

Gate, Globe & Check Valves



ASME Class 150 to 4500 | ½" to 42" (15 mm to 1050 mm)
ASME B16.34



L&T Valves

L&T Valves Limited (Formerly Audco India Limited) is a wholly owned subsidiary of Larsen & Toubro. Backed by an fifty-year track-record of excellence and world-leading innovation, the company provides engineered flow-control solutions for key sectors of the economy such as oil & gas, power, petrochemicals, chemicals, fertilizers and pharmaceuticals.

Product Range:

- Gate, Globe & Check Valves
- Valves for Power
- Pipeline & Process Ball Valves
- Triple-offset Butterfly Valves
- Flanged & Wafer-type Butterfly Valves
- Double Block and Bleed Plug Valves
- Control Valves
- Customised Solutions

Valves are designed by an experienced team of valve experts who have a deep understanding of user-industry processes. An extensive manufacturing and quality assurance infrastructure ensure that world-class designs are transformed into high performance products. Every phase of manufacture is governed by an institutionalised environment, health and safety policy.

L&T Valves distribution network spans the globe, partnering some of the largest valve distribution companies in the world. In India, L&T Valves has a presence in every industrial centre through a network of offices, stockists, automation centres and service franchisees.



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Gate, Globe & Check Valves

L&T Valves manufactures a comprehensive range of Gate, Globe & Check Valves (GGC) in sizes up to 42" (1050 mm) and in ASME classes from 150 to 4500. The valves are offered in combination of size, pressure class, material, end-connection, etc., to suit myriad applications in power and hydrocarbon sectors.

Pressure-seal Range

Valve Type	ASME Class	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
		50	80	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050
Gate Valves	600											•	•	•	•	•	•	•	•	•	•	•	•
	900		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	1500		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	2500		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	3100		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	3500		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	4100		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
Globe Valves	900		•	•	•	•	•	•	•	•	•												
	1500		•	•	•	•	•	•	•	•	•												
	2500		•	•	•	•	•	•	•	•	•												
	3100		•	•	•	•	•	•	•	•	•												
	3500		•	•	•	•	•	•	•	•	•												
	4100		•	•	•	•	•	•	•	•	•												
	4100		•	•	•	•	•	•	•	•	•												
Check Valves	600											•	•	•	•	•	•	•	•	•	•	•	•
	900		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	1500		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	2500		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	3100		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	3500		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						
	4100		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•						

Bolted-bonnet Range

Valve Type	ASME Class	2	3	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42
		50	80	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050
Gate Valves	150	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	300	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	600	•	•	•	•	•	•	•	•	•	•												
Globe Valves	150	•	•	•	•	•	•	•	•	•	•												
	300	•	•	•	•	•	•	•	•	•	•												
	600	•	•	•	•	•	•	•	•	•	•												
Check Valves	150	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	300	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	600	•	•	•	•	•	•	•	•	•	•												

Forged Steel Range

Type	ASME Class	½	¾	1	1¼	1½	2	2½	3	4	6
		15	20	25	32	40	50	65	80	100	150
Globe & Check Valves	1500	•	•	•	•	•	•	•	•	•	•
	2500	•	•	•	•	•	•	•	•	•	•
	4500	•	•	•	•	•	•				



Compliance Standards

L&T Gate, Globe & Check Valves are designed in accordance with key international standards. They also meet the requirements of major power and oil & gas industry standards and customer specifications.

Parameter		Standard	
Design	Gate Valves	ASME B16.34	API 600
	Globe Valves		BS 1873
	Check Valves		BS 1868
Ends	Face-to-face/ End-to-end Dimensions	ASME B16.10	
	End Flange Dimensions	ASME B16.5	
	Butt-weld End Dimensions	ASME B16.25	
	Forged Fittings, Socket welding & Threading Dimensions	ASME B16.11	
Testing		MSS SP-61 or API 598	

Materials of Construction

The product portfolio encompasses valves in carbon steel, stainless steels and alloy steels, in cast and forged materials, in a number of trim options - suitable for line-fluids ranging from low temperature hydrocarbon to super-critical steam.

