

TRUNNION BALL VALVE



SIO
Valves & Automation

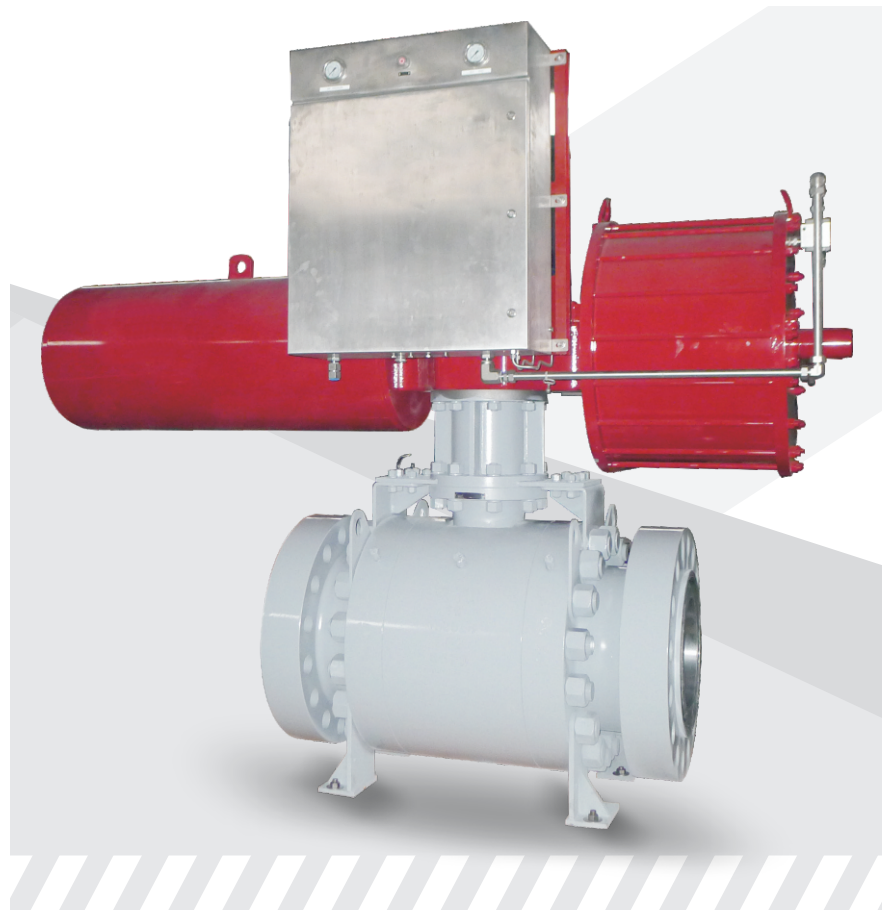
Trunnion Mounted Ball Valves

Features

- > Three-piece body design
- > Double block and bleed
- > Self relieving seat
- > Double piston seat
- > Trunnion supported design reduces operating torque
- > Antistatic device for grounding of the ball, stem and body
- > O-rings plus firesafe stem packing prevent leakage
- > Corrosion resistant low friction bearings
- > Inconel® seat springs provide upstream and downstream sealing
- > Stainless steel sealant injection fittings for emergency stem or seal sealing
- > Direct mount top works pad for actuator or gear operator
- > 6" & larger valves are equipped with lifting lugs
- > Locking device (lock not included)
- > Anti-blowout trunnion stem design

A large trunnion design ensures central positioning under the highest working pressure. Independent floating spring loaded seats 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. Service and maintenance



Constructional Variation available

Design	Class/Size					
	150#	300#	600#	900#	1500#	2500#
2-Piece	2"~12"	2"~12"	2"~12"	2"~12"		
3-Piece	2"~56"	2"~56"	2"~56"	2"~36"	2"~24"	2"~12"

Applicable Standards

The following list contains the most important applicable standards for ball valves. Redstar valves may be designed, manufactured and tested in accordance with other international standards on request.

API-American Petroleum Institute

- Spec. Q1**
- Spec. 6D**
Specification for pipeline valves.
- Std. 607**
Fire test for soft seated quarter-turn valves.
- Spec. 6FA**
Specification for fire testing of valves.
- Std. 598**
Valve inspection and test.
- Std. 605**
Large diameter carbon steel flanges.

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 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.

ASTM-American Society for Testing Materials

Consult factory for details.

British Standards

- BS 1503**
Specification for steel forgings for pressure purposes.
- BS 1504**
Specification for steel castings for pressure purposes.
- 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.

ISO-International Organization for Standardization

- ISO 9001: 2008**
Quality systems-Model for quality assurance in design / development, production, installation and servicing.
- ISO 5211**
Topworks mounting dimensions
- ISO 15156**
For use in H2S containing environments in oil and gas production.

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.

Hydrogen Sulfide (H2S Environments)

- NACE MR0175 ISO 15156**
General principles for cracking resistant materials in H2S containing environments in oil & gas production.

CSA-Canadian Standards Association

- CSA Z245.15-2009**
Standard for steel valves for intended use in oil or gas pipeline systems.
- CSA Z662-07**
Oil and gas pipeline systems.



Trunnion Mounted Ball Valves

General Design

The ball is fixed by trunnion (size 4" & smaller) or trunnion support (size 6" & larger), and the seat rings are floating, free to move against the ball along the valve centerline. The trunnion / trunnion support together with bearings adsorb the side load created by the pressure acting on the ball. At low pressure, the seat tight sealing is ensured by the preload of the springs acting on the seat rings. Along with the pressure increasing, the process medium pressure pushes the seat rings against the ball to provide additional load for tight sealing.

The ball and stem are independent with each other to minimize the effect of the side thrust generated by the pressure acting on the ball.

Ball Seat Alignment

Mechanical stops are equipped on all valves to ensure the ball is never to be over rotated.

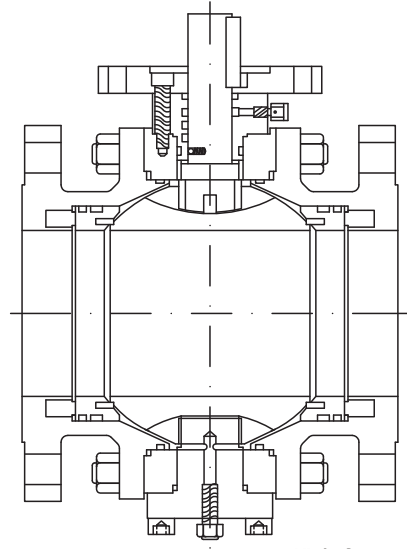
AED O-Ring

When valves are used under high pressure gas applications, e.g. hydrocarbon gas service under class 600 and above, the gas may be absorbed into the molecular structure of elastomeric O-rings. If the valve is subjected to sudden decompression, the O-rings may be destroyed by the rapidly expanded gas. To avoid this possibility, special AED O-rings or Lip seals, suitable for such service conditions, are available on request.

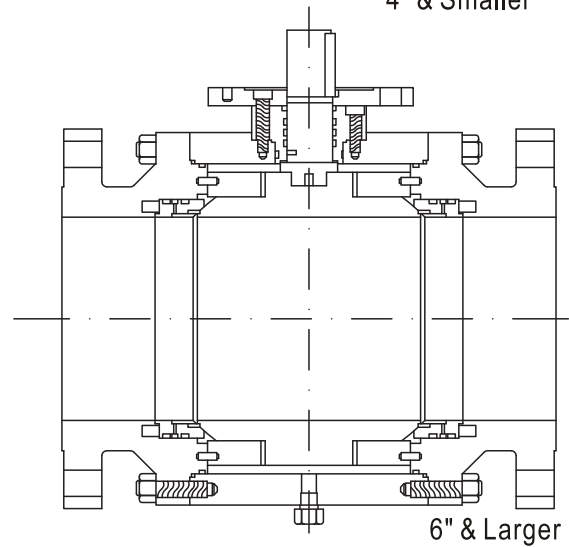
Environment Friendly Valve

Accurate machining of stem, gland and body sealing surfaces with double sealing (O-ring primary seal plus graphite gasket seal) ensure the low emission which is complying with the most severe pollution-control regulations. The test certifications are available on request.

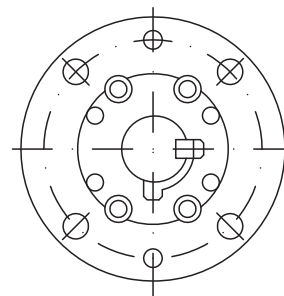
Design Features



4" & Smaller



6" & Larger



Blow-out Proof Stem

The stem is made separately from the ball with integral T-type round shoulder, retained by gland. (other designs are available on request).(Fig. 1)

Anti-static Device

Spring plus graphite type anti-static device are applied between the ball, stem, gland Stem Fire Safe Packing (Graphite) O-ring Stem Top Flange Gland Flange and body, to keep the electrical continuity between all the metallic components, and ensure the resistance lower than the most severe service requirement.(Fig. 1)

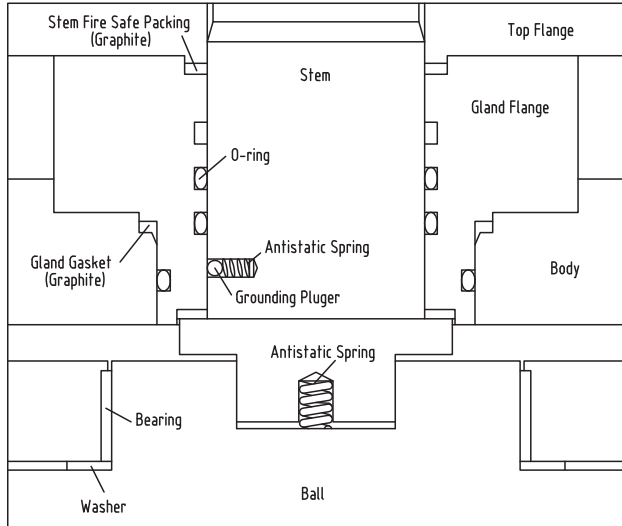


Fig.1

Fire Safe

a) External leakage prevention

All the possible external leakage point between stem and gland flange, gland flange and body, body and adapter are sealed with primary O-ring then secondary graphite gasket. When fire burned out the primary O-ring seal, the secondary graphite gasket seal still can prevent the process medium from external leakage.(Fig. 2)

