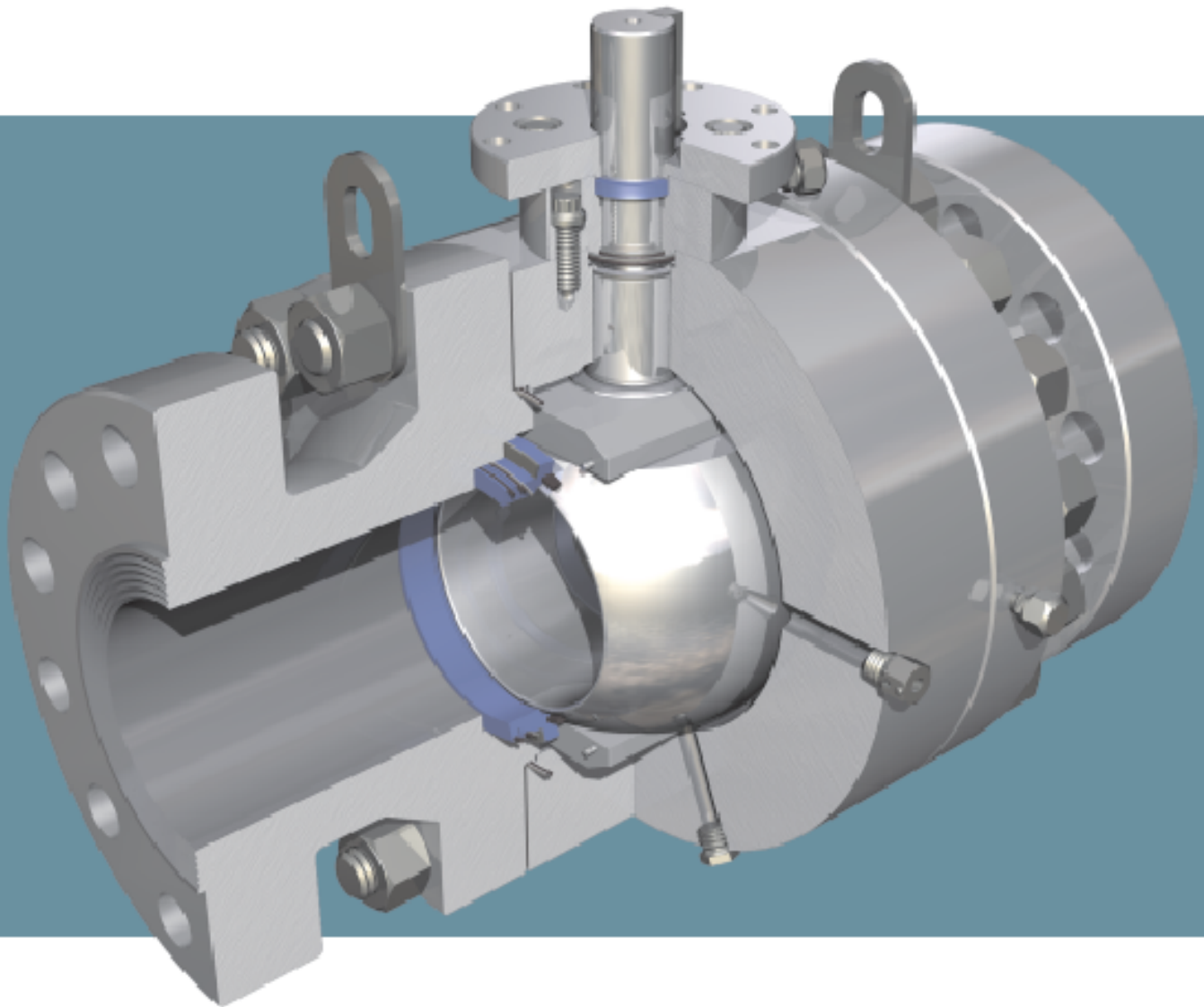


NUTRON[®] Model TT Forged Steel Trunnion Mounted Ball Valves



NUTRON[®]

TABLE OF CONTENTS

**NUTRON MODEL TT FORGED STEEL
TRUNNION MOUNTED BALL VALVES**

Sizes, Specifications and Compliances _____ 1

ORDER INFORMATION _____ 2**EXTERNAL TYPE TRUNNION DESIGN**

Features _____ 3

Detailed View _____ 4

Materials List _____ 5

DIMENSION TABLESASME Class 150 through 900
(PN 20 through 150)

Full Port and Reduced Port _____ 6, 7, 8 & 9

**PRESSURE/TEMPERATURE AND
BREAKAWAY TORQUE TABLES** _____ 10**INTEGRAL TYPE TRUNNION DESIGN**

Features _____ 11

Detailed View _____ 12

Materials List _____ 13

DIMENSION TABLES

ASME Class 1500 & 2500 (PN 250 & 420)

Full Port and Reduced Port _____ 14 & 15

ACTUATOR MOUNTING DIMENSIONS _____ 16 & 17**TRADEMARK INFORMATION** _____ 18

TRUNNION MOUNTED BALL VALVES

EXTERNAL TYPE TRUNNION DESIGN:

- Full Port sizes 2 in. (50 mm) through 12 in. (300 mm)
- Reduced Port sizes 3 in. (80 mm) through 16 in. (400 mm)
- ASME Class 150 through 900 (PN 20 through 150) (depending on Bore size)

INTEGRAL TYPE TRUNNION DESIGN:

- Full Port sizes 2 in. (50 mm) through 12 in. (300 mm)
- Reduced Port sizes 3 in. (80 mm) through 16 in. (400 mm)
- ASME Class 1500 & 2500 (PN 250 & 420) (depending on Bore size)

END CONNECTIONS: FLANGED, BUTTWELD OR COMBINATION

- Materials: Carbon Steel, Stainless Steel, Special Alloys
- Operators: Manual Handle and Gear Type
- Actuation: Consult Cooper Cameron Valves - Nutron Sales Department for information on various types of actuators including; Pneumatic, Hydro-Pneumatic, Electric, Electro-Pneumatic and Hydraulic

COMPLIANCE TO STANDARDS AND SPECIFICATIONS:

- ISO 9001-2000: Registered Quality System
- ASME B16.34
- API 6D and API 607 4th Edition (Fire Safe)
- CE Mark Number 0879
- ASME Section VIII Division 1 Boiler and Pressure Vessel Code
- CSA Z245.15 Steel Valves
- Canadian Registration Number (CRN)

TRUNNION MOUNTED BALL VALVES

SIZES AVAILABLE

in.
(mm)

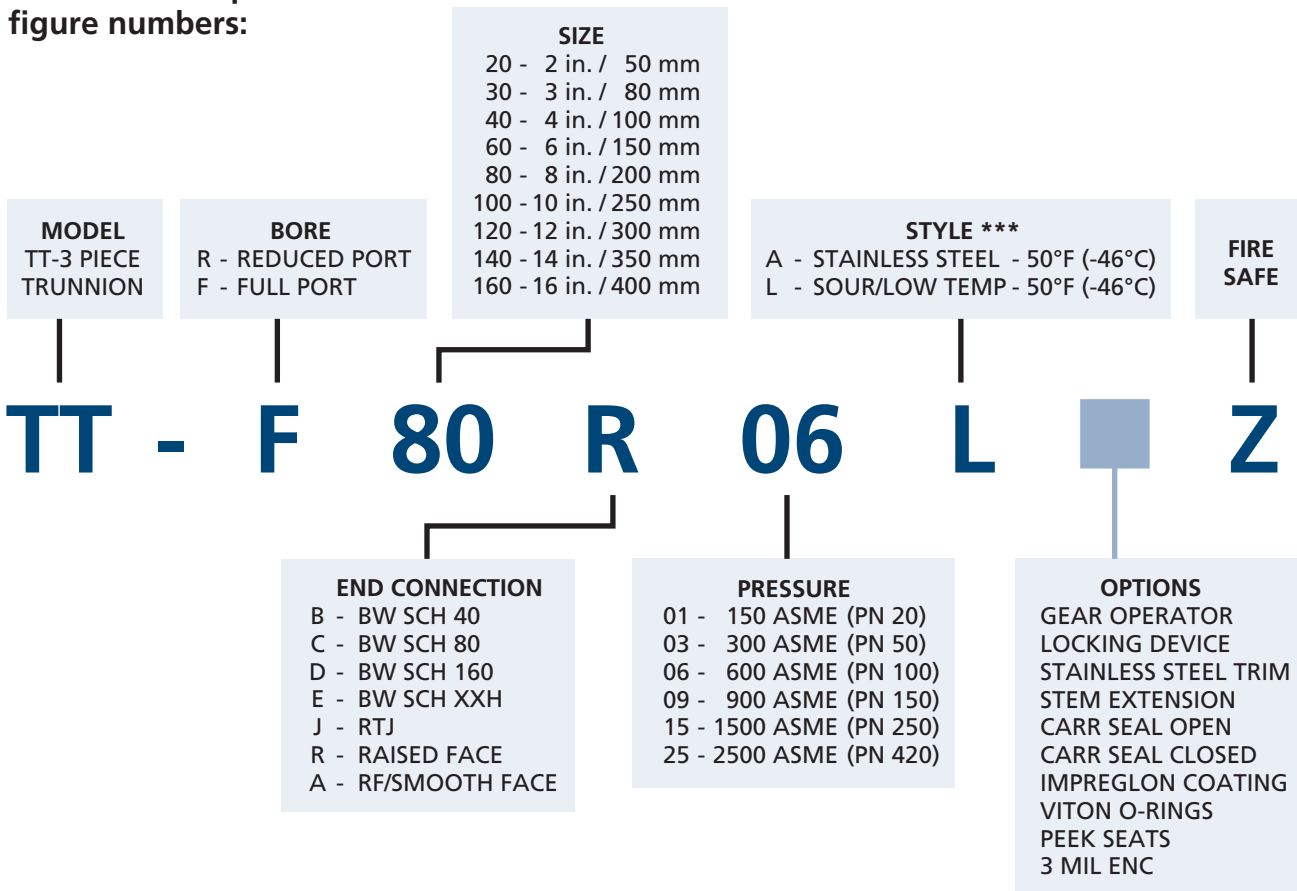
ASME CLASS (PN)	150 (20)	300 (50)	600 (100)	900 (150)	1500 (250)	2500 (420)
Full Port (DN)	6 thru 12 (150 thru 300)	6 thru 12 (150 thru 300)	2 thru 12 (50 thru 300)	2 thru 12 (50 thru 300)	2 thru 12* (50 thru 300)	2 thru 8** (50 thru 200)
Reduced Port (DN)	8 thru 16 (200 thru 400)	8 thru 16 (200 thru 400)	3 thru 16 (80 thru 400)	3 thru 16 (80 thru 400)	3 thru 16* (80 thru 400)	3 thru 10** (80 thru 250)

* ASME Class 1500 (PN 250) 2 in. & 3 in. (50 mm & 80 mm) FP, 3 in. & 4 in. (80 mm & 100 mm) RP have External Type Trunnion.

