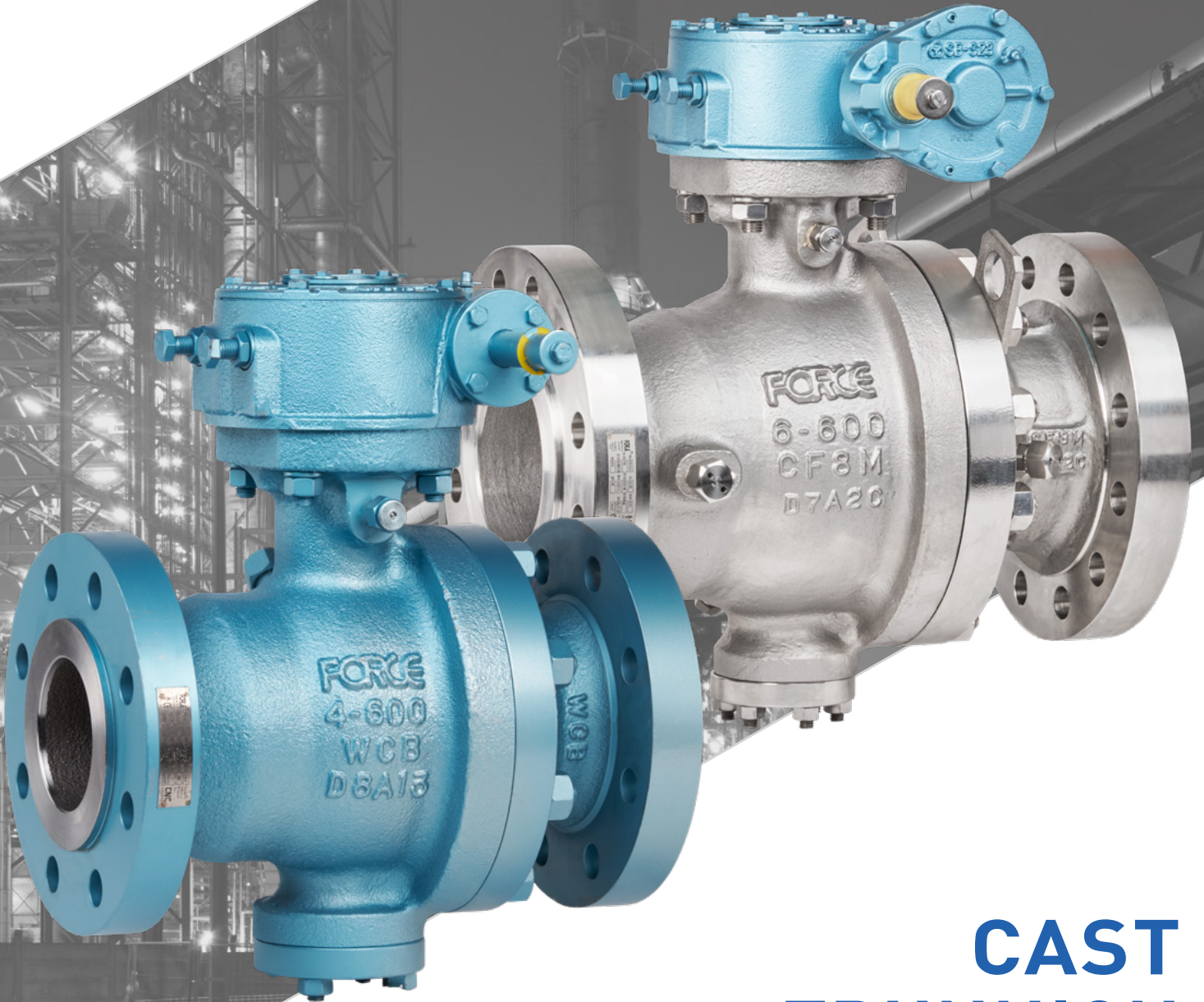


CNC

FLOW CONTROL



CAST TRUNNION MOUNTED BALL VALVE

FORCE[®]

FORCE is a product brand of CNC Flow Control



ABOUT CNC FLOW CONTROL

CNC Flow Control is headquartered in Houston, Texas with multiple other locations in the U.S. and Canada. Our company unifies several trusted valve and flow line brands that have been serving numerous industries in North America for nearly three decades. From long range projects to same-day delivery, our diverse team is dedicated to understanding customers' needs in order to ensure exceptional service and the best solutions. Our extensive product portfolio ranges from commodity products like hammer unions and needle valves, to highly engineered products like API 6D trunnion mounted ball valves.

Quality assurance is critical to CNC Flow Control's process and we hold multiple internationally recognized quality standards certifications and management system. We are dedicated to understanding our customers' needs to ensure exceptional service by offering an in-house engineering and product management team, an extremely large product portfolio and extensive inventory to support same day shipments.



ABOUT FORCE

FORCE® Valve quality is guaranteed by strictly adhering to ISO 9001 and API Q1 audited quality standards. Dedicated to providing the highest quality valve products to meet customers' expectations, **FORCE**® Valves are manufactured in strict accordance with all applicable ASME, API and other standards.

Every valve is tested and documented to API 6D testing requirements and manufactured to comply with NACE standards with complete MTR traceability.

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DESIGN STANDARDS

Shell Wall Thickness

Class 150, 300, 60.....	ASME B16.34 & API 6D
Pressure Temp Rating.....	ASME B16.34
Pressure Test.....	API 6D
Face-to-Face Dimensions.....	ASME B16.10
End Flange Dimensions.....	ASME B16.5
Fire Safety Test.....	API 607 & API 6FA
General Design.....	ASME B16.34 / API 6D
Material Requirements.....	NACE MR0175 150 15156-1
Quality Control.....	API Q1 and ISO 9001

CERTIFICATES

- ISO 9001-2008 Certificate of Conformance issued by ABS Quality Evaluations
- API 6D Monogram License Number 6D-0299 issued by API
- BS 6755 Part 2 (1987) Testing of Valves incorporating API 607, and API 6FA Fire Testing issued by Lloyd's Register
- BS 6755 Part 2 (1987) Testing of Valves incorporating API 607, 4th Edition, and API 6FA Fire Testing issued by Moody International LTD Korea
- Certificate of Witness of Fire Test number 123476-0310 issued by ABS Consulting
- Certificate of Quality System Approval No. CE-PED-H-KCI. 001-08-KOR covering Floating and Trunnion Ball Valves issued by BUREAU VERITAS

TRUNNION MOUNTED BALL VALVE



FEATURES

- Full Bore & Reduced Bore
- Trunnion Mounted Ball Design
- Locking Device
- Blow-Out Proof Stem
- Flexible Cavity Relief Seats
- Anti-Static Grounding Device
- Metal to Metal Construction
- Lip Seal or Plate Seal
- NACE Standard
- Fire Safe Design
- Two Radius of Ball Edge for Long Life Cycle
- ISO Mounting Pad

