

**TANA**  
TOPNOTCH MACHINE CO.,LTD.

API Ball  
**Valve** Series



### ■ General

Since 1950 Ball valve has been available as a valve and become one of the fastest-growing varieties of the valves in the last decades. Ball valve is not only of simple structure, good sealing, but also of smaller size, lighter weight, lower cost, easier installation, less driving torque value, easier operation, quicker opening and closure to a certain nominal range. During the past 50 years, Ball has developed into one of the main valve of the category. Ball valve can be used to cut off or access medium, and also control or regulate the fluid, while the V-ball valve can achieve more precise flow regulation and control. As one of the leading Chinese manufacturers of industrial valves is well capable of the production for various types of industrial valves, ball valves have been serving in a wide range of rigorous conditions and demand of oil, natural gas, refining, petrochemicals, ships, power plants, as well as Pipeline industry, production of the ball valve is in full compliance.

### ■ The ball valve structure

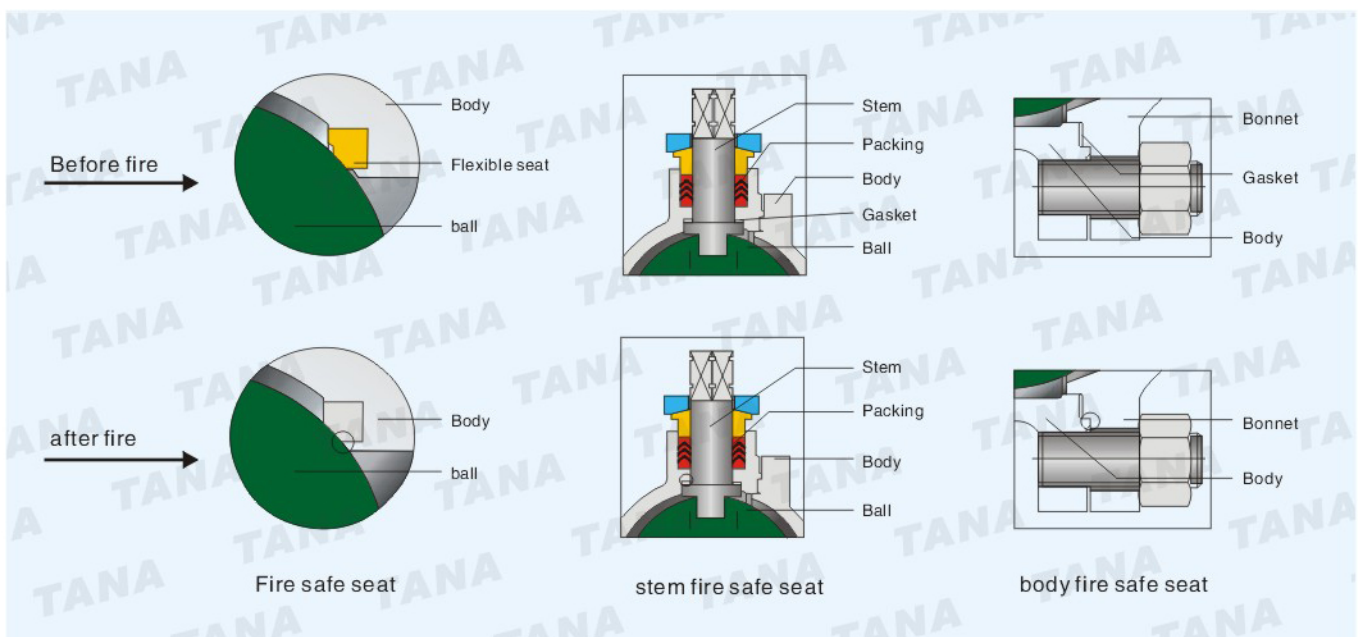
1. Small fluid resistance: The ball valve is of least fluid resistance in all types of valves, even reduced bore ball valve, the fluid resistance is quite small.
2. Quick and easy opening and closing: as long as the stem turns 90°, the ball valve will be able to complete the full open or closure actions.
3. Good sealing performance: the general use of ball valve seat ring, such as PTFE flexible materials, is easy to achieve sealing performance, and the sealing capability increases with the power of the medium pressure.
4. Reliable stem sealing: because of the rotation actions of the operation, the stem packing seals will not be easily destroyed, and the sealing capability increases with the power of the medium pressure.
5. Easy remote control: since the control of the ball valve needs only 90° rotation, it is easy to control and automate the remote control, so the ball valve can be mounted with pneumatic actuator, electrical actuator, hydraulic actuator, gas-liquid interaction actuator, or electro-hydraulic interaction actuator.
6. Smooth channel disables easy medium deposition, ensures smooth pipeline transit.

### ■ Floating ball valve features

Floating ball structure is simple and a good seal for class 150-class 600 pressure class to cut off or access the medium in all kinds of pipeline. Ball valve with different materials, can be applied to water, steam, oil products, liquefied natural gas, gas, nitric acid, acetic acid, such as oxidizing medium. One-piece ball valve includes: one-piece type, and forged split body type. All the floating ball are in accordance with API 608/BS 5351, and other standard design. Fire test to meet the requirements of API 607, pressure range: class 150-class 600; operating temperature range: -196°C-540°C; size range: NPS 1/2-NPS 8.

