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STARD VALVE

SUZHOU SIP STARD VALVE CO.LTD.

Add: No2# Changsheng Road, Shengpu Industrial Zone, Suzhou Industrial Park, Jiangsu, China, Post code 215126

Tel: (86)512-85185361

Fax: (86)512-62822227 62822033

E-mail:sales@stard-valve.com

Website:www.stard-valve.com



STARD SERIES T3 FORGED STEEL TRUNNION MOUNTED BALL VALVE



SUZHOU SIP STARD VALVE CO.LTD.

STARD VALVE

[ABOUT COMPANY]

International Quality, Precision Control

STARD VALVE, established since 2003, and owns two production centers. The STARD Ball Valves Factory is located in Suzhou SIP, which is adjacent to Shanghai-Nanjing Expressway and two hours away from Shanghai Port and Pudong Airport by car, while the STARD-Minli Valves Factory, located in Dafeng, Yancheng City, Jiangsu Province, is specializing in the manufacturing of gate valves, globe valves, and check valves and adjacent to the coastal expressway and the Port of Dafeng and enjoying the ease of transportation accordingly. These factories cover a total area of over 50,000 square meters and have more than 400 workers.

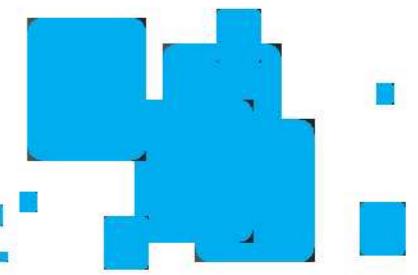


Products offered by STARD are mainly export-based, used for petroleum, natural gas and petrochemical handling, and consist of the 1-piece cast steel floating ball valves, 2-piece and 3-piece cast/forged steel floating /trunnion-mounted/metal-metal sealing ball valves, fully welded ball valves and top entry ball valves as well as cast steel American Standard gate valves, globe valves and check valves. Valve materials include carbon steel, stainless steel, alloy steel, and some special materials such as F51, Inconel625, Monel, 20# alloy and so on. These product lines are available in size 1/2" to 48", in pressure class 150LBS to 2500LBS or PN10 to PN640, and in connection type of flange connection, threaded connection, butt welding and socket welding. To satisfy clients' requirement for quality, products offered are strictly manufactured to API, ASME, ASTM, DIN, EN, BS, and GB standards.



STARD possesses all necessary equipment for machining, including CNC machine tools, CNC drilling machines, large vertical lathes, and machining centers. It has implemented a rigorous classification system for mechanical and machining requirements in accordance with the procedure and precision required by specific products, and uses advanced CNC machines and machining centers to fulfill work tasks involving critical dimensions. STARD has succeeded in passing a number of certifications such as ISO 9001, API6D, CE, API607, and ATEX, and marketed its products as far as to Europe, America, Canada, the Middle East and the East Asia, which have been well received in local markets.

Production Process



Certificate



API 6D



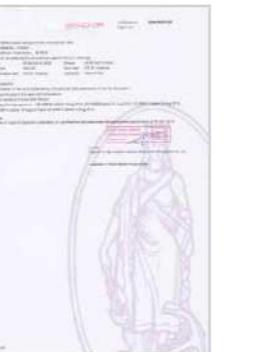
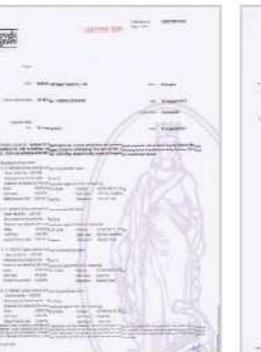
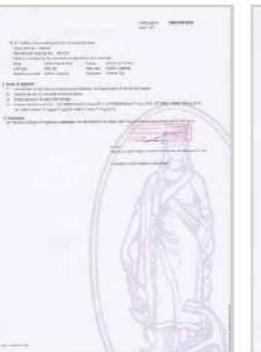
ISO 9001



CE/PED



ATEX



FIRE SAFE TEST

Innovation is the
sources of an
enterprise's life,
Innovation is to
create new
value!

Zero-defect process control
is the reliable guarantee for superior
performance of STARD valves.

STARD
2015|EDITION



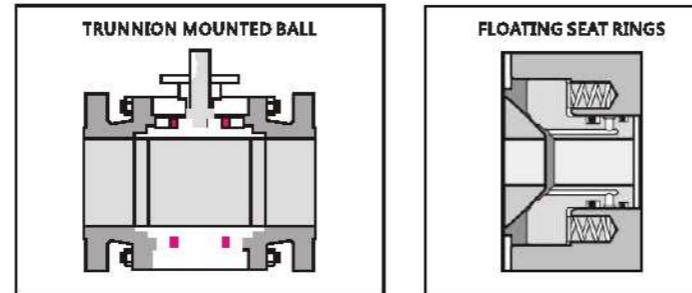
➤ *A provider of high-performance valves*

STARD SERIES T3 TRUNNION MOUNTED BALL VALVES MAIN FEATURES AND BENEFITS

FLOATING SEAT RINGS

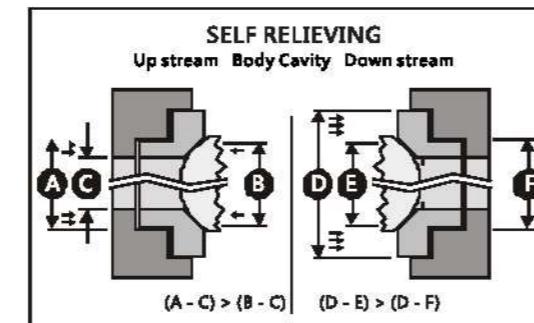
Two independent floating seat rings ensure the required bi-directional tightness of the valve.

The seat rings are spring loaded to achieve the required tightness even at very low pressure.



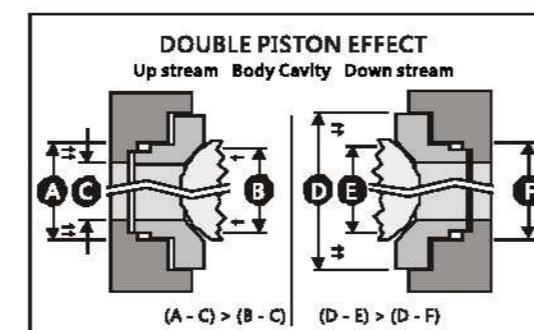
SINGLE PISTON EFFECT

In the standard design of STARD Trunnion Mounted Ball Valves, each seat ring performs the SINGLE PISTON action. In this case the pressure acting on the external side of the seating results in a force pushing the same against the ball while the pressure acting on the internal side of the seat rings results in a force pushing the same away from the ball. Therefore, while both seat rings grant the required tightness when the pressure is applied on their external side, they are SELF RELIEVING. This allows any over pressure acting in the body cavity to be discharged in the line as soon as the force caused by the pressure overcomes the one provided by the springs.



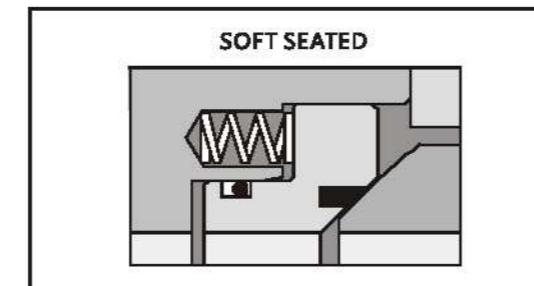
DOUBLE PISTON EFFECT

On request, the seat rings design may be modified to perform the DOUBLE PISTON EFFECT action. In this case the pressure acting on both the external and internal side of the seat rings, results in a force pushing the same against the ball. Therefore, each seat ring grants the required tightness even if the pressure is applied in the body cavity. This feature adds an extra sealing feature to the valve, but to release the possible over pressure developed into the body cavity it may be necessary to use an external safety relief valve.



SOFT SEATED VALVES

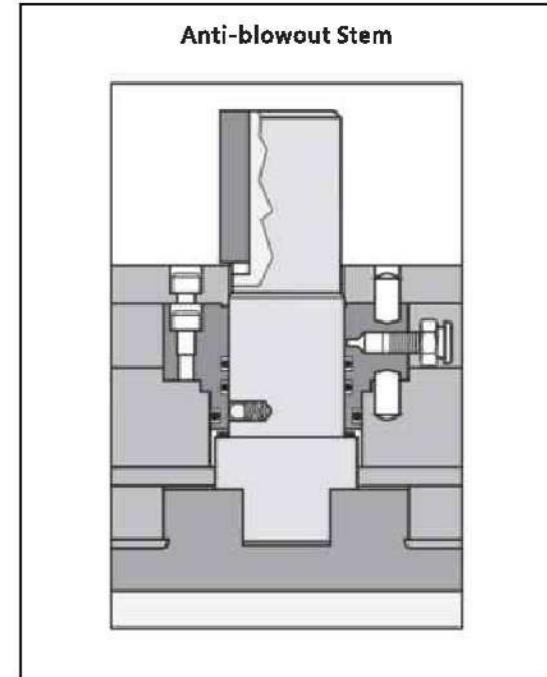
On soft seated ball valves a resilient seat seal is inserted into the seat ring to provide a secondary soft seating in addition to the primary metal to metal seating between the ball and the seat. The sealing between the seat and the seat housing shoulders is achieved by the means of O-rings. Graphite gaskets and/or spring energized lip seals are used for special applications.