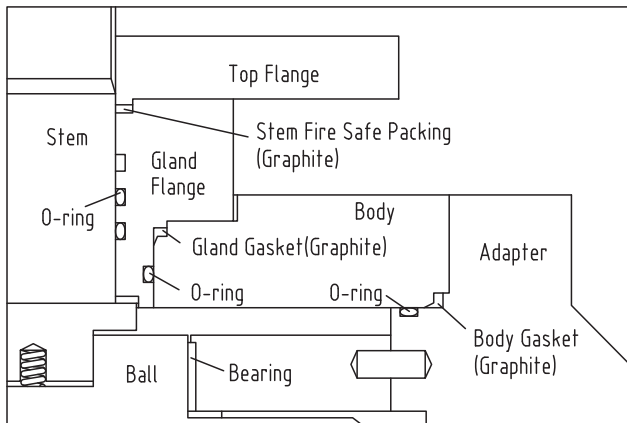


Fig.2

b) Internal leakage prevention

When fire burned out the primary O-ring seal between the floating seat ring and adapter, also the seat insert between seat ring and ball, the secondary graphite seal between seat ring and adapter, and seat ring & ball metal to metal contact preloaded by spring will minimize the internal process medium leakage. (Fig. 3, 4)

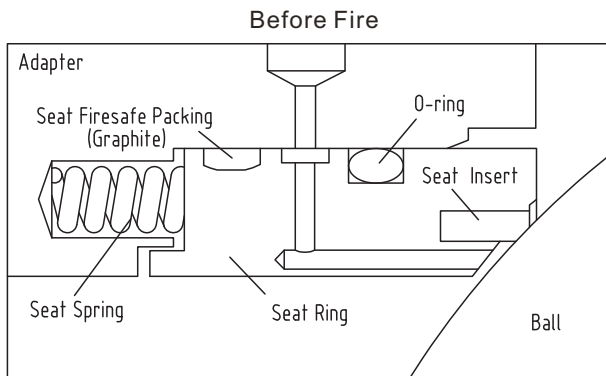


Fig.3

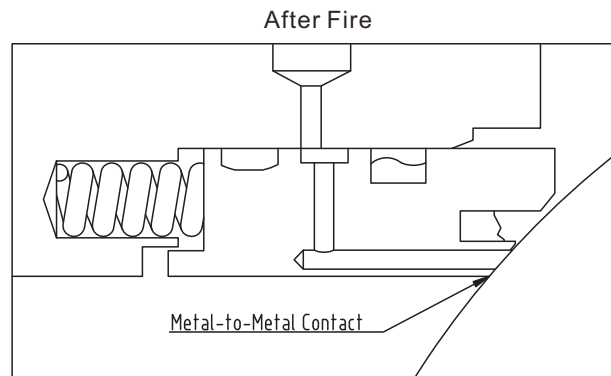


Fig.4

Trunnion Mounted Ball Valves

Seat Design Features

Standard seat design is primary soft seal, and secondary metal to metal seal. Seat insert is designed as pressed-in type which is easy for maintenance. (Fig. 5) Optional design with primary metal to metal seal and secondary soft seal seat design is also available upon request. (Fig. 6)

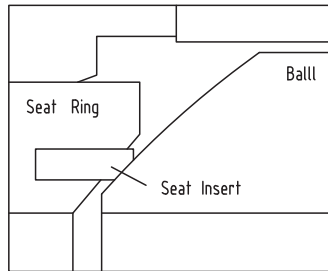


Fig.5

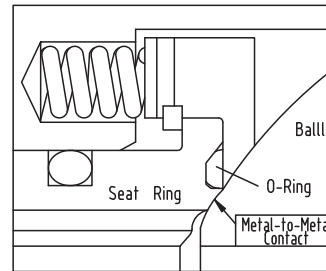


Fig.6

a) Standard: Single Piston Effect Seats (Self Relieving Seats)

Medium pressure, both upstream and downstream, creates a resultant thrust to the seat rings against the ball to assure tight sealing; Medium pressure acting in the body cavity creates a resultant thrust to push the seat rings away from the ball.

The single piston design permits the automatic release of any over pressure in the body cavity when the valve is in the fully open or fully closed position. (Fig. 7, 8)

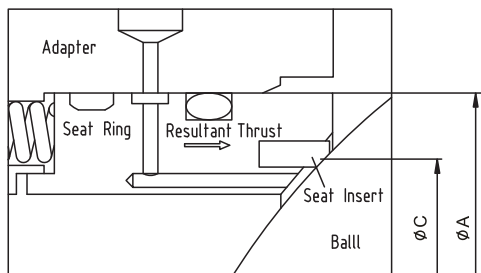


Fig.7

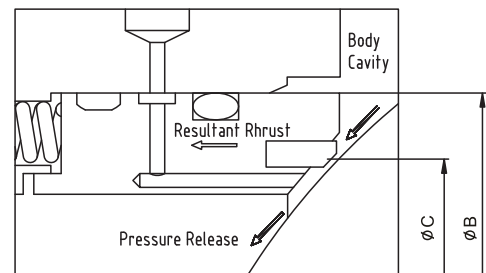


Fig.8

b) Option 1: Double Piston Effect Seats

Medium pressure, both upstream and downstream as well as in the body cavity, creates a resultant thrust that pushes the seat rings against the ball. Valves with double piston effect seat rings require a cavity pressure relief device to reduce the build-up of over pressure in the body cavity. (Fig. 9, 10)

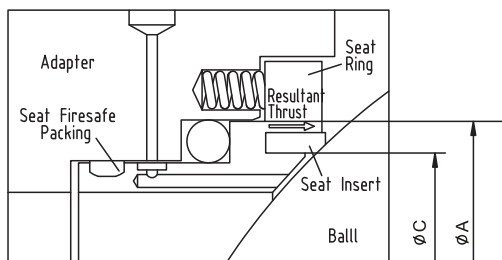


Fig.9

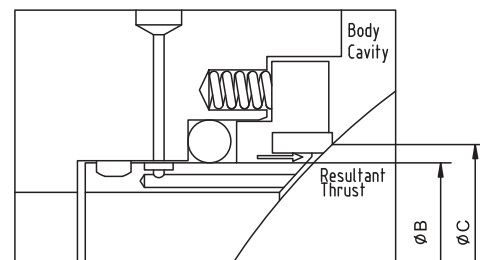


Fig.10

c) Option 2: Combination Seats

Combination seats design is available on request. That is a standard seat design used for upstream side and a double piston effect seats design used for downstream. The advantage is it can reach double piston effect seats design function without cavity pressure relief device to saves the cost, meanwhile only need a little care to install valve per flow direction arrow. (Fig. 7, 10)

Trunnion Mounted Ball Valves

Seat Design Features

Double Block and Bleed

When the ball is in the closed position, each seat seals off the process medium independently at the same time between the up/down stream and body cavity; it allows bleeding of the trapped cavity pressure (DBB) through drain or vent valve. The double block and bleed function makes it possible to flush the valve under pressure and verify that the seats are sealing properly. (Fig. 11)

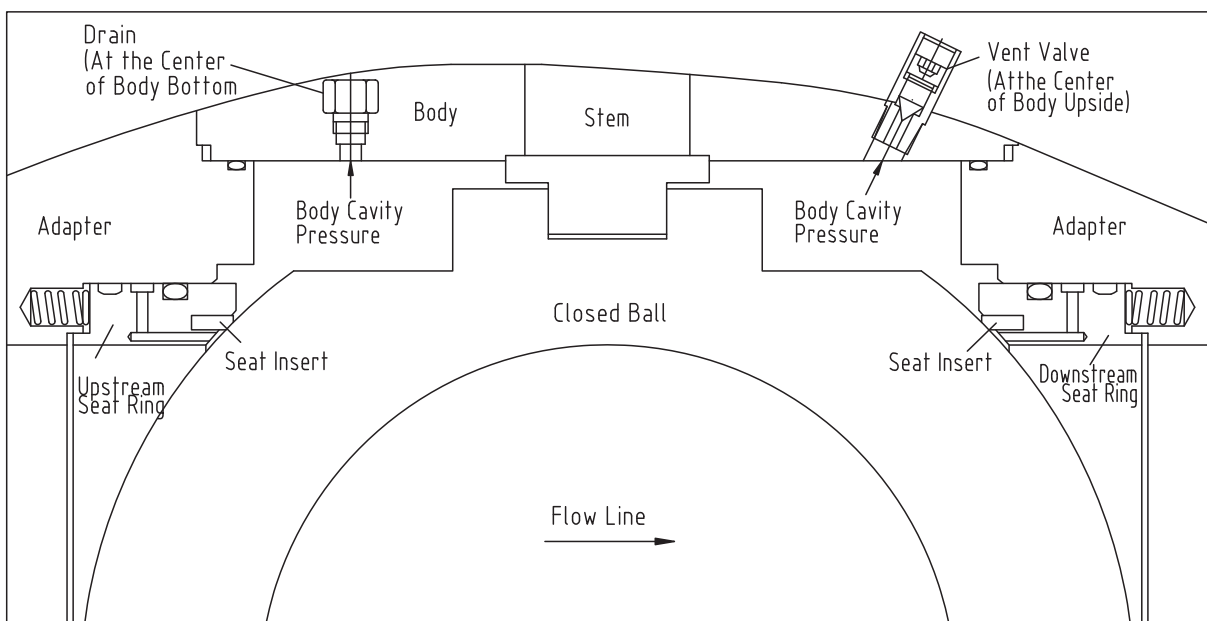


Fig.11

Emergency Sealant Injection System

Each valve of size 6" and larger (or smaller size on request), is equipped with sealant injection located at stem and seats area. The injection is integrated with check valve to provide backup sealing, also a check valve is equipped at front of seat sealant injection to avoid blowing out in case wrong operation. When the soft sealing materials (seat inserts and o- rings) are damaged and leakage happened by fire or other accident, the sealant can be injected through the injection fittings. (Fig. 12)

