

# Special Ball Valve Series



## METAL SEATED BALL VALVE

### SUMMARY

With such features as small fluid resistance, smooth flow channel, rapid opening and dosing, and easy automatic control, the ball valve has been widely used. But the seat of regular ball valves is generally made of PTFE and other nonmetal materials. Limited by seat seal materials, the regular valves cannot be used under the service condition of high temperature. Therefore, the use of regular ball valves is limited to a certain degree. The series of new style practical metal seated ball valve products are newly designed to solve the above problem, and have been widely applied in petroleum, chemical industry, electric power, metallurgy, light industry and etc.

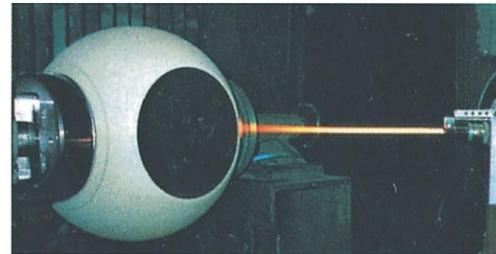
### USAGE

The metal seated ball valve is used to cut off or connect the media in various pipelines. It is suitable for severe service conditions containing solid granules, slurry, coal powder, cinder and etc.

### DESIGN STRUCTURAL FEATURES

#### 1. Advanced Ball And Seat Hardening Technology

The ball and seat of the metal seated ball valve absolutely adopts the sealing mode of metal to metal. 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. Generally, the ball and seat surface hardness can reach HTC55-60 with the maximum value of HRC70. Generally, the heat resistance of the sealing face material can reach 540°C with the maximum value of 980°C. The sealing face material has also good wear resistant and impact resistant performances.



#### 2. Flexible Valve Opening And Closing

Under the service condition of high temperature, the ball and seat will expand too much because of thermal expansion, and thus causing that the valve cannot be opened. The ball valve adopts the disc spring or spring loaded sealing structure so that thermal expansion of parts under high temperature can be absorbed by the disc spring or spring, and it is ensured that the valve will be flexibly opened and closed under high temperature without expanding too much under high temperature.

#### 3. Fire-safe design structure

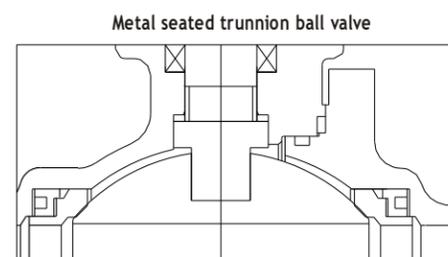
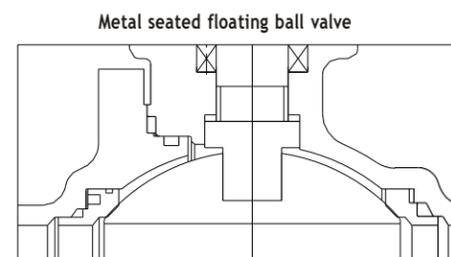
In the metal to metal sealing structure for the valve, the gasket is the stainless steel + flexible graphite and the packing is the flexible graphite. Therefore, reliable sealing of the valve can be ensured even in case of fire.

#### 4. Double block and bleed (metal seated trunnion ball valve)

The metal seated trunnion ball valve usually adopts the sealing structure before the ball. 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. The metal seated floating ball valve usually adopts the sealing structure after the ball. Unidirectional sealing is generally adopted with flow direction marked on the body. If users have special requirements, bidirectional sealing structure can be adopted.

#### 5. Reliable sealing performance

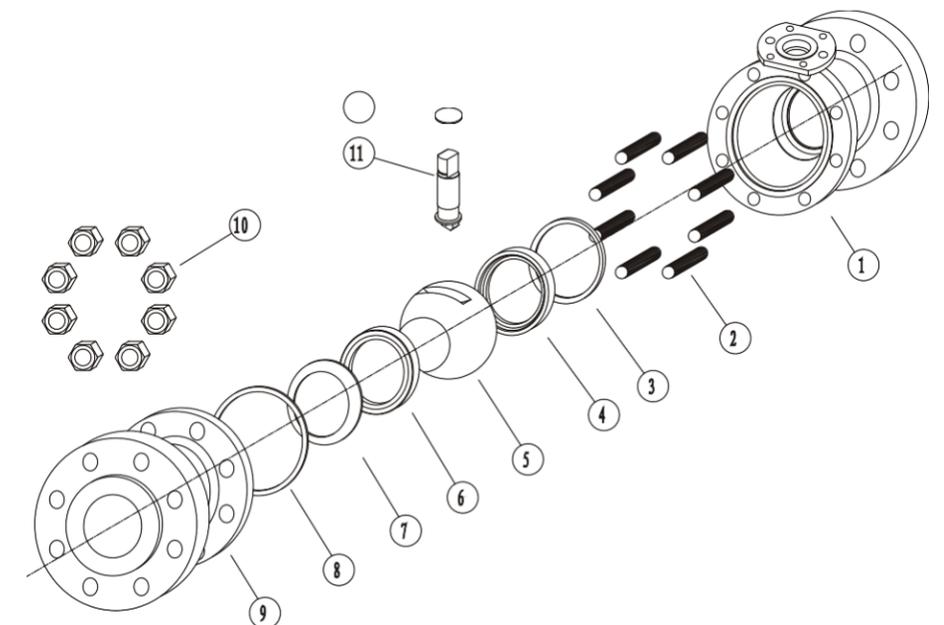
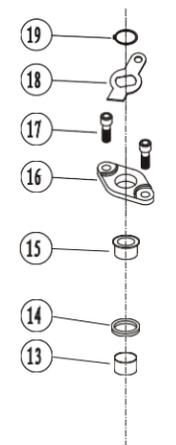
When the grinder is at different positions, the ball surface will achieve high roundness and fineness. The low pressure sealing of valve seat is realized by spring pre-tightening. In addition, the piston effect of valve seat is designed reasonably, which realizes high pressure sealing by the pressure of the medium itself. The sealing level of the valve meets the requirement of level IV in ANSI B16.104.



## METAL SEATED BALL VALVE

### METAL SEATED FLOATING BALL VALVE

1	Body
2	Stud
3	Sealing gasket
4	Back seat
5	Ball
6	Front seat
7	Disc spring
8	Sealing gasket
9	Bonnet
10	Hexagon nut
11	Stem
12	Thrust bearing
13	Sliding bearing
14	Packing
15	Packing bushing
16	Packing gland
17	Socket head cap screw
18	Stopper
19	Retainer ring



## METAL SEATED BALL VALVE

## METAL SEATED BALL VALVE

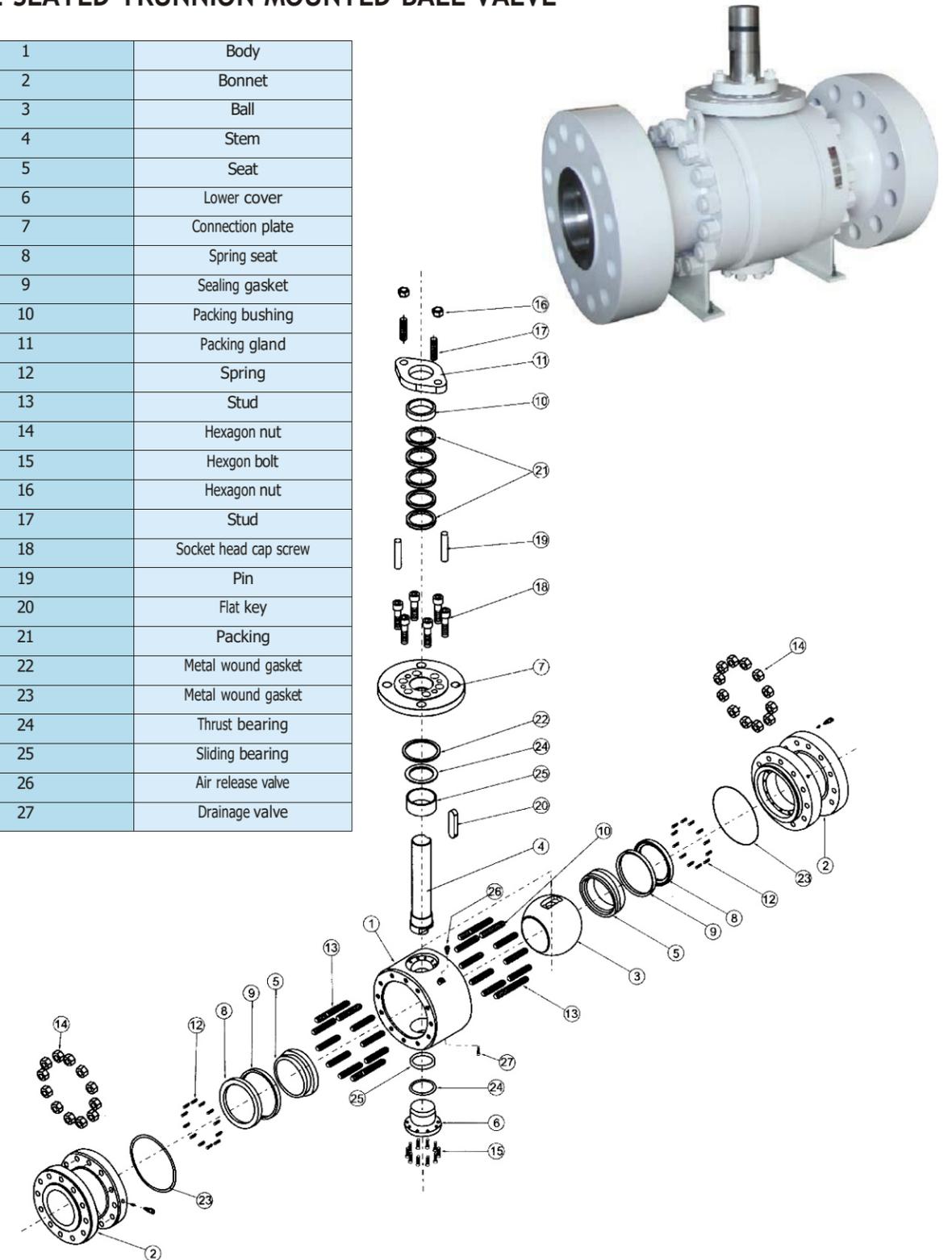
### METAL SEATED FLOATING BALL VALVE

#### Part Materials And Main Parameters

Nominal diameter(in)		NPS 1/2~8					
Nominal pressure(Class)		Class150~Class600					
Materials of parts	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	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
	3	Sealing gasket	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
	4	Back seat	ASTM A105+HF	ASTM A182 304+HF	ASTM A182 316+HF	ASTM A182 304L+HF	ASTM A182 316L+HF
	5	Ball	ASTM A105+HF	ASTM A182 304+HF	ASTM A182 316+HF	ASTM A182 304L+HF	ASTM A182 316L+HF
	6	Front seat	ASTM A105+HF	ASTM A182 304+HF	ASTM A182 316+HF	ASTM A182 304L+HF	ASTM A182 316L+HF
	7	Disc spring	17-7PH	17-7PH	17-7PH	17-7PH	17-7PH
	8	Sealing gaskey	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
	9	Bonnet	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M
	10	Hexagon nut	A194 2HM	A194-8	A194 -8M	A194-8	A194-8M
	11	Stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	12	Thrust bearing	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
	13	Sliding bearing	TF-2	TF-2	TF-2	TF-2	TF-2
	14	Packing	Graphite	Graphite	Graphite	Graphite	Graphite
	15	Packing bushing	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a
	16	Packing gland	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB
	17	Socket head cap screw	A193 B7M	A193 B7M	A193 B7M	A193 B7M	A193 B7M
18	Stopper	A3.Zn	A3.Zn	A3.Zn	A3.Zn	A3.Zn	
19	Retainer ring	65Mn	65Mn	65Mn	65Mn	65Mn	
Applicable service conditions	Applicable media	Water, steam, oil, gas, liquefied gas, natural gas, etc.	Nitric Acid	Nitric Acid	Strong Oxidizer	Urea	
	Applicable temperature	-29~+425℃	≤200℃				
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					