STARD SERIES T3 TRUNNION MOUNTED BALL VALVES MAIN FEATURES AND BENEFITS

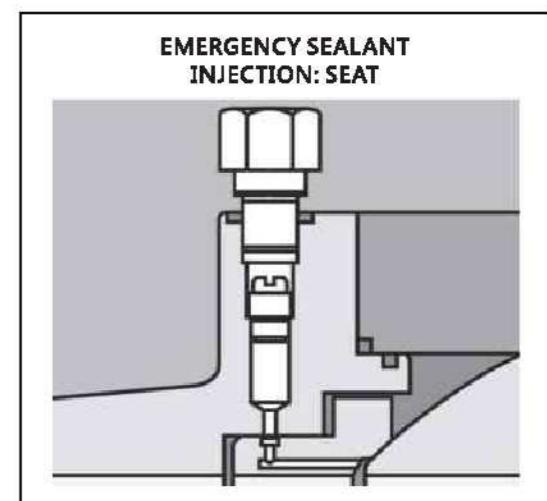
Anti-blowout Stem

Blowout-proof stems are a standard feature of all Stard ball valves. Sealing system can be defined triple: two static o-rings seal the stem, plus a third graphite retained by the adaptor flange. This ultimate seal can be replaced when the valve is in line and in closed position.



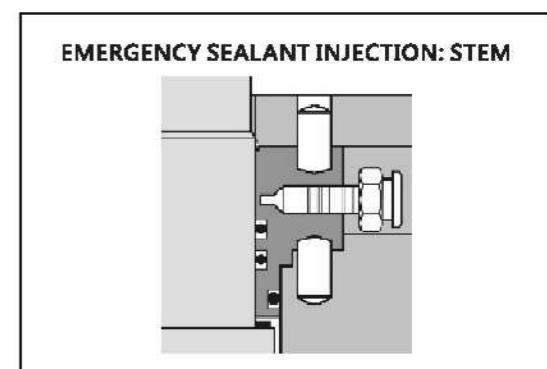
Emergency seat seal

Special sealants maybe injected through fittings that are located on the flange of adapters to restore sealing integrity if seat sealing surface is damaged. A second internal check valve provides backup to the fitting. Emergency metal to metal sealing in case of destruction of soft seals after fire.



EMERGENCY SEALANT INJECTION - STEM

Valves 4 in. (100 mm) and larger come equipped with an Emergency Sealant Injection Fitting located in the valve stem bonnet. Vent and Drain Fittings are supplied on all valves 6 in. (150 mm) and larger.



STARD SERIES T3 TRUNNION MOUNTED BALL VALVES MAIN FEATURES AND BENEFITS

STEM SEALING

The two-piece stem and ball design is not affected by the side thrust created by the line pressure acting on the ball; this contributes to minimize the operational torque and eases the achievement of bubble tight sealing through the stem-body joint.

The stem seal is achieved by the use of two O-rings and a graphite gasket retained by the gland plate. An emergency sealant injection facility is provided between the upper O-ring and the graphite gasket. The graphite gasket can be replaced with the valve in line and the ball in any position by removing the gland plate, after having released through the grease injection fitting hole, the possible pressure existing in the space between the upper O-ring and the graphite gasket.

The stem seals can be replaced with the valve in line, providing that the ball is in the fully closed or fully open position and the pressure in the body cavity has been completely released.

Special stem sealing systems which require the use of lip seals or special gaskets are available for different service conditions.

The provision for emergency grease injection in the stem sealing area is supplied as a standard feature.

BODY SEALING

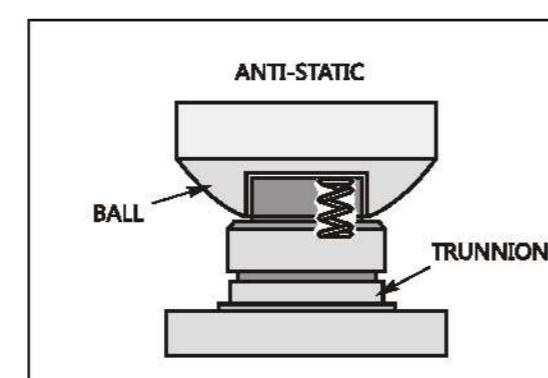
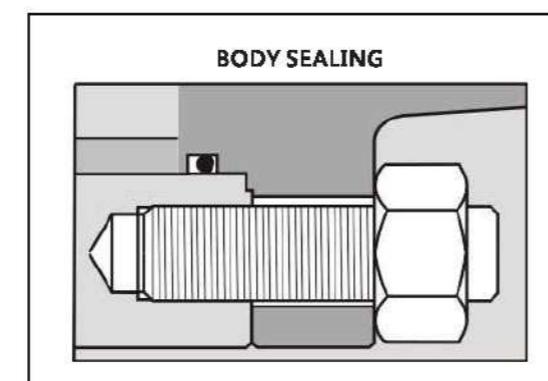
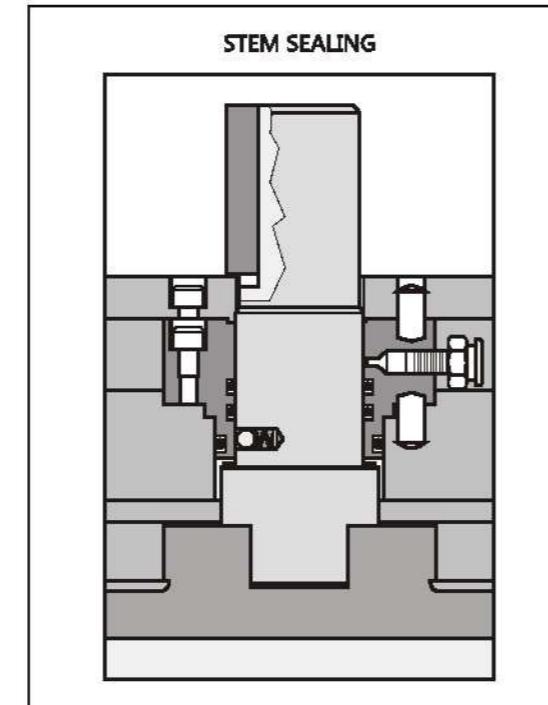
Perfect sealing and fire safe features are granted by the double sealing action of O-rings and graphite gaskets in all the static joints of the body components.

ANTI-STATIC DESIGN

Electrical conductance continually between all the metallic components of the trim and the body is granted by a spring loaded device.

FIRE SAFE DESIGN

STARD trunnion mounted ball valves have been



designed to comply with the fire safety standards of API 6FA and API 607, fire safe qualifications tests witnessed by independent inspection authorities covering all the production range.

Qualification tests to other fire safety standards may be performed on request.

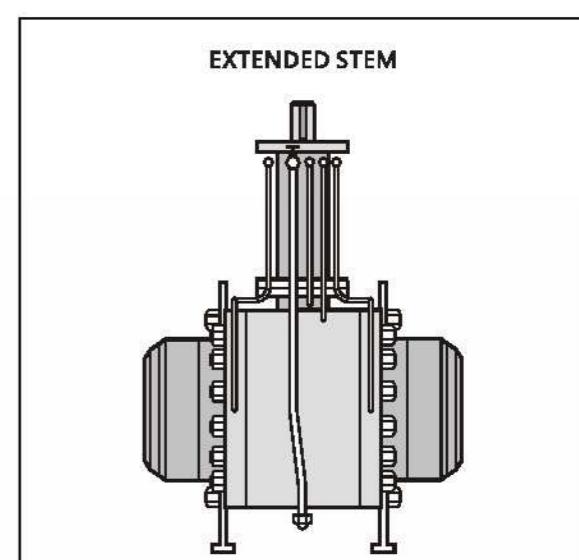
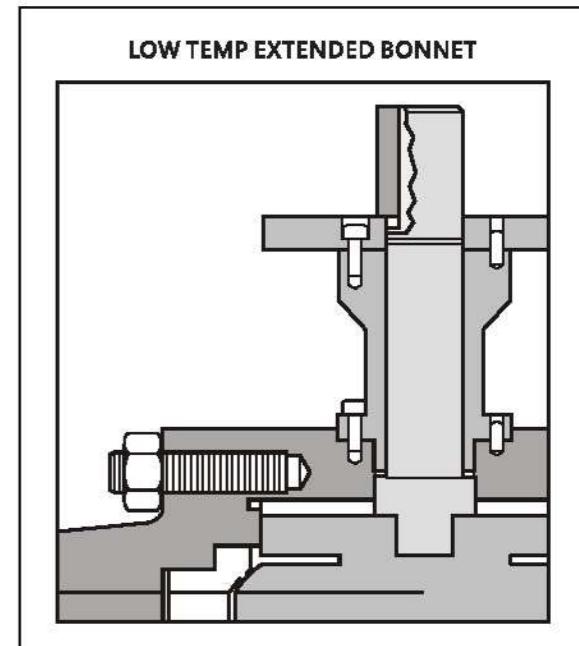
STARD SERIES T3 TRUNNION MOUNTED BALL VALVES MAIN FEATURES AND BENEFITS

EXTENDED STEM FOR LOW AND HIGH TEMPERATURE SERVICE

For valves to be used on insulated lines or for valves required for low or high temperature service,

STARD designs can include an extended bonnet. The extended bonnet increases the distance from the body and the stem sealing area, thus avoiding damage to the seals because of temperature.