** All ASME Class 2500 (PN 420) have Integral Type Trunnion.

ORDERING INFORMATION

How to develop figure numbers:



Examples:

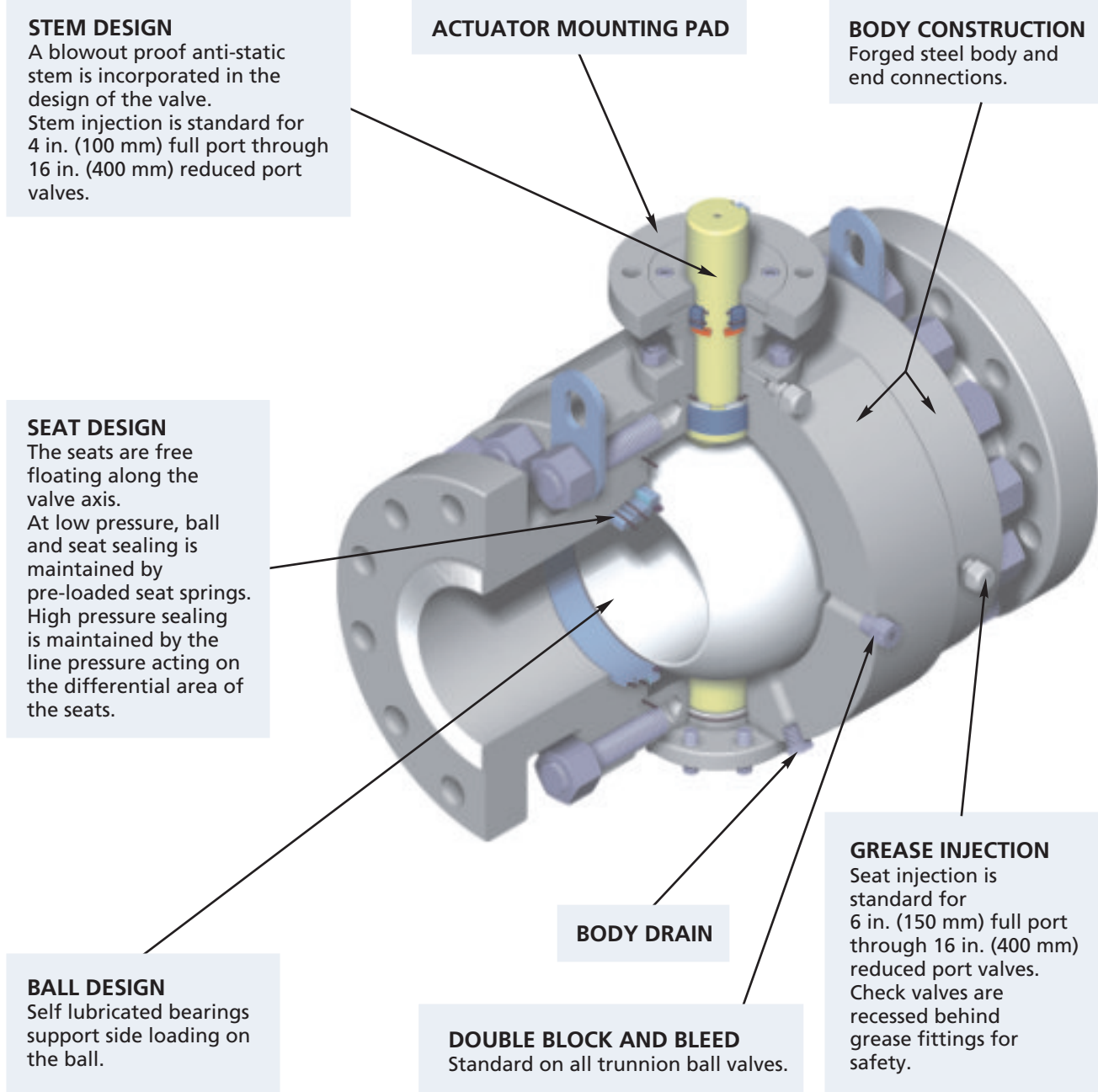
- TT-F80R06LGZ = Model TT, Full Port, 8 in./200 mm, Raised Face Flanges, 600 ASME (PN 100), Sour/Low Temp Style Valve, Gear Operated, Fire Safe.
- TT-R120J09AGZ = Model TT, Reduced Port, 12 in./300 mm, RTJ Flanges, 900 ASME (PN 150), Stainless Steel, Gear Operated, Fire Safe.

*** Consult Cameron, Valves & Measurement - NUTRON Sales Department for detailed valve style descriptions, full range of options, materials, actuation packages or for a particular special valve service application.

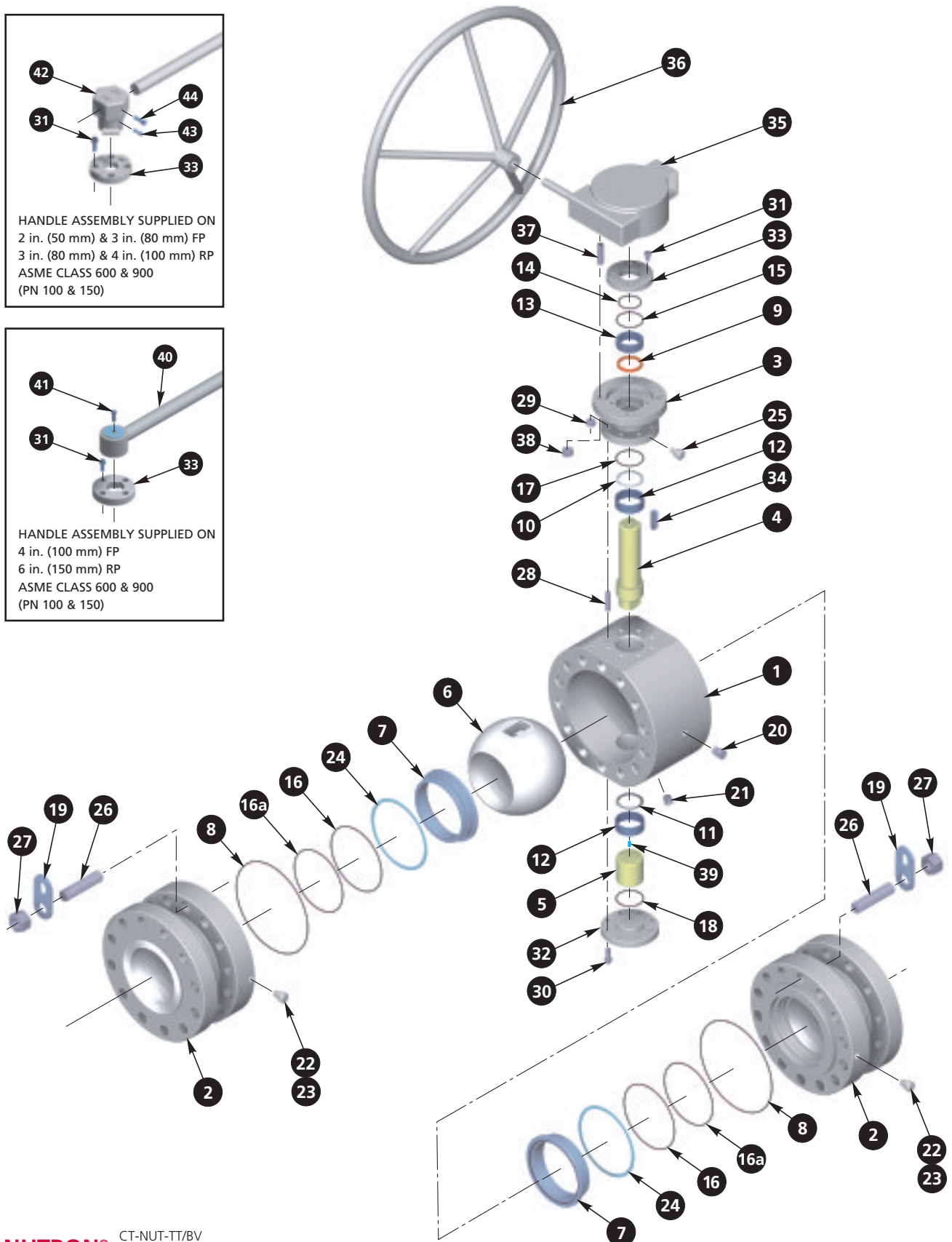
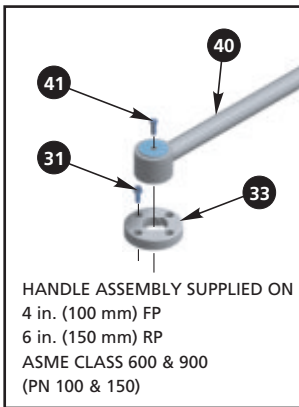
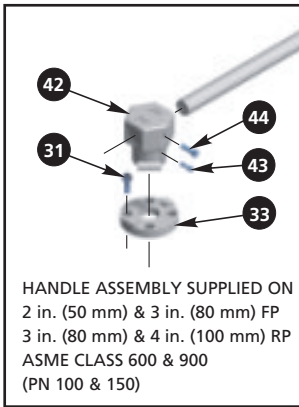
EXTERNAL TYPE TRUNNION MOUNTED BALL VALVES
2 in. Full Port through 16 in. Reduced Port (50 mm through 400 mm)
ASME Class 150 through 900 (PN 20 through 150)

STANDARD FEATURES

FIRE SAFE QUALIFIED TO API 607 4th EDITION.



EXTERNAL TYPE TRUNNION MOUNTED BALL VALVES
2 in. Full Port through 16 in. Reduced Port (50 mm through 400 mm)
ASME Class 150 through 900 (PN 20 through 150)



EXTERNAL TYPE TRUNNION MOUNTED BALL VALVES MATERIALS LIST - ASME Class 150 through 900 (PN 20 through 150)

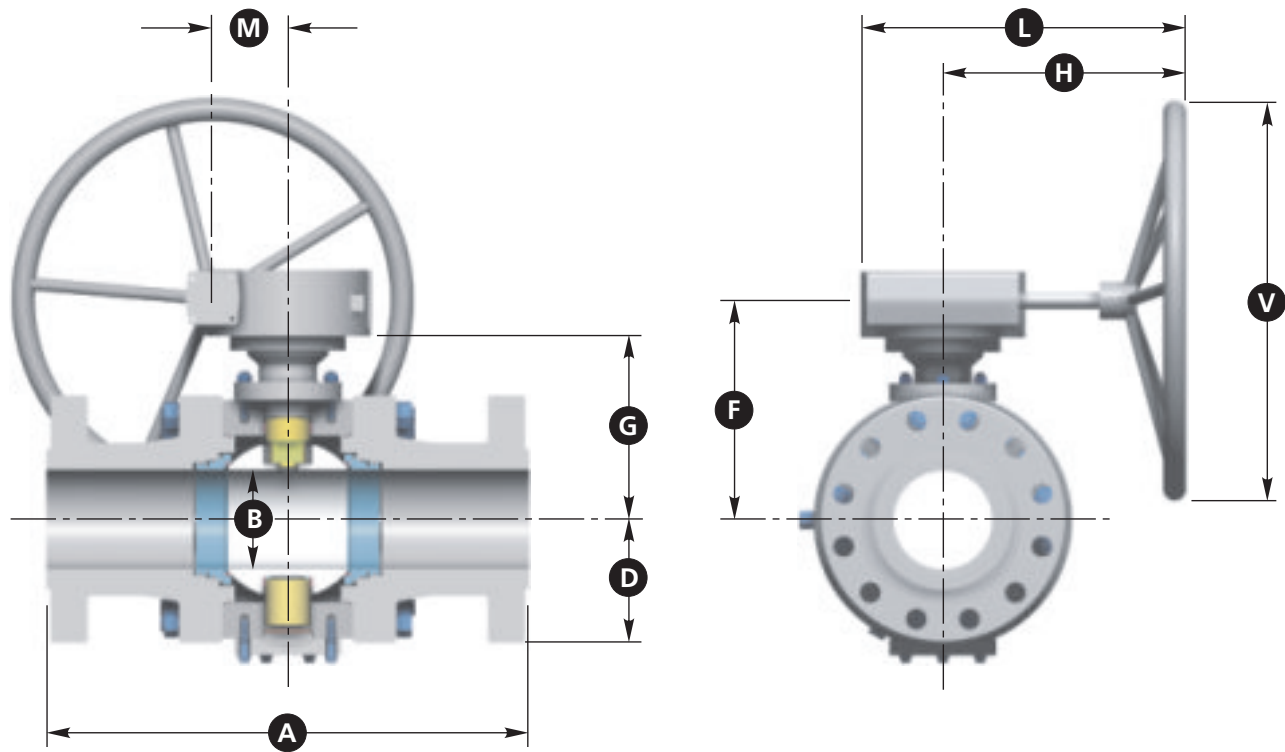
ITEM	PART	SOUR & LOW TEMP	STAINLESS STEEL -50°F (-46°C)
1	Body	ASTM A350 LF2	ASTM A479 Type 316/A182 F316
2	End Caps	ASTM A350 LF2	ASTM A479 Type 316/A182 F316
3	Bonnet	ASTM A350 LF2	ASTM A479 Type 316/A182 F316
■ 4	Stem	ASTM A350 LF2 1 mil ENC	ASTM A564 17-4PH H1150M
■ 5	Trunnion	ASTM A350 LF2 1 mil ENC	ASTM A564 17-4PH H1150M
■ 6	Ball 2 in. FP through 10 in. RP 10 in. FP through 16 in. RP	ASTM A351 CF8M ASTM A350 LF2 1 mil ENC	ASTM A351 CF8M ASTM A351 CF8M
■● 7	Seat Assembly	ASTM A350 LF2 1 mil ENC, Devlon	ASTM A479 Type 316, Devlon
■● 8	Body O-Ring Seal	HNBR	HNBR
■● 9	Stem PolyPak Seal	Flouromyte/SS	Flouromyte/SS
■● 10	Thrust Bearing (Stem)	ASTM B148 9C Aluminum Bronze	ASTM B148 9C Aluminum Bronze
■● 11	Thrust Bearing (Trunnion)	ASTM B148 9C Aluminum Bronze	ASTM B148 9C Aluminum Bronze
■ 12	Stem/Trunnion Bearing	Carbon Steel - Type DU	Carbon Steel - Type DU
13	Stem Bushing	Stainless Steel	Stainless Steel
■● 14	Stem Bushing O-Ring (ID) Seal	HNBR	HNBR
■● 15	Stem Bushing O-Ring (OD) Seal	HNBR	HNBR
■● 16	Seat O-Ring Seal	HNBR	HNBR
■● 16a	Seat O-Ring Seal 6 in. (150 mm) & Larger	HNBR	HNBR
■● 17	Bonnet Cover O-Ring Seal	HNBR	HNBR
■● 18	Trunnion Cover O-Ring Seal	HNBR	HNBR
19	Lifting Lugs 6 in. (150 mm) FP 600 & Larger	Carbon Steel	Carbon Steel
20	Body Bleed Valve	Stainless Steel	Stainless Steel
21	Body Drain Plug	Stainless Steel	Stainless Steel
22	Seat Injection Buttonhead	Stainless Steel	Stainless Steel
23	Seat Buried Check	Stainless Steel	Stainless Steel
■ 24	Seat Wave Spring	Inconel X-750	Inconel X-750
25	Stem Injection Buttonhead 6 in. & Larger	Stainless Steel	Stainless Steel
26	Body Studs	ASTM A320 L7M	ASTM A320 L7M, Coated
27	Body Nuts	ASTM A194 L7M	ASTM A194 L7M, Coated
28	Bonnet Studs	ASTM A320 L7M	ASTM A320 L7M, Coated
29	Bonnet Nuts	ASTM A194 L7M	ASTM A194 L7M, Coated
30	Trunnion Cover Cap Screws	ASTM A320 L7M	ASTM A320 L7M, Coated
31	Stem Cover Cap Screws	ASTM A320 B8CL1 Stainless Steel	ASTM A320 B8CL1 Stainless Steel
32	Trunnion Cover	ASTM A350 LF2	ASTM A479 Type 316
33	Stem Cover	ASTM A350 LF2	ASTM A479 Type 316
34	Key	Carbon Steel	Stainless Steel
35	Gear Operator	Cast Steel	Cast Steel
36	Handwheel	Carbon Steel	Carbon Steel
37	Gear Operator Studs	Carbon Steel	Carbon Steel, Coated
38	Gear Operator Nuts	Carbon Steel	Carbon Steel, Coated
■ 39	Spring (Anti-Static)	Inconel X-750	Inconel X-750
40	Handle Assembly	Carbon Steel	Carbon Steel
41	Screw	Carbon Steel, Plated	Carbon Steel, Plated
42	Handle Nut	Carbon Steel	Carbon Steel
43	Screw	Carbon Steel, Plated	Carbon Steel, Plated
44	Screw	Carbon Steel, Plated	Carbon Steel, Plated

