Sap©

Wisdom in flow Control Products

Quality, Performance, Durability, Value

www.sapvalves.com

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IBR APPROVED

Index

"SAP INDUSTRIES LTD." (previously known as "KAMLESH ENGINEERING CO.") is manufacturer & exporter of Industrial Valves since 1973. The company was formed by experts from the allied field with decades of business experience.

We offer you a wide range of Industrial Valves available in Cast Steel, Forged Steel, Stainless Steel, Alloy Steel as Material of Construction and Pressure Rating ranging from 150# to 2500# As per API and British Standards.

"SAP" Valves are manufacturing as per the latest national and international standards and designed using latest manufacturing techniques and stringent quality checks. Our mission is to achieve leadership as a manufacturer of all types of Industrial Valves by 2020.

People in "SAP" group are with industrial experience, highly skilled and motivated. We work under cost, quality and time matrix. We have modern infrastructure to manufacture quality valves in CNC Machines as well as Semi Automatic Machineries. Our quality process is setup form the casting stage to finished goods to deliver the projects on time and every time. Our ability is to rapidly expand infrastructure to meet customer's needs and dedicated engineering company backed by CAD / CAM Software.

The company is committed to product innovation, engineering excellence, precision manufacturing, 100% quality testing and Hands-on technical assistance to the customers. We mark our products under the Brand Name of "SAP".

We are an AMERICAN PETROLIUM INSTITUTE (API 6D), ISO 9001-2008 (BUREAU VERITAS).

We have a sound customer base through Dealer Network throughout the country and Direct Interaction with Government Departments & Public Sector Undertakings; we exports to GULF Countries. We have been progressing in all the spheres of our business activity and aim to move at much faster pace in future to achieve our GOALS.

Further we would like to introduce our manufacturing range with its application sectors.

TYPES OF VALVES:

- BALL Valves (Fire Safe/Non Fire Safe)
- GATE Valves
- GLOBE Valves
- CHECK Valves
- BUTTERFLY Valves

Quality policy

1

We are committed to provide total customer satisfaction through our quality products, continuous updating our technical competence and services.

Our Vision

2

"Our vision is to become one of the biggest manufacturer and exporter of industrial valves for the precision, reliable, and fulfilling requirements of Fertilizer, Oil exploration, Oil and Gas, Refineries, Thermal & Chemical process plants, Petrochemicals, water supply, and by adopting good manufacturing practice and achieving excellence through continuous improvement for quality product with our clients, employees and suppliers.

Our Mission

3

Company's vision is aptly complimented by management with a mission to create value for our customers by: Meeting or exceeding expectation by partnering with the customer

- Acting professionally, responsibly and with integrity in everything we do.
- Ensuring quality health, safely and the environment in all our activities.
- Committed to promote the sustainable growth

Sap Valves Advantages

- ✓ **Proven track record of performance and reliability**
  Experience over four decades of manufacturing valves. Investment in modern manufacturing technology.

- ✓ **Integrated manufacturer-supplier**
  Complete control over all critical processes including raw materials preferred by reputed Oil majors and EPC contractors.

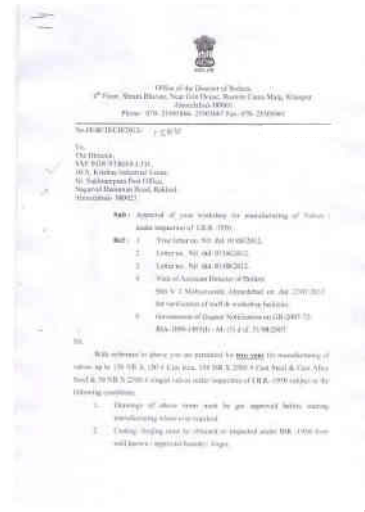
- ✓ **Design and Engineering capability**
  Highly skilled engineers for designing products with optimal performance. Ability to design products with special requirements. Customized product development – working closely with the user groups.

- ✓ **Quality Assurance Program**
  Certified by international inspection agencies and also end users. Valve performance exceeds many international standards.

- ✓ **Variety of products and Wide range**
  Carbon steel to stainless steel with sizes up to 64". Gate, Globe and Check valves both in bolted and pressure seal construction including Cryogenic services.
- ✓ **Wide distribution network**
  Alliance with the reputed distributors in the world. Availability of valves from various locations including back up inventory at factories.

SAP Valves has the distinction of having obtained a number of national and international approvals.
Notable among these are:

- ISO 9001:2008 certified Quality Management System
- API-6D By API Certification (American Petroleum Institute)
- Indian Boiler Regulation (IBR)



Note : Specific company approvals from national and international oil majors and EPC contractors.

Table of available range

SAP Valves manufactures comprehensive range of Gate, Globe, Check Valves (GGC), Ball valve, Butter fly valve and strainer in ASME Class from 150 to 2500.

The valves are offered in combination of size, pressure class, material, end connection etc, to suit in different application.

PRODUCT RANGE

Valve Type	ASME Class	½	¾	1	1 ½	2	2 ½	3	4	5	6	8	10	12	14	16	18	20	24
		15	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	550
Gate Valve	150			●	●	●	●	●	●	●	●	●	●	●	●	●	●		
	300			●	●	●	●	●	●	●	●	●	●	●					
	600				●	●	●	●	●	●	●	●							
Globe Valve	150			●	●	●	●	●	●	●	●	●	●	●	●				
	300			●	●	●	●	●	●	●	●	●	●						
	600				●	●	●	●	●	●	●	●							
Check Valve	150			●	●	●	●	●	●	●	●	●	●	●	●	●			
	300			●	●	●	●	●	●	●	●	●	●	●					
	600				●	●	●	●	●	●	●	●							
Floating Ball Valve	150	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●			
	300	●	●	●	●	●	●	●	●	●	●	●	●	●					
Trunion Valve	150										●	●	●	●	●	●	●		
	300								●	●	●	●	●	●					
	600					●	●	●	●	●	●	●	●						
	900					●	●	●	●	●	●	●	●						
	1500					●	●	●	●	●	●								
	2500					●	●	●	●										

MATERIAL TEMPERATURE CHART

Material Clarification	ASTM Specification	Working Temperature*
Carbon Steel	ASTM A216 Gr. WCB	- 29°C to 427°C (-20°F to 800°F)
1 ¼ Cr –½ Mo	ASTM A217 Gr. WC6	- 29°C to 593°C (- 20°F to 1100°F)
21/4 Cr –1 Mo	ASTM A217 Gr. WC9	- 29°C to 593°C (- 20°F to 1100°F)
5 Cr - ½ Mo	ASTM A217 Gr. C5	- 29°C to 649°C (- 20°F to 1200°F)
9 Cr - 1 Mo	ASTM A217 Gr. C12	- 29°C to 649°C (- 20°F to 1200°F)
9 Cr - 1 Mo – ¼ V	ASTM A217 Gr. C12A	- 29°C to 649°C (- 20°F to 1200°F)
Low - temperature Steel	ASTM A352 Gr. LCB/LCC	- 46°C to 343°C (- 50°F to 650°F)
Austenitic Stainless Steel 18 - 8 (Type 304)	ASTM A 351 Gr.CF8	- 196°C to 649°C (- 320°F to 1200°F)
Austenitic Stainless Steel 16Cr – 12 Ni – 2 Mo (Type 316)	ASTM A 351 Gr.CF8M	- 196°C to 649°C (- 320°F to 1200°F)

Other materials such as ASTM A351 Gr. CF3, ASTM A351 Gr. CF3M and Duplex SS are also offered.

Common Test / Inspection methods

SAP valves undergo a range of destructive and nondestructive tests according to the requirements of the standard, relevant code, service conditions and specific customer requirements.

Test / Inspection	Method	Acceptance Criteria
Visual Inspection	MSS SP55	MSS SP55
Chemical Analysis	ASTM E350	Relevant ASTM
Mechanical Properties	ASTM A370	Relevant ASTM
Radiographic Inspection	ASME B16.34	ASME B16.34
Magnetic Particle Inspection	ASTM E709	ASME B16.34
Liquid Penetrate Inspection	ASTM E165	ASME B16.34
Ultrasonic Inspection	ASTM A388	ASME B16.34
Positive Material Identification (PMI)	Spectrometer	Customer Specification
Pressure Testing	API 598 / BS 17292	API 598 / BS 17292
Helium Leak Test	ASTM E 499	ASTM E 499 / ASME Sec. II
Impact Test	ASTM A370	Relevant ASTM
Seismic qualification Test	ASME - QME	ASCE-7-02
Cryogenic Test	BS 6364	BS 6364 / ASME B16.34
Fire safe Test	API 6FA / API 607 / ISO 10497	API 6FA / API 607 / ISO 10497
Dimensional Inspection	Valve Standard	Valve Standard
Cycle Test	Customer Specification	Customer Specification
Vacuum Test	Customer Specification	Customer Specification
Fugitive Emission Test	Customer Specification	Customer Specification

Test Pressure Chart

Test Pressures for standard Carbon Steel Valves. Every individual valve manufactured, is inspected and pressure – tested to API 598 / BS EN 12266-1 / ISO 17292 requirements, for which test certificates are provided.

ASME Class	Hydrostatic Test Pressure in kg/cm² (Psig)			Pneumatic low pressure closure test pressure in kg/cm² (psig)
	Shell	Back Seat	Closure	
150	32 (450)	23 (315)	23 (315)	7 (100)
300	79 (1125)	58 (815)	58 (815)	7 (100)
600	156 (2225)	115 (1630)	115 (1630)	7 (100)
900	238 (3350)	174(2445)	174(2445)	7 (100)
1500	392 (5575)	289 (4080)	289(4080)	7 (100)
2500	653 (9275)	478 (6790)	478(6790)	7 (100)

Compliance Standards

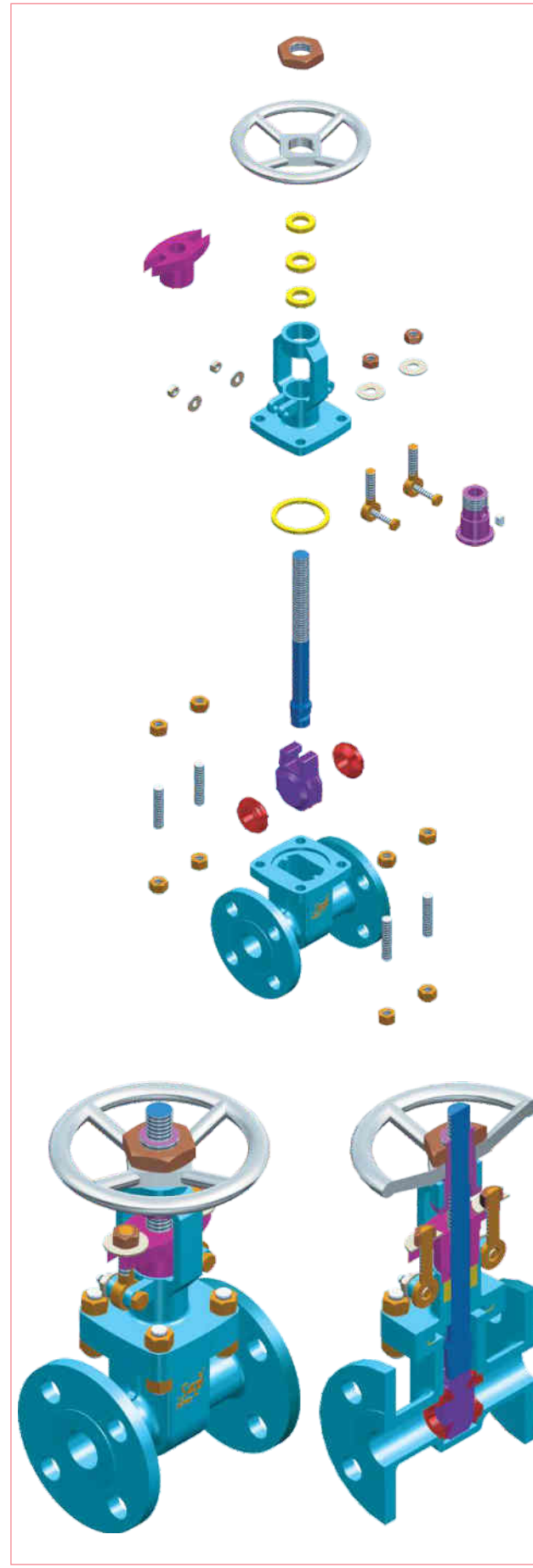
SAP Valves are designed in accordance with key international standards. They also meet the requirements of major Oil - Gas industry and power industry standard with customer specification.

Parameter	Description	Standard
Design	Gate Valve	API 600
	Globe Valve	BS1873
	Check Valve	BS 1868
	Ball Valve	API 6D/ ASME B 16.34 / BS 5351
	Butterfly Valve	BS 5155 / API 609
	Cryogenic Valve	ASME B 16.34 / BS 6364
P-T Rating	--	ASME B 16.34
Ends	Face to Face / End to End Dimension	ASME B16.10
	Flange End Dimensions	ASME B16.5 / ASM B 16.47
	Butt - weld End Dimensions	ASME B16.25
	Forge fittings, socket welding and threading Dimensions	ASME B 16.11
Testing	Valve Inspection & Testing	API 598/ BS EN 12266-1 / ISO 17292 / API 6D
	Fire safe testing	API 607 / API 6FA / BS 6755-II
Mounting position	Gear and actuator mounting	ISO 5211

GATE, GLOBE & CHECK VALVES

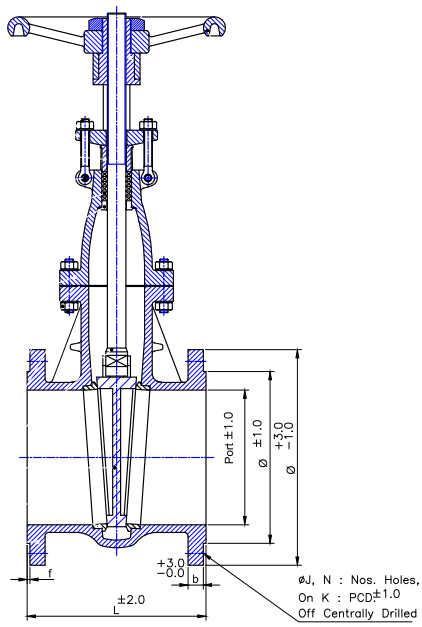
Gate Valve : Special Features

- SAP Gate Valves are heavy duty, outside screw & yoke type, bolted bonnet, rising stem with non rising hand wheel.
- Straight through bore design assures streamlined, minimum turbulence, less erosion, lower pressure drop, & resistance to flow.
- Anti- friction bearings are provided in higher sizes and classes.
- Bi-directional shut-off.
- Deep stuffing box.
- The Seat rings are cylindrical bottom seated type having ample cross section for strength will provided with welded in and threaded Seat-rings will be supplied on request. Integral seat ring provides in SS valves.
- Gate Valves are available in 150#, 300# & 600#.
- Universal trim: 13Cr stem, wedge in CA 15 or 13Cr faced is also available.
- Flexible wedge with low center stem wedge contact, in solid CA15 (13 % Cr) or hard faced with 13% Cr, SS 316, & Monel. Wedge is ground and lapped to a mirror finish and tightly guided to prevent dragging and seat damage, Non-rotating stem with precision Acme threads and burnished finish.
- The two inclined seats allow for tight shut off even against high pressures. Renewable Seat Rings Welded or Threaded.
- Gate Valves are of flexible wedge, outside screw and-yoke and bolted-bonnet construction. The valves confirm to API 600.

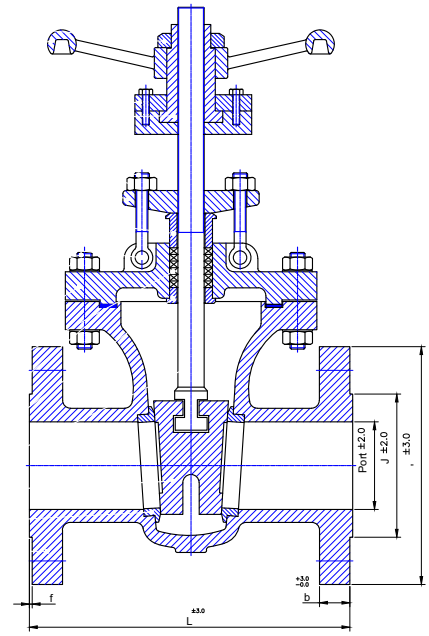


Options in Gate Valves

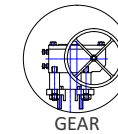
- Locking arrangement.
- Valve Bypass arrangements is optionally available.
- Different types of operating selections are available in Gear, Electrical, Hydraulic or Pneumatic actuator, and Lever or gear with chain operated.
- Solid, flexible, split wedge, double disc and parallel Slide Gate configurations.
- For low temperature and cryogenic services (cold box and non-cold box applications) extended bonnet as per BS 6364.
- Gate valves are adequate for all service media along with NACE applications.
- Other flange drilling are also available on request.



