

PRODUCT SPECIFICATIONS



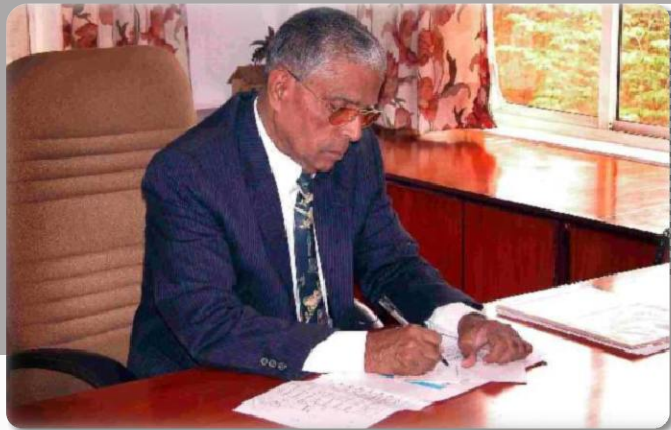
Head Office : 106, Morya House, Off New Link Road, Andheri (W), Mumbai - 400 053, India.
Tel.: +91 (22) 6679 1773 / 74 / 75 **Fax :** +91 (22) 6679 1772 **Web :** www.bellowseal.com **Email :** valves@vsnl.com

Factory : Subramanyanagar, Puttur Village, Dist. Udipi, P.O. Santhekatte - 576 105, Karnataka, India.
Tel.: +91 (820) 2581730 / 31 / 2581157 **Fax :** +91 (820) 2581355



Created for those in search of Perfection...!





List of Contents

01.	Bellow Seal Design Features	04
02.	Bellow Formation & Test	05
03.	What's new at Bellow Seal	06 - 07
04.	Introduction	08
05.	Range of Production	09
06.	Third Party Inspection	11
07.	Cast Bellow Seal Gate Valve Flanged End	12
08.	Forged Bellow Seal Gate Valve Flanged End	13
09.	Forged Bellow Seal Gate Valve	14
10.	Cast Bellow Seal Globe Valve Flanged End	15
11.	Forged Bellow Seal Globe Valve Flanged End	16
12.	Forged Bellow Seal Globe Valve	17
13.	Forged Bellow Seal Globe Valve Compact Design	18
14.	Chlorine Bellow Seal Globe Valve Flanged End	19
15.	Flush Bottom Bellow Seal Globe Valve Flanged End	20
16.	Bellow Seal Y-Type Globe Valve Flanged End	21
17.	Angle Type Bellow Seal Globe Valve Flanged End	22
18.	Bellow Seal Cryogenic Valve	23
19.	Special Products	24 - 25
20.	Chemical & Physical Properties	26
21.	Trim Descriptions	27
22.	CV Flow Coefficient Table	28
23.	API 600-Cast Steel Valves Flanges, Weight & CV Flow Coefficients	29
24.	Conversion Inches to Millimeters	30
25.	Flange End Dimensions as Per ASME B 16.5	31
26.	Flange Dimensions as Per DIN Std. Straight Way & Angle Type	32
27.	Pressure Temperature Ratings ASME B 16.34 - 2004	33
28.	Pressure Temperature Ratings ASME B 16.34 - 2004	34

From the Chairman's Desk

Greetings to you dear customer. In the year 1991 Bell-O-Seal Valves P. Ltd came into existence. A humble beginning, travel through lot of rough weather, ups and downs. Our Managing Director Mr. Rajesh Salins whose hard work, dedication, able leadership and excellent public relation, our company could travel smoothly from strength to strength, year after year. Today, our company has earned a prominent place in the Indian Market and given a significant dent to the International Market.

Our present team consists of an able Vice President who leads a set of honest, sincere, hard working Engineers and Technicians working day and night in Design, Research and Development, Quality Control and other development activities.

The key to our growth has been the constant thirst for innovation with the aid of technology. With the constant effort of our Research Department we now offer a wider range of products. Apart from the Bellow Seal Range of products, we have introduced Polymer Gate Valves, Gate, Globe and Check Valves and Special Valves for the Nuclear and Atomic Energy Department, etc. The company has achieved ISO 9001 : 2000 Certification and CE Marking (TUV), while the API Certification is on the way.

Today nearly 70% of our production is consumed by the International Market. Due to continued increase in demand from Domestic and International Market, serious thoughts are on hand for further expansion to increase capacities.

I would like to thank all our esteemed customers who have stood by us in our difficult times and helped us to realize our achievements. I would also like to record my appreciation to the present Management Team who, I am sure, are in a position to meet all challenges they face in our task of achieving perfection and growing further to the set target.

G. Salins
Chairman



Bellow Seal Design Features

- Design Standards
 - API 602 for forged gate valves
 - EN ISO15761 for forged globe valves
 - API 600 for Cast Gate Valves
 - BS1873 for Cast Globe Valves
 - ASME B 16.34 for Cast Globe and Gate Valve
- Bellow Inspection and Test : MSS SP - 117
- Cycle Life upto and including class 800 Forged Valves : as per EN ISO 15761
 - Min. 5,000 Cycles for Globe Valves
 - Min. 2,000 Cycles for Gate Valves
 - For class above 800, Minimum 2000 cycles for Globe Valve,
 - Minimum 2000 cycles for Gate Valve
- Cycle Life for Forged Valves & all classes Cast Valves : as per MSS SP-117

Size(inch)	upto and including class 800		above class 800	
	Gate Valve	Globe Valve	Globe Valve	Globe Valve
≤2	2,000	5,000	2,000	2,000
2-1/2 ~ 4	2,000	5,000	1,000	2,000
>4	1,000	2,000	1,000	1,000

- Cycle Life Test is performed with the valve under the pressurised conditions.
- Non-Rotating stem prevents torsion of bellows.
- Two Secondary Stem Seals :
 - Stem backseat and stem packing ensure perfect sealing when a bellow is damaged.
- Long Life Seating Surface :
 - Stellite 6 faced both seat and wedge/disc to prevent seizing and galling.
- End Flanged Dimension : ASME B16.5
- Butt Weld End Dimension : ASME B16.25
- Face to Face & End to End : ASME B16.10
- Helium Leak Test is performed for each bellow assembly using a Helium detector with sensitivity of 10⁻⁹ Std cc/sec.
- Bellow Material : SS321, SS316Ti, Inconel 625, Hastelloy C276, etc.
- Multi-Ply Bellows : Minimum 2 ply bellows
- Soft Seat Insert on Globe Disc :
 - Soft seat also available for Gas or Vacuum Service.



Metal Bellows Production - Tube welding



Simultaneous hydroforming



Laser welding „bellows to end parts“

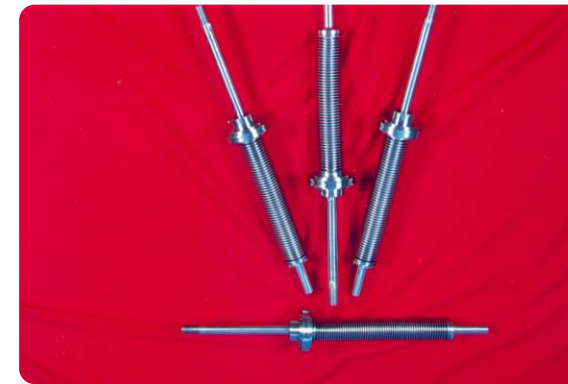


Helium leak testing

"Pictures courtesy WITZEMANN GMBH"



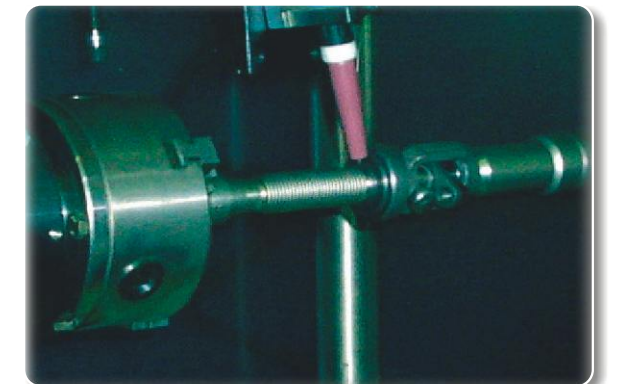
Bellow Formation & Test



Bellows



Helium Leak Testing



Welding of Bellows



Hydroformed Bellows



What's New At Bellow Seal



Jacketed Fabricated Gate Valve 1"-20"NB



14"NB Bellow Seal Gate Valve
(Exported to The Netherlands)



10"-14"NB Bellow Seal Gate Valve
(Shipped to Reliance Industries Limited)



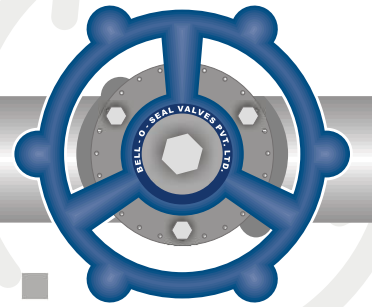
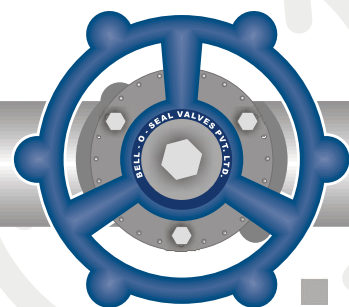
18"NB Bellow Seal Gate Valve
(Exported to USA)



Bellow Seal Valve Exported to Europe



Bellow Seal Valves Exported to China & Taiwan



Introduction

A large volume and wide variety of hazardous and toxic materials are currently use. Coupled with increasingly stringent regulatory requirements positive containment and control measures have become mandatory.

Bell-O-Seal Valves are well qualified to provide technological assistance for applications involving hazardous and difficult-to-handle fluids and gases.

Bell-O-Seal engineers combine more than 15 years of experience in valve design and development with expertise in metallurgical techniques. Their strategic use of **Stainless Steel, Inconel, Monel, Hastelloy** and other high performance metals and alloys makes **Bell-O-Seal** Valves the optimum choice worldwide for a broad range of applications.

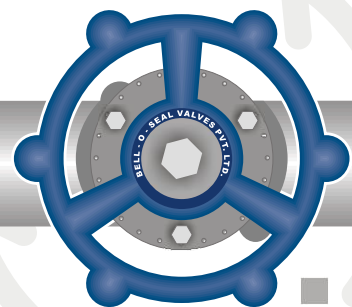
The exceptional versatility, superior operating characteristics, robust construction and consistent dependability of **Bell-O-Seal** Valves have won us widespread acceptance across the industry, especially chemical and hydrocarbon processing industries.

Typical applications of our valves include : **Thermic fluid, Ammonia, Chlorine, Phosgene, Butadine, Benzene, Ethylene, Hydrochloric acid, Hydrogen, Steam, Fatty acid** to name just a fraction of the many possible uses.

Our uniquely engineered, of time and performance tested Bellow Seal Valves assure safer operating conditions and compliance with anti-pollution regulations.

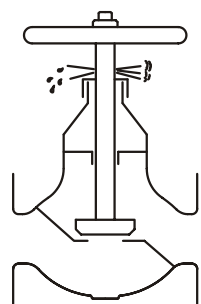
Our '**Zero Stem**' leakage design eliminates product losses, hazards to humans, the environment, and costly downtime required for packing maintenance.

Our Valves are available in all popular sizes in flanged, threaded as well as weld end configurations.

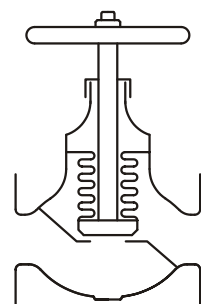


Why Bellow Seal Valves

One of the most frequent and serious problems valves face is gland leakage, results in wasted and increased plant downtime. Apart from the high cost of energy losses, Gland leakages can also cause serious environmental, ecological and health hazards to plant workers and personnel. Leakage of sensitive material can also constitute to a fire hazard, explosion, or damage to equipment by corrosive material. Air entering the pipeline could produce inflammable explosive or poisonous mixtures. Gland packed valves often demand continual maintenance in accessibility creating particular difficulties. The bellows comply to conditions at high temperatures and are capable of withstanding over 10,000 cycles without failure.



Ordinary Valve



Bellow Seal Valve



Critical Test For Bellows

Fatigue / Cycle Test

Cyclic Test for the bellow is carried out for testing the fatigue strength of the bellows. Minimum 10,000 cycles (i.e. to and fro Axial movement of the bellow) are carried out for each type of the bellow on a special spring rate testing fixture and bellow cyclic testing machine available in house.

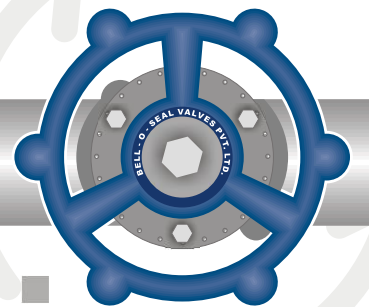
Helium Leak Test (On MSLD)

Bellow Seal Valves for Vaccum Services, Helium Leak test is essential. This test is carried in-house at our works whereby valves will be tested at 10^{-6} Torr with Helium Gas. This would only help to certify whether the valve is suitable for Vaccum and other critical application or not.

Range Of Production

Material of Contruction :

- 1) Shell Material : Cast Steel - WCB / WCC / WC6 / WC9 / LCC / LCB / LC1 / LC3
Cast Stainless Steel - CF8 / CF8M / CF3 / CF3M / CG8 / CG8M, 904L / 904
 - 2) Special Alloys : Inconel - 625 (CW6MC) / Inconel 600 (CY40) / Hastelloy / Monel
 - 3) Forged Steel : A 105 / F304 / F316 / F304L / F316L / LF2
 - 4) Bellow Material : AISI - 321 / AISI - 316 Ti / Inconel - 625 / Hastelloy C - 276
- Radiography of the casting is carried out at the foundry level as per ASTM E446 / E186 and acceptance criteria as per ASME B 16.34 / ASME Section VIII.
 - Visual method for evaluation of Surface Irregularities to MSS SP - 55
 - LP Examination as per ASME Section VIII Div1, ASTM E165, ASME Section V & ASME B 16.34
 - Magnetic Particle Examination Method to ASTM E 609.



