

THREE PIECE TRUNNION MOUNTED BALL VALVES

A large trunnion design ensures central positioning under the highest working pressure. Independent floating spring loaded seat provide a tight seal even at low differential pressures. Service and maintenance is simplified with a bolted body design incorporating Double O-rings or a combination of O-rings and gaskets. Suitable for buried or above ground installation.

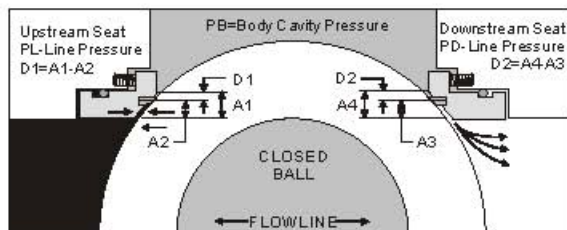
GENERAL DESIGN FEATURES

- Three-piece body design
- Double block and bleed
- Trunnion supported design reduces operating torque
- Antistatic device for grounding of the ball, stem and body
- Two sets of O-rings plus fire safe stem packing prevents leakage
- Corrosion resistant low friction bearings
- Inconel seat springs
- Sealant injection fittings for emergency system or seal sealing
- Direct mount top works pad for actuator or gear operator
- API Spec. 1, 6D, 6FA and 607
- ASME Section III Div. 1-NCA 4000
- BS 5351, 5750 and 6755
- Locking device upon request
- NACE MR0175/ISO 15156
- Anti-blowout trunnion stem design

TECHNICAL SEATING FEATURES DOUBLE PISTON SEAT DESIGN

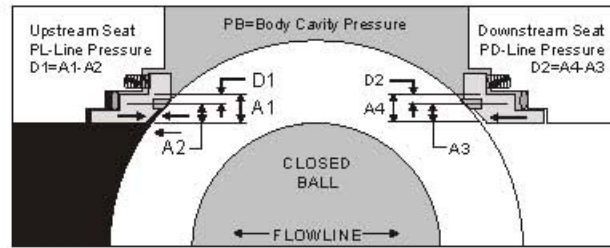
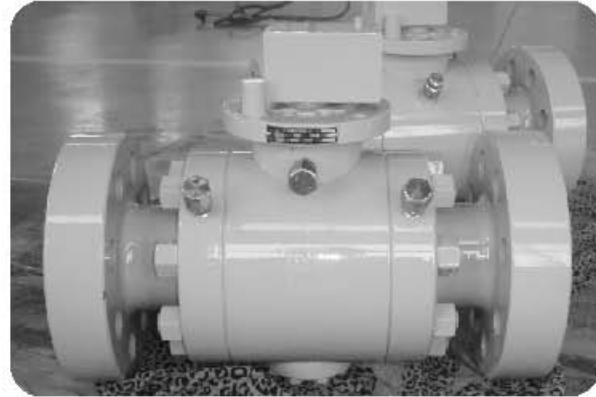
Upstream Seat: Line Pressure acting on the seat area (A1) does not equalize against the line pressure acting on the seat area (A2). The difference in the area (D1) times the line pressure creates a "piston effect" force which pushes the seat against the ball surface resulting in a tight effective seal.

Downstream Seat: When the body cavity pressure is greater than the downstream pressure, the body cavity pressure acts on the seal area (A4). The net pressure difference, acting over area (D2), pushes the downstream seat tightly against the ball creating a positive seal.



DOUBLE BLOCK AND BLEED

The double block and bleed condition is available in all seat design configurations. When the ball is in the closed position the body cavity pressure may be drained down to 'zero' by opening the bleed valve and draining the fluid by removing the drain plug. Each seat works independently assuring tight shut off seal against ball on the upstream and downstream side.



THE ULTIMATE BENEFIT OF USING THE "DOUBLE PISTON SEAT"

Design: In case of upstream seat leakage, the downstream seat maintains a pressure assisted tight shut off by sealing against the ball surface.

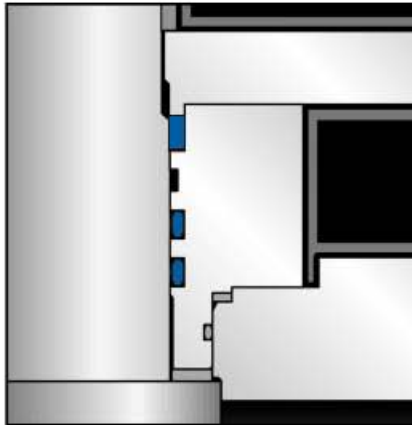
SELF RELIEVING SEAT DESIGN

Upstream Seat: The difference in the area (D1) times the line pressure creates a "piston effect" which forces the seat against the ball surface. Also the springs behind the seat add the force to the seat which keeps the seat in contact with the ball surface by providing the tight seal.

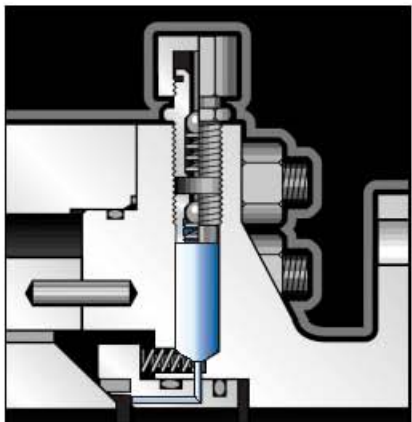
Downstream Seat: When the body cavity pressure exceeds the spring pressure, automatic pressure relief will occur by relieving the body cavity pressure past the downstream seat. This eliminates the need for the body relief valve.



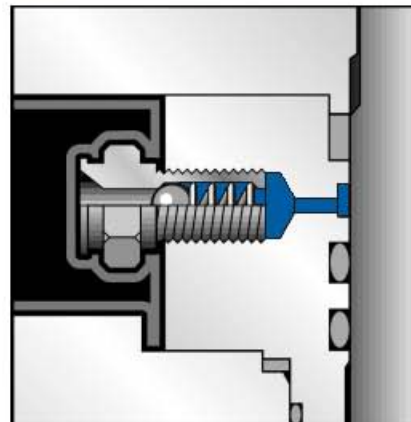
DESIGN FEATURES

ANTI-BLOWOUT
STEM DESIGN

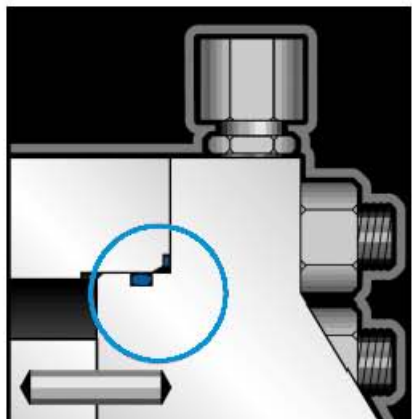
Stem seal integrity is achieved by the use of three o-rings (or two o-rings and a graphite gasket). Upper o-ring (or graphite gasket) can be replaced with the valve inline and under pressure.

