TEJI® VALVES

INDUSTRIAL VALVES

ISO 9001 CE

PRODUCT CATALOGUE

Carbon Steel

&

Stainless Steel

Valves

Applications:

Industrial

Petrochemical

Process Plants

Mining

DPI Trading

The most trusted name in quality products & brands

www.dpitrading.co.za

Incledon

The most trusted name in quality products & brands

www.incledon.co.za

FLOATING BALL VALVE

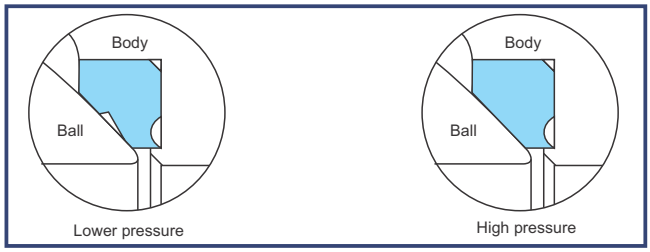
STRUCTURAL FEATURES

1. Special Seat Design

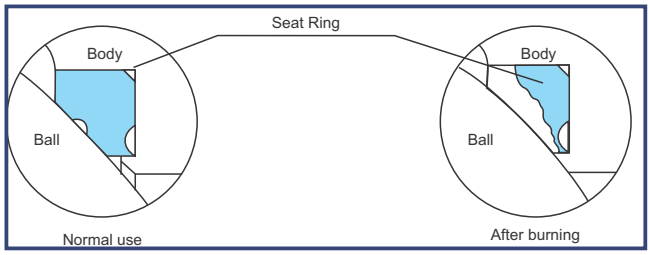
The floating ball valve adopts the design of a flexible seal ring structure. When the medium pressure is low, the contact area of seal ring and ball is smaller. So higher sealing ratio is formed at the place where the seal ring and ball contact to ensure reliable sealing. When the medium pressure is 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.

2. Fireproof Structure Design

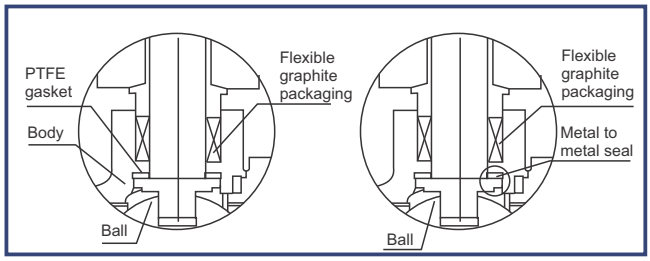
In case of fire during the use of valve, the seat ring made of PTFE, RPTFE or other non-metal materials will be destroyed of damaged under high temperature. The fireproof seal ring is set between ball and seat so that after the valve seat is burnt, the medium will push the ball rapidly towards the downstream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



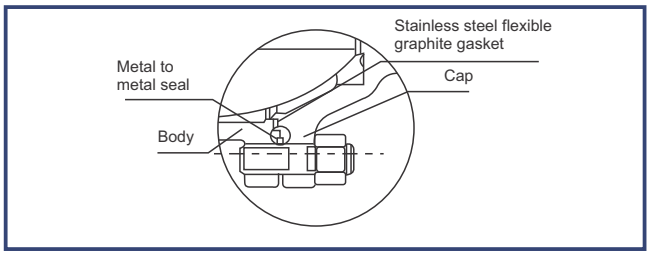
Elastic seat
Fireproof Structure Design of Seat



Fireproof Structure of Design of Stem

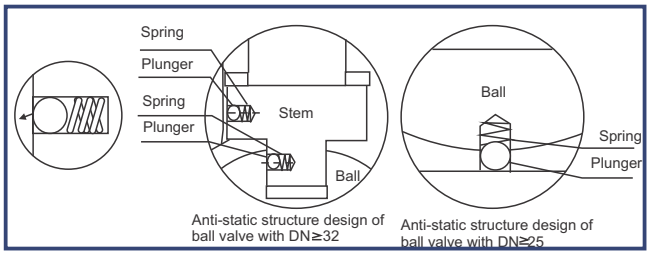


Fireproof Structure of Middle Flange



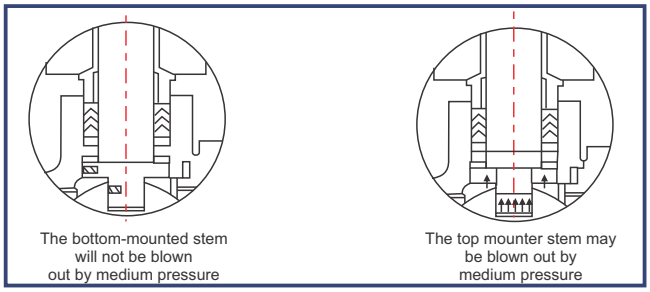
3. Anti-static Structure

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.



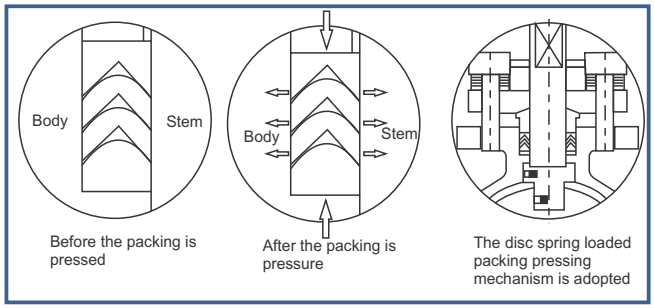
4. Reliable Sealing of Valve Stem/Anti blow out stem

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 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 high pressure, so as to ensure reliable stem sealing under pressure, prevent leakage and avoid accident spreading.



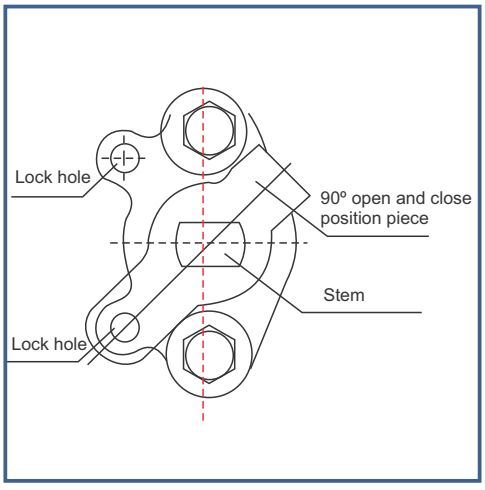
FLOATING BALL VALVE

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.



5. Lock and Mis-operation Prevention

The manual ball valve can be locked by means of a lock when it is at the full open or full close position. The 90º open and close positioning piece with lock hole is designed to avoid valve mis-operation 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.



TRUNNION PIPELINE BALL VALVE

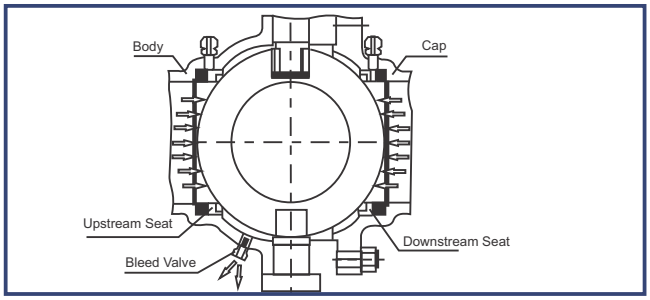
USAGE

The trunnion ball valve is used to cut off or connect the media in various pipelines of Class 150 - Class 2500. The valves made of different materials are suitable for various media such as water, steam, oil, liquefied gas, natural gas, coal gas, nitric acid, oxidizer, urea 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 out and discharge device to reduce damage to the seat by impurities in the medium.



2. Low Operating Torque

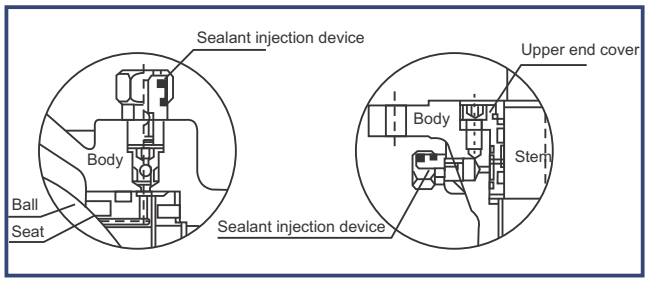
The trunnion pipeline ball valve adopts the trunnion ball structure and floating valve seat, so as to achieve lower torque under operating pressure. It uses self-lubricating PTFE and metal sliding bearing to reduce the friction coefficient to the lowest in conjunction with the high intensity and high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

TRUNNION PIPELINE BALL VALVE

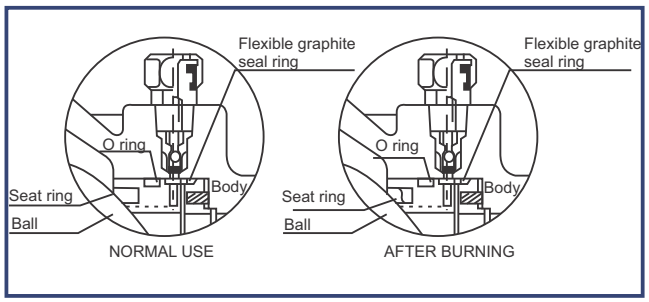
Sealant Injection Device



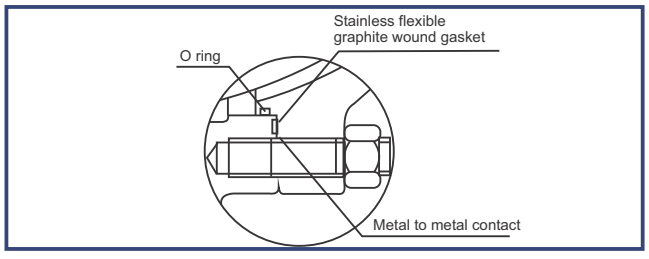
4. Fireproof Structure Design

In care 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 destroyed under high temperature. Under pressure of the medium, the ball valve will push the seat retainer rapidly towards the ball to make the metal seal ring contact the ball and form the auxiliary metal to metal sealing structure, which can effectively control valve leakage. The fireproof structure design of trunnion, pipeline ball valve conforms to requirements in API 607, API 6FA, BS 6755 and other standards.