Type of Valve :

- Bellow Seal Gate Valve
- Bellow Seal Globe Valve
- Bellow Seal Jacketed Valve
- Bellow Seal Flush Bottom Valve
- Jacketed Fabricated Gate Valve

Size and Class :

ASA 150# 1/2" to 30"	1/2" to 2" in Forging	1/2" to 30" in Casting
ASA 300# 1/2" to 30"	1/2" to 2" in Forging	1/2" to 30" in Casting
ASA 600# 1/2" to 12"	1/2" to 2" in Forging	1/2" to 12" in Casting
ASA 800# 1/2" to 2"	Forging	
ASA 1500# 1/2" to 6"	1/2" to 2" in Forging	1/2" to 6" in Casting
ASA 2500# 1/2" to 4"	1/2" to 2" in Forging	1/2" to 4" in Casting

Bellow Seal Valves are also manufactured as per DIN and JIS Specification as per the client's requirement.

Third Party Inspection

List Of Approved Inspection Agencies (Inspection is carried out at our works)

- Lloyds Register Indl. Services India Ltd.
- Bureau Veritas Industrial Services (I) Ltd.
- Krupps Uhde India Ltd.
- Kvaerner Power Gas India Ltd.
- Jacobs H & G Ltd.
- Technimont ICB Ltd.
- Toyo Engineering (India) Ltd.
- IBI Chematur (Engineering & Consultancy) Ltd. / Chematur Engineering
- Linde Process Technologies (India) Ltd.
- Nuclear Power Corporation of India Ltd. (Dept. of Atomic Energy)
- Engineers India Ltd.
- Projects & Development India Ltd.
- Fact Engineering & Design Organisation (FEDO)
- Dalal Consultants & Engineers India Ltd.
- Protech Consultants Pvt. Ltd.
- Directorate Of Steam Boilers (I.B.R.)
- Mazgaon Docks Ltd.
- Larsen & Toubro Ltd.
- Foster Wheeler
- TUV
- DNV
- Germanischer Lloyd
- BARC
- BAX COUNCIL

Quality Control Activities

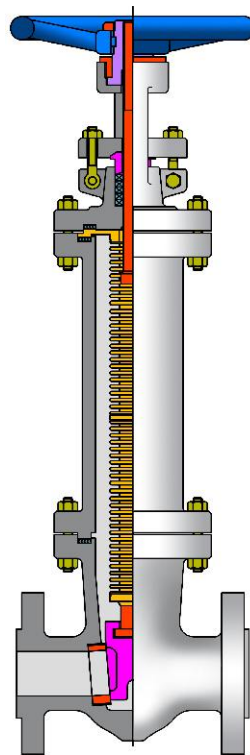
Quality Assurance Systems are being followed to ISO 9001 : 2000 (TUV Certified) standards in achieving a high degree of efficiency in operations. Constant efforts are made for the improvement of techniques, the following inspection methods are followed during manufacturing.

- Visual Inspection
- Dye - Penetrant Testing
- Hydro and Air Testing
- Helium Leak Testing
- Bellow Cyclic Testing

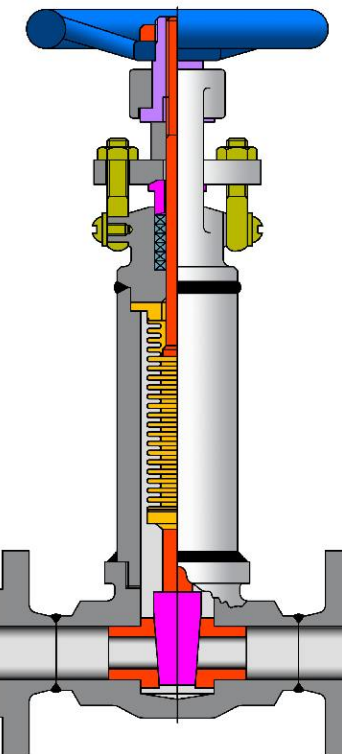
Cast Bellow Seal Gate Valve Flanged End

Sr. No.	Parts	Material	Material
1	Body	ASTM - A 216 Gr. WCB	ASTM - A 351 Gr. CF8 / CF8M
2	Seat Ring	ASTM - A 216 Gr. WCB	ASTM - A 351 Gr. CF8 / CF8M
3	Wedge	ASTM - A 216 Gr. WCB	ASTM - A 351 Gr. CF8 / CF8M
4	Stem	AISI - 410	AISI - 304 / 316
5	Gasket	SPW. SS - 304 + Graphite	SPW. SS-304 + PTFE
6	Bonnet	ASTM - A 216 Gr. WCB	ASTM - A 351 Gr. CF8 / CF8M
7	Fasteners	ASTM - A193 Gr.B7 / A194 Gr.2H	HASTM - A 193 Gr.B8 / A 194 Gr.8
8	Bellow	AISI - 321 / 316Ti	AISI - 321 / 316Ti
9	Packing	Graphite	PTFE
10	Gland Bush	AISI - 410	AISI - 304 / 316
11	Gland Flange	C.S.	AISI - 304 / 316
12	Cross Bolt	C.S.	AISI - 304
13	Eye Bolt & Nut	C.S.	AISI - 304
14	Yoke Sleeve	S.G. Iron	S.G. Iron
15	Hand Wheel	C.S. Fabricated / S.G. Iron	C.S. Fabricated / S.G. Iron
16	Cylinder	C.S. ASTM - A 216 Gr. WCB	ASTM - A 351 Gr. CF8 / CF8M
17	Hand Wheel Nut	C.S.	AISI - 304 / 316
18	Hand Wheel Key	C.S.	AISI - 304 / 316
19	Yoke Nut	AISI - 410	AISI - 304 / 316
20	Top Collar	AISI - 316	AISI - 316
21	Middle Collar	AISI - 316	ISI - 316
22	Bottom Collar	AISI - 316	AISI - 316

Class : 150 & 300

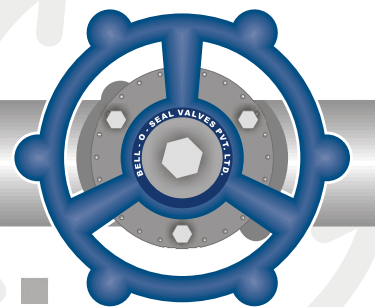
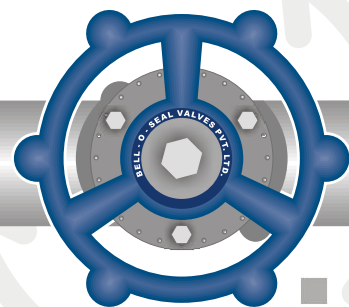


Class : 150 & 300



Forged Bellow Seal Gate Valve Flanged End

Sr. No.	Parts	Material	Material
1	Body	ASTM - A 105	ASTM - A 182 Gr. F304 / F316
2	Seat Ring	AISI - 410	AISI - 304 / 316
3	Wedge	AISI - 410	AISI - 304 / 316
4	Stem	AISI - 410	AISI - 304 / 316
5	Bellow	AISI - 321 / 316Ti	AISI - 321 / 316Ti
6	Bonnet	ASTM - A 105	ASTM - A 182 Gr. F304 / F316
7	Gland Packing	Graphite	PTFE
8	Eye Bolt & Nut	C.S.	AISI - 304
9	Gland Bush	AISI-410	AISI - 304 / 316
10	Gland Flange	ASTM - A 105 / C.S.	AISI - 304 / 316
11	Yoke Sleeve	S.G. Iron	S.G. Iron
12	Hand Wheel	C.S. Fabricated / S.G. Iron	C.S. Fabricated / S.G. Iron
13	Cylinder	C.S. Fabricated	AISI - 304 / 316 Fabricated
14	Bellow Collar	AISI - 304 / 316	AISI - 304 / 316
15	Top Collar	AISI - 304 / 316	AISI - 304 / 316
16	Screw	C.S.	S.S.
17	Hand Wheel Nut	C.S. / AISI - 410	AISI - 304 / 316
18	End Flange	C.S. Fabricated	AISI - 304 / 316 Fabricated



Technical Data

- Valve Designed to API - 602 (1/2", 3/4", 1" & above - API 600)
- Valve Tested to API - 598
- Flanged Ends as per ASME - B 16.5
- Face to Face as per ASME - B 16.10

Note :

- Sizes above 250mm has Two Piece Bonnet
- Optional Stellite Wedge & Seat
- Alternate Bellow Material : HC 276 / Inconel 625

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150

Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	108	117	127	165	178	190	203	229	267	292	330
Flange Diameter	89	99	108	127	152	178	191	229	279	343	406
Flange Thickness	11	13	14	18	19	22	24	24	26	29	30
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	60	70	79	99	121	140	152	191	241	299	362
No.of Holes / Hole Dia.	4/16	4/16	4/16	4/16	4/19	4/19	4/19	8/19	8/22	8/22	12/25

Class : 300

Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	140	152	165	190	216	241	282	305	403	419	457
Flange Diameter	95	118	124	156	165	191	210	254	318	381	445
Flange Thickness	14	16	18	21	22	25	29	32	37	41	48
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	67	83	89	114	127	149	168	200	270	330	387
No.of Holes / Hole Dia.	4/16	4/19	4/19	4/22	8/19	8/22	8/22	8/22	12/22	12/25	16/28

Technical Data

- Valve Designed to API-602
- Valve Tested to API-598
- Flanged Ends as per ASME-B 16.5
- End to End as per ASME-B 16.10

Note :

- Valve upto 50mm NB are from forging
- Optional Full port Design upto 40mmNB
- Optional Stellite Seat & Wedge
- Alternate Bellow Material : HC 276 / Inconel 625

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150

Size - NB (mm)	15	20	25	40
Face To Face	108	117	127	165
Flange Diameter	89	99	108	127
Flange Thickness	11	13	14	18
Raised Face Diameter	35	43	51	73
Raised Face Thickness	1.6	1.6	1.6	1.6
Flange P.C.D.	60	70	79	99
No.of Holes / Hole Dia.	4/16	4/16	4/16	4/16

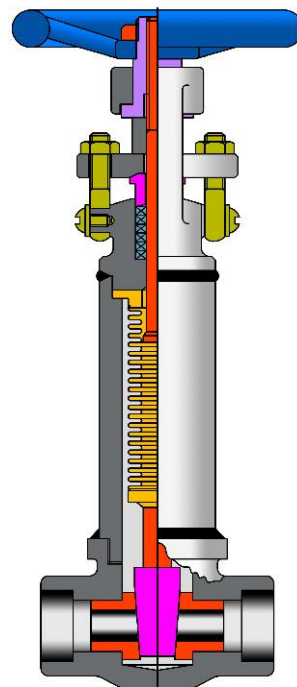
Class : 300

Size - NB (mm)	15	20	25	40	50
Face To Face	140	152	165	190	126
Flange Diameter	95	118	124	156	165
Flange Thickness	14	16	18	21	22
Raised Face Diameter	35	43	51	73	92
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	67	83	89	114	127
No.Of Holes / Hole Dia.	4/16	4/19	4/19	4/22	8/19

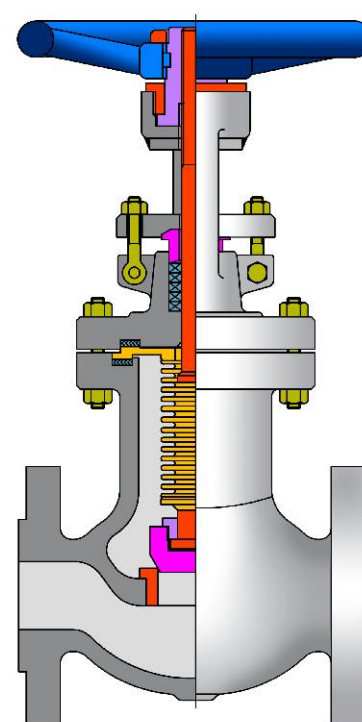
Forged Bellow Seal Gate Valve

Sr. No.	Parts	Material	Material
1	Body	ASTM - A 105	ASTM - A 182 Gr. F304 / F316
2	Seat Ring	AISI - 410	AISI - 304 / 316
3	Wedge	AISI - 410	AISI - 304 / 316
4	Stem	AISI - 410	AISI - 304 / 316
5	Bellow	AISI - 321 / 316Ti	AISI - 321 / 316Ti
6	Bonnet	ASTM A - 105	ASTM - A 182 Gr. F304 / F316
7	Gland Packing	Graphite	PTFE
8	Eye Bolt & Nut	C.S.	AISI - 304
9	Gland Bush	AISI - 410	AISI - 304 / 316
10	Gland Flange	ASTM - A 105 / C.S.	AISI - 304 / 316
11	Yoke Sleeve	S.G. Iron	S.G. Iron
12	Hand Wheel	C.S. Fabricated / S.G. Iron	C.S. Fabricated / S.G. Iron
13	Cylinder	C.S. Fabricated	AISI - 304 / 316 Fabricated
14	Bellow Collar	AISI - 304 / 316	AISI - 304 / 316
15	Top Collar	AISI - 304 / 316	AISI - 304 / 316
16	Screw	C.S.	S.S.
17	Hand Wheel	C.S. / AISI - 410	AISI - 304 / 316

Class : 150 & 300



Class : 150 & 300



Cast Bellow Seal Globe Valve Flanged End

Sr. No.	Parts	Material	Material
1	Body	ASTM - A 216 Gr. WCB	ASTM - A 351 Gr. CF8 / CF8M
2	Guide Plate	C.S.	AISI - 304 / 316
3	Plug	AISI - 410 / WCB	AISI - 304 / 316 / CF8 / CF8M
4	Stem Nut	AISI - 410	AISI - 304 / 316
5	Bellow	AISI - 321 / 316Ti	AISI - 321 / 316Ti
6	Gasket	SPW. SS - 304 + Graphite	SPW. SS - 304 + PTFE
7	Bonnet	ASTM - A 216 Gr. WCB	ASTM - A 351 Gr. CF8 / CF8M
8	Packing	Graphite	PTFE
9	Gland Bush	AISI - 410	AISI - 304 / 316
10	Gland Flange	C.S.	AISI - 304 / 316
11	Stem	AISI - 410	AISI - 304 / 316
12	Cross Bolt & Nut	C.S.	AISI - 304
13	Eye Bolt & Nut	C.S.	AISI - 304
14	Yoke Sleeve	S.G. Iron	S.G. Iron
15	Hand Wheel	C.S. Fabricated / S.G. Iron	C.S. Fabricated / S.G. Iron
16	Fasteners	ASTM - A193 Gr.87/A194 Gr.2H	ASTM - A193 Gr.88 / A194 Gr.8
17	Seat Ring	AISI - 410 / WCB	AISI - 304 / 316 / CF8 / CF8M
18	Bottom Collar	AISI - 316	AISI - 316
19	Top Collar	AISI - 316	AISI - 316
20	Yoke Nut	AISI - 410	AISI - 304 / 316
21	Hand Wheel Key	C.S.	AISI - 304 / 316
22	Hand Wheel Nut	C.S.	AISI - 304 / 316

Technical Data

- Valve Designed to API 602
- Valve Tested to API-598
- Socket Weld Ends as per ASME-B 16.11
- Butt Weld End as per ASME-B 16.25 with End Pups
- Screwed End as per ASME-B 1.20.1 (NPT)
- End to End as per manufacturers spec.

