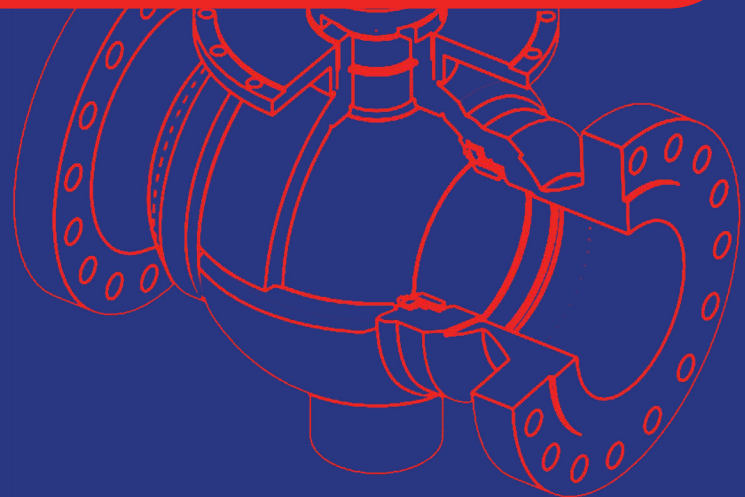


## • ***Trunnion & Floating Ball Valves*** •



Known for its robust design, sealing areas, and stainless steel overlays, providing valve solutions for the oil and gas industries



## About Trunnion Ball Valves

Trunnion ball valves have the obturator bounded by Trunnion which do not allow axial displacements of the ball itself in the flow direction; line pressure compresses the seat onto the ball, the contact between surfaces generates the valve sealing. Trunnion standard construction ensures automatic cavity relief in case of overpressure in the body cavity; these valves can be selected for a wide range of applications with no specific limits to sizes and pressures.



GAZAR Trunnion Ball Valve Production are mainly designed to conform API 6D (Specification for pipeline valves) and ANSI B16.34 (Valves Flanged, Threaded and Welding End) or API 6A (Specification for Wellhead and Christmas Tree Equipment) in case of upstream applications. Other related standards such as ANSI B16.5 (Pipe Flanges and Flanged Fittings), ANSI B16.25 (Butt-welding Ends), and ANSI B16.10 (Face to Face and End-to-End Dimensions of Valves) are also used for the design of ball valves. Also our ball valves are designed to meet FIRE SAFE requirements to BS6755, API 6FA and API 607.

Final testing is done to conform API 598 (Valve Inspection and Testing) MSS-SP-61 (Pressure Testing of Steel Valves) API6D (Specification for Pipeline Valves) or API 6A (Specification for Wellhead and Christmas Tree Equipment) requirements. Materials are selected mainly to ASTM standards and when sour service is specified to meet NACE MR-01-75 (Sulfide Stress cracking resistant Metallic Materials for Oilfield Equipment).

### Bi-directional Flow

GAZAR ball valves are suitable for bi-directional Sealing.

### Soft Seated Valves

The seat design features a deep pocket with a protective lip which makes the design a long lasting design. The seat assembly consists in an outer metallic seat carrier with a soft seat insert. The soft insert is located into a groove in the metallic seat carrier. The complete seat assembly is floating inside valve body and it is energized by a set of springs which load the seat assembly against the ball preventing leakage from behind the seat. Seat assembly is provided with outer O-ring to avoid leakage through the seat carrier and a graphite backup ring which ensure the tightness in case the O-ring is damaged.

### Metal Seated Valves

Similar seat construction is done in case of metal seated valve. However the seat in this case consists only in a metallic seat ring (without any insert). The surface in contact with the ball is hard faced with Tungsten Carbide, stellite etc, achieving a minimum hardness of 42 HRC to stellite or convectional hard faced and 78 HRC to Tungsten Carbide or special hard faced. This makes the design long durable and reliable and able to achieve classes V & VI leakage class.

## Trunnion Design for Low Torque Operation

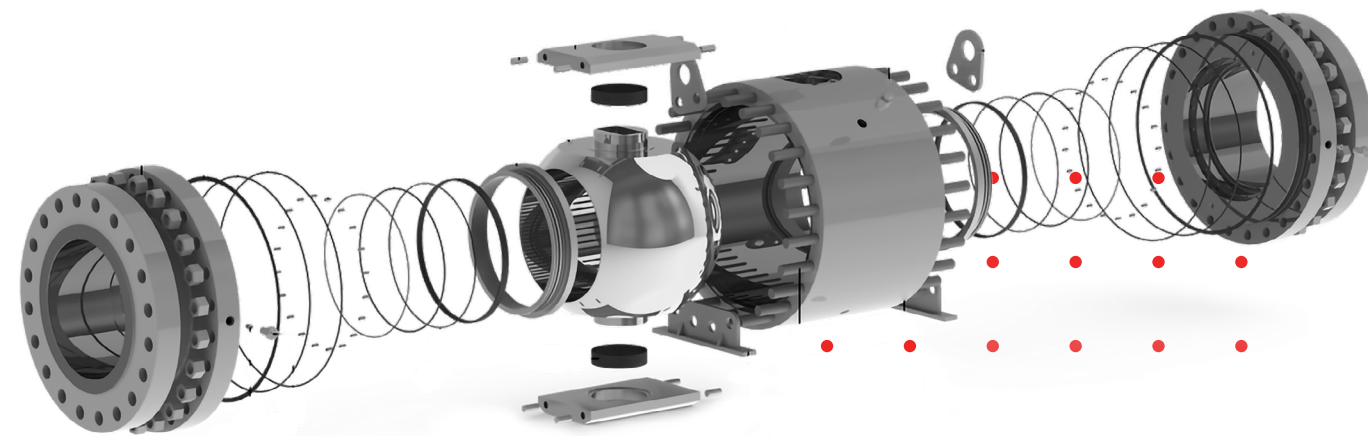
Similar seat construction is done in case of metal seated valve. However the seat in this case consists only in a metallic seat ring (without any insert). The surface in contact with the ball is hard faced with Tungsten Carbide, stellite etc., achieving a minimum hardness of 42 HRC to stellite or convectional hard faced and 78 HRC to Tungsten Carbide or special hard faced. This makes the design long durable and reliable and able to achieve classes V & VI leakage class.