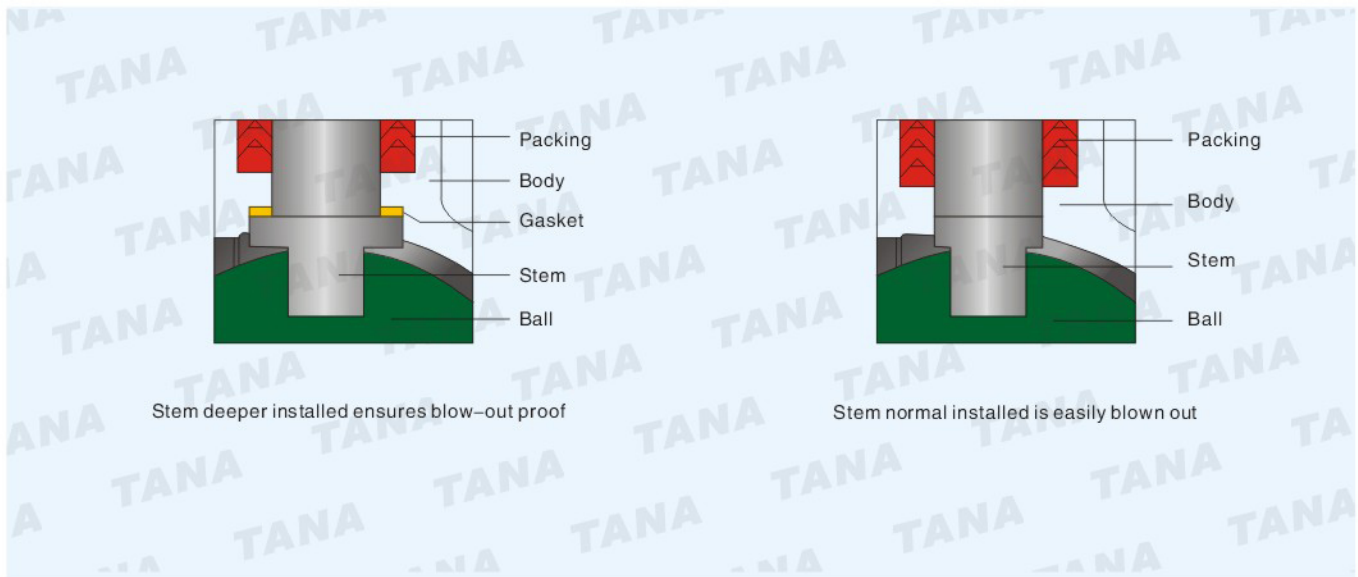
### ■ Fire Safe Design

When the ball valve site happens to be on fire, and non-metallic sealing materials are destroyed after pyrolysis, ball valve with specially designed metal to metal seal auxiliary structure, can achieve effective control of valve in and out leakage.



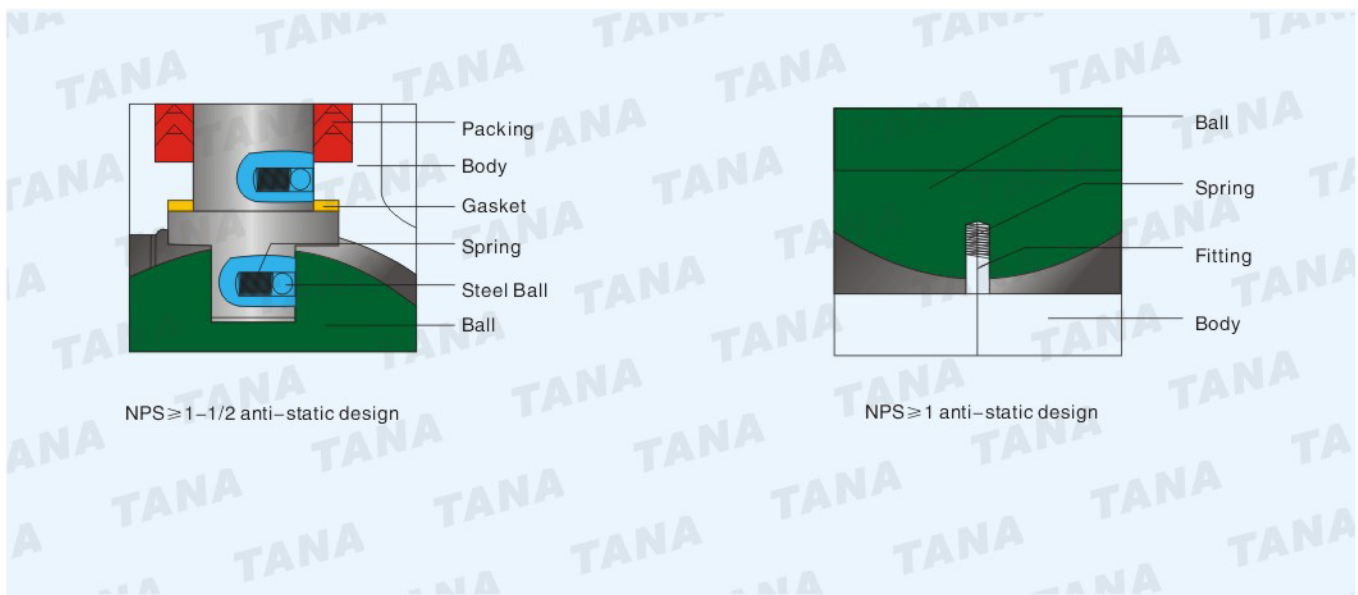
■ **Stem blow-out proof design**

Stem blow-out proof adopts the structural design of the T-shaped structure as a whole, even if the valve chamber is in the unusual pressure arising condition, as well as extreme cases like gland failure, the design can guarantee that stem will not be blown out by the medium. With the stem installed deep inside the valve body, it can function as the backseat which increases with the medium pressure and achieves reliable sealing in a variety of pressure conditions.