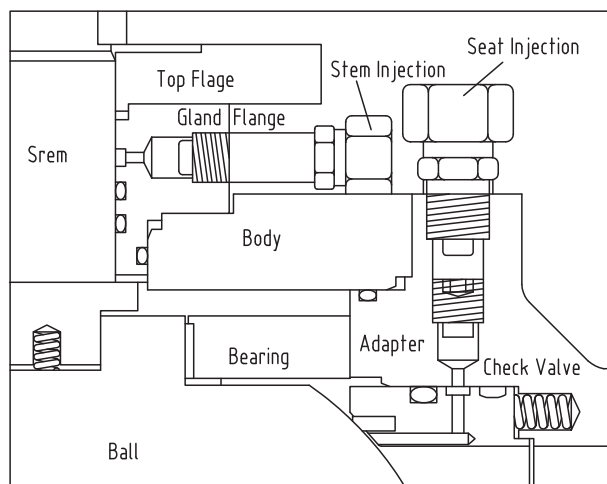


Fig.12

2PC / 3PC Body Casted Trunnion Mounted Ball Valve



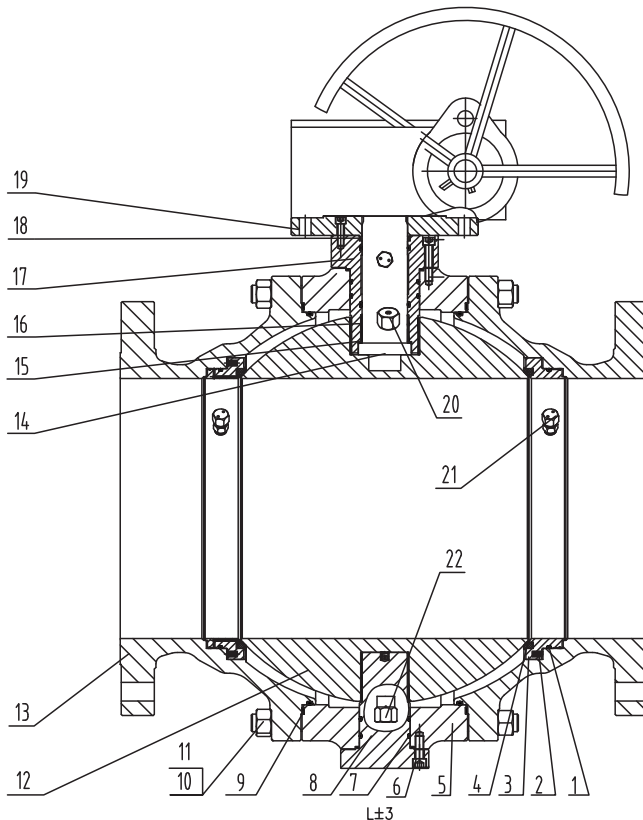
Feature

Size: 2"-24"
Class: 150~900
Two pieces / three pieces casted body
Trunnion Mounted Ball, Full & Reduced Bore
Anti-static Device
Blow-out Proof Stem
Double Block and Bleed
Fire Safe Design
Emergency Sealant Injector (6" & Larger)
Vent Valve (6" & Larger)
Lifting Lugs & Supporting Feet (8" & Larger)
Seat Pocket SS overlay (Optional)
Seals Area ENP Coated

Specifications

Design	ASME B16.34/API6D
Face to Face	ASME B16.10/API 6D
End To End	ASME B16.10/API 6D
End Flange	ASME B16.50/ B16.47A
BW End	ASME B16.25
Test	API 6D
Fire Safe Test	API 607/API 6FA
Special	NACE MR 0175

Main Part Name



No	Part Name
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1	O-ring
2	Spring
3	Seat ring
4	Seat ring
5	Body
6	Stud
7	O ring
8	Trunnion
9	Body Gasket
10	Nut
11	Stud
12	Ball
13	Bonnet
14	Stem
15	Thrust Washer
16	Soliding Bearing
17	Cover
18	Packing
19	Flange Gland
20	Vent
21	Injection
22	Drain

3PC Body Forged Trunnion Mounted Ball Valve



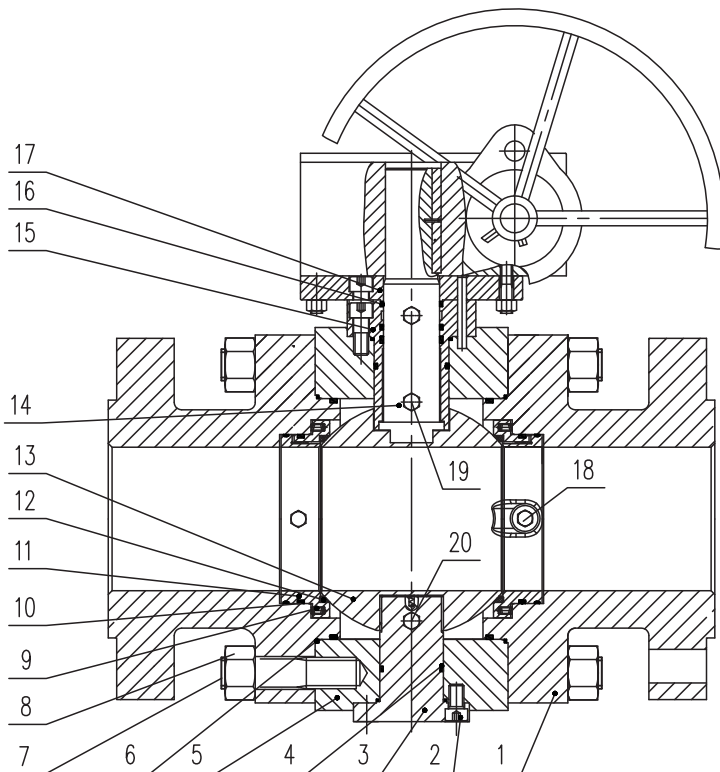
Feature

Size: 2"-48"
Class: 150~2500
Three Pieces Forged Steel Body
Trunnion Mounted Ball, Full & Reduced Bore
Anti-static Device
Blow-out Proof Stem
Double Block and Bleed
Fire Safe Design
Emergency Sealant Injector (6" & Larger)
Vent Valve (6" & Larger)
Lifting Lugs & Supporting Feet (8" & Larger)
Seat Pocket SS overlay (Optional)
Seals Area ENP Coated

Specifications

Design	ASME B16.34/API6D
Face to Face	ASME B16.10/API 6D
End To End	ASME B16.10/API 6D
End Flange	ASME B16.50/ B16.47A
BW End	ASME B16.25
Test	API 6D
Fire Safe Test	API 607/API 6FA
Special	NACE MR 0175

Main Part Name



No	Part Name
----	-----------

1	O-ring
2	Spring
3	Seat ring
4	Seat ring
5	Body
6	Stud
7	O ring
8	Trunnion
9	Body Gasket
10	Nut
11	Stud
12	Ball
13	Bonnet
14	Stem
15	Thrust Washer
16	Soliding Bearing
17	Cover
18	Packing
19	Flange Gland
20	Vent
21	Injection
22	Drain

Top Entry Trunnion Mounted Ball Valve



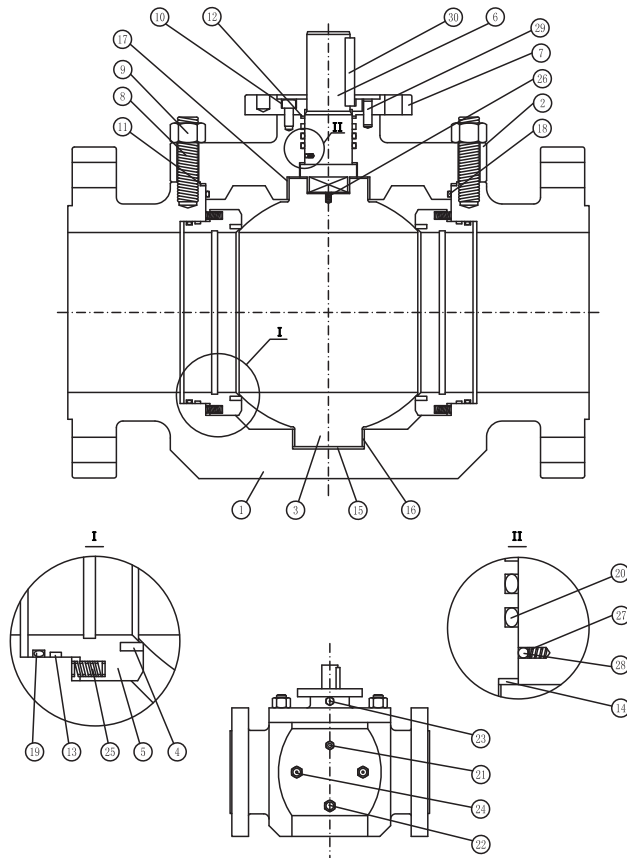
Feature

Size: 2"~28"
Class: 150~1500
Top Entry Cast/ forged steel Body
Trunnion Mounted ball, Full & Reduced Bore
Anti-Static Device
Blow-out Proof Stem
Fire Safe Design
Emergency sealant Injector(6" & larger)

Specifications

Design	ASME B16.34/ API 6D
Face to Face	ASME B16.10/ API6D
End To End	ASME B16.10/ API6D
End Flange	ASME B16.50
BW End	ASME B16.25
Test	API6D
Fire Safe Test	API 607/API6FA
Special	NACE MR0175

Main Part Name

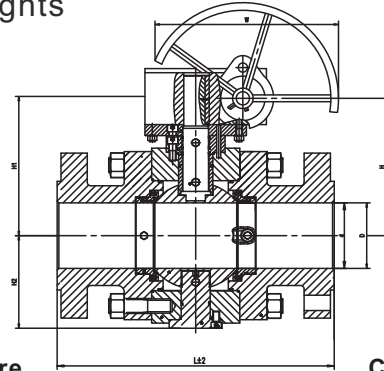
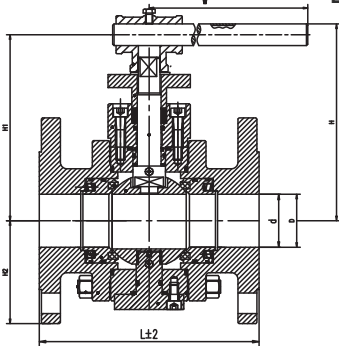