Extended bonnet is recommended for use at temperatures below -50 or above 200. (-58F or above 392 F).



STEM FOR BURIED SERVICE

For valves to be installed on underground lines,

STARD trunnion mounted ball valves are supplied complete with suitable stem extensions.

All the drain, vent and emergency sealant lines are extended and all relevant pipes are firmly attached to the stem extension.



STARD SERIES T3 TRUNNION MOUNTED BALL VALVES MAIN FEATURES AND BENEFITS

CO₂ SERVICE

Carbon Dioxide, besides being corrosive and toxic, is very dangerous because standard O-rings and seals absorb it when under pressure and any quick pressure decrease generates an explosive expansion of the absorbed gas which destroys the O-rings and Seals. To avoid this problem, this design of STARD Trunnion Mounted Ball Valves suitable for CO service, uses 2 O-rings made of special anti-explosion decompressive Viton or PTFE spring energized Lip Seal.



INSTALLATION

STARD Side Entry Ball Valves can be installed with stem in vertical, horizontal or inclined positions; advance information on the position in which the valve will be installed is required for motor operated valves only.



MAINTENANCE

STARD Trunnion Mounted Ball Valves have been designed to be easily disassembled and reassembled in order to simplify the maintenance operations on site. Side Entry Ball Valves can be easily serviced on site without the need of special tools, providing they are removed from the line.

Top Entry Ball Valves can be serviced on site with the use of simple tools available on request, without the need of removing the valve from the line.



ACTUATION

STARD Trunnion Mounted Ball Valves have been designed to be operated by manual operators such as wrench or gear operator; and/or by any actuator available, from electric to pneumatic, hydraulic or gas over oil.

Gear operated valves can be easily actuated in service, by removing the gear box and mounting the desired Actuator.



STARD SERIES T3 TRUNNION MOUNTED BALL VALVES SPECIFICATIONS AND CONFORMANCE

STARD TRUNNION Valves are designed, manufactured and tested in accordance with the following industry standards. Additional end user or industry standards may be produced upon request.

ASME/ANSI - American Society of Mechanical Engineers/American National Standard Institute

B16.5	Steel Pipe Flanges
B16.10	Face-to-Face and End-to End dimensions of ferrous valve
B16.25	Butt Welding Ends
B16.34	Wall Thickness VIII, Div 1 Bolting Design

NACE - National Association of Corrosion Engineers

MR0175 Sulfide stress cracking resistant metallic materials for oil field equipment.

API - American Petroleum Institute

Spec. 6D	Specification for pipeline and piping valves.
Spec. 607	Fire test for soft-seated quarter-turn valves.
Spec. Q1	Specification for quality management system requirements for manufacturing organizations for the petroleum and natural gas industry.

MSS - Manufacturers Standardization Society

SP - 6 Standard Finishes for contact faces of pipe flanges and connecting end flanges of valves and fittings.

SEAT INSERT AND SEAL MATERIALS OPERATING (DYNAMIC) LIMITS

Material	Temperature		Pressure		ClassSize	
	Min.	Max.	SeatInsert	Seal	SeatInsert	Seal
Nylon SMX	-40	120	2500	N/A	64	N/A
Lauramid (Nylon 12G)	-50	100	2500	N/A	64	N/A
Devlon V	-100	140	2500	N/A	64	N/A
PEEK (450 G)	-60	220	2500	N/A	36	N/A
PTFE Glass Filled (25%)	-100	200	600	N/A	24	N/A
PTFE Carbon Filled (25%)	-100	180	300	N/A	24	N/A
PCTFE	-196	150	2500	N/A	36	N/A
HNBR-Therban	-25	120	N/A	2500	64	N/A
FKM A (Viton A)	-20	180	N/A	900	64	N/A
FKM GLT (Viton GLT)	-25	180	N/A	900	64	N/A
FKM AED	-20	180	N/A	2500	64	N/A
PTFE + Elgiloy Springs	-196	200	N/A	2500	N/A	36

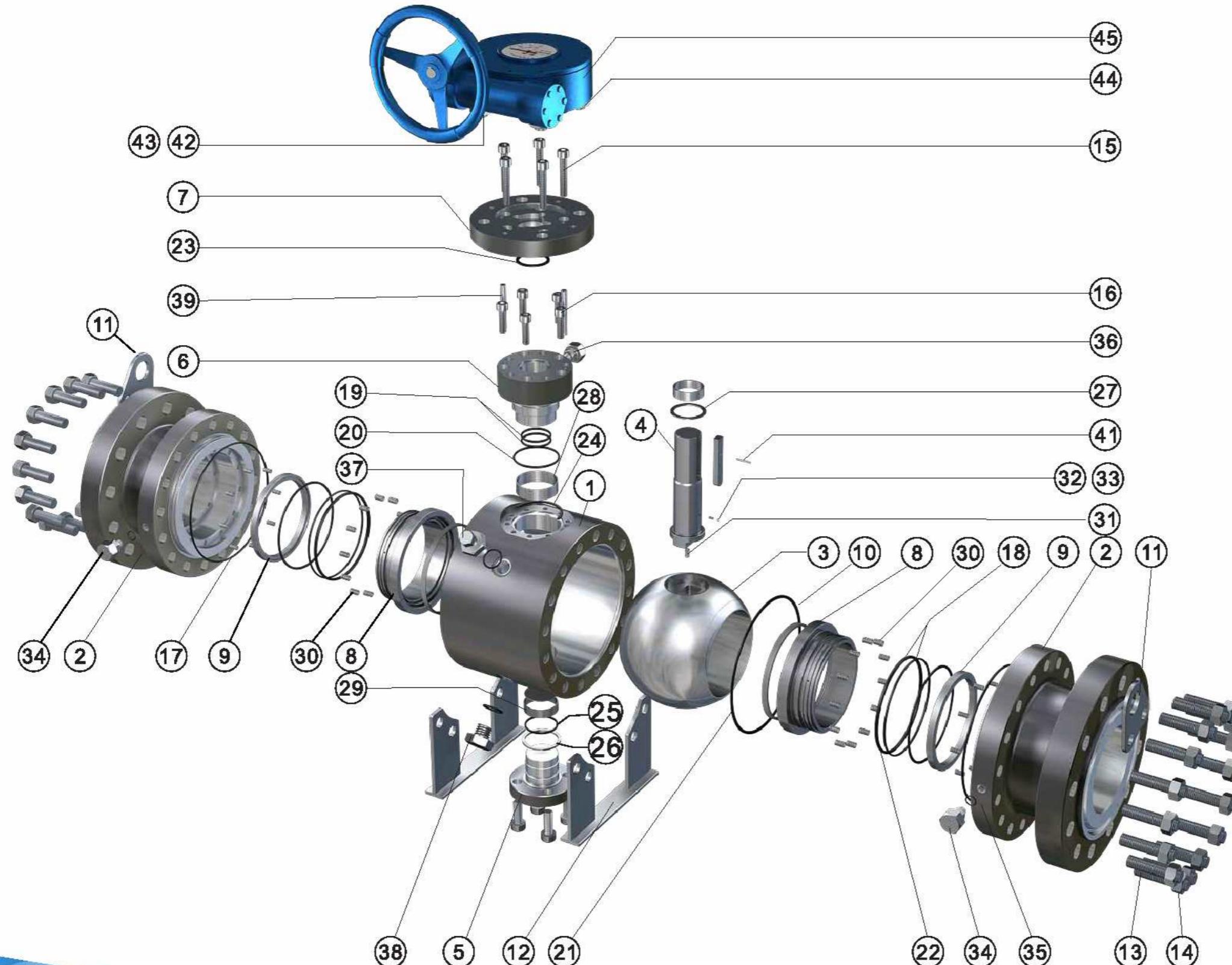
STARD SERIES T3-A DESIGN TRUNNION MOUNTED BALL VALVES

VALVE ASSEMBLY – ASME CLASS 150-600 2in. (50 mm) -12in.(300 mm)