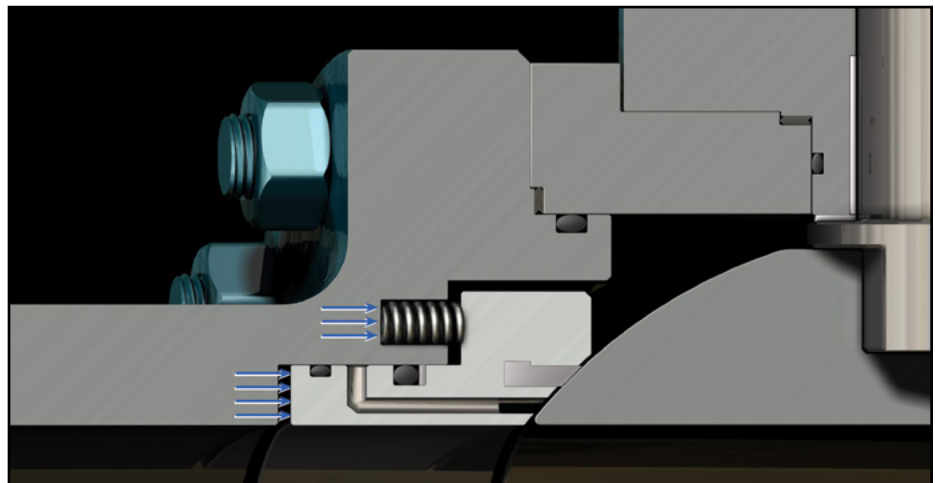
APPLICABLE SEAT MATERIALS

- TFM1600
- PEEK Seat
- Devlon®
- Other materials can be supplied upon request

TRUNNION BALL VALVE FEATURES

Seat To Ball Sealing

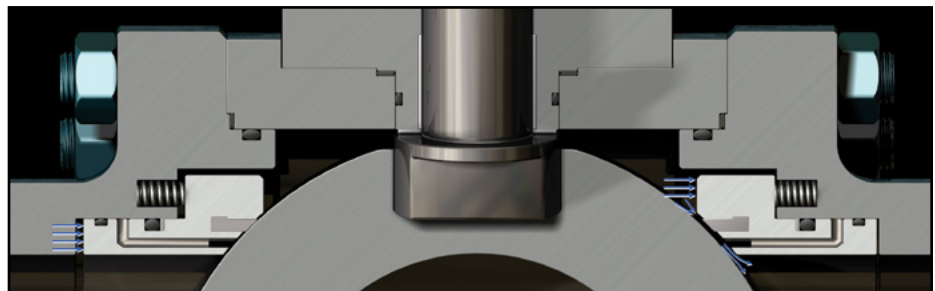
Soft seats are standard. Seat inserts of synthetic material such as RTFE, Devlon, or PEEK are contained within a one-piece metal seat ring. With no, or very low line pressure, sealing between the seats and ball is achieved by the seat springs. As line pressure increases, it begins to work in conjunction with the seat springs to assure the integrity of the seal.



Self Relieving Seat

This standard feature is designed to prevent excessive pressure buildup within the valve by automatically relieving pressure when body cavity pressure exceeds 133% of pressure rating.

Double Piston Seat is also available as an option.

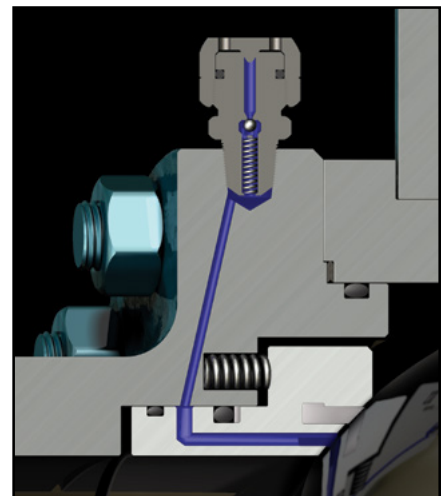
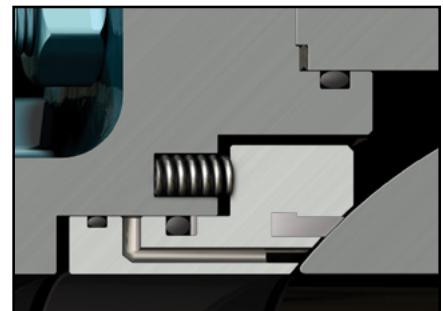


Seat To Body Sealing

Two different types of seals are used to isolate the line pressure from the body cavity. Primary sealing is accomplished by an elastomeric seal such as Viton® or HNBR, and secondary firesafe sealing is accomplished by a graphite seal ring.

Sealant Injection Fittings

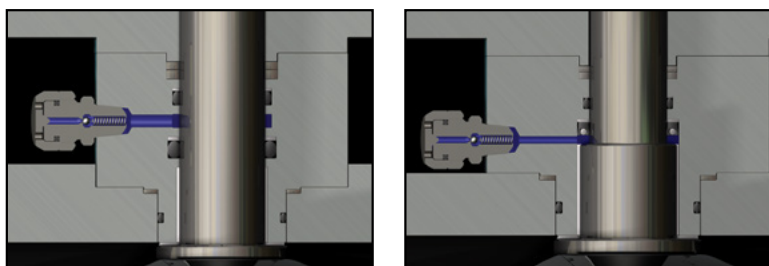
Sealant injection fittings are standard on all Force Trunnion ball valves. If the seat ring becomes damaged, this feature provides the user with an easy way to inject an emergency sealant to restore a tight seal. It also allows for the sealing surfaces of the ball and seat to be periodically flushed to clear away debris which may impair sealing.



TRUNNION BALL VALVE FEATURES

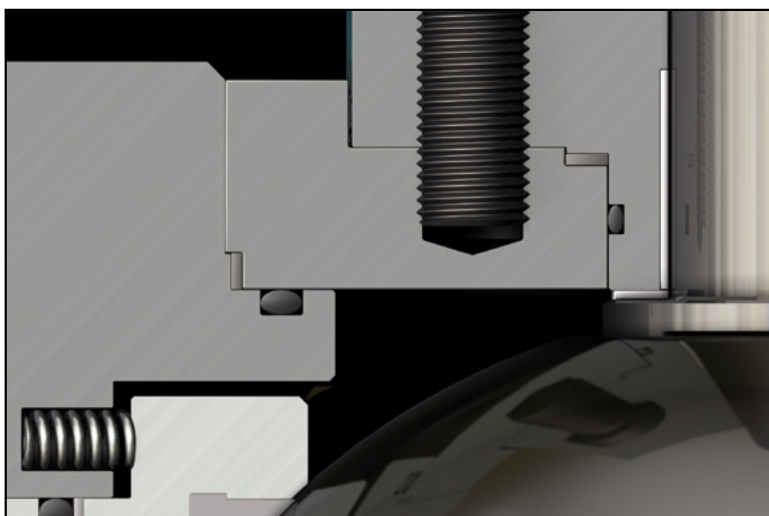
Stem Sealing and Sealant Injection Fitting

ASME Class 150 through 2500 utilize two “O” Rings and a graphite seal ring to effect a tight stem to body seal. In case of damage to the soft seals, stem seal integrity can be restored by injecting sealant into the sealant injection fitting.



Double Seals at all Joints

All connecting parts employ a double sealing design incorporating a spiral wound 316 SS/graphite gasket and o-ring to ensure positive sealing.



Double Block and Bleed

Force Trunnion ball valves incorporate an independent positive seal at both the upstream and downstream ends. In the fully closed position, the body cavity is isolated from upstream/downstream pressure. The body cavity may be vented by use of the body bleed plug to confirm the integrity of the seats.

