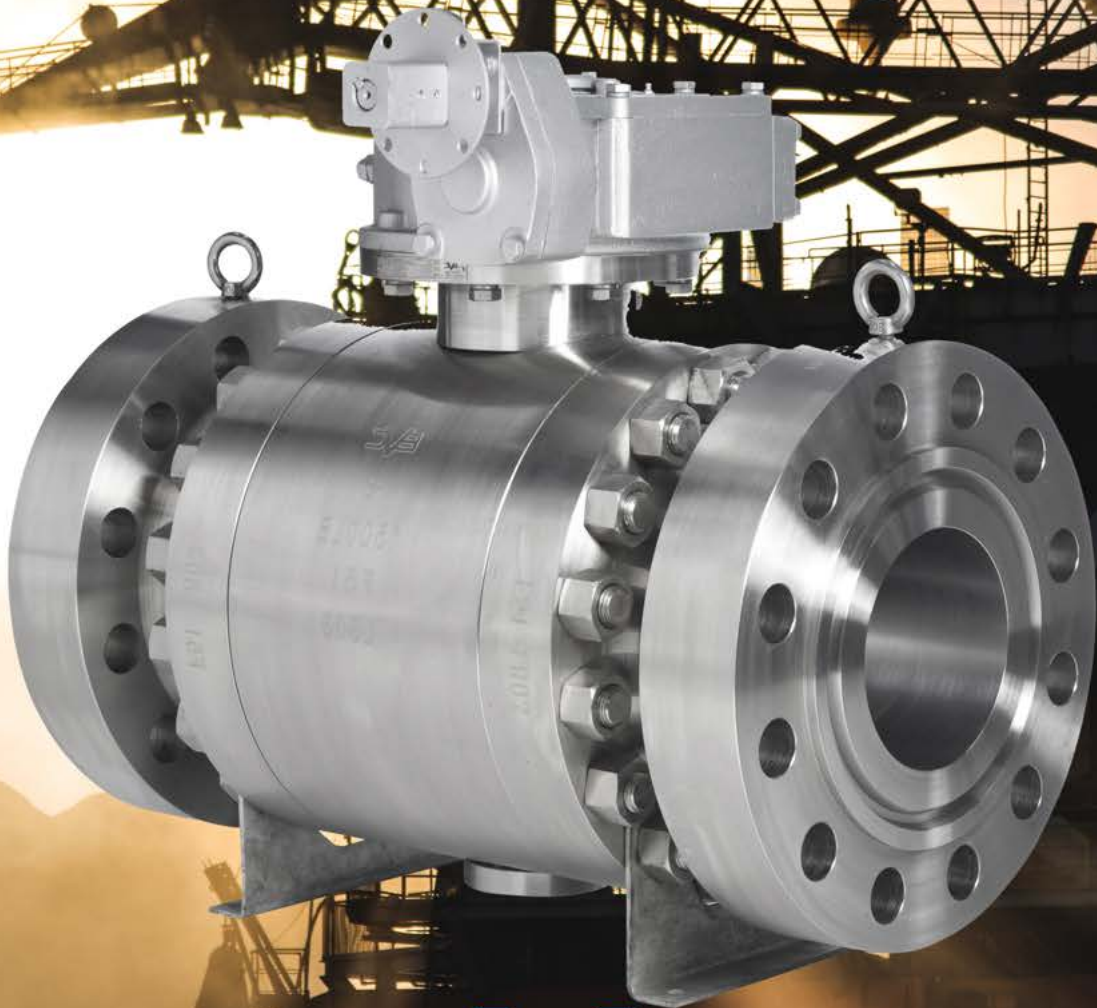




Edmund

VALVE COMPANY (1965) LTD

BALL VALVE



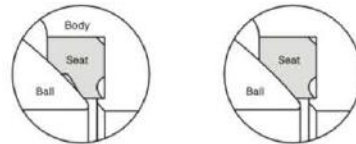
Edmund

Structural Features

1.Special Seat Design

The floating ball valve adopts the design of flexible seal ring structure. When the medium pressure is lower, the contact area of seal ring and ball is smaller. So higher sealing ratio is formed at the place where the seal ring and ball contact to ensure reliable sealing. When the medium pressure is higher, the contact area of seal ring and ball becomes bigger along with the elastic deformation of seal ring, so the seal ring can endure higher medium thrust without being damaged.

Elastic seat



Lower pressure

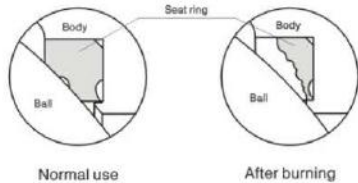
High pressure

2.Fireproof Structure Design

In case of fire during the use of valve, the seat ring made of PTFE or other non-metal materials will be decomposed or damaged under high temperature and cause higher leakage. The fireproof of seal ring is set between ball and seat so that after the valve seat is burnt, the medium will push the ball rapidly towards the downs-

stream metal seal ring to form the auxiliary metal to metal sealing structure which can effectively control valve leakage. In addition, the middle flange sealing gasket, which can ensure sealing even under high temperature. The fireproof structure design of floating ball valve conforms to requirements in API 607, API 6FA, BS 6755 and other standards.