## Stem Extension for Buried Service

A stem extension is a need when valves are being installed in underground pipeline making the valve operator non accessible. GAZAR offer a wide variety of stem extensions for manual operated valves as well as for actuated valves, including gas over-Oil operated valves. The stem extension includes the complete system of grease injection, actuator gas supply, etc. as a part of it.

## Specification

Size Range: 2" - 56" | Pressure Class: ASME 150 - 900 API 2000 -15000 | API Standards: 6D & 6A | API 6D SS | ASME B16.34



## Fully Welded & Split Body Ball Valve

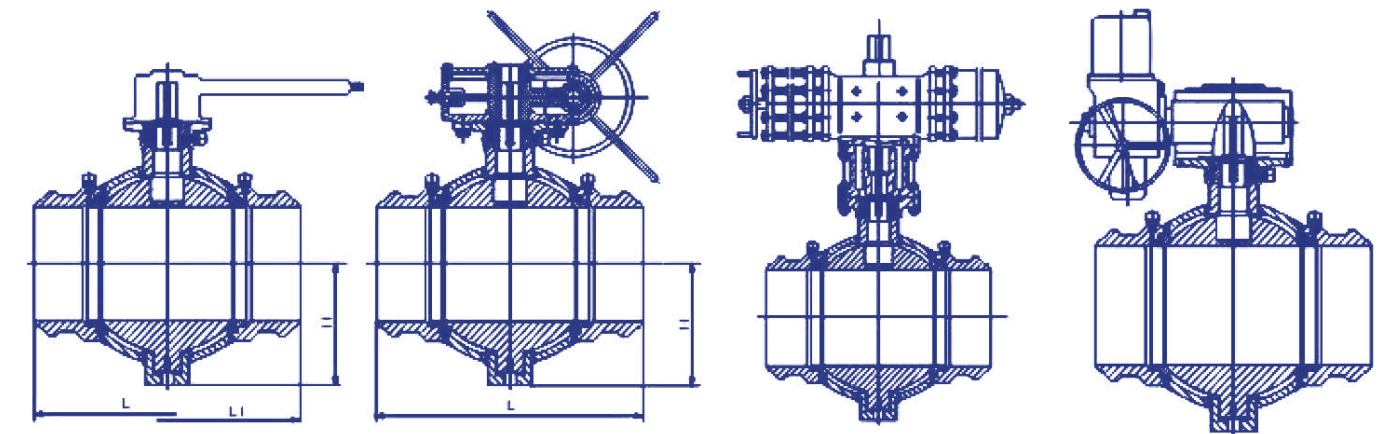
GAZAR Fully Welded & Split Body Valves are used in pipelines and pumping compression stations As well as subsea applications. Our welded design reduces the leakage path And makes the valves ideal for underground and subsea installations. Welding of the two or three piece body parts are performed with a special Technique so that post welding heat treatment is not required and soft Seals are not subject to damage during the welding. The extensive size range and pressure class are available in a Variety of materials including Carbon, Alloy & Stainless steel Suitable for general to severe service conditions. Our Split body design, size range and pressure class are Available in a variety of materials including Carbon, Alloy & Stainless steel suitable for general to severe serviceConditions.

- **Size Range:** 2" - 56"
- **Pressure Class:** ASME 150 - 900
- **API Standards:** 6D & 6DSS & 6A, ASME: B16.34

## Features



Piece Body | Full And Reduced Bore | Trunnion Mounted | Double Block And Bleed | Single Or Double Piston Effect Design | Anti-blow Out Stem | Anti-static Device | Firesafe To Api-607 / 6FA / Iso 10497 | Spring Loaded Seats | Sealant Injection | Nace Mr-01-75





# Top Entry Ball Valve

Top Entry Ball valves are used in pipelines, pumping and compression stations, offshore, onshore, subsea and cryogenic as well as Abrasive and high temp applications. The Top Entry design permits full repair in line and also allows the valve to be welded in line allowing easy maintenance. The cast or forged one piece body and bolted bonnet allows for the use of a full range of materials including Carbon, Alloy & Stainless steel suitable for general to severe service conditions.

