

● TRUNNION PIPELINE BALL VALVE

TRUNNION PIPELINE BALL VALVE



USAGE

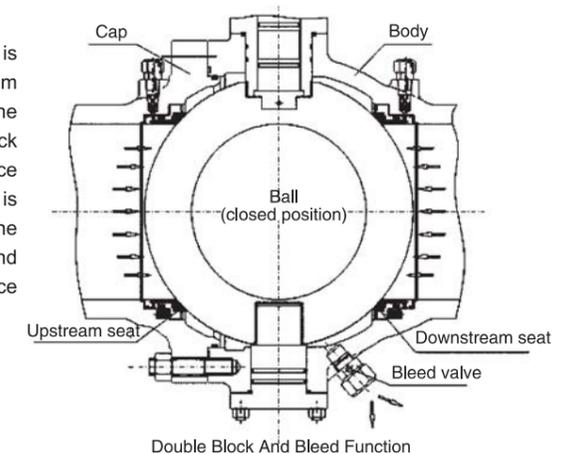
The trunnion ball valve is used to cut off or connect the media in various pipelines of Class 150~Class 2500. The valves made of different materials are suitable for various media such as water, steam, oil, liquefied gas, natural gas, coal gas, nitric acid, oxidizer, urea and etc. The driving modes include manual operation, worm and worm

gear transmission, pneumatic operation and electric operation. The connection ends can be flange or butt welding.

STRUCTURAL FEATURES

1、 Double Block And Bleed (DBB)

When the valve is closed and the middle cavity is emptied through the discharge 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 discharge 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 washed and discharged through the discharge device to reduce damage to the seat by impurities in the medium.



2、 Low Operating Torque

The trunnion pipeline ball valve adopts the trunnion ball structure and floating valve seat, so as to achieve lower torque under operating pressure. It uses self-lubricating PTFE and metal sliding bearing to reduce the friction coefficient to

the lowest in conjunction with the high intensity and high fineness stem.

3、 Emergency Sealing Device

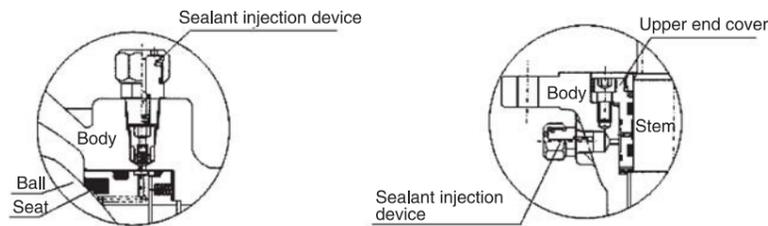
The ball valves with the diameter more than or equal to 6"(DN150) are all designed with sealant injection device on stem and seat. When the seat ring or stem O ring is damaged due to accident, the corresponding sealant can be injected by the

sealant injection device to avoid medium leakage on seat ring and stem. If necessary, the auxiliary sealing system can be used for washing and lubricating the seat to maintain its cleanliness.

● TRUNNION PIPELINE BALL VALVE

STRUCTURAL FEATURES

Sealant Injection Device

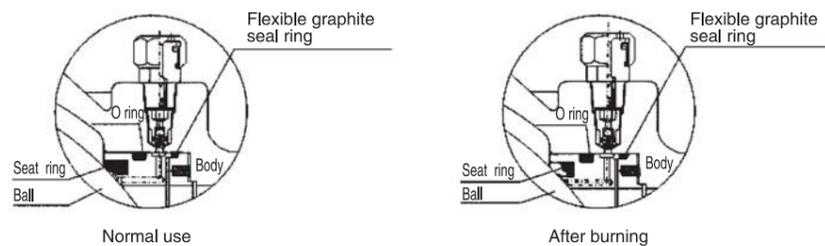


4、Fireproof Structure Design

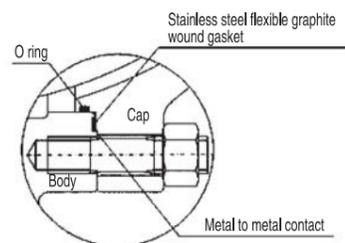
In case of fire during the use of valve, the seat ring, stem O ring and middle flange O ring made of PTFE, rubber or other non-metal materials will be decomposed or damaged under high temperature. Under pressure of the medium, the ball valve will push the seat retainer rapidly towards the ball to make the metal seal ring contact the ball and form

the auxiliary metal to metal sealing structure, which can effectively control valve leakage. The fireproof structure design of trunnion pipeline ball valve conforms to requirements in API 607, API 6FA, BS 6755 and other standards.

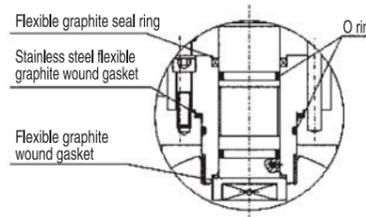
Fireproof Structure Of Seat



Fireproof Structure Of Middle Flange



Fireproof Structure Design Of Stem



● TRUNNION PIPELINE BALL VALVE

STRUCTURAL FEATURES

5、Anti-static Structure

The ball valve is provided with the anti-static structure and adopts the static electricity discharge device to directly form a static channel between the ball and body or form a static channel between the ball and body through the stem, so as to discharge the static electricity produced due to

friction during the opening and closing of ball and seat through the pipeline, avoiding fire or explosion that may be caused by static spark and ensuring system safety.

6、Reliable seat sealing structure

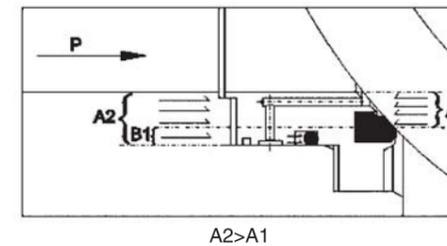
The seat sealing is realized through two floating seat retainers. They can float axially to block the fluid, including ball sealing and body sealing. The low pressure sealing of valve seat is realized by spring pre-tightening. In addition, the piston effect

of valve seat is designed reasonably, which realizes high pressure sealing by the pressure of the medium itself. The following two kinds of ball sealing can be realized.

7、Single Sealing(automatic Pressure Relief In Middle Cavity Of Valve)

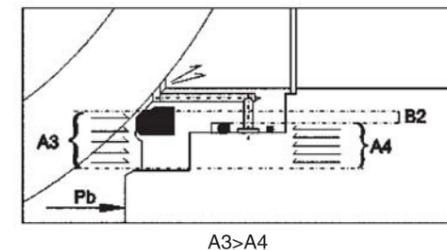
Generally, the single sealing structure is used, that is, there is only the upstream sealing. As the independent spring loaded upstream and downstream sealing seats are used, the over-pressure inside valve cavity can overcome the pre-tightening effect of the spring, so as to make the seat release from the ball and realize automatic

pressure relief towards the downstream part. 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, $A2 \cdot A1 = B1$, the force on B1 will push the seat to the ball and realize tight sealing of the upstream part.



The downstream side: Once the pressure Pb inside the valve cavity increases, the force exerted on A3 is higher than that on A4. As $A3 \cdot A4 = B2$, the pressure differential on B2 will overcome the

spring force to make the seat release from the ball and realize pressure relief of valve cavity to the downstream part. Afterwards, the seat and ball will be sealed again under the spring action.



STRUCTURAL FEATURES

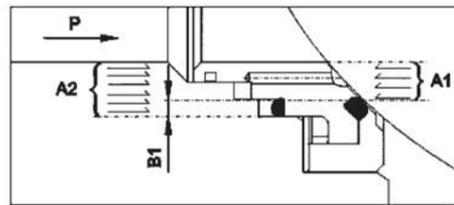
8、Double Sealing (double Piston)

The Trunnion pipeline ball valve can be designed with the double sealing structure before and after the ball for some special service conditions and user requirements. It has double piston effect. Under normal condition, the valve generally adopts primary sealing. When the primary seat sealing is damaged and causes leakage, the secondary seat can play the function of sealing and enhance the sealing reliability.

The seat adopts the combined structure. The primary seal is metal to metal seal. The secondary seal is fluorine rubber O ring that can ensure the ball valve can reach the bubble level sealing. When the pressure differential is very low, the sealing seat will press the ball through the spring action to realize primary sealing. When the

pressure differential rises, the sealing force of seat and body will increase accordingly so as to tightly seal the seat and ball and ensure good sealing performance.

