

Trunnion Mounted Ball Valve

Features And Benefits

Dongsan's Valves business segment is a leading provider of valves, valve automation, and measurement systems to the oil and gas industry.

We provide large-diameter valves for use in natural gas, LNG, crude oil, and refined products transmission lines as well as in many other general industrial applications.

Applications

FORCE split-body side-entry ball valves are manufactured in a wide range of diameters and pressure classes.

In the standard versions, the valves are specified for transmission pipelines, pumping, compression and reinjection units, offshore platforms, onshore terminals, pig traps, measuring stations, and surge-relief skids.

These valves also can be built for speciality applications, such as LNG plants.

Split-body construction allows the use of forged materials in various grades of carbon steel, stainless steel, and high alloys, equipping the valves for some of the most severe service conditions.



PRODUCT RANGE, FULL & REDUCED PORT, FLANGED ENDS

Size		ASME Class					
DN	NPS	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
50	2	● Lever	● Lever	● Lever	● Lever/Gear	● Lever/Gear	■ Gear
75	3	● Lever	● Lever	● Lever/Gear	● Lever/Gear	● Lever/Gear	■ Gear
100	4	● Lever/Gear	● Lever/Gear	● Lever/Gear	● Gear	● Gear	■ Gear
150	6	● Lever/Gear	● Lever/Gear	● Gear	● Gear	● Gear	■ Gear
200	8	● Gear	● Gear	● Gear	● Gear	● Gear	■ Gear
250	10	● Gear	● Gear	● Gear	● Gear	■ Gear	■ Gear
300	12	● Gear	● Gear	● Gear	■ Gear	■ Gear	■ Gear
350	14	● Gear	● Gear	● Gear	■ Gear	■ Gear	
400	16	● Gear	● Gear	■ Gear	■ Gear	■ Gear	
450	18	● Gear	● Gear	■ Gear	■ Gear	■ Gear	
500	20	■ Gear	■ Gear	■ Gear	■ Gear	■ Gear	
550	22	■ Gear	■ Gear	■ Gear	■ Gear	■ Gear	
600	24	■ Gear	■ Gear	■ Gear	■ Gear	■ Gear	
650	26	■ Gear	■ Gear	■ Gear	■ Gear		
700	28	■ Gear	■ Gear	■ Gear	■ Gear		
750	30	■ Gear	■ Gear	■ Gear	■ Gear		
800	32	■ Gear	■ Gear	■ Gear	■ Gear		
850	34	■ Gear	■ Gear	■ Gear	■ Gear		
900	36	■ Gear	■ Gear	■ Gear	■ Gear		
1000	40	■ Gear	■ Gear	■ Gear			
1050	42	■ Gear	■ Gear	■ Gear			
1100	44	■ Gear	■ Gear	■ Gear			
1200	48	■ Gear	■ Gear	■ Gear			
1400	56	■ Gear	■ Gear				
1500	60	■ Gear	■ Gear				

● : BTS Series

■ : DTS Series

STANDARD MATERIALS

- Bolted Split Body & Side Entry Design.
- Double Block and Bleed Design.
- Piston action SR (Self-relieving) Seats.
- Spring Energized Seats for Sealing at Low Line-Pressure.
- Original Fire-safe with Soft Seat Inserts.
- O'Ring Stem Seals ; Double-barrier stem seals
- Secondary Upper-stem Sealant Injection (6" and above)
- Secondary Seat Sealant Injection (6" and above)
- Anti-Blow out proof Stem Design
- Anti-Static Device
- Metal-backed, Self-lubricating PTFE sleeve bearing and Thrust washers reduced torque and extend service life.
- Nickel Plating for Trim Parts
- Fire-safe graphite gaskets for protection against external leakage
- **NACE** standard **MR0175**

OPTIONAL FEATURES

According to the design impact of the optional features

- PTFE various grades of reinforced gaskets, spring energized, for stem and seat sealing.
- Explosive decompression-resistant seals
- Double sealing barrier in both directions(Double Piston Effect) and body pressure relief valve
- Mechanical Interlock System

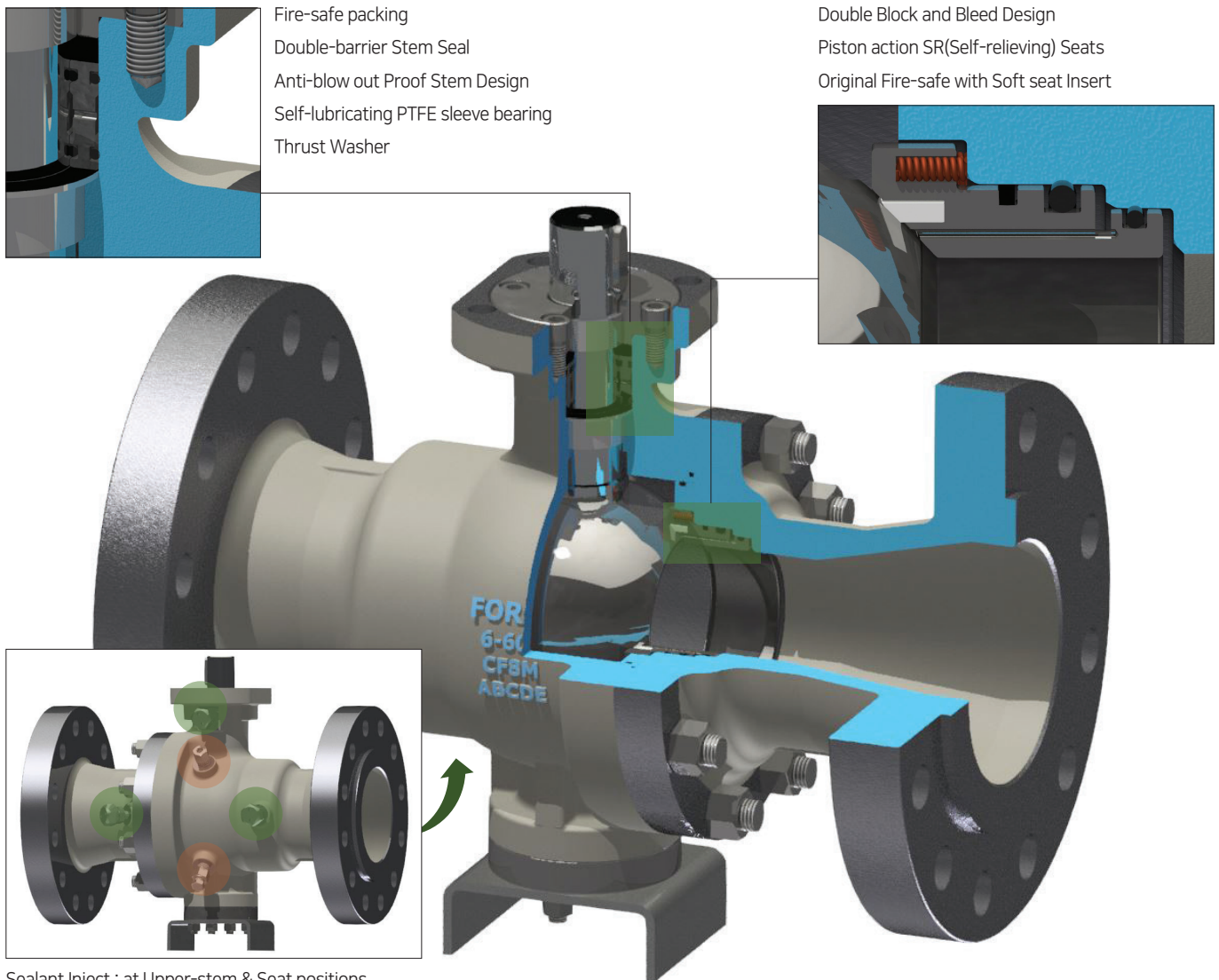
Metal-to-metal Seats

Series **BTM** and **DTM** design offers metal-to-metal seat sealing ideally suited for the following applications.