No	Part Name
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1	O-ring
2	Spring
3	Seat ring
4	Seat ring
5	Body
6	Stud
7	O ring
8	Trunnion
9	Body Gasket
10	Nut
11	Stud
12	Ball
13	Bonnet
14	Stem
15	Thrust Washer
16	Soliding Bearing
17	Cover
18	Packing
19	Flange Gland
20	Vent
21	Injection
22	Drain

3PC Body Forged Trunnion Mounted Ball Valve

Dimensions and Weights



Full Bore Class 150

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	178	155	85	350	30
3	76	203	191	110	400	60
4	102	229	211	130	450	92
6	152	394	231	160	*305	190
8	203	457	282	235	*406	345
10	254	533	336	290	*406	495
12	305	610	373	315	*406	705
14	337	686	413	345	*406	859
16	387	762	457	383	*600	1020
18	438	864	501	435	*600	1440
20	489	914	551	495	*600	1918
22	540	991	600	555	*600	2352
24	591	1067	635	590	*700	2803
26	635	1143	710	620	*700	3200
28	686	1245	760	670	*760	4045
30	737	1295	800	710	*760	4820
32	781	1372	840	745	*760	5490
34	832	1473	890	775	*760	6704
36	876	1524	930	805	*760	7615
40	978	1727	1010	900	*760	10271
42	1022	1987	1598	900	*760	12200
48	1168	2120	1722	1040	*760	18400

Reduced Bore Class 150

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	178	152	80	350	26
3*2	51	76	203	155	85	350	34
4*3	76	102	229	191	110	400	62
6*4	102	152	394	211	130	450	102
8*6	152	203	457	231	160	*305	225
10*8	203	254	533	282	235	*406	373
12*10	254	305	610	336	290	*406	533
14*10	254	337	686	336	290	*406	626
14*12	305	337	686	373	315	*406	730
16*12	305	387	762	373	315	*406	790
16*14	337	387	762	413	345	*406	844
18*14	337	438	864	413	345	*406	1010
18*16	387	438	864	457	383	*600	1095
20*16	387	489	914	457	383	*600	1115
20*18	438	489	914	501	435	*600	1152
22*18	438	540	991	501	435	*600	2343
24*20	489	591	1067	551	495	*600	2060
26*22	540	635	1143	600	555	*600	2215
28*24	591	686	1245	635	590	*700	2803
30*24	591	737	1295	635	590	*700	2803
32*26	635	781	1372	710	620	*700	4005
34*28	686	832	1473	760	670	*760	4445
36*30	737	876	1524	820	710	*760	4995
40*34	832	978	1727	935	775	*760	8200

Full Bore Class 300

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	216	155	85	400	31
3	76	283	191	110	450	69
4	102	305	211	130	500	110
6	152	403	229	160	*305	211
8	203	502	291	235	*406	376
10	254	568	340	290	*406	540
12	305	648	375	315	*500	763
14	337	762	417	345	*600	900
16	387	838	466	400	*600	1300
18	438	914	506	440	*600	1715
20	489	991	563	495	*600	2090
22	540	1092	605	560	*700	2220
24	591	1143	684	590	*760	2890
28	686	1346	770	680	*760	4575
30	737	1397	810	720	*760	5590
32	781	1524	850	760	*800	6240
34	832	1626	900	790	*800	7370
36	876	1727	940	820	*800	8435
40	978	1956	1025	915	*800	11200
42	1022	2032	1640	920	*800	13000
48	1168	2170	1765	1070	*800	19000

Reduced Bore Class 300

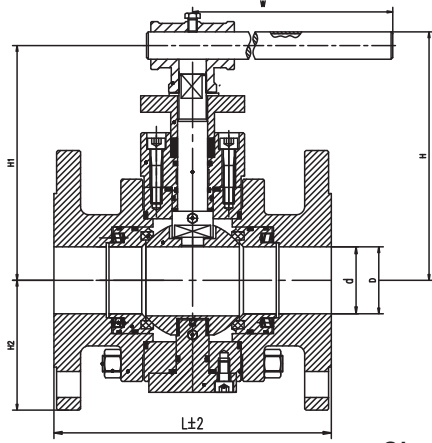
Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	216	152	80	350	30
3*2	51	76	283	155	85	400	37
4*3	76	102	305	191	110	450	74
6*4	102	152	403	211	130	500	142
8*6	152	203	502	229	160	*305	253
10*8	203	254	568	291	235	*406	410
12*10	254	305	648	340	290	*406	580
14*10	254	337	762	340	315	*406	683
14*12	305	337	762	375	315	*500	830
16*12	305	387	838	375	360	*500	1051
16*14	337	387	838	417	360	*600	1125
18*14	337	438	914	417	400	*600	1320
18*16	387	438	914	466	400	*600	1530
20*16	387	489	991	466	420	*600	1780
20*18	438	489	991	506	440	*600	1830
22*18	438	540	1092	506	440	*600	2010
24*20	489	591	1143	563	495	*600	2220
28*24	591	686	1346	684	590	*760	3200
30*24	591	737	1397	684	590	*760	3200
34*28	686	832	1626	770	680	*760	4845
36*30	737	876	1727	810	720	*760	5590
40*34	832	978	1956	900	790	*800	8200

* Gear Operated

Note: Redstar reserves the right to make any modifications without notice.

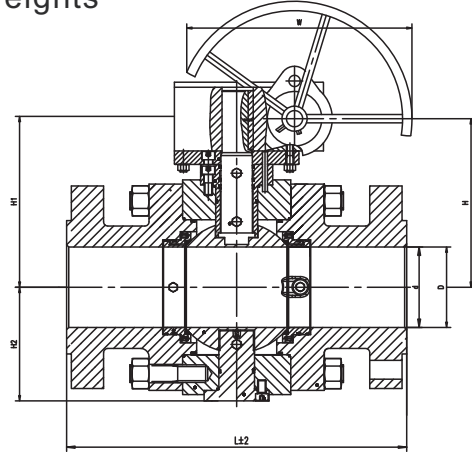
3PC Body Forged Trunnion Mounted Ball Valve

Dimensions and Weights



Full Bore Class 600

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	292	155	85	400	45
3	76	356	193	112	500	80
4	102	432	239	140	700	150
6	152	559	266	175	*406	248
8	203	660	310	250	*406	438
10	254	787	354	290	*600	701
12	305	838	411	345	*600	855
14	337	889	435	370	*600	1230
16	387	991	493	420	*600	1535
18	438	1092	544	462	*700	2135
20	489	1194	629	515	*760	2640
22	540	1295	683	570	*800	3370
24	591	1397	728	610	*800	3960
28	686	1549	810	695	*800	6060
30	737	1651	863	735	*800	6690
32	781	1778	900	775	*800	7825
34	832	1930	940	820	*800	8460
36	876	2083	990	885	*800	10650
40	978	2159	1070	935	*800	14700
42	1022	2175	1640	940	*800	16400
48	1168	2435	1765	1070	*800	24200



Reduced Bore Class 600

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	292	152	80	350	40
3*2	51	76	356	155	85	400	54
4*3	76	102	432	193	112	500	99
6*4	102	152	559	239	140	700	212
8*6	152	203	660	266	175	*406	304
10*8	203	254	787	310	250	*406	510
12*10	254	305	838	354	290	*600	794
14*10	254	337	889	354	345	*600	843
14*12	305	337	889	411	345	*600	910
16*12	305	387	991	411	370	*600	965
16*14	337	387	991	435	370	*600	1310
18*14	337	438	1092	435	410	*600	1520
18*16	387	438	1092	493	420	*600	1640
20*16	387	489	1194	493	440	*600	2065
20*18	438	489	1194	544	462	*700	2270
22*18	438	540	1295	544	462	*700	2430
24*20	489	591	1397	629	515	*760	3440
28*24	591	686	1549	728	610	*800	4250
30*24	591	737	1651	728	610	*800	4730
34*28	686	832	1930	810	695	*800	7200
36*30	737	876	2083	863	735	*800	8600
40*34	832	978	2159	940	820	*800	10020

Full Bore Class 900LB

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	368	178	100	450	52
3	76	381	221	125	600	87
4	102	457	215	150	*305	160
6	152	610	268	215	*406	385
8	203	737	324	260	*600	560
10	254	838	371	305	*600	820
12	305	965	425	360	*600	1125
14	324	1029	463	390	*600	1610
16	375	1130	513	440	*710	2010
18	425	1219	614	500	*760	2810
20	473	1321	644	530	*760	3460
24	572	1549	745	630	*800	5497
28	667	1753	830	720	*800	10202
30	714	1880	880	755	*800	11442
34	810	2159	970	850	*900	17462
36	857	2286	1030	930	*900	20154

Reduced Bore Class 900LB

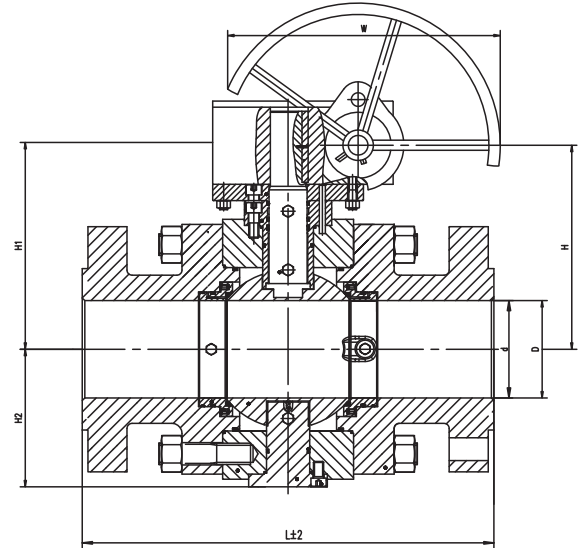
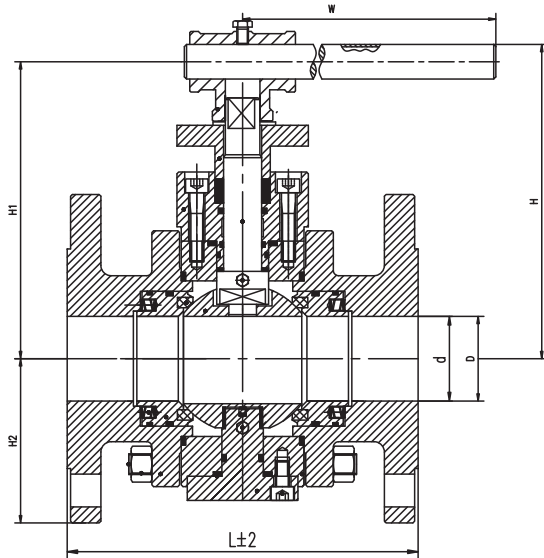
Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	368	152	80	400	45
3*2	51	76	381	178	100	450	56
4*3	76	102	457	221	125	600	94
6*4	102	152	610	215	150	*305	226
8*6	152	203	737	268	260	*406	480
10*8	203	254	838	324	305	*600	650
12*10	254	305	965	371	335	*600	868
14*10	254	324	1029	371	360	*600	1050
14*12	305	324	1029	425	360	*600	1310
16*12	305	375	1130	425	390	*600	1385
16*14	324	375	1130	463	390	*600	1830
18*16	375	425	1219	513	440	*710	2205
20*16	375	473	1321	513	470	*710	2735
20*18	425	473	1321	614	500	*760	3140
24*20	473	572	1549	644	550	*760	3810
28*24	572	667	1753	745	630	*800	7580
30*24	572	714	1880	745	665	*800	7981
34*28	667	810	2159	830	750	*800	11202
36*30	714	857	2286	880	780	*800	15653