VALVE ASSEMBLY – ASME CLASS 900 2in. (50 mm) -10in.(250 mm)

VALVE ASSEMBLY – ASME CLASS 1500 2in. (50 mm) -4in.(100 mm)

VALVE ASSEMBLY – ASME CLASS 2500 2in. (50 mm) -4in.(100 mm)



Item	Part
1	Body
2	Adapter
3	Ball
4	Stem
5	Trunnion
6	Bonnet
7	Top Flange
8	Seat
9	Seat Holder
10	Life Insert
11	Life Eye *
12	Support Leg *
13	Bolt
14	Nut
15	Screw
16	Screw
17	Adapter O-Ring
18	Seat O-Ring
19	Stem O-Ring
20	Body&Bonnet O-Ring
21	Body&Adapter O-Ring
22	Seat Gasket
23	Flange&Bonnet Gasket
24	Body&Bonnet Gasket
25	Trunion O-Ring
26	Washer
27	Trunnion O-Ring
28	Bearing
29	Bearing
30	Seat Spring
31	Spring
32	Spring
33	Small Ball
34	Injection Valve
35	Check Valve
36	Injection Valve
37	Vent Valve
38	Drain Valve
39	Pin
40	Pin
41	Key
42	Bolt
43	Nut
44	Pin
45	Gearbox

Note *: from 6" & above.

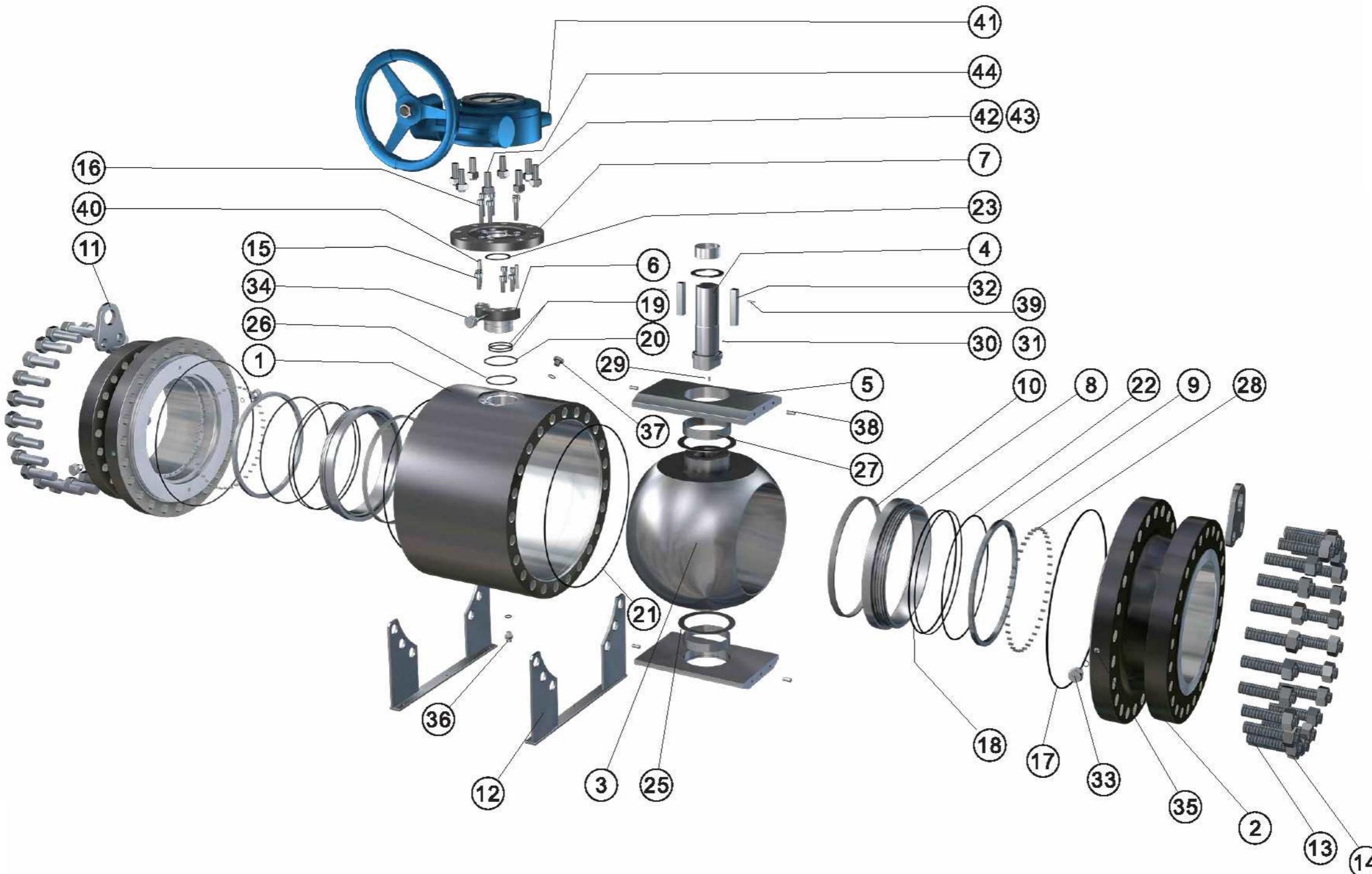
STARD SERIES T3-B DESIGN TRUNNION MOUNTED BALL VALVES

VALVE ASSEMBLY – ASME CLASS 150-600 14in. (350 mm) and above

VALVE ASSEMBLY – ASME CLASS 900 12in. (300 mm) and above

VALVE ASSEMBLY – ASME CLASS 1500 6in. (150 mm) and above

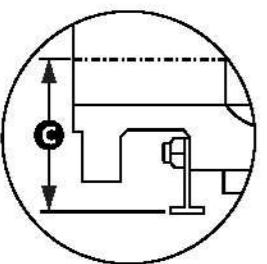
VALVE ASSEMBLY – ASME CLASS 2500 6in. (150 mm) and above



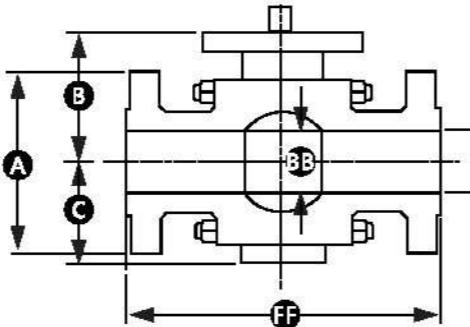
Item	Part
1	Body
2	Adapter
3	Ball
4	Stem
5	Trunnion
6	Bonnet
7	Top Flange
8	Seat
9	Seat Holder
10	Life Insert
11	Life Eye
12	Support Leg
13	Bolt
14	Nut
15	Screw
16	Screw
17	Adapter O-Ring
18	Seat O-Ring
19	Stem O-Ring
20	Body&Bonnet O-Ring
21	Body&Adapter O-Ring
22	Seat Gasket
23	Flange&Bonnet Gasket
24	Body&Bonnet Gasket
25	Washer
26	Thrust Washer
27	Bearing
28	Seat Bearing
29	Spring
30	Spring
31	Small Spring
32	Key
33	Injection Valve
34	Injection Valve
35	Check Valve
36	Drain Valve
37	Vent valve
38	Pin
39	Pin
40	Pin
41	Gearbox
42	Bolt
43	Nut
44	Pin