- High-temperature and abrasive services
- Severe corrosive mediums
- Coal gasification
- Throttling and control services

The metal seated design has a temperature range of -50°F(-45°C) to 1100°F(600°C) and meets acceptance criteria **per API 6D**.

Sealing surface is critical to metal seated valve performance.



Sealant Inject ; at Upper-stem & Seat positions

Drain & Vent Plug

Trunnion Mounted Ball Valve

BODY CONSTRUCTION

The body is made of two casting parts or three forged parts, and the bolted construction allows disassembly in the field for repairs.

The body drain is located in the lowest part of the body cavity and consists of a drain plug with safety plug. Graphite gaskets are provided for compliance with **API 607/ISO 10497, API 6FA** fire-safe standards.

STEM CONSTRUCTION

The stem function is to transmit torque and to absorb the line pressure thrust together with the trunnion. The stem has an anti-blowout design and incorporates a double-barrier system. The pressure thrust on the stem is supported by a thrust washer in antifriction material.

SEAT TO BALL SEALING

Soft seats are standard. Seat inserts of synthetic material such as RPTFE, DEVLON, and PEEK are contained within a one piece metal seat ring. With no, or very low, line pressure, sealing between the seats and ball is achieved by the seat springs. As line pressure increases, it begins to work in conjunction with the seat springs to assure the integrity of the seal.

SEAT FEATURES

Soft seats are standard. Seat inserts of synthetic material such as RPTFE, DEVLON, and PEEK are contained within a one piece metal seat ring. With no, or very low, line pressure, sealing between the seats and ball is achieved by the seat springs. As line pressure increases, it begins to work in conjunction with the seat springs to assure the integrity of the seal.

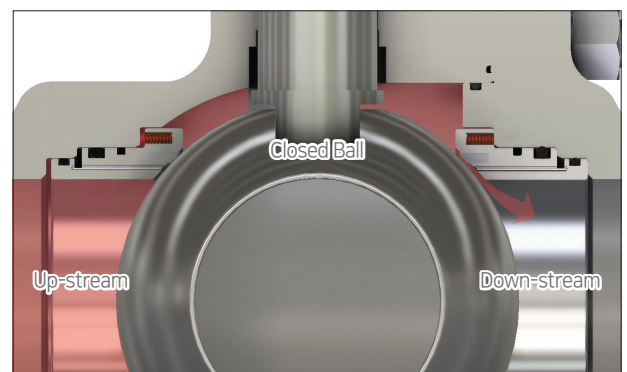
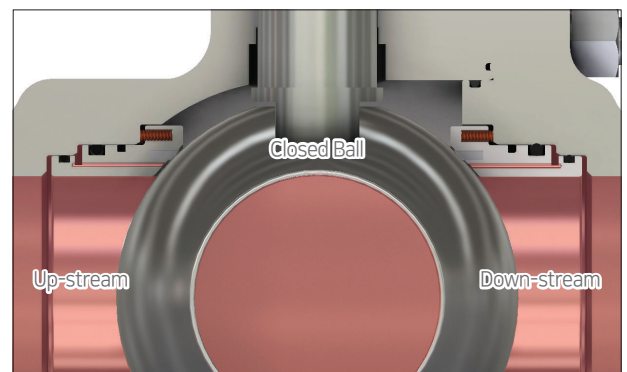
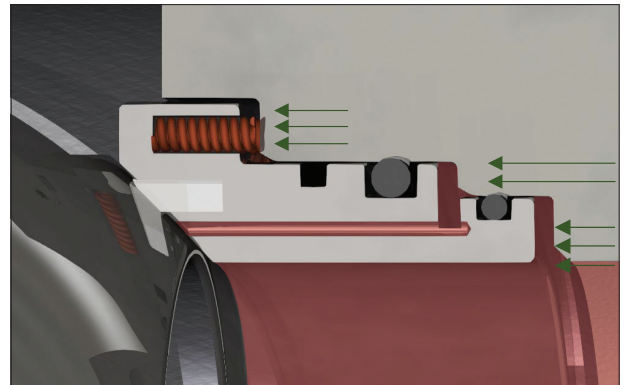
Two different types of seals are used to isolate the line pressure from the body cavity. Primary sealing is accomplished by an elastomeric seal such as **VITON** or **HNBR**, and secondary fire-safe sealing is accomplished by a graphite seal ring.

DOUBLE BLOCK AND BLEED DESIGN

The trapped cavity pressure can bleed out by vent fitting or drain plug when the valve is in fully open or fully closed position. The fluid is intercepted by seats of up stream and down stream side. So, the stem packing or O'ring may be replaced under working pressure. Each seat works independently assuring tight seal against ball on both upstream and downstream side.

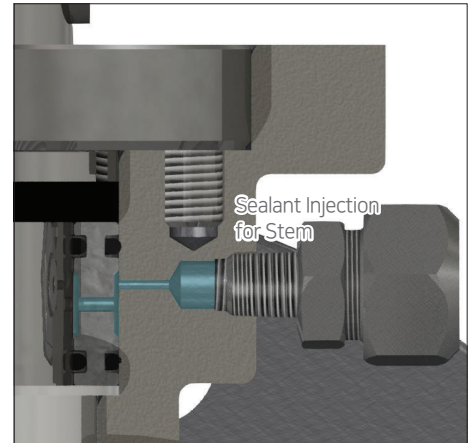
VALVE CAVITY PRESSURE RELIEF (SELF-RELIEVING SEAT)

The standard feature is designed to prevent excessive pressure buildup within the valve by automatically relieving pressure when body cavity pressure exceeds the spring load on the seats. When a trunnion ball valve is in the closed position, media will be trapped in the body cavity. Unless this media is drained, it will be subjected to thermal expansion and contraction. As the temperature rises, the trapped media desires to expand and the pressure increases in the area body cavity. In order to avoid excessive pressure build-up, the **FORCE** seats are designed to self-relieve, allowing the media in the body to escape to the pipeline. This self-relieving seat design feature is standard on all **FORCE** trunnion ball valves.



STEM SEALING

The stem is a free member and carries no side thrust. The absence of this side load and friction drag on the stem ensures lower operating torque and long service life. Precision machining of the stem which is rigidly supported between bearings, combined with hardness control between metallic parts and double O'rings backed up by a secondary graphite seal, ensures reliable operation with the highest levels of sealing integrity. All seals can be replaced without the need to remove the stem from the valve or remove the valve from the pipeline. If leakage should ever occur through both stem seals, the outer O'ring can be replaced with the valve in the line, under pressure with the ball in the closed position.

