



CRESCENT VALVES

Ball Valve

**Forged Steel & Cast Steel
Floating Ball Valve
Trunnion Mounted Ball Valve**



COMPANY OVERVIEW



The word Crescent Originates from the Latin equivalent 'Crescent', which means 'to grow'.

At Crescent Valves, growth has been the story during every moment of its 60 year existence. A growth that has been nurtured by a strong commitment to quality.

A far-sighted management professing to this creed of quality, has steered Crescent to a pinnacle position in Flow Control Industry.

The Crescent story is one of humble beginnings. Today, it possesses one manufacturing unit in Sanand and two manufacturing units in Ahmedabad, With it's head office in Mumbai. With its arsenal of sophisticated equipment and experienced personnel, Crescent has earned and successfully executed prestigious Power, Oil, Steel and Petrochemical projects in India and Abroad.

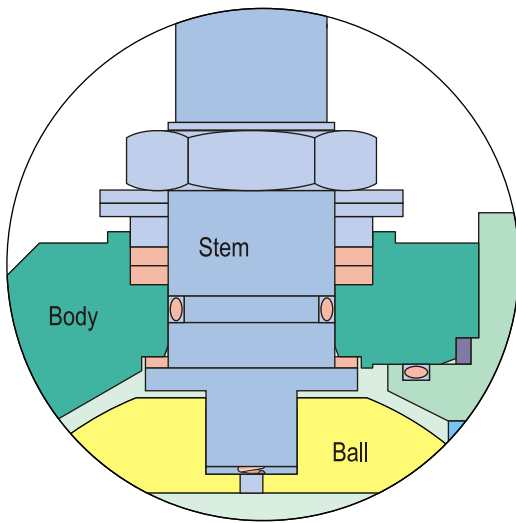
Crescent has established growing markets in the Middle East, South East Asia, Africa, the U. S. A., Europe, Russia & Kazakisthan.

Figure

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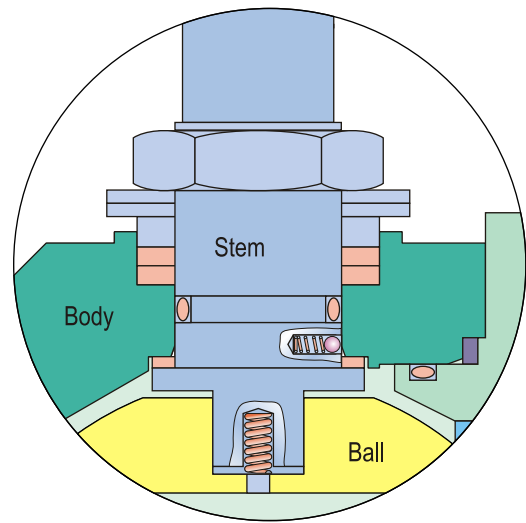


- **Blow-out Proof Stem**



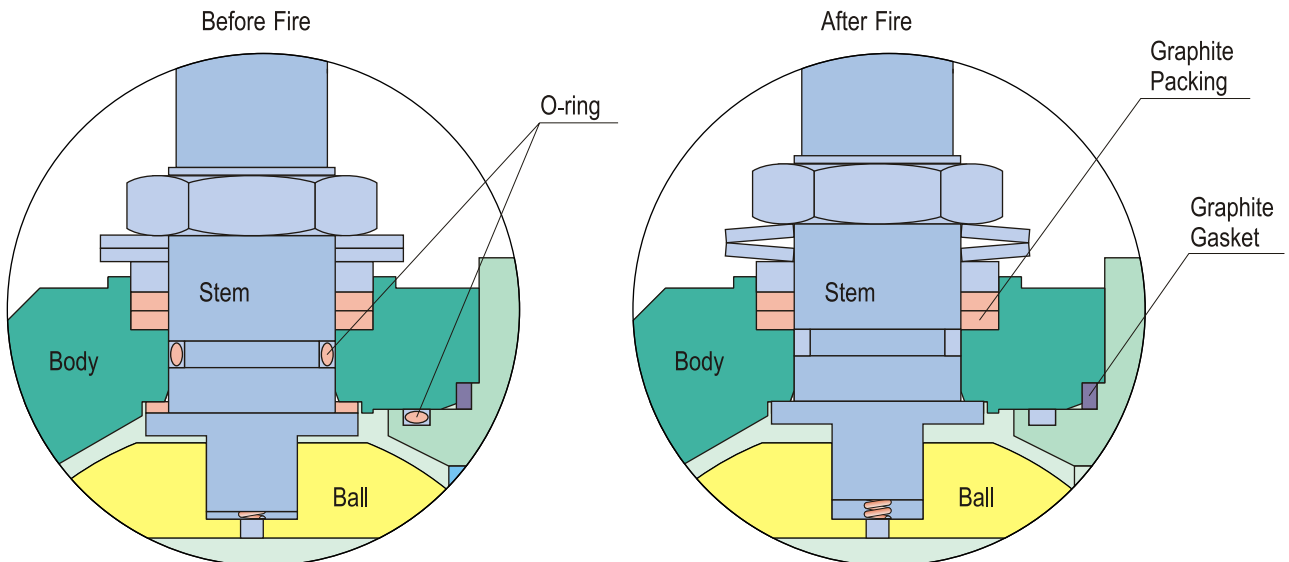
The stem is made separately from the ball with integral T-type round shoulder, installed internally from body side, retained by body to assure sealing safety at all pressure.

- **Anti-Static Device**



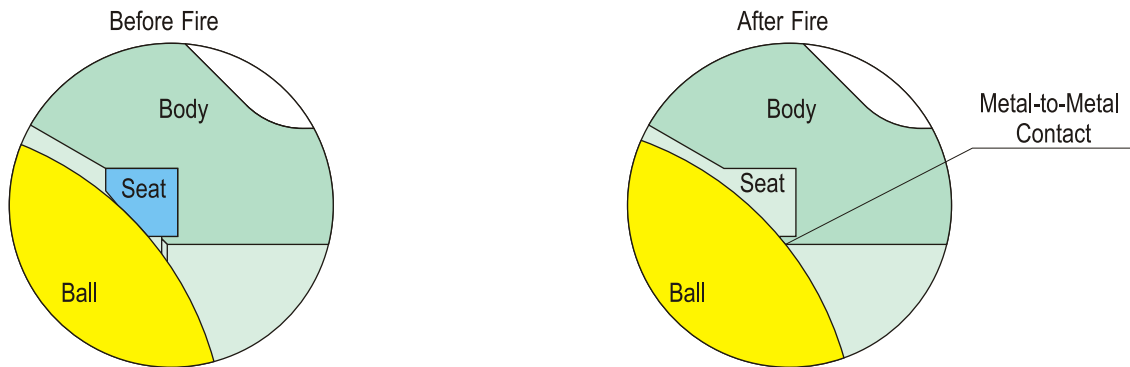
Spring plus graphite type anti-static device is applied between the ball, stem and body, to keep the electrical continuity between all the metallic components, and ensure the resistance lower than the most severe service requirement.

- **Fire Safe**



a) External leakage prevention

All the possible external leakage point between stem and body, body and adapter are made with primary O-ring seal and secondary graphite packing or gasket seal. When fire burned out the primary O-ring seal, the secondary graphite packing/gasket seal still can prevent the process medium without external leakage.

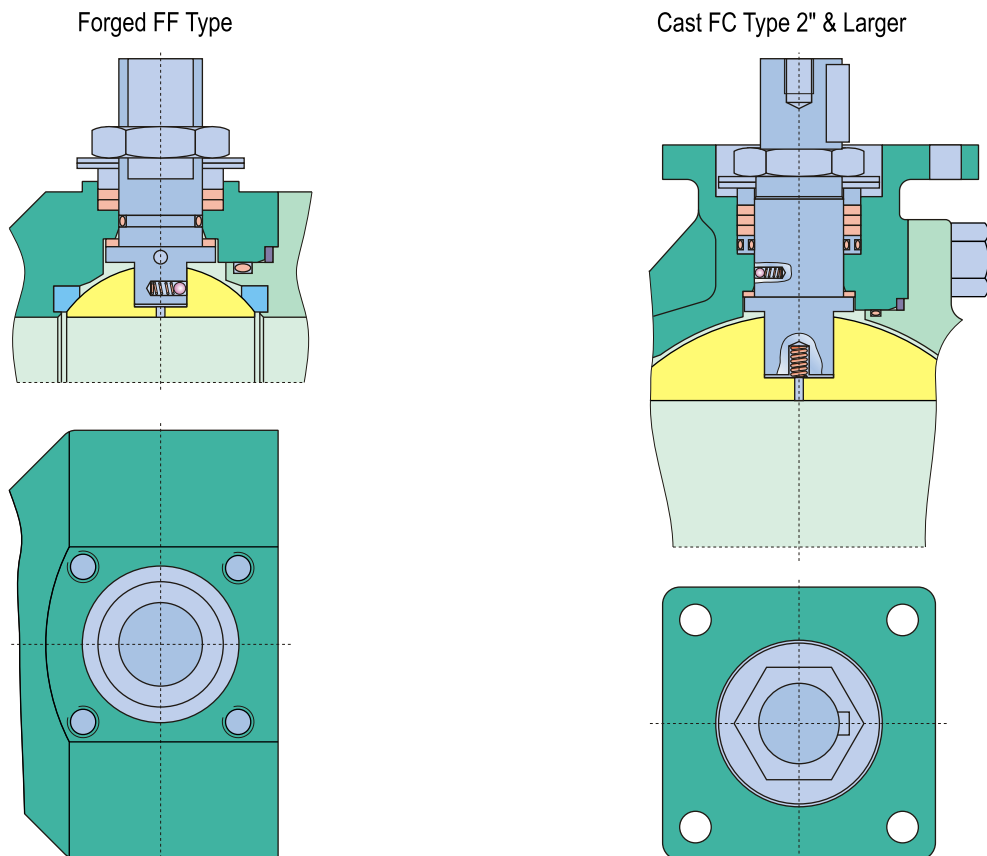


b) Internal leakage prevention

When fire burned out the primary soft seat seal, the upstream medium pressure push the ball to downstream against the secondary metal seat lip to shut off the process medium and prevent internal leakage through the valve bore.

• **Top Mounting**

All valves are designed and manufactured with ISO 5211 top mounting, for 2" & larger cast floating ball valve, actuator can be directly mounted on the valve.



• **Environment Friendly Valve**

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

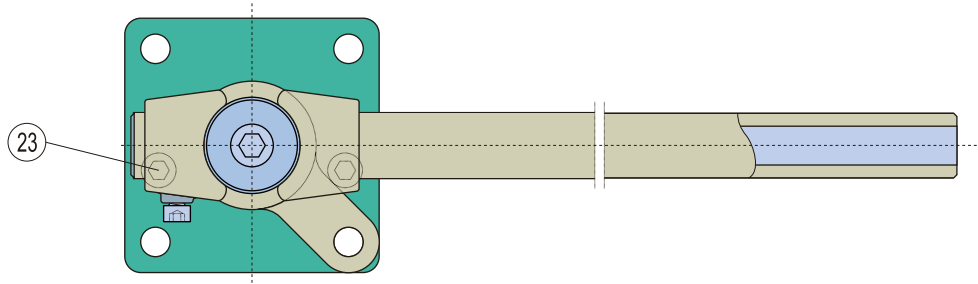
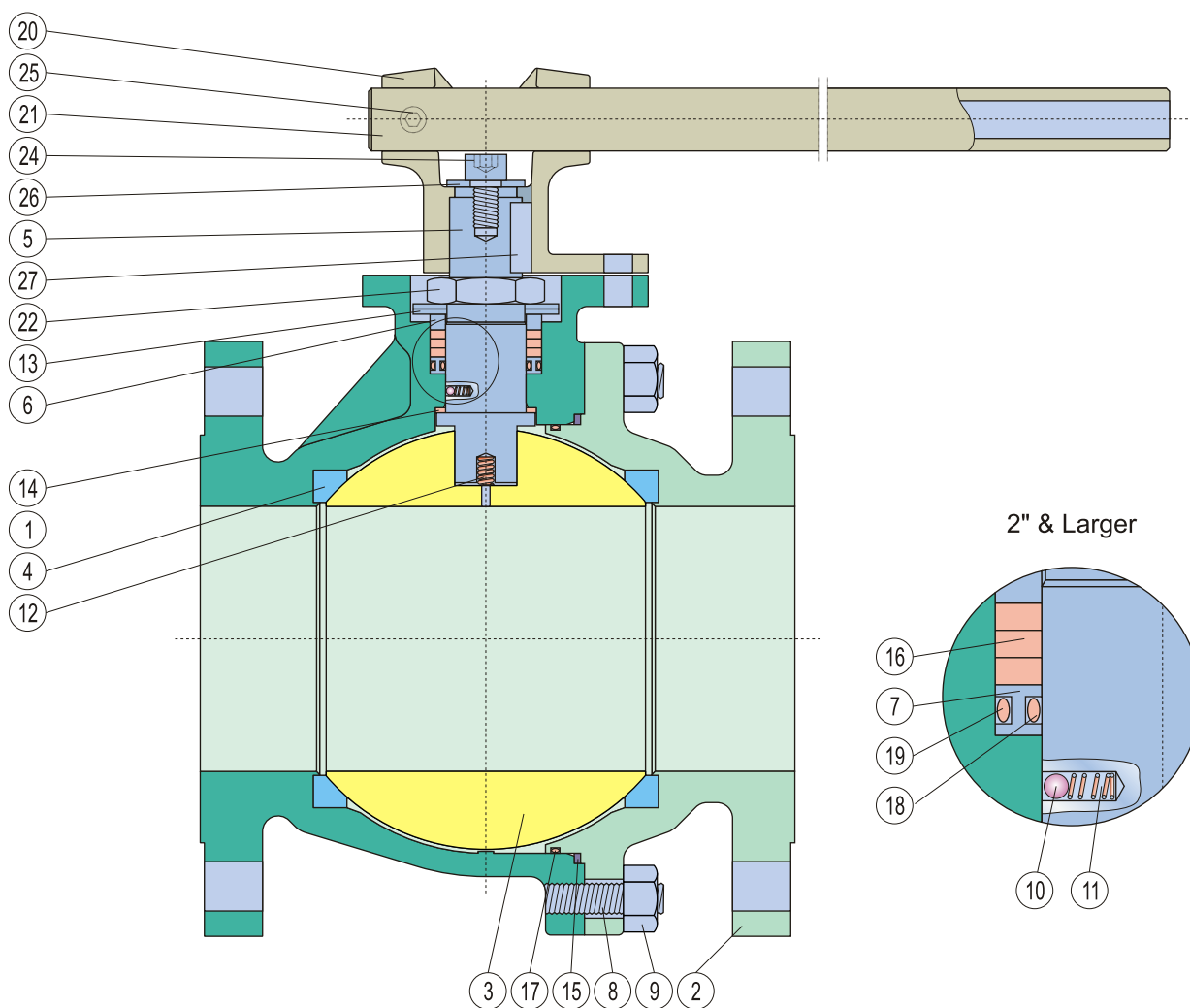


