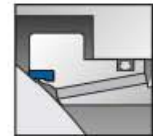


## TWO PIECE TRUNNION BALL VALVES

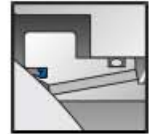
The Vatac two-piece split body trunnion mounted ball valve conforms to API 6D, ASME B16.34 and ASTM specifications. All seats are retained in metal holders which are spring-loaded against the ball for low pressure, fire safe sealing.

### GENERAL DESIGN FEATURES

- Double block and bleed
- Anti blowout stem design
- O-rings plus fire safe packing prevents leakage
- corrosion resistant low friction bearings
- Inconel wave springs to provide upstream and downstream sealing
- Stainless Steel Sealant injection fittings for emergency stem or seat sealing
- Minimized torque required to open and close valve
- Antistatic grounding between ball, stem/trunnion and body
- Integral top works direct mounting pad



Before



After

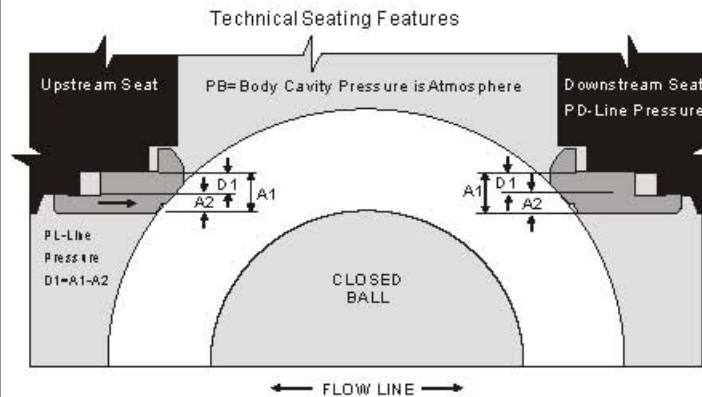
### FIRE SAFE FUNCTION

In case of fire and seat construction damage, fire safe requirements are accomplished with automatic metal-to-metal positive sealing.

### SELF RELIEVING SEAT DESIGN

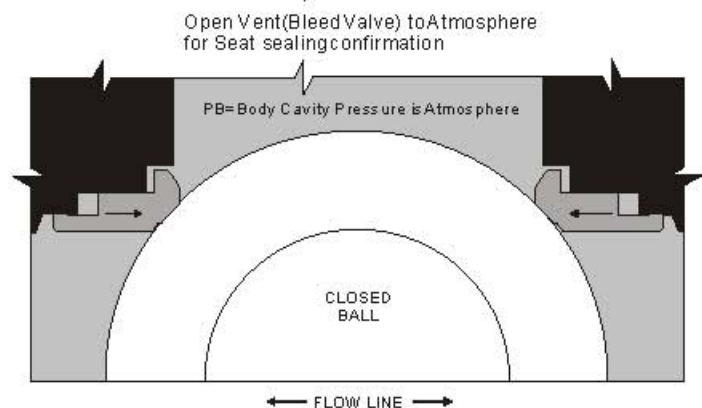
**Upstream Seat:** The difference in the area (D1) times the line pressure creates a "piston effect" which forces the seat against the ball surface. Also the springs behind the seat adds the force to the seat which keeps the seat in contact with the ball surface by providing the tight seal.

**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.



### DOUBLE BLOCK AND BLEED

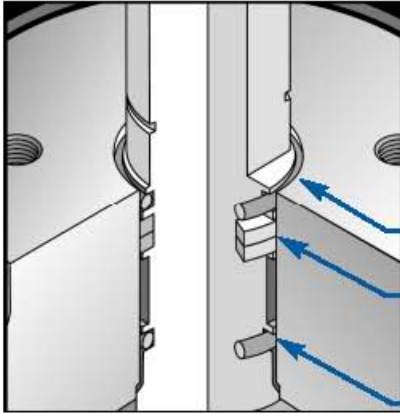
The double block and bleed condition is available in all seat design configurations. When the ball is in the closed position the body cavity pressure may be drained down to 'zero' by opening the bleed valve and draining the fluid by removing the drain plug. Each seat works independently assuring tight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



### AVAILABILITY & MAXIMUM PRESSURE RATING, ASME B16.34 & API 6D

Class		Size (in.)													
		2FP	3RP	3FP	4RP	4FP	6RP	6RP	8RP	8FP	10RP	10FP	12RP	12FP	14RP
150	ASME B16.34	285	285	285	285	285	285	285	285	285	285	285	285	285	285
	API 6D	275	275	275	275	275	275	275	275	275	275	275	275	275	275
300	ASME B16.34	740	740	740	740	740	740	740	740	740	740	740	740	740	740
	API 6D	720	720	720	720	720	720	720	720	720	720	720	720	720	720