150 #



300 #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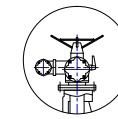
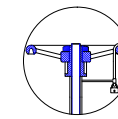
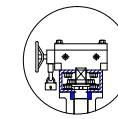

ACTUATOR OPERATE


LOCKING ARRANGMEN


MOTORISED OPERATE

	Materials
Part Name	Material Option
Body	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3/ A 351 CF3M / A 352 LCB
Bonnet	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Wedge	ASTM A 216 WCB + 13% Cr / ASTM A 276 410 / A 217 WC6 / A 217 WC9 / A217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Stem	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316L
Seat Ring	ASTM A 216 WCB + 13% Cr /ASTM A 276 410/ A 217 WC6 / A 217 WC9 / A217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Back Seat Bushing	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316L
Gland	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316L
Gland Flange	Carbon Steel / Stainless Steel
Stem Nut	ASTM A 439 Gr. D2 / Al. Bronze
Lock Nut	Carbon Steel / SS 304
Gland Packing	Graphite Asbestos / Graphoil / PTFE
Bonnet Gasket	Corrugated Soft Iron / Corrugated SS / Spiral Wound SS 304 with Asbestos or Graph oil / Octagonal Ring
Gland Eye Bolt & Nut	Carbon Steel / Stainless Steel
Cross Bolts & Nuts	Carbon Steel / Stainless Steel
Hand Wheel	Carbon Steel / Malleable Iron
Hand Wheel Nut	Carbon Steel
Grease Nipple	Carbon Steel
Grub Screw	Carbon Steel
Studs / Bolts	ASTM A 193 B7 / A 193 B7M / A 193 BBM / A 320 L7
Nut	ASTM A 194 2H / A 194 8 / A 194 8M / A 194 4 / 7

Dimension

GATE VALVE (150 #)

SIZE	1"	1½"	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"
	25	40	50	65	80	100	125	150	200	250	300	350	400
Port	25	38	51	64	76	102	127	152	203	254	305	337	387
Face To Face - R.F	127	165	178	190	203	229	254	267	292	330	356	381	406
Flange O.D. (ØD)	110.0	125.0	150.0	180.0	190.0	230.0	255.0	280.0	345.0	405.0	485.0	535.0	595.0
Flange Thick. (T)	12.7	15.9	17.5	20.7	22.3	22.3	22.3	23.9	27.0	28.6	30.2	33.4	35.0
P.C.D. (K)	79.4	98.4	120.7	139.7	152.4	190.5	215.9	241.3	298.5	362.0	431.8	476.3	539.8
No. of Holes	4	4	4	4	4	8	8	8	8	12	12	12	16
Hole Dia.	15.9	15.9	19.1	19.1	19.1	19.1	22.2	22.2	22.2	25.0	25.0	28.6	28.6

GATE VALVE (300 #)

SIZE	1"	1½"	2"	2½"	3"	4"	5"	6"	8"	10"	12"
	25	40	50	65	80	100	125	150	200	250	300
Port	24	37	49	64	75	98	127	148	198	248	298
Face To Face - R.F	165	190	216	241	282	305	381	403	419	457	502
Flange O.D. (ØD)	125.0	155.0	165.0	190.0	210.0	255.0	280.0	320.0	380.0	445.0	520.0
Flange Thick. (T)	15.9	19.1	20.7	23.9	27.0	30.2	33.4	35.0	39.7	46.1	49.3
P.C.D. (K)	88.9	114.3	127.0	149.2	168.3	200.0	235.0	269.9	330.2	387.4	450.8
No. of Holes	4	4	8	8	8	8	8	12	12	16	16
Hole Dia.	19.1	22.2	19.1	22.2	22.2	22.2	22.2	22.2	25.0	28.6	31.8

GATE VALVE (600 #)

SIZE	1½"	2"	2½"	3"	4"	5"	6"	8"
	40	50	65	80	100	125	150	200
Port	37	49	64	75	98	127	148	198
Face To Face - R.F	241	292	330	356	432	508	559	660
Flange O.D. (ØD)	155.0	165.0	190.0	210.0	275.0	330.0	355.0	420.0
Flange Thick. (T)	22.3	25.4	28.6	31.8	38.1	44.5	47.7	55.6
P.C.D. (K)	114.3	127.0	149.2	168.3	215.9	266.7	292.1	349.2
No. of Holes	4	8	8	8	8	8	12	12
Hole Dia.	22.2	19.1	22.2	22.2	25.0	28.6	28.6	31.8

- ✶ Dimensions and other engineering data aresubjected to change without notice.
- ✶ Other flange drilling also available on request.

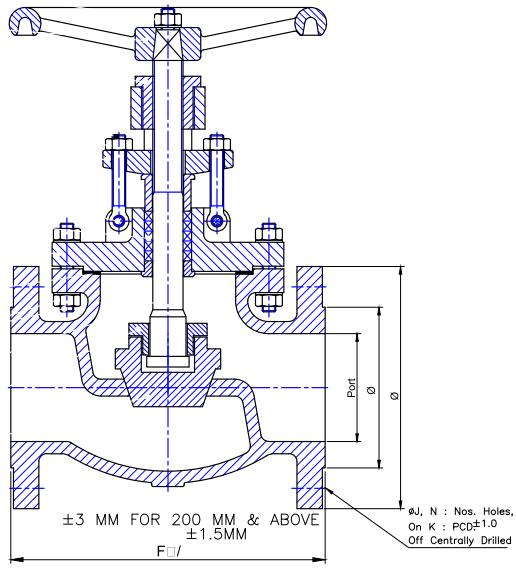
Globe Valve : Special Features

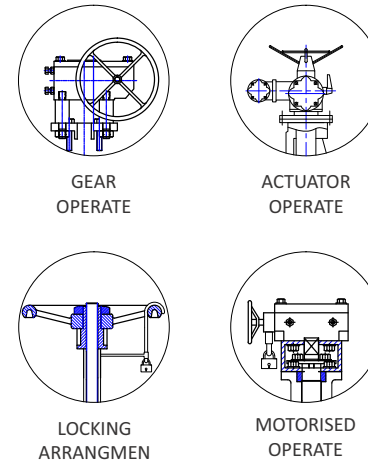
- Rational structure, reliable sealing & sturdy
- construction to ensure excellent performance.
- Anti- friction bearings are provided in higher sizes and classes.
- Universal trim: 13Cr stem, wedge in CA 15 or 13% Cr faced is also available.
- Sap globe Valves are heavy duty, outside screw & yoke type, bolted bonnet, rising stem with rising hand wheel.
- Straight through bore design assures streamlined, minimum turbulence, less erosion, lower pressure drop, & resistance to flow.
- Deep stuffing box.
- The Seat rings are cylindrical bottom seated type having ample cross section for strength are provided with welded in and threaded Seat-rings will be supplied on request. Integral seat ring provides in SS valves.
- Globe Valves are available in 150#, 300# & 600#.
- Back Seat arrangement to provide isolation of Stuffing Box for On-Line serviceability.
- Excellent sealing against increased line pressure.

Options in Globe Valves

- Locking arrangement.
- Valve Bypass arrangements is optionally available.
- Different types of operating selections are available in Gear, Electrical, Hydraulic or Pneumatic actuator, and Lever or gear with chain operated.
- For low temperature and cryogenic services (cold box and non-cold box applications) extended bonnet as per BS 6364.
- Angle and Y type design.
- Spiral wound Gasket for critical service and hazardous media.
- Regulating, guided and soft seated plug available. Quick Lead Times.

Globe valves are adequate for all service media. Valves are marked with flow direction since they are recommended to install with flow and pressure under the disc. It can also be installed in reverse condition depending upon the conditions. The globe valve is generally faster to operate due to less travel.





	Materials
Part Name	Material Option
Body	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Bonnet	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A217 C5 / A 217 C12 / A 351 Cf8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Disc	ASTM A 216 WCB+ 13% Cr / ASTM A 276 410 / A 217 WC6 / A 217 WC9 / A217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Disc Nut	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316L
Stem	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316L
Seat Ring	ASTM A 216 WCB+ 13% Cr / ASTM A 276 410 / A 217 WC6 / A 217 WC9 / A217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Back Seat Bushing	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316L
Gland	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316L
Gland Flange	Carbon Steel / Stainless Steel
Stem Nut	ASTM A 439 Gr. D2 / Al. Bronze
Gland Packing	Graphite Asbestos / Graphoil / PTFE
Bonnet Gasket	Corrugated Soft Iron / Corrugated SS / Spiral Wound SS 304 with Asbestos or Graphoil / Octagonal Ring
Gland Eye Bolt & Nut	Carbon Steel / Stainless Steel
Cross Bolts & Nuts	Carbon Steel / Stainless Steel
Hand Wheel	Carbon Steel / Malleable Iron
Hand Wheel Nut	Carbon Steel
Grub Screw	Carbon Steel
Studs / Bolts	ASTM A 193 B7 / A 193 B7M / A 193 BBM / A 320 L7
Nut	ASTM A 194 2H / A 194 8 / A 194 8M / A 194 4 / 7

Dimension

GLOBE VALVE (150 #)

SIZE	1"	1½"	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"
	25	40	50	65	80	100	125	150	200	250	300	350
Port	25	38	51	64	76	102	127	152	203	254	305	337
Face To Face - R.F	127	165	203	216	241	292	356	406	495	622	698	787
Flange O.D. (ØD)	110.0	125.0	150.0	180.0	190.0	230.0	255.0	280.0	345.0	405.0	485.0	535.0
Flange Thick. (T)	12.7	15.9	17.5	20.7	22.3	22.3	22.3	23.9	27.0	28.6	30.2	33.4
P.C.D. (K)	79.4	98.4	120.7	139.7	152.4	190.5	215.9	241.3	298.5	362.0	431.8	476.3
No. of Holes	4	4	4	4	4	8	8	8	8	12	12	12
Hole Dia.	15.9	15.9	19.1	19.1	19.1	19.1	22.2	22.2	22.2	25.0	25.0	28.6

GLOBE VALVE (300 #)

SIZE	1"	1½"	2"	2½"	3"	4"	5"	6"	8"	10"
	25	40	50	65	80	100	125	150	200	250
Port	25	38	51	64	76	102	127	152	203	254
Face To Face - R.F	203	229	267	292	318	359	400	444	559	622
Flange O.D. (ØD)	125.0	155.0	165.0	190.0	210.0	255.0	280.0	320.0	380.0	445.0
Flange Thick. (T)	15.9	19.1	20.7	23.9	27.0	30.2	33.4	35.0	39.7	46.1
P.C.D. (K)	88.9	114.3	127.0	149.2	168.3	200.0	235.0	269.9	330.0	387.4
No. of Holes	4	4	8	8	8	8	8	12	12	16
Hole Dia.	19.1	22.2	19.1	22.2	22.2	22.2	22.2	22.2	25.0	28.6

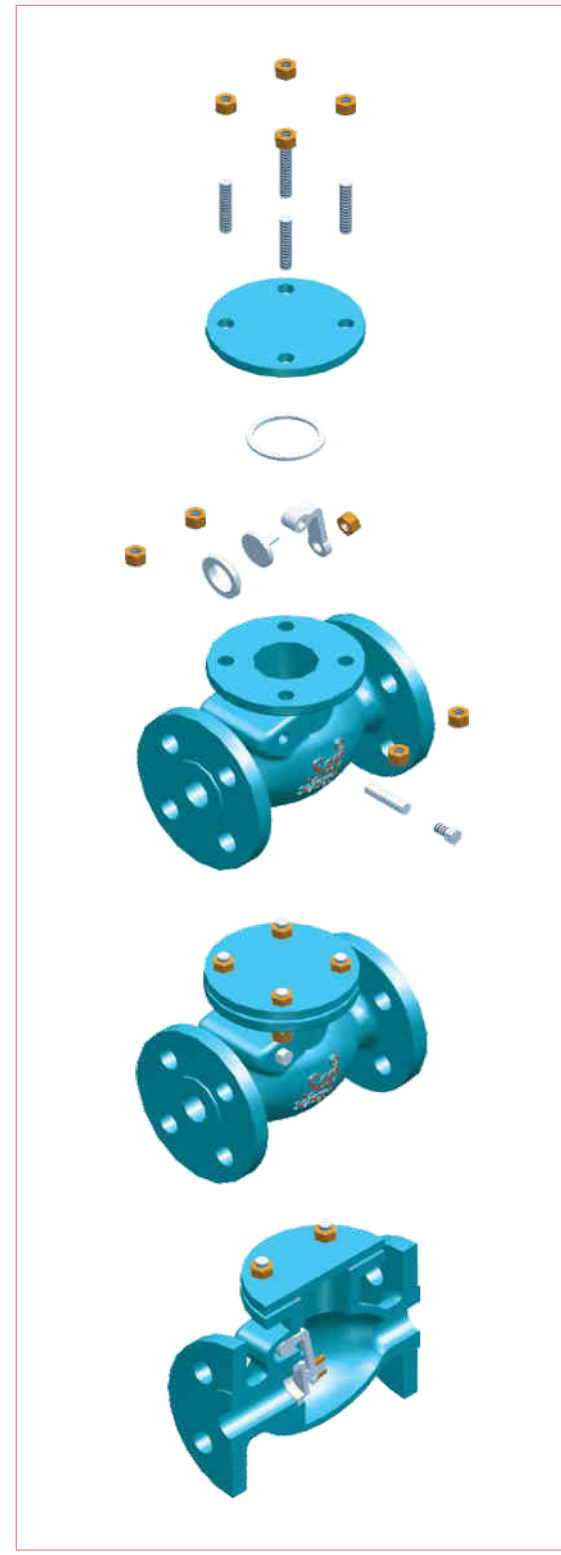
GLOBE VALVE (600 #)

SIZE	1½"	2"	2½"	3"	4"	5"	6"	8"
	40	50	65	80	100	125	150	200
Port	38	51	64	76	102	127	152	200
Face To Face - R.F	241	292	330	356	432	508	559	660
Flange O.D. (ØD)	155.0	165.0	190.0	210.0	275.0	330.0	355.0	420.0
Flange Thick. (T)	22.3	25.4	28.6	31.8	38.1	44.5	47.7	55.6
P.C.D. (K)	114.3	127.0	149.2	168.3	215.9	266.7	292.1	349.2
No. of Holes	4	8	8	8	8	8	12	12
Hole Dia.	22.2	19.1	22.2	22.2	25.0	28.6	28.6	31.8

- Dimensions and other engineering data are subjected to change without notice.
- Other flange drilling also available on request.

Swing Check Valve : Special Features

- The Body to Bonnet joint is a male & female as per ASME 1501.3001 & 6001 and ring joint is used In higher classes valves.
- Valves meet the requirements of fugitive emission levels Shell category-B as per MESCSPE 77 / 312
- Low Friction Losses
- Drip Tight Seating
- Low Maintenance
- No Hinge Pin or spring to Wear
- Easy in-line serviceability



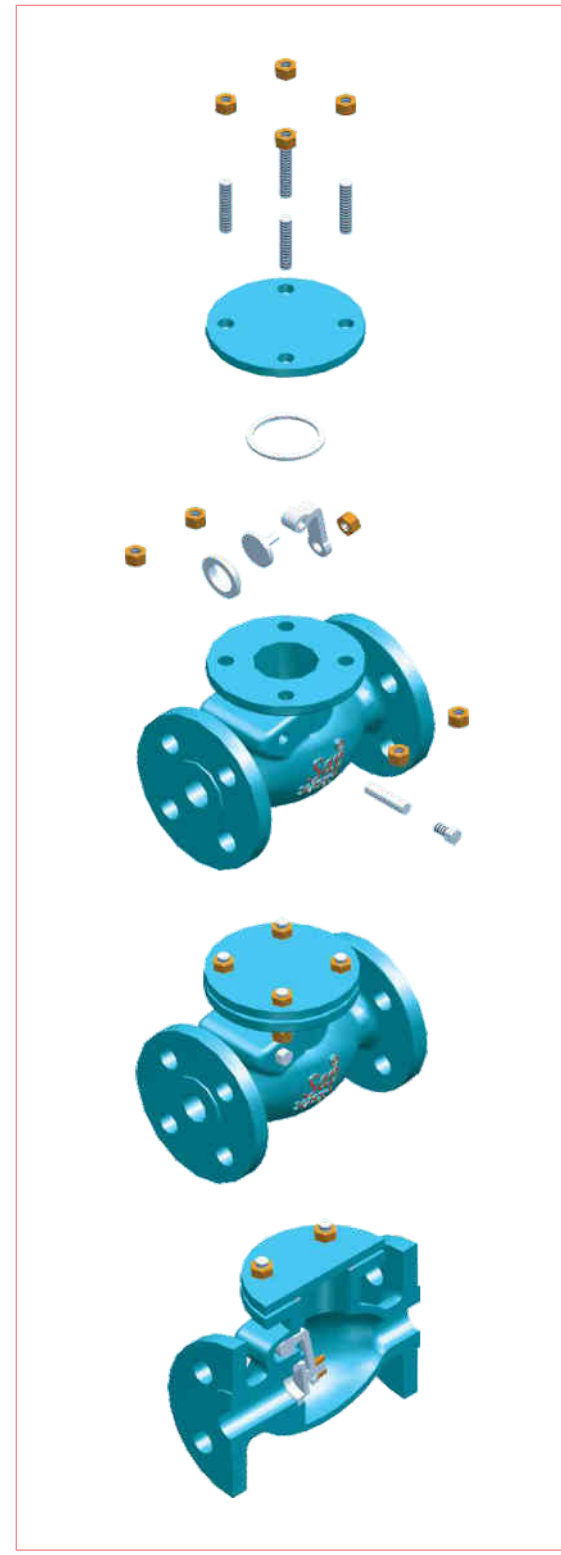
Options in Swing Check Valves

- Check Valves can be supplied with counter weight or dash pot arrangement
- Available in tilting disc design

Part Name	Material Option
Body	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Cover	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Disc@	ASTM A 216 WCB+13% Cr./ A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Hine	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Hine Bracket	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Hine Pin	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316 / A 276 316L
Seat Rings@	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Disc nut	Carbon Steel / Stainless Steel
Washer	Carbon Steel / Stainless Steel
Gasket	Soft Iron / SS 304 / Graphoil
Studs / Bolts	ASTM A 193 B7 / A 193 B7M / A 193 B8 / A 193 B8M / A 320 L7
Nut	ASTM A 194 2H / A 194 B7M / A 194 B / A 194 8M / A 194 4 / 7

Swing Check Valve : Special Features

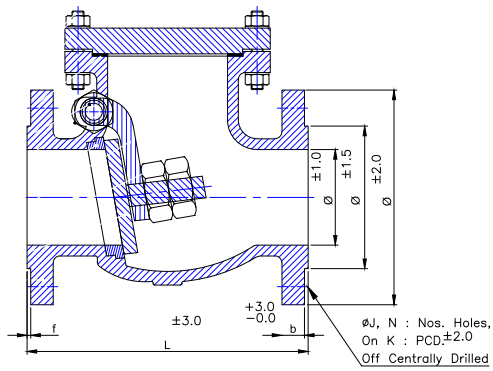
- The Body to Bonnet joint is a male & female as per ASME 1501.3001 & 6001 and ring joint is used In higher classes valves.
- Valves meet the requirements of fugitive emission levels Shell category-B as per MESCSPE 77 / 312
- Low Friction Losses
- Drip Tight Seating
- Low Maintenance
- No Hinge Pin or spring to Wear
- Easy in-line serviceability