Material Classification	Body Materials	
	Cast Steel	Forged Steel
Carbon Steel	ASTM A 216 Gr. WCB/ WCC	ASTM A 105
1¼ Cr - ½ Mo	ASTM A 217 Gr. WC6	ASTM A 182 Gr. F11 Cl. 2
2¼ Cr - 1 Mo	ASTM A 217 Gr. WC9	ASTM A 182 Gr. F22 Cl. 3
5 Cr - ½ Mo	ASTM A 217 Gr. C5	ASTM A 182 Gr. F5a
9 Cr - 1 Mo	ASTM A 217 Gr. C12	ASTM A 182 Gr. F9
9 Cr - 1 Mo - ¼ V	ASTM A 217 Gr. C12A	ASTM A 182 Gr. F91
Low-temperature Steel	ASTM A 352 Gr. LCB/ LCC	ASTM A 350 Gr. LF2
Austenitic Stainless Steel 18-8 (Type 304)	ASTM A 351 Gr. CF8	ASTM A 182 Gr. F304
Austenitic Stainless Steel 16 Cr - 12 Ni - 2 Mo (Type 316)	ASTM A 351 Gr. CF8M	ASTM A 182 Gr. F316

*Valves in other materials available on demand

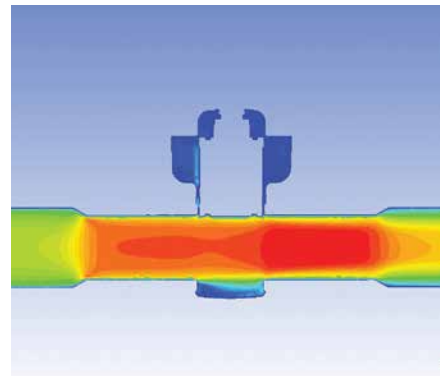
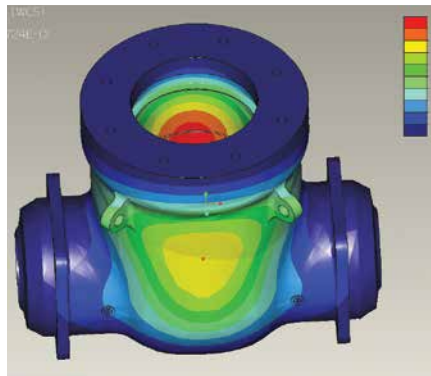
Trim Materials

API 600 Trim	Materials			
	Stem	Seat Surface	Disc Surface	Back Seat
1	13% Cr	13% Cr	13% Cr	13% Cr
2	SS 316	SS 304	SS 304	SS 316
5	13% Cr	HF	HF	13% Cr
8	13% Cr	HF	13% Cr	13% Cr
9	Monel	Monel	Monel	Monel
10	SS 316	SS 316	SS 316	SS 316
12	SS 316	HF	SS 316	SS 316
16	SS 316	HF	HF	SS 316

*Other trim combinations available on demand

Designs for L&T Gate, Globe & Check Valves are created in a 3D environment using the latest design and analysis software. Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) are extensively used to fine-tune product designs.

R&D



In-house Qualification Test Facilities:

- High temperature gas test
- Endurance & Cycle tests
- Seismic qualification tests
- Pipe-end load test
- Vacuum test
- Fugitive Emission Test

L&T Valves design team brings with them a deep understanding of user industry practices. This has aided development of valves in intermediate pressure classes such as 3100, 3500 and 4100 as well as specialized flow-control devices for the power industry.

At L&T Valves facility in Coimbatore, two pressure-seal gate valves (20 inch class 3100 Special WCC and 6 inch class 3100 Special C12A) were subjected to High Temperature High Pressure Gas Test under simulated super-critical power plant operating conditions.

The valves were cycled at high temperature and pressure and the integrity of the pressure boundary as well as seat integrity was successfully established at ambient condition, at elevated temperature and pressure, and at re-ambient condition.