Low Friction Stem/Trunnion Bearings and Thrust Washers

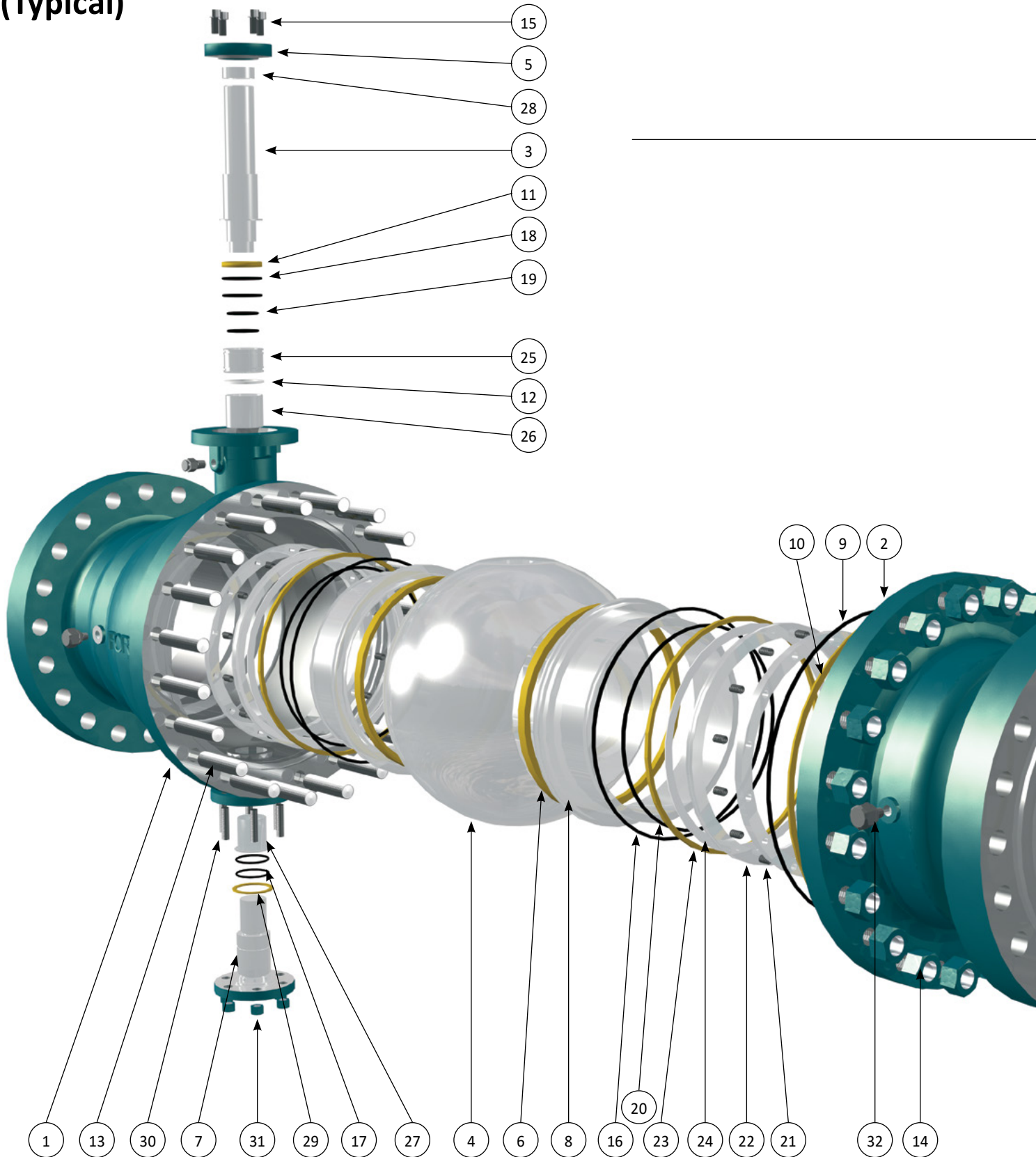
Heavy duty PTFE lined carbon or stainless steel bearing and thrust washers ensure durable and low torque operation.

Other Features

- Anti Static Device
- Blow-out proof stem
- Compliance with NACE MR-0175 latest edition
- Fire safe design certified to API 6FA and API 607
- ISO 5211 Mounting dimensions
- Stem Extensions available

FORCE 2-PIECE TRUNNION PARTS LIST AND BILL OF MATERIAL

(Typical)