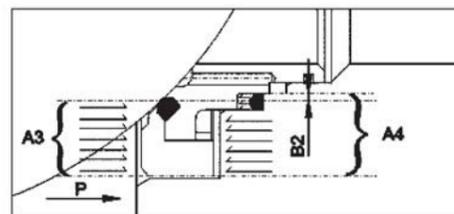
Primary sealing: Upstream. When the pressure differential is lower or there is no pressure differential, the floating seat will move axially along the valve under the spring action and push the seat towards the ball to keep tight sealing. When the pipeline pressure P increases, the force exerted on the 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 towards the ball and realize tight sealing of the upstream part.



A2>A1

Secondary sealing: Downstream. When the pressure differential is lower or there is no pressure differential, the floating seat will move axially along the valve under the spring action and push the seat towards the ball to keep tight sealing. 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 towards the ball and realize tight sealing of the upstream part.



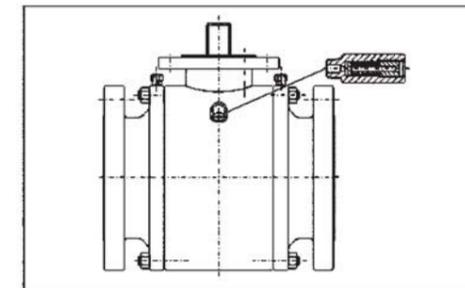
A4>A3

STRUCTURAL FEATURES

9、Safety Relied Device

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

relief valve is directly discharged into the atmosphere. In case direct discharging into the atmosphere is not allowed, we suggest that the ball valve with a special structure of automatic pressure relief towards upper stream should be used. Refer to the following for details. Please indicate it in the order if you do not need the safety relief valve or if you would like to use the ball valve with the special structure of automatic pressure relief towards upper stream.

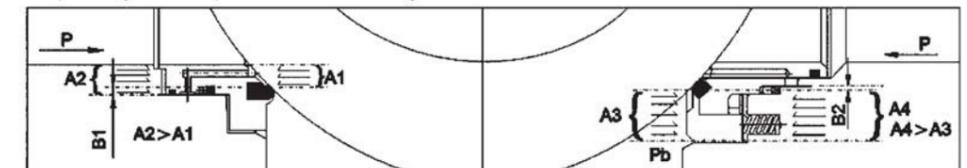


10、Special Structure Of automatic Pressure Relief Towards Upper Stream

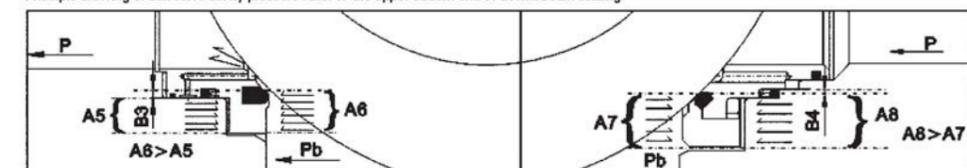
As the ball valve is designed with the advanced primary and secondary sealing that has double piston effect, and the middle cavity cannot realize automatic pressure relief, the ball valve with the special structure is recommended to meet the requirement of automatic pressure relief and ensure no pollution to the environment. In the structure, the upper stream adopts primary sealing and the lower stream adopts primary and secondary sealing. When the ball valve is closed, the pressure in the valve cavity can realize

automatic pressure relief to the upper stream, so as to avoid the danger caused by cavity pressure. When the primary seat is damaged and leaks, the secondary seat can also play the function of sealing. But special attention shall be paid to the flow direction of the ball valve. During the installation, note the upstream and downstream directions. Refer to the following drawings for sealing principle of the valve with the special structure.

Principle drawing of ball valve upstream and downstream sealing



Principle drawing of ball valve cavity pressure relief to the upper stream and of downstream sealing



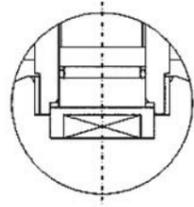
● TRUNNION PIPELINE BALL VALVE

STRUCTURAL FEATURES

11. Blow-out Proof Stem

The stem adopts the blow-out proof structure. The stem is designed with the footstep at its bottom so that with the positioning of upper end cover and screw, the stem will not be blown out by the

medium even in case of abnormal pressure rise in the valve cavity.



Blow-out proof stem

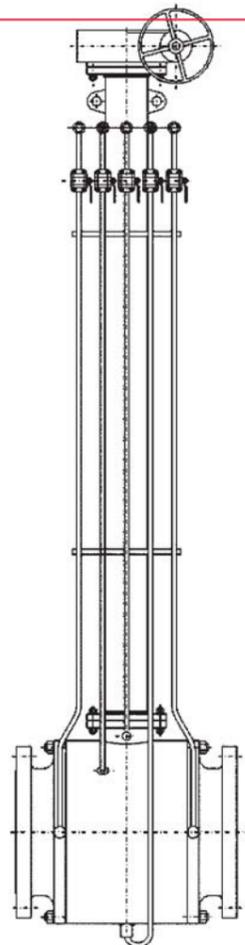
12. Corrosion Resistance And Sulfide Stress Resistance

Certain corrosion allowance is left for the body wall thickness. The carbon steel stem, fixed shaft, ball, seat and seat ring are subjected to chemical nickel plating according to ASTM B733 and B656. In addition, various corrosion resistant materials are available for users to select.

According to customer requirements, the valve materials can be selected according to NACE MR 0175/ ISO 15156 or NACE MR 0103, and strict quality control and quality inspection should be carried out during the manufacturing so as to fully meet the requirements in the standards and meet the service conditions in sulfurization environment.

13. Extension Stem

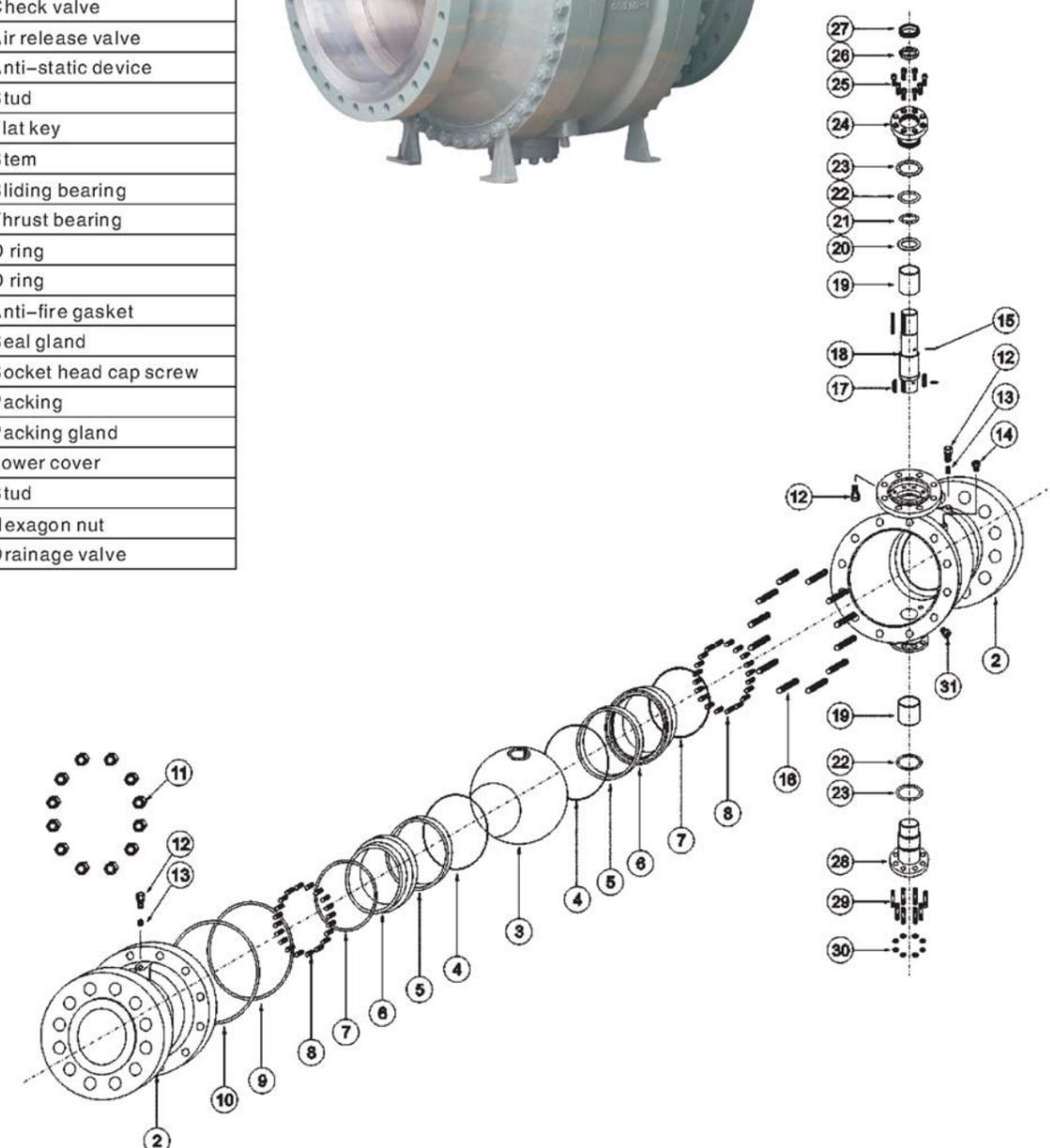
As for the embedded valves, the extension stem can be supplied if ground operation is needed. The extension stem is composed of stem, sealant injection valve, and drainage valve that can be extended to the top for the convenience of operation. Users should indicate the extension stem requirements and length when placing orders. For ball valves driven through electric, pneumatic and pneumatic-hydraulic operations, the extension stem length should be from the centre of pipeline to top flange.



