Athena GROUP

MANUAL BALL VALVE

ATHENA ENGINEERING S.R.L.

www.athenavalve.com

Figure Numbers

Example:	12	TF	1	R	A	22666	-G	-NC
	1	2	3	4	5	6	7	8

i.e. 12" 3PC body forged trunnion mounted ball valve, class 150, raised cace flange end, A105 body/adapter, nylon seat insert, viton O-Ring, 316 stem, 316 ball, 316 seat ring, gear operation, NACE MR-01-75 standard.

1 Valve Size

Full Bore

NPS	1/2"	3/4"	1"	1-1/2"	2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"
DN	15	20	25	40	50	65	80	100	125	150	200	250	300
Symbol	1/2	3/4	1	1-1/2	2	2-1/2	3	4	5	6	8	10	12
NPS	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	40"
DN	350	400	450	500	550	600	650	700	750	800	850	900	1000
Symbol	14	16	18	20	22	24	26	28	30	32	34	36	40

Reduced Bore

NPS	3/4*1/2"	1*3/4"	1-1/2*1"	2*1-1/2"	3*2"	4*3"	6*4"	8*6"	10*8"
DN	20*15	25*20	40*25	50*40	80*50	100*80	150*100	200*150	250*200
Symbol	3/4*1/2	1*3/4	1-1/2*1	2*1-1/2	3*2	4*3	6*4	8*6	10*8
NPS	12*10"	14*12"	16*14"	18*16"	20*18"	24*20"	30*24"	36*30"	40*34"
DN	300*250	350*300	400*350	450*400	500*450	600*500	750*600	900*750	1000*850
Symbol	12*10	14*12	16*14	18*16	20*18	24*20	30*24	36*30	40*34

2 Valve type

Symbol	Floating Ball Valve	Symbol	Trunnion Mounted Ball Valve
FC	2PC Body Cast Floating Ball Valve	TF	3PC Body Forged Trunnion Mounted Ball Valve
FR	1PC Body Cast Floating Ball Valve	TC	2PC Body Cast Trunnion Mounted Ball Valve
FF	2PC Body Forged Floating Ball Valve	TT	Top Entry Forged Trunnion Mounted Ball Valve
FS	Small Sizes Forged Floating Ball Valve	TW	Full Welded Trunnion Mounted Ball Valve
FM	Metal to Metal Seat Floating Ball Valve	TM	Metal to Metal Seat Trunnion Mounted Ball Valve

3 Nominal Pressure

Class	150	250	300	400	600	800	900	1500	2500
Symbol	1	2	3	4	6	8	9	15	25

4 End Type

Symbol	Type	Symbol	Type
R	Raised Face Flange	S	Socket Welding End
J	Ring Joint Flange	N	Screwed End
F	Flat Face Flange	SN	Socket Welding End x Screwed End
B	Butt-Welding End	W	Wafer

Figure Numbers

5 Body/Adapter Material

Material											
	Cast	WCB	WCC	LCB	LCC	LC3	WC1	WC6	WC9	C5	C12
	Forged	A105		LF2				F11	F22	F5	F9
Symbol		A	B	C	D	V	U	I	J	K	L
Material	Cast	CF8	CF8M	CF3	CF3M	CF8C	CN7M	MONEL			
	Forged	F304	F316	F304L	F316L	F347	Alloy 20		F321	F51	F53
Symbol		F	E	H	G	Q	S	M	N	P	T

6 Trim Material

Floating Ball

Seat		Stem		Ball	
Symbol	Material	Symbol	Material	Symbol	Material
1	PTFE	1	13Cr	1	13Cr
2	Nylon 1010	2	304	2	304
3	Delrin	3	A105/ENP*	3	A105/ENP*
4	PPL	4	17-4PH	4	17-4PH
5	Molon	5	4140/ENP*	5	4140/ENP*
6	PEEK	6	316	6	316
7	Nylon 12	7	304L	7	304L
		8	316L	8	316L
9	RPTFE	9	LF2/ENP*	9	LF2/ENP*
		A	4130/ ENP*	A	4130/ ENP*
		B	13Cr/Hard Cr	B	13Cr/Hard Cr
		C	F51	C	F51

Trunnion Mounted Ball

Seat Insert		O-Ring Seals		Stem		Ball		Seat Ring	
Symbol	Material	Symbol	Material	Symbol	Material	Symbol	Material	Symbol	Material
1	PTFE	1	NBR	1	13Cr	1	13Cr	1	13Cr
2	Nylon 1010	2	Viton-A	2	304	2	304	2	304
3	PEEK	3	Viton AED	3	A105/ENP*	3	A105/ENP*	3	A105/ENP*
4	PPL	4	Viton-B	4	17-4PH	4	17-4PH	4	17-4PH
5	Molon	5	HSN(H-NBR)	5	4140/ENP*	5	4140/ENP*	5	4140/ENP*
6	Devlon V	6	PTFE Coated Viton	6	316	6	316	6	316
7	Nylon 12	7	Viton GLT + AED	7	304L	7	304L	7	304L
		8	EPDM	8	316L	8	316L	8	316L
9	RPTFE			9	LF2/ENP*	9	LF2/ENP*	9	LF2/ENP*
				A	4130/ ENP*	A	4130/ ENP*	A	4130/ ENP*
				B	13Cr/Hard Cr	B	13Cr/Hard Cr	B	13Cr/Hard Cr
				C	F51	C	F51	C	F51

* ENP thickness 0.003" is our standard ; thickness 0.001" is on request.

7 Valve Actuator

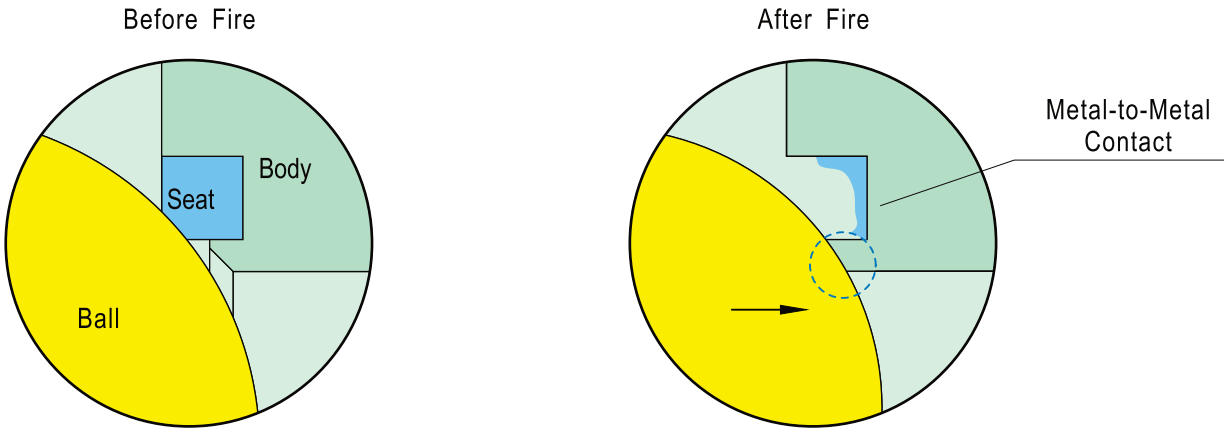
Type	Lever	Gear	Electric Actuator	Pneumatic Actuator	Bare Stem
Symbol	None	G	E	P	B

8 Special Code

Description	Extend Stem	Locking Device	NACE MR-01-75	SHELL Standard
Symbol	ES	LD	NC	SH

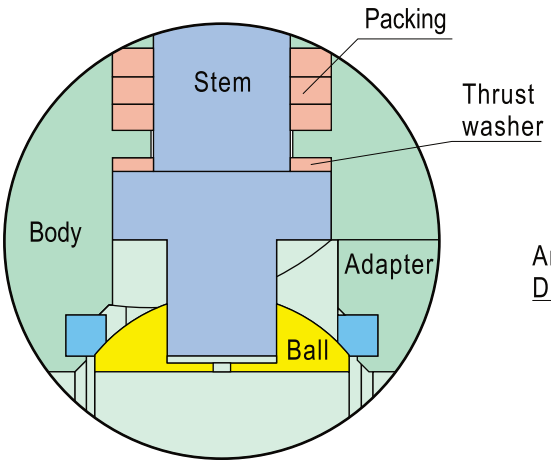
Floating Ball Valves

- ***Fire Safe Seat Sealing***



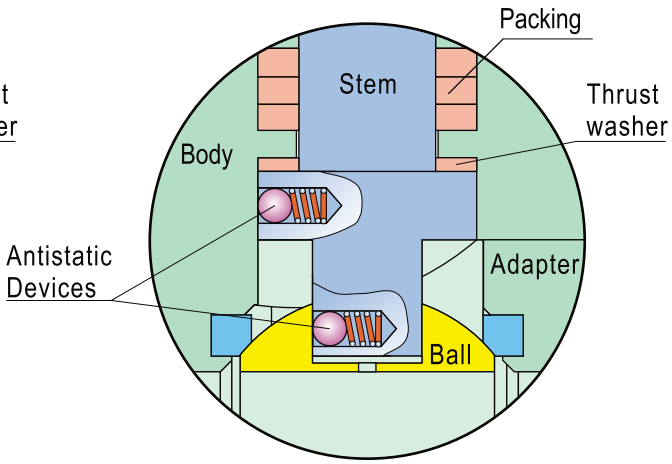
Athena floating ball valves' fire safe is designed in accordance with API607 & API SPEC 6FA. When non-m etal resilient seats are destroyed in a fire, the upstream medium pressure push the ball into the downst ream metal seat lip to cut off the line fluid and prevent the internal leakage due to a secondary metal-t o-metal seals.

- ***Blow-out Proof Stem***



The stem isdesigned with integral T-type shoulder to provide blow-out proof effectively. It is internally inserted as the backseat function to assure stem sealing safety at all pressures.

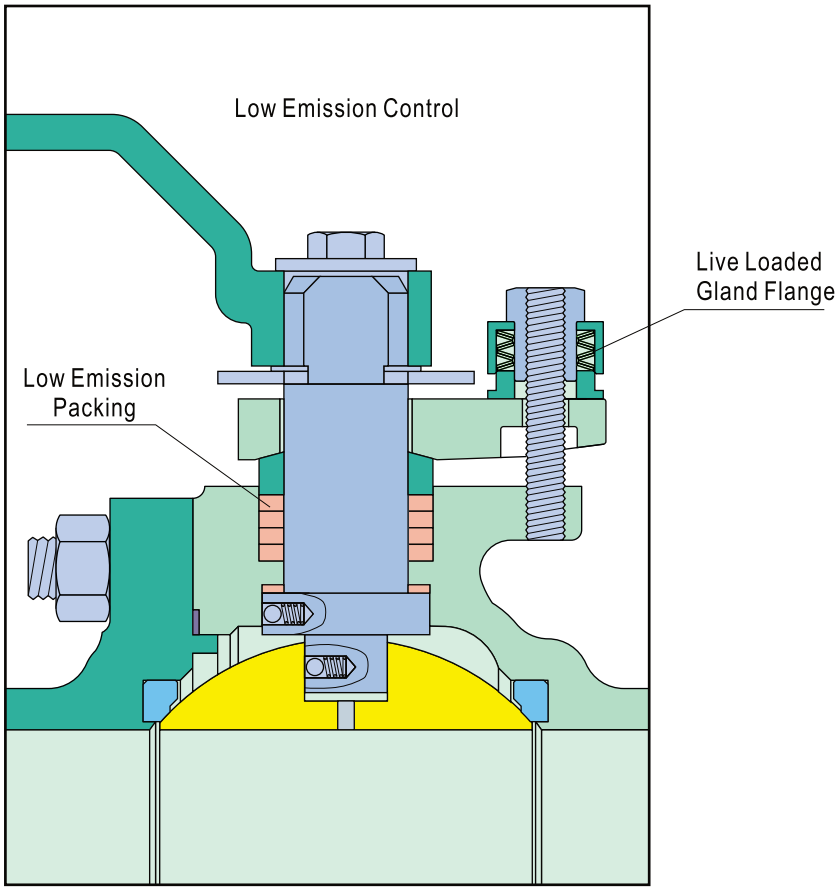
- ***Anti-Static Device***



Antistatic devices between ball & stem and stem & body are assembled by a spring & a stainless steel ball, which ensure all metal valve parts are grounding.

Floating Ball Valves

With more and more concern for environment protection in the whole world, low emission valve will be widely used. Low emission valve can prevent poisonous, flammable, explosive medium from leaking to pollute the air, and also important that low emissions valve can minimum fugitive emission of VOC to help solve the problem of BGlobaWarmingC.



- ***Low Emission Packing***

Because of frequent opening and closing of the valve, normal graphite granule can be drawn by the stem, which will cause leakage.Athena designed low emissions valve use special low emissions packing to ensure the seal of stem. The cone packing is made of expanding graphite in die-formed rings and has feature s of heat resistance, less stress relaxation and low creep. With this special structure, it allows for a low-fri ction on rotary & rising stem valve, therefore providing the stabilized sealing performance for long cycle life. For low temperature service, the standard V shape PTFE packing rings are used for low emissions control.

- ***Controlled Stem and Stuffing Box Finish***

It;s also a key point to control the stem and stuffing box finish when machining. The stem is made by cold rolling and stem surface finish is controlled by Ra0.4, which can reduce friction for stem moving and ensure the graphite to fill and migrate into the stems micro scratches, and function as a lubricant to reduce stem leakage. The stuffing box surface is controlled within Ra1.6 and Ra3.2 for better holding of the packing ring and results in a better sealing performance.

- ***Live Loaded Gland Flange***

In normal case, valve packing is tighten by gland and gland bolting. During the service, the gland load retention will be reduced by long time pressure from medium, which will cause possible leakage with loosened packing. Athena designed low emissions valve use a set of Belleville springs installed on eachgl and stud to provide a continuous compressive force on gland, which guarantees permanent load retention for the stem packing to avoid fugitive emissions.

2PC Body Cast Floating Ball Valve

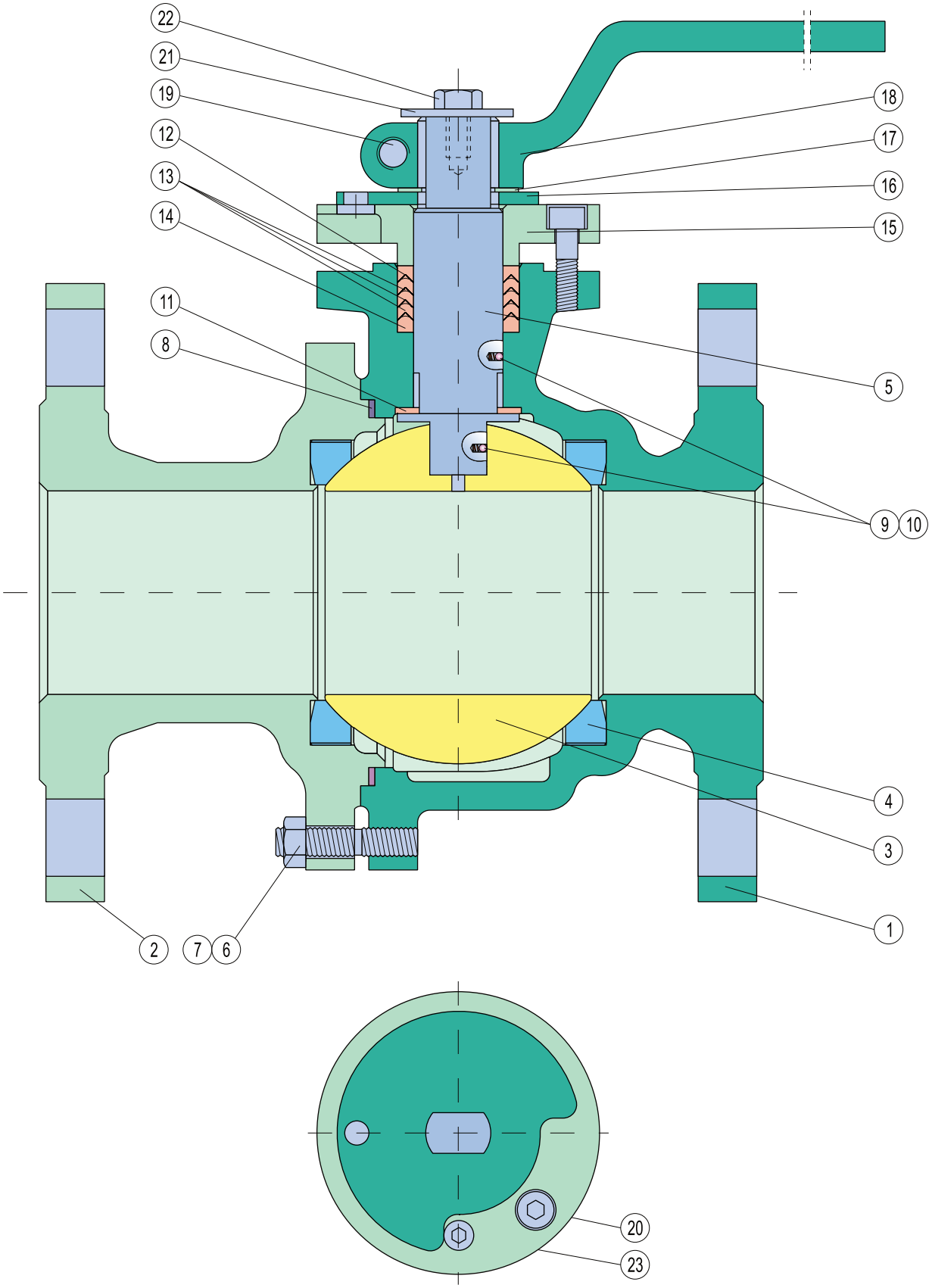
Features

Size: 1/2"~10"
Class: 150~300
Two Pieces Cast Steel Body
Floating Ball, Full & Reduced Bore
Anti-Static Device
Blow-out Proof Stem
Fire Safe Design
Low Emission

Specifications

Design	ASME B16.34/BS 5351/API6D
Face to Face	ASME B16.10
End to End	ASME B16.10
End Flange	ASME B16.5
BW End	ASME B16.25
Test	API 598/ BS 6755
Fire Safe Test	API 607/API 6FA
Special	NACE MR-01-75

2PC Body Cast Floating Ball Valve



2PC Body Cast Floating Ball Valve

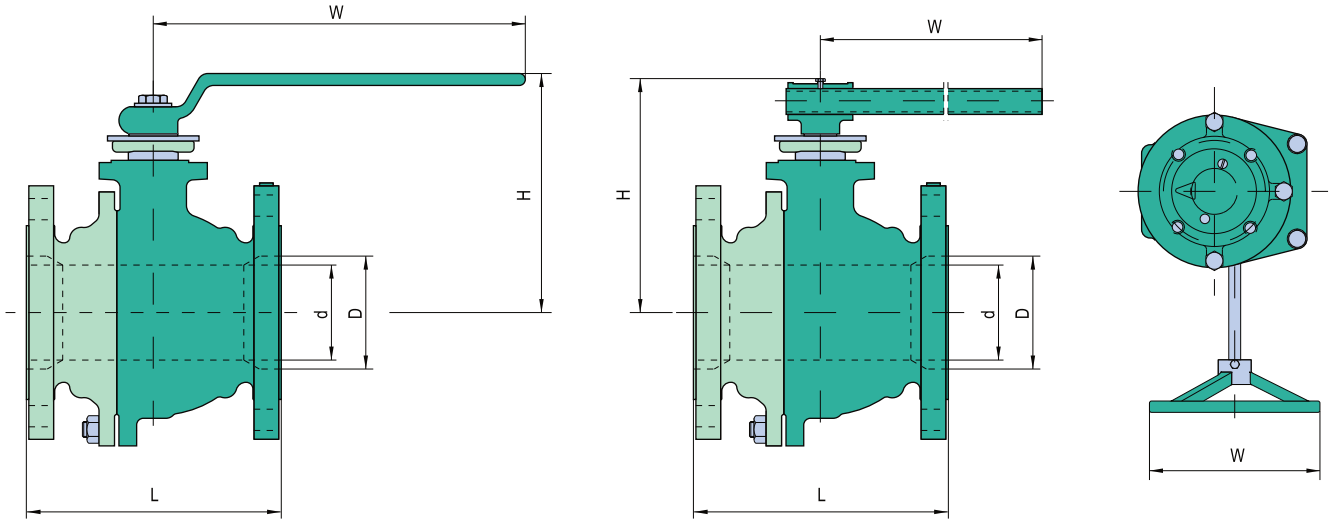
Material Specifications

No.	Part	WCB/ENP	WCB/316	CF8M/316	LCC/316 NACE
1	Body	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
2	Adapter	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
3	Ball	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
4	Seat	PTFE	PTFE	PTFE	PTFE
5	Stem	ASTM A182-F6a	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
6	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
7	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
8	*Body Gasket	304SS + Graphite	316SS + Graphite	316SS + Graphite	316SS + Graphite
9	Antistatic Spring	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
10	Steel Ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
11	Thrust Washer	PTFE	PTFE	PTFE	PTFE
12	*Top Packing	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite
13	*Middle Packing	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite
14	*Bottom Packing	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite
15	Gland Flange	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
16	Stop Plate	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
17	Retainer	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
18	Lever	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
19	Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
20	Screw	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
21	Washer	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
22	Bolt	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
23	Screw	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel

* Recommended Spare Parts

2PC Body Cast Floating Ball Valve

Dimensions and Weights



Full Bore — Class 150

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	108	81	150	2.2
3/4	19	117	85	150	2.7
1	25	127	98	180	4.5
1-1/2	38	165	133	280	7.0
2	51	178	141	280	9.5
2-1/2	64	191	139	400	15.0
3	76	203	150	400	19.0
4	102	229	223	650	30.0
5	125	356	276	1100	58.0
6	152	394	297	*300	75.0
8	203	457	378	*300	115.0
10	254	533	408	*400	180.0

Reduced Bore — Class 150

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	117	81	150	2.5
1*3/4	19	25	127	85	150	4.0
1-1/2*1	25	38	165	98	180	6.2
2*1-1/2	38	51	178	133	280	8.6
2-1/2*2	51	64	191	141	280	13.0
3*2	51	76	203	141	280	18.9
4*3	76	102	229	150	400	23.0
6*4	102	152	267	223	650	55.0
8*6	152	203	292	297	*300	83.0
10*8	203	254	330	378	*300	122.0

* Gear Operated

Full Bore — Class 300

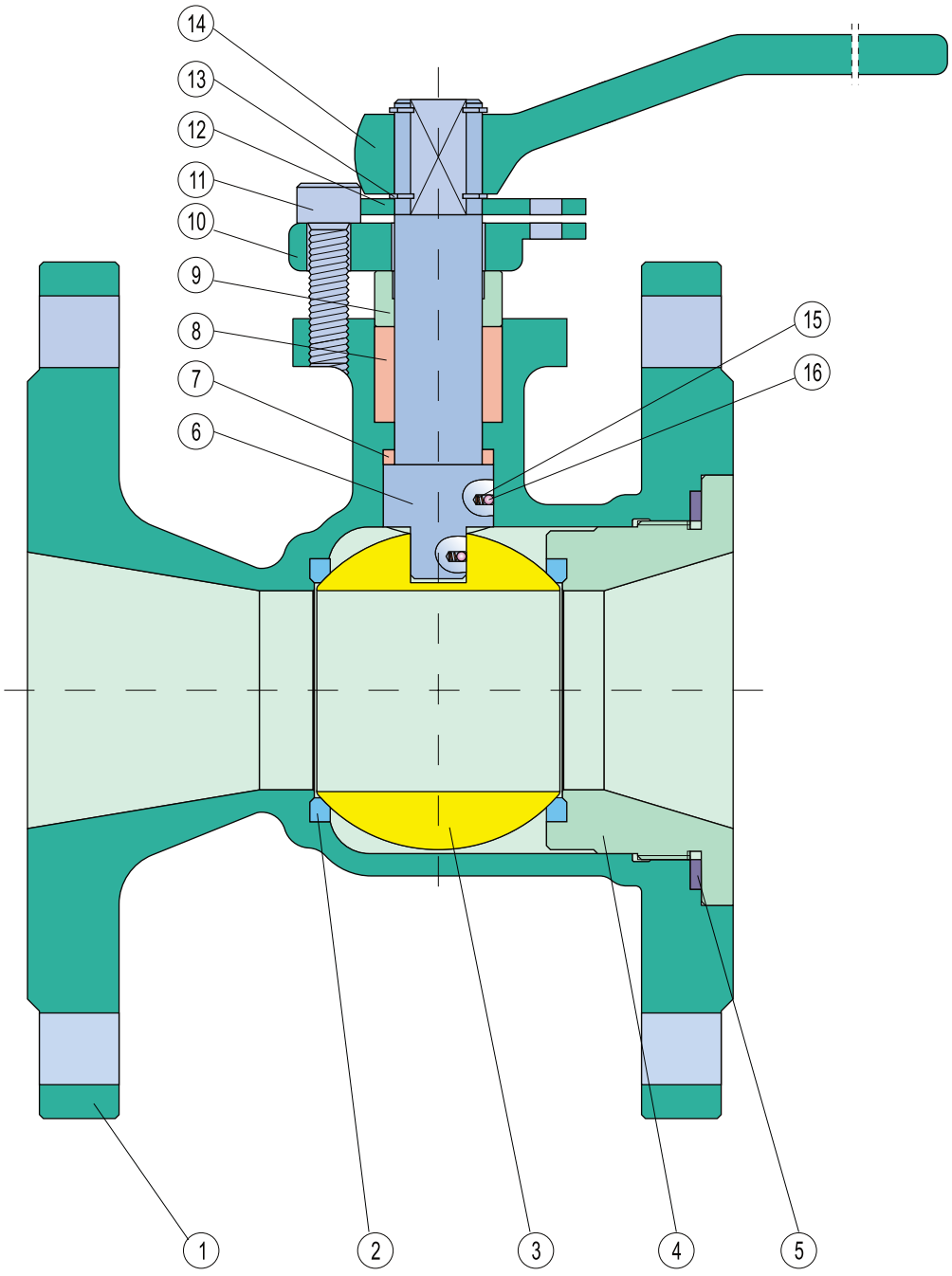
Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	140	81	150	2.5
3/4	19	152	85	150	3.5
1	25	165	98	180	5.5
1-1/2	38	191	133	280	9.0
2	51	216	141	280	13.0
2-1/2	64	241	139	400	21.0
3	76	283	150	400	27.0
4	102	305	223	650	40.0
5	125	381	298	1100	65.0
6	152	403	297	*300	95.0
8	203	502	378	*400	150.0
10	254	568	408	*400	230.0

Reduced Bore — Class 300

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	152	81	150	3.2
1*3/4	19	25	165	85	150	5.0
1-1/2*1	25	38	191	98	180	8.0
2*1-1/2	38	51	216	133	280	12.0
2-1/2*2	51	64	241	141	280	19.0
3*2	51	76	283	141	280	26.0
4*3	76	102	305	150	400	38.0
6*4	102	152	403	223	650	75.0
8*6	152	203	419	297	*300	130.0
10*8	203	254	457	378	*400	200.0

* Gear Operated

1PC Body Cast Floating Ball Valve



Features

Size: 1/2"~6"
Class: 150~300
One Piece Cast Steel Body
Floating Ball, Reduced Bore
Anti-Static Device
Blow-out Proof Stem
Fire Safe Design

Specifications

Design	ASME B16.34/API 608
Face to Face	ASME B16.10
End to End	ASME B16.10
End Flange	ASME B16.5
Test	API 598
Fire Safe Test	API 607/API 6FA
Special	NACE MR-01-75

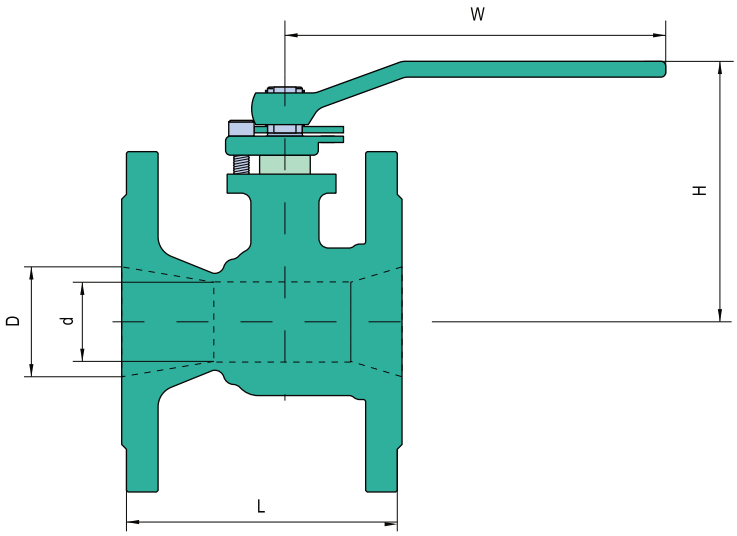
1PC Body Cast Floating Ball Valve

Material Specifications

No.	Part	WCB/ENP	WCB/316	CF8M/316	LCC/316 NACE
1	Body	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
2	Seat	PTFE	PTFE	PTFE	PTFE
3	Ball	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
4	Adapter	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
5	* Body Gasket	304SS+Graphite	316SS+Graphite	316SS+Graphite	316SS+Graphite
6	Stem	ASTM A276-410	ASTM A276-316	ASTM A276-316	ASTM A276-316
7	Thrust Washer	PTFE	PTFE	PTFE	PTFE
8	* Packing	PTFE/Graphite	PTFE/Graphite	PTFE/Graphite	PTFE/Graphite
9	Gland	ASTM A276-410	ASTM A276-316	ASTM A276-316	ASTM A276-316
10	Gland Flange	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
11	Screw	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
12	Stop Plate	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
13	Retainer	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
14	Lever	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
15	Antistatic Spring	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
16	Steel Ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel

* Recommended Spare Parts

Dimensions and Weights



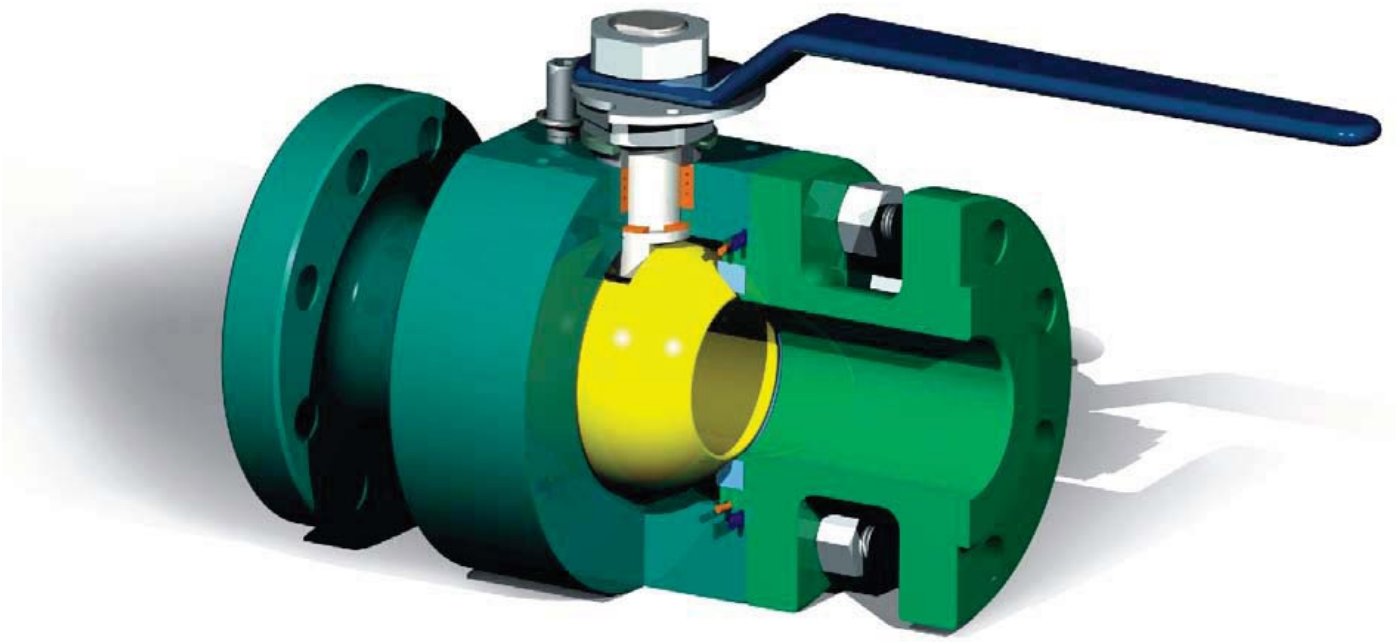
Class 150

Size in	d mm	D mm	L mm	H mm	W mm	Weight Kg
1/2	10	13	108	89	129	5.4
3/4	15	18	117	89	129	6.0
1	19	25	127	90	170	6.6
1-1/2	32	40	165	106	224	7.8
2	38	50	178	111	224	12
3	59	80	203	146	356	23
4	76	102	229	171	356	38
6	102	150	267	246	546	80

Class 300

Size in	d mm	D mm	L mm	H mm	W mm	Weight Kg
1/2	10	13	140	89	129	6.0
3/4	15	18	152	89	129	6.6
1	19	25	165	90	170	7.2
1-1/2	32	40	191	106	224	13
2	38	50	216	111	224	18
3	59	80	283	160	356	36
4	76	102	305	186	506	54
6	102	150	403	284	762	108

2PC Body Forged Floating Ball Valve



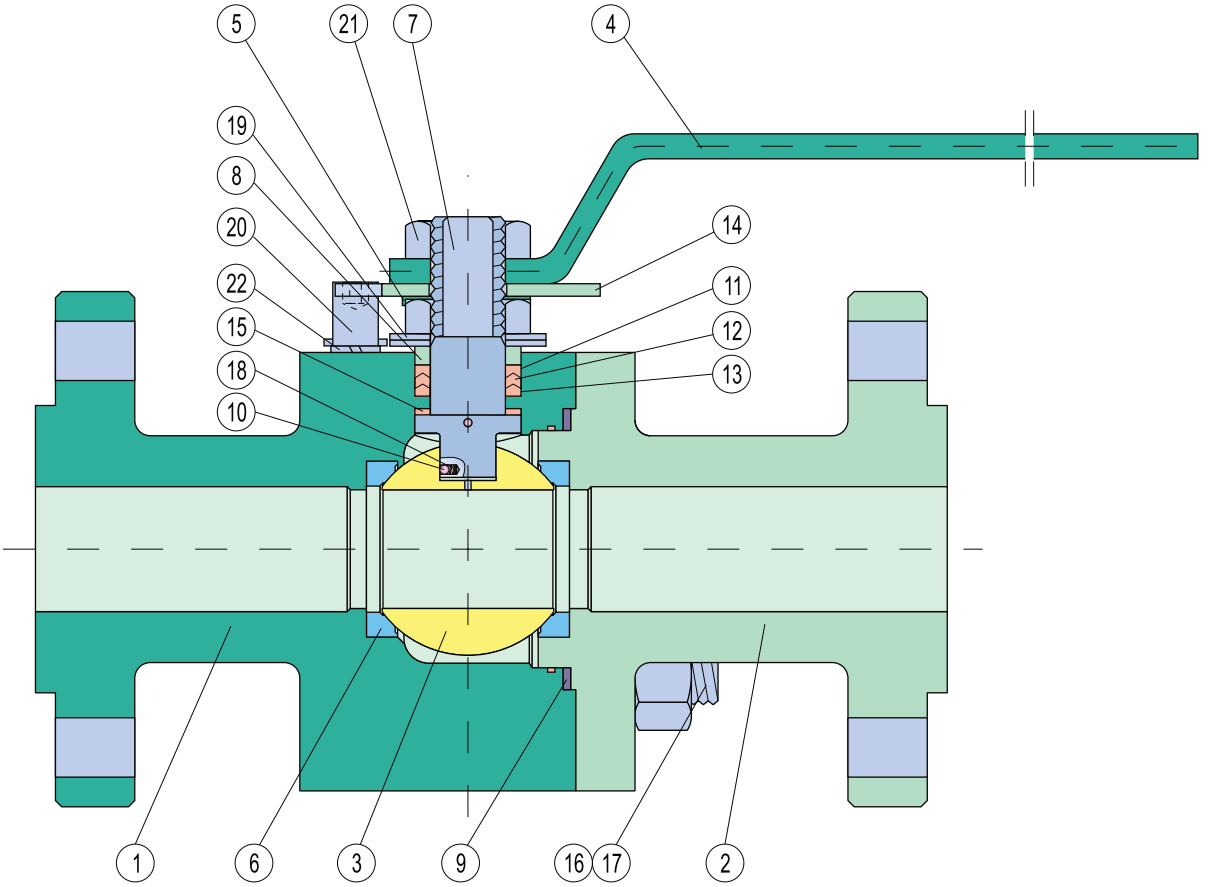
Features

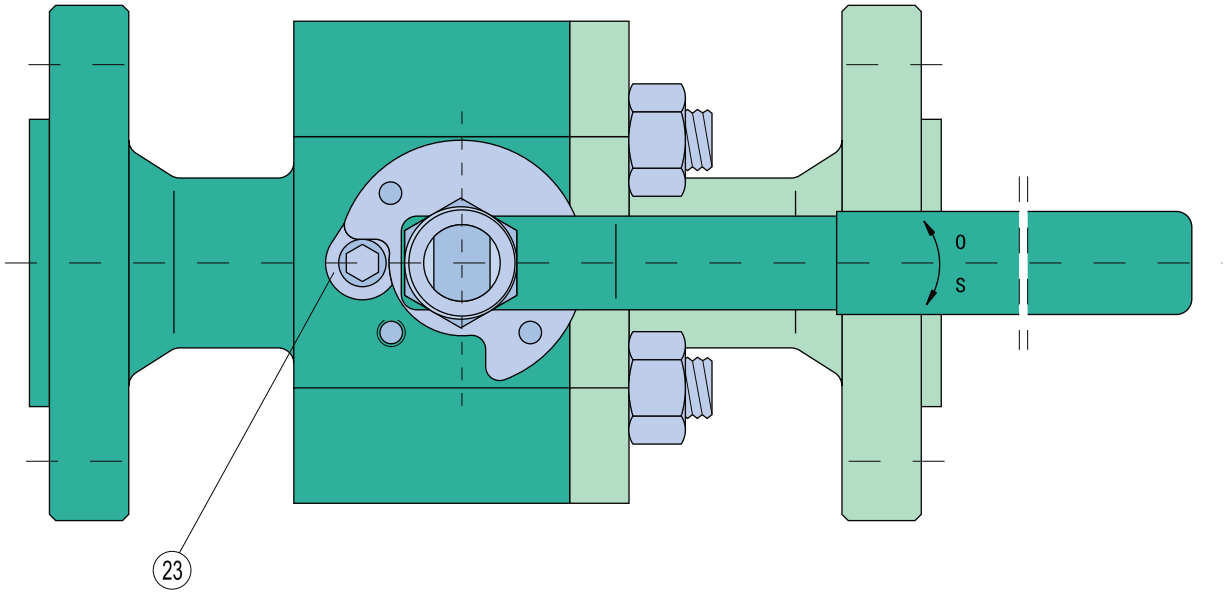
- Size: 1/2"~10"
- Class: 150~2500
- Two Pieces Forged Steel Body
- Floating Ball, Full & Reduced Bore
- Anti-Static Device
- Blow-out Proof Stem
- Fire Safe Design
- Low Emission

Specifications

Design	ASME B16.34/BS 5351/API6D
Face to Face	ASME B16.10
End to End	ASME B16.10
End Flange	ASME B16.5
BW End	ASME B16.25
Test	API 598/ BS 6755
Fire Safe Test	API 607/API 6FA
Special	NACE MR-01-75

2PC Body Forged Floating Ball Valve





2PC Body Forged Floating Ball Valve

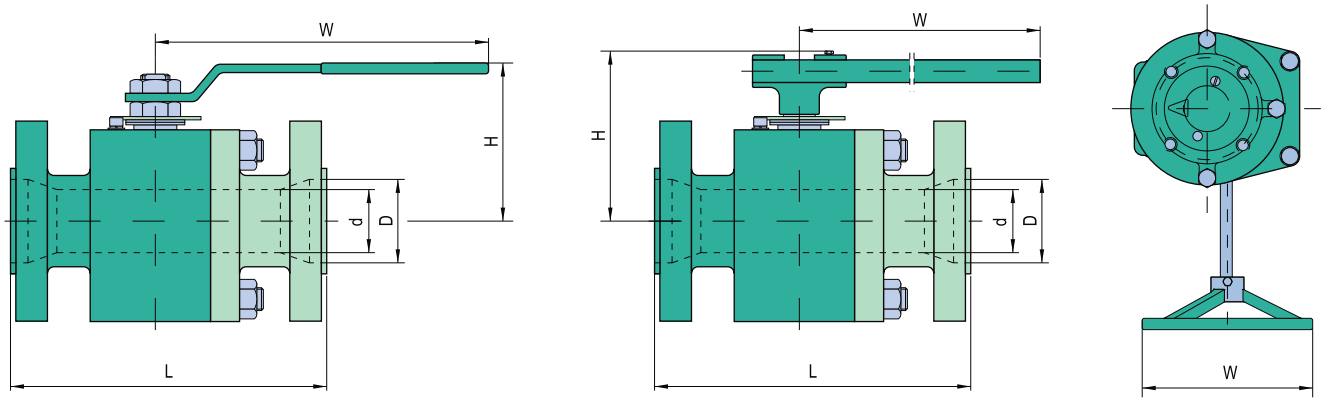
Material Specifications

No.	Part	A105/ENP	A105/316	F316/316	LF2/316 NACE
1	Body	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
2	Adapter	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
3	Ball	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
4	Lever	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
5	Locked Washer	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
6	Seat	PTFE / Nylon	PTFE / Nylon	PTFE / Nylon	PTFE / Nylon
7	Stem	ASTM A182-F6a	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
8	Gland	ASTM A276-410	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
9	*Body Gasket	304SS+Graphite	316SS+Graphite	316SS+Graphite	316SS+Graphite
10	Steel Ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
11	*Top Packing	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite
12	*Middle Packing	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite
13	*Bottom Packing	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite	PTFE / Graphite
14	Stop Plate	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
15	Thrust Washer	PTFE	PTFE	PTFE	PTFE
16	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
17	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
18	Antistatic Spring	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
19	Dished Spring	Alloy Steel	Alloy Steel	Stainless Steel	Alloy Steel
20	Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
21	Nut	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
22	Washer	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
23	Locked Plate	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel

* Recommended Spare Parts

2PC Body Forged Floating Ball Valve

Dimensions and Weights



Full Bore — Class 150

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	108	81	150	2.8
3/4	19	117	85	150	3.7
1	25	127	98	180	5.3
1-1/2	38	165	133	280	8.3
2	51	178	141	280	11.2
2-1/2	64	191	139	400	18.4
3	76	203	150	400	23.0
4	102	229	223	650	39.3
5	125	356	276	1100	69.3
6	152	394	297	*300	90.0
8	203	457	378	*300	140.0
10	254	533	408	*400	230.0

Reduced Bore — Class 150

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	117	81	150	3.5
1*3/4	19	25	127	85	150	5.0
1-1/2*1	25	38	165	98	180	7.5
2*1-1/2	38	51	178	133	280	10.0
2-1/2*2	51	64	191	141	280	16.0
3*2	51	76	203	141	280	21.0
4*3	76	102	229	150	400	35.0
6*4	102	152	267	223	650	73.0
8*6	152	203	292	297	*300	120.0
10*8	203	254	330	378	*300	200.0

* Gear Operated

Full Bore — Class 300

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	140	81	150	3.0
3/4	19	152	85	150	4.0
1	25	165	98	180	6.6
1-1/2	38	191	133	280	12.9
2	51	216	141	280	18.9
2-1/2	64	241	139	400	28.0
3	76	283	150	400	39.0
4	102	305	223	650	60.0
5	125	381	298	1100	90.0
6	152	403	297	*300	130.0
8	203	502	378	*400	195.0
10	254	568	408	*400	290.0

Reduced Bore — Class 300

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	152	81	150	3.7
1*3/4	19	25	165	85	150	5.8
1-1/2*1	25	38	191	98	180	10.5
2*1-1/2	38	51	216	133	280	16.1
2-1/2*2	51	64	241	141	280	24.5
3*2	51	76	283	141	280	34.7
4*3	76	102	305	150	400	53.0
6*4	102	152	403	223	650	100.0
8*6	152	203	419	297	*300	170.0
10*8	203	254	457	378	*400	250.0

* Gear Operated

Full Bore — Class 600

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	165	66	150	3.5
3/4	19	191	88	170	5.0
1	25	216	90	250	7.5
1-1/2	38	241	120	400	15.0
2	51	292	135	400	23.0
3	76	356	164	400	48.0
4	102	432	224	995	80.0
6	152	559	260	*400	156.0

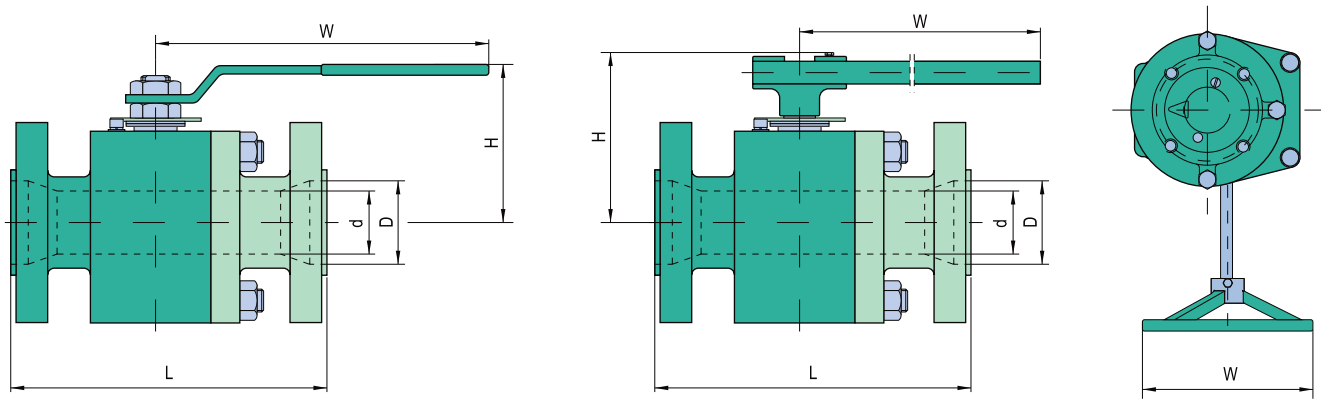
Reduced Bore — Class 600

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	191	66	150	4.0
1*3/4	19	25	216	88	170	5.5
1-1/2*1	25	38	241	90	250	10.5
2*1-1/2	38	51	292	120	400	20.0
3*2	51	76	356	135	400	29.0
4*3	76	102	432	164	400	59.0
6*4	102	152	559	224	995	95.0
8*6	152	203	660	260	*400	190.0

* Gear Operated

2PC Body Forged Floating Ball Valve

Dimensions and Weights



Full Bore — Class 900

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	216	75	140	5.0
3/4	19	229	91	180	8.0
1	25	254	108	250	10.0
1-1/2	38	305	133	400	20.0
2	51	368	150	500	30.0
3	76	381	160	500	55.0

Reduced Bore — Class 900

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	229	75	140	7.0
1*3/4	19	25	254	91	180	9.5
1-1/2*1	25	38	305	108	250	16.5
2*1-1/2	38	51	368	133	400	23.0
3*2	51	76	381	150	500	42.0
4*3	76	102	457	160	500	65.0

Full Bore — Class 1500

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	216	75	140	5.0
3/4	19	229	91	180	8.0
1	25	254	108	250	10.0
1-1/2	38	305	133	400	20.0
2	51	368	150	500	30.0
3	76	470	160	500	65.0

Reduced Bore — Class1500

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	229	75	140	7.0
1*3/4	19	25	254	91	180	9.5
1-1/2*1	25	38	305	108	250	16.5
2*1-1/2	38	51	368	133	400	23.0
3*2	51	76	470	150	500	60.0
4*3	76	102	546	160	500	78.0

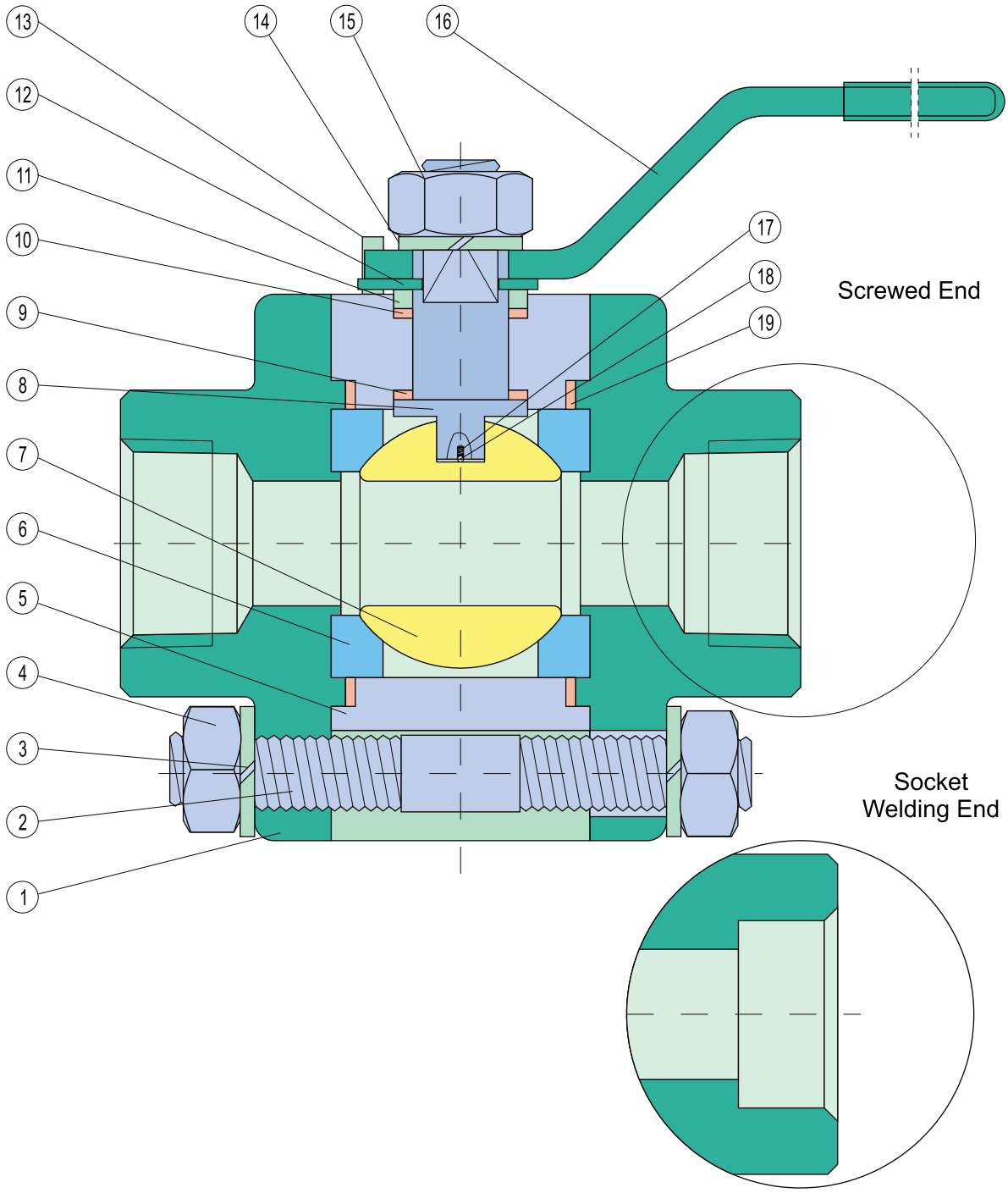
Full Bore — Class 2500

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	264	88	230	7.5
3/4	19	273	117	230	12.0
1	25	308	128	300	15.0
1-1/2	38	384	148	400	30.0
2	51	451	183	500	37.5

Reduced Bore — Class2500

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	273	88	230	11.0
1*3/4	19	25	308	117	230	14.0
1-1/2*1	25	38	384	128	300	25.0
2*1-1/2	38	51	451	148	400	35.0
3*2	51	76	578	183	500	60.0

Small Sizes Forged Floating Ball Valve



Features

Size: 1/2"~2"
Class: 800~1500
Three Pieces Forged Steel Body
Floating Ball
Anti-Static Device
Blow-out Proof Stem

Specifications

Design	ASME B16.34/BS 5351
End to End	Manufacturer Standard
Screwed End	ASME B1.20.1
Socket Welding End	ASME B16.11
Test	API 598/ BS 6755
Special	NACE MR-01-75

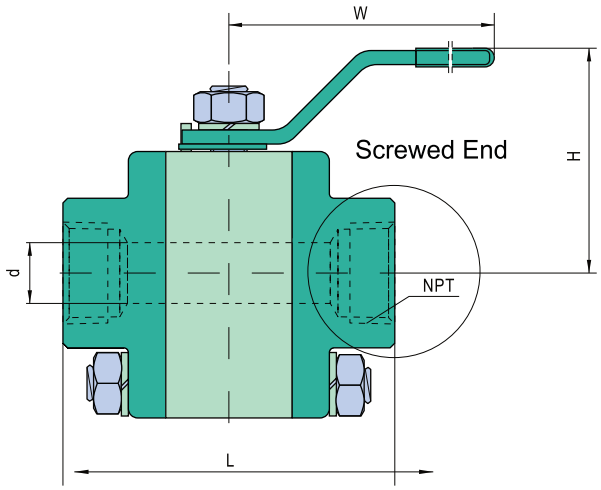
Small Sizes Forged Floating Ball Valve

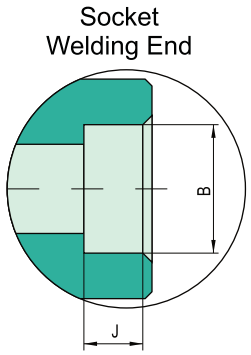
Material Specifications

No.	Part	A105/304	A105/316	F316/316	LF2/316 NACE
1	Adapter	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
2	Body Bolt	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
3	Spring Washer	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
4	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
5	Body	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
6	Seat	PTFE	PTFE	PTFE	PTFE
7	Ball	ASTM A182-F304	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
8	Stem	ASTM A276-304	ASTM A276-316	ASTM A276-316	ASTM A276-316
9	Thrust Washer	PTFE	PTFE	PTFE	PTFE
10	*Stem Packing	PTFE	PTFE	PTFE	PTFE
11	Gland	ASTM A276-410	ASTM A276-410	ASTM A276-316	ASTM A276-316
12	Stop Plate	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
13	Stop Pin	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
14	Spring Washer	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
15	Lever Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
16	Lever	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel
17	Antistatic Spring	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
18	Steel ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
19	*Body Gasket	PTFE	PTFE	PTFE	PTFE

* Recommended Spare Parts

Dimensions and Weights





Class 800/1500

Size	d	L	H	W	B	J	NPT	Weight
in	mm	mm	mm	mm	mm	mm	in	Kg
1/2	13	92	65	140	21.8	10	1/2	1.5
3/4	18	111	75	140	27.1	13	3/4	1.7
1	23.5	127	85	200	33.8	13	1	3.3
1-1/4	28	140	98	230	42.6	13	1-1/4	7.0
1-1/2	35	152	105	240	48.7	13	1-1/2	8.0
2	49	172	115	240	61.2	16	2	11.0

Note:Butt Welding End is on request

Trunnion Mounted Ball Valves

- ***Seat Sealing Feature***

a) Upstream seat: The seats can be moved slightly along the valve axis, Upstream line pressure acting on the seat area (A1) does not equalize against on the seat area (A2). The differential force in the area (D 1) pushes the seat tightly against the ball surface resulting in a tight effective seal. (Fig.1)
b) Downstream seat: When the body cavity pressure is lower than the downstream pressure, the net pressure difference acting over area (D2), pushes the downstream seat tightly against the ball surface creating a positive seal. (Fig.1)

- ***Self Relieving Seat***

When the body cavity pressure exceeds the downstream seat spring preloaded force, the differential force in the area (D 2) pushes the downstream seat away from the ball, the body cav ity pressure will automatically relieve. And then the seat returns to the ball under spring action. (Fig.1)

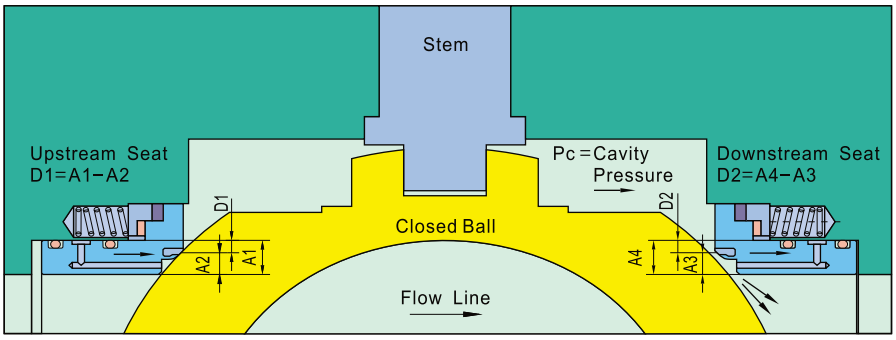


Fig.1

- ***Double Block and Bleed***

When the ball is in the closed position, each seat of the ball valve can cut offthe medium independently on the upstream and downstream side to realize double-block functions. The bo dy cavity are isolated from each si de of the valve, the body cavity press ure could be released through th e vent valve. (Fig.2)

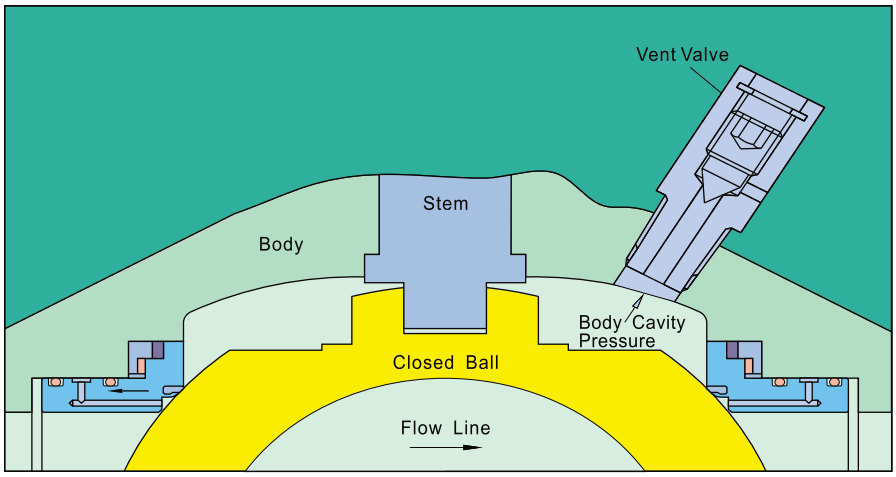


Fig.2

- ***Blow-out Proof Stem***

The stem with integral T-type shoulder, supported by gland, can be guaranteed not to be blow-out by the medium even if at abnormal risen pressure in the cavity. (Fig.3)

- ***Anti-Static Device***

During turning of the stem to opening and closing the valve, static electricity is easily caused by sparks generated by friction. Antistatic devices, assembled by a spring & a grounding plunger, assure the electrical continuity, between ball and stem, stem and body, to prevent the possible risk of fire or explosion. (Fig.3)

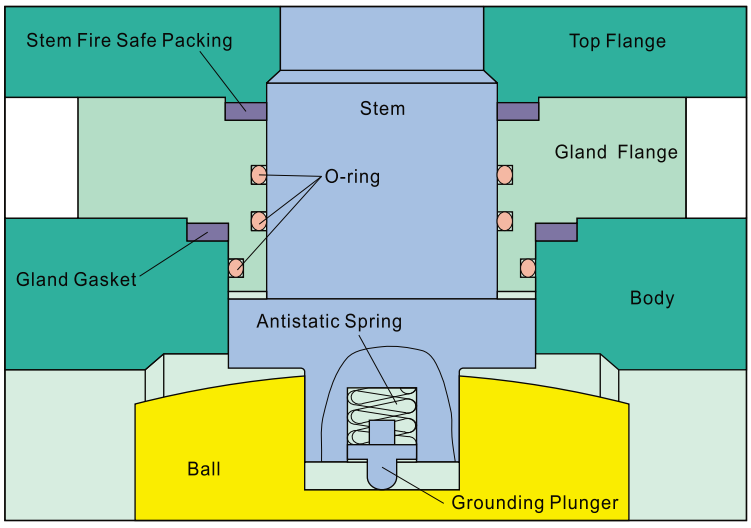


Fig.3

Trunnion Mounted Ball Valves

Emergency Sealant Injection System

For 6 inch and larger trunnion mounted ball valves, or small valves on request, special sealants may be injected through a sealant injection fittings that are located on the adapter and the gland to obtain emergency sealing, in case of seat or stem O-ring are damaged and leakage occur by fire or other accidental. Fittings also internally installed a second check valve to provide backup sealing. (Fig.4)

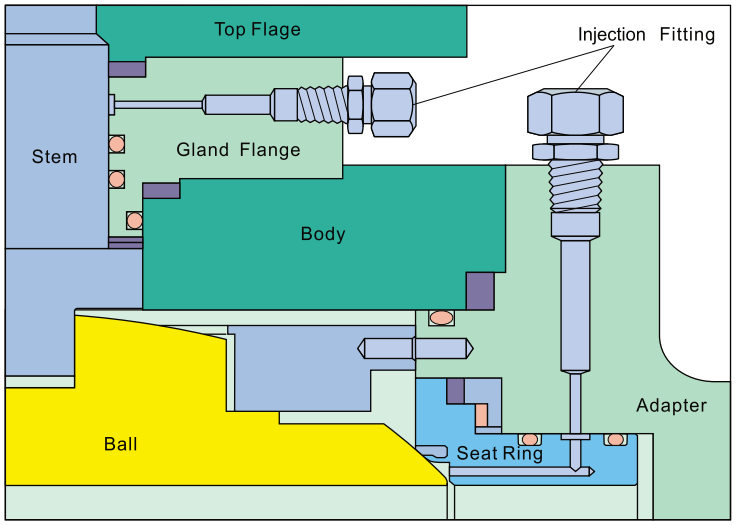


Fig.4

Firesafe Design

a) Internal leakage prevention

When seat insert, O-ring and spacer are damaged in a fire, the line pressure and the seat preloaded spring push the seat metal lip into the ball surface to cut off the line fluid and prevent the internal leakage to reach fire-safe purpose. Besides, the seat graphite packing can prevent fluid leakage from between the valve body and the seat. (Fig.5)