■ **Anti-static design**

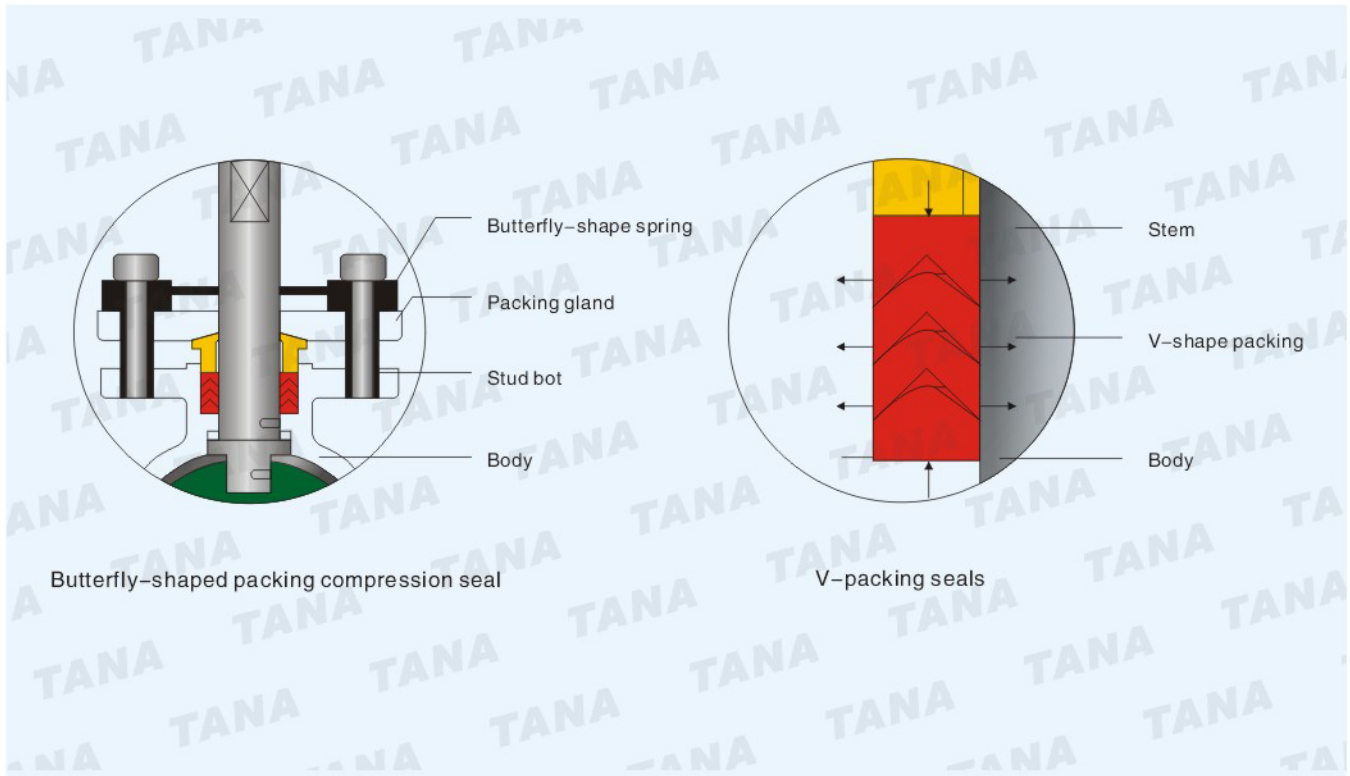
Floating ball valve anti-static design adopts anti-static spring structure or steelstatic extraction device, so that the body between the ball forms an electrostatic channel (NPS= 1 of the ball) or through the stem between the valve body and the ball forms a static channel (NPS = 1-1/2 of the ball), and thus ensures the static electricity generated by friction in the process be grounded into the earth through the body, to avoid static electricity sparks that could cause an explosion or fire danger and so on.