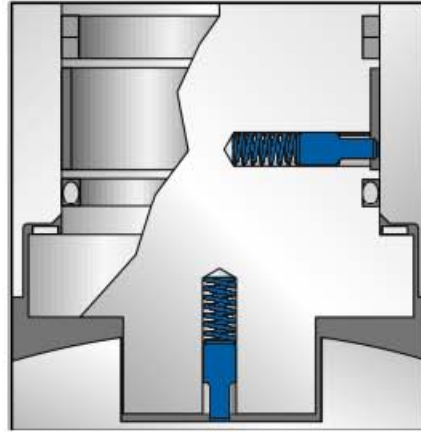
**DESIGN FEATURES**



**FIRE SAFE STANDARD DOUBLE SEAL**

2"FP-12" Bore  
Class 150&300

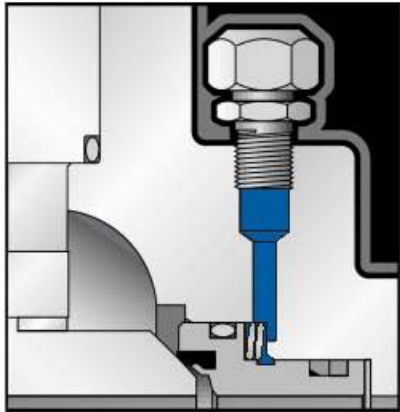
- Weather Seal
- Stem Packing  
Braided Carbon Rope
- Primary Stem Seal



**ANTISTATIC DEVICE\***

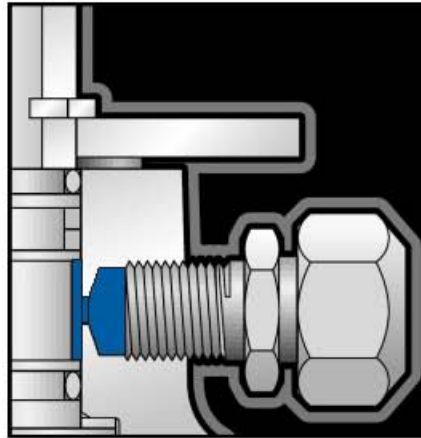
A Stainless Steel grounding plunger between the body/stem and stem/ball permits electrical continuity.

\*2"-4" bore Antistatic accomplished through trunnion bearing.



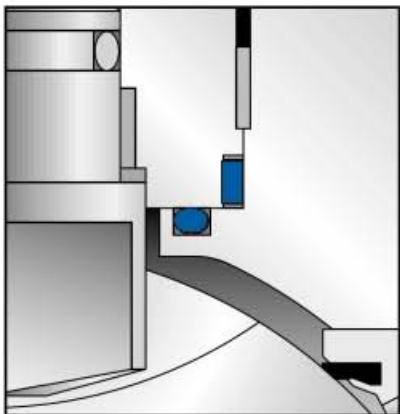
**EMERGENCY SEAT SEAL**

Special sealants may be injected into fittings that are located on the adapter flanges to restore sealing integrity if seat sealing surface is damaged.



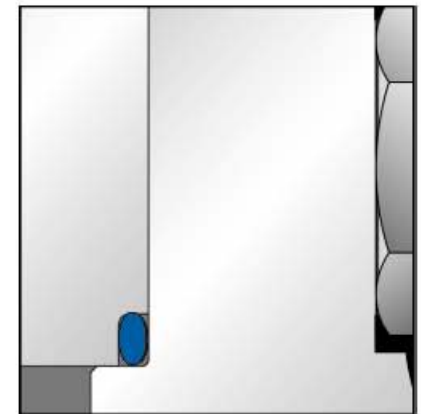
**EMERGENCY SEALANT INJECTION SYSTEM**

The Sealant Injection System Located on the body can be utilized in case of emergencies. O-ring damage, or if stem leakage occurs.



**DOUBLE SEALED ENVELOPE CONNECTIONS 2"-4" BORE**

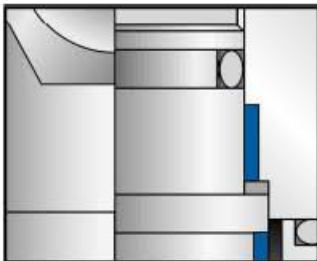
A combination of an o-ring and Firesafe gasket ensures a positive seal.