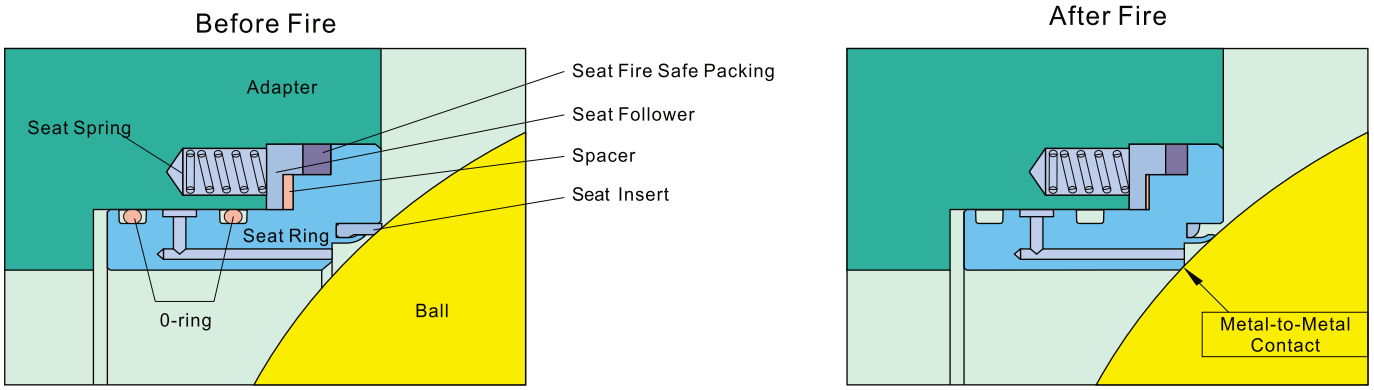


Fig.5

b) External leakage prevention

A combination of O-ring and graphite gasket on body/adapter connection, body/gland connection, and stem/gland joint, can prevent the external leakage. When O-rings are damaged after a fire, body gasket, gland gasket, and stem packing, can reach sealing function and prevents external fluid leakage. (Fig.6)

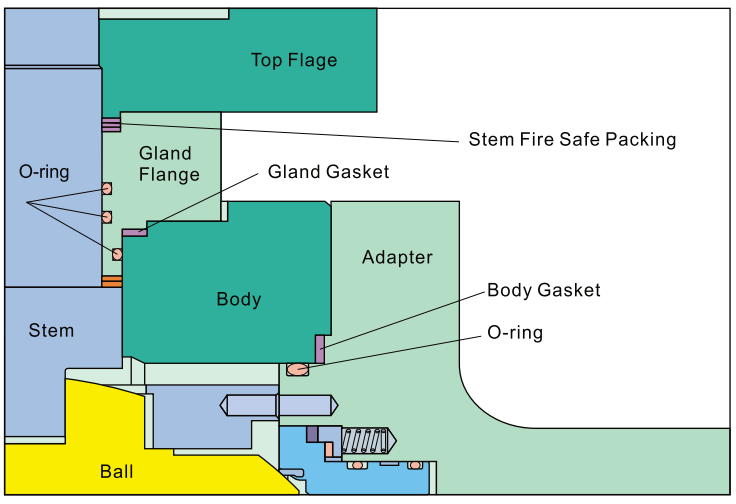
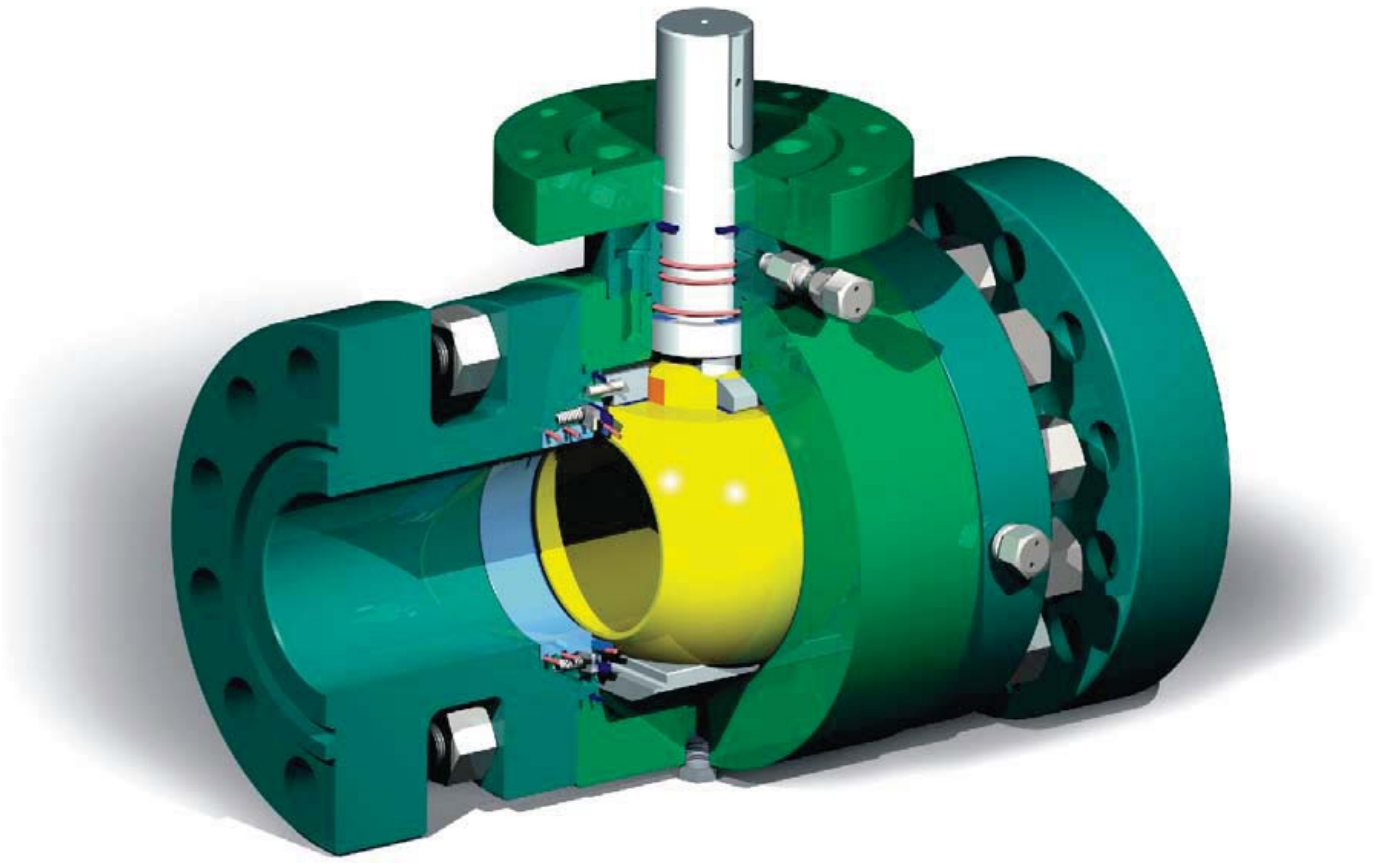


Fig.6

3PC Body Forged Trunnion Mounted Ball Valve



Features

Size: 2"~40"
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)

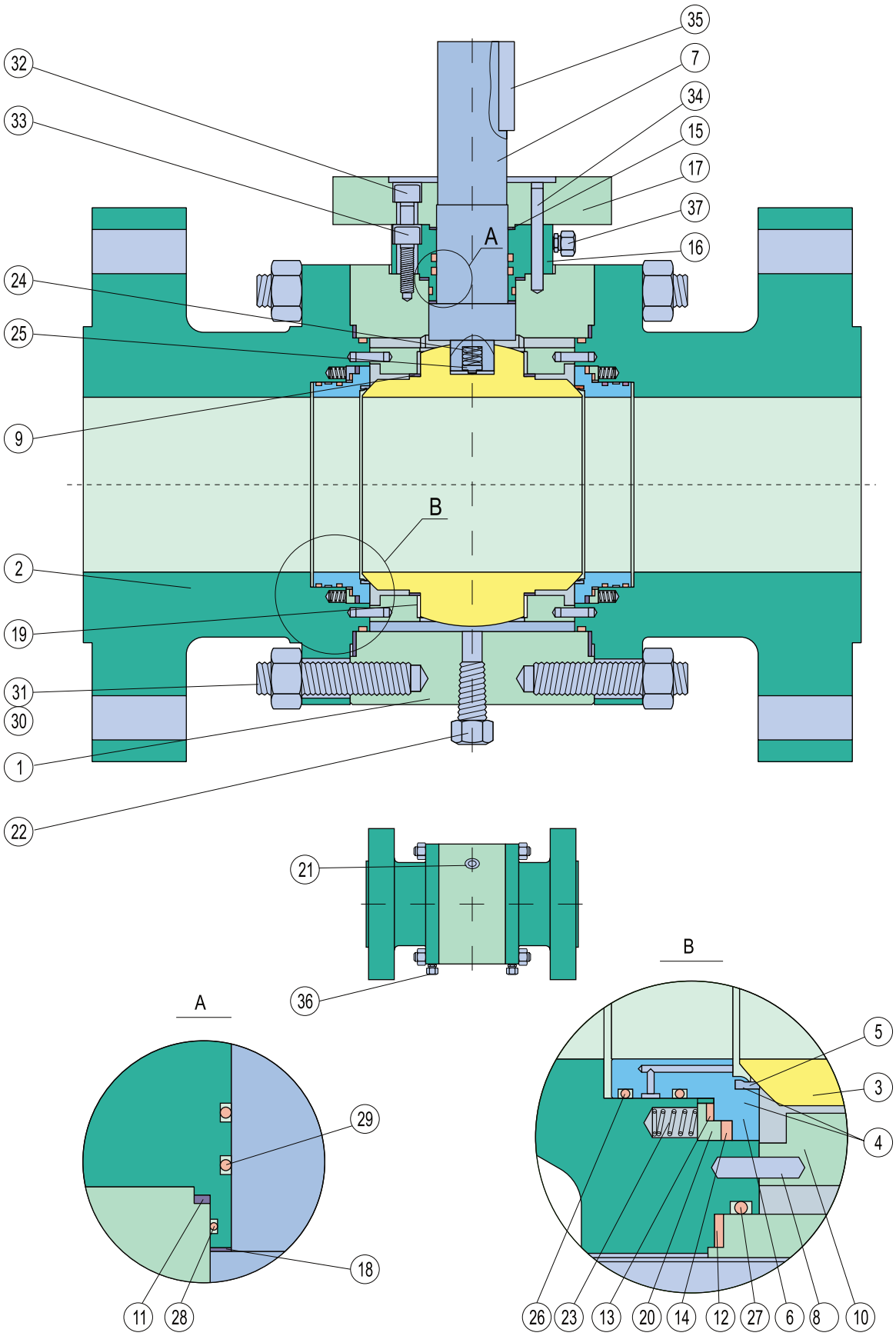
Specifications

Design	ASME B16.34/API 6D
Face to Face	ASME B16.10/API 6D
End to End	ASME B16.10/API 6D
End Flange	ASME B16.5/B16.47 A
BW End	ASME B16.25
Test	API 6D
Fire Safe Test	API 607/API 6FA
Special	NACE MR-01-75

Seat Pocket Overlay (On Request)

Seals Area Overlay (On Request)

3PC Body Forged Trunnion Mounted Ball Valve



3PC Body Forged Trunnion Mounted Ball Valve

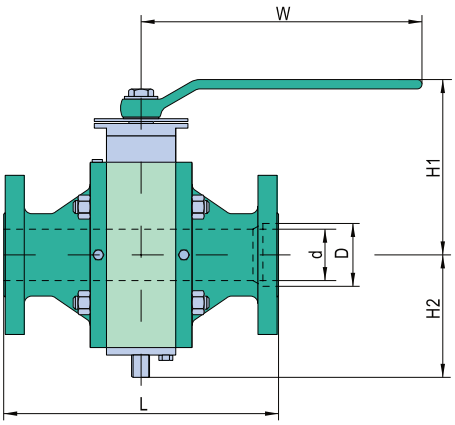
Material Specifications

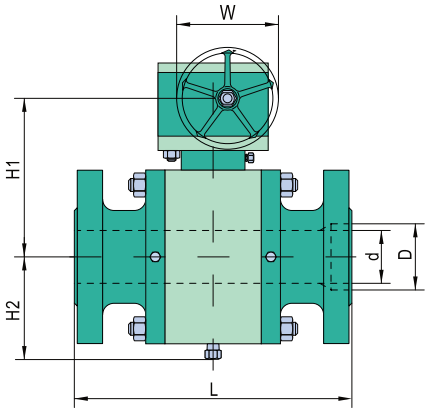
No.	Part	A105/ENP	A105/316	F316/316	LF2/316 NACE
1	Body	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
2	Adapter	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
3	Ball	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
4	Seat Assembly	Assembled By 5&6	Assembled By 5&6	Assembled By 5&6	Assembled By 5&6
5	Seat Insert	PTFE / Nylon	PTFE / Nylon	PTFE / Nylon	PTFE / Nylon
6	Seat Ring	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
7	Stem	ASTM A105/ENP	17-4PH	17-4PH	17-4PH
8	Alignment Pin	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
9	Washer	PTFE	PTFE	PTFE	PTFE
10	Trunnion Support	ASTM A105/ENP	ASTM A105/ENP	ASTM A182-F316	ASTM A350-LF2/ENP
11	* Gland Gasket	304SS + Graphite	316SS + Graphite	316SS + Graphite	316SS + Graphite
12	* Body Gasket	304SS + Graphite	316SS + Graphite	316SS + Graphite	316SS + Graphite
13	** Spacer	PTFE	PTFE	PTFE	PTFE
14	* Seat Firesafe Packing	Flexible Graphite	Flexible Graphite	Flexible Graphite	Flexible Graphite
15	* Stem Firesafe Packing	Flexible Graphite	Flexible Graphite	Flexible Graphite	Flexible Graphite
16	Gland Flange	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
17	Top Flange	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
18	Thrust Washer	PTFE	PTFE	PTFE	PTFE
19	Bearing	316 + PTFE + MoS2	316 + PTFE + MoS2	316 + PTFE + MoS2	316 + PTFE + MoS2
20	Seat Follower	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
21	Vent Valve	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
22	Drain	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
23	Seat Spring	Inconel X-750	Inconel X-750	Inconel X-750	Inconel X-750
24	Antistatic Spring	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
25	Grounding Plunger	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
26	O-Ring	NBR / Viton	NBR / Viton	NBR / Viton	NBR / Viton
27	O-Ring	NBR / Viton	NBR / Viton	NBR / Viton	NBR / Viton
28	O-Ring	NBR / Viton	NBR / Viton	NBR / Viton	NBR / Viton
29	O-Ring	NBR / Viton	NBR / Viton	NBR / Viton	NBR / Viton
30	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
31	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
32	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
33	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
34	** Gland Pin	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
35	Key	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
36	Seat Injection	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
37	Stem Injection	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel

* Recommended Spare Parts ** Optional Parts

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	180	130	265	30
3	76	203	190	150	285	60
4	102	229	212	170	400	92
6	152	394	277	183	*400	190
8	203	457	301	216	*400	345
10	254	533	359	260	*500	495
12	305	610	419	287	*600	705
14	337	686	460	338	*600	859
16	387	762	494	375	*600	1020
18	438	864	521	402	*600	1440
20	489	914	656	427	*600	1918
22	540	991	733	480	*600	2352
24	591	1067	795	518	*700	2803
26	635	1143	870	535	*800	3200
28	686	1245	935	542	*800	4045
30	737	1295	1010	605	*800	4820
32	781	1372	1060	650	*800	5490
34	832	1473	1077	650	*800	6704
36	876	1524	1115	700	*800	7615
40	978	1727	1400	865	*800	10271

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	140	110	250	26
3*2	51	76	203	180	130	265	34
4*3	76	102	229	190	150	285	62
6*4	102	152	394	212	170	400	102
8*6	152	203	457	277	183	*400	225
10*8	203	254	533	301	216	*400	373
12*10	254	305	610	359	260	*500	533
14*12	305	337	686	419	287	*600	730
16*14	337	387	762	460	338	*600	790
18*16	387	438	864	494	375	*600	1095
20*18	438	489	914	521	402	*600	1152
22*18	438	540	991	521	402	*600	2343
24*20	489	591	1067	656	427	*600	2060
26*22	540	635	1143	733	480	*600	2215
28*24	591	686	1245	795	518	*700	2700
30*24	591	737	1295	795	518	*700	2918
32*26	635	781	1372	870	535	*800	4005
34*28	686	832	1473	935	542	*800	4445
36*30	737	876	1524	1010	605	*800	4995
40*34	832	978	1727	1077	650	*800	8200

Full Bore — Class 300

Size	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	216	180	130	265	31
3	76	283	190	150	285	69
4	102	305	212	170	400	110
6	152	403	277	183	*400	211
8	203	502	308	217	*500	376
10	254	568	381	265	*600	540
12	305	648	429	307	*600	763
14	337	762	460	338	*600	900
16	387	838	581	375	*600	1300
18	438	914	674	414	*700	1715
20	489	991	713	450	*700	2090
22	540	1092	780	492	*700	2220
24	591	1143	850	531	*760	2890
28	686	1346	958	556	*800	4575
30	737	1397	1035	620	*800	5590
32	781	1524	1087	666	*800	6240
34	832	1626	1104	666	*800	7370
36	876	1727	1143	718	*800	8435
40	978	1930	1435	887	*800	11200

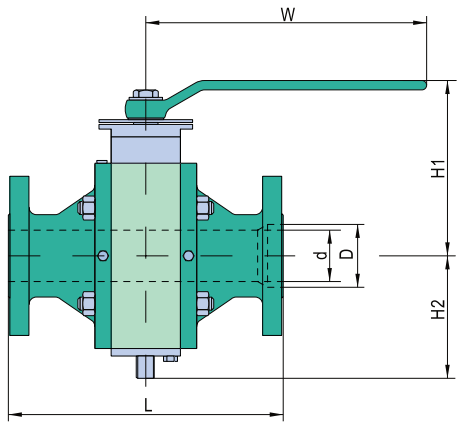
Reduced Bore — Class 300

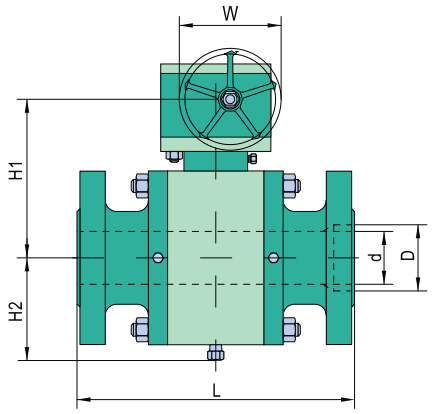
Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	216	140	110	250	30
3*2	51	76	283	180	130	265	37
4*3	76	102	305	190	150	285	74
6*4	102	152	403	212	170	400	142
8*6	152	203	502	277	183	*400	253
10*8	203	254	568	308	217	*500	410
12*10	254	305	648	381	265	*600	580
14*12	305	337	762	429	307	*600	830
16*14	337	387	838	460	338	*600	970
18*16	387	438	914	581	375	*600	1530
20*18	438	489	991	674	414	*700	1830
22*18	438	540	1092	674	414	*700	2010
24*20	489	591	1143	713	450	*700	2220
28*24	591	686	1346	850	531	*760	3200
30*24	591	737	1397	850	531	*760	3200
34*28	686	832	1626	958	556	*800	4845
36*30	737	876	1727	1035	620	*800	6100
40*34	832	978	1930	1104	666	*800	8200

* Gear Operated

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	172	130	400	45
3	76	356	205	150	450	80
4	102	432	308	170	755	150
6	152	559	274	185	*500	248
8	203	660	342	223	*600	438
10	254	787	393	270	*600	701
12	305	838	522	310	*600	925
14	337	889	551	340	*600	1230
16	387	991	637	378	*700	1535
18	438	1092	683	418	*760	2135
20	489	1194	719	451	*760	2640
22	540	1295	754	492	*800	3370
24	591	1397	823	539	*800	3960
28	686	1549	958	556	*800	6060
30	737	1651	1035	620	*800	6690
32	781	1778	1087	666	*800	7825
34	832	1930	1104	666	*800	8460
36	876	2083	1143	718	*800	10650
40	978	2337	1435	887	*800	14700