* Gear Operated

Note: Redstar reserves the right to make any modifications without notice.

3PC Body Forged Trunnion Mounted Ball Valve

Dimensions and Weights



Full Bore Class 1500

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	368	178	100	450	60
3	76	470	226	130	700	115
4	102	546	241	162	*406	194
6	146	705	319	255	*600	580
8	194	832	345	280	*600	752
10	241	991	411	345	*600	1195
12	289	1130	478	405	*600	1970
14	318	1257	517	435	*700	2250
16	362	1384	599	485	*760	2760
18	407	1537	663	545	*800	3646
20	457	1664	695	580	*800	4497
24	548	2045	842	730	*900	7151

Reduced Bore Class 1500

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	368	152	80	400	56
3*2	51	76	470	178	100	450	82
4*3	76	102	546	226	130	700	150
6*4	102	146	705	241	162	*406	295
8*6	146	194	832	319	270	*600	690
10*8	194	241	991	345	325	*600	930
12*10	241	289	1130	411	370	*600	1340
14*10	241	318	1257	411	405	*600	1840
14*12	289	318	1257	478	405	*600	2070
16*12	289	362	1384	478	435	*600	2520
16*14	318	362	1384	517	435	*700	2670
18*16	362	407	1537	599	485	*760	2950
20*16	362	457	1664	599	545	*760	3825
20*18	407	457	1664	663	545	*800	4150
24*20	457	548	2045	695	640	*800	5850

Full Bore Class 2500

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	44	454	214	118	700	90
3	64	584	216	150	*406	200
4	89	683	265	180	*406	385
6	133	927	371	305	*600	778
8	181	1038	426	360	*600	1352
10	225	1292	463	390	*710	2137
12	267	1445	550	465	*760	3267

Reduced Bore Class 2500

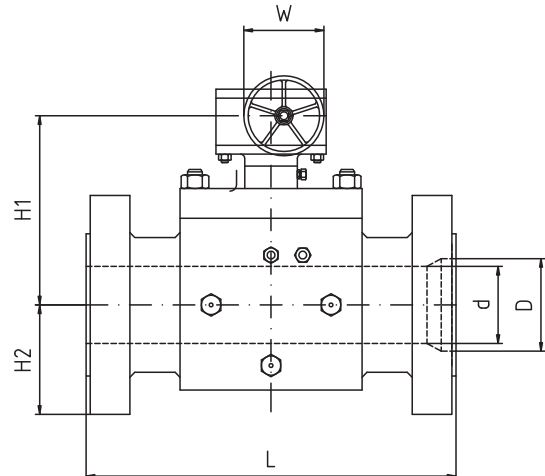
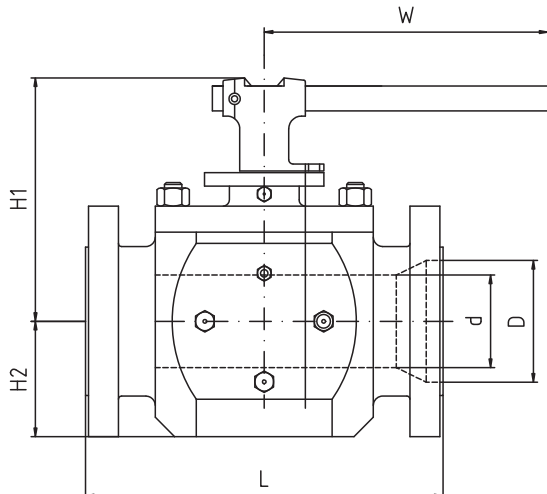
Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	44	454	175	95	450	80
3*2	44	64	584	214	118	700	160
4*3	64	89	683	216	150	*406	320
6*4	89	133	927	265	270	*406	640
8*6	133	181	1038	371	305	*600	1170
10*8	181	225	1292	426	370	*600	1919
12*10	225	267	1445	463	415	*710	2972

Note: Redstar reserves the right to make any modifications without notice.

* Gear Operated

Top Entry Forged Trunnion Mounted Ball Valve

Dimensions and Weights



Full Bore		Class 150				
Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	292	210	83	350	46
3	76	356	225	110	400	83
4	102	432	260	143	450	156
6	152	559	295	217	*305	256
8	203	660	322	264	*406	453
10	254	787	357	313	*406	622
12	305	838	405	372	*406	747
14	337	889	455	430	*406	959
16	387	991	470	452	*600	1220
18	438	1092	500	470	*600	1640
20	489	1194	555	583	*600	2118
24	591	1397	600	594	*700	2950

* Gear Operated

Reduced Bore		Class 150					
Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	292	180	78	250	41
3*2	51	76	356	210	83	350	58
4*3	76	102	432	225	110	400	104
6*4	102	152	559	260	143	450	228
8*6	152	203	660	295	217	*305	320
10*8	203	254	787	322	264	*406	536
12*10	254	305	838	357	313	*406	685
14*10	254	337	889	357	313	*406	740
14*12	305	337	889	405	372	*406	840
16*12	305	387	991	405	372	*406	924
16*14	337	387	991	455	430	*406	1070
18*14	337	438	1092	455	430	*406	1177
18*16	387	438	1092	463	452	*600	1430
20*16	387	489	1194	463	452	*600	1681
20*18	438	489	1194	500	470	*600	1850
24*20	489	591	1397	555	583	*600	2450

Full Bore		Class 300				
Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	292	210	83	400	49
3	76	356	225	110	450	87
4	102	432	260	143	500	164
6	152	559	295	217	*305	272
8	203	660	330	264	*406	479
10	254	787	365	313	*406	657
12	305	838	415	400	*500	783
14	337	889	460	430	*600	1007
16	387	991	480	452	*600	1281
18	438	1092	523	470	*600	1722
20	489	1194	585	583	*600	2224
24	591	1397	635	594	*760	3100

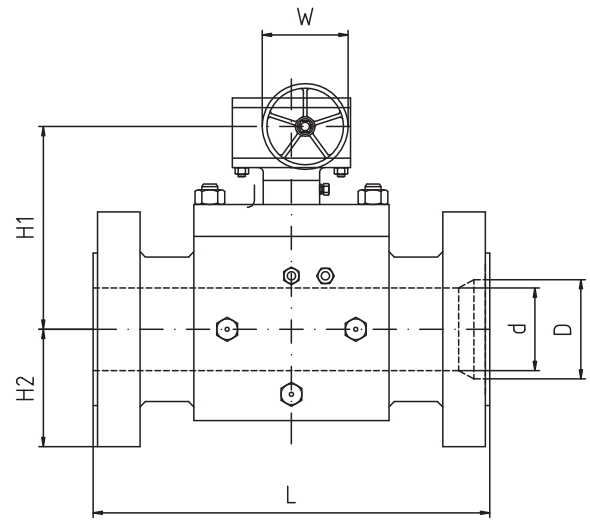
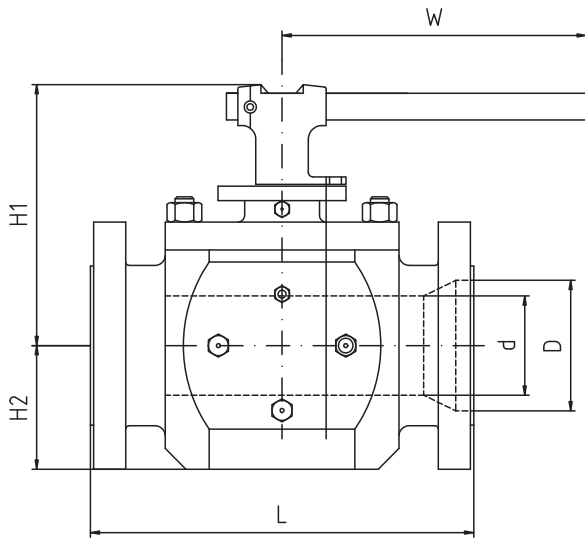
* Gear Operated

Reduced Bore		Class 300					
Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	292	180	78	250	44
3*2	51	76	356	210	83	400	62
4*3	76	102	432	225	110	450	110
6*4	102	152	559	260	143	500	243
8*6	152	203	660	295	217	*305	343
10*8	203	254	787	330	264	*406	559
12*10	254	305	838	365	313	*406	725
14*10	254	337	889	365	313	*406	798
14*12	305	337	889	415	400	*500	890
16*12	305	387	991	415	400	*500	1052
16*14	337	387	991	460	430	*600	1120
18*14	337	438	1092	460	430	*600	1288
18*16	387	438	1092	480	452	*600	1480
20*16	387	489	1194	480	452	*600	1728
20*18	438	489	1194	523	470	*600	1960
24*20	489	591	1397	585	583	*600	2650

Note: Redstar reserves the right to make any modifications without notice.