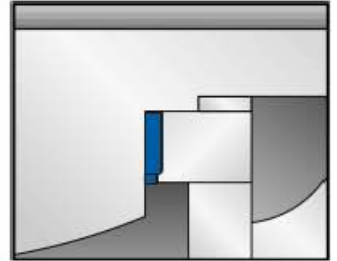
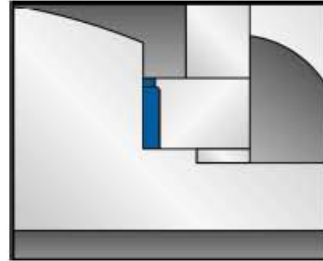
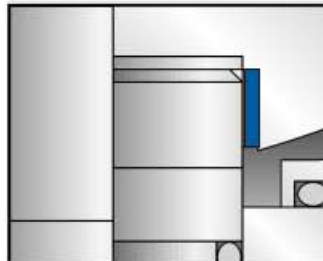
**BODY/ADAPTER SEAL CONNECTION 6"-12" BORE**

An o-ring on this connection ensures a positive seal.

**HEAVY DUTY BEARINGS**



2"-4" bore.



Teflon and glass liner with 316SS housing integral trunnion with trunnion blocks. 6"-12" bore.

Heavy duty bearings balance the pressure load on the ball by reducing friction between ball and seat resulting in smooth and easy operation of valve.

### APPLICABLE STANDARDS

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

#### API-American Petroleum Institute

- Spec. 6D Specification for pipeline valves,
- Spec. RP6F Recommended practice for firetesting of valves,
- Spec. 6FA Specification for fire testing of valves,
- Std, 598 Valve inspection and test.
- Std, 607 Fire test for soft seated quarter-turn valves.

#### ASME/ANSI-American National Standard

- 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 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.

#### 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

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

#### British Standard-cont

- 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.

#### EC-European Community

CE Marked (P.E.D. 97/23/EC.Cat.3)

#### ISO-International Organization for Standardization

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

#### 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 55 Quality standard for steel castings-visual method.

#### NACE-National Association of Corrosion Engineers

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

### PART CONFIGURATION

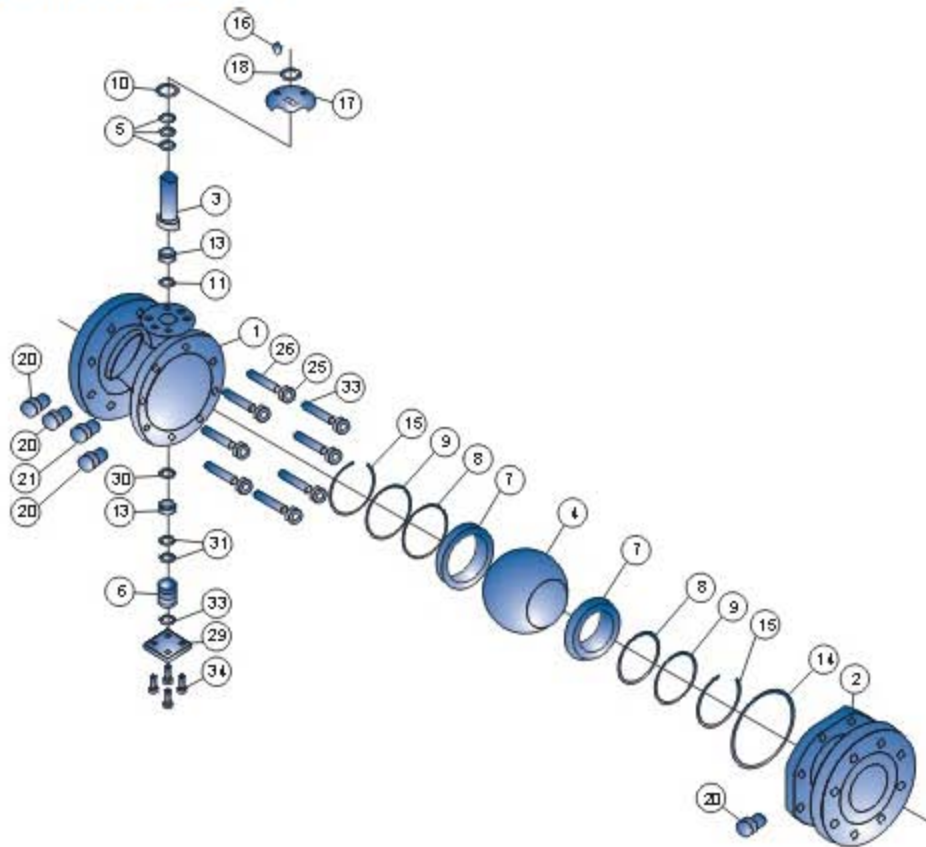
- |   |   |   |  |
|---|---|---|--|
| End Connection                                  | <ul style="list-style-type: none"> <li>● FLANGE</li> <li>● WELD</li> </ul>  | Seat Insert   | <ul style="list-style-type: none"> <li>● Teflon</li> <li>● PEEK</li> </ul>   |
| NACE Conformance Body/Bolting Material (Finish) | <ul style="list-style-type: none"> <li>● NACE III/CI.II Boting</li> <li>● CS/B7</li> <li>● CS/B7 (Cadmium)</li> <li>● CS/B7 (Zinc)</li> </ul> | <ul style="list-style-type: none"> <li>● NACE II/CI.II Boting</li> <li>● CS/B7M (Black)</li> <li>● CS/B7M (Cadmium)</li> <li>● CS/B7M (Zinc)</li> </ul> | <ul style="list-style-type: none"> <li>● Viton</li> <li>● EPDM</li> <li>● NBR</li> </ul>   |
| Trim & Drain                                    | <ul style="list-style-type: none"> <li>● 316SS</li> <li>● CS (3 milENP)</li> <li>● SS w/Drain</li> <li>● CS (3 milENP) w/Drain</li> </ul>     | Actuation   | <ul style="list-style-type: none"> <li>● Handle (2"-8" only)</li> <li>● Gear Operator</li> <li>● Handle w/Locking Device (2"-8" only)</li> <li>● Gear Operator w/Locking Device</li> <li>● Bare Stem</li> <li>● For Actuation</li> </ul> |