 Branch Office: TUV INDIA PRIVATE LIMITED Classic Towers, Office No. 11A, 2nd Floor, No. 1147, Taty Road Coimbatore - 641018 Tel: 0422-4392960 / 4392970 E-mail : coim@tuv-india.com Website : www.tuvindia.co.in	
High Pressure and High Temperature Gas Test 20" Class 3100 Special Carbon Steel Gate Valve (Prototype)	
Customer: M/s Larsen & Toubro Limited Customer PO : EPIC/ES/21000-00258/MHV End Client: Andhra Pradesh Power Development Corporation Limited Manufacturer: M/s L&T Valves, Coimbatore	Dated: 27.05.2010 TUV Job No. : 8107255004 Dated : 27-Nov-2010
Test Valve Description :	
Type Pressure Seal Gate Valve Size and Pressure Class Rating 20" (DN 500) Class 3100 Special Material Specification Body Material : ASTM A216 Gr WCC Bonnet Material : ASTM A216 Gr WCC + Stellite 6 [H] Disc Material : ASTM A105 + Stellite 6 [H] Seat Ring Material : ASTM A105 + Stellite 6 [H] End Type Butt Weld End	
Reference Documents :	
Valve Test Procedure No. General Assembly Drawing No Valve Testing Arrangement Drawing No. Valve Test Report	LTP-EP-03 Revision 2 L.T-HPHT-GAD-001 Revision 0 LT343051 Revision 0 L.T-HPHT-003
Test Parameters / Conditions :	
Test Fluid - Nitrogen gas	
Gas Test Pressures at Temperatures	443 bar at 194°C - Allowable Leakage Rate : 50 cc/min 519 bar at 150°C - No Pressure Drop Allowed 585 bar at ambient - Allowable Leakage Rate : 9 cc/min
Mechanical Cycles	5 Cycles at 535 bar (Ambient) - No Pressure Drop Allowed 5 Cycles at 443 bar (194°C) - No Pressure Drop Allowed
Conclusions / Remarks : The above valve test has been witnessed and found to be acceptable as per test procedure.	
	
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Commitment to customer satisfaction forms the foundation of L&T Valves quality management system. The QMS is certified to comply with ISO 9001: 2008 and CE PED/ 97/ 23/ EC. The QMS is also approved by the global majors in power and oil & gas domains.

L&T Valves has three modern manufacturing facilities, in Chennai (Manapakkam), Coimbatore and Kancheepuram, in Tamil Nadu, India. The plants are designed for manufacture of complex large-size valves as well as high volume production of smaller valves.

Facilities:

- 5-axis Machining Centres
- CNC VTLs with table dia up to 4m
- CNC Rotary Surface Grinding Machines
- SMAW, MIG, Plasma Arc Welding Machines, table dia 60"
- EOT Cranes of capacity 40 tons

Occupational health and safety as well as environmental protection are accorded prime significance and guide all aspects of manufacturing at the plant. L&T Valves plants are zero discharge units and are pioneer in green initiatives.



Gate, Globe & Check Valves - ASME Class 600 to 4100

L&T high pressure range of gate, globe & check valves conform to ASME B16.34. The valves are of pressure-seal design and have innovative features that enhance performance and plant safety. The valves can be supplied with IBR certification.

Pillar-yoke Construction

L&T gate and globe valves are of pillar-yoke construction, where the yoke plate is connected to the body using steel pillars. This construction enables easy access to bonnet and gland packing for maintenance. Further, since the yoke is directly mounted on the body, unbalanced thrust does not compromise valve performance.

Pressure-seal Body-bonnet Design

In this design, line pressure is used to create a high integrity body-bonnet seal - the higher the pressure, the better the sealing. The bonnet is held in place by a split-retainer and pre-loaded against it using the bonnet bolts and retainer plate. This arrangement provides tight seal at low pressures also.