Top Entry Forged Trunnion Mounted Ball Valve

Dimensions and Weights



Full Bore Class 600

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	292	210	83	400	52
3	76	356	225	110	500	92
4	102	432	260	143	700	173
6	152	559	295	217	*406	285
8	203	660	330	264	*406	504
10	254	787	370	313	*600	680
12	305	838	425	400	*600	819

Reduced Bore Class 600

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	292	180	78	350	46
3*2	51	76	356	210	83	400	74
4*3	76	102	432	225	110	500	120
6*4	102	152	559	260	143	700	249
8*6	152	203	660	295	217	*406	380
10*8	203	254	787	330	264	*406	587
12*10	254	305	838	370	313	*600	752

* Gear Operated

Full Bore Class 900

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	368	210	83	450	60
3	76	381	225	110	600	100
4	102	457	260	143	*305	204
6	152	610	295	225	*406	420
8	203	737	335	270	*600	644
10	254	838	377	320	*600	943
12	305	965	510	415	*600	1295

Reduced Bore Class 900

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	368	180	78	400	54
3*2	51	76	381	210	83	450	80
4*3	76	102	457	225	110	600	148
6*4	102	152	610	260	143	*305	305
8*6	152	203	737	295	225	*406	552
10*8	203	254	838	335	270	*600	748
12*10	254	305	965	377	320	*600	1048

* Gear Operated

Full Bore Class 1500

Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	368	210	83	450	69
3	76	470	235	120	700	133
4	102	546	290	153	*406	256
6	146	705	300	235	*600	667
8	194	832	350	282	*600	865
10	241	991	400	335	*600	1375
12	289	1130	525	425	*600	2175

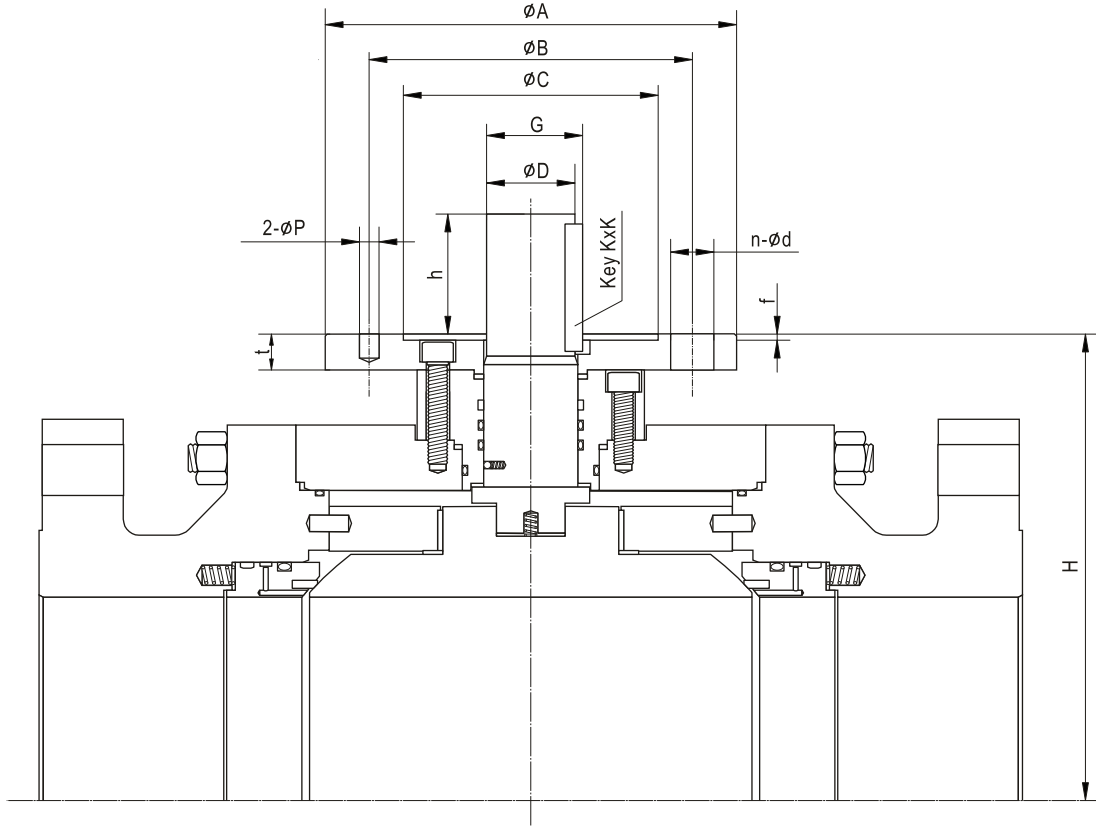
Reduced Bore Class 1500

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	368	180	78	400	63
3*2	51	76	470	235	120	450	95
4*3	76	102	546	290	153	700	183
6*4	102	146	705	300	235	*406	359
8*6	146	194	832	350	282	*600	794
10*8	194	241	991	400	335	*600	1070
12*10	241	289	1130	525	425	*600	1541

* Gear Operated

Note: Redstar reserves the right to make any modifications without notice.

Torque Value & Mounting Flange Dimensions



Size inch	Class	Torque		Flange Dimensions mm							ISO5211 Flange No.	Key Size KxK mm	G mm	D mm	h mm	H mm
		N.m	lbf.ft	A	B	C	f	t	n-d	P						
2*1-1/2	150	42	31	90	70	55	3	12	4-9	6	F07	6x6	25	22	25	95
	300	66	49	90	70	55	3	12	4-9	6	F07	6x6	25	22	25	95
	600	102	75	90	70	55	3	12	4-9	6	F07	6x6	25	22	25	95
	900	142	105	90	70	55	3	12	4-9	6	F07	6x6	25	22	25	100
	1500	241	178	90	70	55	3	15	4-9	6	F07	6x6	25	22	25	100
	2500	423	312	125	102	70	3	15	4-11	8	F10	8x8	32	28	30	115
2	150	76	56	90	70	55	3	12	4-9	6	F07	6x6	25	22	25	103
	300	91	67	90	70	55	3	12	4-9	6	F07	6x6	25	22	25	103
	600	143	105	90	70	55	3	12	4-9	6	F07	6x6	25	22	25	102
	900	231	170	125	102	70	3	17	4-11	8	F10	8x8	32	28	30	117
	1500	349	257	125	102	70	3	17	4-11	8	F10	8x8	32	28	30	117
	2500	798	589	150	125	85	3	20	4-13	10	F12	10x10	41	36	55	141
3	150	121	89	125	102	70	3	15	4-11	8	F10	8x8	32	28	30	129
	300	159	117	125	102	70	3	15	4-11	8	F10	8x8	32	28	30	129
	600	269	198	125	102	70	3	15	4-11	8	F10	8x8	32	28	30	132
	900	524	386	150	125	85	3	18	4-13	10	F12	10x10	41	36	55	140
	1500	887	654	150	125	85	3	18	4-13	10	F12	10x10	41	36	55	153
	2500	1583	1168	175	140	100	4	24	4-18	10	F14	12x12	51	45	65	169
4	150	179	132	125	102	70	3	15	4-11	8	F10	8x8	32	28	30	150
	300	355	262	125	102	70	3	15	4-11	8	F10	8x8	32	28	30	150
	600	670	494	150	125	85	3	18	4-13	10	F12	10x10	41	36	55	160
	900	875	645	175	140	100	4	20	4-18	10	F14	12x12	51	45	65	172
	1500	1351	996	210	165	130	5	24	4-22	12	F16	14x14	57	50	75	193
	2500	2111	1557	210	165	130	5	26	4-22	12	F16	14x14	62	55	80	205

Torque Value & Mounting Flange Dimensions

Size inch	Class	Torque		Flange Dimensions mm							ISO5211 Flange No.	Key Size KxK mm	G mm	D mm	h mm	H mm
		N.m	lbf.ft	A	B	C	f	t	n-d	P						
6	150	631	465	150	125	85	3	18	4-13	10	F12	10x10	41	36	55	188
	300	854	630	150	125	85	3	18	4-13	10	F12	10x10	41	36	55	188
	600	1609	1187	175	140	100	4	20	4-18	10	F14	12x12	51	45	65	208
	900	1927	1421	210	165	130	5	22	4-22	12	F16	14x14	62	55	80	215
	1500	3512	2590	210	165	130	5	24	4-22	14	F16	16x16	68	60	90	235
	2500	5454	4023	300	254	200	5	28	8-18	16	F25	16x16	73	65	95	270
8	150	987	728	210	165	130	5	20	4-22	10	F16	12x12	51	45	60	233
	300	1562	1152	210	165	130	5	20	4-22	10	F16	12x12	51	45	60	233
	600	2501	1845	210	165	130	5	22	4-22	12	F16	14x14	62	55	80	249
	900	4012	2959	210	165	130	5	22	4-22	14	F16	16x16	68	60	90	266
	1500	6513	4804	300	254	200	5	28	8-18	16	F25	18x18	79	70	105	285
	2500	8495	6266	300	254	200	5	32	8-18	16	F25	18x18	84	75	110	355
10	150	1321	974	210	165	130	5	20	4-22	12	F16	14x14	62	55	80	278
	300	2304	1699	210	165	130	5	20	4-22	12	F16	14x14	62	55	80	278
	600	3450	2545	210	165	130	5	24	4-22	14	F16	16x16	68	60	90	300
	900	5017	3700	300	254	200	5	25	8-18	16	F25	18x18	79	70	105	315
	1500	7996	5898	300	254	200	5	28	8-18	16	F25	18x18	84	75	110	345
	2500	13148	9697	300	254	200	5	32	8-18	16	F25	20x20	95	85	125	412
12	150	1650	1217	210	165	130	5	24	4-22	14	F16	16x16	68	60	90	318
	300	3041	2243	210	165	130	5	24	4-22	14	F16	16x16	68	60	90	320
	600	4507	3324	300	254	200	5	25	8-18	16	F25	18x18	79	70	105	345
	900	6512	4803	300	254	200	5	28	8-18	16	F25	18x18	84	75	110	360
	1500	10078	7433	300	254	200	5	30	8-18	16	F25	20x20	95	85	125	408
	2500	18007	13281	350	298	260	5	38	8-22	20	F30	24x24	107	95	140	478
14	150	2415	1781	300	254	200	5	26	8-18	16	F25	16x16	73	65	95	353
	300	4019	2964	300	254	200	5	26	8-18	16	F25	16x16	73	65	95	360
	600	6578	4852	300	254	200	5	28	8-18	16	F25	18x18	84	75	110	376
	900	9489	6999	300	254	200	5	28	8-18	16	F25	20x20	95	85	125	388
	1500	14860	10960	300	254	200	5	35	8-18	16	F25	24x24	107	95	140	448
16	150	3314	2444	300	254	200	5	28	8-18	16	F25	18x18	84	75	110	393
	300	5350	3946	300	254	200	5	28	8-18	16	F25	18x18	84	75	110	406
	600	9025	6656	300	254	200	5	28	8-18	16	F25	20x20	95	85	125	414
	900	12877	9498	300	254	200	5	30	8-18	16	F25	24x24	107	95	140	442
	1500	21857	16121	350	298	230	5	35	8-22	20	F30	28x28	119	105	155	490
18	150	5148	3797	300	254	200	5	28	8-18	16	F25	18x18	84	75	110	435
	300	8375	6177	300	254	200	5	28	8-18	16	F25	20x20	95	85	125	448
	600	13493	9952	300	254	200	5	30	8-18	16	F25	24x24	107	95	140	458
	900	18975	13995	350	298	230	5	32	8-22	20	F30	28x28	119	105	165	487
	1500	29032	21413	350	298	230	5	38	8-22	20	F30	32x32	136	120	180	545
20	150	6425	4739	300	254	200	5	30	8-18	16	F25	20x20	90	80	120	477
	300	10987	8104	300	254	200	5	30	8-18	16	F25	24x24	107	95	140	485
	600	18502	13646	350	298	230	5	32	8-22	20	F30	28x28	119	105	165	510
	900	26048	19212	350	298	230	5	38	8-22	20	F30	32x32	136	120	180	530
	1500	40907	30171	415	356	260	5	42	8-33	28	F35	36x36	158	140	210	580
24	150	12379	9130	300	254	200	5	32	8-18	16	F25	24x24	102	90	135	562
	300	19384	14297	350	298	230	5	32	8-22	20	F30	28x28	124	110	165	565
	600	29546	21792	350	298	230	5	38	8-22	20	F30	32x32	136	120	180	602
	900	42379	31257	415	356	260	5	42	8-33	28	F35	36x36	158	140	210	630
	1500	65223	48106	475	406	300	8	48	8-39	28	F40	40x40	180	160	240	730