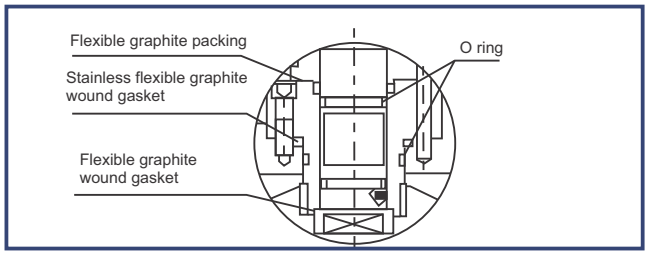
Fireproof Structure of Seat



Fireproof Structure of Middle Flange



Fireproof Structure Design of Stem



5. Anti-static Structure

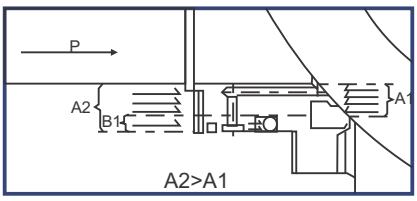
The ball valve is provided with the anti-static structure and adopts the static electricity discharge device to directly form a static channel between the ball and body through the stem, so as to discharge the static electricity produced due to friction during the opening and closing of ball and seat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

6. Reliable seat sealing structure

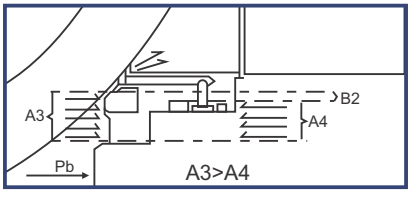
The seat sealing is realized through two floating seat retainers. They can float axially to block the fluid, including ball sealing and body sealing. The low pressure sealing of valve seat is realized by spring pre-tightening.
In addition, the piston effect of valve seat is designed reasonably, which 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-A1 = B1, the force on B1 will push the seat to the ball and realize tight sealing of the upstream part.



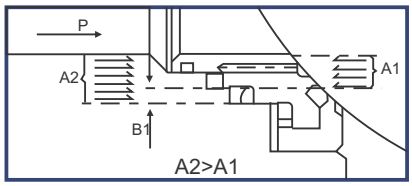
The downstream side: Once the pressure Pb inside the valve cavity increases, the force exerted on A3 is higher than that on A4, As A3-A4 = B2, the pressure differential on B2 will overcome the spring force to make the seat release from the ball and realize pressure relief of valve cavity to the downstream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



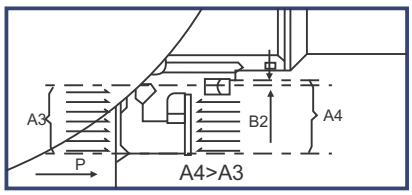
TRUNNION PIPELINE BALL VALVE

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-A1 = B1. Therefore, the force in B1 will push the seat towards the ball and realize tight sealing of the upstream part.

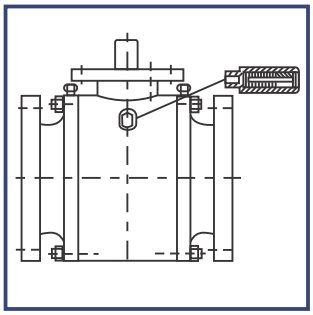


Secondary sealing: Downstream. When the pressure differential is lower for there is no pressure differential, the floating seat will
move axially along the valve under the spring action and push the seat towards the ball to keep tight sealing. When the valve cavity pressure P increases, the force exerted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



9. Safety Relief Device

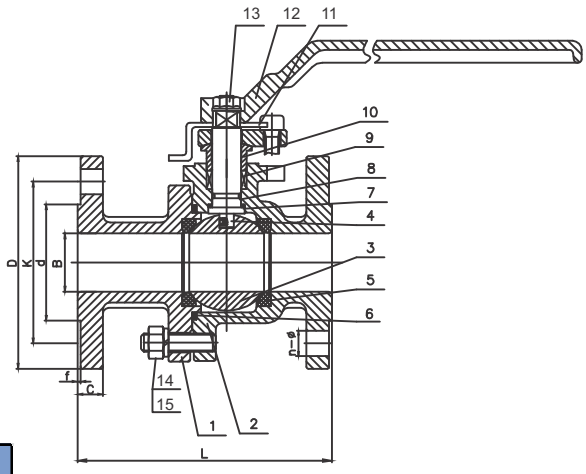
As the ball valve is designed with the advanced primary and secondary sealing that has double piston effect, and the middle cavity cannot realize automatic pressure relief, the safety relief valve must be installed on the body in order to prevent the danger of over-pressure damage inside the valve cavity that may occur due to thermal expansion of medium. The connection of the safety relief valve is generally NPT1/2. Another point to be noted is that the medium of the safety relief valve is directly discharged into the atmosphere. In case direct discharging into the atmosphere is not allowed, we suggest that the ball valve be fitted with a bypass pressure relief towards the upper stream should be used. Refer to the following for details. Please indicate it in 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.



WCB FLOATING BALL VALVE (2 PIECE) CLASS 150

Design Features

1. Handle with stopper, locking device for anti-misoperation and better security
2. Blow out proof stem
3. Operating platforms connected with stopper directly and lock for anti-misoperation and better security
4. Reliable and convenient operation
5. Ap1607 fire safe design
6. Reduced bore
7. ISO5211:2000 operating platform (Top Flange)
8. Anti-static device between stem and ball



Code	NPS	DN	L	ØD	ØD	n-c ŕ	f	C	ØK
051473	½"	15	108	89	35	4 - c يؤ	1.6	11.5	60.5
051474	¾"	20	117	98	43	4 - c يؤ	1.6	11.5	70.0
051475	1"	25	127	108	51	4 - c يؤ	1.6	12.0	79,5
051476	1¼"	32	140	117	64	4 - c يؤ	1.6	13.0	89.0
051477	1½"	40	185	127	73	4 - c يؤ	1.6	15.0	98.5
051478	2"	50	178	192	92	4 - c لاؤ	1.6	16.0	120,5

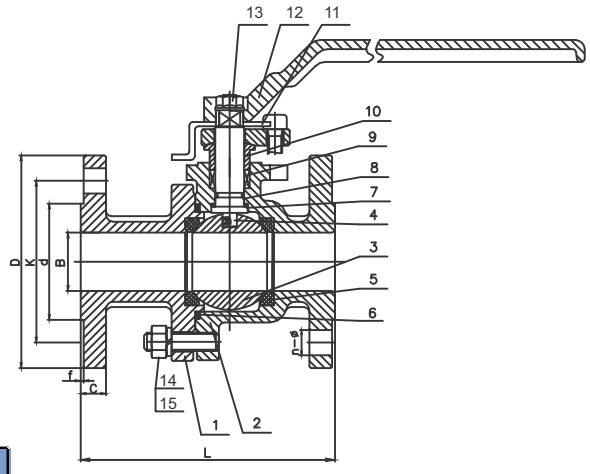
NO.	NAME	MATERIAL	NO.	NAME	MATERIAL
1	Body	WCB	9	Packing	Graphite
2	Bonnet	WCB	10	Gland	A105
3	Ball	316	11	Stop Part	CS + Zn
4	Stem	316	12	Handle Gland	WCB
5	Sealing Ring	PTFE	13	Nut	A193 B7
6	Gasket	304+Graphite	14	Bolt	A193 B7
7	Gasket	PTFE	15	Nut	A193 B7
8	O ring	NBR			

Performance Criterion			
Nominal Pressure		CLASS 150	
Test Pressure	Shell Test	3	Mpa
	Back Seal Test	/	
	Seal Test	2.2	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 150ºC	
Suitable Medium: Water, Oil, Gas			

WCB FLOATING BALL VALVE (2 PIECE) CLASS 150

Design Features

1. Handle with stopper, locking device for anti-misoperation and better security
2. Blow out proof stem
3. Operating platforms connected with stopper directly and lock for anti-misoperation and better security
4. Reliable and convenient operation
5. Ap1607 fire safe design
6. Reduced bore
7. ISO5211:2000 operating platform (Top Flange)
8. Anti-static device between stem and ball



Code	NPS	DN	L	ØD	ØD	n-c ŕ	f	C	ØK
051479	2½"	65	190	178	105	4 - c لاؤ	1.6	18.0	139.5
051480	3"	80	203	190	127	4 - c لاؤ	1.6	19.0	152.5
051481	4"	100	229	229	157	4 - c لاؤ	1.6	24.0	190.5
	5"	125	356	254	196	4 - c ČČ	ي أو	24.0	216.0
051482	6"	150	394	279	216	4 - c ČČ	ي أو	26.0	241.5

