



## Pipeline Ball Valve Series



The following standards are referred for the products in this catalogue.

American Petroleum Institute

API 6D. Petroleum and natural gas industries — Pipeline transportation systems — Pipeline valves

API 607. Fire Test for Soft Seated Quarter-Turn Valve

API 6FA. Specification for Fire Test for Valves

API Q1. Specification for Quality Programs for the Petroleum, Petrochemical and Natural Gas Industry.

Manufacturers Standardization Association

MSS SP-25. Standard Marking System for Valves, Fittings, Flanges and Unions

MSS SP-55. Steel Castings for Controlled Quality Level, -General Industrial Steel Casting Grades for Valves  
Visual Surface Inspection and Scheduled Radiographic Inspection

NACE (National Association of Corrosive Equipment)

NACE MR-01-75 2002. Sulfide Stress Cracking Resistance of Metallic Materials for Oilfield Equipment

ANSI (American National Standard Institute)

ASME/ANSI B 16.10. Face to Face and End to End Dimensions of Valve

ASME/ANSI B 16.5. Steel pipe flanges and flanged fittings

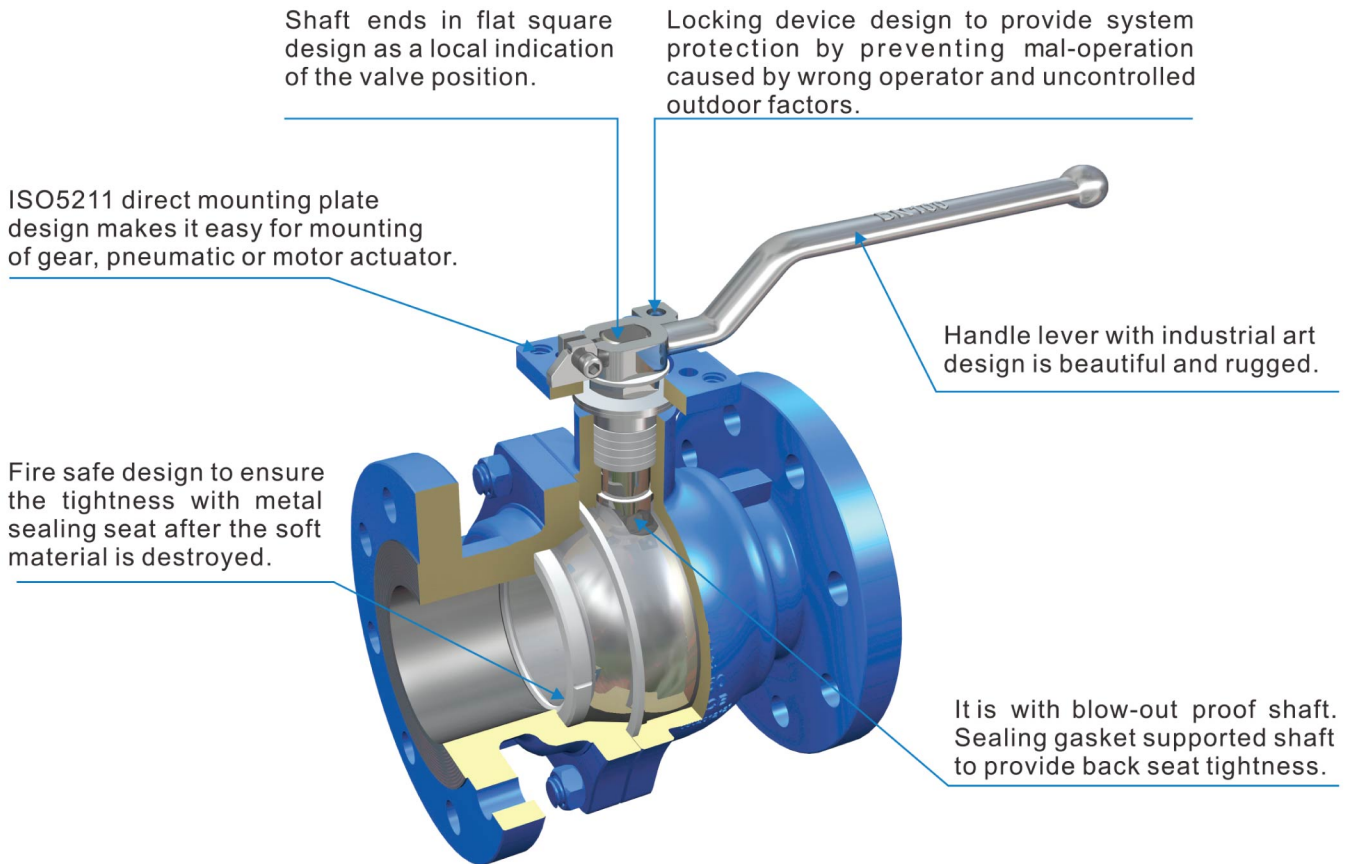
ASME/ANSI B 16.34. Valves— Flanged, Threaded, and Welding End

ASME/ANSI B 31.1. Chemical plant and petroleum refinery piping

ASME 31.4. Liquid petroleum transportation piping systems

ASME B 31.8. Gas transmission and distribution piping systems

### RR Series Ball Valve



### Two-Piece Body, Floating Ball, End Entry

RR series ball valve is in two-piece body, floating ball and end entry design. Two pieces valve body are bolted by flange. It is designed as per API 608 and fire tested as per API 607. Sealing materials available for various pressure and temperature ranges are TEFLON, PPL, PEEK, DELRIN, etc.

RR series floating ball valve is with fire proof, blow-out proof, anti-static design, with locking device and ISO5211 mounting plate for easy mounting of gear, pneumatic and electric actuators.

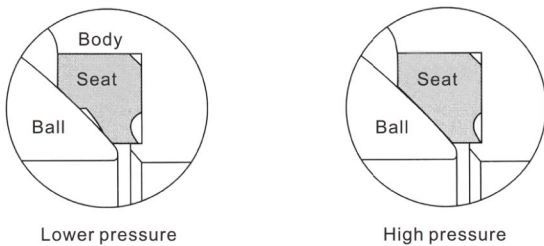
Size Range: 1/2"–8" (DN15–DN200)  
 Pressure Rating Range: 150LB-300LB, PN10–PN40  
 Operating Temperature Range: -40~+200°C, -100~+425°C

### Special Seat Design

The floating ball valve adopts the flexible seal ring design. When the medium pressure is lower, the contact area of seat and ball is smaller, so higher sealing load is formed at the seating face. When the medium pressure is higher, the contact

area of seat and ball becomes bigger along with the elastic deformation of seat, so the seat can offer longer life cycle and low operation torque requirement.

#### Elastic Seat

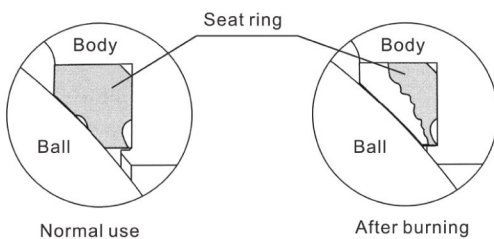


### Fireproof

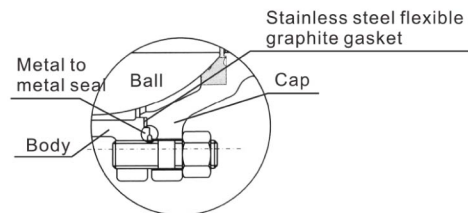
In case of fire during operation, the seat ring made of PTFE or other non-metal materials will be decomposed or damaged by high temperature and cause leakage. The fireproof seal ring is set between ball and metal seat. After the valve seat is burnt, the ball will be pushed against the down stream metal seal ring to form the auxiliary metal

to metal tightness. In addition, the middle flange sealing gasket is in stainless steel spiral wound graphite material, which can ensure tightness even under high temperature. The fireproof design of floating ball valve conforms to API 607, API 6FA, BS6755 and other standards.

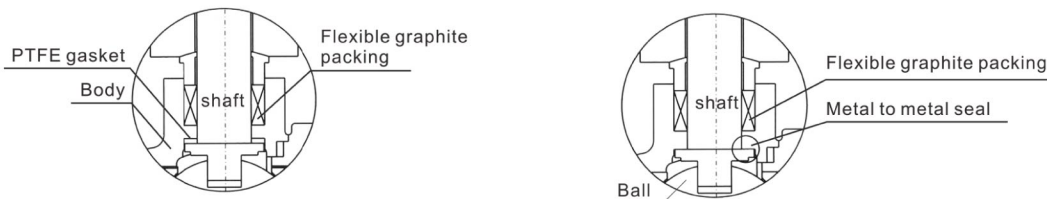
#### Fireproof Design of Seat



#### Fireproof Design of Middle Flange



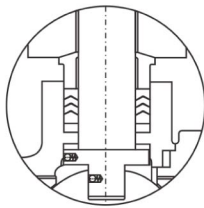
#### Fireproof Design of Shaft



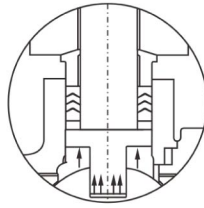
### Reliable Tightness of shaft

The shaft is designed with the shoulder at its bottom so that it will not be blown out by the medium under extreme conditions such as abnormal pressure rise inside valve cavity, failure of gland etc. In addition, to avoid leakage

after the shaft packing is burnt, the thrust bearing is set between shaft shoulder and body to form backseat tightness. The tightness will increase to the rising of medium pressure to ensure reliable shaft packing under various pressure.



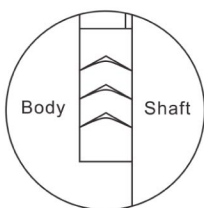
The bottom-mounted shaft will not be blown out by medium pressure.



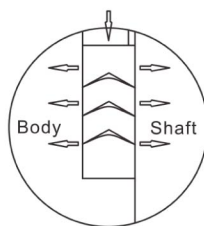
The top-mounted shaft may be blown out by medium pressure.

The shaft packing is V type which can effectively convert the pressing force and medium force into the sealing force.

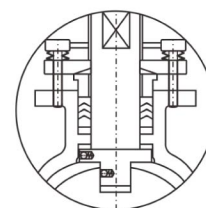
according to user's requirements, Belleville spring loaded packing gland nut design is available to ensure more reliable packing tightness.



Before the packing is pressed



After the packing is pressed

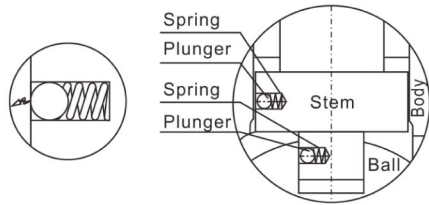


Belleville spring loaded packing pressing mechanism is adopted

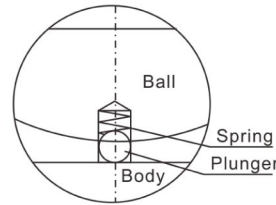
### Anti-static

The ball valve is with anti-static design to directly form a static channel between the ball and body through the shaft, to discharge the static electricity

produced by friction during operation, avoiding fire or explosion resulted from static spark and ensuring system safety.



Anti-static design of ball valve with  $DN \geq 32$

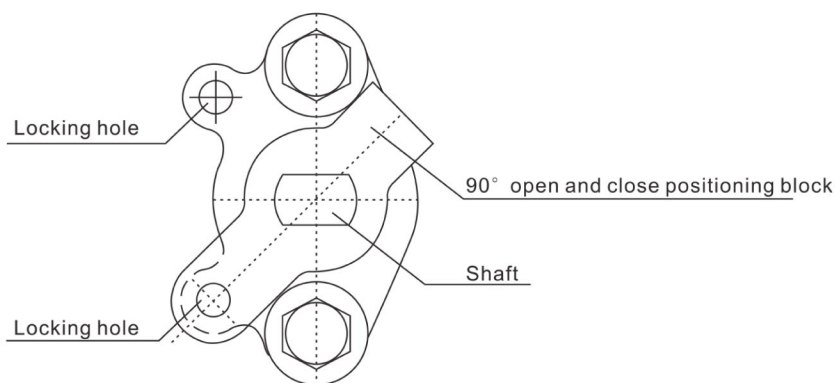


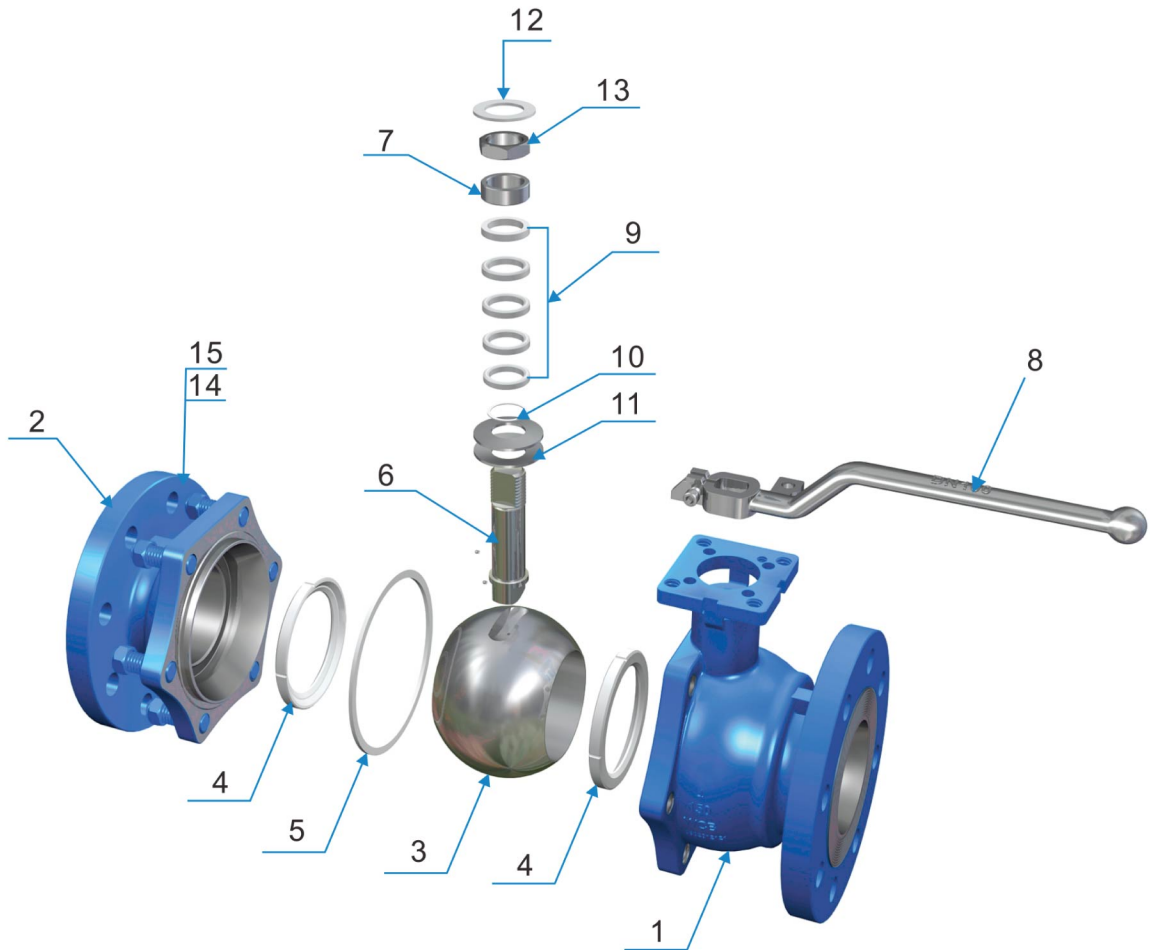
Anti-static design of ball valve with  $DN \leq 25$

