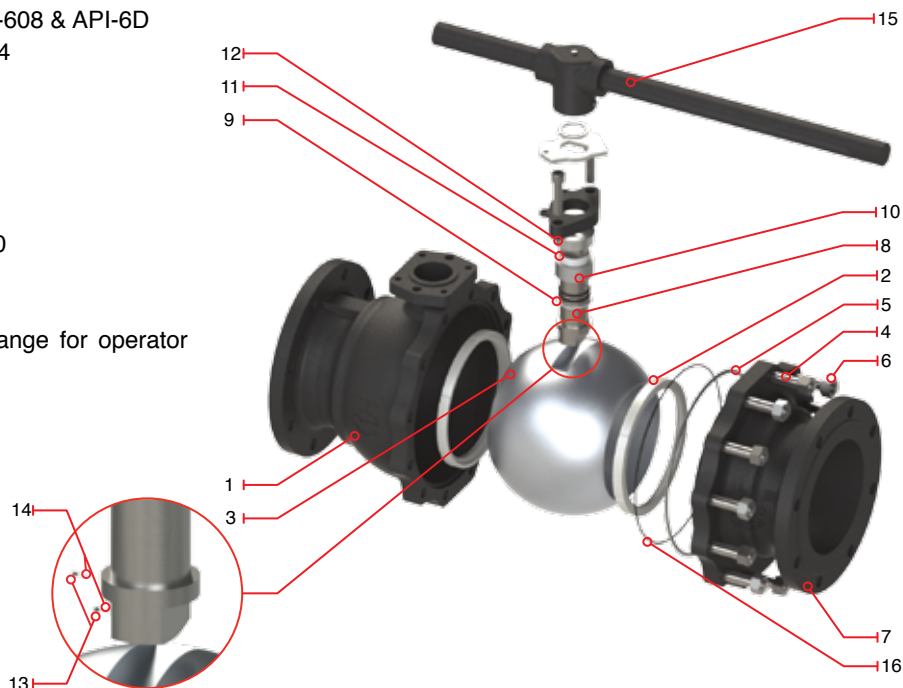
- ① Floating Ball. For all sizes & pressure ratings. The ball is only held by the stem and is in movement with the direction of the fluid in order to seal with the seat rings.
- ② Body. Made of two pieces that includes the central body bolted with the end flange.
- ③ Floating Seat Ring. Two independent dynamic soft seat rings that get in contact with the floating ball which seal in one side of the valve depending on the fluid direction.
- ④ Stem Packing. It is a soft seal that ensure reliable operation high levels of sealing integrity when operating the valve.
- ⑤ Stem. The stem design is anti blow out and with an antistatic structure which is held up by the valve body and fits in the bottom in a small cavity in the top part of the floating ball.
- ⑥ Lever operator. It is supplied in all sizes to open and close the valve.
- ⑦ Gasket. It is a soft seal that has a reliable operation with high levels of sealing integrity between body and ends.
- ⑧ Antistatic device. Inconel springs with small balls are placed between stem-body and stem-floating ball to prevent static continuity.

# WALWORTH STANDARD FLOATING BALL VALVES

## CLASS 150, 300 & 600

### Design Features

- Design in accordance with MSS SP-72, API-608 & API-6D
- CLASS 150, 300 & 600 as per ASME B16.34
- Full Port
- Two-piece body
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator (Optional)
- Valves could be supplied with ISO-5211 flange for operator installation (optional)



### Regular Bill of Materials

No.	Description	Carbon Steel with Trim F4 (SS304)	Carbon Steel with Trim F3 (SS316)	Stainless Steel 316	Carbon Steel with Trim F4 (SS304) NACE	Stainless Steel 316 with Trim F3 (SS316) NACE
1	Body	ASTM A216 GR WCB	ASTM A216 GR WCB	ASTM A351 GR CF8M	ASTM A216 GR WCB	ASTM A351 GR CF8M
2	Seat Ring	RPTFE, PTFE or Nylon**				
3	Ball	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
4	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7	ASTM A193 Gr. B8	ASTM A193 Gr. B7M	ASTM A193 Gr. B8M
5	Gasket	PTFE or Flexible Graphite + Stainless Steel				
6	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H	ASTM A194 Gr. 8	ASTM A194 Gr. 2HM	ASTM A194 Gr. 8M
7	End	ASTM A216 GR WCB	ASTM A216 GR WCB	ASTM A351 GR CF8M	ASTM A216 GR WCB	ASTM A351 GR CF8M
8	Stem	ASTM A182 Gr. F304	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
9	Stem Seat	PTFE or RPTFE				
10	Packing	PTFE or Graphite				
11	Gland	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
12	Gland Flange	ASTM A216 GR WCB	ASTM A216 GR WCB	ASTM A351 GR CF8M	ASTM A216 GR WCB	ASTM A351 GR CF8M
13	Small ball	Stainless Steel				
14	Antistatic spring	Inconel 750				
15	Lever	Carbon Steel				
16	Backup O'ring	Viton				
*17	Identification Plate	Stainless Steel				

\* Not Shown

\*\* Material used as standard on Class 600

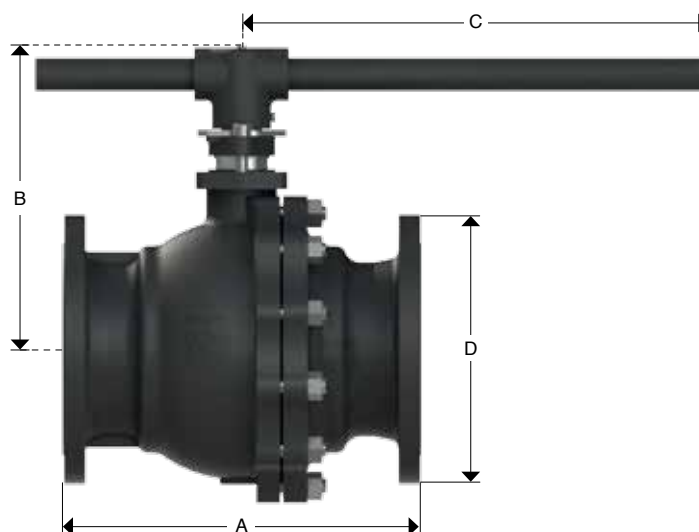
# WALWORTH STANDARD FLOATING BALL VALVES CLASS 150

## Design Features

- Design in accordance with MSS SP-72, API-608 & API-6D
- CLASS 150 as per ASME B16.34
- Full Port
- Two-piece body
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 6" and larger (Optional)
- Valves could be supplied with ISO-5211 flange for operator installation (optional)

Lever Operator	
Catalog Figure No.	Type of Ends
7112	Flanged Raised Face
7113	Flanged Ring Type Joint
7114	Butt Weld

Gear Operator	
Catalog Figure No.	Type of Ends
7122	Flanged Raised Face
7123	Flanged Ring Type Joint
7124	Butt Weld



## Dimensions and Weights

D Nominal Diameter	mm	15	20	25	32	40	50	65	80	100	150	200
	in	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8
A (RF)	mm	108	117	127	140	165	178	190	203	229	394	457
	in	4 1/4	4 3/5	5	5 1/2	6 1/2	7	7 1/2	8	9	15 1/2	18
D	mm	89	98	108	117	127	152	178	190	229	279	343
	in	3 1/2	3 6/7	4 1/4	4 3/5	5	6	7	7 1/2	9	11	13 1/2
B	mm	73	76	86	91	119	127	136	164	178	303	352
	in	2 7/8	3	3 2/5	3 4/7	4 2/3	5	5 1/3	6 1/2	7	12	13 6/7
C	mm	130	130	160	160	200	200	200	325	325	800	800
	in	5 1/8	5 1/8	6 2/7	6 2/7	7 7/8	7 7/8	7 7/8	12 4/5	12 4/5	31 1/2	31 1/2
Weight 7112	kg	1.5	2	3	4	6	8	15	19	31	82	145
	lb	3.31	4.41	6.62	8.82	13.23	17.64	33.08	41.90	68.36	180.82	319.74

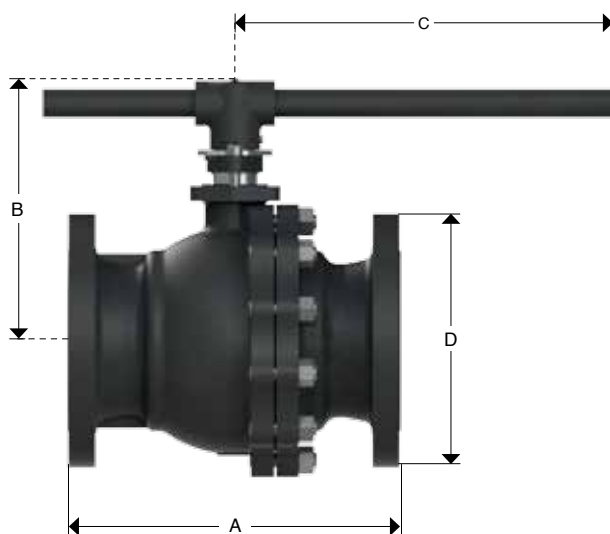
# WALWORTH STANDARD FLOATING BALL VALVES CLASS 300

## Design Features

- Design in accordance with MSS SP-72, API-608 & API-6D
- CLASS 300 As per ASME B16.34
- Full Port
- Two-piece body
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 6" and larger (Optional)
- Valves could be supplied with ISO-5211 flange for operator installation (optional)

Lever Operator	
Catalog Figure No.	Type of Ends
7312	Flanged Raised Face
7313	Flanged Ring Type Joint
7314	Butt Weld

Gear Operator	
Catalog Figure No.	Type of Ends
7322	Flanged Raised Face
7323	Flanged Ring Type Joint
7324	Butt Weld



## Dimensions and Weights

D Nominal Diameter	mm	15	20	25	40	50	65	80	100	150	200
	in	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8
A (RF)	mm	140	152	165	191	216	241	283	305	403	502
	in	5 1/2	6	6 1/2	7 1/2	8 1/2	9 1/2	11 1/7	12	15 6/7	19 3/4
D	mm	95	117	124	156	165	190	210	254	318	381
	in	3 3/4	4 3/5	4 7/8	6 1/7	6 1/2	7 1/2	8 1/4	10	12 1/2	15
B	mm	72	92	105	125	135	153	172	210	303	357
	in	2 5/6	3 5/8	4 1/7	5	5 1/3	6	6 7/9	8 1/4	12	14
C	mm	160	160	160	180	230	400	400	400	800	1000
	in	6 2/7	6 2/7	6 2/7	7	9	15 3/4	15 3/4	15 3/4	31 1/2	39 3/8
Weight 7312	kg	3	5	6	11	16	24	34	56	125	222
	lb	6.62	11.03	13.23	24.26	35.28	52.92	74.97	123.48	275.63	489.53



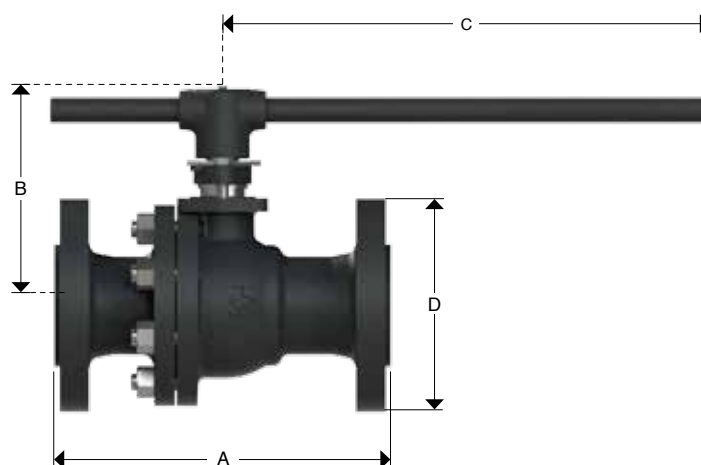
# WALWORTH STANDARD FLOATING BALL VALVES CLASS 600