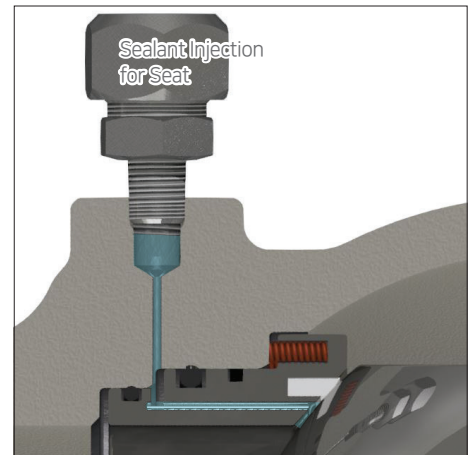


SEAT & STEM EMERGENCY SEALANT INJECTION

Sealing injection fittings are standard on all **FORCE** Trunnion ball valves.

If the seat ring becomes damaged, this feature provides the user with an easy way to inject an emergency sealant to restore a tight seal. It also allows for the sealing surfaces of the ball and seat to be periodically flushed to clear away debris which may impair sealing.

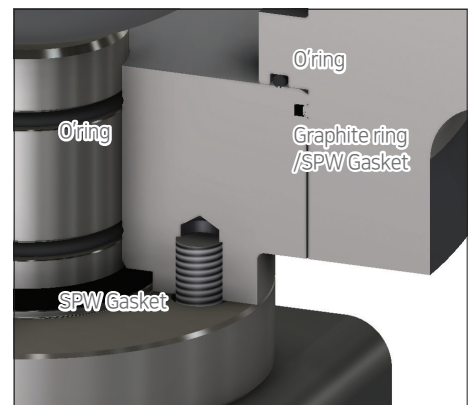
Sealing injection fittings are standard on all **FORCE** trunnion ball valves. If the seat ring becomes damaged, this feature provides the user with an easy way to inject an emergency sealant to restore a tight seal. It also allows for the sealing surfaces of the ball and seat to be periodically flushed to clear away debris which may impair sealing.



DOUBLE SEALS AT ALL JOINTS

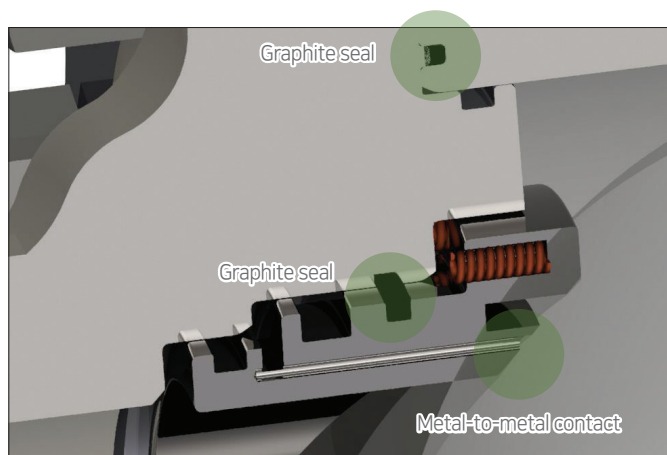
All connecting parts employ a double sealing design incorporating a O'ring and graphite/ spiral wound 316SS-Graphite gasket to ensure positive sealing.

Delta ring is used optionally for Class 1500 and 2500.



LOW FRICTION STEM/ TRUNNION BEARINGS AND THRUST WASHERS

Heavy duty PTFE lined carbon or stainless steel bearing and thrust washers ensure durable and low torque operation.



FIRE-SAFE DESIGN API 607/ISO 10497, API 6FA

When the seat inserts are softened and burnt in case of the fire or unusual temperature increase, the seat retainer, under the duty of the spring, will touch with the ball and form a metal-to-metal contact, which can prevent internal leak.

Meanwhile, the middle flange and the upper part and lower part of the stem will form a metal-to-metal contact which can prevent external leak and confirm to **API 607/ISO 10497** or **API 6FA**

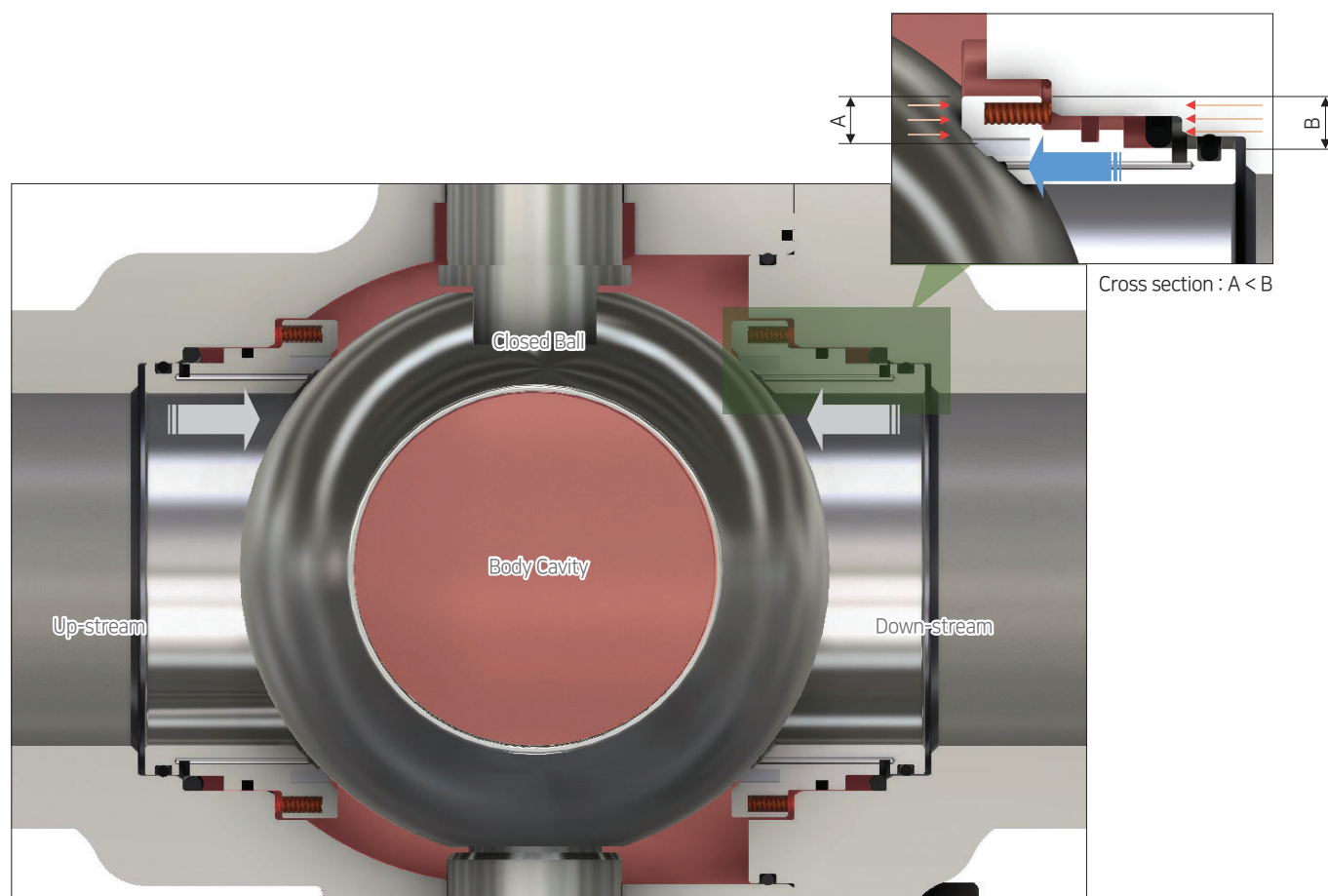
Trunnion Mounted Ball Valve

DOUBLE PISTON EFFECT (DPE)

The DPE seat design allows for both seats to seal with pressure acting from the same side of the valve. In the event one seat becomes damaged, the user has the added advantage of the opposite seat sealing. By means of this double barrier, the sealing is ensured regardless of the direction of the flow through the valve. If the upstream seat becomes damaged and leaks, the pressure entering the body cavity acts on the downstream seat, sealing the downstream seat tightly against the ball.