OVERALL DIMENSIONS - T3 DESIGN

ANSI/ASME CLASS 150



FOR 6 IN. AND LARGER

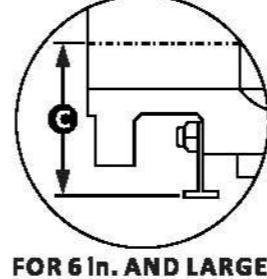


ANSI/ASME CLASS 150

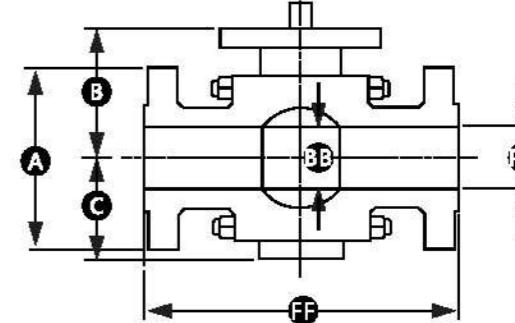
SIZE in.	FF			BB	PB	A	B	C	WEIGHT	
	RF	RTJ	WE						lb.	kg
2x1 1/2	7.0(178)	7.5(190)	8.5(216)	1.5(38)	2.0(50)	6.0(150)	3.7(95)	3.9(99)	55	25
2	7.0(178)	7.5(190)	8.5(216)	2.0(50)	2.0(50)	6.0(150)	5.1(129)	3.9(99)	62	28
3x2	8.0(203)	8.5(216)	11.1(283)	2.0(50)	3.0(76)	7.5(190)	5.1(129)	3.9(99)	66	30
3	8.0(203)	8.5(216)	11.1(283)	3.0(76)	3.0(76)	7.5(190)	5.4(138)	4.7(120)	121	55
4x3	9.0(229)	9.5(241)	12.0(305)	3.0(76)	3.9(100)	9.0(230)	5.4(138)	4.7(120)	132	60
4	9.0(229)	9.5(241)	12.0(305)	3.9(100)	3.9(100)	9.0(230)	6.7(170)	5.7(144)	154	70
6x4	15.5(394)	16.0(406)	18.0(457)	3.9(100)	5.9(150)	11.0(280)	6.7(170)	5.7(144)	163	74
6	15.5(394)	16.0(406)	18.0(457)	5.9(150)	5.9(150)	11.0(280)	8.5(216)	7.9(200)	352	160
8x6	18.0(457)	18.5(470)	20.5(521)	5.9(150)	7.9(201)	13.5(345)	8.5(216)	7.9(200)	392	178
8	18.0(457)	18.5(470)	20.5(521)	7.9(201)	7.9(201)	13.5(345)	10.1(257)	9.8(250)	539	245
10x8	21.0(533)	21.5(546)	22.0(559)	7.9(201)	9.9(252)	16.0(405)	10.1(257)	9.8(250)	634	288
10	21.0(533)	21.5(546)	22.0(559)	9.9(252)	9.9(252)	16.0(405)	11.7(297)	11.8(300)	913	415
12x10	24.0(610)	24.5(622)	25.0(635)	9.9(252)	11.9(303)	19.0(485)	11.7(297)	11.8(300)	1012	460
14x10	27.0(686)	27.5(698)	30.0(762)	9.9(252)	13.1(334)	21.0(535)	11.7(297)	11.8(300)	1250	568
12	24.0(610)	24.5(622)	25.0(635)	11.9(303)	11.9(303)	19.0(485)	13.1(333)	13.9(353)	1320	600
14x12	27.0(686)	27.5(698)	30.0(762)	11.9(303)	13.1(334)	21.0(535)	13.1(333)	13.9(353)	1463	665
16x12	30.0(762)	30.5(775)	33.0(838)	11.9(303)	15.2(385)	23.5(595)	13.1(333)	13.9(353)	1672	760
14	27.0(686)	27.5(698)	30.0(762)	13.1(334)	13.1(334)	21.0(535)	14.1(359)	15.6(395)	1870	850
16x14	30.0(762)	30.5(775)	33.0(838)	13.1(334)	15.2(385)	23.5(595)	14.1(359)	15.6(395)	2024	920
16	30.0(762)	30.5(775)	33.0(838)	15.2(385)	15.2(385)	23.5(595)	15.9(404)	17.1(435)	2570	1168
18x16	34.0(864)	34.5(876)	36.0(914)	15.2(385)	17.2(436)	25.0(635)	15.9(404)	17.1(435)	2772	1260
20x16	36.0(914)	36.5(927)	39.0(991)	15.2(385)	19.2(487)	27.5(700)	15.9(404)	17.1(435)	3003	1365
18	34.0(864)	34.5(876)	36.0(914)	17.2(436)	17.2(436)	25.0(635)	17.6(447)	18.9(480)	3124	1420
20x18	36.0(914)	36.5(927)	39.0(991)	17.2(436)	19.2(487)	27.5(700)	17.6(447)	18.9(480)	3256	1480
20	36.0(914)	36.5(927)	39.0(991)	19.2(487)	19.2(487)	27.5(700)	19.1(486)	20.5(520)	4510	2050
24x20	42.0(1067)	42.5(1079)	45.0(1143)	19.2(487)	23.2(589)	32.0(815)	19.1(486)	20.5(520)	4840	2200
22	39.0(991)	-	43.0(1092)	21.3(540)	21.3(540)	29.5(750)	20.7(525)	18.7(475)	5764	2620
24	42.0(1067)	42.5(1079)	45.0(1143)	23.2(589)	23.2(589)	32.0(815)	22.6(573)	23.6(600)	7524	3420
30x24	51.0(1295)	-	55.0(1397)	23.2(589)	28.9(735)	38.75(985)	22.6(573)	23.6(600)	8030	3650
26	45.0(1143)	-	49.0(1245)	24.9(633)	24.9(633)	34.25(870)	24.8(630)	22.0(560)	8111	3687
28	49.0(1244)	-	53.0(1347)	26.9(684)	26.9(684)	36.5(925)	25.4(645)	25.6(650)	9889	4495
30	51.0(1295)	-	55.0(1397)	28.9(735)	28.9(735)	38.75(985)	27.1(689)	27.6(700)	11506	5230
36x30	60.0(1524)	-	68.0(1728)	28.9(735)	34.4(874)	46.0(1170)	27.1(689)	27.6(700)	13882	6310
32	53.9(1371)	-	60.0(1524)	30.7(779)	30.7(779)	41.75(1060)	29.1(740)	29.3(745)	15004	6820
34	58.0(1473)	-	64.0(1626)	32.7(830)	32.7(830)	43.75(1110)	29.9(760)	30.5(775)	17182	7810
36	60.0(1524)	-	68.0(1728)	34.4(874)	34.4(874)	46.0(1170)	31.9(810)	31.7(805)	19382	8810
40	69.0(1753)	-	77.0(1956)	38.4(976)	38.4(976)	50.75(1290)	35.2(895)	35.4(900)	27698	12590
42	73.0(1855)	-	82.0(2083)	40.2(1020)	40.2(1020)	53.0(1345)	37.4(950)	36.8(935)	31482	14310
48	84.0(2134)	-	94.0(2388)	45.9(1166)	45.9(1166)	59.5(1510)	43.1(1095)	42.1(1070)	48246	21930
56	98.0(2489)	-	98.0(2489)	54.3(1380)	54.3(1380)	68.75(1745)	51.2(1300)	49.2(1250)	75064	34120

OVERALL DIMENSIONS - T3 DESIGN

ANSI/ASME CLASS 300



FOR 6 IN. AND LARGER

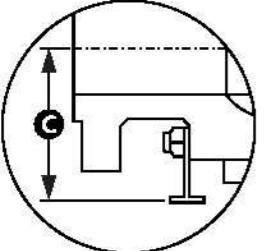


ANSI/ASME CLASS 300

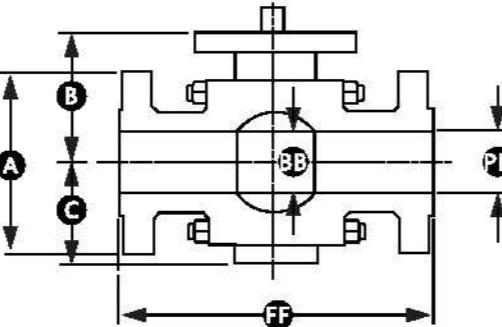
SIZE in.	FF			BB	PB	A	B	C	WEIGHT	
	RF	RTJ	WE						lb.	kg
2x1 1/2	8.5(216)	9.1(232)	8.5(216)	1.5(38)	2.0(50)	6.5(165)	4.0(102)	3.1(80)	57.2	26
2	8.5(216)	9.1(232)	8.5(216)	2.0(50)	2.0(50)	6.5(165)	4.5(115)	3.3(83.5)	66	30
3x2	11.1(283)	11.7(298)	11.1(283)	2.0(50)	3.0(76)	8.25(210)	4.5(115)	3.3(83.5)	77	35
3	11.1(283)	11.7(298)	11.1(283)	3.0(76)	3.0(76)	8.25(210)	5.4(138)	4.4(112)	127.6	58
4x3	12.0(305)	12.6(321)	12.0(305)	3.0(76)	3.9(100)	10.0(255)	5.4(138)	4.4(112)	143	65
4	12.0(30									