## Valve Material

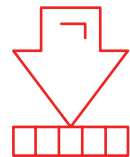


GAZAR valves are manufactured using a wide selection of materials such as:

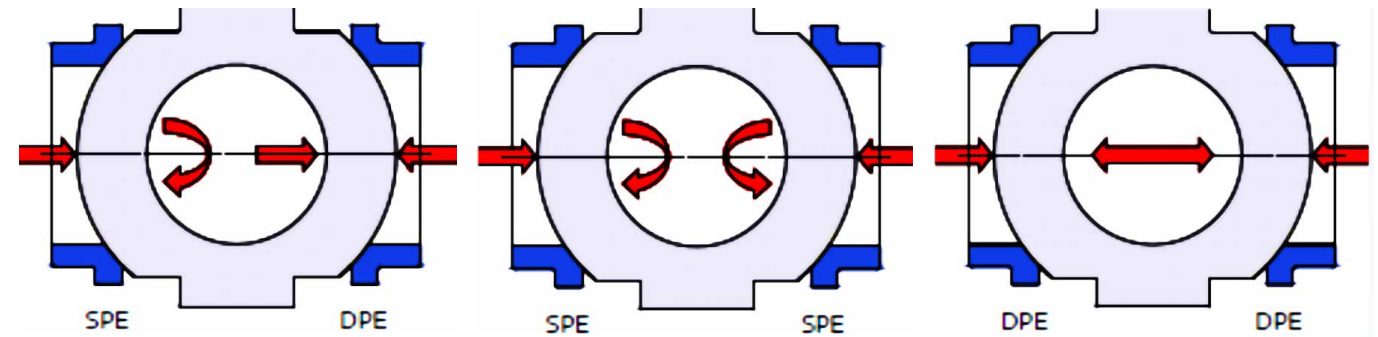
- Carbon steel
- Killed carbon steel for low temperature applications
- High resistance alloy steels for API 6A applications
- Stainless Steel
- Duplex & Super duplex steel
- Nickel alloys

Materials also meet the requirements of NACE MR-0175/ISO 15156 when sour gas services are specified. Our technical staff is ready and available to provide customized material selection for those special customer applications. GAZAR always provides the customer with suitable information of material selection which is agreed prior valves are manufactured.

## Seat Principle:



**1.** Two independent seat rings grant the sealing barrier against the line pressure acting on the upstream and downstream sides of the valve which allows the valve to be bidirectional. **2.** A set of coil springs acting between the upstream side of each seat ring and the body, generate an uniform thrust on the seat which push the same against the ball and grant the sealing feature with no or very low pressure in the line, when the line pressure increase the thrust acting on the seat increases proportionally and the sealing feature is granted throughout the full pressure range. **3.** The GAZAR trunnion mounted ball valves **4.** Are available with Double Block & Bleed independent of the seat type.



Seat Design	Single Piston Effect (SPE)	Single Piston Effect (DPE) - DIB!	Combined DIB!
Bi-Directional Sealing	Yes	Yes	Yes
Body-Cavity Self-Relieving	Yes	No	Yes
Double Barrier	No	No	Yes (Perferred Direction Only)

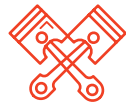
## Single Piston Effect



Single piston effect (SPE) is the standard feature for the seat rings of the SADRA MAHAN PARSIAN (GAZAR) trunnion mounted ball valves. The pressure acting on the upstream side of the seat ring generates a force which push the seat towards the ball. The pressure acting on the downstream side of the seat ring generates a force which pull the seat ring away from the ball. Any overpressure which may be generated by the thermal expansion of the fluid trapped in the body cavity with the ball in fully closed position, will be automatically discharged in the line on the lower pressure side.



## Double Piston Effect



Double piston effect (DPE) is a standard feature for the seat rings of the GAZAR trunnion mounted ball valves & recommended for welded body valves. On a DPE seat ring, both the pressure acting on the upstream side of the seat ring and the pressure acting on the downstream side of the seat ring, generate a force which push the seat towards the ball.

With this type of seat ring, the eventual overpressure which may be generated by the thermal expansion of the fluid trapped in the body cavity with the ball in fully closed position, can be discharged by the use of, an external safety relief device. The Double Piston Effect grants a double sealing feature, if the upstream seat ring is damaged, the downstream seat grant the sealing feature of the valve.

## Fire Safe



GAZAR complete range of Side entry, Top Entry and Welded body ball valves are certified fire safe according to API 607 / ISO 10497 - API 6 FA.

## Valves Ends



Valves are available with:

- Flanged Ends (RF or RTJ) to ASME B16.5 or ASME B16.47
- Welding Ends to ASME B16.25 Hub End

## Bore



Valve can be supplied with Full or Reduced bore in accordance with table 1 of API 6D, unless otherwise required or advised. Valves with special Bore are available.

## Face to Face/End to End



Dimensions are in accordance with API 6D and ASME B16.10. Special dimensions are available.

## Valve Transition Pieces



Transition pieces (pups), can be supplied for Welding Ends Valves to facilitate the welding of the valve to the line for:

- Material compatibility.
- Excessive difference in strengths and thickness between valve closures and line pipe (limit is 1,5 times).
- Avoiding damages to the valve soft seals.

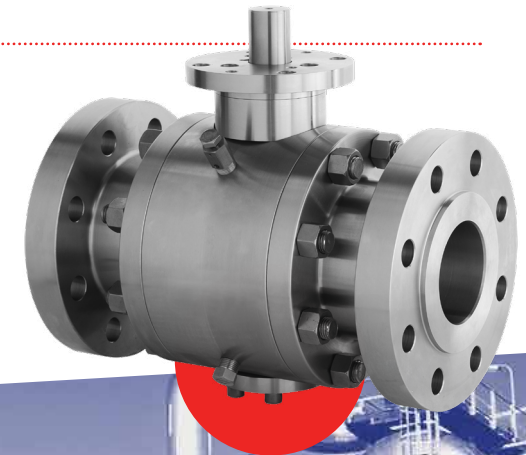
Important note: when transition pieces are supplied by the customers, it is imperative to verify if the strength of the Same, suitable to undergo the hydrotest of the valve without damages or deformations (1.5 times the valve maximum rated pressure).