Note :

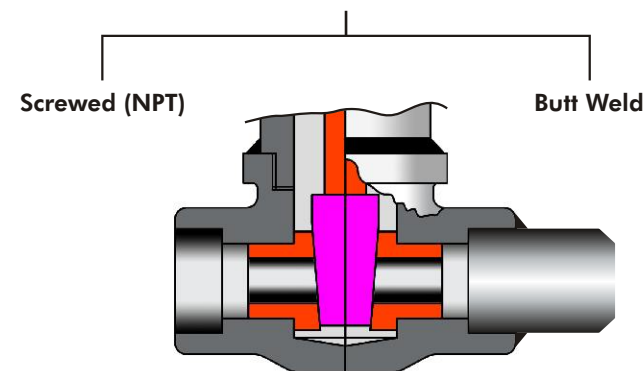
- Valve upto 50mm NB are from forging
- Optional Full port Design upto 40mmNB
- Optional Stellite Seat & Wedge
- Optional Screwed Ends (BSP / NPT)
- Optional Butt Weld Ends
- Optional Socket Weld Ends
- Alternate Bellow Material : HC 276 / Inconel 625

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150 & 300

Size - NB (mm)	8	10	15	20	25	32	40	50
Face To Face	70	70	86	92	106	110	130	145
Socket Diameter	14.10	17.53	21.72	27.05	33.78	42.55	48.64	61.11
Socket Depth	9.7	9.7	9.7	12.7	12.7	12.7	12.7	15.8

Optional Valve Ends



Technical Data

- Valve Designed to BS - 1873
- Valve Tested to API - 598
- Flanged Ends as per ASME - B 16.5
- Face to Face as per ASME - B 16.10

Note:

- Sizes above 250mm has Two Piece Bonnet
- Optional Stellite Plug & Seat
- Alternate Bellow Material: HC 276 / Inconel 625

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150

Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	108	117	127	165	203	216	241	292	406	495	622
Flange Diameter	89	99	108	127	152	178	191	229	279	343	406
Flange Thickness	11	13	14	18	19	22	24	24	26	29	30
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	60	70	79	99	121	140	152	191	241	299	362
No.Of Holes / Hole Dia.	4/16	4/16	4/16	4/16	4/19	4/19	4/19	8/19	8/22	8/22	12/25

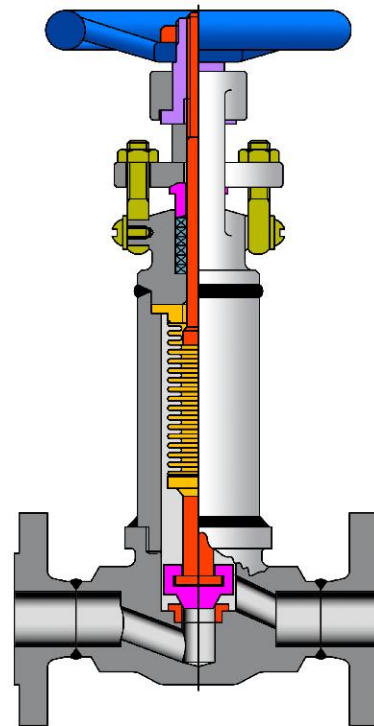
Class : 300

Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	152	178	203	229	267	292	318	356	444	559	622
Flange Diameter	95	118	124	156	165	191	210	254	318	381	445
Flange Thickness	14	16	18	21	22	25	29	32	37	41	48
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	67	83	89	114	127	149	168	200	270	330	387
No.Of Holes / Hole Dia.	4/16	4/19	4/19	4/22	8/19	8/21	8/22	8/22	12/22	12/25	16/28

Forged Bellow Seal Globe Valve Flanged End

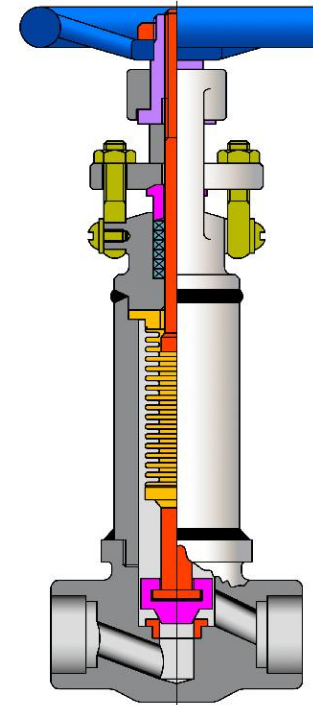
Sr. No.	Parts	Material	Material
1	Body	ASTM - A 105	ASTM - A 182 Gr. F304 / F316
2	Seat Ring	AISI - 410	AISI - 304 / 316
3	Plug	AISI - 410	AISI - 304 / 316
4	Stem	AISI - 410	AISI - 304 / 316
5	Bellow	AISI - 321 / 316Ti	AISI - 321 / 316Ti
6	Bonnet	ASTM - A 105	ASTM - A 182 Gr. F304 / F316
7	Gland Packing	Graphite	PTFE
8	Eye Bolt & Nut	C.S.	AISI - 304
9	Gland Bush	AISI - 410	AISI - 304 / 316
10	Gland Flange	ASTM - A 105 / C.S.	AISI - 304 / 316
11	Yoke Sleeve	S.G. Iron	S.G. Iron
12	Hand Wheel	C.S. Fabricated / S.G. Iron	C.S. Fabricated / S.G. Iron
13	Cylinder	C.S. Fabricated	AISI - 304 / 316 Fabricated
14	Bellow Collar	AISI - 304 / 316	AISI - 304 / 316
15	Top Collar	AISI - 304 / 316	AISI - 304 / 316
16	Screw	C.S.	S.S.
17	Hand Wheel Nut	C.S. / AISI - 410	AISI - 304 / 316
18	End Flange	C.S. Fabricated	AISI - 304 / 316 Fabricated

Class : 150 & 300



BELL SEAL

Class : 150 & 300



BELL SEAL

Sr. No.	Parts	Material	Material
1	Body	ASTM - A 105	ASTM - A 182 Gr. F304 / F316
2	Seat Ring	AISI - 410	AISI - 304 / 316
3	Plug	AISI - 410	AISI - 304 / 316
4	Stem	AISI - 410	AISI - 304 / 316
5	Bellow	AISI - 321 / 316Ti	AISI - 321 / 316Ti
6	Bonnet	ASTM - A 105	ASTM - A 182 Gr. F304 / F316
7	Gland Packing	Graphite	PTFE
8	Eye Bolt & Nut	C.S.	AISI - 304
9	Gland Bush	AISI - 410	AISI - 304 / 316
10	Gland Flange	ASTM - A 105 / C.S.	AISI - 304 / 316
11	Yoke Sleeve	S.G. Iron	S.G. Iron
12	Hand Wheel	C.S. Fabricated / S.G. Iron	C.S. Fabricated / S.G. Iron
13	Cylinder	C.S. Fabricated	AISI - 304 / 316 Fabricated
14	Bellow Collar	AISI - 304 / 316	AISI - 304 / 316
15	Top Collar	AISI - 304 / 316	AISI - 304 / 316
16	Screw	C.S.	S.S.
17	Hand Wheel Nut	C.S. / AISI - 410	AISI - 304 / 316

Technical Data

- Valve Designed to EN-ISO-15761
- Valve Tested to API-598
- Socket Weld Ends as per ASME-B 16.11
- Butt Weld End as per ASME - B - 1.6.25 with End Pups
- Screwed End as per ASME - B 1.20.1 (NPT)
- End to End as per manufacturers specification

Note :

- Valve upto 50mm NB are from forging
- Optional Standard port Design upto 40mmNB
- Optional Stellite Seat & Plug
- Optional Screwed Ends (BSP / NPT)
- Optional Butt Weld Ends
- Optional Socket Weld Ends
- Alternate Bellow Material : HC - 276 / Inconel 625

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Technical Data

- Valve Designed to EN - ISO - 15761
- Valve Tested to API - 598
- Flanged Ends as per ASME-B 16.5
- End to End as per ASME-B 16.10

Note :

- Valve upto 50mm NB are from forging
- Optional Standard port Design upto 40mmNB
- Optional Stellite Seat & Plug
- Alternate Bellow Material : HC 276 / Inconel 625

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150

Size - NB (mm)	15	20	25	40	50
Face To Face	108	117	127	165	203
Flange Diameter	89	99	108	127	152
Flange Thickness	11	13	14	18	19
Raised Face Diameter	35	43	51	73	92
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	60	70	79	99	121
No.of Holes / Hole Dia.	4/16	4/16	4/16	4/16	4/19

Class : 300

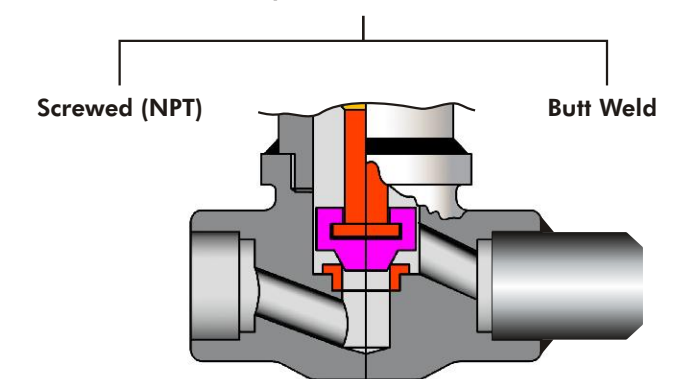
Size - NB (mm)	15	20	25	40	50
Face To Face	152	178	203	229	267
Flange Diameter	95	118	124	156	165
Flange Thickness	14	16	18	21	22
Raised Face Diameter	35	43	51	73	92
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	67	83	89	114	127
No.Of Holes / Hole Dia.	4/16	4/19	4/19	4/22	8/19

Forged Bellow Seal Globe Valve

Class : 150 & 300

Size - NB (mm)	8	10	15	20	25	32	40	50
Face To Face	70	70	86	92	106	110	130	145
Socket Diameter	14.10	17.53	21.72	27.05	33.78	42.55	48.64	61.11
Socket Depth	9.7	9.7	9.7	12.7	12.7	12.7	12.7	15.8

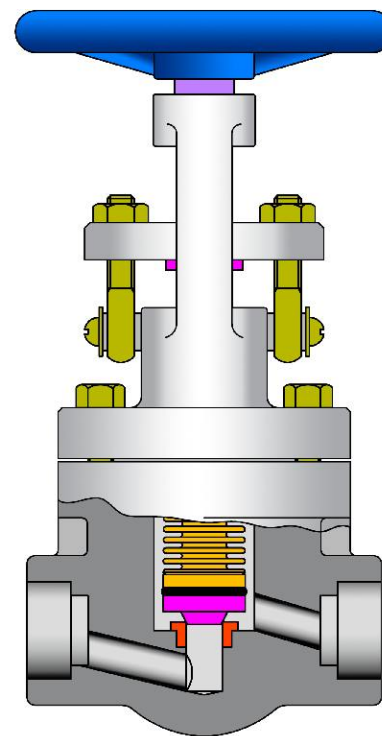
Optional Valve Ends



Forged Bellow Seal Globe Valve Compact Design

Sr. No.	Parts	Material
1	Body	ASTM - A 105
2	Bellow	AISI - 321 / 316Ti
3	Plug	AISI - 410
4	Stem	AISI - 410
5	Bonnet	ASTM - A 105
6	Gasket	SPW SS 304 + Graphite
7	Fasteners	ASTM - A193 Gr.B7
8	Packing	Graphite
9	Eye Bolt & Nut	C. S.
10	Gland Bush	AISI - 410
11	Gland Flange	ASTM - A 105 / C.S.
12	Yoke Sleeve	SG Iron
13	Hand Wheel	C. S. / S.G. Iron
14	Hand Wheel Nut	C. S.
15	Screw	C. S.
16	Bottom Collar	AISI - 304 / 316
17	Top Collar	AISI - 304 / 316

Class : 150 & 300



BELL SEAL

Technical Data

- Valve Designed to EN-ISO-15761
- Valve Tested to API-598
- Socket Weld Ends as per ASME-B 16.11
- Butt Weld End as per ASME-B 16.25 with End Pups
- Screwed End as per ASME-B 1.20.1 (NPT)
- End to End as per manufacturers specification

Note :