## Design Features

- Design in accordance with MSS SP-72, API-608 & API-6D
- CLASS 600 as per ASME B16.34
- Full Port
- Two-piece body
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 4" and larger (Optional)
- Valves could be supplied with ISO-5211 flange for operator installation (optional)

Lever Operator	
Catalog Figure No.	Type of Ends
7612	Flanged Raised Face
7613	Flanged Ring Type Joint
7614	Butt Weld

Gear Operator	
Catalog Figure No.	Type of Ends
7622	Flanged Raised Face
7623	Flanged Ring Type Joint
7624	Butt Weld



## Dimensions and Weights

D Nominal Diameter	mm	15	20	25	40	50	65	80	100
	in	1/2	3/4	1	1 1/2	2	2 1/2	3	4
A (RF)	mm	165	190	216	241	292	330	356	432
	in	6 1/2	7 1/2	8 1/2	9 1/2	11 1/2	13	14	17
D	mm	95	117	124	156	165	190	210	273
	in	3 3/4	4 3/5	4 7/8	6 1/7	6 1/2	7 1/2	8 1/4	10 3/4
B	mm	72	95	110	130	142	180	200	245
	in	2 5/6	3 3/4	4 1/3	5 1/8	5 3/5	7	7 7/8	9 2/3
C	mm	160	160	230	230	400	400	500	800
	in	6 2/7	6 2/7	9	9	15 3/4	15 3/4	19 2/3	31 1/2
Weight 7612	kg	5	7	9	17	25	42	56	85
	lb	11.03	15.44	19.85	37.49	55.13	92.61	123.48	187.43

# WALWORTH FIRE SAFE FLOATING BALL VALVES

## CLASS 150, 300 & 600

### Design Features

- Design in accordance with API 6D & API 608
- CLASS 150, 300 & 600 as per ASME B16.34
- Full Port
- Reduced Port (upon request)
- Two-piece body
- Fire safe design as per API 6FA, API 607
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator (Optional)
- Valves could be supplied with ISO-5211 flange for operator installation (optional)



- ① Floating Ball. For all sizes & pressure ratings. The ball is only hold by the stem and is in movement with the direction of the fluid in order to seal with the seat rings.
- ② Body. Made of two pieces that includes the central body bolted with the end flange.
- ③ Floating Seat Ring. Two independent dynamic soft seat rings that get in contact with the floating ball which seal in one side of the valve depending on the fluid direction.
- ④ Stem Packing (firesafe design). It is a graphite seal that ensure safety for fire emergency as it has a reliable operation with high levels of sealing integrity when operating the valve.

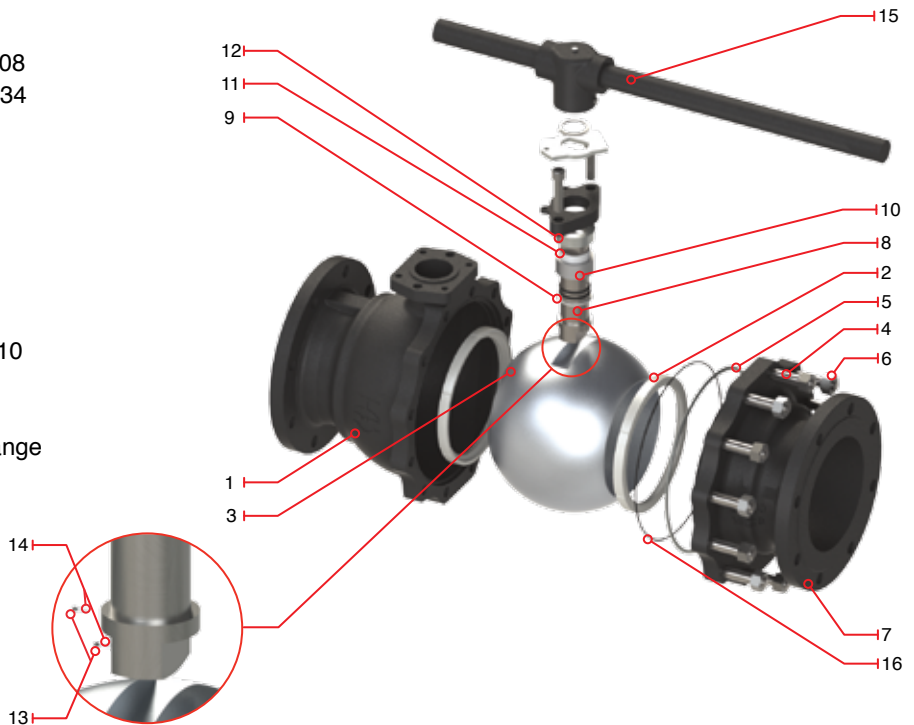
- ⑤ Stem. The stem design is anti blow out and with an antistatic structure which is held up by the valve body and fits in the bottom in a small cavity in the top part of the floating ball.
- ⑥ Lever operator. It is supplied in all sizes to open and close the valve.
- ⑦ Gasket (firesafe design). It is a graphite seal that ensure safety for fire emergency as it has a reliable operation with high levels of sealing integrity between body and ends.
- ⑧ Antistatic device. Inconel springs with small balls are placed between stem-body and stem-floating ball to prevent static continuity.

# WALWORTH FIRE SAFE FLOATING BALL VALVES

## CLASS 150, 300 & 600

### Design Features

- Design in accordance with API-6D & API 608
- CLASS 150, 300 & 600 as per ASME B16.34
- Full Port
- Reduced Port (upon request)
- Two-piece body
- Fire safe design as per API 607
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator (Optional)
- Valves could be supplied with ISO-5211 flange for operator installation (optional)



### Regular Bill of Materials

No.	Description	Carbon Steel with Trim F4 (SS304)	Carbon Steel with Trim F3 (SS316)	Stainless Steel 316	Carbon Steel with Trim F4 (SS304) NACE	Stainless Steel 316 with Trim F3 (SS316) NACE
1	Body	ASTM A216 GR WCB	ASTM A216 GR WCB	ASTM A351 GR CF8M	ASTM A216 GR WCB	ASTM A351 GR CF8M
2	Seat Ring	RPTFE, PTFE or Nylon**				
3	Ball	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
4	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7	ASTM A193 Gr. B8	ASTM A193 Gr. B7M	ASTM A193 Gr. B8M
5	Gasket	Flexible Graphite + Stainless Steel				
6	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H	ASTM A194 Gr. 8	ASTM A194 Gr. 2HM	ASTM A194 Gr. 8M
7	End	ASTM A216 GR WCB	ASTM A216 GR WCB	ASTM A351 GR CF8M	ASTM A216 GR WCB	ASTM A351 GR CF8M
8	Stem	ASTM A182 Gr. F304	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
9	Stem Seat	PTFE or RPTFE				
10	Packing	Graphite				
11	Gland	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
12	Gland Flange	ASTM A216 GR WCB	ASTM A216 GR WCB	ASTM A351 GR CF8M	ASTM A216 GR WCB	ASTM A351 GR CF8M
13	Small ball	Stainless Steel				
14	Antistatic spring	Inconel 750				
15	Lever	Carbon Steel				
16	Backup O'ring	Viton				
*17	Identification Plate	Stainless Steel				

\* Not Shown

\*\* Material used as standard on Class 600

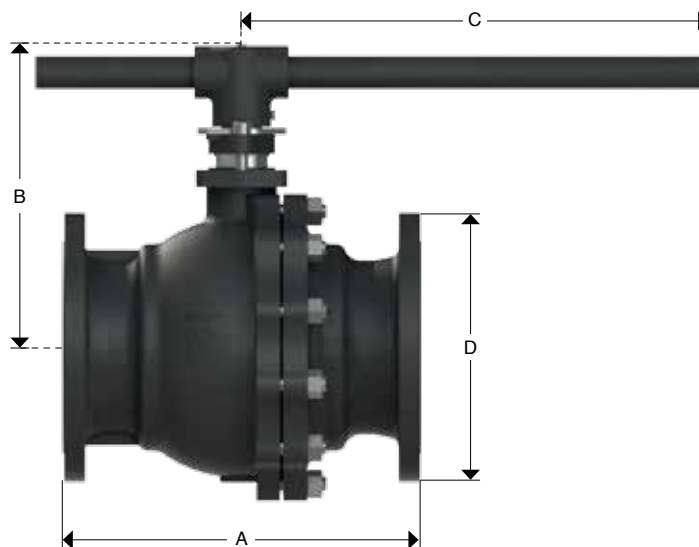
# WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 150 FULL PORT

## Design Features

- Design in accordance with API-6D & API 608
- CLASS 150 as per ASME B16.34
- Full Port
- Two-piece body
- Fire safe design as per API 607
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 6" and larger (Optional)

Lever Operator	
Catalog Figure No.	Type of Ends
7112-Z	Flanged Raised Face
7113-Z	Flanged Ring Type Joint
7114-Z	Butt Weld

Gear Operator	
Catalog Figure No.	Type of Ends
7122-Z	Flanged Raised Face
7123-Z	Flanged Ring Type Joint
7124-Z	Butt Weld



## Dimensions and Weights

D Nominal Diameter	mm	15	20	25	32	40	50	65	80	100	150	200
	in	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	6	8
A (RF)	mm	108	117	127	140	165	178	191	203	229	394	457
	in	4 1/4	4 3/5	5	5 1/2	6 1/2	7	7 1/2	8	9	15 1/2	18
D	mm	89	98.5	108	117	127	152	178	190	229	279	343
	in	3 1/2	3 7/8	4 1/4	4 3/5	5	6	7	7 1/2	9	11	13 1/2
B	mm	72	92	105	91	125	135	153	172	210	303	352
	in	2 5/6	3 5/8	4 1/7	3 4/7	5	5 1/3	6	6 7/9	8 1/4	12	13 6/7
C	mm	160	160	160	160	180	230	400	400	400	800	800
	in	6 2/7	6 2/7	6 2/7	6 2/7	7	9	15 3/4	15 3/4	15 3/4	31 1/2	31 1/2
Weight 7112-Z	kg	3	4	5	5	8	12	18	24	38	82	145
	lb	6.62	8.82	11.03	11.03	17.64	26.46	39.69	52.92	83.79	180.82	319.74



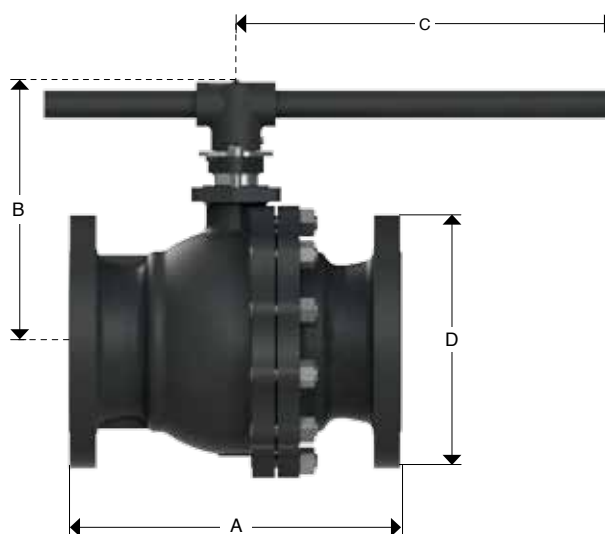
# WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 300 FULL PORT