## Weld Overlays



Welded overlays, with Stainless Steel, Duplex and Inconel are available on request for:

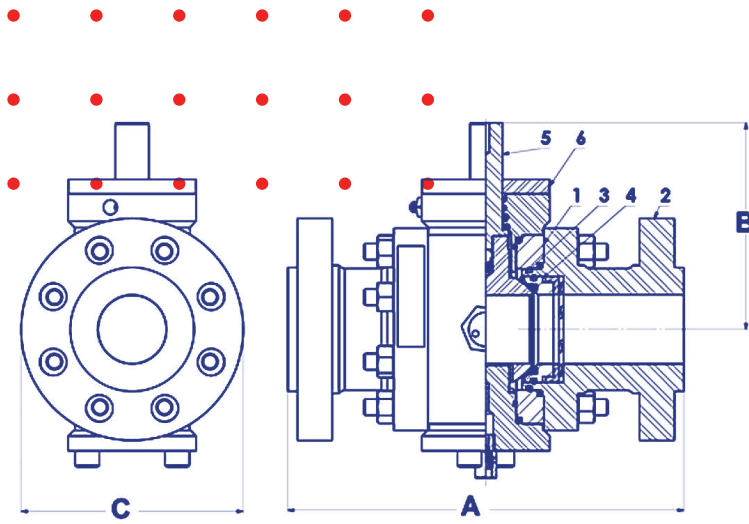
- All wetted parts
- Body wetted parts
- Seat rings housing pocket
- Stem sealing area
- Balls





**GAZAR Ball Valve Trunnion mounted (Double seat) (Size 1 1/2" to 4")**

**Specifications:** Side Entry (3 Pieces) | Flanged Ends  
| Full Bore



**S T A N D A R D**

Face to Face Dimension	ANSI B16.10
End Flange Dimension	ANSI B16.5
Design	ANSI B16.34
Basic Design	API608 / API6D
Fire Safe Design	API607

Part	Description	Material (General)	Material (NACE-MR0175)	Material (Stainless Steel)
1	Body	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A351 Gr.CF8M
2	Closure	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A351 Gr.CF8M
3	Ball	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A351 Gr.CF8M
4	Seat	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A351 Gr.CF8M
5	Stem	AISI 4140	AISI 4140	SS 410
6	Adaptor Plate	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	SS 316

Size (inch)	Class 150						Class 150					
	Flanged		Butt Weld		Ring Type Joint		B	C	Flanged		Butt Weld	
	A	Weight	A	Weight	A	Weight			A	Weight	A	Weight
1 1/2"	165	14	191	13	178	14	130	127	191	18	191	13
2"	178	23	216	17	191	23	140	143	216	23	216	17
3"	203	43	283	38	216	43	171	197	283	53	283	40
4"	229	66	305	56	241	66	196	238	305	77	305	58

Size (inch)	Class 300				Class 600							
	Ring Type Joint		B	C	Flanged		Butt Weld		Ring Type Joint		B	C
	A	Weight			A	Weight	A	Weight	A	Weight		
1 1/2"	203	18	130	127	241	21	241	14	241	21	130	127
2"	232	23	140	143	292	28	292	20	295	28	140	143
3"	298	53	171	197	356	59	356	44	359	59	171	197
4"	321	77	196	238	432	152	432	87	435	152	196	238