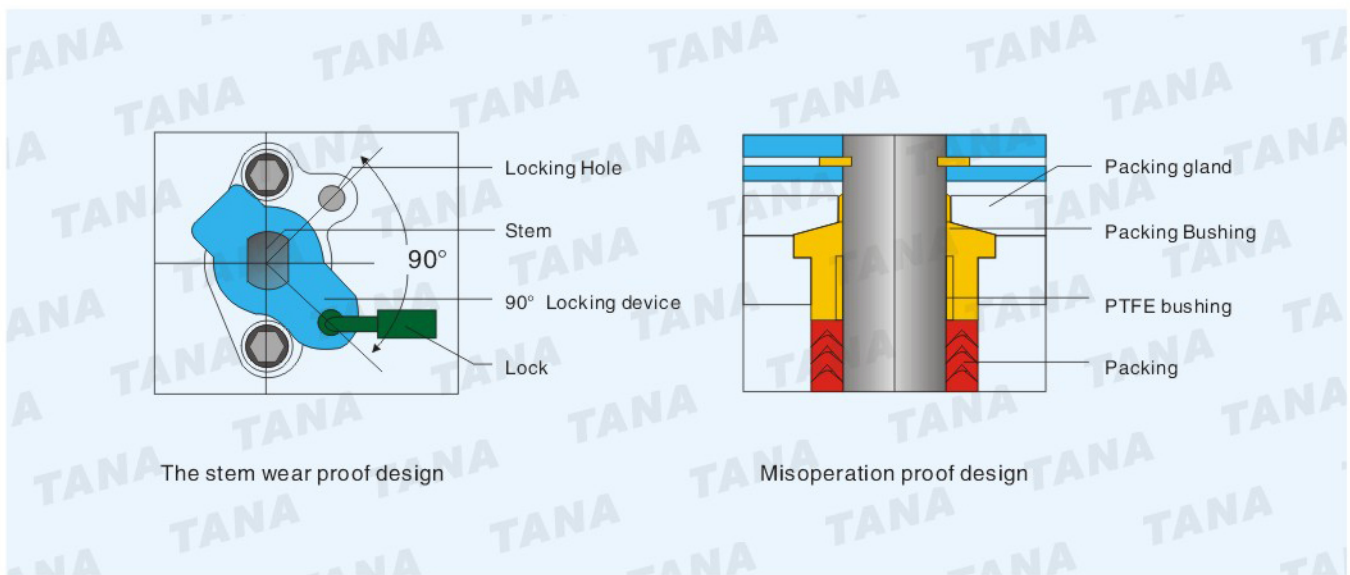
■ **Fugitive emission design**

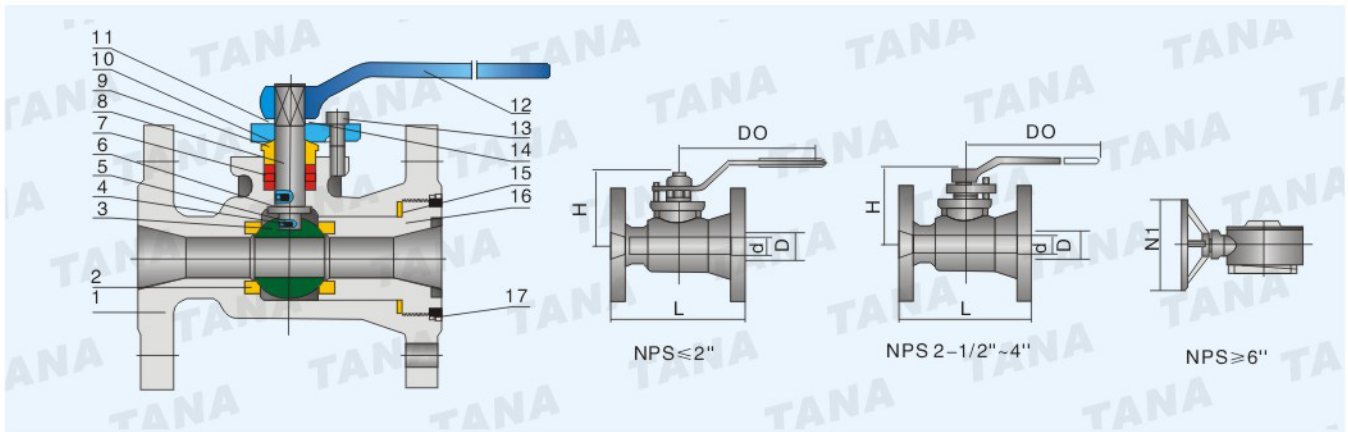
adopts dynamic loading gland design and the V-packing seals that ensures continuous loading to the gland and guarantees lasting close sealing. prevents medium from leaking. Meanwhile the V-fill packing gland can compress the power and medium power effectively into the valve stem sealing.



■ **The stem wear proof and misoperation proof**

Design has changed the traditional packing gland into packing gland and bushing with spherical contact to ensure that the bushing always stay vertical. Inside the bushing there sets a PTFE bush to avoid the wear and reduce torque valve operation. The structural design to prevent the misoperation is set up with the approach of the 90° position locking devise that can be locked to prevent the misoperation. Stem head adopts flat head design. when opening the valve, the handle is parallel to the pipeline; when closing the valve, the handle is vertical to the pipeline, to ensure that the prevention of misoperation.





■ Material List

No	Parts	Material
1	Body	ASTM A216 Gr.WCB
2	Seat	PTFE
3	Ball	304 S.S.
4	Steel Ball	304 S.S.
5	Spring	304 S.S.
6	Gasket	304 S.S.+Graphite
7	Packing	Graphite
8	Stem	ASTM A182 F6a
9	Bushing	ASTM A276 410
10	Gland	ASTM A216 Gr.WCB
11	Gauge Block	AISI 1010Zinc-coated
12	Handle	ASTM A216Gr.WCB
13	Nut	ASTM A193 Gr.B7
14	Retaining Ring	304 S.S.
15	Body Fire Safe Ring	304S.S.
16	Bonnet	ASTM A216 Gr.WCB

■ Standards

Face-to-Face dimension: ASME B 16.10  
 Design and manufacture: API 608/BS 5351/API 6D  
 Flanged End: ASME B16.5  
 Shell Wall Thickness: BS 5351  
 Valve Test: API 598

■ Features

Under medium pressure, the ball can have a certain amount of displacement and be pressed at the valve seat ring exit and achieves sealing. Floating ball valve structure is simple and of good seal, but since the full load from the ball under pressure is transferred to the ring at exit, its use is restricted in a certain range of pressure size, generally floating ball valve is applicable to low pressure in small size valve. One-piece ball valve was developed from many years of manufacturing experience, it's of side entry, simple structure, light weight, good sealing, low torque value, and different sealing materials that can meet different temperature range.