- Major repair kit.
- Minor repair kit.

Cameron, Valves & Measurement reserves the right to substitute materials listed above with alternate material approved for designated service.

EXTERNAL TYPE TRUNNION MOUNTED BALL VALVES

Full Port ASME Class 150 & 300 (PN 20 & 50)



DIMENSIONS - ASME CLASS 150 (PN 20)

NPS in. (DN)	in. (mm)	A			B	D	F	G	H	L	M	V	C _v (K _v)	Weight lb. (kg)
		BW	RF	RTJ										
6 (150)	18.00 (457)	15.50 (394)	16.00 (406)	6.00 (153)	5.50 (140)	12.35 (314)	10.50 (267)	12.00 (305)	15.55 (395)	3.16 (80)	16.00 (406)	5400 (4.67)	425 (193)	
8 (200)	20.50 (521)	18.00 (457)	18.50 (470)	8.00 (203)	6.75 (171)	14.36 (365)	12.00 (305)	14.00 (356)	18.64 (473)	4.63 (117)	16.00 (406)	10000 (8.65)	725 (330)	
10 (250)	22.00 (559)	21.00 (533)	21.50 (546)	10.00 (254)	8.00 (203)	15.88 (403)	13.50 (343)	18.93 (481)	23.87 (606)	4.72 (120)	30.00 (762)	16000 (13.84)	1050 (476)	
12 (300)	25.00 (635)	24.00 (610)	24.50 (622)	12.00 (305)	9.50 (241)	19.00 (483)	16.63 (422)	17.68 (449)	22.62 (575)	4.72 (120)	24.00 (610)	24000 (20.76)	1575 (715)	

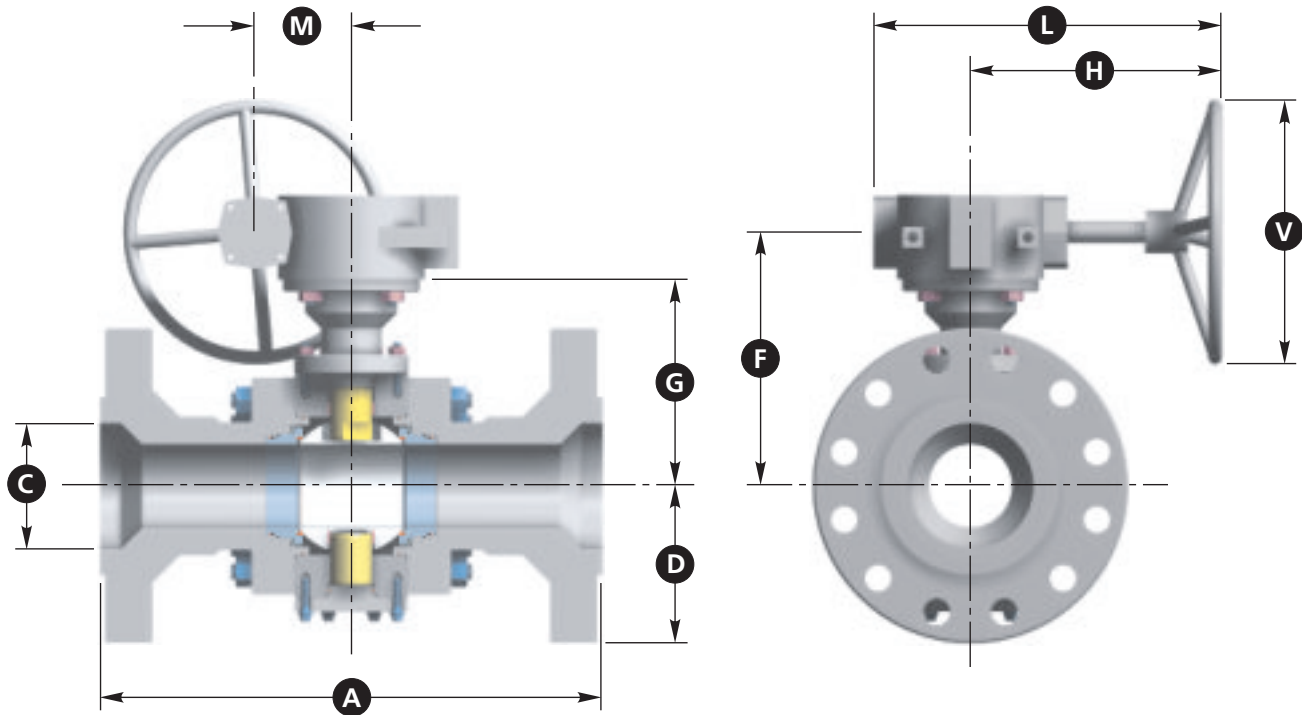
DIMENSIONS - ASME CLASS 300 (PN 50)

NPS in. (DN)	in. (mm)	A			B	D	F	G	H	L	M	V	C _v (K _v)	Weight lb. (kg)
		BW	RF	RTJ										
6 (150)	15.88 (403)	15.88 (403)	16.50 (419)	6.00 (153)	6.25 (159)	12.35 (314)	10.50 (267)	12.00 (305)	15.55 (395)	3.16 (80)	16.00 (406)	5400 (4.67)	480 (218)	
8 (200)	20.50 (521)	19.75 (502)	20.37 (518)	8.00 (203)	7.50 (190)	14.36 (365)	12.00 (305)	14.75 (375)	19.40 (493)	4.63 (117)	20.00 (508)	10000 (8.65)	825 (375)	
10 (250)	22.00 (559)	22.38 (568)	23.00 (584)	10.00 (254)	8.75 (222)	15.88 (403)	13.50 (343)	18.93 (481)	23.87 (606)	4.72 (120)	30.00 (762)	16000 (13.84)	1260 (572)	
12 (300)	25.00 (635)	25.50 (648)	26.12 (664)	12.00 (305)	10.25 (260)	19.00 (483)	16.63 (422)	17.68 (449)	22.62 (575)	4.72 (120)	24.00 (610)	24000 (20.76)	1875 (852)	

NOTE: Flanged sizes 2 in. (50 mm) through 10 in. (250 mm) - "A" dimensions to be within ± 0.06 in. (2 mm).
Flanged size 12 in. (300 mm) & larger - "A" dimensions to be within ± 0.12 in. (3 mm).

EXTERNAL TYPE TRUNNION MOUNTED BALL VALVES

Reduced Port ASME Class 150 & 300 (PN 20 & 50)



DIMENSIONS - ASME CLASS 150 (PN 20)

NPS in. (DN)	in. (mm)	A			B	C	D	F	G	H	L	M	V	C _v (K _v)	Weight lb. (kg)
		BW	RF	RTJ											
8 x 6 (200 x 150)	20.50 (521)	18.00 (457)	18.50 (470)	6.00 (153)	8.00 (203)	6.75 (171)	12.35 (314)	10.50 (267)	12.00 (305)	15.55 (395)	3.16 (80)	16.00 (406)	3400 (2.94)	490 (223)	
10 x 8 (250 x 200)	22.00 (559)	21.00 (533)	21.50 (546)	8.00 (203)	10.00 (254)	8.00 (203)	14.36 (365)	12.00 (305)	14.00 (356)	18.64 (473)	4.63 (117)	16.00 (406)	5900 (5.10)	810 (370)	
12 x 10 (300 x 250)	25.00 (635)	24.00 (610)	24.50 (622)	10.00 (254)	12.00 (305)	9.50 (241)	15.88 (403)	13.50 (343)	18.93 (481)	23.87 (606)	4.72 (120)	30.00 (762)	8000 (6.92)	1180 (536)	
14 x 12 (350 x 300)	30.00 (762)	27.00 (686)	27.50 (699)	12.00 (305)	13.25 (337)	10.50 (267)	19.00 (483)	16.63 (422)	17.68 (449)	22.62 (575)	4.72 (120)	24.00 (610)	- -	- -	
16 x 12 (400 x 300)	33.00 (838)	30.00 (762)	30.50 (775)	12.00 (305)	15.25 (387)	11.75 (299)	19.00 (483)	16.63 (422)	17.68 (449)	22.62 (575)	4.72 (120)	24.00 (610)	- -	1915 (870)	

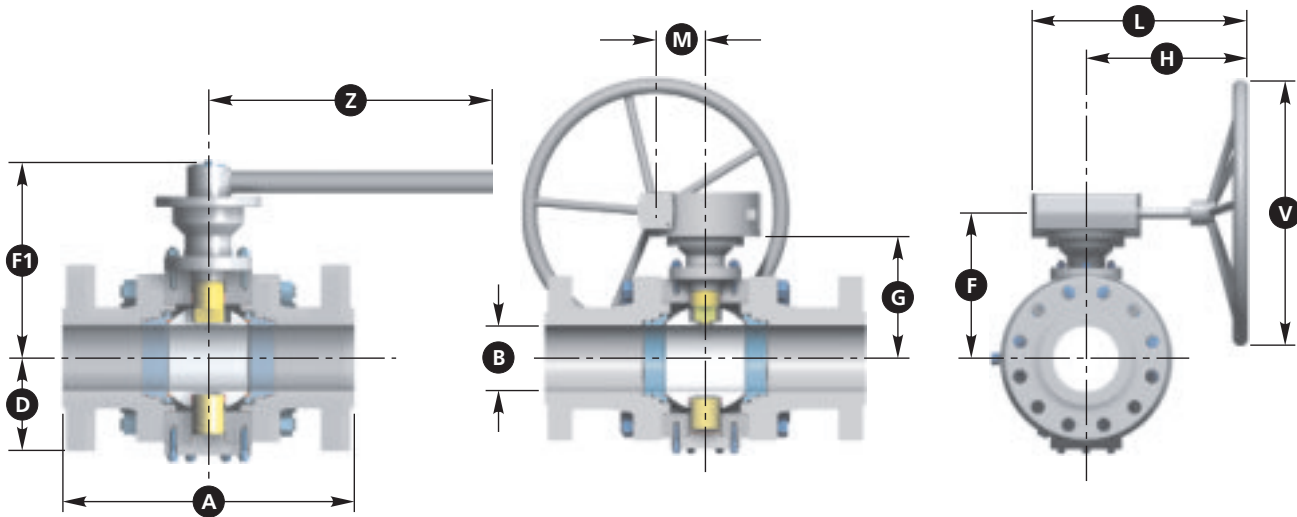
DIMENSIONS - ASME CLASS 300 (PN 50)