Note:

- * The DPE feature and the double block-and-bleed feature are not to be confused with one another.
- * The initial seal, at extremely low pressure differential or vacuum conditions, is obtained with spring-loaded floating seats, which are free to move slightly along the longitudinal axis of the valve.
- * Line pressure behind the seat ring supplements the seat spring load to force the seat tightly against the ball.



On request, the seat rings design may be modified to perform the "DOUBLE PISTON EFFECT" action.

This feature adds an extra sealing feature to the valve, but to release the possible over pressure developed into the body cavity it may be necessary to use an external safety relief valve.

STANDARD MATERIAL

Part Name	Standard Material Grade			
	Carbon Steel	Low Temp. Carbon Steel	Stainless Steel	Duple x Stainless Steel
Body	A216-WCB or A105	A352-LCC or A350-LF2	A351-CF8M or A182-F316	A995-4A or A182-F51
Cap	A216-WCB or A105	A352-LCC or A350-LF2	A351-CF8M or A182-F316	A995-4A or A182-F51
Ball	Body Material (CS/LTCS) +ENP		316SS	UNS S31803
Stem	410SS +ENP or 316SS		316SS	UNS S31803
Stem bush	410SS +ENP		316SS	UNS S31803
Gland Flange	AISI 1020		316SS	UNS S31803
Bottom Cover	Body Material (CS/LTCS) +ENP		316SS	UNS S31803
Trunnion	Body Material (CS/LTCS) +ENP		316SS	UNS S31803
Seat Retainer	Body Material (CS/LTCS) +ENP		316SS	UNS S31803
Seat Ring	Reinforced PTFE or NYLON/DEVLON, PEEK			
Seal	O'Ring (FKM or HNBR)			
Gasket	Graphite or Spiral Wound Gasket (304/316SS +Graphite)			
Bushing	DU-BUSH (Electro Plated Carbon Steel +PTFE Coating)			
Thrust Washer	DDU (Electro Plated Carbon Steel +PTFE Coating)			
Spring	Inconel x-750			
Fitting(Drain/Vent/Injection)	Body Material (CS/LTCS) +ENP		316SS	UNS S31803
Lever Operator	Cast Iron or Carbon Steel			
Gear Operator	Cast Iron Case, Ductile Iron Gear, High Carbon Steel Worm Shaft			
Bolts/ Nuts (for Joint)	A193-B7/ A194-2H A193-B7M/ A194-2HM	A320-L7/ A194-7 A320-L7M/ A194-7M	A193-B8M/ A194-8M (A320-B8M/ A194-8M)	A193-B8M/ A194-8M or UNS S31803

* Typical materials for standard valves. Alternative materials available on request.

DESIGN SPECIFICATIONS AVAILABLE

API Spec. 6D	Specification for Quality Management Systems (design)
ASME B16.34	Valves- Flanged, Threaded, and Welding End (design)
ISO 17292/ BS 5351	Metal Ball Valves for Petroleum, Petrochemical and Allied Industries
API Standard 608	Metal Ball Valves-Flanged, Threaded, and Welding Ends
ASME B16.5/ ASME B16.47	Pipe Flanges and Flanged Fittings
ASME B16.10	Face-to-Face and End-to-End Dimensions of Valves
MSS SP-72	Ball Valves with Flanged or Butt-Welding Ends for General Service
NACE Standard MR0175	Sour gas service application
API Standard 607/ ISO 10497	Fire Test for Quarter-turn Valves and Valves Equipped with Nonmetallic Seats
API Spec. 6FA	Specification for Fire Test for Valves

DTS Series

"Split-Body, Trunnion Mounted Ball, Soft Seated & Forged Valves"

Design and construction conforms to API spec. 6D, tested to API 598 & 6D standards.

Manufactured custom ball valve solutions. These valves are made to exceed difficult oil and gas requirements.

Dongsan engineers can manufacture one-of-a-kind valve solutions for high performance applications. The general purpose trunnion mounted ball valve for the petroleum and chemical process industries, its strong suit is low torque block and bleed service. Ball valves satisfy a wide range of **API 6D** and **ASME** applications. Available in carbon steel and stainless steel with various trims, they may be specified in sizes from 2" FP to 48" FP and pressure classes of 150, 300, 600, 900, 1500 and 2500.

DTS trunnion mounted ball valves are available in a variety of materials and configurations to meet your specific project requirements. A large trunnion design ensure central positioning under the highest working pressure. Independent floating spring loaded seats provide a tight seal even at low differential pressure. Service and maintenance is simplified with a bolted body design incorporating double O-rings or a combination of O-rings and gaskets, suitable for buried or above ground installation.

GENERAL DESIGN FEATURES

- Two/Three-piece body design
- Double block and bleed
- Trunnion supported design reduces operating torque
- Antistatic device for grounding of the ball, stem and body
- Two sets of O-ring plus fire safe stem packing prevents leakage
- Trunnion supported design reduces operating torque
- Corrosion resistant low friction bearing
- Inconel seat springs
- Sealant injection fittings for emergency stem or seal sealing
- Direct mount topworks mounting pad for actuator or gear operator
- 8" and larger valves are equipped with lifting lugs.
- Locking device (lock not included)
- **NACE** standard **MR 0175**



MATERIAL SELECTION

The design of the valve also depends on the materials of construction selected. After examination of service conditions, the selection criteria are based on the verification of the physical and chemical characteristics of the materials or product.

For the soft sealing (O-rings, inserts, and lip seal gaskets), the guidelines to be followed are relevant for hardness, tensile strength, modulus, compression set, swelling, and fluid suitability. The process is qualified so that the final thickness after machining can verify the chemical composition as per the relevant **ASTM** standard.

The final check is carried out by the liquid penetrant method.

Certification of Quality and Design

Quality systems are a way of life at **FORCE**. In addition, **FORCE** functions under the requirements of an API Q1 quality program.

Our facilities and quality programs are always open to customer audits. The complete **FORCE** trunnion ball valve line has been designed and tested to ensure that the external and through-bore maximum allowable leakage rates are maintained in the event of a fire.

FORCE has equipment and facilities to firesafe test our products to the edition of **API 607** and **API 6FA** firesafe standards. All **API 6D**, **CE PED** and other licenses are maintained on a current basis.