### METAL SEATED TRUNNION MOUNTED BALL VALVE

1	Body
2	Bonnet
3	Ball
4	Stem
5	Seat
6	Lower cover
7	Connection plate
8	Spring seat
9	Sealing gasket
10	Packing bushing
11	Packing gland
12	Spring
13	Stud
14	Hexagon nut
15	Hexgon bolt
16	Hexagon nut
17	Stud
18	Socket head cap screw
19	Pin
20	Flat key
21	Packing
22	Metal wound gasket
23	Metal wound gasket
24	Thrust bearing
25	Sliding bearing
26	Air release valve
27	Drainage valve



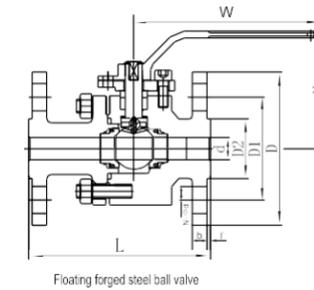
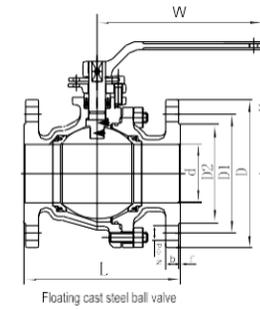
METAL SEATED BALL VALVE

METAL SEATED BALL VALVE

METAL SEATED TRUNNION MOUNTED BALL VALVE

Part Materials And Main Parameters

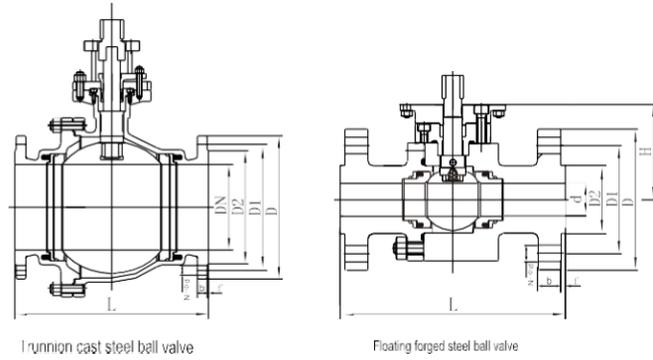
Nominal diameter(in)		NPS 2~48					
Nominal pressure(Class)		Class150~Class600					
Materials of parts	No	Part Name	Carbon Steel	Stainless Steel			
	1	Body	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	2	Bonnet	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	3	Ball	ASTM A105+HF	ASTM A182 304+HF	ASTM A182 316+HF	ASTM A182 304L+HF	ASTM A182 316L+HF
	4	Stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	5	Seat	ASTM A105+HF	ASTM A182 304+HF	ASTM A182 316+HF	ASTM A182 304L+HF	ASTM A182 316L+HF
	6	Lower cover	ASTM A105 • CHR	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	7	Connection plate	ASTM A105	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	8	Spring seat	ASTM A105 • CHR	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	9	Sealing gasket	Graphite	Graphite	Graphite	Graphite	Graphite
	10	Packing bushing	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a
	11	Packing gland	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB
	12	Spring	17-7PH	17-7PH	17-7PH	17-7PH	17-7PH
	13	Stud	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
	14	Hexagon nut	A194 2HM	A194-8	A194 -8M	A194-8	A194-8M
	15	Hexgon bolt	A193 B7M	A320 B8	A320 B8 M	A320 B8	A320 B8M
	16	Hexagon nut	A194 2H	A194-8	A194 -8	A194-8	A194-8
	17	Stud	A193 B7M	A193 B7M	A193 B7M	A193 B7M	A193 B7M
	18	Socket head cap screw	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
	19	Pin	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035
	20	Flat key	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045
	21	Packing	Graphite	Graphite	Graphite	Graphite	Graphite
	22	Metal wound gasket	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
	23	Metal wound gasket	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
	24	Thrust bearing	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
	25	Sliding bearing	TF-2	TF-2	TF-2	TF-2	TF-2
	26	Air release valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
27	Drainage valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts	
	Applicable media	Water, steam, oil, gas, liquefied gas, natural gas, etc.	Nitric Acid	Nitric Acid	Strong Oxidizer	Urea	
	Applicable temperature		≤ ℃				
	Design and manufacturing						
	Face-to-face dimensions						
	Type of connection	Flange	ASME B16.5	Butt welding	ASME B16.25		
	Pressure test	API 598, API 6D					
	Transmission mode	Manual, worm and worm gear transmission, pneumatic, electric					



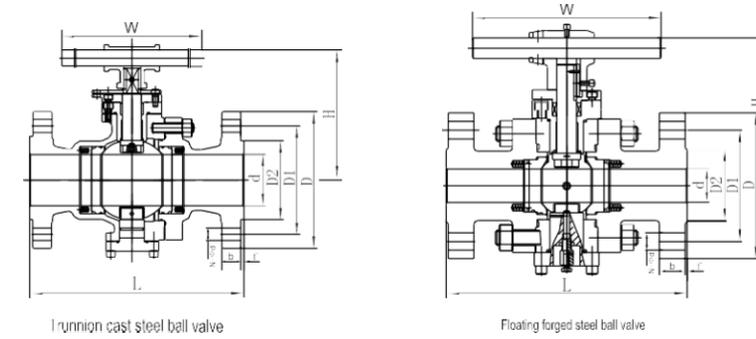
Pressure rating	Nominal Diameter		d	Flanged		Butt welding L(BW)	Raised face flange						W	Cast steel H	Forged steel H	Weight(kg)	
	Class	NPS		DN	L(RF)		L(RTJ)	D	D1	D2	f	b				N- d	Cast steel
150	1/2"	15	13	108	-	140	90	60.5	35	2	9	4- 16	140	80	63	2.3	△
	3/4"	20	19	117	-	152	100	70	43	2	10	4- 16	140	86	82.5	3	△
	1"	25	25	127	-	165	110	79.5	51	2	11	4- 16	140	95	93.5	4.5	△
	1 1/4"	32	32	140	-	178	115	89	64	2	11	4- 16	180	101	96	5.5	△
	1 1/2"	40	38	165	-	190	125	98.5	73	2	13	4- 16	180	128.5	128	7	△
	2"	50	50	178	191	216	150	120.5	92	2	14.5	4- 19	200	136	136	9.5	△
	3"	80	75	203	216	283	190	152.5	127	2	17.5	4- 19	300	145	145	19	△
	4"	100	100	229	241	305	230	190.5	157	2	22.5	8- 19	650	197.5	204	33	△
300	1/2"	15	13	140	-	140	95	66.5	35	2	13	4- 16	140	80	63	2.5	△
	3/4"	20	19	152	-	152	115	82.5	43	2	14.5	4- 19	140	82	82.5	3.5	△
	1"	25	25	165	-	165	125	89	51	2	16	4- 19	140	84	93.5	5.5	△
	1 1/4"	32	32	178	-	178	135	98.5	64	2	17.5	4- 19	180	101	96	8	△
	1 1/2"	40	38	190	-	190	155	114.5	73	2	19.5	4- 22	180	128.5	128	10.5	△
	2"	50	50	216	232	216	165	127	92	2	21	8- 19	200	136	136	15	△
	3"	80	75	283	298	283	210	168.5	127	2	27	8- 22	300	145	145	30	△
	4"	100	100	305	321	305	255	200	157	2	30.5	8- 22	650	197.5	204	55	△
600	1/2"	15	13	165	-	165	95	66.5	35	7	14.5	4- 16	140	88	78	3.5	△
	3/4"	20	19	190	-	190	115	82.5	43	7	16	4- 19	140	98	92.5	6.5	△
	1"	25	25	216	-	216	125	89	51	7	17.5	4- 19	180	115	102	8.5	△
	1 1/4"	32	32	229	-	229	135	98.5	64	7	21	4- 19	200	125	110	10.5	△
	1 1/2"	40	38	241	-	241	155	114.5	73	7	22.5	4- 22	250	142	128	13.5	△
	2"	50	50	292	295	292	165	127	92	7	26	8- 19	300	160	142	△	△
	3"	80	75	356	359	356	210	168.5	127	7	32	8- 22	650	178	156	△	△

△ Please consult the factory:  
Note: The weight valve 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.

### METAL SEATED BALL VALVE



### METAL SEATED BALL VALVE



Pressure rating	Nominal Diameter		d	Flanged			Butt welding	Raised face flange					Cast steel	Forged steel	Weight(kg)	
	Class	NPS		DN	L(RF)	L(RTJ)		L(BW)	D	D1	D2	f			b	N-φ d
150	4"	100	100	229	241	305	230	190.5	157	2	22.5	8-φ 19	220	197	33	△
	6"	150	150	394	406	457	280	241.5	216	2	24	8-φ 22	300	250	93	△
	8"	200	201	457	470	521	345	298.5	270	2	27	8-φ 22	355	290	160	△
300	4"	100	100	305	321	305	255	200	157	2	30.5	8-φ 22	220	197	55	△
	6"	150	150	403	419	457	320	270	216	2	35	12-φ 22	300	250	118	△
	8"	200	201	502	518	521	380	330	270	2	40	12-φ 25	355	290	200	△
600	4"	100	100	432	435	432	275	216	157	7	38.5	8-φ 25	230	205	△	△
	6"	150	150	559	562	559	355	292	216	7	48	12-φ 29	310	260	△	△
	8"	200	201	660	664	660	420	349	270	7	56	12-φ 32	370	310	△	△

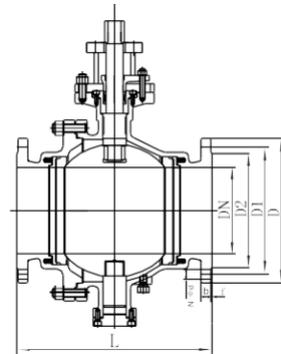
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Pressure rating	Nominal Diameter		d	Flanged			Butt welding	Raised face flange					W	Cast steel	Forged steel	Weight(kg)		
	Class	NPS		DN	L(RF)	L(RTJ)		L(BW)	D	D1	D2	D3				f	b	N-φ d
150	2"	50	50	178	191	216	150	120.5	92	-	2	14.5	4-φ 19	200	174	153	14	19
	3"	80	75	203	216	283	190	152.5	127	-	2	17.5	4-φ 19	300	178	162	26	28
	4"	100	100	229	241	305	230	190.5	157	-	2	22.5	8-φ 19	650	288	240	45	48
300	2"	50	50	216	232	216	165	127	92	-	2	21	8-φ 19	200	174	153	17	22
	3"	80	75	283	298	283	210	168.5	127	-	2	27	8-φ 22	300	178	162	35	38
	4"	100	100	305	321	305	255	200	157	-	2	30.5	8-φ 22	650	288	240	55	60
600	2"	50	50	292	295	292	165	127	92		7	26	8-φ 19	300	178	153	28	28
	3"	80	75	356	359	356	210	168.5	127		7	32	8-φ 22	300	283	244	55	65
900	2"	50	50	368	371	368	215	165	124	95.25	7.92	38.5	8-φ 25	650	233	222	△	57
	3"	80	75	381	384	381	240	190.5	156	123.83	7.92	38.5	8-φ 25	800	276	255	△	87

