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PIPELINE VALVE®**
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Joint Venture

WELDED BODY FORGED TRUNNION MOUNTED BALL VALVE CATALOGUE



API 6D - 1473
API Q1 - 2345
API QR - 2470 (9001)
API 6A - 0842



CHEVRON
APPROVED



BP APPROVED



SHELL TAT TAMAP
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PETRONAS
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PDO APPROVED



API 607 5th, 6th & 7th Ed.
ISO 10497 Firesafe Certified



ISO 15848-1 & API 641
Fugitive Emission Certified



API 6D - 1473
API Q1 - 2345
API QR - 2470 (9001)
API 6A - 0842



SIL 3



LLOYDS
FZV - CE/PED
2014/68/EU

FANGZHENG VALVE GROUP CO., LTD

Add: NO.1921, Binhai 1st Avenue, Economy & Technology Development Zone,
Wenzhou City, Zhejiang Province, China 325025
Tel: +86-577-6735 6515 Fax: +86-577-6735 8449

E-mail: fzvalve@fzvgroup.com

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Catalogue information is current at time of publication, subject to change without notice



INDUSTRIAL PIPELINE CONTROL EXPERT

FANGZHENG VALVE GROUP



We (FZV) commit ourselves to manufacturing excellent valves and achieving our customer satisfaction based on the principles of quality assurance and continual improvement.

We are specialized in supplying a wide range of API 6D, API 609, API600, API 602, API 608, API 594, API 6A products and wellhead equipment.

FZV was formally established in 1992, and so far, FZV has been approved by well-known international and domestic End-users and EPC companies.

FZV has set up three factories based in Shanghai and Wenzhou city with total area 76000 m² and maximum production capacity up to 32000 tons.

To enhance engineering designs and manufacture high-end products, FZV has in-house laboratory equipped with various facilities and test equipment to check and verify the product quality. The following tests are conducted in-house:

- Chemical analysis
- Mechanical test, Hardness, and impact test
- Non-destructive examination
- Salt spray test
- Fugitive emission test(ISO 15848-1 & 2)
- Design validation testing (DVT) as per SHELL(MESC SPE 77/300)
- High temperature (Up to 550°C) and Cryogenic test (Up to -196°C)

FZV is certified by ISO 9001, ISO 14001, OHSAS 18001, API6D, API600, API609, API594, API607, API6A, API6A-PR2, API Spec.Q1, ABS, CCS, DNV, ATEX, and CE/PED, etc.

FZV Main Products Range:

Product types: Ball Valve, Gate Valve, Globe Valve, Check Valve, Butterfly Valve, Slab Gate Valve, Pipe Fitting, Cryogenic Valve, API6A Valve, Wellhead Equipment, Manifold & Christmas tree, etc.

Implemented Standards: ISO, API, BS, etc.

Casting material: WCB, LCB, WC6, WC9, C5, C12, CF3, CF3M, CF8, CF8M, C95500, 4A, 5A, Monel 400/500, Inconel 825/625, Titanium Alloy, etc.

Forging material: A105, LF2, F11, F12, F304, F321, F347, F316, 304L, 316L, C61900, F51, F53, F55, Inconel, Titanium Alloy, etc.

Nominal diameter: NPS 1/2"-68"(DN 15-DN 1,700)

Nominal pressure: API600 & API6D: CLASS 150~CLASS 2,500 (PN16~PN420) API 6A: 2,000PSI~15,000PSI

Temperature range: -196°C-550°C

Applications: Onshore oil and gas exploitation and transportation, offshore oil and gas platform and FPSO / FLNG / FSRU, natural gas purification and liquefaction unit, LNG receiving station and vaporization unit, refining, chemical industry and chemistry, coal to gas (oil) and coal chemical industry, air separation, power station, aerospace, military industry and new energy (solar power generation, hydrogen energy, etc.) etc.

Mission: Providing Complete Control Solutions For Industrial Pipelines.

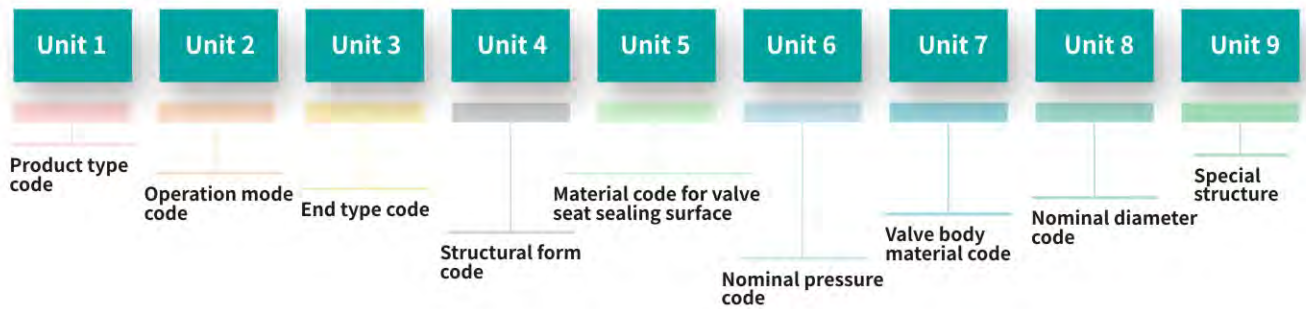
Our Advantages:

1. Strict quality management system to ensure excellent product quality;
2. Excellent production management system to ensure the shortest delivery;
3. Competitive price;
4. Responsive after-sales service.



IDENTIFICATION NUMBERING SYSTEM FOR BALL VALVE PRODUCTS

A ball valve's identification number consists of 8 units as the following:



Unit 1

Table.1 indicates the number of codes used to categorize Ball valve type.

Unit 2

Table.2 indicates the number of codes used to categorize Ball valve's operation type.

Unit 3

Table.3 indicates the number of codes used to categorize Ball valve's End flange type.

Unit 4

Table.4 & 5 indicates the number of codes used to specify Ball valve's structural design.

Unit 5

Table.6 indicates the number of codes used to specify Ball valve's seat material.

Unit 6

Table.7 indicates the number of codes used to specify Ball valve's nominal pressure.

Unit 7

Table.8 indicates the number of codes used to specify Ball valve's body material.

Unit 8

Table.7 indicates the number of codes used to specify Ball valve's nominal diameter.

Unit 9

The special structure is described in parentheses, and multiple requirements in the description are separated by "/". Examples include (DIB-2), (PTFE), (PTFE/G), (non extension), etc.

BALL VALVE CATEGORY CODE
Table 1

CATEGORY	CODE	CATEGORY	CODE	CATEGORY	CODE
Floating ball valve Shaft type Trunnion mounted ball valve	Q	High temperature ball valve	HQ	Integrated ball valve (side entry)	Qs
Fixed plate structure	Qg	A standard ball valve	MQ	Fully welded ball valve	Qw
Shell 2008 Structure	Qm	Orbit ball valve	QD	Shell standard cavity overlay	Qmn
-46°C low temperature	DQ	Oxygen ball valve	YQ		
-101°C and below	CDQ	Internal cavity welding	Qn		

VALVE OPERATION MODE CODE
Table 2

OPERATION MODE	CODE	OPERATION MODE	CODE	OPERATION MODE	CODE	OPERATION MODE	CODE
Bare shaft	0	Worm gear	3	Pneumatic	6	Motor	9
Lever/Handwheel	N/A	Spur gear	4	Hydraulic/ Gas over oil	7		
Impact type handwheel	2	Bevel gear	5	Chain wheel	8		

Note: (1) For pneumatic or hydraulic valves, 6K and 7K are used for normally open valves, and 6B and 7B are used for normally closed valves.

(2) Explosion proof electric is represented by 9B.