Features

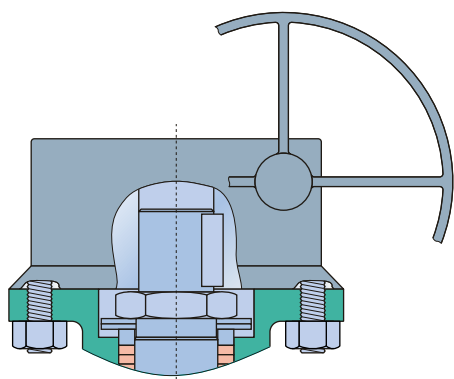
Size: 1/2"~10"
Class: 150~300
Two Pieces Cast Steel Body
Floating Ball, Full & Reduced Bore
Anti-Static Device
Blow-out Proof Stem
Fire Safe Design
Low Emission

Specifications

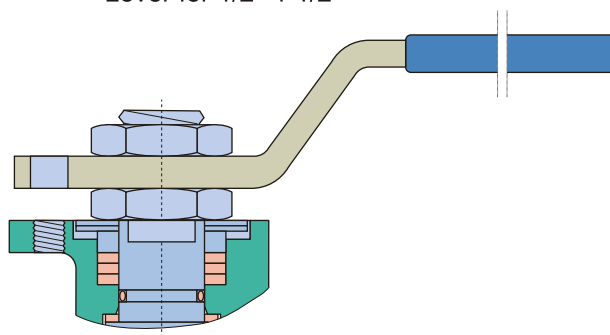
Design	ASME B16.34/BS 5351/API6D
Face to Face	ASME B16.10
End to End	ASME B16.10
End Flange	ASME B16.5
BW End	ASME B16.25
Test	API 598/ BS 6755
Fire Safe Test	API 607/API 6FA
Special	NACE MR-01-75



Gear Standard for 6" & Larger



Lever for 1/2"-1 1/2"



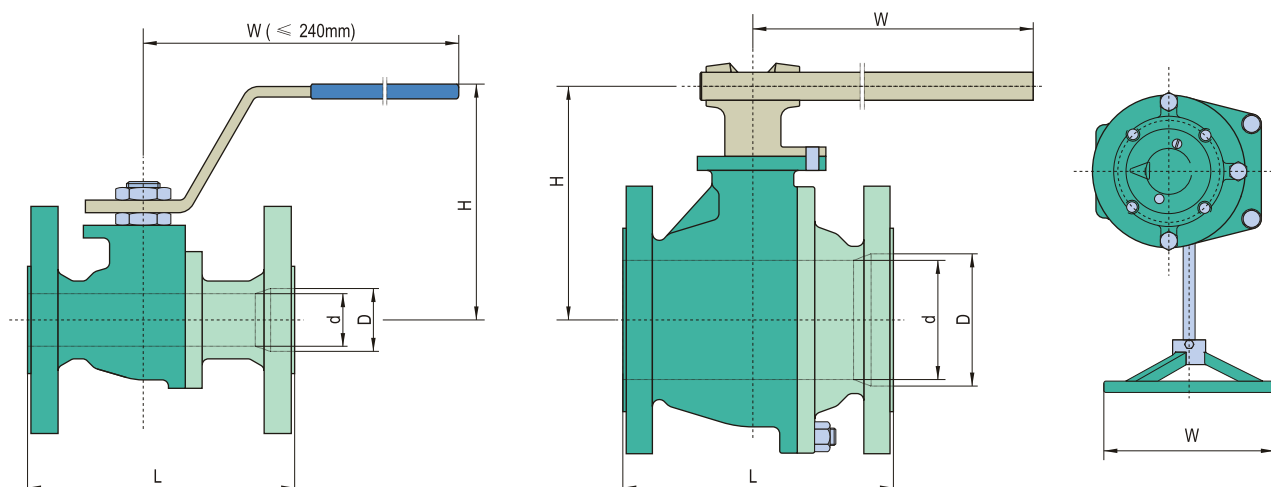
Material Specifications

No.	Part	WCB/304	WCB/316	CF8M/316	LCC/316 NACE
1	Body	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A351-LCC
2	Adapter	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A351-LCC
3	Ball	ASTM A 351-CF8	ASTM A 351-CF8M	ASTM A 351-CF8M	ASTM A 351-CF8M
4	Seat	PTFE	PTFE	PTFE	PTFE
5	Stem	ASTM A182-F6a	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
6	Gland	ASTM A276-410	ASTM A276-316	ASTM A276-316	ASTM A276-316
7	O-Ring Box(2"&Larger)	ASTM A276-410	ASTM A276-316	ASTM A276-316	ASTM A276-316
8	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
9	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
10	Steel Ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
11	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
12	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
13	Dish Spring	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
14	Thrust Washer	PTFE	PTFE	PTFE	PTFE
15	*Gasket	Graphite	Graphite	Graphite	Graphite
16	*Packing	Graphite	Graphite	Graphite	Graphite
17	*O-Ring	Viton	Viton	Viton	Viton
18	*O-Ring	Viton	Viton	Viton	Viton
19	*O-Ring	Viton	Viton	Viton	Viton
20	Lever Head	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated
21	Lever Pipe	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated
22	Nut	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
23	Position Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
24	Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
25	Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
26	Washer	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
27	Key	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel

* Recommended Spare Parts



Dimensions and Weights



Full Bore

Class 150

Size	d	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	108	85	160	2.2
3/4	19	117	93	160	2.7
1	25	127	112	180	4.5
1-1/2	38	165	132	240	7.0
2	51	178	138	350	9.5
2-1/2	64	191	155	400	15
3	76	203	175	400	19
4	102	229	200	450	30
5	125	356	230	550	58
6	152	394	230	*300	75
8	203	457	290	*400	115
10	254	533	320	*400	180

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	85	160	2.5
1*3/4	19	25	127	93	160	4.0
1-1/2*1	25	38	165	112	180	6.2
2*1-1/2	38	51	178	132	240	8.6
2-1/2*2	51	64	191	138	350	13.0
3*2	51	76	203	138	350	18.9
4*3	76	102	229	175	400	23
6*4	102	152	267	200	450	55
8*6	152	203	292	230	*300	83
10*8	203	254	330	290	*400	122

* Gear Operated

Full Bore

Class 300

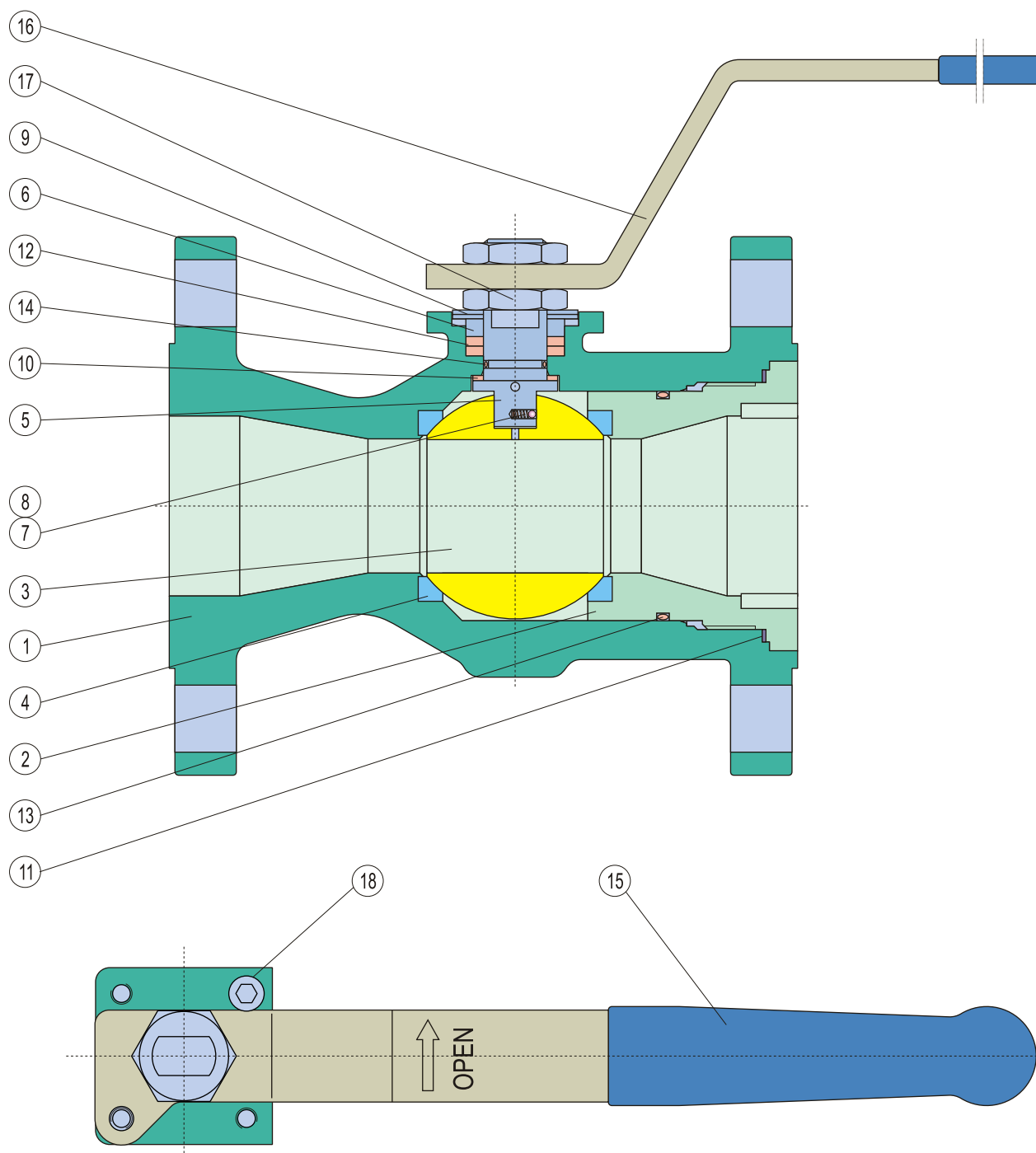
Size	d	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	140	85	160	2.5
3/4	19	152	93	160	3.5
1	25	165	112	180	5.5
1-1/2	38	191	132	240	9
2	51	216	138	400	13
2-1/2	64	241	155	400	21
3	76	283	175	450	27
4	102	305	200	500	40
5	125	381	230	550	65
6	152	403	230	*300	95
8	203	502	290	*400	150
10	254	568	320	*400	230

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	85	160	3.2
1*3/4	19	25	165	93	160	5
1-1/2*1	25	38	191	112	180	8
2*1-1/2	38	51	216	132	240	12
2-1/2*2	51	64	241	138	400	19
3*2	51	76	283	138	400	26
4*3	76	102	305	175	450	38
6*4	102	152	403	200	500	75
8*6	152	203	419	230	*300	130
10*8	203	254	457	290	*400	200

* Gear Operated



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

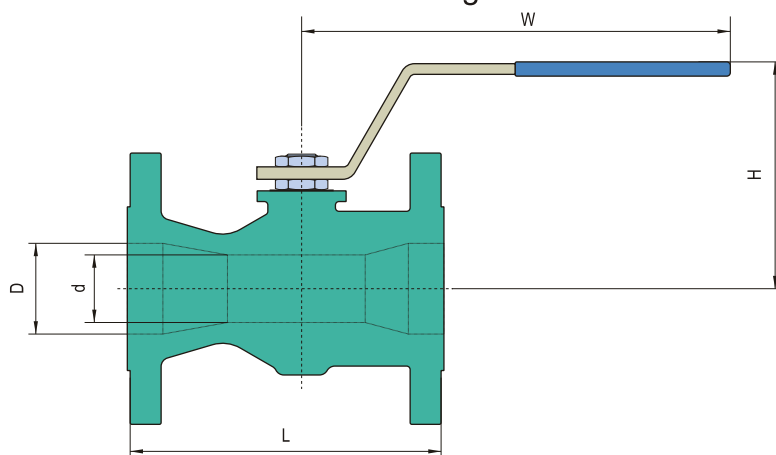
Design	ASME B16.34/API 608
Face to Face	ASME B16.10
End to End	ASME B16.10
End Flange	ASME B16.5
Test	API 598
Fire Safe Test	API 607/API 6FA
Special	NACE MR-01-75

Material Specifications

No.	Part	WCB/304	WCB/316	CF8M/316	LCC/316 NACE
1	Body	ASTM A216-WCB	ASTM A216-WCB	ASTM A351-CF8M	ASTM A352-LCC
2	Adapter	ASTM A 216-WCB	ASTM A 216-WCB	ASTM A 351-CF8M	ASTM A 352-LCC
3	Ball	ASTM A 351-CF8	ASTM A 351-CF8M	ASTM A 351-CF8M	ASTM A 351-CF8M
4	Seat	PTFE	PTFE	PTFE	PTFE
5	Stem	ASTM A182-F6a	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
6	Gland	ASTM A276-410	ASTM A276-316	ASTM A276-316	ASTM A276-316
7	Steel Ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
8	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
9	Dish Spring	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
10	Thrust Washer	PTFE	PTFE	PTFE	PTFE
11	* Gasket	Graphite	Graphite	Graphite	Graphite
12	* Packing	Graphite	Graphite	Graphite	Graphite
13	* O-Ring	Viton	Viton	Viton	Viton
14	* O-Ring	Viton	Viton	Viton	Viton
15	Lever Cover	Plastic	Plastic	Plastic	Plastic
16	Lever	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated
17	Nut	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
18	Position Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel

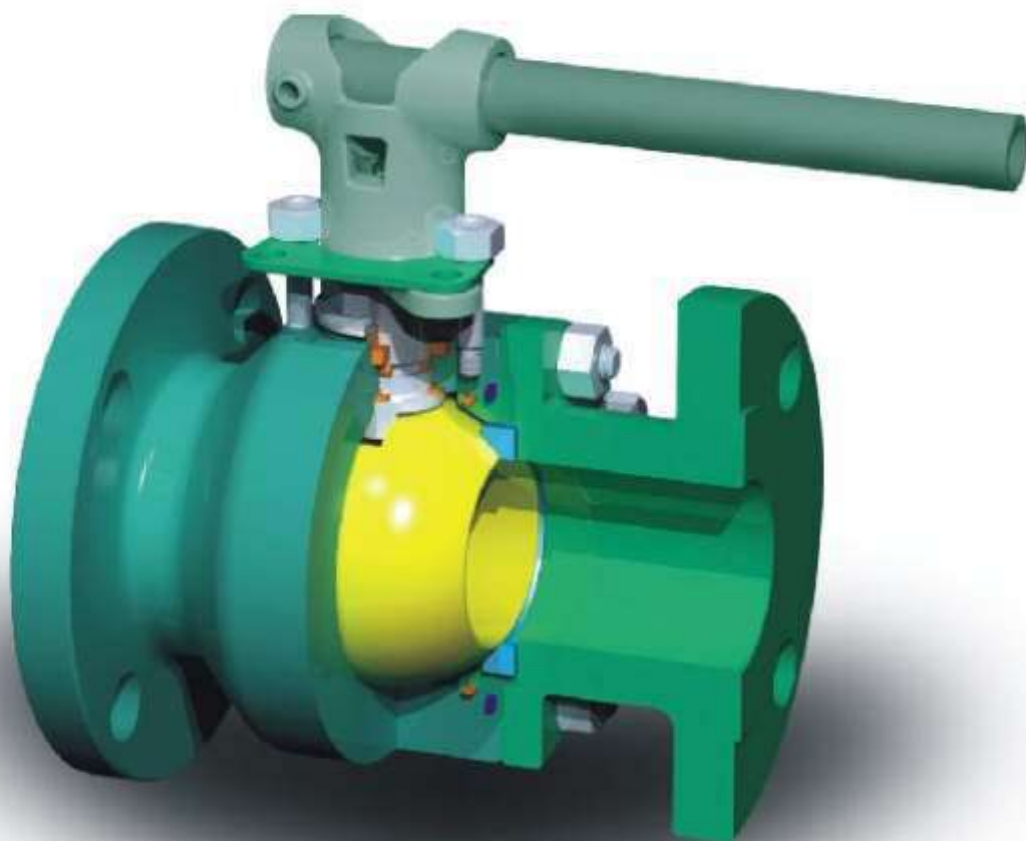
* Recommended Spare Parts

Dimensions and Weights



Class 150						
Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	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	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	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

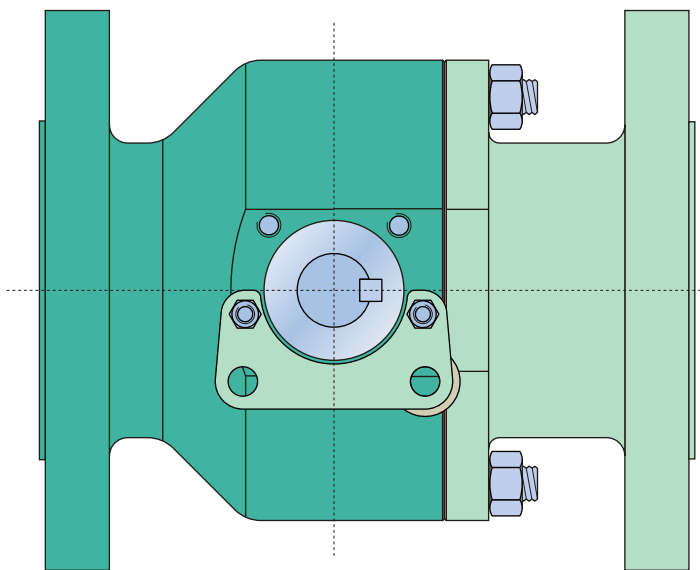
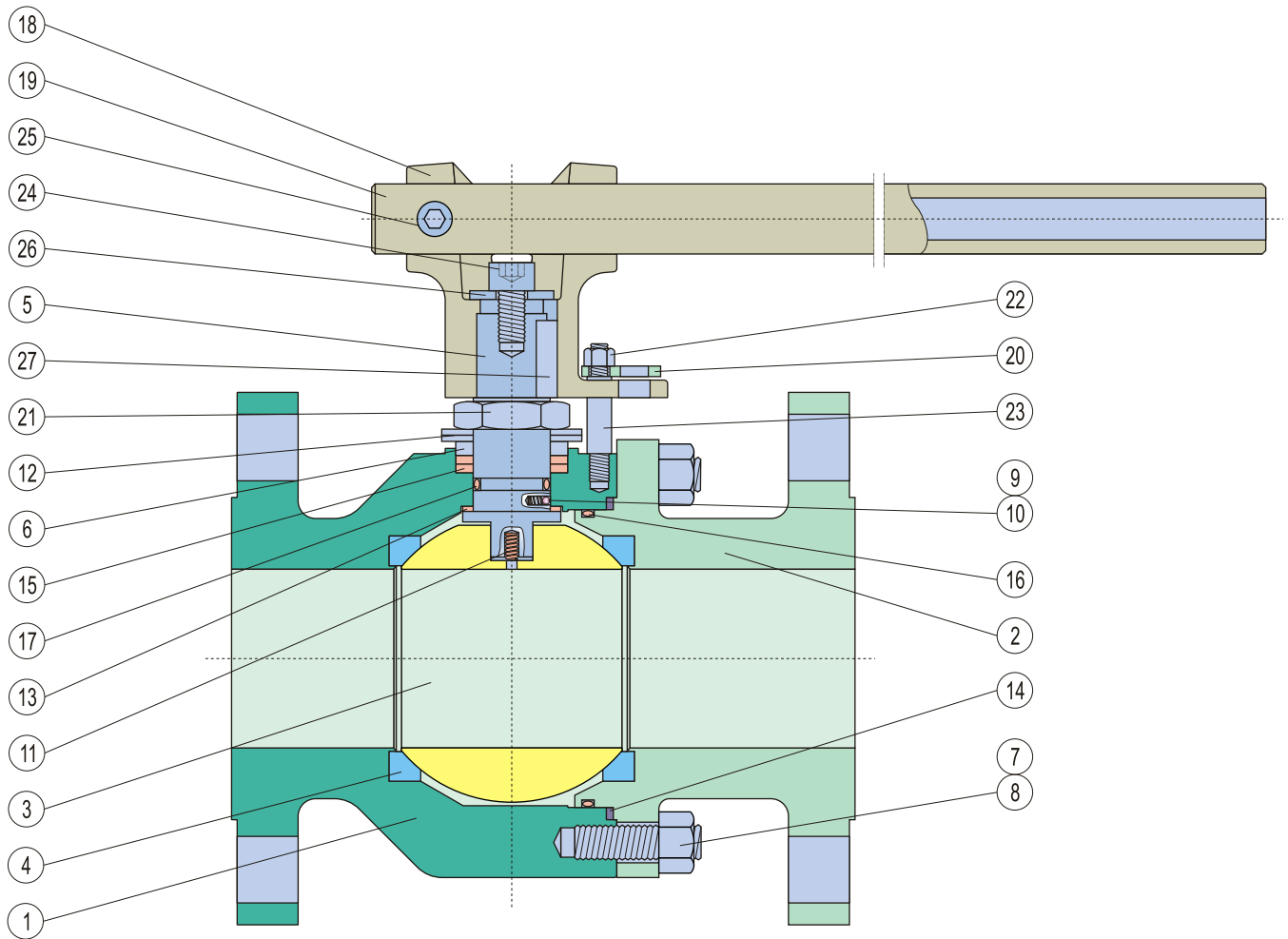


Features

Size: 1/2"~10"
Class: 150~2500
2PC/3PC Body 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



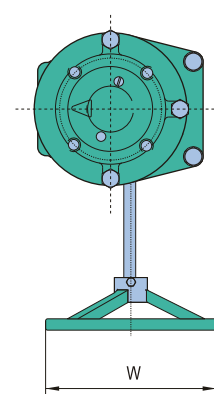
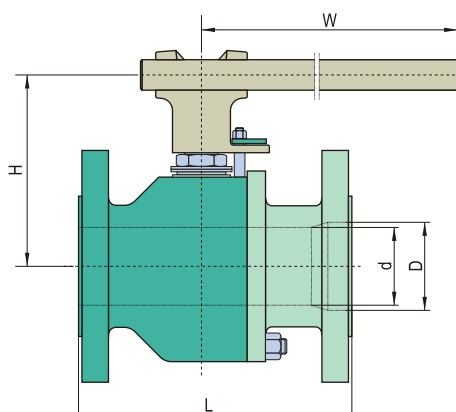
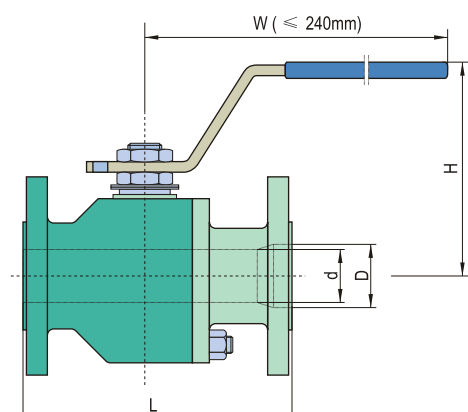
Material Specifications

No.	Part	WCB/304	WCB/316	CF8M/316	LLC/316
1	Body	ASTM A 216-WCB/A105	ASTM A 216-WCB/A105	ASTM A 351-CF8M/F316	ASTM A 352-LLC/LCB
2	Adapter	ASTM A 216-WCB/A105	ASTM A 216-WCB/A105	ASTM A 351-CF8M/F316	ASTM A 352-LLC/LCB
3	Ball	ASTM A 351-CF8/F304	ASTM A 351-CF8M/F316	ASTM A 351-CF8M/F316	ASTM A 351-CF8M/F316
4	Seat	PTFE/Nylon/PEEK	PTFE/Nylon/PEEK	PTFE/Nylon/PEEK	PTFE/Nylon/PEEK
5	Stem	ASTM A182-F6a	ASTM A182-F316	ASTM A182-F316	ASTM A182-F316
6	Gland	ASTM A276-410	ASTM A276-316	ASTM A276-316	ASTM A276-316
7	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A193-L7M
8	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
9	Steel Ball	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
10	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
11	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
12	Dish Spring	Alloy Steel	Alloy Steel	Alloy Steel	Alloy Steel
13	Thrust Washer	PTFE	PTFE	PTFE	PTFE
14	*Gasket	Graphite	Graphite	Graphite	Graphite
15	*Packing	Graphite	Graphite	Graphite	Graphite
16	*O-Ring	Viton	Viton	Viton	Viton
17	*O-Ring	Viton	Viton	Viton	Viton
18	Lever Head	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated
19	Lever Pipe	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated
20	Lock Plate	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated	Carbon Steel Zinc Plated
21	Nut	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
22	Nut	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
23	Position Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
24	Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
25	Screw	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
26	Washer	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
27	Key	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel

* Recommended Spare Parts



Dimensions and Weights



Gear Operation

Full Bore Class 150

Size	d	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	108	85	160	2.8
3/4	19	117	93	160	3.7
1	25	127	112	180	5.3
1-1/2	38	165	125	240	8.3
2	51	178	126	350	11.2
2-1/2	64	191	139	400	18.4
3	76	203	164	400	23
4	102	229	185	450	39.3
5	125	356	240	550	69.3
6	152	394	270	*300	90
8	203	457	360	*400	140
10	254	533	410	*400	230

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	85	160	3.5
1*3/4	19	25	127	93	160	5.0
1-1/2*1	25	38	165	112	180	7.5
2*1-1/2	38	51	178	125	240	10
2-1/2*2	51	64	191	126	350	16
3*2	51	76	203	126	350	21
4*3	76	102	229	164	400	35
6*4	102	152	267	185	450	73
8*6	152	203	292	270	*300	120
10*8	203	254	330	360	*400	200

* Gear Operated

Full Bore Class 300

Size	d	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	140	85	160	3.0
3/4	19	152	93	160	4.0
1	25	165	112	180	6.6
1-1/2	38	191	125	240	12.9
2	51	216	126	400	18.9
2-1/2	64	241	139	400	28
3	76	283	164	450	39
4	102	305	185	500	60
5	125	381	240	550	90
6	152	403	270	*300	130
8	203	502	360	*400	195
10	254	568	410	*400	290

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	85	160	3.7
1*3/4	19	25	165	93	160	5.8
1-1/2*1	25	38	191	112	180	10.5
2*1-1/2	38	51	216	125	240	16.1
2-1/2*2	51	64	241	126	400	24.5
3*2	51	76	283	126	400	34.7
4*3	76	102	305	164	450	53
6*4	102	152	403	185	500	100
8*6	152	203	419	270	*300	170
10*8	203	254	457	360	*400	250