### Locking And Misoperation Prevention

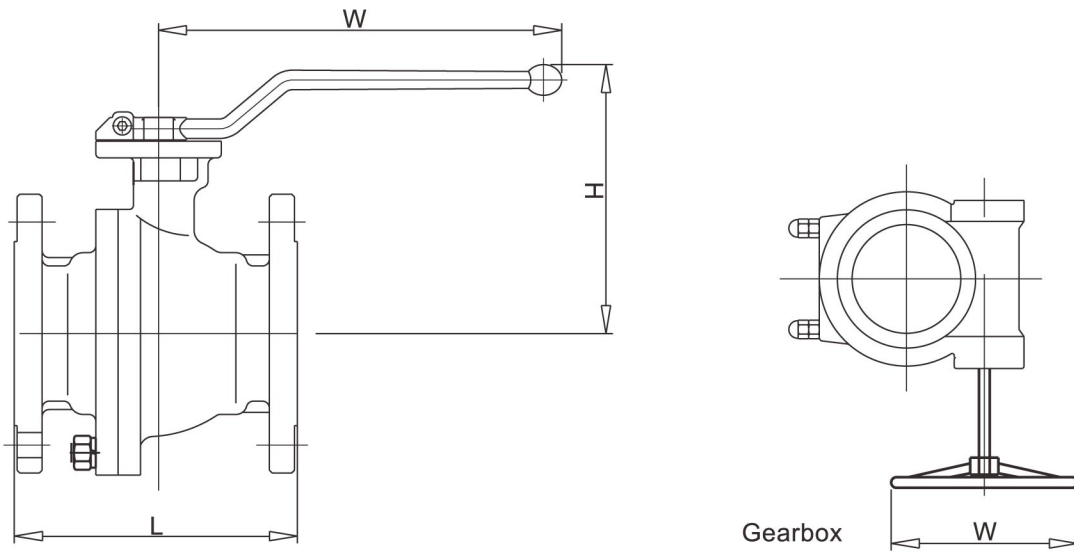
The manual ball valve can be locked by a locking device when it is at the full open or full closed position. Positioning block with locking hole is designed to avoid valve disoperation by non-operators. It can also prevent valve to be open or closed by pipeline vibration or unpredictable factors. It is very necessary especially for inflammable and explosive oil, chemical and

medical working pipelines or field tubing. Flat shaf end design offers local position indication. When the valve is opened, the handle is parallel to the pipeline and when the valve is closed, the handle is vertical to the pipeline, so that the opening and closing indications of the valve are guaranteed without error.





NO.	PARTS	Carbon Steel	Stainless Steel304(CF8)	Stainless Steel316(CF8M)
1	BODY	ASTMA216-WCB	ASTMA351-CF8	ASTMA351-CF8M
2	BONNET	ASTMA216-WCB	ASTMA351-CF8	ASTMA351-CF8M
3	BALL	ASTMA182 F6A	ASTMA182 F304	ASTMA182 F316
4	SEAT	PTFE	PTFE	PTFE
5	GASKET	PTFE	PTFE	PTFE
6	SHAFT	ASTMA182-F6A	17-4PH	ASTMA182-F316
7	BUSHING	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
8	HANDLE LEVER	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
9	PACKING	PTFE	PTFE	PTFE
10	THRUST WASHER	PTFE	PTFE	PTFE
11	BELLEVILL SPRING	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
12	WASHER	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
13	NUT	ASTMA194-2H	ASTMA193-B8	ASTMA193-B8
14	BOLT	ASTMA193-B7	ASTMA194-8	ASTMA194-8
15	NUT	ASTMA194-2H	ASTMA193-B8	ASTMA193-B8



**CLASS150 Dimensions**

Full Bore (mm)					Full Bore (inch)				
DN	L	H	W	Weight (kg)	NPS	L	H	W	Weight (kg)
15	108	75	137	1.8	½	4.25	2.95	5.39	1.8
20	117	80	137	2.0	¾	4.61	3.15	5.39	2.0
25	127	92	172	3.5	1	5.00	3.62	6.77	3.5
32	140	103	172	5.5	1¼	5.51	4.06	6.77	5.5
40	165	115	234	7.0	1½	6.50	4.53	9.21	7.0
50	178	130	234	9.5	2	7.01	5.12	9.21	9.5
65	190	165	253	14.0	2½	7.48	6.50	9.96	14.0
80	203	193	288	19.0	3	7.99	7.60	11.34	19.0
100	229	224	323	30.0	4	9.02	8.82	12.72	30.0
125	356	272	323	58.0	5	14.02	10.71	12.72	58.0
150	394	312	*300	80.0	6	15.51	12.28	*11.81	80.0
200	457	418	*300	140.0	8	17.99	16.46	*11.81	140.0

\*With gearbox operation

**CLASS300 Dimensions**

Full Bore (mm)					Full Bore (inch)				
DN	L	H	W	Weight (kg)	NPS	L	H	W	Weight (kg)
15	140	75	137	2.3	½	5.51	2.95	5.39	2.3
20	152	80	137	3.6	¾	5.98	3.15	5.39	3.6
25	165	92	172	5.0	1	6.50	3.62	6.77	5.0
32	178	103	172	7.5	1¼	7.01	4.06	6.77	7.5
40	190	115	234	10.0	1½	7.48	4.53	9.21	10.0
50	216	130	234	14.0	2	8.50	5.12	9.21	14.0
65	241	165	253	23.0	2½	9.49	6.50	10.08	23.0
80	283	193	288	30.0	3	11.14	7.60	11.34	30.0
100	305	224	323	50.0	4	12.01	8.82	12.72	50.0
125	381	272	323	90.0	5	15.00	10.71	12.72	90.0
150	403	312	*300	116.0	6	15.87	12.28	*11.81	116.0
200	502	418	*300	180.0	8	19.76	16.46	*11.81	180.0

\*With gearbox operation



### RB Series Ball Valve

Double o ring shaft seal design to prevent leakage through shaft packing.

Emergency sealant injection device is designed to prevent leakage through shaft.

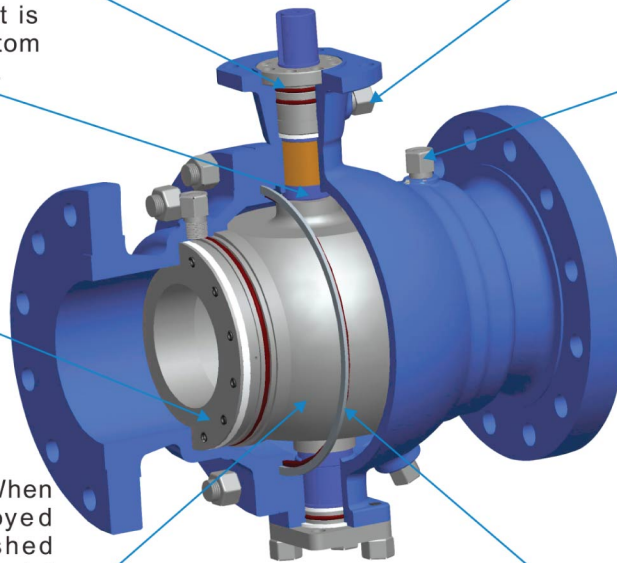
Blow-out proof design shaft is with gasket at the shaft bottom to keep back seat tightness.

Emergency sealant injection device is designed to prevent leakage through seat.

Spring loaded seat design to ensure good tightness even under low differential pressure.

It is with fire safe design. When the soft material is destroyed the metal seats will be pushed to the ball by spring with metal tightness to prevent the leakage through seats.

Body linkage flange tightness is ensured by both o ring and gasket.



#### Two-piece Body, Trunnion Mounted Ball Valve

RB series is a two-piece body, trunnion mounted ball valve. It is designed as per API 6D and fire tested as per API 6FA, applicable for various applications in oil and natural gas industry.

RB series trunnion ball valve is with fire safe, blow-out proof shaft, anti-static and no emission design. Spring loaded seat design to ensure good tightness under low differential pressure with low operation torque requirement. Special seat design for low temperature or high temperature application is available.

Size Range: 1/2"–8" (DN15–DN200)

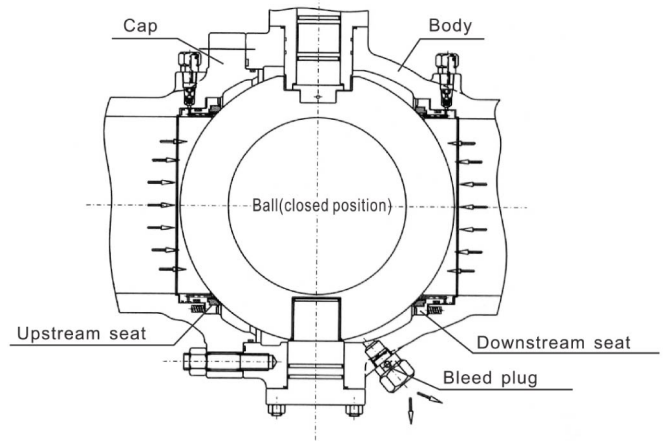
Pressure Rating Range: 150LB-300LB, PN10–PN40

Operating Temperature Range: -40~+200°C, -100~+425°C

### Double Block and Bleed (DBB)

When the valve is closed, the medium left in the middle cavity can be discharged through the bleed valve. The upstream and downstream seats will independently block the fluid at the inlet and outlet to realize double block function.

Another function of the bleed device is that the valve seat can be checked if there is any leakage during the test. In addition, the deposits inside the body can be flushed and discharged through the bleed valve to prevent damage to the seat by impurities in the medium.



### Low Operation Torque

The ball valve is with trunnion mounted design and seat to achieve low torque under operating pressure. It uses self-lubricating PTFE and metal sliding

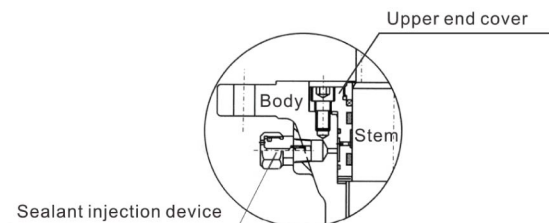
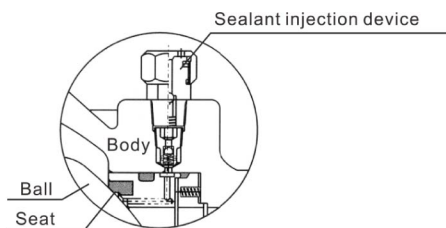
bearing to reduce the friction coefficient to the lowest to work with the high intensity and high fineness stem.

### Emergency Sealing Device

The ball valves with the diameter more than or equal to 6" (DN150) are all designed with sealant injection device on shaft and seat. When the seat ring or shaft O ring is damaged accidentally, the corresponding sealant can be injected through the sealant injection

device to prevent leakage through seat and shaft. When necessary, the auxiliary sealing system can be used for flushing and lubricating the seat to maintain its cleanliness.

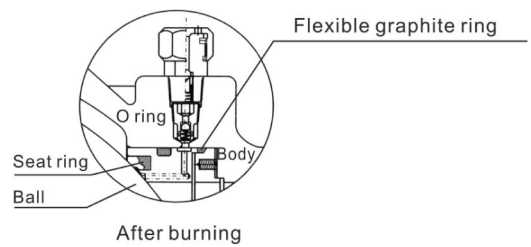
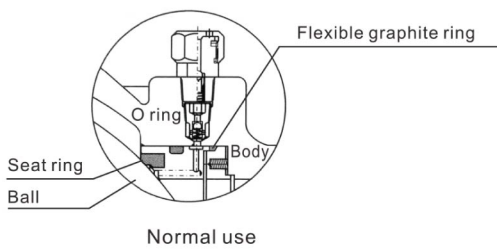
### Sealant Injection Decice



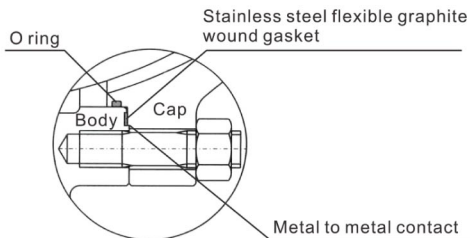
### Fireproof Design

In case of fire during operation, the seat ring, shaft O ring and middle flange O ring made of PTFE, rubber or other non-metal materials will be decomposed or damaged under high temperature. Under pressure of the medium, the seat retainer

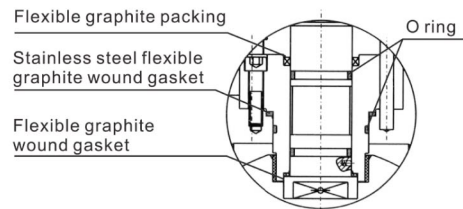
will be pushed against ball quickly with the metal to metal contact and form the auxiliary metal to metal sealing, which can effectively control valve leakage. The fireproof design conforms to API 607, API 6FA, BS 6755 and other standards.