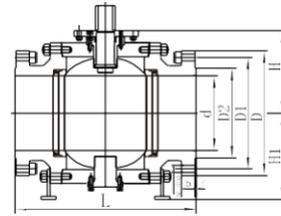
△ Please consult the factory:  
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## METAL SEATED BALL VALVE

## ORBIT BALL VALVE



Cast steel trunnion ball valve



Forged steel trunnion ball valve

Pressure rating	Nominal Diameter		d	Flanged		Butt welding	Raised face flange						Cast steel		Forged steel		Weight(kg)		
	Class	NPS		DN	L(RF)		L(RTJ)	L(BW)	D	D1	D2	D3	f	b	N-φ d	H	H	H	H
150	6"	150	150	394	406	457	280	241.5	216	-	2	24	8-φ 22	310	213.5	276	178.5	120	170
	8"	200	201	457	470	521	345	298.5	270	-	2	27	8-φ 22	384.5	272	319	222	300	300
	10"	250	252	533	546	559	405	362	324	-	2	29	12-φ 25	434	363	370	265	315	430
	12"	300	303	610	622	635	485	432	381	-	2	30.5	12-φ 25	513	412	419.5	310	500	680
	14"	350	334	686	699	762	535	476	413	-	2	33.5	12-φ 29	535	436	432	334	670	930
	16"	400	385	762	775	838	595	540	470	-	2	35	16-φ 29	575	462	515	375	900	1130
	18"	450	436	864	876	914	635	578	533	-	2	38.5	16-φ 32	615	507	560	410	1080	1560
20"	500	487	914	927	991	700	635	584	-	2	41.5	20-φ 32	685	536	623	458	1560	2020	
300	6"	150	150	403	419	457	320	270	216	-	2	35	12-φ 22	310	213.5	276	178.5	160	180
	8"	200	201	502	518	521	380	330	270	-	2	40	12-φ 25	384.5	272	319	222	260	258
	10"	250	252	568	584	559	445	387.5	324	-	2	46.5	16-φ 29	434	363	370	265	380	413
	12"	300	303	648	664	635	520	451	381	-	2	49.5	16-φ 32	513	412	419.5	310	570	629
	14"	350	334	762	778	762	585	514.5	413	-	2	52.5	20-φ 32	535	436	432	334	750	887
	16"	400	385	838	854	838	650	571.5	470	-	2	56	20-φ 35	575	462	515	375	1120	1340
	18"	450	436	914	930	914	710	628.5	533	-	2	59	24-φ 35	615	507	560	410	1460	1610
20"	500	487	991	1010	991	775	686	584	-	2	62	24-φ 35	685	536	623	458	2030	2200	
600	4"	100	100	432	435	432	275	216	157	-	7	38.5	8-φ 25	234	165	261	150	102	118
	6"	150	150	559	562	559	355	292	216	-	7	48	12-φ 29	335	251	283	192.5	250	250
	8"	200	201	660	664	660	420	349	270	-	7	56	12-φ 32	430	290	339.5	235	430	430
	10"	250	252	787	791	787	510	432	324	-	7	64	16-φ 35	466	334	380	280	680	680
	12"	300	303	838	841	838	560	489	381	-	7	67	20-φ 35	528	383	432	320	985	985
	14"	350	334	889	892	889	605	527	413	-	7	70	20-φ 39	600	398	473	350	1006	1002
	16"	400	385	991	994	991	685	603	470	-	7	77	20-φ 41	630	434	515	395	1160	1160
18"	450	436	1092	1095	1092	745	654	533	-	7	83	20-φ 44	685	473	560	439	1611	1611	
20"	500	487	1194	1200	1194	815	724	584	-	7	89	24-φ 44	740	506	617	490	2985	2985	
900	4"	100	100	457	460	457	290	235	181	149.23	7.92	45	8-φ 32	310	186	267	267	△	△
	6"	150	150	610	613	610	380	317.5	241	211.12	7.92	56	12-φ 32	372	262	288.5	200	△	△
	8"	200	201	737	740	737	470	393.5	308	269.88	7.92	64	12-φ 39	428	300	300	250	△	△
	10"	250	252	838	841	838	545	470	362	323.85	7.92	70	16-φ 39	477	346	410	300	△	△
	12"	300	303	965	968	965	610	533.5	419	381	7.92	79.5	20-φ 39	543	388	432	320	△	△
	14"	350	322	1029	1038	1029	640	559	467	419.1	11.13	86	20-φ 42	558	402	△	△	△	△
	16"	400	373	1130	1140	1130	705	616	524	469.9	11.13	89	20-φ 45	605	442	△	△	△	△
	18"	450	423	1219	1232	1219	785	686	594	533.4	12.7	102	20-φ 51	657	489	△	△	△	△
20"	500	471	1321	1334	1321	855	749.5	648	584.2	12.7	108	20-φ 54	729	538	△	△	△	△	

△ Please consult the factory;  
Note: The weight valve 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.

## SUMMARY

The valve is suitable for use in petrochemical industry, liquefied petroleum gas storage, refinery, natural gas, compressor system, oil and gas transportation pipeline, light industry, textile and other industries.

## DESIGN STRUCTURAL FEATURES

### 1. Top Entry Structure

The valve adopts the top entry structure. The most distinctive difference between this kind of valve and others is that the online maintenance function can be realized without the need of removing the valve from the pipeline.

### 2. Integral Structure

The body adopts the integral structure, so as to ensure that it has enough strength and rigidity under the maximum rated working pressure, the valve trims have been carefully designed and selected to ensure reliability under various service conditions. The sufficient wall thickness and the connection bolts of high strength are very helpful to the maintenance and servicing of valves and are able to endure pipeline stress.

### 3. Lower Torque Operation

The stem structure is specially designed and there is no friction between seat and ball sealing faces, therefore the stem can turn easily with low opening and closing torque.

## WORK PRINCIPLE

### Opening Of Orbit Ball Valve

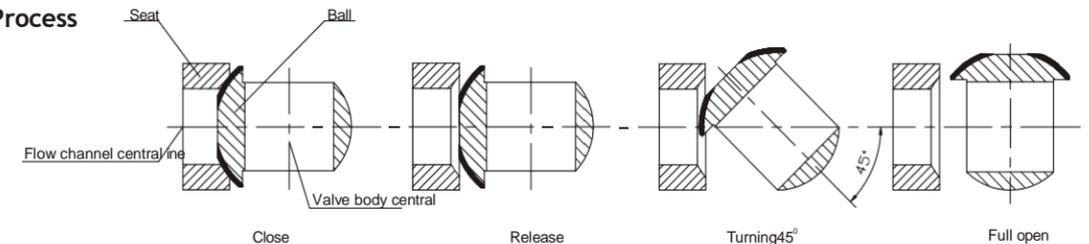
When it is at the closed position, the ball is closely pressed onto the seat under the mechanical pressure of stem. When the handwheel is turned counterclockwise. The stem will move upward, and the angular plane at the bottom of stem will make the ball sealing face leave the seat. The stem will continue rising and interact with the guide pin in the stem spiral groove to make the ball turn 90° without friction until the stem rises to the ultimate position and the ball hole is aligned with the valve channel.

### Closing Of Ball Valve

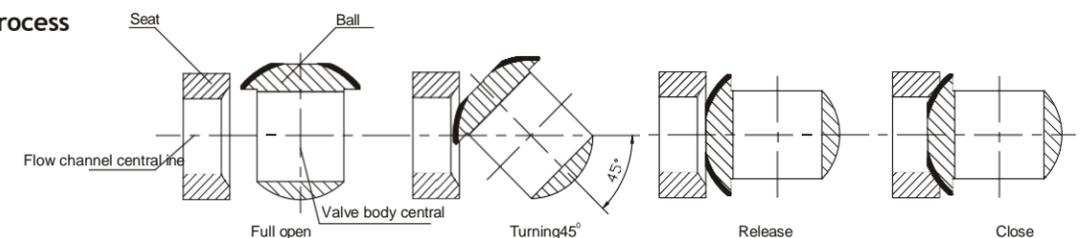
During the closing, turn the handwheel clockwise, the stem will move downward and make the ball start rotation. Continue turning the handwheel, and the stem will make the stem and ball turn 90° together under the action of guide pin in the spiral groove embedded in the stem, when it is nearly closed, the ball has turned 90° without contact with the seat, the stem will continue moving downward, the ball sways to press the seat so as to make the sealing face in the seat produce elastic deformation and closely fit the ball sealing face, and therefore, ensuring safe and reliable zero leakage.

### opening and closing schematic diagram

#### Opening Process



#### Closing Process

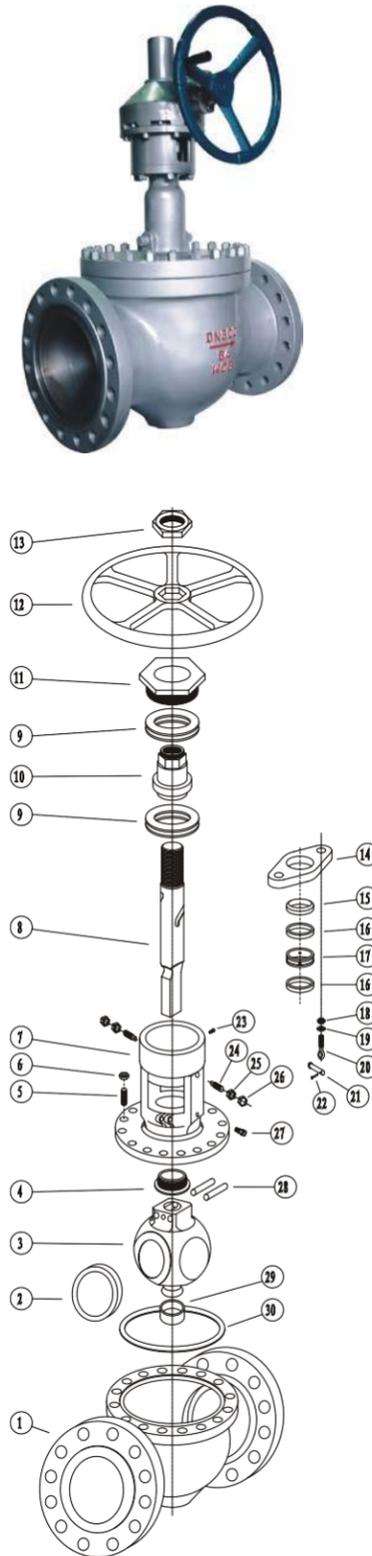


## ORBIT BALL VALVE

## ORBIT BALL VALVE

### ORBIT BALL VALVE

1	Body
2	Seat
3	Ball
4	Upper bearing sleeve
5	Stud
6	Hexagon nut
7	Bonnet
8	Stem
9	Rolling bearing
10	Stem nut
11	Nut gland
12	Handwheel
13	Anchor nut
14	Packing gland
15	Bushing
16	Packing
17	Lantern ring
18	Hexagon nut
19	Flat washer
20	Eye bolt
21	Pin
22	Forelck
23	Oil cap
24	Holding screw
25	Hexagon nut
26	Cap nut
27	Sealant injection vlave
28	Rolling pin
29	Locating bush
30	Metal wound gasket