* Gear Operated

Full Bore Class 600

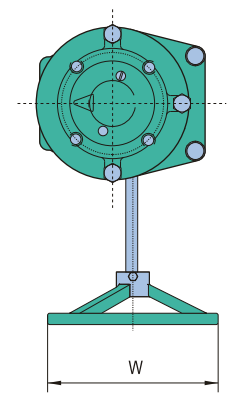
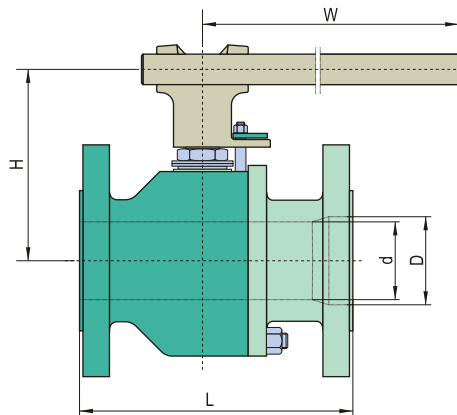
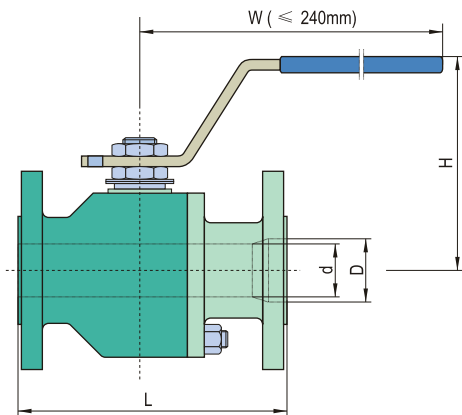
Size	d	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	165	85	160	3.5
3/4	19	191	93	180	5.0
1	25	216	112	240	7.5
1-1/2	38	241	125	350	15
2	51	292	130	400	23
3	76	356	178	500	48
4	102	432	190	700	80

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	85	160	4.0
1*3/4	19	25	216	93	180	5.5
1-1/2*1	25	38	241	112	240	10.5
2*1-1/2	38	51	292	125	350	20
3*2	51	76	356	130	400	29
4*3	76	102	432	178	500	59
6*4	102	152	559	190	700	95

* Gear Operated

Dimensions and Weights



Gear Operation

Full Bore

Class 900

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	216	85	160	5
3/4	19	229	93	180	8
1	25	254	112	240	10
1-1/2	38	305	128	400	20
2	51	368	132	450	25
3	76	381	182	600	50

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	85	160	7.0
1*3/4	19	25	254	93	180	9.5
1-1/2*1	25	38	305	112	240	16.5
2*1-1/2	38	51	368	128	400	23
3*2	51	76	381	132	450	42
4*3	76	102	457	182	600	65

Full Bore

Class 1500

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	216	85	160	5
3/4	19	229	93	180	8
1	25	254	112	240	10
1-1/2	38	305	128	400	20
2	51	368	132	450	30

Reduced Bore

Class 1500

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	229	85	160	7.0
1*3/4	19	25	254	93	180	9.5
1-1/2*1	25	38	305	112	240	16.5
2*1-1/2	38	51	368	128	400	23
3*2	51	76	470	132	450	50

Full Bore

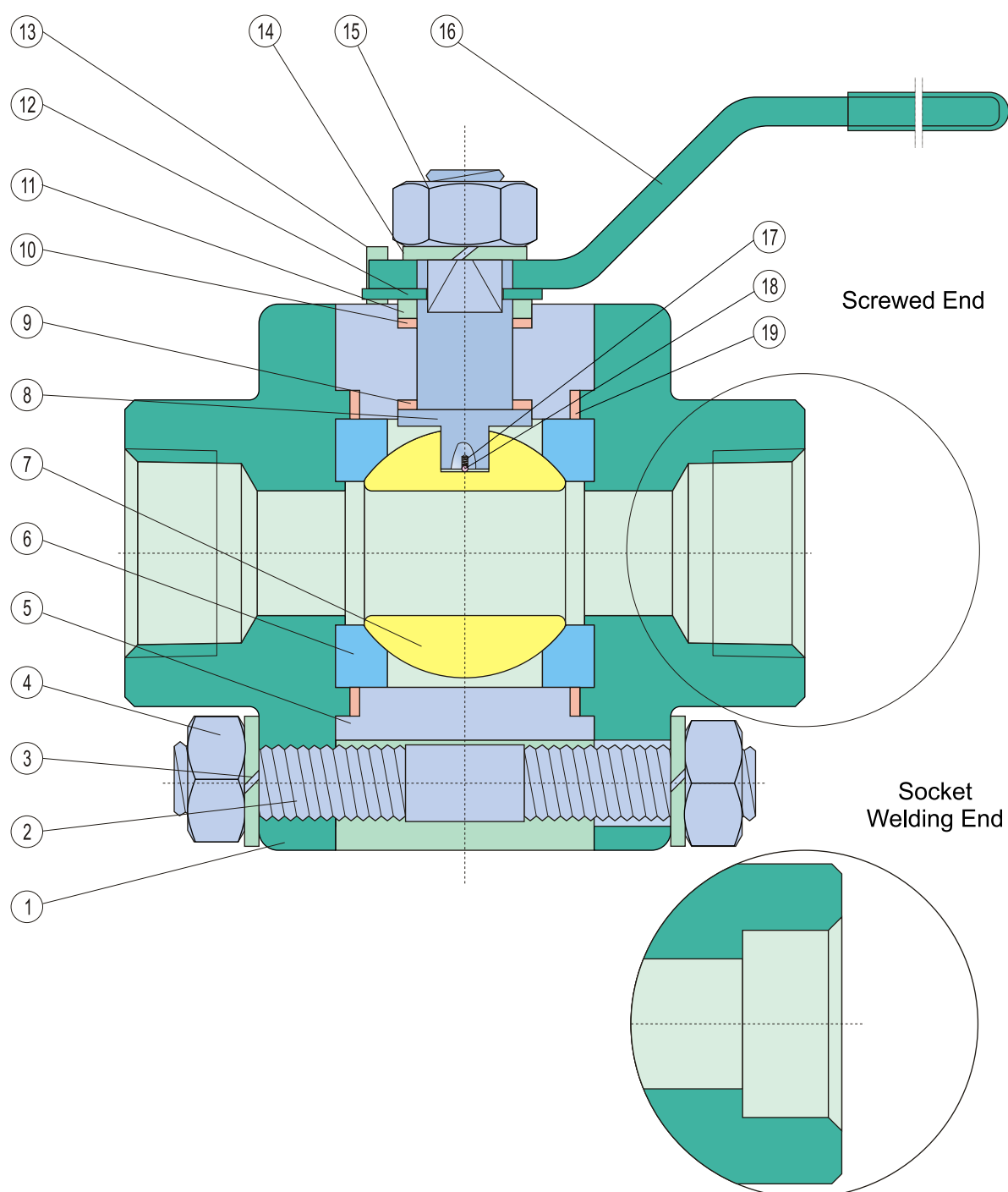
Class 2500

Size	D	L	H	W	Weight
in	mm	mm	mm	mm	Kg
1/2	13	264	93	180	7.5
3/4	19	273	96	240	12
1	25	308	117	350	15
1-1/2	38	384	132	450	30
2	51	451	138	550	37.5

Reduced Bore

Class 2500

Size	d	D	L	H	W	Weight
in	mm	mm	mm	mm	mm	Kg
3/4*1/2	13	19	273	93	180	11
1*3/4	19	25	308	96	240	14
1-1/2*1	25	38	384	117	350	25
2*1-1/2	38	51	451	132	450	35
3*2	51	76	578	138	550	60



Features

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

Specifications

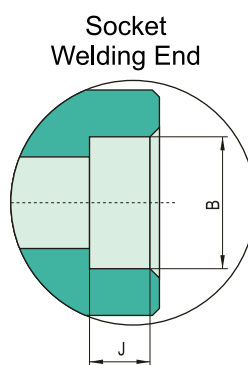
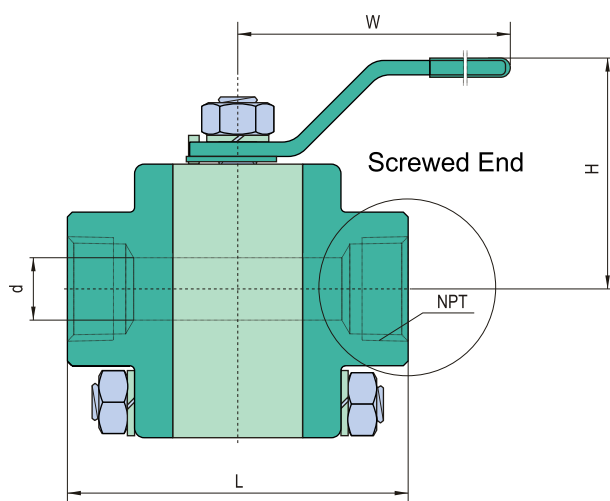
Design	ASME B16.34/BS 5351
End to End	Manufacturer Standard
Screwed End	ASME B1.20.1
Socket Welding End	ASME B16.11
Test	API 598/ BS 6755
Special	NACE MR-01-75

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





- **Severity Service**

Normal soft-seated valve cannot be used for abrasive service or for operation in high temperatures that prohibits the use of a resilient material. metal-to-metal seated floating ball valve (series FM, range 1/2"~4" class 150lb & 300lb, 1/2"~2" class 600lb) is designed for this type of severity service has seating action provided by the metal-to-metal contact between the ball and the seat rings.

- **General Design**

Blow-out proof stem, anti-static device are designed as standard requirements.

- **Superior Sealing**

High precision machining and seat to ball rubbing, as well as adopt seat spring structure, which push up stream seat tightly against the ball surface, result in superior ball and seat interfacing for reliable sealing conforming to ANSI/FCI 70-2 class V.

- **Stem Seal**

Belleville spring acted gland provides live-loading on stem packing. Equipped with Special low emission packing, the environmental friendly valve is available on request.

- **Reliable Operations**

Spring-loaded seat maintain close contact with the ball ensuring tight sealing even at low pressures. This also results in stable operating torques at high differential pressures over a wide range of temperatures or/and high frequency.

- **Fire Safe**

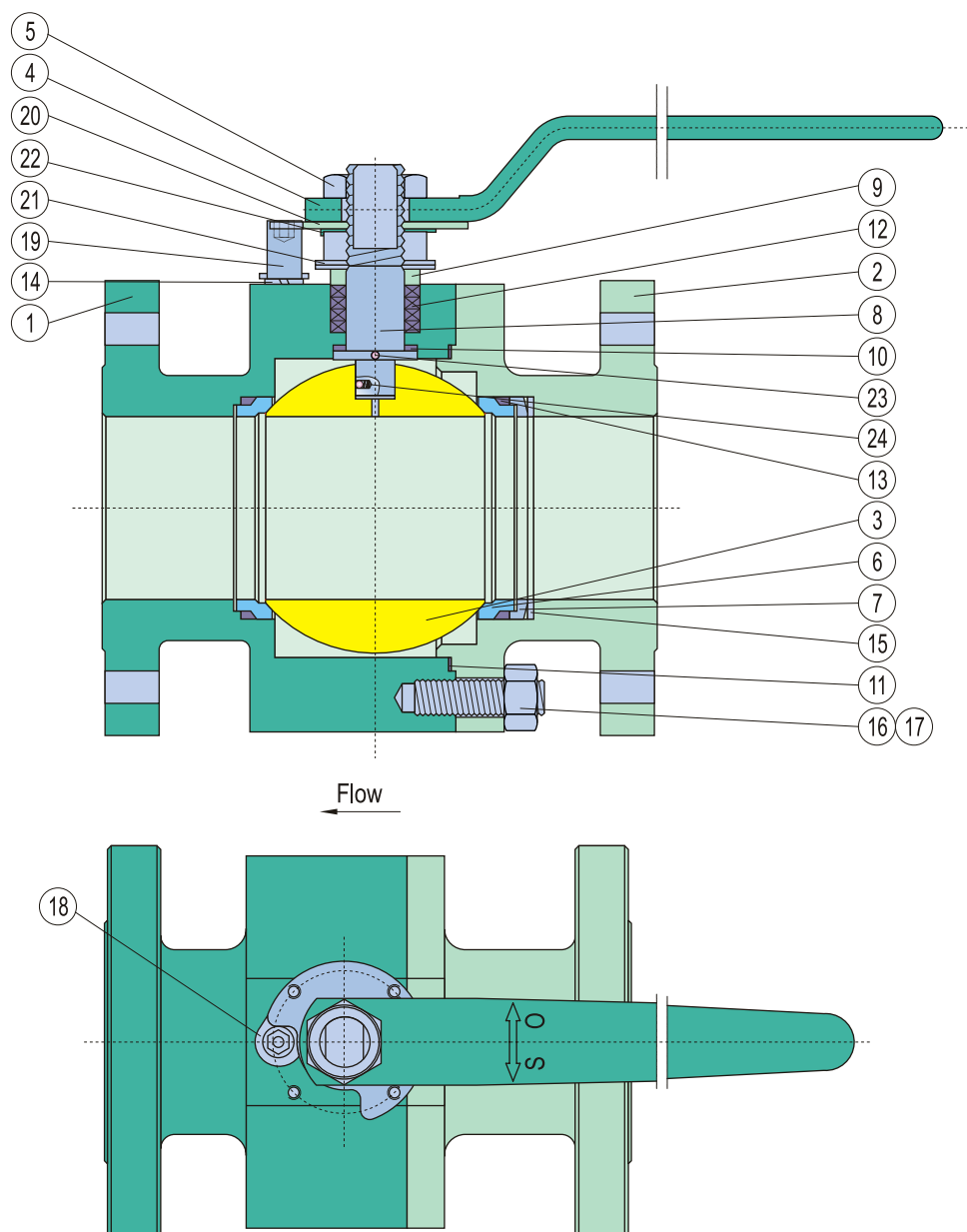
The combination of the metal seat and graphite seals results in the nature of its features/properties that is capable of passing a fire test.

- **Material Selection**

Various material components are available for a variety of service applicable up to 500°C. For service temperature above 300°C the extension bonnet is required.