### Fireproof Design Of Middle Flange



### Fireproof Design Of Stem



### Anti-static Design

The ball valve is with anti-static design. Static electricity discharge device forms a static channel between the ball and body directly or through the shaft, to discharge the static electricity produced

by friction during the operation, avoiding fire or explosion that may be caused by static spark and ensuring system safety.

### Reliable Seat Tightness

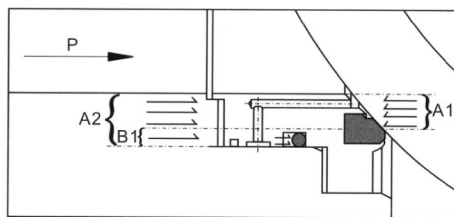
The seat tightness achieved with two floating seat retainers. They can float axially to block the fluid for seat sealing and body sealing. Spring loaded seat to ensure seat tightness even under low

differential pressure. In addition, the piston effect design valve seat provide high pressure sealing by the medium pressure itself. The following two kinds of seat tightness can be realized.

### Unidirectional Tightness (Automatic Pressure Relief in Body Cavity of Valve)

When the single sealing design is used, there is only the upstream sealing. As the spring loaded upstream and downstream sealing seats are used, the over-pressure inside valve cavity will overcome the pre-tightening stress of the spring, push the seat away from the ball and pressure will be released through the downstream parts.

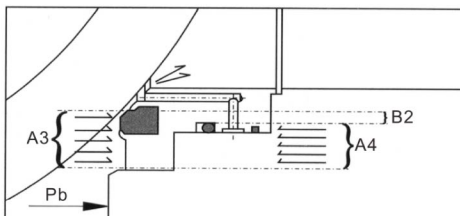
The upstream side: when the seat moves axially along the valve, the pressure P exerted on the upstream part (inlet) produces a reverse force on A1. As A2 is higher than A1,  $A2 - A1 = B1$ , the force on B1 will push the seat against the ball to realize tightness of the upstream tightness.



$A2 > A1$

The downstream side: once the pressure  $P_b$  inside the valve cavity increases, the force exerted on A3 is higher than that on A4. As  $A3 - A4 = B2$ , the differential pressure B2 will overcome the spring force to

push the seat away from the ball and pressure inside valve cavity will be released through the downstream part. Afterwards, the seat and ball will be in contact again by spring.

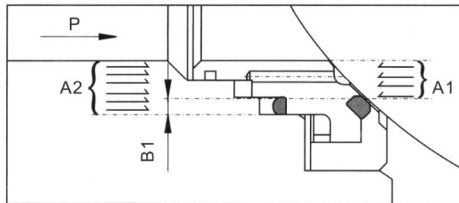


### Bidirectional Tightness

Bidirectional tightness design is available for special service applications and user's requirements. It is with double piston effect. Under normal condition, the valve generally used primary sealing. When the primary seat sealing is damaged with leakage, the secondary seat will provide tightness and ensure reliable tightness. The seat is in combined design. The primary seal is metal to metal. The secondary seal is fluorine rubber O ring which ensure the bubble tightness. When the differential pressure is very low, the tightness will still be ensured by spring. When the differential pressure rises, the sealing

force on seat and body will increase accordingly with good tightness.

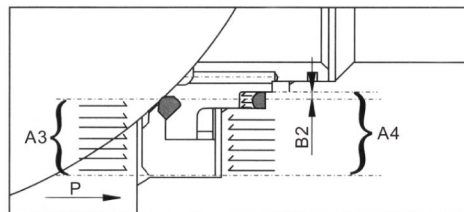
Primary sealing: upstream. When the differential pressure is low or there is no differential pressure, the floating seat will move axially along the valve by the spring and push the seat against the ball to keep tightness. When the pipeline pressure P increases, the force exerted on the area A2 of valve seat is higher than the force exerted on the area A1,  $A2-A1=B1$ . Therefore, the force on B1 will push the seat against the ball and achieve the upstream tightness.



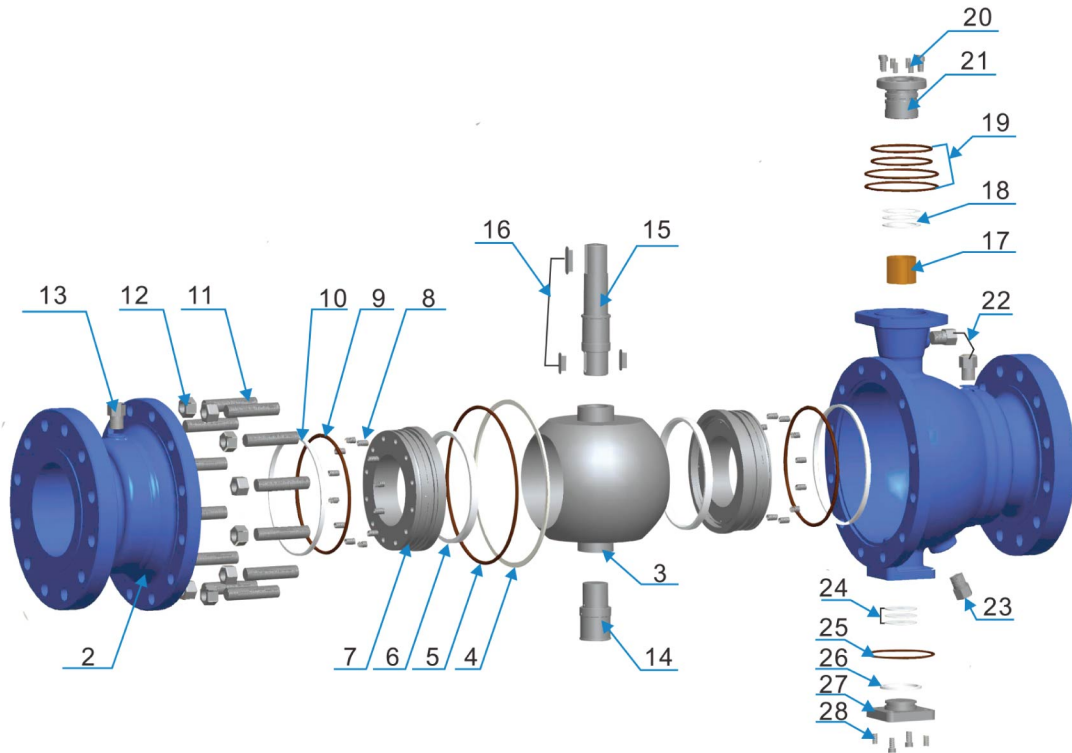
$A2 > A1$

Secondary sealing: downstream. When the differential pressure is low or there is no differential pressure, the floating seat will move axially along the valve by the spring and push the seat against the ball to keep tightness. When the valve cavity

pressure P increases, the force exerted on the area A4 of valve seat is higher than the force exerted on the area A3,  $A4-A3=B1$ . Therefore, the force on B1 will push the seat against the ball and achieve tightness of the upstream part.



$A4 > A3$

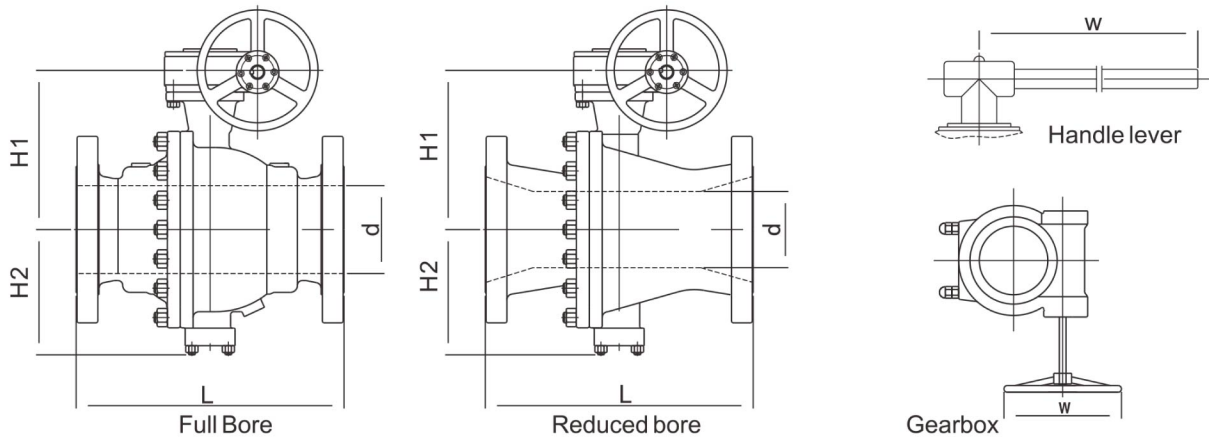


NO.	PARTS
1	BODY
2	BONNET
3	BALL
4	GASKET
5	O RING
6	SEAL RING
7	SEAT
8	SPRING
9	O RING
10	PACKING
11	STUD
12	NUT
13	SEALANT INJECTION PLUG
14	SHAFT

NO.	PARTS
15	SHAFT
16	FLAT KEY
17	BEARING
18	GASKET
19	O RING
20	BOLT
21	PACKING BOX
22	SEALANT INJECTION PLUG
23	PRESSURE RELIEF PLUG
24	GASKET
25	O RING
26	WASHER
27	BLIND FLANGE
28	BOLTS

RB BALL VALVE PART LIST

NO.	PARTS	CARBON STEEL	STAINLESS STEEL304(CF8)	STAINLESS STEEL316(CF8M)
01	BODY	ASTMA216 WCB	ASTMA351 CF8	ASTMA351 CF8M
02	BONNET	ASTMA216 WCB	ASTMA351 CF8	ASTMA351 CF8M
03	BALL	ASTMA216 WCB	ASTMA351 CF8	ASTMA351 CF8M
04	GASKET	304+DUCTILE GRAPHITE	304+DUCTILE GRAPHITE	316+DUCTILE GRAPHITE
05	O RING	NBR	NBR	NBR
06	SEAL RING	PTFE+25%GLASS FIBER	PTFE+25%GLASS FIBER	PTFE+25%GLASS FIBER
07	SEAT	ASTMA216 WCB	ASTMA182 F304	ASTMA182 F316
08	SPRING	INCONEL X-750	INCONEL X-750	INCONEL X-750
09	O RING	NBR	NBR	NBR
10	PACKING	DUCTILE GRAPHITE	DUCTILE GRAPHITE	DUCTILE GRAPHITE
11	STUD	ASTMA193 B7	ASTMA193 B8	ASTMA193 B8
12	NUT	ASTMA194 2H	ASTMA194 8	ASTMA194 8
13	SEALANT INJECTION PLUG	CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
14	SHAFT	ASTMA 182 F6a	ASTMA182 F304	ASTMA182 F316
15	SHAFT	ASTMA 182 F6a	ASTMA182 F304	ASTMA182 F316
16	FLAT KEY	CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
17	BEARING	316+PTFE+MoS2	316+PTFE+MoS2	316+PTFE+MoS2
18	GASKET	DUCTILE GRAPHITE	DUCTILE GRAPHITE	DUCTILE GRAPHITE
19	O RING	NBR	NBR	NBR
20	BOLT	ASTMA193 B7	ASTMA193 B8	ASTMA193 B8
21	PACKING BOX	ASTMA105	ASTMA182 F304	ASTMA182 F316
22	SEALANT INJECTION PLUG	CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
23	BLEED PLUG	CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
24	GASKET	DUCTILE GRAPHITE	DUCTILE GRAPHITE	DUCTILE GRAPHITE
25	O RING	NBR	NBR	NBR
26	WASHER	ASTMA276 304	ASTMA276 304	ASTMA276 316
27	BLIND FLANGE	ASTMA216 WCB	ASTMA351 CF8	ASTMA351 CF8M
28	BOLT	ASTMA193 B7	ASTMA193 B8	ASTMA193 B8



CLASS150 Dimensions

Full Bore (mm)							Full Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
50	51	178	176	95	350	17	2	2.01	7.01	6.93	3.74	13.78	17
80	76	203	215	120	400	33	3	2.99	7.99	8.46	4.72	15.75	33
100	102	229	252	142	500	50	4	4.02	9.02	9.92	5.59	19.69	50
150	152	394	330	220	*300	93	6	5.98	15.51	12.99	8.66	*11.81	93
200	203	457	448	259	*300	166	8	7.99	17.99	17.56	10.20	*11.81	166
250	254	533	505	305	*300	273	10	10.00	20.98	19.88	12.01	*11.81	273
300	305	610	556	348	*500	475	12	12.01	24.02	21.89	13.70	*19.69	475
350	337	686	620	395	*600	570	14	13.27	26.22	24.41	15.55	*23.62	570
400	387	762	700	450	*600	778	16	15.24	30.00	27.56	17.72	*23.62	778
450	438	864	750	485	*600	935	18	17.24	34.02	29.53	19.09	*23.62	935
500	489	914	805	525	*600	1190	20	19.25	35.98	31.69	20.67	*23.62	1190
550	540	1016	890	615	*600	1346	22	21.26	40.00	35.04	24.21	*23.62	1346
600	591	1067	1110	680	*800	1579	24	23.27	42.01	43.70	26.77	*31.50	1579