END TYPE CODE
Table 3

END TYPE	CODE	END TYPE	CODE	END TYPE	CODE	END TYPE	CODE
Male Threaded (SD)	1	Raised flange (RF)	4	Wafer (WR)	7	Flat flange (FF)	0
Groove surface (G)	2	Ring type flange (RTJ)	5	Clamp (CP)	8	One side Female threaded /another side Socket weld	1/9
Concave flange (FM)	3	Butt welding (BW)	6	Socket weld (SW)	9		

STRUCTURAL FORM CODE
Table 4
**STRUCTURAL FORM CODE OF
ORBIT BALL VALVE**
Table 5

CODE	STRUCTURAL FORM	CODE	STRUCTURAL FORM	CODE	STRUCTURAL FORM	CODE	STRUCTURAL FORM
0	Tope entry trunnion mounted ball	5	T type floating three way	1	Integral valve stem, closed type valve cover	3	Integral valve stem, OS&Y
1	Two pieces floating ball valve	6	Two pieces trunnion mounted ball valve			4	Two section valve stem, OS&Y
2	Integral reduce bore floating ball valve	7	Three pieces trunnion mounted ball valve	2	Two section valve stem, sealed type valve cover		
3	Three pieces floating ball valve	8	L type trunnion mounted three way				
4	L type floating three way	9	T type trunnion mounted three way				

MATERIAL CODE FOR VALVE SEAT SEALING SURFACE
Table 6

SEALING SURFACE MATERIAL	CODE	SEALING SURFACE MATERIAL	CODE	SEALING SURFACE MATERIAL	CODE
Tin based bearing alloy	B	Nylon	N	Lined with fluorine	J
18-8 series stainless steel	P	Mo2Ti series stainless steel	R	Body (integral valve seat)	W
Fluoroplastic	F	Copper alloy	T	Multi lay composite	HF
Cr13 series stainless steel /alloy steel	H	Rubber	X		
Monel	M	Hard faced alloy	Y		

Note: General drawing design: F for soft seat,Y for metal seat.

BALL VALVE PRODUCT PRESSURE - TRUNNION RANGE - FIXED BALL VALVE (INCLUDING DIAMETER AND REDUCED DIAMETER)

Table 7

NOMINAL DIAMETER NPS	CL 150	CL 300	CL 600	CL 900	CL 1500	CL 2500
2	●	●	●	●	●	●
3	●	●	●	●	●	●
4	●	●	●	●	●	●
6	●	●	●	●	●	●
8	●	●	●	●	●	●
10	●	●	●	●	●	●
12	●	●	●	●	●	●
14	●	●	●	●	●	●
16	●	●	●	●	●	●
18	●	●	●	●	●	●
20	●	●	●	●	●	●
24	●	●	●	●	●	●
28	●	●	●	●	●	●
30	●	●	●	●	●	●
32	●	●	●	●	●	●
36	●	●	●	●	●	●
42	●	●	●	●	●	●
48	●	●	●	●	●	●

BALL VALVE PRODUCT PRESSURE - SIZE RANGE - FLOATING BALL VALVE (INCLUDING FULL BORE AND REDUCE BORE)

NOMINAL DIAMETER NPS	CL 150	CL 300	CL 600	CL 900	CL 1500	CL 2500
1/2	●	●	●	●	●	●
3/4	●	●	●	●	●	●
1	●	●	●	●	●	●
1 1/2	●	●	●	●	●	●
2	●	●	●	●	●	●
3	●	●	●	●	●	●
4	●	●	●	●	●	●
6	●	●	●	●	●	●
8	●	●	●	●	●	●
10	●	●	●	●	●	●

VALVE BODY MATERIAL CODE

Table 8

BODY MATERIAL	CODE	BODY MATERIAL	CODE	BODY MATERIAL	CODE	BODY MATERIAL	CODE
WCB	C	Ductile iron	Q	A105	A	F304L	F4
18-8 series stainless steel	P	Mo2Ti series stainless steel	R	LF2/LF1	LF	F316	F6
Chromium molybdenum steel	I	Copper and copper alloys	B	F11	F1	F316L	F7
Malleable iron	K	Chromium molybdenum vanadium steel	V	F22	F2	LCB/LCC	LC
Cr13 series stainless steel	H	Grey cast iron	Z	F304	F3	C5	C5
WC6	C6	WC9	C9	CF3	S3	CF3M	S4
Cf8	S8	CF8M	S9				

Note: (1) For national and German standard valves, when $PN \leq 1.6\text{MPa}$ uses gray cast iron valve bodies and $PN \geq 2.5\text{MPa}$ uses carbon cast steel valve bodies, codes Z and C can be omitted.

(2) When using carbon cast steel valve bodies for American and British standard valves, the code C can be omitted.

(3) Universal drawing design, forging valve body uniformly uses A, omitting code for cast steel valves, specific material details are executed according to BOM.

(4) The main types of valve body materials are shown in Table 8.1: Types of main body materials.

(5) Common combinations of internal materials: see Tables 9-1 to 9-3 for combinations of internal materials.

TYPE OF MAIN MATERIAL
Table 8.1

ITEM	01	02	03	04	05	06	07
MATERIAL GRADE	A105	WCB	WCA	WCC	WCI	Wc4	Wc5
MATERIAL TYPE	Carbon steel forging				Heat-resistant cast steel		
ITEM	08	09	10	11	12	13	14
MATERIAL GRADE	WC6	WC9	C5	C12	CF3	CF3M	CF8
MATERIAL TYPE	Heat-resistant cast steel				Stainless steel casting		
ITEM	15	16	17	18	19	20	21
MATERIAL GRADE	CF8M	LF1	LF2	LF3	LFA	LCB	LCC
MATERIAL TYPE	Stainless steel casting	Low temperature forged steel			Low temperature cast steel		
ITEM	22	23	24	25	26	27	28
MATERIAL GRADE	LC1	LC2	LC3	F304	F304L	F316	F316L
MATERIAL TYPE	Low temperature cast steel				Stainless steel forging		
ITEM	29	30	31	32	33	34	35
MATERIAL GRADE	410	17-4PH	IRON	STEEL	C95800	MONEL	INCONEL625
MATERIAL TYPE	Martensitic stainless steel	Precipitation stainless steel	Soft iron	Cast steel, cold-rolled steel	Copper	Special materials	
ITEM	36	37	38	39	40	41	42
MATERIAL GRADE	20#	Hastelloy B	Hastelloy C	4140	CA15	A105+ENP	WCB+ENP
MATERIAL TYPE	Special materials			Alloy steel	Heat-resistant steel	Surface treatment	
ITEM	43	44	45	46	47	48	49
MATERIAL GRADE	STEELITE	A105N	4A	F51	INCONEL825	LF2+ENP	WCB+DSS
MATERIAL TYPE	Wear resistant material	Surface treatment	Special materials		(CU5MCUC)	Surface treatment	
ITEM	50	51	52	53	54	55	56
MATERIAL GRADE	HT200	F11	F22	A 105N+ENP	54	Organic glass	F12
MATERIAL TYPE	Grey cast iron	High temperature steel		Surface treatment	F44	Special treatment	High temperature steel
ITEM	57	58	59	60	61	62	63
MATERIAL GRADE	WCB+PFA	F55	F91	C95200	61	C61900	
MATERIAL TYPE	Carbon steel lining	Special materials	High temperature steel	Copper alloy	C95500	Copper alloy	

Copper alloy

TRIM MATERIAL COMBINATION TRUNNION MOUNTED BALL VALVE WELDED BODY VALVE

Table 9-1

Explanation: The materials in the table can be combined arbitrarily according to the working conditions, and if there are no specified ones, they will be according to the factory standards

ITEM	BALL	SEAT	STEM	SUPPORT PLATE/ LOWER COVER	SEAL RING	BODY FASTENER
1	A105+ENP	A105+ENP	A105+ENP	A105+ENP	PTFE	B7/2H
2	4140+ENP	4140+ENP	4140+ENP	4140+ENP	RPTFE	B7M/2HM
3	F6a(ENP)/410(ENP)	F6a(ENP)/410(ENP)	F6a(ENP)/410(ENP)	F6a(ENP)/410(ENP)	NYLON	B8/8(A)
4	304	304	304	304	NYLON 12	B8M/8M(A)
5	304L	304L	304L	304L	NYLON 66	L7/7
6	316	316	316	316	PEEK	L7M/7M
7	316L	316L	316L	316L	DEVLON V	B8T/8T
8	LF2+ENP	LF2+ENP	LF2+ENP	LF2+ENP	MOLON	L7/4L
9	WCB+ENP	F316+ENP	17-4PH	17-4PH	PARA POLYSTYRENE	B16/4
10	4A/F51	F51	F51	F51	TEFLON	
11	Alloy 825	Alloy 825	Alloy 825	Alloy 825	POM	
12	CF8M	F6a	F6a	F6a	PCTFE	
13	CF8	F55	F56	F57		
14	INCONEL625	INCONEL625	INCONEL625	INCONEL625		
15	MONEL400	MONEL400	MONEL400	MONEL400		
16	MONEL500	MONEL500	MONEL500	MONEL500		
17	Alloy 20	Alloy 20	Alloy 20	Alloy 20		
18	A105N/ENP	A105N/ENP	A105N/ENP	A105N/ENP		
19	F55			ORGANIC GLASS		
20	F44	F44	F44	F44		

Note: The ENP thickness is usually specified as 0.03mm, and can be 0.075mm as needed.