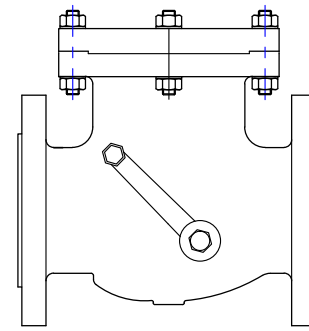


Options in Swing Check Valves

- Check Valves can be supplied with counter weight or dash pot arrangement
- Available in tilting disc design

Part Name	Material Option
Body	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Cover	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Disc@	ASTM A 216 WCB+13% Cr./ A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Hine	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Hine Bracket	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Hine Pin	ASTM A 276 410 / A 276 304 / A 276 304L / A 276 316 / A 276 316L
Seat Rings@	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Disc nut	Carbon Steel / Stainless Steel
Washer	Carbon Steel / Stainless Steel
Gasket	Soft Iron / SS 304 / Graphoil
Studs / Bolts	ASTM A 193 B7 / A 193 B7M / A 193 B8 / A 193 B8M / A 320 L7
Nut	ASTM A 194 2H / A 194 B7M / A 194 B / A 194 8M / A 194 4 / 7





Dimension

SWING CHECK VALVE (150 #)

SIZE	1"	1.1/2"	2"	2.1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"
	25	40	50	65	80	100	125	150	200	250	300	350	400
PORT	25	38	51	64	76	102	127	152	203	254	305	337	387
FACE TO FACE	127	165	203	216	241	292	356	406	495	622	698	787	914
FLANGE OD	110	125	150	180	190	230	255	280	345	405	485	535	595
FLANGE THIK	12.7	15.9	17.5	20.7	22.3	22.3	22.3	23.9	27	28.6	30.2	33.4	35
P.C.D.(K)	79.4	98.4	12.7	139.7	152.4	190.5	215.9	241.3	298.5	362	431.8	476.3	539.8
NO. OF HOLES	4	4	4	4	4	8	8	8	8	12	12	12	16
HOLE DIA.	15.9	15.9	19.1	19.1	19.1	19.1	22.2	22.2	22.2	25	25	28.6	28.6

SWING CHECK VALVE (300 #)

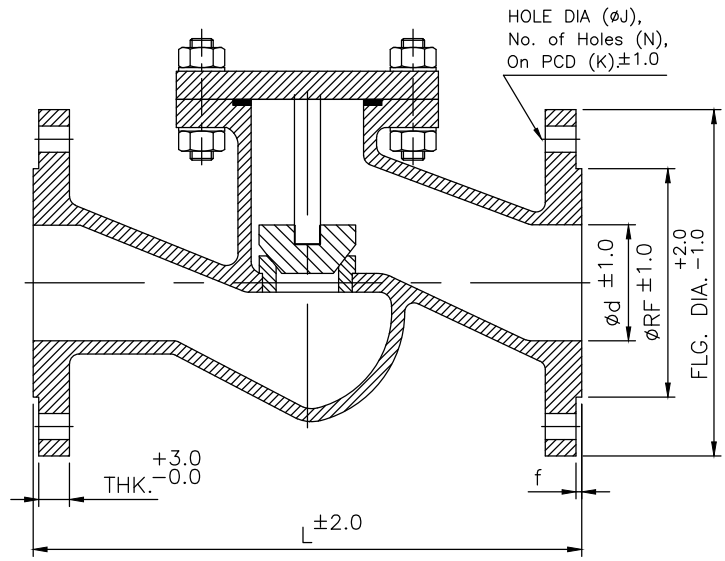
SIZE	1"	1.1/2"	2"	2.1/2"	3"	4"	5"	6"	8"	10"	12"
	25	40	50	65	80	100	125	150	200	250	300
PORT	25	38	51	64	76	102	127	152	203	254	305
FACE TO FACE	203	229	267	292	318	356	400	444	559	622	711
FLANGE OD	125	155	165	190	210	255	280	320	380	445	520
FLANGE THIK	15.9	19.1	20.7	23.9	27	30.2	33.4	35	39.7	46.1	49.3
P.C.D.(K)	88.9	114.3	127	149.2	168.3	200	235	269.9	330.2	387.4	450.8
NO. OF HOLES	4	4	8	8	8	8	8	12	12	16	16
HOLE DIA.	19.1	22.2	19.1	22.2	22.2	22.2	22.2	22.2	25	28.6	31.8

SWING CHECK VALVE (600 #)

SIZE	1.1/2"	2"	2.1/2"	3"	4"	5"	6"	8"
	40	50	65	80	100	125	150	200
PORT	38	51	64	76	102	127	152	200
FACE TO FACE	241	292	330	356	432	508	559	660
FLANGE OD	155	165	190	210	275	330	355	420
FLANGE THIK	22.3	25.4	28.6	31.8	38.1	44.5	47.7	55.6
P.C.D.(K)	114.3	127	149.2	168.3	215.9	266.7	292.1	349.2
NO. OF HOLES	4	8	8	8	8	8	12	12
HOLE DIA.	22.2	19.1	22.2	22.2	25	28.6	28.6	31.8

- ✶ Dimension and other engineering data are subjected to change without notice.
- ✶ Other flange drilling also available on request.

LIFT UP CHECK VALVE



Dimension

SIZE	Ød	L	ØD	THK	F	ØRF	ØJ	N	K
25	25	160	115	18	2	68	14	04	85
32	32	180	140	18	2	78	18	04	100
40	38	200	150	18	3	88	18	04	110
50	51	230	165	20	3	102	18	04	125
65	64	290	185	22	3	122	18	08	145
80	76	310	200	24	3	138	18	08	160
100	102	350	235	24	3	162	22	08	190
125	127	400	270	26	3	188	26	08	220
150	152	480	300	28	3	218	26	08	250
200	203	600	375	34	3	285	30	12	320
250	254	730	450	38	3	345	33	12	385
300	305	850	515	42	4	410	33	16	450
350	336	980	580	46	4	465	36	16	510
400	387	1100	660	50	4	535	39	16	585

- ✶ Dimension and other engineering data are subjected to change without notice.
- ✶ Other flange drilling also available on request.

FORGED STEEL GATE, GLOBE & CHECK VALVE

FORGED STEEL GATE VALVE / GLOBE VALVE / CHECK VALVE

FEATURES

SAP Forged Steel Valves have been designed to meet the requirements of API 602/BS 5352/ASME B 16.34

- Socket weld ends dimensions confirm to ASME B 16.11
- Screwed ends dimensions confirm to ASME B 1.20.1
- Outside screw and yoke construction
- The gland is of two piece self aligning type
- Back seat arrangement for Gate and Globe Valves.
- Valves meet the requirements of fugitive emission levels Shell category B as per MESC SPE 77 / 312

OPTIONS

- For low temperature and cryogenic service (cold box and non cold box) extended bonnet as per BS 6364 available
- Welded bonnet construction
- Locking arrangement
- Welded on flanges

Part Name	Material Option
Body	ASTM A 105 / 182 F304 / 182 F316 / 182 304L / 182 316L / 182 F11 / 182 F22 / 350 LF2
Bonnet	ASTM A 105 / 182 F304 / 182 F316 / 182 304L / 182 316L / 182 F11 / 182 F22 / 350 LF2
Wedge / Plug@	ASTM A 182 F6a / 182 F304 / 182 F304L / 182 F316 / 182 F316L / 182 F11 / 182 F22 350 LF2
Stem	ASTM A 276 T410 / 182 F304 / 182 F304L / 182 F316 / 182 F316L / 182 F11 / 182 F22 350 LF2
Stem Rings@	ASTM A 182 F6a / 182 F304 / 182 F304L / 182 F316 / 182 F316L / 182 F11 / 182 F22 350 LF2
Back Seat	Bushing Integral
Gland	ASTM A 276 T410 / 182 F304 / 182 F304L / 182 F316 / 182 F316L / 182 F11 / 182 F22 350 LF2
Gland Flange	ASTM A 105 / 182 F304 / 182 F316 / 182 304L / 182 316L / 182 F11 / 182 F22 / 350 LF2
Stem Nut	ASTM A 439 Gr. D2 / AL. Bronze
Lock Nut	Carbon Steel / SS 304
Gland Packing	Graphite Asbestos / Graf-oil / PTFE
Bonnet Gasket	Spiral Wound SS 304 / 304l /316 / 316l with Asbestos / Teflon Or Graf-oil
Gland Eye Bolt & Nut	Aa410 / AA304
Hand Wheel	Carbon Steel
Hand Wheel Nut	Carbon Steel
Studs / Bolts	ASTM A 193 B7 / A 193 B7M / A 193 B8 / A 193 B8M / A 320 L7
Nut	ASTM A 194 2H / A 194 2HM / A 194 8 / A 194 8M / A 194 4 / 7

Disc Seats and Body Seats

Following are the Trims as per API 600, Table 3 available as our standard. Other material combination available on request.

Trim No.	Nominal Trim	Trim Material	Stem Material	Temperature
1.	F6 / F6	a) ASTM A 182 F6/13% Cr Steel	13% Cr (410)	1100®F
		b) 13% Cr Deposit		
2.	304 / 304	a) ASTM A 182(F304) or A 351(CF8)	304 SS	1200®F
		b) 304 Deposit		
3.	HF / HF	Co-Cr- W Alloy (Stellite 6) Deposit	13%Cr(410)	1200®F
4.	F6 / HF	Trim No. 1 + No. 5	13%Cr(410)	1100®F
5.	Monel / Monel	a) Money Deposit	Monel	450®F
		b) B 164		
6.	316 / 316	a) ASTM A 182(F316) or 351 (CF8m)	316 SS	850®F
		b) 316 Deposit		
7.	Monel / HF	Trim No. 5 + No. 9	Monel	450®F
8.	316 / HF	Trim No.5 + No. 10	316 SS	850®F

*Available Optionally

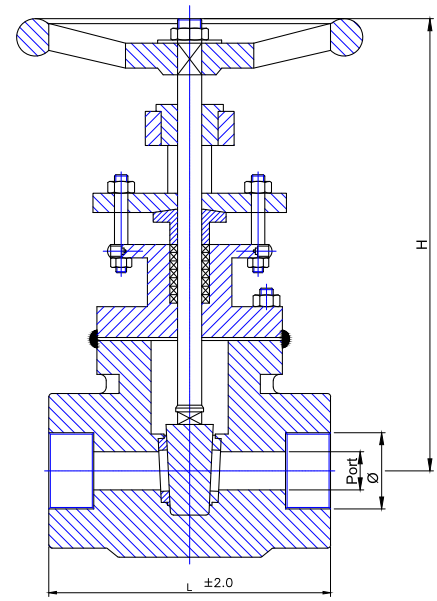
Trim Parts are Defined as follows

Gate Valve- Body & Wedge seating surface, stem, back seat surface
Globe Valve- Body & Disc seating surface, stem, back seat surface
Check Valve- Body & Disc seating surface, Hinge pin

Sour Gas Service Materials

For servicing sour gases or other hydrocarbon fluids, SAP cast steel valves may be furnished with materials specially heat treated and hardness controlled in compliance with NACE MR 0175. The shell are WCB with double tempered trim 2 and class II bolting. Other materials and trims are also available on request

GATE VALVE



Dimension

GATE VALVE (800 #)

SIZE	15	20	25	32	40	50
L	85	93	104	127	127	140
P	15	17.5	22	28	35	40
ØW	90	90	90	150	150	150

GATE VALVE (1500 #)

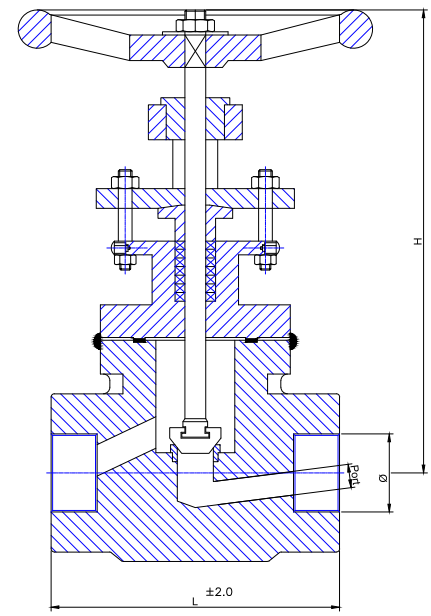
SIZE	15	20	25	40
L	93	104	127	140
P	15	17	22	35
ØW	90	90	150	150

GATE VALVE (2500 #)

SIZE	15	20	25
L	104	127	140
P	15	11	25
ØW	90	150	150

✶ Dimension and other engineering data are subjected to change without notice.

GLOBE VALVE



Dimension

GLOBE VALVE (800 #)

SIZE	15	20	25	32	40	50
L	85	93	104	127	127	140
P	10	12.5	17.5	22	26	30
ØW	90	90	90	150	150	150

GLOBE VALVE (1500 #)

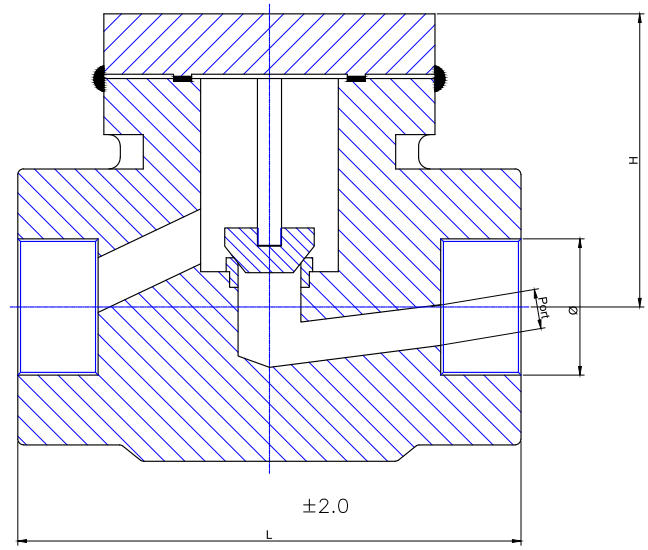
SIZE	15	20	25	40
L	93	104	127	140
P	10	12.5	17.5	26
ØW	90	90	150	150

GLOBE VALVE (2500 #)

SIZE	15	20	25
L	104	127	140
P	10	20	22
ØW	90	150	150

✶ Dimension and other engineering data are subjected to change without notice.

LIFT CHECK VALVE



Dimension

LIFT CHECK VALVE (800 #)

SIZE	15	20	25	32	40	50
L	85	93	104	127	127	140
P	10	12.5	17.5	22	26	30
ØW	-	-	-	-	-	-

LIFT CHECK VALVE (1500 #)

SIZE	15	20	25	40
L	93	104	127	140
P	10	12.5	17.5	26
ØW	-	-	-	-

LIFT CHECK VALVE (2500 #)

SIZE	15	20	25
L	104	127	140
P	10	20	22
ØW	-	-	-

✶ Dimension and other engineering data are subjected to change without notice.

BALL VALVES

Special Features of Floating Ball Valves

- Free floating ball design provides seat wear compensation and longer life.
- Provide fire safe design as per APO 607 / API 6FA / BS 6755-II with single point contact seat design.
- Blow out proof and Anti blow out stem construction.
- Micro-finished ball provides a positive seal.
- Straight through flow path for minimum pressure drop.
- Bi-directional flow.
- 90° (Quarter-turn) actuation.
- Wide selection of seat materials.
- Extended stem/extended bonnet design as per customer's specific pipe line usage.
- Antistatic devices ensure electrical continuity between Body, ball & stem.
- Triple stem seal with accurate stem.
- Handle indicates flow direction.
- Valves meet the requirements of fugitive emission levels shell category B as per MESC SPE 77/312.
- ISO 5211 top mounting pad for simplified gear / actuator in 150#, 300# & 600# as optional in only flanged end design.
- Variety of end connections.

Design Feature

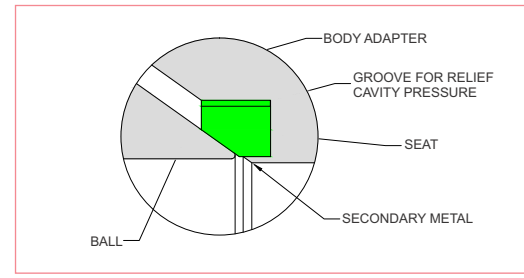
Fire Safe :

- Fire safe confirming to API 607 / API 6FA / BS-6755 part II assures highest standard of safety.
- Certified by customer's inspectors and independent certifying authorities.

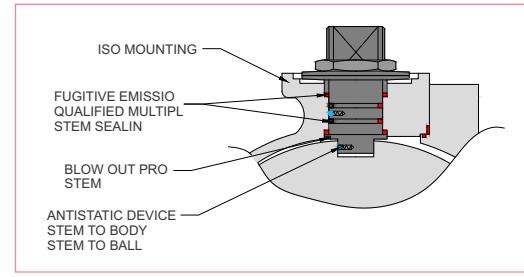
Antistatic Device :

- Antistatic devices are built in the valve stem to ensure electrical continuity between ball, stem and body. Thus providing greater safety while handling volatile media.
- Higher size ball valves are designed with stem bearing to absorb radial loading on the stem.
- Multiple stem sealing ensures high degree of sealing.