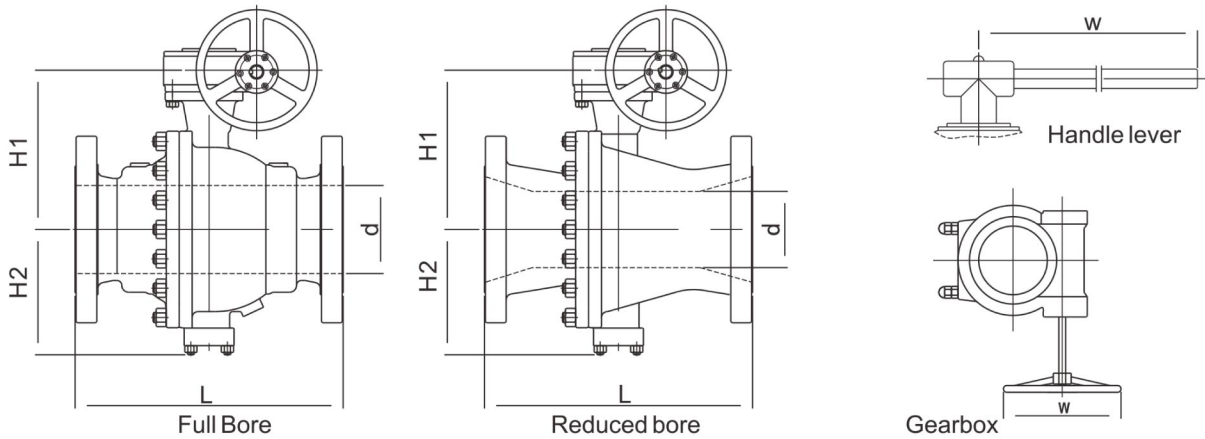
\*With gearbox operation

CLASS150 Dimensions

Reduced Bore (mm)							Reduced Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
80*50*80	51	203	176	95	350	30	3*2*3	2.01	7.99	6.93	3.74	13.78	30
100*80*100	76	229	215	120	400	47	4*3*4	2.99	9.02	8.46	4.72	15.75	47
150*100*150	102	394	252	142	500	90	6*4*6	4.02	15.51	9.92	5.59	19.69	90
200*150*200	152	457	330	220	*300	161	8*6*8	5.98	17.99	12.99	8.66	*11.81	161
250*200*250	203	533	448	259	*300	268	10*8*10	7.99	20.98	17.56	10.20	*11.81	268
300*250*300	254	610	505	305	*300	467	12*10*12	10.00	24.02	19.88	12.01	*11.81	467
350*300*350	305	686	556	348	*500	560	14*12*14	12.01	26.22	21.89	13.70	*19.69	560
400*350*400	337	762	620	395	*600	766	16*14*16	13.27	30.00	24.41	15.55	*23.62	766
450*400*450	387	864	700	450	*600	902	18*16*18	15.24	34.02	27.56	17.72	*23.62	902
500*450*500	438	914	750	485	*600	1130	20*18*20	17.24	35.98	29.53	19.09	*23.62	1130
550*450*550	438	1016	750	485	*600	1300	22*18*22	17.24	40.00	29.53	19.09	*23.62	1300
600*500*600	489	1067	805	525	*600	1520	24*20*22	19.25	42.01	31.69	20.67	*23.62	1520

\*With gearbox operation





CLASS300 Dimensions

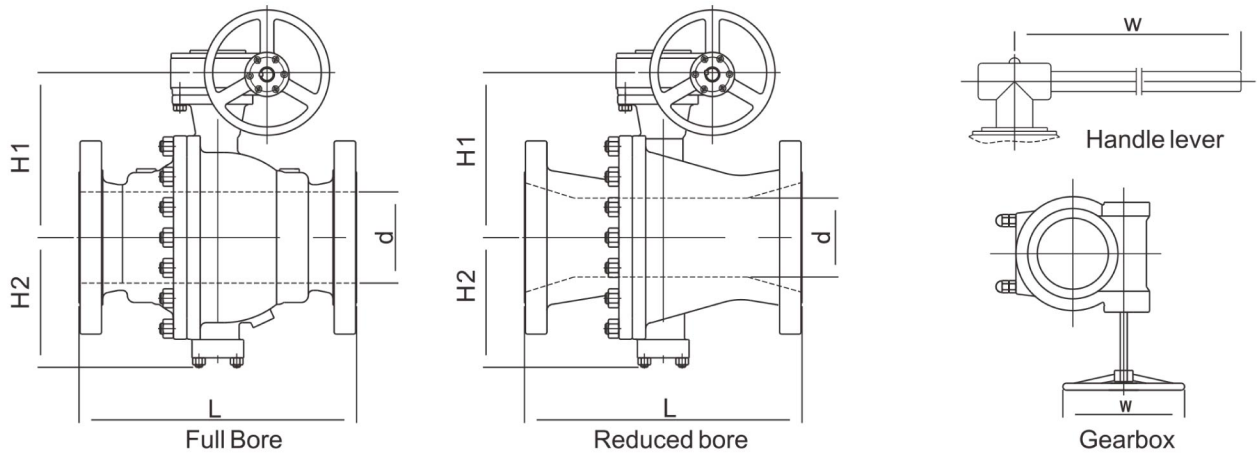
Full Bore (mm)							Full Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
50	51	216	176	95	350	18	2	2.01	8.50	6.93	3.74	13.78	18
80	76	283	215	120	400	40	3	2.99	11.14	8.46	4.72	15.75	40
100	102	305	252	142	500	63	4	4.02	12.01	9.92	5.59	19.69	63
150	152	403	330	220	*300	150	6	5.98	15.87	12.99	8.66	*11.81	150
200	203	502	448	259	*300	240	8	7.99	19.76	17.64	10.20	*11.81	240
250	254	568	505	305	*400	305	10	10.00	22.36	19.88	12.01	*15.75	305
300	305	648	556	348	*500	507	12	12.01	25.51	21.89	13.70	*19.69	507
350	337	762	620	395	*600	602	14	13.27	30.00	24.41	15.55	*23.62	602
400	387	838	700	450	*600	1000	16	15.24	32.99	27.56	17.72	*23.62	1000
450	438	914	750	485	*600	1160	18	17.24	35.98	29.53	19.09	*23.62	1160
500	489	991	805	525	*600	1320	20	19.25	39.02	31.69	20.67	*23.62	1320
550	540	1092	890	615	*600	1540	22	21.26	42.99	35.04	24.21	*23.62	1540
600	591	1143	1110	680	*800	1874	24	23.27	45.00	43.70	26.77	*31.50	1874

\*With gearbox operation

CLASS300 Dimensions

Reduced Bore (mm)							Reduced Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
80*50*80	51	283	176	95	350	38	3*2*3	2.01	11.14	6.93	3.74	13.78	38
100*80*100	76	305	215	120	400	60	4*3*4	2.99	12.01	8.46	4.72	15.75	60
150*100*150	102	403	252	142	500	147	6*4*6	4.02	15.87	9.92	5.59	19.69	147
200*150*200	152	502	330	220	*300	234	8*6*8	5.98	19.76	12.99	*8.66	*11.81	234
250*200*250	203	568	448	259	*300	295	10*8*10	7.99	22.36	17.64	*10.20	*11.81	295
300*250*300	254	648	505	305	*400	488	12*10*12	10.00	25.51	19.88	*12.01	*15.75	488
350*300*350	305	762	556	348	*500	577	14*12*14	12.01	30.00	21.89	*13.70	*19.69	577
400*350*400	337	838	620	395	*600	910	16*14*16	13.27	32.99	24.41	*15.55	*23.62	910
450*400*450	387	914	700	450	*600	1020	18*16*18	15.24	35.98	27.56	*17.72	*23.62	1020
500*450*500	438	991	750	485	*600	1280	20*18*20	17.24	39.02	29.53	*19.09	*23.62	1280
550*450*550	438	1092	750	485	*600	1360	22*18*22	17.24	42.99	29.53	*19.09	*23.62	1360
600*500*600	489	1143	805	525	*600	1670	24*20*24	19.25	45.00	31.69	*20.67	*23.62	1670

\*With gearbox operation



CLASS600 Dimensions

Full Bore (mm)							Full Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
50	51	292	192	142	600	27	2	2.01	11.50	7.56	5.59	23.62	27
80	76	356	279	142	1000	50	3	2.99	14.02	10.89	5.59	39.37	50
100	102	432	315	172	1500	80	4	4.02	17.01	12.40	6.77	59.06	80
150	152	559	323	205	*300	252	6	5.98	22.01	12.72	8.07	*11.81	252
200	203	660	381	272	*400	350	8	7.99	25.98	15.00	10.71	*15.75	350
250	254	787	518	335	*500	600	10	10.00	30.98	20.39	13.19	*19.69	600
300	305	838	568	405	*600	820	12	12.01	32.99	22.36	15.94	*23.62	820
350	337	889	665	513	*600	1130	14	13.27	35.00	26.18	20.20	*23.62	1130
400	387	991	730	583	*600	1550	16	15.24	39.02	28.74	22.95	*23.62	1550
450	438	1092	795	646	*600	2100	18	17.24	42.99	31.30	25.43	*23.62	2100
500	489	1194	825	706	*600	2800	20	19.25	47.01	32.48	27.80	*23.62	2800
600	591	1397	973	831	*800	3626	24	23.27	55.00	38.31	32.72	*31.50	3626

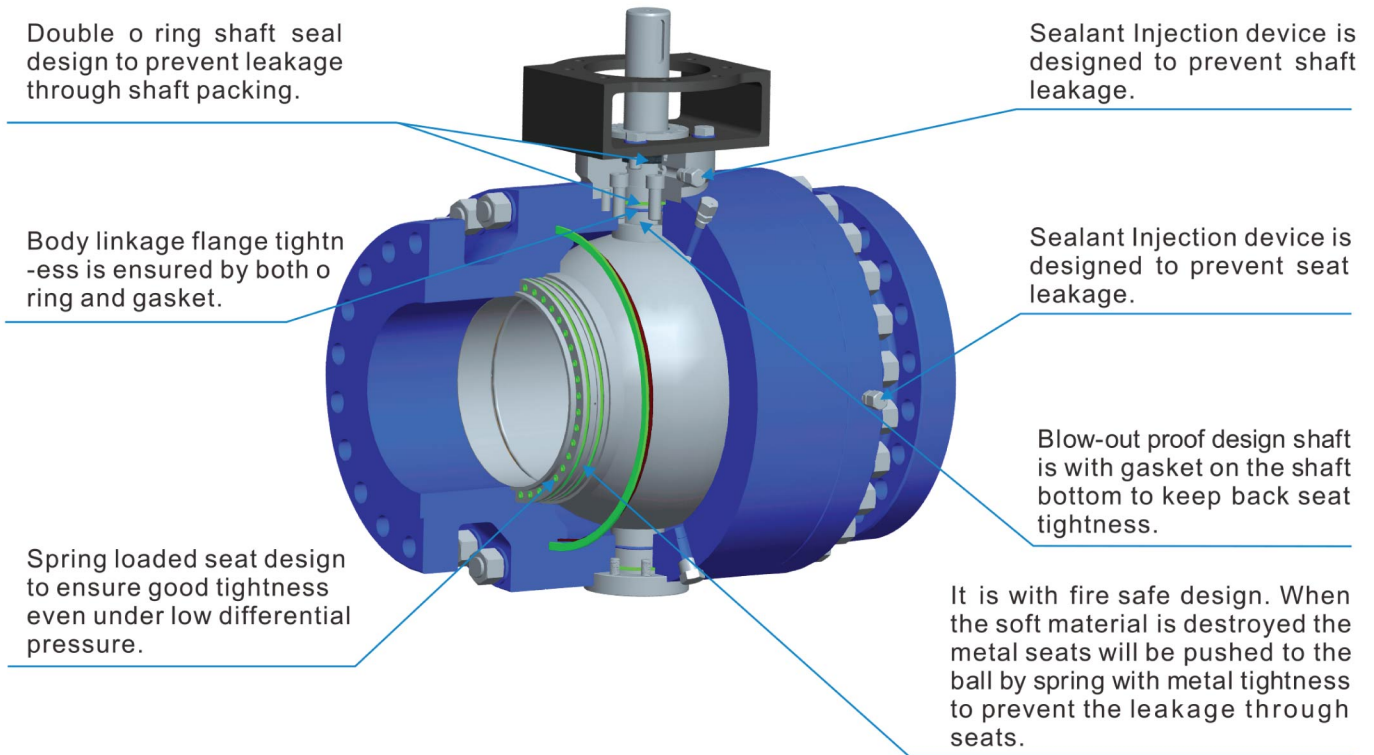
\*With gearbox operation

CLASS600 Dimensions

Reduced Bore (mm)							Reduced Bore (inch)						
DN	D	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
80*50*80	51	356	192	142	600	41	3*2*3	2.01	14.02	7.56	5.59	23.6	41
100*80*100	76	432	279	142	1000	70	4*3*4	2.99	17.01	10.98	5.59	39.37	70
150*100*150	102	559	315	172	1500	122	6*4*6	4.02	22.01	12.40	6.77	59.06	122
200*150*200	152	660	323	205	*300	255	8*6*8	5.98	25.98	12.72	8.07	*11.81	255
250*200*250	203	787	381	272	*300	440	10*8*10	7.99	30.98	15.00	10.71	*15.75	440
300*250*300	254	838	518	335	*500	620	12*10*12	10.00	32.99	20.39	13.19	*19.69	620
350*300*350	305	889	568	405	*600	1060	14*12*14	12.01	35.00	22.36	15.94	*23.62	1060
400*350*400	337	991	665	513	*600	1440	16*14*16	13.27	39.02	26.18	20.20	*23.62	1440
450*400*450	387	1092	730	583	*600	1860	18*16*18	15.24	42.99	28.74	22.95	*23.62	1860
500*450*500	438	1194	795	646	*600	2400	20*18*20	17.24	47.01	31.30	25.43	*23.62	2400
600*500*600	489	1397	825	706	*600	3240	24*20*24	19.25	55.00	32.48	27.80	*23.62	3240

\*With gearbox operation

### RC Series Ball Valve



3-Piece Body, Trunnion Mounted Ball Valve. RC series ball valve is designed as per API16D specification and fire tested as per API6FA standard, applicable for various applications in oil and natural gas industry.

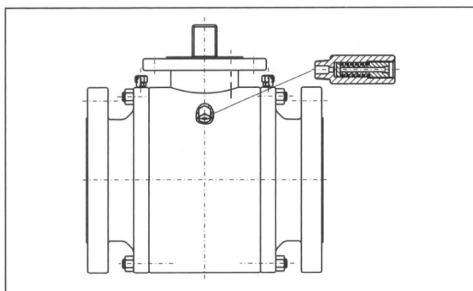
RC series ball valve is in forged steel body and bonnet design to solve the inevitable deflection of casting steel and can ensure a stable and reliable performance under full differential pressure. Besides the trunnion mounted ball design, it is with spring loaded seat to ensure good tightness under low differential pressure and low operation torque requirement. Special seat design for Low temperature or high temperature application is available.