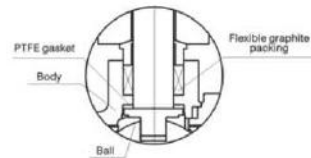
Fireproof Structure Design of Seat



Normal use

After burning

Fireproof Structure Design of Stem



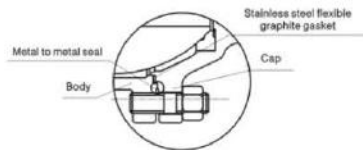
PTFE gasket

Body

Ball

Flexible graphite packing

Fireproof Structure of Middle Flange



Metal to metal seal

Stainless steel flexible graphite gasket

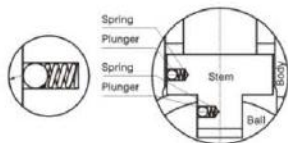
Body

Cap

3.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 through the stem, so as to

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



Spring

Plunger

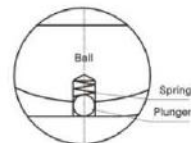
Spring

Plunger

Stem

Ball

Anti-static structure design of ball valve with DN ≥ 32



Ball

Spring

Plunger

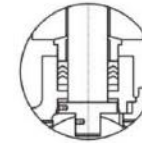
Anti-static structure design of ball valve with DN ≤ 25

Structural Features

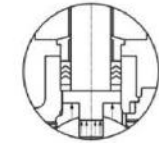
4.Reliable Sealing of Valve Stem

The stem is provided with the shoulder at its bottom so that it will not be blown out by the medium even under the extreme conditions such as abnormal pressure rise inside the valve cavity, failure of gland plate and etc. In addition, to avoid leakage after the stem packing is burnt in case of fire, the thrust bearing is set at the

place where the stem shoulder and body contact to form a reverse sealing seat. The sealing force of the reverse seal will increase according to the increase of medium pressure, so as to ensure reliable stem sealing under various pressure, prevent leakage and avoid accident spreading.



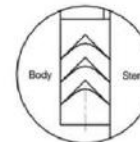
The bottom-mounted stem will not be blown out by medium pressure.



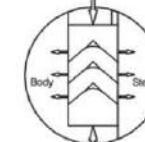
The top-mounted stem may be blown out by medium pressure

The stem adopts V type packing sealing structure, the V type packing can effectively change the pressing force and medium force of the gland into the sealing force of the stem. According

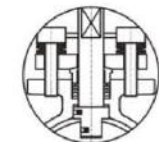
to user requirements, the disc spring loaded packing pressing mechanism can be adopted to make the sealing of stem packing more reliable.



Before the packing is pressed



After the packing is pressed



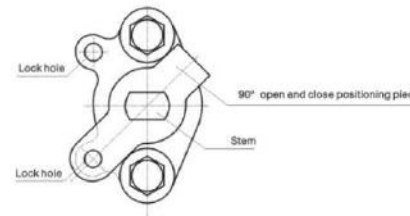
The disc spring loaded packing pressing mechanism is adopted.

5.Lock and Misoperation Prevention

The manual ball valve can be locked by a lock when it is at the full open or full close position. The 90° open and close positioning piece with lock hole is designed to avoid valve misoperation caused due to handle operation by non-operators, and it can also prevent valve opening or closing, or other accidents caused by pipeline

vibration or unpredictable factors. It is very effective especially for inflammable and explosive oil, chemical and medical working pipelines or field tubing. The part on the head of the stem that is installed with the handle adopts flat design. Where the valve is opened, the handle is parallel to the pipeline, and closing indications of the valve are guaranteed to have no error.

Lock and Misoperation Prevention Structure

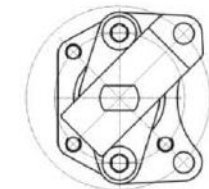


Lock hole

90° open and close positioning piece

Stem

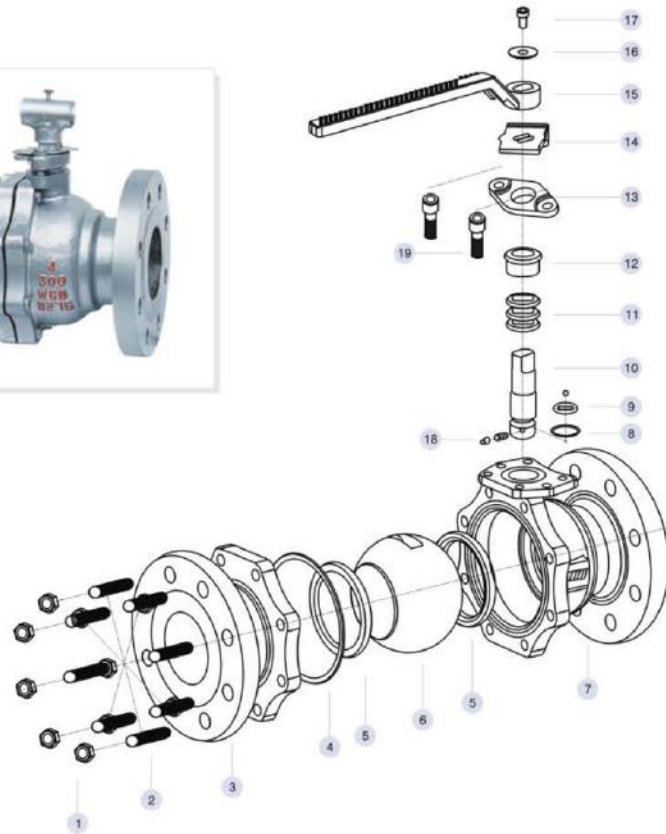
Lock hole



Cast Steel Floating Ball Valve

1	Nut
2	Stud
3	Bonnet
4	Gasket
5	Seat
6	Ball
7	Body
8	Stem Bearing
9	O-Ring
10	Stem
11	Packing

12	Packing bushing
13	Packing gland
14	Stopper
15	Handle
16	Metal pad
17	Screw
18	Anti-static device
19	Socket head cap screw