Notes:

- 1.Valves with ISO 5211 mounting flange and adaptability for all types actuators mounting.
- 2.The torque is for valves with PTFE seat or Nylon seat as per different size/class selection.
- 3.The torque value showed in above table is the valve torque at normal temperature. For customer's sizing actuator:
 - a.If medium temperature is -10°C~40°C, the output torque of actuator should be 1.5 times the valve torque;
 - b.If medium temperature is less than -10°C, the output torque of actuator should be 2 or 2.5 times the valve torque.

FLOW COEFFICIENT SPECIFICATION TABLE

Nominal Size in/mm	Class 150 PN 20		Class 300 PN 50		Class 600 PN 100		Class 900 PN 150		Class 1500 PN 250	
	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv
½ 15	25	21	25	18	20	17	16	14	16	14
□ 20	56	48	56	40	4	3	34	29	34	29
1 25	95	81	95	69	64	54	55	47	55	47
1 ½ 40	308	262	308	223	308	262	165	140	165	140
2 50	500	425	430	361	370	315	320	272	320	272
3 80	1,360	1,156	1,100	983	1,020	867	920	782	820	697
4 100	2,500	2,125	2,000	1,806	1,850	1,573	1,760	1,496	1,600	1,360
6 150	4,060	3,451	4,056	2,933	3,410	2,899	4,300	3,655	4,150	3,528
8 200	8,090	6,877	7,700	5,845	6,730	5,721	8,475	7,204	8,010	6,809
10 250	13,510	11,484	13,090	9,761	11,120	9,452	14,160	12,036	13,220	11,237
12 300	20,440	17,374	19,830	14,768	17,440	14,824	21,200	18,020	18,800	15,980
14 350	25,050	21,293	23,770	18,099	22,010	18,709	26,700	22,695	24,180	20,553
16 400	34,200	29,070	32,595	24,710	29,980	25,483	36,600	31,110	33,150	28,178
18 450	44,430	37,766	43,200	32,101	39,520	33,592	49,000	41,650	45,703	38,848
20 500	57,665	49,015	55,380	41,663	50,450	42,883	64,600	54,910	60,750	51,638
22 550	70,080	59,568	70,080	50,633	68,900	58,565				
24 600	87,680	74,528	84,720	63,349	76,630	65,136				
28 700	120,000	102,000	115,350	86,700	107,510	91,384				
30 750	141,850	120,573	136,600	102,487	125,630	106,786				
32 800	160,390	136,332	152,200	115,882	140,900	119,765				
36 900	205,450	174,633	192,995	148,438	239,160	203,286				
40 1000	248,700	211,395	248,700	179,686	239,160	203,286				
42 1050	275,260	233,971	275,260	198,875	275,260	233,971				
48 1200	364,180	309,553	364,180	263,120	364,180	309,553				
56 1400	529,430	450,016	529,430	382,513	520,500	442,425				

CALCULATION OF FLOW COEFFICIENT

Flow coefficient Cv (Kv is the metric equivalent) is the rate of flow in gallon per minute with the pressure drop of 1 psi across the valve. The flow coefficients shown in the above table are determined with equations as follows:

For liquids:

$$Q_1 = C_v \cdot (\Delta P / SG)^{1/2}$$

Where:

- Q₁ = Flow of liquid (gallon/minute)
- ΔP = Pressure drop in psi (P₁-P₂)
- SG = Specific gravity (1 for liquid)

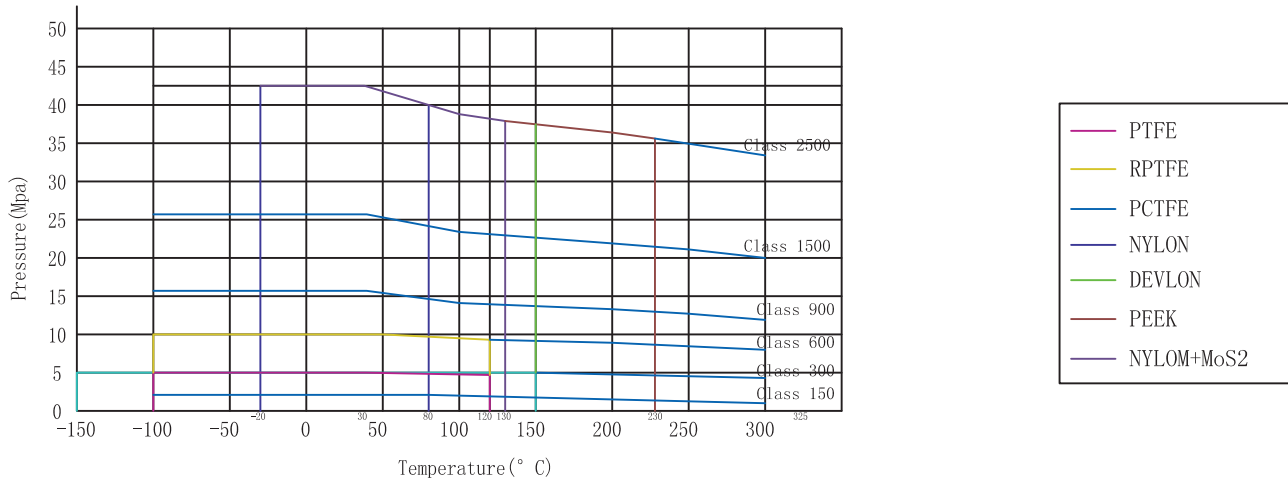
For gases (non-critical):

$$Q_g = 61 \cdot C_v \cdot (P_2 \cdot P_1 / SG)^{1/2}$$

Where:

- Q_g = Flow of gases (SFH at STP)
- P₂ = Outlet pressure (psi)
- P₁ = Inlet pressure (psi)
- SG = Specific gravity (1 for gas)