Trunnion Mounted Ball

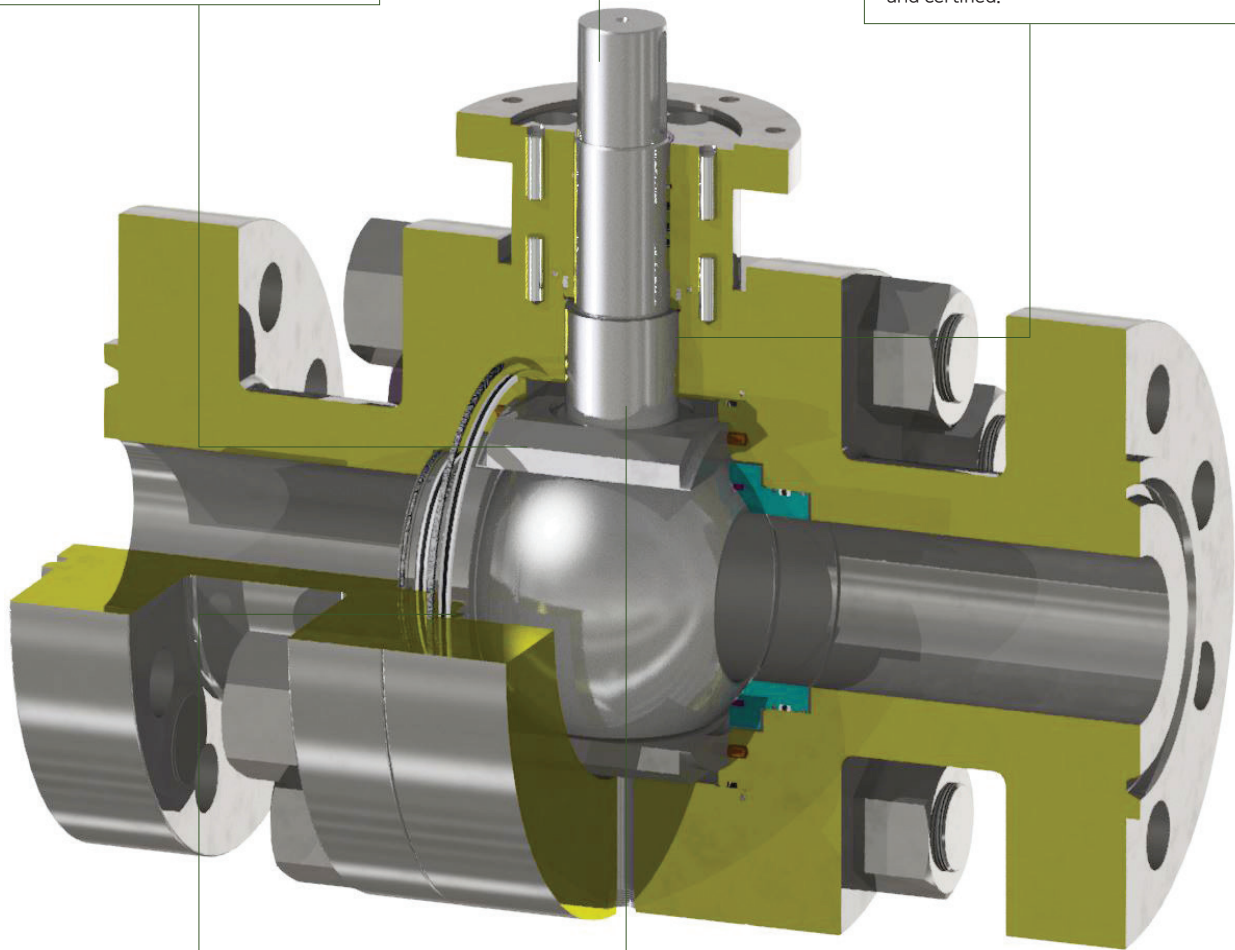
The ball is fixed and the seat rings are floating, free to move along the valve axis. Side load generated by the pressure acting on the ball is absorbed by bearings. At low pressure the seat sealing action is achieved by the thrust of the springs acting on the seat rings. As the pressure increases the fluid pressure pushes the seat rings against the ball.

Independent Ball and Stem

The ball and stem are independent to minimize the effect of the side thrust generated by the pressure acting on the ball.

Anti-Static Design

The electrical conductance continuity between all the metallic components is guaranteed and certified.



Floating Self-relieving Seat Rings

Two independent floating seat rings assure the bi-directional tightness of the valve. The seats are carefully designed to minimize the torque required to operate the valves without losing sealing power, which is assured from zero differential pressure to the valve's maximum rated pressure.

Low emission valves

Accurate machining of stem and bonnet sealing surfaces ensures compliance with the most severe pollution control regulations. Special "live" seals are available on request.

DTS Series

"Split-Body, Trunnion Mounted Ball, Soft Seated & Forged Valves"



SPECIFICATIONS

Construction

Split-body, Side entry, Full/Reduced port, Trunnion mounted ball, "Fire-safe" designed to **API 607/ISO 10497** or **API 6FA**, Double seal design, Double block and bleed, Blow out proof stem, Anti-static device, Pressure relieving seats, Locking device.

Valves are designed to **API 6D**, **ASME B16.34** and **ISO 17292/BS 5351** specifications.

Manufactured and conforms to **NACE** standard **MR 0175**.

Test pressure (psig/ CS material)

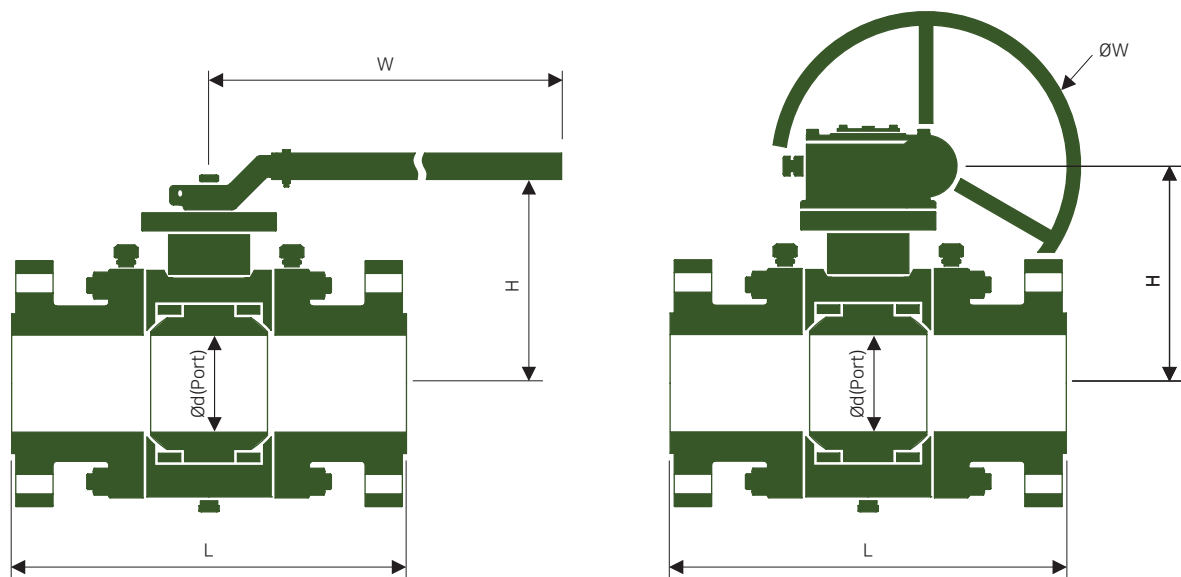
ASME Class	Ma x. Working pressure	Shell (Hydro.)	Seat (Hydro. / Air)
Class 150	285	450	325 / 80
Class 300	740	1125	825 / 80