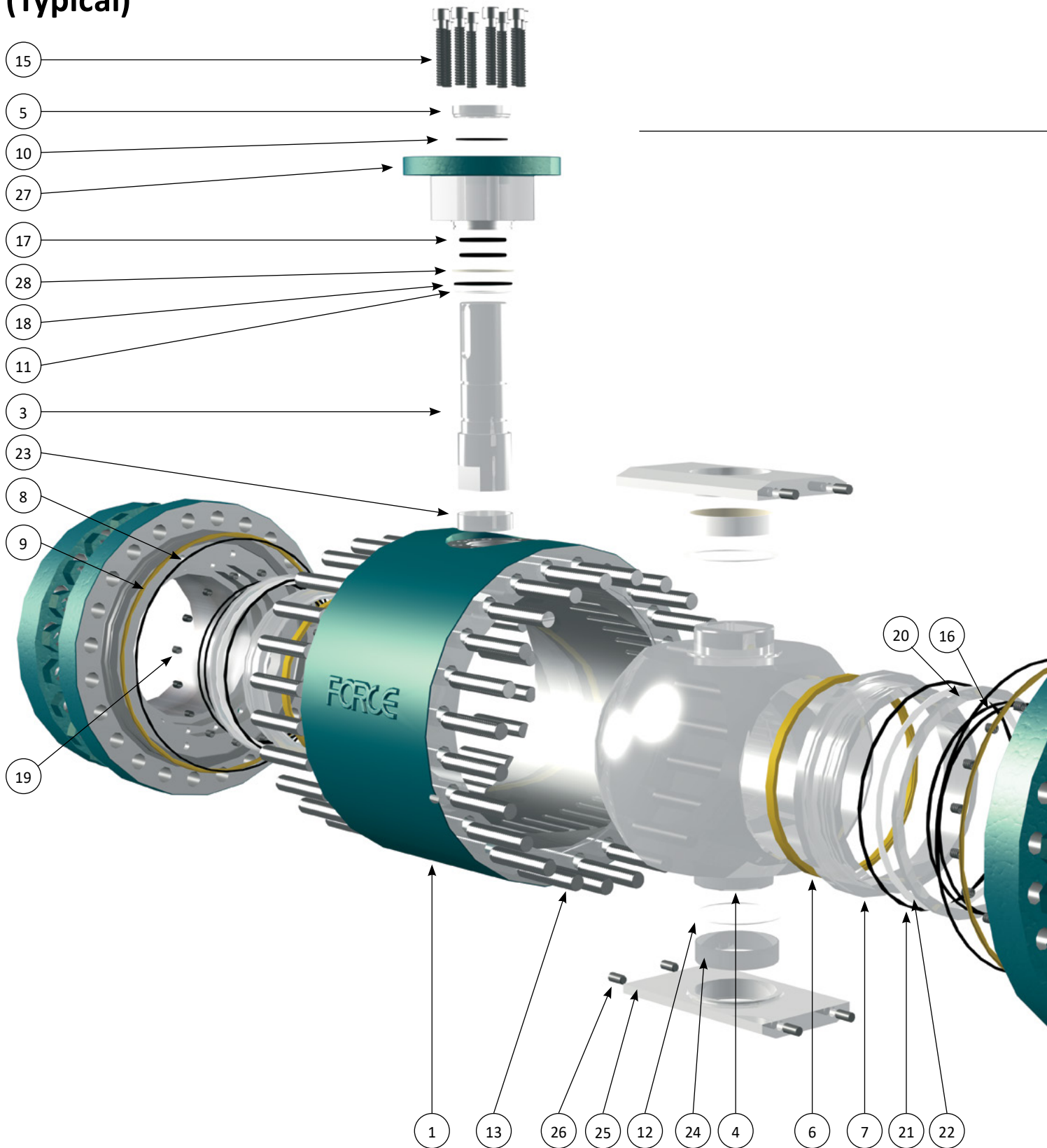


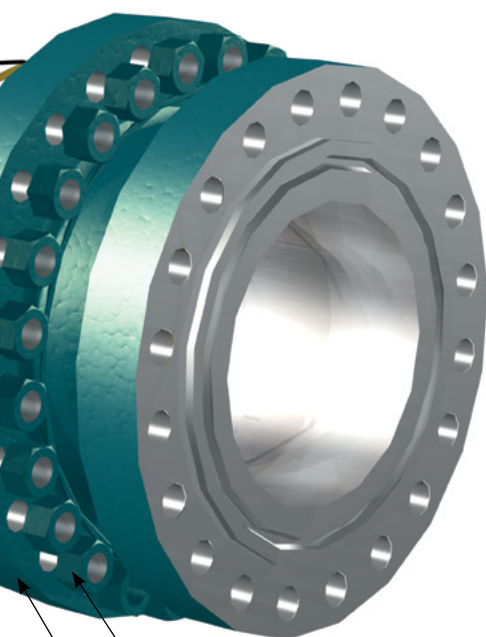


NO	PART NAME	QTY	CARBON STEEL	STAINLESS STEEL	LOW TEMP CARBON STEEL
1	Body	1	A216 WCB	A351 CF8M	A352 LCC
2	Cap	1	A216 WCB	A351 CF8M	A352 LCC
3	Stem	1	410SS/ENP	316SS	410SS/ENP
4	Ball	1	A216 WCB/ENP	A351 CF8M	A352 LCC/ENP
5	Gland Flange	1	AISI 1020	A276 304	AISI 1020
6	Seat Ring	2	DEVLON		
7	Bottom Cover	1	A216 WCB/ENP	A351 CF8M	A352 LCC/ENP
8	Seat Retainer	2	WCB or A105/ENP	316SS	A352 LCC/ENP
9	O-Ring	1	Viton®		
10	Gasket	1	SPW 316 + Graphite		
11	Stem Seal	1	Graphite		
12	Thrust Washer	1	A240-316 Teflon Coated		
13	Cap Bolt	1 set	A193 B7M	A193 B8	A320 L7M
14	Cap Bolt Nut	1 set	A194 2HM	A193 B8	A320 L7M
15	Gland Bolt	1 set	AISI 4140	A193-B8	AISI 4140
16	O-Ring	2	Viton®		
17	O-Ring	2	Viton®		
18	O-Ring	2	Viton®		
19	O-Ring	2	Viton®		
20	O-Ring	2	Viton®		
21	Spring	1 set	INCONEL X-750		
22	Seat Insert	2	A216 WCB/ENP	A351 CF8M	A352 LCC/ENP
23	Retainer Seat	2	Graphite		
24	Retainer Seat	2	PTFE		
25	Stem Bushing	1	AISI 1020/ENP	A276 316	AISI 1020/ENP
26	Du-Bush	1	Commercial Teflon Coated		
27	Du-Bush	1	Commercial Teflon Coated		
28	Du-Bush	1	Commercial Teflon Coated		
29	Bottom Gasket	1	SPW 316 + Graphite		
30	Bottom Bolt	1 set	A193 B7M	A193 B8	A320 L7M
31	Bottom Nut	1 set	A194 2HM	A194 8	A194 7M
32	Sealant	1 set	AISI 1020 Zn Plated	316SS	AISI 1020 Zn Plated

*Variations may occur based on size and pressure class.

FORCE 3-PIECE TRUNNION PARTS LIST AND BILL OF MATERIAL (Typical)





2 14

NO	PART NAME	QTY	CARBON STEEL	STAINLESS STEEL	LOW TEMP CARBON STEEL
1	Body	1	A105	A182 F316	A350 LF2
1	Cap	2	A216 WCB	A351 CF8M	A352 LCC
3	Stem	1	410SS/ENP	316SS	410SS/ENP
4	Ball	1	WCB or A105/ENP	CF8M or F316	LCC or LF2/ENP
5	Gland Flange	1	AISI 1020	A276 304	AISI 1020
6	Seat Ring	2	DEVLON*		
7	Seat Retainer	2	WCB or A105/ENP	CF8M or F316	LCC or LF2/ENP
8	O-Ring	2	Viton®		
9	Gasket	2	SPW 316 + Graphite		
10	Stem Seal	1	Graphite		
11	Thrust Washer	1	A240 316 Teflon Coated		
12	Thrust Washer	2	A240 316 Teflon Coated		
13	Cap Bolt	1 set	A193 B7M	A193 B8	A320 L7M
14	Cap Bolt Nut	1 set	A194 2HM	A193 8	A194 7M
15	Gland Bolt	1 set	AISI 4140	A193 B8	AISI 4140
16	O-Ring	4	Viton®		
17	O-Ring	1	Viton®		
18	O-Ring	2	Viton®		
19	Spring	1 set	Inconel X-750		
20	Seat Insert	2	A216 WCB/ENP	A351 CF8M	A350 LF2/ENP
21	Retainer Seat	2	Graphite		
22	Retainer Seat	2	PTFE		
23	Du-Bush	1	Commercial Teflon Coated		
24	Du-Bush	2	Commercial Teflon Coated		
25	Ball Guide	2	AISI 1020	A240 316	AISI 1020
26	Pin	1 set	A276 304	A276 316	A276 304
27	Mounting Flange	1	A216 WCB	A351 CF8M	A352 LCC
28	M/Flange Gasket	1	SPW 316 + Graphite		
29	Sealant (Not Pictured)	1 set	AISI 1020 Zn Plated	316SS	AISI 1020 Zn Plated

*Variations may occur based on size and pressure class.

ANSI 150 Weights And Dimensions

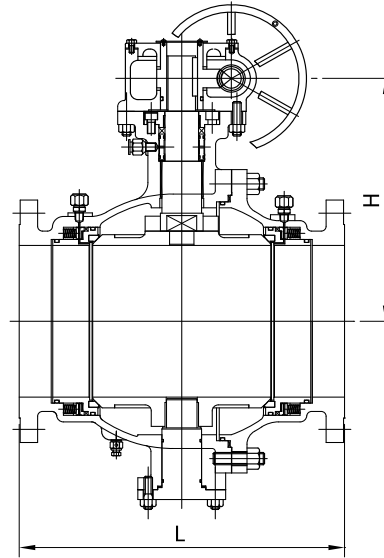
Full Bore: Sizes 2" to 24"

Reduced Bore: Sizes 2" to 24"

Standard Materials

Body: A216-Gr. WCB
 Trim: Carbon Steel/E.N.P.
 Seats: Glass Filled Teflon®
 Seals: HNBR

(Special materials available on request)



NPS	L		H		Weight	
	in	mm	in	mm	lb	Kg
2 x 1.5	7.0	177.8	6.2	157.0	26.5	12
2 x 2	7.0	177.8	6.5	165.0	35	16
3 x 2	8.0	203.2	6.5	165.0	49	22
3 x 3	8.0	203.2	7.3	186.0	57	26
4 x 3	9.0	228.6	7.3	186.0	88	40
4 x 4	9.0	228.6	9.3	237.0	123	56
6 x 4	15.50	393.70	9.3	237.0	264	120
6 x 6	15.50	393.70	11.4	290.0	275	125
8 x 6	18.00	457.20	11.4	290.0	330	150
8 x 8	18.00	457.20	13.2	335.0	429	195
10 x 8	21.00	533.40	13.2	335.0	506	230
10 x 10	21.00	533.40	16.4	417.0	594	270
12 x 10	24.00	609.60	16.4	417.0	653	296
12 x 12	24.00	609.60	17.9	455.0	1014	460
14 x 12	27.00	685.80	17.9	455.0	1036	470
14 x 14	27.00	685.80	19.1	486.0	1742	790
16 x 14	30.00	762.00	19.1	486.0	1418	643
16 x 16	30.00	762.00	20.6	524.0	2271	1030
18 x 16	34.00	863.60	20.6	524.0	2408	1092
18 x 18	34.00	863.60	23.1	586.0	3043	1380
20 x 18	36.00	914.40	23.1	586.0	3308	1500
20 x 20	36.00	914.40	25.4	646.0	4653	2110
24 x 20	42.00	1,066.80	25.4	646.0	5332	2418
24 x 24	42.00	1,066.80	27.9	708.0	6196	2810

ANSI 300 Weights And Dimensions

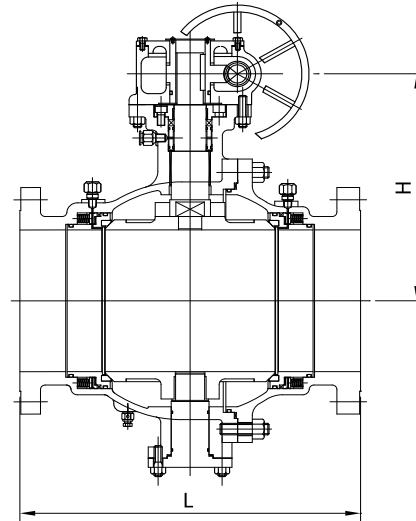
Full Bore: Sizes 2" to 24"

Reduced Bore: Sizes 2" to 24"

Standard Materials

- Body: A216-Gr.WCB
- Trim: Carbon Steel/E.N.P.
- Seats: Glass Filled Teflon
- Seals: HNBR

(Special materials available on request)