NPS in. (DN)	in. (mm)	A			B	C	D	F	G	H	L	M	V	C _v (K _v)	Weight lb. (kg)
		BW	RF	RTJ											
8 x 6 (200 x 150)	20.50 (521)	19.75 (502)	20.37 (518)	6.00 (153)	8.00 (203)	7.50 (190)	12.35 (314)	10.50 (267)	12.00 (305)	15.55 (395)	3.16 (80)	16.00 (406)	3400 (2.94)	560 (255)	
10 x 8 (250 x 200)	22.00 (559)	22.38 (568)	23.00 (584)	8.00 (203)	10.00 (254)	8.75 (222)	14.36 (365)	12.00 (305)	14.75 (375)	19.40 (493)	4.63 (117)	20.00 (508)	5900 (5.10)	926 (420)	
12 x 10 (300 x 250)	25.00 (635)	25.50 (648)	26.12 (664)	10.00 (254)	12.00 (305)	16.25 (413)	15.88 (403)	13.50 (343)	18.93 (481)	23.87 (606)	4.72 (120)	30.00 (762)	8000 (6.92)	1440 (655)	
14 x 12 (350 x 300)	30.00 (762)	30.00 (762)	30.62 (778)	12.00 (305)	13.25 (337)	11.50 (292)	19.00 (483)	16.63 (422)	17.68 (449)	22.62 (575)	4.72 (120)	24.00 (610)	- -	- -	
16 x 12 (400 x 300)	33.00 (838)	33.00 (838)	33.62 (854)	12.00 (305)	15.25 (387)	12.15 (324)	19.00 (483)	16.63 (422)	17.68 (449)	22.62 (575)	4.72 (120)	24.00 (610)	- -	- -	

NOTE: Flanged sizes 2 in. (50 mm) through 10 in. (250 mm) - "A" dimensions to be within ± 0.06 in. (2 mm).
Flanged size 12 in. (300 mm) & larger - "A" dimensions to be within ± 0.12 in. (3 mm).

EXTERNAL TYPE TRUNNION MOUNTED BALL VALVES

Full Port ASME Class 600 & 900 (PN 100 & 150)



DIMENSIONS - ASME CLASS 600 (PN 100)

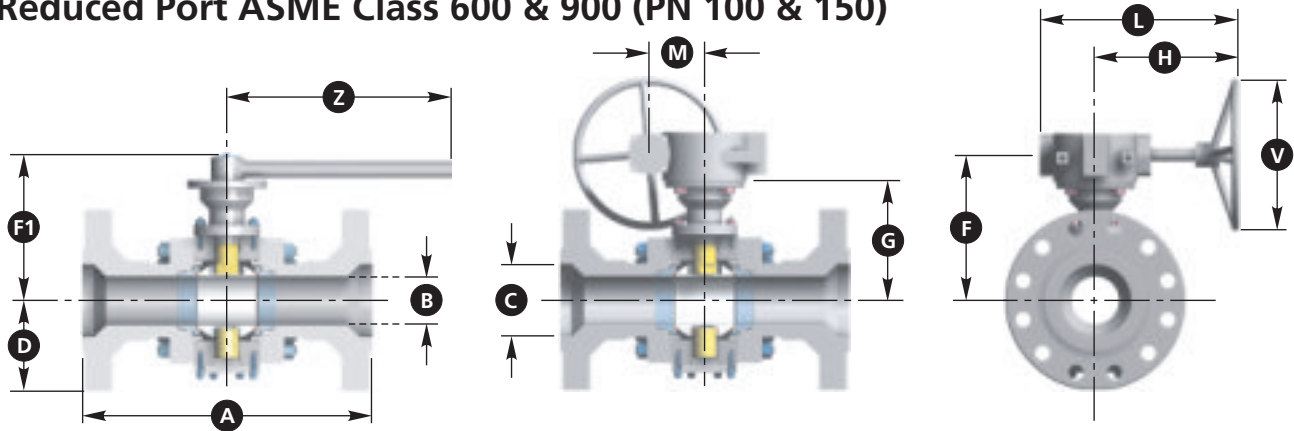
NPS in.	in.	A		B	D	F	F1	G	H	L	M	V	Z	C _v	Weight lb.
(DN)	(mm)	BW/RF	RTJ											(K _v)	(kg)
2	50	11.50 (292)	11.62 (295)	2.00 (51)	3.25 (83)	-	10.54 (268)	7.26 (184)	-	-	-	-	20.63 (524)	480 (0.42)	105 (48)
3	80	14.00 (356)	14.12 (359)	3.00 (76)	4.10 (104)	11.32 (288)	12.76 (324)	9.47 (240)	11.00 (280)	14.55 (370)	3.16 (80)	12.00 (305)	20.63 (524)	1300 (1.12)	205 (93)
4	100	17.00 (432)	17.12 (435)	4.00 (102)	5.40 (137)	11.80 (300)	12.44 (316)	9.95 (253)	12.00 (305)	15.55 (395)	3.16 (80)	16.00 (406)	49.10 (1248)	2300 (1.99)	360 (164)
6	150	22.00 (559)	22.12 (562)	6.00 (153)	7.00 (178)	13.11 (333)	-	10.75 (273)	14.75 (375)	19.40 (493)	4.63 (118)	20.00 (508)	-	5400 (4.67)	760 (345)
8	200	26.00 (660)	26.12 (664)	8.00 (203)	8.25 (210)	16.38 (416)	-	14.00 (356)	18.93 (481)	23.87 (606)	4.72 (120)	30.00 (762)	-	10000 (8.65)	1325 (602)
10	250	31.00 (787)	31.12 (791)	10.00 (254)	10.00 (254)	18.88 (480)	-	15.88 (404)	18.50 (470)	23.06 (586)	4.63 (118)	18.00 (457)	-	16000 (13.84)	2185 (990)
12	300	33.00 (839)	33.12 (841)	12.00 (305)	11.00 (279)	21.27 (540)	-	18.96 (482)	18.74 (476)	24.62 (625)	6.25 (159)	18.00 (457)	-	24000 (20.76)	3100 (1410)

DIMENSIONS - ASME CLASS 900 (PN 150)

NPS in.	in.	A		B	D	F	F1	G	H	L	M	V	Z	C _v	Weight lb.
(DN)	(mm)	BW/RF	RTJ											(K _v)	(kg)
2	50	14.50 (368)	14.62 (371)	2.00 (51)	4.25 (108)	-	10.54 (268)	7.26 (184)	-	-	-	-	20.63 (524)	480 (0.42)	145 (66)
3	80	15.00 (381)	15.12 (384)	3.00 (76)	4.75 (121)	11.32 (288)	12.76 (324)	9.47 (240)	11.00 (280)	14.55 (370)	3.16 (80)	12.00 (305)	20.63 (524)	1300 (1.12)	235 (107)
4	100	18.00 (457)	18.12 (460)	4.00 (102)	5.75 (146)	11.80 (300)	12.44 (316)	9.95 (253)	12.00 (305)	15.55 (395)	3.16 (80)	16.00 (406)	49.10 (1248)	2300 (1.99)	390 (177)
6	150	24.00 (610)	24.12 (613)	6.00 (153)	7.50 (190)	13.50 (343)	-	11.13 (283)	16.75 (425)	21.39 (543)	4.63 (118)	24.00 (610)	-	5400 (4.67)	950 (432)
8	203	29.00 (737)	29.12 (740)	8.00 (203)	9.25 (235)	16.38 (416)	-	14.00 (356)	19.68 (500)	24.62 (625)	4.72 (120)	36.00 (914)	-	10000 (8.65)	1500 (680)
10	250	33.00 (838)	33.12 (841)	10.00 (254)	10.75 (273)	19.31 (490)	-	16.31 (414)	22.17 (563)	26.75 (679)	4.63 (118)	36.00 (914)	-	16000 (13.84)	2690 (1220)
12	300	38.00 (965)	38.12 (968)	12.00 (305)	12.00 (305)	22.31 (567)	-	20.00 (508)	20.61 (523)	26.50 (673)	6.25 (159)	24.00 (610)	-	24000 (20.76)	4125 (1875)

NOTE: Flanged sizes 2 in. (50 mm) through 10 in. (250 mm) - "A" dimensions to be within ± 0.06 in. (2 mm).
Flanged size 12 in. (300 mm) & larger - "A" dimensions to be within ± 0.12 in. (3 mm).

EXTERNAL TYPE TRUNNION MOUNTED BALL VALVES Reduced Port ASME Class 600 & 900 (PN 100 & 150)



DIMENSIONS - ASME CLASS 600 (PN 100)

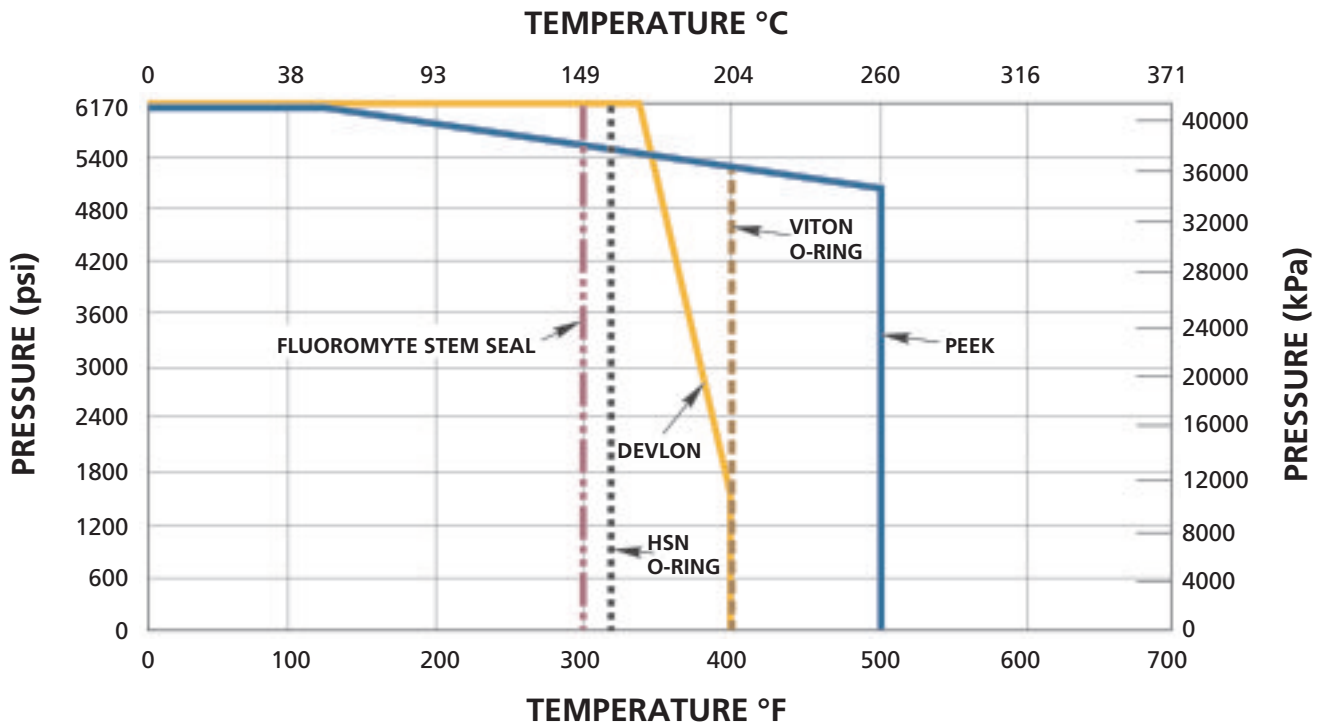
NPS in.	in.	A		B	C	D	F	F1	G	H	L	M	V	Z	C _v	Weight lb.
(DN)	(mm)	BW/RF	RTJ												(K _v)	(kg)
3 x 2	80 x 50	14.00	14.12	2.00	3.00	4.10	-	10.54	7.26	-	-	-	-	20.63	420	130
		(356)	(359)	(51)	(76)	(104)	-	(268)	(184)	-	-	-	-	(524)	(0.36)	(60)
4 x 3	100 x 80	17.00	17.12	3.00	4.00	5.40	11.32	12.76	9.47	11.00	14.55	3.16	12.00	20.63	770	260
		(432)	(435)	(76)	(102)	(137)	(288)	(324)	(240)	(280)	(370)	(80)	(305)	(524)	(0.67)	(118)
6 x 4	150 x 100	22.00	22.12	4.00	6.00	7.00	11.80	12.44	9.95	12.00	15.55	3.16	16.00	49.10	1800	475
		(559)	(562)	(102)	(153)	(178)	(300)	(316)	(253)	(305)	(395)	(80)	(406)	(1248)	(1.56)	(216)
8 x 6	200 x 150	26.00	26.12	6.00	8.00	8.25	13.11	-	10.75	14.75	19.40	4.63	20.00	-	3400	850
		(660)	(664)	(153)	(203)	(210)	(333)	-	(273)	(375)	(493)	(118)	(508)	-	(2.94)	(386)
10 x 8	250 x 200	31.00	31.12	8.00	10.00	10.00	16.38	-	14.00	18.93	23.87	4.72	30.00	-	5900	1546
		(787)	(791)	(203)	(254)	(254)	(416)	-	(356)	(481)	(606)	(120)	(762)	-	(5.10)	(702)
12 x 10	300 x 250	33.00	33.12	10.00	12.00	11.00	18.88	-	15.88	18.50	23.06	4.63	18.00	-	8000	2350
		(838)	(841)	(254)	(305)	(279)	(480)	-	(404)	(470)	(586)	(118)	(457)	-	(6.92)	(1065)
14 x 12	350 x 300	35.00	35.12	12.00	13.25	11.88	21.27	-	18.96	18.74	24.62	6.25	18.00	-	-	3265
		(889)	(892)	(305)	(337)	(302)	(540)	-	(482)	(476)	(625)	(159)	(457)	-	-	(1484)
16 x 12	400 x 300	39.00	39.12	12.00	15.25	13.50	21.27	-	18.96	18.74	24.62	6.25	18.00	-	-	3595
		(991)	(994)	(305)	(387)	(343)	(540)	-	(482)	(476)	(625)	(159)	(457)	-	-	(1634)