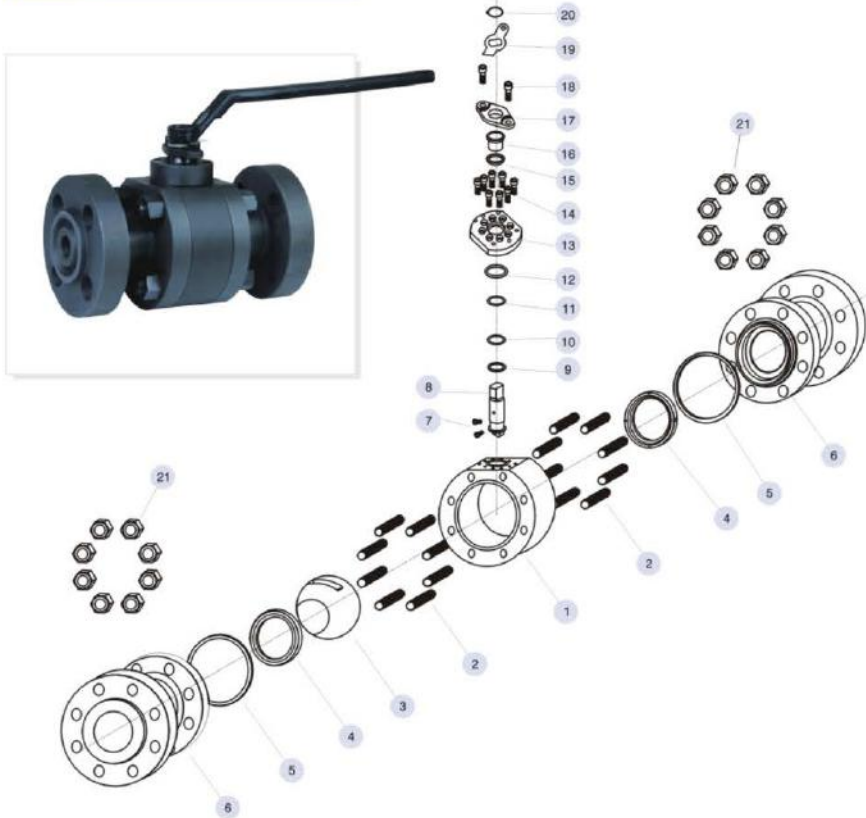
Part Materials And Main Parameters

Nominal diameter (in)		NPS 1/2-8				
Nominal pressure (MPa)		Class150-Class600				
No.	Part Name	Material				
		Carbon steel	Stainless steel			
1	Body	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF8	ASTM A351 CF3M
2	Stud	A197 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
3	Seat	PTFE/NYLON/PEEK/PPL				
4	Ball	ASTM A105 + ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
5	Anti-fire Gasket	SST+ Graphite				
6	Bonnet	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF8	ASTM A351 CF3M
7	Hexagon nut	A194 2HM	A194-8	A194-8M	A194-8	A194-8M
8	Anti-static device	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
9	Stem	ASTM A182 F6A	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A 182 316L
10	Thrust bearing	PTFE				
11	Sliding bearing	PTFE				
12	Packing	Graphite				
13	Packing bushing	ASTM A182 F6A	ASTM A182 F6A	ASTM A182 F6A	ASTM A182 F6A	ASTM A182 F6A
14	Packing gland	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB
15	Socket head cap screw	A197 B7M	A197 B7M	A197 B7M	A197 B7M	A197 B7M
16	Stopper	A3.Zn	A3.Zn	A3.Zn	A3.Zn	A3.Zn
17	Retainer ring	65Mn	65Mn	65Mn	65Mn	65Mn
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				
Face-to-face dimensions		ASME B16.10				
Type of connection	Flange	ASME B16.5		Butt welding	ASME B16.25	
Pressure test		API 598				
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric				

Forged Steel Floating Ball Valve

1	Body
2	Stud
3	Ball
4	Seat
5	Anti-fire Gasket
6	Bonnet
7	Anti-static device
8	Stem
9	Thrust bearing
10	Sliding bearing
11	O ring
12	Anti-fire gasket