Welded Seat Ring

In gate and check valves, seat rings are seal-welded to the body. This eliminates leakage path between seat ring and body as well as accidental loosening due to temperature fluctuations or vibrations.

Full-bore Design

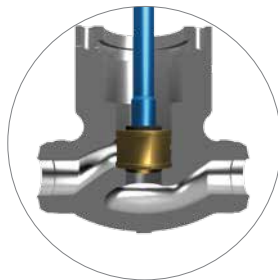
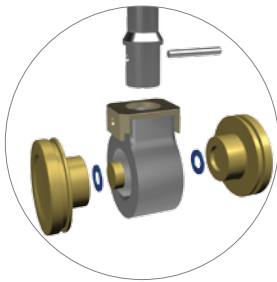
For gate valves, the standard product offering is full-bore as per ASME B16.34. Higher wall thickness and enhanced flow parameters are the characteristics of this design. Gate valves are offered in reduced-bore design also.



Parallel-slide Disc

The disc mechanism comprises two independent discs, a disc carrier and Belleville springs. The disc faces are parallel to each other and the springs keep the discs loaded against the body seats. Sealing occurs when line pressure forces the disc against the downstream seat.

Parallel-slide discs are position-seated and operating torques are considerably lower in this design. This design also eliminates chances of disc-jamming due to thermal binding.



Hard-faced Trim

Disc, seats and back-seat (for gate and globe valves) of high pressure valves are hard-faced with Stellite 6 or equivalent. As a standard, the valves are offered with a hard-facing thickness of 3 mm to ensure long and trouble-free service life.

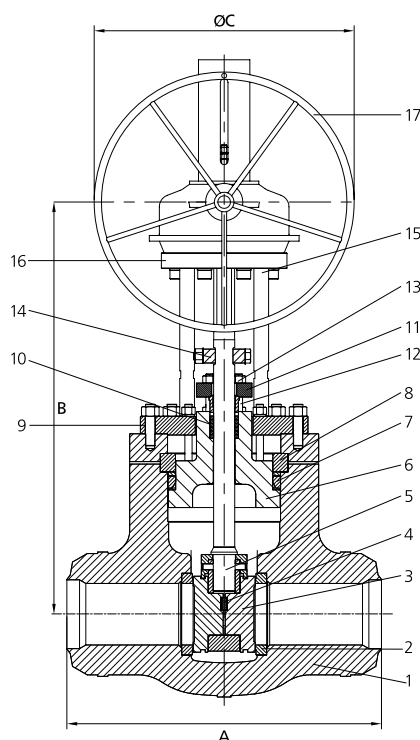
Globe Valves - Insitu Seat & Body-guided Disc

High pressure globe valves have integral seats that are machined and hard-faced insitu to improve wear resistance.

The discs of L&T globe valves are guided during opening/ closing to minimise effects of side thrust and this prevents seat damage.

Gate Valves - ASME Class 600 to 4100 (ASME B16.34)

L&T gate valves in classes ranging from 600 to 4100 conform to ASME B16.34. The valves feature a high integrity pressure-seal body-bonnet connection and are of pillar-yoke construction. The parallel-slide disc is another innovative feature of this range.