### BUTT WELD END SCHEDULE

Pipe Description	Nominal Pipe Size (in.) ● Schedule Code						
	2	3	4	6	8	10	12
Outside Dia. (in)	2.375	3.500	4.500	6.625	8.625	10.750	12.750
(STD) Standard	-	-	.237	.280	.322	.365	.375
Schedule 40	.154	.216	.237	.280	.322	.364	.406
Schedule 60	-	-	-	-	.406	.500	.562
XS	.218	.300	.337	.432	.500	.500	.500
Schedule 80	.218	.300	.337	.432	.500	.593	.687
Schedule 120	-	-	.438	.562	.718	.843	1.000
Schedule 160	.343	.438	.531	.718	.906	1.125	1.312
XXS	.436	.600	.674	.864	.875	1.000	1.000

Consult factory for other wall thicknesses.

● COMPONENT PARTS ● 2" FP-6" RP

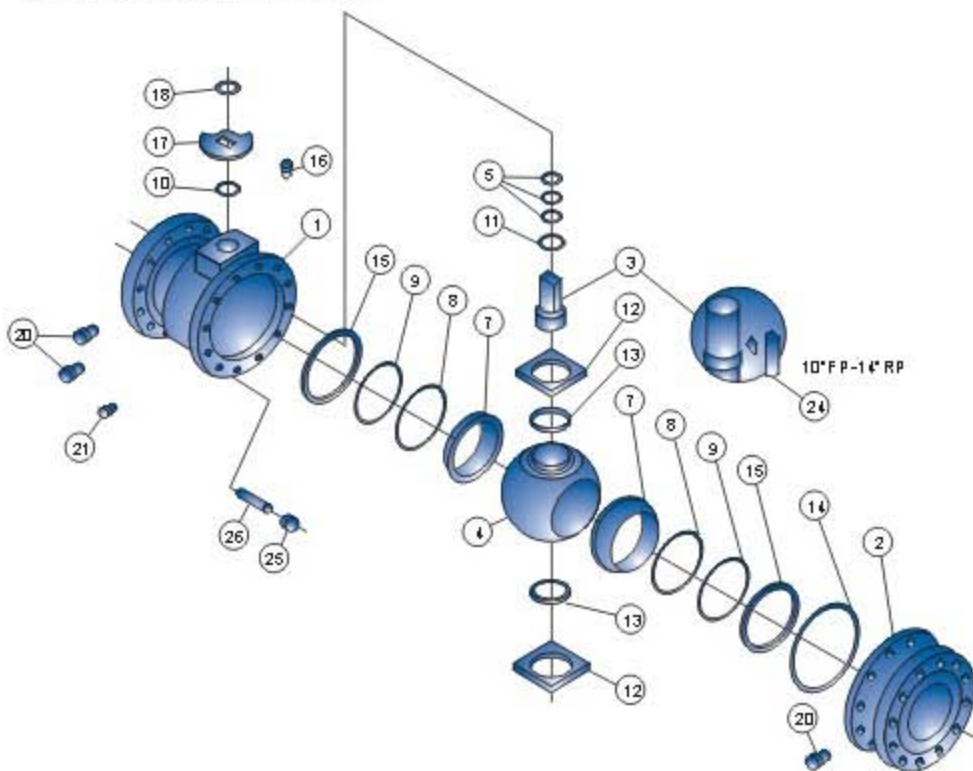


PARTS LIST

Part No Description

1	Body
2	Adapter
3	Stem Assembly
4	Ball
5	Stem Seal
7	Seat
8	Seat O-Ring
9	Seat Sub Seal
10	Stem Bearing
11	Thrust Bearing
12	Trunnion Support
13	Trunnion Bearing
14	Body Seal
15	Wave Spring
16	Stop Screw
17	Stop Plate
18	Retainer
20	Injection Fitting
21	Bleed Valve
25	Hex Nut
26	Stud