DIMENSIONS - ASME CLASS 900 (PN 150)

NPS in.	in.	A		B	C	D	F	F1	G	H	L	M	V	Z	C _v	Weight lb.
(DN)	(mm)	BW/RF	RTJ												(K _v)	(kg)
3 x 2	80 x 50	15.00	15.12	2.00	3.00	4.75	-	10.54	7.26	-	-	-	-	20.63	420	160
		(381)	(384)	(51)	(76)	(121)	-	(268)	(184)	-	-	-	-	(524)	(0.36)	(73)
4 x 3	100 x 80	18.00	18.12	3.00	4.00	5.75	11.32	12.76	9.47	11.00	14.55	3.16	12.00	20.63	770	295
		(457)	(460)	(76)	(102)	(146)	(288)	(324)	(240)	(280)	(370)	(80)	(305)	(524)	(0.67)	(134)
6 x 4	150 x 100	24.00	24.12	4.00	6.00	7.50	11.80	12.44	9.95	12.00	15.55	3.16	16.00	49.10	1800	538
		(610)	(613)	(102)	(153)	(190)	(300)	(316)	(253)	(305)	(395)	(80)	(406)	(1248)	(1.56)	(244)
8 x 6	200 x 150	29.00	29.12	6.00	8.00	9.25	13.50	-	11.13	16.75	21.39	4.63	24.00	-	3400	1050
		(737)	(740)	(153)	(203)	(235)	(343)	-	(283)	(425)	(543)	(118)	(610)	-	(2.94)	(477)
10 x 8	250 x 200	33.00	33.12	8.00	10.00	10.75	16.38	-	14.00	19.68	24.62	4.72	36.00	-	5900	1875
		(838)	(841)	(203)	(254)	(273)	(416)	-	(356)	(500)	(625)	(120)	(914)	-	(5.10)	(852)
12 x 10	300 x 250	38.00	38.12	10.00	12.00	12.00	19.31	-	16.31	22.17	26.75	4.63	36.00	-	8000	3130
		(965)	(968)	(254)	(305)	(305)	(490)	-	(414)	(563)	(679)	(118)	(914)	-	(6.92)	(1423)
14 x 12	350 x 300	40.50	40.88	12.00	12.75	12.63	22.31	-	20.00	20.61	26.50	6.25	24.00	-	-	4385
		(1029)	(1038)	(305)	(324)	(321)	(567)	-	(508)	(523)	(673)	(159)	(610)	-	-	(1993)
16 x 12	400 x 300	44.50	44.88	12.00	14.75	13.88	22.31	-	20.00	20.61	26.50	6.25	24.00	-	-	4795
		(1130)	(1140)	(305)	(375)	(353)	(567)	-	(508)	(523)	(673)	(159)	(610)	-	-	(2180)

NOTE: Flanged sizes 2 in. (50 mm) through 10 in. (250 mm) - "A" dimensions to be within ± 0.06 in. (2 mm).
Flanged size 12 in. (300 mm) & larger - "A" dimensions to be within ± 0.12 in. (3 mm).

TRUNNION MOUNTED BALL VALVES ASME Class 150 through 2500 (PN 20 through PN 420) Pressure/Temperature Ratings (Seat and Seals)*



* Consult ASME B16.34 for Body and Adapter Material Pressure/Temperature Ratings.

BREAKAWAY TORQUE DATA

Torque=foot-pounds

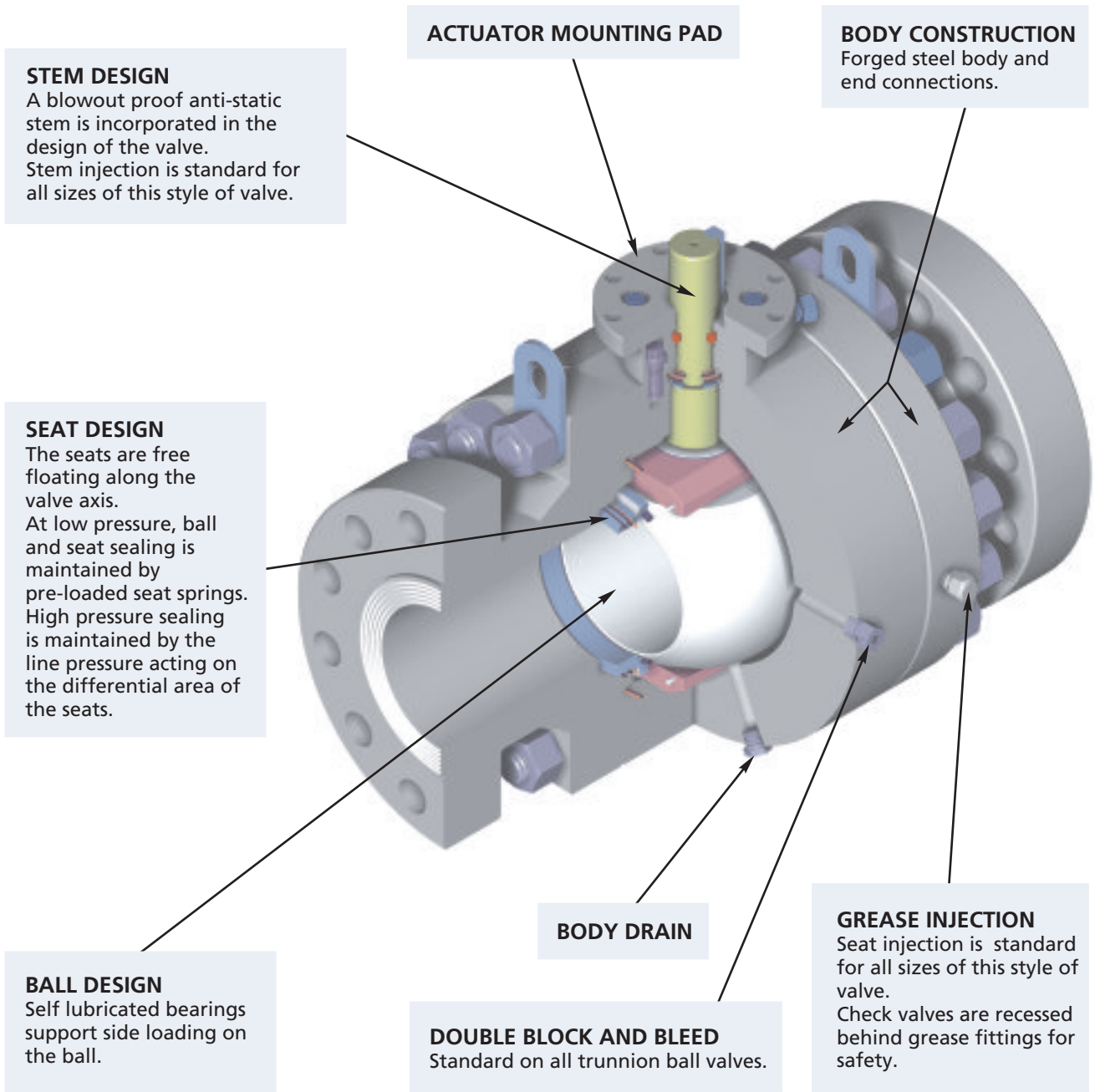
ASME CLASS (PN)	150 (20)	300 (50)	600 (100)	900 (150)	1500 (250)	2500 (420)	
Pressure (psi)	285	740	1480	2220	3705	6170	
Bore Size (DN)	Seat Material						
2 in./50 mm (50)	Devlon	-	-	100	125	162	290
3 in./80 mm (80)	Devlon	-	-	310	340	355	580
4 in./100 mm (100)	Devlon	-	-	330	400	720	775
6 in./150 mm (150)	Devlon	325	480	930	1200	1710	2175
8 in./200 mm (200)	Devlon	480	840	1800	2800	3580	4380
10 in./250 mm (250)	Devlon	1300	1600	2450	4500	4850	-
12 in./300 mm (300)	Devlon	1000	1650	3000	4600	6150	-

Torque values shown are to be used as a guide for actuator selection. All above torque values are based on dry gas. Additional factors such as media characteristics, number of cycles and temperature may require an additional safety factor. Please contact the actuator supplier/manufacturer for these factors.

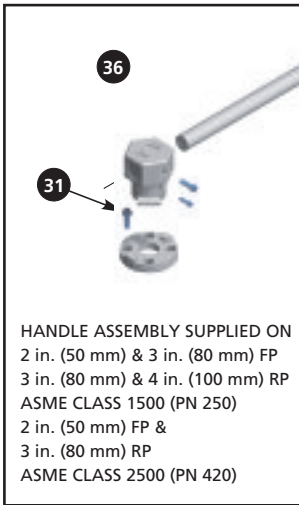
INTEGRAL TYPE TRUNNION MOUNTED BALL VALVES
2 in. Full Port through 16 in. Reduced Port (50 mm through 400 mm)
ASME Class 1500 & 2500 (PN 250 & 420)

STANDARD FEATURES

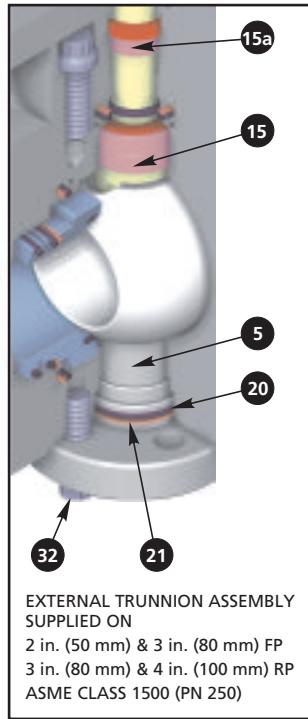
FIRE SAFE QUALIFIED TO API 607 4th EDITION.