Size Range: 1/2" - 8" (DN15 - DN200)  
 Pressure Rating Range: 150LB-300LB, PN10 - PN40  
 Operating Temperature Range: -40 ~ +200°C, -100 ~ +425°C

### Pressure Relief Device

As the ball valve is designed with the advanced primary and secondary sealing that has double piston effect, and the middle cavity can't realize automatic pressure relief, the pressure relief valve must be installed on the body in order to prevent the danger of over-pressure inside the valve cavity that may occur due to thermal expansion of medium. The connection of the safety relief valve is normally NPT1/2. Another point to be noted is that the medium

through the pressure relief valve will be directly discharged into the atmosphere. If it is not allowed, we suggest that a special design of automatic pressure relief towards upstream should be used. Refer to the following for details. Please indicate it in the order if pressure relief valve is required or if you would like to have the special design of automatic pressure relief towards upstream.

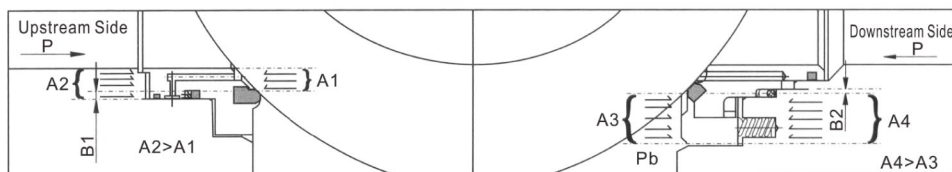


### Automatic Pressure Relief towards Upstream

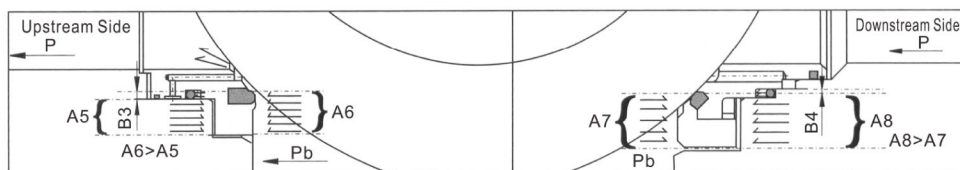
As the ball valve is designed with the advanced primary and secondary sealing that has double piston effect, and the middle cavity can't realize automatic pressure relief, the ball valve with the special design is recommended to meet the requirement of automatic pressure relief and ensure no pollution to the environment. In the design, the upstream adopts primary sealing and the downstream adopts primary and secondary sealing. When the

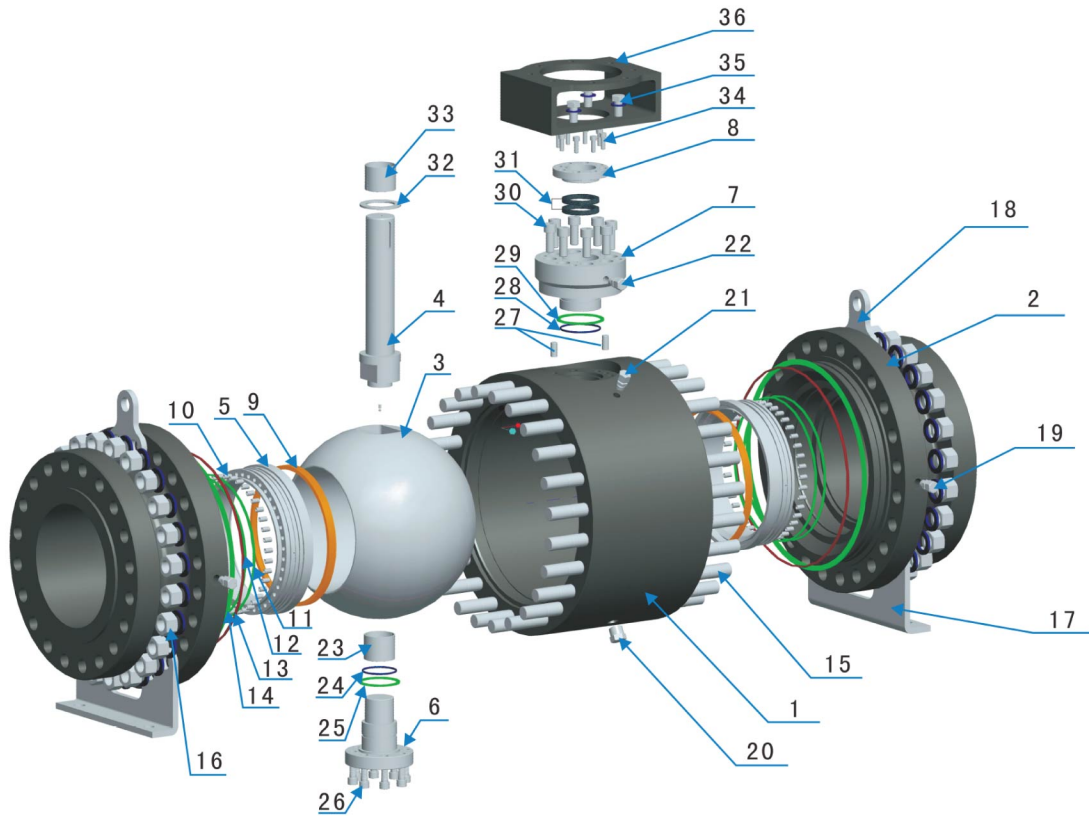
ball valve is closed, the pressure in the valve cavity can be automatically released to the upstream, to prevent the danger caused by cavity pressure. When the primary seat is damaged with leakage, the secondary seat can also ensure the tightness. But special attention shall be paid to the flow direction of the ball valve. During the installation, be careful with the upstream and downstream direction. Refer to the following drawings for working principle of the valve with the special design.

### Upstream and downstream sealing



### Cavity pressure relief to upstream and downstream



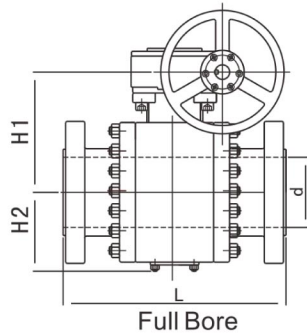


NO.	PARTS
1	BODY
2	BODY
3	BALL
4	SHAFT
5	SEAT
6	SHAFT
7	PACKING BOX
8	PACKIN GLAND
9	SEAT
10	SPRING
11	O RING
12	O RING
13	O RING
14	GASKET
15	STUD
16	NUT
17	SUPPORT
18	LIFT LUG

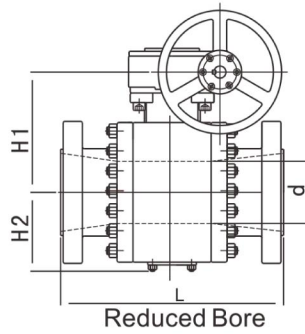
NO.	PARTS
19	SEALANT INJECTION PLUG
20	BLEED PLUG
21	PRESSURE RELIEF PLUG
22	SEALANT INJECTION PLUG
23	BEARING
24	O RING
25	GASKET
26	BOLT
27	PIN
28	O RING
29	GASKET
30	BOLT
31	PACKING
32	GASKET
33	BEARING
34	BOLT
35	BOLT
36	BRACKET

RC BALL VALVE PART LIST

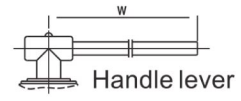
NO.	PARTS	CARBON STEEL	STAINLESS STEEL F304	STAINLESS STEEL F316
01	BODY	ASTMA105	ASTMA182 F304	ASTMA182 F316
02	BODY	ASTMA105	ASTMA182 F304	ASTMA182 F316
03	BALL	ASTMA105/ENP	ASTMA182 F304	ASTMA182 F316
04	SHAFT	ASTMA182-F6a	ASTMA182 F304	ASTMA182 F316
05	SEAT	ASTMA105/ENP	ASTMA182 F304	ASTMA182 F316
06	SHAFT	ASTMA182-F6a	ASTMA182 F304	ASTMA182 F316
07	PACKING BOX	ASTMA105/ENP	ASTMA182 F304	ASTMA182 F316
08	PACKING GLAND	ASTMA105/ENP	ASTMA182 F304	ASTMA182 F316
09	SEAL RING	PTFE	PTFE	PTFE
10	SPRING	17-17PH	INCONEL X-750	INCONEL X-750
11	O RING	NBR	NBR	NBR
12	O RING	NBR	NBR	NBR
13	O RING	NBR	NBR	NBR
14	GASKET	SS 304+GRAPHITE	SS 304+GRAPHITE	SS 316+GRAPHITE
15	STUD	ASTMA193 B7	ASTMA193 B8	ASTMA193 B8
16	NUT	ASTMA194 2H	ASTMA194 8	ASTMA194 8
17	SUPPORT	STEEL	STEEL	STEEL
18	LIFT LUG	STEEL	STEEL	STEEL
19	SEALANT INJECTION PLUG	CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
20	BLEED PLUG	CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
21	PRESSURE RELIEF PLUG	CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
22	SEALANT INJECTION PLUG	CARBON STEEL	STAINLESS STEEL	STAINLESS STEEL
23	BEARING	SS304+PTFE	SS304+PTFE	SS316+PTFE
24	O RING	NBR	NBR	NBR
25	GASKET	SS304+GRAPHITE	SS304+GRAPHITE	SS316+GRAPHITE
26	BOLT	ASTMA193 B7	ASTMA193 B8	ASTMA193 B8
27	PIN	SS 316	SS 316	SS 316
28	O RING	NBR	NBR	NBR
29	GASKET	SS 304+GRAPHITE	SS 304+GRAPHITE	SS 316+GRAPHITE
30	BOLT	ASTMA193 B7	ASTMA193 B8	ASTMA193 B8
31	PACKING	GRAPHITE	GRAPHITE	GRAPHITE
32	GASKET	PTFE	PTFE	PTFE
33	BEARING	SS304+PTFE	SS304+PTFE	SS316+PTFE
34	BOLT	ASTMA193 B7	ASTMA193 B8	ASTMA193 B8
35	BOLT	ASTMA193 B7	ASTMA193 B8	ASTMA193 B8
36	BRACKET	ASTMA216 WCB	ASTMA216 WCB	ASTMA216 WCB



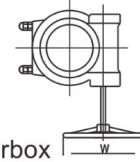
Full Bore



Reduced Bore



Handle lever



Gearbox

CLASS150 Dimensions

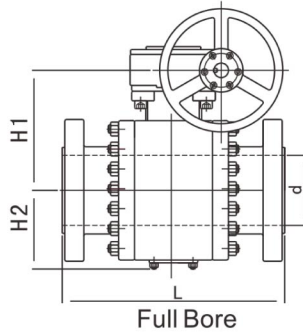
Full Bore (mm)							Full Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
50	51	178	200	110	265	21	2	2.01	7.01	7.87	4.33	10.43	21
80	76	203	300	126	285	32	3	2.99	7.99	11.81	4.96	11.22	32
100	102	229	315	165	285	52	4	4.02	9.02	12.40	6.50	11.22	52
150	152	394	335	165	*300	164	6	5.98	15.51	13.19	6.50	*11.81	164
200	203	457	405	200	*300	345	8	7.99	17.99	15.94	7.87	*11.81	345
250	254	533	427	220	*300	440	10	10.00	20.98	16.81	8.66	*11.81	440
300	305	610	465	262	*500	577	12	12.01	24.02	18.31	10.31	*19.69	577
350	337	686	506	293	*600	859	14	13.27	27.01	19.92	11.54	*23.62	859
400	387	762	622	341	*600	1144	16	15.24	30.00	24.49	13.43	*23.62	1144
450	438	864	666	392	*600	1440	18	17.24	34.02	26.22	15.43	*23.62	1440
500	489	914	730	435	*600	1944	20	19.25	35.98	28.74	17.13	*23.62	1944
550	540	1016	833	480	*600	2352	22	21.26	40.00	32.80	18.90	*23.62	2352
600	591	1067	895	518	*800	2803	24	23.27	42.01	35.24	20.39	*23.62	2803
650	635	1143	900	535	*800	3200	26	25.00	45.00	35.43	21.06	*31.50	3200
700	686	1245	935	542	*800	4045	28	27.01	49.02	36.81	21.34	*31.50	4045
750	737	1295	1010	605	*800	6200	30	29.02	50.95	39.76	23.82	*31.50	6200
800	781	1372	1060	650	*800	5490	32	30.75	54.02	41.73	25.59	*31.50	5490

\* With gearbox operation

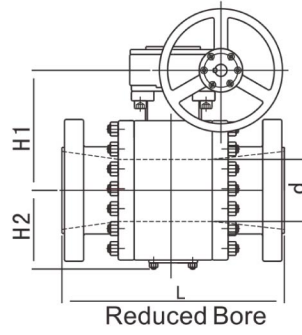
CLASS150 Dimensions

Reduced Bore (mm)							Reduced Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
80*50*80	51	203	200	110	265	26	3*2*3	2.01	7.99	7.87	4.33	10.43	26
100*80*100	76	229	300	126	285	40	4*3*4	2.99	9.02	11.81	4.96	11.22	40
150*100*150	102	394	315	165	285	68	6*4*6	4.02	15.51	12.40	6.50	11.22	68
200*150*200	152	457	335	165	*300	177	8*6*8	5.98	17.99	13.19	6.50	*11.81	177
250*200*250	203	533	405	200	*300	307	10*8*10	7.99	20.98	15.94	7.87	*11.81	307
300*250*300	254	610	427	220	*300	509	12*10*12	10.00	24.02	16.81	8.66	*11.81	509
350*300*350	305	686	465	262	*500	722	14*12*14	12.01	27.01	18.31	10.31	*19.69	722
400*350*400	337	762	506	293	*600	9220	16*14*16	13.27	30.00	19.92	11.54	*23.62	920
450*400*450	387	864	622	341	*600	1241	18*16*18	15.24	34.02	24.49	13.43	*23.62	1241
500*450*500	438	914	666	392	*600	1670	20*18*20	17.24	35.98	26.22	15.43	*23.62	1670
550*450*550	438	1016	666	392	*600	2343	22*18*22	17.24	40.00	26.22	15.43	*23.62	2343
600*500*600	489	1067	730	435	*600	2060	24*20*24	19.25	42.01	28.74	17.13	*23.62	2060
650*550*600	540	1143	833	480	*600	2215	26*22*26	21.26	45.00	32.80	18.90	*23.62	2215
700*600*700	591	1245	895	518	*800	2700	28*24*28	23.27	49.02	35.24	20.39	*31.50	2700
750*600*750	591	1295	895	518	*800	2918	30*24*30	23.27	50.98	35.24	20.39	*31.50	2918
800*650*800	635	1372	900	535	*800	4005	32*26*32	25.00	54.02	35.43	21.06	*31.50	4005
850*700*850	686	1473	935	542	*800	4445	34*28*34	27.01	57.99	36.81	21.34	*31.50	4445