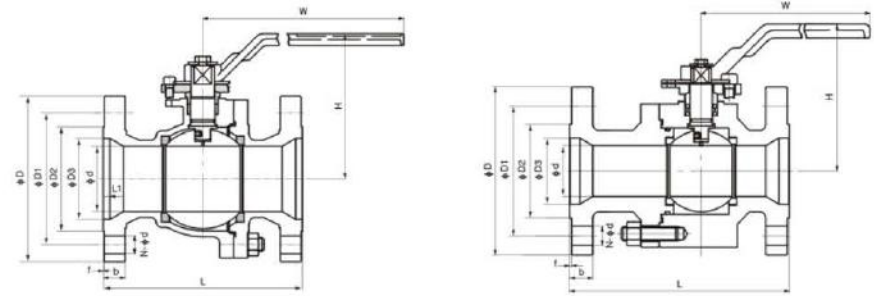
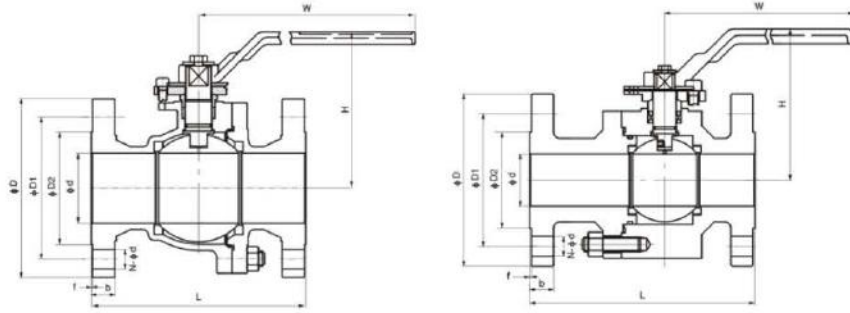
13	Seal gland
14	Socket head cap screw
15	Packing
16	Packing bushing
17	Packing gland
18	Socket head cap screw
19	Stopper
20	Retainer ring
21	Hexagon nut



Part Materials And Main Parameters

Nominal diameter (in)		NPS 1/2-8				
Nominal pressure (MPa)		Class150~Class600				
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	Stud	A197 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
3	Ball	ASTM A105 + ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
4	Seat	PTFE/NYLON/PEEK/PPL				
5	Anti-fire Gasket	SST+Graphite				
6	Bonnet	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
7	Anti-static device	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
8	Stem	ASTM A182 F6A	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
9	Thrust bearing	PTFE				
10	Sliding bearing	PTFE				
11	O ring	VITON				
12	Anti-fire gasket	Graphite				
13	Seal gland	ASTM A105 + ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
14	Socket head cap screw	A197 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
15	Packing	Graphite				
16	Packing bushing	ASTM A182 F6A	ASTM A182 F6A	ASTM A182 F6A	ASTM A182 F6A	ASTM A182 F6A
17	Packing gland	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB
18	Socket head cap screw	A197 B7M	A197 B7M	A197 B7M	A197 B7M	A197 B7M
19	Stopper	A3.Zn	A3.Zn	A3.Zn	A3.Zn	A3.Zn
20	Retainer ring	65Mn	65Mn	65Mn	65Mn	65Mn
21	Hexagon nut	A194 2HM	A194-B	A194-8M	A194-B	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				
Face-to-face dimensions		ASME B16.10				
Type of connection	Flange	ASME B16.5	Butt welding	ASME B16.25		
Pressure test		API 598				
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric				

Materials of parts



Pressure rating	Nominal Diameter		d	Flanged		Butt welding	Raised face flange						W	Cast steel	Forged steel	Weight (kg)	
	Class	NPS		DN	L(RF)		L(RTJ)	L(BW)	D	D1	D2	f				b	N- ϕ d
150	1/2"	15	13	108	/	140	90	60.5	35	2	9	4- ϕ 16	140	80	78	2	Δ
	3/4"	20	19	117	/	152	100	70	43	2	10	4- ϕ 16	140	86	82	2.5	Δ
	1"	25	25	127	/	165	110	79.5	51	2	11	4- ϕ 16	140	98	95	3.5	Δ
	1 1/4"	32	32	140	/	178	115	89	64	2	11	4- ϕ 16	180	106	100	6.5	Δ
	1 1/2"	40	38	165	/	190	125	98.5	73	2	13	4- ϕ 16	180	133	128	7.5	Δ
	2"	50	50	178	191	216	150	120.5	92	2	14.5	4- ϕ 19	200	138	137	9	Δ
	3"	80	75	203	216	283	190	152.5	127	2	17.5	4- ϕ 19	300	175	148	19	Δ
	4"	100	100	229	241	305	230	190.5	157	2	22.5	8- ϕ 19	650	235	223	36	Δ
300	6"	150	150	394	406	457	280	241.5	216	2	24	8- ϕ 22	800	285	278	78	Δ
	8"	200	201	457	470	521	345	298.5	270	2	27	8- ϕ 22	1000	342	336	160	Δ
	1/2"	15	13	140	/	140	95	66.5	35	2	13	4- ϕ 16	140	80	78	2.5	Δ
	3/4"	20	19	152	/	152	115	82.5	43	2	14.5	4- ϕ 19	140	86	82	3.6	Δ
	1"	25	25	165	/	165	125	89	51	2	16	4- ϕ 19	140	98	95	5	Δ
	1 1/4"	32	32	178	/	178	135	98.5	64	2	17.5	4- ϕ 19	180	106	100	8.5	Δ
	1 1/2"	40	38	190	/	190	155	114.5	73	2	19.5	4- ϕ 22	180	133	128	10	Δ
	2"	50	50	216	232	216	165	127	92	2	21	8- ϕ 19	200	138	137	12	Δ
600	3"	80	75	283	298	283	210	168.5	127	2	27	8- ϕ 22	300	175	148	28	Δ
	4"	100	100	305	321	305	255	200	157	2	30.5	8- ϕ 22	650	235	223	46	Δ
	6"	150	150	403	419	457	320	270	216	2	35	12- ϕ 22	800	285	278	104	Δ
	8"	200	201	502	518	521	380	330	270	2	40	12- ϕ 25	1000	342	336	208	Δ
	1/2"	15	13	165	/	165	95	66.5	35	7	14.5	4- ϕ 16	140	78	68	5	Δ
	3/4"	20	19	190	/	190	115	82.5	43	7	16	4- ϕ 19	140	80	76	7	Δ
	1"	25	25	216	/	216	125	89	51	7	17.5	4- ϕ 19	180	110	106	9	Δ
	1 1/4"	32	32	229	/	229	135	98.5	64	7	21	4- ϕ 19	200	115	110	13	Δ
600	1 1/2"	40	38	241	/	241	155	114.5	73	7	22.5	4- ϕ 22	250	135	128	17	Δ
	2"	50	50	292	295	292	165	127	92	7	26	8- ϕ 19	300	152	140	21	Δ
	3"	80	75	356	359	356	210	168.5	127	7	32	8- ϕ 22	650	224	213	43	Δ
	4"	100	100	432	435	432	275	216	157	7	38.5	8- ϕ 25	800	248	238	85	Δ