Schematic diagram of extension stem

CAST ● TRUNNION PIPELINE BALL VALVE

1	Body
2	Stud
3	Ball
4	Anti-fire packing
5	Seat
6	Seat support ring
7	O ring
8	Spring
9	O ring
10	Anti-fire gasket
11	Hexagon nut
12	Sealant injection valve
13	Check valve
14	Air release valve
15	Anti-static device
16	Stud
17	Flat key
18	Stem
19	Sliding bearing
20	Thrust bearing
21	O ring
22	O ring
23	Anti-fire gasket
24	Seal gland
25	Socket head cap screw
26	Packing
27	Packing gland
28	Lower cover
29	Stud
30	Hexagon nut
31	Drainage valve



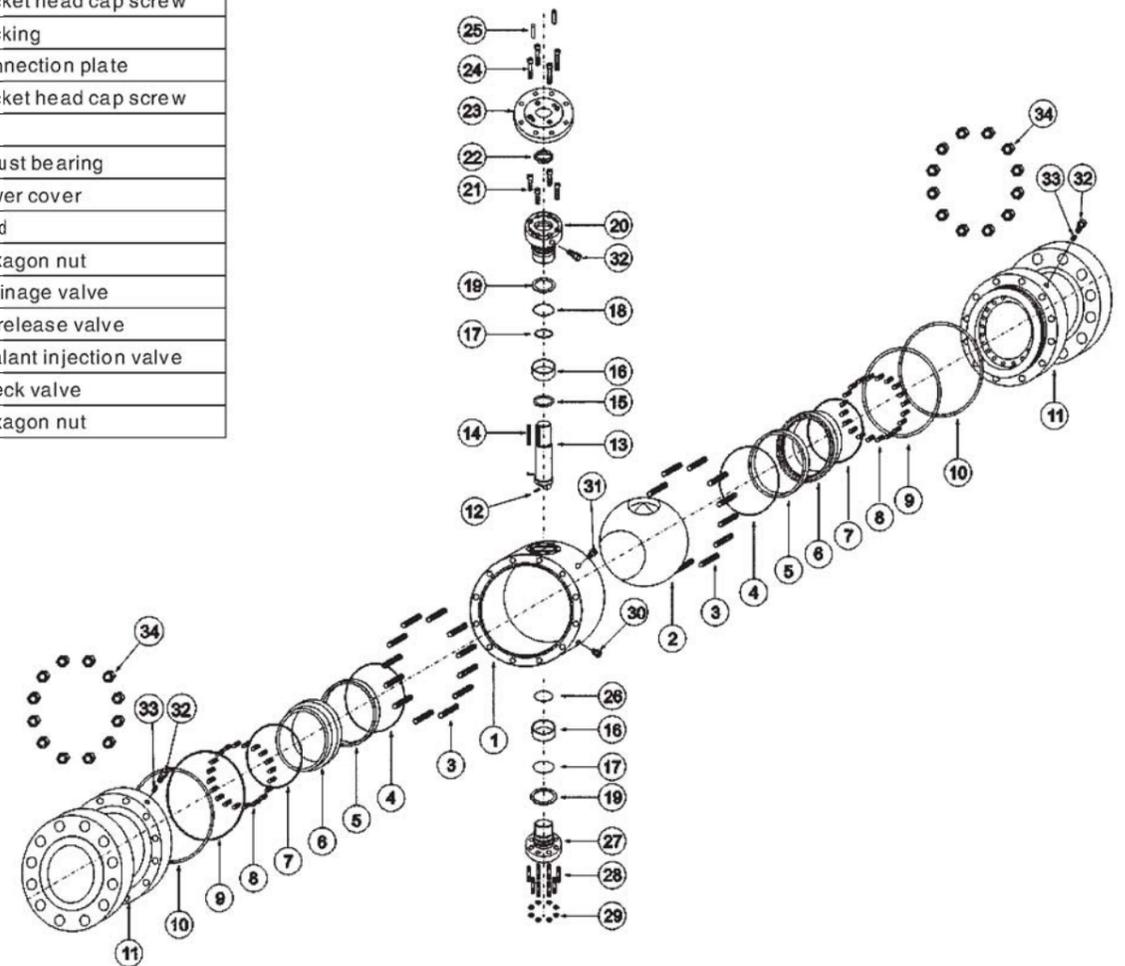
CAST ● TRUNNION PIPELINE BALL VALVE

PART MATERIALS AND MAIN PARAMETERS

Nominal diameter (in)		NPS 1/2~8				
Nominal pressure (MPa)		Class 150~Class 900				
No.	Part Name	Material				
		Carbon steel	Stainless steel			
1	Body	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M
2	Stud	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M
3	Ball	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
4	Anti-fire packing	Graphite				
5	Seat	PTFE/NYLON/PEEK/PPL				
6	Seat support ring	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
7	O ring	VITON				
8	Spring	17-7PH				
9	O ring	VITON				
10	Anti-fire gasket	SST+Graphite				
11	Hexagon nut	A194 2HM	A194-8	A194-8M	A194-8	A194-8M
12	Sealant injection valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
13	Check valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
14	Air release valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
15	Anti-static device	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
16	Stud	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
17	Flat key	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045
18	Stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
19	Sliding bearing	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE
20	Thrust bearing	PTFE				
21	O ring	VITON				
22	O ring	VITON				
23	Anti-fire gasket	SST+Graphite				
24	Seal gland	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
25	Socket head cap screw	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
26	Packing	Graphite				
27	Packing gland	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a
28	Lower cover	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
29	Stud	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
30	Hexagon nut	A194 2HM	A194-8	A194-8M	A194-8	A194-8M
31	Drainage valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
Applicable service conditions	Applicable media	Water, steam, oil, gas, liquefied gas, natural gas, etc	Nitric Acid	Acetic acid	Strong Oxidizer	Urea
	Applicable temperature	≤120℃(PTFE), ≤80℃(NYLON), ≤250℃(PEEK), ≤250℃(PPL)				
Design and manufacturing		API 608, API 6D				
Face-to-face dimensions		ASME B16.10, API 6D				
Type of connection		Flange	ASME B16.5/ASME B16.47	Butt welding	ASME B16.25	
Pressure test		API 598, API 6D				
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric				

FORGED ● TRUNNION PIPELINE BALL VALVE

1	Body
2	Ball
3	Stud
4	Anti-fire packing
5	Seat
6	Support ring
7	O ring
8	Spring
9	O ring
10	Anti-fire gasket
11	Bonnet
12	Anti-static device
13	Stem
14	Flat key
15	Thrust bearing
16	Sliding bearing
17	O ring
18	O ring
19	Anti-fire gasket
20	Seal gland
21	Socket head cap screw
22	Packing
23	Connection plate
24	Socket head cap screw
25	Pin
26	Thrust bearing
27	Lower cover
28	Stud
29	Hexagon nut
30	Drainage valve
31	Air release valve
32	Sealant injection valve
33	Check valve
34	Hexagon nut