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	164	110	265	40
3*2	51	76	356	172	130	400	54
4*3	76	102	432	205	150	450	99
6*4	102	152	559	308	170	755	212
8*6	152	203	660	274	185	*500	304
10*8	203	254	787	342	223	*600	510
12*10	254	305	838	393	270	*600	902
14*12	305	337	889	522	310	*600	1090
16*14	337	387	991	551	340	*600	1310
18*16	387	438	1092	637	378	*700	1640
20*18	438	489	1194	683	418	*760	2270
22*18	438	540	1295	683	418	*760	2430
24*20	489	591	1397	719	451	*760	3440
28*24	591	686	1549	823	539	*800	4250
30*24	591	737	1651	823	539	*800	4730
34*28	686	832	1930	958	556	*800	7200
36*30	737	876	2083	1035	620	*800	8600
40*34	832	978	2337	1104	666	*800	10020

Full Bore — Class 900

Size	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	368	193	136	450	52
3	76	381	302	158	755	87
4	102	457	332	180	*400	160
6	152	610	320	187	*600	385
8	203	737	365	226	*600	560
10	254	838	495	280	*600	820
12	305	965	600	329	*700	1125
14	324	1029	625	390	*760	1610
16	375	1130	675	407	*760	2010
18	425	1219	715	526	*760	2810
20	473	1321	750	600	*760	3460
22	524	1422	780	640	*800	4410
24	572	1549	800	690	*800	5497
28	667	1753	987	573	*800	10202
30	714	1880	1066	638	*800	11442
32	762	2032	1120	686	*800	12102
34	810	2159	1137	688	*800	17462
36	857	2286	1177	739	*800	20154

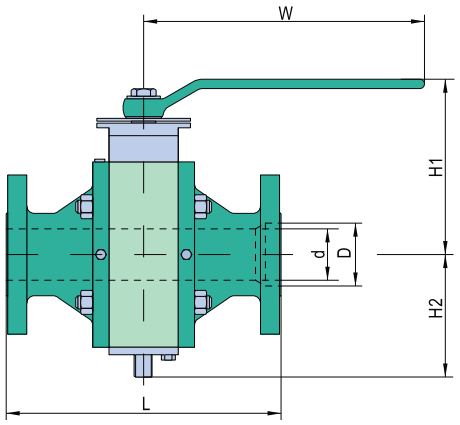
Reduced Bore — Class 900

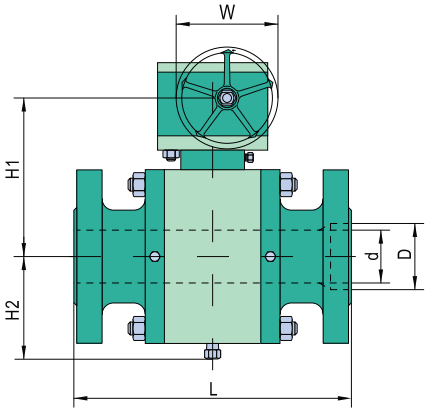
Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	368	175	110	285	45
3*2	51	76	381	193	136	450	56
4*3	76	102	457	302	158	755	94
6*4	102	152	610	332	180	*400	226
8*6	152	203	737	320	187	*600	480
10*8	203	254	838	365	226	*600	650
12*10	254	305	965	495	280	*600	868
14*12	305	324	1029	600	329	*700	1310
16*14	324	375	1130	625	390	*760	1830
18*16	375	425	1219	675	407	*760	2205
20*18	425	473	1321	715	526	*760	3140
22*18	425	524	1422	715	526	*760	3288
24*20	473	572	1549	750	600	*760	3810
28*24	572	667	1753	800	690	*800	7580
30*24	572	714	1880	945	547	*800	7981
34*28	667	810	2159	987	573	*800	11202
36*30	714	857	2286	1066	638	*800	15653

* Gear Operated

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	193	150	450	60
3	76	470	270	168	1135	115
4	102	546	275	176	*500	194
6	146	705	325	203	*600	580
8	194	832	501	248	*700	752
10	241	991	536	297	*700	1195
12	289	1130	614	357	*760	1970
14	318	1257	662	383	*760	2250
16	362	1384	700	434	*760	2760
18	407	1537	750	506	*760	3646
20	457	1664	864	586	*800	4497
22	495	1816	925	631	*800	5731
24	534	2045	1065	675	*800	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	183	110	285	56
3*2	51	76	470	193	150	450	82
4*3	76	102	546	270	168	1135	150
6*4	102	146	705	275	176	*500	295
8*6	146	194	832	325	203	*600	690
10*8	194	241	991	501	248	*700	930
12*10	241	289	1130	536	297	*700	1340
14*12	289	318	1257	614	357	*760	2070
16*14	318	362	1384	662	383	*760	2470
18*16	362	407	1537	700	434	*760	2950
20*18	407	457	1664	750	506	*760	3350
22*18	407	495	1816	750	506	*800	3600
24*20	457	534	2045	864	586	*800	5850

Full Bore — Class 2500

Size	D	L(RTJ)	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	44	454	230	121	815	90
3	64	584	284	146	*500	200
4	89	683	303	164	*500	385
6	133	927	394	220	*600	778
8	181	1038	488	312	*760	1352
10	225	1292	600	425	*760	2137
12	267	1445	700	500	*800	3267
14	284	1546	750	550	*800	4700

Reduced Bore — Class 2500

Size	d	D	L(RTJ)	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	44	454	170	100	400	80
3*2	44	64	584	230	121	815	160
4*3	64	89	683	284	146	*500	320
6*4	89	133	927	303	164	*500	640
8*6	133	181	1038	360	365	*600	1170
10*8	181	225	1292	420	410	*760	1919
12*10	225	267	1445	509	470	*760	2972
14*12	267	284	1546	700	500	*800	4200
16*14(BW)	284	311	1567	750	550	*800	5300

* Gear Operated

2PC Body Cast Trunnion Mounted Ball Valve

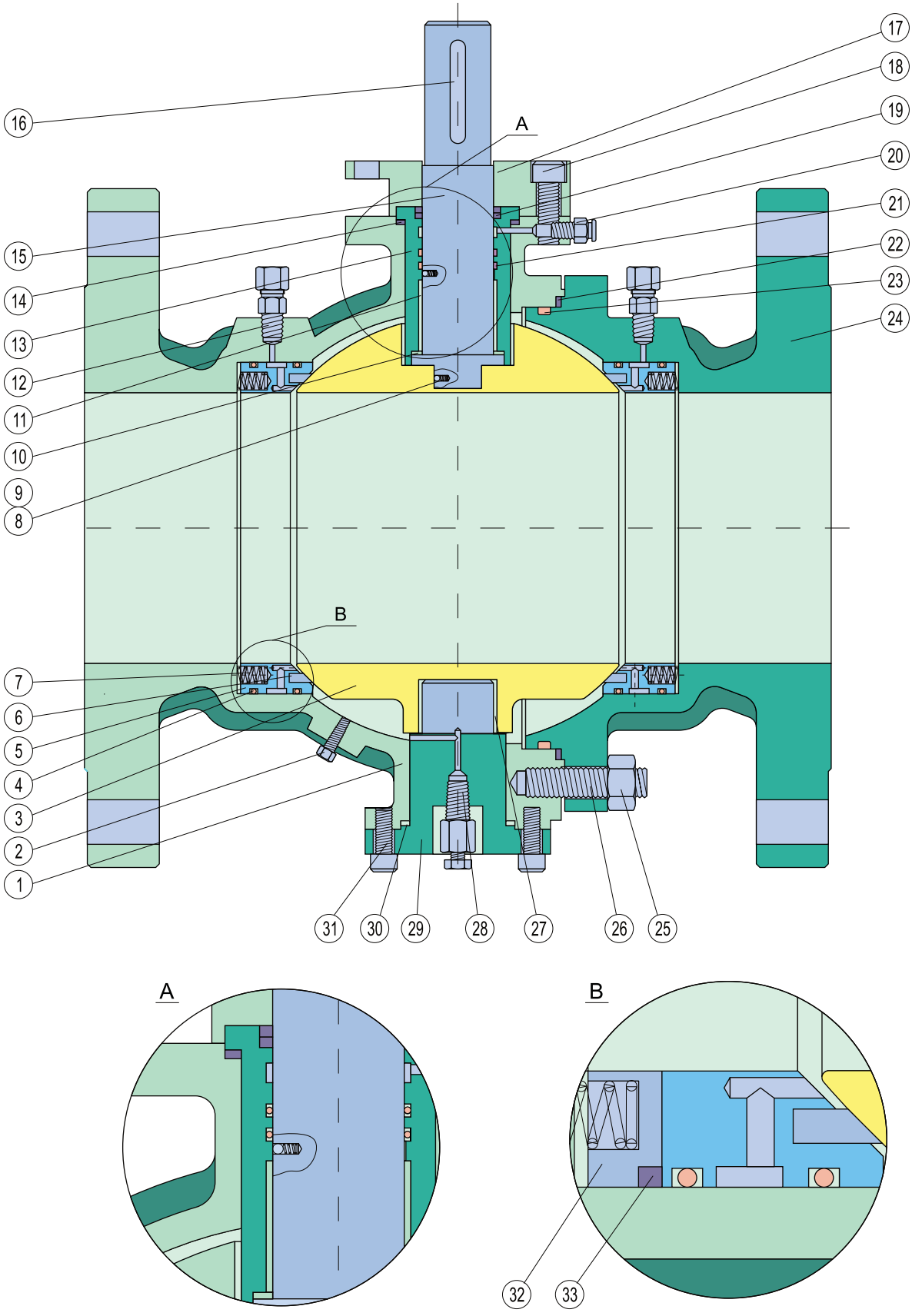
Features

Size: 2"~24"
Class: 150~600
Two Pieces Cast 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/API 6D
End to End	ASME B16.10/API 6D
End Flange	ASME B16.5
BW End	ASME B16.25
Test	API 6D
Fire Safe Test	API 607/API 6FA
Special	NACE MR-01-75

2PC Body Cast Trunnion Mounted Ball Valve



2PC Body Cast Trunnion Mounted Ball Valve

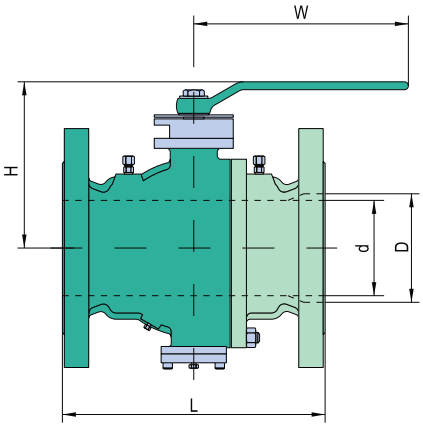
Material Specifications

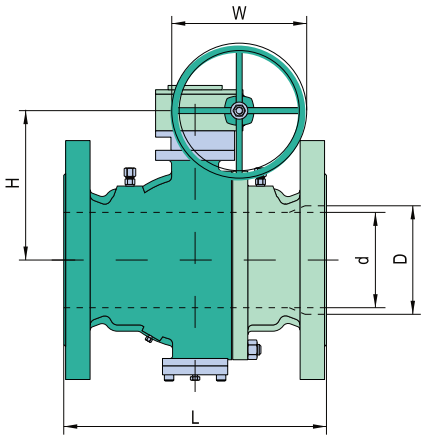
No.	Part	WCB/ENP	WCB/316	CF8M/316	LCC/316 NACE
1	Body	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352 -LCC
2	Vent Valve	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
3	Ball	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
4	*O-Ring	NBR/Viton	NBR/Viton	NBR/Viton	NBR/Viton
5	Seat Ring	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
6	Seat Insert	PTFE/Nylon	PTFE/Nylon	PTFE/Nylon	PTFE/Nylon
7	Seat Spring	Inconel X-750	Inconel X-750	Inconel X-750	Inconel X-750
8	Steel Ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
9	Antistatic Spring	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
10	Thrust Washer	PTFE	PTFE	PTFE	PTFE
11	Bearing	Carbon Steel+PTFE	Carbon Steel+PTFE	316SS+PTFE	316SS+PTFE
12	Seat Injection	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
13	Gland Flange	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
14	*Gland Gasket	304SS+Graphite	316SS+Graphite	316SS+Graphite	316SS+Graphite
15	Stem	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
16	Key	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
17	Top Flange	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
18	Screw	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
19	*Stem Firesafe Packing	Flexible Graphite	Flexible Graphite	Flexible Graphite	Flexible Graphite
20	Stem Injection	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
21	*O-Ring	NBR/Viton	NBR/Viton	NBR/Viton	NBR/Viton
22	*Body Gasket	304SS+Graphite	316SS+Graphite	316SS+Graphite	316SS+Graphite
23	*O-Ring	NBR/Viton	NBR/Viton	NBR/Viton	NBR/Viton
24	Adapter	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
25	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
26	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
27	Bearing	Carbon Steel+PTFE	Carbon Steel+PTFE	316SS+PTFE	316SS+PTFE
28	Drain	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
29	Trunnion	ASTM A105/ENP	ASTM A105/ENP	ASTM A182-F316	ASTM A350-LF2/ENP
30	*Trunnion Gasket	304SS+Graphite	316SS+Graphite	316SS+Graphite	316SS+Graphite
31	Screw	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
32	Seat Follower	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
33	*Seat Firesafe Packing	Flexible Graphite	Flexible Graphite	Flexible Graphite	Flexible Graphite

* Recommended Spare Parts

2PC Body Cast Trunnion Mounted Ball Valve

Dimensions and Weights





Full Bore — Class 150

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
2	51	178	124	265	12
3	76	203	152	285	22
4	102	229	175	285	35
6	152	394	329	*300	74
8	203	457	398	*300	205
10	254	533	495	*300	322
12	305	610	580	*500	460
14	337	686	625	*600	576
16	387	762	670	*600	864
18	438	864	698	*600	1280
20	489	914	840	*600	1600
24	591	1067	1050	*800	3540

Reduced Bore — Class 150

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3*2	51	76	203	124	265	17
4*3	76	102	229	152	285	28
6*4	102	152	394	175	285	59
8*6	152	203	457	329	*300	164
10*8	203	254	533	398	*300	258
12*10	254	305	610	495	*300	368
14*12	305	337	686	580	*500	493
16*14	337	387	762	625	*600	691
18*16	387	438	864	670	*600	1024
20*18	438	489	914	698	*600	1440
24*20	489	591	1067	840	*600	1800

* Gear Operated

Full Bore — Class 300

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
2	51	216	124	265	15
3	76	283	152	400	30
4	102	305	175	750	55
6	152	403	329	*300	118
8	203	502	398	*300	255
10	254	568	495	*400	370
12	305	648	580	*500	533
14	337	762	625	*600	640
16	387	838	670	*600	1030
18	438	914	698	*600	1280
20	489	991	840	*600	2100
24	591	1143	1050	*800	4200

Reduced Bore — Class 300

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3*2	51	76	283	124	265	20
4*3	76	102	305	152	400	44
6*4	102	152	403	175	750	102
8*6	152	203	502	329	*300	164
10*8	203	254	568	398	*300	296
12*10	254	305	648	495	*400	465
14*12	305	337	762	580	*500	578
16*14	337	387	838	625	*600	830
18*16	387	438	914	670	*600	1080
20*18	438	489	991	698	*600	1798
24*20	489	591	1143	840	*600	2600

* Gear Operated

Full Bore — Class 600

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
2	51	292	108	400	35
3	76	356	197	750	55
4	102	432	235	1000	102
6	152	559	300	*300	232
8	203	660	371	*300	390
10	254	787	415	*500	710
12	305	838	512	*600	960
14	337	889	550	*600	1200
16	387	991	615	*600	1527
18	438	1092	698	*600	2097
20	489	1194	810	*600	2640
24	591	1397	1010	*800	4740

Reduced Bore — Class 600

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3*2	51	76	356	108	400	39
4*3	76	102	432	197	750	72
6*4	102	152	559	295	1000	162
8*6	152	203	660	300	*300	290
10*8	203	254	787	371	*300	547
12*10	254	305	838	415	*500	810
14*12	305	337	889	512	*600	1140
16*14	337	387	991	550	*600	1308
18*16	387	438	1092	615	*600	1682
20*18	438	489	1194	698	*600	2377
24*20	489	591	1397	810	*600	3100

* Gear Operated

Cryogenic Ball Valve

- ***Cryogenic Service***

Valves are demanded widely in cryogenic applications (-196 ~ -50 °C), including LNG that is fast becoming a better alternative source of clean energy. Athena developed its cryogenic floating (Ser i es FY) and Trunnion mounted (Series TY) ball v alve accordingly.

- ***Standards***

ASME B16.34, ASME B16.5
API 6D, BS 5351, BS 6364, Shell MESC 77/200
BS 6755, Shell MESC 77/306

- ***Applications***

Ethane:	-89°C
Ethylene:	-104°C
Methane:	-162°C
Liquefied Natrual Gas (LNG):	-162°C
Oxygen:	-183°C
Nitrogen:	-196°C

- ***Cryogenic Test***

Valves can be tested by in house cryogenic test facility and issue the report on request.

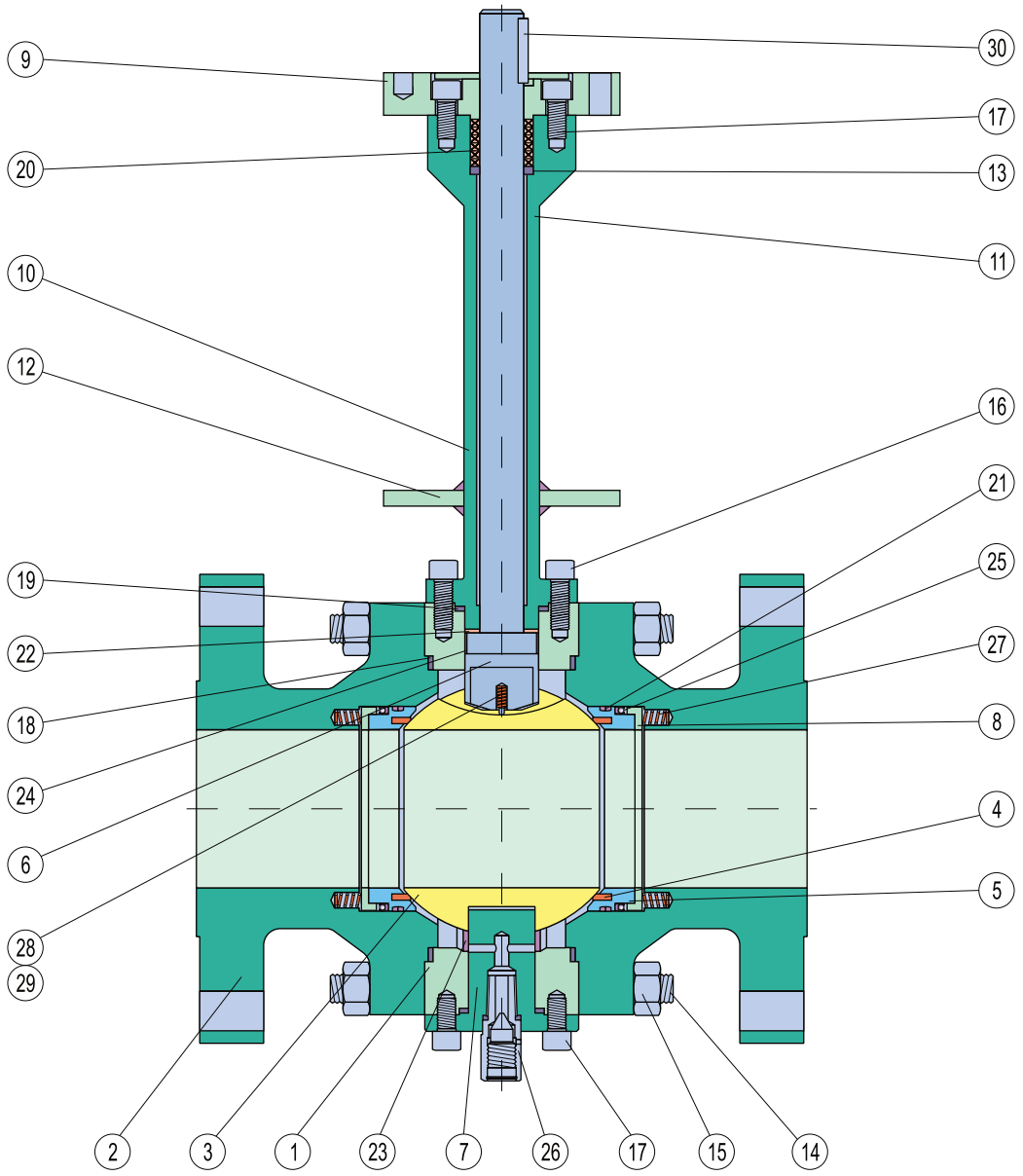
- ***General Features***

Extension bonnet gives enough vapour space to maintain the stem packing at a temperature high enough to protect the stem packing against malfunctioning due to freezing;
Cavity pressure relief;
Low operating torque for smoother operations;
Blow-out proof stem, anti-static device and fire safe design;
Double block & Bleed (Series TY);
Low fugitive emission compliance.