Fire Safe



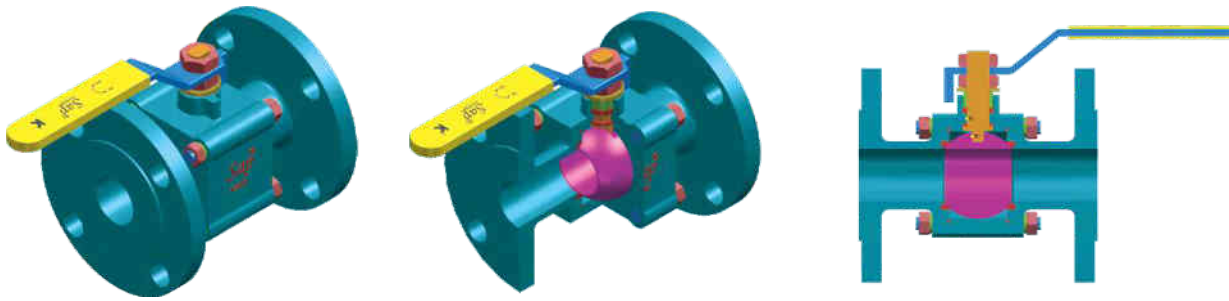
Antistatic Device



Technical Details of Seat Material

Material	Temperature Range	General Use	Not Recommended For	Properties
PTFE	-40°C TO 205°C	Most of the chemicals, acids, alkalis	High abrasive media, Fluorides, Chlorides, High mechanical loading	Self lubrication, Low friction, thermal stability.
CPTFE	-100°C TO 200°C	Same as PTFE, better mechanical loading compound to PTFE	High abrasive media, Fluorides, Chlorides, High mechanical loading	Self lubrication, Low friction, thermal stability.
NYLON	-50°C TO 120°C	Hydrocarbons, ether, week alkali acids, acetone	Strong acids, alkali, Sodium hydroxide, Ammonia	High strength, rigidity, self lubricating, good abrasion resistance
PEEK	-50°C TO 260°C	Good chemical resistance for most of the chemicals, including alcohols, acids, ammonia, organic, hydrocarbons	Nitric, sulfuric acids, aquilegia, bromine, chlorine, fluorine	Very good high temperature performance, wear resistance, low toxic emission.

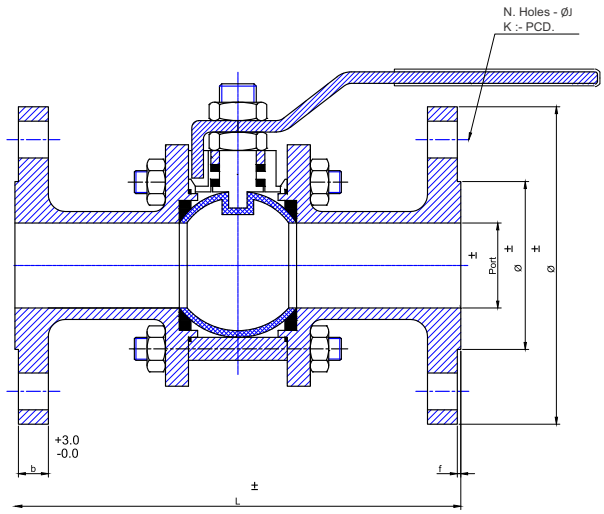
BALL VALVE FLANGED END



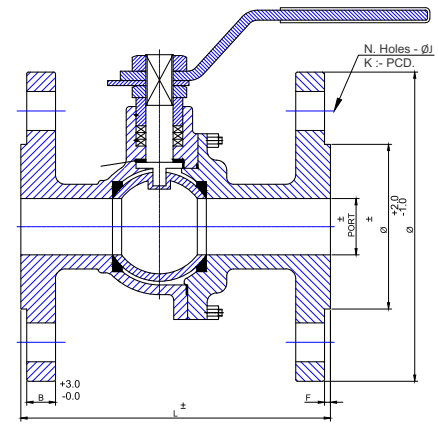
Part Name	Material Option
Body	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
SIDE PIECE	ASTM A 216 WCB / A 217 WC6 / A 217 WC9 / A 217 C5 / A 217 C12 / A 351 CF8 / A 351 CF8M / A 351 CF3 / A 351 CF3M / A 352 LCB
Ball	ASTM A 351 CF8 / A 351 CF8M / A 182 F304 / A 182 F316 / A 182 F 6a
Body Seal	PTFE / Graphoil / Spiral Wound SS 316 with Graphoil
Seats	PTFE / PTFE / GFT / CFT
Stem	ASTM A 182 F304 / A 182 F316 / A 182 F 6a
Gland Bush	ASTM A 182 F304 / A 182 F316 / A 182 F 6a
Gland Packing	Graphoil / PTFE
Stem Packing	Graphite filled PTFE / Graphoil
Gland Nut	Stainless Steel
Stem Nut	Stainless Steel
Lever	Carbon Steel with PVC / Stainless Steel
Disc Spring	Carbon Steel
Studs / Bolts	ASTM A 193 B7 / A 193 B7M / A 193 B8 / A 193 B8M / A 320 L7
Nut	ASTM A 194 2H / A 194 B7M / A 194 B / A 194 8M / A 194 4/7

- For low temperature and cryogenic services extended bonnet available as per BS 6364. Locking arrangement.
- Different types of operating selections are available in Gear, Electrical and Hydraulic or Pneumatic actuator.
- Soft seats are recommended for service temperature up to 260'C

BALL VALVE F/E 150# 300# WITH LEVER OPERATED



3PC



2PC

Dimension

BALL VALVE (150 #)

SIZE	1/2"	3/4"	1"	1.1/2"	2"	2.1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"
	15	20	25	40	50	65	80	100	125	150	200	250	300	350	400
PORT	12.5	17	24	37	49	64	75	98	127	148	198	248	298	335	380
FACE TO FACE	108	117	127	165	178	190	203	229	254	267	292	533	610	686	762
FLANGE OD	90	100	110	125	150	180	190	230	255	280	345	405	485	535	595
FLANGE THIK	9.6	11.2	12.7	15.9	17.5	20.7	22.3	22.3	22.3	23.9	27	28.6	30.2	33.4	35
RAISED FACE DIA.	34.9	43	50.8	73	92.1	104.8	127	157.2	185.7	215.9	269.9	323.8	381	412.8	469.9
R.F.THICKNESS	2	20	2	2	2	2	2	2	2	2	2	2	2	2	2
P.C.D.(K)	60.3	69.9	79.4	98.4	120.7	139.7	152.4	190.5	215.9	241.3	298.5	362	431.8	476.3	539.8
NO.OF.HOLES	4	4	4	4	4	4	4	8	8	8	8	12	12	12	16
HOLE DIA.	15.9	15.9	15.9	15.9	19.1	19.1	19.1	19.1	22.2	22.2	22.2	25	25	28.6	28.6

BALL VALVE (300 #)

SIZE	1/2"	3/4"	1"	1.1/2"	2"	2.1/2"	3"	4"	5"	6"	8"	10"	12"
	15	20	25	40	50	65	80	100	125	150	200	250	300
PORT	12.5	17	24	37	49	64	75	98	127	148	198	248	298
FACE TO FACE	108	117	127	165	178	190	203	229	254	267	292	533	610
FLANGEOD	90	100	110	125	150	180	190	230	255	280	345	405	485
FLANGE THIK	9.6	11.2	12.7	15.9	17.5	20.7	22.3	22.3	22.3	23.9	27	28.6	30.2
RAISED FACE DIA.	34.9	43	50.8	73	92.1	104.8	127	157.2	185.7	215.9	269.9	323.8	381
R.F.THICKNESS	2	20	2	2	2	2	2	2	2	2	2	2	2
P.C.D.(K)	60.3	69.9	79.4	98.4	120.7	139.7	152.4	190.5	215.9	241.3	298.5	362	431.8
NO.OF.HOLES	4	4	4	4	4	4	4	8	8	8	8	12	12
HOLE DIA.	15.9	15.9	15.9	15.9	19.1	19.1	19.1	19.1	22.2	22.2	22.2	25	25

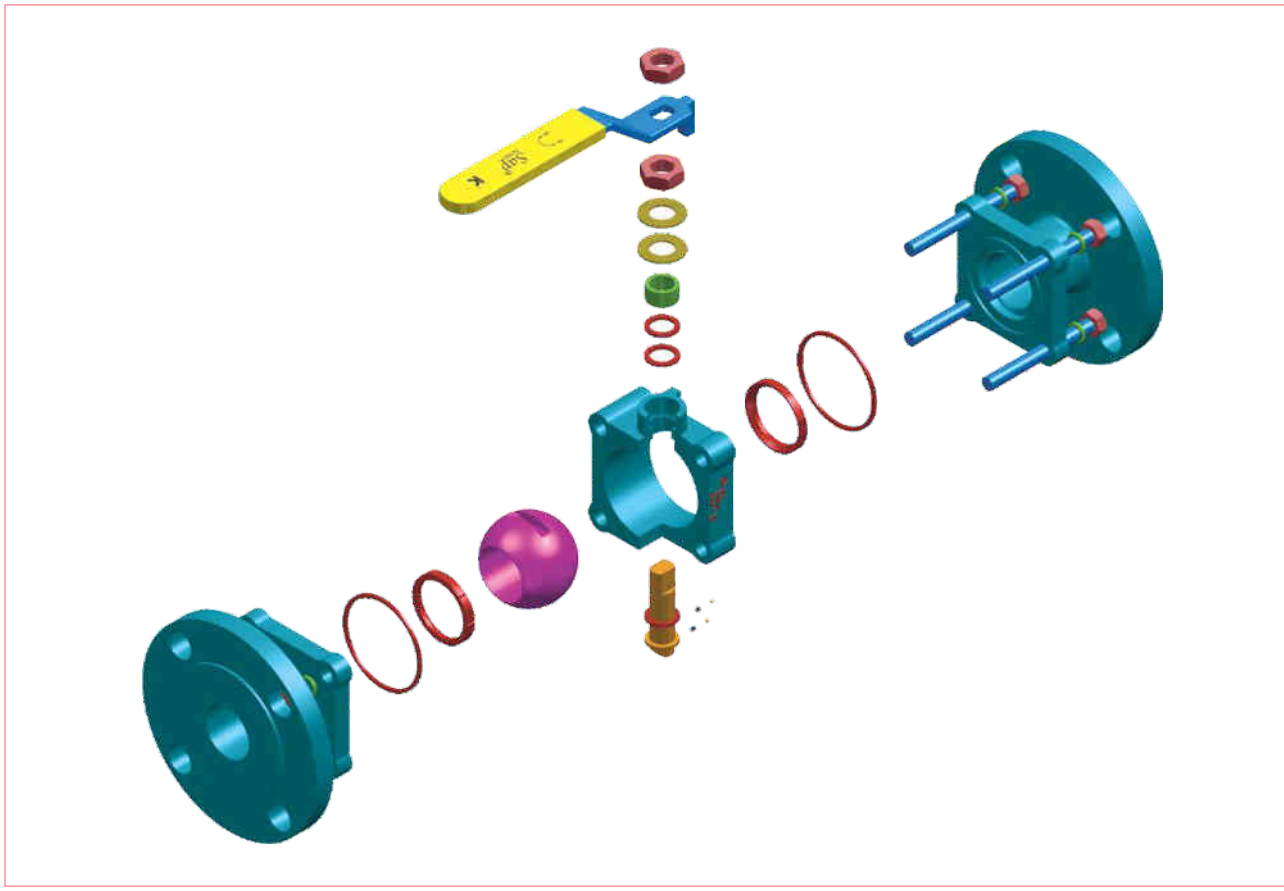
Note : ISO 5211 top mounting pad for simplified Gear / Actuator in 150#, 300# as a optional in only flanged end design.

- Dimension and other engineering data are subjected to change without notice.
- Other flange drilling also available on request.

HEAVY DUTY BALL VALVE

Ball valves are designed and constructed from heavy duty castings. It is designed for steam, water and gas application. The heavy duty blow out proof stem utilize with anti frictional washer. Seats, packing and thrust washer which assure long life. Unique ball design offers increase durability over traditional ball designs.

1. Internal anti-static design. Utilizes PTFE/CFT/GFT contact washers for applications including volatile or flammable fluids.
2. Pressure loaded seats. Low torque design gives a bubble-tight seal even in bidirectional flow. Seating materials available for specific media, high pressure and/or high temperature applications.
3. Body materials mean strong body component integrity capable of withstanding the most severe operating conditions and/or hostile external environments.
4. Precision machined solid stainless steel ball with straight through design.
5. ISO 5211 secure mounting actuator top flange, threaded, and welded flange end and custom end connections are offered as optional.



PTFE Seat with Slots Fire-Safe Feature Cavity Pressure Relief

PTFE seats used in SAP ball valves are manufactured in a controlled process that ensures a finer grain structure and longer service life. When the valve is in the closed position, upstream pressure can force the upstream seat against the ball. This can cause damage to the seats as well as increase operating torques. In SAP ball valves slots are provided in the seats to relieve upstream pressure to ensure that the upstream seat does not get forced against the ball.

Note : ** Dimension as per 150# & 300#

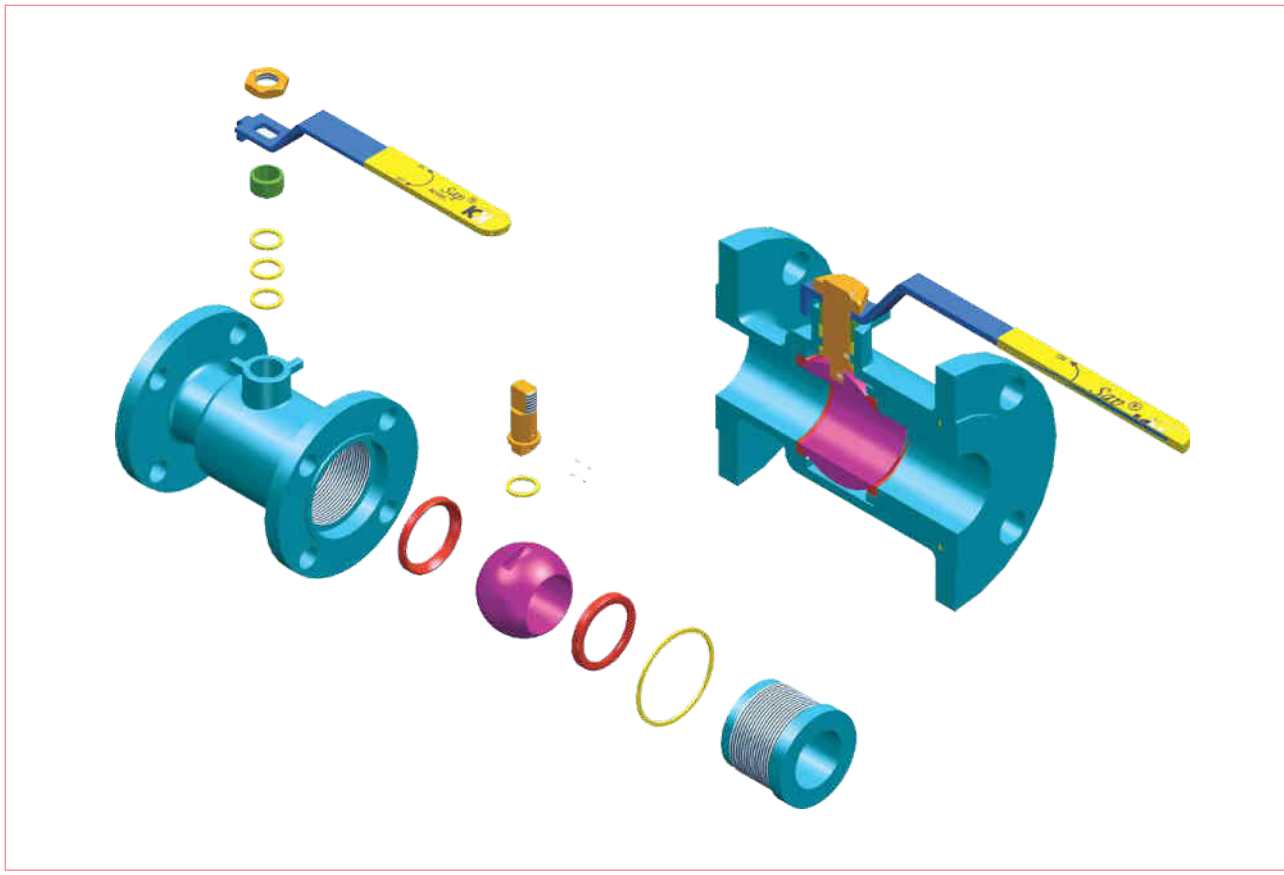
1 PC, Floating Ball, Full and Reduced Port

Special Features:

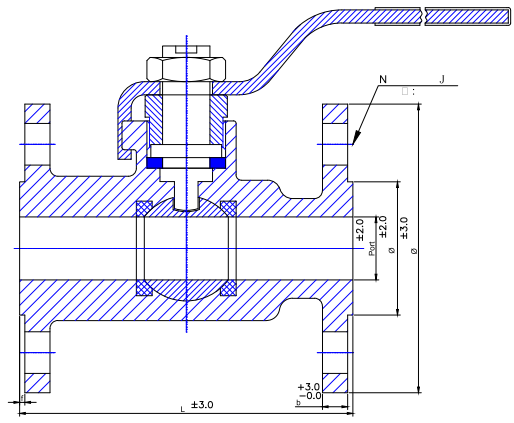
- Standard port, 1/2"~3" (DN25~DN 80)
- W. P.:CLASS 150
- W. T.:-20? - 200?
- Investment casting
- Blow out proof stem construction
- Antistatic devices ensure electrical continuity between ball, stem & body.
- Valve testing as per BS 6755
- Wall thickness :ASME B16.34
- Flange dimension: IS 3643
- Face to face: ASME B16.10
- 1 Pc., Cast Steel Ball Valves have been designed to meet the requirements BS 5351 / ISO 14313

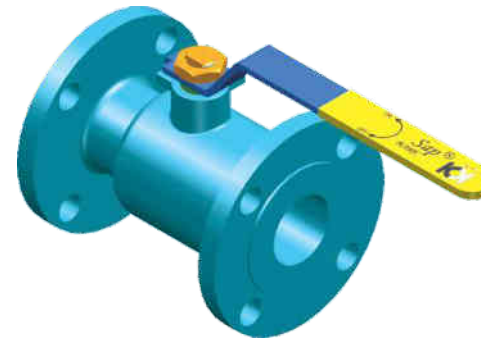
Options:

- Locking arrangement



1 PC, Floating Ball, Full and Reduced Port





1PC FULL BORE BALL VALVE F/E 150# WITH LEVER OPERATED.