\* With gearbox operation



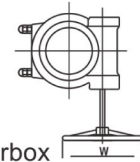
Full Bore



Reduced Bore



Handle lever



Gearbox

CLASS300 Dimensions

Full Bore (mm)							Full Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
50	51	216	206	113	265	25	2	2.01	8.50	8.11	4.45	10.43	25
80	76	283	315	129	400	46	3	2.99	11.14	12.40	5.08	15.75	46
100	102	305	330	169	750	77	4	4.02	12.01	12.99	6.65	29.53	77
150	152	403	345	148	*300	211	6	5.98	15.87	13.58	5.83	*11.81	211
200	203	502	415	185	*300	322	8	7.99	19.76	16.34	7.28	*11.81	322
250	254	568	427	226	*400	517	10	10.00	22.36	16.81	8.90	*15.75	517
300	305	648	465	269	*500	758	12	12.01	25.51	18.31	10.59	*19.69	758
350	337	762	519	300	*600	975	14	13.27	30.00	20.43	11.81	*23.62	975
400	387	838	638	350	*600	1350	16	15.24	32.99	25.12	13.78	*23.62	1350
450	438	914	683	402	*600	1715	18	17.24	35.98	26.89	15.83	*23.62	1715
500	489	991	748	446	*600	2090	20	19.25	39.02	29.45	17.56	*23.62	2090
550	540	1092	854	492	*600	2220	22	21.26	42.99	33.62	19.37	*23.62	2220
600	591	1143	917	531	*800	2890	24	23.27	45.00	36.10	20.91	*31.50	2890
700	686	1346	958	556	*800	4575	28	27.01	52.99	37.72	21.89	*31.50	4575
750	737	1397	1035	620	*800	5590	30	29.02	55.00	40.75	24.41	*31.50	5590
800	781	1524	1087	666	*800	6240	32	30.75	60.00	42.80	26.22	*31.50	6240
850	832	1626	1104	666	*800	7370	34	32.76	64.02	43.46	26.22	*31.50	7370
900	876	1727	1143	718	*800	8435	36	34.49	67.99	45.00	28.27	*31.50	8435

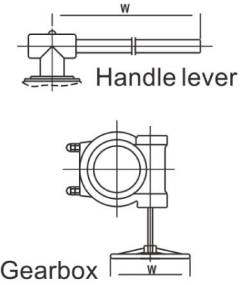
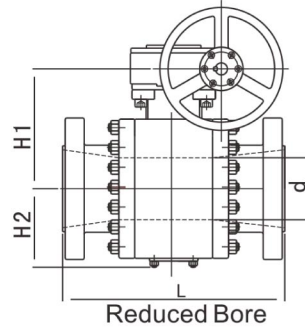
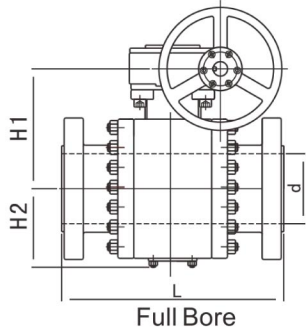
\* With gearbox operation

CLASS300 Dimensions

Reduced Bore (mm)							Reduced Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
80*50*80	51	283	206	113	265	36	3*2*3	2.01	11.14	8.11	4.45	10.43	36
100*80*100	76	305	315	129	400	55	4*3*4	2.99	12.01	12.40	5.08	15.75	55
150*100*150	102	403	330	169	750	112	6*4*6	4.02	15.87	12.99	6.65	29.53	112
200*150*200	152	502	345	148	*300	122	8*6*8	5.98	19.76	13.58	5.83	*11.81	222
250*200*250	203	568	415	185	*300	381	10*8*10	7.99	22.36	16.34	7.28	*11.81	381
300*250*300	254	648	427	226	*400	619	12*10*12	10.00	25.51	16.81	8.90	*15.75	619
350*300*350	305	762	465	269	*500	920	14*12*14	12.01	30.00	18.31	10.59	*19.69	920
400*350*400	337	838	519	300	*600	1050	16*14*16	13.27	32.99	20.43	11.81	*23.62	1050
450*400*450	387	914	638	350	*600	1530	18*16*18	15.24	35.98	25.12	13.78	*23.62	1530
500*450*500	438	991	683	402	*600	1830	20*18*20	17.24	39.02	26.89	15.83	*23.62	1830
550*450*550	438	1092	683	402	*600	2010	22*18*22	17.24	42.99	26.89	15.83	*23.62	2010
600*500*600	489	1143	748	446	*600	2220	24*20*24	19.25	45.00	29.45	17.56	*23.62	2220
700*600*700	591	1346	917	531	*800	3200	28*24*28	23.27	52.99	36.10	20.91	*31.50	3200
750*600*750	591	1397	917	531	*800	3200	30*24*30	23.27	55.00	36.10	20.91	*31.50	3200
850*700*850	686	1524	958	556	*800	4845	34*28*34	27.01	60.00	37.72	21.89	*31.50	4845
900*750*900	737	1626	1035	620	*800	6100	36*30*36	29.02	64.02	40.75	24.41	*31.50	6100
1000*850*1000	832	1930	1104	666	*800	8200	40*34*40	32.76	75.98	43.46	26.22	*31.50	8200
1050*900*1050	876	2032	1143	718	*800	9200	42*36*42	34.49	80.00	45.00	28.27	*31.50	9200

\* With gearbox operation





CLASS600 Dimensions

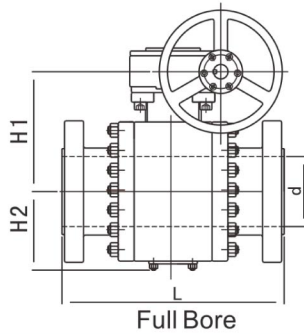
Full Bore (mm)							Full Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
50	51	292	206	113	400	33	2	2.01	11.50	8.11	4.45	15.75	33
80	76	356	315	129	750	64	3	2.99	14.00	12.40	5.08	29.53	64
100	102	432	330	169	1000	117	4	4.02	17.01	12.99	6.65	39.37	117
150	152	559	345	148	*300	285	6	5.98	22.01	13.58	5.83	*11.81	285
200	203	660	415	185	*300	452	8	7.99	25.98	16.34	7.28	*11.81	452
250	254	787	427	226	*500	736	10	10.00	30.98	16.81	8.90	*19.69	736
300	305	838	465	269	*600	1000	12	12.01	32.99	18.31	10.59	*23.62	1000
350	337	889	519	300	*600	1329	14	13.27	35.00	20.43	11.81	*23.62	1329
400	387	991	638	350	*600	1730	16	15.24	39.02	25.12	13.78	*23.62	1730
450	438	1092	683	402	*600	2285	18	17.24	42.99	26.89	15.83	*23.62	2285
500	489	1194	748	446	*600	2814	20	19.25	47.01	29.45	17.56	*23.62	2814
550	540	1295	854	492	*800	3370	22	21.26	50.98	33.62	19.37	*31.50	3370
600	591	1397	917	531	*800	4920	24	23.27	55.00	36.10	20.91	*31.50	4920
700	686	1549	958	556	*800	6060	28	27.01	60.98	37.72	21.89	*31.50	6060
750	737	1651	1035	620	*800	6690	30	29.02	65.00	40.75	24.41	*31.50	6690
800	781	1778	1087	666	*800	7825	32	30.75	70.00	42.80	26.22	*31.50	7825
850	832	1930	1104	666	*800	8460	34	32.76	75.98	43.46	26.22	*31.50	8460
900	876	2083	1143	718	*800	10650	36	34.49	82.01	45.00	28.27	*31.50	10650

\* With gearbox operation

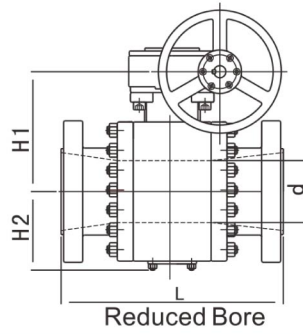
CLASS600 Dimensions

Reduced Bore (mm)							Reduced Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
80*50*80	51	356	206	113	400	36	3*2*3	2.01	14.02	8.11	4.45	15.75	36
100*80*100	76	432	315	129	750	55	4*3*4	2.99	17.01	12.40	5.08	29.53	55
150*100*150	102	559	330	169	1000	112	6*4*6	4.02	22.01	12.99	6.65	39.37	112
200*150*200	152	660	345	148	*300	222	8*6*8	5.98	25.98	13.58	5.83	*11.81	222
250*200*250	203	787	415	185	*300	381	10*8*10	7.99	30.98	16.34	7.28	*11.81	381
300*250*300	254	838	427	226	*500	619	12*10*12	10.00	32.99	16.81	8.90	*19.69	619
350*300*350	305	889	465	269	*600	920	14*12*14	12.01	35.00	18.31	10.59	*23.62	920
400*350*400	337	991	519	300	*600	1050	16*14*16	13.27	39.02	20.43	11.81	*23.62	1050
450*400*450	387	1092	638	350	*600	1530	18*16*18	15.24	42.99	25.12	13.78	*23.62	1530
500*450*500	438	1194	683	402	*600	1830	20*18*20	17.24	47.01	26.89	15.83	*23.62	1830
550*450*550	438	1295	683	402	*600	2010	22*18*22	17.24	50.98	26.89	15.83	*23.62	2010
600*500*600	489	1397	748	446	*600	2220	24*20*24	19.25	55.00	29.45	17.56	*23.62	2220
700*600*700	591	1549	917	531	*800	3200	28*24*28	23.27	60.98	36.10	20.91	*31.50	3200
750*600*750	591	1651	917	531	*800	3200	30*24*30	23.27	65.00	36.10	20.91	*31.50	3200
850*700*850	686	1930	958	556	*800	4845	34*28*34	27.01	75.98	40.75	21.89	*31.50	4845
900*750*900	737	2083	1035	620	*800	6100	36*30*36	29.02	82.01	42.80	24.41	*31.50	6100
1000*850*1000	832	2337	1104	666	*800	8200	40*34*40	32.76	92.01	43.46	26.22	*31.50	8200
1050*900*1050	876	2438	1143	718	*800	9200	42*36*42	34.49	95.98	45.00	28.27	*31.50	9200

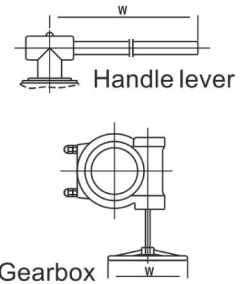
\* With gearbox operation



Full Bore



Reduced Bore



Gearbox

CLASS900 Dimensions

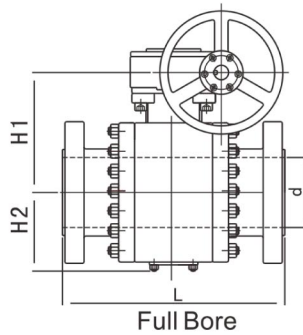
Full Bore (mm)							Full Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
50	51	368	217	119	460	65	2	2.01	14.49	8.54	4.69	18.11	65
80	76	381	327	133	1000	92	3	2.99	15.00	12.87	5.24	39.37	92
100	102	457	343	176	1500	154	4	4.02	17.99	13.50	6.93	59.06	154
150	152	610	358	153	*300	392	6	5.98	24.02	14.09	6.02	*11.81	392
200	203	737	431	193	*400	613	8	7.99	29.02	16.97	7.60	*15.75	613
250	254	838	443	235	*500	820	10	10.00	32.99	17.44	9.25	*19.69	820
300	305	965	484	280	*600	1125	12	12.01	37.99	19.06	11.02	*23.62	1125
350	324	1029	540	312	*600	1610	14	12.76	40.51	21.26	12.28	*23.62	1610
400	375	1130	660	365	*600	2010	16	14.76	44.49	25.98	14.37	*23.62	2010
450	425	1219	700	414	*600	2810	18	16.73	47.99	27.56	16.30	*23.62	2810
500	473	1321	770	459	*600	3460	20	18.62	52.01	30.31	18.07	*23.62	3460
550	524	1422	880	507	*800	4410	22	20.63	55.98	34.65	19.96	*31.50	4410
600	572	1549	945	547	*800	5497	24	22.52	60.98	37.20	21.54	*31.50	5497
700	667	1753	987	573	*800	10202	28	26.26	69.02	38.86	22.56	*31.50	10202
750	714	1880	1066	638	*800	11620	30	28.11	74.02	41.97	25.12	*31.50	11620
800	762	2032	1120	686	*800	12102	32	30.00	80.00	44.09	27.01	*31.50	12102
850	810	2159	1137	686	*800	17460	34	31.89	85.00	44.76	27.09	*31.50	17462
900	857	2286	1177	739	*800	20154	36	33.74	90.00	46.34	29.09	*31.50	20154