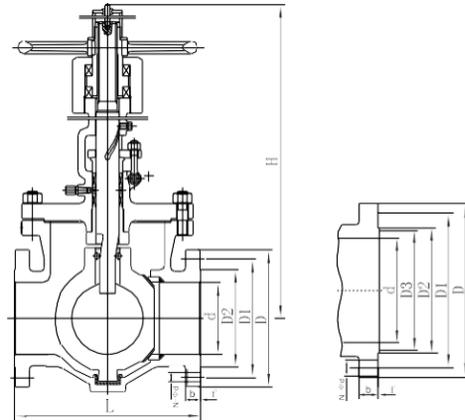


### ORBIT BALL VALVE

#### Part Materials And Main Parameters

Nominal diameter(in)		NPS 2~20				
Nominal pressure(Class)		Class150~Class600				
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	Seat	ASTM A105+HF	ASTM A182 304+HF	ASTM A182 316+HF	ASTM A182 304L+HF	ASTM A182 316L+HF
3	Ball	ASTM A105+HF	ASTM A182 304+HF	ASTM A182 316+HF	ASTM A182 304L+HF	ASTM A182 316L+HF
4	Upper bearing sleeve	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
5	Stud	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M
6	Hexagon nut	A194 2HM	A194-8	A194 -8M	A194-8	A194-8M
7	Bonnet	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M
8	Stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
9	Rolling bearing	bearing steel	bearing steel	bearing steel	bearing steel	bearing steel
10	Stem nut	A429 D-2	A429 D-2	A429 D-2	A429 D-2	A429 D-2
11	Nut gland	ASTM A105	ASTM A105	ASTM A105	ASTM A105	ASTM A105
12	Handwheel	QT400-17	QT400-17	QT400-17	QT400-17	QT400-17
13	Anchor nut	A194 2HM	A194 2HM	A194 2HM	A194 2HM	A194 2HM
14	Packing gland	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB
15	Bushing	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a
16	Packing	Graphite	Graphite	Graphite	Graphite	Graphite
17	Lantern ring	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a
18	Hexagon nut	A194 2HM	A194 2HM	A194 2HM	A194 2HM	A194 2HM
19	Flat washer	ANSI 1025	ANSI 1025	ANSI 1025	ANSI 1025	ANSI 1025
20	Eye bolt	A193 B7M	A193 B7M	A193 B7M	A193 B7M	A193 B7M
21	Pin	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035
22	Forelck	A3	A3	A3	A3	A3
23	Oil cap	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
24	Holding screw	A193 B7M	A193 B7M	A193 B7M	A193 B7M	A193 B7M
25	Hexagon nut	A194 2HM	A194 2HM	A194 2HM	A194 2HM	A194 2HM
26	Cap nut	A194 2HM	A194 2HM	A194 2HM	A194 2HM	A194 2HM
27	Sealant injection vlave	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts
28	Rolling pin	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045
29	Locating bush	TF-2	TF-2	TF-2	TF-2	TF-2
30	Metal wound gasket	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
Applicable service conditions	Applicable media	Water, steam, oil, gas, liquefied gas, natural gas, etc.	Nitric Acid	Nitric Acid	Strong Oxidizer	Urea
	Applicable temperature	-29~+425℃				
Design and manufacturing		API 6D				
Face-to-face dimensions		ASME B16.10、API 6D				
Type of connection		Flange	ASME B16.5	Butt welding	ASME B16.25	
Pressure test		API 598, API 6D				
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric				

## ORBIT BALL VALVE



## V TYPE BALL VALVE

### USAGE

The V type ball valve is suitable for use on various pipelines of Class150-Class300. According to different user requirements, the V type ball valve can be used for two purposes. One is it can be used to cut off or connect the medium in the pipeline. The other is it can serve as a control valve for controlling parameters such as flow rate of medium in the pipeline. The V type ball valve for cut-off purpose can adopt different driving modes such as manual operation, worm and worm gear transmission, pneumatic operation and electric operation. The V type ball valve for control purpose adopt the driving modes such as pneumatic operation and electric operation.

By using different materials, the V type ball valve can be used for various media such as water, steam, oil, liquefied gas, natural gas, coal gas, nitric acid, acetic acid, oxidizing medium, urea and etc.

The connection ends of V type ball valve can be wafer or flange.

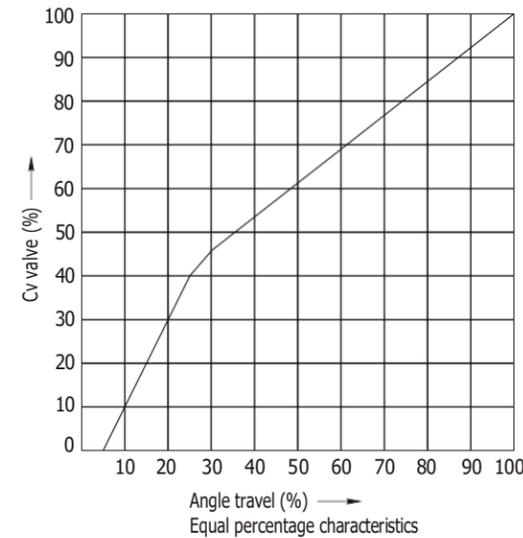
### DESIGN STRUCTURAL FEATURES

1. The V type ball valve adopts disc spring or cylindrical spring loaded moveable metal seat structure provided with compensation character, so no problems such as blocking or release of V type ball and seat will occur. The sealing is reliable and the service life is long.
2. The V type notch of the ball plays the shearing function between the metals, so the valve is especially suitable for media of high viscosity, containing fiber, solid granules, slurry and paper pulp.
3. According to different service conditions, the metal seated ball and seat sealing face can be subjected to various advanced technologies such as nickel-base alloy ( $HRC \geq 60$ ) spray welding, tungsten cobalt alloy ( $HRC \geq 70$ ) HVOF coating, suitable for various severe service conditions.
4. When the valve is fully opened, the flow is high and pressure loss is low, and the media will not deposit in the middle cavity of valve. The valve has flow characteristics of equal percentage, and the V type ball valve for control purpose has a wide adjusting range with the maximum adjusting ratio of 100:1. In addition, the valve is also provided with precise control and reliable positioning functions.
5. Compact structure, strong adaptability. The V type ball valve for cut-off purpose has good sealing performance and can replace various valves such as gate valve, globe valve, ordinary ball valve and etc.

Pressure rating	Nominal Diameter		d	Flanged		Butt welding	Raised face flange						H	Weight (kg)	
	Class	NPS		DN	L(RF)		L(RTJ)	L(BW)	D	D1	D2	D3			f
150	2"	50	50	292	295	292	150	120.5	92	-	2	14.5	4-φ19	360	28
	3"	80	75	356	359	356	190	152.5	127	-	2	17.5	4-φ19	490	41
	4"	100	100	406	410	406	230	190.5	157	-	2	22.5	8-φ19	525	55
	6"	150	150	403	419	403	280	241.5	216	-	2	24	8-φ22	611	115
	8"	200	201	597	600	597	345	298.5	270	-	2	27	8-φ22	750	215
	10"	250	252	673	676	673	405	362	324	-	2	29	12-φ25	826	270
	12"	300	303	762	765	762	485	432	381	-	2	30.5	12-φ25	920	385
	14"	350	334	826	829	826	535	476	413	-	2	33.5	12-φ29	990	502
	16"	400	385	902	905	902	595	540	470	-	2	35	16-φ29	1090	876
	18"	450	436	978	981	978	635	578	533	-	2	38.5	16-φ32	1200	980
20"	500	487	1054	1060	1054	700	635	584	-	2	41.5	20-φ32	1320	1240	
300	2"	50	50	292	295	292	165	127	92	-	2	21	8-φ19	360	32
	3"	80	75	356	359	356	210	168.5	127	-	2	27	8-φ22	490	48
	4"	100	100	406	410	406	255	200	157	-	2	30.5	8-φ22	525	65
	6"	150	150	403	419	457	320	270	216	-	2	35	12-φ22	611	130
	8"	200	201	597	600	597	380	330	270	-	2	40	12-φ25	750	235
	10"	250	252	673	676	673	445	387.5	324	-	2	46.5	16-φ29	826	305
	12"	300	303	762	765	762	520	451	381	-	2	49.5	16-φ32	920	410
	14"	350	334	826	829	826	585	514.5	413	-	2	52.5	20-φ32	990	550
	16"	400	385	902	905	902	650	571.5	470	-	2	56	20-φ35	1090	925
	18"	450	436	978	981	978	710	628.5	533	-	2	59	24-φ35	1200	1135
20"	500	487	1054	1060	1054	775	686	584	-	2	62	24-φ35	1320	1365	
600	2"	50	50	292	295	292	165	127	92	-	7	26	8-φ19	430	50
	3"	80	75	356	359	356	210	168.5	127	-	7	32	8-φ22	490	74
	4"	100	100	432	435	432	275	216	157	-	7	38.5	8-φ25	570	101
	6"	150	150	559	562	559	355	292	216	-	7	48	12-φ29	645	202
	8"	200	201	660	664	660	420	349	270	-	7	56	12-φ32	780	364
	10"	250	252	787	791	787	510	432	324	-	7	64	16-φ35	860	473
	12"	300	303	838	841	838	560	489	381	-	7	67	20-φ35	985	636
	14"	350	334	889	892	889	605	527	413	-	7	70	20-φ39	1050	853
	16"	400	385	991	994	991	685	603	470	-	7	77	20-φ41	1160	1434
	18"	450	436	1092	1095	1092	745	654	533	-	7	83	20-φ44	1275	1759
20"	500	487	1194	1200	1194	815	724	584	-	7	89	24-φ44	1410	2113	

△ Please consult the factory:  
Note: The weight valve 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.