## Design Features

- Design in accordance with API-6D & API 608
- CLASS 300 as per ASME B16.34
- Full Port
- Two-piece body
- Fire safe design as per API 607
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 6" and larger (Optional)

Lever Operator	
Catalog Figure No.	Type of Ends
7312-Z	Flanged Raised Face
7313-Z	Flanged Ring Type Joint
7314-Z	Butt Weld

Gear Operator	
Catalog Figure No.	Type of Ends
7322-Z	Flanged Raised Face
7323-Z	Flanged Ring Type Joint
7324-Z	Butt Weld



## Dimensions and Weights

D Nominal Diameter	mm	15	20	25	40	50	65	80	100	150	200
	in	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8
A (RF)	mm	140	152	165	191	216	241	283	305	403	502
	in	5 1/2	6	6 1/2	7 1/2	8 1/2	9 1/2	11 1/7	12	15 6/7	19 3/4
D	mm	95	117	124	156	165	190	210	254	318	381
	in	3 3/4	4 3/5	4 7/8	6 1/7	6 1/2	7 1/2	8 1/4	10	12 1/2	15
B	mm	72	92	105	125	135	153	172	210	303	357
	in	2 5/6	3 5/8	4 1/7	5	5 1/3	6	6 7/9	8 1/4	12	14
C	mm	160	160	160	180	230	400	400	400	800	1000
	in	6 2/7	6 2/7	6 2/7	7	9	15 3/4	15 3/4	15 3/4	31 1/2	39 3/8
Weight 7312-Z	kg	3	5	6	11	16	24	34	56	125	222
	lb	6.62	11.03	13.23	24.26	35.28	52.92	74.97	123.48	275.63	489.53

# WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 600

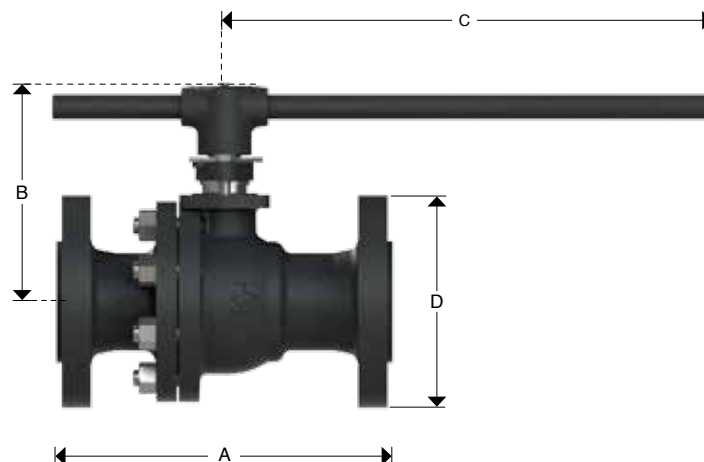
## FULL PORT

### Design Features

- Design in accordance with API-6D & API 608
- CLASS 600 as per ASME B16.34
- Full Port
- Two-piece body
- Fire safe design as per API 607
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 4" and larger (Optional)
- Valves could be supplied with ISO-5211 flange for operator installation (optional)

Lever Operator	
Catalog Figure No.	Type of Ends
7612-Z	Flanged Raised Face
7613-Z	Flanged Ring Type Joint
7614-Z	Butt Weld

Gear Operator	
Catalog Figure No.	Type of Ends
7622-Z	Flanged Raised Face
7623-Z	Flanged Ring Type Joint
7624-Z	Butt Weld



### Dimensions and Weights

D Nominal Diameter	mm	15	20	25	40	50	65	80	100
	in	1/2	3/4	1	1 1/2	2	2 1/2	3	4
A (RF)	mm	165	190	216	241	292	330	356	432
	in	6 1/2	7 1/2	8 1/2	9 1/2	11 1/2	13	14	17
D	mm	95	117	124	156	165	190	210	273
	in	3 3/4	4 3/5	4 7/8	6 1/7	6 1/2	7 1/2	8 1/4	10 3/4
B	mm	72	95	110	130	142	180	200	245
	in	2 5/6	3 3/4	4 1/3	5 1/8	5 3/5	7	7 7/8	9 2/3
C	mm	160	160	160	230	400	400	500	800
	in	6 2/7	6 2/7	6 2/7	9	15 3/4	15 3/4	19 2/3	31 1/2
Weight 7612-Z	kg	5	7	9	17	25	42	56	85
	lb	11.03	15.44	19.85	37.49	55.13	92.61	123.48	187.43

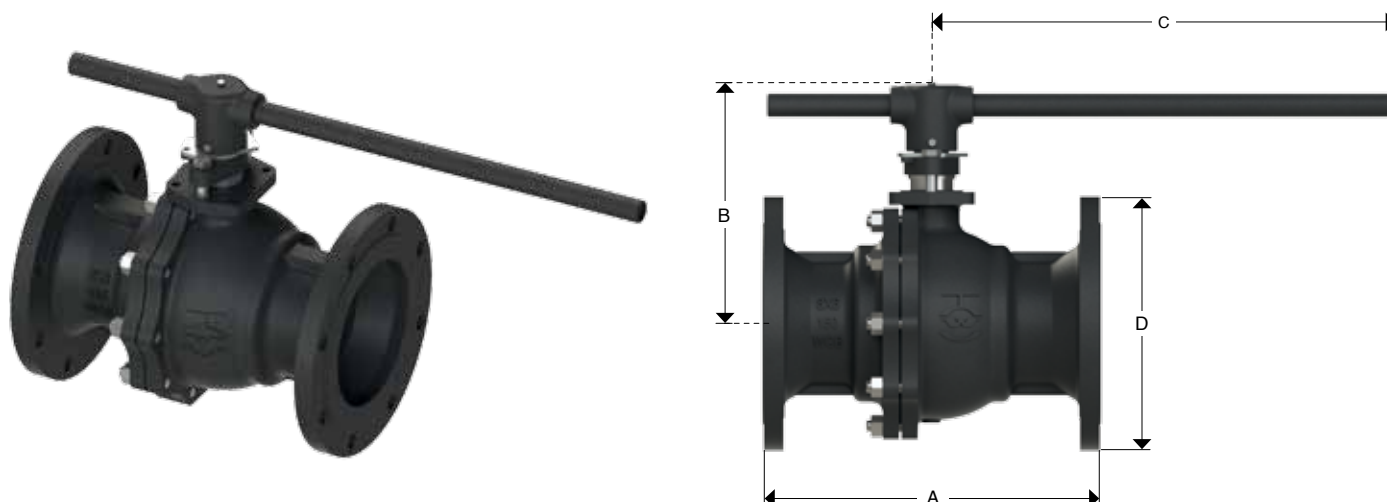
# **WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 150 REDUCED PORT**

## **Design Features**

- Design in accordance with API-6D & API 608
- CLASS 150 as per ASME B16.34
- Reduced Port
- Two-piece body
- Fire safe design as per API 607
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 6" X 4" and larger (Optional)

Lever Operator	
Catalog Figure No.	Type of Ends
7112-RZ	Flanged Raised Face
7113-RZ	Flanged Ring Type Joint
7114-RZ	Butt Weld

Gear Operator	
Catalog Figure No.	Type of Ends
7122-RZ	Flanged Raised Face
7123-RZ	Flanged Ring Type Joint
7124-RZ	Butt Weld



## **Dimensions and Weights**

D Nominal Diameter	mm	15 X 10	20 X 15	25 X 20	50 X 40	80 X 50	100 X 80	150 X 100	200 X 150
	in	1/2 X 3/8	3/4 X 1/2	1 X 3/4	2 X 1 1/2	3 X 2	4 X 3	6 X 4	8 X 6
A (RF)	mm	108	117	127	178	203	229	394	457
	in	4 1/4	4 3/5	5	7	8	9	15 1/2	18
D	mm	89	98.5	108	152	190	229	279	343
	in	3 1/2	3 7/8	4 1/4	6	7 1/2	9	11	13 1/2
B	mm	72	72	92	125	135	172	210	303
	in	2 5/6	2 5/6	3 5/8	5	5 1/3	6 7/9	8 1/4	12
C	mm	160	160	160	180	230	400	400	800
	in	6 2/7	6 2/7	6 2/7	7	9	15 3/4	15 3/4	31 1/2
Weight 7112-RZ	kg	3	3.5	5	9	15	25	60	105
	lb	6.62	7.72	11.03	19.85	33.08	55.13	132.30	231.53

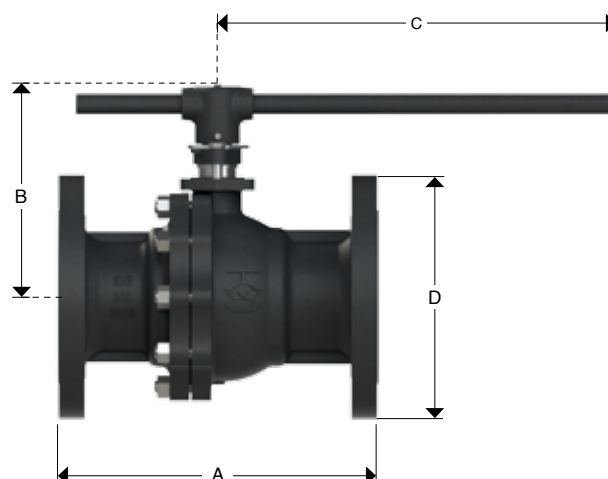
# WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 300 REDUCED PORT

## Design Features

- Design in accordance with API-6D & API 608
- CLASS 300 as per ASME B16.34
- Reduced Port
- Two-piece body
- Fire safe design as per API 607
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 6" X 4" and larger (Optional)

Lever Operator (Reduced Port)	
Catalog Figure No.	Type of Ends
7312-RZ	Flanged Raised Face
7313-RZ	Flanged Ring Type Joint
7314-RZ	Butt Weld

Gear Operator (Reduced Port)	
Catalog Figure No.	Type of Ends
7322-RZ	Flanged Raised Face
7323-RZ	Flanged Ring Type Joint
7324-RZ	Butt Weld



## Dimensions and Weights

D Nominal Diameter	mm	15 X 10	20 X 15	25 X 20	50 X 40	80 X 50	100 X 80	150 X 100	200 X 150
	in	1/2 X 3/8	3/4 X 1/2	1 X 3/4	2 X 1 1/2	3 X 2	4 X 3	6 X 4	8 X 6
A (RF)	mm	108	117	127	178	203	229	394	457
	in	4 1/4	4 3/5	5	7	8	9	15 1/2	18
D	mm	89	98.5	108	152	190	229	279	343
	in	3 1/2	3 7/8	4 1/4	6	7 1/2	9	11	13 1/2
B	mm	72	72	92	125	135	172	210	303
	in	2 5/6	2 5/6	3 5/8	5	5 1/3	6 7/9	8 1/4	12
C	mm	160	160	160	180	230	400	400	800
	in	6 2/7	6 2/7	6 2/7	7	9	15 3/4	15 3/4	31 1/2
Weight 7312-RZ	kg	4	5	6	14	25	48	90	130
	lb	8.82	11.03	13.23	30.87	55.13	105.84	198.46	286.66