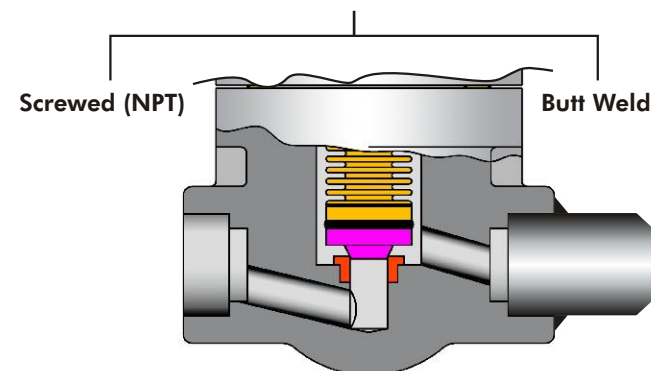
- Valve upto 40mm NB are from forging
- Optional Standard port Design upto 40mmNB
- Optional Stellite Seat & Plug
- Optional Screwed Ends (BSP / NPT)
- Optional Butt Weld Ends

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150 & 300

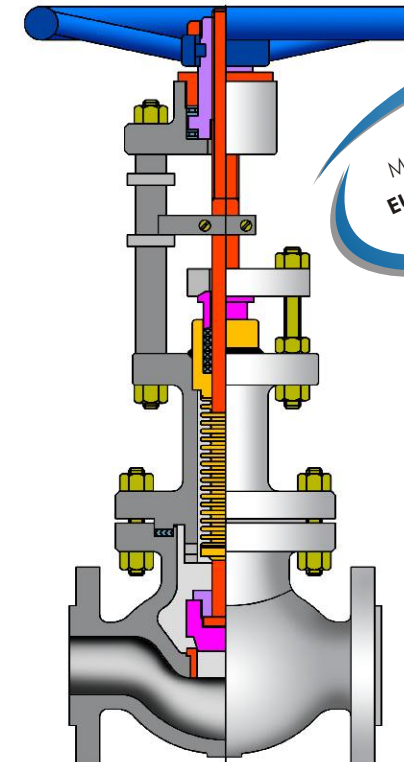
Size - NB (mm)	8	10	15	20	25	32	40	50
Face To Face	70	70	92	92	106	110	130	145
Socket Diameter	14.10	17.53	21.72	27.05	33.78	42.55	48.64	61.11
Socket Depth	9.7	9.7	9.7	12.7	12.7	12.7	12.7	15.8

Optional Valve Ends



Chlorine Bellow Seal Globe Valve Flanged End

Class : 150 & 300



Manufactured Similar to
EURO CHLORO DESIGN
GEST 89 / 140

Sr. No.	Parts	Material
1	Body	ASTM - A - 352 Gr. LCB / LCC
2	Seat Ring	AISI 316L / Hastalloy - C
3	Plug	AISI 316L / Hastalloy - C
4	Stem	AISI 316L / Hastalloy - C
5	Gasket	SPW, SS 316 + PTFE
6	Bellow	Hastalloy - C - 276
7	Bellow Collar	Hastalloy - C
8	Bonnet	ASTM - A - 352 Gr. LCB / LCC
9	Fasteners	ASTM - A320 Gr.L7/A 194 Gr 7
10	Stuffing Box	Hastalloy - C
11	Gland Packing	PTFE
12	Gland Bush	Hastalloy - C
13	Gland Flange	AISI - 304
14	Pillar Nut	AISI - 304
15	Gland Stud & Nut	AISI - 304
16	Yoke Sleeve	Ni-Resist
17	Hand Wheel	C.S. Fabricated / S.G. Iron
18	Stem Nut	AISI 316L / Hastalloy-C
19	Pillar	AISI - 304
20	Guide Plate	AISI - 304
21	Yoke	ASTM - A 352 Gr. LCB / LCC
22	Bearing	Std.
23	Yoke Nut	AISI - 304
24	Hand Wheel Key	AISI - 304
25	Hand Wheel Nut	AISI - 304

BELL SEAL

Technical Data :

- Valve Designed to BS - 1873
- Valve Tested to API - 598
- Flanged Ends as per ASME - B 16.5
- Face to Face as per ASME - B 16.10
- Optional Stellite Seat & Plug

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	78 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150

Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	108	117	127	165	203	216	241	292	406	495	622
Flange Diameter	89	99	108	127	152	178	191	229	279	343	406
Flange Thickness	11	13	14	18	19	22	24	24	26	29	30
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	60	70	79	99	121	140	152	191	241	299	362
No.Of Holes / Hole Dia.	4/16	4/16	4/16	4/16	4/19	4/19	4/19	8/19	8/22	8/22	12/25

Class : 300

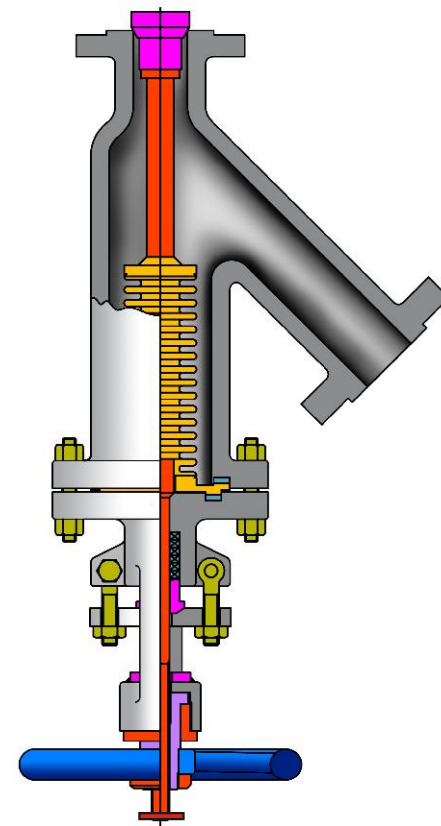
Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	152	178	203	229	267	292	318	356	444	559	622
Flange Diameter	95	118	124	156	165	191	210	254	318	381	445
Flange Thickness	14	16	18	21	22	25	29	32	37	41	48
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	67	83	89	114	127	149	168	200	270	330	387
No.Of Holes / Hole Dia.	4/16	4/19	4/19	4/22	8/19	8/22	8/22	8/22	12/22	12/25	16/28



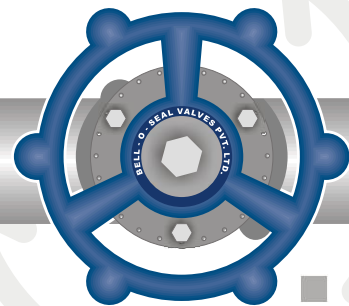
Flush Bottom Bellow Seal Globe Valve Flanged End

Class : 150 & 300

Sr. No.	Parts	Material
1	Body	ASTM - A 351 Gr. CF8 / CF8M
2	Stem Nut	AISI - 304 / 316
3	Plug	AISI - 304 / 316 / CF8 / CF8M
4	Stem	AISI - 304 / 316
5	Gasket	PW. SS - 304 + Graphite / PTFE
6	Bonnet	ASTM - A 351 Gr. CF8 / CF8M
7	Fasteners	A - 193 Gr.B8 / A - 194 Gr. 8
8	Packing	Graphite / PTFE
9	Gland Bush	AISI - 304 / 316
10	Gland Flange	AISI - 304 / 316
11	Cross Bolt & Nut	AISI - 304
12	Eye Bolt & Nut	AISI - 304
13	Yoke Sleeve	S.G. Iron
14	Hand Wheel	C.S. Fabricated / S.G. Iron
15	Bellow	AISI 316Ti / 321
16	Hand Wheel Nut	AISI - 304
17	Yoke Nut	AISI - 304
18	Guide Plate	AISI - 304
19	Top Collar	AISI - 304 / 316
20	Bottom Collar	AISI - 304 / 316



BELL SEAL



Technical Data

- Valve Designed to BS - 1873 / ASME B 16.34
- Valve Tested to API - 598
- Flanged Ends as per ASME - B 16.5

Test Pressure	150 #	300 #
Body (Hyd)	29 Kg/cm ²	75 Kg/cm ²
Seat (Hyd)	21 Kg/cm ²	55 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150

Size - NB (mm)	40	50	65	80	100	150	200	250
Flange Diameter	127	152	178	191	229	279	343	406
Flange Thickness	18	19	22	24	24	26	29	30
Raised Face Diameter	73	92	105	127	157	216	270	324
Raised Face Thick.	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	99	121	140	152	191	241	299	362
No.Of Holes / Hole Dia.	4/16	4/19	4/19	4/19	8/19	8/22	8/22	12/25

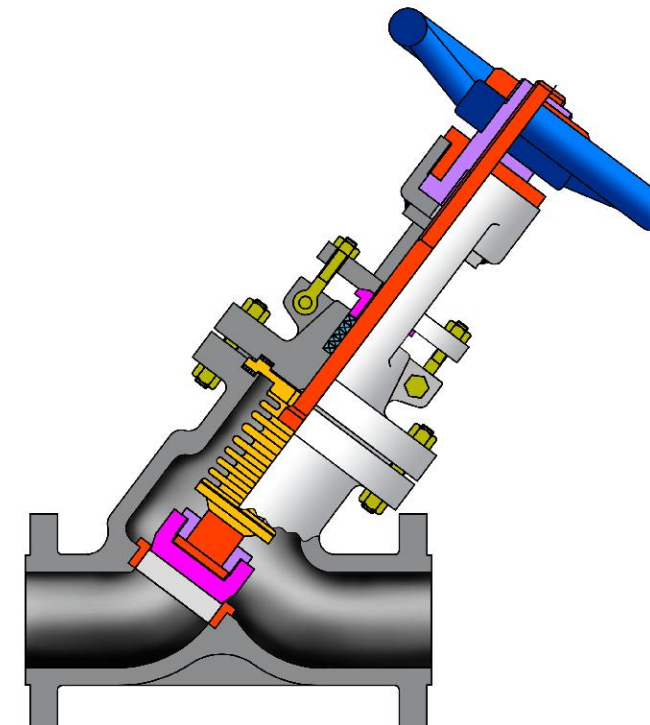
Class : 300

Size - NB (mm)	40	50	65	80	100	150	200	250
Flange Diameter	156	165	191	210	254	318	381	445
Flange Thickness	21	22	25	29	32	37	41	49
Raised Face Diameter	73	92	105	127	157	216	270	324
Raised Face Thick.	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	114	127	149	168	200	270	330	387
No.Of Holes / Hole Dia.	4/22	8/19	8/22	8/22	8/22	12/22	12/25	16/28

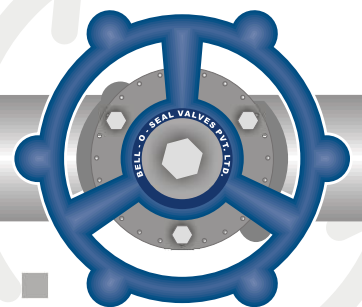
Bellow Seal Y-Type Globe Valve Flanged End

Class : 150 & 300

Sr. No.	Parts	Material
1	Body	ASTM - A 216 Gr. WCB
2	Bonnet	ASTM - A 216 Gr. WCB
3	Plug	AISI - 410 / WCB
4	Seat Ring	AISI - 410 / WCB
5	Stem	AISI - 410
6	Gasket	SPW SS 304 + Graphite
7	Stem Nut	AISI - 410
8	Fasteners	ASTM - A193 Gr.B7/A194 Gr.2H
9	Gland Bush	AISI - 410
10	Gland Flange	C.S.
11	Packings	Graphite
12	Yoke Sleeve	S.G. Iron
13	Eye Bolt Nut	C.S.
14	Hand Wheel	C.S. Fabricated / S.G. Iron
15	Hand Wheel Nut	C.S.
16	Bottom Collar	AISI - 316
17	Bellow	AISI - 316 Ti / 321
18	Top Collar	AISI - 316
19	Cross Bolt	C.S.
20	Guide Plate	C.S.
21	Yoke Nut	AISI - 410



BELL SEAL



Technical Data

- Valve Designed to BS - 1873
- Valve Tested to API - 598
- Flanged Ends as per ASME-B 16.5
- Face to Face as per ASME-B 16.10

Note :

- Optional Stellite Plug & Seat
- Alternate Bellow Material:
HC 276 / Inconel 625

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150

Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	140	152	165	203	229	279	318	368	470	597	673
Flange Diameter	89	99	108	127	152	178	191	229	279	343	406
Flange Thickness	11	13	14	18	19	22	24	24	26	29	30
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	60	70	79	99	121	140	152	191	241	299	362
No.Of Holes / Hole Dia.	4/16	4/16	4/16	4/16	4/19	4/19	4/19	8/19	8/22	8/22	12/25

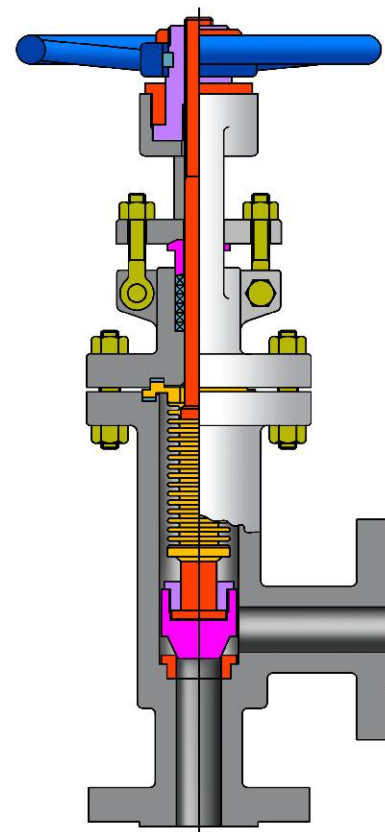
Class : 300

Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	152	178	203	229	267	292	318	356	444	559	622
Flange Diameter	95	118	124	156	165	191	210	254	318	381	445
Flange Thickness	14	16	18	21	22	25	29	32	37	41	48
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	67	83	89	114	127	149	168	200	270	330	387
No.Of Holes / Hole Dia.	4/16	4/19	4/19	4/22	8/19	8/22	8/22	8/22	12/22	12/25	16/28