### Flow coefficient chart



### Relation of relative opening and flow coefficient Cv of the V type ball valve for control purpose

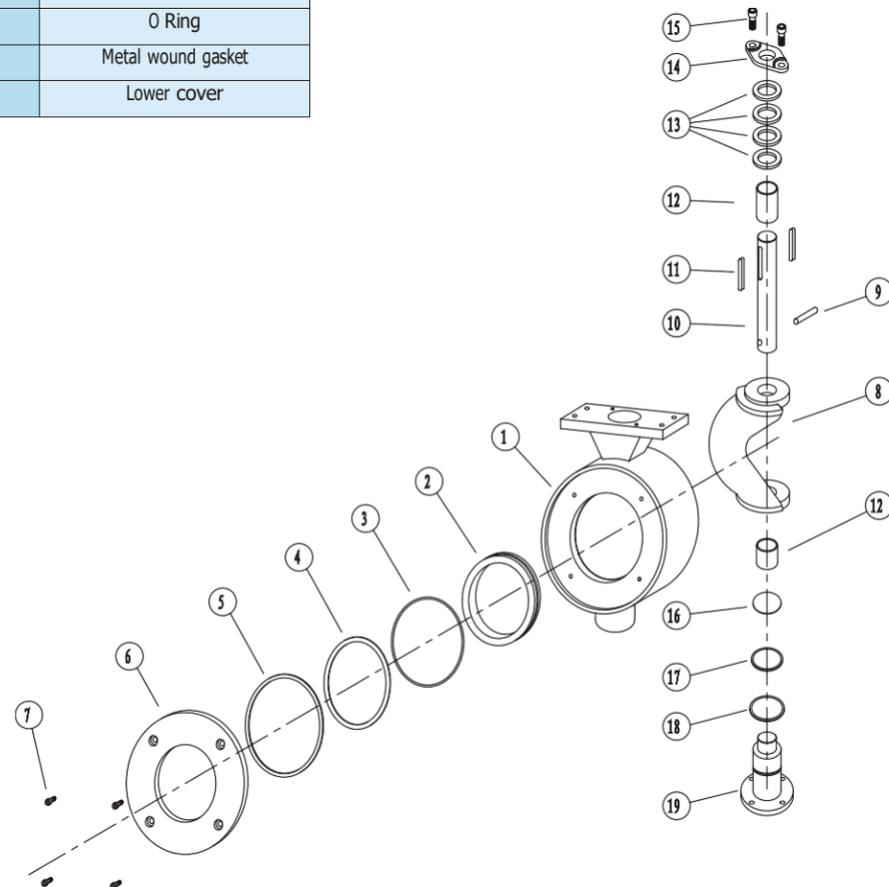
inside nominal diameter		relative opening					
DN	NPS	10%	30%	50%	70%	90%	100%
25	1	0.33	1.6	4.6	10	20	33
40	1½	0.85	4.5	15	29	60	90
50	2	1.36	7.6	22	48	100	145
65	2½	2.3	12	37	80	165	250
80	3	3.1	16.5	50	108	215	330
100	4	5	27	80	178	365	530
125	5	7	36	108	238	488	710
150	6	10	53	160	356	740	1080
200	8	16	85	258	576	1195	1750
250	10	31	148	396	825	1460	2170
300	12	42	202	552	1110	2130	3120

### V TYPE BALL VALVE

### V TYPE BALL VALVE

### V TYPE BALL VALVE

1	Body
2	Seat
3	O Ring
4	Disc spring
5	Metal wound gasket
6	Clamping ring
7	Socket head cap screw
8	Ball
9	Pin
10	Stem
11	Flat key
12	Sliding bearing
13	Packing
14	Packing gland
15	Socket head cap screw
16	Thrust bearing
17	O Ring
18	Metal wound gasket
19	Lower cover



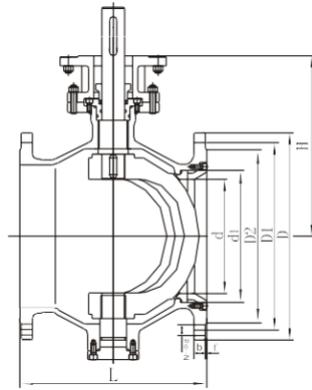
### V TYPE BALL VALVE

#### Part Materials And Main Parameters

Nominal diameter(in)		NPS 1~12					
Nominal pressure(Class)		Class150~Class300					
Materials of parts	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	Seat	ASTM A105+HF	ASTM A182 304+HF	ASTM A182 316+HF	ASTM A182 304L+HF	ASTM A182 316L+HF
	3	O Ring	VITON	VITON	VITON	VITON	VITON
	4	Disc spring	17-7PH	17-7PH	17-7PH	17-7PH	17-7PH
	5	Metal wound gasket	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
	6	Clamping ring	ASTM A105 ?ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	7	Socket head cap screw	A193 B7M	A320 B8	A320 B8 M	A320 B8	A320 B8M
	8	Ball	ASTM A216 WCB+HF	ASTM A351 CF8+HF	ASTM A351 CF8M+HF	ASTM A351 CF3+HF	ASTM A351 CF3M+HF
	9	Pin	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035	ANSI 1035
	10	Stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L
	11	Flat key	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045
	12	Sliding bearing	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE
	13	Packing	Graphite	Graphite	Graphite	Graphite	Graphite
	14	Packing gland	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB
	15	Socket head cap screw	A193 B7M	A193 B7M	A193 B7M	A193 B7M	A193 B7M
	16	Thrust bearing	PTFE	PTFE	PTFE	PTFE	PTFE
	17	O Ring	VITON	VITON	VITON	VITON	VITON
	18	Metal wound gasket	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite
19	Lower cover	ASTM A105 ?ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L	
Applicable service conditions	Applicable media	Water, steam, oil, gas, liquefied gas, natural gas, etc.	Nitric Acid	Nitric Acid	Strong Oxidizer	Urea	
	Applicable temperature	Regular products: =200℃ , Special orders: =425℃ (Carbon Steel) or =540℃ (Cr-Mo Steel, Cr-Mo-V Steel, stainless steel)					
Design and manufacturing		API 608, API 6D					
Face-to-face dimensions		ASME B16.10 , API 6D					
Type of connection		Flange	ASME B16.5	Butt welding	ASME B16.25		
Pressure test		API 598, API 6D					
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric					

## V TYPE BALL VALVE

## 3-WAY/4-WAY BALL VALVE



Pressure rating	Nominal Diameter		d	d1	L	Raised face flange						H	Weight (kg)	
	Class	NPS				DN	D	D1	D2	f	b			N-φd
150		1"	25	19	25	127	110	79.5	51	2	11	4-φ16	80	△
		1 1/2"	32	25	32	140	115	89	64	2	11	4-φ16	86	△
		1 1/2"	40	32	38	165	125	98.5	73	2	13	4-φ16	95	△
		2"	50	38	50	178	150	120.5	92	2	14.5	4-φ19	104	△
		3"	80	50	75	203	190	152.5	127	2	17.5	4-φ19	114	△
		4"	100	75	100	229	230	190.5	157	2	22.5	8-φ19	160	△
		6"	150	100	150	267	280	241.5	216	2	24	8-φ22	200	△
		8"	200	150	201	292	345	298.5	270	2	27	8-φ22	240	△
		10"	250	201	252	330	405	362	324	2	29	12-φ25	275	△
	12"	300	252	303	356	485	432	381	2	30.5	12-φ25	330	△	
300		1"	25	19	25	127	125	89	51	2	16	4-φ19	80	△
		1 1/2"	32	25	32	140	135	98.5	64	2	17.5	4-φ19	86	△
		1 1/2"	40	32	38	165	155	114.5	73	2	19.5	4-φ22	95	△
		2"	50	38	50	178	165	127	92	2	21	8-φ19	104	△
		3"	80	50	75	203	210	168.5	127	2	27	8-φ22	114	△
		4"	100	75	100	229	255	200	157	2	30.5	8-φ22	160	△
		6"	150	100	150	267	320	270	216	2	35	12-φ22	200	△
		8"	200	150	201	292	380	330	270	2	40	12-φ25	240	△
		10"	250	201	252	330	445	387.5	324	2	46.5	16-φ29	275	△
	12"	300	252	303	356	520	451	381	2	49.5	16-φ32	330	△	

△ Please consult the factory:  
 Note: The weight valve 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.

## USAGE

The three-way/four-way ball valve is used for switching, converging and diverging pipeline medium flow direction. It is widely applied in metallurgy, mine, petroleum, chemical industry, electric power, light industry, shipping industry and automation control systems, suitable for service condition such as swtching, mixing and diverging of fluid, gas and powder.

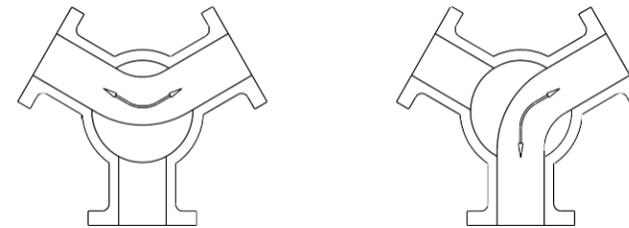
## STRUCTURAL CHARACTERISTICS

The three-way/four-way ball valve is provided with reliable sealing and smooth flow channel so as to ensure accuracy of opening and closing through small fluid pressure loss and stable flow channel. According to the forms of flow channel, the valve can be classified into "Y" pattern three-way ball valve, "L" pattern three-way ball valve, "T" pattern three-way ball valve and "LL" pattern four-way ball valve.

### "Y" pattern Three-way Ball Valve (q42 Type)

The form of flow channel is "Y" pattern, which can effectively realize switching from service condition 1 to service condition 2. It is mainly used for switching "Y" pattern pipeline flow direction.

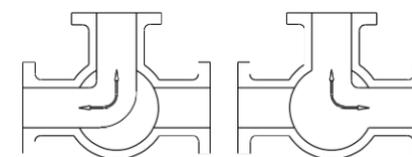
Two service conditions of "Y" pattern three-way ball valve



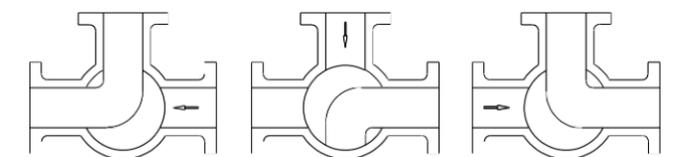
### "L" Pattern Three-way Ball Valve (q44 Floating Type, Q49 Trunnion Type)

The "L" pattern three-way ball valve is used for switching pipeline medium flow direction. It can connect two flow channels that are vertical with each other. The ordinary "L" pattern floating three-way ball valve may not be suitable for some service conditions, which shall be paid special attention to when users select it.

Two service conditions of "L" pattern three-way ball valve



Several service conditions for which the ordinary "Y" pattern floating three-way ball valve is not suitable

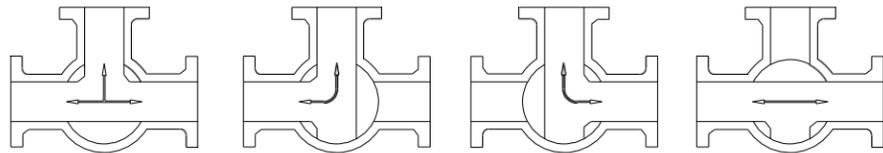


## DESIGN STRUCTURAL FEATURES

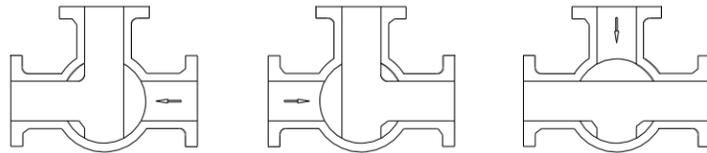
### "T" Pattern Three-way Ball Valve (q45 Floating Type, Q48 Trunnion Type)

The "T" pattern three-way ball valve is used for switching, converging and diverging medium flow direction. The "T" pattern ball channel can make three channels connect with each other or two of them connect with each other to realize two, three or found kinds of functions. Therefore, users shall make detailed descriptions to the service requirements when selecting and ordering the "T" pattern three-way ball valve, so that our company can make designs and configurations correctly. The ordinary "T" pattern floating three-way ball valve may not be suitable for some service conditions, which shall be paid special attention to when users select it.