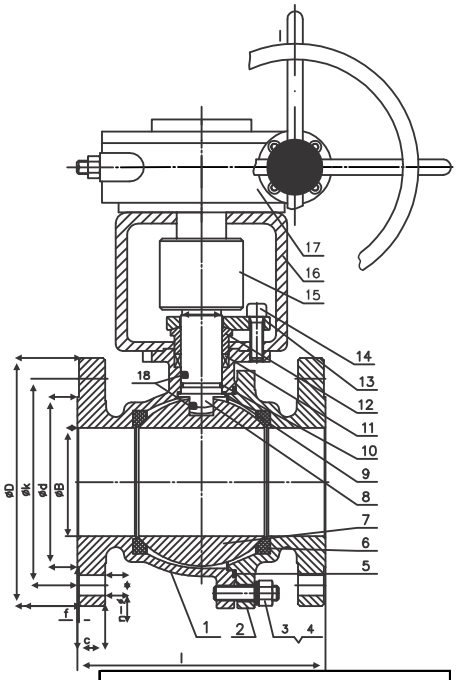
NO.	NAME	MATERIAL	NO.	NAME	MATERIAL
1	Body	WCB	9	Packing	Graphite
2	Bonnet	WCB	10	Gland	A105
3	Ball	316	11	Stop Part	CS + Zn
4	Stem	316	12	Handle Gland	WCB
5	Sealing Ring	PTFE	13	Nut	A193 B7
6	Gasket	304+Graphite	14	Bolt	A193 B7
7	Gasket	PTFE	15	Nut	A193 B7
8	O ring	NBR			

Performance Criterion			
Nominal Pressure		CLASS 150	
Test Pressure	Shell Test	3	Mpa
	Back Seal Test	/	
	Seal Test	2.2	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 150ºC	
Suitable Medium: Water, Oil, Gas			

WCB FLOATING BALL VALVE (2 PIECE) CLASS 150

Design Features

1. Handle with stopper, locking device for anti-misoperation and better security
2. Blow out proof stem
3. Operating platforms connected with stopper directly and lock for anti-misoperation and better security
4. Reliable and convenient operation
5. Ap1607 fire safe design
6. Reduced bore
7. ISO5211:2000 operating platform (Top Flange)
8. Anti-static device between stem and ball

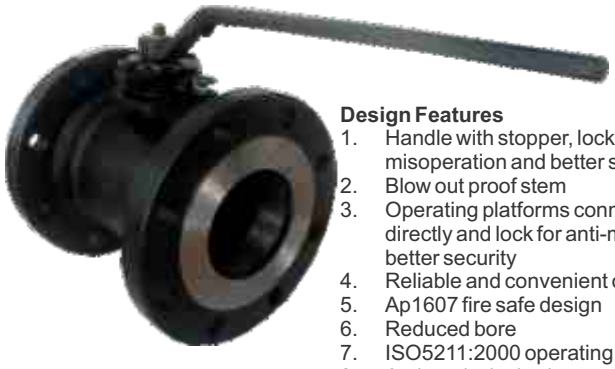


Code	NPS	L (RF)	D	K	d	C	f	n-c
ى بى وي ڤ	8"	457	343	298.5	270	29	1.6	8-22

NO	NAME	MATERIAL	NO	NAME	MATERIAL
1	Body	WCB	10	O-ring	VITON
2	Bonnet	WCB	11	Packaging	GRAPHITE
3	Stud	A193 B7	12	Gland	316
4	Nut	A194 2H	13	Gland	WCB
5	Gasket	316+Graphite	14	Inner Hexagon screw	A193 B7
6	Sealing ring	PTFE	15	Sleve	A105
7	Ball	316	16	Bracket	WCB
8	Stem	316	17	Drive	Gear box
9	Gasket	PTFE	18	Anti static	316

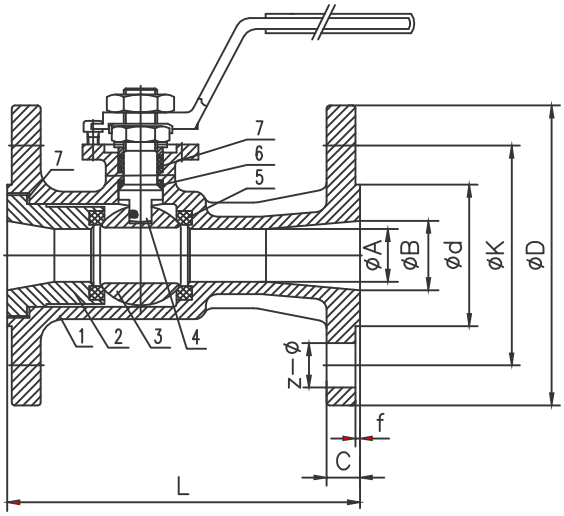
Performance Criterion			
Nominal Pressure		CLASS 150	
Test Pressure	Shell Test	3	Mpa
	Back Seal Test	/	
	Seal Test	2.2	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 150ºC	
Suitable Medium:		Water, Oil, Gas	

WCB FLOATING BALL VALVE (1 PIECE) CLASS 150



Design Features

1. Handle with stopper, locking device for anti-misoperation and better security
2. Blow out proof stem
3. Operating platforms connected with stopper directly and lock for anti-misoperation and better security
4. Reliable and convenient operation
5. Ap1607 fire safe design
6. Reduced bore
7. ISO5211:2000 operating platform (Top Flange)
8. Anti-static device between stem and ball

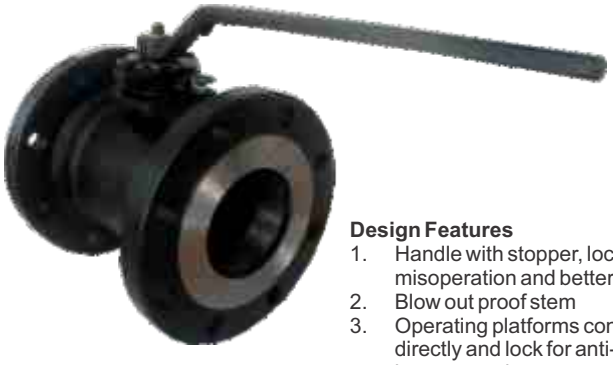


Code	NPS	DN	L	A	ØD	Ød	n-Ø	f	C	ØK
	½"	15	108	10	89	35	4-Ø16	1.6	11.5	60.5
	¾"	20	117	15	98	43	4-Ø16	1.6	11.5	70.0
112622	1"	25	127	19	108	51	4-Ø16	1.6	12.0	79.5
	1½"	40	165	32	127	73	4-Ø16	1.6	15.0	98.5
112623	2"	50	178	38	152	92	4-Ø19	1.6	16.0	120.5
	2½"	65	190	50	178	105	4-Ø19	1.6	18.0	139.5
112624	3"	80	203	65	190	127	4-Ø19	1.6	19.0	152.5

NO	NAME	MATERIAL	NO	NAME	MATERIAL
1	Body	WCB	7	Gasket	304+Graphite
2	Bonnet	WCB	8	Packing	Graphite
3	Ball	316	9	Gland	F316
4	Stem	316	10	Inner Hexagon Screw	A193 B8
5	Sealing Ring	PTFE	11	Handle	CF8
6	Gasket	PTFE	12	Anti Static	316

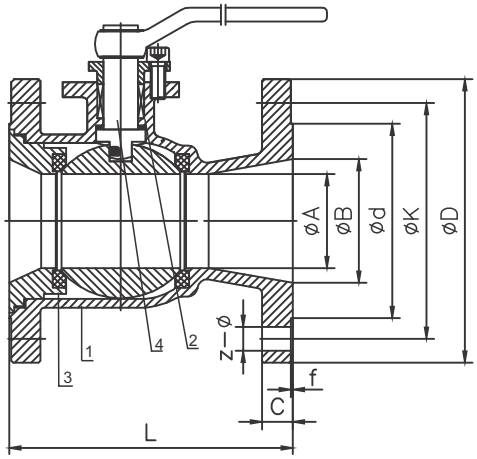
Performance Criterion			
Nominal Pressure		CLASS 150	
Test Pressure	Shell Test	3	Mpa
	Back Seal Test	/	
	Seal Test	2.2	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 150ºC	
Suitable Medium:		Water, Oil, Gas	

WCB FLOATING BALL VALVE (2 PIECE) CLASS 150



Design Features

1. Handle with stopper, locking device for anti-misoperation and better security
2. Blow out proof stem
3. Operating platforms connected with stopper directly and lock for anti-misoperation and better security
4. Reliable and convenient operation
5. Ap1607 fire safe design
6. Reduced bore
7. ISO5211:2000 operating platform (Top Flange)
8. Anti-static device between stem and ball

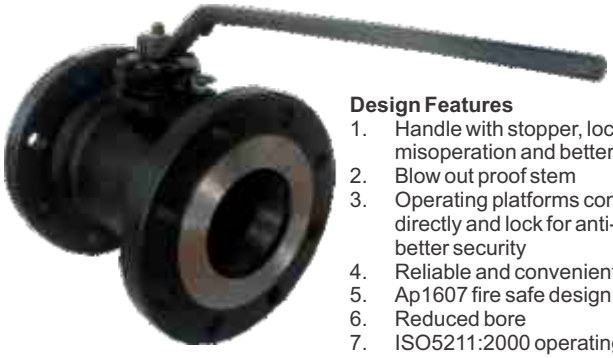


Code	NPS	DN	L	A	ØD	Ød	n-Ø	f	C	ØK
112625	4"	100	229	76	229	157	8-Ø19	1.6	24	190.5
112626	6"	150	394	100	279	216	8-Ø22	1.6	26	241.5

NO	NAME	MATERIAL	NO	NAME	MATERIAL
1	Body	WCB	5	Sealing Ring	PTFE
2	Bonnet	WCB	6	Gasket	304+Graphite
3	Ball	316	7	Gasket	PTFE
4	Stem	316			