NPS	L		H		Weight	
	in	mm	in	mm	lb	Kg
2 x 1.5	8.5	215.9	6.2	157.0	39.7	18
2 x 2	8.5	215.9	6.5	165.0	79.37	36
3 x 2	11.12	282.4	6.5	165.0	92.60	42
3 x 3	11.12	282.4	7.3	186.0	127.87	58
4 x 3	12.0	304.8	7.3	186.0	136.60	62
4 x 4	12.0	304.8	9.3	237.0	165	75
6 x 4	15.88	403.35	9.3	237.0	297	135
6 x 6	15.88	403.35	11.4	290.0	334	152
8 x 6	19.75	501.65	11.4	290.0	440	200
8 x 8	19.75	501.65	13.2	335.0	517	235
10 x 8	22.38	568.45	13.2	335.0	616	280
10 x 10	22.38	568.45	16.4	417.0	660	300
12 x 10	25.50	647.70	16.4	417.0	860	390
12 x 12	25.50	647.70	17.9	455.0	1147	520
14 x 12	30.00	762.00	17.9	455.0	1323	600
14 x 14	30.00	762.00	19.1	486.0	2139	970
16 x 14	33.00	838.20	19.1	486.0	2271	1030
16 x 16	33.00	838.20	20.6	524.0	2646	1200
18 x 16	36.00	914.40	20.6	524.0	3021	1370
18 x 18	36.00	914.40	23.1	586.0	4190	1900
20 x 18	39.00	990.60	23.1	586.0	4322	1960
20 x 20	39.00	990.60	25.4	646.0	4763	2160
24 x 20	45.00	1,143.00	25.4	646.0	5858	2430
24 x 24	45.00	1,143.00	27.9	708.0	6637	3010

ANSI 600 Weights And Dimensions

Full Bore: Sizes 2" to 24"

Reduced Bore: Sizes 2" to 24"

Standard Materials

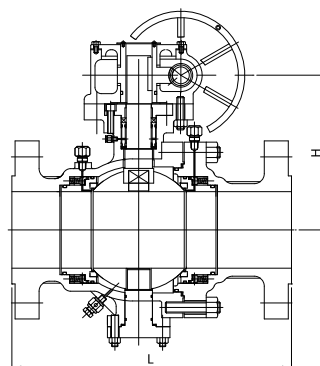
Body: A216-Gr. WCB

Trim: Carbon Steel/E.N.P.

Seats: Devlon®

Seals: HNBR

(Special materials available on request)



NPS	Bore		L				H		Weight	
			RF/BW		RTJ					
	in	mm	in	mm	in	mm	in	mm	lb	kg
2 x 1.5	1.5	39.0	11.5	292.1	11.6	294.6	6.6	167.0	84	38
2 x 2	2.0	50.0	11.5	292.1	11.6	294.6	6.8	172.0	88	40
3 x 2	2.0	50.0	14.0	355.6	14.1	358.1	6.8	172.0	132	60
3 x 3	3.0	76.0	14.0	355.6	14.1	358.1	8.3	210.0	154	70
4 x 3	3.0	76.0	17.0	431.8	17.1	434.3	8.3	210.0	209	95
4 x 4	4.0	102.0	17.0	431.8	17.1	434.3	10.3	262.0	243	110
6 x 4	4.0	102.0	22.0	558.8	22.1	561.3	10.3	262.0	342	155
6 x 6	6.0	153.0	22.0	558.8	22.1	561.3	12.5	317.0	476	216
8 x 6	6.0	153.0	26.0	660.4	26.1	662.9	12.5	317.0	639	290
8 x 8	8.0	203.0	26.0	660.4	26.1	662.9	14.3	363.0	816	370
10 x 8	8.0	203.0	31.0	787.4	31.1	789.9	14.3	363.0	1080	490
10 x 10	10.0	254.0	31.0	787.4	31.1	789.9	16.9	428.0	1359	615
12 x 10	10.0	254.0	33.0	838.2	33.1	840.7	16.9	428.0	2156	980
12 x 12	12.0	305.0	33.0	838.2	33.1	840.7	18.4	468.0	2420	1100
14 x 10	10.0	254.0	35.0	889.0	35.1	891.5	16.9	428.0	2310	1050
14 x 14	13.2	336.5	35.0	889.0	35.1	891.5	16.1	408.0	2932	1330
16 x 12	12.0	305.0	39.0	990.6	39.1	993.1	18.4	468.0	2860	1300
16 x 16	15.2	386.0	39.0	990.6	39.1	993.1	22.7	576.0	3858	1750
18 x 14	13.2	336.5	43.0	1092.2	43.1	1094.7	16.1	408.0	3344	1520
18 x 18	17.2	438.0	43.0	1092.2	43.1	1094.7	23.9	606.0	5071	2300
20 x 16	15.2	386.0	47.0	1193.8	47.2	1198.9	22.7	576.0	4620	2100
20 x 20	19.3	489.0	47.0	1193.8	47.2	1198.9	26.9	682.0	6614	3000
22 x 18	17.2	438.0	51.0	1295.4	51.4	1305.6	23.9	606.0	5940	2700
22 x 22	21.1	538.0	51.0	1295.4	51.4	1305.6	28.7	728.0	7370	3350
24 x 20	19.3	489.0	55.0	1397.0	55.4	1407.2	26.9	682.0	7150	3250
24 x 24	23.2	590.0	55.0	1397.0	55.4	1407.2	30.4	773.0	7788	3540

ANSI 900 Weights And Dimensions

Full Bore: Sizes 2" to 24"

Reduced Bore: Sizes 2" to 24"

Standard Materials

Body: ASTM A 105 or ASTM A216 – Gr. WCB

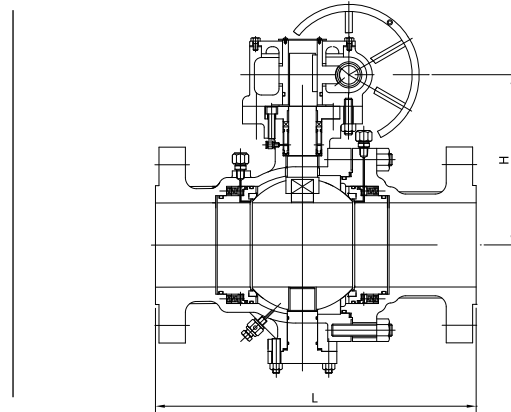
End Caps: ASTM A216 – Gr. WCB

Trim: Carbon Steel/E.N.P.

Seats: Devlon®

Seals: HNBR

(Special materials available on request)



NPS	bore		L				H		WEIGHT	
			rf/bw		rtj					
	in	mm	in	mm	in	mm	in	mm	lb	kg
2 x 1.5	1.5	39.0	14.5	368.3	14.6	370.8	6.6	167.0	121	55
2 x 2	2.0	50.0	14.5	368.3	14.6	370.8	7.0	177.0	154	70
3 x 2	2.0	50.0	15.0	381.0	15.1	383.5	7.0	177.0	198	90
3 x 3	3.0	76.0	15.0	381.0	15.1	383.5	8.5	215.0	243	110
4 x 3	3.0	76.0	18.0	457.2	18.1	459.7	8.5	215.0	374	170
4 x 4	4.0	102.0	18.0	457.2	18.1	459.7	10.4	263.0	573	260
6 x 4	4.0	102.0	24.0	609.6	24.1	612.1	10.4	263.0	682	310
6 x 6	6.0	153.0	24.0	609.6	24.1	612.1	12.7	322.0	794	360
8 x 6	6.0	153.0	29.0	736.6	29.1	739.1	12.7	322.0	1166	530
8 x 8	8.0	203.0	29.0	736.6	29.1	739.1	15.9	403.0	1367	620
10 x 8	8.0	203.0	33.0	838.2	33.1	840.7	15.9	403.0	1562	710
10 x 10	10.0	254.0	33.0	838.2	33.1	840.7	18.1	460.0	2067	950
12 x 10	10.0	254.0	38.0	965.2	38.1	967.7	18.1	460.0	2244	1020
12 x 12	12.0	303.0	38.0	965.2	38.1	967.7	22.3	566.0	2866	1300
14 x 10	10.0	254.0	40.5	1028.7	40.9	1038.9	18.1	460.0	2574	1170
16 x 12	12.0	303.0	44.5	1130.3	40.9	1038.9	22.3	566.0	3256	1480

ANSI 1500/2500 Weights And Dimensions

Full Bore: Sizes 2" to 12"

Reduced Bore: Sizes 2" to 12"

Standard Materials

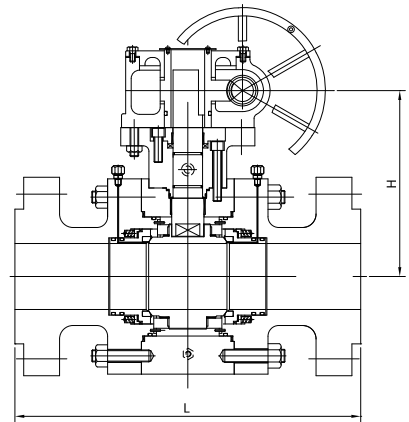
Body: ASTM A105 or ASTM A216 – Gr. WCB

End Caps: ASTM A216 – Gr. WCB

Trim: Carbon Steel/E.N.P.