Several service conditions of "T" pattern three-way ball valve



Several service conditions for which the ordinary "T" pattern floating three-way ball valve is not suitable



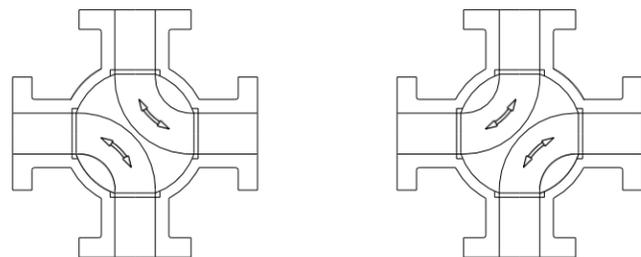
### "LL" Pattern Four-way Ball Valve

The "LL" pattern four-way ball valve is provided with four seats to realize switching from service condition 1 to service condition 2. It can simultaneously switch the flow direction of two media, which realizes the effect of multiple functions in one valve with convenience and swiftness.

The work form is shown as follows:

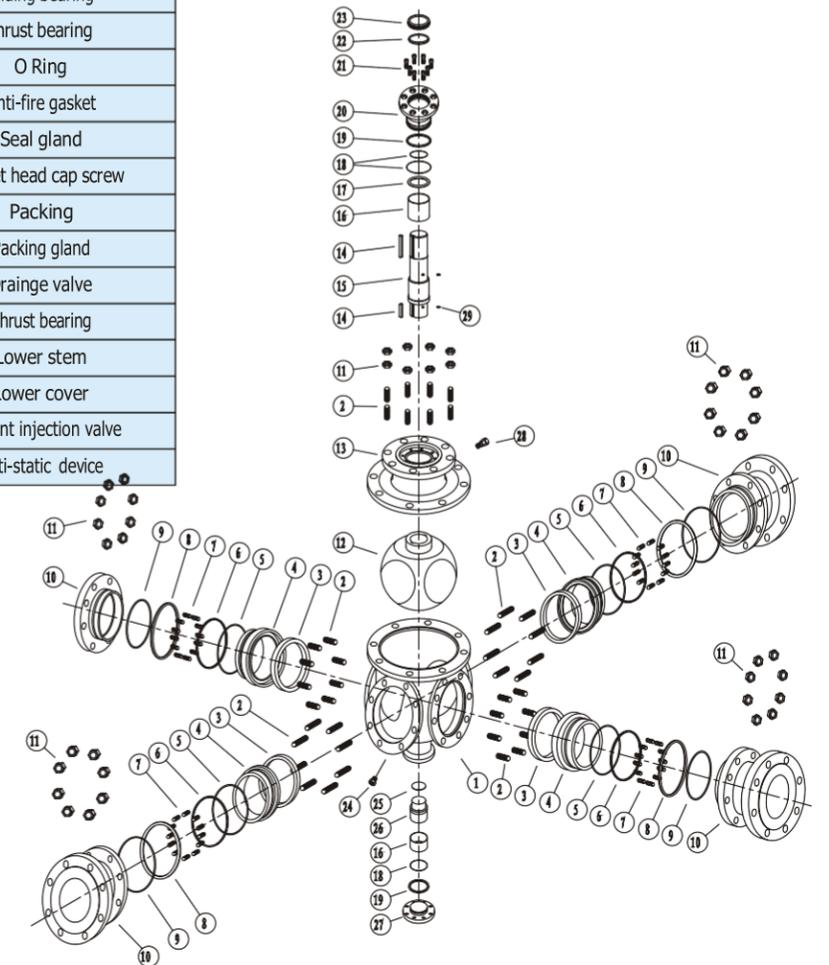
1. When A(C) is the inlet, the two connections of A → B. (C D) or A → C (C → A) can be realized.
2. A cannot be realized.
3. A → D (C → B). D → A (B → C) is impossible.

Several service conditions of "LL" pattern four-way ball valve



## T PATTERN THREE-WAY BALL VALVE

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



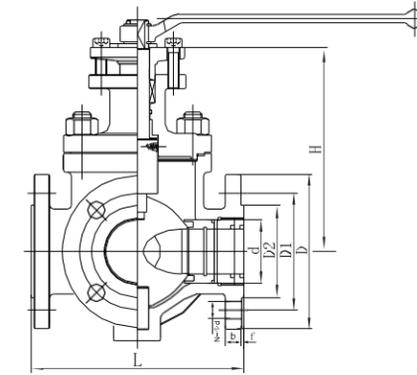
3-WAY/4-WAY BALL VALVE

3-WAY/4-WAY BALL VALVE

T PATTERN THREE-WAY BALL VALVE

Part Materials And Main Parameters

Nominal diameter(in)		NPS 2~20					
Nominal pressure(Class)		Class150~Class300					
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	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M	
3	Seat	PTFE/NYOLN/PEEK/PPL	PTFE/NYOLN/PEEK/PPL	PTFE/NYOLN/PEEK/PPL	PTFE/NYOLN/PEEK/PPL	PTFE/NYOLN/PEEK/PPL	
4	Seat ring	ASTM A105 • ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L	
5	O Ring	VITON	VITON	VITON	VITON	VITON	
6	Anti-fire packing	Graphite	Graphite	Graphite	Graphite	Graphite	
7	Spring	17-7PH	17-7PH	17-7PH	17-7PH	17-7PH	
8	Anti-fire gasket	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	
9	O Ring	VITON	VITON	VITON	VITON	VITON	
10	Bonnet	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M	
11	Hexagon nut	A194 2HM	A194-8	A194 -8M	A194-8	A194-8M	
12	Ball	ASTM A105 • ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L	
13	Bonnet	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M	
14	Flat key	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045	ANSI 1045	
15	Stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L	
16	Sliding bearing	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE	Metal+PTFE	
17	thrust bearing	PTFE	PTFE	PTFE	PTFE	PTFE	
18	O Ring	VITON	VITON	VITON	VITON	VITON	
19	Anti-fire gasket	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	SST+Graphite	
20	Seal gland	ASTM A105 • ENP	ASTM A182 304	ASTM A182316	ASTM A182304L	ASTM A182316L	
21	Socket head cap screw	A193 B7M	A320 B8	A320 B8M	A320 B8	A320 B8M	
22	Packing	Graphite	Graphite	Graphite	Graphite	Graphite	
23	Packing gland	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	
24	Drainge valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts	
25	Thrust bearing	PTFE	PTFE	PTFE	PTFE	PTFE	
26	Lower stem	ASTM A182 F6a	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L	
27	Lower cover	ASTM A105 • ENP	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L	
28	Sealant injection valve	Combined parts	Combined parts	Combined parts	Combined parts	Combined parts	
29	Anti-static device	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	Nitric Acid	Strong Oxidizer	Urea
	Applicable temperature	≤200℃ (PTFE) ≤80℃ (NYLON) ≤250℃ (PEEK) ≤250℃ (PPL)					
Design and manufacturing		API 608, API 6D					
Type of connection		Flange	ASME B16.5		Wafer	ASME B16.5	
Pressure test		API 598, API 6D					
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric					



Pressure rating	Nominal Diameter		d	L	Raised face flange						H	Weight (kg)		
	Class	NPS			DN	D	D1	D2	D3	f			b	N-φd
150		2"	50	50	260	150	120.5	92	-	2	14.5	4-φ19	205	△
		3"	80	75	320	190	152.5	127	-	2	17.5	4-φ19	245	△
		4"	100	100	370	230	190.5	157	-	2	22.5	8-φ19	305	△
		6"	150	150	510	280	241.5	216	-	2	24	8-φ22	340	△
		8"	200	201	580	345	298.5	270	-	2	27	8-φ22	425	△
		10"	250	252	670	405	362	324	-	2	29	12-φ25	450	△
		12"	300	303	760	485	432	381	-	2	30.5	12-φ25	530	△
		14"	350	334	850	535	476	413	-	2	33.5	12-φ29	630	△
		16"	400	385	980	595	540	470	-	2	35	16-φ29	680	△
		18"	450	436	1080	635	578	533	-	2	38.5	16-φ32	625	△
		20"	500	487	1220	700	635	584	-	2	41.5	20-φ32	670	△
		24"	600	589	1360	815	749.5	692	-	2	46.5	20-φ35	705	△
300		2"	50	50	260	165	127	92	-	2	21	8-φ19	205	△
		3"	80	75	320	210	168.5	127	-	2	27	8-φ22	245	△
		4"	100	100	370	255	200	157	-	2	30.5	8-φ22	305	△
		6"	150	150	510	320	270	216	-	2	35	12-φ22	340	△
		8"	200	201	580	380	330	270	-	2	40	12-φ25	425	△
		10"	250	252	670	445	387.5	324	-	2	46.5	16-φ29	450	△
		12"	300	303	760	520	451	381	-	2	49.5	16-φ32	530	△
		14"	350	334	850	585	514.5	413	-	2	52.5	20-φ32	630	△
		16"	400	385	980	650	571.5	470	-	2	56	20-φ35	680	△
		18"	450	436	1080	710	628.5	533	-	2	59	24-φ35	625	△
		20"	500	487	1220	775	686	584	-	2	62	24-φ35	670	△
		24"	600	589	1360	915	813	692	-	2	68.5	24-φ41	705	△

△ Please consult the factory:  
 Note: The weight valve 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.

## MOUNTING PAD BALL VALVE

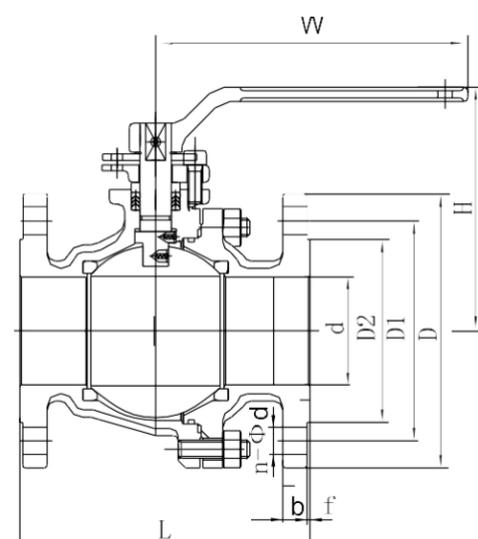
## JACKETED BALL VALVE

### MOUNTING PAD BALL VALVE

The valve has such advantages as small fluid resistance, rapid opening and closing, compact structure, small volume, light weight and good sealing performance. The body and bonnet are subjected to silicasol precise casting, it adopts ISO 5211 platform design, and the two disc springs can compress the packing automatically. It is designed with the blow-out proof stem and anti-static structure. It is suitable for water, gas, oil, natural gas and other acid and alkaline corrosive media. Suitable temperature is less than or equal to 200°C, the driving modes include: manual operation, worm gear transmission, pneumatic operation and electric operation.