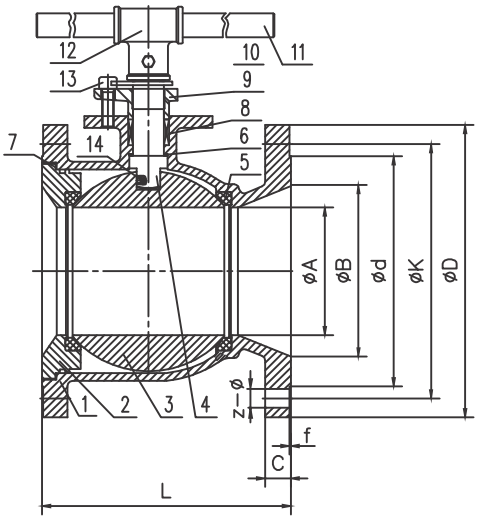
Performance Criterion			
Nominal Pressure		CLASS 150	
Test Pressure	Shell Test	3	Mpa
	Back Seal Test	/	
	Seal Test	2.2	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 150ºC	
Suitable Medium: Water, Oil, Gas			

WCB FLOATING BALL VALVE (2 PIECE) CLASS 150



Design Features

1. Handle with stopper, locking device for anti-misoperation and better security
2. Blow out proof stem
3. Operating platforms connected with stopper directly and lock for anti-misoperation and better security
4. Reliable and convenient operation
5. Ap1607 fire safe design
6. Reduced bore
7. ISO5211:2000 operating platform (Top Flange)
8. Anti-static device between stem and ball



Code	NPS	DN	L	A	ØD	Ød	n-Ø	f	C	ØK
112627	8"	200	457	150	343	270	8-Ø22	1.6	29	298.5

NO	NAME	MATERIAL	NO	NAME	MATERIAL
1	Body	WCB	8	Packing	Graphite
2	Bonnet	WCB	9	Gland	F316
3	Ball	316	10	Stop Part	SS304
4	Stem	316	11	Pull Rool	304
5	Sealing Ring	PTFE	12	Sleeve	CF8
6	Gasket	304+Graphite	13	Inner Hexagon Screw	A193 B8
7	Gasket	PTFE	14	Anti Statiac	316

Performance Criterion			
Nominal Pressure		CLASS 150	
Test Pressure	Shell Test	3	Mpa
	Back Seal Test	/	
	Seal Test	2.2	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 150ºC	
Suitable Medium: Water, Oil, Gas			

DESIGN FEATURES WCB (Weldable Cast B-grade Carbon Steel) WEDGE GATE VALVE

DESIGN OF DISC

Gate valves with pipe size greater >2 are of flexible wedge gate; Gate valves with pipe size smaller <2 are of solid wedge gate.

Body and Bonnet Connection

The body and bonnet of Class 150-Class 900 gate valves are usually bolted bonnet design. And Class 1500-Class 2500 gate valves are usually of pressurized seal design.

Gasket of Cover Flange

Carbon steel or stainless steel + flexible graphite combined gasket is used for Class 150 gate valve Stainless steel + flexible graphite wounded gasket is used for Class 300 gate valve; Stainless steel + flexible graphite wounded gasket is used for Class 600 gate valve ,and ring joint gasket is also optional for Class 600 gate valve; Ring Joint gasket is used for Class 900 gate valve; Pressurized seal design is used for Class 1500-Class 2500 gate valve.

Actuation

Hand wheel or gear box is usually used for gate valve actuation .Chain wheel and electric actuator can be also used for gate valve actuator if requested.

Packing Seal

Moulded flexible graphite is used for packing material PTFE or combined packing material can be also used if requested by the customers. The internal
surface of the stuffing box, of which area is contacted with the packing is of excellent finish(Ra 3.2um). The stem surface Contacting with the packing, should be rolled and pressed after being precisely machined, so as to reach to the high finish and compactness(Ra 0.8um)and ensure the reliable tightness of the stem area.

Bellville Spring Loaded Packing Impacting System

If requested by the customer, the Belleville spring loaded packing impacting system can be adopted for enhancing the durability and reliability of the packing seal.

Back Seating Design

All our gate valves have back seating design and in most cases, the carbon steel gate valve is fitted with a renewable back seat. For stainless steel gate Valve, the back seat is machined directly in the bonnet or is machined after welding .When the gate valve is at fully open position, the sealing of the back seat can be very reliable .However, as per the requirement of API600,it is not advisable to add or change packing by the mean of back seating when the valve is pressure containing.

Seat

For carbon steel gate valve, the seat is usually forged steel. The sealing surface of the seat is spray welded with hard alloy specified by the customer. Welded seat is used for NPS<10 gate valves ,and welded on seat can be also optional if requested by the customer. Welded on seat is used for NPS<10 carbon steel gate valves .for Stainless steel gate valve integral seat is usually adopted, or to weld hard alloy directly integrally. Threaded or welded on seat is also optional for stainless steel gate valve if being requested by the customer.

Stem Design

The stem is of integral forged design. The minimum diameter of the stem shall per the standard requirement. The connection of the stem and disc is T type The strength of the connecting area is bigger than that of the T threaded part of the stem The strength test if that area conforms to API 591.

Stem Nut

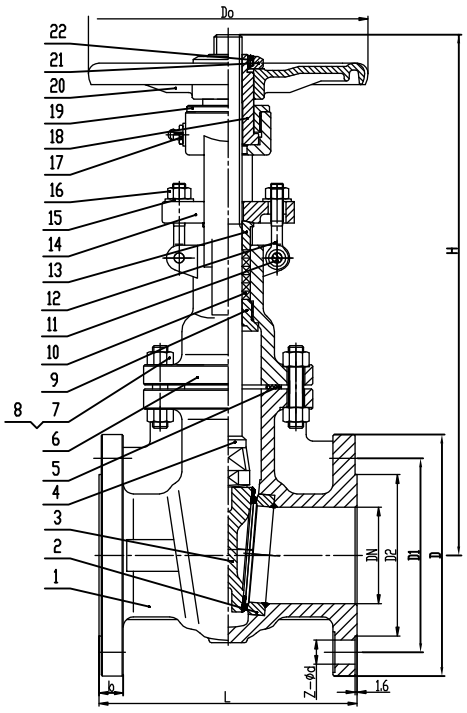
Usually, the stem nut is made of ASTM A439 D2.It is also can be made of copper alloy if requested. For large sized gate valves (NPS 10 for Class 150,NPS 8 for Class 300,NPS 6 for Class 600,NPS 5 for Class 900), roller bearing is fitted at the two sides of the stem nut in order to minimize the open and close torque of the gate valve.

Special Gate Valve

Besides the common gate valves, Teji also makes cryogenic gate valve, Jacketed Gate Valve, Bellow Sealed Gate Valve, Extension Stem Gate Valve for
Underground application, Flat Gate Valve, etc.

WCB GATE VALVE CLASS 150

1. Design and manufacture: API 600
2. Face-to-face : ASTM B16.10
3. Flanged ends : ASME B16.5
4. Inspection and test : API 598



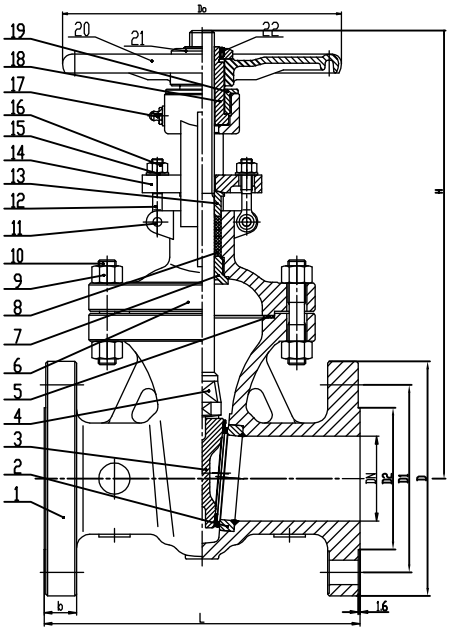
Code	NPS	DN	L	D	D1	D2	b	H	Z-ØK	Do
051520	2"	50	65	80	100	92	16	398	4-Ø19	200
051521	2½"	65	191	178	139.5	105	18	425	4-Ø19	200
051522	3"	80	203	190	152.5	127	20	480	4-Ø19	250
051523	4"	100	229	229	190.5	157	24	595	4-Ø19	280
051525	6"	150	267	279	241.5	216	26	777	8-c وو	350
051526	8"	200	292	343	298.5	270	29	975	8-c وو	400
051527	10"	250	330	40	362	324	31	1149	12-Ø25	400
051528	12"	300	356	483	432	381	32	1350	12-Ø26	450
-	14"	350	381	533	476	413	35	1555	12-Ø27	500
-	16"	400	406	597	540	470	37	1811	12-Ø28	550

NO.	NAME	MATERIAL	NO.	NAME	MATERIAL
1	Body	ASTM A216 WCB	12	Gland eye bolt	ASTM A193 B7
2	Seat	ASTM A105+13Cr	13	Gland	ASTM A182 F6a
3	Wedge	ASTM A216 WCB+13Cr	14	Gland flange	ASTM A216 WCB
4	Stem	ASTM A182 F6a	15	Washer	ASTM A276 410
5	Gasket	CS+Jacketed Graphite	16	Gland Nut	ASTM A194 2H
6	Bonnet	ASTM A216 WCB	17	Lubricating cap	AL-Bronze
7	Bonnet Bolt	ASTM A193 B7	18	Stem Nut	Ductile Iron
8	Bonnet Nut	ASTM A194 2H	19	Retaining Nut	Carbon Steel
9	Back Seat	ASTM A182 F6a	20	Handwheel	Ductile Iron
10	Packing	Flexible Graphite	21	H.W.Lock Nut	Carbon Steel
11	Pin	ASTM A276 410	22	Bolt	Carbon Steel

Performance Criterion			
Nominal Pressure		CLASS 150	
Test Pressure	Shell Test	3.1	Mpa
	Back Seal Test	2.3	
	Seal Test	2.3	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 425ºC	
Suitable Medium: Water, Oil, Gas			

WCB GATE VALVE CLASS 300

1. Design and manufacture: API 600
2. Face-to-face : ASTM B16.10
3. Flanged ends : ASME B16.5
4. Inspection and test : API 598