DIMENSIONS

Class 150

Valve Size	Ød (Ball port)		L		H		W		Approx Weight	
	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	1.93	49	7.01	178	6.30	160	9.65	245	62	28
3" x 2"	1.93	49	7.99	203	6.30	160	9.65	245	75	34
3"	2.91	74	7.99	203	7.48	190	14.96	380	110	50
4" x 3"	2.91	74	9.02	229	7.48	190	14.96	380	148	67
4"	3.94	100	9.02	229	8.27	210	17.72	450	209	95
6" x 4"	3.94	100	15.51	394	8.27	210	17.72	450	269	122
6"	5.91	150	15.51	394	12.99	330	23.62	600	373	169
8" x 6"	5.91	150	17.99	457	12.99	330	23.62	600	507	230
8"	7.91	201	17.99	457	14.96	380	19.69	500	679	308
10" x 8"	7.91	201	20.98	533	14.96	380	19.69	500	754	342
10"	9.92	252	20.98	533	16.93	430	22.05	560	1,093	496
12" x 10"	9.92	252	24.02	610	16.93	430	22.05	560	1,217	552
12"	11.93	303	24.02	610	19.69	500	24.80	630	1,828	829
14" x 12"	11.93	303	27.01	686	19.69	500	24.80	630	1,978	897
14"	13.15	334	27.01	686	20.47	520	24.80	630	2,324	1,054
16" x 14"	13.15	334	30.00	762	20.47	520	24.80	630	2,441	1,107
16"	15.16	385	30.00	762	23.62	600	27.95	710	3,179	1,442
18" x 16"	15.16	385	34.02	864	23.62	600	27.95	710	3,384	1,535
18"	17.17	436	34.02	864	25.20	640	27.95	710	4,147	1,881
20" x 18"	17.17	436	35.98	914	25.20	640	27.95	710	4,471	2,028
20"	19.17	487	35.98	914	26.77	680	31.50	800	5,251	2,382
24" x 20"	19.17	487	42.01	1,067	26.77	680	31.50	800	6,047	2,743
24"	23.19	589	42.01	1,067	29.53	750	31.50	800	7,769	3,524
30"	28.94	735	50.98	1,295	33.66	855	31.50	800	13,761	6,242
36"	34.41	874	60.00	1,524	41.34	1,050	31.50	800	23,731	10,764
40"	38.43	976	72.83	1,850	44.29	1,125	35.43	900	33,327	15,117
48"	45.91	1,166	85.83	2,180	50.59	1,285	39.37	1,000	53,980	24,485

* Valve sizes 8" and larger are gear operated.



DIMENSIONS

Class 300

Valve Size	Ød (Ball port)		L		H		W		Approx Weight	
	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	1.93	49	8.50	216	6.30	160	9.65	245	75	34
3" x 2"	1.93	49	11.14	283	6.30	160	9.65	245	82	37
3"	2.91	74	11.14	283	7.48	190	14.96	380	150	68
4" x 3"	2.91	74	12.01	305	7.48	190	14.96	380	161	73
4"	3.94	100	12.01	305	8.27	210	23.62	600	271	123
6" x 4"	3.94	100	15.87	403	8.27	210	23.62	600	432	196
6"	5.91	150	15.87	403	12.99	330	19.69	500	467	212
8" x 6"	5.91	150	19.76	502	12.99	330	19.69	500	573	260
8"	7.91	201	19.76	502	14.96	380	19.69	500	765	347
10" x 8"	7.91	201	22.36	568	14.96	380	19.69	500	893	405
10"	9.92	252	22.36	568	16.93	430	22.05	560	1,217	552
12" x 10"	9.92	252	25.51	648	16.93	430	22.05	560	1,393	632
12"	11.93	303	25.51	648	19.69	500	24.80	630	1,951	885
14" x 12"	11.93	303	30.00	762	19.69	500	24.80	630	2,165	982
14"	13.15	334	30.00	762	20.47	520	24.80	630	2,685	1,218
16" x 14"	13.15	334	32.99	838	20.47	520	24.80	630	2,908	1,319
16"	15.16	385	32.99	838	23.62	600	27.95	710	3,543	1,607
18" x 16"	15.16	385	35.98	914	23.62	600	27.95	710	3,918	1,777
18"	17.17	436	35.98	914	25.20	640	27.95	710	5,141	2,332
20" x 18"	17.17	436	39.02	991	25.20	640	27.95	710	5,551	2,518
20"	19.17	487	39.02	991	26.77	680	31.50	800	6,184	2,805
24" x 20"	19.17	487	45.00	1,143	26.77	680	31.50	800	6,942	3,149
24"	23.19	589	45.00	1,143	29.53	750	31.50	800	9,193	4,170
30"	28.94	735	55.00	1,397	33.66	855	31.50	800	16,720	7,584
36"	34.41	874	67.99	1,727	41.34	1,050	31.50	800	25,926	11,760
40"	38.43	976	72.83	1,850	44.29	1,125	35.43	900	36,409	16,515
48"	45.91	1,166	85.83	2,180	50.59	1,285	39.37	1,000	59,106	26,810

* Valve sizes 6" and larger are gear operated.

DTS Series

"Split-Body, Trunnion Mounted Ball, Soft Seated & Forged Valves"



SPECIFICATIONS

Construction

Split-body, Side entry, Full/Reduced port, Trunnion mounted ball, "Fire-safe" designed to **API 607/ISO 10497** or **API 6FA**, Double seal design, Double block and bleed, Blow out proof stem, Anti-static device, Pressure relieving seats, Locking device.

Valves are designed to **API 6D**, **ASME B16.34** and **ISO 17292/BS 5351** specifications.

Manufactured and conforms to **NACE** standard **MR 0175**.

Test pressure (psig/ CS material)

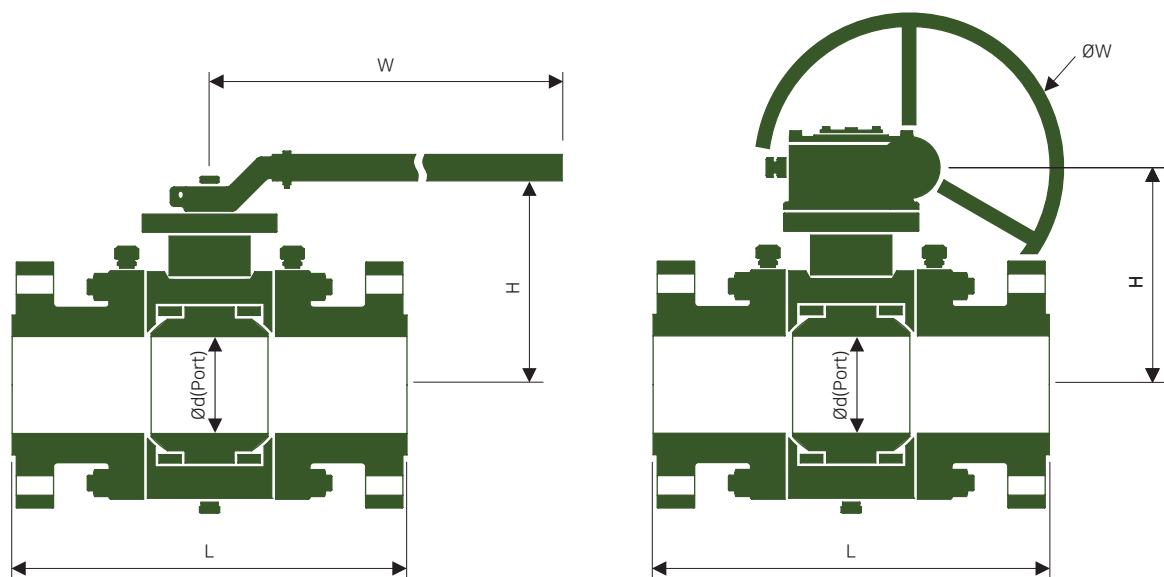
ASME Class	Ma x. Working pressure	Shell (Hydro.)	Seat (Hydro. / Air)
Class 600	1480	2225	1650 / 80
Class 900	2220	3350	2450 / 80