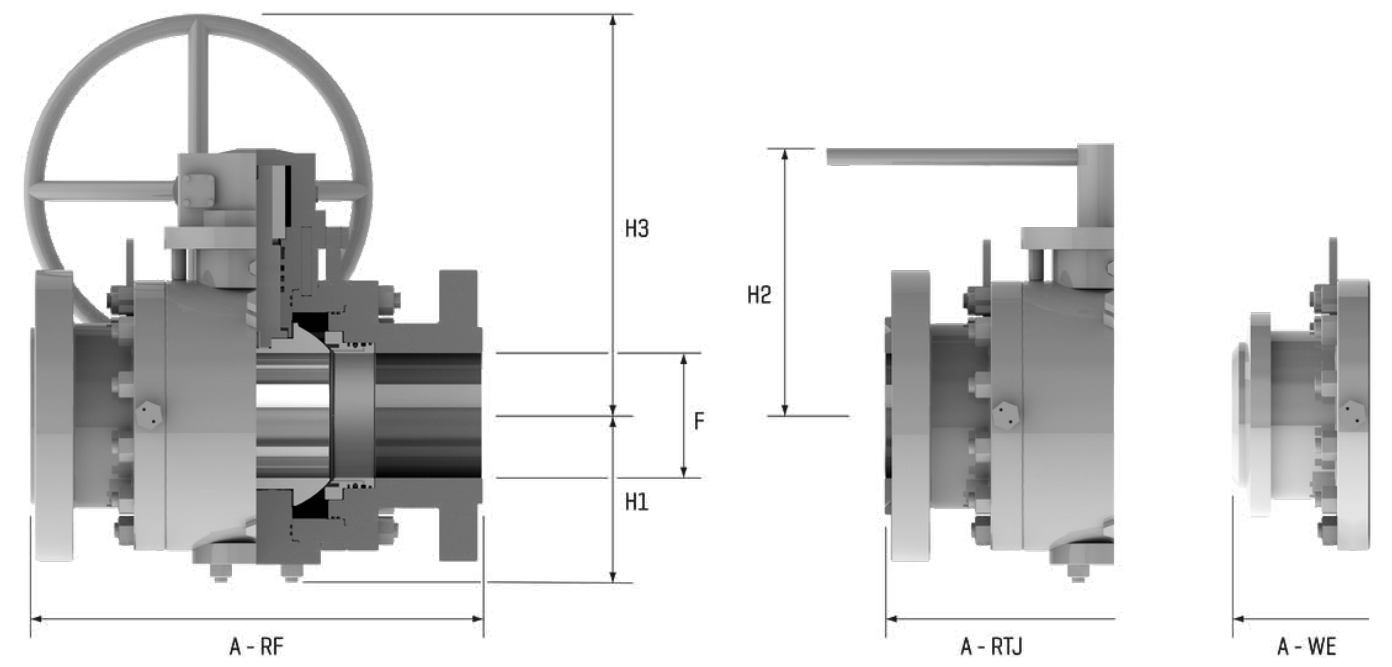
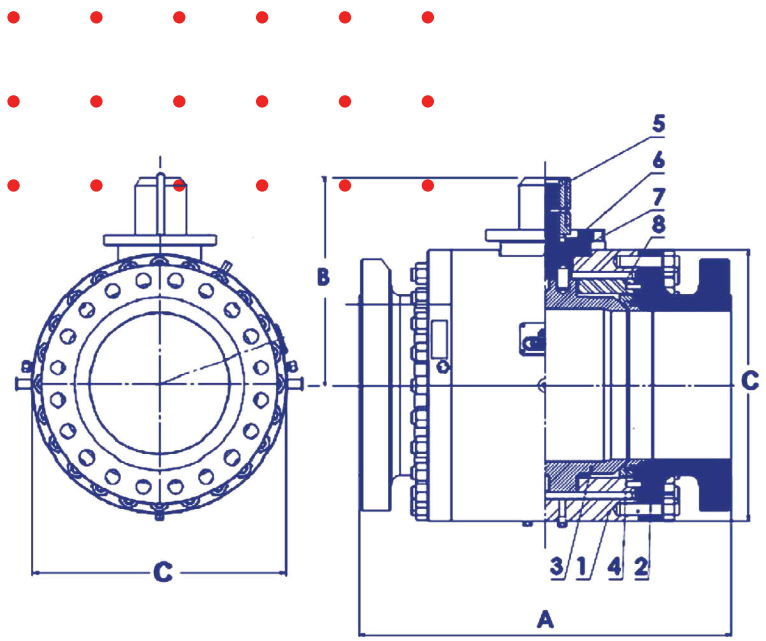


**GAZAR Ball Valve Trunnion mounted (Double seat) (Size 6" to 60")**

**Specifications:** Side Entry (3 Pieces) | Flanged Ends  
| Full Bore

**S T A N D A R D**

Face to Face Dimension	ANSI B16.10
End Flange Dimension	ANSI B16.5
Design	ANSI B16.34, ANSI B16.34
Basic Design	API608 / API6D
Fire Safe Design	API607



Part	Description	Material (General)	Material (NACE-MR0175)	Material (Stainless Steel)
1	Body	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A351 Gr.CF8M
2	Closure	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A351 Gr.CF8M
3	Ball	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A351 Gr.CF8M
4	Seat	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	ASTM A351 Gr.CF8M
5	Stem	AISI 4140	AISI 4140	SS 410
6	Adaptor Plate	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	SS 316
7	Top Cover	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	SS 316
8	Bearing Retainer	ASTM A216 Gr. WCC	ASTM A216 Gr. WCC	SS 316

Size (inch)	Class 150								Class 300			
	Flanged		Butt Weld		Ring Type Joint		B	C	Flanged		Butt Weld	
	A	Weight	A	Weight	A	Weight			A	Weight	A	Weight
6"	394	236	457	200	406	236	178	302	403	249	457	209
8"	457	386	521	327	470	386	178	397	502	399	521	336
10"	533	567	559	476	546	567	188	464	568	599	559	499
12"	610	789	635	658	622	789	188	549	648	816	635	689
14"	686	980	762	816	699	980	238	584	762	1030	762	857
16"	762	1166	838	980	775	1166	238	670	838	1216	838	1016
18"	864	1637	914	1370	876	1637	282	759	914	1706	914	1429
20"	914	2200	991	1837	927	2200	282	835	991	2309	991	1928
22"	-	2726	-	2277	-	2726	651	921	1092	2858	1092	2386
24"	1067	3266	1143	2726	1080	3266	753	988	1143	3429	1143	2858
26"	1143	4137	1245	3447	-	4137	803	1060	1245	4336	1245	3620
28"	1245	4736	1346	3946	-	4736	838	1137	1346	4958	1346	4137
30"	1295	5670	1397	4726	-	5670	880	1235	1397	5947	1397	4958
32"	1372	6446	1524	5380	-	6446	943	1295	1524	6759	1524	5638
34"	1473	7888	1626	6577	-	7888	993	1356	1626	8278	1626	6899
36"	1524	9190	1727	7657	-	9190	1028	1441	1727	9639	1727	8038
40"	-	11725	-	9779	-	11725	1111	1623	-	12306	-	10256
42"	-	13816	-	11517	-	13816	1174	1711	-	14498	-	12088
46"	-	16797	-	13998	-	16797	1286	1892	-	17636	-	14696
48"	-	19196	-	15998	-	19196	1333	1969	-	20158	-	16797
56"	-	29397	-	24499	-	29397	1525	2280	-	30858	-	25719