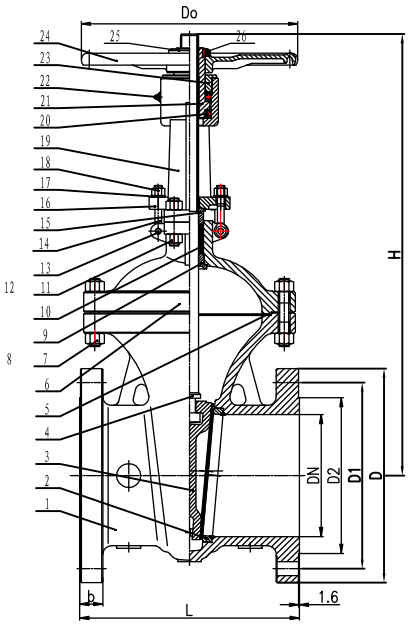
Code	NPS	DN	L	D	D1	D2	b	H	Z-ØK	Do
051530	2'	50	216	165	127	92	22.5	410	8-Ø19	200
051531	2½"	65	241	191	149.4	105	25.5	457	8-Ø22	200
051532	3'	80	283	210	168	127	29.0	509	8-Ø22	250
051533	4'	100	305	254	200	157	32.0	578	8-Ø22	300
051534	5'	125	381	279	235	186	35.5	658	8-Ø22	350
051535	6'	152	403	318	270	216	37	805	12-Ø22	350
051536	8"	203	419	381	330	270	42	980	12-Ø25	400

NO	NAME	MATERIAL	NO	NAME	MATERIAL
1	Body	ASTM A216 WCB	12	Gland eye bolt	ASTM A193 B7
2	Seat	ASTM A105+13Cr	13	Gland	ASTM A182 F6a
3	Wedge	ASTM A216 WCB+13Cr	14	Gland flange	ASTM A216 WCB
4	Stem	ASTM A182 F6a	15	Washer	ASTM A276 410
5	Gasket	CS+Jacketed Graphite	16	Gland Nut	ASTM A194 2H
6	Bonnet	ASTM A216 WCB	17	Lubricating cap	AL- Bronze
7	Back Seat	ASTM A182 F6a	18	Stem Nut	DucHle Iron
8	Packing	Flexible Graphite	19	Retaining Nut	Carbon Steel
9	Bonnet Nut	ASTM A194 2H	20	Handwheel	Ductile Iron
10	Bonnet Bolt	ASTM A193 B7	21	H.W.Lock Nut	Carbon Steel
11	Pin	ASTM A276 410	22	Bolt	Carbon Steel

Performance Criterion			
Nominal Pressure		CLASS 300	
Test Pressure	Shell Test	7.5	Mpa
	Back Seal Test	5.5	
	Seal Test	5.5	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 425ºC	
Suitable Medium: Water, Oil, Gas			

WCB GATE VALVE CLASS 300

1. Design and manufacture: API 1600
2. Face-to-face : ASTM B16.10
3. Flanged ends : ASME B16.5
4. Inspection and test : API 598
5. NACE : MR-0175(2002)



Code	NPS	DN	L	D	D1	D2	b	H	Z-Ød	Do
051537	10'	250	457	445	387.4	324	48	1210	16-Ø28	450
051538	12"	300	502	521	450.9	381	51	1415	16-Ø32	500
-	14"	350	762	584	514.4	413	54	1580	20-Ø32	600
-	16'	400	838	648	571.5	470	58	1825	20-Ø35	700

NO.	NAME	MATERIAL	NO.	NAME	MATERIAL
1	Body	ASTM	14	Gland eye bolt	ASTM A193 B7
2	Seat	ASTM A105+13Cr	15	Gland	ASTM A182 F6a
3	Wedge	ASTM A216 WCB+13Cr	16	Gland flange	ASTM A216 WCB
4	Stem	ASTM A182 F6a	17	Washer	ASTM A276 410
5	Gasket	CS+Jacketed Graphite	18	Gland Nut	ASTM A194 2H
6	Bonnet	ASTM A216 WCB	19	Yoke	ASTM A216 WCB
7	Bonnet Bolt	ASTM A193 B7	20	Bearing	Stainless Steel
8	Bonnet Nut	ASTM A194 2H	21	Stem Nut	Ductile Iron
9	Back Seat	ASTM A182 F6a	22	Lubricating cap	Copper
10	Packing	Flexible Graphite	23	Retaining Nut	Carbon Steel
11	Yoke Blot	ASTM A193 B7	24	Handwheel	Ductile Iron
12	Yoke Nut	ASTM A194 2H	25	H.Wlock Nut	Carbon Steel
13	Pin	ASTM A276 410	26	Bolt	Carbon Steel

Performance Criterion			
Nominal Pressure		CLASS 300	
Test Pressure	Shell Test	7.5	Mpa
	Back Seal Test	5.5	
	Seal Test	5.5	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 425ºC	
Suitable Medium: Water, Oil, Gas			

Check Valve

Definition

A Check Valve, Clack Valve, Non-Return Valve or One-Way Valve is a valve that normally allows fluid (liquid or gas) to flow through it in only one direction.

Check valves are two-port valves, meaning they have two openings in the body, one for fluid to enter and the other for fluid to leave. There are various types of check valves used in a wide variety of applications. Check valves work automatically and most are not controlled by a person or any external control: accordingly, most do not have any valve handle or stem. An important concept in check valves is the cracking pressure which is the minimum upstream pressure at which the valve will operate. Typically the check valve is designed for and can therefore be specified for a specific cracking pressure.

A **Stop Check Valve** is a check valve with override control to stop flow regardless of flow direction or pressure. In addition to closing in response to backflow or insufficient forward pressure (normal check-valve behaviour), it can also be deliberately shut by an external mechanism, thereby preventing any flow regardless of forward pressureA **Lift Check Valve** is a check valve in which the disc, sometimes called a lift, can be lifted up off its seat by higher pressure of inlet or upstream fluid to allow flow to the outlet or downstream side. A guide keeps motion of the disc on a vertical line, so the valve can later reseat properly. When the pressure in no longer higher, gravity or higher downstream pressure will cause the disc to lower onto its seat, shutting the valve to stop reverse flow.

An **In-Line Check Valve** is a check valve similar to the lift check valve. However, this valve generally has a spring that will “lift” when there is pressure on the upstream side of the valve. The pressure needed on the upstream side of the valve to overcome the spring tension is called the “cracking pressure”. When the pressure going through the valve goes below the cracking pressure, the spring will close the valve to prevent back-flow in the process.

Industrial processes

Check valves are used in many fluid systems suck as those in chemical and power plants, and in many other industrial processes. Check valves are also often used when multiple gases are mixed into one gas stream. A check valve is installed on each of the individual gas streams to prevent mixing of the gases in the original source.

Swing Check Valves

A swing check valve consists of a flap or disc of the same diameter as the pipe bore, which hangs down in the flow path. With flow in the forwards direction, the pressure of the fluid forces the disc to hinge upwards, allowing flow through the valve. Reverse flow ill cause the disc to shut against the seat and stop the fluid going back down the pipe. In the absence of flow, the weight of the flap is responsible for the closure of the valve, however, in some cases closure may be assisted by the use of a weighted lever.

Wafer Check Valves

Both lift and swing check valves tend to be bulky which limits their size and makes them costly. To overcome this, wafer check valves have been developed. By definition wafer check valves are those that are designed to fit between a set of flanges. This broad definition covers a variety of different designs, including disc check valves and wafer versions of swing or split disc check valves.

Disc Check Valves

The disc check valve consists of four main components: the body, a disc, a spring and a spring retainer. The disc moves in a plane at right angles to the flow of the fluid, resisted by the spring that is held in place by the retainer. The body is designed to act as an integral centring collar that facilitates installation. Where a “zero leakage” seal is required, a soft seat can be included.

Swing Type Wafer Check Valves

These are similar to the standard swing check valves, but do not have the full-bodied arrangement, instead, when the valve opens, the flap is forced into the top of the pipeline. Subsequently, the flap must have a smaller diameter than that of the pipeline, and because of this, the pressure drop across the valve, which is often high for swing type valves, is further increased.

Swing type check valves are used mainly on larger pipeline sizes, typically above Dn125, because on smaller pipelines the pressure drop, caused by the disc “floating” on the fluid stream, becomes significant. Furthermore, there are significant cost saving to be made by using these valves on larger sizes, due to the small amount of material required for the construction of the valve. There is

however on problem with using larger size valves, due to their size, the discs are particularly heavy, and therefor possess a large amount of kinetic energy when they close. This energy is transferred to the seat and process fluid when the valve slams shut, which could cause damage to the seat of the valve and generate waterhammer.

Double Door Split Disc Check Valves

The check valve or dual plate check valve is designed to overcome the size and pressure drop limitations of the swing and disc type wafer check valves. The flap of the swing check valve is essentially split and hinged down its centre, such that the two disc plates will only swing in one direction. The disc plates are held against the seat by a torsion spring mounted on the hinge.

In order to hold the hinge in the centre of the flow path, mounted retained pins can be used. These retainer pins are a common source of leakage from the valve. An improved design secured the hinge internally, and as the valve mechanism is entirely sealed within the body, leakage to atmosphere is prevented. The valve is normally closed, as the disc plates are kept shut by the torsion spring. When fluid flows in the forwards direction, the pressure of the fluid causes the disc plates to hinge open, allowing flow. The check valve is closed by the spring as soon as flow ceases, before any reverse flow can occur.