Dimensions & Weights

■ Class 150

NPS(in)	L(mm)	D(mm)	d(mm)	H(mm)	W(mm)	W1(mm)	WT(kg)
1/2	108	12.7	9.5	54	140	---	2.1
3/4	117	19	12.7	59	140	---	3
1	127	25.4	19	64	160	---	4.1
1-1/2	165	38	30	90	160	---	6.5
2	178	51	38	102	260	---	9
2-1/2	190	64	51	112	260	---	11.2
3	203	76	64	121	260	---	15.3
4	229	102	76	166	320	---	28.6
6	267	152	114	208	---	450	53
8	292	203	144	246	---	660	81
10	330	254	187	303	---	660	150

■ Class 300

NPS(in)	L(mm)	D(mm)	d(mm)	H(mm)	W(mm)	W1(mm)	WT(kg)
1/2	140	12.7	9.5	54	140	---	2.8
3/4	152	19	12.7	59	140	---	3.6
1	165	25.4	19	64	160	---	4.9
1-1/2	190	38	30	90	160	---	10.4
2	216	51	38	102	260	---	12
2-1/2	241	64	51	112	260	---	16.1
3	282	76	64	121	260	---	23
4	305	102	76	166	320	---	39.5
6	403	152	114	208	---	450	82
8	419	203	144	246	---	660	124
10	457	254	187	303	---	660	206

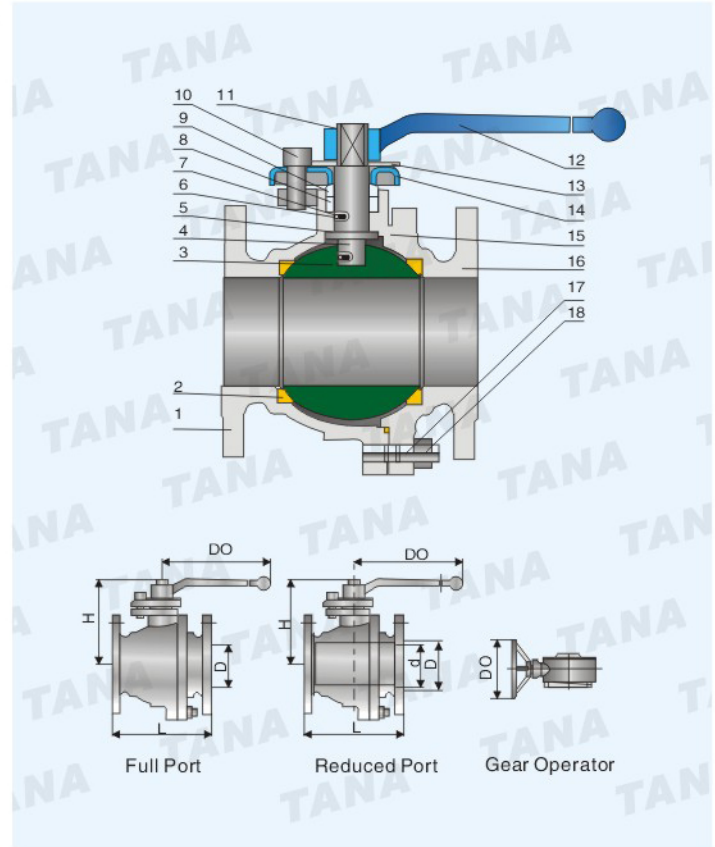


■ Standards

Face-to-Face dimension: ASME B 16.10 JIS B2002  
Design and manufacture: API 608/BS 5351/API 6D  
Flanged End: ASME B16.5 JIS B2212, B2214  
Shell Wall Thickness: BS 5351  
Valve Test: API 598 JIS B2003  
Pressure-Temperature Rating: JIS B2071, B2081

■ Material List

No	Parts	Material
1	Body	ASTM A216 Gr.WCB
2	SeatSeal	PTFE
3	Ball	304 S.S.
4	Stem	ASTM A182 F6a
5	Gasket	PTFE
6	Spring	304 S.S.
7	Steel Ball	304 S.S.
8	Packing	PTFE
9	Packing Bushing	ASTM A276 410
10	Nut	ASTM A193 Gr.B7
11	Retaining Ring	304 S.S.
12	Lever	ASTM A216 Gr.WCB
13	Gauge Block	AISI 1010Zinc-coated
14	Packing Gland	ASTM A216 Gr.WCB
15	Body Gasket	PTFE
16	Bonnet	ASTM A216 Gr.WCB
17	Stud	ASTM A193 Gr.B7
18	Nut	ASTM A194 Gr. 2H