EMERGENCY
SEAT SEAL

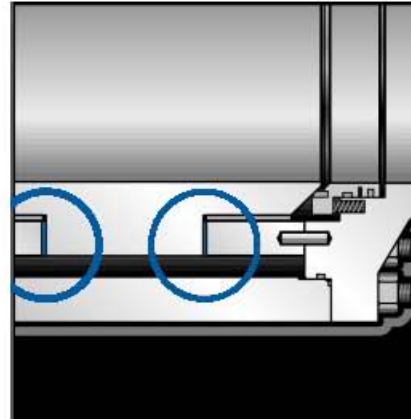
Special sealants may be injected thru fitting that are located on the adapter flanges to restore sealing integrity if seat sealing surface is damaged. A second internal check valve provides backup to the fitting.

EMERGENCY SEALANT
INJECTION SYSTEM

The Sealant Injection System located on the bonnet can be utilized in case of emergencies, o-ring damage, or if stem leakage occurs.

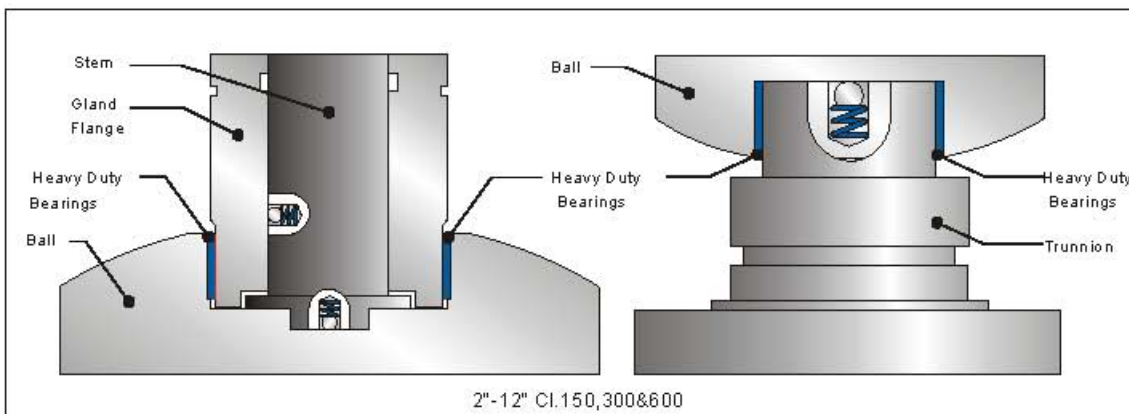
DOUBLE SEALED
ENVELOPE
CONNECTIONS

Double o-rings or a combination of an o-ring and firesafe gasket on body/adapter connections to ensure positive sealing. This makes these valves suitable for above or below ground service.

HEAVY
DUTY BEARINGS

Trunnions are supported by heavy duty Teflon coated Steel Bearings. Thrust load on the ball is supported by large trunnions mounted within captured trunnion blocks, resulting in low operating torque and seat wear.

6"-12" Cl. 900 & 1500
14"-24" Cl. 150, 300 & 600



ANTISTATIC DEVICE

A spring between the trunnion and the ball or between the stem and the gland plate permits electrical continuity between all valve components.

2"-12" Cl. 150, 300 & 600

APPLICABLE STANDARDS

The following list contains the most important applicable standards for ball valves. Vatac may be designed,

API-AMERICAN PETROLEUM INSTITUTE

- 6D Specification for pipeline valves,
- RP6F Recommended practice for fire testing of valves,
- 6FA Specification for fire testing of valves,
- 598 Valve inspection and test.
- 605 Large diameter carbon steel flanges.
- 607 Fire test for soft seated quarter-turn valves.

ASME/ANSI-AMERICAN NATIONAL STANDARD INSTITUTE

- B 16.5 Steel pipe flanges and flanged fittings.
- B 16.10 Face-to-face and end-to-end dimensions of ferrous valves.
- B 16.25 Butt welding ends.
- B 16.34 Steel valves- Flanged and butt welding ends.
- B 16.47 Steel Flanges.
- B 31.3 Chemical plant and petroleum refinery piping
- B 31.4 Liquid petroleum transportation piping systems.
- B 31.8 Gas transmission and distribution piping systems.
- B 46.1 Surface texture.

ASTM-American Society for Testing Materials

Consult factory for details.

ISO-International Organization for Standardization

ISO 9001:2000 Quality systems-Model for quality assurance in design/development, production, installation and servicing.

ISO 5211 Top works Mounting Dimensions

ISO 15156 For use INH₂S containing environments in oil and gas production

Manufactured and tested in accordance with other international standards on request.

British Standard

- BS 1503 Specification for steel forgings for pressure purposes.
- BS 1504 Specification for steel castings for pressure purposes.
- BS 1560 Steel pipe flanges and flanged fittings.
- BS 2080 Face-to-face, center-to-face, end-to-end, and center-to-end dimensions of flanged and butt-welding end steel valves for the petroleum, petrochemical and allied industries.
- BS 4504 Flanges and boltings for pipes, valves and fittings
- BS 5146 Inspection and test of steel valves for the petroleum, petrochemical and allied industries.
- BS 5351 Steel ball valves for the petroleum, petrochemical and allied industries.
- BS 5750 Quality system.
- BS 6755 Testing of valves.

MSS-Manufacturers Standardization Society

- SP 6 Standard finishes for contact faces of pipe flanges and connecting-end flanges of valves and fittings.
- SP 25 Standard marking system for valves, fittings, flanges and unions.
- SP 45 Bypass and drain connection standard.

NACE-National Association of Corrosion Engineers

- MR 0175 Sulfide stress cracking resistant metallic materials for oil field equipment.