- **Applications**

Hard faced ball and seats (TCC as standard, other special coatings are available on request) allow use in more severe services such as slurries, pulp stock, mining and other abrasive media in long life.



Material Specifications

No.	Part	Standard Materials	No.	Part	Standard Materials
1	Body	ASTM A 216-WCB/A105 OR ASTM A 351-CF8M/A182-F316	13	Seat Packing	Graphite
2	Adapter	ASTM A 216-WCB/A105 OR ASTM A 351-CF8M/A182-F316	14	Washer	Carbon Steel or Stainless Steel
3	Ball	ASTM A 217-CA15 OR ASTM A 351-CF8M/Nitriding or TCC	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 TCC	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

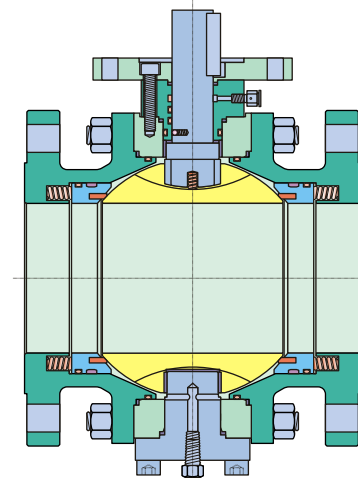
Note: 1. TCC: Tungsten Carbide Coating.

2. Customer shall order the valve according to service condition.

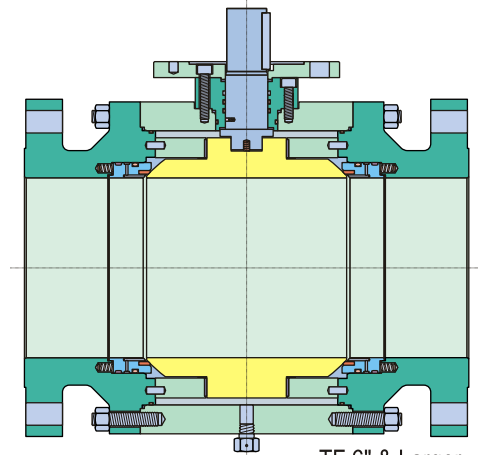
- **General Design**

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.



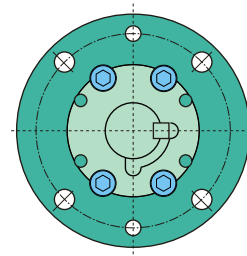
TF 4" & Smaller



TF 6" & Larger

- **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 600lb 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.

• Seat Design

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. 1) Optional design with primary metal to metal seal and secondary soft seal seat design is also available upon request. (Fig. 2)

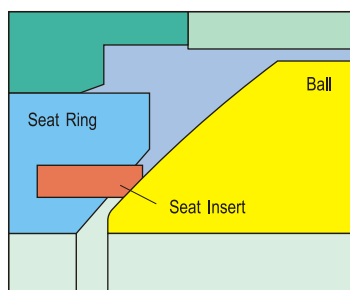


Fig.1

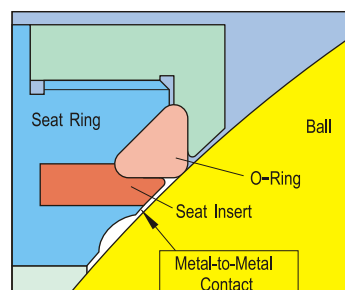


Fig.2

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. 3, 4)

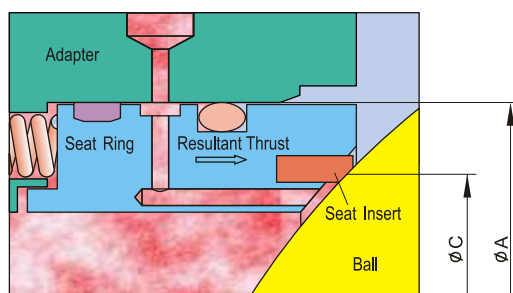


Fig.3

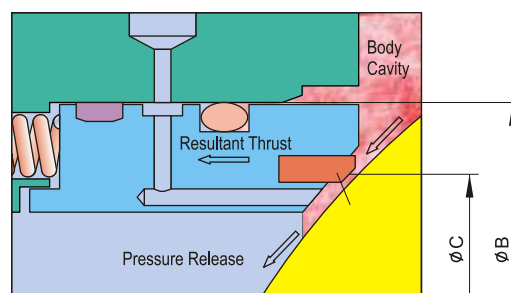


Fig.4

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. 5, 6)

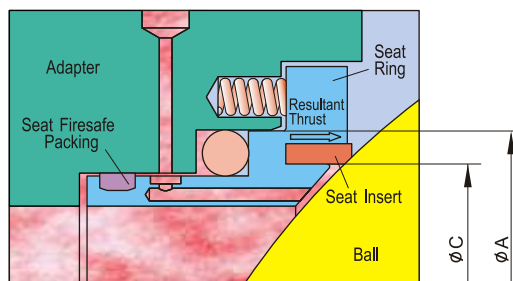


Fig.5

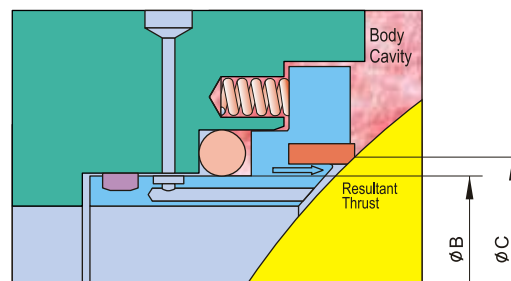


Fig.6

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. 3, 6)

- **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. 7)

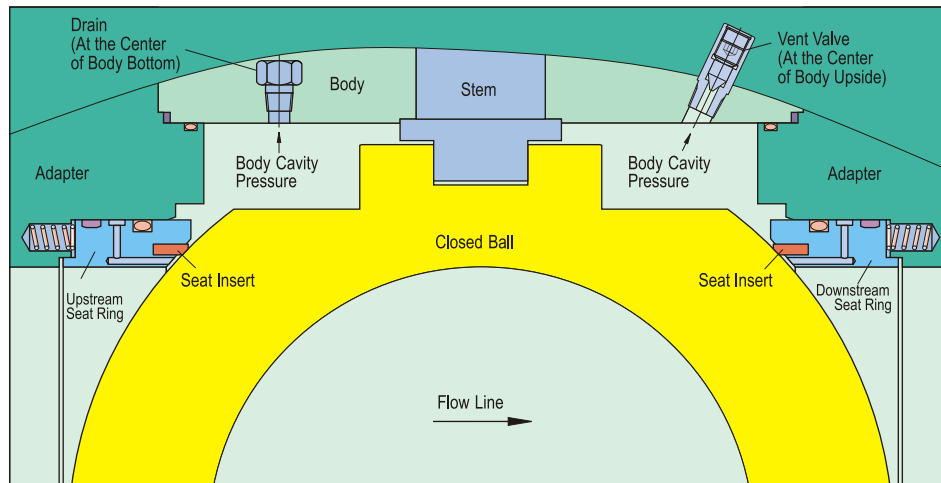


Fig.7

- **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. 8)

- **Anti-static Device**

Spring plus graphite type anti-static device are applied between the ball, stem, 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. 8)

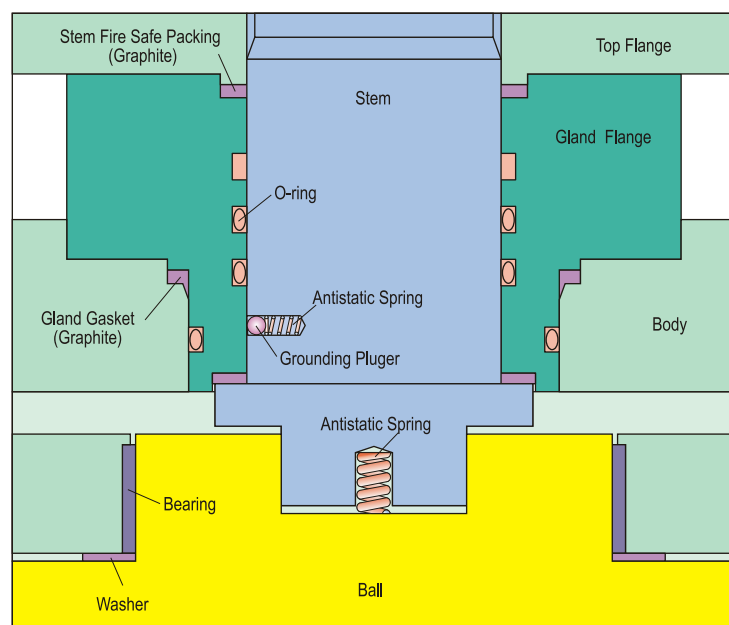


Fig.8

- 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. 9)

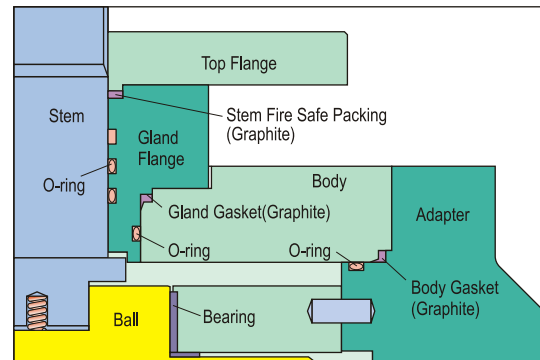


Fig.9

- 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. 10, 11)

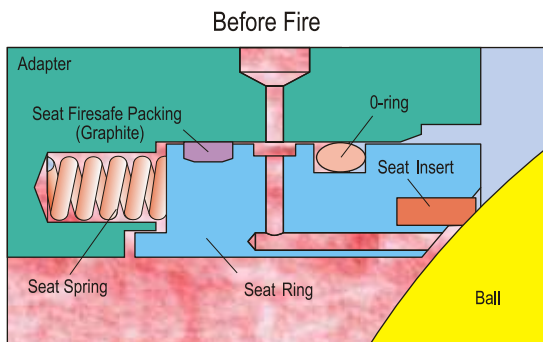


Fig.10

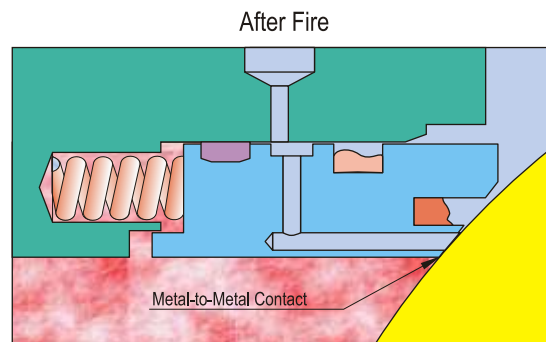


Fig.11

- 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)

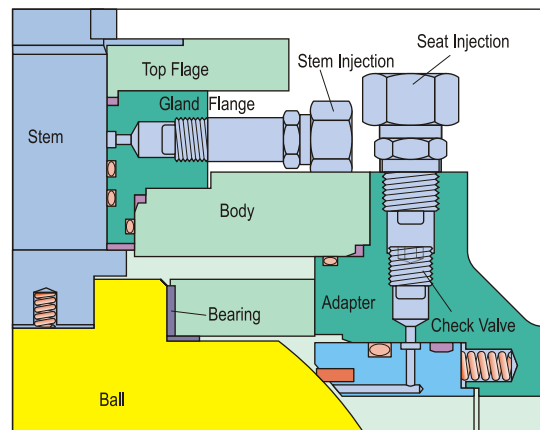


Fig.12

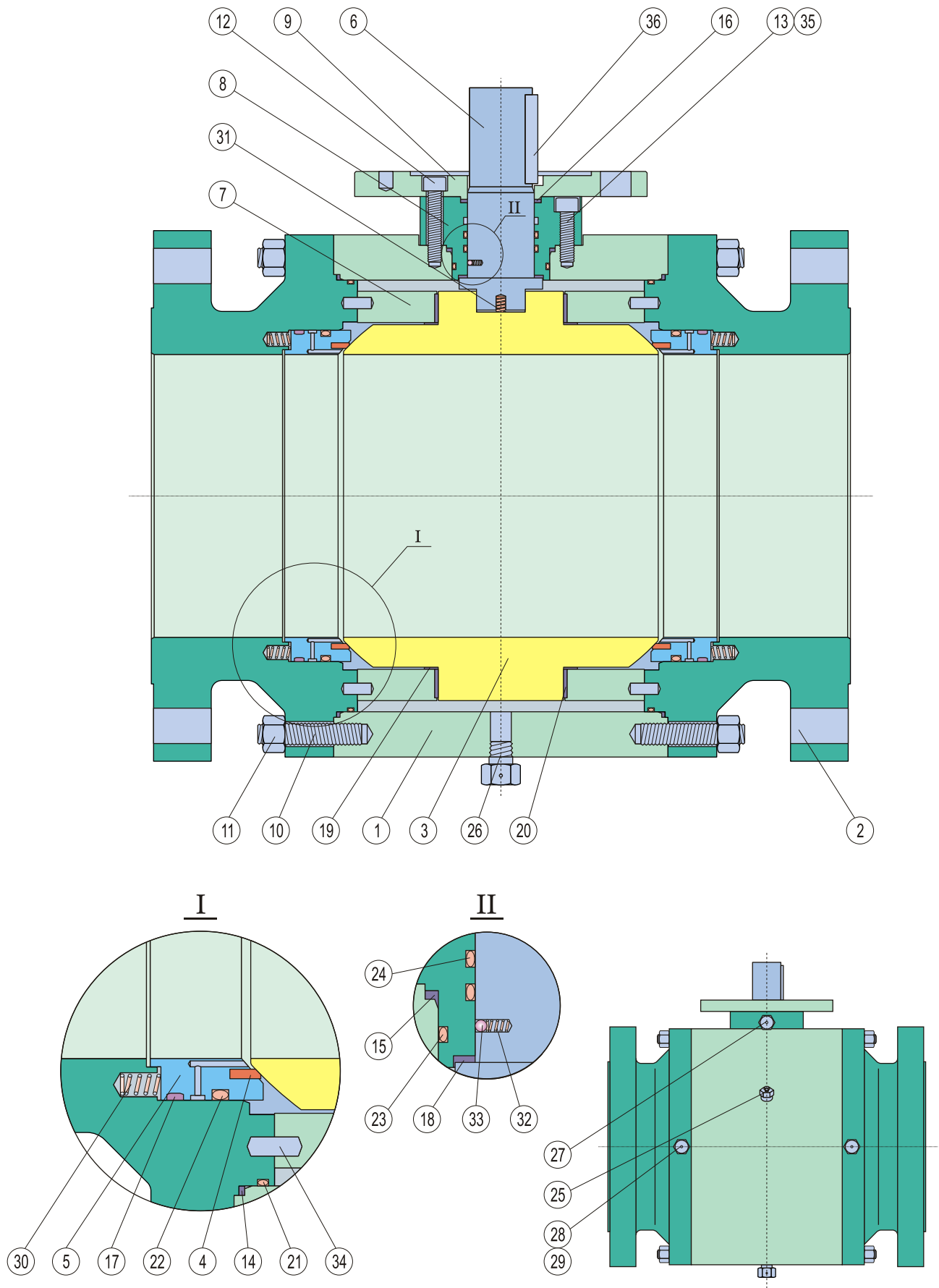


Features

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 SS Overlay	
Seals Area ENP Coated	