Please consult the factory:
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		Butt welding	Raised face flange						W	Cast steel	Forged steel	Weight (kg)	
	Class	NPS			DN	L(RF)		L(RTJ)	L(BW)	D	D1	D2	f				b	N- ϕ d
150	3/4x1/2"	20	13	19	117	/	152	100	70	43	2	10	4- ϕ 16	140	80	78	Δ	Δ
	1x3/4"	25	19	25	127	/	165	110	79.5	51	2	11	4- ϕ 16	140	86	82	Δ	Δ
	1 1/4x1"	32	25	32	140	/	178	115	89	64	2	11	4- ϕ 16	180	98	95	Δ	Δ
	1 1/2x1 1/4"	40	32	38	165	/	190	125	98.5	73	2	13	4- ϕ 16	180	106	100	Δ	Δ
	2x1 1/2"	50	38	50	178	191	216	150	120.5	92	2	14.5	4- ϕ 19	200	133	128	8	Δ
	3x2"	80	50	75	203	216	283	190	152.5	127	2	17.5	4- ϕ 19	300	138	137	14	Δ
	4x3"	100	75	100	229	241	305	230	190.5	157	2	22.5	8- ϕ 19	650	175	148	24	Δ
	6x4"	150	100	150	267	278	403	280	241.5	216	2	24	8- ϕ 22	800	235	223	41	Δ
300	8x6"	200	150	201	292	305	419	345	298.5	270	2	27	8- ϕ 22	1000	285	278	68	Δ
	3/4x1/2"	20	13	19	152	/	152	115	82.5	43	2	14.5	4- ϕ 19	140	80	78	Δ	Δ
	1x3/4"	25	19	25	165	/	165	125	89	51	2	16	4- ϕ 19	140	86	82	Δ	Δ
	1 1/4x1"	32	25	32	178	/	178	135	98.5	64	2	17.5	4- ϕ 19	180	98	95	Δ	Δ
	1 1/2x1 1/4"	40	32	38	190	/	190	155	114.5	73	2	19.5	4- ϕ 22	180	106	100	Δ	Δ
	2x1 1/2"	50	38	50	216	232	216	165	127	92	2	21	8- ϕ 19	200	133	128	11	Δ
	3x2"	80	50	75	283	298	283	210	168.5	127	2	27	8- ϕ 22	300	138	137	21	Δ
	4x3"	100	75	100	305	321	305	255	200	157	2	30.5	8- ϕ 22	650	175	148	36	Δ
600	6x4"	150	100	150	403	419	457	320	270	216	2	35	12- ϕ 22	800	235	223	82	Δ
	8x6"	200	150	201	419	435	419	380	330	270	2	40	12- ϕ 25	1000	285	278	126	Δ
	3/4x1/2"	20	13	19	190	/	190	115	82.5	43	7	16	4- ϕ 19	140	78	68	Δ	Δ
	1x3/4"	25	19	25	216	/	216	125	89	51	7	17.5	4- ϕ 19	180	80	76	Δ	Δ
	1 1/4x1"	32	25	32	229	/	229	135	98.5	64	7	21	4- ϕ 19	200	110	106	Δ	Δ
	1 1/2x1 1/4"	40	32	38	241	/	241	155	114.5	73	7	22.5	4- ϕ 22	250	115	110	Δ	Δ
	2x1 1/2"	50	38	50	292	295	292	165	127	92	7	26	8- ϕ 19	300	135	128	Δ	Δ
	3x2"	80	50	75	356	359	356	210	168.5	127	7	32	8- ϕ 22	650	152	140	Δ	Δ
4x3"	100	75	100	432	435	432	275	216	157	7	38.5	8- ϕ 25	800	224	213	Δ	Δ	

Please consult the factory:
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.

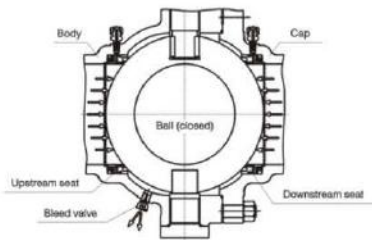
USAGE

The trunnion ball valve is used to cut off or connect the media in various pipelines of Class150—Class2500. 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 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 discharge device to reduce damage to the seat by impurities in the medium.