**VATAC THREEPIECE TRUNNION PARTS CONFIGURATION
2" FP-36"FP, CLASS 150,300,600,900,1500&2500**

End Connection — ● R F ● RFxWE
 ● RTJ ● RTJxWE
 ● WE

Weld End Wall Thickness — XX ● See Weld Chart

	NACE III.CI.III Bolting	NACE II.CI.II Bolting
Body/Bolting Material NACE Conformance	● A105/B7 ● SS/B7 ● LF2/L7 ● SS/L7 ● LF2/L7 ● A105/B7	● A105/B7 ● SS/B7M ● SS/L7M ● A105/B7M Cad ● LF2/L7 ● SS/660SS

Trim — ● 316SS
 ● 410SS or CA-15M
 ● CS w/3 mil ENP (Std. on 2" & larger)
 ● LTCS (3 mil ENP)

Seat Insert/FS — ● Teflon/FS
 ● PEEK/FS

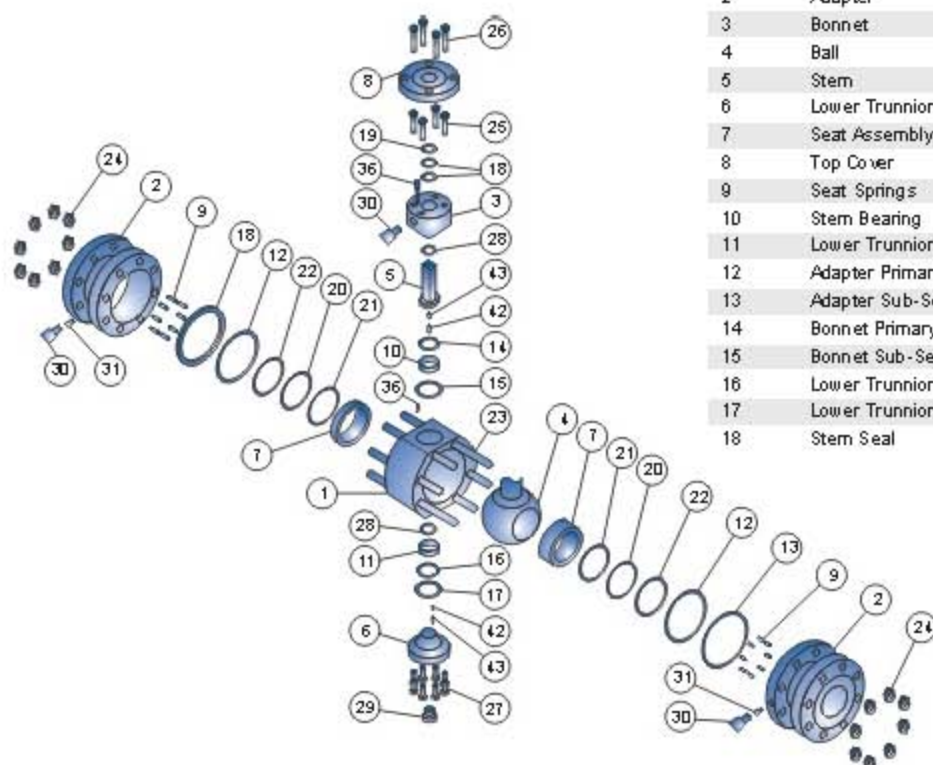
Seal Material — ● Viton
 ● EPDM
 ● HNBR

Actuation — ● Locking Handle upon request
 ● Locking Gear Operator upon request
 ● Bare Stem
 ● For Actuator

BUTTWELD END PIPE SCHEDULE

Pipe	Nominal Pipe Size (in.) ● Schedule Code												
Description	2	3	4	6	8	10	12	14	16	18	20	22	24
Outside Dia.(in.)	2.375	3.500	4.500	6.625	8.625	10.750	12.750	14.000	16.000	18.000	20.000	22.000	24.000
(STD) Standard	-	-	.237	.280	.322	.365	.375	.375	.375	.375	.375	.375	.375
Schedule 40	.154	.216	.237	.280	.322	.365	.406	.438	.500	.562	.593	-	.687
XS	.218	.300	.337	.432	.500	.500	.500	.500	.500	-	-	0.500	-
Schedule 80	.218	.300	.337	.432	.500	.593	.687	.750	.843	.937	1.031	1.125	1.218
Schedule 160	.343	.438	.531	.718	.906	1.125	1.312	1.406	1.593	1.781	1.968	-	2.343
XXS	.436	.600	.674	.864	.875	1.000	1.000	-	-	-	-	-	-

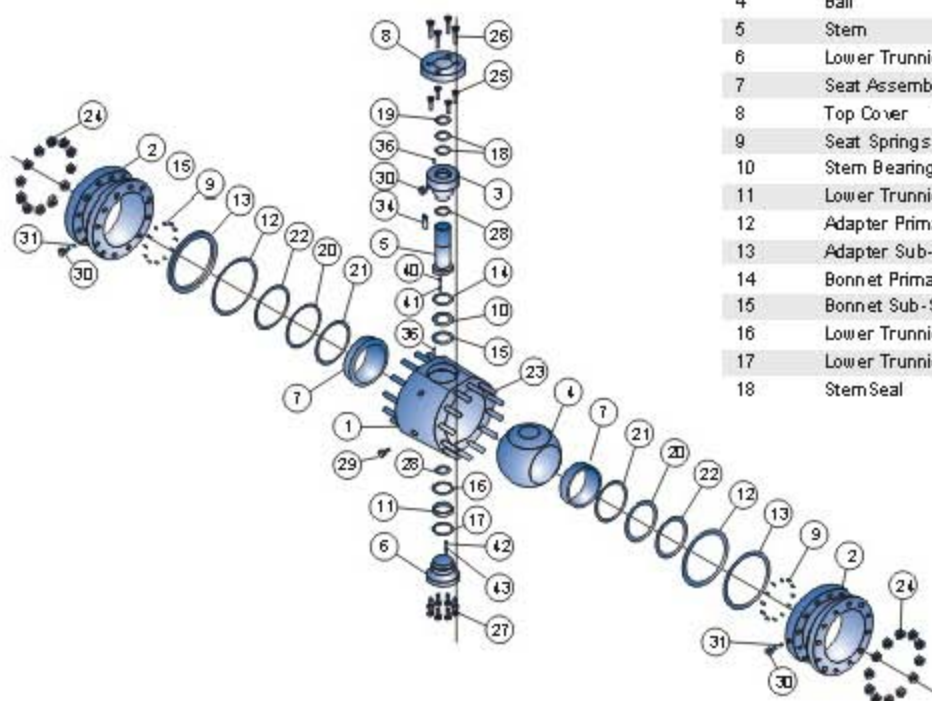
● COMPONENT PARTS ● 2" 3" & 4", CLASS 600, 900 & 1500



PARTS LIST

Part No	Description	Part No	Description
1	Body	19	Stem Sub-Seal
2	Adapter	20	Seat Seal
3	Bonnet	21	Seat Seal Backup
4	Ball	22	Seat Sub-Seal
5	Stem	23	Stud Body
6	Lower Trunnion	24	Nut Body
7	Seat Assembly	25	Cap Screw, Bonnet
8	Top Cover	26	Cap Screw, Top Cover
9	Seat Springs	27	Cap Screw, Lower Trunnion
10	Stem Bearing	28	Thrust Bearing
11	Lower Trunnion Bearing	29	Bleed/Drain Valve
12	Adapter Primary Seal	30	Injection Fitting
13	Adapter Sub-Seal	31	Ball Check
14	Bonnet Primary Seal	32	Drain Plug
15	Bonnet Sub-Seal	34	Key
16	Lower Trunnion Primary Seal	36	Alignment Pin, Bonnet
17	Lower Trunnion Sub-Seal	42	Antistatic Pin
18	Stem Seal	43	Antistatic Spring