Dimensions

■ Class 150/10K

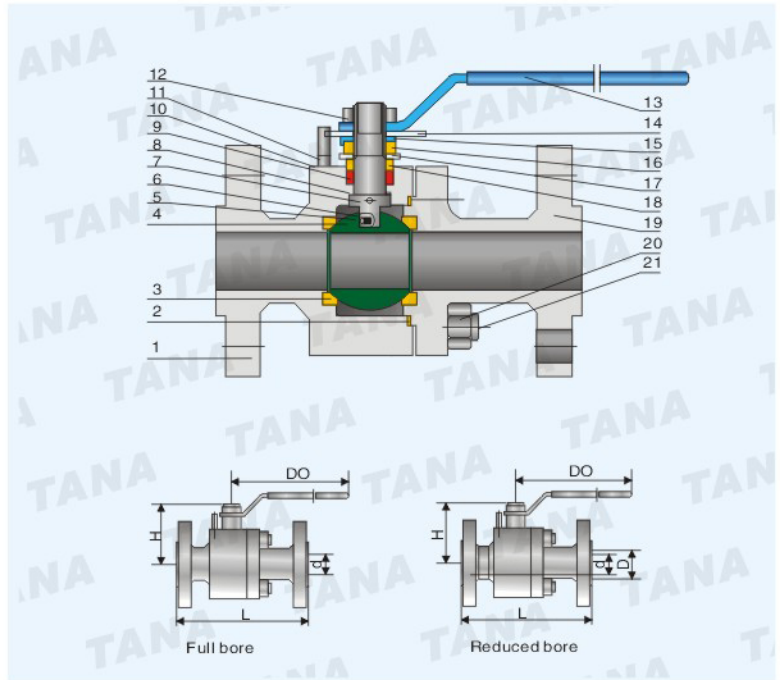
	NPS(in)	1/2	3/4	1	1-1/2	2	3	4	6	8
		D(mm)	13	19	25	38	51	64	76	102
Full bore	L(mm)	108	117	127	165	178	203	229	394	457
	H(mm)	61	66	76	95	142	156	181	270	345
	Do(mm)	130	130	160	230	400	400	700	300*	300*
	WT(kg)	2.4	3.3	4.8	8.2	15.6	19.8	32.0	94.0	162.0
	Reduced bore	NPS(in)	3/4*1/2	1*3/4	1-1/2*1	2*1-1/2	3*2	4*3	6*4	8*6
L(mm)		117	127	165	178	203	229	267	292	330
D(mm)		19	25	38	63	76	102	152	203	254
H(mm)		82	85	100	120	153	162	191	290	340
Do(mm)		130	130	160	230	400	400	460	300*	300*
d(mm)		13	19	25	51	63	76	105	152	203
WT(kg)		2.6	4.5	6.0	14.6	19.0	32.5	58.0	117.0	160.0

■ Class 300/20K

	NPS(in)	1/2	3/4	1	1-1/2	2	3	4	6	8
		D(mm)	13	19	25	38	51	64	76	102
Full bore	L(mm)	140	152	165	190	216	282	305	403	419
	H(mm)	62	68	80	100	148	162	188	283	360
	Do(mm)	150	150	180	250	400	400	700	300*	400*
	WT(kg)	3.0	3.5	6.2	11.0	25.0	40.0	57.5	128.0	252.0
	Reduced bore	NPS(in)	3/4*1/2	1*3/4	1-1/2*1	2*1-1/2	3*2	4*3	6*4	8*6
L(mm)		152	165	190	216	282	305	403	419	--
D(mm)		19	25	38	63	76	102	152	203	--
H(mm)		82	85	100	120	153	162	191	290	--
Do(mm)		130	130	160	230	400	400	460	300*	--
d(mm)		13	19	25	50	63	76	102	152	--
WT(kg)		3.5	5.5	10.0	23.5	29.0	55.0	80.0	162.0	--

■ Material Lis

No	Parts	Material
1	Body	ASTMA105
2	Gasket	PTFE
3	Seat	R-PTFE
4	Ball	304 S.S.
5	Steel Ball	304 S.S.
6	Anti-static Spring	304 S.S.
7	Stem	ASTMA182 F6a
8	Gasket	PTFE
9	Packing	PTFE
10	Plate	ASTM 1045
11	Nut	ASTMA193 Gr.B7
12	Nut	ASTMA194 Gr. 2H
13	Lever	ASTMA216 Gr.WCB
14	Gauge Block	AISI 1010Zinc-coated
15	Bushing Gasket	ASTM 1045
16	Nut	ASTMA194 Gr. 2H
17	Gland	304 S.S.
18	Gland Bushing	ASTMA276 410
19	Bonnet	ASTM 1045
20	Nut	ASTMA194 Gr. 2H
21	Stud	ASTMA193 Gr.B7



Dimensions

■ Class 600

	NPS(in)	1/2	3/4	1	1-1/2	2	3
	Full bore	L(mm)	165	190	216	241	292
D(mm)		13	19	25	38	51	76
H(mm)		98	103	122	135	151	177
Do(mm)		140	140	170	260	300	450
WT(kg)		3.0	4.8	6.5	12.0	15.0	28.0
Reduced bore		NPS(in)	3/4*1/2	1*3/4	1-1/2*1	2*1-1/2	3*2
	L(mm)	190	216	241	292	356	--
	D(mm)	19	25	38	51	76	--
	H(mm)	98	103	122	135	151	--
	Do(mm)	140	140	170	260	300	--
	d(mm)	13	19	25	38	51	--
	WT(kg)	2.8	3.2	5.5	7.1	12.8	--

■ Class 900

	NPS(in)	1/2	3/4	1	1-1/2	2	3
	Full bore	L(mm)	216	229	254	305	368
D(mm)		13	19	25	38	51	76
H(mm)		115	122	125	157	178	208
Do(mm)		160	230	230	400	400	500
(kg)		4.2	9.6	13.8	21.8	39.0	58.0
Reduced bore		NPS(in)	3/4*1/2	1*3/4	1-1/2*1	2*1-1/2	3*2
	L(mm)	229	254	305	368	381	--
	D(mm)	19	25	38	51	76	--
	H(mm)	115	122	125	157	178	--
	Do(mm)	160	230	230	400	400	--
	d(mm)	13	19	25	38	51	--
	WT(kg)	5.6	6.8	12.0	16.5	24.0	--

### ■ General

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Metal Seated Ball Valves is particularly applicable in severe service conditions such as granule medium, pasty stock, coom, lime-ash, and of advantage such as reliable sealing capacity and low operation torque value.