● COMPONENT PARTS ● 6" FP-14" RP\*



PARTS LIST

Part No Description

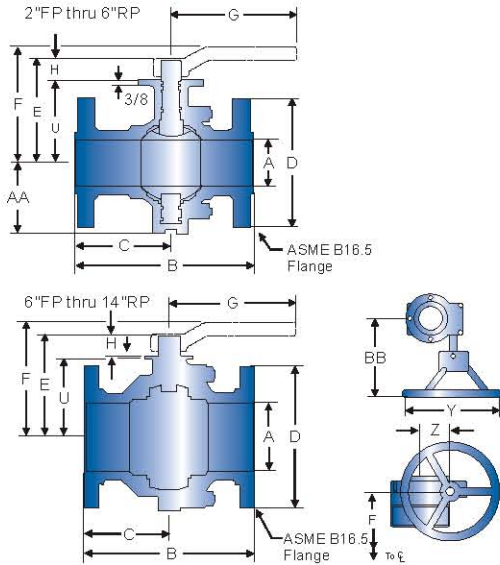
1	Body
2	Adapter
3	Stem Assembly
4	Ball
5	Stem Seal
7	Seat
8	Seat O-Ring
9	Seat Sub Seal
10	Stem Bearing
11	Thrust Bearing
12	Trunnion Support
13	Trunnion Bearing
14	Body Seal
15	Wave Spring
16	Stop Screw
17	Stop Plate
18	Retainer
20	Injection Fitting
21	Bleed Valve
24	Key, 10"FP thru 12"FP only
25	Hex Nut
26	Stud

### SPLIT BODY TRUNNION MOUNTED BALL VALVE

- Two Piece Split Body, Full Port 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



### CLASS 150 DIMENSION

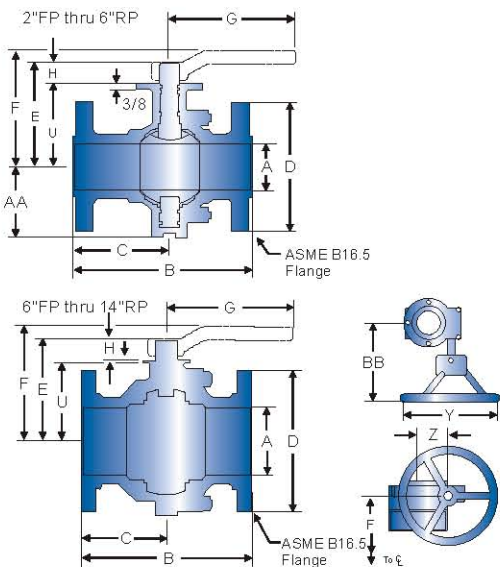
SIZE Valve w/ (in.) Only G.O W.T.(lbs.)	A	B	C	D	E	F	G	H	U	Y	Z	AA	BB	Unit:inch
	Top of CL of Handle H/Wht.													
2X2	31	43	2	7	3-1/8	6	4-15/16	6-7/8	5	8-1/2	1-1/16	3-7/8	8	2-3/4 3-9/16 7-3/16
3X2	33	46	2	8	4	7-1/2	4-15/16	6-7/8	5	8-1/2	1-1/16	3-7/8	8	2-3/4 3-9/16 7-3/16
3X3	52	65	3	8	3-7/8	7-1/2	6-5/8	8-1/4	6-1/2	15	1-1/4	5-3/8	8	2-3/4 4-1/2 7-3/16
4X3	60	70	3	9	4-1/2	9	6-5/8	8-1/4	6-1/2	15	1-1/4	5-3/8	8	2-3/4 4-1/2 7-3/16
4X4	78	91	4	9	4-1/2	9	7-7/16	9	7-5/16	15	1-1/4	6-3/16	8	2-3/4 4-1/2 7-3/16
6X4	110	123	4	15-1/2	5-1/4	11	7-7/16	9	7-5/16	15	1-1/4	6-3/16	8	2-3/4 5-1/4 7-3/16
6X6	204	234	6	15-1/2	7-3/4	11	9-1/2	10-13/16	9-1/4	48	2-3/32	7	12	2-1/2 5-1/4 9-1/4
8X6	271	301	6	18	9	13-1/2	9-1/2	10-13/16	9-1/4	48	2-3/32	7	12	2-1/2 - 9-1/4
8X8	365	429	8	18	9	13-1/2	11-9/16	12-19/32	10-3/8	48-5/16	2-3/8	8-3/4	18	3-1/2 - 11-15/16
10X8	456	520	8	21	10-1/2	16	11-9/16	12-19/32	10-3/8	48-5/16	2-3/8	8-3/4	18	3-1/2 - 11-15/16
10X10	528	605	10	21	10-1/2	16	14-5/16	-	13-3/8	-	3-3/16	11-1/4	24	4-5/8 - 14-5/8
12X10	648	725	10	24	12	19	14-5/16	-	13-3/8	-	3-3/16	11-1/4	24	4-5/8 - 14-5/8
12X12	794	899	12	24	12	19	15-11/16	-	14-3/4	-	3-3/16	12-5/8	24	4-5/8 - 14-5/8
14X12	944	1049	12	27	13-1/2	21	17-11/16	-	16-1/4	-	3-3/16	14-5/8	36	4-5/8 - 17-3/4