Part Name	Material Option
Body	ASTM A 351 CF8 / CF3 / CF 8M / CF 3M / ASTM A 216 GR. WCB
Body Connector	ASTM A 351 CF8 / CF3 / CF 8M / CF 3M / ASTM A 216 GR. WCB
Connector seal	PTFE / GFT
Ball Seal	PTFE / GFT
Ball	AISI304 / AISI316 / AISI304L / AISI316L
Stem	AISI304 / AISI316 / AISI304L / AISI316L / ALLOY20 / HAST - B / HAST-C
Stem Seal	PTFE / GFT
Gland Packing	PTFE
Gland	AISI304 / AISI316 / AISI304L / AISI316L
Gland Nut	SS - 304
Lever	SS - 304 / MS
Lever Nut	SS - 304 / MS
Lever Sleeve	PVC

Dimension

SIZE	Ø B	L	CS	CLH	CL	Ø S	DT
15	12.5	65	35	50	110	½”	13.5
20	17	75	40	55	110	¾”	14
25	24	85	42	60	135	1”	17.5
32	30	95	55	75	170	1.1/4”	18.0
40	37	105	70	95	220	1.1/2”	18.5
50	49	125	85	100	260	2”	19.5

✶ Dimension and other engineering data are subjected to change without notice.
✶ Other flange drilling also available on request.

Forged Steel High Pressure Ball Valve

The Forged Floating Ball Valve product line includes premium features and special options that deliver performance and longevity in the most demanding applications. SAP Forge specializes in both commodity and manufactured-to-order.

Forged Floating Ball Valves are a great choice for on/off service applications in smaller or lower pressure applications because the pressure actually seals the valve. SAP Forge manufactures Forged Floating Ball Valves in an extensive range of designs, materials, sizes, pressure classes and end connections that are designed in accordance to ASME B16.34 and, where applicable, API 608, API 6D or BS EN ISO 17292, 3 pc split body, ideal for medium or high pressure services and wide temperature range. The valves design features to ensure electrical continuity between ball, stem and body. All designs are forged for improved mechanical properties, pressure retention, and quality.

Compression fitting light and heavy series, BSP thread, NPT thread, welding end and welding taper, UNC/UNF female thread, bulkhead connection, plug-in socket und plug nipple, Thread connection.

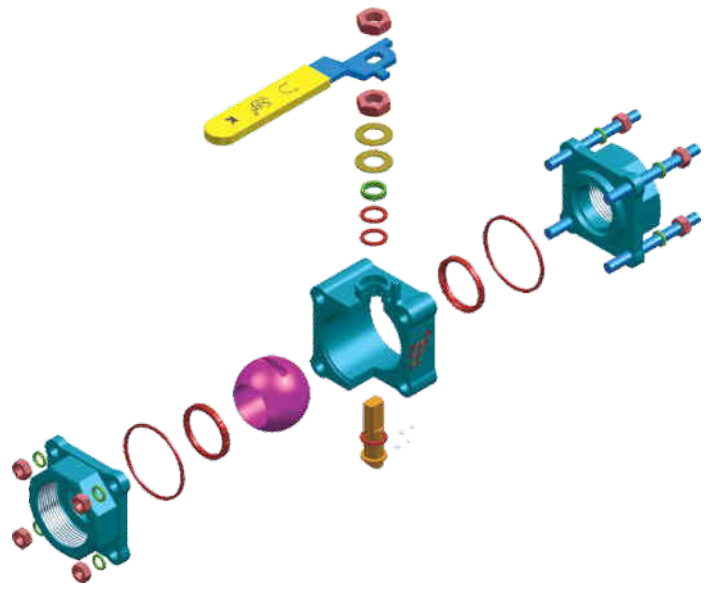
SAP manufacturing High performance Forged Steel Ball Valve as per international design and standard to get 100% Client Satisfaction and repeat order with total interchangeability, superior quality, workmanship & service. These Ball Valves comes in 3PC Design (1/2 to 2) to suit various critical, non-critical applications and pressure rating 800#, 1500# & 2500# class in regular (reduce) bore design.

Application standards

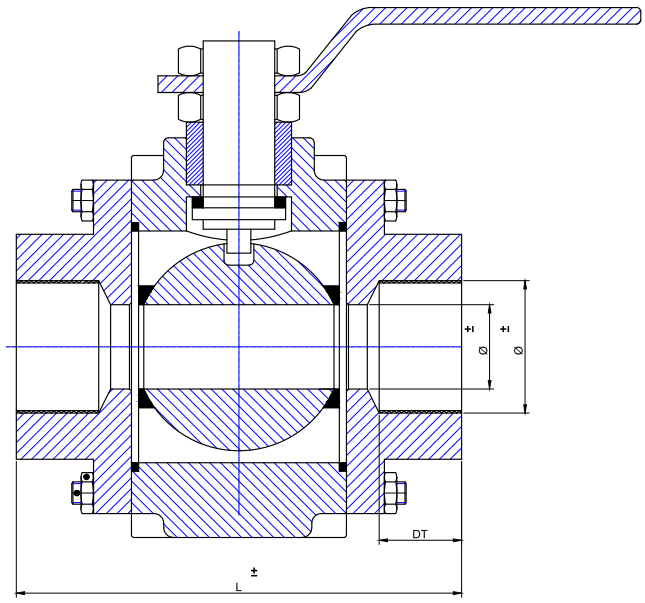
- Design and manufacture conform to BS 5351 / ANSI B 16.34
- Connection ends conform to?
  1. Socket welded ends conform to ANSI B16.11
  2. Screw ends conform to ANSI B 1.20.1 (BSP / NPT)
  3. Butt-welded ends conform to ANSI B16.25
  4. Flanged ends conform to ANSI B16.5
- Test and inspection conform to: API 598 / BS 6755 Part II
- Structure features: Bolted bonnet
- Materials conform to ANSI/ASTM.
- Main materials: A105 / LF2 / 304(L) / 316(L) / F347 / F321 / F51 / Monel

Special Features

- Full port or conventional port
- 90° locating and lock structure
- Fire proof and anti static design
- Blow out Proof stem
- Bolted bonnet
- High Performance Ball Valve
- Longer Life
- Compact Design



Socket End & Screwed End Ball Valve



Forged Steel High Pressure Ball Valve
Pressure Rating: 800# / 1500# / 2500#

Part Name	Material Option
Body	ASTM A 105 / 182 F304 / 182 F316 /182 304L / 182 316L / 182 F11 / 182 F22 /350 LF2
Body Connector	ASTM A 105 / 182 F304 / 182 F316 / 182 304L / 182 316L / 182 F11 / 182 F22 /350 LF2
Connector seal	PTFE / GFT
Ball Seal	PTFE / GFT
Ball	AISI304 / AISI316 / AISI304L / AISI316L
Stem	AISI304 / AISI316 / AISI304L / AISI316L / ALLOY20 / HAST - B / HAST - C
Stem Seal	PTFE / GFT
Gland Packing	PTFE
Gland	AISI304 / AISI316 / AISI304L / AISI316L
Gland Nut	SS - 304
Lever	SS - 304 / MS
Lever Nut	SS - 304 / MS
Lever Sleeve	PVC

Dimension

FORGED STEEL 3 PC BALL VALVE (800 #)

SIZE	ØB	L	ØS	DT
½" (15 mm)	13	66	19	16
¾" (20 mm)	19	75	24.5	16
1" (25 mm)	24	85	30.75	17
1.1/4"(32 mm)	30	95	39	17
1.1/2"(40 mm)	37	105	45	20
2"(50 mm)	37	125	57	20

FORGED STEEL 3 PC BALL VALVE (1500 #)

SIZE	ØB	L	ØS	DT
½" (15 mm)	13	75	19	16
¾" (20 mm)	19	85	24.5	16
1" (25 mm)	24	95	30.75	17
1.1/4"(32 mm)	30	105	39	17
1.1/2"(40 mm)	37	125	45	20

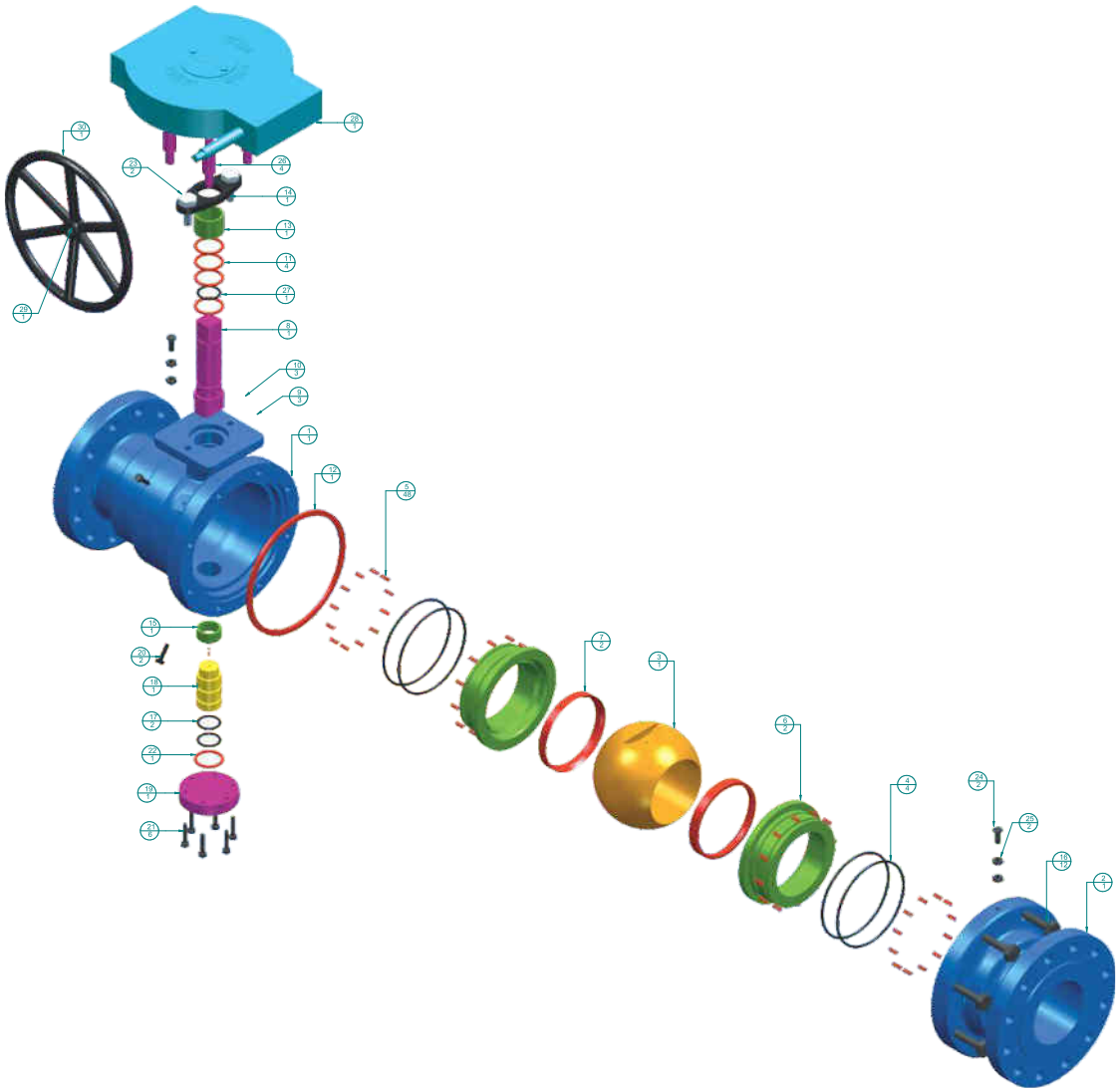
FORGED STEEL 3 PC BALL VALVE (2500 #)

SIZE	ØB	L	ØS	DT
½" (15 mm)	85	13	19	16
¾" (20 mm)	105	19	24.5	16
1" (25 mm)	125	24	30.75	18

✶ Dimension and other engineering data are subjected to change without notice.

TRUNNION BALL VALVES

TRUNNION MOUNTED BALL VALVE



No.	Description	Material	Qty.
01	Body Mach.	ASTM A350 Gr.	01
02	Conn. Mach.	ASTM A350 Gr.	01
03	Ball Mach.	ASTM A350 Gr.	01
04	O-Ring for Holder	NBR	04
05	Spring for Holder	SPRING STEEL	48
06	Seat Holder	M. S.	02
07	Seat Ring	CFT	02
08	Stem Pin	S.S. 304	01
09	Antistatic Ball	S.S. 304	03
10	Antistatic Spring	S.S.	03
11	Bonnet Ring	CFT	04
12	Body Seal	CFT	01
13	Gland Bush	M. S.	01
14	Gland Pata	S.G.IRON	01
15	Trunion Bush	S.S.	01

No.	Description	Material	Qty.
16	Hex Bolt	S.S.	12
17	Trunion O- Ring	NBR	02
18	Trunion	M.S.	01
19	Trunion Plate	M.S.	01
20	Drain & Vent Bolt	S.S.	02
21	Bolt for Plate	S.S.	06
22	Ring for Plate	PTFE	01
23	Gland Hex bolt	M.S.	02
24	Injection Fitting Bolt	S.S.	02
25	Injection Fitting Nut	S.S.	02
26	Gear Stand	M.S.	04
27	Stem O- Ring	NBR	01
28	Gear Box	C. S.	01
29	Key	S. S.	01
30	Hand Wheel	M. S.	01

Standard Features

Bolted Body Construction

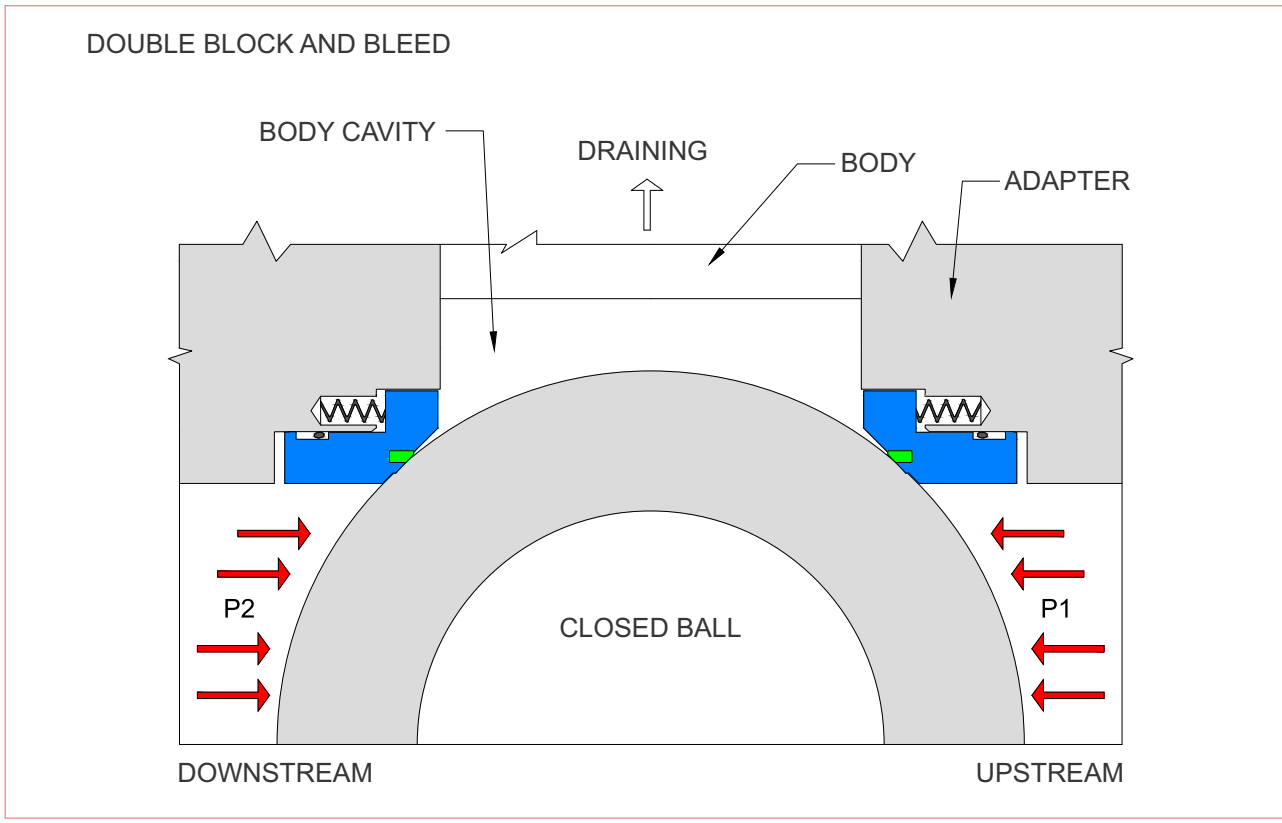
As a standard, the valves are manufactured in 2-piece or 3 Piece bolted body designs, where the joint between the body and the connector is bolted.

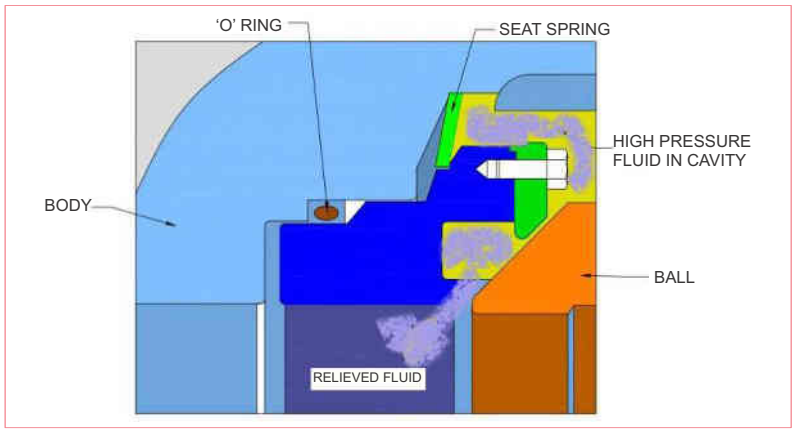
Double Block and Bleed

SAP Trunnion Mounted Ball Valves are designed for upstream sealing, so that the double block and bleed features are automatically built in. The load generated by the line fluid on ball is absorbed by the Trunnion bearings and is directly transmitted to the valve body.

The valve stem is hence free from any bending load which leads to reduced stem friction torque and enhanced stem seal life. The seat rings are allowed to float in the flow axis against a fixed ball so that the line pressure assists in pressing the spring-loaded upstream seat against the ball. Thus, the operating torque and wear on the seats is relatively low, enhancing seat life.