Size (inch)	Class 300				Class 150							
	Ring Type Joint		B	C	Flanged		Butt Weld		Ring Type Joint		B	C
	A	Weight			A	Weight	A	Weight	A	Weight		
1½"	203	18	130	127	241	21	241	14	241	21	130	127
2"	232	23	140	143	292	28	292	20	295	28	140	143
3"	298	53	171	197	356	59	356	44	359	59	171	197
4"	321	77	196	238	432	152	432	87	435	152	196	238
6"	419	249	178	305	559	308	559	259	562	308	178	311
8"	518	399	178	403	660	500	660	417	664	500	203	410
10"	584	599	213	467	787	739	787	617	790	739	213	480
12"	664	816	213	552	838	1030	838	857	841	1030	213	565
14"	778	1030	257	591	889	1266	889	1057	892	1266	257	603
16"	854	1216	257	679	991	1520	991	1266	994	1520	257	692
18"	930	1706	282	768	1092	2127	1092	1778	1095	2127	349	784
20"	1010	2309	610	845	1194	2876	1194	2400	1200	2876	673	861
22"	1115	2858	718	930	1295	3570	1295	2976	1305	3570	743	949
24"	1165	3429	753	997	1397	4277	1397	3570	1407	4277	778	1019
26"	1270	4336	828	1070	1448	5430	1448	4527	1461	5430	828	1092
28"	1372	4958	863	1149	1549	6210	1549	5175	1562	6210	863	1172
30"	1422	5947	905	1248	1651	7448	1651	6210	1664	7448	944	1273
32"	1553	6759	943	1308	1778	8469	1778	7058	1794	8469	982	1334
34"	1654	8278	990	1369	1930	10356	1930	8636	1946	10356	1029	1397
36"	1756	9639	1028	1457	2083	12079	2083	10070	2099	12079	1067	1486
40"	-	12306	1111	1638	-	15418	-	12846	-	15418	1150	1673
42"	-	14497	1213	1730	-	18175	-	15145	-	18175	1213	1765
46"	-	17636	1325	1911	-	22099	-	18416	-	22099	1325	1949
48"	-	20158	1372	1988	2181	25256	2181	21047	-	25256	1372	2029
56"	-	30858	1525	2305	-	38669	-	32228	-	38669	1559	2353



## About Floating Ball Valve

GAZAR Floating Ball Valves are available in an extensive range of designs, materials, sizes and pressure classes and are in full conformance with ANSI, API and NACE specifications. All ball valves are designed in accordance with ASME B16.34 and API 608 and where applicable with API 6D or BS EN ISO 17292. GAZAR uses only high-quality materials inspected & tested to International Standards and utilizes advanced manufacturing technology with special emphasis on safety, quality, and long service life of our products, to ensure that our clients receive the “best in class” products available from us at a competitive price and delivered on time. Forging material has increased strength under maximum rated operation pressure compared with cast. Other forging properties include greater impact resistance, resistance to fatigue cracking, particularly when cycling at either high or Cryogenic temperature. Overdesigned wall thickness and adaptation of high strength tie bolts convenient for valve maintenance and sufficient pipe stress.



Ball valves are intended to be used as on/off flow control devices and are not to be used to throttle fluid flow. The valves should always be either fully open or closed.

GAZAR Floating Ball Valve design is developed using the latest software based analysis tools. At the design stage, all projects are analyzed using 3D solid modelling tools. Benefits include reduction of development time and cost, improved product quality, and ability to solve field problems for customers. Product flexibility and accuracy is assured.

Finite Element Analysis (FEA) is a very important step at the development stage to ensure the best possible performance requirements. Valves operational problems, pressure/temperature-related deformations and flow-related forces within a valve can be evaluated.

GAZAR uses the FEA for predicting failure due to unknown stresses by showing problem areas in a material and allowing designers to see all of the theoretical stresses within.

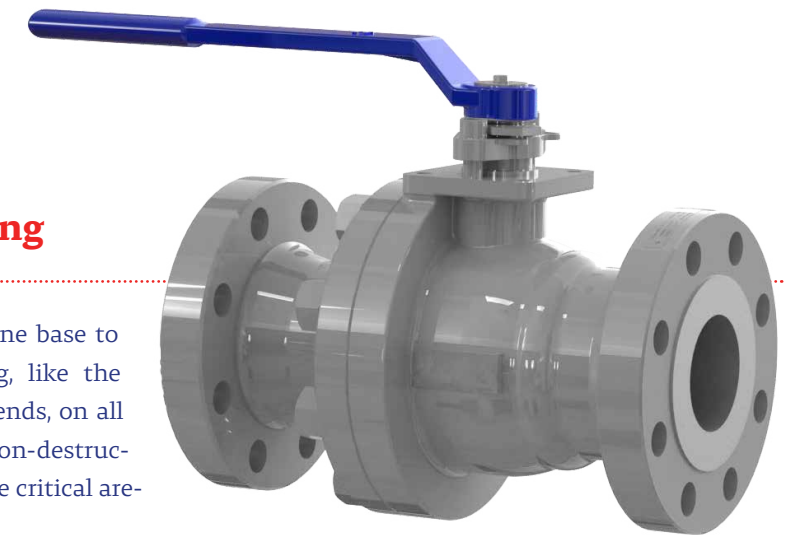
Computational Fluid Dynamics (CFD) is used to simulate operating flow conditions. Evaluation of Valve CV coefficient and convective heat transfer coefficient takes place at the design stage.