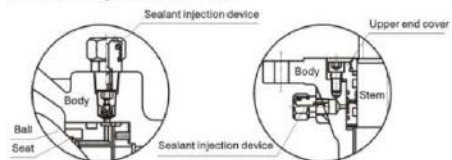
2.Low Operating Torque

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.

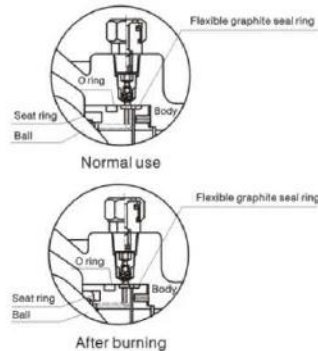
Sealant Injection Device



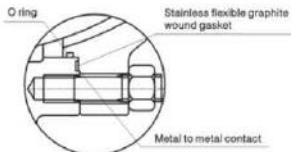
4.Fireproof Structure Design

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 seat 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.

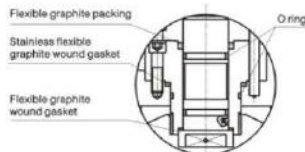
Fireproof Structure of seat



Fireproof Structure of Middle Flange



Fireproof Structure Design of Stem



5.Anti-static Structure

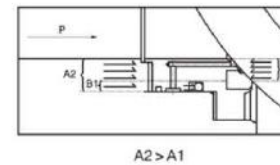
The ball valve is provided with the anti-static structure and adopts the static electricity discharge device to directly form a static channel between the ball and body through the stem, so as to discharge the static electricity produced due to friction during the opening and closing of ball and seat through the pipeline, avoiding fire or explosion that may be caused by static spark and ensuring system safety.

6.Reliable seat sealing structure

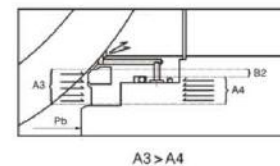
The seat sealing is realized through two floating seat retainers. They can float axially to block the fluid, including ball sealing and body sealing. The low pressure sealing of valve seat is realized by spring pre-tightening. In addition, the piston effect of valve seat is designed reasonably, which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



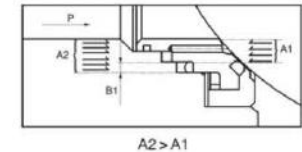
The downstream side: Once the pressure P_b inside the valve cavity increases, the force exerted on $A3$ is higher than that on $A4$. As $A3 \cdot A4 = B2$, the pressure differential on $B2$ will overcome the spring force to make the seat release from the ball and realize pressure relief of valve cavity to the downstream part. Afterwards, the seat and ball will be sealed again under the spring action.



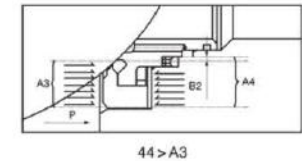
8.Double Sealing (Double Piston)

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 in the area $A2$ of valve seat is higher than the force exerted on the area $A1$, $A2 \cdot A1 = B1$. Therefore, the force in $B1$ will push the seat towards the ball and realize tight sealing of the upstream part.

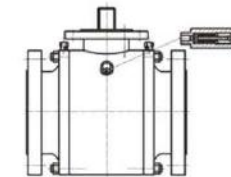


Secondary sealing: Downstream. When the pressure differential is lower or there is no pressure differential, the floating seat will move axially along the valve under the spring action and push the seat towards the ball to keep tight sealing. When the valve cavity pressure P increases, the force exerted on the area $A4$ of valve seat is higher than the force exerted on the area $A3$, $A4 \cdot A3 = B1$. Therefore, the force on $B1$ will push the seat towards the ball and realize tight sealing of the upstream part.



9.Safety Relief 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 NPT 1/2. Another point to be noted is that the medium of the safety relief valve is directly discharged into the atmosphere. In case of 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.



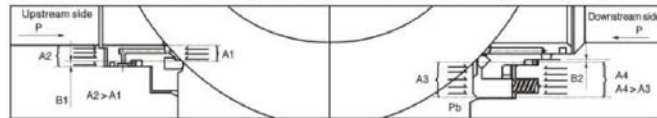
Structural Features

10. Social Structure of Automatic Pressure Relief Towards Upper Stream

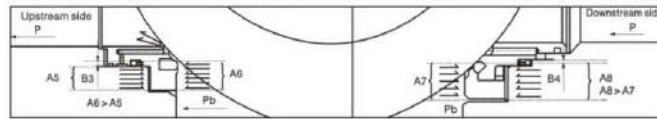
As the ball valve is designed with the advanced primary and secondary sealing that has double piston effect, and the middle cavity cannot realize automatic pressure relief, the ball valve with the special structure is recommended to meet the requirement of automatic pressure relief and ensure no pollution 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, Not 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

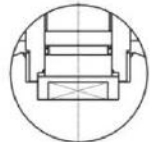


Principle drawing of ball valve cavity pressure relief to the upper stream and of downstream sealing



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

extender to the top for the convenience of operation. Users should indicate the extension stem requirements and length when placing orders. For ball valve 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

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.