OVERALL DIMENSIONS - T3 DESIGN

ANSI/ASME CLASS 600



FOR 6 in. AND LARGER

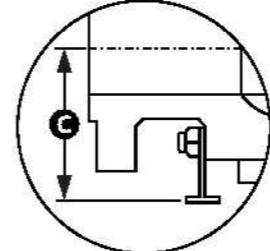


ANSI/ASME CLASS 600

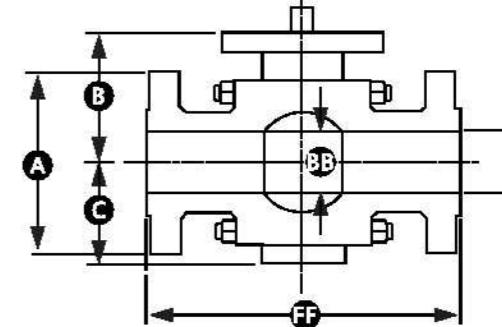
SIZE in.	FF			WE	BB	PB	A	B	C	WEIGHT	
	RF	RTJ	WE							lb.	kg
2x1 1/2	11.5(292)	11.6(295)	11.5(292)	1.5(38)	1.9(49)	6.5(165)	4.5(114)	3.5(90)	70.4	32	
2	11.5(292)	11.6(295)	11.5(292)	2.0(50)	2.0(50)	6.5(165)	4.8(121)	3.5(90)	77	35	
3x2	14.0(356)	14.1(359)	14.0(356)	2.0(50)	3.0(76)	8.25(210)	4.8(121)	3.5(90)	101.2	46	
3	14.0(356)	14.1(359)	14.0(356)	3.0(76)	3.0(76)	8.25(210)	5.9(150)	4.8(121)	143	65	
4x3	17.0(432)	17.1(435)	17.0(432)	3.0(76)	3.9(100)	10.75(275)	5.9(150)	4.8(121)	180.4	82	
4	17.0(432)	17.1(435)	17.0(432)	3.9(100)	3.9(100)	10.75(275)	7.2(183)	5.3(135)	264	120	
6x4	22.0(559)	22.1(562)	22.0(559)	3.9(100)	5.9(150)	14.0(355)	7.2(183)	5.3(135)	352	160	
6	22.0(559)	22.1(562)	22.0(559)	5.9(150)	5.9(150)	14.0(355)	8.9(225)	9.1(230)	576.4	262	
8x6	26.0(660)	26.1(664)	26.0(660)	5.9(150)	8.0(202)	16.5(420)	8.9(225)	9.1(230)	704	320	
8	26.0(660)	26.1(664)	26.0(660)	8.0(202)	8.0(202)	16.5(420)	10.0(255)	10.5(267.5)	924	420	
10x8	31.0(787)	31.1(791)	31.0(787)	8.0(202)	10.0(254)	20.0(510)	10.0(255)	10.5(267.5)	1232	560	
10	31.0(787)	31.1(791)	31.0(787)	10.0(254)	10.0(254)	20.0(510)	11.8(299)	13.4(340)	1711.6	778	
12x10	33.0(838)	33.1(841)	33.0(838)	10.0(254)	11.9(303)	22.0(560)	11.8(299)	13.4(340)	1874.4	852	
14x10	35.0(889)	35.1(892)	35.0(889)	10.0(254)	13.1(334)	23.8(605)	11.8(299)	13.4(340)	2090	950	
12	33.0(838)	33.1(841)	33.0(838)	11.9(303)	11.9(303)	22.0(560)	13.9(353)	13.9(352.5)	2380.4	1082	
14x12	35.0(889)	35.1(892)	35.0(889)	11.9(303)	13.1(334)	23.75(605)	13.9(353)	13.9(352.5)	2508	1140	
16x12	39.0(991)	39.1(994)	39.0(991)	11.9(303)	15.2(385)	27.0(685)	13.9(353)	13.9(352.5)	2970	1350	
14	35.0(889)	35.1(892)	35.0(889)	13.1(334)	13.1(334)	23.75(605)	15.3(388)	16.5(420)	2816	1280	
16x14	39.0(991)	39.1(994)	39.0(991)	13.1(334)	15.2(385)	27.0(685)	15.3(388)	16.5(420)	2877.6	1308	
16	39.0(991)	39.1(994)	39.0(991)	15.2(385)	15.2(385)	27.0(685)	17.0(433)	18.4(467)	3696	1680	
18x16	43.0(1092)	43.1(1095)	43.0(1092)	15.2(385)	17.2(436)	29.25(745)	17.0(433)	18.4(467)	4070	1850	
20x16	47.0(1194)	47.2(1200)	47.0(1194)	15.2(385)	19.2(487)	32.0(815)	17.0(433)	18.4(467)	4906	2230	
18	43.0(1092)	43.1(1095)	43.0(1092)	17.2(436)	17.2(436)	29.25(745)	18.9(479)	20.1(510)	5335	2425	
20x18	47.0(1194)	47.2(1200)	47.0(1194)	17.2(436)	19.2(487)	32.0(815)	18.9(479)	20.1(510)	6050	2750	
20	47.0(1194)	47.2(1200)	47.0(1194)	19.2(487)	19.2(487)	32.0(815)	20.6(523)	21.7(550)	6714.4	3052	
24x20	55.0(1397)	55.4(1406)	55.0(1397)	19.2(487)	23.2(589)	37.0(940)	20.6(523)	21.7(550)	7150	3250	
22	51.0(1296)	51.4(1305)	51.0(1296)	21.3(540)	21.3(540)	34.3(870)	21.5(545)	20.1(510)	8338	3790	
24	55.0(1397)	55.4(1406)	55.0(1397)	23.2(589)	23.2(589)	37.0(940)	24.8(630)	25.2(640)	11440	5200	
30x24	65.0(1651)	65.5(1664)	65.0(1651)	23.2(589)	28.9(735)	44.5(1130)	24.8(630)	25.2(640)	12694	5770	
26	57.0(1448)	57.5(1460)	57.0(1448)	24.9(633)	24.9(633)	40.0(1015)	26.5(673)	26.8(680)	12430	5650	
28	61.0(1549)	61.5(1562)	61.0(1549)	26.9(684)	26.9(684)	42.25(1075)	26.2(665)	27.2(690)	14872	6760	
30	65.0(1651)	65.5(1664)	65.0(1651)	28.9(735)	28.9(735)	52.5(1334)	29.7(755)	32.2(817)	18370	8350	
36x30	82.0(2083)	82.6(2098)	82.0(2083)	28.9(735)	34.4(874)	51.75(1315)	29.7(755)	32.2(817)	22836	10380	
32	70.0(1778)	70.6(1794)	70.0(1778)	30.7(779)	30.7(779)	47.0(1195)	29.7(755)	30.7(780)	21428	9740	
34	76.0(1930)	76.6(1946)	76.0(1930)	32.7(830)	32.7(830)	49.0(1245)	30.7(780)	32.1(815)	24948	11340	
36	82.0(2083)	82.6(2098)	82.0(2083)	34.4(874)	34.4(874)	51.75(1315)	32.1(815)	33.1(840)	29700	13500	
40	92.0(2337)	92.0(2337)	92.0(2337)	38.4(976)	38.4(976)	52.0(1320)	36.0(915)	37.0(940)	40348	18340	
42	96.0(2437)	96.0(2437)	96.0(2437)	40.2(1020)	40.2(1020)	55.25(1405)	38.2(970)	38.6(980)	46992	21360	
48	100.0(2540)	100.0(2540)	100.0(2540)	45.9(1166)	45.9(1166)	62.75(1595)	43.5(1105)	44.1(1120)	68640	31200	
56	116.1(2949)	116.1(2949)	116.1(2949)	54.3(1380)	54.3(1380)	73(1855)	51.2(1300)	50.8(1290)	104478	47490	

OVERALL DIMENSIONS - T3 DESIGN

ANSI/ASME CLASS 900



FOR 6 in. AND LARGER

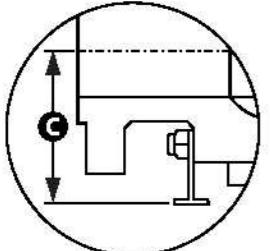


ANSI/ASME CLASS 900

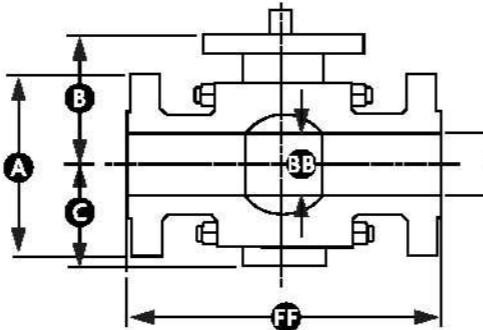
SIZE in.	FF			WE	BB	PB	A	B	C	WEIGHT	
	RF	RTJ	WE							lb.	kg
2x1 1/2	14.5(368)	14.6(371)	14.5(368)	1.5(38)	1.9(49)	8.5(215)	4.5(114)	3.5(90)	92.4	42	
2	14.5(368)	14.6(371)									