DIMENSIONS

Class 600

Valve Size	Ød (Ball port)		L				H		W		Approx Weight	
			RF/BW		RTJ							
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	1.93	49	11.50	292	11.61	295	7.68	195	14.96	380	88	40
3" x 2"	1.93	49	14.02	356	14.13	359	7.68	195	14.96	380	110	50
3"	2.91	74	14.02	356	14.13	359	8.66	220	23.62	600	148	67
4" x 3"	2.91	74	17.01	432	17.13	435	8.66	220	23.62	600	220	100
4"	3.94	100	17.01	432	17.13	435	11.42	290	15.75	400	324	147
6" x 4"	3.94	100	22.01	559	22.13	562	11.42	290	15.75	400	470	213
6"	5.91	150	22.01	559	22.13	562	12.99	330	19.69	500	686	311
8" x 6"	5.91	150	25.98	660	26.14	664	12.99	330	19.69	500	855	388
8"	7.91	201	25.98	660	26.14	664	15.35	390	24.80	630	1,285	583
10" x 8"	7.91	201	30.98	787	31.14	791	15.35	390	24.80	630	1,605	728
10"	9.92	252	30.98	787	31.14	791	16.93	430	24.80	630	2,004	909
12" x 10"	9.92	252	32.99	838	33.11	841	16.93	430	24.80	630	2,251	1,021
12"	11.93	303	32.99	838	33.11	841	18.50	470	24.80	630	2,668	1,210
14" x 12"	11.93	303	35.00	889	35.12	892	18.50	470	24.80	630	2,866	1,300
14"	13.15	334	35.00	889	35.12	892	20.08	510	27.95	710	3,349	1,519
16" x 14"	13.15	334	39.02	991	39.13	994	20.08	510	27.95	710	3,865	1,753
16"	15.16	385	39.02	991	39.13	994	23.62	600	27.95	710	3,999	1,814
18" x 16"	15.16	385	42.99	1,092	43.11	1,095	23.62	600	27.95	710	4,716	2,139
18"	17.17	436	42.99	1,092	43.11	1,095	25.59	650	27.95	710	5,633	2,555
20"x 18"	17.17	436	47.01	1,194	47.24	1,200	25.59	650	27.95	710	6,138	2,784
20"	19.17	487	47.01	1,194	47.24	1,200	29.13	740	31.50	800	7,990	3,624
24"x 20"	19.17	487	55.00	1,397	55.39	1,407	29.13	740	31.50	800	9,251	4,196
24"	23.19	589	55.00	1,397	55.39	1,407	32.28	820	31.50	800	12,311	5,584
30"	28.94	735	65.00	1,651	65.51	1,664	39.37	1,000	39.37	1,000	19,434	8,815
36"	34.41	874	82.01	2,083	82.64	2,099	47.24	1,200	39.37	1,000	31,614	14,340

* Valve sizes 4" and larger are gear operated.



DIMENSIONS

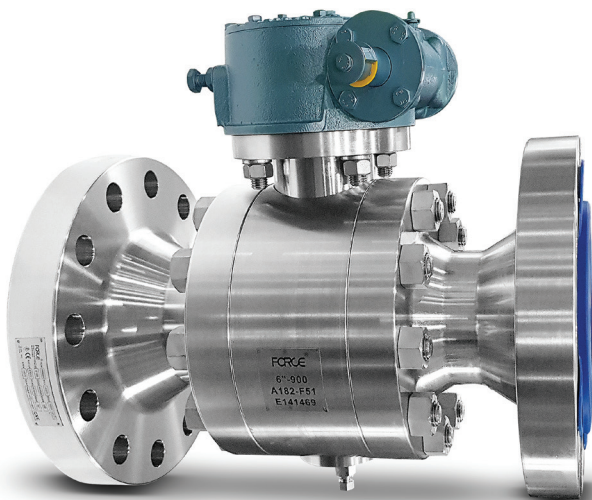
Class 900

Valve Size	Ød (Ball port)		L				H		W		Approx Weight	
			RF/BW		RTJ							
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	1.93	49	14.49	368	14.61	371	7.87	200	23.62	600	150	68
3" x 2"	1.93	49	15.00	381	15.12	384	7.87	200	23.62	600	212	96
3"	2.91	74	15.00	381	15.12	384	9.45	240	15.75	400	289	131
4" x 3"	2.91	74	17.99	457	18.11	460	9.45	240	15.75	400	342	155
4"	3.94	100	17.99	457	18.11	460	11.02	280	19.69	500	445	202
6" x 4"	3.94	100	24.02	610	24.13	613	11.02	280	19.69	500	624	283
6"	5.91	150	24.02	610	24.13	613	12.99	330	22.05	560	913	414
8" x 6"	5.91	150	29.02	737	29.13	740	12.99	330	22.05	560	1,038	471
8"	7.91	201	29.02	737	29.13	740	15.75	400	24.80	630	1,398	634
10" x 8"	7.91	201	32.99	838	33.11	841	15.75	400	24.80	630	1,680	762
10"	9.92	252	32.99	838	33.11	841	17.72	450	24.80	630	2,161	980
12" x 10"	9.92	252	37.99	965	38.11	968	17.72	450	24.80	630	2,544	1,154
12"	11.93	303	37.99	965	38.11	968	19.69	500	24.80	630	3,221	1,461
14" x 12"	11.93	303	40.51	1,029	40.87	1,038	19.69	500	24.80	630	3,466	1,572
14"	12.68	322	40.51	1,029	40.87	1,038	21.26	540	27.95	710	4,109	1,864
16" x 14"	12.68	322	44.49	1,130	44.88	1,140	21.26	540	27.95	710	4,511	2,046
16"	14.69	373	44.49	1,130	44.88	1,140	24.41	620	31.50	800	5,734	2,601
18" x 16"	14.69	373	47.99	1,219	48.50	1,232	24.41	620	31.50	800	6,345	2,878
18"	16.65	423	47.99	1,219	48.50	1,232	27.17	690	31.50	800	8,247	3,741
20" x 18"	16.65	423	52.01	1,321	52.52	1,334	27.17	690	31.50	800	8,865	4,021
20"	18.54	471	52.01	1,321	52.52	1,334	29.53	750	31.50	800	10,834	4,914
24" x 20"	18.54	471	60.98	1,549	61.73	1,568	29.53	750	31.50	800	13,192	5,984
24"	22.44	570	60.98	1,549	61.73	1,568	33.86	860	35.43	900	17,549	7,960
30"	28.03	712	74.02	1,880	74.88	1,902	41.73	1,060	39.37	1,000	33,160	15,041
36"	33.66	855	90.00	2,286	91.14	2,315	49.61	1,260	39.37	1,000	60,729	27,546

* Valve sizes 3" and larger are gear operated.