### SPLIT BODY TRUNNION MOUNTED BALL VALVE

- Two Piece Split Body, Full Port 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

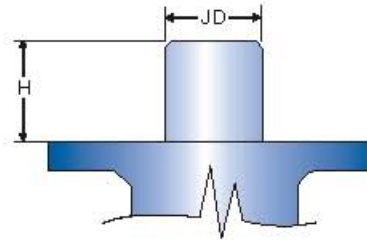
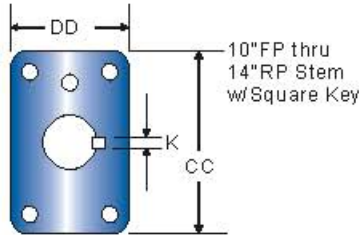
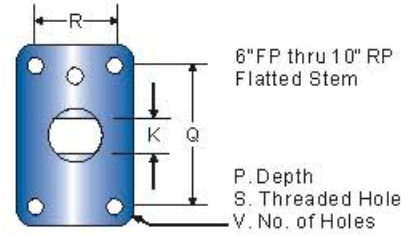
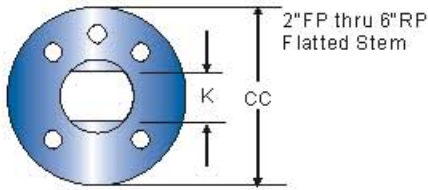
Face to Face	API 6D
End Flange	ASME B16.5
Buttweld	ASME B16.25
Class	ASME CL300



### CLASS 300 DIMENSION

SIZE Valve w/ (in.) Only G.O Wt.(lbs.)	A	B	C	D	E	F	G	H	U	Y	Z	AA	BB	Unit:inch
	Top of CL of Handle H/Wht.													
2X2	35	48	2	8-1/2	4-1/4	6-1/2	4-15/16	6-7/8	5	8-1/2	1-1/16	3-7/8	8	2-3/4 3-9/16 7-3/16
3X2	42	55	2	11-1/8	5-9/16	8-1/4	4-15/16	6-7/8	5	8-1/2	1-1/16	3-7/8	8	2-3/4 3-9/16 7-3/16
3X3	63	76	3	11-1/8	6	10	6-5/8	8-1/4	6-1/2	15	1-1/4	5-3/8	8	2-3/4 4-1/2 7-3/16
4X3	83	96	3	12	6	10	6-5/8	8-1/4	6-1/2	15	1-1/4	5-3/8	8	2-3/4 4-1/2 7-3/16
4X4	114	127	4	12	6	10	7-7/16	9	7-5/16	15	1-1/4	6-3/16	8	2-3/4 4-1/2 7-3/16
6X4	160	173	4	15-7/8	7-15/16	12-1/2	7-7/16	9	7-5/16	15	1-1/4	6-3/16	8	2-3/4 5-1/4 7-3/16
6X6	282	312	6	15-7/8	7-15/16	12-1/2	9-1/2	10-13/16	9-1/4	48	2-3/32	7	14	2-1/2 5-1/4 9-3/8
8X6	352	382	6	19-3/4	9-7/8	15	9-1/2	10-13/16	9-1/4	48	2-3/32	7	14	2-1/2 - 9-3/8
8X8	481	545	8	19-3/4	9-7/8	15	11-9/16	12-19/32	10-3/8	48-5/16	2-3/8	8-3/4	18	3-1/2 - 11-15/16
10X8	597	661	8	22-3/8	11-3/16	17-1/2	11-9/16	12-19/32	10-3/8	48-5/16	2-3/8	8-3/4	18	3-1/2 - 11-15/16
10X10	735	840	10	22-3/8	11-3/16	17-1/2	14-5/16	-	13-3/8	-	3-3/16	11-1/4	24	4-5/8 - 14-5/8
12X10	904	1009	10	25-1/2	12-3/4	20-1/2	14-5/16	-	13-3/8	-	3-3/16	11-1/4	24	4-5/8 - 14-5/8
12X12	1083	1188	12	25-1/2	12-3/4	20-1/2	15-11/16	-	14-3/4	-	3-3/16	12-5/8	24	4-5/8 - 14-5/8
14X12	1233	1385	12	30	15	23	15-11/16	-	14-1/4	-	3-3/16	12-5/8	24	4-5/8 - 17-3/4