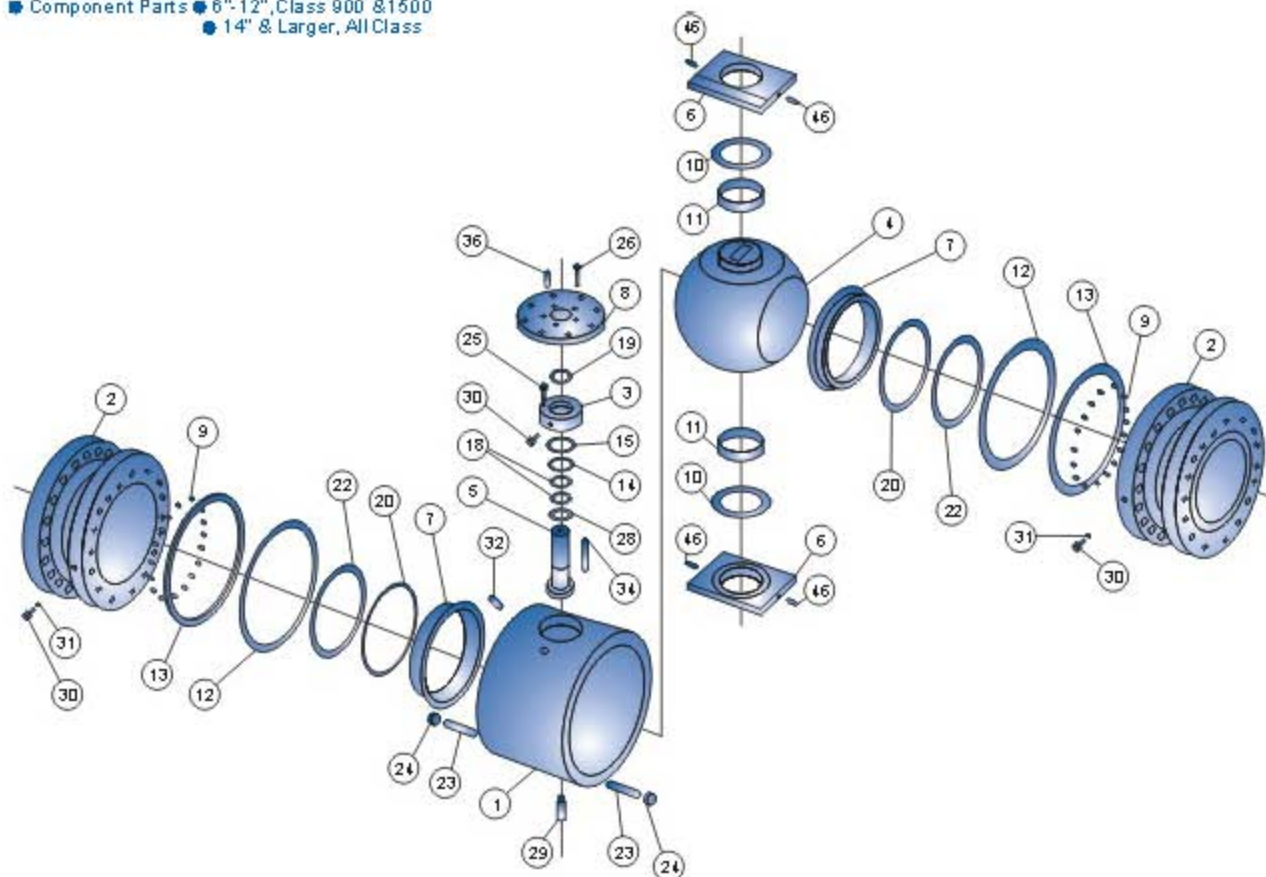
● COMPONENT PARTS ● 6"-12", CLASS 600



PARTS LIST

Part No	Description	Part No	Description
1	Body	19	Stem Sub-Seal
2	Adapter	20	Seat Seal
3	Bonnet	21	Seat Seal Backup
4	Ball	22	Seat Sub-Seal
5	Stem	23	Stud, Body
6	Lower Trunnion	24	Nut Body
7	Seat Assembly	25	Cap Screw, Bonnet
8	Top Cover	26	Cap Screw, Top Cover
9	Seat Springs	27	Cap Screw, Lower Trunnion
10	Stem Bearing	28	Thrust Bearing
11	Lower Trunnion Bearing	29	Bleed/Drain Valve
12	Adapter Primary Seal	30	Injection Fitting
13	Adapter Sub-Seal	31	Ball Check
14	Bonnet Primary Seal	32	Drain Plug
15	Bonnet Sub-Seal	34	Key
16	Lower Trunnion Primary Seal	36	Alignment Pin, Bonnet
17	Lower Trunnion Sub-Seal	42	Antistatic Pin
18	Stem Seal	43	Antistatic Spring

- Component Parts ■ 6"-12", Class 900 & 1500
 ● 14" & Larger, All Class



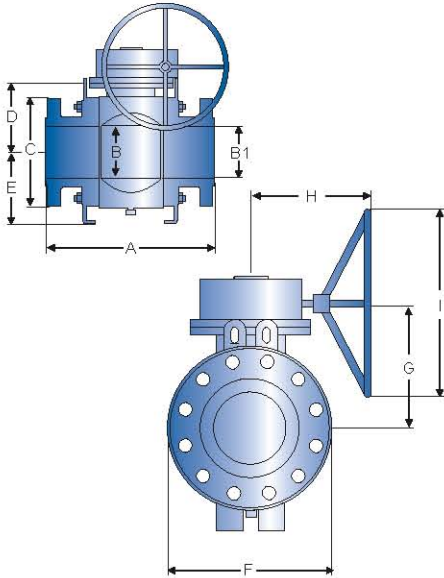
PARTS LIST

Part No	Description	Part No	Description
1	Body	18	Stem Seal
2	Adapter	19	Stem Sub-Seal
3	Bonnet	20	Seat Seal
4	Ball	21	Seat Seal Backup
5	Stem	22	Seat Sub-Seal
6	Trunnion Block	23	Stud, Body
7	Seat Assembly	24	Nut, Body
8	Top Cover	25	Cap Screw, Bonnet
9	Seat Springs	26	Cap Screw, Top Cover
10	Stem Bearing	28	Thrust Bearing
11	Lower Trunnion Bearing	29	Bleed/Drain Valve
12	Adapter Primary Seal	30	Injection Fitting
13	Adapter Sub-Seal	31	Ball Check
14	Bonnet Primary Seal	32	Drain Plug
15	Bonnet Sub-Seal	34	Key
16	Lower Trunnion Primary Seal	36	Alignment Pin, Bonnet
17	Lower Trunnion Sub-Seal	46	Trunnion Block Pin