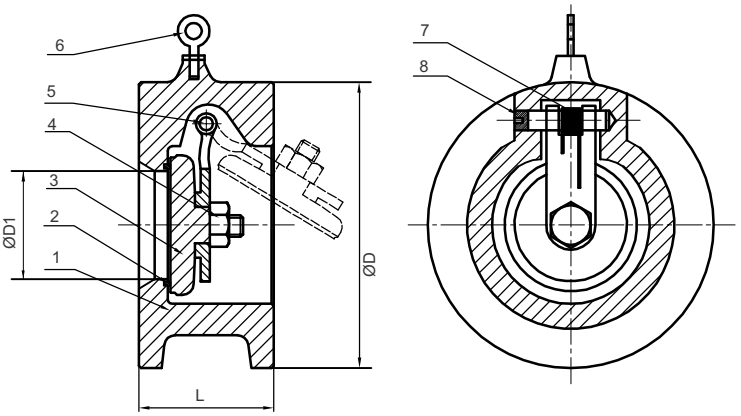
Ball Check Valve

This consists of a rubber-coated ball that is normally seated on the inlet to the valve, sealing off the inlet. When pressure is exerted on the ball, it is moved off its seat along a guide rail, allowing fluid to pass through the inlet. When the fluid pressure drops, the ball slides back into its position on the inlet seat. Not: Ball check valves are typically only used in liquid systems, as it is difficult to obtain a tight seal using a ball.

Tilting Disc Check Valve

This is similar to the swing type check valve, but with the flap pivoted in from of its centre of pressure and counter weighted of spring loaded to assume a normally closed position. When flow is in the forwards direction, the disc lifts and “floats” in the stream offering minimum resistance to flow. The disc is balanced so that as flow decreases, it will pivot towards its closed position, closing before reverse flow actually commence. The operation is smooth and silent under most conditions. Note: due to the design of the tilting disc check valve, it is limited to use on liquid applications only.

WAFER CHECK VALVE SINGLE DOOR 150 LB

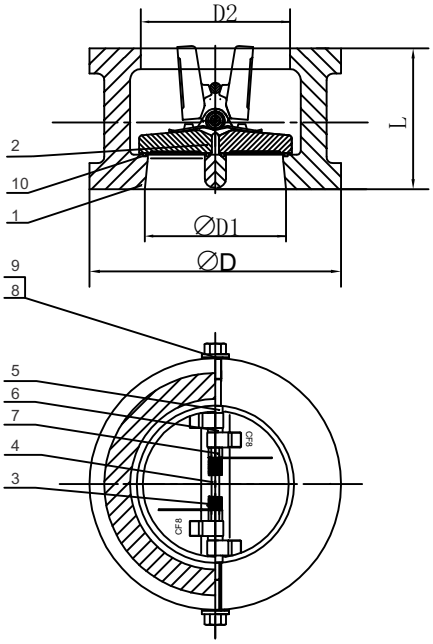


Code	NPS	Class	L	D	D1
051490	2	150LB	60	103	33
051491	2½		67	122	43
051492	3		73	135	52
051493	4		73	173	76
051494	5		86	195	95
051495	6		98	220	121
051496	8		127	277	164
051497	10		146	337	194
051498	12		181	407	241

1. Design and manufacture: API 594
2. Pressure temperature : ANSI B16.34
3. Flanged ends : ANSI B16.5
4. Face-to-fact dimension : API 1594
5. Inspection and test : API 598

NO.	NAME	MATERIAL	NO.	NAME	MATERIAL
1	Body	A216 1CB+316	5	Hinge pin	A182 F316
2	Seat	316	6	Screw	A182 F316
3	Disc	A351 CF8M	7	Spring	ANSI 316
4	EYE BOLT	A182 F316	8	Screw	A182 F316

WAFER CHECK DOUBLE DOOR VALVE CLASS 150

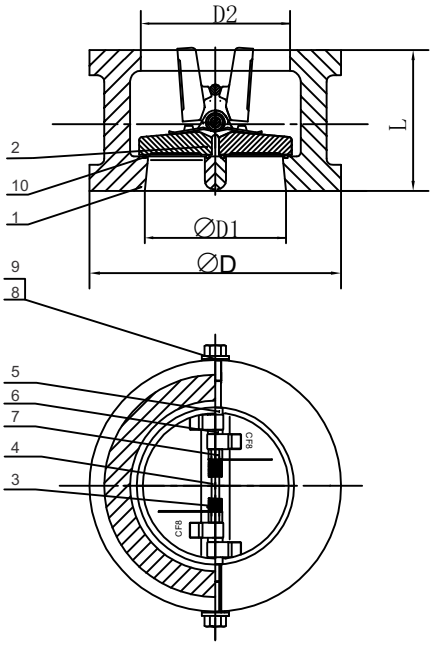


Code	NPS	DN	Class	NO.	L	D	DI	D2
051500	2"	50	150Lb	1	60	103	51	56
051501	2½"	65		2	67	122	65	73
051502	3"	80		3	73	135	80	88
051503	4"	100		4	73	173	102	108
051504	5"	125		5	86	195	127	132
051505	6"	150		6	98	220	152	160
051506	8"	200		7	127	277	203	210
051507	10"	250		1	146	337	254	266
051508	12"	300		2	181	407	305	310

NO.	NAME	MATERIAL	NO.	NAME	MATERIAL
1	Body	A216 WCB+316	6	Middle retainer ring	A182 F316
2	Disc	A351 CF8M	7	Spring retainer	A182 F316
3	Spring	SS316	8	lasher	A182 F316
4	Hinge pin	A182 F316	9	Screw	A182 F316
5	End retainer ring	A182 F316	10	Seat	316

1. Design and manufacture: API 594
2. Pressure temperature : ANSI B16.34
3. Flanged ends : ANSI B16.5
4. Face-to-fact dimension : API 1594
5. Inspection and test : API 598

WAFER CHECK DOUBLE DOOR VALVE CLASS 300

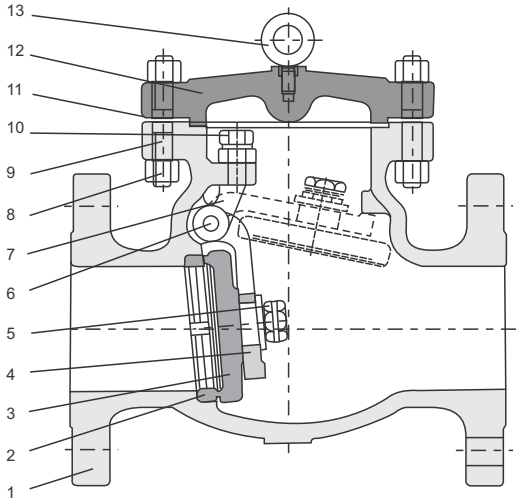


Code	NPS	DN	Class	NO.	L	D	DI	D2
051510	2"	50	300Lb	1	60	110	51	56
051511	2½"	65		2	67	128	65	73
051512	3"	80		3	73	147	80	88
051513	4"	100		4	73	179	102	108
051514	5"	125		5	86	214	127	132
051515	6"	150		6	98	249	152	160
051516	8"	200		7	127	305	203	210
051517	10"	250		1	146	359	254	266
051518	12"	300		2	181	420	305	310

NO.	NAME	MATERIAL	NO.	NAME	MATERIAL
1	Body	A216 1CB+316	6	Middle retainer ring	A182 F316
2	Disc	A351 CF8M	7	Spring retainer	A182 F316
3	Spring	SS316	8	lasher	A182 F316
4	Hinge pin	A182 F316	9	Screw	A182 F316
5	End retainer ring	A182 F316	10	Seat	316

1. Design and manufacture: API 594
2. Pressure temperature : ANSI B16.34
3. Flanged ends : ANSI B16.5
4. Face-to-fact dimension : API 1594
5. Inspection and test : API 598

WCB FLANGED SWING CHECK VALVE



Code	NPS	DN	L	D	D1	D2	b	H	Z-cŕ
112628	2"	50	203	152	120.5	92	16.0	152.0	4 - c لآو
112629	2½"	65	191	178	139.5	105	18.0	165.0	4 - c لآو
112630	3"	80	241	191	152.5	127	19.0	175.0	4 - c لآو
112631	4"	100	292	229	190.5	157	24.0	204.0	8 - c لآو
112632	6"	150	356	279	241.5	216	26.0	268.0	8 - c ČČ
تقيووو	8"	200	495	343	298.5	270	29.0	310.0	9 - c ČČ
□	10"	250	622	406	362.0	324	31.0	370.0	10 - c ČČ
□	12"	300	698	483	432.0	381	32.0	370.0	11 - c ČČ

NO.	NAME	MATERIAL	NO.	NAME	MATERIAL
1	Body	ASTM	8	Pin	ASTM A193 B7
2	Disc pin	ASTM A105+13Cr	9	Pothook	ASTM A182 F6a
3	Disc nut	ASTM A216 WCB+13Cr	10	Gasket	ASTM A216 WCB
4	Disc washer	ASTM A182 F6a	11	Cover nut	ASTM A276 410
5	Rocker	CS+Jacketed Graphite	12	Cover bolt	ASTM A194 2H
6	Seat	ASTM A216 WCB	13	Cover	ASTM A216 WCB
7	Disc	ASTM A193 B7			

Performance Criterion			
Nominal Pressure		CLASS 150	
Test Pressure	Shell Test	3.1	Mpa
	Back Seal Test	2.3	
	Seal Test	2.3	
	Gas Seal Test	0.6	
Working Temp		-29 ~ 150°C	
Suitable Medium: Water, Oil, Gas			

Size		Class 150						Class 300					
NPS	DN	Dimensions (mm)					Weight (kg)	Dimensions (mm)					Weight (kg)
		L			d	H		L			d	H	
		RF	RTJ	BW				RF	RTJ	BW			
2	50	203	216	203	51	132	15	267	283	267	51	144	20
2½	65	216	229	216	64	147	20	292	308	292	64	169	35
3	80	241	254	241	76	176	27	318	333	318	76	210	40
4	100	292	305	292	102	198	45	356	371	356	102	260	61
5	125	330	343	330	127	255	58	400	416	400	127	295	80
6	150	356	368	356	152	320	69	445	460	445	152	326	130
8	200	495	508	495	203	380	131	533	549	533	203	380	190
10	250	622	635	622	254	440	219	622	638	622	254	440	296
12	300	699	711	699	305	480	321	711	727	711	305	520	450
14	350	787	800	787	337	b3G	380	838	854	838	337	b40	640
16	400	864	876	864	387	580	560	864	879	864	387	588	850

INTRODUCTION

STRAINERS

Definition

A pipeline strainer is a device which provides a means of mechanically removing solids from a flowing fluid. This is accomplished by utilizing a perforated metal, mesh or wedge wire straining element. The most common range of strainer particle retention is 1 to 40 micron (0.0016)

Purpose

Strainers are employed in pipelines to protect downstream mechanical equipment such as condensers, heat exchange, pumps, compressors, meters, spray nozzles, turbines, and steam traps from the detrimental effect of sediment, rust, pipe scale, or other extraneous debris.