The seats provide the positive seal at both upstream and downstream independently. The fluid is blocked from the body cavity; this facilitates to check the integrity of the upstream and downstream seats.



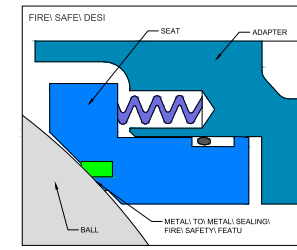


Cavity Relief

The seat design has a built-in automatic cavity relief mechanism. In the event of excessive pressure build-up inside the cavity, the springs that keep the seats pressed to the ball are pressed back by the seat, allowing the release of excessive pressure. This eliminates the need for having external cavity relief assemblies.

Fire-Safe Design

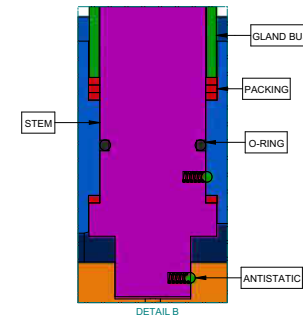
SAP Trunnion Mounted Ball Valves are fire-safe by design in accordance with API 6FA - Specification for Fire Test for Valves (equivalent to ISO 10497) and API 607 - Fire Test for Soft Seated Quarter-Turn Valves. SAP has successfully fire-tested the valves in-house. These valves have been supplied in large quantities for crude/gas pipelines and in petrochemical and allied industries where fire hazard is an important consideration.
When resilient sealing material is decomposed during the fire, the seat retainer comes in to contact with the ball and minimize the leakage. Body and stem seal are provided with graphite gasket to prevent atmospheric leakage.



Stem Sealing - Assured safety

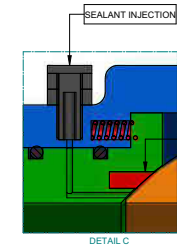
A high integrity sealing system is provided on the stem for assured protection to the atmosphere.

- An elastomer seal in the form of an 'O' ring is located at the lower end of the stem which provides the first level of protection to the atmosphere.
- Pre-compressed and pressure-energised graphite gland packing is provided at the upper portion of the stem.
- The design provides for stem sealant injection (optional) between the elastomer seal and the gland packing for valve of sizes 8" and above, which gives the third level of protection.



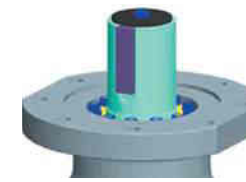
Sealant Injection System

A Renewable seal is provided for valves in sizes of 6” and above in the form of a fully contained sealant injection system, which also serves as an emergency backup in case of damage to other sealing members.



Actuator Mounting Flange

The valves come with an integral mounting flange with drilled holes suitable for mounting gear units and actuators. The mounting flange conforms to ISO 5211.



End Connections

SAP Trunnion Mounted Ball Valves come with a variety of end connections: Flanged: As standard features, valves with ASME Class ratings of 150, 300 and 600 come with Raised Face (RF) flanges with serration and of finish 125-250 AARH. Valves with ASME Class ratings of 900, 1500 and 2500 come with Ring-Type Joint flanges. As an option, valves with ASME Class rating of 600 can also be supplied with Ring-Type Joint flanges.
Butt-weld: Valves can be supplied with butt-weld ends (BWE), with schedule as per customer requirement. Valves can also be supplied with a combination of any of the above mentioned ends (like, one end flanged and the other butt-welded).

End Connections

SAP Trunnion Mounted Ball Valves come with a variety of end connections: Flanged: As standard features, valves with ASME Class ratings of 150, 300 and 600 come with Raised Face (RF) flanges with serration and of finish 125-250 AARH. Valves with ASME Class ratings of 900, 1500 and 2500 come with Ring-Type Joint flanges. As an option, valves with ASME Class rating of 600 can also be supplied with Ring-Type Joint flanges. Butt-weld: Valves can be supplied with butt-weld ends (BWE), with schedule as per customer requirement. Valves can also be supplied with a combination of any of the above mentioned ends (like, one end flanged and the other butt-welded).

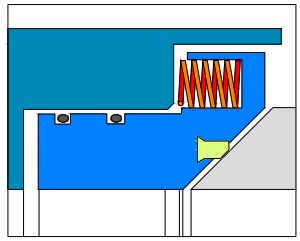
Lifting Lugs and Foot Support Valves of sizes 8" and above are provided with lifting lugs and foot support.

Standard Trunnion Mounted Ball Valve

Features

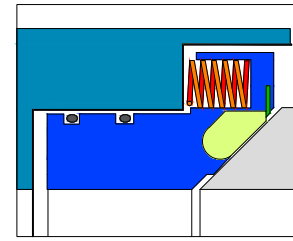
Different seat configurations are available to meet the wide range of applications. The use of high integrity sealing technology combined with optimum seat material assures reliable performance. Our standard valves are equipped with nylon seats with Type - A seat Construction. Other seat Constructions and materials are selected based on customer specifications and expectations. (Type - A)

Type - A



Seat insert is positively locked in to the seat retainer. The seat material such as PTFE, RPTFE, Nylon and Peek are available. The tangential seat / ball contact requires far less torque than other seat with increased contact area. Spring loading of the seat holders ensures leak tightness even at low pressure. The seats are easy to replace at the time of damage.(Type - B)

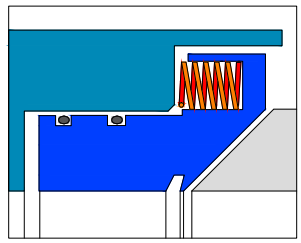
Type - B



Elastomer seat design is available low pressure and zero leakage reliability requirements. The seals are easily replaceable with less maintenance cost.

There are several applications that require metal to metal sealing. The usual resilient seal is not suitable because of high abrasive service or high temperature. Different hard facing materials are used such as ENP coating and satellite 6. The contact surface of the seat is not contoured to the ball surface hence may be remachined without changing the seat. (Type - C)

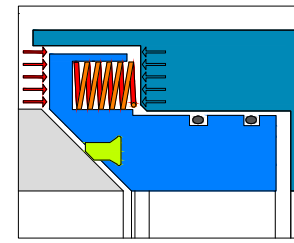
Type - C



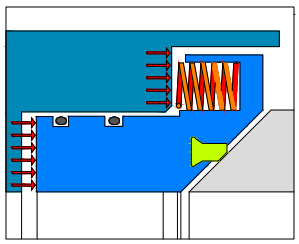
Self Relieving Seat

The seats are designed for self relieving feature. This prevents excessive pressure buildup in the body cavity. The fluid trapped in the valve cavity is subjected to thermal expansion and contraction due to temperature variation, results in increase of pressure in the cavity. The seat will pressure relieve automatically when the force due to body cavity pressure exceeds the spring force and pushes the seat away from the ball.

Self Relieving Seat

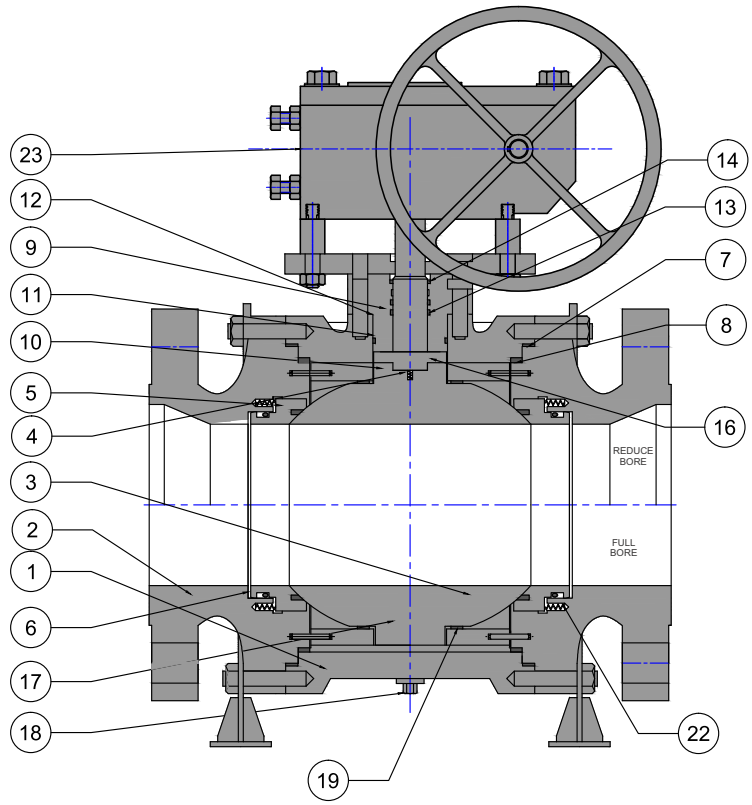


Piston Effect



Single Piston Effect

The ball is fixed on the horizontal axis. The seats are floating and operate in the direction of the pressure. At low pressure the sealing is achieved by the spring force. As the pressure increases, the combined spring force and the fluid pushes the seat ring against the ball, resulting in tight seal.



ITEM NO.	PART NAME
01	BODY
02	BODY ADAPTER
03	BALL
04	STEM
05	SEAT + INSERT
06	O RING (SEAT)
07	O RING (BODY ADAPTER)
08	GASKET (BODY)
09	STEM HOUSING
10	BUSH BEARING
11	O RING (STEM HOUSING)
12	GASKET (STEM HOUSING)
13	O RING (STEM)

ITEM NO.	PART NAME
14	GASKET (STEM)
15	STEM THRUST WASHER
16	ISO MOUNTING FLANGE
17	TRUNNION
18	GASKET (TRUNNION)
19	O RING (TRUNNION)
20	TRUNNION THRUST WASHER
21	ANTISTATIC SPRINGS
22	SEAT SPRINGS
23	DRAIN PLUG/ BLEED VALVE
24	HAND LEVER
25	GEAR BOX

Dimension

BALL VALVE (150 #)

SIZE	6"	8"	10"	12"	14"	16"
	150	200	250	300	350	400
PORT	148	198	248	298	335	380
FACE TO FACE	267	292	533	610	686	762
FLANGE OD	280	345	405	485	535	595
FLANGE THIK	23.9	27	28.6	30.2	33.4	35
RAISED FACE DIA.	215.9	269.9	323.8	381	412.8	469.9
R.F.THICKNESS	2	2	2	2	2	2
P.C.D.(K)	241.3	298.5	362	431.8	476.3	539.8
NO. OF HOLES	8	8	12	12	12	16
HOLE DIA.	22.2	22.2	25	25	28.6	28.6

BALL VALVE (300 #)

SIZE	4"	5"	6"	8"	10"	12"
	100	125	150	200	250	300
PORT	98	127	148	198	248	298
FACE TO FACE	229	254	267	292	533	610
FLANGE OD	230	255	280	345	405	485
FLANGE THIK	22.3	22.3	23.9	27	28.6	30.2
RAISED FACE DIA.	157.2	185.7	215.9	269.9	323.8	381
R.F.THICKNESS	2	2	2	2	2	2
P.C.D.(K)	190.5	215.9	241.3	298.5	362	431.8
NO. OF HOLES	8	8	8	8	12	12
HOLE DIA.	19.1	22.2	22.2	22.2	25	25

BALL VALVE (600 #)

SIZE	2"	2.1/2"	3"	4"	5"	6"	8"	10"
	50	65	80	100	125	150	200	250
PORT	49	64	75	98	127	148	198	248
FACE TO FACE	292	330	356	432	508	559	660	787
FLANGE OD	165.0	190.0	210.0	275.0	330.0	355.0	420.0	510.0
FLANGE THIK	25.4	28.6	31.8	38.1	44.5	47.7	55.6	63.5
RAISED FACE DIA.	92.1	104.8	127.0	157.2	185.7	215.9	269.9	323.8
R.F.THICKNESS	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
P.C.D.(K)	127.0	149.2	168.3	215.9	266.7	292.1	349.2	431.8
NO. OF HOLES	8	8	8	8	8	12	12	16
HOLE DIA.	19.1	22.2	22.2	25.0	28.6	28.6	31.835.0	35.0

✶ Dimensions and other engineering data are subjected to change without notice.

Dimension

BALL VALVE (900 #)

SIZE	2"	2.1/2"	3"	4"	5"	6"	8"	10"
	50	65	80	100	125	150	200	250
PORT	49	64	75	98	127	148	198	248
FACE TO FACE	368	419	381	457	559	610	737	838
FLANGE OD	215.0	245.0	240.0	290.0	350.0	380.0	470.0	545.0
FLANGE THIK	38.1	41.3	38.1	44.5	50.8	55.6	63.5	69.9
RAISED FACE DIA.	92.1	104.8	127.0	157.2	185.7	215.9	269.9	323.8
R.F.THICKNESS	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
P.C.D.(K)	165.1	190.5	190.5	235.0	279.4	317.5	393.7	469.9
NO. OF HOLES	8	8	8	8	8	12	12	16
HOLE DIA.	25.4	28.5	10.9	13.0	15.1	18.2	23.4	28.7

BALL VALVE (1500 #)

SIZE	2"	2.1/2"	3"	4"	5"	6"
	50	65	80	100	125	150
PORT	48	57	70	92	115	137
FACE TO FACE	368	419	470	546	673	705
FLANGE OD	215.0	245.0	265.0	310.0	375.0	395.0
FLANGE THIK	38.1	41.03	47.7	54.0	73.1	82.6
RAISED FACE DIA.	92.1	104.8	127.0	157.2	185.7	215.9
R.F.THICKNESS	7.0	7.0	7.0	7.0	7.0	7.0
P.C.D.(K)	165.1	190.5	203.2	241.3	292.1	317.5
NO. OF HOLES	8	8	8	8	8	12
HOLE DIA.	25.4	28.5	31.8	35.0	41.3	38.1

BALL VALVE (2500 #)

SIZE	2"	2.1/2"	3"	4"
	50	65	80	100
PORT	48	57	70	92
FACE TO FACE	451	508	578	673
FLANGE OD	235.0	265.0	305.0	355.0
FLANGE THIK	50.9	57.2	66.7	76.2
RAISED FACE DIA.	92.1	104.8	127.0	157.2
R.F.THICKNESS	7.0	7.0	7.0	7.0
P.C.D.(K)	171.4	198.8	228.6	273.0
NO. OF HOLES	8	8	8	8
HOLE DIA.	28.6	31.8	34.9	41.3

✶ Dimensions and other engineering data are subjected to change without notice.

TECHNICAL DETAILS

Cv VALUES

SIZE	CV FLOW COEFICEINT		
	150#	300#	600#
2”	405	400	390
3”	1160	1000	980
3” x 2”	200	195	190
4”	2150	2050	1820
4” x 3”	570	560	550
6”	5200	5000	4450
6” x 4”	820	810	800
8”	9600	9250	8750
8” x 6”	2050	2030	2000
10”	15400	15200	14300
10” x 8”	4260	4240	4200
12”	23300	23200	22500
12” x 10”	7280	7250	7200
14”	29100	28800	28400
14” x 12”	13600	13400	13200
16”	38200	38000	37000
16” x 14”	14800	14700	14500
18”	49800	49300	48200
18” x 16”	20600	20500	20200
20”	60500	59700	58500
20” x 18”	28100	27900	27400
24”	96000	95000	93000
24” x 20”	29900	29800	29500
22”	68200	68200	68200
24”	92000	92000	92000
30” x 24”	36000	36000	36000
26”	110000	110000	110000
28”	121000	121000	121000
30”	145000	144000	144000
36” x 30”	64000	64000	64000
32”	170000	170000	170000
36” x 32”	87000	87000	87000
36”	210000	210000	210000
40”	267500	267500	267500
42” x 36”	96700	96700	96000
42”	280000	280000	280000
48”	384000	384000	384000

CV IS A BASIC INDUSTRY AIDS STANDARD FOR DETERMINING VALVE CAPACITY & IT IS DEFINED AS “THE FLOW OF COLD WATER IN GALLONS PER MINUTE WHICH WILL PRODUCE A PRESSURE FROP OF ONE PSI ACROSS A VALVE”.

NOTE: Kv is the metric equivalent of Cv.

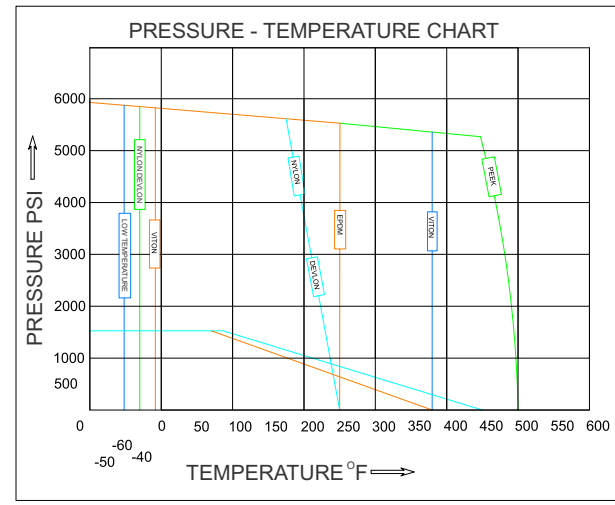
Kv = Cv x 0.85

$$Cv = \frac{Q\sqrt{G}}{\sqrt{\Delta P}}$$

Q = Flow Rate in GSM

G = Specific Gravity of Liquid (Water = 1)

Δ P = Pressure Drop across the valve (Psi)



Testing Std: API 6D/ API 598

Test Type		Test Pressure		
		150 #	300 #	600 #
Hydro shell	Kg/Cm²	32	79	157
	PSIG	450	1125	2225
Hydro Seat	Kg/Cm²	23	58	116
	PSIG	325	825	1650
Air Seat	Kg/Cm²		6.0	
	PSIG		80	

BUTTERFLY VALVES

Butterfly Valves

SAP butterfly valves have been very commonly used in various water supply and other industrial services, irrespective of sizes, pressure ratings, fluids handled, type of operators etc. our BF valves are the most preferred choice of the discerning customers. We have also kept our valves in tune with the latest technological advancements in materials, manufacturing, pattern making & foundry & operators fields.