FORGED TRUNNION PIPELINE BALL VALVE

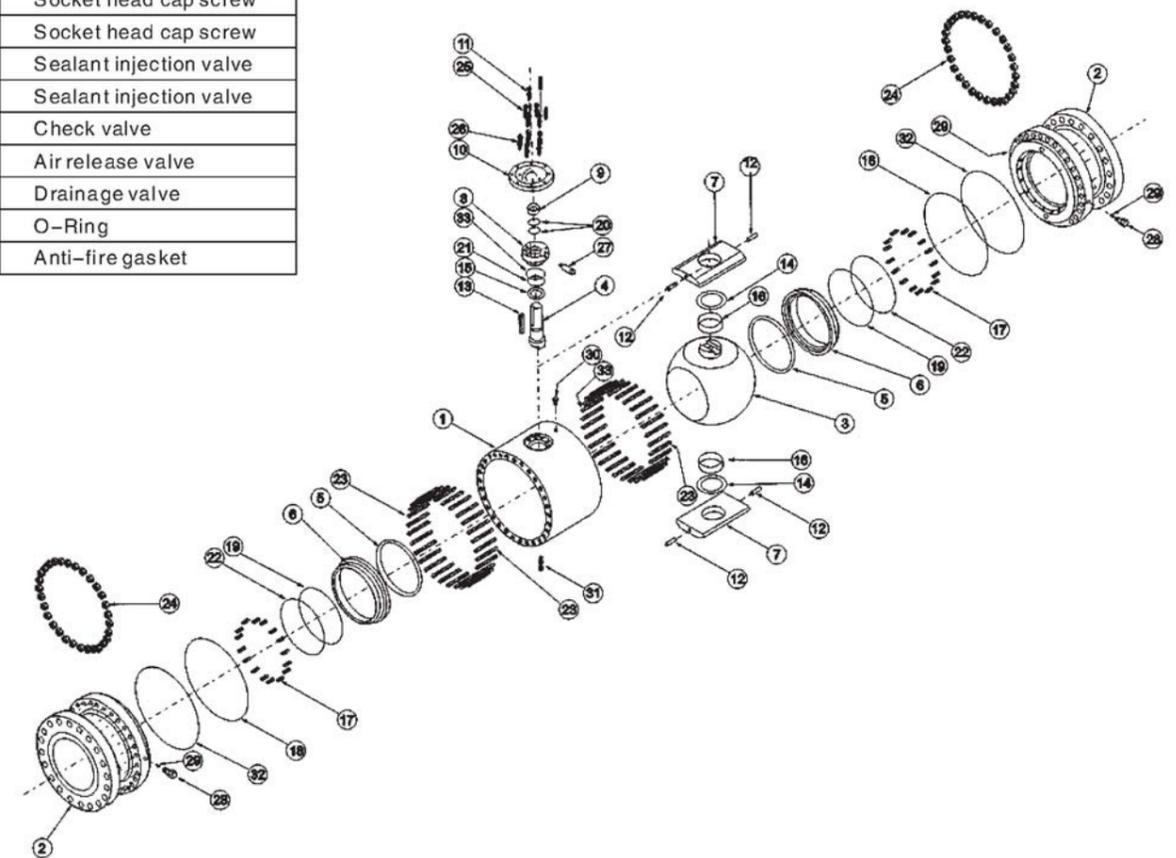
PART MATERIALS AND MAIN PARAMETERS

Nominal diameter (in)		NPS 1/2~8				
Nominal pressure (MPa)		Class 150~Class 900				
No.	Part Name	Material				
		Carbon steel	Stainless steel			
1	Body	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
2	Ball	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
3	Stud	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
4	Anti-fire packing	Graphite				
5	Seat	PTFE/NYLON/PEEK/PPL				
6	Support ring	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
7	O ring	VITON				
8	Spring	17-7PH				
9	O ring	VITON				
10	Anti-fire gasket	SST+Graphite				
11	Bonnet	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
12	Anti-static device	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
13	Stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
14	Flat key	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045
15	Thrust bearing	PTFE				
16	Sliding bearing	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE
17	O ring	VITON				
18	O ring	VITON				
19	Anti-fire gasket	SST+Graphite				
20	Seal gland	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
21	Socket head cap screw	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
22	Packing	Graphite				
23	Connection plate	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
24	Socket head cap screw	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
25	Pin	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035
26	Thrust bearing	PTFE				
27	Lower cover	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
28	Stud	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
29	Hexagon nut	A194 2HM	A194-8	A194-8M	A194-8	A194-8M
30	Drainage valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
31	Air release valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
32	Sealant injection valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
33	Check valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
34	Hexagon nut	A194 2HM	A194-8	A194-8M	A194-8	A194-8M
Applicable service conditions	Applicable media	Water, steam, oil, gas, liquefied gas, natural gas, etc	Nitric Acid	Acetic acid	Strong Oxidizer	Urea
	Applicable temperature	120°C(PTFE), ≤80°C(NYLON), ≤250°C(PEEK), ≤250°C(PPL)				
Design and manufacturing	API 608, API 6D					
Face-to-face dimensions	ASME B16.10, API 6D					
Type of connection	Flange	ASME B16.5/ASME B16.47		Butt welding	ASME B16.25	
Pressure test	API 598, API 6D					
Transmission mode	Manual, worm and worm gear transmission, pneumatic, electric					

Materials of Parts

FORGED TRUNNION PIPELINE BALL VALVE

1	Body
2	Bonnet
3	Ball
4	Stem
5	Seat
6	Seat ring
7	Bearing holder
8	Seal gland
9	Packing
10	Connection plate
11	Pin
12	Pin
13	Flat key
14	Thrust bearing
15	Thrust bearing
16	Sliding bearing
17	Spring
18	O-Ring
19	O-Ring
20	O-Ring
21	O-Ring
22	Anti-fire packing
23	Stud
24	Hexagon nut
25	Socket head cap screw
26	Socket head cap screw
27	Sealant injection valve
28	Sealant injection valve
29	Check valve
30	Air release valve
31	Drainage valve
32	O-Ring
33	Anti-fire gasket

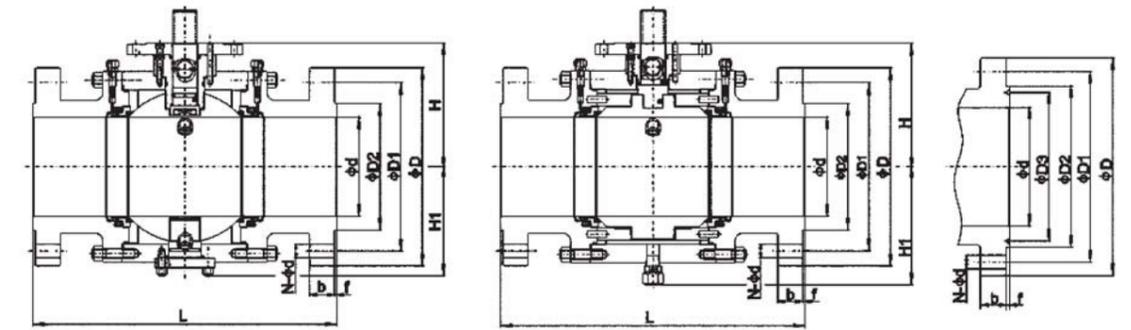


FORGED TRUNNION PIPELINE BALL VALVE

FORGED TRUNNION PIPELINE BALL VALVE

PART MATERIALS AND MAIN PARAMETERS

Nominal diameter (in)		NPS 2~48				
Nominal pressure (MPa)		Class 150~Class 2500				
No.	Part Name	Material				
		Carbon steel	Stainless steel			
1	Body	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
2	Bonnet	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
3	Ball	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
4	Stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
5	Seat	PTFE/NYOLN/PEEK/PPL				
6	Seat ring	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
7	Bearing holder	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
8	Seal gland	ASTM A105 · ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
9	Packing	Graphite				
10	Connection plate	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
11	Pin	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035
12	Pin	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035
13	Flat key	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045
14	Thrust bearing	PTFE				
15	Thrust bearing	PTFE				
16	Sliding bearing	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE
17	Spring	17-7PH				
18	O-Ring	VITON				
19	O-Ring	VITON				
20	O-Ring	VITON				
21	O-Ring	VITON				
22	Anti-fire packing	Graphite				
23	Stud	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
24	Hexagon nut	A194 2HM	A194-8	A194-8M	A194-8	A194-8M
25	Socket head cap screw	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
26	Socket head cap screw	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
27	Sealant injection valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
28	Sealant injection valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
29	Check valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
30	Air release valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
31	Drainage valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
32	O-Ring	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
33	Anti-fire gasket	SST+Graphite				
Applicable service conditions	Applicable media	Water, steam, oil, gas, liquefied gas, natural gas, etc	Nitric Acid	Acetic Acid	Strong Oxidizer	Urea
	Applicable temperature	120°C(PTFE), ≤80°C(NYLON), ≤250°C(PEEK), ≤250°C(PPL)				
Design and manufacturing		API 608, API 6D				
Face-to-face dimensions		ASME B16.10, API 6D				
Type of connection		Flange	ASME B16.5/ASME B16.47	Butt welding	ASME B16.25	
Pressure test		API 598, API 6D				
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric				