Angle Type Bellow Seal Globe Valve Flanged End

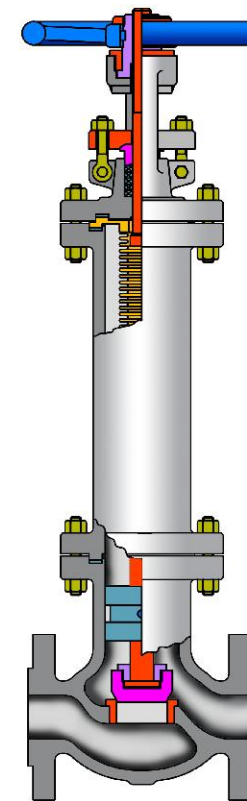
Class : 150 & 300

Sr. No.	Parts	Material	Material
1	Body	ASTM - A 216 WCB	ASTM - A 351 Gr. CF8 / CF8M
2	Seat Ring	AISI - 410	AISI - 304 / 316
3	Plug	AISI - 410 / WCB	AISI - 304 / 316 / CF8 / CF8M
4	Stem	AISI - 410 / WCB	AISI - 304 / 316
5	Gasket	SPW. SS - 304 + Graphite	SPW. SS - 304 + PTFE
6	Bonnet	ASTM - A 216 WCB	ASTM - A 351 Gr. CF8 / CF8M
7	Fasteners	ASTM-A-193 Gr.B7/A-194 Gr. 2H	ASTM-A-193 Gr.B8/A-194 Gr. 8
8	Gland Packing	Graphite	PTFE
9	Gland Bush	AISI - 410	AISI - 304 / 316
10	Gland Flange	C.S.	AISI - 304 / 316
11	Cross Bolt & Nut	C.S.	AISI - 304
12	Eye Bolt & Nut	C.S.	AISI - 304
13	Yoke Sleeve	S.G. Iron	S.G. Iron
14	Hand Wheel	C.S. Fabricated / S.G. Iron	C.S. Fabricated / S.G. Iron
15	Bellow	AISI - 316Ti / 321	AISI - 316Ti / 321
16	Hand Wheel Nut	C.S.	AISI - 304 / 316
17	Yoke Nut	C.S.	AISI - 304 / 316
18	Top Collar	AISI - 316	AISI - 316
19	Bottom Collar	AISI - 316	AISI - 316
20	Stem Nut	AISI - 410	AISI - 304 / 316



BELL SEAL

Class : 150 & 300



BELL SEAL

Bellow Seal Cryogenic Valve

Sr. No.	Parts	Material
1	Body	ASTM - A 351 Gr. CF8 / CF8M
2	Seat Ring	ASTM - A 351 Gr. CF8 / CF8M
3	Plug	ASTM - A 351 Gr. CF8 / CF8M
4	Stem	AISI - 304 / 316
5	Gasket	SPW. SS - 304 + PTFE
6	Bonnet	ASTM - A 351 Gr. CF8 / CF8M
7	Fasteners	ASTM - A193 Gr.B8 / A194 Gr. 8
8	Bellow	AISI - 321 / 316Ti
9	Packing	PTFE
10	Gland Bush	AISI - 304 / 316
11	Gland Flange	AISI - 304 / 316
12	Cross Bolt	AISI - 304 / 316
13	Eye Bolt & Nut	AISI - 304 / 316
14	Yoke Sleeve	S.G. Iron
15	Hand Wheel	C.S. Fabricated / S.G. Iron
16	Cylinder	ASTM - A 351 Gr. CF8 / CF8M
17	Hand Wheel Nut	AISI - 304 / 316
18	Hand Wheel Key	AISI - 304 / 316
19	Yoke Nut	AISI - 304 / 316
20	Top Collar	AISI - 316
21	Middle Collar	AISI - 316
22	Bottom Collar	AISI - 316

Class : 150

Size - NB (mm)	40	50	65	80	100	150	200	250
Face To Face	83	102	108	121	146	203	248	311
Flange Diameter	127	152	178	191	229	279	343	406
Flange Thickness	18	19	22	24	24	26	29	30
Raised Face Diameter	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	99	121	140	152	191	241	299	362
No.Of Holes / Hole Dia.	4/16	4/19	4/19	4/19	8/19	8/22	8/22	12/25

Class : 300

Size - NB (mm)	40	50	65	80	100	150	200	250
Face To Face	114	133	146	159	178	222	279	311
Flange Diameter	156	165	191	210	254	318	381	445
Flange Thickness	21	22	25	29	32	37	41	48
Raised Face Dia.	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	114	127	149	168	200	270	330	387
No.Of Holes / Hole Dia.	4/22	8/19	8/22	8/22	8/22	12/22	12/25	16/28

Technical Data

- Valve Designed to BS - 1873
- Valve Tested to API - 598
- Flanged Ends as per ASME - B 16.5
- Face to Face as per ASME - B 16.10

Note :

- Sizes above 250 mm has Two Piece Bonnet
- Optional Stellite Plug & Seat
- Alternate Bellow Material:
HC 276 / Inconel 625

Test Pressure	150 #	300 #
Body (Hyd)	30 Kg/cm ²	77 Kg/cm ²
Seat (Hyd)	22 Kg/cm ²	57 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Technical Data

- Valve Designed to BS - 1873
- Valve Tested to API - 598
- Flanged Ends as per ASME-B 16.5
- Face to Face as per ASME-B 16.10

Note :

- Sizes above 250mm has Two Piece Bonnet
- Optional Stellite Plug & Seat
- Alternate Bellow Material:
HC 276 / Inconel 625

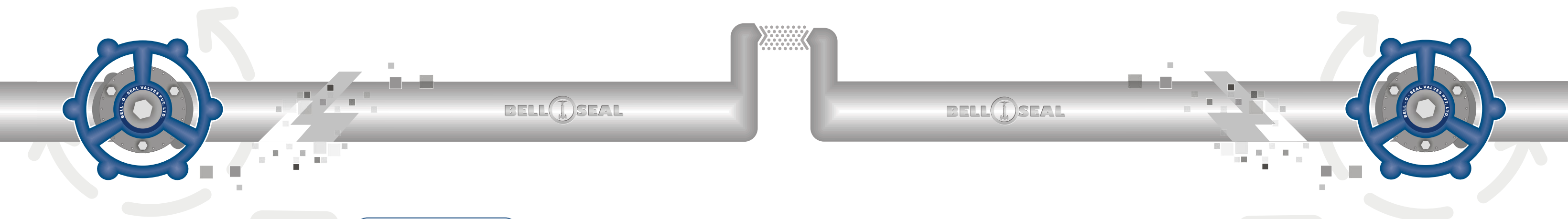
Test Pressure	150 #	300 #
Body (Hyd)	29 Kg/cm ²	75 Kg/cm ²
Seat (Hyd)	21 Kg/cm ²	55 Kg/cm ²
Seat (Air)	07 Kg/cm ²	07 Kg/cm ²

Class : 150

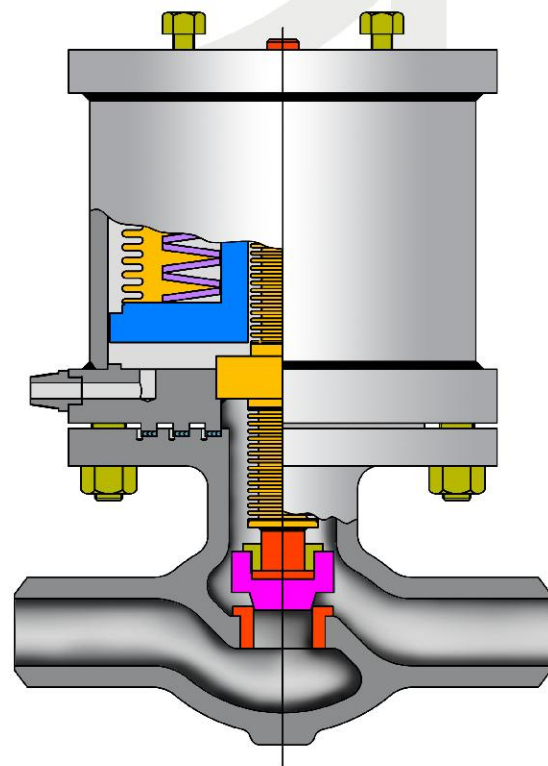
Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	108	117	127	165	203	216	241	292	406	495	622
Flange Diameter	89	99	108	127	152	178	191	229	279	343	406
Flange Thickness	11	13	14	18	19	22	24	24	26	29	30
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	60	70	79	99	121	140	152	191	241	299	362
No.Of Holes / Hole Dia.	4/16	4/16	4/16	4/16	4/19	4/19	4/19	8/19	8/22	8/22	12/25

Class : 300

Size - NB (mm)	15	20	25	40	50	65	80	100	150	200	250
Face To Face	152	178	203	229	267	292	318	356	444	559	622
Flange Diameter	95	118	124	156	165	191	210	254	318	381	445
Flange Thickness	14	16	18	21	22	25	29	32	37	41	48
Raised Face Diameter	35	43	51	73	92	105	127	157	216	270	324
Raised Face Thickness	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Flange P.C.D.	67	83	89	114	127	149	168	200	270	330	387
No.Of Holes / Hole Dia.	4/16	4/19	4/19	4/22	8/19	8/22	8/22	8/22	12/22	12/25	16/28

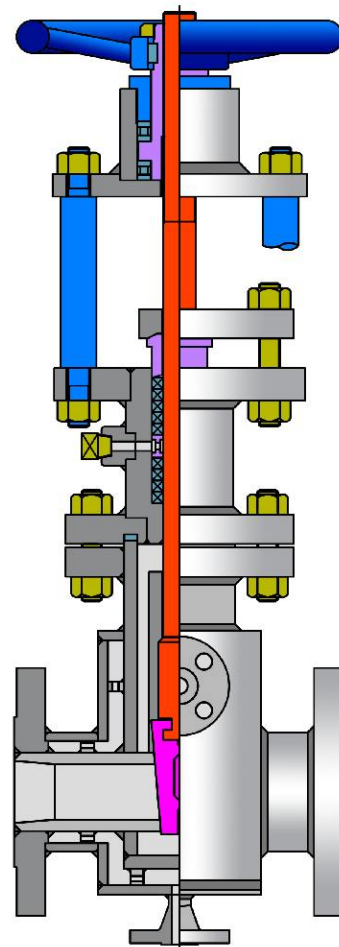


Special Products



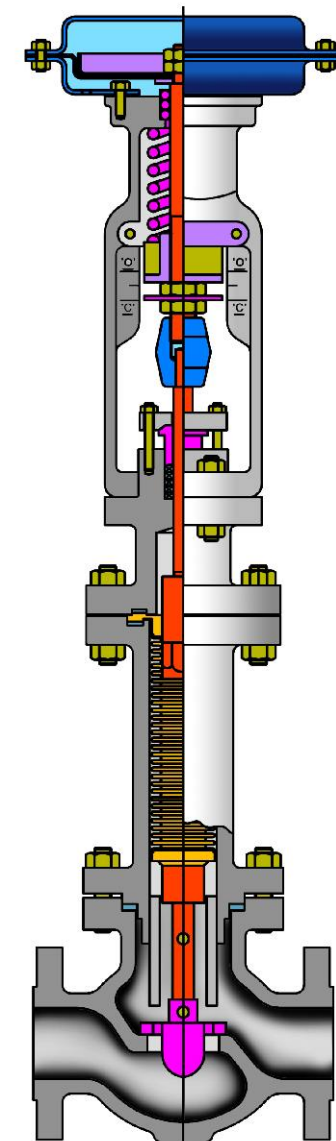
On/Off Bellow Seal
Bellow Operated Valve

Fabricated Jacketed
Gate Valve

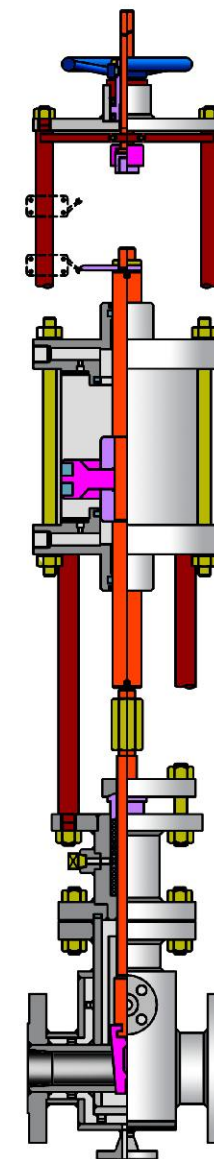


Special Products

Bellow Seal Globe Valve
Actuated (ON/OFF)