The FZV trunnion ball valves have been engineered to meet both general service and heavy duty applications including petroleum, petro-chemical, and industrial. Valves are designed in accordance with API 6D, they are available in a variety of configurations and materials to meet your specific operational needs. FZV valves not only meet but exceed industry standards.

FEATURES

- Valve body, closures, ball and seat carriers are manufactured from forged steel to ensure high strength, dependable service life in high pressure or severe applications.
- Available seat configurations include self-relieving (single piston effect), DIB-1 (double piston effect) and DIB-2 (single piston one side, double piston one side) options.
- DIB-1 valves are provided with drilled, tapped, plugged ports for ease of thermal relief piping as necessary.
- The primary seat design utilises TEFLON, DEVLON, or PEEK as standard dependent on pressure class, the secondary metal seat ring will provide sealing should the primary be eliminated by fire per API 607.
- All seat rings and O-rings include graphite secondary seals to achieve firesafe requirements for API 607.
- All O-rings are anti-explosive decompression style.
- All sizes/ANSI classes are double block and bleed capable in accordance with API 6D.
- The drain valve can be for block and bleed function or to check seat integrity during maintenance.
- Valve stems are anti-blowout, designed in accordance with API 6D to ensure the body cavity pressure cannot eject stem.
- The design incorporates two springs to assure electric continuity between the stem/body/ball to eliminate static build-up.
- The mounting pad provided is standard to ISO 5211 for ease of automation.

ADDITIONAL OPTIONS

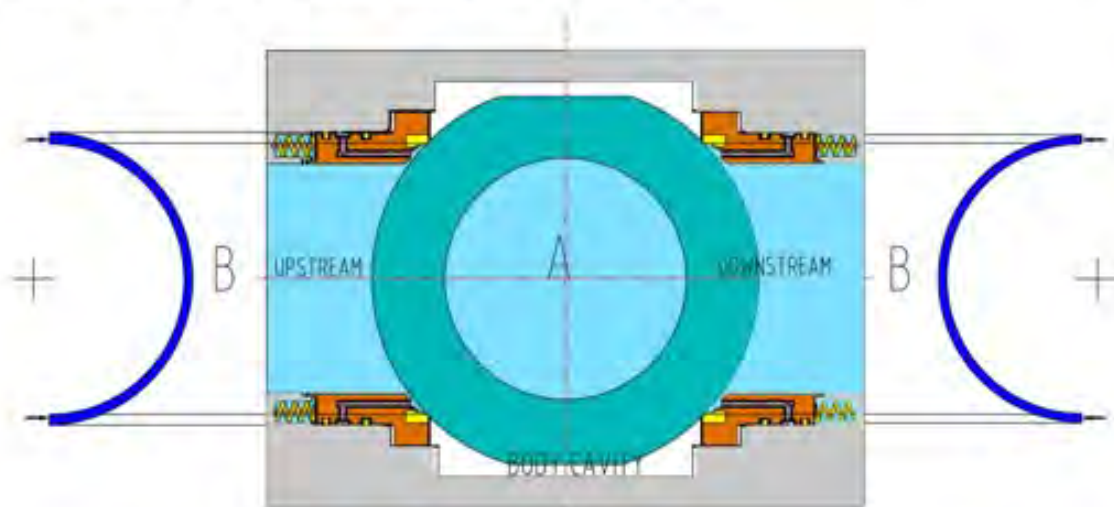
- Cryogenic designs and test capabilities are available.
- For severe service (high temperature or abrasive media), metal seated design options can be provided.
- Valves are provided with factory enamel coating, custom coating or colours can be offered based upon specific needs.
- Additional testing or documentation is available and can be offered as required.



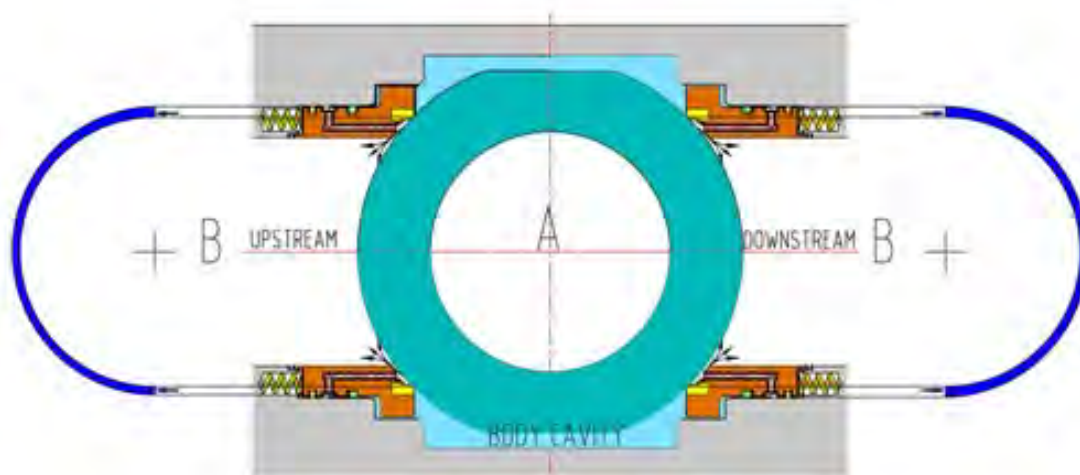
SELF-RELIEVING, DIB-1, AND DIB-2 SEAT DESIGN

SELF-RELIEVING (SINGLE PISTON EFFECT) DOUBLE BLOCK & BLEED

For this design, the seat retains tight contact with the ball in one direction. The line pressures upstream and downstream act upon the back of the seat retainers to force each of the seat rings more tightly against the ball. In the event that the body cavity pressure exceeds either the upstream or downstream line pressure, the body pressure will create a thrust that will push the seat ring away from the ball and allow the pressure to equalize between the cavity and the line. This overpressure release can occur in either the full open or close valve position. This style of valve is fully bi-directional for installation.



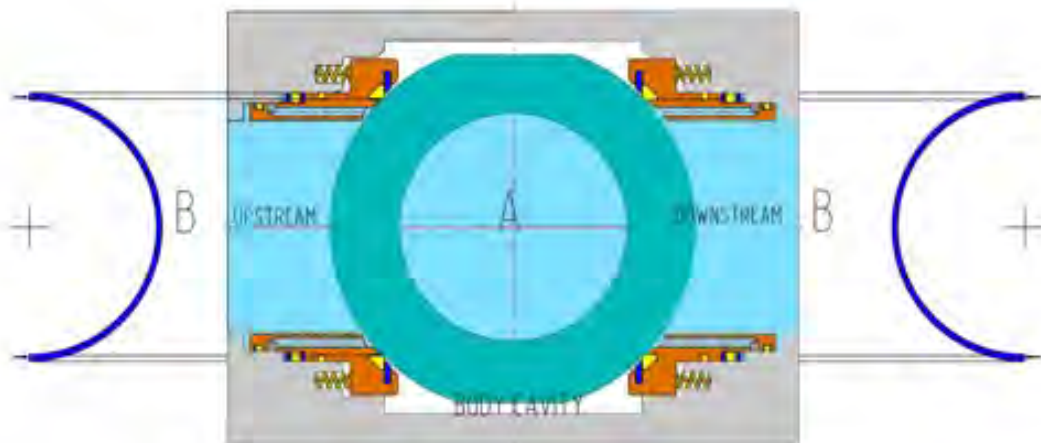
PRESSURE ACTING UPSTREAM AND/OR DOWNSTREAM
PRESSURE $B > A$
A=BODY CAVITY PRESSURE, B=LINE PRESSURE