External supporting structure

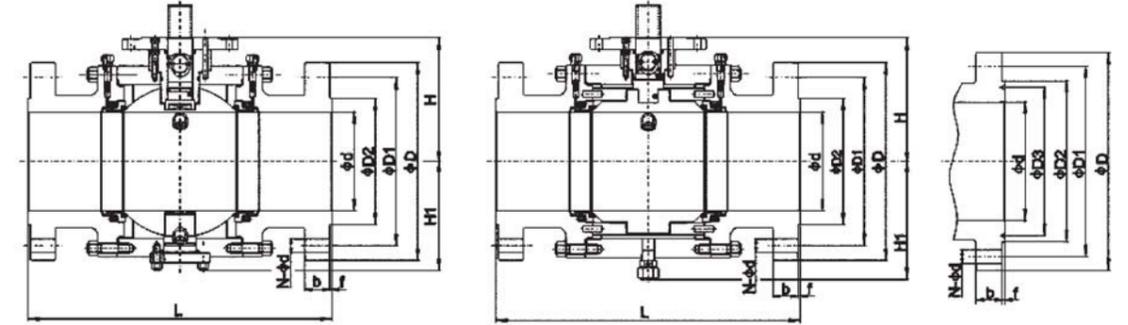
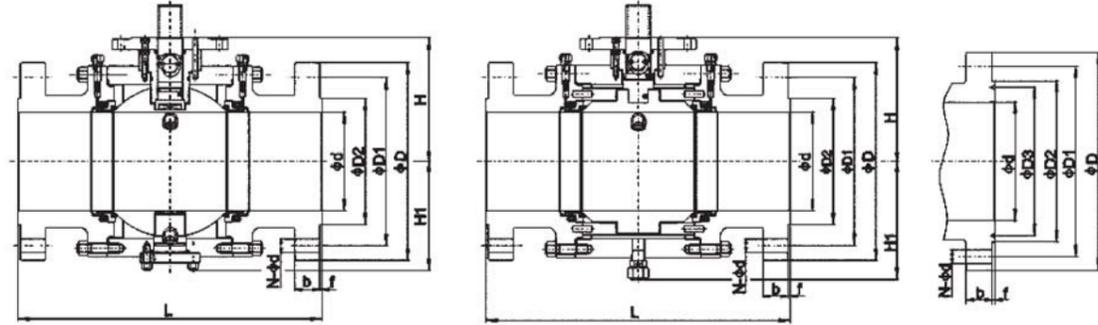
Internal supporting structure

Pressure rating Class	Nominal Diameter NPS	DN	d	Flanged			Raised face flange				General		Support Board		Weight(kg)				
				L(RF)	L(RTJ)	L(BW)	D	D1	D2	D3	f	b	N-φd	H	H1	H	H1	Cast steel	Forged steel
150	2"	50	50	178	191	216	150	120.5	92	-	2	14.5	4-φ19	93	88	-	-	19	-
	3"	80	75	203	216	283	190	152.5	127	-	2	17.5	4-φ19	118.5	117	-	-	28	-
	4"	100	100	229	241	305	230	190.5	157	-	2	22.5	8-φ19	143.5	137	-	-	50	-
	6"	150	150	394	406	457	280	241.5	216	-	2	24	8-φ22	208	178.5	-	-	160	-
	8"	200	201	457	470	521	345	298.5	270	-	2	27	8-φ22	248	222	248	235	270	284
	10"	250	252	533	546	559	405	362	324	-	2	29	12-φ25	294	265	294	288	415	436
	12"	300	303	610	622	635	485	432	381	-	2	30.5	12-φ25	344.5	308.5	345	330	660	693
	14"	350	334	686	699	762	535	476	413	-	2	33.5	12-φ29	377	334	377	360	890	935
	16"	400	385	762	775	838	595	540	470	-	2	35	16-φ29	418	375	418	400	1080	1134
	18"	450	436	864	876	914	635	578	533	-	2	38.5	16-φ32	463	410	463	435	1480	1554
	20"	500	487	914	927	991	700	635	584	-	2	41.5	20-φ32	502	458	502	484	1970	2069
	24"	600	589	1067	1080	1143	815	749.5	692	-	2	46.5	20-φ35	586	534	586	568	3000	3150
	26"	650	633	1143	-	1245	870	806.5	749	-	2	68	24-φ35	626	582	626	594	3612	3793
	28"	700	684	1245	-	1346	927	864	800	-	2	71	28-φ35	644	605	644	658	4402	4622
	30"	750	735	1295	-	1397	984	914.5	857	-	2	75	28-φ35	720	672	720	677	5112	5368
	32"	800	779	1372	-	1524	1060	978	914	-	2	81	28-φ41	742	704	742	746	6667	7000
	36"	900	874	1524	-	1727	1168	1086	1022	-	2	90	32-φ41	839	796	839	791	8627	9058
	40"	1000	976	1753	-	-	1289	1200	1124	-	2	90	36-φ41	913.5	866	913.5	863	12313	12929
42"	1050	1020	1855	-	-	1346	1257	1194	-	2	97	36-φ41	943	881	943	937	14000	14700	
48"	1200	1166	2134	-	-	1511	1422	1359	-	2	108	44-φ41	1097	1016	1097	1066	21470	22544	
56"	1400	1360	2489	-	-	1746	1651	1575	-	2	124	48-φ48	1302	1186	1302	1253	33431	35103	
300	2"	50	50	216	232	216	165	142.7	92	-	2	21	8-φ19	93	88	-	-	22	-
	3"	80	75	283	298	283	210	168.5	127	-	2	27	8-φ22	118.5	117	-	-	38	-
	4"	100	100	305	321	305	255	200	157	-	2	30.5	8-φ22	143.5	137	-	-	60	-
	6"	150	150	403	419	457	320	270	216	-	2	35	12-φ22	208	178.5	-	-	180	189
	8"	200	201	502	518	521	380	330	270	-	2	40	12-φ25	248	222	248	235	295	310
	10"	250	252	568	584	559	445	387.5	324	-	2	46.5	16-φ29	294	265	294	288	450	473
	12"	300	303	648	664	635	520	451	381	-	2	49.5	16-φ32	344.5	308.5	345	330	700	735
	14"	350	334	762	778	762	585	514.5	413	-	2	52.5	20-φ32	377	334	377	360	1160	1218
	16"	400	385	838	854	838	650	571.5	470	-	2	56	20-φ35	423	380	423	345	1340	1407
	18"	450	436	914	930	914	710	628.5	533	-	2	59	24-φ35	463	410	463	431	1610	1691
	20"	500	487	991	1010	991	775	686	584	-	2	62	24-φ35	502	458	502	474	2200	2310
	24"	600	589	1143	1165	1143	915	813	692	-	2	68.5	24-φ41	592	549	592	561	3460	3633
	26"	650	633	1245	-	1245	972	876.5	749	-	2	79	28-φ45	633	590	633	601	4017	4218
	28"	700	684	1346	-	1346	1035	940	800	-	2	86	28-φ45	680	637	680	636	4974	5223
	30"	750	735	1397	-	1397	1092	997	857	-	2	92	32-φ48	730	682	730	681	5681	5965
	32"	800	779	1524	-	1524	1149	1054	914	-	2	98	28-φ51	765	720	765	716	6837	7179
	36"	900	874	1727	-	1727	1270	1168	1022	-	2	105	32-φ54	847	804	847	798	8700	9135
	40"	1000	976	1956	-	-	1238	1156	1086	-	2	114	32-φ45	921	877	921	871	12299	12914
42"	1050	1020	2083	-	-	1289	1206.5	1137	-	2	119	32-φ45	936	900	936	890	14379	15098	
48"	1200	1166	2170	-	-	1467	1372	1302	-	2	134	32-φ51	1093	1052	1093	1040	21482	22556	
56"	1400	1360	2743	-	-	1708	1600	1518	-	2	154	28-φ60	1263	1216	1263	1203	34066	35769	

Note: The weight value is only for flanged valve. Please consult our factory for higher nominal diameter or weight. Any modification to sizes H, H1 and weight will not be notified otherwise.