Actuated Fabricated Jacketed
Gate Valve



Chemical & Physical Properties

Cast Carbon And Alloy Steel

ASTM Standard	A 216		A 217		A 217		A 217		A 217		A 217		A 352		A 352	
Grade	WCB		WC 6		WC 9		C 5		C 12		C 12A		LCB		LC 3	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Carbon (C)	-	0.30	0.05	0.20	0.05	0.18	-	0.2	-	0.2	0.08	0.12	-	0.3	-	0.15
Manganese (Mn)	-	1.00	0.50	0.80	0.40	0.70	0.40	0.70	0.35	0.65	0.30	0.60	-	1.00	0.50	0.80
Phosphorous (P)	-	0.04	-	0.04	-	0.04	-	0.04	-	0.04	-	0.020	-	0.04	-	0.04
Sulphur (S)	-	0.045	-	0.045	-	0.045	-	0.045	-	0.045	-	0.01	-	0.045	-	0.045
Silicon (Si)	-	0.60	-	0.60	-	0.60	-	0.75	-	1.00	0.20	0.50	-	0.60	-	0.60
Copper (Cu)	-	0.30	-	0.50	-	0.50	-	0.50	-	0.50	-	-	-	0.30	-	-
Nickel (Ni)	-	0.50	-	0.50	-	0.50	-	0.50	-	0.50	-	0.40	-	0.50	3.00	4.00
Chromium (Cr)	-	0.50	1.00	1.50	2.00	2.75	4.00	6.50	8.00	10.00	8.0	9.5	-	0.50	-	-
Molybdenum (Mo)	-	0.20	0.45	0.65	0.90	1.20	0.45	0.65	0.90	1.20	0.85	1.05	-	0.20	-	-
Vanadium (V)	-	0.03	-	-	-	-	-	-	-	-	0.18	0.25	-	0.03	-	-
Tungsten (W)	-	-	-	0.10	-	0.10	-	0.10	-	0.10	-	-	-	-	-	-
Columbium (Cb)	-	-	-	-	-	-	-	-	-	-	0.060	0.10	-	-	-	-
Tensile Strength	70 Ksi	90	70 Ksi	95	70 Ksi	95	90 Ksi	115	90 Ksi	115	85 Ksi	110	65 Ksi	90	70 Ksi	95
Yield Strength	36 Ksi	-	40 Ksi	-	40 Ksi	-	60 Ksi	-	60 Ksi	-	60 Ksi	-	35 Ksi	-	40 Ksi	-
Elongation	22%	-	20%	-	20%	-	18%	-	18%	-	20%	-	24%	-	24%	-
Reduction of Area	35	-	35	-	35	-	35	-	35	-	45	-	35	-	35	-
Temperature	-20F	800F	-20F	1100F	-20F	1100F	-20F	1200F	-20F	1200F	-20F	1200F	-50F	650F	-150F	650F

Trim Descriptions

Trim No.	Seat Nominal Description	Seat Nominal Composition	Nominal Hardness (HB)	Typical Stem Backseat Material	Acceptable Alternate Trim No.
1	F6	13 Cr	250 (a)	Type 410 or 420 (13Cr)	8 or 8 a
2	304	18 Cr - 8 Ni	-	Type 304 (18Cr - 8Ni)	10
3	F310	25 Cr - 10 Ni	-	Type 310 (25Cr - 20Ni)	-
4	Hard F6	Hard 13 Cr	750	Type 410 or 420 (13Cr)	-
5	Hardfaced	Co - Cr - A (b)	350	Type 410 or 420 (13Cr)	-
5A	Hardfaced	Ni - Cr	350	Type 410 or 420 (13Cr)	5
6	F6 and Cu - Ni	13Cr Cu - Ni	250 175	Type 410 or 420 (13Cr) Type 410 or 420 (13Cr)	8
7	F6 Hard F6	13Cr Hard 13 Cr	250 750	Type 410 or 420 (13Cr)	-
8	F6 and Hardfaced	13Cr Co - Cr - A (b)	250 350	Type 410	-
8A	F6 and Hardfaced	13Cr Ni - Cr	250 350	Type 410 or 420 (13Cr)	8
9	Monel	Ni - Cu Alloy	-	Monel (Ni - Cu)	-
10	316	18 Cr - 8 Ni	-	Type 316	-
11	Monel and Hardfaced	Ni - Cu Alloy Trim 5 or 5A	- 350	Monel (Ni - Cu)	-
12	316 and Hardfaced	18Cr - 18Ni Trim 5 or 5A	- 350	Type 316 (18Cr - 8Ni)	-
13	Alloy 20	19Cr - 29Ni	-	Alloy 20 (19Cr - 29Ni)	-
14	Alloy 20 and Hardfaced	19Cr - 29Ni Trim 5 or 5A	- 350	Alloy 20 (19Cr - 29Ni)	-
15	Hardfaced	Co - Cr - A (b)	350	Type 304 (18Cr - 8Ni)	-
16	Hardfaced	Co - Cr - A (b)	350	Type 316 (18Cr - 8Ni)	-
17	Hardfaced	Co - Cr - A (b)	350	Type 347 (18Cr - 8Ni)	-
18	Hardfaced	Co - Cr - A (b)	350	ASTM B 473	-

(a) Minimum 50HB Differential Hardness Between Mating Seating Surfaces

(b) Stellite 6 TM or Equal

Cast Stainless Steels And Nickel Alloy

ASTM Standard	A 351		A 351		A 351		A 351		A 351		A 351		A 494		A 494		A 494		A 494	
Grade	CF 3		CF 8		CF 3M		CF 8M		CN 7M		CD 4 MCU		Cz100		M35 - I		C Y40		CW 12 MW	
Type	304 L		304		316 L		316		Alloy 20		Duplex		Nickel		Monel		Inco 600		Hast.C	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Carbon (C)	-	0.03	-	0.08	-	0.03	-	0.08	-	0.07	-	0.04	-	1.00	-	0.35	-	0.4	-	0.12
Manganese (Mn)	-	1.50	-	1.50	-	1.50	-	1.50	-	1.50	-	1.0	-	1.50	-	1.50	-	1.5	-	1.00
Phosphorous (P)	-	0.040	-	0.040	-	0.040	-	0.040	-	0.040	-	0.040	-	0.030	-	0.030	-	0.03	-	0.040
Sulphur (S)	-	0.040	-	0.040	-	0.040	-	0.040	-	0.040	-	0.040	-	0.030	-	0.030	-	0.030	-	0.030
Silicon (Si)	-	2.00	-	2.00	-	1.50	-	1.50	-	1.50	-	1.00	-	2.00	-	1.25	-	3.00	-	1.00
Copper (Cu)	-	-	-	-	-	-	-	-	3.0	4.0	2.75	3.25	-	1.25	26.0	33.0	-	-	-	-
Nickel (Ni)	8.0	12.0	8.0	11.0	9.0	13.0	9.0	12.0	27.5	30.5	4.75	6.00	95.00	-	-	Bal	-	Bal	-	Bal
Chromium (Cr)	17.0	21.0	18.0	21.0	17.0	21.0	18.0	21.0	19.0	22.0	24.5	26.5	-	-	-	14.00	17.00	15.5	17.5	17.5
Molybdenum (Mo)	-	0.50	-	0.50	2.0	3.0	2.0	3.0	2.0	3.0	1.75	2.25	-	-	-	-	-	16.0	18.0	18.0
Vanadium (V)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.20	0.40	0.40
Tungsten (W)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.75	5.25	5.25
Columbium (Cb)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-
Iron (Fe)	-	-	-	-	-	-	-	-	-	-	-	-	3.00	-	3.5	-	11.0	4.5	7.5	7.5
Tensile Strength	70 Ksi	-	70 Ksi	-	70 Ksi	-	70 Ksi	-	62 Ksi	-	100 Ksi	-	50 Ksi	-	65 Ksi	-	70 Ksi	-	72 Ksi	-
Yield Strength	30 Ksi	-	30 Ksi	-	30 Ksi	-	30 Ksi	-	25 Ksi	-	70 Ksi	-	18 Ksi	-	25 Ksi	-	28.0Ksi	-	40 Ksi	-
Elongation	35%	-	35%	-	30%	-	30%	-	35%	-	16%	-	10%	-	25%	-	30.0%	-	4%	-
Temperature	-425F	800F	-425F	1500F*	-425F	850F	-425F	1500F*	-325F	600F	-20F	600F	-325F	600F	-325F	900F	-325F	1000F	-325F	1000F

*For temperatures over 1000°F, minimum Carbon is 0.04. Customer must specify if temperature is over 1000°F and this minimum Carbon is required.

**For temperature below - 50°F special cryogenic cleaning and bonnet extensions may be required.

Note : Chemical compositions are in units of percent.

CV Flow Coefficient Table

Size In Inches	Gate or Bellow Seal Gate Valves Standard Port		Full Port Gate Valves	Globe Valves		Bellow Seal Globe Valves	
	150 - 800	900 - 1500	150 - 1500	150 - 800	900 - 800	150 - 800	1500 - 2500
1/4, 3/8	2.6	2.6	2.6	2	2	1.5	-
1/2	7	14	14	3	3	2.5	5
3/4	14	14	22	4	4	3.5	7
1	30	30	34	6	8	6	9
1.1/4	85	85	92	14	19	12	30
1.1/2	100	100	110	14	19	12	34
2	160	160	200	33	29	28	38

$$K_v = C_v \times 0.85$$

$$\frac{\text{m}^3/\text{h}}{\sqrt{\text{Kg}/\text{cm}^2}}$$

Data for Calculation of Flow and / or Pressure Drop

A Valve coefficient C_v is used to calculate pressure drop through a particular Valve for a given flow rate. The coefficient of flow C_v expresses the rate of flow in gallons per minute at 60° F water with a pressure drop of 1 psi across the valve. The C_v coefficients for the various types of size, shown in the tables, have been determined from calculations and actual flow tests.

Note: K_v is the metric equivalent of C_v

For Liquids :

$$(1) Q_L = C_v \sqrt{\frac{\Delta P}{G_L}} \quad (2) \Delta P = G_L \left[\frac{Q_L}{C_v} \right]^2$$

Where Q_L = Flow in U.S. Gallons per minute.

ΔP ($P_1 - P_2$) Pressure drop in psi.

G_L Specific gravity of liquid (Water = 1 at 60° F)

For Gas :

$$(3) Q_G = 1360 C_v \sqrt{\frac{\Delta P}{G_G T}} \sqrt{\frac{P_1 + P_2}{2}}$$

$$(4) \Delta P = P_1 - \sqrt{P_1^2 + 2 G_G T \left[\frac{Q_G}{1360 C_v} \right]^2}$$

Where Q_G = Volumetric flow of gas (SCFH)

G_G = Specific gravity of gas at standard conditions

(air at atmosphere and 60° F=1)

T = Absolute temperature of gas (°F + 460)

For Steam :

$$(5) W = \sqrt{\frac{2.1}{1 + 0.0007 T_s}} \times \sqrt{\Delta P = (P_1 + P_2)}$$

$$(6) \Delta P = P_1 - \sqrt{P_1^2 - K^2}$$

$$\text{Where : } K = \left[\frac{1 - 0.0007 T_s}{2.1 C_v} \right] W$$

Note : For saturated steam $T_s=0$

W = Pound per hour of steam

P = ($P_1 - P_2$) Pressure drop in psi

T_s = Degree of superheat (°F)

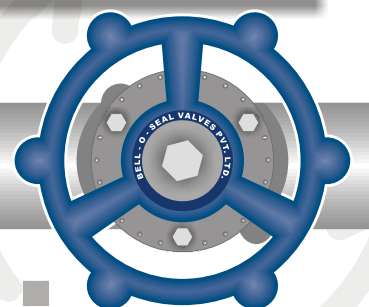
Note : For gas and steam, max. $\Delta P = 1/2 P_1$ and min.

$P_2 = 1/2 P_1$ and P_1, P_2 are absolute pressure (psia)

P_1 = inlet pressure, P_2 = outlet pressure

API 600-Cast Steel Bellow Seal Valves Flanges, Weights & CV Flow Coefficients

ASME Class	Dimensions in Inches						Weight in Kgs.				Cv Flow	
	Size In	Flange Dia	Bolt Circle	Hole Dia.	No. of Holes	Bolt Dia	Gate		Globe		Gate	Globe
			Dia				Bw	Ff	Bw	Ff		
150# Raised Face	2	6.00	4.75	0.75	4	5/8	38	41	28	32	260	35
	2.1/2	7.00	5.50	0.75	4	5/8	50	59	38	42	420	60
	3	7.50	6.00	0.75	4	5/8	67	76	60	66	625	92
	4	9.00	7.50	0.75	8	5/8	112	123	77	83	1150	180
	6	11.00	9.50	0.88	8	3/4	182	195	161	169	2650	430
	8	13.50	11.75	0.88	8	3/4	260	280	295	310	4850	810
	10	16.00	14.25	1.00	12	7/8	350	375	350	375	7750	1400
	12	19.00	17.00	1.00	12	7/8	440	480	750	790	11500	1950
	14	21.00	18.75	1.13	12	1	730	780	1050	1110	14000	2500
	16	23.50	21.25	1.13	16	1	1015	1080	1560	1630	19000	3400
	18	25.00	22.75	1.25	16	1.1/8	1196	1266	2050	2120	24000	4500
	20	27.50	25.00	1.25	20	1.1/8	1375	1455	2400	2490	31000	
300# Raised Face	24	32.00	29.50	1.38	20	1.1/4	1830	1920			45000	
	2"	6.50	5.00	0.75	8	5/8	43	47	30	34	260	35
	2.1/2	7.50	5.88	0.88	8	3/4	55	76	42	46	420	60
	3	8.25	6.62	0.88	8	3/4	98	108	70	75	625	92
	4	10.00	7.88	0.88	8	3/4	154	166	98	104	1150	180
	6	12.50	10.62	0.88	12	3/4	272	287	174	182	2650	430
	8	15.00	13.00	1.00	12	7/8	350	375	350	364	4850	810
	10	17.50	15.25	1.13	16	1	405	440	400	425	7750	1325
	12	20.50	17.75	1.25	16	1.1/8	640	680	950	990	11500	1950
	14	23.00	20.25	1.25	20	1.1/8	930	980	1250	1310	14000	2500
	16	25.50	22.50	1.38	20	1.1/4	1215	1280	1760	1830	19000	3400
	18	28.00	24.75	1.38	24	1.1/4	1396	1466	2250	2320	23500	4500
600# Raised Face	20	30.50	27.00	1.38	24	1.1/4	1575	1655	2600	2690	30000	
	24	36.00	32.00	1.63	24	1.1/2	2030	2120			44000	
	2	6.50	5.00	0.75	8	5/8	58	65	40	48	260	35
	2.1/2	7.50	5.88	0.88	8	3/4	83	90	53	61	420	60
	3	8.25	6.62	0.88	8	3/4	105	115	70	80	625	92
	4	10.75	8.50	1.00	8	7/8	150	160	130	140	1150	180
	6	14.00	11.50	1.13	12	1	310	320	295	310	2650	430
	8	16.50	13.75	1.25	12	1.1/8	590	610	491	510	4850	800
	10	20.00	17.00	1.38	16	1.1/4	890	915	960	980	7750	1250
	12	22.00	19.25	1.38	20	1.1/4	1184	1214			11500	
	14	23.75	20.75	1.50	20	1.3/8	1415	1450			13000	
	16	27.00	23.75	1.63	20	1.1/2	1840	1875			18000	