THREE PIECE TRUNNION MOUNTED BALL VALVE

- Three Piece Body, FullPort or Reduced Bore
- Trunnion Mounted, Fire Safe, Blow-out Proof Stem
- Anti-static Device, Cavity Relieving Seats
- NACE MR-01-75, Optional Locking Device
- Designed to ASME B16.34, API 6D

Face to Face	API 6D
End Flange	ASME B16.5
Buttweld	ASME B16.25
Class	ASME CL150/300



CLASS 150 DIMENSION

SIZE (in.)	A			B	B1	C	D	E	F	G	H	I
	RF	RTJ	WE									
14	27.0	27.5	30.0	13.3	13.3	21.0	15.7	15.3	25.1	18.5	20.4	23.6
16	30.0	30.5	33.0	15.3	15.3	23.5	16.7	17.7	28.0	19.4	18.7	27.6
20x16	36.0	36.5	39.0	15.3	19.3	27.5	16.7	17.7	28.0	19.4	18.7	27.6
18	34.0	34.5	36.0	17.2	17.2	25.0	19.1	19.5	31.9	22.3	22.6	27.6
20	36.0	36.5	39.0	19.3	19.3	27.5	21.1	21.4	34.1	24.3	22.6	27.6
24x20	42.0	42.5	45.0	19.3	23.3	32.0	21.1	21.4	34.1	24.3	22.6	27.6
24	42.0	42.5	45.0	23.3	23.3	32.0	24.3	23.2	40.4	27.8	23.3	31.5

Unit: inch

CLASS 300 DIMENSION

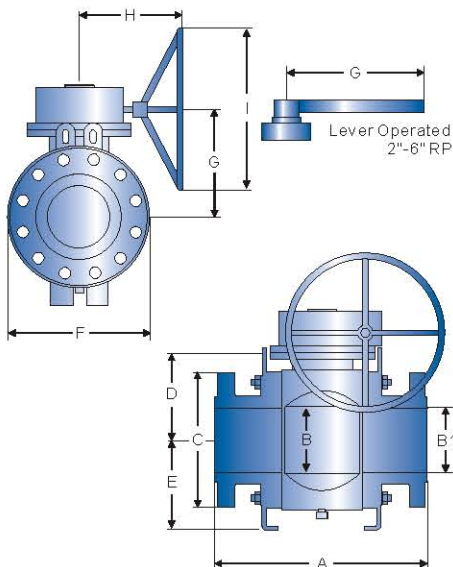
SIZE (in.)	A			B	B1	C	D	E	F	G	H	I
	RF	RTJ	WE									
14	30.0	30.6	30.0	13.3	13.3	23.0	15.7	15.3	18.5	25.1	20.4	23.6
16	33.0	33.6	33.0	15.3	15.3	25.5	16.7	16.7	19.4	28.0	22.6	27.6
20x16	39.0	39.8	39.0	15.3	19.3	30.5	16.7	16.7	19.4	28.0	22.6	27.6
18	36.0	36.6	36.0	17.2	17.2	28.0	19.2	19.6	22.4	32.3	22.6	27.6
20	39.0	39.8	39.0	19.3	19.3	30.5	21.2	21.6	24.7	34.4	23.3	31.5
24x20	45.0	45.9	45.0	19.3	23.3	36.0	21.2	21.6	24.7	34.4	23.3	31.5
24	45.0	45.9	45.0	23.3	23.3	36.0	24.6	23.4	29.3	40.9	27.3	35.4

Unit: inch

THREE PIECE TRUNNION MOUNTED BALL VALVE

- Three Piece Body, FullPort or Reduced Bore
- Trunnion Mounted, Fire Safe, Blow-out Proof Stem
- Anti-static Device, Cavity Relieving Seats
- NACE MR-01-75, Optional Locking Device
- Designed to ASME B16.34, API 6D

Face to Face	API 6D
End Flange	ASME B16.5
Buttweld	ASME B16.25
Class	ASME CL600



CLASS 600 DIMENSION

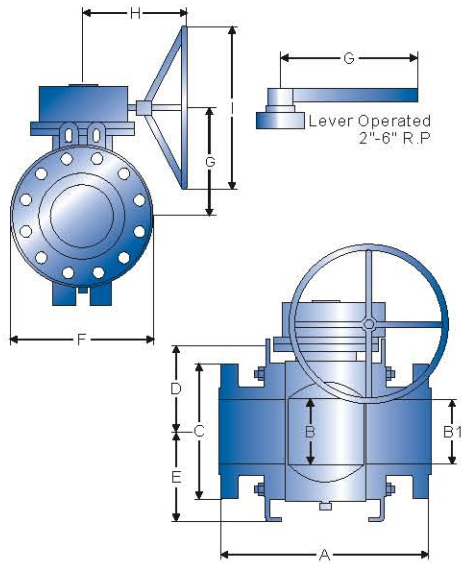
SIZE (in.)	A			B	B1	C	D	E	F	G	H	I
	RF	RTJ	WE									
2	11.5	11.6	11.5	2.0	2.0	6.5	6.1	4.2	6.5	22.8	-	-
3X2	14.0	14.1	14.0	2.0	3.0	8.3	6.1	4.2	6.5	22.8	-	-
3	14.0	14.1	14.0	3.0	3.0	8.3	6.7	5.4	9.0	27.6	-	-
4X3	17.0	17.1	17.0	3.0	4.0	10.7	6.7	5.4	9.0	27.6	-	-
4	17.0	17.1	17.0	4.1	4.1	10.8	8.0	6.4	10.4	27.8	-	-
6X4	22.0	22.1	22.0	4.1	6.0	14.0	8.0	6.4	10.4	27.8	-	-
6	22.0	22.1	22.0	6.0	6.0	14.0	9.1	9.2	12.6	11.2	14.2	19.7
8X6	26.0	26.1	26.0	6.0	8.0	16.5	9.1	9.2	12.6	11.2	14.2	19.7
8	26.0	26.1	26.0	8.0	8.0	16.5	11.4	12.4	17.0	13.5	15.0	23.6
10X8	31.0	31.1	31.0	8.0	10.0	20.0	11.4	12.4	17.0	13.5	15.0	23.6
10	31.0	31.1	31.0	10.0	10.0	20.0	13.0	15.7	20.4	15.5	16.5	23.6
12X10	33.0	33.1	33.0	10.0	12.0	22.0	13.0	15.7	20.4	15.5	16.5	23.6
12	33.0	33.1	33.0	12.0	12.0	22.0	15.9	17.8	24.5	18.7	21.5	27.6
14X12	35.0	35.1	35.0	12.0	13.3	23.7	15.9	17.8	24.5	18.7	21.5	27.6
16X12	39.0	39.1	39.0	12.0	15.3	27.0	15.9	17.8	24.5	18.7	21.5	27.6
14	35.0	35.1	35.0	13.3	13.3	23.7	15.7	15.3	25.1	18.9	23.1	31.5
16	39.0	39.1	39.0	15.3	15.3	27.0	17.4	17.6	28.9	20.6	22.6	27.6
20X16	47.0	47.2	47.0	15.3	19.3	32.1	17.4	17.6	28.9	20.6	22.6	27.6
18	43.0	43.1	43.0	17.2	17.2	29.3	19.6	20.1	33.1	23.1	23.3	31.5
20	47.0	47.2	47.0	19.3	19.3	32.0	22.2	21.3	36.2	27.0	27.3	35.4
24X20	55.0	55.4	55.0	19.3	23.3	37.0	22.2	21.3	36.2	27.0	27.3	35.4
24	55.0	55.4	55.0	23.3	23.3	37.0	24.6	23.5	41.1	30.8	37.4	27.6