- ***Technical Data***

Design type:	Floating, Trunnion
Sizes:	1/2C~24C
Pressure:	class 150lb~600lb
Temperature:	-196°C to ambient temperature
Body material:	A351 Gr CF8/CF8M, A182 F304/F316 (-196°C)

Cryogenic Ball Valve



Material Specifications

No.	Part	Standard Materials	No.	Part	Standard Materials
1	Body	ASTM A182-F316	16	Screw	ASTM A320-B8
2	Adapter	ASTM A182-F316	17	Screw	ASTM A320-B8
3	Ball	ASTM A182-F316	18	*Body Gasket	316SS+Graphite
4	Seat Insert	PCTFE	19	*Gasket	316SS+Graphite
5	Seat ring	ASTM A182-F316	20	*Stem Packing	Graphite
6	Stem	ASTM A182-F316/17-4PH	21	*Seat Packing	Carbon Fibre+Graphite
7	Trunnion	ASTM A182-F316	22	Thrust Washer	PTFE/316SS+PTFE+MoS2
8	Seat Follower	ASTM A182-F316	23	Bearing	316SS+PTFE+MoS2
9	Top Flange	ASTM A182-F316	24	Stem Bearing	316SS+PTFE+MoS2
10	Extension	Assembled by 14&15	25	Lip-Seal	PTFE+Spring
11	Extended Bonnet	ASTM A182-F316	26	Vent Valve	Stainless Steel
12	Adiabatic Plate	ASTM A182-F316	27	Seat Spring	INCONEL X-750
13	Packing Washer	ASTM A276-316	28	Antistatic Spring	INCONEL X-750
14	Body Stud	ASTM A320-B8	29	Grounding Plunger	Stainless Steel
15	Body Nut	ASTM A194-8	30	Key	Stainless Steel

* Recommended Spare Parts

Welded Body Trunnion Mounted Ball Valve

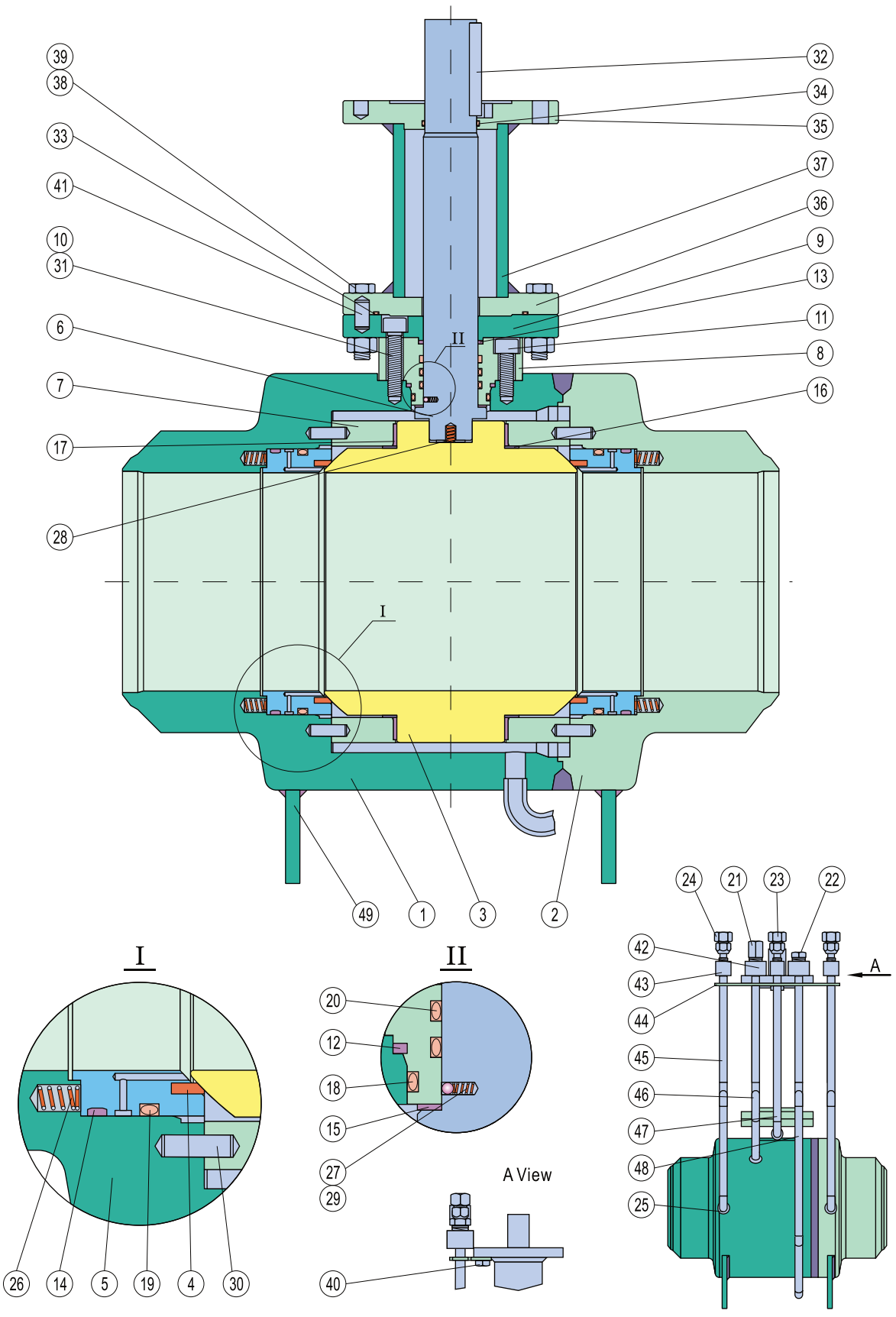
Features

Size: 2"~40"
Class: 150~2500
Welded Forged Steel Body
Trunnion Mounted Ball
Anti-Static Device
Blow-out Proof Stem
Fire Safe Design
For Undergroud Use (On Request)

Specifications

Design	ASMEB16.34/API6D
Face to Face	ASMEB16.34/API6D
End to End	ASMEB16.34/API6D
End Flange	ASMEB16.5/B16.47A
BW End	ASME B16.25
Test	API6D
Fire Safe Test	API607/6FA
Special	NACE MR-01-75

Welded Body Trunnion Mounted Ball Valve



Welded Body Trunnion Mounted Ball Valve

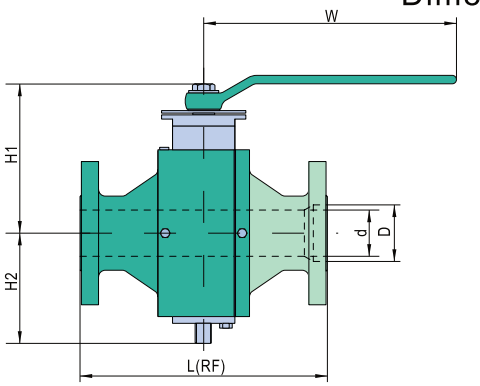
Material Specifications

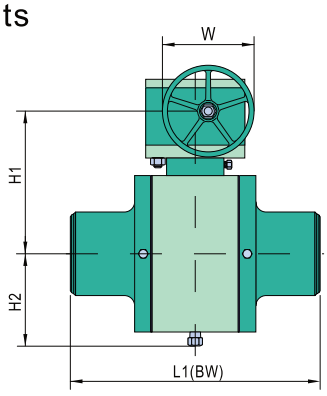
No.	Part	A105/ENP	A105/316	F316/316	LF2/316 NACE
1	Body	ASTM A105N	ASTM A105N	ASTM A182-F316	ASTM A350-LF2
2	Adapter	ASTM A105N	ASTM A105N	ASTM A182-F316	ASTM A350-LF2
3	Ball	ASTM A105N/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
4	Seat Insert	PTFE/Nylon/PEEK	PTFE/Nylon/PEEK	PTFE/Nylon/PEEK	PTFE/Nylon/PEEK
5	Seat Ring	ASTM A105N/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
6	Stem	ASTM A105N/ENP	ASTM A182-F316/17-4PH	ASTM A182-F316/17-4PH	ASTM A182-F316/17-4PH
7	Trunnion Support	ASTM A105N/ENP	ASTM A105N/ENP	ASTM A182-F316	ASTM A350-LF2/ENP
8	Gland Flange	ASTM A105N/ENP	ASTM A105N/ENP	ASTM A182-F316	ASTM A350-LF2/ENP
9	Top Flange	ASTM A105N	ASTM A105N	ASTM A182-F316	ASTM A350-LF2
10	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
11	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
12	* Gland Gasket	Graphite	Graphite	Graphite	Graphite
13	* Stem Firesafe Packing	Graphite	Graphite	Graphite	Graphite
14	* Seat Firesafe Packing	Carbon Fibre+Graphite	Carbon Fibre+Graphite	Carbon Fibre+Graphite	Carbon Fibre+Graphite
15	Thrust Washer	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2
16	Washer	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2
17	Bearing	316SS+PTFE+MoS2	316SS+PTFE+MoS2	316SS+PTFE+MoS2	316SS+PTFE+MoS2
18	* O-Ring	Viton	Viton	Viton	Viton
19	* O-Ring	Viton	Viton	Viton	Viton
20	* O-Ring	Viton	Viton	Viton	Viton
21	Vent Valve	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
22	Drain	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
23	Stem Injection	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
24	Seat Injection	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
25	Check Valve	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
26	Seat Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
27	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
28	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
29	Grounding Plunger	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
30	ALignment Pin	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
31	Gland Pin	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
32	key	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
33	* O-Ring	Viton	Viton	Viton	Viton
34	* O-Ring	Viton	Viton	Viton	Viton
35	Upper Flange	ASTM A105N	ASTM A105N	ASTM A182-F316	ASTM A105N
36	Under Flange	ASTM A105N	ASTM A105N	ASTM A182-F316	ASTM A105N
37	Steel Tube	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
38	Stud	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
39	Nut	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
40	Stud	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
41	Pin	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
42	Adapter Sleeve	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
43	Adapter Sleeve	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
44	fixed plate	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
45	Eduction tube 1	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
46	Eduction tube 2	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
47	Eduction tube 3	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
48	Eduction tube 4	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
49	Supporting Feet	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel

* Recommended Spare Parts

Welded Body Trunnion Mounted Ball Valve

Dimensions and Weights





Full Bore — Class 150

Size	d	L	L1	H1	H2	W	RF Weight	BW Weight
in	mm	mm	mm	mm	mm	mm	Kg	Kg
2	51	178	216	155	85	350	30	29
3	76	203	283	191	110	400	60	54
4	102	229	305	211	130	450	91	83
6	152	394	457	231	160	*305	189	177
8	203	457	521	282	235	*406	344	325
10	254	533	559	336	290	*406	492	461
12	305	610	635	373	315	*406	702	657
14	337	686	762	413	345	*406	854	807
16	387	762	838	457	383	*600	1014	948
18	438	864	914	501	435	*600	1431	1338
20	489	914	991	551	495	*600	1907	1783
22	540	991	1092	600	555	*600	2338	2186
24	591	1067	1143	635	590	*700	2789	2607
26	635	1143	1245	710	620	*700	3181	2974
28	686	1245	1346	760	670	*760	4021	3759
30	737	1295	1397	800	710	*760	4791	4479
32	781	1372	1524	840	745	*760	5457	5102
34	832	1473	1626	890	775	*760	6664	5230
36	876	1524	1727	930	805	*760	7569	7077
40	978	1727	1956	1010	900	*760	10209	9545

Reduced Bore — Class 150

Size	d	D	L	L1	H1	H2	W	RF Weight
in	mm	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	178	216	152	80	350	26
3*2	51	76	203	283	155	85	350	34
4*3	76	102	229	305	191	110	400	62
6*4	102	152	394	457	211	130	450	101
8*6	152	203	457	521	231	160	*305	224
10*8	203	254	533	559	282	235	*406	372
12*10	254	305	610	635	336	290	*406	530
14*10	254	337	686	762	336	290	*406	623
14*12	305	337	686	762	373	315	*406	727
16*12	305	387	762	838	373	315	*406	787
16*14	337	387	762	838	413	345	*406	839
18*14	337	438	864	914	413	345	*406	1005
18*16	387	438	864	914	457	383	*600	1089
20*16	387	489	914	991	457	383	*600	1109
20*18	438	489	914	991	501	435	*600	1143
22*18	438	540	991	1092	501	435	*600	2332
24*20	489	591	1067	1143	551	495	*600	2046
26*22	540	635	1143	1245	600	555	*600	2201
28*24	591	686	1245	1346	635	590	*700	2784
30*24	591	737	1295	1397	635	590	*700	2779
32*26	635	781	1372	1524	710	620	*700	3976
34*28	686	832	1473	1626	760	670	*760	4412
36*30	737	876	1524	1727	820	710	*760	4955
40*34	832	978	1727	1956	935	775	*760	8154

Full Bore — Class 300

Size	d	L	L1	H1	H2	W	RF Weight	BW Weight
in	mm	mm	mm	mm	mm	mm	Kg	Kg
2	51	216	216	155	85	400	30	26
3	76	283	283	191	110	450	68	62
4	102	305	305	211	130	500	108	97
6	152	403	457	229	160	*305	208	193
8	203	502	521	291	235	*406	370	347
10	254	568	559	340	290	*406	531	498
12	305	648	635	375	315	*500	760	713
14	337	762	762	417	345	*600	895	830
16	387	838	838	466	400	*600	1294	1214
18	438	914	914	506	440	*600	1706	1618
20	489	991	991	563	495	*600	2079	1966
22	540	1092	1092	605	560	*700	2206	2068
24	591	1143	1143	684	590	*760	2876	2717
28	686	1346	1346	770	680	*760	4552	4297
30	737	1397	1397	810	720	*760	5562	5251
32	781	1524	1524	850	760	*800	6209	5861
34	832	1626	1626	900	790	*800	7333	6922
36	876	1727	1727	940	820	*800	8393	7923
40	978	1956	1956	1025	915	*800	11144	10528

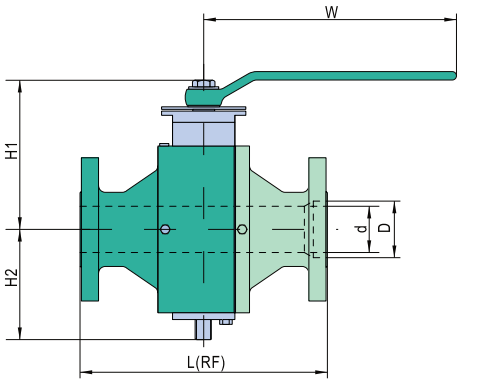
* Gear Operated

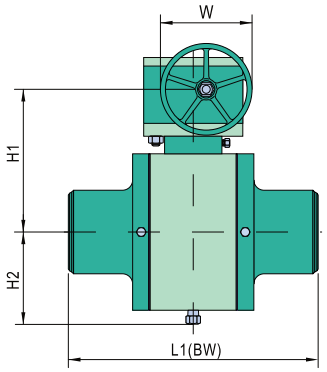
Reduced Bore — Class 300

Size	d	D	L	L1	H1	H2	W	RF Weight
in	mm	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	216	216	152	80	350	30
3*2	51	76	283	283	155	85	400	36
4*3	76	102	305	305	191	110	450	72
6*4	102	152	403	457	211	130	500	139
8*6	152	203	502	521	229	160	*305	247
10*8	203	254	568	559	291	235	*406	401
12*10	254	305	648	635	340	290	*406	577
14*10	254	337	762	762	340	315	*406	678
14*12	305	337	762	762	375	315	*500	825
16*12	305	387	838	838	375	360	*500	1045
16*14	337	387	838	838	417	360	*600	1116
18*14	337	438	914	914	417	400	*600	1309
18*16	387	438	914	914	466	400	*600	1516
20*16	387	489	991	991	466	420	*600	1766
20*18	438	489	991	991	506	440	*600	1807
22*18	438	540	1092	1092	506	440	*600	1982
24*20	489	591	1143	1143	563	495	*600	2189
28*24	591	686	1346	1346	684	590	*760	3163
30*24	591	737	1397	1397	684	590	*760	3158
34*28	686	832	1626	1626	770	680	*760	4789
36*30	737	876	1727	1727	810	720	*760	5525
40*34	832	978	1956	1956	900	790	*800	8112

Welded Body Trunnion Mounted Ball Valve

Dimensions and Weights





Full Bore — Class 600

Size	d	L	L1	H1	H2	W	RF Weight	BW Weight
in	mm	mm	mm	mm	mm	mm	Kg	Kg
2	51	292	292	155	85	400	44	41
3	76	356	356	193	112	500	79	73
4	102	432	432	239	140	700	148	138
6	152	559	559	266	175	*406	243	227
8	203	660	660	310	250	*406	432	408
10	254	787	787	354	290	*600	690	655
12	305	838	838	411	345	*600	841	790
14	337	889	889	435	370	*600	1211	1141
16	387	991	991	493	420	*600	1511	1424
18	438	1092	1092	544	462	*700	2106	1997
20	489	1194	1194	629	515	*760	2605	2473
22	540	1295	1295	683	570	*800	3318	3162
24	591	1397	1397	728	610	*800	3901	3703
28	686	1549	1549	810	695	*800	5969	5671
30	737	1651	1651	863	735	*800	6590	6261
32	781	1778	1778	900	775	*800	7708	7323
34	832	1930	1930	940	820	*800	8333	7916
36	876	2083	2083	990	885	*800	10490	9966
40	978	2337	2337	1070	935	*900	14480	13756

Reduced Bore — Class 600

Size	d	D	L	L1	H1	H2	W	RF Weight
in	mm	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	292	292	152	80	350	40
3*2	51	76	356	356	155	85	400	53
4*3	76	102	432	432	193	112	500	98
6*4	102	152	559	559	239	140	700	210
8*6	152	203	660	660	266	175	*406	299
10*8	203	254	787	787	310	250	*406	504
12*10	254	305	838	838	354	290	*600	783
14*10	254	337	889	889	354	345	*600	832
14*12	305	337	889	889	411	345	*600	896
16*12	305	387	991	991	411	370	*600	951
16*14	337	387	991	991	435	370	*600	1291
18*14	337	438	1092	1092	435	410	*600	1501
18*16	387	438	1092	1092	493	420	*600	1616
20*16	387	489	1194	1194	493	440	*600	2041
20*18	438	489	1194	1194	544	462	*700	2241
22*18	438	540	1295	1295	544	462	*700	2401
24*20	489	591	1397	1397	629	515	*760	3405
28*24	591	686	1549	1549	728	610	*800	4191
30*24	591	737	1651	1651	728	610	*800	4671
34*28	686	832	1930	1930	810	695	*800	7109
36*30	737	876	2083	2083	863	735	*800	8500
40*34	832	978	2337	2337	940	820	*800	9903

Full Bore — Class 900LB

Size	d	L	L1	H1	H2	W	RF Weight	BW Weight
in	mm	mm	mm	mm	mm	mm	Kg	Kg
2	51	368	368	178	100	450	50	47
3	76	381	381	221	125	600	85	78
4	102	457	457	215	150	*305	156	142
6	152	610	610	268	215	*406	379	351
8	203	737	737	324	260	*600	554	512
10	254	838	838	371	305	*600	809	738
12	305	965	965	425	360	*600	1110	1027
14	324	1029	1029	463	390	*600	1591	1491
16	375	1130	1130	513	440	*710	1986	1844
18	425	1219	1219	614	500	*760	2781	2605
20	473	1321	1321	644	530	*760	3416	3193
24	572	1549	1549	745	630	*800	5443	5113
28	667	1753	1753	830	720	*800	10132	9473
30	714	1880	1880	880	755	*800	11385	10645
34	810	2159	2159	970	850	*900	17375	16246
36	857	2286	2286	1030	930	*900	20053	18750