Seats: Devlon®

Seals: HNBR



(Special materials available on request)

NPS	Bore		L				H		Weight	
			RF/BW		RTJ		in	mm	lb	Kg
	in	mm	in	mm	in	mm				
SME 1500:										
2 x 1.5	1.50	39.0	14.5	368.3	14.6	370.8	6.6	167.0	121	55
2 x 2	2.00	50.0	14.5	368.3	14.6	370.8	7.0	177.0	154	70
3 x 2	2.00	50.0	18.5	469.9	18.6	472.4	7.0	177.0	242	110
3 x 3	3.00	76.0	18.5	469.9	18.6	472.4	8.5	215.0	287	130
4 x 3	3.00	76.0	21.5	546.1	21.6	548.6	8.5	215.0	418	190
4 x 4	4.00	102.0	21.5	546.1	21.6	548.6	10.6	268.0	617	280
6 x 4	4.00	102.0	27.8	704.9	28.0	711.2	10.6	268.0	748	340
6 x 6	5.67	144.0	27.8	704.9	28.0	711.2	12.7	323.0	1124	510
8 x 6	5.67	144.0	32.8	831.9	33.1	840.7	12.7	323.0	1408	640
8 x 8	7.56	192.0	32.8	831.9	33.1	840.7	18.2	463.0	1543	700
10 x 8	7.56	192.0	39.0	990.6	39.4	1001.0	18.2	463.0	2200	1000
10 x 10	9.45	245.0	39.0	990.6	39.4	1000.8	19.6	497.0	2646	1200
12 x 10	9.45	245.0	44.5	1130.3	45.1	1145.5	19.6	497.0	3190	1450
12 x 12	11.34	288.0	44.5	1130.3	45.1	1145.5	20.6	522.0	3968	1800
SME 2500:										
2 x 2	1.75	44.0	17.8	450.9	17.9	454.2	7.5	191.0	220	100
3 x 2	1.75	44.0	22.8	577.9	23.0	584.2	7.5	191.0	330	150
3 x 3	2.52	64.0	22.8	577.9	23.0	584.2	10.1	256.0	550	250
4 x 3	2.52	64.0	26.5	673.1	26.9	682.8	10.1	256.0	726	330
4 x 4	3.50	89.0	26.5	673.1	26.9	682.8	11.7	298.0	814	370
6 x 4	3.50	89.0	36.0	914.4	36.5	927.1	11.7	298.0	1320	600
6 x 6	5.25	133.0	36.0	914.4	36.5	927.1	16.1	408.0	1870	850

MATERIAL For Sealing and Seat Insert

Material	General Temperature Range	USE / Characteristics	Not Recommended for	Properties
FM (Viton® A)	-13° F - 400° F (- 25° C ~ 204° C)	aliphatic hydrocarbons (petroleum oil, mineral oil/grease, fuel oils, butane, propane, natural gas), aromatic hydrocarbons (benzene, toluene), chlorinated hydrocarbons, high vacuum, most acids/chemicals	brake fluid with glycol base, ammonia gas, amines, alkalis, acetone, skydrol, ethyl acetate, superheated steam, polar solvents (ketone, acetone, acetic acid, etc), low molecular esters and ethers	excellent resistance for wear, ozone, weather, aging, compression set, permeation
FKM (Viton® GLT)	-50° F - 400° F (-45° C ~ 204° C)	extended low temperature service over Viton® A. Excellent for water, steam and mineral acids in addition to use of Viton® A	same as those of Viton® A	similar to those of Viton® A except a little inferior compression set and permeability
PTFE	-400° F - 450° F (-240° C ~ 232° F)	almost all chemicals and solvents including strong acid and alkali, high and very low temperature service	high mechanical loading	weather resistance, thermal stability, low friction
DEVLON®	-285°F - +350°F (-176°C ~ +176°C)	general purpose oil and gas applications, aliphatic and aromatic hydrocarbons, ketones, acetone, ethers, weak alkalis, and acids, inorganic salt solutions	chlorine, fluorine, hydrofluoric acid, phosphoric acid, nitric acid, hydrochloric acid, sulfuric acid, acetic acid, hydrogen peroxide	The particularly low moisture absorption of this grade provides high dimensional stability. This feature combines with excellent impact wear characteristics to make this material invaluable for offshore applications where weight saving and non-corrosion are imperative
PEEK	-40° F - 500° F (-40° C ~ 260° C)	superb chemical resistance including alcohols, acids, ammonia, esters, halogenated organics, hydrocarbons and inorganics	some strong acids - nitric, chromic, sulfuric, benzene sulfonic acids and aqua regia, etc., some inorganics - bromine, chlorine and fluorine, etc.	good high temperature performance, wear resistance, very low smoke and toxic gas emission, good hydrolysis resistance
HNBR	-50°F ~ +350°F (-46°C ~ +180°C)	dilute acids, weak alkalis, lower alcohols, amines, aliphatic hydrocarbons, kerosene, animal oils and fats, synthetic and mineral oils and lubricants, sweet or sour (H2S) oil & gas, amine corrosion inhibitors, explosive decompression resistant	aromatic phosphate esters, ethers, ketones, aromatic hydrocarbons, chlorine	These materials have the excellent oil/fuel resistance of traditional nitrile elastomers. They also have superior mechanical properties and can sustain higher service temperatures: e.g. up to 180°C in oil. In addition, they display superior resistance to aggressive fluids such as sour crude oil and have excellent resistance to ozone

TEMPERATURE Limits of Metal Parts

Forging	Casting	Low Temperature	High Temperature
A105	A216 WCB	-20° F (-29° C)	800° F (426° C)
A350 LF2	A352 LCB, LCC	-50° F (-46° C)	650° F (343° C)
A182 F 316	A351 CF8M	-425° F (-254° C)	1500° F (815° C)

TYPICAL GASKET Specifications

Type	Material	Low Temperature	High Temperature	Max. Pressure
Spiral wound	316 SS + Graphite	-420° F (-250° C)	1500° F (815° C)	6,250 psi (430bar)
Spiral wound	316 SS + PTFE	-200° F (-129° C)	450° F (232° C)	6,000 psi (415bar)

GEAR ACTUATOR DATA

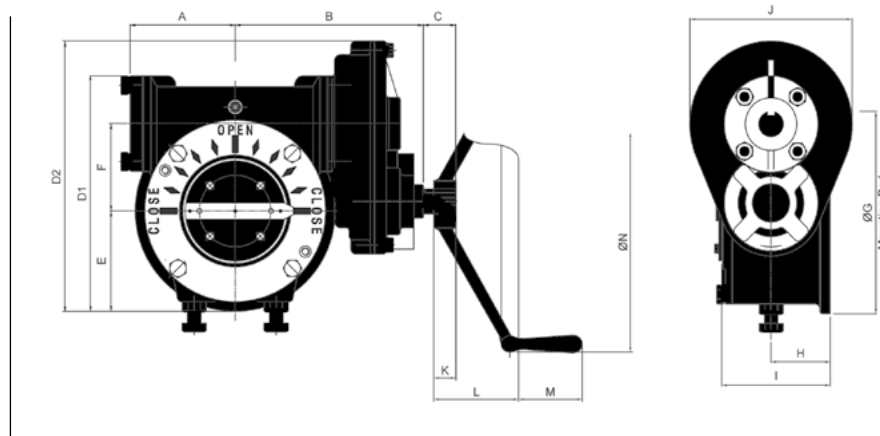
Valve Automation

FORCE® is able to offer a comprehensive package of control equipment including actuators, switches, solenoids and positioners.