Unit: inch

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- Three Piece Body, FullPort or Reduced Bore
- Trunnion Mounted, Fire Safe, Blow-out Proof Stem
- Anti-static Device, Cavity Relieving Seats
- NACE MR-01-75, Optional Locking Device
- Designed to ASME B16.34, API 6D

Face to Face	API 6D
End Flange	ASME B16.5
Buttweld	ASME B16.25
Class	ASME CL900/1500



CLASS 900 DIMENSION

SIZE (in.)	RF	RTJ	WE	B	B1	C	D	E	F	G	H	I	Unit: inch
2	14.5	14.6	14.5	2.0	2.0	8.5	5.8	4.6	7.3	22.8	-	-	
3x2	15.0	15.1	15.0	2.0	3.0	9.5	5.8	4.6	7.3	22.8	-	-	
3	15.0	15.1	15.0	3.0	3.0	9.5	7.0	5.7	9.3	27.6	-	-	
4x3	18.0	18.1	18.0	3.0	4.0	11.5	7.0	5.7	9.3	27.6	-	-	
4	18.0	18.1	18.0	4.1	4.1	11.5	8.5	6.9	11.3	33.7	-	-	
6x4	24.0	24.1	24.0	4.1	6.0	15.0	8.5	6.9	11.3	33.7	-	-	
6	24.0	24.1	24.0	6.0	6.0	15.0	10.0	10.0	14.2	12.1	14.8	23.6	
8x6	29.0	29.1	29.0	6.0	8.0	18.5	10.0	10.0	14.2	12.1	14.8	23.6	
8	29.0	29.1	29.0	8.0	8.0	18.5	11.7	12.6	17.3	14.2	21.5	27.6	
10x8	33.0	33.1	33.0	8.0	10.0	21.5	11.7	12.6	17.3	14.2	21.5	27.6	
10	33.0	33.1	33.0	10.0	10.0	21.5	13.5	16.0	20.9	16.2	20.4	23.6	
12x10	38.0	38.1	38.0	10.0	12.0	24.0	13.5	16.0	20.9	16.2	20.4	23.6	
12	38.0	38.1	38.0	12.0	12.0	24.0	16.4	18.2	25.4	19.6	23.1	31.5	
14x12	40.5	40.9	40.5	12.0	12.8	25.3	16.4	18.2	25.4	19.6	23.1	31.5	
16x12	44.5	44.9	44.5	12.0	14.8	27.8	16.4	18.2	25.4	19.6	23.1	31.5	
14	40.5	40.9	40.5	12.8	12.8	25.3	15.6	16.5	24.8	18.7	23.1	31.5	
16	44.5	44.9	44.5	14.8	14.8	27.8	18.3	19.4	29.3	21.8	23.3	31.5	

CLASS 1500 DIMENSION

SIZE (in.)	RF	RTJ	WE	B	B1	C	D	E	F	G	H	I	Unit: inch
2	14.3	14.6	14.5	2.0	2.0	8.5	6.8	5.3	8.4	22.0	-	-	
3x2	18.3	18.6	18.5	2.0	3.0	10.5	6.8	5.3	8.4	22.0	-	-	
3	18.3	18.6	18.5	3.0	3.0	10.5	8.6	7.1	11.8	27.6	-	-	
4x3	21.2	21.6	21.5	3.0	4.1	12.2	8.6	7.1	11.8	27.6	-	-	
4	21.2	21.6	21.5	4.1	4.1	12.2	9.2	7.8	13.0	39.4	-	-	
6x4	27.4	28.0	27.8	4.1	5.7	15.5	9.2	7.8	13.0	39.4	-	-	
6	27.4	28.0	27.8	5.7	5.7	15.5	11.3	11.2	16.5	13.9	20.4	23.6	
8x6	32.8	33.1	32.8	5.7	7.6	19.0	11.3	11.2	16.5	13.9	20.4	23.6	
8	32.8	33.1	32.8	7.6	7.6	19.0	13.7	14.5	21.2	16.4	22.6	27.6	
10x8	39.0	39.4	39.0	7.6	9.5	23.0	13.7	14.5	21.2	16.4	22.6	27.6	
10	39.0	39.4	39.0	9.5	9.5	23.0	15.6	17.9	24.8	18.8	23.1	31.5	
12x10	44.5	45.1	44.5	9.5	11.4	26.5	15.6	17.9	24.8	18.8	23.1	31.5	
12	44.5	45.1	44.5	11.4	11.4	26.5	19.1	20.9	30.7	22.3	23.1	31.5	

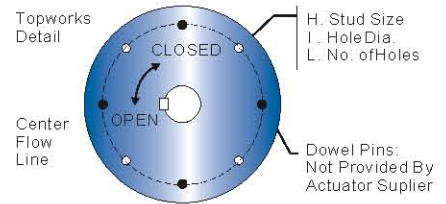
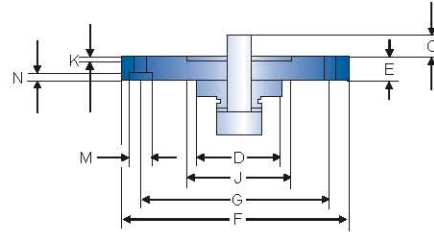
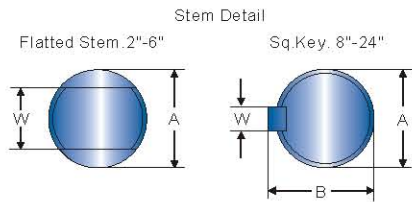
VATAC THREEPIECE TRUNNION BALL VALVE REF. WEIGHTS

Unit: lbs.