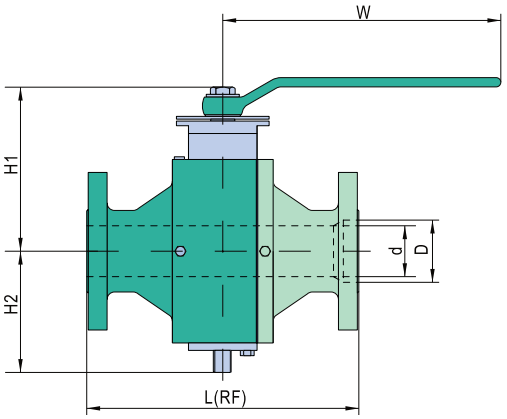
* Gear Operated

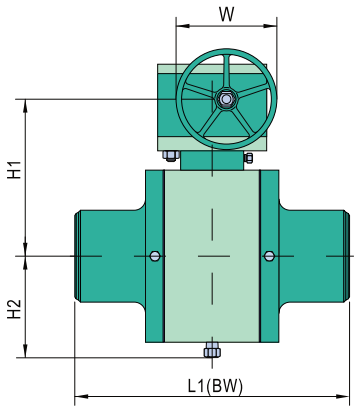
Reduced Bore — Class 900LB

Size	d	D	L	L1	H1	H2	W	RF Weight
in	mm	mm	mm	mm	mm	mm	mm	Kg
	38	51	368	368	152	80	400	44
3*2	51	76	381	381	178	100	450	54
4*3	76	102	457	457	221	125	600	92
6*4	102	152	610	610	215	150	*305	222
8*6	152	203	737	737	268	260	*406	474
10*8	203	254	838	838	324	305	*600	644
12*10	254	305	965	965	371	335	*600	857
14*10	254	324	1029	1029	371	360	*600	1039
14*12	305	324	1029	1029	425	360	*600	1295
16*12	305	375	1130	1130	425	390	*600	1370
16*14	324	375	1130	1130	463	390	*600	1811
18*16	375	425	1219	1219	513	440	*710	2181
20*16	375	473	1321	1321	513	470	*710	2711
20*18	425	473	1321	1321	614	500	*760	3111
24*20	473	572	1549	1549	644	550	*760	3766
28*24	572	667	1753	1753	745	630	*800	7526
30*24	572	714	1880	1880	745	665	*800	7927
34*28	667	810	2159	2159	830	750	*800	11132
36*30	714	857	2286	2286	880	780	*800	15596

Welded Body Trunnion Mounted Ball Valve

Dimensions and Weights





Full Bore — Class 1500

Size	d	L	L1	H1	H2	W	RF Weight	BW Weight
in	mm	mm	mm	mm	mm	mm	Kg	Kg
2	51	368	368	178	100	450	50	47
3	76	470	470	226	130	700	112	100
4	102	546	546	241	162	*406	190	170
6	146	705	705	319	255	*600	574	534
8	194	832	832	345	280	*600	742	674
10	241	991	991	411	345	*600	1184	1086
12	289	1130	1130	478	405	*600	1952	1818
14	318	1257	1257	517	435	*700	2224	2070
16	362	1384	1384	599	485	*760	2717	2528
18	407	1537	1537	663	545	*800	3584	3317
20	457	1664	1664	695	580	*800	4421	4088
24	534	2045	2045	842	730	*900	7029	6383

Reduced Bore — Class 1500

Size	d	D	L	L1	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	368	368	152	80	400	55
3*2	51	76	470	470	178	100	450	80
4*3	76	102	546	546	226	130	700	147
6*4	102	146	705	705	241	162	*406	291
8*6	146	194	832	832	319	270	*600	684
10*8	194	241	991	991	345	325	*600	920
12*10	241	289	1130	1130	411	370	*600	1329
14*10	241	318	1257	1257	411	405	*600	1829
14*12	289	318	1257	1257	478	405	*600	2052
16*12	289	362	1384	1384	478	435	*600	2502
16*14	318	362	1384	1384	517	435	*700	2644
18*16	362	407	1537	1537	599	485	*760	2907
20*16	362	457	1664	1664	599	545	*760	3782
20*18	407	457	1664	1664	663	545	*800	4088
24*20	457	534	2045	2045	695	640	*800	5774

Full Bore — Class 2500

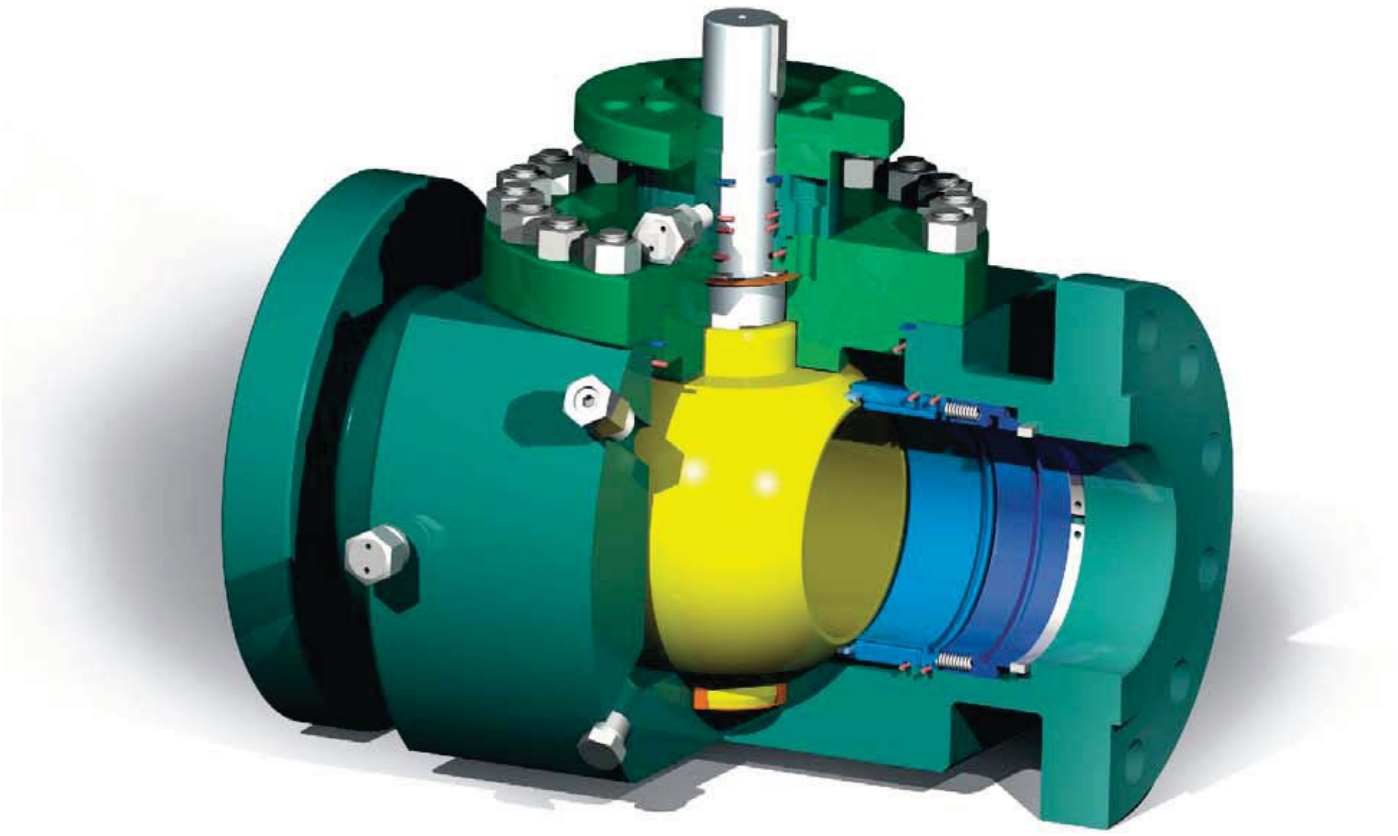
Size	d	L(RTJ)	L1	H1	H2	W	RF Weight	BW Weight
in	mm	mm	mm	mm	mm	mm	Kg	Kg
2	44	454	451	214	118	700	87	71
3	64	584	578	216	150	*406	194	159
4	89	683	673	265	180	*406	375	320
6	133	927	914	371	305	*600	756	614
8	181	1038	1022	426	360	*600	1319	1108
10	225	1292	1270	463	390	*710	2096	1688
12	267	1445	1422	550	465	*760	3216	2639

Reduced Bore — Class 2500

Size	d	D	L(RTJ)	L1	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	44	454	451	175	95	450	78
3*2	44	64	584	578	214	118	700	157
4*3	64	89	683	673	216	150	*406	314
6*4	89	133	927	914	265	270	*406	630
8*6	133	181	1038	1022	371	305	*600	1148
10*8	181	225	1292	1270	426	370	*600	1886
12*10	225	267	1445	1422	463	415	*710	2921

* Gear Operated

Top Entry Forged Trunnion Mounted Ball Valve



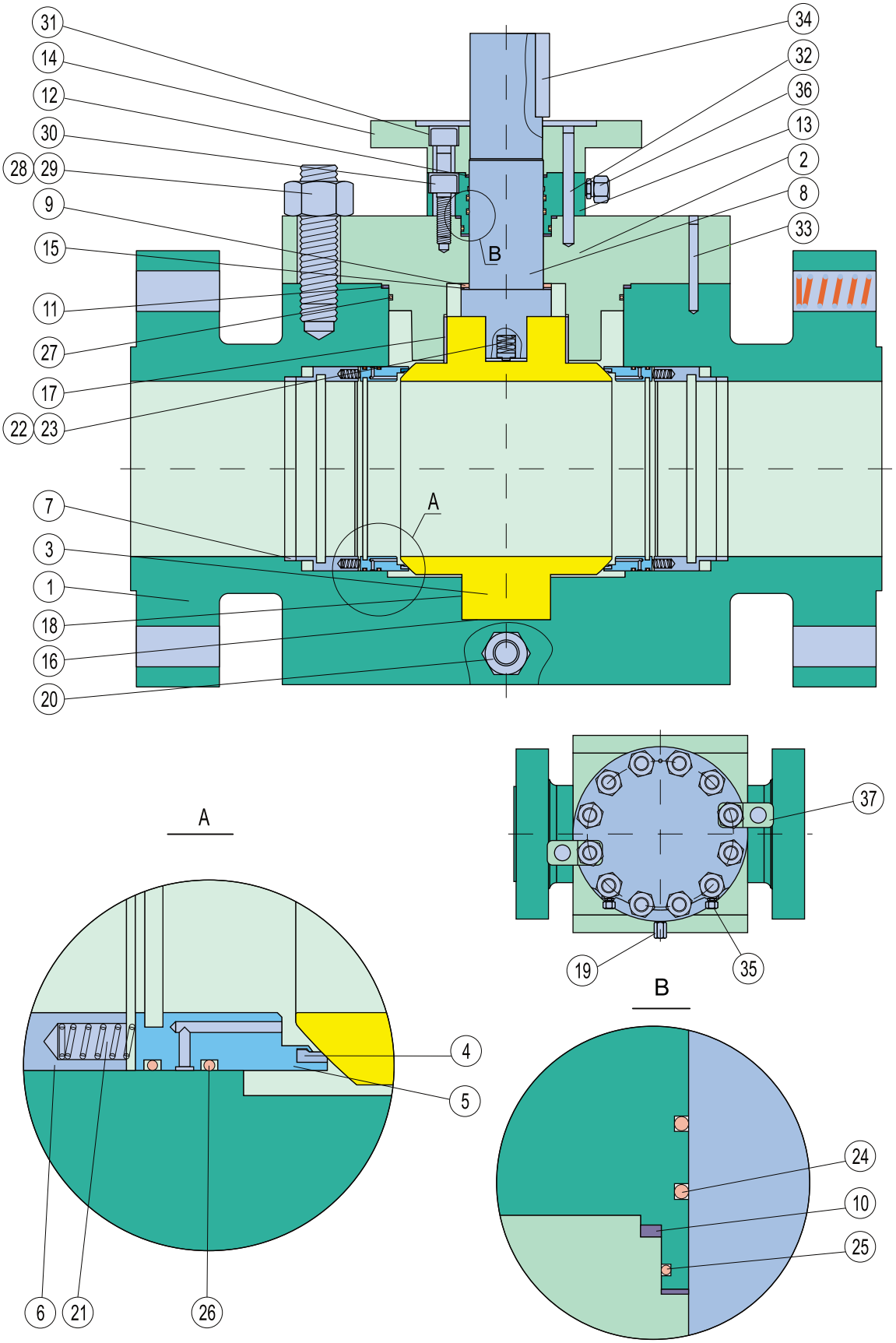
Features

Size: 2"~24"
Class: 150~1500
Top Entry 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/API 6D
End to End	ASME B16.10/API 6D
End Flange	ASME B16.5
BW End	ASME B16.25
Test	API 6D
Fire Safe Test	API 607/API 6FA
Special	NACE MR-01-75

Top Entry Forged Trunnion Mounted Ball Valve



Top Entry Forged Trunnion Mounted Ball Valve

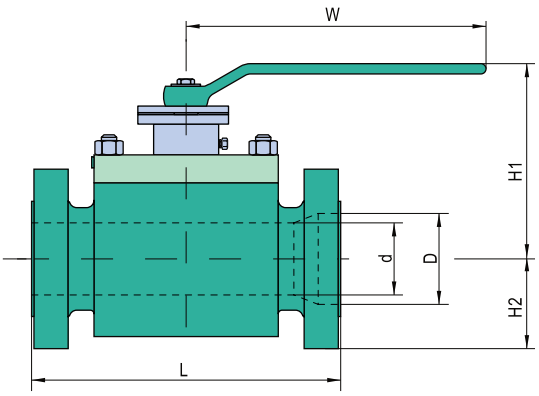
Material Specifications

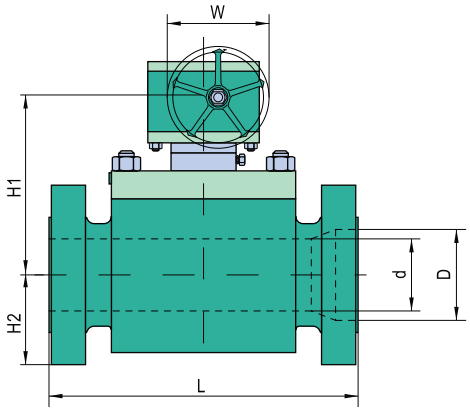
No.	Part	A105/ENP	A105/316	F316/316	LF2/316 NACE
1	Body	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
2	Adapter	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
3	Ball	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
4	Seat Insert	PTFE / Nylon	PTFE / Nylon	PTFE / Nylon	PTFE / Nylon
5	Seat Ring	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
6	Spring Seat	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
7	Retainer Ring	ASTM A276-420	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
8	Stem	ASTM A105/ENP	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
9	Shim	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
10	*Gland Gasket	304SS + Graphite	316SS + Graphite	316SS + Graphite	316SS + Graphite
11	*Body Gasket	304SS + Graphite	316SS + Graphite	316SS + Graphite	316SS + Graphite
12	*Stem Firesafe	Flexible Graphite	Flexible Graphite	Flexible Graphite	Flexible Graphite
13	Gland Flange	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
14	Top Flange	ASTM A105	ASTM A105	ASTM A182-F316	ASTM A350-LF2
15	Thrust Washer	PTFE	PTFE	PTFE	PTFE
16	Adjusting Washer	PTFE	PTFE	PTFE	PTFE
17	Bearing	316+PTFE+MoS2	316+PTFE+MoS2	316+PTFE+MoS2	316+PTFE+MoS2
18	Bearing	316+PTFE+MoS2	316+PTFE+MoS2	316+PTFE+MoS2	316+PTFE+MoS2
19	Vent Valve	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
20	Drain	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
21	Seat Spring	Inconel X-750	Inconel X-750	Inconel X-750	Inconel X-750
22	Antistatic Spring	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
23	Grounding Plunger	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
24	*O-Ring	NBR / Viton	NBR / Viton	NBR / Viton	NBR / Viton
25	*O-Ring	NBR / Viton	NBR / Viton	NBR / Viton	NBR / Viton
26	*O-Ring	NBR / Viton	NBR / Viton	NBR / Viton	NBR / Viton
27	*O-Ring	NBR / Viton	NBR / Viton	NBR / Viton	NBR / Viton
28	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
29	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
30	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
31	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
32	Gland Pin	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
33	Body Pin	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
34	Key	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
35	Seat Injection	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
36	Stem Injection	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
37	Lifting Lugs	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel

* Recommended Spare Parts

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	170	76	285	46
3	76	356	210	95	285	83
4	102	432	250	115	400	156
6	152	559	265	140	*400	256
8	203	660	355	172	*400	453
10	254	787	385	203	*600	622
12	305	838	400	242	*600	747
14	337	889	450	267	*600	959
16	387	991	510	299	*600	1220
18	438	1092	565	318	*600	1640
20	489	1194	620	349	*600	2118
24	591	1397	680	407	*700	2950

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	165	76	265	41
3*2	51	76	356	170	95	285	58
4*3	76	102	432	210	115	285	104
6*4	102	152	559	250	140	400	228
8*6	152	203	660	265	172	*400	320
10*8	203	254	787	355	203	*400	536
12*10	254	305	838	385	242	*600	685
14*12	305	337	889	400	267	*600	840
16*14	337	387	991	450	299	*600	1070
18*16	387	438	1092	510	318	*600	1430
20*18	438	489	1194	565	349	*600	1850
24*20	489	591	1397	620	407	*600	2450

* Gear Operated

Full Bore — Class 300

Size	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	292	170	83	285	49
3	76	356	210	105	285	87
4	102	432	250	127	400	164
6	152	559	265	159	*400	272
8	203	660	355	191	*500	479
10	254	787	385	222	*600	657
12	305	838	400	261	*600	783
14	337	889	450	292	*600	1007
16	387	991	510	324	*600	1281
18	438	1092	565	356	*700	1722
20	489	1194	620	388	*700	2224
24	591	1397	680	457	*760	3100

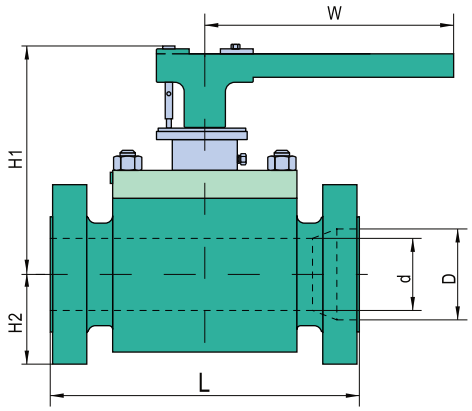
Reduced Bore — Class 300

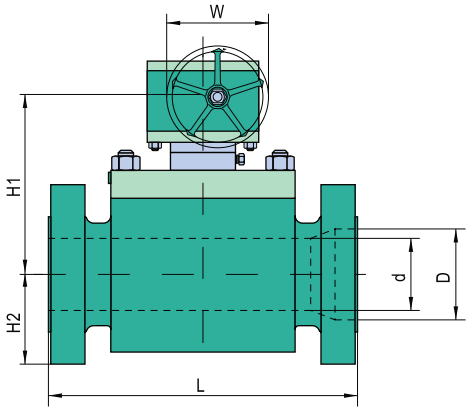
Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1-1/2	38	51	292	165	83	265	44
3*2	51	76	356	170	105	285	62
4*3	76	102	432	210	127	285	110
6*4	102	152	559	250	159	400	243
8*6	152	203	660	265	191	*400	343
10*8	203	254	787	355	222	*400	559
12*10	254	305	838	385	261	*600	725
14*12	305	337	889	400	292	*600	890
16*14	337	387	991	450	324	*600	1120
18*16	387	438	1092	510	356	*600	1480
20*18	438	489	1194	565	388	*700	1960
24*20	489	591	1397	620	457	*700	2650

* Gear Operated

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	180	83	285	52
3	76	356	220	105	760	92
4	102	432	260	1375	1140	173
6	152	559	275	178	*500	285
8	203	660	370	210	*600	504
10	254	787	398	254	*600	680
12	305	838	410	280	*700	819

Reduced Bore — Class 600

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
	38	51	292	174	83	285	46
3*2	51	76	356	180	105	285	74
4*3	76	102	432	220	137	760	120
6*4	102	152	559	260	178	1140	249
8*6	152	203	660	275	210	*500	380
10*8	203	254	787	370	254	*600	587
12*10	254	305	838	398	280	*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	190	108	760	60
3	76	381	230	121	1140	100
4	102	457	270	146	*400	204
6	152	610	320	191	*500	420
8	203	737	375	235	*600	644
10	254	838	440	273	*700	943
12	305	965	498	305	*700	1295

Reduced Bore — Class 900

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1.5	38	51	368	182	108	760	54
3*2	51	76	381	190	121	760	80
4*3	76	102	457	230	146	1140	148
6*4	102	152	610	270	191	*400	305
8*6	152	203	737	320	235	*500	552
10*8	203	254	838	375	273	*600	748
12*10	254	305	965	440	305	*700	1048

* Gear Operated

Full Bore — Class 1500

Size	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	368	195	108	760	69
3	76	470	233	134	*400	133
4	102	546	276	156	*500	253
6	146	705	324	197	*600	667
8	194	832	397	242	*700	865
10	241	991	462	292	*700	1375
12	289	1130	493	337	*760	2175

Reduced Bore — Class 1500

Size	d	D	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	mm	Kg
2*1.5	38	51	368	189	108	760	63
3*2	51	76	470	195	134	760	95
4*3	76	102	546	233	156	*400	183
6*4	102	146	705	276	197	*500	359
8*6	146	194	832	324	242	*600	794
10*8	194	241	991	397	292	*700	1070
12*10	241	289	1130	462	337	*700	1541

* Gear Operated

Metal to Metal Seat Ball Valve

- ***High Temperature Service***

General soft seated ball valves working temperature is limited up to 400°F , but metal-seated ball valves are guaranteed for a maximum service temperature of 800 °F.