Types of Strainers

Specified strainers are the Y strainer and the basket strainer. While there is primarily one type of Y strainer, there are several variations of basket strainers.

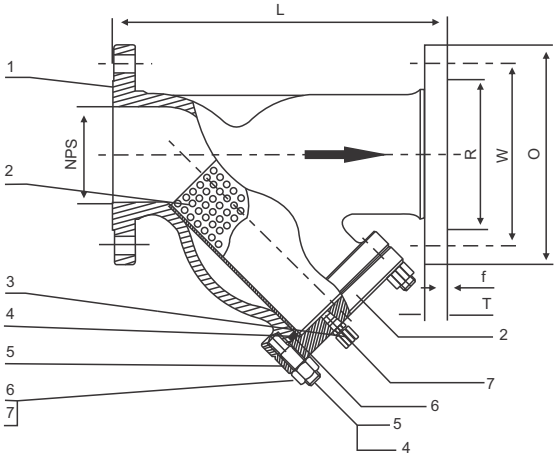
Y Strainer, Basket Strainer

Vertical piping, frequently found at pump inlets, necessitates the use of a Y strainer or a tee type basket strainer. Most basket strainers are intended for horizontal or slightly inclined piping. Special attention must be given to the orientation of the debris collection chamber and the drain (blowdown) connection of the strainer. The strainer must be installed such that it is located at the lowest possible position. For liquid flow a Y strainer in vertical piping must be placed with its screen in the downward position to the sediment in the debris collection chamber. For steam service, it is recommended that Y strainers be mounted sideways in horizontal lines to prevent condensate accumulation.

Y strainers and most variations of basket strainers can be self-cleaning. With the addition of a blowdown valve and some modification of the straining element of a basket strainer, the element can be flushed out by opening and closing the blowdown valve. This can be accomplished without flow stoppage or disassembling any piping.

In sizes above 4", a single basket strainer will generally create less pressure drop than a Y strainer. Basket strainers are normally installed in a horizontal pipeline with the cover over the basket at the top. Cleaning of the strainer is generally simple and no draining is required. Cover flanges for basket strainers are relatively easy to remove and servicing is simple. Replacements of covers is facilitated by some manufacturers through the use of studs, rather than bolts, which help to align the cover during the replacement operations. Hinged covers and screen locking devices can also make servicing easier.

WCB FLANGED Y STRAINER 150 LBS

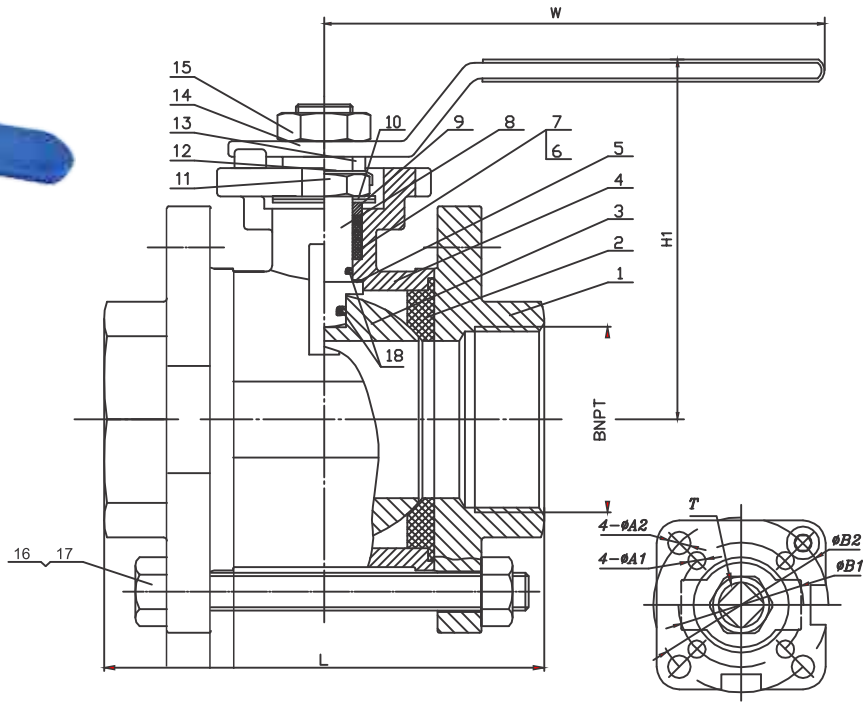


Code	NPS	DN	L	O	W	R	Z - T	T	f
112628	2"	50	203	150	120.7	92.1	4-Ø19	14.3	2.0
-	2½"	65	216	180	139.7	104.8	4-Ø19	15.9	2.0
112629	3"	80	241	190	152.4	127.0	4-Ø19	17.5	2.0
112631	4"	100	292	230	190.5	157.2	8-Ø19	22.3	2.0
-	5"	125	355	255	215.9	185.7	8-Ø22.5	22.3	2.0
112632	6"	150	406	280	241.3	215.9	8-Ø22.5	23.9	2.0
112633	8"	200	495	345	298.5	269.9	8-Ø22.5	27.0	2.0
-	10"	250	622	405	362.0	323.8	12-022.5	28.6	2.0
-	12"	300	699	485	431.8	381.0	12-Ø22.5	30.2	2.0

NO	NAME	MATERIAL
1	Body	A216 WCB
2	Screen	SS304
3	Plug	A105
4	Gasket	304+Graphite
5	Cover	A105
6	Bolt	A193 B7
7	Nut	A194 2H

Performance Standard			
Nominal Pressure		150LBS	
Test Pressure	Shell Test	3.0	Mpa
Suitable Temp.		-29~425°C	
Suitable Medium:		Water, Oil, Gas	

3 PIECE STAINLESS STEEL BALL VALVE



Design Features:

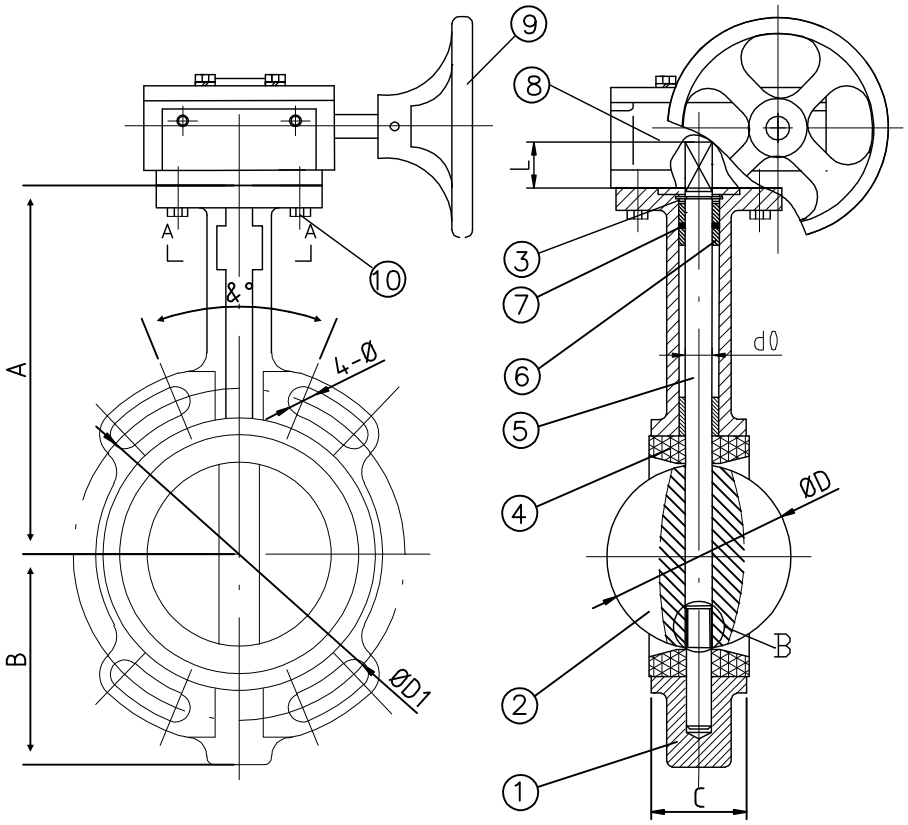
1. Stopper on handle plus locking device for anti-misoperation and better security.
2. Blow out proof stem
3. Reliable and convenient operation
4. Entire API 607 fire safe design
5. RPTFE seats
6. Anti-static device between stem and ball
7. End connection: Thread, SW, BW (extended stem)
8. Full ISO Pad

Code	BSPT	DN	L	H	W
140300	½"	15	72	60.0	125
140301	¾"	20	84	65.0	130
140302	1"	25	93	72.5	145
140303	1¼"	32	112	82.5	165
140304	1½"	40	120	85.0	165
140305	2"	50	146	96.5	185
140306	2½"	65	180	138.0	215
140307	3"	80	208	140.5	250
-	4"	100	268	168.0	315