FORGED TRUNNION PIPELINE BALL VALVE

FORGED TRUNNION PIPELINE BALL VALVE



External supporting structure

Internal supporting structure

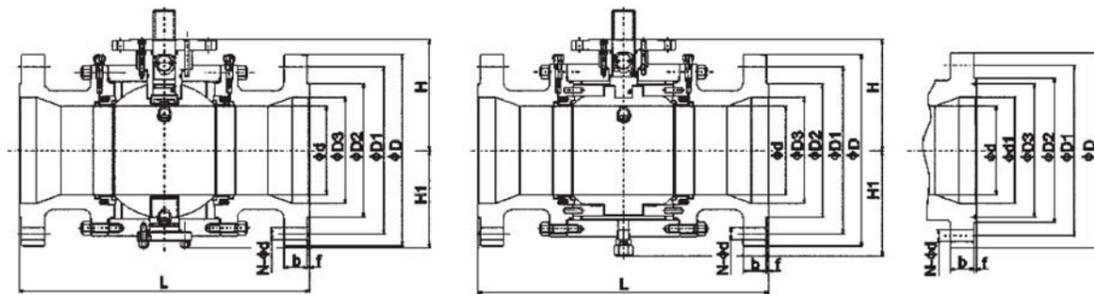
Pressure rating	Nominal Diameter		d	d1	Flanged			Raised face flange					General		Support Board		Weight(kg)			
	NPS	DN			L(RF)	L(RTJ)	L(BW)	D	D1	D2	D3	f	b	N-φ d	H	H1	H	H1	Cast steel	Forged steel
150	3"x2"	80	50	75	203	216	283	190	152.5	127	-	2	17.5	4-φ 19	93	88	-	-	28	-
	4"x3"	100	75	100	229	241	305	230	190.5	157	-	2	22.5	8-φ 19	118.5	117	-	-	45	-
	6"x4"	150	100	150	394	406	457	280	241.5	216	-	2	24	8-φ 22	143	137	-	-	95	-
	8"x6"	200	150	201	457	470	521	345	298.5	270	-	2	27	8-φ 22	208	178.5	-	-	170	179
	10"x8"	250	201	252	533	546	559	405	362	324	-	2	29	12-φ 25	248	222	248	235	313	329
	12"x10"	300	252	303	610	622	635	485	432	381	-	2	30.5	12-φ 25	294	265	294	288	470	494
	14"x10"	350	252	334	686	699	762	535	476	413	-	2	33.5	12-φ 29	294	265	294	288	521	580
	14"x12"	350	303	334	686	699	762	535	476	413	-	2	33.5	12-φ 29	344.5	308.5	345	330	760	840
	16"x12"	400	303	385	762	775	838	595	540	470	-	2	35	16-φ 29	344.5	308.5	345	330	834	920
	16"x14"	400	334	385	762	775	838	595	540	470	-	2	35	16-φ 29	377	334	377	360	930	1020
	18"x16"	450	385	436	864	876	914	635	578	533	-	2	38.5	16-φ 32	418	375	418	400	1120	1210
	20"x16"	500	385	487	914	927	991	700	635	584	-	2	41.5	20-φ 32	418	375	418	400	1480	1570
	20"x18"	500	436	487	914	927	991	700	635	584	-	2	41.5	20-φ 32	463	410	463	431	1620	1710
	24"x20"	600	487	589	1067	1080	1143	815	749.5	692	-	2	46.5	20-φ 35	502	458	502	484	2270	2384
	30"x24"	750	589	735	1295	-	1397	984	914.5	857	-	2	75	28-φ 35	586	534	586	568	3730	3917
	36"x30"	900	735	874	1524	-	1727	1168	1086	1022	-	2	90	32-φ 41	720	672	720	677	6740	7077
300	3"x2"	80	50	75	283	298	283	210	168.5	127	-	2	27	8-φ 22	93	88	-	-	42	-
	4"x3"	100	75	100	305	321	305	255	200	157	-	2	30.5	8-φ 22	118.5	117	-	-	62	-
	6"x4"	150	100	150	403	419	457	320	270	216	-	2	35	12-φ 22	143.5	137	-	-	115	120.8
	8"x6"	200	150	201	502	518	521	380	330	270	-	2	40	12-φ 25	208	178.5	-	-	196	206
	10"x8"	250	201	252	568	584	559	445	387.5	324	-	2	46.5	16-φ 29	248	222	248	235	350	368
	12"x10"	300	252	303	648	664	635	520	451	381	-	2	49.5	16-φ 32	294	265	294	288	552	580
	14"x10"	350	252	334	762	778	762	585	514.5	413	-	2	52.5	20-φ 32	294	265	294	288	644	684
	14"x12"	350	303	334	762	778	762	585	514.5	413	-	2	52.5	20-φ 32	344.5	308.5	345	330	780	860
	16"x12"	400	303	385	838	854	838	650	571.5	470	-	2	56	20-φ 35	344.5	308.5	345	330	908	988
	16"x14"	400	334	385	838	854	838	650	571.5	470	-	2	56	20-φ 35	377	334	377	360	1105	1180
	18"x16"	450	385	436	914	930	914	710	628.5	533	-	2	59	24-φ 35	423	380	423	345	1500	1575
	20"x16"	500	385	487	991	1010	991	775	686	584	-	2	62	24-φ 35	423	380	423	345	1600	1700
	20"x18"	500	487	436	991	1010	991	775	686	584	-	2	62	24-φ 35	463	410	463	431	1910	2053
	24"x20"	600	487	589	1143	1165	1143	915	813	692	-	2	68.5	24-φ 41	502	458	502	474	2940	3087
	30"x24"	750	589	735	1397	-	1397	1092	997	857	-	2	92	28-φ 48	592	549	592	561	4430	4652
	36"x30"	900	735	874	1727	-	1727	1270	1168	1022	-	2	105	32-φ 54	730	682	730	681	7520	7896

Note: The weight value is only for flanged valve. Please consult our factory for higher nominal diameter or weight. Any modification to sizes H, H1 and weight will not be notified otherwise.