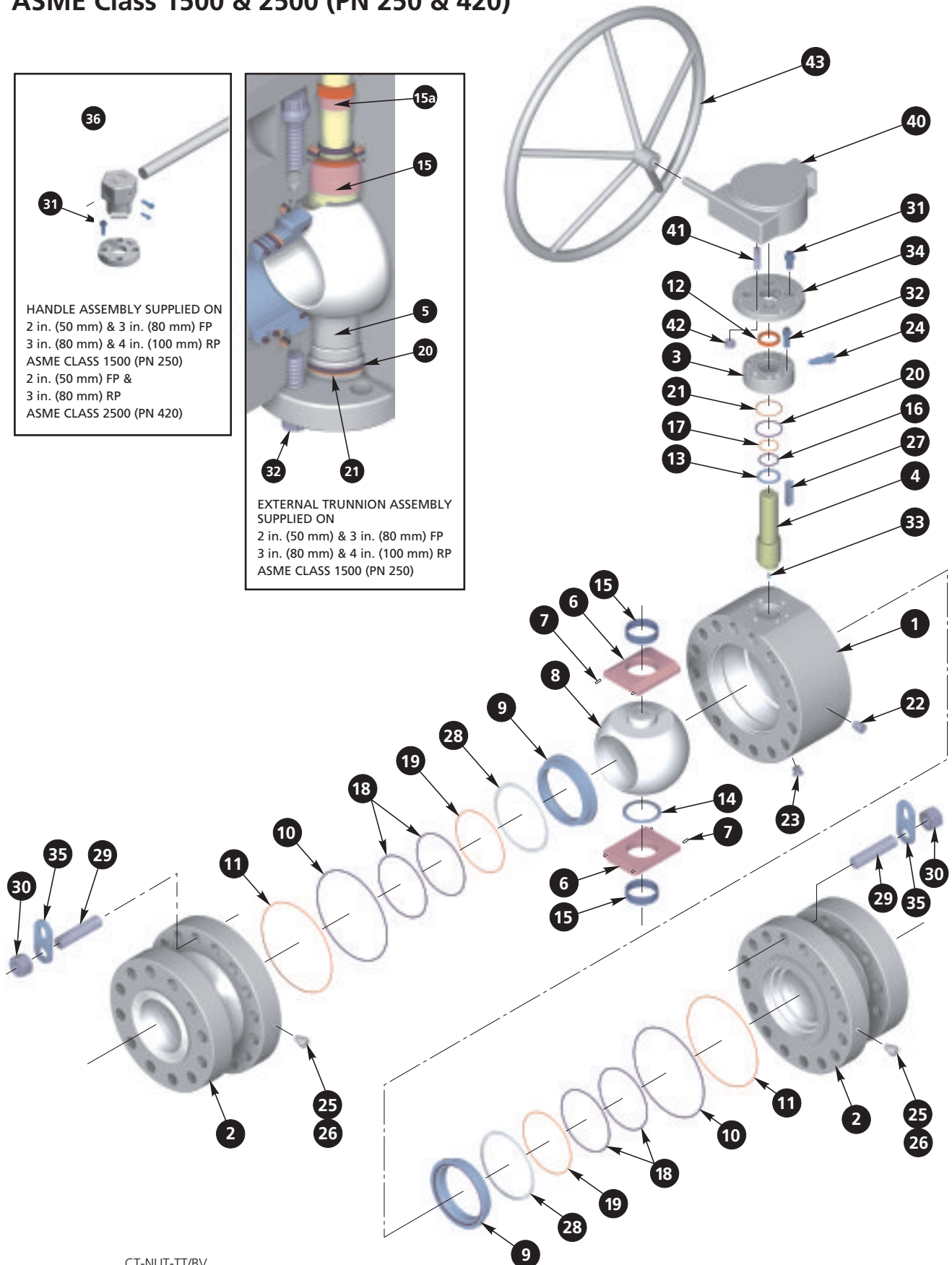
INTEGRAL TYPE TRUNNION MOUNTED BALL VALVES
2 in. Full Port through 16 in. Reduced Port (50 mm through 400 mm)
ASME Class 1500 & 2500 (PN 250 & 420)



HANDLE ASSEMBLY SUPPLIED ON
 2 in. (50 mm) & 3 in. (80 mm) FP
 3 in. (80 mm) & 4 in. (100 mm) RP
 ASME CLASS 1500 (PN 250)
 2 in. (50 mm) FP &
 3 in. (80 mm) RP
 ASME CLASS 2500 (PN 420)



EXTERNAL TRUNNION ASSEMBLY
 SUPPLIED ON
 2 in. (50 mm) & 3 in. (80 mm) FP
 3 in. (80 mm) & 4 in. (100 mm) RP
 ASME CLASS 1500 (PN 250)



INTEGRAL TYPE TRUNNION MOUNTED BALL VALVES MATERIALS LIST - ASME Class 1500 & 2500 (PN 250 & 420)

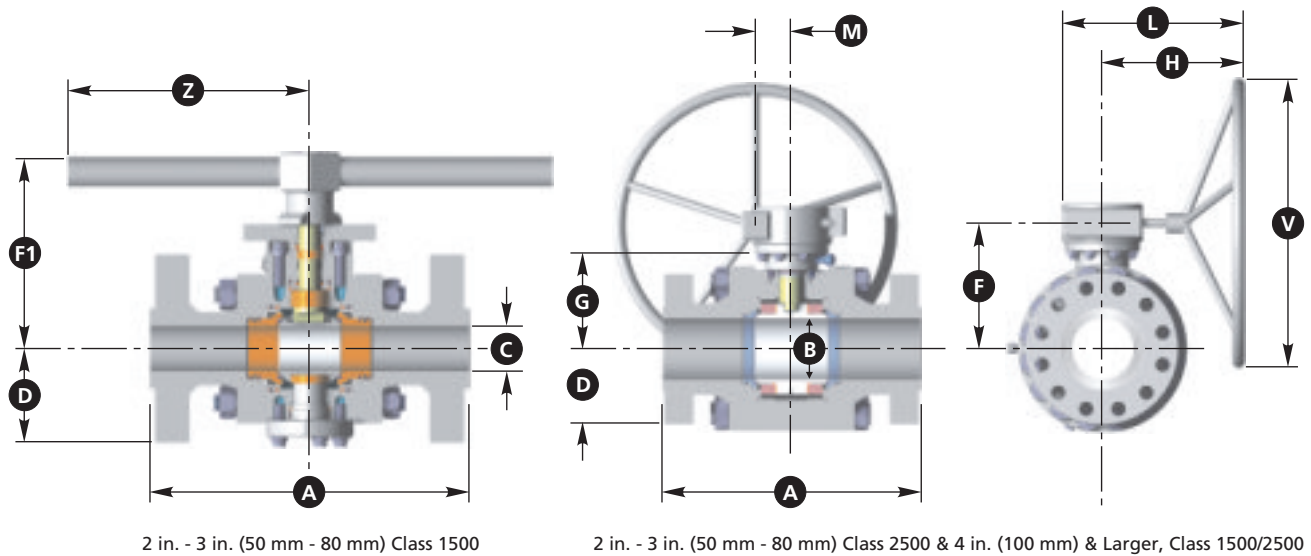
ITEM	PART		SOUR & LOW TEMP	STAINLESS STEEL -50°F (-46°C)
1	Body		ASTM A350 LF2	ASTM A479 316/A182 F316
2	End Caps		ASTM A350 LF2	ASTM A479 316/A182 F316
3	Bonnet		ASTM A350 LF2	ASTM A479 316
■ 4	Stem	ASME 2500, 2 in. FP All Others	ASTM A564 17-4PH H1150M ASTM A322 4130, 1 mil ENC	ASTM A564 17-4PH H1150M ASTM A564 17-4PH H1150M
■ 5	Trunnion	ASME 1500, 2 & 3 in. FP	ASTM A350 LF2, 1 mil ENC	ASTM A564 17-4PH H1150M
6*	Bearing Plate		Carbon Steel	Stainless Steel
7*	Bearing Plate Dowel Pin		Carbon Steel	Stainless Steel
■ 8	Ball	ASME 1500, 2 & 3 in. FP All Others ASME 1500 & 2500	ASTM A350 LF2, 1 mil ENC AISI A322 4140, 1 Mil ENC	ASTM A351 Gr. CF8M ASTM A351 Gr. CD4MCu
■● 9	Seat Assembly	ASME 1500, 10 & 12 in. FP ASME 2500, 3, 4, 6 & 8 in. FP All Others	ASTM A322 4130, 1 mil ENC Devlon ASTM A322 4130, 1 mil ENC Devlon ASTM A350 LF2, 1 mil ENC Devlon	ASTM A564 17-4PH H1150M Devlon ASTM A564 17-4PH H1150M Devlon ASTM A564 17-4PH H1150M Devlon
■● 10	Body O-Ring Seal		HNBR	HNBR
■● 11	Body Back-Up Ring		Buna 90 Durometer	Buna 90 Durometer
■● 12	Stem Polypak Seal		Fluoromyte/SS	Fluoromyte/SS
■● 13	Thrust Bearing (Stem)		ASTM B148 9C Aluminum Bronze	ASTM B148 9C Aluminum Bronze
■● 14	Thrust Bearing (Ball)		ASTM B148 9C Aluminum Bronze	ASTM B148 9C Aluminum Bronze
■15/15a	Stem/Trunnion Bearing		Carbon Steel - Type DU	Carbon Steel - Type DU
■● 16	Stem O-Ring Seal		HNBR	HNBR
■● 17	Stem Back-Up Ring		Buna 90 Durometer	Buna 90 Durometer
■● 18	Seat O-Ring Seal		HNBR	HNBR
■● 19	Seat Back-Up Ring		Buna 90 Durometer	Buna 90 Durometer
■● 20	Trunnion*/Bonnet O-Ring Seal		HNBR	HNBR
■● 21	Trunnion*/Bonnet Back-Up Ring		Buna 90 Durometer	Buna 90 Durometer
22	Body Bleed Valve		Stainless Steel	Stainless Steel
23	Body Drain Plug		Stainless Steel	Stainless Steel
24	Stem Injection Buttonhead		Stainless Steel	Stainless Steel
25	Seat Injection Buttonhead		Stainless Steel	Stainless Steel
26	Seat Buried Check Valve		Stainless Steel	Stainless Steel
27	Key		Carbon Steel	Stainless Steel
■ 28	Seat Wave Spring		Inconel X-750	Inconel X-750
29	Body Studs		ASTM A320 L7M	ASTM A320 L7M, Coated
30	Body Nuts		ASTM A194 L7M	ASTM A194 L7M, Coated
31	Mounting Plate Cap Screws		ASTM A320 L7M	ASTM A320 L7M, Coated
32	Trunnion*/Bonnet Cap Screws		ASTM A320 L7M	ASTM A320 L7M, Coated
■ 33	Spring (Anti-Static)		Inconel X-750	Inconel X-750
34	Mounting Plate		ASTM A350 LF2	ASTM A479 316
35	Lifting Lug/Eye Bolt	ASME 1500, 4 in. & Larger ASME 2500, 3 in. & Larger	Carbon Steel Carbon Steel	Carbon Steel Carbon Steel
36	Handle Nut/Handle Assembly		Carbon Steel	Carbon Steel
37	Pipe Handle		Carbon Steel	Carbon Steel
38	Hex Head Screw		Carbon Steel, Plated	Carbon Steel, Plated
39	Hex Head Screw		Carbon Steel, Plated	Carbon Steel, Plated
40	Gear Operator		Cast Steel	Cast Steel
41	Gear Operator Studs Gear Operator Cap Screws		Carbon Steel Carbon Steel	Carbon Steel, Coated Carbon Steel, Plated
42	Gear Operator Nuts Gear Operator Lock Washers		Carbon Steel Stainless Steel	Carbon Steel, Coated Stainless Steel
43	Handwheel		Carbon Steel	Carbon Steel

- Major repair kit.
- Minor repair kit.

* External Trunnion used in 2 in. (50 mm), 3 in. (80 mm) Full Port, 3 in. (80 mm) & 4 in. (100 mm) Reduced Port ASME Class 1500 (PN 250) Valves.
Cameron, Valves & Measurement reserves the right to substitute materials listed above with alternate material approved for designated service.