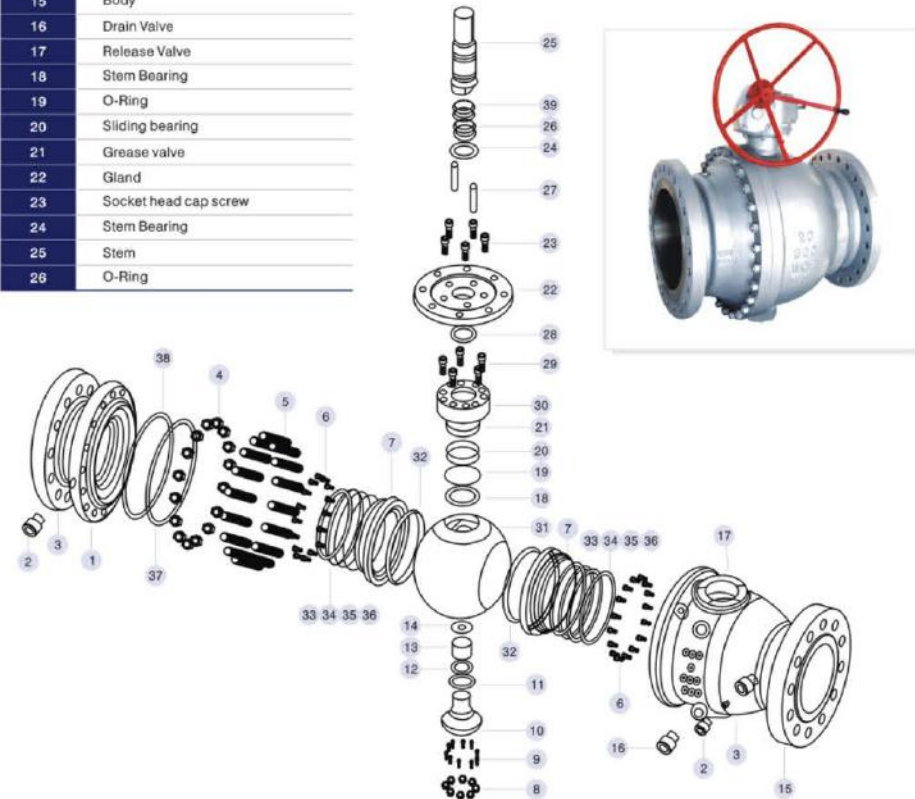
13. Extension Stem

As for the embedded valve, 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

Cast Trunnion Ball Valve

1	Bonnet
2	Grease valve
3	Damping valve
4	Nut
5	Stud
6	Spring
7	Seat Retainer
8	Nut
9	Stud
10	Lower Cover
11	Gasket
12	O-Ring
13	Thrust Bearing
14	Stem Bearing
15	Body
16	Drain Valve
17	Release Valve
18	Stem Bearing
19	O-Ring
20	Sliding bearing
21	Grease valve
22	Gland
23	Socket head cap screw
24	Stem Bearing
25	Stem
26	O-Ring

27	Pin
28	Packing
29	Socket head cap screw
30	Packing Box
31	Ball
32	Seat
33	O-Ring
34	Gasket
35	Fire Proof Ring
36	O-Ring
37	O-Ring
38	Gasket
39	Gasket



Part Materials and Main Parameters

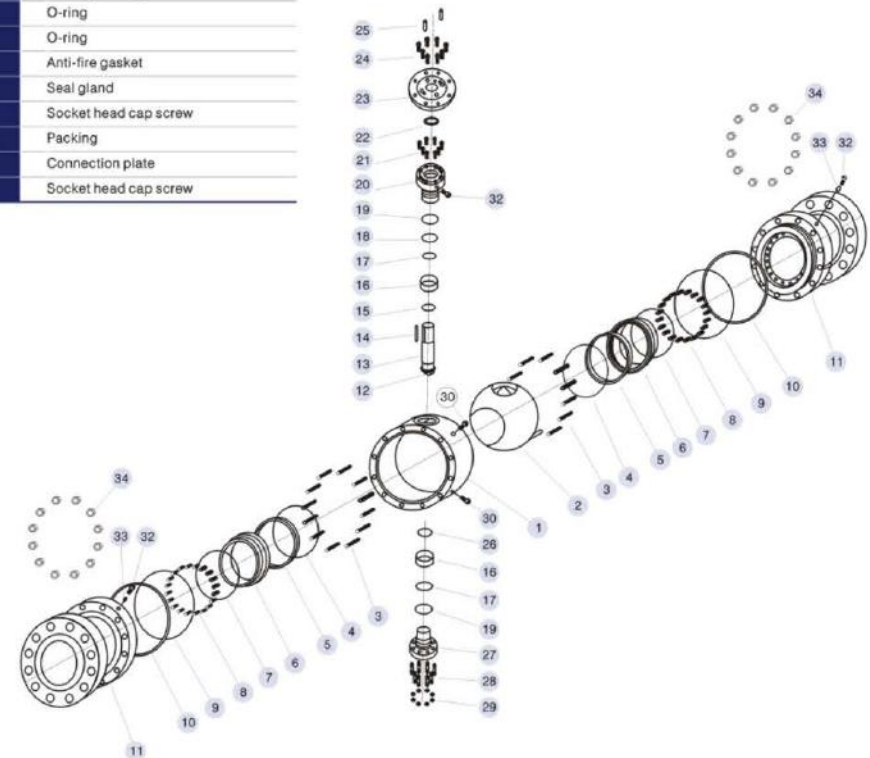
Nominal diameter (in)		NPS1/2-8				
Nominal Pressure (MPa)		Class150-Class900				
No.	Part Name	Material				
		Carbon steel		Stainless steel		
1	Body	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M
2	Bonnet	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M
3	Ball	ASTM A105 + ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
4	Anti-fire paking	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
	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 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