OVERALL DIMENSIONS - T3 DESIGN

ANSI/ASME CLASS 1500



FOR 6 in. AND LARGER

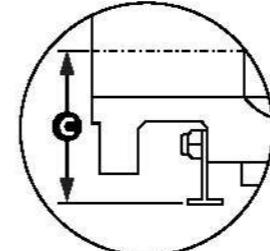


ANSI/ASME CLASS 1500

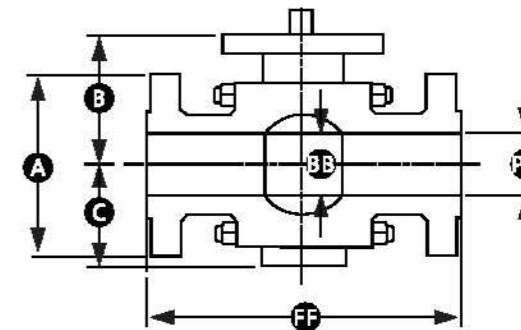
SIZE in.	FF			BB	PB	A	B	C	WEIGHT	
	RF	RTJ	WE						lb.	kg
2x1 1/2	14.5(368)	14.6(371)	14.5(368)	1.5(38)	1.9(49)	8.5(215)	4.5(114)	3.5(90)	99	45
2	14.5(368)	14.6(371)	14.5(368)	2.0(50)	2.0(50)	8.5(215)	4.9(125)	3.7(95)	121	55
3x2	18.5(470)	18.6(473)	18.5(470)	2.0(50)	3.0(76)	10.5(265)	4.9(125)	3.7(95)	171.6	78
3	18.5(470)	18.6(473)	18.5(470)	3.0(76)	3.0(76)	10.5(265)	6.3(161)	4.8(122.5)	242	110
4x3	21.5(546)	21.6(549)	21.5(546)	3.0(76)	4.0(102)	12.25(310)	6.3(161)	4.8(122.5)	297	135
4	21.5(546)	21.6(549)	21.5(546)	4.0(102)	4.0(102)	12.25(310)	7.8(199)	7.9(200)	484	220
6x4	27.8(705)	28.0(711)	27.8(705)	4.0(102)	5.7(144)	15.5(395)	7.8(199)	7.9(200)	693	315
6	27.8(705)	28.0(711)	27.8(705)	5.7(144)	5.7(144)	15.5(395)	10.6(268)	11.0(280)	1144	520
8x6	32.8(832)	33.1(841)	32.8(832)	5.7(144)	7.6(192)	19.0(485)	10.6(268)	11.0(280)	1430	650
8	32.8(832)	33.1(841)	32.8(832)	7.6(192)	7.6(192)	19.0(485)	13.2(335)	13.2(335)	2094.4	952
10x8	39.0(991)	39.4(1000)	39.0(991)	7.6(192)	9.4(239)	23.0(585)	13.2(335)	13.2(335)	2530	1150
10	39.0(991)	39.4(1000)	39.0(991)	9.4(239)	9.4(239)	23.0(585)	15.1(383)	15.7(400)	3572.8	1624
12x10	44.5(1130)	45.1(1146)	44.5(1130)	9.4(239)	11.3(287)	26.5(675)	15.1(383)	15.7(400)	3887.4	1767
14x10	49.5(1257)	50.2(1276)	49.5(1257)	9.4(239)	12.4(315)	29.5(750)	15.1(383)	15.7(400)	4734.4	2152
12	44.5(1130)	45.1(1146)	44.5(1130)	11.3(287)	11.3(287)	26.6(675)	17.4(441)	18.1(460)	5775	2625
14x12	49.5(1257)	50.2(1276)	49.5(1257)	11.3(287)	12.4(315)	29.5(750)	17.4(441)	18.1(460)	5581.4	2537
16x12	54.5(1384)	55.4(1406)	54.5(1384)	11.3(287)	14.3(362)	32.5(825)	17.4(441)	18.1(460)	6175.4	2807
14	49.5(1257)	50.2(1276)	49.5(1257)	12.4(315)	12.4(315)	29.5(750)	18.6(473)	19.7(500)	6336	2880
16x14	54.5(1384)	55.4(1406)	54.5(1384)	12.4(315)	14.3(362)	32.5(825)	18.6(473)	19.7(500)	7216	3280
16	54.5(1384)	55.4(1406)	54.5(1384)	14.3(362)	14.3(362)	32.5(825)	19.0(483)	22.5(572.5)	8910	4050
18x16	60.5(1537)	61.4(1559)	60.5(1537)	14.3(362)	16.0(406)	36.0(915)	19.0(483)	22.5(572.5)	10956	4980
20x16	65.5(1664)	66.4(1686)	65.5(1664)	14.3(362)	18.0(457)	38.75(985)	19.0(483)	22.5(572.5)	11330	5150
18	60.5(1537)	61.4(1559)	60.5(1537)	16.0(406)	16.0(406)	36.0(915)	23.4(595)	23.6(600)	13772	6260
20x18	65.5(1664)	66.4(1686)	65.5(1664)	16.0(406)	17.9(454)	38.75(985)	23.4(595)	23.6(600)	16588	7540
20	65.5(1664)	66.4(1686)	65.5(1664)	17.9(454)	17.9(454)	38.75(985)	25.1(636.5)	27.6(700)	20064	9120
24x20	80.4(2043)	81.5(2071)	80.4(2043)	17.9(454)	21.5(546)	46.0(1170)	25.1(636.5)	27.6(700)	24090	10950
22	-	-	-	-	-	-	-	-	-	-
24	80.4(2043)	81.5(2071)	80.4(2043)	21.5(546)	21.5(546)	46.0(1170)	29.4(747.5)	30.7(780)	31504	14320

OVERALL DIMENSIONS - T3 DESIGN

ANSI/ASME CLASS 2500



FOR 6 in. AND LARGER



ANSI/ASME CLASS 2500

SIZE in.	FF			BB	PB	A	B	C	WEIGHT	
	RF	RTJ	WE						lb.	kg
2x1 1/2	17.8(451)	17.9(454)	17.8(451)	1.5(38)	1.7(44)	9.25(235)	4.3(109)	3.5(89.5)	138.6	63
2	17.8(451)	17.9(454)	17.8(451)	1.7(44)	1.7(44)	9.25(235)	5.7(144)	4.7(118.5)	202.4	92
3x2	22.8(578)	23.0(584)	22.8(578)	1.7(44)	2.5(64)	12.0(305)	5.7(144)	4.7(118.5)	347.6	158
3	22.8(578)	23.0(584)	22.8(578)	2.5(64)	2.5(64)	12.0(305)	7.2(182)	5.7(145)	440	200
4x3	26.5(673)	26.9(683)	26.5(673)	2.5(64)	3.5(89)	14.0(355)	7.2(182)	5.7(145)	770	350
4	26.5(673)	26.9(683)	26.5(673)	3.5(89)	3.5(89)	14.0(355)	8.6(219)	6.9(174.5)	847	385
6x4	36.0(914)	36.5(927)	36.0(914)	3.5(89)	5.2(133)	19.1(485)	8.6(219)	6.9(174.5)	1137.4	517
6	36.0(914)	36.5(927)	36.0(914)	5.2(133)	5.2(133)	19.1(485)	12.0(305)	11.0(280)	1727	785
8x6	40.2(1022)	40.9(1038)	40.2(1022)	5.2(133)	7.1(179.5)	21.75(550)	12.0(305)	11.0(280)	2640	1200
8	40.2(1022)	40.9(1038)	40.2(1022)	7.1(179.5)	7.1(179.5)	21.75(550)	16.9(430)	17.1(435)	2974.4	1352
10x8	50.0(1270)	50.9(1292)	50.0(1270)	7.1(179.5)	8.8(223)	26.5(675)	16.9(430)	17.1(435)	5566	2530
10	50.0(1270)	50.9(1292)	50.0(1270)	8.8(223)	8.8(223)	26.5(675)	17.7(450)	16.7(425)	5940	2700
12x10	56.0(1422)	56.9(1445)	56.0(1422)	8.8(223)	10.4(265)	30.0(760)	17.7(450)	16.7(425)	7084	3220
12	56.0(1422)	56.9(1445)	56.0(1422)	10.4(265)	10.4(265)	30.0(760)	20.3(515)	18.9(480)	7744	3520



STANDARD MATERIALS - T3 DESIGN

Standard Materials

The following bills of materials are only some sample solutions STARD has developed during its long experience. STARD range of production covers a wider choice of materials for the different components of the valve.