Performance Criterion			
Nominal Pressure		1000 PSI	
Test Pressure	Shell Test	10.2	Mpa
	Back Seal Test	/	
	Seal Test	7.5	
	Gas Seal Test	0.6	
Working Temp		150°C	
Suitable Medium: Water, Oil, Gas			

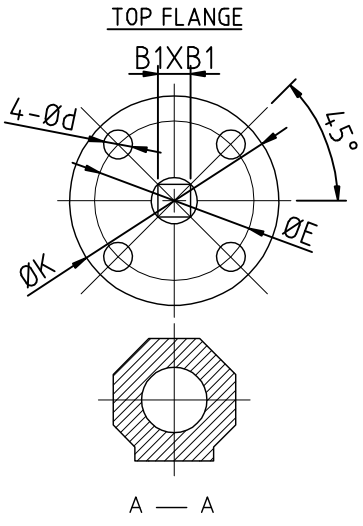
NO	NAME	MATERIAL	NO	NAME	MATERIAL
1	Bonnet	CF8M	10	Belleville washer	316
2	Sealing ring	RPTFE	11	Nut	A193 B8
3	Ball	F316	12	Stop-lock-cap	316
4	Body	CF8M	13	ISO Mounting Pad	316
5	Gasket	PTFE	14	Handle	CF8
6	Packing	PTFE	15	Nut	A194 8
7	Stem Gasket	PTFE+316	16	Bolt	A193 B8
8	Stem	316	17	Nut	A194 8
9	Ring	316	18	Anti Static	316

DUCTILE IRON GGG 4O BUTTERFLY VALVE GEARBOX OPERATED

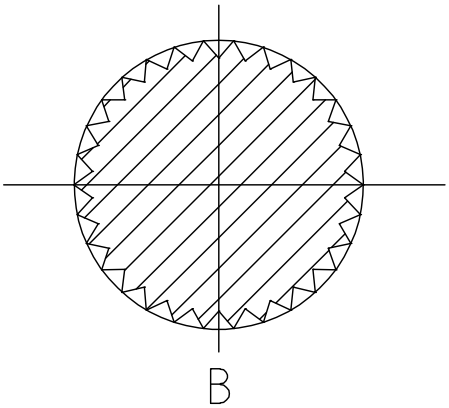


Design Features
1. Pinless spline shaft
2. CF8M disc

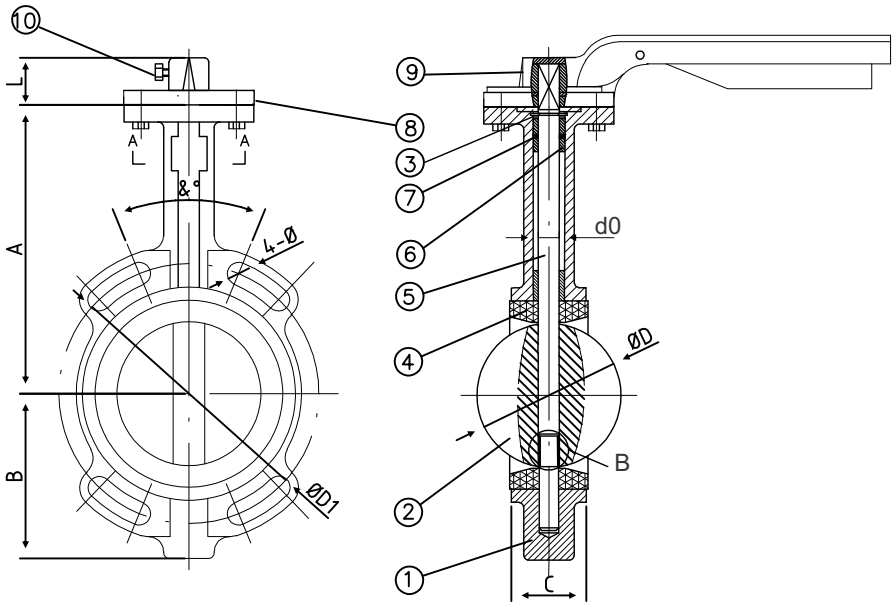
Code	Size	DN	A	B	C	D	d0	ISO 5211	K	E	4-d	L	D1	4-c	∠ Ŵ	B1
140267	2"	50	140	80	42.0	52.9	12.60	F07	90	70	10	30	125	4 - 19	90°	11
140268	2½"	65	150	89	44.7	64.5	12.60	F07	90	70	10	30	145	4 - 19	90°	11
140269	3"	80	158	95	45.2	78.8	12.60	F07	90	70	10	30	160	4 - 19	45°	11
140280	4"	100	176	114	52.0	104.0	15.77	F07	90	70	10	30	180	4 - 19	45°	11
140281	5"	125	190	127	54.4	123.3	18.92	F07	90	70	10	30	210	4 - 19	45°	14
140282	6"	150	201	139	55.8	155.1	18.92	F07	90	70	10	30	240	4 - 23	45°	14
140283	8"	200	248	175	60.6	202.5	22.10	F10	125	102	12	40	295	4 - 23	30°	17
140284	10"	250	276	203	65.6	250.5	28.45	F10	125	102	12	40	355	4 - 27	30°	22
140285	12"	300	305	242	76.9	301.5	31.60	F10	125	102	12	40	410	4 - 27	30°	22



NO	NAME	MATERIAL
1	Body	DI
2	Disc	SS316
4	Retaining Wire	16Mn
5	Stem	SS416
6	Bushing	PTFE
7	O-Ring	EPDM
8	Gear	Ductile Iron
9	Hand Wheel	Ductile Iron
10	Bolt	Carbon Steel

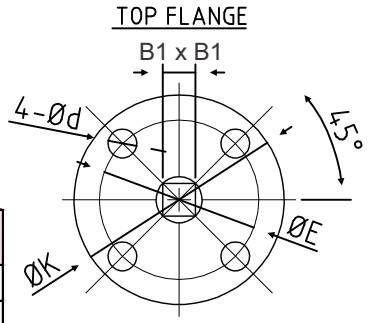


DUCTILE IRON GGG 40 LEVER OPERATED BUTTERFLY VALVES

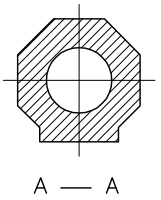


Design Features

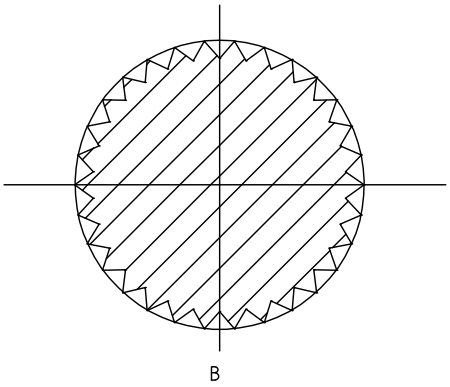
1. Pinless spline shaft
2. CF8M disc
3. Lever - aluminium



Code	Size	DN	A	B	C	D	d0	ISO 5211	K	E	4-d	L	D1	4-c	⊐ Ŵ	B1
140259	2"	50	140	80	42.0	52.9	12.60	F07	90	70	10	30	125	4 - 19	90º	11
140260	2½"	65	150	89	44.7	64.5	12.60	F07	90	70	10	30	145	4 - 19	90º	11
140261	3"	80	158	95	45.2	78.8	12.60	F07	90	70	10	30	160	4 - 19	45º	11
140262	4"	100	176	114	52.0	104.0	15.77	F07	90	70	10	30	180	4 - 19	45º	11
-	5"	125	190	127	54.4	123.3	18.92	F07	90	70	10	30	210	4 - 19	45º	14
140263	6"	150	201	139	55.8	155.1	18.92	F07	90	70	10	30	240	4 - 23	45º	14
140264	8"	200	248	175	60.6	202.5	22.10	F10	125	102	12	40	295	4 - 23	30º	17
140265	10"	250	276	203	65.6	250.5	28.45	F10	125	102	12	40	355	4 - 27	30º	22
140266	12"	300	305	242	76.9	301.5	31.60	F10	125	102	12	40	410	4 - 27	30º	22



NO	NAME	MATERIAL
1	Body	DI
2	Disc	SS316
4	Retaining Wire	16Mn
5	Stem	SS416
6	Bushing	PTFE
7	O-Ring	EPDM
8	Gear	Ductile Iron
9	Hand Wheel	Ductile Iron
10	Bolt	Carbon Steel



TEJI®
VALVES

ISO 9001 CE

DISCLAIMER

Whilst every care was taken in compiling this data, information and related material contained herein are subject to change without notification. All detail that this document contains are provided in good faith and therefore no representation or warranty whatsoever regarding the completeness, accuracy, "up to date", or adequacy of, suitability, functionality, ommission, or operation is specifically disclaimed of any liability for direct, indirect or consequential loss or damage, however so arising, from the use or reliance on information herein thereafter provided.

INCLEDON

BLOEMFONTEIN	Tel: 051 408 9200	BURGERSFORT	Tel: 013 231 7224	GERMISTON	Tel: 011 323 0800	KATHU	Tel: 053 723 2213
KLERKSDORP	Tel: 018 462 0009	LEPHALALE	Tel: 014 763 5824	NELSPRUIT	Tel: 013 752 3121	POLOKWANE	Tel: 015 292 8660
RUSTENBURG	Tel: 014 591 7700	SECUNDA	Tel: 017 631 4200	UPINGTON	Tel: 054 332 1089	WELKOM	Tel: 057 396 1131
DURBAN	Tel: 031 716 2200	EAST LONDON	Tel: 043 736 6022	PORT ELIZABETH	Tel: 041 409 8000		

DPI TRADING (Western Cape)

CAPE TOWN	Tel: 021 957 5600	GEORGE	Tel: 044 874 2327

D A W N
Member of the Dawn Group