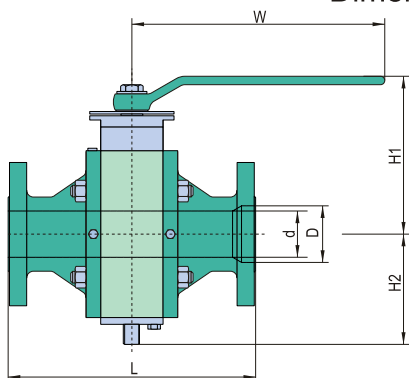
Material Specifications

No.	Part	WCB/304	WCB/316	CF8M/316	LLC/316
1	Body	ASTM A 216-WCB/A105	ASTM A 216-WCB/A105	ASTM A 351-CF8M/F316	ASTM A 352-LLC/LCB
2	Adapter	ASTM A 216-WCB/A105	ASTM A 216-WCB/A105	ASTM A 351-CF8M/F316	ASTM A 352-LLC/LCB
3	Ball	ASTM A 351-CF8/F304	ASTM A 351-CF8M/F316	ASTM A 351-CF8M/F316	ASTM A 351-CF8M/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	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
11	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
12	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
13	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
14	* Body Gasket	Graphite	Graphite	Graphite	Graphite
15	* Gland Gasket	Graphite	Graphite	Graphite	Graphite
16	* Stem Firesafe Packing	Graphite	Graphite	Graphite	Graphite
17	* Seat Firesafe Packing	Carbon Fibre+Graphite	Carbon Fibre+Graphite	Carbon Fibre+Graphite	Carbon Fibre+Graphite
18	Thrust Washer	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2
19	Washer	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2
20	Bearing	316SS+PTFE+MoS2	316SS+PTFE+MoS2	316SS+PTFE+MoS2	316SS+PTFE+MoS2
21	* O-Ring	Viton	Viton	Viton	Viton
22	* O-Ring	Viton	Viton	Viton	Viton
23	* O-Ring	Viton	Viton	Viton	Viton
24	* O-Ring	Viton	Viton	Viton	Viton
25	Vent Valve	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
26	Drain	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
27	Stem Injection	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
28	Seat Injection	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
29	Check Valve	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
30	Seat Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
31	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
32	Antistatic Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
33	Grounding Plunger	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
34	Alignment Pin	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
35	Gland Pin	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel
36	Key	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel

* Recommended Spare Parts



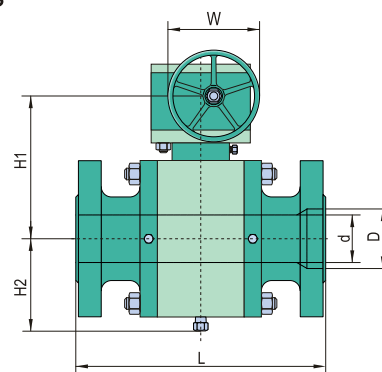
Dimensions and Weights



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



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

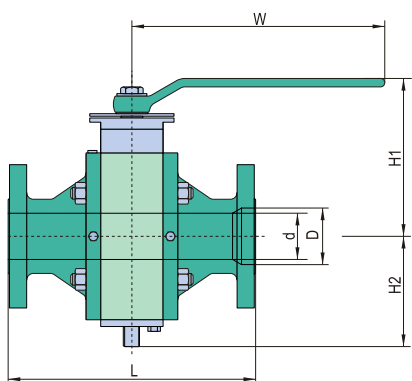
Reduced Bore

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

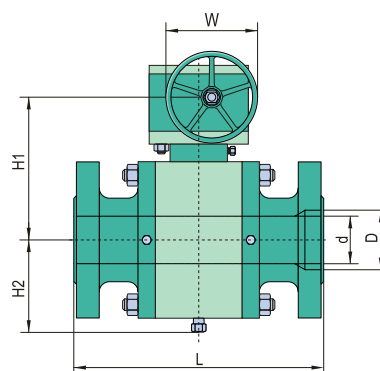
* Gear Operated

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	2337	1070	935	*900	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	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	2337	940	820	*800	10020

Full Bore Class 900LB

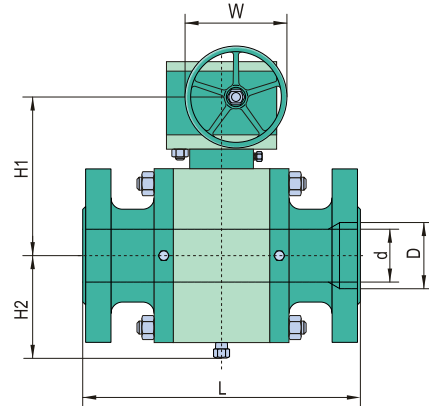
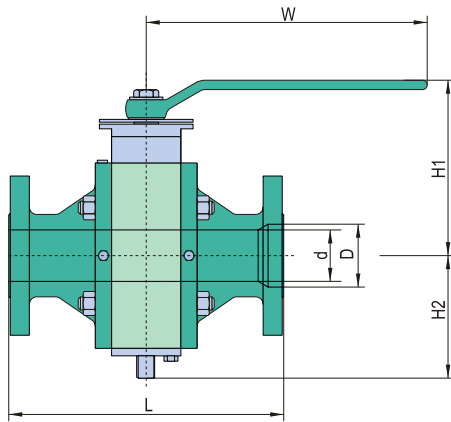
Size	d	L	H1	H2	W	Weight
in	mm	mm	mm	mm	mm	Kg
2	51	368	178	100	450	52
3	76	381	221	125	600	87
4	102	457	215	150	*305	160
6	152	610	268	215	*406	385
8	203	737	324	260	*600	560
10	254	838	371	305	*600	820
12	305	965	425	360	*600	1125
14	324	1029	463	390	*600	1610
16	375	1130	513	440	*710	2010
18	425	1219	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

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	534	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	534	2045	695	640	*800	5850

Full Bore

Class 2500

Size	d	L RTJ)	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 RTJ)	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

* Gear Operated

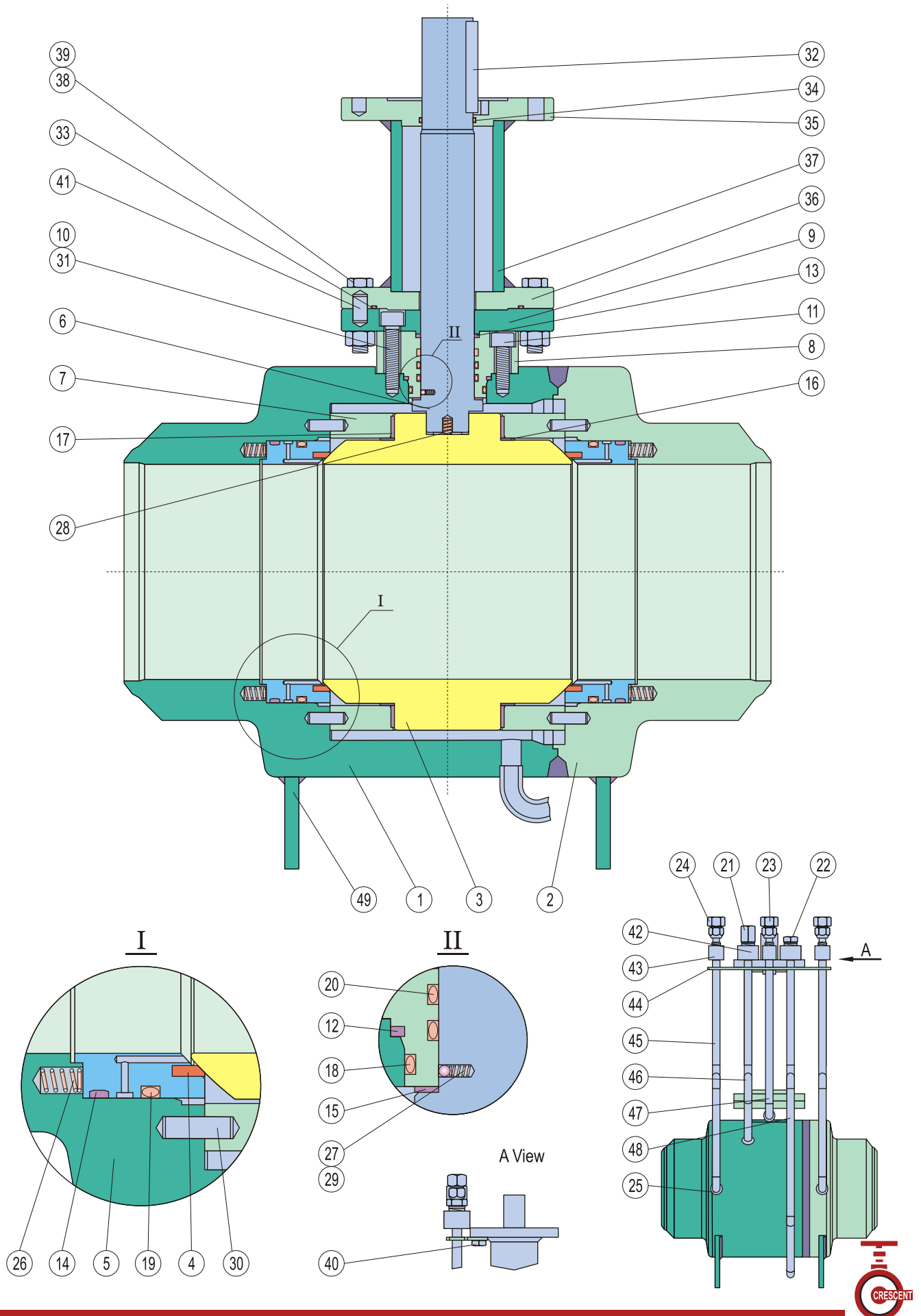


Features

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



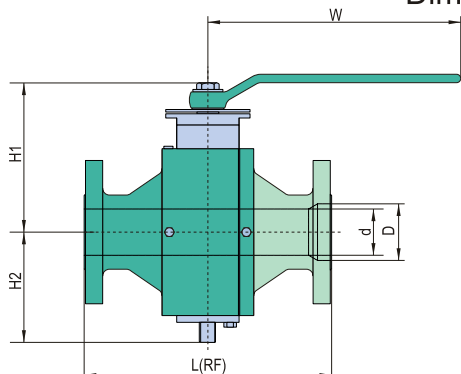
Material Specifications

No.	Part	WCB/304	WCB/316	CF8M/316	LLC/316
1	Body	ASTM A 216-WCB/A105	ASTM A 216-WCB/A105	ASTM A 351-CF8M/F316	ASTM A 352-LLC/LCB
2	Adapter	ASTM A 216-WCB/A105	ASTM A 216-WCB/A105	ASTM A 351-CF8M/F316	ASTM A 352-LLC/LCB
3	Ball	ASTM A 351-CF8/F304	ASTM A 351-CF8M/F316	ASTM A 351-CF8M/F316	ASTM A 351-CF8M/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



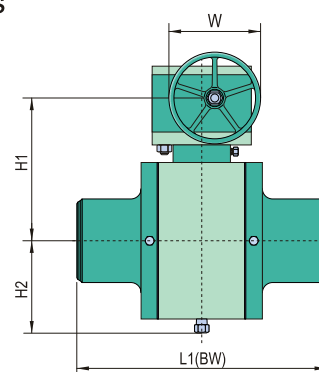
Dimensions and Weights



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

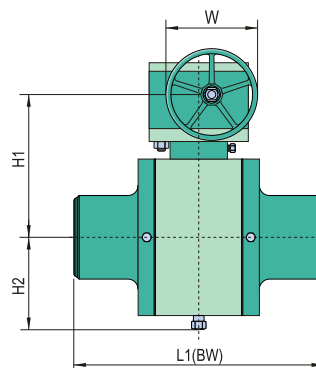
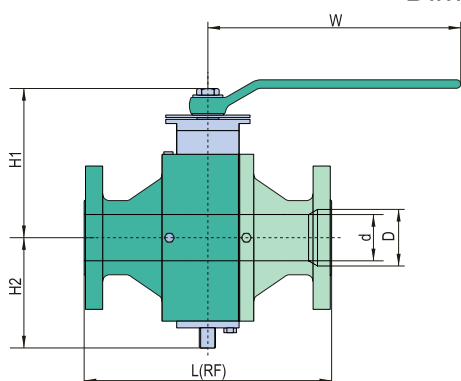
Reduced Bore