Standard Materials for ANSI Class 150#, 300#, 600#

ANSI Class 150#, 300#, 600# Carbon Steel Ball Valves

Body: ASTM A105
Ball: AISI 4140+ENP/ASTM A105+ENP
Stem: AISI 4140+ENP/ASTM A105+ENP
Seat: AISI 4140+ENP/ASTM A105+ENP+PTFE Insert
O'Rings: Nitrile or Viton
Gaskets: Graphite

ANSI Class 150#, 300#, 600# Low Temperature Carbon Steel Ball Valves (-46degC)

Body: ASTM A350 LF2
Ball: ASTM A350 LF2+ENP or AISI 4140+ENP
Stem: ASTM A350 LF2+ENP or AISI 4140+ENP
Seat: ASTM A350 LF2+ENP or A105+ENP + PTFE Insert
O'Rings: Nitrile or Viton
Gaskets: Graphite

ANSI Class 150#, 300#, 600# Stainless Steel Ball Valves

Body: ASTM A182 F316
Ball: ASTM A182 F316+ENP
Stem: ASTM A182 F316+ENP or 17-4-PH+ENP
Seat: ASTM A182 F316+ENP + PTFE Insert
O'Rings: Nitrile or Viton
Gaskets: Graphite

ANSI Class 150#, 300#, 600# Duplex Stainless Steel Ball Valves

Body: ASTM A182 F51
Ball: ASTM A182 F51+ENP
Stem: ASTM A182 F51+ENP
Seat: ASTM A182 F51+ENP+PTFE Insert
O'Rings: Nitrile or Viton
Gaskets: Graphite

Standard Materials for ANSI Class 900#, 1500#, 2500#

ANSI Class 900#, 1500#, 2500# Carbon Steel Ball Valves

Body: ASTM A105 or A350 LF2 (900#, 1500#), A694 F60 (2500#)
Ball: AISI 4140+ENP
Stem: AISI 4140+ENP
Seat: AISI 4140+ENP+Nylon or Devlon Insert
O'Rings: Viton AED
Gaskets: Graphite

ANSI Class 900#, 1500#, 2500# Low Temperature Carbon Steel Ball Valves (-46degC)

Body: ASTM A350 LF2
Ball: ASTM A350 LF2+ENP or AISI 4140+ENP
Stem: ASTM A350 LF2+ENP or AISI 4140+ENP
Seat: ASTM A350 LF2+ENP or AISI 4140+ENP+Nylon or Devlon Insert
O'Rings: Viton AED
Gaskets: Graphite

ANSI Class 900#, 1500#, 2500# Stainless Steel Ball Valves

Body: ASTM A182 F316
Ball: ASTM A182 F51+ENP
Stem: ASTM A182 F51+ENP or 17-4-PH+ENP
Seat: ASTM A182 F51+ENP + Nylon or Devlon Insert
O'Rings: Viton AED
Gaskets: Graphite

ANSI Class 900#, 1500#, 2500# Duplex Stainless Steel Ball Valves

Body: ASTM A182 F51
Ball: ASTM A182 F51+ENP
Stem: ASTM A182 F51+ENP or 17-4-PH+ENP
Seat: ASTM A182 F51+ENP + Nylon or Devlon Insert
O'Rings: Viton AED
Gaskets: Graphite

Special material and design valves:

Special Materials also available: A350 LF3, A350 LF6, A182 F44, A182 F55, Monel K500 or K400, Titanium B381 Grade F2, Inconel 625, Alloy 825, Alloy 20, SANICRO-28.

STARD is also serving the market with fully welded valves with special design upon the customer's requirement, such as Tungsten Carbide Coating, Chromium Carbide Coating, Stellite Coating, seats in Double piston effect, and etc.

We are offering valves for buried service, high temperature and cryogenic services with special stem extensions too.

STARD SERIES T3 TRUNNION MOUNTED BALL VALVES

FLOW COEFFICIENTS AND TORQUE VALUES

FLOW EQUATIONS

Liquid Flow

Q_L = Flow Rate of liquid (gallons/Minute)

DP = Differential pressure across the valve (psig)

G = Specific gravity of liquid

$$Q_L = C \times \sqrt{DP + G}$$

Gas Flow (for non-critical flow)

Q_g = Flow Rate of Gas (CFH)

DP = Differential pressure across the valve (psig)

P_2 = Outlet Pressure (psia)

G = Specific gravity of Gas (air = 1)

$$Q_g = 61 \times C \times \sqrt{(P_2 \times DP) + G}$$

Information provided for general information only; consult factory for certified data.

T3-VALVE Cv		SIZE	2FP	3FP	4FP	6FP	8FP	10FP	12FP	14FP	16FP	18FP	20FP	24FP	26FP	28FP	30FP	32FP	36FP
CLASS150	420	1200	2200	5150	9500	16000	23000	28000	37200	49000	59000	69000	92000	110000	121000	145000	170000	210000	
CLASS300	420	1050	2100	5100	8400	15000	23000	28000	37200	49000	59000	69000	92000	110000	121000	144000	170000	210000	
CLASS600	400	1000	1850	4800	9000	14700	22500	28000	37200	49000	59000	69000	92000	110000	121000	144000	170000	210000	
CLASS800	330	910	1600	4380	6500	14500	21100	25000	34500	45000	55200	63800	86500	113000	130000	151000	188200		
CLASS1500	330	820	1700	3800	7400	11500	18000	21000	27500	37000	47800	70000	-	-	-	-	-		
CLASS2500	250	500	1100	2500	5300	8300	13000	-	-	-	-	-	-	-	-	-	-		

The flow coefficient Cv of a valve is the flow rate of water (gallons/minute at 60° F) through a fully opened valve, with a pressure drop of 1psi across the valve. To find the flow of a liquid or gas through a valve from the Cv, use the above formulas.

VALVE TORQUES AT MAX RATED PRESSURE at 100°F (inch pounds)

SIZE	2FP	3FP	4FP	6FP	8FP	10FP	12FP	14FP	16FP	18FP	20FP	24FP	26FP	28FP	30FP	32FP	36FP
CLASS150	823	2038	3248	5611	8726	11682	14636	24718	33223	45029	56684	106981	133635	151778	184522	175938	203585
CLASS300	1000	2814	4283	6821	13850	18098	22010	37320	48905	72951	105538	171646	201417	225726	243092	261518	302564
CLASS600	1301	4080	5947	14284	22160	28462	42825	57702	76860	118121	163690	273323	311679	345108	370284	399976	484475
CLASS800	1593	5345	7620	10638	30471	38834	65313	78101	119696	165053	230065	374892	421172	464475	498202	538965	624226
CLASS1500	2177	7930	10956	30364	47082	59569	102218	118944	157849	260190	362027	577693	-	-	-	-	-
CLASS2500	5213	13983	35081	48268	104297	116820	155318	-	-	-	-	-	-	-	-	-	-

VALVE TORQUES AT MAX RATED PRESSURE at 36.8°C (N*M)

SIZE	2FP	3FP	4FP	6FP	8FP	10FP	12FP	14FP	16FP	18FP	20FP	24FP	26FP	28FP	30FP	32FP	36FP
CLASS150	93	230	367	634	986	1320	1654	2793	3754	5088	6405	12312	15100	17150	16590	19880	23004
CLASS300	113	318	484	1008	1566	2045	2488	4217	5639	8243	11925	18395	22759	25506	27468	29550	34188
CLASS600	147	461	672	1614	2504	3216	4839	6520	8687	13347	18496	30884	35218	38995	41840	45195	52483
CLASS800	180	604	861	2219	3443	4388	7380	8825	13525	18650	25996	42372	47590	52483	56407	60900	70534
CLASS1500	248	898	1238	3431	5320	6731	11550	13440	17638	26400	40907	65278	-	-	-	-	-
CLASS2500	589	1580	3964	5454	11785	13200	17550	-	-	-	-	-	-	-	-	-	-

Information provided for general information only; consult factory for certified data.

STARD SERIES T3 TRUNNION MOUNTED BALL VALVES

HOW TO ORDER

Our T3 valve code consists of 19-20 digits, and see the example as following:

2	T3	600	RFxRF	24	N	R	F	24	BS
Size	Valve	Pressure	End	Body	Seat	Seal	Fire	Internal	Actuation
Inches	Model	Class	Connections	Group	Group	Group	Tested	Group	

This code means : 2"/600LBS T3 BALL VALVE, RF ends, Body In LCB/LCC LF2/LF2+3MIL trim, HNBR O ring, Nylon seat insert, fire-safe, bare-shaft

End Connection:	RFxRF, RTJxRTJ, LFXLF	Fire tested	F
Body Group:	A105 23 ALLOY20 28	Actuation	Bare shaft BS
	LF2 24 F44 30		Wrench W
	F316 25 F51 31		Gear operated G
	F304 26 F53 32		150 900
	F316L 27 F55 33		300 1500 A00
	F304L 28 MONEL400 34		600
Seat Group	Devon D	Seal Group	Viton AED V Graphite G
	PTFE T		HNBR R
	Peek P		EPDM E
	Nylon N		Buna N B
	PCTFE K		Atlas A
			Lip-seal L
Internal Group (Soft seal)	A105+3mil ENP 23 F55 29	Internal Group	F6A+TCC M1 Inconel 625+TCC M6
	LF2+3mil ENP 24 17-4PH 30		F316+TCC M2
	F6A/CA15 25 Inconel 625 31		M51+TCC M3
	CF8M/F316 26 M35-1 32		F53+TCC M4
	F51/4A 27 ALLOY 20/CN7M 33		F55+TCC M5
	F53/5A 28		17-4PH+TCC M6



*STARD Provide
High Performance Ball Valves*



**STARD SERIES T3 FORGED STEEL
TRUNNION MOUNTED
BALL VALVE**