Conversion Inches To Millimeters

1 inch = 25.4 Millimeters

Inches	0	1/16	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	Inches
0	0.000	1.587	3.175	4.762	6.350	7.937	9.525	11.112	12.700	14.287	15.875	17.762	19.050	20.631	22.225	23.812	0
1	25.400	26.987	28.574	30.162	31.749	34.337	34.924	36.512	38.099	39.687	41.274	42.862	44.449	46.037	47.624	49.212	1
2	50.799	52.387	53.974	55.561	57.149	58.736	60.324	61.911	63.499	65.086	66.674	68.261	69.849	71.436	73.024	74.611	2
3	76.199	77.786	79.374	80.961	82.549	84.723	85.723	87.311	88.898	90.486	92.073	93.661	95.248	96.836	98.423	100.01	3
4	101.60	103.19	104.77	106.36	107.95	109.54	111.12	112.71	114.3	115.89	117.47	119.06	120.65	122.24	123.82	125.41	4
5	127.00	128.59	130.17	131.76	133.35	134.94	136.52	138.11	139.70	141.28	142.87	144.46	146.05	147.63	149.22	150.81	5
6	152.40	153.98	155.57	157.16	158.75	160.33	161.92	163.51	165.10	166.68	168.27	169.86	171.45	173.03	174.62	176.21	6
7	177.80	179.38	180.97	182.56	184.15	185.73	187.32	188.91	190.50	192.08	193.67	195.26	196.85	198.43	200.02	201.61	7
8	203.20	204.78	206.37	207.96	209.13	211.13	212.72	214.31	215.90	217.48	219.07	220.66	222.25	223.83	225.42	227.01	8
9	228.60	230.18	231.77	233.36	234.95	236.53	238.12	239.71	241.30	242.88	244.47	246.06	247.65	249.23	250.82	252.41	9
10	254.00	255.58	257.17	258.76	260.35	261.93	263.52	265.11	266.70	268.28	269.87	271.46	273.05	274.63	276.22	277.81	10
11	279.39	280.98	282.57	284.16	285.74	287.33	288.92	290.51	292.09	293.68	295.27	296.86	298.44	300.03	301.62	303.21	11
12	304.79	306.38	307.97	309.56	311.14	312.73	314.32	315.91	317.49	319.08	320.07	322.26	323.84	325.43	327.02	328.61	12
13	330.19	331.78	333.37	334.96	336.54	338.13	339.72	341.31	342.89	344.48	346.07	347.66	349.24	350.83	352.42	354.01	13
14	355.59	357.18	358.77	360.36	361.94	363.53	365.12	366.71	368.29	369.88	371.47	373.06	374.64	376.23	377.82	379.41	14
15	380.99	382.58	384.17	385.76	387.34	388.93	390.52	392.11	393.69	395.28	396.87	398.46	400.04	401.63	403.22	404.81	15
16	406.39	407.98	409.57	411.16	412.74	414.33	415.92	417.50	419.09	420.68	422.27	423.85	425.44	427.03	428.62	430.20	16
17	431.79	433.38	434.97	436.55	438.14	439.73	441.32	442.90	444.49	446.08	447.67	449.25	450.84	452.43	454.02	455.60	17
18	457.19	458.78	460.37	461.95	463.54	465.13	466.72	468.30	469.89	471.48	473.07	474.65	476.24	477.83	479.42	481.00	18
19	482.59	484.18	485.77	487.35	488.94	490.53	492.12	493.70	495.29	496.88	498.47	500.05	501.64	503.23	504.82	506.40	19
20	507.99	509.58	511.17	512.75	514.34	515.93	517.52	519.10	520.69	522.28	523.87	525.45	527.04	528.63	530.22	531.80	20
21	533.39	534.98	536.57	538.15	539.74	541.33	542.92	544.50	546.09	547.68	549.27	550.85	552.44	554.03	555.61	557.20	21
22	558.79	560.38	561.96	563.55	565.14	566.73	568.31	569.90	571.49	573.08	574.66	576.25	577.84	579.33	581.01	582.50	22
23	584.19	585.78	587.36	588.95	590.54	592.13	593.71	595.30	596.89	598.48	600.06	601.65	603.24	604.83	606.41	608.00	23
24	609.59	611.18	612.73	614.35	615.94	617.53	619.11	620.70	622.29	623.88	625.46	627.05	628.64	630.23	631.81	633.40	24
25	634.99	636.58	638.16	639.75	641.34	642.93	644.51	646.10	647.69	649.28	650.86	652.45	654.04	655.63	657.21	658.80	25
26	660.39	661.98	663.56	665.15	666.74	668.33	669.92	671.50	673.09	674.68	676.26	677.85	679.44	681.03	682.61	684.20	26
27	685.79	687.38	688.96	690.55	692.14	693.72	695.31	696.90	698.48	700.07	701.66	703.25	704.84	706.42	708.01	709.60	27
28	711.19	712.77	714.36	715.95	717.54	719.12	720.71	722.30	723.89	725.47	727.06	728.65	730.24	731.83	733.41	734.00	28
29	736.50	738.17	739.76	741.35	742.94	744.52	746.11	747.70	749.29	750.87	752.46	754.05	755.64	757.22	758.81	760.40	29
30	761.99	763.57	765.16	766.75	768.34	769.92	771.51	773.10	774.69	776.27	777.86	779.45	781.04	782.62	784.21	785.80	30
31	787.39	788.97	790.56	792.15	793.74	795.32	796.91	798.50	800.09	801.67	803.26	804.85	806.44	808.02	809.61	811.20	31
32	812.79	814.37	815.96	817.55	819.16	820.72	822.31	823.90	825.49	827.07	828.66	830.25	831.83	833.42	835.01	836.60	32
33	838.18	839.77	841.36	842.95	844.53	846.12	847.71	849.30	850.88	852.47	854.06	855.65	857.23	858.82	860.41	862.00	33
34	863.58	865.17	866.76	868.35	869.93	871.52	873.11	874.70	876.28	877.87	879.46	881.05	882.63	884.22	885.81	887.40	34
35	888.98	890.57	892.16	893.75	895.33	896.92	898.51	900.10	901.68	903.27	904.86	906.45	908.03	909.62	911.21	912.80	35

Flange End Dimensions As Per ASME B 16.5

Class : 150

Nominal Pipe Size	Φ D	Φ P	d	No. of Holes	H	Φ R
1/2	89	60	16	4	9.4	35
3/4	99	70	16	4	11.4	43
1	108	79	16	4	12.4	51
1.1/4	117	89	16	4	14.4	64
1.1/2	127	99	16	4	16.4	73
2	152	121	19	4	17.4	92
2.1/2	178	140	19	4	20.4	105
3	191	152	19	4	22.4	127
3.1/2	216	178	19	8	22.4	140
4	229	191	19	8	22.4	157
5	254	216	22	8	22.4	186
6	279	241	22	8	24.4	216
8	343	299	22	8	27.4	270
10	406	362	25	12	28.4	324
12	483	432	25	12	30.4	381
14	533	476	29	12	33.4	413
16	597	540	29	16	35.4	470
18	635	578	32	16	38.4	533
20	699	635	32	20	43.4	584
24	813	749	35	20	47.4	692

Raised face thickness = 1.6

Class : 300

Nominal Pipe Size	Φ D	Φ P	d	No. of Holes	H	Φ R
1/2	95	67	16	4	12.4	35
3/4	118	83	19	4	14.4	43
1	124	89	19	4	16.4	51
1.1/4	133	99	19	4	17.4	64
1.1/2	156	114	22	4	19.4	73
2	165	127	19	8	20.4	92
2.1/2	191	149	22	8	23.4	105
3	210	168	22	8	27.4	127
3.1/2	229	184	22	8	28.4	140
4	254	200	22	8	30.4	157
5	279	235	22	8	33.4	186
6	318	270	22	12	35.4	216
8	381	330	25	12	39.4	270
10	445	387	28	16	46.4	324
12	521	451	32	16	49.4	381
14	584	514	32	20	52.4	413
16	648	572	35	20	55.4	470
18	711	629	35	24	58.4	533
20	775	686	35	24	62.4	584
24	914	813	41	24	68.4	692

Raised face thickness = 1.6

Class : 600

Nominal Pipe Size	Φ D	Φ P	d	No. of Holes	H	Φ R
1/2	95	67	16	4	14.6	35
3/4	118	83	19	4	15.6	43
1	124	89	19	4	17.6	51
1.1/4	133	99	19	4	20.6	64
1.1/2	155	114	22	4	22.5	73
2	165	127	19	8	25.6	92
2.1/2	191	149	22	8	28.6	105
3	210	168	22	8	31.6	127
4	273	216	25	8	38.6	157
5	330	267	29	8	44.6	186
6	356	292	29	12	47.6	216
8	419	349	32	12	55.6	270
10	508	432	35	16	63.6	324
12	559	489	35	20	66.6	381
14	603	527	38	20	69.6	413
16	686	603	41	20	76.6	470
18	743	654	44	20	82.6	533
20	813	724	44	24	88.6	584
24	940	838	51	24	101.6	692

Raised face thickness = 6.35

Class : 900

Nominal Pipe Size	Φ D	Φ P	d	No. of Holes	H	Φ R
1/2	121	83	22	4	22.6	35
3/4	130	89	22	4	25.6	43
1	149	102	25	4	28.6	51
1.1/4	159	111	25	4	28.6	64
1.1/2	178	124	29	4	31.6	73
2	216	165	25	8	38.6	92
2.1/2	244	191	29	8	41.6	105
3	241	191	25	8	38.6	127
4	292	235	32	8	44.6	157
5	349	279	35	8	50.6	186
6	381	318	32	12	55.6	216
8	470	394	38	12	63.6	270
10	546	470	38	16	69.6	324
12	610	533	38	20	79.6	381
14	641	559	41	20	85.6	413
16	705	616	44	20	88.6	470
18	787	686	51	20	101.6	533
20	857	749	54	20	107.6	584
24	1041	902	67	20	139.6	692
		Raised face thickness = 6.35				

Flange Dimensions As Per Din STD. Straight Way & Angle Type

Steel Flanges				DIN 2543		DIN 2544		DIN 2545		DIN 2546		DIN 2547		DIN 2548		DIN 2549		DIN 2550			
Welding neck flanges		DIN 2632		DIN 2633		DIN 2634		DIN 2635		DIN 2636		DIN 2637		DIN 2638		DIN 2628		DIN 2629			
	DN	PN 10		PN 16		PN 25		PN 40		PN 63		PN 100		PN 160		PN 250		PN 320			
Height of Contact Face : 2mm	10	130 85		130 85		210 105		230 105						230 105							
		90 - 14 - 40	90 - 16 - 40	100 - 20 - 40	125 - 24 - 40																
		60 - 4* 14	60 - 4* 14	70 - 4 - 14	85 - 4* 18																
	15	130 90		130 90		210 105		230 115						230 115							
		95 - 14 - 45	95 - 16 - 45	105 - 20 - 45	130 - 26 - 45																
		65 - 4* 14	65 - 4* 14	75 - 4* 4	90 - 4* 18																
	20	150 95		150 95		1) 230 115	1) 260 130		1) 260 130						1) 260 130						
		105 - 16 - 58	105 - 18 - 58	130 - 22 - 58	135 - 28 - 58	150 - 30 - 55															
		75 - 4* 14	75 - 4* 14	90 - 4* 18	95 - 4* 18	105 - 4* 22															
	25	160 100		160 100		230 115		260 130						260 130							
		115 - 16 - 68	115 - 18 - 68	140 - 24 - 68	150 - 28 - 68	160 - 34 - 68															
		85 - 4* 14	85 - 4* 14	100 - 4* 18	105 - 4* 22	115 - 4* 22															
	32	180 105		180 105		1) 260 130	1) 300 150		1) 300 150						1) 300 150						
		140 - 16 - 78	140 - 18 - 78	155 - 26 - 78	165 - 34 - 75	180 - 36 - 75															
		100 - 4* 18	100 - 4* 18	110 - 4* 22	120 - 4* 22	130 - 4* 26															
Height of Contact Face : 3mm	40	200 115		200 115		260 130		260 130		300 150		300 150		300 150		300 150		300 150			
		150 - 16 - 88	150 - 18 - 88	170 - 26 - 88	170 - 28 - 88	185 - 34 - 88	195 - 38 - 88														
		110 - 4* 18	110 - 4* 18	125 - 4* 22	125 - 4* 22	135 - 4* 26	145 - 4* 26														
	50	230 125		230 125		300 150		300 150		350 175		350 175		350 175		350 175		350 175			
		165 - 18 - 102	165 - 20 - 102	180 - 26 - 102	195 - 28 - 102	200 - 38 - 102	210 - 42 - 102														
		125 - 4* 18	125 - 4* 18	135 - 4* 22	145 - 4* 26	150 - 8* 26	160 - 8* 26														
	65	290 145		290 145		340 170		340 170		400 200		400 200		400 200		400 200		400 200			
		185 - 18 - 122	185 - 22 - 122	205 - 26 - 122	220 - 30 - 122	230 - 34 - 122	255 - 51 - 122														
		145 - 4* 18	145 - 8* 18	160 - 8* 22	170 - 8* 26	180 - 8* 26	200 - 8* 30														
	80	310 155		310 155		380 190		380 190		450 225		450 225		450 225		450 225		450 225			
		200 - 20 - 138	200 - 24 - 138	215 - 28 - 138	230 - 32 - 138	255 - 46 - 138	275 - 55 - 138														
		160 - 8* 18	160 - 8* 18	170 - 8* 22	180 - 8* 26	200 - 8* 30	220 - 8* 30														
	100	350 175		350 175		430 215		430 215		520 260		520 260		520 260		520 260		520 260			
		220 - 20 - 158	235 - 24 - 162	250 - 30 - 162	265 - 36 - 162	265 - 40 - 162	335 - 65 - 162														
		180 - 8* 18	190 - 8* 22	200 - 8* 26	210 - 8* 30	210 - 8* 30	265 - 8* 36														
	125	400 200		400 200		500 250		500 250		600 300		600 300		600 300		600 300		600 300			
		250 - 22 - 188	270 - 26 - 188	295 - 34 - 188	315 - 40 - 188	315 - 44 - 188	380 - 75 - 188														
		210 - 8* 18	220 - 8* 26	240 - 8* 30	250 - 8* 33	250 - 8* 33	310 - 12* 36														
	150	480 225		480 225		550 275		550 275		700 350		700 350		700 350		700 350		700 350			
		285 - 22 - 212	300 - 28 - 218	345 - 36 - 218	355 - 44 - 218	355 - 50 - 218	425 - 84 - 218														
		240 - 8* 22	250 - 8* 26	280 - 8* 33	290 - 12* 33	290 - 12* 33	350 - 12* 39														
	200	600 275		600 275		650 325		650 325		800 400		800 400		800 400		800 400		800 400			
		340 - 24 - 268	340 - 24 - 268	360 - 30 - 278	375 - 34 - 285	415 - 42 - 285	430 - 52 - 285	430 - 60 - 285	485 - 82 - 285	525 - 103 - 285											
		295 - 8* 22	295 - 12* 22	310 - 12* 26	320 - 12* 30	345 - 12* 36	360 - 12* 36	360 - 12* 36	400 - 12* 42	440 - 16* 42											
	250	730 325		730 325		730 325		730 325													
		395 - 26 - 320	405 - 26 - 320	425 - 32 - 335	450 - 38 - 345																
		350 - 12* 22	355 - 12* 26	370 - 12* 30	385 - 12* 33																
Height of Contact Face : 4mm	300	850 375		850 375		850 375		850 375													
		445 - 26 - 370	460 - 28 - 378	485 - 34 - 395	515 - 42 - 410																
		400 - 12* 22	410 - 12* 26	430 - 16* 30	450 - 16* 33																
	350	980 425		980 425		980 425		980 425													
505 - 26 - 430		520 - 30 - 438	555 - 38 - 450	580 - 46 - 465																	
460 - 16* 22		470 - 16* 26	490 - 16* 33	510 - 16* 36																	
400	1100 475		1100 475		1100 475		1100 475														
	565 - 26 - 482	580 - 32 - 490	620 - 40 - 305	660 - 50 - 535																	
	515 16* 26	525 16* 30	550 -16* 36	585 -16* 39																	
1) no DIN standard available to Groove / Tongue DIN 2512 Male / Female DIN 2513 Lens-shaped joints DIN 2696																					
Explanation of figures : Face to Face - Elbow Length Flange φ - Thickness- Contact Face φ Bolt Circle φ - Bolt Number * Bolt Holes φ																					