### Main Features

- Fire-Safe Test Approved: GAZAR floating ball valves are designed in accordance with API 607 & API SPEC 6FA.
- Double Body Gasket
- Anti-Static Device
- Anti-Blow-Out Proof Stem
- Solid Ball
- Longevity of Life
- Low Torque Output

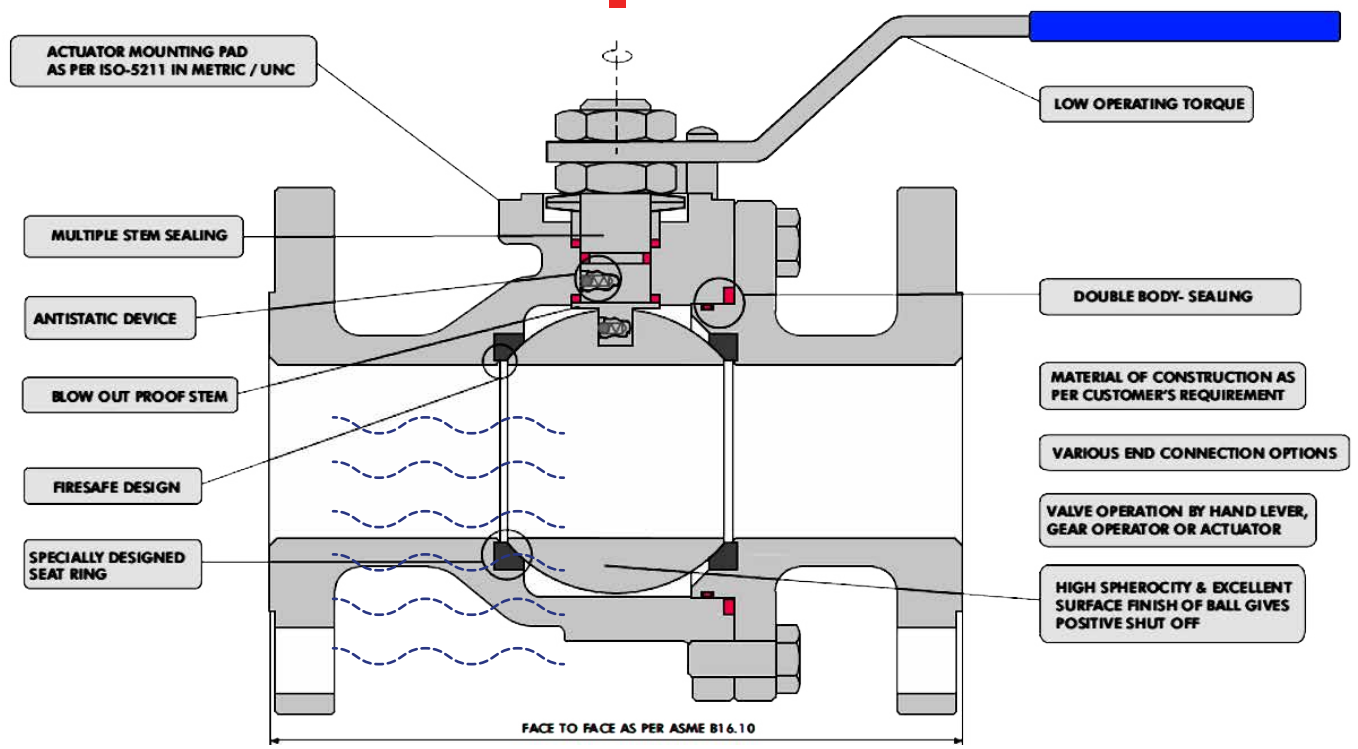
### Inspection And Testing

Every valve is subjected on routine base to different non-destructive testing, like the dye penetrant test on butt weld ends, on all hard faced and cladding areas. Non-destructive test are also carried out on the critical areas as defined by ASME B16.34





**GAZAR Ball Valve Floating (Double seat)**

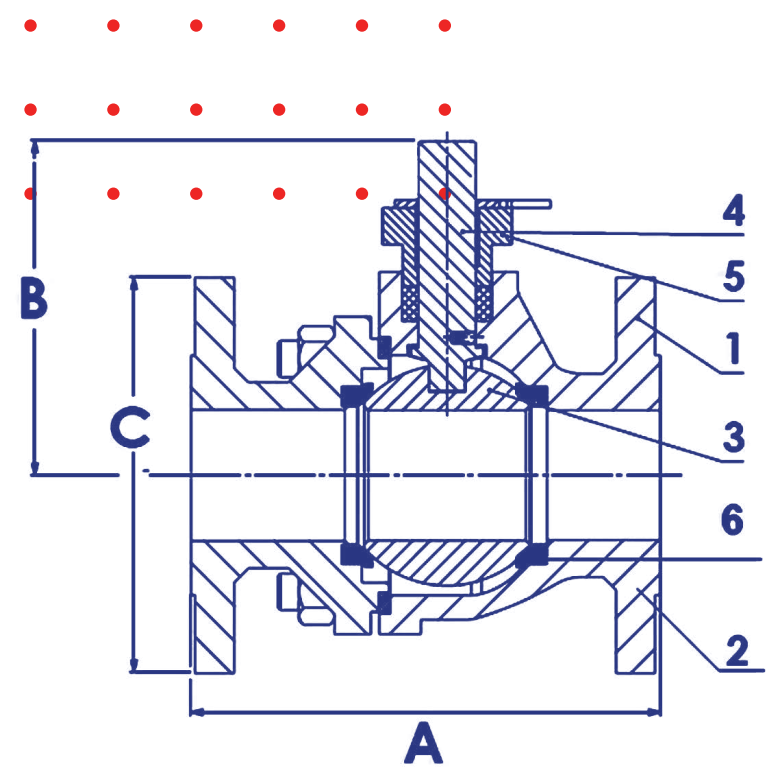


**Marking And Identification**

Each valve is identified on proper name plate and on valve body as required by MSS SP-25 and ASME B16.34. Name plate carries all information on rating, size, valve body and trim material, customer tags.