Materials of Construction

No.	Components	Materials			
		WCC	WC6	WC9	C12A
1	Body	A 216 Gr. WCC	A 217 Gr. WC6	A 217 Gr. WC9	A 217 Gr. C12A
2	Seat Ring (Seal-welded)	A 105 + HF	A 182 Gr. F11 + HF	A 182 Gr. F22 + HF	A 182 Gr. F91 + HF
3	Disc	A 105 + HF	A 182 Gr. F11 + HF	A 182 Gr. F22 + HF	A 182 Gr. F91 + HF
4	Spring	Inconel X750			
5	Stem	A 182 Gr. F6a	A 182 Gr. F6a	A 182 Gr. F6a	A 479 Type 431
6	Bonnet	A 216 Gr. WCC + HF	A 217 Gr. WC6 + HF	A 217 Gr. WC9 + HF	A 217 Gr. C12A + HF
7	Gasket	Graphite			
8	Segmental Retainer	A 182 Gr. F6a	A 182 Gr. F6a	A 182 Gr. F6a	A 479 Type 431
9	Retainer Plate	A 516 Gr. 70	A 182 Gr. F11	A 182 Gr. F22	A 182 Gr. F91
10	Packing	Die-moulded Graphite Packing with Braided end-rings			
11	Gland Flange	A 105	A 105	A 105	A 105
12	Stud	A 193 Gr. B7	A 193 Gr. B16	A 193 Gr. B16	A 193 Gr. B16
13	Heavy Hex Nut	A 194 Gr. 2H	A 194 Gr. 7	A 194 Gr. 7	A 194 Gr. 7
14	Guide Plate	A 276 Type 410	A 276 Type 410	A 276 Type 410	A 276 Type 410
15	Pillar	ASTM A479 Type 410	ASTM A479 Type 410	ASTM A479 Type 410	A 479 Type 431
16	Yoke Plate	A 216 Gr. WCB			
17	Handwheel	IS 1865 Gr. SG400/15/ Steel			
--	Identification Plate	Stainless Steel			

HF - Hard-Faced with Stellite 6 or equivalent

Dimensions

Size		Class 600				
NPS	DN	A	B	ØC	Wt.	
20	500	1195	1855	800	2320	
22	550	1250	2045	800	3100	
24	600	1397	2380	800	3535	
26	650	1448	2520	800	4600	
28	700	1549	2695	800	5345	
30	750	1651	2835	900	7700	
32	800	1778	3180	1000	8035	
34	850	1900	3250	900	8850	
36	900	1900	3375	1000	9500	
38	950	1900	3415	1000	11500	
40	1000	1900	3855	900	14000	
42	1050	1900	3960	1000	16500	

Gate valves of sizes 20" and above in class 600 are offered in pressure-seal design.



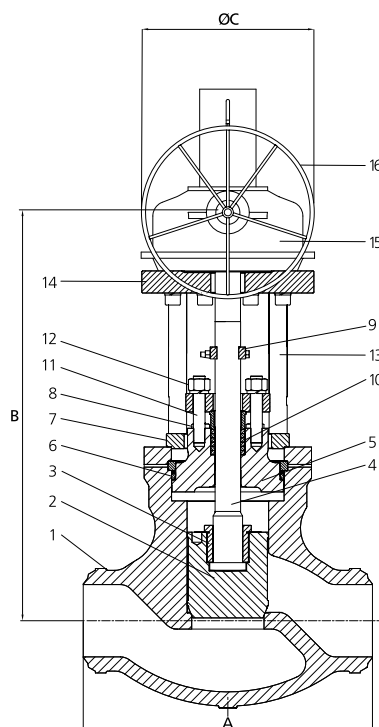
Size		Class 900					Class 1500					Class 2500					Class 3100				
NPS	DN	A	B	ØC	Wt.		A	B	ØC	Wt.		A	B	ØC	Wt.		A	B	ØC	Wt.	
3	80	305	620	350	72		305	618	350	81		368	666	450	125		368	738	328	130	
4	100	356	767	450	105		406	767	450	139		457	653	400	185		457	871	400	220	
6	150	508	845	630	280		559	880	630	290		610	863	710	400		610	1153	710	485	
8	200	660	1020	710	445		711	1020	710	568		762	1050	800	780		762	1455	630	920	
10	250	787	1280	630	695		864	1280	630	849		914	1280	710	1180		914	1639	710	1350	
12	300	914	1420	710	971		991	1420	710	1248		1041	1520	500	1720		1041	1896	800	2100	
14	350	991	1405	900	1150		1067	1560	800	1846		1118	1710	630	2450		1118	2045	630	2900	
16	400	1092	1570	900	1647		1194	1930	630	2485		1245	1830	800	3500		1245	2194	800	3900	
18	450	1219	1870	500	1965		1346	2145	710	3399		1397	2115	710	4540		1397	2412	900	5450	
20	500	1321	2170	630	2780		1473	2275	710	4418		1473	2410	800	6280		1524	2712	800	7000	
22	550	1549	2360	800	4350		1549	2675	800	6640		1549	2680	900	9260		1625	2801	1000	8550	
24	600	1549	2360	800	4350		1549	2675	800	6640		1549	2680	900	9260		1727	3217	900	10800	
26	650	1651	2430	900	5050		1651	3200	900	7550		1651	3600	900	9460		1727	3380	900	13000	
28	700	1651	2890	900	6510		1727	3450	900	8900		1727	4100	900	10205		1900	3450	1000	16100	
30	750	1778	3005	900	7826																