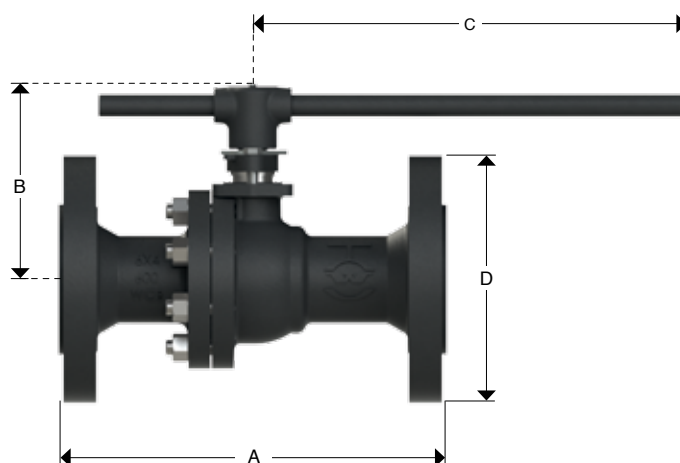
# **WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 600** **REDUCED PORT**

## **Design Features**

- Design in accordance with API-6D & API 608
- CLASS 600 as per ASME B16.34
- Reduced Port
- Two-piece body
- Fire safe design as per API 607
- Cast Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25
- Gear Operator 4" X 3" and larger (Optional)

Lever Operator (Reduced Port)	
Catalog Figure No.	Type of Ends
7612-RZ	Flanged Raised Face
7613-RZ	Flanged Ring Type Joint
7614-RZ	Butt Weld

Gear Operator (Reduced Port)	
Catalog Figure No.	Type of Ends
7622-RZ	Flanged Raised Face
7623-RZ	Flanged Ring Type Joint
7624-RZ	Butt Weld



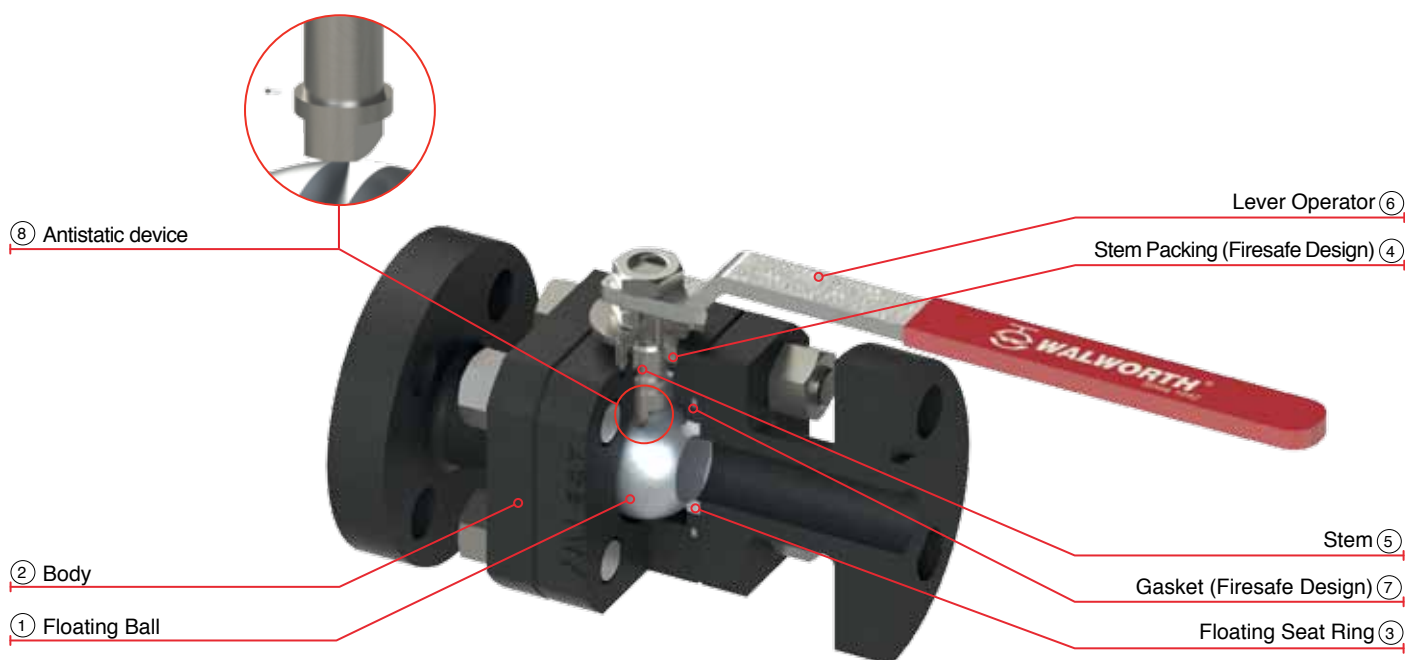
## **Dimensions and Weights**

D Nominal Diameter	mm	15 X 10	20 X 15	25 X 20	40 X 32	50 X 40	80 X 50	100 X 80
	in	1/2 X 3/8	3/4 X 1/2	1 X 3/4	1 1/2 X 1 1/4	2 X 1 1/2	3 X 2	4 X 3
A (RF)	mm	165	190	216	241	292	356	432
	in	6 1/2	7 1/2	8 1/2	9 1/2	11 1/2	14	17
D	mm	95	117	124	156	165	210	273
	in	3 3/4	4 3/5	4 7/8	6 1/7	6 1/2	8 1/4	10 3/4
B	mm	72	72	95	113	130	142	200
	in	2 5/6	2 5/6	3 3/4	4 4/9	5 1/8	5 3/5	7 7/8
C	mm	160	160	160	200	230	400	500
	in	6 2/7	6 2/7	6 2/7	7 7/8	9	15 3/4	19 2/3
Weight 7612-RZ	kg	5	6	7	13	21	39	72
	lb	11.03	13.23	15.44	28.67	46.31	86.00	158.77

# WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 1500

## Design Features

- Design in accordance with API 6D
- CLASS 1500 as per ASME B16.34
- Full Port
- Reduced Port (upon request)
- Three-pieces body
- Fire safe design as per API 607
- Forged Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25



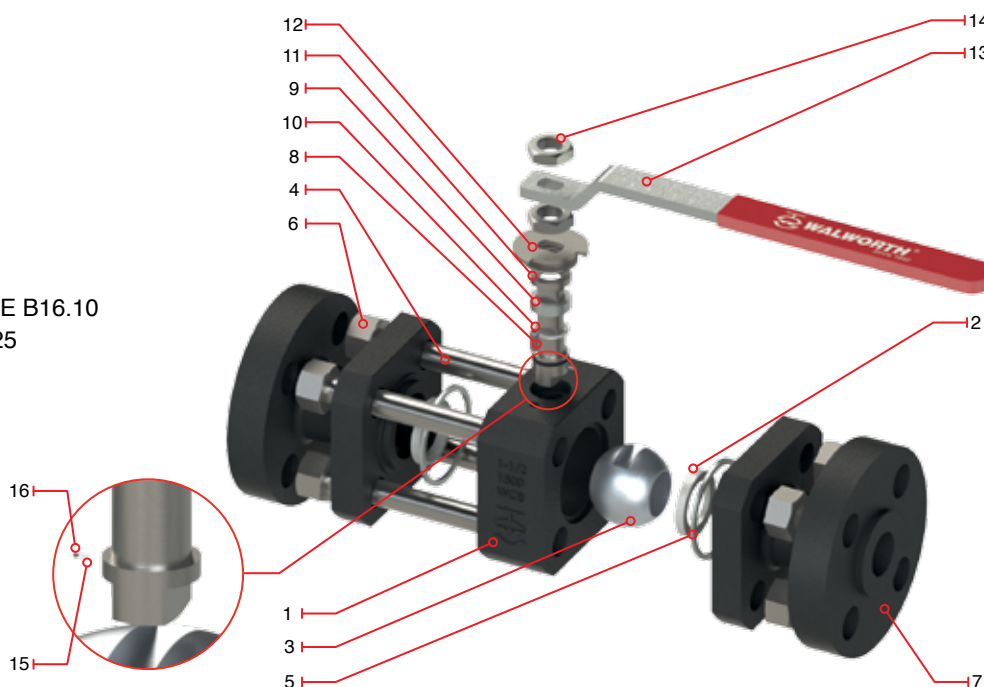
- ① Floating Ball. For all sizes & pressure ratings. The ball is only held by the stem and is in movement with the direction of the fluid in order to seal with the seat rings.
- ② Body. Made of three pieces that includes the central body bolted with the end flanges.
- ③ Floating Seat Ring. Two independent dynamic soft seat rings that get in contact with the floating ball which seal in one side of the valve depending on the fluid direction.
- ④ Stem Packing (firesafe design). It is a graphite seal that ensure safety for fire emergency as it has a reliable operation with high levels of sealing integrity when operating the valve.

- ⑤ Stem. The stem design is anti blow out which is held up by the valve body and fits in the bottom with a small cavity in the top part of the floating ball.
- ⑥ Lever operator. It is supplied in all sizes to open and close the valve.
- ⑦ Gasket (firesafe design). It is a graphite seal that ensure safety for fire emergency as it has a reliable operation with high levels of sealing integrity between body and ends.
- ⑧ Antistatic device. An Inconel spring with a small ball is placed between stem-body to prevent static continuity.

# WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 1500

## Design Features

- Design in accordance with API 6D
- CLASS 1500 as per ASME B16.34
- Full Port
- Reduced Port (upon request)
- Three-pieces body
- Fire safe design as per API 607
- Forged Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25



## Regular Bill of Materials

No.	Description	Carbon Steel with Trim F4 (SS304)	Carbon Steel with Trim F3 (SS316)	Stainless Steel 316	Carbon Steel with Trim F4 (SS304) NACE	Stainless Steel 316 with Trim F3 (SS316) NACE
1	Body	ASTM A105	ASTM A105	ASTM A182 Gr. F316	ASTM A105	ASTM A182 Gr. F316
2	Seat Ring	Nylon				
3	Ball	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
4	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7	ASTM A193 Gr. B8	ASTM A193 Gr. B7M	ASTM A193 Gr. B8M
5	Gasket	Flexible Graphite + Stainless Steel				
6	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H	ASTM A194 Gr. 8	ASTM A194 Gr. 2HM	ASTM A194 Gr. 8M
7	End	ASTM A105	ASTM A105	ASTM A182 Gr. F316	ASTM A105	ASTM A182 Gr. F316
8	Stem	ASTM A564 Gr 630 17-4PH	ASTM A564 Gr 630 17-4PH	ASTM A564 Gr 630 17-4PH	ASTM A564 Gr 630 17-4PH	ASTM A564 Gr 630 17-4PH
9	Packing	Flexible Graphite				
10	Stem Seat	RPTFE				
11	Washer	Carbon or Stainless Steel				
12	Stop Plate	Carbon or Stainless Steel				
13	Lever	Carbon Steel				
14	Stem Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H	ASTM A194 Gr. 8	ASTM A194 Gr. 2HM	ASTM A194 Gr. 8M
15	Antistatic Spring	Inconel 750				
16	Small ball	Stainless Steel				
*17	Identification Plate	Stainless Steel				