**Fire Safe**

Fire safe Conformance to API 6FA/ API 607/BS-6755 part II Assures highest standard of safety. Certified by Customer's Inspectors and independent certifying authorities.



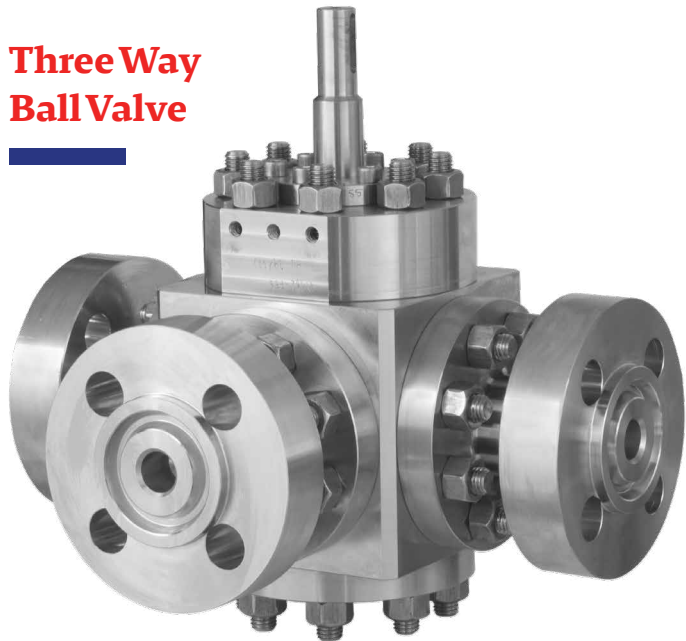
**Specifications:** Split Body | Flanged Ends | Full Bore

**S T A N D A R D**

Face to Face Dimension	ANSI B16.10
End Flange Dimension	ANSI B16.5
Design	ANSI B16.34
Basic Design	API608 / API6D
Fire Safe Design	API607

Part	Description	Material (General)	Material (NACE-MR0175)	Material (Stainless Steel)
1	Body	ASTM A216 Gr. WCC	ASTM A352 Gr. LCB	ASTM A351 Gr.CF8M
2	Bonnet	ASTM A216 Gr. WCC	ASTM A352 Gr. LCB	ASTM A351 Gr.CF8M
3	Ball	ASTM A105N + ENP	ASTM A351 Gr.CF8M	ASTM A351 Gr.CF8M
4	Stem	ASTM A479 TP410	ASTM A479 TP410	ASTM A479 TP316
5	Packing Gland	ASTM A216 Gr. WCC	ASTM A352 Gr. LCB	ASTM A351 Gr.CF8M
6	Seat	PTFE	PTFE/Viton	PTFE

**Three Way Ball Valve**



**Full Jacket Ball Valve**



Size (inch)	Class 150						
	A				B	C	Weight
	Flanged long pattern	Flanged Short pattern	Butt Weld long pattern	Butt Weld Short pattern			
1/2"	108	108	-	140	89	81	2
3/4"	117	117	-	152	98	86	3
1"	127	127	-	165	108	86	3
1 1/4"	140	140	-	178	117	92	4
1 1/2"	165	165	190	190	127	110	7
2"	178	178	216	216	152	118	9
2 1/2"	190	190	241	241	178	142	16
3"	203	203	282	282	190	155	19
4"	230	229	305	305	229	170	33
5"	356	-	-	-	254	218	50
6"	394	267	457	403	279	236	65
8"	457	292	521	419	343	265	120
10"	533	330	559	457	406	340	160
12"	610	356	635	502	433	382	430

Size (inch)	Class 300						
	A				B	C	Weight
	Flanged long pattern	Flanged Short pattern	Butt Weld long pattern	Butt Weld Short pattern			
1/2"	-	140	-	140	-	-	-
3/4"	-	152	-	152	-	-	-
1"	165	165	-	165	125	86	5
1 1/4"	-	178	-	178	-	-	-
1 1/2"	190	190	190	190	156	110	10
2"	216	216	216	216	165	118	16
2 1/2"	241	241	241	241	191	142	22
3"	283	282	282	282	210	155	31
4"	305	305	305	305	254	170	52
5"	-	403	-	403	-	-	-
6"	403	419	457	419	318	236	105
8"	502	457	521	457	381	265	170
10"	568	502	559	502	445	340	-
12"	648	572	635	572	520	382	-

Size (inch)	Class 600				
	A			B	Weight
	Flanged long pattern	Butt Weld long pattern	Ring Type Joint		
1/2"	165	165	163.5	95	5
3/4"	190	190	190.5	115	7
1"	216	216	216	125	10
1 1/4"	229	229	229	135	15
1 1/2"	241	241	241	155	18
2"	292	292	295	165	22
2 1/2"	330	330	333	190	28
3"	356	356	359	210	38
4"	432	432	435	275	78
5"	-	-	-	-	-
6"	559	559	-	-	-
8"	660	660	-	-	-
10"	787	787	-	-	-
12"	838	838	-	-	-



Unit 13, No 10,  
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