All dimensions in mm and weights in kg

Dimensions of valves in ASME Classes 3500 & 4100 available on demand

Globe Valves - ASME Class 900 to 4100 (ASME B16.34)

L&T manufactures high-pressure globe valves in ASME classes ranging from 600 to 4100. These valves conform to ASME B16.34 and feature a pressure-seal body-bonnet connection.



Materials of Construction

No.	Components	Materials			
		WCC	WC6	WC9	C12A
1	Body	A 216 Gr. WCC + HF	A 217 Gr. WC6 + HF	A 217 Gr. WC9 + HF	A 217 Gr. C12A + HF
2	Disc	A 105 + HF	A 182 Gr. F11 + HF	A 182 Gr. F22 + HF	A 182 Gr. F91 + HF
3	Disc Nut	A 276 Type 410			
4	Stem	A 182 Gr. F6a	A 182 Gr. F6a	A 182 Gr. F6a	A 479 Type 431
5	Bonnet	A 216 Gr. WCC + HF	A 217 Gr. WC6 + HF	A 217 Gr. WC9 + HF	A 217 Gr. C12A + HF
6	Gasket	Graphite			
7	Retainer Plate	A 216 Gr. WCC	A 217 Gr. WC6	A 217 Gr. WC9	A 217 Gr. C12A
8	Hex. Screw	A 193 Gr. B7	A 193 Gr. B16	A 193 Gr. B16	A 193 Gr. B16
9	Guide Plate	A 276 Type 410			
10	Packing	Die-moulded Graphite Packing with Braided end-rings			
11	Stud	A 193 Gr. B7	A 193 Gr. B16	A 193 Gr. B16	A 193 Gr. B16
12	Heavy Hex Nut	A 194 Gr. 2H	A 194 Gr. 7	A 194 Gr. 7	A 194 Gr. 7
13	Pillar	A 479 Type 410	A 479 Type 410	A 479 Type 410	A 479 Type 431
14	Yoke Plate	A 516 Gr. 70			
15	Gear Unit	Bevel Type			
16	Handwheel	Steel			
--	Identification Plate	Stainless Steel			

HF - Hard-Faced with Stellite 6 or equivalent

Globe – Disc Options

Globe valves are supplied with customised discs with complex profiles to produce specific flow characteristics.



Tapered Disc (Quick-opening Disc)

We offer the Tapered Disc design as a standard. In this design, when the valve is opened, close-to-maximum discharge is obtained very quickly. These valves are used in services that require quick opening.



Special Profile Discs

- Linear Characteristic Disc
- Equal Percentage Disc

Dimensions

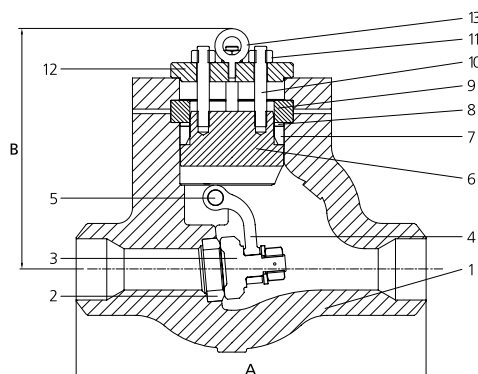
Size		Class 900				Class 1500				Class 2500				Class 3100			
NPS	DN	A	B	ØC	Wt.	A	B	ØC	Wt.	A	B	ØC	Wt.	A	B	ØC	Wt.
3	80	305	675	450	95	305	675	450	95	368	740	450	150	368	600	328	150
4	100	356	755	450	135	406	755	450	155	457	784	710	290	457	710	630	450
6	150	508	900	630	310	559	900	630	365	610	986	900	645	610	950	900	810
8	200	660	1100	630	860	711	1100	630	950	762	1428	630	1160	762	1211	1000	1540
10	250	787	1516	630	1210	864	1516	630	1340	914	1465	630	1620	914	1405	800	1890