Pressure Temperature Ratings ASME B 16.34 - 2004

Materials	Cast			WCB(a) LF3	WCC(a) LCC(e)		WC1(b) LCI(d)	WC4(h) WC5(f)	WC6(i)	WC9(j)	C5	C12	CF8 CF3(f)	CF8M CF3M(g)	CF8C
	Forged			A105(a) LF2(d2)	LC2(d) LC3(d)	F1	LCB	F2(h)	F11(c)	F22(c)	F5a	F9	F304	F316	F347(h)
	Temperature°C			Working pressure in bars											
Class	-29	to	38	19.6	19.8	18.4	18.4	19.8	19.8	19.8	20	20	19	19	19
	100			17.7	17.7	17.7	17.4	17.7	17.7	17.7	17.7	17.7	15.7	16.2	17.4
	150			15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	14.2	14.8	15.8
	200			13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.8	13.2	13.7	13.8
	250			12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
	300			10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2	10.2
	350			8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	400			6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
	450			4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	500			2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	538			1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
	Shell test			30	30	28	28	30	30	30	30	30	29	29	29
Seat test			22	22	21	21	22	22	22	22	22	21	21	21	
300 (PN 50)	-29	to	38	51.1	51.7	48	48	51.7	51.7	51.7	51.7	51.7	49.6	49.6	49.6
	100			46.6	51.5	47.9	45.3	51.5	51.5	51.5	51.5	51.5	40.9	42.2	45.3
	150			45.1	50.2	47.3	43.9	50.3	49.7	50.3	50.3	50.3	37	38.5	42.5
	200			43.8	48.6	45.8	42.5	48.6	48	48.6	48.6	48.6	34.5	35.7	39.9
	250			41.9	46.3	44.5	40.8	46.3	46.3	46.3	46.3	46.3	32.5	33.4	37.8
	300			39.8	42.9	42.9	38.7	42.9	42.9	42.9	42.9	42.9	30.9	31.6	36.1
	350			37.6	40	40.3	36.4	40.3	40.3	40.3	40.3	40.3	29.6	30.3	34.8
	400			34.7	34.7	36.5	32.6	36.5	36.5	36.5	36.5	36.5	28.4	29.4	33.9
	450			23	23	33.7	21.6	33.7	33.7	33.7	33.7	33.7	27.4	28.8	33.5
	500			11.8	11.6	24.1	11.1	26.7	25.7	28.2	21.4	28.2	26.5	28.2	28.2
	538			5.9	5.9	11.3	5.9	13.9	14.9	18.4	13.7	17.5	24.4	25.2	25.2
	600								6.1	6.9	6.2	7.2	16.9	19.9	21.6
	650								2.8	2.8	2.4	3.5	11.3	12.7	14.1
	700												8	8.4	10.1
	750												5.8	5.9	5.9
	800												3.5	3.5	3.5
	Shell test			77	78	72	72	78	78	78	78	78	75	75	75
	Seat test			57	57	53	53	57	57	57	57	57	55	55	55
600 (PN 100)	-29	to	38	102.1	103.4	96	96	103.4	103.4	103.4	103.4	103.4	99.3	99.3	99.3
	100			93.2	103	95.9	90.7	103	103	103	103	103	81.7	84.4	90.6
	150			90.2	100.3	94.7	87.9	100.3	99.5	100.3	100.3	100.3	74	77	84.9
	200			87.6	97.2	91.6	85.1	97.2	95.9	97.2	97.2	97.2	69	71.3	79.9
	250			83.9	92.7	89	81.6	92.7	92.7	92.7	92.7	92.7	65	66.8	75.6
	300			79.6	85.7	85.7	77.4	85.7	85.7	85.7	85.7	85.7	61.8	63.2	72.2
	350			75.1	80	80.4	72.8	80.4	80.4	80.4	80.4	80.4	59.3	60.7	69.5
	400			69.4	69.4	73.3	65.2	73.3	73.3	73.3	73.3	73.3	56.9	58.9	67.8
	450			46	46	67.7	43.2	67.7	67.7	67.7	67.7	67.7	54.8	57.7	66.9
	500			23.5	23.2	48.1	22.1	53.4	51.5	56.5	42.8	56.5	53	56.5	56.5
	538			11.8	11.8	22.7	11.8	27.9	29.8	36.9	27.4	35	48.9	50	50
	600								12.2	13.8	12.5	14.4	33.8	39.8	42.9
	650								5.7	5.7	4.7	7.1	22.5	25.3	28.1
	700												16.1	16.8	20
	750												11.6	11.7	11.7
	800												7	7	7
	Shell test			154	155	144	144	156	156	156	156	156	149	149	149
	Seat test			113	114	106	106	114	114	114	114	114	110	110	110

Pressure Temperature Ratings ASME B 16.34 - 2004

Materials	Cast			WCB(a)	WCC(a)		WC1(b)	WC4(h)	F2(R)	WC9(i)	C5	C12	CF8	CF8M	CF8C
	Forged			LF3	LCC(e)		LCI(d)	WC5(f)	FII(c)	F22(c)	F5a	F9	CF3(f)	CF3M(g)	F347(h)
	Temperature°C			A105(a)	LC2(d)	F1	LCB	F2(h)					F304	F316	F347(h)
Class				Working pressure in bars											
	29	to	38	153.2	155.1	144.1	144.1	155.1	155.1	155.1	155.1	155.1	148.9	148.9	148.9
900 (PN 150)	100			139.8	154.6	143.8	136	154.6	154.6	154.6	154.6	154.6	122.6	126.6	135.9
	150			135.2	150.5	142	131.8	150.6	149.2	150.6	150.6	150.6	111	115.5	127.4
	200			131.4	145.8	137.4	127.6	145.8	143.9	145.8	145.8	145.8	103.4	107	119.8
	250			125.8	139	133.5	122.3	139	139	139	139	139	97.5	100.1	113.4
	300			119.5	128.6	128.6	116.1	128.6	128.6	128.6	128.6	128.6	92.7	94.9	108.3
	350			112.7	120.1	120.7	109.2	120.7	120.7	120.7	120.7	120.7	88.9	91	104.3
	400			104.2	104.2	109.8	97.9	109.8	109.8	109.8	109.8	109.8	85.3	88.3	101.7
	450			69	69	101.4	64.8	101.4	101.4	101.4	101.4	101.4	82.2	86.5	100.4
	500			35.3	34.7	72.2	33.2	80.1	77.2	84.7	64.1	84.7	79.5	84.7	84.7
	538			17.7	17.7	34	17.7	41.3	44.7	55.3	41.1	52.5	73.3	75.2	75.2
	600								18.3	20.7	18.7	21.5	50.6	59.7	64.2
	650								8.5	8.5	7.1	10.6	33.8	38	42.5
	700												24.1	25.1	29.8
	750												17.3	17.6	17.6
	800												10.5	10.5	10.5
	Shell test			230	233	217	216	233	233	233	233	233	224	224	224
	Seat test			169	171	159	159	171	171	171	171	171	164	164	164
1500 (PN 250)	-29	to	38	255.3	258.6	240.1	240.1	258.6	258.6	258.6	258.6	258.6	248.2	248.2	248.2
	100			233	257.6	239.7	226.7	257.6	257.6	257.6	257.6	257.6	204.3	211	226.5
	150			225.4	250.8	236.7	219.7	250.8	248.7	250.8	250.8	250.8	185	192.5	212.4
	200			219	243.2	229	212.7	243.4	239.8	243.4	243.4	243.4	172.4	178.3	199.7
	250			209.7	231.8	222.5	203.9	231.8	231.8	231.8	231.8	231.8	162.4	166.9	189.1
	300			199	214.4	214.4	193.4	214.4	214.4	214.4	214.4	214.4	154.6	158.1	180.4
	350			187.8	200.1	201.1	182	201.1	201.1	201.1	201.1	201.1	148.1	151.6	173.8
	400			173.6	173.6	183.1	163.1	183.1	183.1	183.1	183.1	183.1	142.2	147.2	169.5
	450			115	115	169	107.9	169	169	169	169	169	137	144.2	167.3
	500			58.8	57.9	120.3	55.4	133.4	128.6	140.9	106.9	140.9	132.4	140.9	140.9
	538			29.5	29.5	56.7	29.5	69.7	74.8	92.2	68.6	87.5	122.1	125.5	125.5
	600								30.5	34.4	31.2	35.9	84.4	99.5	107
	650								14.2	14.2	11.8	17.7	56.3	63.3	70.7
	700												40.1	41.9	49.7
	750												28.9	29.3	29.6
	800												17.4	17.4	17.4
	Shell test			383	388	361	361	388	388	388	388	388	373	373	373
	Seat test			281	285	265	265	285	285	285	285	285	274	274	274
2500 (PN 420)	-29	to	38	425.5	430.9	400.1	400.1	430.9	430.9	430.9	430.9	430.9	413.7	413.7	413.7
	100			388.3	429.4	399.5	377.8	429.4	429	429.4	429.4	429.4	340.4	351.6	377.4
	150			375.6	418.1	394.5	366.1	418.2	414.5	418.2	418.2	418.2	308.4	320.8	353.9
	200			365	405.4	381.7	354.4	405.4	399.6	405.4	405.4	405.4	287.3	297.2	332.8
	250			349.5	386.2	370.9	339.8	386.2	386.2	386.2	386.2	386.2	270.7	278.1	315.1
	300			331.8	357.1	357.1	322.4	357.1	357.1	357.1	357.1	357.1	257.6	263.5	300.7
	350			313	333.5	335.3	303.3	335.3	335.3	335.3	335.3	335.3	246.9	252.7	289.6
	400			289.3	289.3	304.9	271.9	304.9	304.9	304.9	304.9	304.9	237	245.3	282.6
	450			191.7	191.7	281.8	179.9	281.8	281.8	281.8	281.8	281.8	228.4	240.4	278.8
	500			97.9	96.5	200.5	92.3	222.4	214.4	235	178.2	235	220.7	235	235
	538			49.2	49.2	94.6	49.2	116.2	124.1	153.7	114.3	145.8	203.6	208.9	208.9
	600								50.9	57.4	51.9	59.8	140.7	165.9	178.5
	650								23.6	23.6	19.7	29.5	93.8	105.5	117.7
	700												66.9	69.8	83
	750												48.1	48.9	49.1
	800												29.2	29.2	29.2
	Shell test			638	647	601	601	647	647	647	647	647	621	621	621
	Seat test			468	474	441	441	474	474	474	474	474	456	456	456

BELL O SEAL



General Notes :

Materials shall not be used beyond temperature limits specified in the governing Code

- (a) Permissible, but not recommended for prolonged usage above about 425°C
- (b) Permissible, but not recommended for prolonged usage above about 455°C
- (c) Permissible, but not recommended for prolonged usage above about 595°C
- (d) Not to be used over 345°C
- (e) Not to be used over 370°C
- (f) Not to be used over 425°C
- (g) Not to be used over 455°C
- (h) Not to be used over 540°C
- (i) Not to be used over 595°C