### ■ Utilize advanced technique of ball and seat hardening

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Many techniques has been applied in ball and seat hardening such as, including supersonic spraying, nimonic alloy spraying-weld, surface peculiarly hardening, carbide spraying-weld and high strength high hardness ceramic materials etc, the hardness of ball and seat can generally reach HRC 62 above, even surpass HRC 70. Refractory of sealing material can generally reach 540 centigrade, and 980 centigrade at its highest. Materials bond-strength can reach 10000PSI or above, Sealing material jiss also of the capability of braze-proof and impact-proof.

### ■ High capability of seal

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With peculiar lapping crafts for the ball, spinning the ball to the lapping appliance from different directions to make the ball surface reach sky-high circularity and cleanliness, the sealing capacity of valve can fully reach or surpass the requirement of standard

### ■ Moveable seat design

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Achieves Zero leakage sealing in bi-directional flow and pressure relief for over-pressure protecting.

### ■ High temperature warming design

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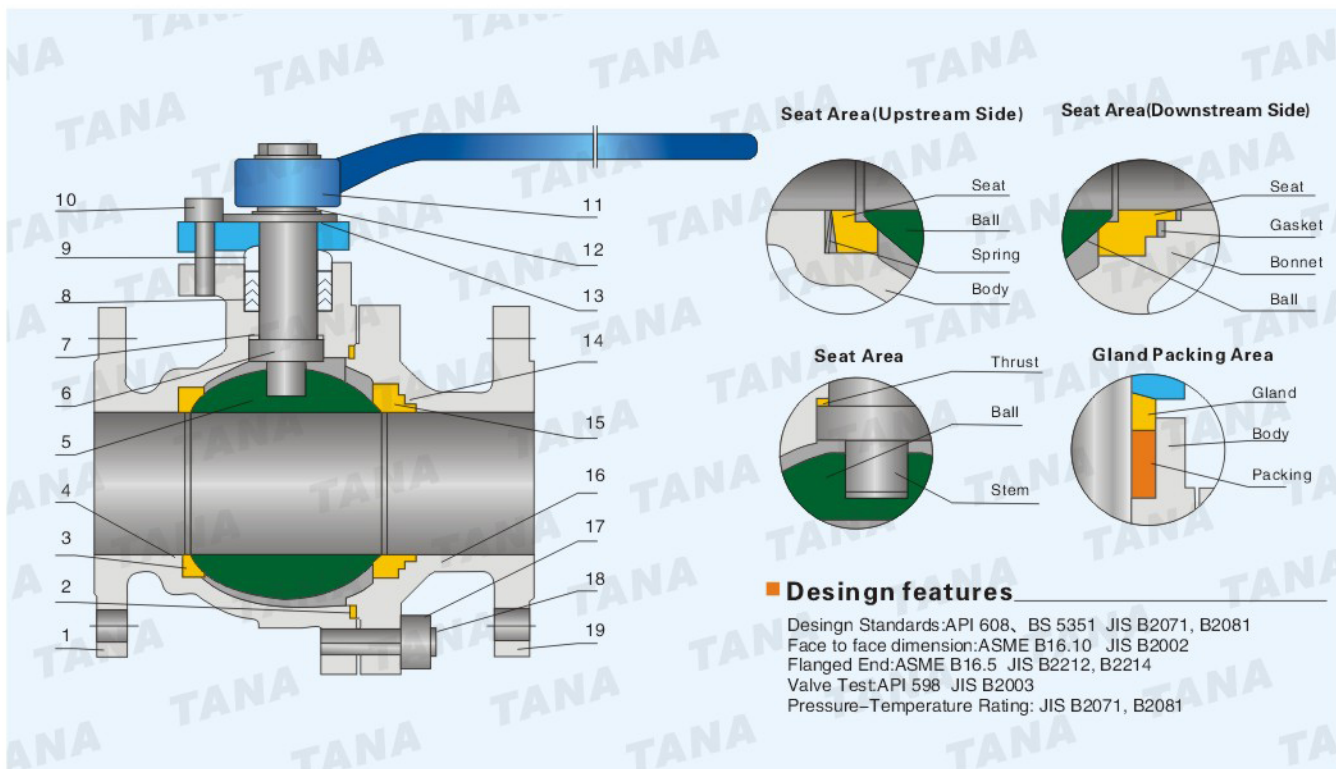
Cup spring supported S.S. ball Seats are of high hardness HV 1500 due to special surface treatment, cup spring made of Inconel alloy can self-compensate the thermal expansion caused by high temperature medium.

### ■ Fully fire safe design structure

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Metal to Metal sealing structure in the sealing surface, and flexible graphite as packing, stainless steel+flexible graphite as gasket, so when if fire burns up the valve can be sealed properly.