This has enabled us to offer valves in Cast / fabricated constructions in Cast Iron, Carbon & Alloy Steels & Stainless Steels & also rubber-lined variety. The types of operators offered are Manual, Electrical, and Pneumatic & Electro- Hydraulic.

Special Features of Center Disc Design

- Lower Torque: There is no frictional contact between disc and rubber seat, which makes frictional resistance almost close to zero, thus markedly reducing operating torque.
- Low Torque with any fluid: There is no point at which frictional resistance occurs. Therefore, torque is always low regardless of the fluid, air water or Oil.
- Long Service Life: When the disc contacts the tapered projection of the rubber seat, a complete seal, is attained, which results in long service life.
- Greater Sealing Capacity: The dynamic seat means the greater pressure and betters the sealing.
- Bi- directional zero leakage butterfly valve.
- Accurate Dual stem sealing and Quarter turn operation for excellence flow control.
- Compact space saving design.
- Seat integrally moulded with the body.
- Sturdy & robust construction.
- Disc assembly perfectly centered & secured in valve Body bore.
- Flow through disc ensuring minimum pressure drop.
- Compliance with: IS 13095, AWWA C504, BS 5155 standards.

Wafer-lined Butterfly Valves

- Liner locked in precision machined grooves in valve body.
- Sealing ribs on end faces with enough protrusion to ensure drop-tight end face joints.
- Sturdy & long shaft bearings ensuring precise rotation of the disc assembly in the body.
- Double shaft seal which precludes leakage possibility.
- Robust Hand Lever mechanism without backlash & possibility of over-travel due to provision of in-built, positive travel limit stops.
- Possibility of offering Electrical / Pneumatic actuator.
- Optimized liner dimensions ensuring efficient sealing performance.
- Critically controlled interference between the Rubber liner & the Disc sealing surface ensuring leak-tightness & lower operating torque at the same time leading to long seal life.

Wafer Type

SAP valves are designed to meet the demanding requirements of the general utility valve market. These valves are truly fit & forget valve, which requires minimal maintenance.

The body liner which also functions as the soft seat comes in an integrally molded (bonded) version and offers 100% bi-directional sealing against vacuum to rated pressures of PN10.The wafer style body has universal design to fit between pipe flanges of almost all popular flange standards.

Confirmation of codes & Standards

General design and manufacturing	: API 609 category A / BS 5155 / MSS SP-67
Valve face to face dimension	: Short wafer as per ISO 5752 Tab 5 / API 609 category A
Top flange drilling	: ISO 5211 part II
Valve inspection and testing	: API 598
Flange standard conformity	: ANSI 150 , DIN PN6 / 10,BS10 Tab D & E, IS 6392 NP 0.6 / 1.0

Technical Specification

1. Valve type	: Centric Disc Butterfly valve with a single piece Rubber lined body
2. Body type	: Short wafer (sandwiched between flanges)
3. Seat type	: Integrally moulded with the body.
4. End Connection	: Wafer Sandwiched
5. Size range	: 40 NB to 300 NB
6. Pressure rating	: PN 10 / PN 16
7. Operating temperature range	: -25°C to 130°C (depending on MOC)
8. Seat leakage	: Tight shut off
9. Operation	: Hand lever for sizes from 40 NB to 250 NB Worm gear boxes for 40 NB to 300 NB.

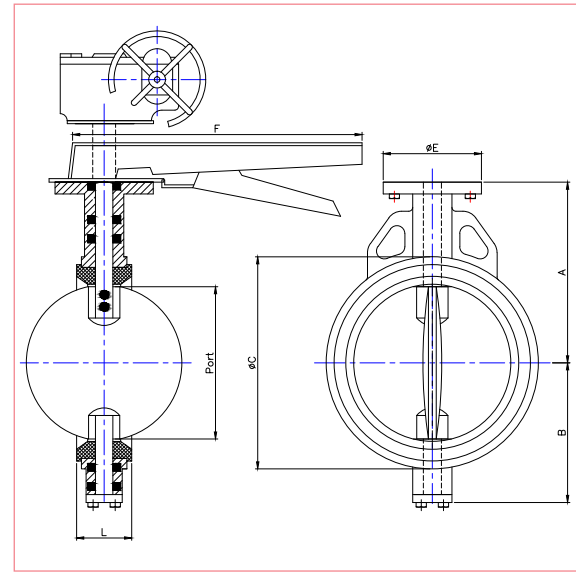
10. Standard Material of Construction (MOC)Valve

Body	: CI / SGI / WCB
Disc	: SGI / WCB / CF8 / CF8M
Seat	: Nitrile / EDPM / Neoprene / Hypalon
Bearing	: AISI410 / SS 17.4 PH / SS 316 Steel+PTFE or SS316+PTFE

Key Features

- Integrally molded seat liner on the body, which ensures excellent dimensional stability & guaranteed seat tightness.
- Seat liner extending on to the contact faces ensures perfect sealing and eliminates the need for separate flange gaskets.
- Narrow land disc ensures perfect sealing with least operating torque requirements.
- A fully universal body design ensures fitment of the valve between companion flanges of all popular standards (viz: ANSI, BS, DIN, JIS, IS etc)
- A ten position notch disc and hand lever ensures locking of the valve in 8 intermediate positions in addition to closed and open position. Hand lever lockable through pad lock for tamper proof positioning.
- Valve disc made of ductile cast iron instead of cast iron to withstand against possible water hammer or pressure surges.
- A truly line size body bore to ensure maximum flow capacity with the lowest pressure drop.
- Shafts made of martensitic stainless steel to ensure maximum strength and torsional rigidity.
- Both top and bottom shaft swiveling are guided by self - lubricated PTFE bearings.

WAFER TYPE BUTTER FLY VALVE



Dimension

Butter Fly Valve With Pressed Steel Lever Operated

SIZE		A	B	C	D	E	F	G	FLANGE MOUNTING (I.S.O. 5211)
MM	INCH								
50	2	43	103	70	28	65	180	15	F05
65	2.1/2	46	110	76	48	65	180	15	F05
80	3	46	118	85	67	65	215	15	F05
100	4	52	148	102	88	65	215	15	F05
125	5	56	164	115	114	65	265	15	F05
150	6	56	176	130	142	65	265	15	F05
200	8	60	230	156	194	75	325	15	F07

Butter Fly Valve With Warm Gear Operated

SIZE		A	B	C	D	E	F	G	FLANGE MOUNTING (I.S.O. 5211)
MM	INCH								
100	4	52	157	100	88	180	200	15	F07
125	5	56	164	115	114	180	200	15	F07
150	6	56	181	133	142	240	250	15	F07
200	8	60	230	156	194	285	350	15	F10
250	10	68	266	196	243	285	350	18	F10
300	12	78	300	230	292	285	350	18	F10
350	14	92	320	272	330	300	350	22	F12
400	16	102	385	302	375	305	500	22	F14
450	18	114	405	325	425	305	500	24	F14
500	20	127	465	405	470	370	450	26	F16
600	24	154	540	460	570	350	600	26	F16

✶ Dimensions and other engineering data are subjected to change without notice.

✶ Dimensions are as per standard API 609

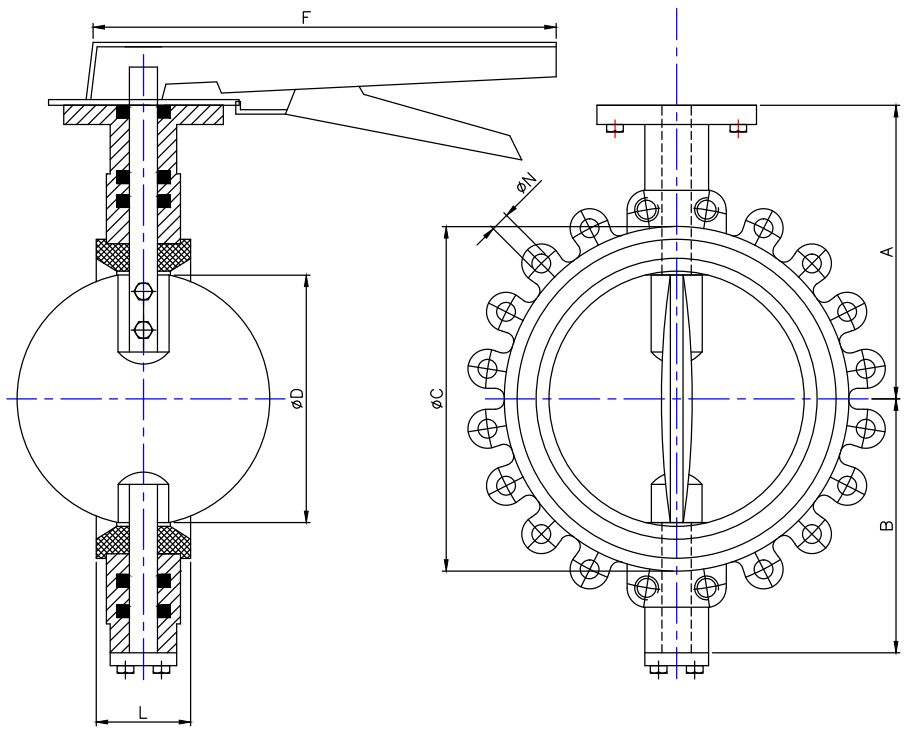
Lug Type Butterfly Valve
Technical data

- Face-to-face: EN 558 Series 20 / ISO 5752 Series 20 / API 609 Table 1 / BS 5155 Series 4.
- Flange accommodation: DINE EN 1092 PN 10 / PN 16 / ANSI B 16.5, Class 150
- Flange surface design: DIN 2526 Form A-E / DIN 2642 / ASME B 16.5 RF, FF.
- Top flange: EN ISO 5211
- Marking: DIN / EN 19
- Tightness check: DIN EN 12266, Leakage rate, ISO 5208, Category 3 / API 598 Table 5 / ASME B 16-104, Class VI
- Standard of fitness for use: EN 593 (DIN 3354)
- Temperature range: -4°F bis + 320°F (depending on pressure, medium and material)

Features:

- One piece disc/shaft, centric bearing
- Split body with stainless steel screws on request
- Can be installed in any desired position
- Disc sealing surface mirror polished
- Materials complying with FDA standards available

LUG TYPE BUTTERFLY VALVE WITH LEVER & GEAR OPERATED



Dimension

Butterfly Valve Lug Type with Lever Operated

SIZE		CATGORY 'A'	A CATEGORY 'B'		D	E	F	G	FLANGE MOUNTING (ISO 5211)
MM	INCH	FACE TO FACE	FACE TO FACE						
			150#	300#					
50	2	43	-	-	28	65	180	15	F05
65	2.1/2	46	-	-	48	65	180	15	F05
80	3	46	48	48	67	65	215	15	F05
100	4	52	54	54	88	65	215	15	F05
125	5	56	57	59	114	65	265	15	F05
150	6	56	57	59	142	65	265	15	F05
200	8	60	64	73	194	75	325	15	F07

Butterfly Valve Lug Type with Warm Gear Operated

SIZE		CATGORY 'A'	A CATEGORY 'B'		D	E	F	G	FLANGE MOUNTING (ISO 5211)
MM	INCH	FACE TO FACE	FACE TO FACE						
			150#	300#					
50	2	43	-	-	28	180	200	15	F07
65	2.1/2	46	-	-	48	180	200	15	F07
80	3	46	48	48	67	180	200	15	F07
100	4	52	54	54	88	180	200	15	F07
125	5	56	57	59	114	180	200	15	F07
150	6	56	57	59	142	240	250	15	F07
200	8	60	64	73	194	285	350	15	F10
250	10	68	71	83	243	285	350	18	F10
300	12	78	81	92	292	285	350	18	F10
350	14	92	92	117	330	300	350	22	F12
400	16	102	102	133	375	305	500	22	F14
450	18	114	114	149	425	305	500	24	F14
500	20	127	127	159	470	370	450	26	F16
600	24	154	154	181	570	350	600	26	F16

- ✶ Dimensions and other engineering data are subjected to change without notice.
- ✶ Dimensions are as per standard API 609

Double Flanged Centric Disc Rubber Lined Butterfly Valve

The most sought after design by desalination plants and utility installations, represents the state of the art rubber lined Flanged double valve, meeting all the user industry requirements.
The double flanged body pattern ensures precise installation in pipeline, and can be used as an end to the line valve if required. The unique feature of this valve is its ability for lined pipes, due to negligible disc protrusion beyond the body laying length. The universal square top shaft on valves up to DN 200, enables easy change over from hand lever operation to actuated operation when required.

Conformity of Codes & Specification

General design & manufacturing	: EN 593 (BS 5155)/ API 609/ IS 13095.
Valve face to face dimension	: Double flanged Short Pattern to EN593 (BS5155) / API 609 IS 13095 /ISO 5752 series-13 / EN 558-1 series-13.
Top flange drilling	: ISO 5211.
Valve Inspection & Testing	: API 598 / EN 12266 Part 1 (BS 6755 Pt 1)
Flange Standard Conformity	: ASME B16.5 #150, en 1092 or BD4504-PN6/PN10/PN16/AWWAC207CLASS-B&D.

Technical Specification

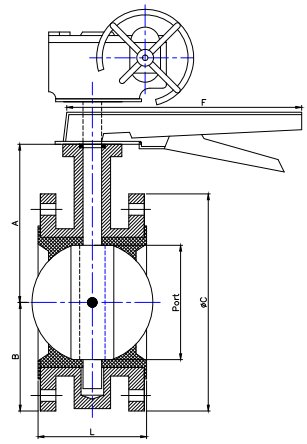
1. Valve type	: Centric Disc Design lined Flanged end Butterfly valve
2. Body type	: Double Flanged Short
3. Seat (liner) type	: Integrally Bonded with body ID.
4. End connection	: Flanged Ends (Double Flanged)
5. Size Range	: DN 50 to DN 650
6. Pressure rating	: PN2.5, PN6, PN10 & PN16
7. Operating temperature range	: -20^{o}C to 13^{o}C (depending on MOC)
8. Seat leakage	: Tight shut off
9. Operation	: Hand Lever for sizes upto DN200 or Worm Gear, Pneumatic or Electric Actuators
10. Standard Material of Construction (MOC) Valve	
Body	: CI / SGI / WCB
Disc	: SGI / WCB / CF8 / CF8M
Seat	: Nitrile / EDPM / Neoprene / Hypalon
Bearing	: AISI410 / SS 17.4 PH / SS 316 Steel+PTFE or SS316+PTFE

Key Features

- Fully rubber lined body, with lining extending up to the flange contact face to make gasket free sealing.
- Ideal valve for installation with lined pipes, since the disc chord interference with pipe ID is negligible.
- Controlled compression of the gasket face offers optimum sealing and prevents gasket face crushing.
- Unique triple sealing system, for shaft sealing to ensure zero secondary leakage.
- Self lubricated PTFE lined bearings, for both drive end and non-drive end shafts, ensures minimum bearing friction.
- Bi-directional tight shut off sealing from vacuum to rated pressure.
- Excellent adaptability for actuated operation through standardized ISO top flange.
- Universal top square shaft enabling direct actuator fitment, after removal of Hand lever, for sizes upto DN200.
- Choice of seat and disc materials to suit media and operating conditions.
- Enables installation close to other pipe fittings, without disc interference.
- Preferred design for desalination plants, municipal water supply and Effluent plants.
- Adjustable bottom thrust pad / bearing for DN250 and higher to take care of axial thrust loading

DN600/DN650 size provided with "O Ring holder" type drive end shaft sealing arrangement for extra reliability

BUTTER FLY VALVE DOUBLE FLANGED WITH LEVER & GEAR OPERATED.



Dimension

Double Flange Centric Disc Butterfly Valve Lever Operated

SIZE		A	B	D	E	F	G	FLANGE MOUNTING (ISO 5211)
MM	INCH							
50	2	108	125	85	65	180	15	F05
65	2.1/2	112	135	95	65	180	15	F05
80	3	114	155	102	65	215	15	F05
100	4	127	160	112	65	215	15	F05
125	5	140	180	134	65	265	15	F05
150	6	140	210	147	65	265	15	F05
200	8	152	250	175	75	325	15	F07

Double Flange Centric Disc Butterfly Valve Warm Gear Opeated

SIZE		A	B	D	E	F	G	FLANGE MOUNTING (ISO 5211)
MM	INCH							
200	8	152	250	175	285	300	15	F10
250	10	165	285	208	285	350	18	F10
300	12	178	310	227	285	350	18	F10
350	14	190	340	275	300	350	22	F12
400	16	216	376	308	305	500	22	F14
450	18	222	390	373	305	500	24	F14
500	20	229	425	408	370	500	26	F16
600	24	267	500	464	350	600	26	F16

- ✶ Dimensions and other engineering data are subjected to change without notice.
- ✶ Dimensions are as per standard API 609

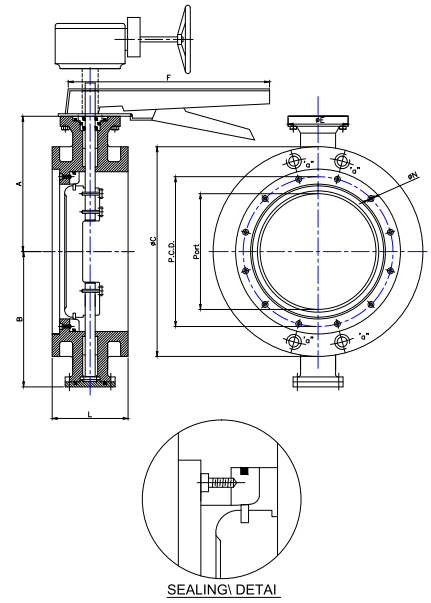
OFF SET BUTTERFLY VALVE

Standards:
Valve comply with BS 5155, API 609, MSS SP 67 and ISO 5752 valves designed to fit without gaskets between flanges drilled to ANSI 125, DIN. ND 10.16 BS 10 tables D E and F of BS 4505 PN 10/16 tables 6, 7 & 8 of IS: 6418 and tables. 11, 15 & 17 of IS: 6392

Note:
Face to face dimensions given in the installed condition (i.e. with liner compressed)
Free length exceeds this dimension by 5 mm max.
Depending on valve size.
The minimum internal pipe diameter should exceed this dimension for correct installation.