INTEGRAL TYPE TRUNNION MOUNTED BALL VALVES

Full Port ASME Class 1500 & 2500 (PN 250 & 420)



2 in. - 3 in. (50 mm - 80 mm) Class 1500

2 in. - 3 in. (50 mm - 80 mm) Class 2500 & 4 in. (100 mm) & Larger, Class 1500/2500

DIMENSIONS - ASME CLASS 1500 (PN 250)

NPS in. (DN)	in. (mm)	A		B	D	F	F1	G	H	L	M	V	Z	C _v (K _v)	Weight lb. (kg)
		BW/RF	RTJ												
2 (50)	14.50 (268)	14.62 (371)	2.01 (51)	4.25 (108)	7.33 (186)	8.88 (226)	5.63 (143)	11.00 (279)	14.28 (363)	2.56 (65)	12.00 (305)	20.63 (524)	-	-	169 (77)
3 (80)	18.50 (470)	18.62 (473)	3.01 (76)	5.25 (133)	9.16 (233)	10.65 (271)	7.38 (187)	11.00 (279)	14.55 (370)	3.16 (80)	16.00 (406)	34.63 (880)	-	-	332 (151)
4 (100)	21.50 (546)	21.62 (549)	4.01 (102)	6.13 (156)	10.53 (267)	-	8.72 (221)	11.00 (279)	14.55 (370)	3.16 (80)	16.00 (406)	-	-	-	505 (229)
6 (150)	27.75 (705)	28.00 (711)	5.76 (146)	7.75 (197)	13.22 (336)	-	10.84 (275)	17.69 (449)	22.63 (575)	4.72 (120)	36.00 (914)	-	-	-	1206 (547)
8 (200)	32.75 (832)	33.13 (841)	7.63 (194)	9.50 (241)	15.86 (403)	-	13.25 (337)	20.22 (514)	25.83 (656)	5.16 (131)	42.00 (1067)	-	-	-	2147 (974)
10 (250)	39.00 (991)	39.38 (1000)	9.51 (241)	11.50 (292)	17.29 (439)	-	14.68 (373)	20.22 (514)	25.83 (656)	5.16 (131)	42.00 (1067)	-	-	-	3177 (1441)
12 (300)	44.50 (1130)	45.12 (1146)	11.38 (289)	13.25 (336)	20.28 (515)	-	17.69 (449)	22.44 (570)	28.44 (722)	7.30 (185)	36.00 (914)	-	-	-	4833 (2192)

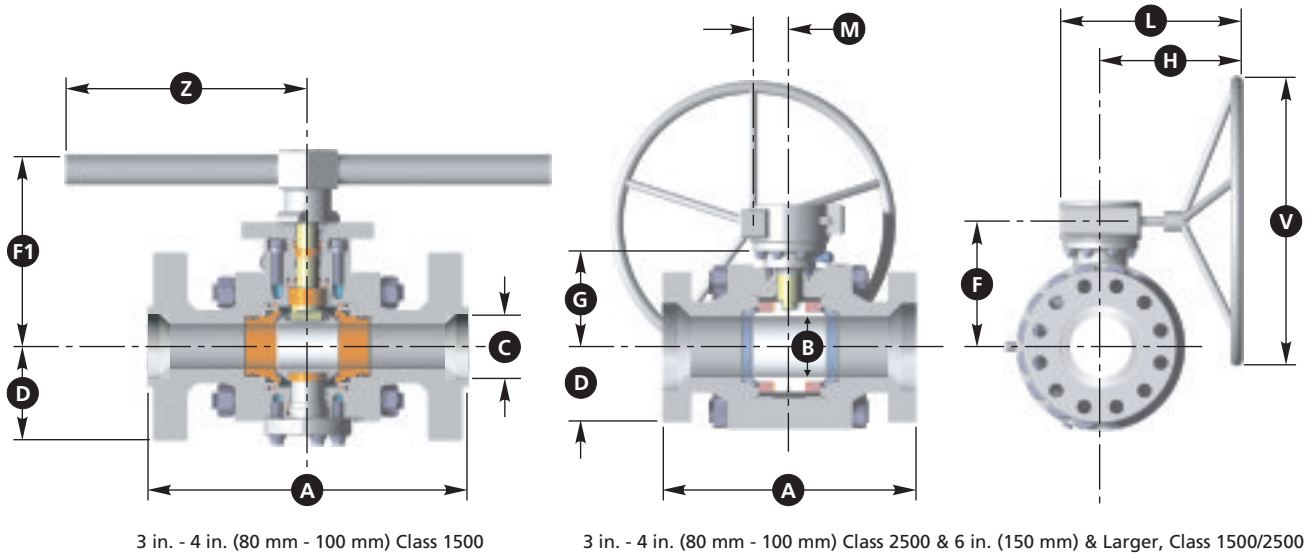
DIMENSIONS - ASME CLASS 2500 (PN 420)

NPS in. (DN)	in. (mm)	A		B	D	F	F1	G	H	L	M	V	Z	C _v (K _v)	Weight lb. (kg)
		BW/RF	RTJ												
2 (50)	17.75 (451)	17.87 (454)	1.76 (44)	4.63 (118)	8.87 (225)	-	7.09 (180)	11.00 (279)	14.28 (363)	2.56 (65)	12.00 (305)	-	-	-	308 (140)
3 (80)	22.75 (578)	23.00 (584)	2.51 (64)	6.00 (152)	10.17 (258)	-	8.31 (211)	11.00 (279)	14.55 (370)	3.16 (80)	16.00 (406)	-	-	-	541 (245)
4 (100)	26.50 (673)	26.88 (683)	3.51 (89)	7.00 (178)	12.42 (315)	-	10.09 (256)	13.00 (330)	17.64 (448)	4.63 (118)	16.00 (406)	-	-	-	980 (445)
6 (150)	36.00 (914)	36.50 (927)	5.26 (133)	9.50 (241)	15.61 (396)	-	13.00 (330)	17.69 (449)	22.63 (575)	4.72 (120)	36.00 (914)	-	-	-	2241 (1017)
8 (200)	40.25 (1022)	40.87 (1038)	7.13 (181)	10.88 (276)	17.11 (435)	-	14.50 (368)	20.22 (514)	25.83 (656)	5.16 (131)	42.00 (1067)	-	-	-	3285 (1490)

NOTE: Flanged sizes 2 in. (50 mm) through 10 in. (250 mm) - "A" dimensions to be within ± 0.06 in. (2 mm).
Flanged size 12 in. (300 mm) & larger - "A" dimensions to be within ± 0.12 in. (3 mm).

INTEGRAL TYPE TRUNNION MOUNTED BALL VALVES

Reduced Port ASME Class 1500 & 2500 (PN 250 & 420)



DIMENSIONS - ASME CLASS 1500 (PN 250)

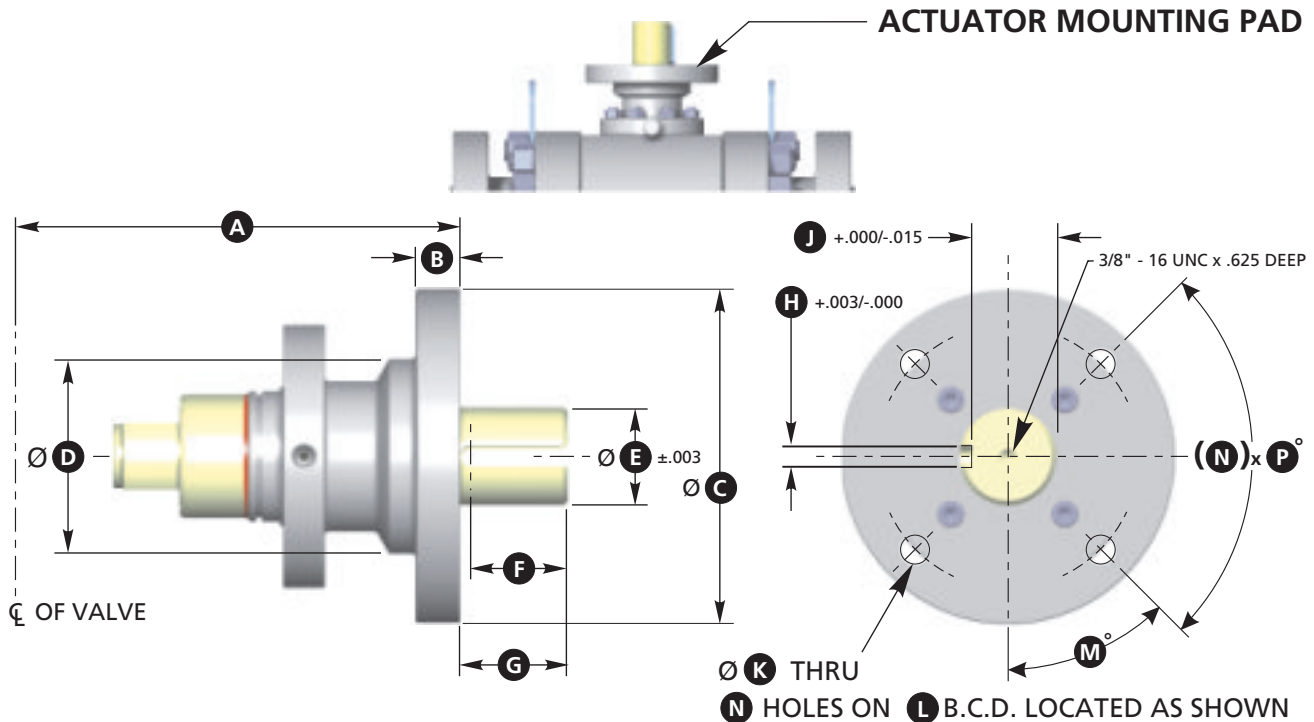
NPS in.	in.	A		B	C	D	F	F1	G	H	L	M	V	Z	C _v	Weight lb.
(DN)	(mm)	BW/RF	RTJ												(K _v)	(kg)
3 x 2	80 x 50	18.50	18.62	2.01	3.01	5.25	7.33	8.88	4.88	11.00	14.28	2.56	12.00	20.63	-	215
		(470)	(473)	(51)	(76)	(133)	(186)	(226)	(124)	(279)	(363)	(65)	(305)	(524)	-	(98)
4 x 3	100 x 80	21.50	21.62	3.01	4.01	6.13	9.16	10.65	6.50	11.00	14.55	3.16	16.00	34.63	-	413
		(546)	(549)	(76)	(102)	(156)	(233)	(271)	(165)	(279)	(370)	(80)	(406)	(880)	-	(187)
6 x 4	150 x 100	27.75	28.00	4.01	5.76	7.75	10.53	-	7.75	11.00	14.55	3.16	16.00	-	-	709
		(705)	(711)	(102)	(146)	(197)	(267)	-	(197)	(279)	(370)	(80)	(406)	-	-	(322)
8 x 6	200 x 150	32.75	33.13	5.76	7.63	9.50	13.22	-	9.87	17.69	22.63	4.72	36.00	-	-	1460
		(832)	(841)	(146)	(194)	(241)	(336)	-	(251)	(449)	(575)	(120)	(914)	-	-	(662)
10 x 8	250 x 200	39.00	39.38	7.63	9.51	11.50	15.86	-	12.12	20.22	25.83	5.16	42.00	-	-	2614
		(991)	(1000)	(194)	(241)	(292)	(403)	-	(308)	(514)	(656)	(131)	(1067)	-	-	(1186)
12 x 10	300 x 250	44.50	45.12	9.51	11.38	13.25	17.29	-	13.55	20.22	25.83	5.16	42.00	-	-	3750
		(1130)	(1146)	(241)	(289)	(336)	(439)	-	(344)	(514)	(656)	(131)	(1067)	-	-	(1701)
16 x 12	400 x 300	54.50	55.38	11.38	14.26	16.25	20.28	-	16.44	22.44	28.44	7.30	36.00	-	-	6196
		(1384)	(1407)	(289)	(362)	(413)	(515)	-	(418)	(570)	(722)	(185)	(914)	-	-	(2810)

DIMENSIONS - ASME CLASS 2500 (PN 420)

NPS in.	in.	A		B	C	D	F	F1	G	H	L	M	V	Z	C _v	Weight lb.
(DN)	(mm)	BW/RF	RTJ												(K _v)	(kg)
3 x 2	80 x 50	22.75	23.00	1.76	2.51	6.00	8.87	-	6.25	11.00	14.28	2.56	12.00	-	-	405
		(578)	(584)	(44)	(64)	(152)	(225)	-	(159)	(279)	(363)	(65)	(305)	-	-	(184)
4 x 3	100 x 80	26.50	26.88	2.51	3.51	7.00	10.17	-	7.45	11.00	14.55	3.16	16.00	-	-	641
		(673)	(683)	(64)	(89)	(178)	(258)	-	(189)	(279)	(370)	(80)	(406)	-	-	(291)
6 x 4	150 x 100	36.00	36.50	3.51	5.26	9.50	12.42	-	8.94	13.00	17.64	4.63	16.00	-	-	1441
		(914)	(927)	(89)	(133)	(241)	(315)	-	(227)	(330)	(448)	(118)	(406)	-	-	(654)
8 x 6	200 x 150	40.25	40.87	5.26	7.13	10.88	15.61	-	11.75	17.69	22.63	4.72	36.00	-	-	2633
		(1022)	(1038)	(133)	(181)	(276)	(396)	-	(298)	(449)	(575)	(120)	(914)	-	-	(1194)
10 x 8	250 x 200	50.00	50.88	7.13	8.88	13.25	17.11	-	13.25	20.22	25.83	5.16	42.00	-	-	4354
		(1270)	(1292)	(181)	(226)	(337)	(435)	-	(337)	(514)	(656)	(131)	(1067)	-	-	(1975)

NOTE: Flanged sizes 2 in. (50 mm) through 10 in. (250 mm) - "A" dimensions to be within ± 0.06 in. (2 mm).
 Flanged size 12 in. (300 mm) & larger - "A" dimensions to be within ± 0.12 in. (3 mm).