\* Not Shown

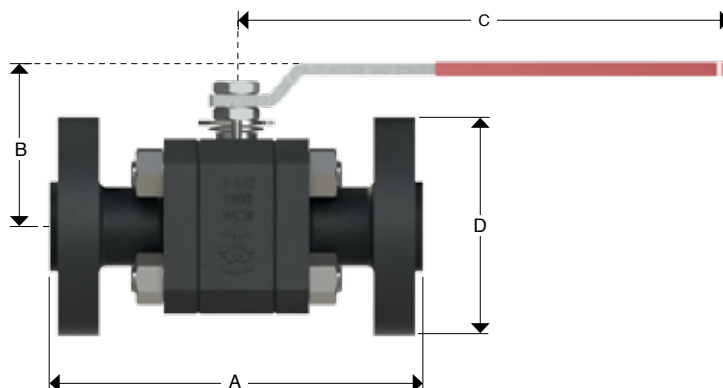
# WALWORTH FIRE SAFE FLOATING BALL VALVES CLASS 1500

## Design Features

- Design in accordance with API 6D
- CLASS 1500 as per ASME B16.34
- Full Port
- Three-pieces body
- Fire safe design as per API 607
- Forged Steel Construction
- Bolted Body
- Flanged ends as per ASME B16.5
- End to end dimensions as per ASME B16.10
- Butt Weld ends as per ASME B16.25

Lever Operator	
Catalog Figure No.	Type of Ends
7512-Z	Flanged Raised Face
7513-Z	Flanged Ring Type Joint
7514-Z	Butt Weld

Lever Operator (Reduced Port)	
Catalog Figure No.	Type of Ends
7512-RZ	Flanged Raised Face
7513-RZ	Flanged Ring Type Joint
7514-RZ	Butt Weld



## Dimensions and Weights

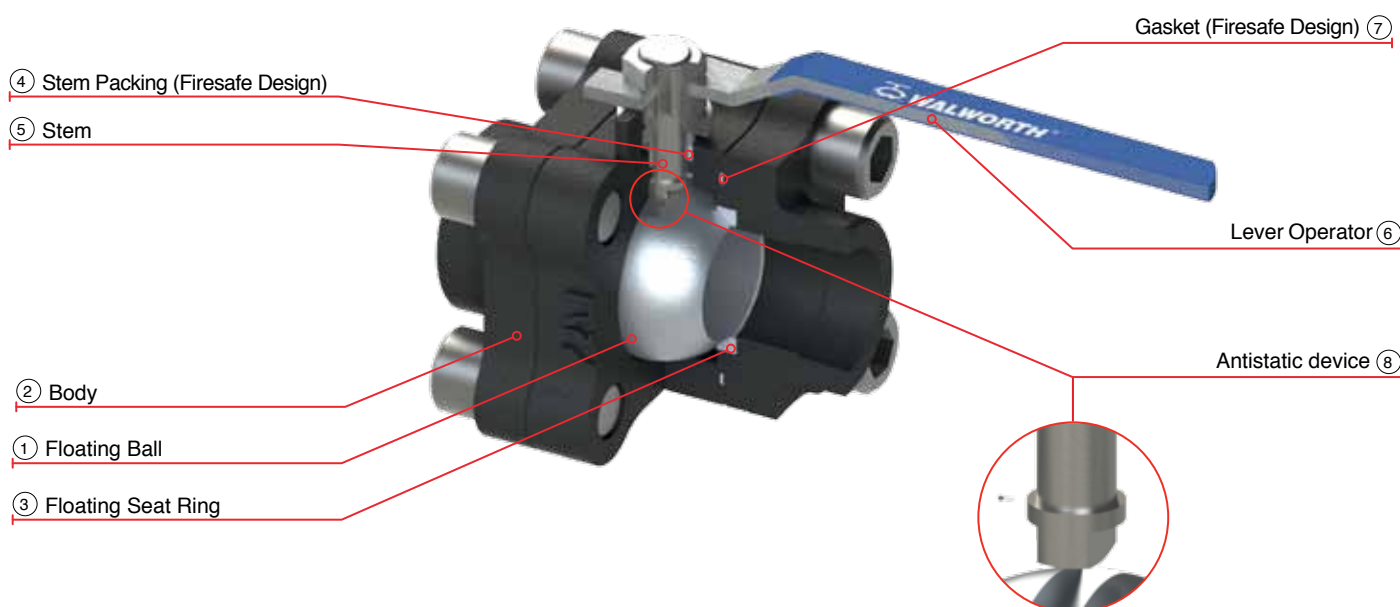
D Nominal Diameter	mm	15	20	25	32	40
	in	1/2	3/4	1	1 1/4	1 1/2
A (RF)	mm	216	229	254	279	305
	in	8 1/2	9	10	11	12
D	mm	121	130	149	159	178
	in	4 3/4	5 1/8	5 6/7	6 1/4	7
B	mm	75	81	105	125	150
	in	3	3 1/5	4 1/7	5	6
C	mm	180	230	230	230	400
	in	7	9	9	9	15 3/4
Weight 7512-Z	kg	9	11	17	23	29
	lb	19.85	24.26	37.49	50.72	63.95



# **WALWORTH FIRE SAFE FLOATING BALL VALVES** **CLASS 800, 1500 & 2500 (THREADED OR SOCKET WELD ENDS)**

## **Design Features**

- Design in accordance with API 608 for class 800 or as per ASME 16.34 for classes 1500 & 2500
- CLASS 800 as per API 602, 1500 & 2500 as per ASME B16.34
- Full Port
- Reduced Port (upon request)
- Three-pieces body
- Fire safe design as per API 607
- Forged Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- End to end dimensions as per WALWORTH standard
- Socket Weld ends as per ASME B16.11
- Gear Operator (Optional)

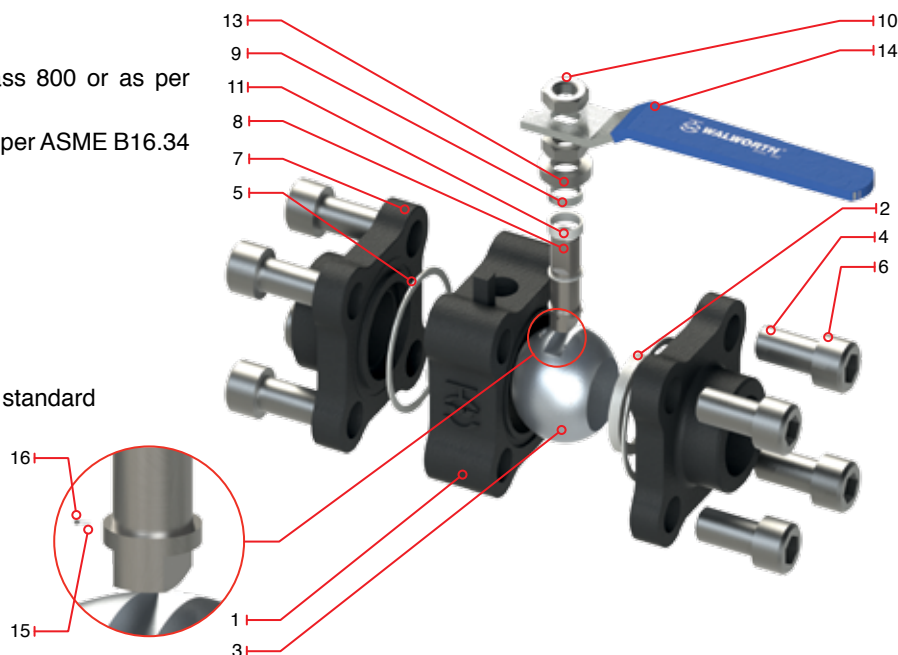


- ① Floating Ball. For all sizes & pressure ratings. The ball is only held by the stem and is in movement with the direction of the fluid in order to seal with the seat rings.
- ② Body. Made of three pieces that includes the central body bolted with the end flanges.
- ③ Floating Seat Ring. Two independent dynamic soft seat rings that get in contact with the floating ball which seal in one side of the valve depending on the fluid direction.
- ④ Stem Packing (firesafe design). It is a graphite seal that ensures safety for fire emergency as it has a reliable operation with high levels of sealing integrity when operating the valve.
- ⑤ Stem. The stem design is anti blow out and with an antistatic structure which is held up by the valve body and fits in the bottom in a small cavity in the top part of the floating ball.
- ⑥ Lever operator. It is supplied in all sizes to open and close the valve.
- ⑦ Gasket (firesafe design). It is a graphite seal that ensures safety for fire emergency as it has a reliable operation with high levels of sealing integrity between body and ends.
- ⑧ Antistatic device. An Inconel spring with a small ball is placed between stem-body to prevent static continuity.

# **WALWORTH FIRE SAFE FLOATING BALL VALVES** **CLASS 800, 1500 & 2500 (THD OR SW ENDS)**

## **Design Features**

- Design in accordance with API 608 for class 800 or as per ASME 16.34 for classes 1500 & 2500
- CLASS 800 as per API 602, 1500 & 2500 as per ASME B16.34
- Full Port
- Reduced Port (optional)
- Three-pieces body
- Fire safe design as per API 607
- Forged Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- End to end dimensions as per WALWORTH standard
- Socket Weld ends as per ASME B16.11
- Gear Operator (Optional)



## **Regular Bill of Materials**

No.	Description	Carbon Steel with Trim F4 (SS304)	Carbon Steel with Trim F3 (SS316)	Stainless Steel 316	Carbon Steel with Trim F4 (SS304) NACE	Stainless Steel 316 with Trim F3 (SS316) NACE
1	Body	ASTM A105	ASTM A105	ASTM A182 Gr. F316	ASTM A105	ASTM A182 Gr. F316
2	Seat Ring	Nylon				
3	Ball	ASTM A182 Gr. F304	ASTM A182 Gr. F316	ASTM A182 Gr. F316	ASTM A182 Gr. F304	ASTM A182 Gr. F316
4	Stud	ASTM A193 Gr. B7	ASTM A193 Gr. B7	ASTM A193 Gr. B8	ASTM A193 Gr. B7M	ASTM A193 Gr. B8M
5	Gasket	Graphite				
6	Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H	ASTM A194 Gr. 8	ASTM A194 Gr. 2HM	ASTM A194 Gr. 8M
7	End	ASTM A105	ASTM A105	ASTM A182 Gr. F316	ASTM A105	ASTM A182 Gr. F316
8	Stem	ASTM A182 GR F304 OR 17-4PH**	ASTM A182 GR F316 OR 17-4PH**	ASTM A182 GR F316 OR 17-4PH**	ASTM A182 GR F304 OR 17-4PH**	ASTM A182 GR F316 OR 17-4PH**
9	Packing	Flexible Graphite				
10	Stem Nut	ASTM A194 Gr. 2H	ASTM A194 Gr. 2H	ASTM A193 Gr. 8	ASTM A193 Gr. 2HM	ASTM A193 Gr. 8M
11	Stem Seat	RPTFE				
*12	Stem O'ring (only for class 2500)	Viton				
13	Washer	Carbon or Stainless Steel				
14	Lever	Carbon Steel				
15	Antistatic Spring	Inconel 750				
16	Small Ball	Stainless Steel				
*17	Identification Plate	Stainless Steel				