Technical Data & Specifications

Size Range : 50 to 700 mm
Pressure Rating : PN 10 / PN 16 / PN 20
Temp.Rating : Material will be selected according to service.



Dimension

Wafer Type Offset Butterfly Valve With Lever Operated

Dimensional Details	Dimensions in MM						
Valve Size	50	65	80	100	125	150	200
L Face to Face	43	46	46	52	56	56	60
CV center line of top of body platform	105	111	121	139	171	184	218
B center line to bottom	65	75	85	105	125	144	168
D Maximum dia of body	91	111	124	162	190	219	273
HL maximum length of valve flow control lever	242	242	242	343	343	343	457
NB nominal bore	50	63	76	102	127	152	203

Wafer Type Offset Butterfly Valve with Gear Operated

Dimensional Details	Dimensions in MM								
Valve Size	200	250	300	350	400	450	500	600	700
L Face to Face	60	68	78	92	102	114	127	154	229
CV center line of top of body platform	218	282	314	350	365	416	465	519	568
V Centre line to top of Gear Box	315	345	377	425	440	491	580	634	693
B center line to top of bottom	168	231	266	340	345	353	449	494	545
D Maximum dia of body	273	237	384	440	500	555	594	713	828
NB nominal bore	203	254	305	350	400	450	500	600	675

* Dimensions and other engineering data are subjected to change without notice.

DOUBLE FLANGED OFFSET

Standards:

Valve comply with BS 5155, API 609, MSS SP 67 and ISO 5752 valves designed to fit without gaskets between flanges drilled to ANSI 125, DIN. ND 10.16 BS 10 tables D E and F of BS 4505 PN 10/16 tables 6, 7 & 8 of IS : 6418 and tables. 11,15 & 17 of IS : 6392

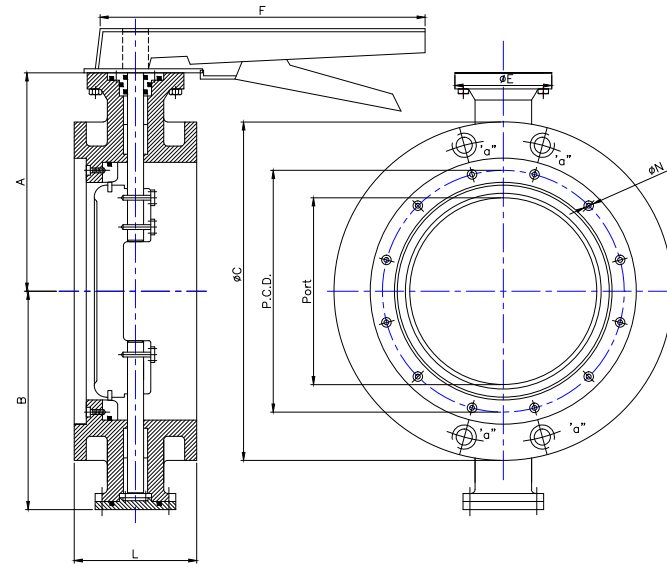
Note:

Face to face dimensions given in the installed condition (i.e. with liner compressed)
Free length exceeds this dimension by 5 mm max. Depending on valve size.
The minimum internal pipe diameter should exceed this dimension for correct installation.

Technical Data & Specifications:

Size Range : 50 to 200 mm
Pressure Rating : PN 10 / PN 16 / PN 20
Temp.Rating : Material will be selected according to service.

BUTTER FLY VALVE DOUBLE FLANGED OFFSET WITH LEVER OPERATED



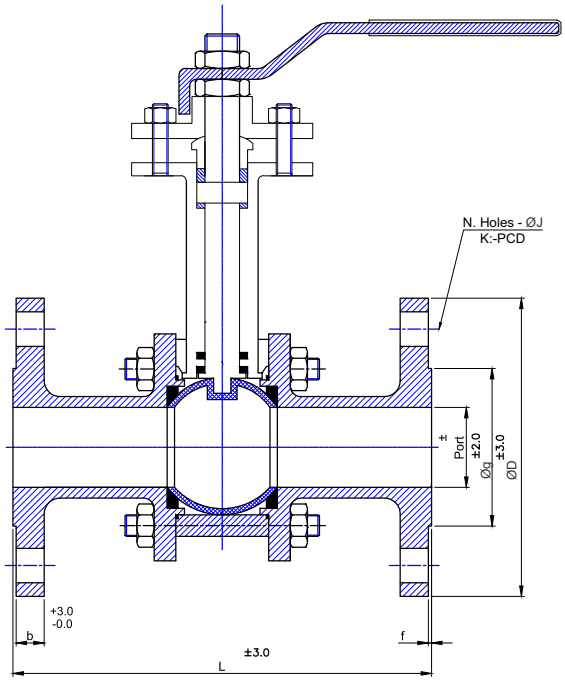
Dimension

Dimensional Details	Dimensions in MM						
Valve Size	50	65	80	100	125	150	200
CV center line of top of body platform	108	112	114	127	140	140	152
B center line to bottom	105	111	121	139	171	184	218
HL maximum length of valve flow control lever	242	242	242	343	343	343	457
NB nominal bore	50	63	76	102	127	152	203

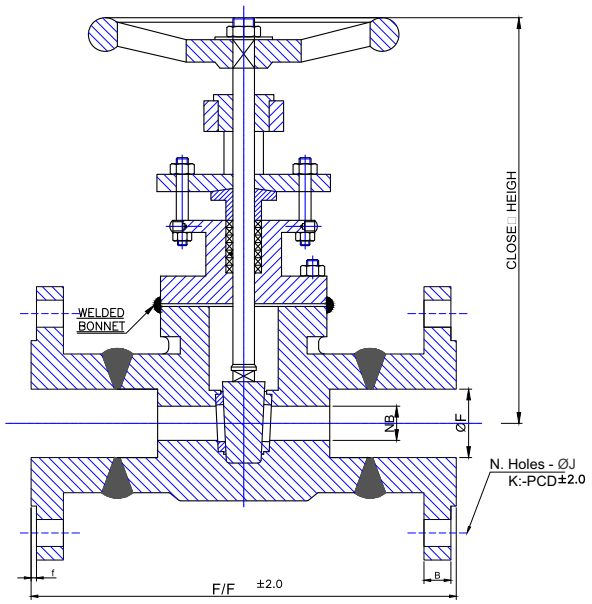
✶ Dimensions and other engineering data are subjected to change without notice.

Special Range

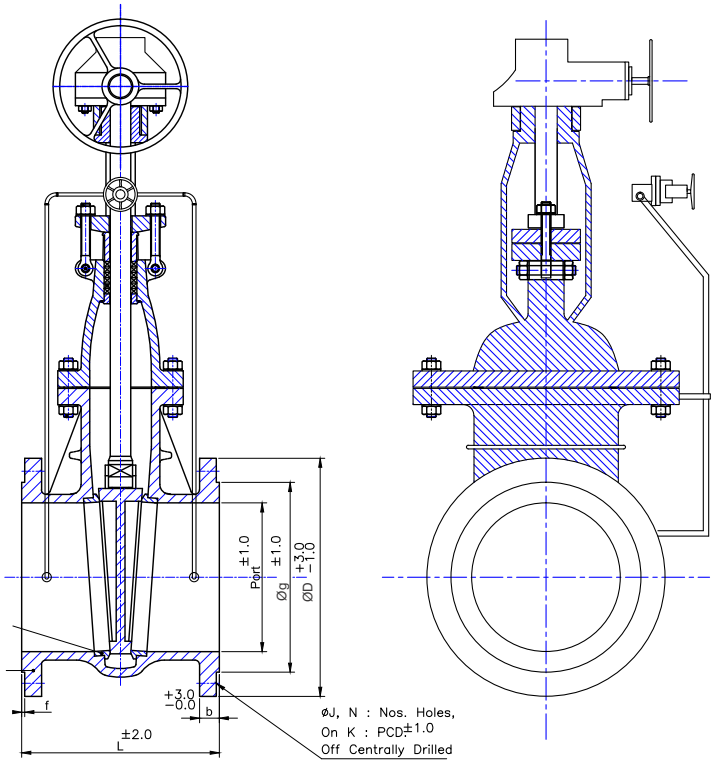
3PC FULL BORE BALL VALVE EXTENDED STEM GO 600# 900#



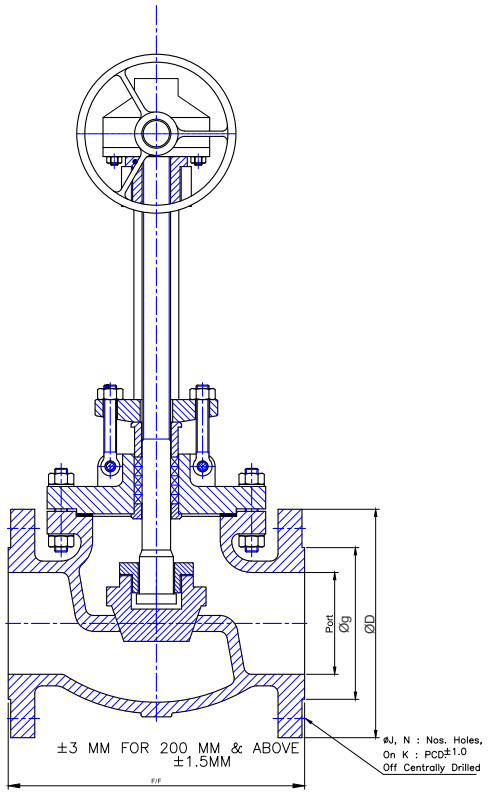
F.S.GATE VALVE F/E FLANGED



GATE VALVE WITH BY PASS ARRANGEMANT



GLOBE VALVE EXTENDED BONNET



General recommendations for handling and trouble free operation

1. End protectors are attached to each valve before shipment. Do not remove the protector until installing the valve.
2. Valves must be stored in dust free, dry and clean storage room on a proper rubber sheet, wooden crates.
3. For lifting the valves use proper rope, wire, etc through the lifting lugs to avoid damage.
4. Do not use actuator or valve stem for lifting purpose.
5. Depressurize and drain the testing fluid in the pipe line before installation.
6. Before mounting the valves, make sure all foreig objects such as sands or scales are removed by filters or strainers to protect valve seat surface.
7. Ensure that valve flanges and pipe flanges are coupled with correct alignment.
8. After mounting the valves, clean the inside of the pipes again so that no weld spatters, chips, or sand are left.
9. For flanged end valves tightening of bolts must be done alternately and diagonally. Provide valve support if required, to reduce pipe stresses.
10. If leakage is observed from the gland while valve in service, the gland must be tightened immediately. Gland must be tightened just sufficient to stop the leakage. If operating torque is increased after this procedure then it is recommended to replace the packing.
11. It is recommended to replace the packing during valve maintenance operation. But never replace while valve is being pressurized.
12. Care to be taken to clean the packing chamber and the valve stem before replacing the packing.

Specification & Properties of Materials

Specifications ASTM	COMPOSITION									MECHANICAL CHARACTERISTICS				
	C max	Mn max	P max	S max	Si max	Cr max	Mo max	Ni max	Others	UTS min.	Y S min. Mpa	Elong % min.	RA % min.	HARDNESS
A 216 WCB	0.30	1.00	0.04	0.045	0.60	0.50	0.20	0.50	Cu < 0.3	485-655	250	22	35	
A 216 WCC	0.25	1.20	0.04	0.045	0.60	0.5	0.20	0.50	Cu < 0.3	485-655	275	22	35	
A 351 CF8	0.08	1.50	0.04	0.04	2.00	18.00-21.00	0.50	8.00-11.00	-	485	205	35	-	
A 351 CF8 C	0.08	1.50	0.04	0.04	2.00	18.00-21.00	0.50	9.00-12.00	Cb + min 0.8 x	485	205	30	-	
A 351 CF8 M	0.08	1.50	0.04	0.04	1.50	18.00-21.00	2.00-3.00	9.00-12.00	C max 1.00	485	205	30	-	
A 351 CF3	0.03	1.50	0.04	0.04	2.00	17.00-21.00	0.50	8.00-12.00	-	485	205	35	-	
A 351 C3M	0.03	1.50	0.04	0.04	1.50	17.00-21.00	2.00-3.00	9.00-13.00	-	485	205	30	-	
A 351 CN 7M	0.07	1.50	0.04	0.04	1.50	19.00-22.00	2.00-3.00	27.5-30.5	Cu 3.00- 4.00	425	170	35	-	
A 352 LCB	0.30	1.00	0.04	0.05	0.60	0.50	0.20	0.50	Cu < 0.3	450-620	240	24	35	
A 352 LCC	0.25	1.20	0.04	0.05	0.60	0.50	0.20	0.50	-	485-655	275	22	35	
A 217 WC 6	0.05-0.20	0.50-0.80	0.04	0.045	0.60	1.00-1.50	0.45-0.65	0.50	Cu < 0.5	485-655	275	20	35	
A 217 WC 9	0.05-0.18	0.40-0.70	0.04	0.045	0.60	2.00-2.75	0.90-1.20	0.50	Cu < 0.5	485-655	275	20	35	
A 217 C 5	0.20	0.40-0.70	0.04	0.045	0.75	4.00-6.50	0.45-0.65	0.50	Cu < 0.5	620-795	415	18	35	
A 217 C 12	0.20	0.35-0.65	0.04	0.05	1.00	8.00-10.00	0.90-1.20	0.50	Cu < 0.5	620-795	415	18	35	
A 217 CA 15	0.15	1.00	0.04	0.04	1.50	11.50-14.00	0.50	1.00	-	620-795	450	18	30	
A 105	0.35	0.60-1.05	0.035	0.04	0.10-0.35	0.30	0.12	0.40	Cu < 0.4	485	250	22	30	max 187 HB
A 182 F 5	0.15	0.30-0.60	0.03	0.03	0.50	4.00-6.00	0.44-0.65	0.50	-	485	275	20	35	143-217 BHN
A 182 F 6 A	0.15	1.00	0.04	0.03	1.00	11.50-13.50	-	0.50	-	585	380	18	35	167-229 BHN
A 182 F 11	0.10-0.20	0.30-0.80	0.04	0.04	0.50-1.00	1.00-1.50	0.44-0.65	-	-	485	275	20	30	143-207 BHN
A 182 F 12	0.10-0.20	0.30-0.80	0.04	0.04	0.10-0.60	0.80-1.25	0.44-0.65	-	-	485	275	20	30	143-207 BHN
A 182 F 22	0.05-0.15	0.30-0.60	0.04	0.04	0.50	2.00-2.50	0.87-1.13	-	-	515	310	20	30	156-207 BHN
A 182 F 304	0.08	2.00	0.045	0.03	1.00	18.00-20.00	-	8.00-11.00	N < 0.1	515	205	30	50	
A 182 F 316	0.08	2.00	0.045	0.03	1.00	16.00-18.00	2.00-3.00	10.00-14.00	N < 0.1	515	205	30	50	
A 350 LF2	0.35	0.60-1.35	0.035	0.040	0.15-0.30	0.30	0.12	0.40	Cu < 0.4	485 - 655	250	22	30	
A 276 TP 410	0.15	1.00	0.04	0.03	1.00	11.50-13.50	-	-		480	275	20	45	
A 276 TP 304	0.08	2.00	0.045	0.030	1.00	18.00-20.00	-	8.00-10.50	N < 0.1	515	205	30	40	
A 276 TP 304L	0.08	2.00	0.045	0.03	1.00	16.00-18.00	2.00-3.00	10.00-14.00	N < 0.1	515	205	30	40	
A 276 TP 316L	0.03	2.00	0.045	0.030	1.00	18.00-20.00		8.00-12.00	N < 0.1	485	170	40	50	
B 164 - MONEL	0.30	2.00	-	0.024	0.50	-		63.00	Cu 28-34 Al max 3.00	550	275	30	-	
STELLITE - 6	0.90-1.40	1.00	0.04	0.04	1.50	27.00-31.00	1.50	3.00	W 3.5-5.5 Fe 3.00 bal.Co	895		1		344 BHN MIN
439 D2C	2.9	1.80-2.40	0.08	-	1.00-3.00	0.50		21.00-24.00		400	193	20		121-171 BHN
AL- BRONZE-B 148 Gr.955		3.50						3.00-5.50	Cu min 78.00 Fe 3.00-5.00 Al 10.00-11.50	620	275	6		190 BHN
A 193 GR.B7	0.37-0.49	0.65-1.10	0.035	0.04	0.15-0.35	0.75-1.20	0.15-0.25			860	725	16	50	35 HRC max
A 193 GR.B7M	0.37-0.49	0.65-1.10	0.035	0.04	0.15-0.35	0.75-1.20	0.15-0.25			690	552	18	50	99 HRB max
A 193 GR.B16	0.36-0.47	0.45-0.70	0.035	0.04	0.15-0.35	0.80-1.15	0.50-0.65		Va 0.25 - 0.35 Al 0.015	860	725	18	50	35 HRB max
A 193 GR.B8	0.08	2.00	0.045	0.03	1.00	18.00-20.00		8.00-11.00		517	207	30	50	96 HRB max
A 193 GR.B8M	0.08	2.00	0.045	0.030	1.00	16.00-18.00	2.00-3.00	10.00-14.00		517	207	30	50	96 HRB max
A 320 GR.L7	0.38-0.48	0.75-1.00	0.035	0.04	0.15-0.35	0.80-1.10	0.15-0.25			860	725	16	50	
A 194 GR.2H	min 0.40	1.00	0.040	0.05	0.40									24-38 HRC
A 194 GR.2HM	min 0.40	1.00	0.040	0.05	0.40									22 HRC max
A 194 GR.8	0.08	2.00	0.045	0.03	1.00	18.00-20.00		8.00-11.00						126-300 BHN
A 194 GR.8M	0.08	2.00	0.045	0.03	1.00	16.00-18.00	2.00-3.00	10.00-14.00						126-300 BHN
A 194 GR.7	0.37-0.49	0.65-1.10	0.040	0.04	0.15-0.35	0.75-1.20	0.15-0.25							24-38 HRC
A 194 GR.4	0.40-0.50	0.70-0.90	0.035	0.04	0.15-0.35		0.20-0.30							24-38 HRC

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