#### Main Parts And Materials

NO.	Part Name	Material	
1	Body	ASTM A351 CF8	ASTM A351 CF8M
2	Bonnet	ASTM A351 CF8	ASTM A351 CF8M
3	Stud	A320 B8	A320 B8M
4	Hexagon nut	A194-8	A194-8M
5	Seat	PTFE	PTFE
6	Ball	ASTM A182 304	ASTM A182 316
7	Fireproof sealing gasket	SST+Graphite	SST+Graphite
8	Thrust bearing	PTFE	PTFE
9	Stem	ASTM A182 304	ASTM A182 316
10	Packing	Graphite	Graphite
11	Anti-static device	Combined parts	Combined parts
12	Packing bushing	ASTM A182 304	ASTM A182 316
13	Gland	ANSI 1025	ANSI 1025
14	Hexagon nut	A194-8	A194-8
15	Handle gland	ANSI 1025	ANSI 1025
16	Gasket	ANSI 1025	ANSI 1025
17	Hexagon nut	A194-2HM	A194-2HM
18	Handle	Combined parts	Combined parts

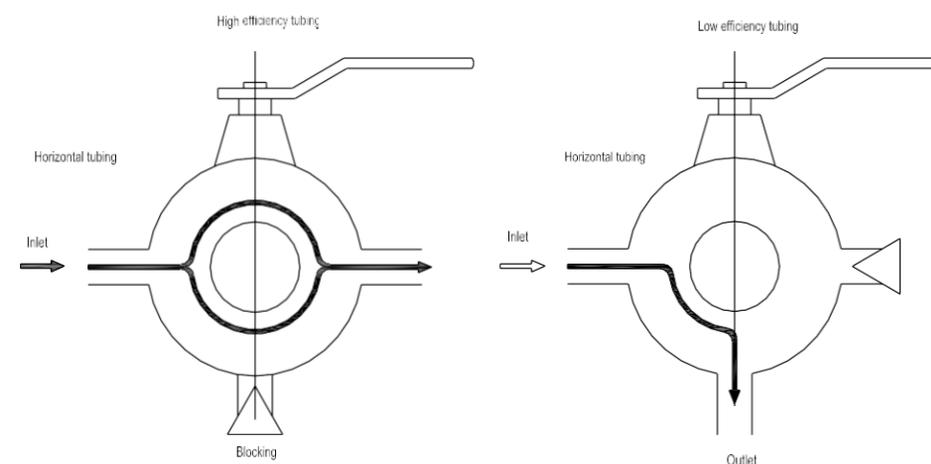


### JACKETED BALL VALVE

#### Structural Features And Usage

The jacket ball valve has such features as small fluid resistance, compact structure, light weight, good heat and cold insulation performance, flexible opening and closing. The jacket ball valve adopts the integral structure, so it is much smaller than the ordinary ball valve, and its weight is much lighter with good sealing performance. The media that are allowed to pass the jacket include 1Mpa steam or cooled water, or special design can be made according to user requirements. It is mainly used in various systems in petroleum, chemical industry, metallurgy, pharmacy, food and other industries for transporting media of high viscosity that will be solidified under normal temperature.

The installation and tubing of the jacket ball valve shall be made according to the followings



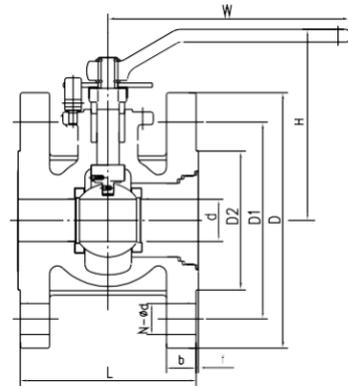
#### Main Size

Pressure rating	Nominal Diameter(in)		d	L	Raised face flange						H	W
	NPS	DN			D	D1	D2	f	b	N-φ d		
150	1/2"	15	13	108	90	60.5	35	2	9	4-φ 16	79	140
	3/4"	20	19	117	100	70	43	2	10	4-φ 16	84	140
	1"	25	25	127	110	79.5	51	2	11	4-φ 16	95	180
	1 1/4"	32	32	140	115	89	64	2	11	4-φ 16	103	180
	1 1/2"	40	38	165	125	98.5	73	2	13	4-φ 16	111	200
	2"	50	50	178	150	120.5	92	2	14.5	4-φ 19	120	200
	3"	80	75	203	190	152.5	127	2	17.5	4-φ 19	163	300
	4"	100	100	229	230	190.5	157	2	22.5	8-φ 19	182	400
300	6"	150	150	394	280	241.5	216	2	24	8-φ 22	280	800
	8"	200	201	457	345	298.5	270	2	27	8-φ 22	448	1100
	1/2"	15	13	140	95	66.5	35	2	13	4-φ 16	79	140
	3/4"	20	19	152	115	82.5	43	2	14.5	4-φ 19	84	140
	1"	25	25	165	125	89	51	2	16	4-φ 19	95	180
	1 1/4"	32	32	178	135	98.5	64	2	17.5	4-φ 19	103	180
	1 1/2"	40	38	190	155	114.5	73	2	19.5	4-φ 22	111	200
	2"	50	50	216	165	127	92	2	21	8-φ 19	120	200
	3"	80	75	283	210	168.5	127	2	27	8-φ 22	163	300
	4"	100	100	305	255	200	157	2	30.5	8-φ 22	182	400
	6"	150	150	403	320	270	216	2	35	12-φ 22	280	800
	8"	200	201	502	380	330	270	2	40	12-φ 25	448	1100

#### Part Materials And Main Parameters

Nominal diameter(in)		NPS 1/2--8					
Nominal pressure(Class)		Class150--Class300					
Materials of parts	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	Seat	PTFE/ PPL	PTFE/ PPL	PTFE/ PPL	PTFE/ PPL	PTFE/ PPL
	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	Packing	Graphite	Graphite	Graphite	Graphite	Graphite	
Applicable service conditions	Applicable media		Water, steam, oil, gas, liquefied gas, natural gas, etc.	Nitric Acid	Nitric Acid	Strong Oxidizer	Urea
	Applicable temperature		≤ 200°C (PTFE) ≤ 250°C (PPL)				
Design and manufacturing		API 608					
Face-to-face dimensions		ASME B16.10					
Type of connection		Flange	ASME B16.5		Wafer	ASME B16.5	
Pressure test		API 598					
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric					

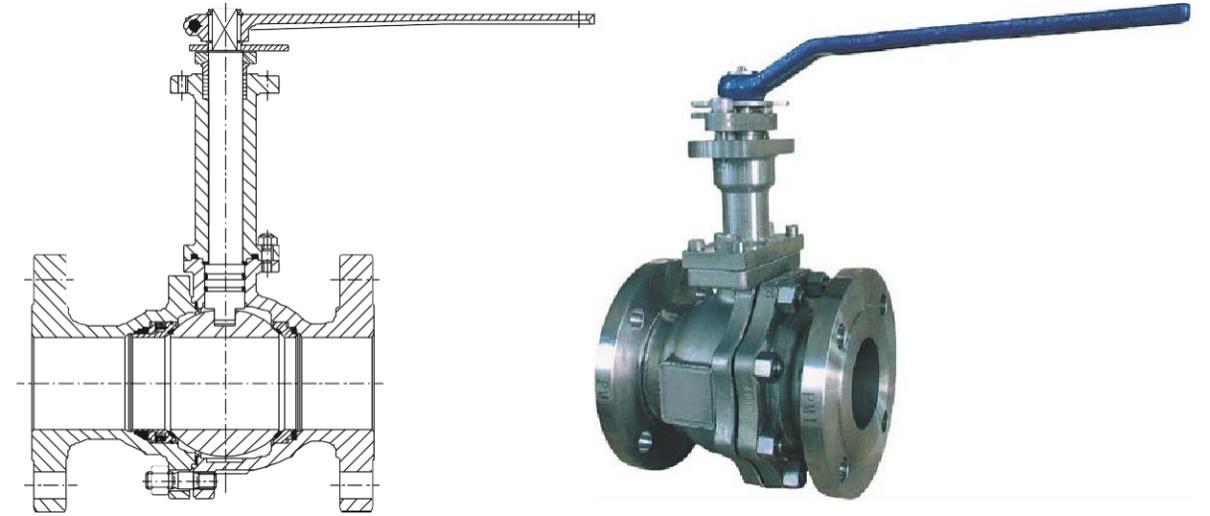
## JACKETED BALL VALVE



Pressure rating	Flanged				d	L	Raised face flange						H	W	Weight (kg)	
	Class	NPS	DN	NPS			DN	D	D1	D2	f	b				N-φd
150		1/2"	15	1/2" X 1 1/2"	15 X 32	13	108	115	89	64	2	11	4-φ16	140	140	3
		3/4"	20	3/4" X 1 1/2"	20 X 40	19	117	125	98.5	73	2	13	4-φ16	140	150	4
		1"	25	1" X 2"	25 X 50	25	127	150	120.5	92	2	14.5	4-φ19	150	160	6
		1 1/4"	32	1 1/4" X 2"	32 X 50	32	140	150	120.5	92	2	14.5	4-φ19	180	180	8
		1 1/2"	40	1 1/2" X 2 1/2"	40 X 65	38	165	180	139.5	105	2	16	4-φ19	200	180	10
		2"	50	2" X 3"	50 X 80	50	178	190	152.5	127	2	17.5	4-φ19	250	200	14
		3"	80	3" X 6"	80 X 150	75	229	280	241.5	216	2	24	8-φ22	350	220	25
		4"	100	4" X 8"	100 X 200	100	254	345	298.5	270	2	27	8-φ22	500	250	36
		6"	150	6" X 10"	150 X 250	150	292	405	362	324	2	29	12-φ25	800	290	98
300		1/2"	15	1/2" X 1 1/2"	15 X 32	13	108	135	98.5	64	2	17.5	4-φ19	140	150	4
		3/4"	20	3/4" X 1 1/2"	20 X 40	19	117	155	114.5	73	2	19.5	4-φ22	140	160	5
		1"	25	1" X 2"	25 X 50	25	127	165	127	92	2	21	8-φ19	150	180	8
		1 1/4"	32	1 1/4" X 2"	32 X 50	32	140	165	127	92	2	21	8-φ19	180	200	10
		1 1/2"	40	1 1/2" X 2 1/2"	40 X 65	38	165	190	149	105	2	24	8-φ22	200	200	13
		2"	50	2" X 3"	50 X 80	50	178	210	168.5	127	2	27	8-φ22	250	220	18
		3"	80	3" X 6"	80 X 150	75	229	320	270	216	2	35	12-φ22	350	240	36
		4"	100	4" X 8"	100 X 200	100	254	380	330	270	2	40	12-φ25	500	270	58
		6"	150	6" X 10"	150 X 250	150	292	445	387.5	324	2	46.5	16-φ29	800	320	120
	8"	200	8" X 14"	200 X 350	201	330	585	514.5	413	2	52.5	20-φ32	1000	370	212	

△ Please consult the factory:  
 Note: The weight valve 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.