**TOPWORKS & STEM TORQUE (IN.)**



Valve SIZE (in.)	Pressure Class	H	JD Stem Dia.	K	P Hole Depth	Q	R	S Threaded Hole	V No. of Holes	CC	DD	Max. Stem Shear Torque Ft.-Lbs.	Break* Torque In.-Lbs.	Torque Expression See Notes 1,2,3 Below Chart
2	150	1-1/16	.873/.867	.558/.554	-	-	-	-	4	4-1/8	-	1634	351	.624*P+1728
2	300	1-1/16	.873/.867	.558/.554	-	-	-	-	8	4-1/8	-	1634	632	
3	150	1-1/4	1.246/1.240	.748/.744	-	-	-	-	4	4-1/8	-	4297	768	1.29*P+400
3	300	1-1/4	1.246/1.240	.748/.744	-	-	-	-	8	4-1/8	-	4297	1355	
4	150	1-1/4	1.246/1.240	.748/.744	-	-	-	-	8	4-1/8	-	4297	1178	1.44*P+768
4	300	1-1/4	1.246/1.240	.748/.744	-	-	-	-	8	4-1/8	-	4297	1834	
6	150	2-3/32	1.999/1.995	1.249/1.246	3/4	3-3/8	2	3/8-16	8	5-1/8	3-1/8	18.959	4968	4.8*P+3600
6	300	2-3/32	1.999/1.995	1.249/1.246	3/4	4-1/2	2-3/8	1/2-13	12	5-5/8	3-1/2	18.959	7152	
8	150	2-3/8	2.499/2.495	1.249/1.246	1	4-5/8	2-7/8	1/2-13	8	6-1/4	4-1/8	46.657	8714	11.04*P+5568
8	300	2-3/8	2.499/2.495	1.249/1.246	1	4-5/8	2-7/8	1/2-13	12	6-1/4	4-1/8	46.657	13.738	
10	150	3-3/16	2.874/2.871	3/4Sq.	1-1/8	6	3-1/2	5/8-11	12	7-1/2	5	68.121	15.157	19.07*P+9722
10	300	3-3/16	2.874/2.871	3/4Sq.	1-1/8	6	3-1/2	5/8-11	16	7-1/2	5	68.121	23.834	
12	150	3-3/16	2.874/2.871	3/4Sq.	1-1/8	6	3-1/2	5/8-11	12	7-1/2	5	68.121	20.811	28.90*P+12.574
12	300	3-3/16	2.874/2.871	3/4Sq.	1-1/8	6	3-1/2	5/8-11	16	7-1/2	5	68.121	33.960	

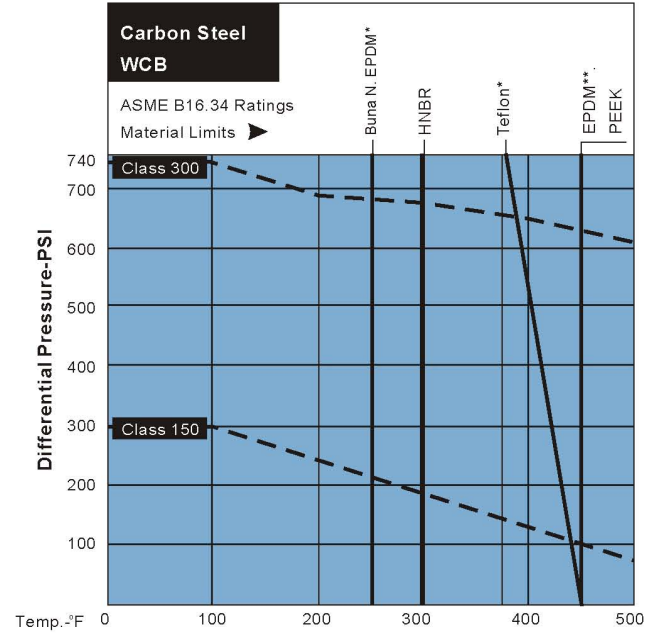
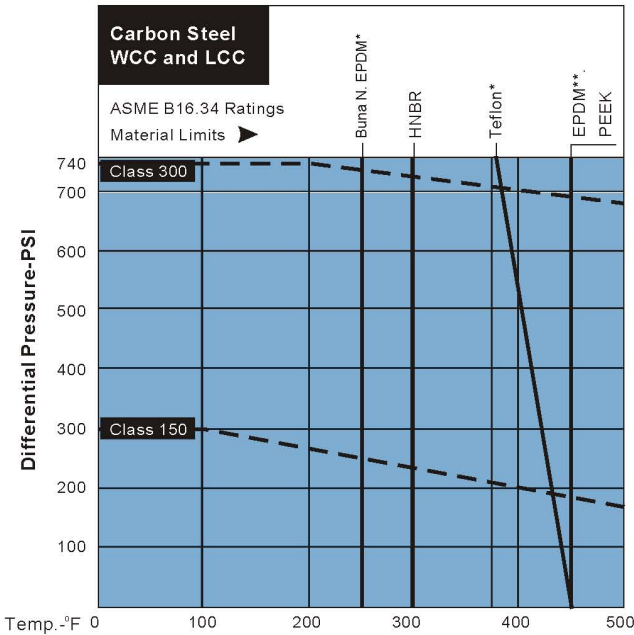
\*Torque listed is calculated for "clean wet service" use 1.22 multiplier to this to calculate for "dry gas service".