\* Not Shown

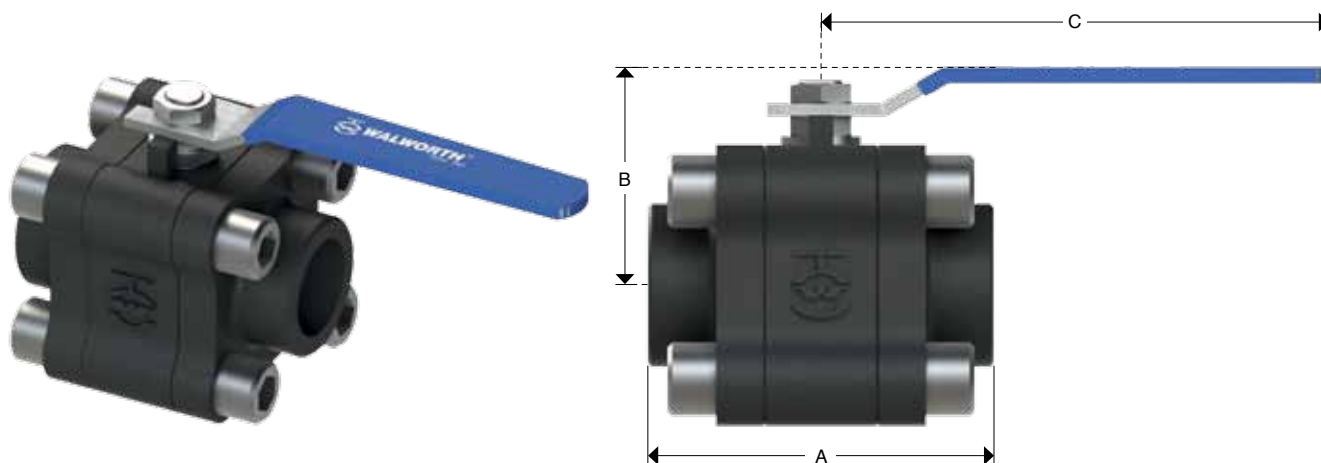
\*\* Material used as standard on class 1500 & 2500

# **WALWORTH FIRE SAFE FLOATING BALL VALVES** **CLASS 800 (THD OR SW ENDS)**

- Design in accordance with API 608
- CLASS 800 as per API 602
- Full Port
- Three-pieces body
- Fire safe design as per API 607
- Forged Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- End to end dimensions as per WALWORTH standard
- Socket Weld ends as per ASME B16.11

Lever Operator	
Catalog Figure No.	Type of Ends
7811-Z	Threaded (S)
7817-Z	Socket Weld (SW)
7810-Z	Threaded X Socket Weld (SSW)

Lever Operator (Reduced Port)	
Catalog Figure No.	Type of Ends
7811-RZ	Threaded (S)
7817-RZ	Socket Weld (SW)
7810-RZ	Threaded X Socket Weld (SSW)



## **Dimensions and Weights**

D Nominal Diameter	mm	15	20	25	40	50
	in	1/2	3/4	1	1 1/2	2
A	mm	92	108	120	145	170
	in	3 5/8	4 1/4	4 5/7	5 5/7	6 2/3
B	mm	59	68	73	90	97
	in	2 1/3	2 2/3	2 7/8	3 1/2	3 5/6
C	mm	<120	160	160	215	250
	in	4 5/7	6 2/7	6 2/7	8 1/2	9 5/6
Weight 7811-Z	kg	1	1.7	2.7	4.7	8.2
	lb	2.21	3.75	5.95	10.36	18.08

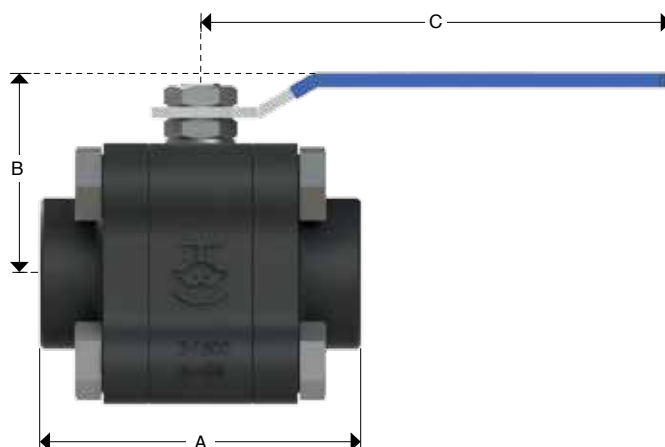
# WALWORTH FIRE SAFE FLOATING BALL VALVES

## CLASS 1500 (THREADED OR SOCKET WELD ENDS)

- Design in accordance with ASME 16.34
- CLASS 800 as per API 602
- Full Port
- Three-pieces body
- Fire safe design as per API 607
- Forged Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- End to end dimensions as per WALWORTH standard
- Socket Weld ends as per ASME B16.11

Lever Operator	
Catalog Figure No.	Type of Ends
7511-Z	Threaded (S)
7517-Z	Socket Weld (SW)
7510-Z	Threaded X Socket Weld (SSW)

Lever Operator (Reduced Port)	
Catalog Figure No.	Type of Ends
7511-RZ	Threaded (S)
7517-RZ	Socket Weld (SW)
7510-RZ	Threaded X Socket Weld (SSW)



### Dimensions and Weights

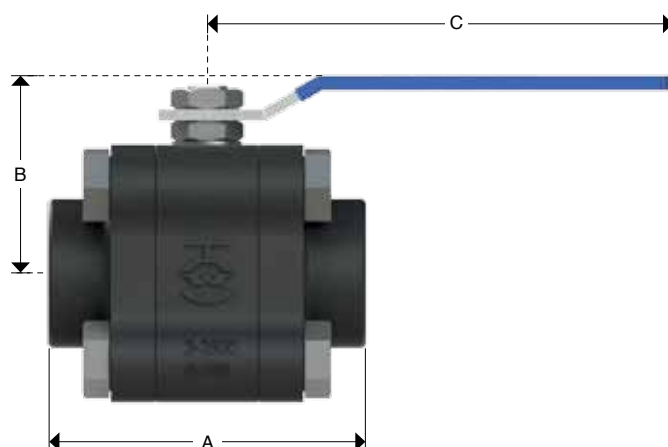
D Nominal Diameter	mm	15	20	25	40	50
	in	1/2	3/4	1	1 1/2	2
A	mm	92	108	120	145	170
	in	3 5/8	4 1/4	4 5/7	5 5/7	6 2/3
B	mm	59	68	73	90	97
	in	2 1/3	2 2/3	2 7/8	3 1/2	3 5/6
C	mm	120	160	160	215	250
	in	4 5/7	6 2/7	6 2/7	8 1/2	9 5/6
Weight 7511-Z	kg	1.2	2	3.5	6	9.5
	lb	2.65	4.41	7.72	13.23	20.95

# **WALWORTH FIRE SAFE FLOATING BALL VALVES** **CLASS 2500 (THREADED OR SOCKET WELD ENDS)**

- Design in accordance with ASME 16.34
- CLASS 2500 as per ASME B16.34
- Full Port
- Three-pieces body
- Fire safe design as per API 607
- Forged Steel Construction
- Bolted Body
- Threaded ends as per ASME B1.20.1
- End to end dimensions as per WALWORTH standard
- Socket Weld ends as per ASME B16.11

Lever Operator	
Catalog Figure No.	Type of Ends
7211-Z	Threaded (S)
7217-Z	Socket Weld (SW)
7210-Z	Threaded X Socket Weld (SSW)

Lever Operator (Reduced Port)	
Catalog Figure No.	Type of Ends
7211-RZ	Threaded (S)
7217-RZ	Socket Weld (SW)
7210-RZ	Threaded X Socket Weld (SSW)



## **Dimensions and Weights**

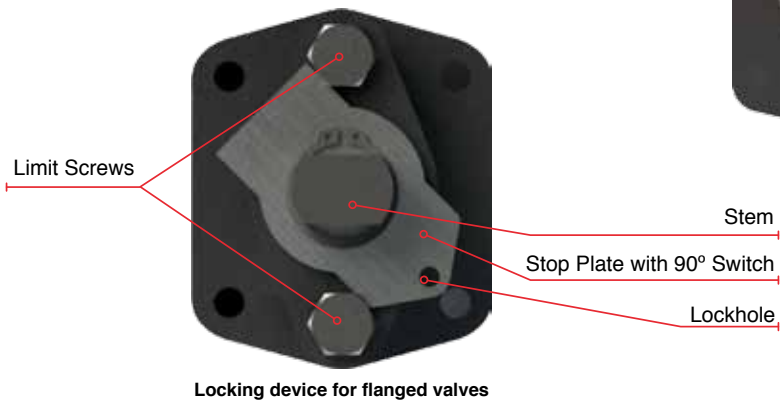
D Nominal Diameter	mm	15	20	25	40
	in	1/2	3/4	1	1 1/2
A	mm	170	190	205	260
	in	6 2/3	7 1/2	8	10 1/4
B	mm	62	75	80	111
	in	2 4/9	3	3 1/7	4 3/8
C	mm	220	250	250	400
	in	8 2/3	9 5/6	9 5/6	15 3/4
Weight 7211-Z	kg	2.8	4.5	7	15
	lb	6.17	9.92	15.44	33.08



## ACCESSORIES FOR OPERATION

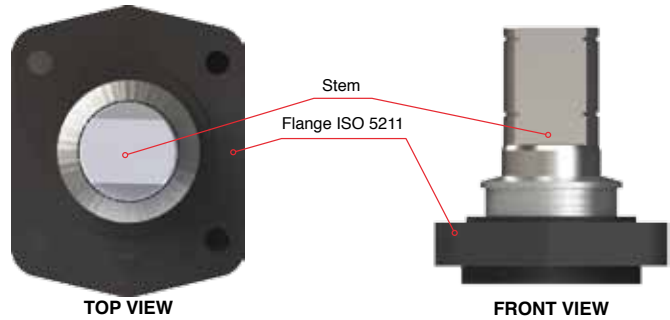
### Locking Device

Valves are designed with locking devices as per request, just to put a lock in the lockholes to prevent misoperation in the fully opened or closed position of people not authorized to use them, specially when the valves are mounted outdoors or when the valves are not allowed to be opened or closed by technical process. This locking device is designed for standard lock usage, valves are not supplied with the lock.



### Flange ISO 5211

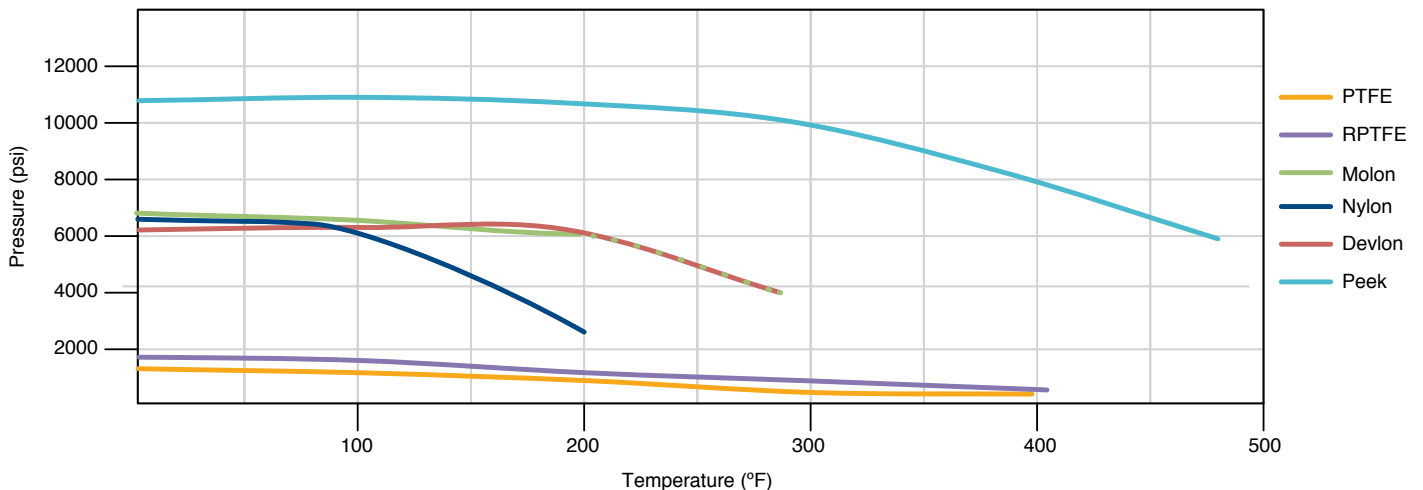
This flange connection could be provided in the top of the valve to install an operator device by removing the lever.