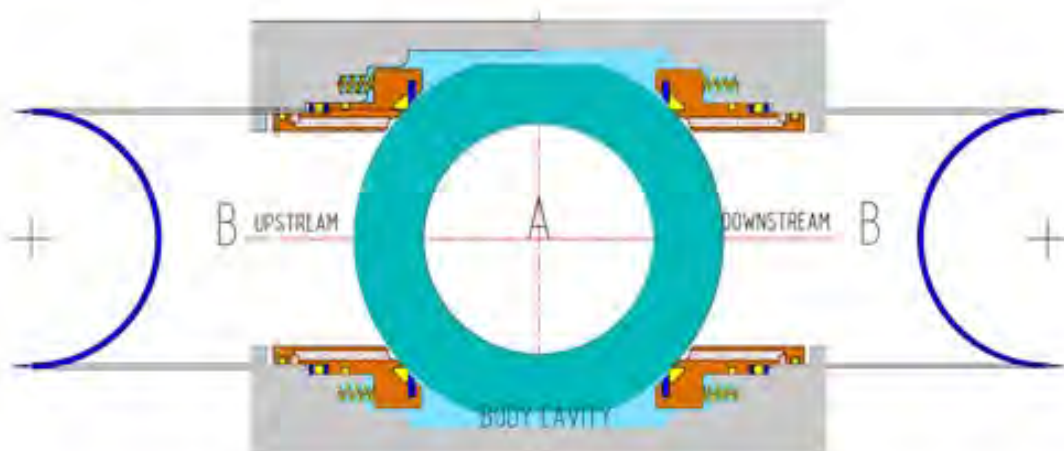
PRESSURE ACTING IN THE BODY CAVITY
PRESSURE $A > B$
A=BODY CAVITY PRESSURE, B=LINE PRESSURE

DIB-1 (DOUBLE PISTON EFFECT)

In the double piston effect design, the seat remains in tight contact with the ball in both directions. The line pressures upstream, downstream and in the body cavity will all act to increase the thrust forcing the seats into the ball. Therefore in full open or closed positions, the media in the body cavity will always be fully isolated from the line media. Dependent upon the application, this design of valve may require additional pressure relief devices to protect the valve in case of over-pressure of the body cavity. A common example of this requirement would be a liquid service where the media is subject to thermal expansion. This valve is also fully bi-directional for installation purposes, though if provided with cavity pressure relief piped to the flange, the valve would need to be installed so the media pressure release discharges to the upstream or downstream side based upon site requirements.



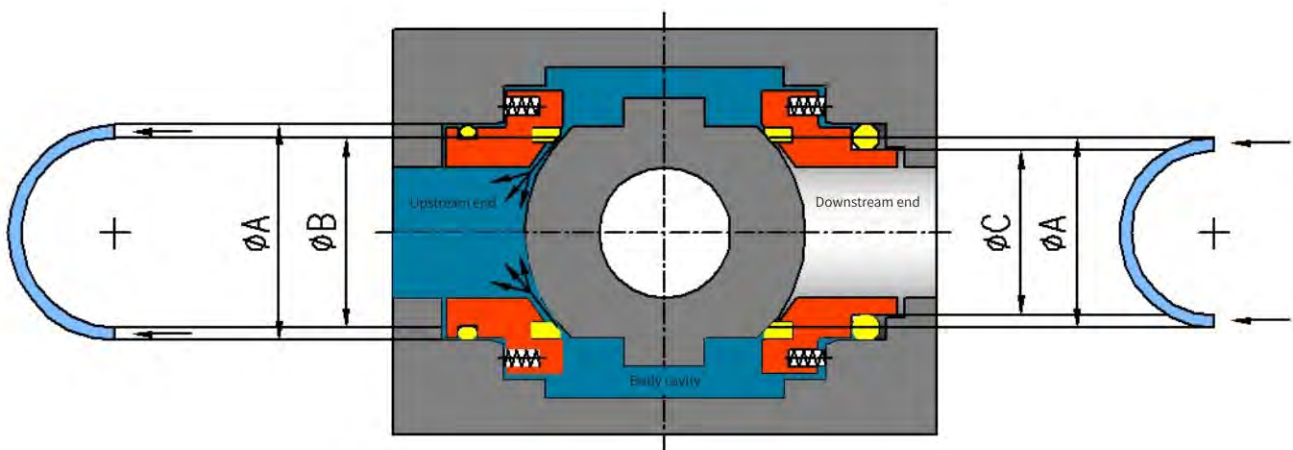
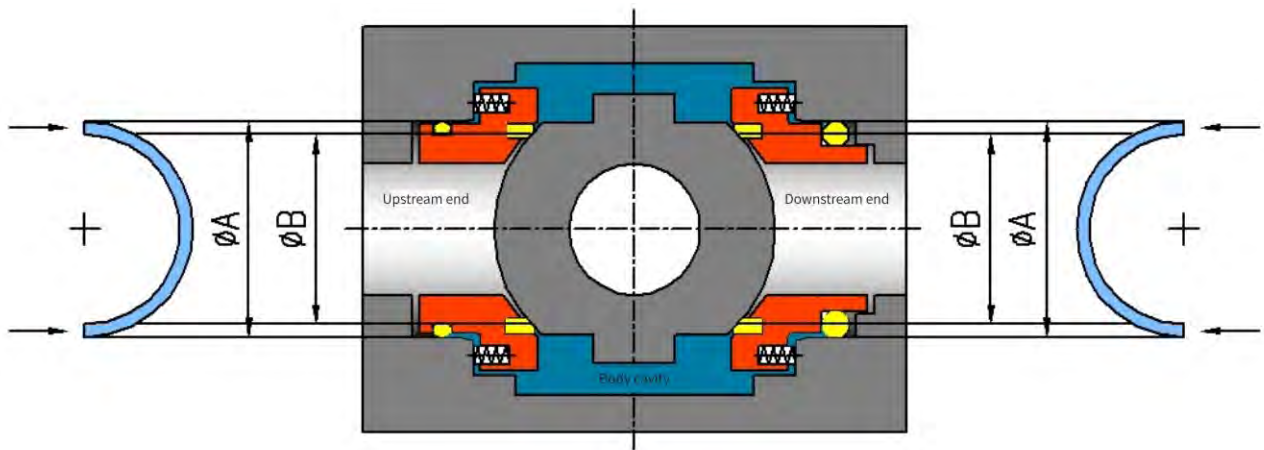
PRESSURE ACTING UPSTREAM AND/OR DOWNSTREAM
PRESSURE $B > A$
A=BODY CAVITY PRESSURE, B=LINE PRESSURE



PRESSURE ACTING IN THE BODY CAVITY
PRESSURE $A > B$
A=BODY CAVITY PRESSURE, B=LINE PRESSURE

DIB-2 (ONE SINGLE PISTON SEAT + ONE DOUBLE PISTON EFFECT SEAT)

The DIB-2 design incorporates one of each seat in the valve construction. This will create a unidirectional valve with the double piston effect seat typically protecting the downstream line. In the case of body cavity pressure exceeding the line pressure, the single piston effect seat will allow for pressure to relieve (typically upstream) and equalise. There is no need to provide for additional pressure relief with this design, as it provides for the relief through the single piston effect seat.



INTRODUCTION OF TRUNNION MOUNTED BALL VALVE PRODUCTS

A. PURPOSE Trunnion mounted ball valves are essential components to control the flow of fluids or gases in a pipeline, particularly in high-pressure applications, by utilising a fixed ball mounted on trunnions which provide stability and allow for tight sealing with minimal operating torque, making them ideal for demanding industrial settings like oil and gas operations, chemical processing, and power generation plants.

B. CHARACTERISTIC

1. Double block and bleed: A “double block and bleed” (DBB) is a valve configuration used to completely isolate a section of a pipeline or system by employing two isolation valves (“blocks”) with a bleed valve situated between them, allowing for the safe release of any trapped fluid or gas before maintenance or repairs are performed thus enhancing safety during operations by preventing pressure build-up and potential leaks.
2. Anti-static structure
3. Firesafe structure
4. The valve seat and stem are equipped with a grease injection system and are fire-resistant.
5. The valve stem has anti blowout function.
6. The ISO 5211 standard top flange design can meet the requirements of changing manual valves to worm gear or motor operation modes.
7. Locking device, manual worm gear operation, can be equipped with a padlock device to prevent operation of the valve.