SIZE (in.)	PORT	ANSI Class	Valve Only	With Handle	With G.O.	SIZE (in.)	PORT	ANSI Class	Valve Only	With Handle	With G.O.	SIZE (in.)	PORT	ANSI Class	Valve Only	With Handle	With G.O.
2	FP	600	81	86	119	6	RP	600	368	377	413	14	FP	150	1781	-	1979
2	FP	900	114	118	168	6	FP	600	498	-	582	14	FP	300	2380	-	2578
2	FP	1500	169	173	223	6	RP	900	529	538	574	14	RP	600	2491	-	2779
2	FP	2500	Consult Factory			6	FP	900	762	-	854	14	FP	600	3020	-	3308
3	RP	600	96	101	134	6	RP	1500	816	-	897	14	FP	900	3339	-	3537
3	FP	600	160	168	214	6	FP	1500	1157	-	1272	16	RP	150	1610	-	1808
3	RP	900	147	152	201	6	RP/FP	2500	Consult Factory			16	FP	150	2799	-	2997
3	FP	900	216	223	270	8	RP	600	604	-	688	16	RP	300	2332	-	2530
3	RP	1500	210	214	264	8	FP	600	992	-	1082	16	FP	300	2870	-	3064
3	FP	1500	386	390	431	8	RP	900	912	-	1004	16	RP	600	3042	-	3330
3	RP/FP	2500	Consult Factory			8	FP	900	1344	-	1456	16	FP	600	3791	-	4084
4	RP	600	216	223	270	8	RP	1500	1356	-	1471	16	RP	900	3947	-	4145
4	FP	600	286	295	331	8	FP	1500	2149	-	2345	16	FP	900	4596	-	5072
4	RP	900	288	296	342	8	RP/FP	2500	Consult Factory			16	FP	1500	9393	-	10,235
4	FP	900	385	395	430	10	RP	600	1256	-	1346	24	FP	150	7680	-	8156
4	RP	1500	485	494	530	10	FP	600	1653	-	1768	24	RP	300	6063	-	6352
4	FP	1500	617	-	698	10	RP	900	1499	-	1611	24	FP	300	7960	-	8802
4	RP/FP	2500	Consult Factory			10	FP	900	2010	-	2208	24	RP	600	7475	-	8317
Note: Consult factory for sizes not shown.						10	RP	1500	2628	-	2824	24	FP	600	12,125	-	12,995
						10	FP	1500	3440	-	3740	24	RP	900	12,303	-	13,145
						10	RP/FP	2500	Consult Factory			24	FP	900	15,500	-	16,370
						12	RP	600	1834	-	1949						
						12	FP	600	2535	-	2823						
						12	RP	900	2226	-	2424						
						12	FP	900	2865	-	3164						
						12	RP	1500	4156	-	4456						
						12	FP	1500	4012	-	4312						
						12	RP/FP	2500									

Note: All weights listed are estimated.
Consult factory for sizes not shown.

THREE PIECE TRUNNION BALL VALVE TOPWORKS (IN.) & STEM TORQUE DATA (IN.-LBS.)



SIZE (in.)	ANSI Class	A	B	C	D	E	F	G	H Stud Sz UNC	I Hole Dia.	J	K	L No.Of Holes	M C.Line Bore	N Bore Depth	W	Max Stem Shear Torq. ft.-lbs.	Break Torq. in.-lbs.	Torq.Express.(1) For P<=2160 PSI in.-lbs. (2)(3)	
2	600	0.871	-	1.319	3.760	0.709	5.906	4.921	1/2-13	0.531	-	-	4	0.787	0.512	*0.558	134	1314	0.409*P+	
2	900	0.871	-	1.345	3.858	0.709	5.906	4.921	1/2-13	0.531	-	-	4	0.787	0.512	*0.558	135	1616	708.20	
2	1500	1.103	-	1.988	4.094	1.063	5.906	4.921	1/2-13	0.531	-	-	4	0.787	0.551	*0.746	306	2224		
3	600	1.378	-	2.010	4.429	0.787	6.240	5.433	1/2-13	0.531	-	-	4	-	-	*0.994	405	4151	1.758*P+	
3	900	1.378	-	2.000	4.941	0.945	6.713	5.433	1/2-13	0.531	-	-	4	0.807	0.500	*0.994	630	5452	1548.75	
3	1500	1.493	-	1.973	4.921	1.181	6.693	5.512	5/8-11	0.657	-	-	4	1.024	0.650	*0.993	726	8062		
4	600	1.497	-	1.687	5.020	1.220	6.890	5.512	5/8-11	0.657	3.939	0.118	4	0.984	0.630	*0.996	725	6043	2.319*P+	
4	900	1.497	-	1.687	5.020	1.220	6.890	5.512	5/8-11	0.657	3.939	0.118	4	0.984	0.630	*0.996	728	7759	2610.75	
4	1500	1.774	-	2.402	5.925	1.220	8.268	6.496	3/4-10	0.787	5.120	0.118	4	1.181	0.787	*1.247	1337	11.203		
6	600	1.931	-	2.179	4.921	1.299	6.909	5.512	5/8-11	0.657	3.939	0.118	4	1.000	0.669	*1.247	1624	14.580	7.446*P+	
6	900	1.992	-	1.991	4.921	1.378	8.287	6.496	3/4-10	0.787	5.120	0.118	4	1.181	0.787	*1.247	1695	20.090	3559.47	
6	1500	2.493	-	2.795	6.299	1.181	11.811	10.000	5/8-11	0.669	7.880	0.118	8	-	-	*1.747	3722	31.147		
8	600	2.870	3.191	3.588	6.297	1.732	8.287	6.496	3/4-10	0.787	5.120	0.157	4	1.165	0.787	0.750	7460	22.628	11.535*P+	
8	900	2.870	3.191	3.780	6.496	1.575	11.811	10.000	5/8-11	0.669	7.877	0.157	8	-	-	0.750	7460	31.164	5556.03	
8	1500	2.870	3.191	3.299	6.496	1.575	11.811	10.000	5/8-11	0.669	7.877	0.118	8	-	-	0.750	7460	48.293		
10	600	3.240	3.613	3.581	6.900	0.986	11.319	10.000	5/8-11	0.657	7.877	0.118	8	-	-	0.875	10.631	29.042	14.402*P+	
10	900	3.240	3.617	3.972	7.096	1.260	11.811	10.000	5/8-11	0.657	7.877	0.118	8	-	-	0.875	10.631	39.699	7726.94	
10	1500	3.240	3.617	3.775	7.490	1.457	11.811	10.000	5/8-11	0.669	7.877	0.118	8	-	-	0.875	10.631	61.086		
12	600	3.994	4.426	4.244	8.500	1.319	12.000	10.000	5/8-11	0.657	7.877	0.118	8	-	-	1.000	20.315	34.639	16.6*P+	
12	900	3.994	4.426	4.210	9.051	1.813	13.780	11.732	3/4-10	0.787	9.057	0.199	8	-	-	1.000	20.315	46.923	10071.30	
12	1500	3.990	4.426	4.210	9.445	1.813	13.780	11.732	3/4-10	0.787	9.057	0.199	8	-	-	1.000	20.315	71.574		
14	150	3.240	3.613	3.603	8.071	1.299	11.811	10.000	5/8-11	0.657	7.875	0.118	8	-	-	0.875	7444	25.000	28.32*P+	
14	300	3.240	3.613	3.603	8.071	1.299	11.811	10.000	5/8-11	0.657	7.875	0.118	8	-	-	0.875	7444	37.886	16929.17	
14	600	3.240	3.613	3.603	8.071	1.299	13.780	11.732	3/4-10	0.787	9.057	0.118	8	-	-	0.875	10.631	58.843		
14	900	3.240	3.613	3.287	7.874	1.457	13.780	11.732	3/4-10	0.827	9.057	0.118	8	-	-	0.875	10.631	79.000		
16	150	3.240	3.613	3.838	8.228	1.299	11.811	10.000	5/8-11	0.657	7.875	0.118	8	-	-	0.875	10.631	33.602	37.48*P+	
16	300	3.240	3.613	3.838	8.228	1.299	11.811	10.000	5/8-11	0.657	7.875	0.118	8	-	-	0.875	10.631	50.655	22919.73	
16	600	4.333	4.749	4.114	8.898	1.299	13.228	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	78.390		
16	900	4.333	4.749	4.568	8.543	1.000	13.780	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	106.125		
16	1500	Consult Factory																		
18	150	4.333	4.749	3.996	9.055	1.299	13.228	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	45.663	62.74*P+	
18	300	4.333	4.749	3.996	9.055	1.299	13.228	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	74.210	27781.92	
18	600	4.333	4.749	3.996	9.055	1.299	13.780	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	120.637		
18	900	4.742	5.284	3.267	11.807	1.000	18.701	15.984	1-1/2-8	1.575	11.819	0.315	8	-	-	1.250	60.984	167.065	91.86*P+	
20	150	4.333	4.749	4.528	9.248	1.000	13.386	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	57.608	31428.12	
20	300	4.323	4.749	4.449	9.248	1.417	13.780	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	99.405		
20	600	4.333	4.749	4.382	9.839	1.000	13.780	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	167.381		
20	900	4.742	5.284	5.118	11.807	1.000	18.701	15.984	1-1/2-8	1.575	11.819	0.315	8	-	-	1.250	60.984	235.357	141.23*P+	
24	150	4.333	4.749	4.429	9.248	1.417	13.780	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	110.228	69976.95	
24	300	4.333	4.749	4.429	9.248	1.417	13.780	11.732	3/4-10	0.787	9.057	0.118	8	-	-	1.000	26.103	174.487		
24	600	4.725	5.257	4.331	11.020	2.362	18.701	15.984	1-1/2-8	1.575	11.819	0.394	8	-	-	1.250	33.100	278.997		
24	900	5.741	6.391	6.259	12.386	1.181	18.701	15.984	1-1/2-8	1.575	11.817	0.118	8	-	-	1.500	108.306	383.508		
30	600	Consult Factory																		
36	600	Consult Factory																		