- ***Low Pressure Reliable Sealing***

Athena metal-seated ball valves adopt seat spri ng structure, which can push upstream seat tig htly against the ball surface creating a reliable se aling even if extremely low pressure.

- ***Pressure Test***

Metal-seated ball valves maximum allowable seat leakage:
Air: ANSI/FCI 70-2 Class V

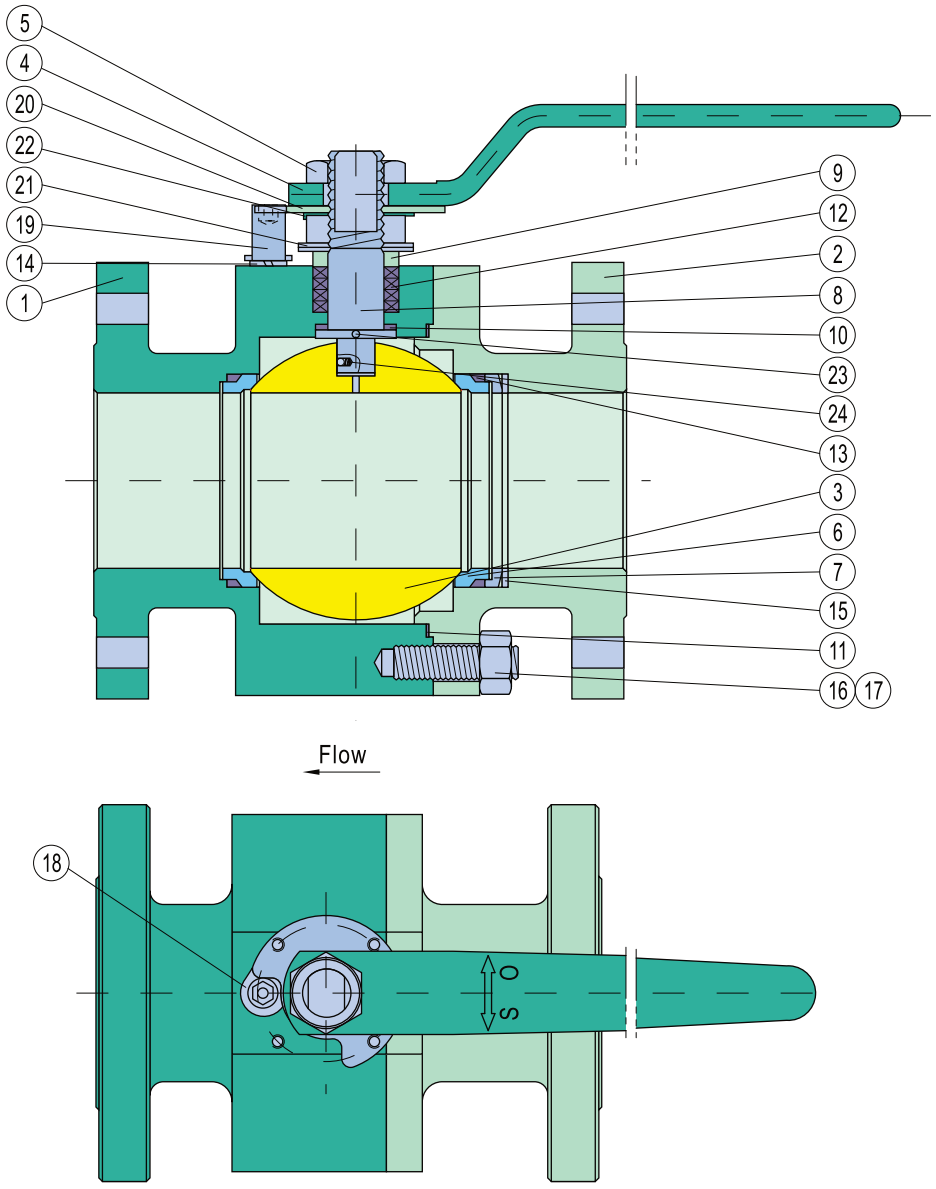
- ***Absolute Fire Safe Guarantee***

Athena metal-seated ball valves are absolute fires a fe design. Metal-to-metal contact is designed bet ween ball and seat, where is unconditional fire safe function. Flexible graphite gasket can prev ent fluid leakage from between body & seat or body & adapte r even if high temperature envir onments to reac h fire-safe purpose. In addition, o ther sealing co mponents such as stem packing ca n also reach fi re-safe function and prevent externa l leakage. So a ll parts of the valve will not be aff ected by high temperature service.

- ***Blow-out Proof Stem& Anti-Static Device***

As general ball valves, Athena metal-seated b all valves are provided with blow-out proof stem& a nti- static device.

Metal to Metal Seat Ball Valve



Material Specifications

No.	Part	Standard Materials	No.	Part	Standard Materials
1	Body	ASTM A105 or A182-F316	13	Seat Packing	Graphite
2	Adapter	ASTM A105 or A182-F316	14	Washer	Carbon Steel or Stainless Steel
3	Ball	ASTM A182-F6a or F316/Nitriding or WC Plated	15	Dished Spring	Stainless Steel
4	Lever	Carbon Steel	16	Body Stud	ASTM A193-B7 or A193-B8
5	Nut	Carbon Steel or Stainless Steel	17	Body Nut	ASTM A194-2H or A194-8
6	Seat	ASTM A182-F6a or F316/Stellite 6 Faced or WC Plated	18	Locked Plate	Carbon Steel or Stainless Steel
7	Push Ring	Stainless Steel	19	Screw	Carbon Steel or Stainless Steel
8	Stem	ASTM A182-F6a or F316	20	Stop Plate	Carbon Steel or Stainless Steel
9	Gland	Stainless Steel	21	Dished Spring	Alloy Steel or Stainless Steel
10	Thrust Washer	Graphite	22	Locked Washer	Carbon Steel or Stainless Steel
11	Body Gasket	316+Graphite	23	Steel Ball	Stainless Steel
12	Stem Packing	Graphite	24	Antistatic Spring	Stainless Steel

Note:
1. WC: Tungsten Carbide.
2. Customer shall order the valve according to service condition.

Torque Value & Cv Value

Floating Ball Valve Design Torque

Size	Design Torque (N.m)				
(inch)	Class 150	Class 300	Class 600	Class 900	Class 1500
1/2	12	17	30	38	51
3/4	14	23	38	56	71
1	27	48	66	98	130
1-1/2	55	89	120	189	238
2	75	100	160	240	350
2-1/2	125	141	233	390	550
3	162	216	308	610	980
4	234	476	635	---	---
5	546	910	---	---	---
6	804	1338	1944	---	---
8	1410	3100	---	---	---
10	2600	5400	---	---	---

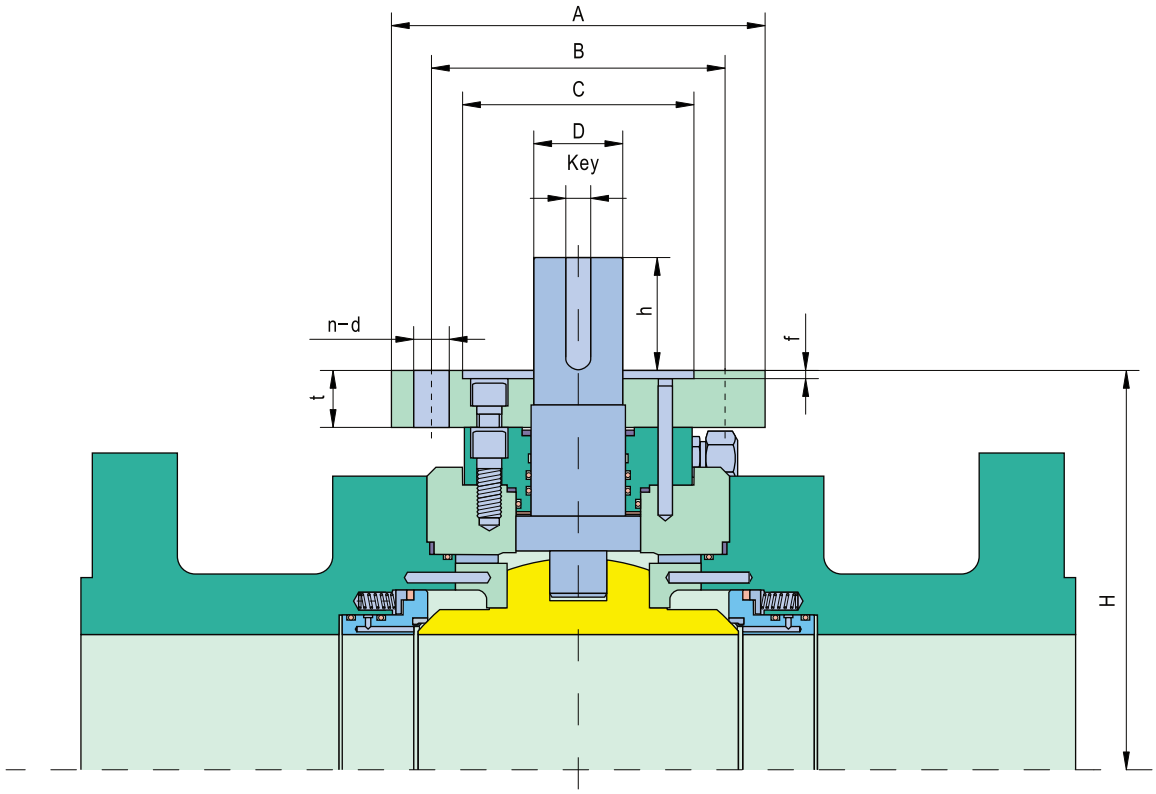
Notes:
1. For FC, FR & FF series valves, torque is the same.
2. All valves are in normal temperature, with PTFE seat for Class 150~300 and Nylon seat for Class 600~1500.
3. For cryogenic ball valve, torque will be 2~2.5 times the above torque.
4. Torque shown in this table is to be used as a guide for actuator selection. A safety factor of 1.5 is recommended for actuator sizing.
5. Torque may be changed according to different medium and trim material.

Ball Valve Flow Coefficient (Cv)

Size	Cv					
(inch)	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
1/2	24	24	24	24	24	24
3/4	53	53	53	53	53	53
1	92	92	92	92	92	92
1-1/2	211	211	211	211	211	211
2	381	381	381	381	381	283
3	845	845	845	845	845	600
4	1523	1523	1523	1523	1523	1160
6	3381	3381	3381	3381	3120	2590
8	6031	6031	6031	6031	5508	4795
10	9442	9442	9442	9442	8500	7410
12	13614	13614	13614	13614	12223	10433
14	16621	16621	16621	15363	14800	---
16	21920	21920	21920	20581	19178	---
18	28076	28076	28076	26435	24243	---
20	34995	34995	34995	32743	30565	---
22	42676	42676	42676	40184	35860	---
24	51117	51117	51117	47884	41733	---
26	59012	59012	59012	56076	---	---
28	68872	68872	68872	65110	---	---
30	79493	79493	79493	74610	---	---
32	89268	89268	89268	84977	---	---
34	101307	101307	101307	96020	---	---
36	112306	112306	112306	107487	---	---
40	139982	139982	139982	---	---	---

Note:
1. The flow coefficiency "Cv" of a valve is the flow rate in Gallons /minute of 60°F water through a fully opened valve, at a pressure drop of 1 psi across the vavle.
2. All the ball valves are in full bore.

Torque Value & Mounting Flange Dimensions



Size inch	Class	Torque N.m	Flange Dimensions mm						ISO5211 Flange No.	Key Size DIN 6885 b*h*l	D mm	h mm	H mm
			A	B	C	f	t	n-d					
2*1-1/2	150	40	90	75	58	3.5	10	4-7	FX75	C5*5*35	16	37	106
	300	65	90	75	58	3.5	10	4-7	FX75	C5*5*35	16	37	106
	600	100	125	102	70	4	15	4-12	F10	C6*6*30	19	30	114
	900	140	125	102	70	4	18	4-12	F10	C8*7*30	24	32	122
	1500	240	125	102	70	4	18	4-12	F10	C8*7*30	24	32	122
	2500	420	150	125	85	4	18	4-14	F12	C8*7*40	30	41	153
2	150	75	125	102	70	4	15	4-12	F10	C6*6*30	19	30	128
	300	90	125	102	70	4	15	4-12	F10	C6*6*30	19	30	126
	600	140	125	102	70	4	15	4-12	F10	C8*7*30	24	30	126
	900	230	150	125	85	4	18	4-14	F12	C8*7*30	30	31	140
	1500	350	150	125	85	4	18	4-14	F12	C8*7*30	30	31	139
	2500	800	175	140	100	5	20	4-18	F14	C10*8*55	35	51	183
3	150	120	125	102	70	4	18	4-12	F10	C8*7*30	24	32	144
	300	160	125	102	70	4	18	4-12	F10	C8*7*30	24	32	144
	600	260	150	125	85	4	18	4-14	F12	C8*7*40	30	41	169
	900	520	175	140	100	5	20	4-18	F14	C10*8*55	35	52	179
	1500	890	175	140	100	5	15	4-18	F14	C12*8*50	40	50	187
	2500	1580	210	165	130	6	20	4-22	F16	C12*8*60	40	61	212
4	150	180	125	102	70	4	18	4-12	F10	C8*7*30	24	32	167
	300	350	150	125	85	4	18	4-14	F12	C8*7*40	30	38	189
	600	670	175	140	100	5	20	4-18	F14	C10*8*55	35	51	191
	900	875	175	140	100	5	15	4-18	F14	C12*8*50	40	48	201
	1500	1350	210	165	130	6	35	4-22	F16	C14*9*50	50	68	225
	2500	2100	210	165	130	6	35	4-22	F16	C14*9*90	50	90	228

Torque Value & Mounting Flange Dimensions

Size (inch)	Class	Torque N.m	Flange Dimensions (mm)						ISO5211 Flange No.	Key Size DIN 6885 b*h*l	D (mm)	h (mm)	H (mm)
			A	B	C	f	t	n-d					
6	150	630	175	140	100	5	15	4-18	F14	C12*8*50	40	48	234
	300	850	175	140	100	5	15	4-18	F14	C12*8*50	40	48	234
	600	1600	210	165	130	6	33	4-22	F16	C14*9*50	50	50	225
	900	1920	300	254	200	6	41	8-18	F25	C18*11*70	60	70	267
	1500	3500	300	254	200	6	47	8-18	F25	C20*12*90	70	91	273
8	150	980	210	165	130	6	33	4-22	F16	C14*9*50	50	51	259
	300	1560	210	165	130	6	33	4-22	F16	C14*9*50	50	51	259
	600	2500	300	254	200	6	41	8-18	F25	C18*11*70	60	71	290
	900	4000	300	254	200	6	47	8-18	F25	C20*12*100	70	103	312
	1500	6500	300	254	200	6	48	8-18	F25	C22*14*100	80	100	310
10	150	1320	210	165	130	6	33	4-22	F16	C14*9*50	50	52	310
	300	2300	300	254	200	6	41	8-18	F25	C18*11*70	60	71	329
	600	3450	300	254	200	6	47	8-18	F25	C20*12*100	70	101	341
	900	5500	300	254	200	6	48	8-18	F25	C22*14*140	80	118	350
	1500	11000	300	254	200	6	48	8-18	F25	C28*16*140	100	140	363
12	150	1650	300	254	200	6	41	8-18	F25	C18*11*70	60	74	367
	300	3000	300	254	200	6	47	8-18	F25	C20*12*100	70	101	377
	600	5100	300	254	200	6	47	8-18	F25	C20*12*100	70	101	377
	900	9000	300	254	200	6	48	8-18	F25	C28*16*140	100	138	407
	1500	16000	350	298	230	6	48	8-22	F30	C32*18*150	120	154	421
14	150	2400	300	254	200	6	47	8-18	F25	C20*12*100	70	103	408
	300	3600	300	254	200	6	47	8-18	F25	C20*12*100	70	103	408
	600	7200	300	254	200	6	48	8-18	F25	C22*14*100	80	102	406
16	150	3300	300	254	200	6	48	8-18	F25	C22*14*100	80	98	442
	300	5350	300	254	200	6	48	8-18	F25	C22*14*100	80	102	436
	600	9500	300	254	200	6	48	8-18	F25	C28*16*140	100	142	446
	900	15300	350	298	230	6	48	8-22	F30	C32*18*180	120	179	457
18	150	5100	300	254	200	6	48	8-18	F25	C22*14*100	80	100	469
	300	8300	300	254	200	6	48	8-18	F25	C28*16*140	100	140	483
	600	14500	350	298	230	6	48	8-22	F30	C32*18*150	120	149	486
	900	21800	350	298	230	6	52	8-22	F30	C32*18*180	120	179	516
	1500	32000	415	356	260	6	52	8-33	F35	C36*20*220	140	219	563
20	150	6400	300	254	200	6	48	8-18	F25	C22*14*100	80	98	511
	300	11000	300	254	200	6	48	8-18	F25	C28*16*140	100	140	522
	600	20000	415	356	260	6	48	8-33	F35	C32*18*180	120	179	521
	900	29000	415	356	260	6	52	8-33	F35	C36*20*220	140	220	567
24	150	12300	300	254	200	6	48	8-18	F25	C28*16*140	100	142	592
	300	19400	350	298	230	6	48	8-22	F30	C32*18*150	120	150	600
	600	29500	415	356	260	6	52	8-33	F35	C36*20*210	140	212	631
30	600	52000	415	356	260	6	55	8-33	F35	C36*20*210	140	209	796

Notes:
1.The above table is for TF & TT series valves, which are with ISO 5211 mounting flange and adaptablity 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℃~40℃, the output torque of actuator should be 1.5 times the valve torque;
b. If medium temperature is less than -10℃, the output torque of actuator should be 2 or 2.5 times the valve torque.

Soft Materials Data

Specifications for Seat Materials

	PTFE	RPTFE	Molon(Nylon+MoS_2)	PEEK
Tensile Strength (MPa)	24.8	25.4	75~100	91
Compressive Strength (MPa)	35	52	100~140	137
Elongation (%)	250	120	10~30	50
Hardness(SH.A)	56	60	78	82
Water Absorption (%)	<0.01	<0.01	0.7	0.12
Specific Gravity (G/cm3)	2.2	2.2	1.2	1.35
Temperature Range (°F)	-300~400	-150~425	-40~300	-150~500
Pressure Rating (Class)	150~600	150~600	150~1500	150~2500
Service Application	Chemical & Cryogenic	Chemical & Cryogenic	High Pressure & Low Temperature	High Pressure & High Temperature
	Nylon 1010	Nylon 12	Devlon V	Delrin
Tensile Strength (MPa)	55	60	80	68
Compressive Strength (MPa)	70	79	140	110
Elongation (%)	150	200	5.37	220
Hardness(SH.A)	70	75	78	78
Water Absorption (%)	0.3	0.2	0.1	0.2
Specific Gravity (G/cm3)	1.04	1.01	1.14	1.41
Temperature Range (°F)	-40~200	-58~250	-150~300	-58~230
Pressure Rating (Class)	600~1500	600~1500	150~1500	150~1500
Service Application	High Pressure & Low Temperature	High Pressure & Low Temperature	High Pressure & Low Temperature	High Pressure & Low Temperature

Specifications for Seal Materials

	Viton A	NBR	Viton B	HNBR (HSN)	Viton AED
Temperature range (°F)	-20~400	-50~250	-20~400	-40~320	-20~480
Hardness (SH.A)	70	70	70	80	90
Specific Gravity (G/cm3)	1.85	1.2	1.85	1.33	1.9
Service Application	Petroleum Oils, Gasoline, Transmission Fluid	Petroleum Oils, Water, Hydraulic Oils	Mineral Acid, Steam, MTBE	Petroleum Oils, H2S & CO2 Anti-Explosive Decompression	Petroleum Oils, H2S & CO2 Anti-Explosive Decompression

Specifications for Gasket Materials

	Flexible Graphite	Spiral Wound 316+Graphite	PTFE	Spiral Wound Monel + PTFE
Temperature Range °F	-300~900	-300~900	-300~400	-300~400
PH	0~14	0~14	0~14	0~14
Service Application	Fire-safe	Fire-safe	Cryogenic, High Corrosive	High Corrosive

*Due to quick develop, we reserve the right to institute changes in material, design and specifications for all Athena designed valves without prior notice.

Athena Engineering S.r.l

OFFICE: ROMA(RM)VIA DEL TORRACCIO DI TORRENOVA 2/D CAP 00133

FACILITY: NAPOLI(NA) VIA POSILLIPO 96/34 CAP 80123

TEL:0039-06-87567272

FAX:0039-06-490781

www.athenavalve.com

E-mail: info@athenavalve.com