## PRESSURE-TEMPERATURE RATINGS

### PRESSURE-TEMPERATURE GRAPH FOR SOFT SEALS

The following graph shows the soft seals service performance curves at different temperatures and pressures as a reference.



# PRESSURE-TEMPERATURE RATINGS

## FORGED CARBON STEEL ASTM A105<sup>(1)(2)</sup>, ASTM A182 Gr. LF2<sup>(1)</sup> & CAST STEEL A216 Gr. WCB<sup>(1)</sup>

Temperature		Working class pressure					
°F	°C	150	300	600	800	1500	2500
- 20 to 100	-29 to 38	285	740	1480	1975	3705	6170
200	93	260	680	1360	1810	3395	5655
300	149	230	655	1310	1745	3270	5450
400	204	200	635	1265	1690	3170	5280
500	260	170	605	1205	1610	3015	5025
600	316	140	570	1135	1515	2840	4730
650	343	125	550	1100	1465	2745	4575
700	371	110	530	1060	1415	2665	4425
750	399	98	505	1015	1350	2535	4230
800	427	80	410	825	1100	2055	3430
850	454	65	320	640	850	1595	2655
900	482	50	230	460	615	1150	1915
950	510	35	135	275	365	685	1145
1000	538	20	85	170	225	430	715

(1) Not recommended to temperatures above 800°F, the carbide phase of steel may be converted to graphite. Permissible but not recommended for prolonged use above 800°F.

(2) Only killed steel shall be used above 850°F.

## FORGED STAINLESS STEEL ASTM A182 Gr. F304<sup>(1)</sup> & ASTM A351 Gr. CF8<sup>(1)</sup>

Temperature		Working class pressure					
°F	°C	150	300	600	800	1500	2500
- 20 to 100	-29 to 38	275	720	1440	1920	3600	6000
200	93	230	600	1200	1600	3000	5000
300	149	205	540	1075	1435	2690	4480
400	204	190	495	995	1325	2485	4140
500	260	170	465	9320	1240	2330	3880
600	316	140	440	885	1180	2210	3680
650	343	125	430	865	1150	2160	3600
700	371	110	420	845	1125	2110	3520
750	399	95	415	825	1100	2065	3440
800	427	80	405	710	1080	2030	3380
850	454	65	395	790	1055	1980	3300
900	482	50	390	780	1035	1945	3240
950	510	35	380	765	1020	1910	3180
1000	538	20	355	710	945	1770	2950
1050	566	20(*)	325	650	865	1630	2715
1100	593	20(*)	255	515	685	1285	2145
1150	621	20(*)	205	410	545	1030	1715
1200	649	20(*)	165	330	440	825	1370
1250	677	20(*)	135	265	355	970	1115
1300	704	20(*)	115	225	300	565	945
1350	732	20(*)	95	185	250	465	770
1400	760	20(*)	75	150	200	380	630
1450	788	20(*)	60	115	155	290	485
1500	816	15(*)	40	85	110	205	345

(1) At temperatures over 1,000°F, use only when the carbon content is 0.04% or higher.

(\*) Flanged end valve ratings terminate at 1,000°F

# PRESSURE-TEMPERATURE RATINGS

## FORGED STAINLESS STEEL ASTM A182 Gr. F316<sup>(1)</sup> & ASTM A351 Gr. CF8M<sup>(1)</sup>

Temperature		Working class pressure					
°F	°C	150	300	600	800	1500	2500
- 20 to 100	-29 to 38	275	720	1440	1920	3600	6000
200	93	235	620	1240	1655	3095	5160
300	149	215	560	1120	1495	2795	4660
400	204	195	515	1025	1370	2570	4280
500	260	170	480	955	1275	2390	3980
600	316	140	450	900	1205	2255	3760
650	343	125	440	885	1180	2210	3680
700	371	110	435	870	1160	2170	3620
750	399	95	425	855	1140	2135	3560
800	427	80	420	745	1125	2110	3520
850	454	65	420	735	1115	2090	3480
900	482	50	415	730	1105	2075	3460
950	510	35	385	775	1030	1930	3220
1000	538	20	365	725	970	1820	3030
1050	566	20	360	720	960	1800	3000
1100	593	20(*)	305	610	815	1525	2545
1150	621	20(*)	235	475	630	1185	1970
1200	649	20(*)	185	370	495	925	1545
1250	677	20(*)	145	295	390	735	1230
1300	704	20(*)	115	235	310	585	970
1350	732	20(*)	95	190	255	480	800
1400	760	20(*)	75	150	200	380	630
1450	788	20(*)	60	115	155	290	475
1500	816	15(*)	40	85	110	205	345

(1) At temperatures over 1,000°F, use only when the carbon content is 0.04% or higher.

(\*) Flanged end valve ratings terminate at 1,000°F

## CAST LOW TEMPERATURE CARBON STEEL ASTM A350 Gr. LCC<sup>(1)</sup>

Temperature		Working class pressure					
°F	°C	150	300	600	800	1500	2500
- 20 to 100	-29 to 38	290	750	1,500	2,000	3,750	6,250
200	93	260	750	1,500	2,000	3,750	6,250
300	149	230	730	1,455	1,940	3,640	6,070
400	204	200	705	1,405	1,875	3,520	5,865
500	260	170	665	1,330	1,775	3,325	5,540
600	316	140	605	1,210	1,615	3,025	5,040
650	343	125	590	1,175	1,570	2,940	4,905
700	371	110	555	1,110	1,480	2,775	4,630
750	399	95	505	1,015	1,350	2,535	4,230
800	427	80	410	825	1,100	2,055	3,430
850	454	65	320	640	850	1,595	2,655
900	482	50	225	445	595	1,115	1,855
950	510	35	135	275	365	685	1,145
1000	538	20	85	170	225	430	715

(1) Not to be used over 650°F.

## WALWORTH BODY AND TRIM MATERIALS

WALWORTH offers as standard the floating ball valves trim and body arrangements mentioned below, which configuration is suitable for the recommended service described in each of the materials. Any other trim or body material could be supplied upon request.

Body	WALWORTH Trim	Components		Recommended Service
		Ball	Stem	
BRASS	F1	SS-304 or Brass Chromium plated	Brass	Light commercial and residential applications including water and gas services
ASTM A216 GR. WCB OR ASTM A105	F2	Stainless Steel 410	Stainless Steel 410 or 17-4PH	Non-corrosive applications or general services including water, oil, steam and gases
ASTM A216 GR. WCB OR ASTM A105	F3	Stainless Steel 316	Stainless Steel 316 or 17-4PH	Non-corrosive applications or general services including water, oil, steam and gases
ASTM A216 GR. WCB OR ASTM A105	F4	Stainless Steel 304	Stainless Steel 304 or 17-4PH	Non-corrosive applications or general services including water, oil, steam and gases
ASTM A350 Gr. LCC OR ASTM A182 Gr. LF2	F3	Stainless Steel 316	Stainless Steel 316 or 17-4PH	Low Temperature applications
ASTM A351 Gr. CF8M OR ASTM A182 Gr. F316	F3	Stainless Steel 316	Stainless Steel 316 or 17-4PH	Corrosive systems as it has superior resistance to corrosive at high and low temperatures

## TORQUE AND CV FLOW RATES FOR FLOATING BALL VALVES

The torques and CV flow rates mentioned in the table below are for reference. The torque data already includes a safety factor of 30%, in case that is needed an actuator shall be added another 20% to 30% safety factor.

The torques are calculated only for RPTFE seat inserts.

Torque and CV data of floating ball valves																		
Size	150Lb						300Lb						600Lb					
	Torque		Stem Diameter		ISO	CV	Torque		Stem Diameter		ISO	CV	Torque		Stem Diameter		ISO	CV
	lb.ft	N.m	in	mm			lb.ft	N.m	in	mm			lb.ft	N.m	in	mm		
1/2"	14.8	20	1/2	12	F04	25	22.1	30	1/2	12	F04	25	29.5	40	1/2	12	F04	25
3/4"	18.4	25	1/2	12	F04	50	25.8	35	1/2	12	F04	50	33.2	45	1/2	12	F04	50
1"	25.8	35	5/8	14	F05	100	29.5	40	5/8	14	F05	100	66.4	90	5/8	14	F05	100
1 1/4"	36.9	50	5/8	14	F05		44.3	60	5/8	14	F05		88.5	120	5/8	14	F05	
1 1/2"	44.3	60	5/6	21	F07	270	59.0	80	5/6	21	F07	270	95.9	130	5/6	21	F07	270
2"	51.6	70	5/6	21	F07	490	81.1	110	5/6	21	F07	490	140.1	190	1	26	F07	490
2 1/2"	84.8	115	1	26	F07	950	136.4	185	1	26	F07	950	265.5	360	1	26	F10	950
3"	110.6	150	1	26	F07	1160	166.0	225	1	26	F07	1160	339.3	460	1 1/8	28	F10	1160
4"	180.7	245	1 1/4	32	F10	2200	302.4	410	1 1/4	32	F10	2200	567.9	770	1 4/7	40	F12	2200
5"	350.3	475	1 1/4	32	F12	3800	704.4	955	1 1/4	32	F12	3800						
6"	461.0	625	1 4/7	40	F12	5100	1003.1	1360	1 4/7	40	F12	5100						
8"	1003.1	1360	1 8/9	48	F12	9300	1696.4	2300	1 8/9	48	F14	9300						
10"	1622.6	2200	2 1/6	55	F16													

## WALWORTH FLOATING BALL VALVES FIGURES

Model		Class		Operation		Ends	
7	Floating Ball Valve	1	150 ANSI	1	Lever	1	Threaded (S)
		2	2500 ANSI	2	Gear Operator	2	Raised Face (RF)
		3	300 ANSI	3	Actuator	3	Ring Type Joint (RTJ)
		4	2000 WOG	5	Bare Stem prepared to receive actuator	4	Butt Weld (WE)
		5	1500 ANSI			7	Socket Weld (SW)
		6	600 ANSI			0	Threaded X Socket Weld (SSW)
		7	600 WOG				
		8	800 API				
		9	900 ANSI				
		0	1000 WOG				

Modifier Suffixes for Floating Ball Valves	
R	Reduced port
Z	Fire Safe valve

### Examples:

7312-RZ	"Fire safe floating ball valve, class 300, wrench operated, reduced port with raised face ends"
7817-Z	"Fire safe floating ball valve, class 800, wrench operated with socket weld ends"
7410	"Floating ball valve class 2000 WOG, wrench operated with threaded by socket weld ends"



# HOW TO ORDER

WALWORTH Valves are identified by a figure number which describes main features. Identification procedure is intended to assist customers to specify the sort of valve required according to a specific need.