Details of actuator are available on request.

Gear Operated

The gear operator can be furnished upon request.



Part No.	Units	A	B	C	D1	D2	E	F	G	H	I	J	K	L	M	N	Max Output Torque (ft-lb)	Weight	
																		lbs.	Kg
G-SBWG-BF	in	2.28	2.28	2.24	4.84	N/A	1.87	1.59	3.74	1.57	3.03	N/A	0.98	5.12	3.94	15.75	229	8.8	4
	mm	58	58	57	123	N/A	47.5	40.5	95	40	77	N/A	25	130	100	400			
G-SBWG-0	in	2.81	2.81	2.24	5.94	N/A	2.46	2.09	4.92	1.69	3.23	N/A	0.98	5.12	3.94	15.75	443	13.2	6
	mm	71.5	71.5	57	151	N/A	62.5	53	125	43	82	N/A	25	130	100	400			
G-SBWG-00	in	3.29	3.29	3.19	7.01	N/A	2.95	2.46	5.91	2.05	3.78	N/A	1.18	5.91	3.94	19.69	738	19.8	9
	mm	83.5	83.5	81	178	N/A	75	62.5	150	52	96	N/A	30	150	100	500			
G-SBWG-00-SPUR	in	3.29	5.93	1.54	6.93	7.70	2.95	2.46	5.91	2.05	3.78	4.57	1.18	5.91	3.94	19.69	738	28.6	13
	mm	83.5	150.5	39	176	195.5	75	62.5	150	52	96	116	30	150	100	500			
G-SBWG-01	in	3.64	3.64	3.19	7.99	N/A	3.44	2.95	6.89	2.13	3.82	N/A	1.18	5.91	3.94	19.69	1143	28.6	13
	mm	92.5	92.5	81	203	N/A	87.5	75	175	54	97	N/A	30	150	100	500			
G-SBWG-01-SPUR	in	3.64	6.28	1.54	8.70	8.68	3.44	2.95	6.89	2.13	3.82	4.57	1.18	5.91	3.94	19.69	1143	37.4	17
	mm	92.5	159.5	39	221	220.5	87.5	75	175	54	97	116	30	150	100	500			
G-SBWG-02	in	4.35	4.35	3.62	9.72	N/A	4.13	3.60	8.27	2.48	4.55	N/A	1.38	8.27	3.94	27.95	1770	46.2	21
	mm	110.5	110.5	92	247	N/A	105	91.5	210	63	115.5	N/A	35	210	100	710			
G-SBWG-02-SPUR	in	4.35	7.38	1.73	10.71	11.38	4.13	3.6	8.27	2.48	4.55	6.81	1.38	8.27	3.94	27.95	1770	59.4	27
	mm	110.5	187.5	44	272	289	105	91.5	210	63	115.5	173	35	210	100	710			
G-SBWG-03-SPUR	in	4.88	7.91	1.73	12.32	11.34	4.92	4.45	9.84	2.48	4.61	6.81	1.38	8.27	3.94	27.95	3172	79.2	36
	mm	124	201	44	313	288	125	113	250	63	117	173	35	210	100	710			
G-SBWG-04-SPUR	in	6.1	9.53	1.65	16.46	16.44	6.4	6.02	11.81	2.87	5.79	8.03	1.38	9.06	3.94	31.5	6820	154.3	70
	mm	155	242	42	418	417.5	162.5	153	300	73	147	204	35	230	100	800			
G-SBWG-05-SPUR	in	6.5	9.92	1.65	18.50	18.48	7.38	7.09	13.78	3.07	6.10	8.03	1.38	9.06	3.94	31.5	10916	224.4	102
	mm	165	252	42	470	469.5	187.5	180	350	78	155	204	35	230	100	800			

METAL SEATED BALL VALVES

BTM Series

- Full Bore & Reduced Bore
- Applicable Standards
ANSI B16.34, BS5351 & API 6D
- Face to Face: ANSI B16.10
- End Flange Dimensions:
ANSI B16.5



FORCE Metal Seated Ball Valve Features:

- 2-Piece or 3-Piece split body construction
- Manufactured to exact customer specifications / requirements



- Provide excellent service in high temperature / high operational frequency applications
- Standard ISO Mounting Pad
- Manufactured to meet ANSI B16.104 Class V and MSS SP-61 sealing requirements
- Standard Fire Safe design



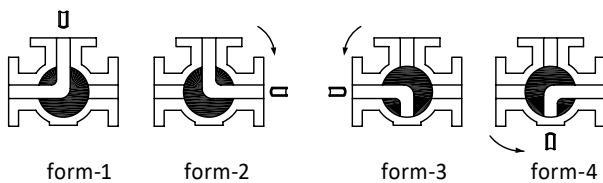
3-WAY 4-SEAT BALL VALVES

- T-Port or L-Port
- Side Entry and Top Entry
- 4-Seat Design
- Face to Face: manufacturer standard
- End Flange Dimensions: ANSI B16.5
- Full Bore