C. DESIGN, MANUFACTURING, AND INSPECTION STANDARDS

Design and manufacturing: API 6D, ASME B16.34, API 608, ISO 17292

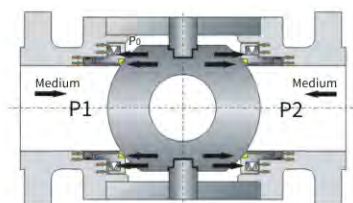
End connection dimensions: ASME B16.5, EN1092, GB/T12221, JB/T79, GB/T 9113

Fire safe design: API 6D, JB/T 6899

Inspection and testing: API 6D, ISO 5208, API 598, GB/T 18927, GB/T 9092

Sulfur resistant materials: NACE MR 0175

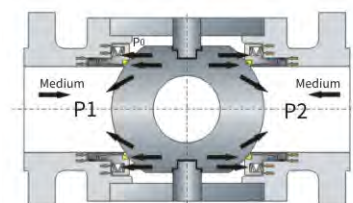
DOUBLE BLOCK AND BLEED



$P_o \leq P_1 (\leq P_N)$

$P_o \leq P_2 (\leq P_N)$

When the body cavity is open to the atmosphere or emptied of the medium, the flow of the medium at both ends of the valve cavity is blocked.



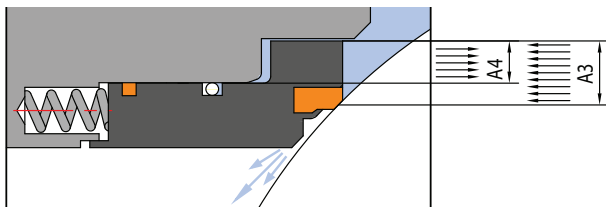
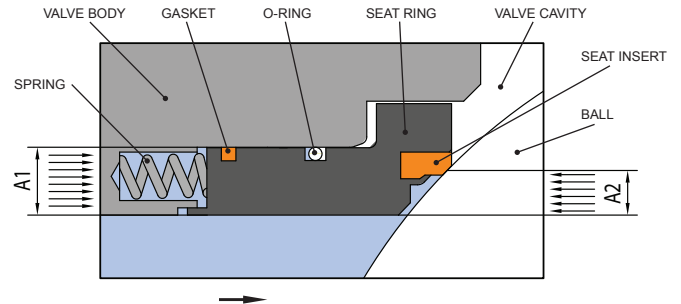
$P_o \leq 1.33 P_N (P_1, P_2 \leq P_N)$

The valve seat automatically retracts under pressure, releasing the pressure in the cavity.

DOUBLE BLOCK AND BLEED VS. DOUBLE ISOLATION AND BLEED

How Do Single Piston Effect Seats Work?

1. During normal operation, upstream or downstream pressure in combination with force created by the seat springs pushes the seat ring against the ball creating positive shutoff ($A1 > A2$).



Pressure acting in the body cavity allows "self relieving" of the seat

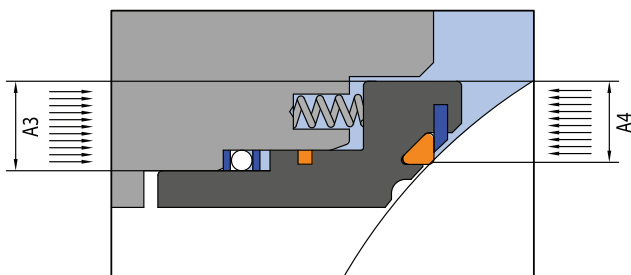
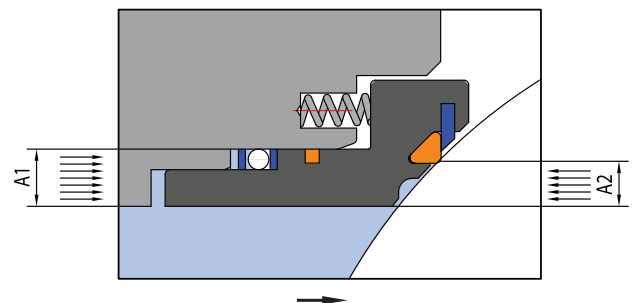
2. With media trapped in the body cavity any increase in media pressure attempts to push the seat ring away from the ball ($A3$). As pressure in the cavity continues to increase a point is reached where the pressure in the cavity can now overcome the spring force and any other forces ($A4$).

The resultant force pushes the seat assembly away from the ball ($A3 > A4$). Seat assemblies with this feature are referred to as "self relieving".

A valve with two single piston effect seats has a double block and bleed (DBB) design.

How Do Double Piston Effect Seats Work?

1. During normal operation, upstream or downstream pressure in combination with force created by the seat springs pushes the seat ring against the ball creating positive shutoff ($A1 > A2$).



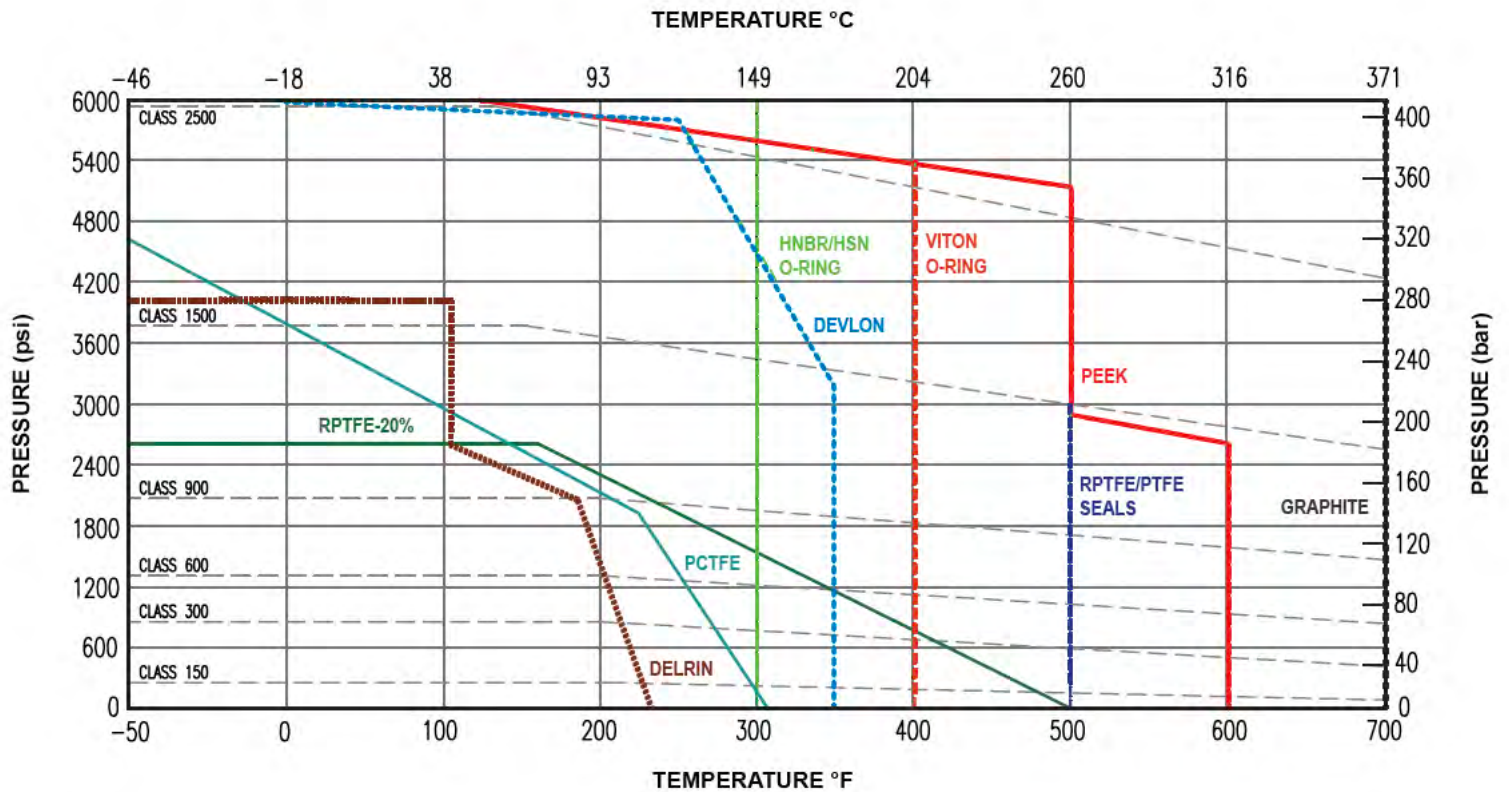
Resultant pressure acting in the body cavity pushes seat against the ball.