Size	WALWORTH Figure	Type of Port	Design	Trim	Base Material ASTM	Supplementary Requirements
3/8"	7010	R= Reduced	Z= Firesafe	F1=Brass	Carbon Steel	GO= Gear Operator
1/4"	7011	In Blank= Full	In Blank= Non Firesafe	F2=SS410	A105	MOV= Motor Operated Valve
1/2"	7017			F3=SS316	WCB	POV= Pneumatic Operated Valve
3/4"	7410			F4=SS304	Low Carbon Steel	LD= Locking Device
1"	7411				LF2	NACE MR0175
1 1/4"	7417				LCC	NACE MR0103
1 1/2"	7112				Stainless Steel	SP= Special Paint
2"	7113				F316	SG= Special Gasket
2 1/2"	7114				F304	SPK= Special Packing
3"	7122				CF8	VOC= Certification of Volatile organic compounds
4"	7123				CF8M	XX= Additional requirements
6"	7124					
8"	7312					
10"	7313					
12"	7314					
	7322					
	7323					
	7324					
	7612					
	7613					
	7614					
	7622					
	7623					
	7624					
	7512					
	7513					
	7514					
	7810					
	7811					
	7817					
	7510					
	7511					
	7517					
	7210					
	7211					
	7217					
	7711					

## Examples:

3/4"-7011-F4-A105

3/4" Floating ball 1000 WOG Threaded ends Full Port Non Firesafe Design Trim F4 (SS304) Body A105

2"-7312-RZ-F3-CF8M-NACE MR0175

2" Floating ball class 300 Raised Face ends Reduced Port Firesafe Design Trim F3 (SS316) Body CF8M as per NACE MR0175

## DESIGN BASIS

All of WALWORTH's Valve Designs, when applicable, follow one or more of the following standards:

<b>API</b>	American Petroleum Institute:	
	API 598	Valve Inspection and Testing
	API 6D	Pipeline Valves (Gate, Ball and Check)
	API 602	Pressure rating for class 800
	API 607	Fire Test for 1/4 Turn Soft-Seated Valves
	API 608	Metal Ball Valves-Flanged, Threaded and Welding ends
<b>ANSI Standards</b>	National Standards Institute:	
	<b>ANSI B1.20.1</b>	NPT General Purpose Pipe Threads (Inches)
	<b>ANSI B16.5</b>	Pipeline Flanges and Flanged Fittings
	<b>ANSI B16.10</b>	Face to Face and End to End Valve Dimensions
	<b>ANSI B16.11</b>	Socket Weld General Purpose Dimensions
	<b>ANSI B16.25</b>	Butt Weld Ends
<b>MSS Standards</b>	Manufacturer's Standardization Society	
	<b>MSS SP-25</b>	Standard Marking System for Valves, Fittings, Flanges and Unions
	<b>MSS SP-55</b>	Quality Standard for Steel Castings for Valves, Flanges, Fittings and Other Piping Components/Visual Method for Evaluation of Surface Irregularities
	<b>MSS SP-72</b>	Ball Valves with Flanged or Butt-Welding Ends for General Service
	<b>MSS SP-110</b>	Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends
<b>ASTM Standards</b>	American Society for Testing and Materials:	
	<b>ASTM A-105</b>	Standard Specification for Carbon Steel Forgings for Piping Applications
	<b>ASTM A-182</b>	Standard Specification for Forged or Rolled Alloy Steel Pipe Flanges, Forged Fittings and Valves and Parts for High Temperature Service
	<b>ASTM A-193</b>	Standard Specification for Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service
	<b>ASTM A-194</b>	Standard Specification for Carbon and Alloy Steel Nuts for High Pressure and High Temperature Service
	<b>ASTM A-216</b>	Standard Specification for Carbon Steel Castings, Suitable for Fusion Welding and High Temperature Service
	<b>ASTM A-276</b>	Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes
	<b>ASTM A-320</b>	Standard Specification for Alloy Steel Bolting Materials for Low Temperature Service
	<b>ASTM A-350</b>	Standard Specification for Carbon and Low Alloy Steel Forgings, Requiring Notch Toughness Testing for Piping Components
	<b>ASTM A-351</b>	Standard Specification for Steel Austenitic and Austenitic-Ferritic (Duplex) Castings for Pressure Containing Parts
	<b>ASTM A-352</b>	Standard Specification for Steel, Ferritic and Martensitic Castings for Pressure Containing Parts, Suitable for Low Temperature Service
	<b>ASTM A-515</b>	Standard Specification for Carbon Steel Pressure Vessel Plates for Intermediate and High Temperature Service
	<b>ASTM A-564</b>	Standard Specification for Hot-Rolled and Cold-Finished Age-Hardening Stainless Steel Bars and Shapes
	<b>ASTM B-124</b>	Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes
	<b>ASTM B-283</b>	Standard Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)
<b>NACE Standard</b>	National Association of Corrosion Engineers	
	<b>NACE MR0175</b>	Sulfide Stress Corrosion Cracking Resistant Metallic Materials for Oil Field Equipment

# DESIGN BASIS

<b>ASME Code</b>	American Society of Mechanical Engineers	
	<b>ANSI/ASME B16.34</b>	Valves—Flanged, Threaded, and Welding End (Pressure-temperature ratings)
	<b>ANSI/ASME B31.1</b>	Power Piping
	<b>ANSI/ASME B31.2</b>	Fuel Gas Piping
	<b>ASME/ANSI B31.3</b>	Process Piping
<b>BS Code</b>	British Standard Institution	
	<b>BS 5351</b>	Specification for steel ball valves for the petroleum, petrochemical and allied industries
<b>Boiler and Pressure Vessel Code:</b>		
	<b>Section II</b>	Part A - Ferrous Material Specifications
	<b>Section II</b>	Part B - Non - Ferrous Material Specifications
	<b>Section II</b>	Part C - Specifications for Welding Rods, Electrodes and Filler Metals
	<b>Section V</b>	Non - Destructive Examination
	<b>Section VIII</b>	Rules for Construction of Pressure Vessels, Divisions 1 and 2
	<b>Section IX</b>	Welding and Brazing Qualifications of Surface Irregularities



# THE WALWORTH COMPANY GENERAL TERMS AND CONDITIONS

**ACCEPTANCE:** All quotations are for acceptance within 30 days from date of quotation unless extended in writing. In the event a purchase order is placed after this period of time. The WALWORTH Company reserves the right to quote base prices of all valves offered. All orders and contracts are subject to credit approval and acceptance by the WALWORTH Company.

**FREIGHT:** When prices are FOB point of shipment –no freight allowance, we will attempt to route shipments in the method which will result in the lowest cost unless otherwise instructed. All shipments will be freight charges collect except when stipulated on the purchase order, in which case you will be invoiced for all transportation charges. Delivery of material to a common carrier shall be considered to be delivery to Buyer and shall be at Buyer's risk thereafter. Claims of loss of or damage to material in transit shall be filed by the Buyer directly with the carrier.

**PRICES:** There will be added to all prices quoted sales, use, occupation or any other excise or similar tax which Seller may be required to pay or collect on or in connection with the sale. Seller shall be established by Federal, State or other government regulation with respect to the product(s) covered by the order which shall be lower than the price(s) specified in the order.

**ESCALATION TERMS:** Prices shown in this price schedule reflect the costs in effect at the time of publication. These prices will remain firm on all products with a quoted delivery of twenty-six (26) weeks or less. On products which have a scheduled delivery of more than twenty-six (26) weeks, the goods will be invoiced based on the applicable price sheet in effect at the time of shipment. In no event will the invoiced price be less than the price originally quoted.

**PURCHASED COMPONENTS:** (i.e. motors, gearing, etc.) Prices are quoted on supplier price in effect at time of quotation. Actual invoice Price will be adjusted in accordance with the supplier's escalation policy.

**DEFERRED SHIPMENTS:** If for any reason the customer desires to delay shipments more than 30 days after manufacturing is complete or to place a hold or stop to the order during the manufacturing cycle, The WALWORTH Company reserves the right to consider the order cancelled and to invoke cancellation charges per the schedule below.

**CANCELLATION:** After order acceptance by WALWORTH, items or completed orders may be cancelled and buyer will be charged for work performed, based on the following schedule:

- Five (5%) percent of prices of stock items.
- Ten (10%) percent of price of stock items ordered in quantities which exceed normal inventory levels.
- Five (5%) percent of prices prior to drawing submittal on made-to-order items.
- 15% after drawing approval, but prior to the start of castings.
- 30% to 50% during casting cycle, depending on the state of completion.
- 55% to 75% during machining and assembly operations, depending on the state of completion.
- 100% after final assembly and test.

**REMITTANCES:** Remittances must be made to the address indicated on the invoice.

**CREDIT TERMS:** As quoted. Invoices on balances overdue will be subject to a service charge of 11/2 % per month on such indebtedness.

**DELIVERIES:** Shipments and deliveries shall at all times be subject to the approval of Seller's Credit Department. If the Buyer shall fail to make any payments according to the terms of the contract, Seller may, in addition to and not in limitation of its other rights and remedies, at its option, cancel all or any part of Buyer's incomplete contracts with Seller or may defer shipments of deliveries under Buyer's contracts with Seller except upon receipt of satisfactory security or for cash shipment.

All schedule of shipments are estimated as closely as possible and Seller will use its best efforts to ship within the time scheduled, but does not guarantee to do so. Schedules commence with the date Seller receives authorization to proceed with order, subject to the provisions of the next sentence. The order will not be released for manufacture until complete specifications and approved drawings (if drawing approval is required) are received at the plant of manufacture and the estimated schedule of shipment will commence with the date of such receipt.

Seller shall not be liable for any direct, indirect or consequential damage or loss caused by any delay in delivery, regardless of the cause of delay.

Without limiting the generality of the foregoing, Seller assumes no responsibility for delays in delivery resulting from fire, flood, accidents, riots, strikes, transportation delays, labor or material shortages, existing or future laws, acts of any governmental authority, or any other cause beyond Seller's control. Items offered from stock are subject to prior sale.

**INSPECTION:** Final inspection and acceptance of products must be made at the plant of manufacture, unless otherwise provided in the order and/ or in agreed upon specifications. Prices do not include charges for special tests or inspections performed at the request of the Buyer, unless called for in the order and/or in agreed upon specifications.

**RETURNS:** Permission in writing and return tagging instructions must be obtained from Seller before any goods returned for credit or adjustment will be acceptance. Where returned goods are accepted, a minimum charge of 25% of the invoice price will be made, plus freight from both directions and costs of reconditioning the material for resale as new.

**WARRANTY:** Seller will replace without charge or refund the purchase price of products manufactured by Seller which prove to be defective in the material or workmanship, provided in each case that the product is properly installed and is used in the service for which Seller recommends it and that written claim, specifying the alleged defect, is presented to Seller shall in no event be responsible for (a) claims for labor, expenses or other damages occasioned by defective products or (b) for consequences or secondary damages. THE WARRANTY STATED IN THIS PARAGRAPH IS IN LIEU OF ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED. WITH RESPECT TO WARRANTIES THIS PARAGRAPH STATES BUYER'S EXCLUSIVE REMEDY AND SELLER'S EXCLUSIVE LIABILITY.

**DESIGN, ETC:** Seller reserves the right to change design, materials or specifications without notice. There will be a charge for modifying an order after it has been entered when such change or modification results in additional engineering or clerical work for either The WALWORTH Company or our suppliers.

**MINIMUM CHARGE:** Orders totaling less than \$100.00 USD net will be billed at a minimum charge of \$100.00 USD. Repair parts will be billed at a minimum charge of \$50.00 USD.

**NOTE:** We reserve the right to correct obvious clerical errors in quotations, invoices, and other contracts.







# **WALWORTH®**

*Since 1842*



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