Note: (1) Torques are actual and based on maximum differential low temperature service, without safety factors.  
 (2) Vatac recommends adding a 25% safety factor for pneumatic and 50% for electric actuators  
 (3) Differential pressure "P" in torque expression is in PSI.

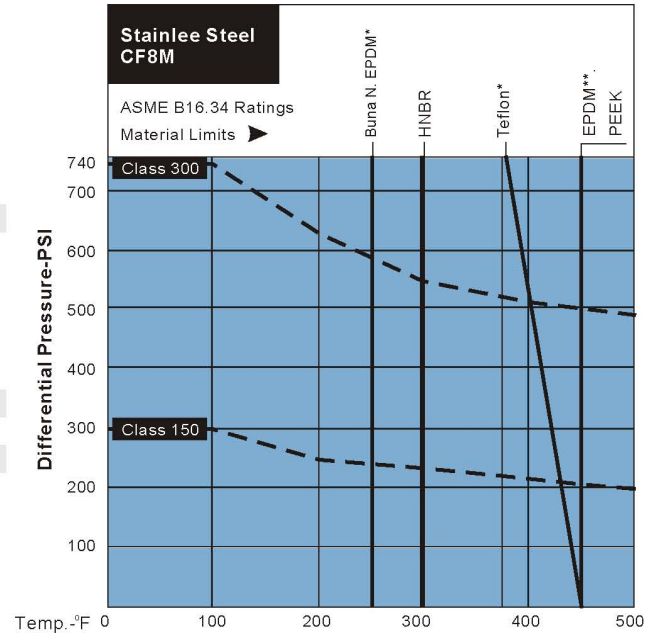
Pressure ratings according to API 6D:  
 Class 150 P= 285 psi  
 Class 300 P= 740 psi



**PRESSURE TEMPERATURE AND FLOW DATA**



Pressure Temperature Chart Notes: Consult factory for service above 325° F  
 \*For chemical service. \*\* For water and steam service only.



**LOW TEMPERATURE LIMITS**

Body Material	° F	° C	Seat Material	° F	° C
WCC	-20°	-28.9	Teflon	-50°	-45.6
LCC	-50°	-45.6	PEEK	-50°	-45.6
WCB	-20°	-28.9			
CF8M	-50°	-45.6			

Seat Material	° F	° C	Seat Material	° F	° C
Buna N	-30°	-34.4	Viton	+10°	-12.2
LowTempBunaN	-50°	-45.6	HNBR	-40°	-40°
Viton	-15°	26.1	EPDM	-50°	-45.6°

**FLOW COEFFICIENT (CV)**

Class	Size (in.)													
	2FP	3RP	3FP	4RP	4FP	6RP	6FP	8RP	8FP	10RP	10FP	12RP	12FP	14 RP
150	420	225	1050	600	2000	910	5470	2500	10.750	5000	17.775	8400	26.750	14.125
300	420	225	1050	600	2000	910	5100	2400	10.300	4825	16.300	8200	26.000	14.075

**METHOD OF CALCULATING FLOW**

The Flow Coefficient "Cv" of a valve is the flow rate of water (gallons/minute @ 60° F) through a fully opened valve, with a pressure drop of 1psi across the valve. To find the flow of liquid or gas through a 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)

$$QL = Cv \sqrt{\frac{\Delta P}{G}}$$

**GAS FLOW**

Qg = flow rate of gas (CFH at STP)  
 P<sub>2</sub> = outlet pressure (psia)  
 g = Specific gravity of gas (for air, g=1.000)

$$Qg = 61Cv \sqrt{\frac{P_2 \Delta P}{g}}$$

For non-critical flow  
 $\left\{ \frac{\Delta P}{P_2} < 1.0 \right\}$