\* With gearbox operation

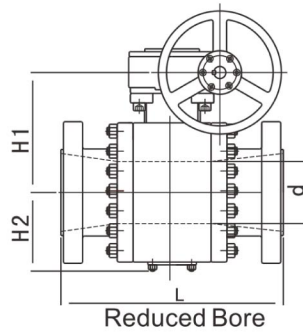
CLASS900 Dimensions

Reduced Bore (mm)							Reduced Bore (inch)						
DN	d	L	H1	H2	W	Weight (kg)	NPS	d	L	H1	H2	W	Weight (kg)
80*50*80	51	381	217	119	460	47	3*2*3	2.01	14.02	8.11	4.45	18.11	47
100*80*100	76	457	327	133	1000	86	4*3*4	2.99	17.01	12.40	5.08	39.37	86
150*100*150	102	610	343	176	1500	176	6*4*6	4.02	22.01	12.99	6.65	59.06	176
200*150*200	152	737	358	153	*300	304	8*6*8	5.98	25.98	13.58	5.83	*11.81	304
250*200*250	203	838	431	193	*400	536	10*8*10	7.99	0.98	16.34	7.28	*15.75	536
300*250*300	254	965	443	235	*500	834	12*10*12	10.00	32.99	16.81	8.90	*19.69	834
350*300*350	305	1029	484	280	*600	1090	14*12*14	12.01	35.00	18.31	10.59	*23.62	1090
400*350*400	324	1130	540	312	*600	1310	16*14*16	12.76	39.02	20.43	11.81	*23.62	1310
450*400*450	375	1219	660	365	*600	1876	18*16*18	14.76	42.99	25.12	13.78	*23.62	1876
500*450*500	425	1321	700	414	*600	2270	20*18*20	16.73	47.01	26.89	15.83	*23.62	2270
550*450*550	425	1422	700	414	*600	2430	22*18*22	16.73	50.98	26.89	15.83	*23.62	2430
600*500*600	473	1549	880	507	*600	3440	24*20*24	18.62	55.00	29.45	4.57	*23.62	3440
700*600*700	572	1753	945	547	*800	4250	28*24*28	22.52	60.98	36.10	20.91	*31.50	4250
750*600*750	572	1880	945	547	*800	4730	30*24*30	22.52	65.00	36.10	20.91	*31.50	4730
850*700*850	667	2159	1066	638	*800	7200	34*28*34	26.26	75.98	37.72	21.89	*31.50	7200
900*750*900	714	2286	1120	686	*800	8600	36*30*36	28.11	82.01	40.75	24.41	*31.50	8600

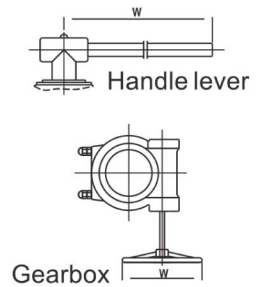
\* With gearbox operation



Full Bore



Reduced Bore



Gearbox

CLASS1500 Dimensions

Full Bore (mm)							Full Bore (inch)						
DN	d	L	H1	H2	W	Weight(kg)	NPS	d	L	H1	H2	W	Weight(kg)
50	51	368	221	130	750	65	2	2.01	14.49	8.70	5.12	29.53	65
80	76	470	297	152	1500	145	3	2.99	18.50	11.69	5.98	59.06	145
100	102	546	345	166	*300	259	4	4.02	21.50	13.58	6.61	*11.80	259
150	146	705	365	192	*400	475	6	5.75	27.76	14.37	7.56	*15.75	475
200	194	832	423	238	*500	821	8	7.64	32.76	16.65	9.37	*19.69	821
250	252	991	560	274	*600	1826	10	9.92	39.02	22.05	10.79	*23.62	1826
300	289	1130	608	318	*600	2170	12	11.38	44.49	23.94	12.52	*23.62	2170
350	318	1257	662	483	*600	2250	14	12.52	49.49	26.06	19.02	*23.62	2250
400	362	1384	796	534	*600	2760	16	14.25	54.49	31.34	21.02	*23.62	2760
450	406	1537	849	606	*600	3646	18	15.98	60.51	33.43	23.86	*23.62	3646
500	451	1664	964	686	*800	4497	20	17.76	65.51	37.95	27.01	*31.5	4497
550	495	1816	1025	731	*800	5731	22	19.49	71.50	40.35	28.78	*31.5	5731
600	533	2043	1065	775	*800	7151	24	20.98	80.43	41.93	30.51	*31.5	7151

\* With gearbox operation

CLASS1500 Dimensions

Reduced Bore (mm)							Reduced Bore (inch)						
DN	d	L	H1	H2	W	Weight(kg)	NPS	d	L	H1	H2	W	Weight(kg)
80*50*80	51	470	217	130	750	85	3*2*3	2.01	18.50	8.70	5.12	29.53	85
100*80*100	76	546	297	152	1500	169	4*3*4	2.99	21.50	11.69	5.98	59.06	169
150*100*150	102	705	345	166	*300	345	6*4*6	4.02	27.76	13.58	6.54	*11.81	345
200*150*200	146	832	365	192	*400	599	8*6*8	5.75	32.76	14.37	7.56	*15.75	599
250*200*250	194	991	423	238	*500	1196	10*8*10	7.64	39.02	16.65	9.37	*19.69	1196
300*250*300	252	1130	560	274	*600	1340	12*10*12	9.92	44.49	22.05	10.79	*23.62	1340
350*300*350	289	1257	608	318	*600	2070	14*12*14	11.38	49.49	23.94	12.52	*23.62	2070
400*350*400	318	1384	662	483	*600	2470	16*14*16	12.52	54.49	26.06	19.09	*23.62	2470
450*400*450	362	1537	796	534	*600	2950	18*16*18	14.25	60.51	31.34	21.02	*23.62	2950
500*450*500	406	1664	849	606	*600	3350	20*18*20	15.98	65.51	33.43	23.86	*23.62	3350
550*450*550	406	1816	849	606	*600	3600	22*18*22	15.98	71.50	33.43	11.93	*23.62	3600
600*500*600	451	2043	964	686	*800	5850	24*20*24	17.76	80.43	37.95	27.01	*31.50	5850

\* With gearbox operation

### ENGINEERING DATA

#### Seat

Performance		Nylon	Teflon(unfilled)	PEEK	Delrin	PPL Polystyrene
Temperature Range-F°		-30-200	-320-400	-328-230	-58-230	-50-750
Pressure Rating		900-1500	150-600	150-1500	150-1500	150-300
Mechanical Performance	Hardness	D75	D58	D85	R-120	D80
	Tensile	8700(min)	2100-2400	11000(min)	6600-7500(min)	2000-2350(min)
	Elongation	250-290	250	30(min)	220	275-310
Physical Performance	Specific Gravity	1.04	2.2	1.3	1.41	1.9-2.1
	Water soluble	0.2	<0.01	0.18	0.15	0.1-0.2
	Diverging rate	5*10 <sup>6</sup> RAD	10 <sup>4</sup> RAD	10 <sup>9</sup> RAD	10 <sup>7</sup> RAD	9*10 <sup>6</sup> RAD
Applicable range		High pressure and low temperature applications	Chemicals and low temperature applications	High temperature, high pressure with steam divergence applications	High temperature and high pressure applications	High temperature and high corrosive applications

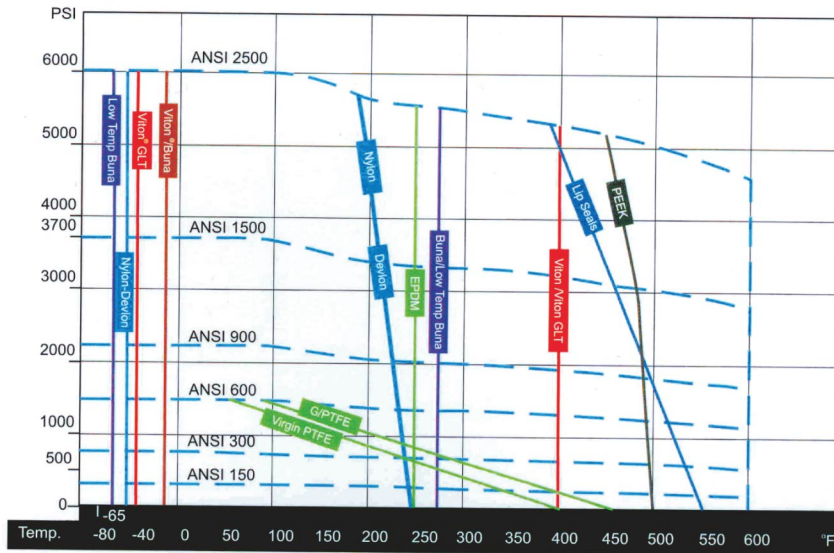
#### Sealing Ring

Material	Viton	Ductile Graphite	PTFE+25% Glass	NBR	BUNA
Temperature Range – F°	-30-400	-60-500	-60-428	-30-300	-30-300
Specific Gravity	1.85	---	2.24	1.2	1.31
Hardness	D75	D90	D65	D50	D90

#### Gasket

Material	EPR	SS 316 graphite spiral wound gasket	SS316 PTFE spiral wound gasket
Temperature Range –	-328-500	-328-500	-328-500
Applicable Range	100%fire safe	100%fire safe	Ultra low temperature and high corrosion
Hardness	0-14	0-14	0-14

ENGINEERING DATA



Torque Value—Floating Ball Valve

Unit :N.M

Class \ Size (inch)	½	¾	1	1½	2	2½	3	4	5	6	8
150	10	15	20	40	50	80	90	180	300	520	800
300	20	25	30	60	70	120	160	280	600	950	1550

Torque Value—Trunnion Mounted Ball Valve

Unit :N.M

Class \ Size (inch)	2	2½	3	4	5	6	8	10	12	14	16	18	20	24	28	30	36	40
150	25	50	65	125	250	410	700	1100	1750	2600	3900	6200	7500	10500	14500	21000	28000	35000
300	60	120	160	280	600	950	1550	2000	3300	5000	7500	11800	14400	19600	28200	29800	40000	45000
400	140	240	350	540	740	1260	1910	3250	5340	7500	10000	12400	18500	29500	40500	53000	51000	71000
600	190	360	460	770	1050	1980	3280	5250	7200	9860	14500	19600	29000	42500	58000	62000	75000	105000

NOTE:

- 1.The above torque value is calculated as per normal condition with PTFE seat.
- 2.For actuator selection, safety factor 1.3-1.5 is recommended.
- 3.The torque value will be subject to change with different trim material and medium .

Cv

Size		Class				
mm	inch	150	300	600	900	1500
15	1/2	25	25	20	16	16
20	3/4	65	56	40	34	34
25	1	95	95	64	55	55
40	1½	308	308	308	165	165
50	2	500	430	370	320	320
80	3	1360	1100	1020	920	820
100	4	2500	2000	1850	1760	1600
150	6	4060	4056	3410	4300	4150
200	8	8090	7720	6730	8475	8010
250	10	13510	13090	11120	14160	13220
300	12	20440	19830	17440	21200	18800
350	14	25050	23770	22010	26700	24180
400	16	34200	32595	29980	36600	33150
450	18	44430	43200	39520	49000	45703
500	20	57665	55380	60460	64600	60750
550	22	70080	70080	68900		
600	24	87680	84720	76630		
700	28	120000	115350	107510		
750	30	141850	136600	125630		
800	32	160390	152000	140900		
900	36	205450	192995	175730		
1000	40	248700	248700	239160		
1050	42	275260	275260	275260		
1200	48	364180	364180	247080		
1400	56	529430	529430	520500		

**Remark :**

1. The above Cv value is for full bore design.
2. The design for all pressure ratings are as per API6D

**How To Calculate Cv:**

What is the Cv Value? The volume flow in US gallons per minute of water at a temperature of 60° fahrenheit with a pressure drop across the valve of 1 psi. Cv value is calculated with the following formula:

**Liquids:**

$$QL = Cv(P/G)^{1/2}$$

QL: Flow rate (gallons / min)

P: Differential pressure through the Valve

G: Specific gravity of the liquid (Water:G=1)

**Gas:**

$$Qg = 61Cv(P_2P/g)^{1/2}$$

(For non-critical:  $P_2/P < 1$ )

QL: Flow rate (CFH at STP)

P2: Outlet pressure (psia)

G: Specific gravity of the gas (Air: g=1.0)

## METAL SEATED BALL VALVE

### Ball and Seat Hardening Technology

According to different service conditions and requirements of users, various advanced ball and seat hardening technologies can be adopted, including HVOF coating, nickel-base alloy spray welding, high nickel alloy spray welding, nickel-base tungsten carbide alloy spray welding, cobalt-base hard alloy spray welding, etc. the ball and seat surface hardness can reach HRC55~70. Generally, the coating on the sealing face is good for heat resistance for 540°C, maximum 980°C. They are also with good wear resistant and impact resistant performances.

### Flexible Valve Opening and Closing

For high temperature application, the ball and seat will have large thermal expansion, causing jamming problem. The ball valve adopts the Belleville spring or spring loaded sealing design so that thermal expansion of parts under high temperature can be compensated by the Bellville spring or spring, and it is ensured that the valve will be flexibly opened and closed under high temperature.

### Fireproof Design

In the metal to metal ball valve seat design, gasket is the stainless steel flexible graphite and the packing is the flexible graphite. Therefore, reliable sealing of the valve can be ensured even in case of fire.

### Reliable Tightness

Ball grinding technology is adopted to grind the ball against the grinder at different positions. The ball surface will achieve high roundness and fineness. The seat tightness under low differential pressure is realized by spring pre-tightening. In addition, the piston effect of valve seat is designed reasonably, realizing high pressure sealing by the pressure of the medium itself. The tightness class meets ANSI/FCI70.2 class IV to class VI.

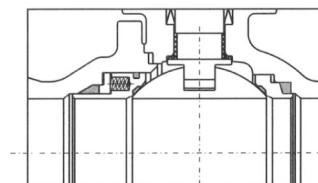


### Double Block and Bleed (Metal Seated Trunnion mounted Ball Valve)

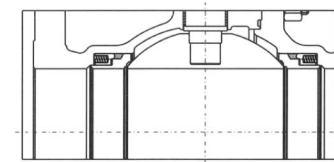
The metal seated trunnion mounted ball valve is with seat located in front of the ball. When the valve is closed, the medium left in the middle cavity can be discharged through the bleed valve. The upstream and downstream seats will independently block the fluid at the inlet and outlet to realize double block function.

The metal seated floating ball valve is with seat is located behind the ball. Unidirectional sealing is adopted with flow direction marked on the body. If users have special requirements, bidirectional sealing design can be adopted.