Temperature VS Pressure for Soft Seat



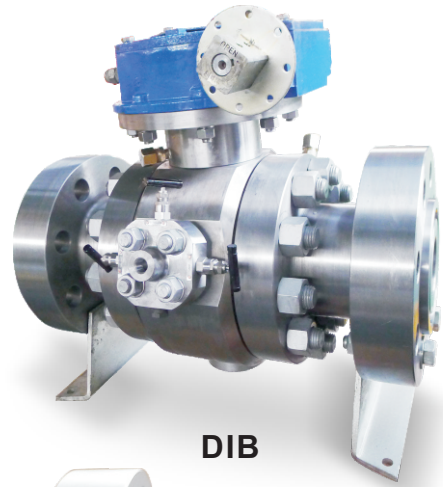
MATERIAL OF CONSTRUCTION

PART	MATERIAL OPTIONS
BODY	ASTM - A 216 WCB / WCC / LF2 / A 105 / A 351 CF8M / A 351 CF3M / A 352 LCB / LCC / A 217 CA15 / DUPLEX SS / INCONEL / 254 SMO.
BODY ADAPTER	ASTM - A 216 WCB / WCC / LF2 / A 105 / A 351 CF8M / A 351 CF3M / A 352 LCB / LCC / A 217 CA15 / DUPLEX SS / INCONEL / 254 SMO.
BALL	ASTM - A 216 WCB/WCC + ENP / A 351 CF8M / A 351 CF3M / A 217 CA 15 / DUPLEX SS / INCONEL / MONEL
STEM HOUSING	ASTM - A 216 WCB / A351 CF8M / A 351 CF3M / A 352 LCB / A 217 CA 15
STEM	A 479 SS 316 / A 479 SS 316L / A 182 F 6A / A 564 TYPE 630 / A 479 SS 410 / AISI 4140 + ENP / ASTM A 182 F51, F53, F44 / INCONEL (625, 825, 718)
SEAT	ASTM - A 105 + ENP / A 182 F316 / ASTM A 182 F6A / DUPLEX SS / INCONEL / F44 / Lf2
SEAT INSERT	RPTFE / NYLON / PEEK / DEVLON / PCTFE
STEM GASKET	GRAPHITE / LIP SEAL
BODY GASKET	GRAPHITE / REINFORCED SPIRAL-WOUND SS 316 GRAPHITE / LIP SEAL
STEM H. GASKET	GRAPHITE / LIP SEAL
TRUNNION GASKET	GRAPHITE / LIP SEAL
O RING	VITON (SPECIAL O-RING ON REQUEST)
TRUNNION	A 479 SS 316 / A 479 SS 316L / A 182 F 304 / A 182 F 316 / A 182 F 410 / A 564n TYPE 630 / A 105 / LF2 / DUPLEX SS / INCONEL
ISO MTG FLANGE	STEEL
SPRINGS	ASTM - A 313 SS 302 / ASTM B 637 (INCONEL 750) / INCONEL 718
THRUST WASHER	PHOSPHOR BRONZE / A 479 SS 316 + BRONZE + PTFE COATED / A 479 SS 316 + PTFE COATED
STUDS / BOLTS / CAP SCREW	ASTM - A 320 L7, L7M / A 193 B8M / A 193 B7 / A 193 GR. B7M
NUT	ASTM - A 194 GR 7M / A 194 GR 8M / A 194 2H / A 194 GR 2HM
BEARING	A 479 SS 316 + PTFE COATED
COUPLING	STEEL + PLATING
SUPPORT STAND	STEEL
LIFTING HOOK	STEEL
BRACKET	STEEL
DRAIN PLUG/ NEEDLE VALVE	STANDARD

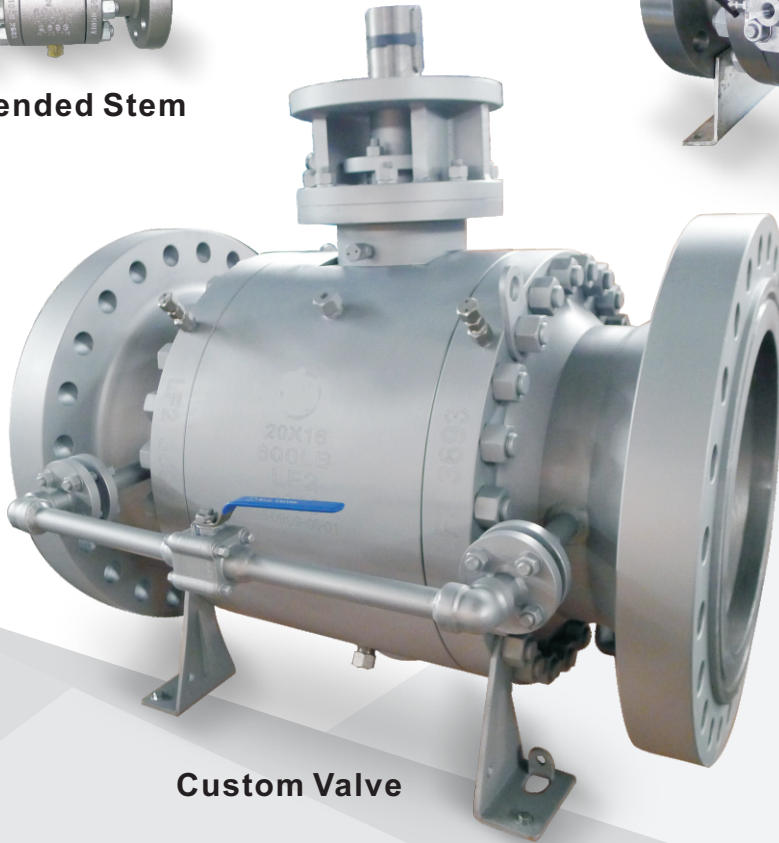
Note : Materials not listed above can be offered on request.



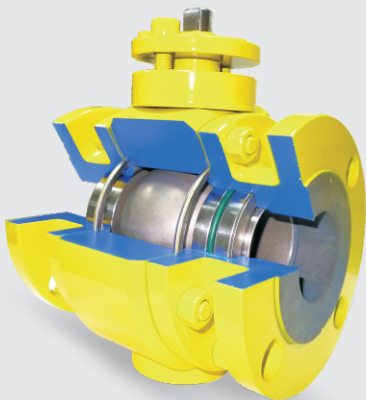
Extended Stem



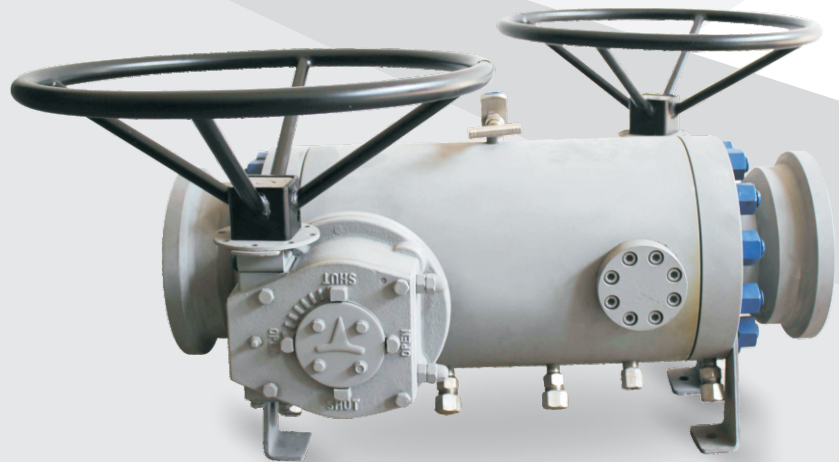
DIB



Custom Valve



Metal Seated



DBB (Double Block & Bleed, Twin Ball)

Product Selection Code

Size	Design	Construction	End Connection	Ratings	Bore	Body	Ball Coating	Seat Coating	O-Ring	Fire Safety	Operation	Special Test
1/2" ~56"	N S M P W X C D T L E U B	1 2 3	RF RS FF FS RT SW SN BS NP BW DN BT SG LG TG BN O	1 2 3 4 5 6 8 9 0	F R	C 1 7 L 8 2 4 6 3 5 A U W X M O	C 1 7 L 8 2 4 6 3 5 A U W I M O	1 2 4 6 3 5 U I M T G N L D P E V O	0 1 2 3 4 5 6 7 8 9	F N	B G L A C O	SI PP SE BE DP SP LP JK LT XX

<p>Design</p> <p>Size - 1/2" ~56"</p> <p>Design</p> <p>N - Side Entry Soft Seated Trunnion S - Side Entry Soft Seated Floater M - Side Entry Metal Seated Trunnion P - Side Entry Metal Seated Floater W - Side Entry Welded Body Trunnion X - Side Entry Welded Body Floater C - Side Entry Cryogenic Trunnion D - Side Entry Cryogenic Floater T - Side Entry Multi Port (T Port) L - Side Entry Multi Port (L Port) E - Top Entry Soft Seated Trunnion U - Top Entry Metal Seated Trunnion B - Top Entry Cryogenic Trunnion</p> <p>Construction</p> <p>1 - One Piece 2 - Two Piece 3 - Three Piece</p> <p>End Connection</p> <p>RF - Flanged Raised Face Serrated RS - Flanged Raised Face Smooth FF - Flanged Flat Face Serrated FS - Flanged Flat Face Smooth RT - Flanged RTJ SW - Socket Weld SN - Socket Weld With Nipple Extension BS - Screwed BSP NP - Screwed NPT BW - Butt Weld DN - DIN BT - Screwed BSPT SG - Small Groove LG - Large Groove TG - Tongue & Groove BN - Butt Weld + Nipple Ext. O - Other than above</p> <p>Ratings</p> <p>1 - 150# / PN16 2 - 1500# 3 - 300# / PN40 4 - 400# / PN64 5 - 2500# 6 - 600# 8 - 800# 9 - 900# O - Other than above</p>	<p>Bore</p> <p>F - Full R - Reduced / Regular</p> <p>Body & Ball</p> <p>C - WCB 1 - A105 7 - WCC L - LCB 8 - LF2 2 - LCC 4 - CF8 / SS304 / F304 6 - CF8M / SS316 / F316 3 - CF3 / SS304L / F304 5 - CF3M / SS316L / F316L A - CA 15 / SS 410 / F6A U - Duplex SS W - Super Duplex I - Inconel M - Monel O - Other than above</p> <p>Ball/Seat Coating (If applicable)</p> <p>e - ENP w - Overlay h - Hard Chrome s - Stellite c - Chrome Carbide t - Tungsten Carbide n - Chromium Nitride O - Other than above</p> <p>Seat</p> <p>1 - A105 2 - LF2 4 - F304 6 - F316 3 - F304L 5 - F316L U - Duplex SS I - Inconel M - Monel T - PTFE G - RPTFE N - Nylon-PA 12 L - Nylon-Devlon D - Delrin P - PEEK E - PCTFE V - VITON O - Other than above</p>	<p>O-Ring</p> <p>0 - None 1 - Viton 2 - Teflon 3 - HNBR 4 - NBR 5 - EPDM 6 - FVMQ 7 - FFKM 8 - AFLAS 9 - Special</p> <p>Fire Safety</p> <p>F - Fire Safe N - Non-Fire Safe</p> <p>Operator</p> <p>B - Bare Stem G - Gear L - Hand Lever A - Actuated C - Chain Wheel O - Other than above</p> <p>Special Requirement</p> <p>SI - Sealant Injection PP - Pup Piece SE - Stem Extension BE - Bonnet Extension DP - Double Piston Effect Non Relieving) SP - Short Pattern LP - Long Pattern JK - Jacketed LT - Low Temp. (-46°C/-50°F) XX - Special Requirement To Be Specified</p>
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Examples

12	N	3	RT	9	F	1	1e	L	1	F	G	BE,SI
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Above stands for 12 inch side entry soft seated trunnion, three pieces body, RTJ ends, 900#, Full Bore, A 105 Body, A105 Ball with ENP coating, Nylon seat, viton O-ring, Fire Safe, Gear Operated, Bonnet extension with sealant injection facility



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WUXING INDUSTRIAL ZONE, OUBEI,YONGJIA,ZHEJIANG

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