EXTERNAL TYPE TRUNNION MOUNTED BALL VALVES ASME Class 150 through 900 (PN 20 through 150) Actuator Mounting Dimensions



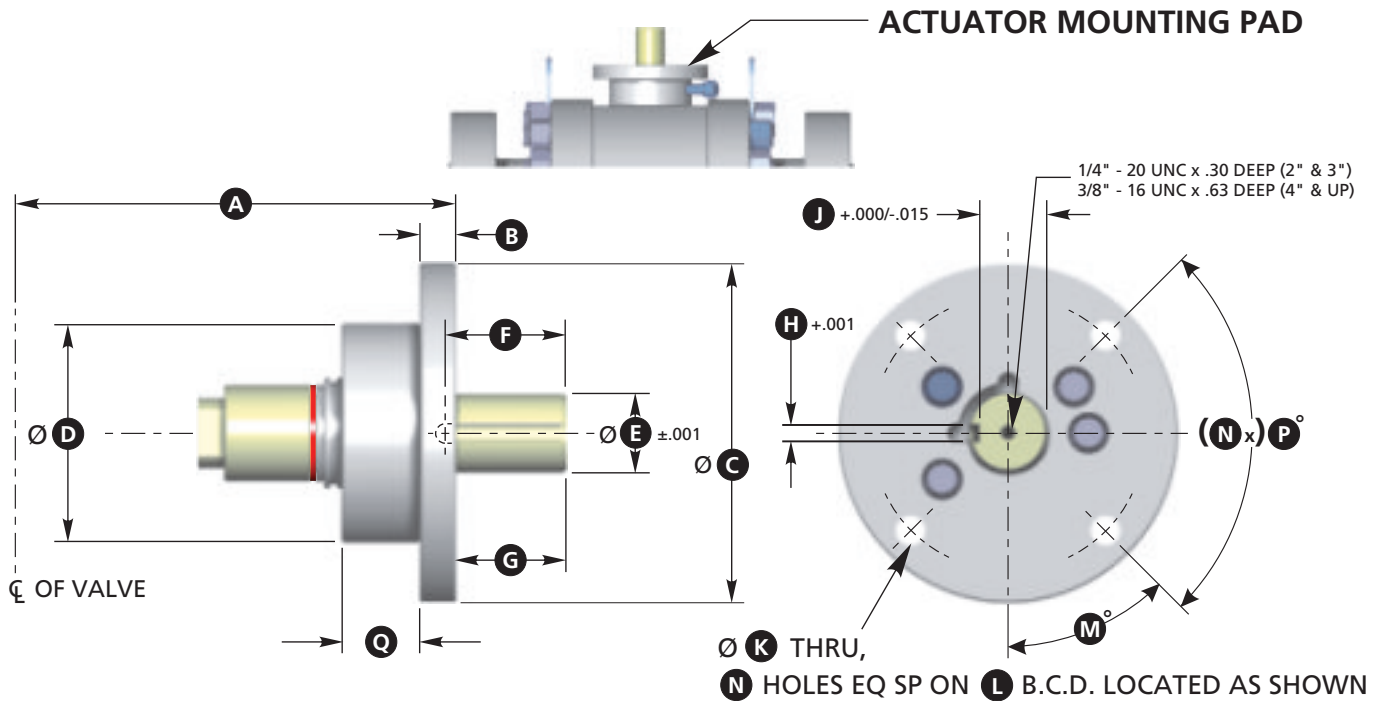
DIMENSIONS

SIZE in. (DN)	ASME CLASS	PN	in. A (mm)	B	C	D	E	F	G	H	J	K	L	M	N	P
2 (50)	600/900	(100/150)	7.25 (184.2)	0.50 (12.7)	6.00 (152.4)	3.88 (98.5)	1.001 (25.4)	1.125 (28.6)	1.26 (32.0)	0.250 (6.4)	0.851 (21.7)	0.532 (13.5)	5.00 (127.0)	45	4	90
3 (80)	600/900	(100/150)	9.46 (240.3)	0.53 (13.5)	6.50 (165.1)	4.49 (114.0)	1.247 (31.7)	1.217 (30.9)	1.38 (35.1)	0.314 (7.98)	1.067 (27.1)	0.532 (13.5)	5.50 (139.7)	45	4	90
4 (100)	600/900	(100/150)	9.95 (252.7)	0.625 (15.9)	6.50 (165.1)	4.38 (111.3)	1.499 (38.0)	2.438 (61.9)	2.00 (50.8)	0.375 (9.53)	1.289 (32.7)	0.563 (14.3)	5.50 (139.7)	45	4	90
6 (150)	150/300	(20/50)	10.51 (266.9)	0.875 (22.2)	6.50 (165.1)	4.00 (101.6)	1.500 (38.1)	1.500 (38.1)	1.88 (47.8)	0.375 (9.53)	1.289 (32.7)	0.532 (13.5)	5.50 (139.7)	45	4	90
	600	(100)	10.75 (273.0)	0.875 (22.2)	7.00 (177.8)	4.88 (124.0)	2.000 (50.8)	2.000 (50.8)	2.25 (57.2)	0.500 (12.7)	1.718 (43.6)	0.563 (14.3)	6.00 (152.4)	45	4	90
	900	(150)	11.13 (282.7)	0.875 (22.2)	7.00 (177.8)	4.88 (124.0)	2.000 (50.8)	2.000 (50.8)	2.25 (57.2)	0.500 (12.7)	1.718 (43.6)	0.563 (14.3)	6.00 (152.4)	45	4	90
8 (200)	150/300	(20/50)	12.00 (304.8)	0.875 (22.2)	7.00 (177.8)	4.50 (114.3)	2.000 (50.8)	2.000 (50.8)	2.38 (60.5)	0.500 (12.7)	1.718 (43.6)	0.532 (13.5)	6.00 (152.4)	45	4	90
	600/900	(100/150)	14.00 (355.6)	1.25 (31.8)	9.50 (241.3)	5.50 (139.7)	2.750 (69.9)	2.750 (69.9)	3.06 (77.7)	0.625 (15.88)	2.402 (61.0)	0.813 (20.7)	7.50 (190.5)	45	4	90
10 (250)	150/300	(20/50)	13.50 (342.9)	1.12 (28.4)	9.50 (241.3)	4.75 (120.7)	2.125 (54.0)	2.250 (57.2)	2.63 (66.8)	0.500 (12.7)	1.845 (46.9)	0.813 (20.7)	7.50 (190.5)	45	4	90
	600	(100)	15.88 (403.4)	1.15 (29.2)	9.50 (241.3)	6.00 (152.4)	2.875 (73.0)	3.000 (76.2)	3.44 (87.4)	0.750 (19.05)	2.450 (62.2)	0.781 (19.8)	8.00 (203.2)	45	4	90
	900	(150)	16.31 (414.3)	1.15 (29.2)	9.50 (241.3)	6.00 (152.4)	2.875 (73.0)	3.000 (76.2)	3.44 (87.4)	0.750 (19.05)	2.450 (62.2)	0.781 (19.8)	8.00 (203.2)	45	4	90
12 (300)	150/300	(20/50)	16.63 (422.4)	1.13 (28.7)	9.50 (241.3)	5.25 (133.4)	2.125 (54.0)	2.250 (57.2)	3.00 (76.2)	0.500 (12.7)	1.845 (46.9)	0.813 (20.7)	7.50 (190.5)	45	4	90
	600	(100)	18.96 (481.6)	1.40 (35.7)	11.00 (279.4)	6.50 (165.1)	3.313 (84.2)	3.500 (88.9)	3.90 (99.1)	0.875 (22.23)	2.816 (71.5)	0.781 (19.8)	9.25 (234.9)	22.5	8	45
	900	(150)	20.00 (508.0)	1.25 (31.8)	10.87 (276.1)	7.77 (197.4)	3.313 (84.2)	3.500 (88.9)	4.00 (101.6)	0.875 (22.23)	2.816 (71.5)	0.781 (19.8)	9.25 (234.9)	22.5	8	45

INTEGRAL TYPE TRUNNION MOUNTED BALL VALVES

ASME Class 1500 & 2500 (PN 250 & 420)

Actuator Mounting Dimensions



DIMENSIONS

SIZE in. (DN)	ASME CLASS (PN)	in. A (mm)	B	C	D	E	F	G	H	J	K	L	M	N	P	Q
2 (50)	1500 (250)	5.63 (143.0)	0.75 (19.1)	6.00 (152.4)	3.94 (100.1)	0.998 (25.3)	1.50 (38.1)	1.25 (31.8)	0.250 (6.4)	0.851 (21.6)	0.531 (13.5)	5.00 (127.0)	45	4	90	1.63 (41.4)
	2500 (420)	6.97 (176.9)	0.84 (21.3)	6.50 (165.1)	4.38 (111.3)	1.125 (28.6)	2.13 (54.1)	1.80 (45.7)	0.250 (6.4)	0.986 (25.0)	0.531 (13.5)	5.50 (139.7)	45	4	90	2.00 (50.8)
3 (80)	1500 (250)	7.38 (187.5)	0.88 (22.4)	6.50 (165.1)	4.38 (111.3)	1.248 (31.7)	1.69 (42.9)	1.38 (35.1)	0.312 (7.9)	1.068 (27.1)	0.531 (13.5)	5.50 (139.7)	45	4	90	1.75 (44.5)
	2500 (420)	8.31 (211.1)	0.94 (23.9)	7.00 (177.8)	5.50 (139.7)	1.498 (38.0)	2.75 (69.9)	2.50 (63.5)	0.375 (9.5)	1.285 (32.6)	0.531 (13.5)	5.50 (139.7)	45	4	90	2.12 (53.8)
4 (100)	1500 (250)	8.72 (221.5)	0.97 (24.6)	6.50 (165.1)	5.25 (133.4)	1.748 (44.4)	2.31 (58.7)	2.02 (51.3)	0.375 (9.5)	1.530 (38.9)	0.531 (13.5)	5.50 (139.7)	45	4	90	2.12 (53.8)
	2500 (420)	10.09 (256.3)	1.12 (28.4)	9.25 (235.0)	6.75 (171.5)	1.998 (50.7)	3.00 (76.2)	2.63 (66.8)	0.375 (9.5)	1.790 (45.5)	0.781 (19.8)	7.50 (190.5)	45	4	90	2.22 (56.4)
6 (150)	1500 (250)	10.84 (275.3)	0.97 (24.6)	9.25 (235.0)	5.94 (150.9)	2.123 (53.9)	3.25 (82.6)	3.00 (76.2)	0.500 (12.7)	1.840 (46.7)	0.781 (19.8)	7.50 (190.5)	45	4	90	2.12 (53.8)
	2500 (420)	13.00 (330.2)	1.25 (31.8)	10.75 (273.1)	7.50 (190.5)	2.373 (60.3)	3.88 (98.6)	3.63 (92.2)	0.625 (15.9)	2.020 (51.3)	0.813 (20.7)	9.25 (235.0)	22.5	8	45	2.75 (69.9)
8 (200)	1500 (250)	13.25 (336.6)	1.13 (28.7)	9.25 (235.0)	6.50 (165.1)	2.373 (60.3)	3.25 (82.6)	3.00 (76.2)	0.625 (15.9)	2.021 (51.3)	0.781 (19.8)	8.00 (203.2)	22.5	8	45	2.12 (53.8)
	2500 (420)	14.50 (368.3)	1.25 (31.8)	11.50 (292.1)	8.50 (215.9)	2.748 (69.8)	4.50 (114.3)	4.27 (108.5)	0.750 (19.1)	2.320 (58.9)	0.813 (20.7)	10.00 (254.0)	22.5	8	45	3.00 (76.2)
10 (250)	1500 (250)	14.68 (372.9)	1.13 (28.7)	10.69 (271.5)	7.00 (177.8)	2.373 (60.3)	3.88 (98.6)	3.63 (92.2)	0.625 (15.9)	2.020 (51.3)	0.813 (20.7)	9.25 (235.0)	22.5	8	45	2.12 (53.8)
12 (300)	1500 (250)	17.69 (449.3)	1.25 (31.8)	10.69 (271.5)	7.75 (196.9)	2.748 (69.8)	4.50 (114.3)	4.25 (108.0)	0.750 (19.1)	2.320 (58.9)	0.813 (20.7)	9.25 (235.0)	22.5	8	45	2.75 (69.9)

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