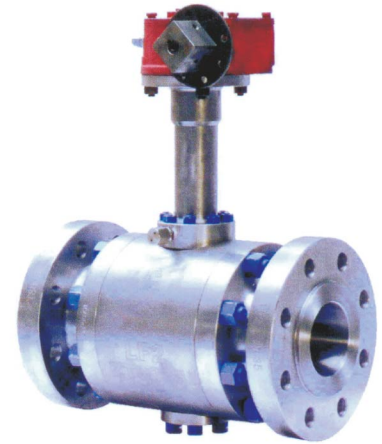
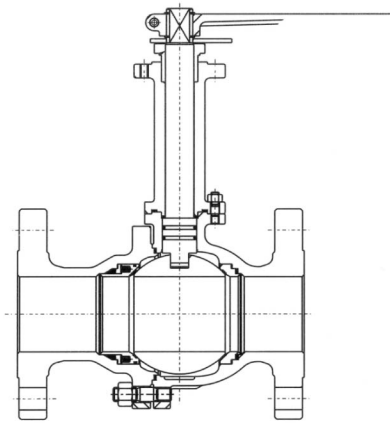
Metal seated floating ball valve



Metal seated trunnion mounted ball valve



CRYOGENIC BALL VALVE



Application

The cryogenic ball valve is used to cut off or connect the media in various applications from class 150 to class 1500. The valves can be in different materials for various media and temperature. It is used for low temperature service application, especially the

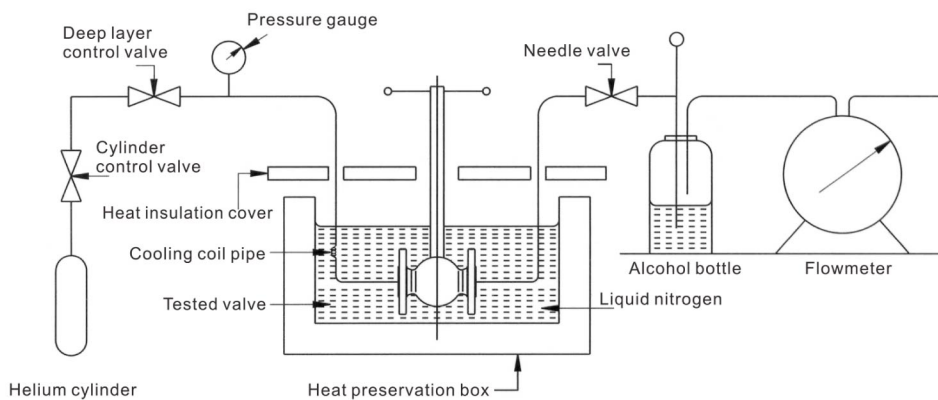
dangerous media such as natural gas. The lowest working temperature can be achieved is  $-196^{\circ}\text{C}$ . The actuator type available include handle lever, gearbox, pneumatic and electric. The connection ends can be flange or welding.

Floating or Trunnion Mounted Ball, Extended Neck

The cryogenic ball valves are classified into cryogenic floating ball valves and cryogenic trunnion ball valves. Refer to the data of floating ball valve and trunnion ball valve for the product range, face-to-face dimensions, connection flange dimensions

and etc. for the ball valves with temperature higher than  $-50^{\circ}\text{C}$ , neck extension design is not required. For the ball valves with temperature lower than  $-50^{\circ}\text{C}$ , the neck length has to be extended according to standard or according to user's requirements.

Typical layout diagram of cryogenic test device



Note: the stem packing bushing is located on the top cover of the heat preservation box.



### Material Selection

Common steel will show its brittleness under low temperature. Therefore, it is crucial to select suitable body materials according to the lowest working temperature. Refer to the following table for the lowest working temperature of materials. The materials shall be able to meet low temperature impact test requirements according to standard. For valves with working temperature lower than -100°C. The body, bonnet and shaft must go

through cryogenic treatment after rough machining. The ball and seat sealing face should be welded with hard alloy after cryogenic treatment. Then grinding and assembly can be carried out to ensure the adaptability of materials under low temperature. In addition, the packing, gasket, bolt and nut shall be made of materials suitable for low temperature service condition.

Lowest working temperature of shell materials			
Casting		Forging	
Materials	Lowest working	Materials	Lowest working
ASTMA352 LCB	-46°C	ASTMA350 LF2	-46°C
ASTMA352 LCC	-46°C		-46°C
ASTMA352 LC1	-59°C	ASTMA350 LF5	-59°C
ASTMA352 LC2	-73°C	ASTMA350 LF9	-73°C
ASTMA352 LC3	-101°C	ASTMA350 LF3	-101°C
ASTMA351 CF8	-254°C	ASTMA182 F304	-254°C
ASTMA351 CF8M	-254°C	ASTMA182 F316	-254°C
ASTMA351 CF3	-254°C	ASTMA182 F304L	-254°C
ASTMA351 CF3M	-254°C	ASTMA182 F316L	-254°C
main parameters			
Design and manufacturing	BS6364-1998、JB/T7749-1995		
Face-to-face dimensions	ASME B16.10		
Connection type	Flange	ASME B16.5	Wafer ASME B16.5
Pressure test	API 598		
Actuator type	Handle lever, gearbox, pneumatic, electric		

### Design Features

According to standard, the ball valves for temperature lower than -50°C should be with extend neck design to protect the packing and ensure reliable shaft sealing. The neck length is designed according to standard or according to user's requirements. In low temperature applications, when the valve is at closed position, the low temperature liquid staying in the cavity of valve will be gasified at the rise of temperature, which causes quick volume expansion and leads to abnormal pressure rise in the middle cavity, or even valve breakage. The ball valve is with

pressure relief design in body cavity. In case of abnormal pressure rise in the middle cavity, the medium will overcome the spring pre-tightening stress with its own force and push the seat away from the ball to realize automatic pressure relief and to ensure valve safety. According to order requirements, cryogenic test can be carried out to test operating torque, tightness and other performances under low temperature. The parts of the valve should go through treatment to ensure stability under low temperature.

Shaft extension (Figure 7)

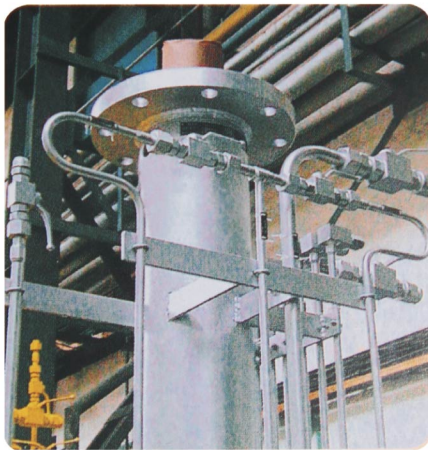
For underground installation application, the shaft can be extended according to the customers' requirements. There is no limitation on the extended length, but it should be specified by the user.

Additional Devices (Figure 8)

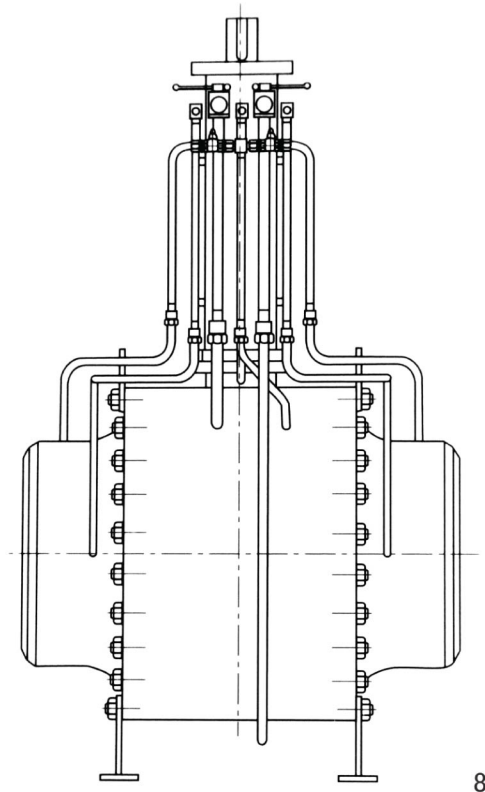
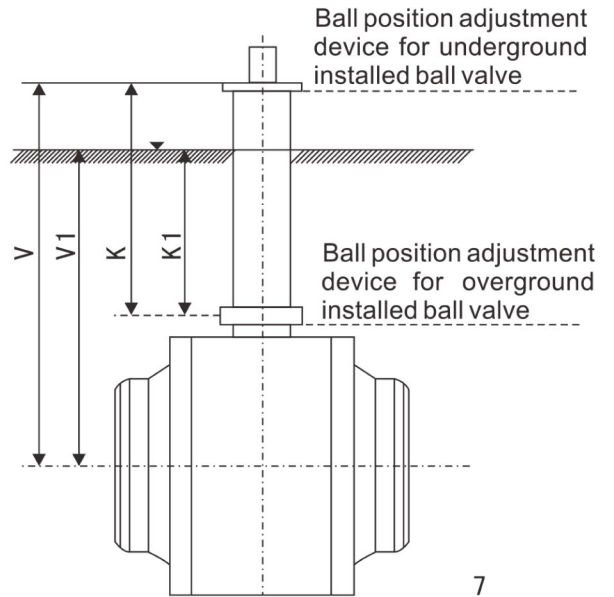
According to the customers' needs, valve can be equipped with more accessories and systems, such as drain piping, vent piping, sealant injection piping, actuator power supply piping and pressure relief valve, etc. These accessories and systems are made of stainless steel. The end of sealant injection piping is connected with two separate injection tubes. The end of drain piping, vent piping and actuator power supply piping are all equipped with ball valves.

Pressure Relief From Body

If the working application makes the pressure inside the body cavity exceed the rated pressure, valve must be equipped with the special device to reduce the pressure. This can be achieved either by adjusting the seat, or by leaking the pressure out of ball valve. When the pressure is reduced through the seat, DPE (Double piston effect) function is canceled.



Piping system of bleed, vent, pressure relief and sealant injection for ball valve with extended shaft.

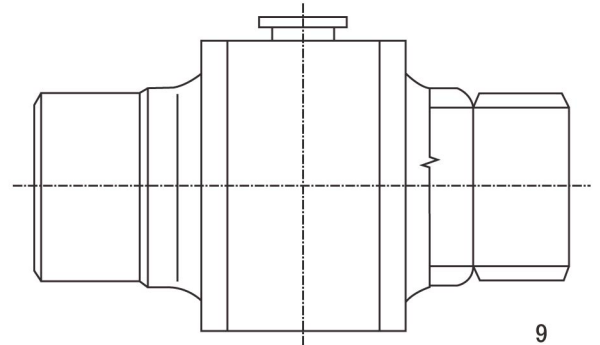


Tubing (Figure 9)

If following the installation and operation instructions, connection turbings are not required for ball valve with butt-welding end. If you need the tubing supplied together with valve, Vocester offers you the following two options.

**Option A:** When tubing is forged material, it will be welded to valve body before machining as into -grated body. This is used for tubing length not longer than 200mm.

**Option B:** When the material and size of tubing is the same as upstream and downstream piping connected with ball valve. The ball valve will be manufactured and inspected as per standard specification and tubing will be welded with completed ball valve and inspected. This option has no limitation on tubing length unless limited by transport due to packing size. If the piping is in special material and size, we suggest user offer the tubing.



Actuator

Vocester can provide valves equipped with actuators or without actuators. Actuator can be manual handle lever or gearbox, electric motor, airdraulic, electro-hydraulic, pneumatic and hydraulic type, etc. Vocester has cooperation with all the top actuator manufacturers.

# HOW TO ORDER



①   VALVE TYPE
BALL VALVE
RR   Floating ball two-piece body
RB   Trunnion mounted ball two-piece body
RC   Trunnion mounted ball three-piece body

②   VALVE SIZE		
015   1/2"	100   4"	450   18"
020   3/4"	125   5"	500   20"
025   1"	150   6"	600   24"
032   1-1/4"	200   8"	700   28"
040   1-1/2"	250   10"	800   32"
050   2"	300   12"	900   36"
065   2-1/2"	350   14"	1000   40"
080   3"	400   16"	

③   CONNECTION TYPE	
F1   Flanged (RF)	R1   Flanged (RTJ)
S1   Socked welding	B1   Butt Welding

④   PRESSURE RATING	
MNSI STANDARD	GB STANDARD
01   150Lb	10   PN10
03   300Lb	16   PN16
06   600Lb	25   PN25
09   900Lb	40   PN40
15   1500Lb	64   PN64
20   2500Lb	80   PN100
	90   PN160

⑤   BODY MATERIAL		
C   WCB/A105	M   CF8M/F316	B   LCB
P   CF8/F304	L   CF3M/F316L	D   LCC
Q   CF3/F304L	G   CG8M/F317	W   WC6/F11

⑥   TRIM MATERIAL&SURFACE TREATMENT	
TRIM MATERIAL	SURFACE TREATMENT
1   WCB/A105	01   Polishing
2   F6a	1   Hard Chrome Plating
3   CF8/F304	2   Nickle Plating (ENP)
4   CF3/F304L	3   Spray welding Nickle based alloy
5   CF8M/F316	4   Spray welding Tungsten Carbide
6   CF3M/F316L	5   Plasma Nitriding
7   CG8M/F317	6   Overlaying welding Stellite

⑦   SEAT TYPE	
Normal Temperature.Metal Seat	Y
High Temperature.Metal Seat	G
Soft Seat	R

⑧   SEAT MATERIAL&SURFACE TREATMENT		
Y-Metal Seat		R-Soft Seat
Material	Surface Treatment	Material
1   A105	1   Hard Chrome Plating	PO   PTFE
2   F6a	2   Nickle Plating(ENP)	RO   RTFE
3   304	3   Spray welding Nickle based alloy	NO   NYLON
4   304L	4   Spray welding Tungsten Carbide	LO   PPL
5   316	5   Plasma Nitriding	KO   PEEK
6   316L	6   Overlaying welding Stellite	
7   317		

⑨   O-RING MATERIAL	
Material & Application Temperature	
E   EPDM -40~+120°C	A   PFA -40~+230°C
R   NBR -40~+100°C	F   FEP -40~+160°C
V   VITON -40~+230°C	G   GRAPHITE -100~+425°C
S   SI -60~+230°C	

⑩   ACTUATOR
SD   Manual
ZS   Pneumatic
ZK   Electric

⑪   OTHERS
GL   Seat/Shaft Injection
AS   Shaft Extension
AB   Bonnet Extension
NC   NACE



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