Pressure rating	Nominal Diameter		d	d1	Flanged			Raised face flange					General		Support Board		Weight(kg)		
	NPS	DN			L(RF)	L(RTJ)	L(BW)	D	D1	D2	D3	f	b	N-φ d	H	H1	H	H1	Cast steel
600	2"	50	50	292	295	292	165	127	92	-	7	26	8-φ 19	107	91.5	-	-	38	-
	3"	80	75	356	359	356	210	168.5	127	-	7	32	8-φ 22	140	119	-	-	65	-
	4"	100	100	432	435	432	275	216	157	-	7	38.5	8-φ 25	164	150	-	-	118	-
	6"	150	150	559	562	559	355	292	216	-	7	48	12-φ 29	222	192.5	224	208	250	263
	8"	200	201	660	664	660	420	349	270	-	7	56	12-φ 32	271	235	272	248	430	452
	10"	250	252	787	791	787	510	432	324	-	7	64	16-φ 35	317.5	280	318	303	680	714
	12"	300	303	838	841	838	560	489	381	-	7	67	20-φ 35	360	320	355	341	985	1034
	14"	350	334	889	892	889	605	527	413	-	7	70	20-φ 39	390	350	390	370	1287	1351
	16"	400	385	991	994	991	685	603	470	-	7	77	20-φ 41	440	395	400	415	1640	1722
	18"	450	436	1092	1095	1092	745	654	533	-	7	83	20-φ 44	485	439	485	460	2268	2381
	20"	500	487	1194	1200	1194	815	724	584	-	7	89	24-φ 44	533	490	533	510	2830	2972
	24"	600	589	1397	1407	1397	940	838	692	-	7	102	24-φ 51	616	573	616	595	4400	4620
	26"	650	633	1448	-	1448	1016	914.5	749	-	7	108	28-φ 51	643.5	612	643.5	635	5455	5728
	28"	700	684	1549	-	1549	1073	965	800	-	7	112	28-φ 54	665	670	665	692	7610	7991
	30"	750	735	1651	-	1651	1130	1022	857	-	7	114	28-φ 54	753	710	753	690	8420	8841
	32"	800	779	1778	-	1778	1194	1079.5	914	-	7	118	28-φ 54	768	780	768	804	9230	9692
36"	900	874	2083	-	2083	1314	1194	1022	-	7	124	28-φ 67	861	840	861	865	13000	13650	
900	2"	50	50	368	371	368	215	165	124	95.25	7.92	38.5	8-φ 25	126.5	105	-	-	57	-
	3"	80	75	381	384	381	240	190.5	156	123.83	7.92	38.5	8-φ 25	150	130	-	-	87	-
	4"	100	100	457	460	457	290	235	181	149.23	7.92	45	8-φ 32	172.5	158	-	-	193	-
	6"	150	150	610	613	610	380	317.5	241	211.12	7.92	56	12-φ 32	230	197	235	210	340	357
	8"	200	201	737	740	737	470	393.5	308	269.88	7.92	64	12-φ 39	285	250	290	255	570	598.5
	10"	250	252	838	841	838	545	470	362	323.85	7.92	70	16-φ 39	330	294	330	316	912	957.6
	12"	300	303	965	968	965	610	533.5	419	381	7.92	79.5	20-φ 39	366	334	366	351	1325	1391
	14"	350	322	1029	1038	1029	640	559	467	419.1	11.13	86	20-φ 42	415	368	415	376	1620	1701
	16"	400	373	1130	1140	1130	705	616	524	469.9	11.13	89	20-φ 45	452	408	452	421	1990	2090
	18"	450	423	1219	1232	1219	785	686	594	533.4	12.7	102	20-φ 51	501	461	501	463	2611	2742
	20"	500	471	1321	1334	1321	855	749.5	648	584.2	12.7	108	20-φ 54	544	506	544	505	3880	4074
	24"	600	570	1549	1568	1549	1040	901.5	772	692.15	15.88	140	20-φ 67	657	616	657	608	6296	6611
	26"	650	617	1651	-	1651	1086	952.5	749	-	7	124	20-φ 73	700	635	700	625	7280	8050
	28"	700	665	1753	-	1753	1168	1022	800	-	7	143	20-φ 79	727	685	727	673	9166	9624
	30"	750	712	1880	-	1880	1232	1086	857	-	7	149	20-φ 79	760	722	760	706	11277	11841
	32"	800	760	2032	-	2032	1314	1156	914	-	7	159	20-φ 86	795	755	795	734	12300	12915
36"	900	855	2286	-	2286	1461	1289	1022	-	7	172	20-φ 92	886	846	886	822	17500	18375	

Note: The weight value is only for flanged valve. Please consult our factory for higher nominal diameter or weight. Any modification to sizes H, H1 and weight will not be notified otherwise.

FORGED TRUNNION PIPELINE BALL VALVE



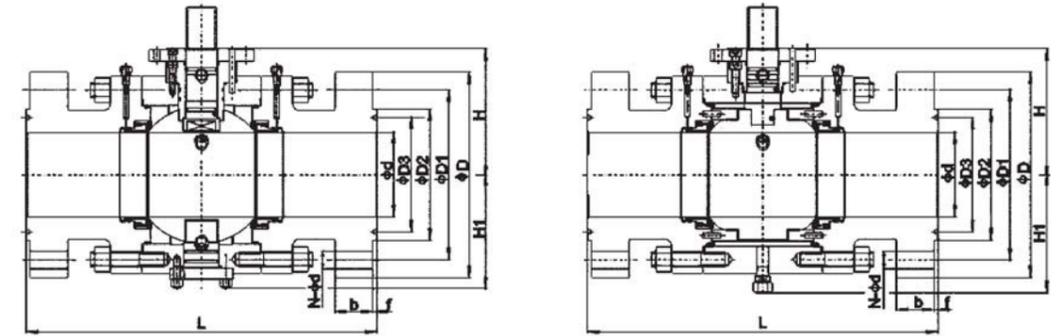
External supporting structure

Internal supporting structure

Pressure rating	Nominal Diameter		d	d1	Flanged		Butt welding L(BW)	Raised face flange						General		Support Board		Weight(kg)		
	NPS	DN			L(RF)	L(RTJ)		D	D1	D2	D3	f	b	N-φ d	H	H1	H	H1	Cast steel	Forged steel
600	3"x2"	80	50	75	356	359	356	210	168.5	127	-	7	32	8-φ 22	107	91.5	-	-	44	-
	4"x3"	100	75	100	432	435	432	275	216	157	-	7	38.5	8-φ 25	140	119	-	-	85	-
	6"x4"	150	100	150	559	562	559	355	292	216	-	7	48	12-φ 29	167	150	-	-	169	177
	8"x6"	200	150	201	660	664	660	420	349	270	-	7	56	12-φ 32	222	192.5	224	208	280	294
	10"x8"	250	201	252	787	791	787	510	432	324	-	7	64	16-φ 35	271	235	272	248	520	546
	12"x10"	300	252	303	838	841	838	560	489	381	-	7	67	20-φ 35	317.5	280	318	303	790	830
	14"x10"	350	252	334	889	892	889	605	527	413	-	7	70	20-φ 39	317.5	280	318	303	960	1050
	14"x12"	350	303	334	889	892	889	605	527	413	-	7	70	20-φ 39	360	320	355	341	1070	1180
	16"x12"	400	303	385	991	994	991	685	603	470	-	7	77	20-φ 41	360	320	355	341	1250	1370
	16"x14"	400	334	385	991	994	991	685	603	470	-	7	77	20-φ 41	390	350	390	370	1367	1490
	18"x16"	450	385	436	1092	1095	1092	745	654	533	-	7	83	20-φ 44	440	395	400	415	1840	1932
	20"x16"	500	385	487	1194	1200	1194	815	724	584	-	7	89	24-φ 44	440	395	400	415	2177	2340
	20"x18"	500	436	484	1194	1200	1194	815	724	584	-	7	89	24-φ 44	485	439	485	460	2390	2540
	24"x20"	600	487	589	1397	1407	1397	940	838	692	-	7	102	24-φ 51	533	490	533	510	3560	3738
30"x24"	750	589	735	1651	-	1651	1130	1022	857	-	7	114	28-φ 54	616	573	616	595	5200	5460	
36"x30"	900	735	874	2083	-	2083	1314	1194	1022	-	7	124	28-φ 67	753	710	753	690	9900	10395	
900	3"x2"	80	50	75	381	384	381	240	190.5	156	123.83	7.92	38.5	8-φ 25	126.5	105	-	-	56	-
	4"x3"	100	75	100	457	460	457	290	235	181	149.23	7.92	45	8-φ 32	150	130	-	-	97	-
	6"x4"	150	100	150	610	613	610	380	317.5	241	211.12	7.92	56	12-φ 32	172.5	158	-	-	220	231
	8"x6"	200	150	201	737	740	737	470	393.5	308	269.88	7.92	64	12-φ 39	230	197	235	210	436	458
	10"x8"	250	201	252	838	841	838	545	470	362	323.85	7.92	70	16-φ 39	285	250	290	255	650	683
	12"x10"	300	252	303	965	968	965	610	533.5	419	381	7.92	79.5	20-φ 39	330	294	330	316	1050	1103
	14"x10"	350	252	322	1029	1038	1029	640	559	467	419.1	11.13	86	20-φ 42	330	294	330	316	1230	1390
	14"x12"	350	303	322	1029	1038	1029	640	559	467	419.1	11.13	86	20-φ 42	366	334	366	351	1435	1565
	16"x12"	400	303	373	1130	1140	1130	705	616	524	469.9	11.13	89	20-φ 45	366	334	366	351	1700	1820
	16"x14"	400	322	373	1130	1140	1130	705	616	524	469.9	11.13	89	20-φ 45	415	368	415	376	1820	2080
	18"x16"	450	373	423	1219	1232	1219	785	686	594	533.4	12.7	102	20-φ 51	452	408	452	421	2550	2678
	20"x16"	500	373	471	1321	1334	1321	855	749.5	648	584.2	12.7	108	20-φ 54	452	408	452	421	2630	2765
	20"x18"	500	373	471	1321	1334	1321	855	749.5	648	584.2	12.7	108	20-φ 54	501	461	501	463	3630	3900
	24"x20"	600	471	570	1549	1568	1549	1040	901.5	772	692.15	15.88	140	20-φ 67	544	506	544	505	5030	5282
30"x24"	750	570	712	1880	-	1880	1232	1086	857	-	7	149	20-φ 79	657	616	657	608	8730	9167	
36"x30"	900	712	855	2286	-	2286	1461	1289	1022	-	7	172	20-φ 92	760	722	760	706	15385	16154	

Note: The weight value is only for flanged valve. Please consult our factory for higher nominal diameter or weight. Any modification to sizes H, H1 and weight will not be notified otherwise.