2. With media trapped in the body cavity any increase in media pressure acts to push the seat ring against the ball ($A3$). As a result, regardless of whether the pressure is from upstream, downstream or within the body cavity, the seat ring is always pushed against the ball.

The movement of the seat ring against the ball is created due to differences in the effective pressure influenced area of the upstream and downstream side of the seat assembly ($A3 > A4$). Seat assemblies with this feature are not self relieving.

A valve with two double piston effect seats has a double isolation and bleed (DIB-1) design.

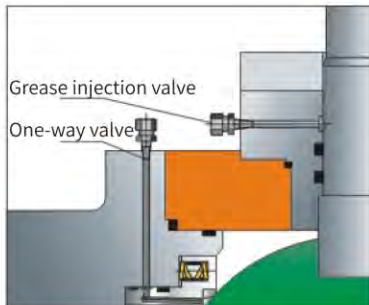
PRESSURE & TEMPERATURE CHART FOR TYPICAL SEAT & SEAL MATERIALS



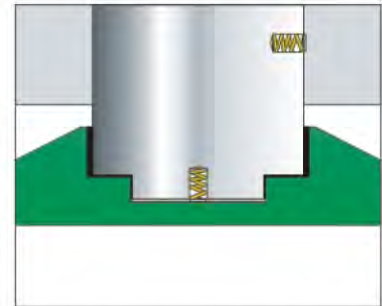
DESIGN AND TEST STANDARDS

DESIGN	API 6D, API 608, ISO 17292, CSAB 51
PRESSURE/TEMPERATURE	ASME B16.34
FACE TO FACE	ASME B16.10
END FLANGES	RF/RTJ: ASME B16.5, >24"; B16.47/MSS SP-44, BW: B16.25
FIRESAFE	API 607
SOUR SERVICE	NACE MR0175/ISO 15156
TOP FLANGE	ISO 5211
INSPECTION	API 598
TESTING	API 6D
MARKING	MSS SP-25, API 6D
QUALITY	MSS SP-55
DOCUMENTATION	BS EN 1020403.1

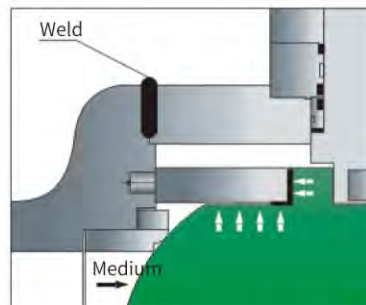
FZV DESIGN OVERVIEW



The valve seat and stem are equipped with secondary injection seals, which can be used to urgently injection grease into the body cavity in case of leakage.



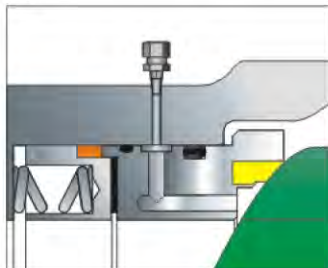
Anti-static devices transmit static electricity through ball, stem, and valve body .



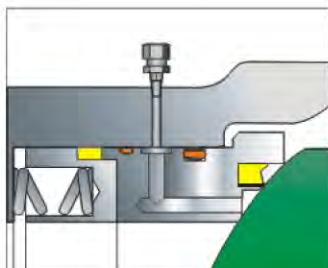
The support plate holds securely the ball and bears the action of the medium. The stem only transmits torque.

FZV TWO TYPES OF VALVE SEAT FIRE SAFE FIG

Type A

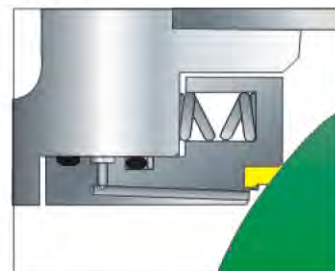


The ball and valve seat are sealed under pressure, the PTFE gasket of the secondary valve seat is tightly pressed, the graphite gasket of the secondary valve seat is loose, and the valve seat moves well.



When a fire occurs, soft seat burns out. PTFE gasket as the secondary sealing starts to melt, and the flexible graphite is compressed to reduce the leakage. A metal to metal seal with the ball reduces the leakage when the seal housing is pushed against the ball, by the line pressure.

Type B

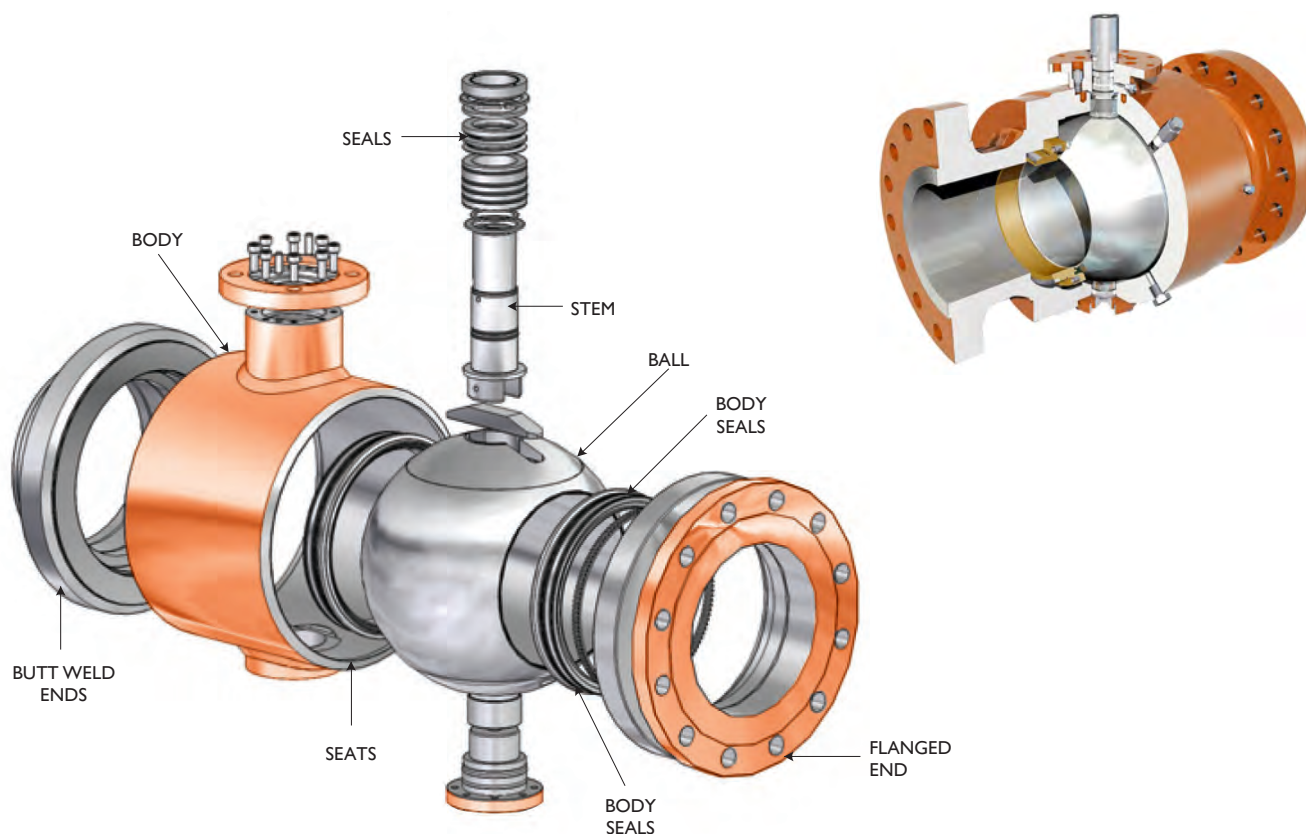


The ball and valve seat are sealed under normal pressure.



When a fire occurs, soft seat and O-ring start to melt. O-ring leakage path has a graphite gasket to restrict the oil / gas flowing to the atmosphere. A metal to metal seal with the ball reduces the leakage when the seal housing is pushed against the ball, by the line pressure.