* Stem with Double 'D' Flat Style

Note: (1) Torque at maximum differential pressure are tabulated

(2) Torque expressions are suggested for other differential pressure

(3) Differential pressure "P" in torque expressions in PSI

Pressure ratings are according to API 6D/ASME 16.34

Class 150 P = 285 Class 900 P = 2220

Class 300 P = 740 Class 1500 P = 3705

Class 600 P = 1480

THREE PIECE TRUNNION BALL VALVE ENGINEERING DATA

Flow Coefficient (Cv)

SIZE (in.)	285 psi	740 psi	1480 psi	2220 psi	3705 psi
2	-	-	350	320	330
3x2	-	-	190	185	187
3	-	-	1000	910	830
4x3	-	-	560	505	510
4	-	-	1850	1760	1660
6x4	-	-	800	730	742
6	-	-	4400	4300	4167
8x6	-	-	2150	2010	2033
8	-	-	8450	8400	8013
10x8	-	-	4500	4160	4051
10	-	-	14.25	14.160	13.909
12x10	-	-	8000	7300	7117
12	-	-	22.790	21.230	17.073
14x12	-	-	13.990	-	-
16x12	-	-	-	-	-
14	32,600	30,990	28,600	26,000	24,276
16x14	14,780	14,750	14,720	14,690	14,247
16	44,700	42,600	39,250	36,600	33,215
20x16	14,870	14,860	14,850	14,830	14,795
18	87,825	56,225	57,410	48,665	43,402
20	74,775	71,800	65,463	62,239	55,931
24x20	26,768	26,755	25,698	26,659	-
22	91,789	88,537	81,305	-	-
24	113,284	109,414	98,963	93,993	83,926

Note: Consult factory for sizes not shown.

METHOD OF CALCULATING FLOW

The Flow Coefficient "Cv" of a valve is the flow rate of water (gallons/minute) through a fully opened valve, with a pressure drop of 1 psi across the valve. To find the flow of liquid through valve from the Cv, use the following formulas:

LIQUID FLOW

QL = flow rate of liquid (gal./min.)

 ΔP = differential pressure across the valve (psi)

G = specific gravity of liquid (for water, G=1)

$$Q_L = C_v \sqrt{\frac{\Delta P}{G}}$$

GAS FLOW

Qg = flow rate of gas (CFH at STP)

P₂ = outlet pressure (psia)

g = Specific gravity of gas (for air, g = 1.000)

$$Q_g = 61 C_v \sqrt{\frac{P_2 \Delta P}{g}}$$

For non-critical flow

$$\left\{ \frac{\Delta P}{P_2} < 1.0 \right\}$$

BODY & TRIM MATERIALS

Part	Material
Body/Adapter	A105, LF2, F316SS
Ball/Stem	F316SS or CS+5 mil ENP
Seat	Teflon, PEEK

PRESSURE RATING (PSIG)

Material	ANSI Cl. 150	ANSI Cl. 300	ANSI Cl. 600	ANSI Cl. 900	ANSI Cl. 1500
A105, LF2	285	740	1480	2220	3705
F316	275	720	1440	2160	3600

LOW TEMPERATURE LIMITS

Body Material	° F	° C	Seat Material	° F	° C
A105	-20	-29	PEEK	-50	-46
LF2	-50	-46	Teflon	-50	-46
F316	-50	-46			

Seat Material ° F ° C

Viton -20 -29

NBR -40 -40

PRESSURE TEMPERATURE CHART (CARBON STEEL)