FORGED TRUNNION PIPELINE BALL VALVE



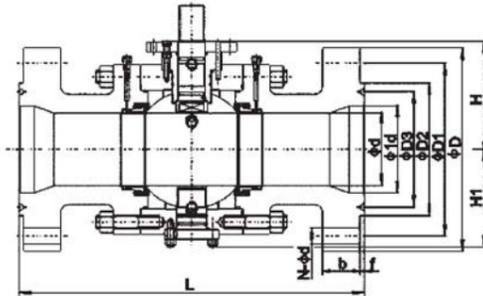
External supporting structure

Internal supporting structure

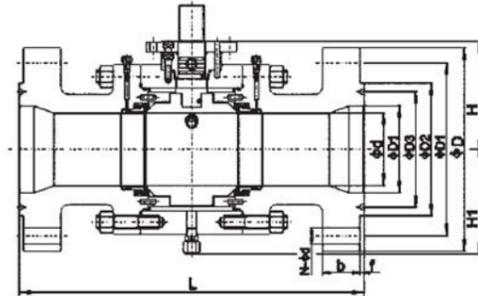
Pressure rating	Nominal Diameter		d	d1	Flanged		Butt welding L(BW)	Raised face flange						General		Support Board		Weight(kg)	
	NPS	DN			L(RF)	L(RTJ)		D	D1	D2	D3	f	b	N-φ d	H	H1	H	H1	Cast steel
1500	2"	50	50	368	371	368	215	165	124	95.25	7.92	38.5	8-φ 25	126.5	105	-	-	57	-
	3"	80	75	470	473	470	265	203.2	168	136.53	7.92	48	8-φ 32	166	149	-	-	168	-
	4"	100	100	546	549	546	310	241.3	194	161.93	7.92	54	8-φ 35	219	178	-	-	230	-
	6"	150	144	705	711	705	395	317.5	248	211.14	9.53	83	12-φ 39	268	227	-	-	685	-
	8"	200	192	832	841	832	485	393.7	318	269.88	11.13	92	12-φ 45	303	267	305	270	993	1043
	10"	250	239	991	1000	991	585	482.6	371	323.85	11.13	108	12-φ 51	358	323	358	336	1781	1870
	12"	300	287	1130	1146	1130	675	571.5	438	381	14.27	124	16-φ 54	414	381	414	395	2280	2394
	14"	350	315	1257	1276	1257	750	635	489	419.1	15.88	134	16-φ 60	471	432	471	441	3000	3150
	16"	400	360	1384	1407	1384	825	704.8	546	469.9	17.48	146.5	16-φ 67	498	453	498	456	3816	4007
	18"	450	406	1537	1559	-	915	774.7	613	533.4	17.48	162	16-φ 73	570	530	570	535	6195	6505
20"	500	454	1664	1686	-	985	831.8	673	584.2	17.48	178	16-φ 79	611	569	611	561	9075	9529	
2500	2"	50	42	451	454	451	235	171.4	133	101.6	7.92	51	8-φ 29	149	123	-	-	140	-
	3"	80	62	578	584	578	305	228.6	168	127	9.53	67	8-φ 35	215	171	-	-	216	-
	4"	100	87	673	683	673	355	273	203	157.18	11.13	76.5	8-φ 42	245	206	-	-	328	-
	6"	150	131	914	927	914	485	368.3	279	228.6	12.7	108	8-φ 54	306	263	306	265	1030	1082
	8"	200	179	1022	1038	1022	550	438.2	340	279.4	14.27	127	12-φ 54	361	330	361	336	1570	1649
	10"	250	223	1270	1292	1270	675	539.8	425	342.9	17.48	166	12-φ 67	426	388	426	394	2550	2678
12"	300	265	1422	1445	1422	760	619.1	495	406.4	17.48	185	12-φ 74	479	440	479	446	3872	4066	

Note: The weight value is only for flanged valve. Please consult our factory for higher nominal diameter or weight. Any modification to sizes H, H1 and weight will not be notified otherwise.

FORGED ● TRUNNION PIPELINE BALL VALVE



External supporting structure



Internal supporting structure

Pressure rating	Nominal Diameter		d	d1	Flanged		Butt welding	Raised face flange						General		Support Board		Weight(kg)		
	Class	NPS			DN	L(RF)		L(RTJ)	L(BW)	D	D1	D2	D3	f	b	N-φd	H	H1	H	H1
1500	3"x2"	80	50	75	470	473	470	265	203.2	168	136.53	7.92	38.5	8-φ32	126.5	105	-	-	2	-
	4"x3"	100	74	100	546	549	546	310	241.3	194	161.93	7.92	54	8-φ35	166	149	-	-	195	205
	6"x4"	150	100	144	705	711	705	395	317.5	248	211.14	9.53	83	12-φ39	219	178	-	-	270	284
	8"x6"	200	144	192	832	841	832	485	393.7	318	269.88	11.13	92	12-φ45	268	227	-	-	586	615
	10"x8"	250	192	239	991	1000	991	585	482.6	371	323.85	11.13	108	12-φ51	303	267	305	270	1010	1061
	12"x10"	300	239	287	1130	1146	1130	675	571.5	438	381	14.27	124	16-φ54	358	323	358	336	1760	1848
	14"x10"	350	239	315	1257	1276	1257	750	635	489	419.1	15.88	134	16-φ60	358	323	358	336	2010	2238
	14"x12"	350	287	315	1257	1276	1257	750	635	489	419.1	15.88	134	16-φ60	414	381	414	395	2680	2940
	16"x12"	400	287	360	1384	1407	1384	825	704.8	546	469.9	17.48	146.5	16-φ67	414	381	414	395	2860	3180
	16"x14"	400	315	360	1384	1407	1384	825	704.8	546	469.9	17.48	146.5	16-φ67	471	432	471	441	3530	3850
	18"x16"	450	360	406	1537	1559	-	915	774.7	613	533.4	17.48	162	16-φ73	498	453	498	456	5030	5282
2500	20"x16"	500	360	454	1664	1686	-	985	831.8	673	584.2	17.48	178	16-φ79	498	453	498	355	-	-
	20"x18"	500	406	454	1664	1686	-	985	831.8	673	584.2	17.48	178	16-φ79	570	530	570	456	5380	5790
	3"x2"	80	42	62	578	584	578	305	228.6	168	127	9.53	67	8-φ35	149	123	-	-	157	165
	4"x3"	100	62	87	673	683	673	355	273	203	157.18	11.13	76.5	8-φ42	215	171	-	-	260	273
	6"x4"	150	87	131	914	927	914	485	368.3	279	228.6	12.7	108	8-φ54	245	206	-	-	548	575
	8"x6"	200	131	179	1022	1038	1022	550	438.2	340	279.4	14.27	127	12-φ54	306	263	306	265	1100	1155
	10"x8"	250	179	223	1270	1292	1270	675	539.8	425	342.9	17.48	166	12-φ67	361	330	361	336	1890	1985
	12"x10"	300	223	265	1422	1445	1422	760	619.1	495	406.4	17.48	185	12-φ74	426	388	426	394	2850	2993

Note: The weight value is only for flanged valve. Please consult our factory for higher nominal diameter or weight. Any modification to sizes H, H1 and weight will not be notified otherwise.

DOUBLE BLOCK AND BLEED VALVE