## CRYOGENIC BALL VALVE



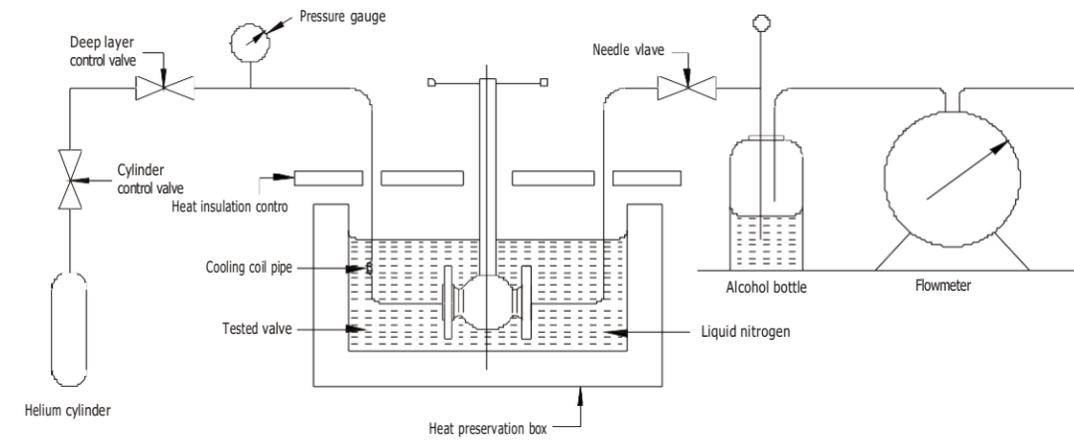
### USAGE

The cryogenic ball valve is used to cut off or connect the media in various pipelines of class 150~class1500. The valves made of different materials are suitable for various media and different temperature. The lowest working temperature is -195℃. The driving modes include manual operation, worm and worm gear transmission, pneumatic operation and electric operation. The connection ends can be flange or welding.

### PRODUCT RANGE

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℃, the long neck structure is not designed, for the ball valves with temperature lower than -50℃, the neck length is generally designed according to standard requirements or according to user requirements.

#### Typical layout diagram of cryogenic test device



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

## CRYOGENIC BALL VALVE

### STRUCTURAL FEATURES

The cryogenic ball valve is used for low temperature service condition, especially the dangerous media service conditions such as natural gas. Our company has accumulated rich experience in designing, manufacturing, testing and inspecting the cryogenic ball valve.

#### Material Selection

Carbon steel will show low temperature brittleness under low temperature. Therefore, it is a key for design and manufacturing to select suitable body materials according to the lowest working temperature of the cryogenic ball valve. Refer to the following table for the lowest working temperature of body materials. The low temperature materials shall be subjected to low temperature impact test according to standard requirements. For valves with working temperature lower than  $-100^{\circ}\text{C}$ , the body, bonnet and stem must be subjected to cryogenic treatment after rough machining. The ball and seat sealing face should be subjected to cryogenic treatment hard alloy spray welding/overlay welding. Then grinding and assembly can be carried out, so as 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 And Main Parameters

Lowest Working Temperature Of Shell Materials				
Casting		forging		
Materials	Lowest working	Materials	Lowest working	
ASTM A352 LCB	$-46^{\circ}\text{C}$	ASTM A350 LF2	$-46^{\circ}\text{C}$	
ASTM A352 LCC	$-46^{\circ}\text{C}$	ASTM A350 LF2	$-46^{\circ}\text{C}$	
ASTM A352 LC1	$-59^{\circ}\text{C}$	ASTM A350 LF5	$-59^{\circ}\text{C}$	
ASTM A352 LC2	$-73^{\circ}\text{C}$	ASTM A350 LF9	$-73^{\circ}\text{C}$	
ASTM A352 LC3	$-101^{\circ}\text{C}$	ASTM A350 LF3	$-101^{\circ}\text{C}$	
ASTM A351 CF8	$-196^{\circ}\text{C}$	ASTM A182 F304	$-196^{\circ}\text{C}$	
ASTM A351 CF8M	$-196^{\circ}\text{C}$	ASTM A182 F316	$-196^{\circ}\text{C}$	
ASTM A351 CF3	$-196^{\circ}\text{C}$	ASTM A182 F304L	$-196^{\circ}\text{C}$	
ASTM A351 CF3M	$-196^{\circ}\text{C}$	ASTM A182 F316L	$-196^{\circ}\text{C}$	
Main parameters				
Design and manufacturing	BS6364-1998、JB/T7749-1995			
Face-to-face dimensions	ASME B16.10			
Type of connection	Flange	ASME B16.5	Wafer	ASME B16.5
Pressure test	API 598			
Transmission mode	Manual, worm drive, pneumatic, electrical			

#### Structural Design And Machining And Manufacturing Features

According to standard requirements, the ball valves with temperature lower than  $-50^{\circ}\text{C}$  generally adopt the long neck structure design to improve the temperature at the packing and ensure reliable sealing of stem packing, the neck length is generally designed according to standard requirements or according to contract requirements if users have special requirements.

For the valve used for low temperature media, when the valve is at the closed position, the low temperature liquid staying in the middle cavity of valve will be gasified with the rise of temperature, which causes the volume to expand rapidly and leads to abnormal pressure rise in the middle cavity, or even valve breakage if serious. The ball valve is provided with the function of middle cavity automatic pressure relief, in case of abnormal pressure rise in the middle cavity, the medium in the middle cavity will overcome the spring pre-tightening effect through its own force and push the seat out of the ball to realize automatic pressure relief, so as to ensure valve safety.

According to contract requirements, cryogenic test can be carried out to test operating torque, sealing performance and other indexes under low temperature, the parts of the valve have been subjected to cryogenic treatment to ensure stability of form and size of parts under low temperature.

## CERAMIC LINED BALL VALVE

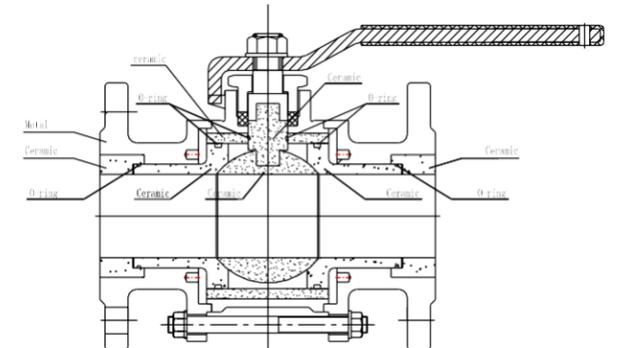
### USAGE

The ceramic lined ball valve is widely applied in high corrosive service, generally the pipeline pressure is not high, so the pressure rating should be not above PN50, according to different work condition (temperature, service), there will be different material configuration.

Due to ceramic's feature of perfect abrasion resistance, perfect corrosion resistance, perfect erosion resistance, good heat-insulating property and small thermal expansion, ceramic ball valve have much better function than normal metal valve, more reliable, and also have much longer lifetime than Titanium ball valve or Monel ball valves

### DESIGN STRUCTURAL FEATURES

- All metal part of valves should be not wetted by high corrosive service, so all wetted part is ceramic. Generally the sealing between ceramic is O-ring, of course we may adopt other sealing construction if the O-ring can't meet the requirements of temperature.
- All ceramic ball valve have to be reduced bore;



### VALVE CONSTRUCTION

1	Body
2	Body lining
3	O-ring
4	Spring
5	Adaptor
6	End Lining
7	seat
8	O-ring
9	Ball
10	Stem
11	Packing
12	Gland
13	Stem connection
14	Wrench
15	Nut
16	Nut
17	Bolting

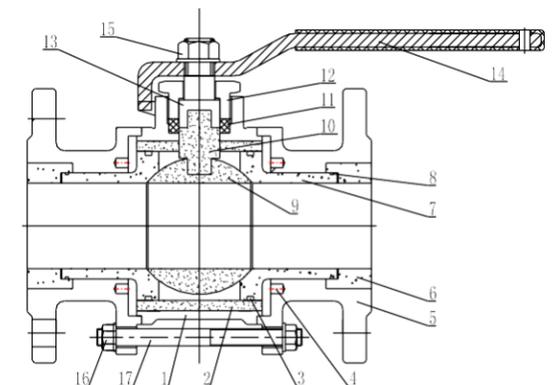


图2

## CERAMIC LINED BALL VALVE

## 3-PC NPT ENDS BALL VALVE

### CERAMIC LINED BALL VALVE

#### Part Materials And Main Parameters

Nominal diameter(in)		NPS 1/2 ~8(DN15-DN200)						
Nominal pressure(Class)		Class150~Class300. PN16-PN40						
Materials of parts	No	Part Name	C.S.	L.T.C.S.	S.S.			
	1	Body	A216 WCB	A352 LCB	A351 CF8	A351 CF8M	A351 CF3	A351 CF3M
	2	Body lining	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
	3	O-ring	VITON	VITON	VITON	VITON	VITON	VITON
	4	Spring	Inconel X750					
	5	Adaptor	A216 WCB	A352 LCB	A351 CF8	A351 CF8M	A351 CF3	A351 CF3M
	6	End Lining	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
	7	seat	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
	8	O-ring	VITON	VITON	VITON	VITON	VITON	VITON
	9	Ball	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
	10	Stem	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
	11	Packing	PTFE	PTFE	PTFE	PTFE	PTFE	PTFE
	12	Gland	A216 WCB	A352 LCB	A351 CF8	A351 CF8M	A351 CF3	A351 CF8
	13	Stem connection	A182 F6A	A182 F316	A182 F304	A182 F316	A182 F304L	A182 F316L
	14	Wrench	C.S	C.S	C.S	C.S	C.S	C.S
	15	Nut	C.S	C.S	C.S	C.S	C.S	C.S
	16	Nut	A194 2HM	A194 4	A194 8	A194 8M	A194 8	A194 8M
17	Bolting	A193 B7M	A193 L7	A193 B8	A193 B8M	A193 B8	A193 B8M	
Application Service								
App.temp.(°C)								
Design and manufacturing								
Face-to-face(Length)								
Connection								
Pressure test								
Operation								



### USAGE

The NPT ends ball valve is used to cut off or connect the media in middle and low pressure pipelines. The driving modes include manual operation, or pneumatic operation and electric operation. According to different structure designs, the valves can be one-piece, two-piece and three-piece.

#### Part Materials And Main Parameters

Model		QS11F-WP8		QS11F-WR8			
Structural features		Three-piece					
Nominal diameter(in)		NPS 3/8~3					
Pressure class(MPa)		800WOG or 1000WOG					
Materials of parts	No	Part Name	Material				
				Stainless Steel			
	1	Body	ASTM A351 CF8	ASTM A351 CF8M	ASTM A351 CF3	ASTM A351 CF3M	
	2	Seat	PTFE/ PPL	PTFE/ PPL	PTFE/ PPL	PTFE/ PPL	
	3	Ball	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L	
	4	Stem	ASTM A182 304	ASTM A182 316	ASTM A182 304L	ASTM A182 316L	
Applicable service conditions	Applicable media	Nitric Acid	Nitric Acid	Strong Oxidizer	Urea		
	Applicable temperature	≤120°C (PTFE)					
Design and manufacturing		API 608					
Type of connection		API 598					
Pressure test		Female thread connection(generally the taper pipe thread Rc is adopted, NPT thread can also be adopted according to user requirements)					
Transmission mode		Manual, worm and worm gear transmission, pneumatic, electric					

Structural form	Dimensions		Rc	Size(mm)				Weight (kg)
	DN	NPS		L	D	W	H	
Three-piece	10	3/8"	3/8"	60	10	95	57	0.4
	15	1/2"	1/2"	75	14	110	68	0.5
	20	3/4"	3/4"	80	19	110	70	0.7
	25	1"	1"	90	25	140	80	1.2
	32	1 1/4"	1 1/4"	110	32	140	85	1.9
	40	1 1/2"	1 1/2"	120	38	180	100	2.7
	50	2"	2"	144	50	180	110	3.9
	65	2 1/2"	2 1/2"	186	64	200	130	7.1
	80	3"	3"	206	76	250	150	11.5
	100	4"	4"	240	100	250	170	20.5