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

* Gear Operated

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

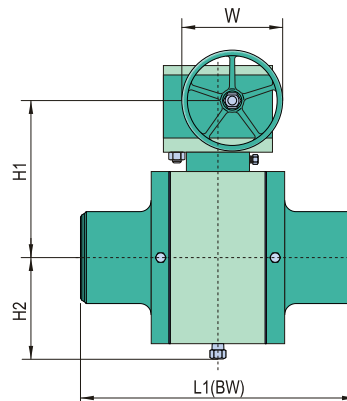
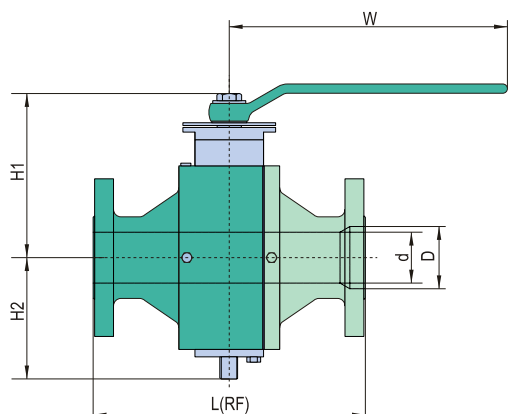
Reduced Bore

Class 900LB

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	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

* Gear Operated

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

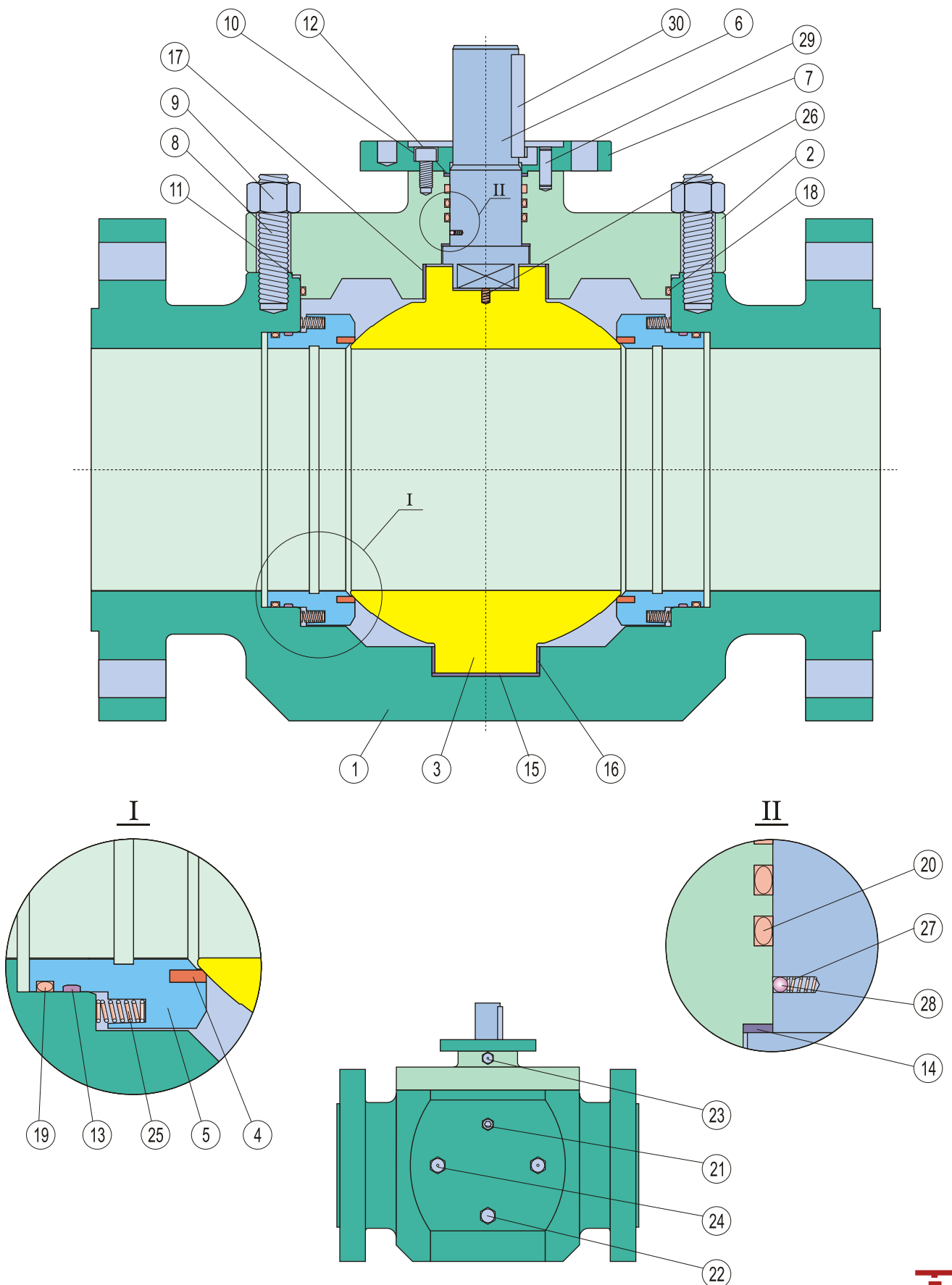


Features

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



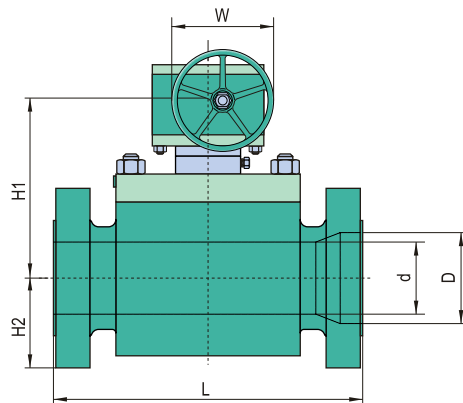
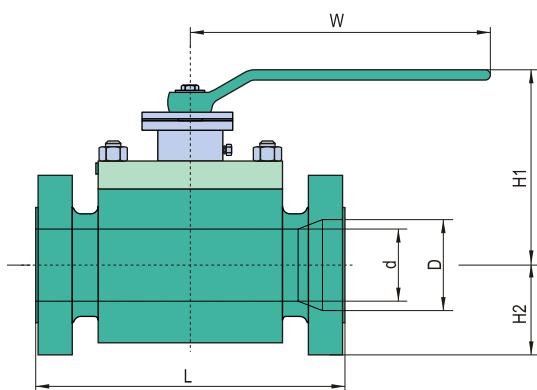
Material Specifications

No.	Part	WCB/304	WCB/316	CF8M/316	LLC/316
1	Body	ASTM A 216-WCB/A105	ASTM A 216-WCB/A105	ASTM A 351-CF8M/F316	ASTM A 352-LLC/LCB
2	Cover	ASTM A 216-WCB/A105	ASTM A 216-WCB/A105	ASTM A 351-CF8M/F316	ASTM A 352-LLC/LCB
3	Ball	ASTM A 351-CF8/F304	ASTM A 351-CF8M/F316	ASTM A 351-CF8M/F316	ASTM A 351-CF8M/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	Top Flange	ASTM A105N	ASTM A105N	ASTM A182-F316	ASTM A350-LF2
8	Body Stud	ASTM A193-B7	ASTM A193-B7	ASTM A193-B8	ASTM A320-L7M
9	Body Nut	ASTM A194-2H	ASTM A194-2H	ASTM A194-8	ASTM A194-7M
10	Screw	Carbon Steel	Carbon Steel	Stainless Steel	ASTM A320-L7M
11	*Body Gasket	Graphite	Graphite	Graphite	Graphite
12	*Stem Firesafe packing	Graphite	Graphite	Graphite	Graphite
13	*Seat Firesafe Packing	Carbon Fibre+Graphite	Carbon Fibre+Graphite	Carbon Fibre+Graphite	Carbon Fibre+Graphite
14	Thrust Washer	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2
15	Washer	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2	PTFE/316SS+PTFE+MoS2
16	Bearing	316SS+PTFE+MoS2	316SS+PTFE+MoS2	316SS+PTFE+MoS2	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	Seat Spring	INCONEL X-750	INCONEL X-750	INCONEL X-750	INCONEL X-750
26	Antistatic 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	Grounding Plunger	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
29	Gland Pin	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel
30	Key	Carbon Steel	Carbon Steel	Stainless Steel	Carbon Steel

* Recommended Spare Parts



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

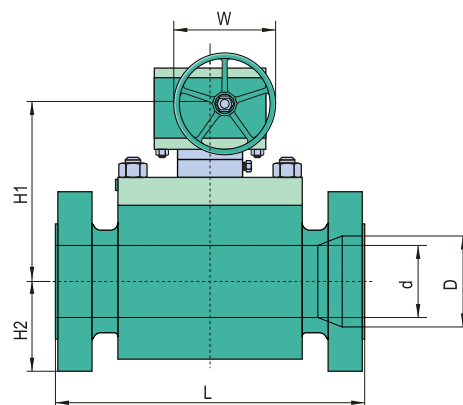
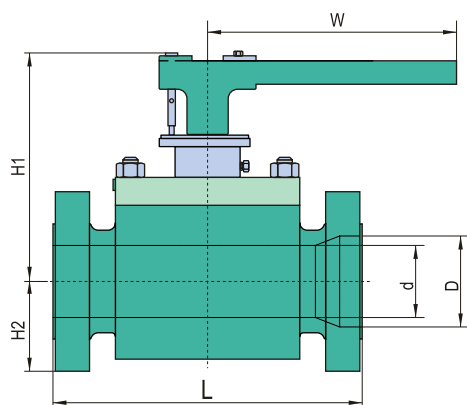
* Gear Operated

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

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



- **Severity Service**

Normal soft-seated valve cannot be used for abrasive service or/and for operation in high temperatures that prohibits the use of a resilient material. metal-to-metal seated trunnion mounted ball valve (series TM, range 2"~24" class 150lb~2500lb) is designed for this type of severity service has seating action provided by the metal-to-metal contact between the ball and the seat rings.

- **General Design**

Blow-out proof stem, anti-static device, double block & bleed, self relieving seats, Mechanical stops for ball seat alignment are designed as standard requirements; while for fire safe and sealant injection system will be supplied when service request.

- **Superior Sealing**

High precision machining and seat to ball rubbing result in superior ball and seat interfacing for reliable sealing conforming to ANSI/FCI 70-2 class V.

- **Reliable Operations**

Spring-loaded seats maintain close contact with the ball ensuring tight sealing even at low pressures. This also results in stable operating torques at high differential pressures over a wide range of temperatures or/and high frequency.

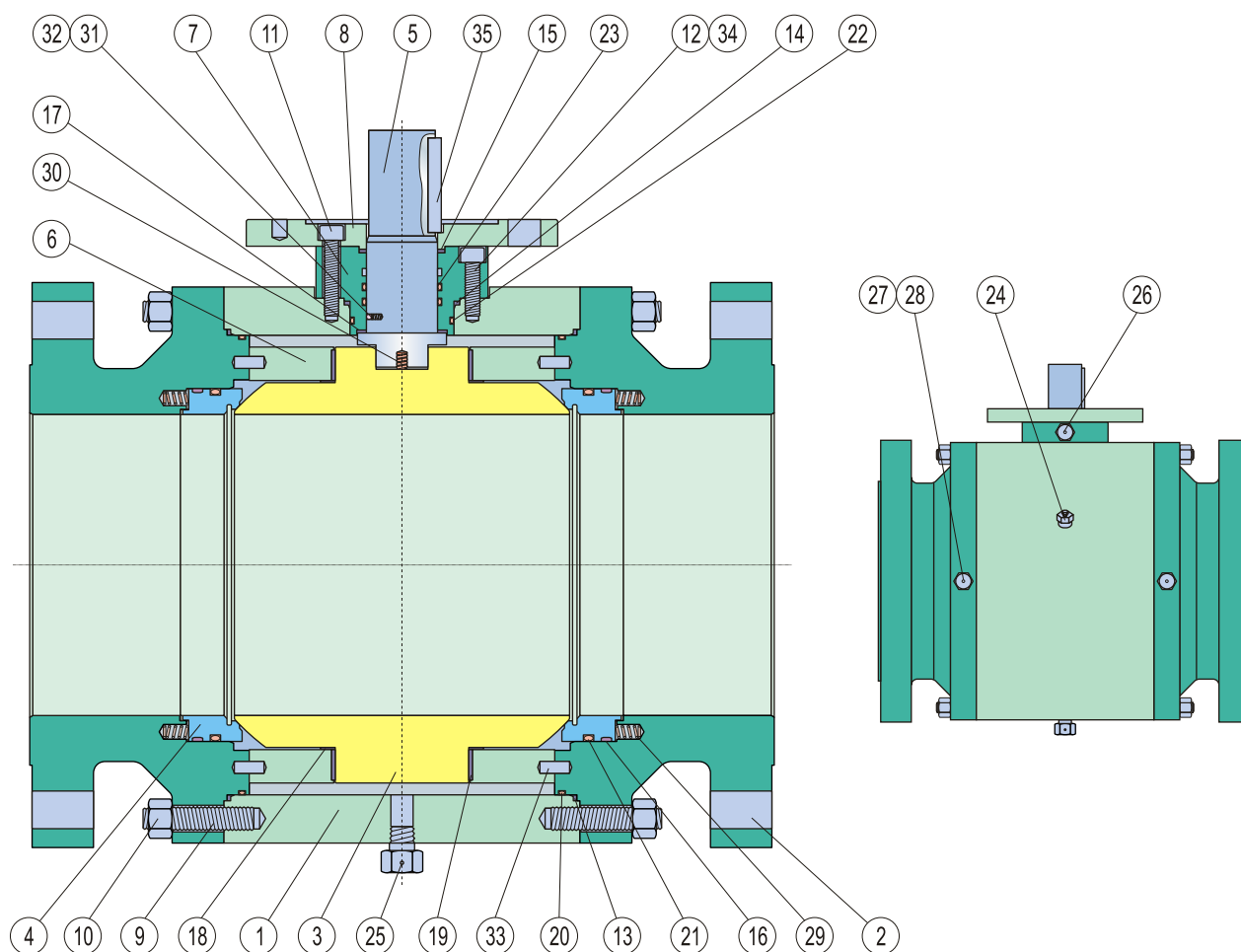
- **Material Selection**

Various material components are available for a variety of service applicable up to 500°C. For service temperature above 300°C, the extension bonnet is required.