WELDED BODY TRUNNION MOUNTED BALL VALVE EXPLODED VIEW - EXTERNAL TRUNNION FLANGE

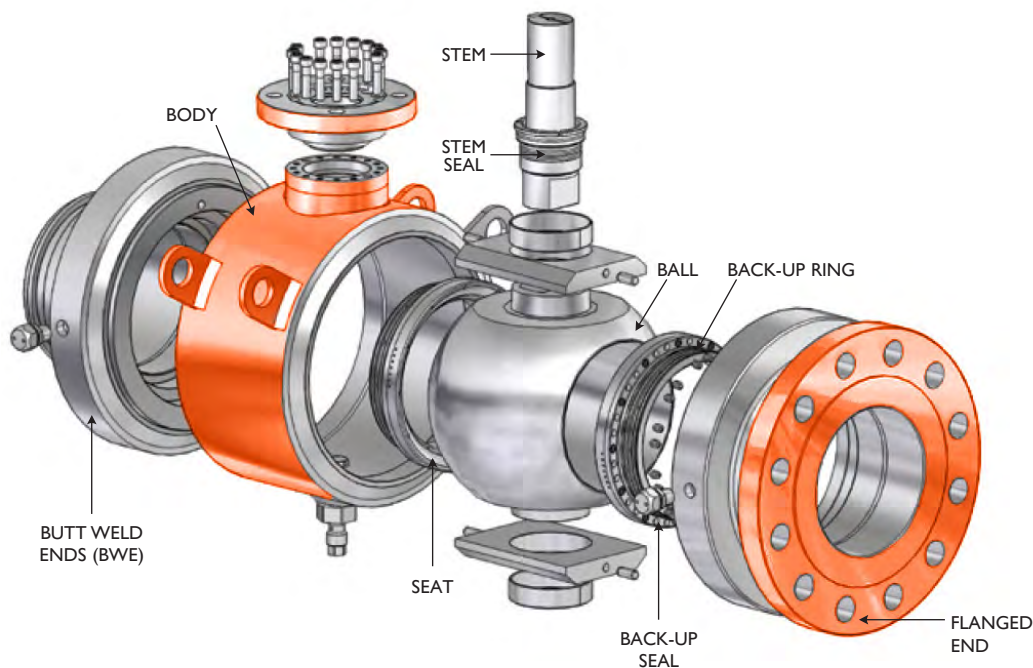


MATERIALS EXAMPLE

NPS	Body	Flanged End	Butt-Weld Ends (BWE)	Ball	Stem	Back-Up Ring	Seat	Back-Up Seal	Stem Seal
1/2"	A105N/LF2	A105N/LF2	A105N/LF2	A350 LF2 +ENP AISI 316 F51	X20Cr13 F6A 410 17-4PH F51	CS + Ni-CR SS F6A 410 F51	PTFE; PTFE+C Devlon Delrin PEEK	HNBR Viton Graphite	HNBR Viton Graphite PTFE
3/4"									
1"									
1 1/4"									
1 1/2"									
2"									
2 1/2"									
3"									
4"									
6"									
8"									
10"									
12"									
14"									
16"									
20"									
24"									
28"									
32"									

Example B.O.M. only. Refer to as built drawing.

WELDED BODY TRUNNION MOUNTED BALL VALVE EXPLODED VIEW - INTERNAL TRUNNION FLANGE



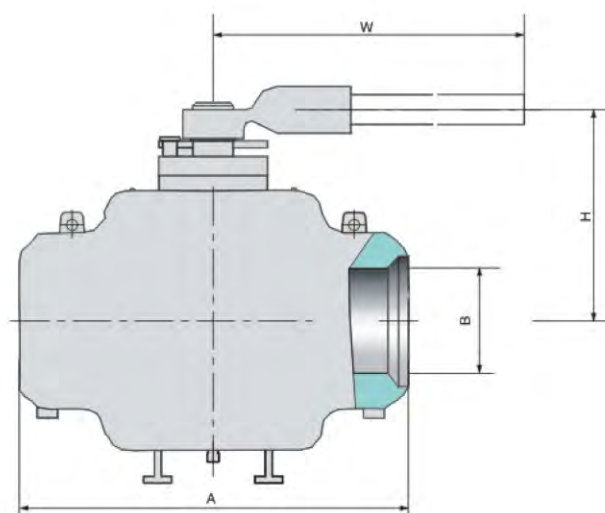
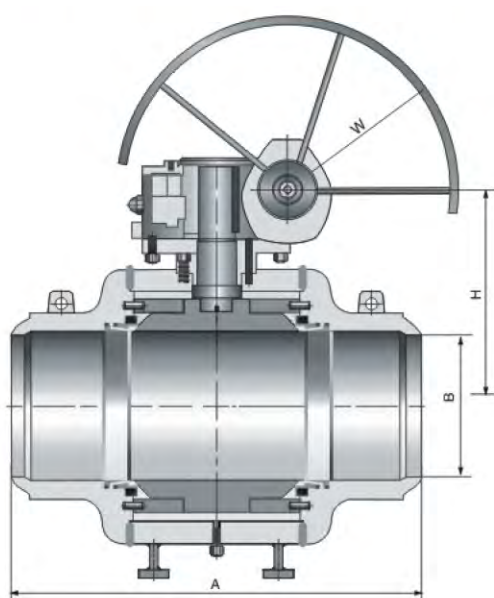
MATERIALS - EXAMPLE

NPS	BODY	FLANGED END	BUTT-WELD ENDS (BWE)	BALL	STEM	BACK-UP RING	SEAT	BACK-UP SEAL	STEM SEAL
1/2"	A105N/LF2	A105N/LF2	A105N/LF2	A350 LF2 +ENP AISI 316 F51	X20Cr13 F6A 410 17-4PH F51	CS + Ni-CR SS	PTFE; PTFE+C	HNBR Viton Graphite	HNBR Viton Graphite PTFE
3/4"									
1"									
1 1/4"									
1 1/2"									
2"									
2 1/2"									
3"									
4"									
6"									
8"									
10"									
12"									
14"									
16"									
20"									

Example B.O.M. only. Refer to as built drawing.



FULLY WELDED BALL VALVE SERIES TRUNNION MOUNTED - MAIN DIMENSIONS AND WEIGHTS



THE MAIN DIMENSIONS AND WEIGHT

CLASS 150													
NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m	NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m
2	216	49	185	500	20	50	*18	914	436	550	600	1450	4574
3x2	283	49	185	500	30	50	*20x18	991	436	550	600	1600	4574
3	283	74	190	600	41	65	*20	991	487	600	750	1750	6016
4x3	305	74	190	600	60	65	*24x20	1143	487	600	750	2300	6016
4	305	100	220	650	70	151	*24	1143	589	705	750	2850	9750
6x4	457	100	220	650	118	151	*28	1346	684	810	800	3500	14540
*6	457	150	270	600	180	320	*30	1397	735	850	800	4800	18005
*8x6	521	150	270	600	215	320	*32	1524	779	880	800	5500	21350
*8	521	201	320	600	250	1020	*36	1727	874	1060	800	8500	17000
*10x8	559	201	320	600	320	1020	*40	1780	976	1150	800	11500	37000
*10	559	252	350	600	400	1085	*42	1960	1020	1200	800	12500	39000
*12x10	635	252	350	600	480	1085	*48	2100	1166	1360	800	18500	42776
*12	635	303	400	600	560	1562	*56	2250	1360	1480	800	30500	65654
*14x12	762	303	400	600	700	1562							
*14	762	334	460	600	830	2426							
*16x14	838	334	460	600	940	2426							
*16	838	385	500	600	1050	3018							

*worm gear operation

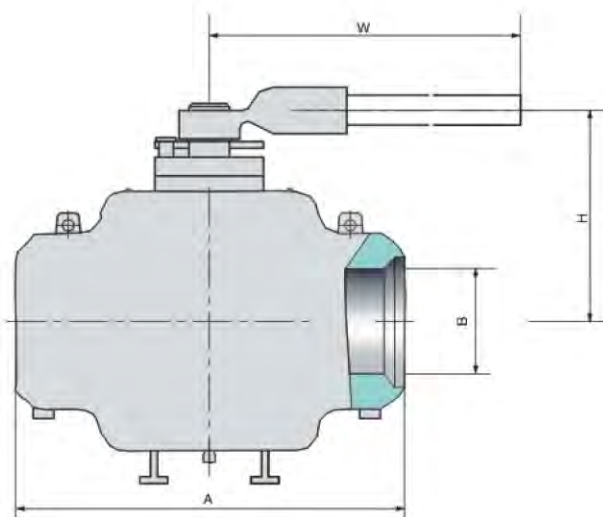
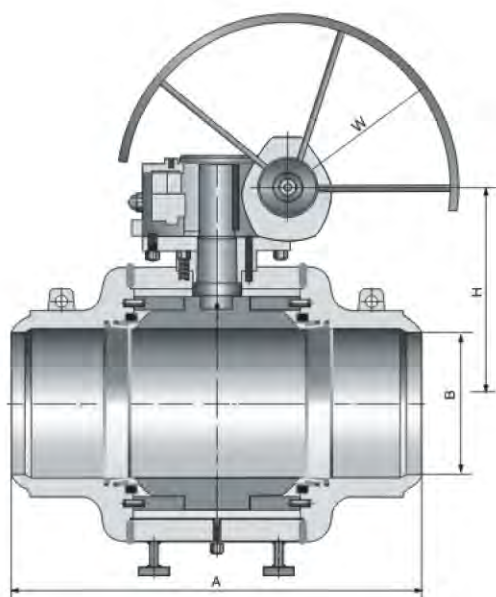
CLASS 300

NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m	NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m
2	216	49	185	500	20	86	*18	914	436	550	600	1450	8000
3x2	283	49	185	500	30	86	*20x18	991	436	550	600	1600	8000
3	283	74	190	600	41	110	*20	991	487	600	750	1750	10610
4x3	305	74	190	600	60	110	*24x20	1143	487	600	750	2300	10610
4	305	100	220	650	70	270	*24	1143	589	705	750	2850	17280
6x4	457	100	220	650	118	270	*28	1346	684	810	800	3500	25102
*6	457	150	270	600	180	544	*30	1397	735	850	800	4800	31664
*8x6	521	150	270	600	215	544	*32	1524	779	880	800	5500	37580
*8	521	201	320	600	250	1620	*36	1727	874	1060	800	8500	35170
*10x8	559	201	320	600	320	1620	*40	1780	976	1150	800	11500	39115
*10	559	252	350	600	400	1824	*42	1960	1020	1200	800	12500	42414
*12x10	635	252	350	600	480	1824	*48	2100	1166	1360	800	18500	71868
*12	635	303	400	600	560	2632	*56	2250	1360	1480	800	32500	91238
*14x12	762	303	400	600	700	2632							
*14	762	334	460	600	830	4280							
*16x14	838	334	460	600	940	4280							
*16	838	385	500	600	1050	5376							

CLASS 600

NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m	NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m
2	292	49	185	500	27	148	*18x15	1092	385	500	700	2190	9174
3x2	356	49	185	500	40	148	*18	1092	436	560	762	2380	13520
3	356	74	190	600	48	200	*20x18	1194	436	560	762	2625	13520
4x3	432	74	210	600	74	200	*20	1194	487	620	762	2875	18034
4	432	100	220	650	95	460	*24x20	1397	487	620	762	3600	18034
6x4	559	100	220	650	180	460	*24	1397	589	700	762	4830	29512
*6	559	150	270	600	210	908	*24x28	1549	589	700	762	5310	29512
*8x6	660	150	270	600	325	908	*28	1549	684	840	762	5900	42264
*8	660	201	320	600	405	2560	*30x28	1651	684	840	762	6530	42264
*10x8	787	201	320	600	510	2560	*32x28	1778	684	840	762	6950	42264
*10	787	252	350	600	655	3048	*32	1778	781	1245	765	9940	
*12x10	838	252	350	600	805	3048	*34	1930	832	1245	765	11570	
*12	838	303	400	700	915	4300	*36	2083	876	1315	765	13530	
*14x12	889	303	400	700	1035	4300	*40	2337	978	1320	765	18570	
*14	889	334	450	700	1228	7255	*42	2437	1022	1405	765	21590	
*16x12	991	303	400	700	1345	4300	*48	2540	1168	1595	765	31550	
*16x14	991	334	450	700	1450	7255	*56	2949	1384	1855	765	47840	
*16	991	385	500	700	1705	9174							

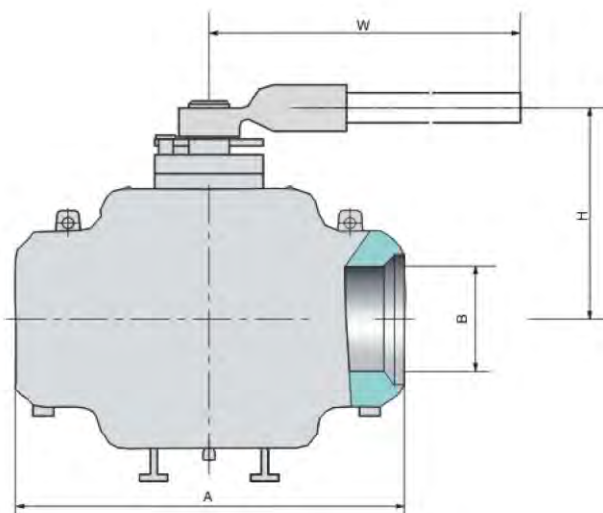
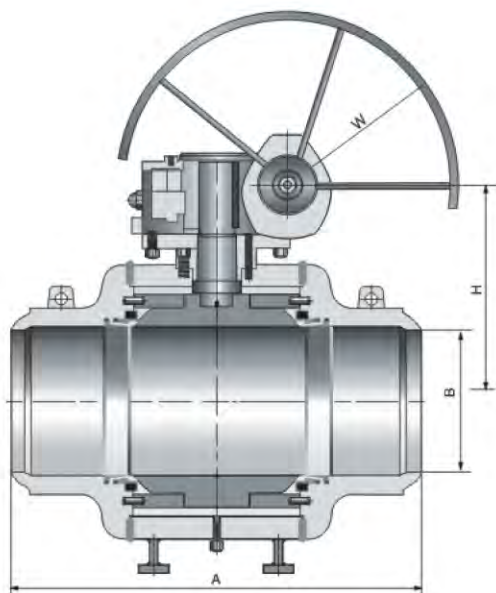
*worm gear operation



CLASS 900

NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m	NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m
2	368	49	180	650	40	208	*14	1029	322	600	600	1515	10220
3x2	381	49	180	650	45	20	*16x14	1130	322	600	600	1750	10220
3	381	74	208	700	70	280	*16	1130	373	620	600	2420	12968
4x3	457	74	208	700	85	280	*18x16	1219	373	620	600	2565	12968
4	457	610	222	800	110	650	*18	1219	423	658	750	2740	19054
6x4	610	100	222	800	215	650	*20x18	1321	423	658	750	2900	19054
*6	610	150	283	460	255	1298	*20	1321	471	715	750	3325	25452
*8x6	737	150	283	460	450	1298	*24x20	1549	471	715	750	3410	25452
*8	737	201	420	460	525	3596	*24	1549	570	850	750	6500	43276
*10x8	838	201	420	460	720	3596	*28	1753	665	930	800	9500	59410
*10	838	252	490	600	810	4306	*30	1880	712	980	800	12000	76000
*12x10	965	252	490	600	1000	4306	*32	2032	760	1040	800	13200	90195
*12	965	303	560	600	1270	6000	*36	2286	855	1160	800	17500	101500
*14x12	1029	303	560	600	1435	6000							

*worm gear operation



CLASS 1500							CLASS 2500						
NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m	NPS inch	A mm	B mm	H mm	W mm	WT kg	T N.m
*2	368	49	164	350	48	330	*2	451	42	233	460	63	446
*3	470	74	236	460	113	440	*3	578	62	251	600	145	802
*4	546	100	261	600	195	1034	*4	673	87	288	600	280	1588
*6	705	144	430	600	578	2084	*6	914	131	517	600	770	5501
*8	832	192	413	600	745	5496	*8	1022	179	550	600	1360	11785
*10	991	239	481	600	1195	9936	*10	1270	223	616	750	2100	13222
*12	1130	287	563	750	2165	14175	*12	1422	265	680	750	3210	20075
*14	1257	315	645	750	2245	21000							
*16	1384	360	695	750	2758	27000							
*18	1537	406	750	750	3640	34392							
*20	1664	454	830	750	4490	40918							
*24	1943	546	990	750	7150	65351							

*worm gear operation



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FANGZHENG VALVE GROUP CO., LTD

Add: NO.1921, Binhai 1st Avenue, Economy & Technology Development Zone,
Wenzhou City, Zhejiang Province, China 325025
Tel: +86-577-6735 6515 Fax: +86-577-6735 8449

E-mail: fzvalve@fzvgroup.com

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