Part Materials and Main Parameters

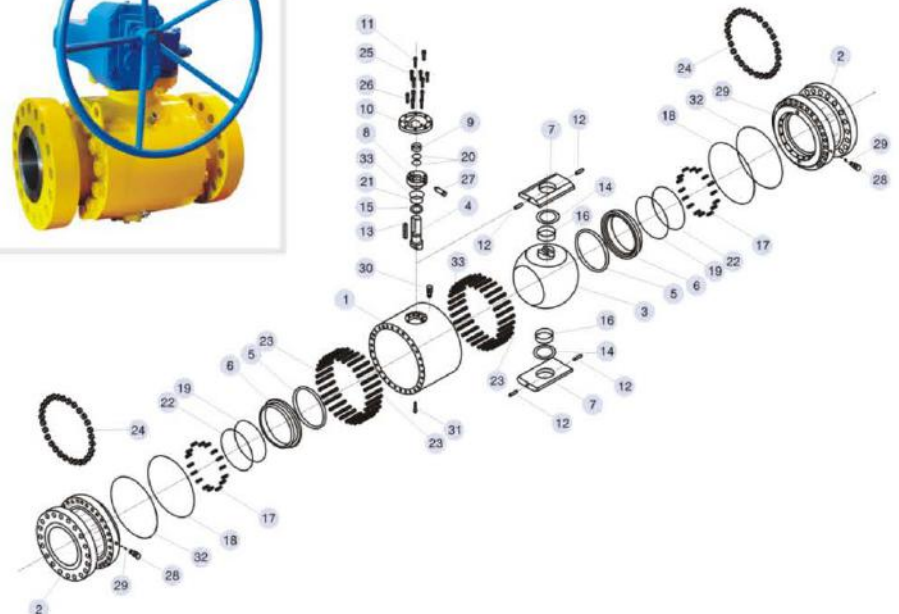
Nominal diameter (in)		NPS1/2-8				
Nominal Pressure (MPa)		Class150~Class900				
No.	Part Name	Material				
		Carbon steel	Stainless steel			
1	Body	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
2	Ball	ASTM A105 - ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
3	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, liquefied gas, oil, gas, natural gas, etc.				
	Applicable temperature	120°C(PTFE), ≤60°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 Ball Valve

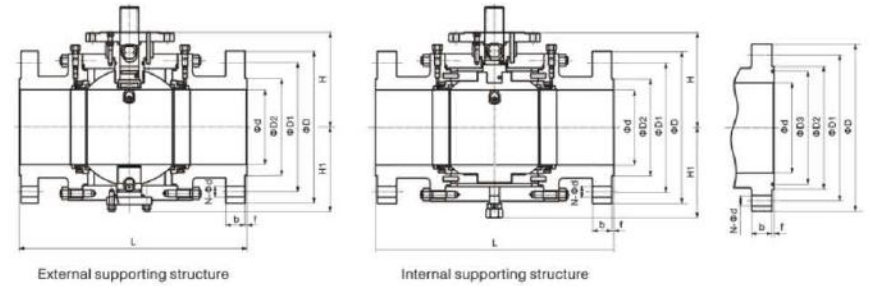
1	Body
2	Bonnet
3	Ball
4	Stem
5	Seat
6	Seat ring
7	Bearing holder
8	Seal gland
9	Packing
10	Connection plate
11	Pin
12	Pin
13	Flat key
14	Thrust bearing
15	Thrust bearing
16	Thrust bearing
17	Spring

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



Part Materials and Main Parameters

Nominal diameter (in)		NPS 2-48				
Nominal Pressure (MPa)		Class150~Class2500				
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	ASME A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
5	Seat	PTFE/NYLON/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 paking	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, liquefied gas, oil, 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				



Pressure rating	Nominal Diameter	d	Flange		Butt welding	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	General	Support Board
150	2"	50	50	178	191	216	160	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	465	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	48	24-Φ35	626	582	626	594	3612	3793
	28"	700	684	1245	/	1346	927	864	800	/	2	71	28-Φ35	644	605	644	605	4402	4622
	30"	750	735	1295	/	1387	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	/	/	1298	1200	1124	/	2	90	36-Φ41	913.5	866	913.5	863	12313	12929	
42"	1050	1020	1855	/	/	1346	1257	1194	/	2	97	44-Φ41	943	881	943	937	14000	14700	
48"	1200	1166	2134	/	/	1511	1422	1359	/	2	108	36-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	127	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	29	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	574	/	2	62	24-Φ35	502	458	502	474	2200	2310
	24"	600	589	1143	1165	1143	915	813	592	/	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	737	680	736	4974	5223
	30"	750	735	1397	/	1397	1092	997	857	/	2	92	28-Φ48	730	682	730	684	5681	5965
	32"	800	779	1524	/	1524	1179	1054	914	/	2	98	32-Φ54	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	971	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 size H, H1, and weight will not be notified otherwise.



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