- **Applications**

Hard faced ball and seats (TCC as standard, other special coatings are available on request) allow use in more severe services such as slurries, pulp stock, mining and other abrasive media in long life.





Material Specifications

No.	Part	Standard Materials	No.	Part	Standard Materials
1	Body	ASTM A 216-WCB/ASTM A 351-CF8M OR ASTM A 105/F316	19	Bearing	316SS+PTFE+MoS2
2	Adapter	ASTM A 216-WCB/ASTM A 351-CF8M OR ASTM A 105/F316	20	* O-Ring	Viton
3	Ball	ASTM A 351-CF8 OR ASTM A 351-CF8M	21	* O-Ring	Viton
4	Seat	ASTM A105N+TCC or A182-F316+TCC	22	* O-Ring	Viton
5	Stem	ASTM A105N/ENP or A182-F316/17-4PH	23	* O-Ring	Viton
6	Trunnion Supprot	ASTM A105N/ENP or A182-F316	24	Vent Valve	Stainless Steel
7	Gland Flange	ASTM A105N/ENP or A182-F316	25	Drain	Stainless Steel
8	Top Flange	ASTM A105N or A182-F316	26	Stem Injection	Stainless Steel
9	Body Stud	ASTM A193-B7 or A193-B8	27	Seat Injection	Stainless Steel
10	Body Nut	ASTM A194-2H or A194-8	28	Check Valve	Stainless Steel
11	Screw	Carbon Steel or Stainless Steel	29	Seat Spring	Inconel X-750
12	Screw	Carbon Steel or Stainless Steel	30	Antistatic Spring	Inconel X-750
13	* Body Gasket	Graphite	31	Antistatic Spring	Inconel X-750
14	* Gland Gasket	Graphite	32	Grounding Plunger	Stainless Steel
15	* Stem Firesafe Packing	Graphite	33	Alignment Pin	Stainless Steel
16	* Seat Firesafe Packing	Carbon Fibre+Graphite	34	Gland Pin	Carbon Steel or Stainless Steel
17	Thrust Washer	PTFE/316SS+PTFE+MoS2	35	Key	Carbon Steel or Stainless Steel
18	Washer	PTFE/316SS+PTFE+MoS2			

Note: 1. * Recommended Spare Parts

2. TCC: Tungsten Carbide Coating.

3. Customer shall order the valve according to service condition.



- **Cryogenic Service**

Valves are demanded widely in cryogenic applications ($-196 \sim -50^{\circ}\text{C}$), including LNG that is fast becoming a better alternative source of clean energy.

- **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 Natural 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.

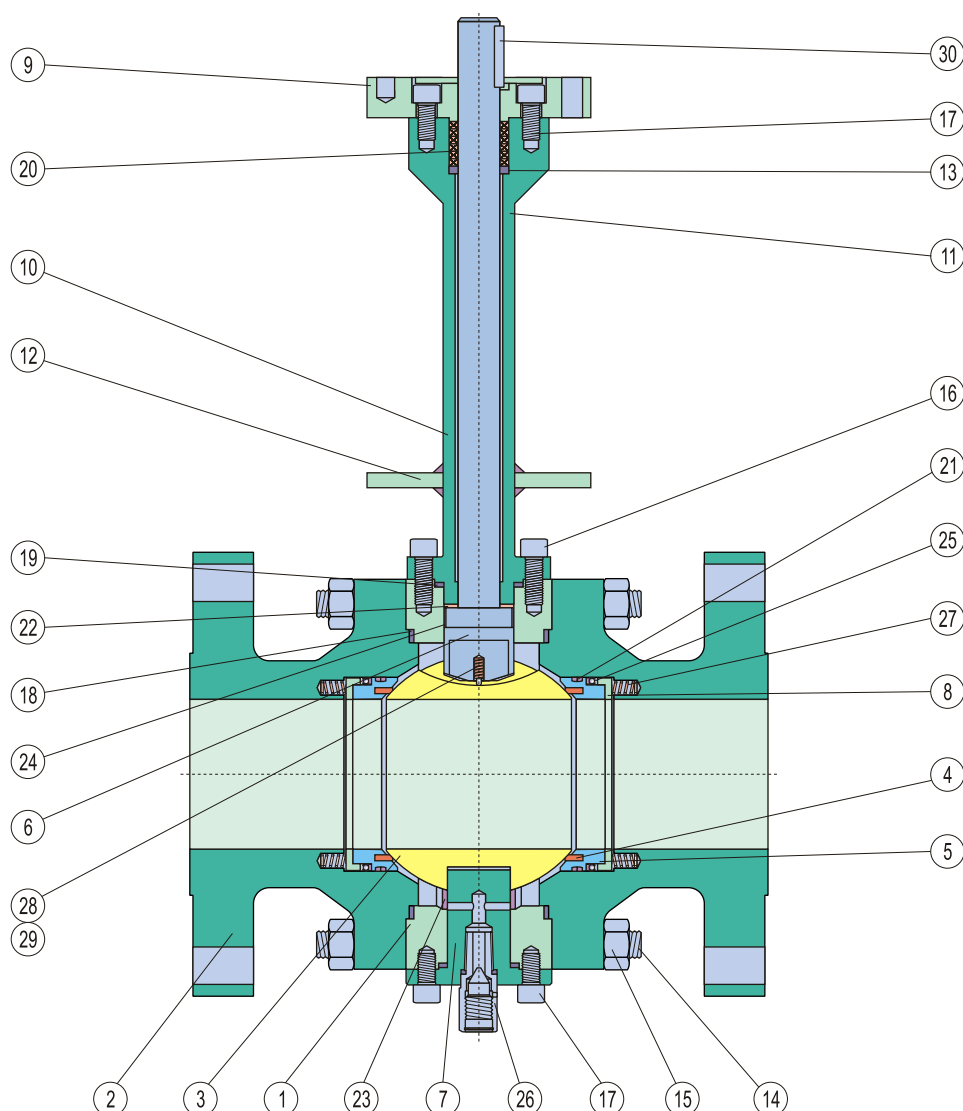
- **General Features**

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:	$1/2'' \sim 24''$
Pressure:	class 150lb~600lb
Temperature:	-196°C to ambient temperature
Body material:	A351 Gr CF8/CF8M, A182 F304/F316 (-196°C)





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

Floating Ball Valve Design Torque

Size (inch)	Design Torque (N.m)				
	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.

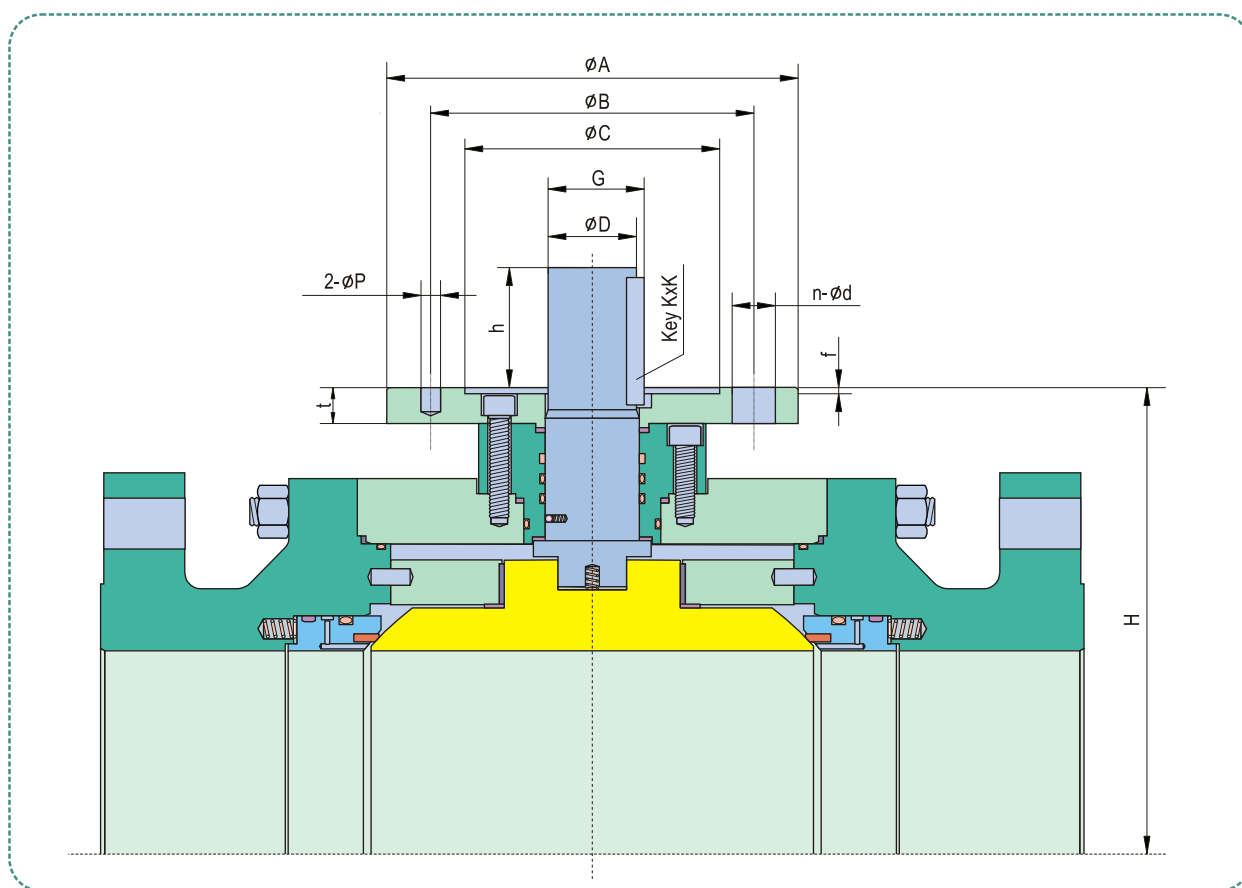
Ball Valve Flow Coefficient (Cv)

Size (inch)	Cv					
	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 coefficient "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 valve.
2. All the ball valves are in full bore.





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

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

Notes:

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



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/cm ³)	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/cm ³)	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/cm ³)	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, H ₂ S & CO ₂ Anti-Explosive Decompression	Petroleum Oils, H ₂ S & CO ₂ 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

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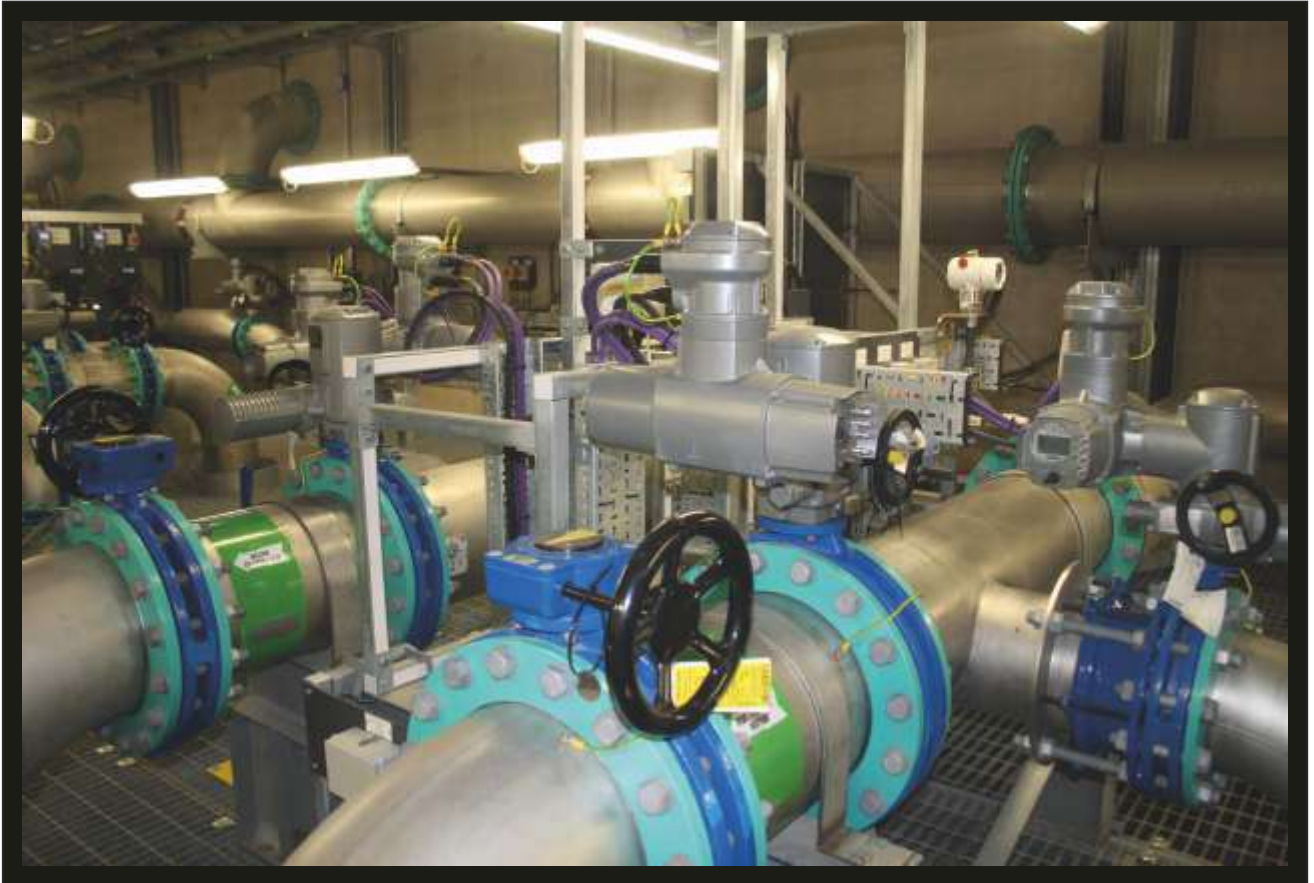
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