■ Design features

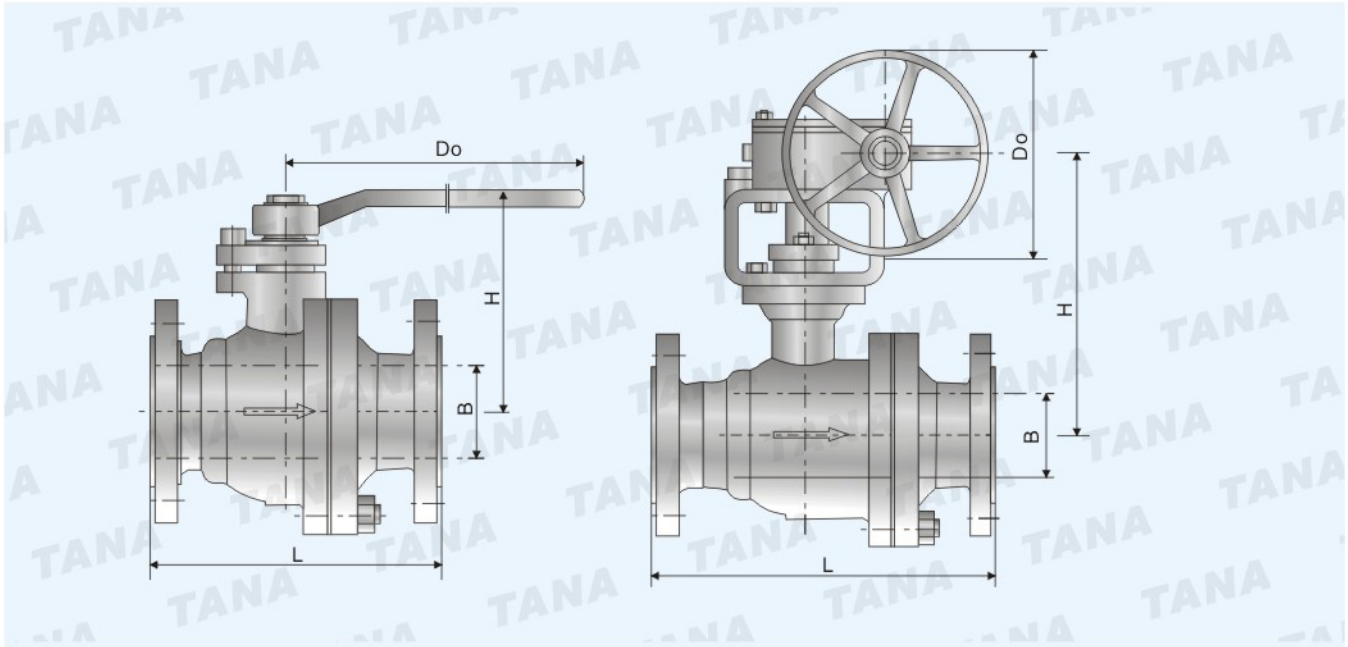
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 Face to face dimension: ASME B16.10 JIS B2002  
 Flanged End: ASME B16.5 JIS B2212, B2214  
 Valve Test: API 598 JIS B2003  
 Pressure-Temperature Rating: JIS B2071, B2081

■ Material List

Item	Carbon Steel		Stainless Steel	
	-29°C~250°C	250°C~425°C	-29°C~250°C	250°C~550°C
Body	ASTM A216 Gr.WCB		ASTM A351 CF8M	
ball	ASTM A 182 F304/coating		ASTM A 182 F316/coating	
Stem	ASTM A 182 F6a		ASTM A182 F316	
Seat	ASTM A 182 F316/Stellite Overlay		ASTM A 182 F316/Stellite Overlay	
Gasket	PEEK	Graphite+304 S.S.	PEEK	Graphite+316 S.S.
Gland Packing	PEEK	Graphite+304 S.S.	PEEK	Graphite+316 S.S.
Stem Bearing	PEEK	Graphite+304 S.S.	PEEK	Graphite+316 S.S.
Spring	17-7PH	Inconel x-750	316 Stainless Steel	Inconel x-750
Bolt	ASTM A 193 B7		ASTM A 193 B8M	
Nut	ASTM A 194 2H		ASTM A 194 8M	
Seat Seal Gasket	Graphite+304 S.S.		Graphite+316 S.S.	

■ Applications of metal seated ball valve

Type	Size	Temperature Range	Auxiliary Seal	Ball/Seats Seal	Working Condition
Floating Ball Valve	pressure Range Class: 150,300,600 NPS:1/2"-8"	-50°C~250°C	PEEK	Ball:nitriding or Nickel base/Co base alloy overlay Seat:Stellited	1.finishing mixture 2.solid containing fluids 3.high temperature and high pressure
		-50°C~380°C	Graphite		
		-35°C~550°C	Graphite	Ball:Nickel Base/ Co base alloy overlay Seat:Stellited	



■ Dimensions ( Class 150/10K )

Size(in)	1/2	3/4	1	1-1/2	2	1-1/2	3	4	6	8
B(mm)	12.7	19	25.4	38	51	64	76	102	152	203
L(mm)	108	117	127	165	178	190	203	229	267	292
H(mm)	54	59	64	90	102	112	121	166	208	246
Do(mm)	140	140	160	160	260	260	260	320	400	300
WT(kg)	2.1	3	4.1	6.5	9	11.2	15.3	28.6	53	81

■ Dimensions ( Class 300/20K )

Size(in)	1/2	3/4	1	1-1/2	2	1-1/2	3	4	6	8
B(mm)	12.7	19	25.4	38	51	64	76	102	152	203
L(mm)	140	152	165	190	216	241	282	305	403	419
H(mm)	54	59	64	90	102	112	121	166	208	246
Do(mm)	140	140	160	160	260	260	260	320	300	300
WT(kg)	2.8	3.6	4.9	10.4	10	16.1	23	39.5	82	124

■ Dimensions ( Class 600 )

Size(in)	1/2	3/4	1	1-1/2
B(mm)	13	19	25	38
L(mm)	165	190	216	241
H(mm)	180	180	250	300
Do(mm)	65	70	85	105
WT(kg)	8.5	11.5	16.3	19.5