DTS Series

"Split-Body, Trunnion Mounted Ball, Soft Seated & Forged Valves"



SPECIFICATIONS

Construction

Split-body, Side entry, Full/Reduced port, Trunnion mounted ball, "Fire-safe" designed to **API 607/ISO 10497** or **API 6FA**, Double seal design, Double block and bleed, Blow out proof stem, Anti-static device, Pressure relieving seats, Locking device.

Valves are designed to **API 6D**, **ASME B16.34** and **ISO 17292/BS 5351** specifications.

Manufactured and conforms to **NACE** standard **MR 0175**.

Test pressure (psig/ CS material)

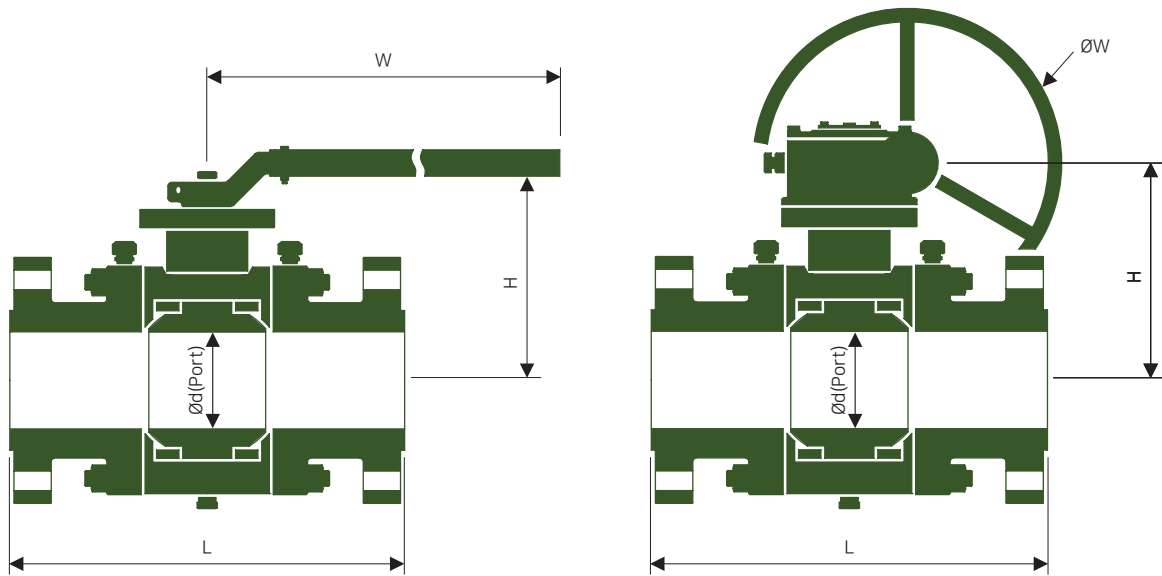
ASME Class	Ma x. Working pressure	Shell (Hydro.)	Seat (Hydro./ Air)
Class 1500	3705	5575	4100/ 80
Class 2500	6170	9275	6800/ 80

DIMENSIONS

Class 1500

Valve Size	Ød (Ball port)		L				H		W		Approx Weight	
			RF/BW		RTJ							
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	1.93	49	14.49	368	14.61	371	7.87	200	23.62	600	150	68
3" x 2"	1.93	49	18.50	470	18.62	473	7.87	200	23.62	600	216	98
3"	2.91	74	18.50	470	18.62	473	10.63	270	15.75	400	408	185
4" x 3"	2.91	74	21.50	546	21.61	549	10.63	270	15.75	400	461	209
4"	3.94	100	21.50	546	21.61	549	11.81	300	19.69	500	586	266
6" x 4"	3.94	100	27.76	705	27.99	711	11.81	300	19.69	500	842	382
6"	5.67	144	27.76	705	27.99	711	15.75	400	24.80	630	1,301	590
8" x 6"	5.67	144	32.76	832	33.11	841	15.75	400	24.80	630	1,691	767
8"	7.56	192	32.76	832	33.11	841	17.32	440	24.80	630	2,081	944
10" x 8"	7.56	192	39.02	991	39.37	1,000	17.32	440	24.80	630	2,571	1,166
10"	9.41	239	39.02	991	39.37	1,000	19.29	490	27.95	710	3,567	1,618
12" x 10"	9.41	239	44.49	1,130	45.12	1,146	19.29	490	27.95	710	4,244	1,925
12"	11.30	287	44.49	1,130	45.12	1,146	22.83	580	31.50	800	5,377	2,439
14" x 12"	11.30	287	49.49	1,257	50.24	1,276	22.83	580	31.50	800	6,032	2,736
14"	12.40	315	49.49	1,257	50.24	1,276	25.59	650	35.43	900	7,749	3,515
16" x 14"	12.40	315	54.49	1,384	55.39	1,407	25.59	650	35.43	900	8,234	3,735
16"	14.17	360	54.49	1,384	55.39	1,407	26.77	680	35.43	900	9,744	4,420

* Valve sizes 3" and larger are gear operated.



DIMENSIONS

Class 2500

Valve Size	Ød (Ball port)		L				H		W		Approx Weight	
			RF/BW		RTJ							
	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	lb	kg
2"	1.65	42	17.76	451	17.87	454	10.24	260	15.75	400	322	146
3" x 2"	1.65	42	22.76	578	22.99	584	10.24	260	15.75	400	425	193
3"	2.44	62	22.76	578	22.99	584	11.42	290	19.69	500	573	260
4" x 3"	2.44	62	26.50	673	26.89	683	11.42	290	19.69	500	714	324
4"	3.43	87	26.50	673	26.89	683	13.58	345	22.05	560	1,021	463
6" x 4"	3.43	87	35.98	914	36.50	927	13.58	345	22.05	560	1,468	666
6"	5.16	131	35.98	914	36.50	927	16.93	430	24.80	630	2,366	1,073
8" x 6"	5.16	131	40.24	1,022	40.87	1,038	16.93	430	24.80	630	2,743	1,244
8"	7.05	179	40.24	1,022	40.87	1,038	21.65	550	27.95	710	4,632	2,101
10" x 8"	7.05	179	50.00	1,270	50.87	1,292	21.65	550	27.95	710	5,617	2,548
10"	8.78	223	50.00	1,270	50.87	1,292	29.53	750	31.50	800	8,510	3,860
12" x 10"	8.78	223	55.98	1,422	56.89	1,445	29.53	750	31.50	800	9,480	4,300
12"	10.43	265	55.98	1,422	56.89	1,445	33.46	850	35.43	900	15,011	6,809

* Valve sizes 2" and larger are gear operated.