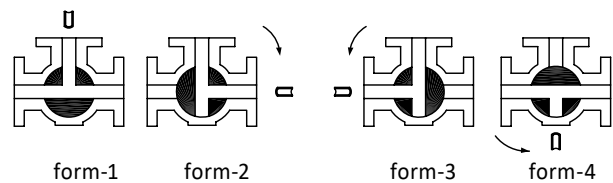


Operating Forms

3-way L-Port

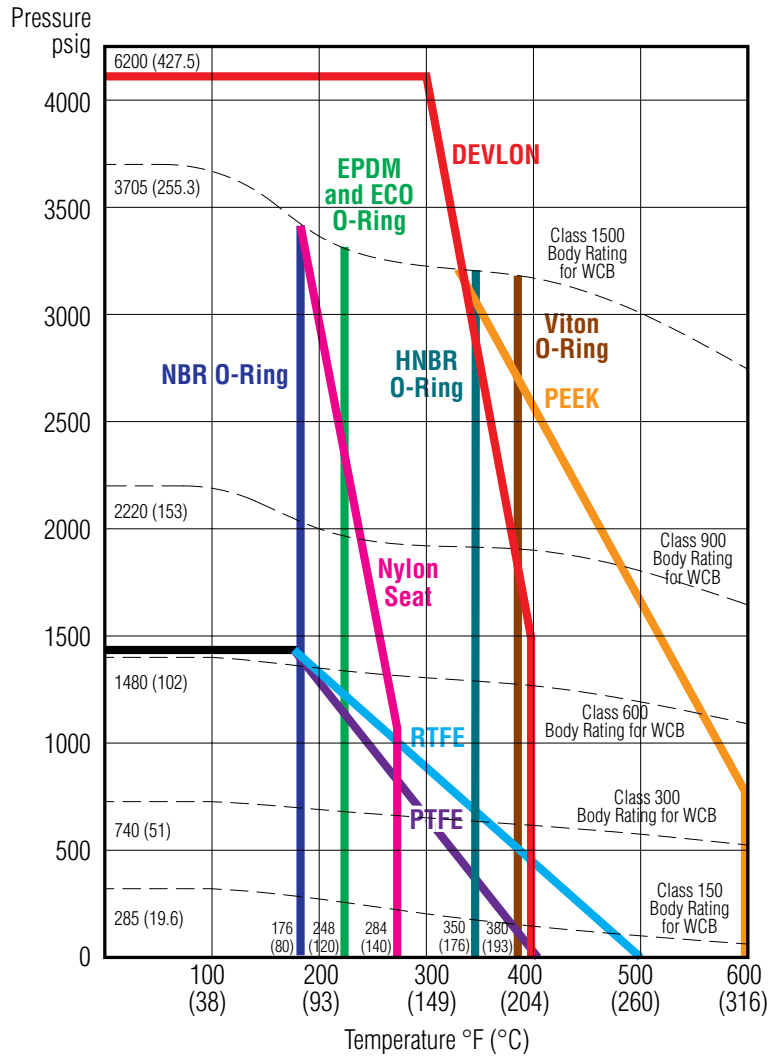


3-way T-Port



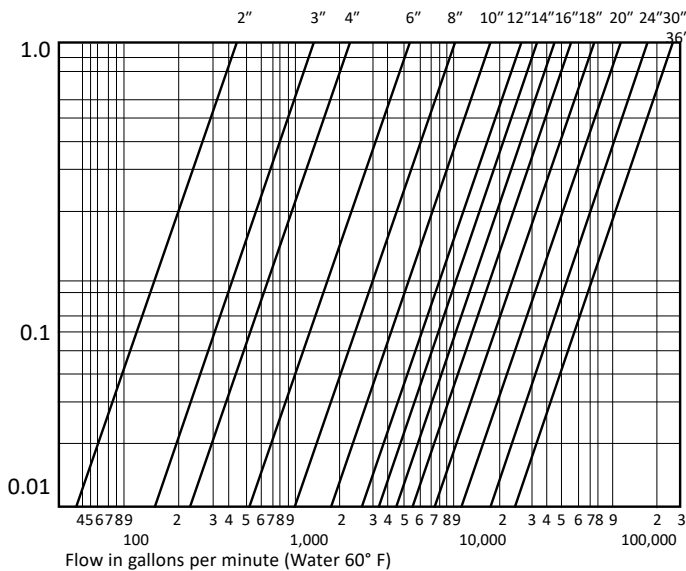
Flow direction is marked on top of stem

PRESSURE/TEMPERATURE RATING

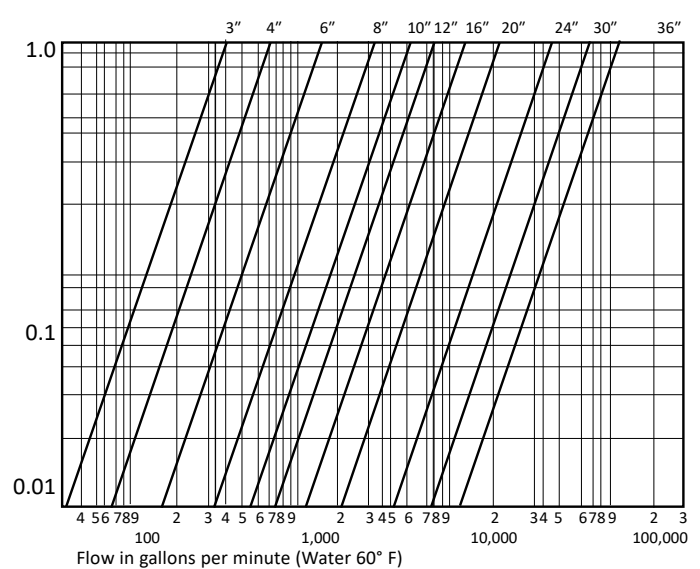


Pressure Loss Vs. Flow Rate

Full Port Ball Valves



Reduced Port Ball Valves



CRYOGENIC BALL VALVES

BUC/BFC/BTC Series

Scope of Offering

- Full Port
- End Connections: RF and RTJ
- Floating Valve Offering:
 - ASME CL 150, Sizes 2" - 4"
- Trunnion Mounted Valve Offering:
 - ASME CL 150 - 900, Sizes 2" - 8"
 - ASME CL 1500, Size 2"
 - Seat Designs Available:
 - DBB (self relieving x self relieving)
 - DIB2 (self relieving x double piston effect)

Design Standards and Features

- Design/Material: API 6D / ASME B16.34
- Inspection & Testing: API 6D / MSS SP134
- End to End: ASME B16.10
- Flanged End: ASME B16.5
- NACE Compliance: MR 0175/ISO 15156-1
- Design Temp: -320°F to 212°F (-196°C to 100°C)
- Blowout proof stem
- Anti-static design
- Fire safe design



HOW TO ORDER A FORCE® BALL VALVE

Example: A 1", Class 150, 2 Piece, Full Port Trunnion Mounted Ball Valve with Raised Face Flanged End Connections, Carbon Steel Body, Carbon Steel+ ENP Ball and 410 SS + ENP Stem with PTFE Seats, Viton® O-Rings, and Lever is written as 1-BTN11-AAA1L-1.

A	B	C	D	E	F	G	H	I	J
1	BTN	1	1	A	A	A	1	L	1

A	Size
0.5	1/2"
0.75	3/4"
1	1"
1.5	1-1/2"
2	2"
3	3"
4	4"
5	5"
6	6"
8	8"
10	10"
12	12"
14	14"
16	16"
18	18"
20	20"
24	24"
30	30"
36	36"

B	Ball Valve Type
BU	1 PC Floating BV
BF	2 PC Floating BV w/ Bolted Body
BN	3-Way BV w/ 90° V-Ball
BV	3-Way BV w/ 120° V-Ball
BT	3 PC Forged Trunnion BV
BTN	2 PC Cast Trunnion BV
BUM	1 PC Metal Seated Floating BV
BFM	2 PC Metal Seated Floating BV w/ Bolted Body
BTM	2 PC Metal Seated Trunnion BV
BUC	Cryo. 1 PC Floating BV
BFC	Cryo. 2 PC Floating BV w/ Bolted Body
BTC	Cryo. 2 PC Trunnion BV
BP	Pocketless BV
BJ	Jacketed BV

C	Port
1	Full Port
2	Reduced Port

D	Pressure Class
1	Class 150
2	Class 300
3	Class 600
4	Class 900
5	Class 1500
6	Class 2500
7	Other

E	Body Material
A	A216-WCB (A105)
B	A351-CF8 (F304)
C	A351-CF8M (F316)
D	A351-CF3 (F304L)
E	A351-CF3M (F316L)
F	A351-CN7M (Alloy 20)
G	A217-WC1
H	A217-WC6 (F11)
J	A217-WC9 (F22)
K	A352-LCC
L	A352-LC2
M	A352-LC3
N	A352-LCB (LF2)
P	A217-C5
Q	Duplex
R	Monel
S	Hastelloy®
T	Titanium
U	Inconel
V	Super Duplex
X	Other

F	Trim Material
A	WCB+ENP Ball & 410 SS + ENP Stem
B	304 SS
C	316 SS
D	304L SS
E	316L SS
F	Alloy 20
G	410 SS
Q	CF8M Ball & F51 Stem
R	Monel
S	Hastelloy®
T	Titanium
U	Inconel
V	Super Duplex
X	Other

G	Seat Material
A	PTFE
B	RTFE (Glass)
C	RTFE (Carbon)
D	TFM 1600
E	PFA
F	PEEK
G	Nylon
H	Metal
I	PCTFE
J	Devlon®
K	Graphite
X	Other

H	End Connection
1	Raised Face Flange (RF)
2	Ring Type Joint Flange (RTJ)
3	Welded End (WE)
4	RF x WE
5	RTJ x WE
6	Socket Weld (SW)
7	SW x Threaded
8	Special

I	Operator
E	Electric Actuator
P	Pneumatic Actuator
G	Gear Operator
B	Bare Stem
L	Lever

J	O-Rings (For BTN Series)
1	Viton®
2	Viton® AED
3	LT HNBR 90
9	Other

BV - Ball Valve
 PC - Piece
 Cryo. - Cryogenic
 BU Series - Standard O-Rings are Viton
 BF Series - Valves do NOT have O-Rings
 BTN Series - O-Rings require dash number designation (J)

About Our Company



CNC Flow Control is headquartered in Houston, Texas with multiple other locations in the U.S. and Canada. Our company unifies several trusted valve and flow line brands that have been serving numerous industries in North America for nearly three decades. From long range projects to same-day delivery, our diverse team is dedicated to understanding customers' needs in order to ensure exceptional service and the best solutions. Our extensive product portfolio ranges from commodity products like hammer unions and needle valves, to highly engineered products like API 6D trunnion mounted ball valves.



Quality assurance is critical to CNC Flow Control's process and we hold multiple internationally recognized quality standards certifications and management system. We are dedicated to understanding our customers' needs to ensure exceptional service by offering an in-house engineering and product management team, an extremely large product portfolio and extensive inventory to support same day shipments.

Permian Basin

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