All dimensions in mm and weights in kg

Dimensions of valves in larger sizes and higher pressure available on demand

Check Valves - ASME Class 900 to 4100 (ASME B16.34)

L&T's high-pressure check valves are of pressure-seal design. As a standard, these valves are supplied with internal hinge-pins.



Materials of Construction

No.	Components	Materials			
		WCC	WC6	WC9	C12A
1	Body	A 216 Gr. WCC	A 217 Gr. WC6	A 217 Gr. WC9	A 217 Gr. C12A
2	Seat Ring	A 105 + HF	A 182 Gr. F11 + HF	A 182 Gr. F22 + HF	A 182 Gr. F91 + HF
3	Disc	A 105 + HF	A 182 Gr. F11 + HF	A 182 Gr. F22 + HF	A 182 Gr. F91 + HF
4	Hinge	A 216 Gr. WCC	A 217 Gr. WC6	A 217 Gr. WC9	A 217 Gr. C12A
5	Hinge-pin	A 276 Type 410	A 276 Type 410	A 276 Type 410	A 479 Type 431
6	Cover	A 105	A 182 Gr. F11	A 182 Gr. F22	A 182 Gr. F91
7	Gasket with anti-extrusion caps	Graphite			
8	Spacer	A 105	A 182 Gr. F11	A 182 Gr. F22	A 182 Gr. F91
9	Segmental Retainer	A 182 Gr. F6a	A 182 Gr. F6a	A 182 Gr. F6a	A 182 Gr. F91
10	Stud	A 193 Gr. B7	A 193 Gr. B16	A 193 Gr. 16	A 193 Gr. B16
11	Heavy Hex Nut	A 194 Gr. 2H	A 194 Gr. 7	A 194 Gr. 7	A 194 Gr. 7
12	Cap	A 105	A 182 Gr. F11	A 182 Gr. F22	A 182 Gr. F91
13	Eye Bolt	Carbon Steel			
--	Identification Plate	Stainless Steel			

HF - Hard-Faced with Stellite 6 or equivalent

Dimensions

Size		Class 900			Class 1500			Class 2500			Class 3100		
NPS	DN	A	B	Wt.	A	B	Wt.	A	B	Wt.	A	B	Wt.
3	80	305	250	45	305	250	45	368	250	60	368	280	112
4	100	356	260	40	406	260	60	457	275	100	457	314	113
6	150	508	350	90	559	350	135	610	380	220	610	440	235
8	200	660	400	185	711	400	240	762	450	370	762	520	486
10	250	787	510	310	864	510	465	914	560	695	914	600	946
12	300	914	590	460	991	590	700	1041	660	1100	1041	706	1376
14	350	991	650	700	1067	650	940	1118	760	1530	1241	832	1700
16	400	1092	720	950	1194	735	1415	1245	890	2250	1245	778	2593
18	450	1240	790	1350	1366	850	1800	1397	890	2790	1395	861	3659
20	500	1321	850	1890	1473	900	2500	1420	920	2920	1524	933	4223
22	550	1549	900	2410	1549	900	2745	1549	1100	5770	1625	988	5500
24	600	1549	900	2410	1549	990	3550	1549	1100	5770	1727	1041	6700
26	650	1650	1050	2630	1650	1070	3290	1710	1120	6525	1750	1125	7400
28	700	1650	1120	3400	1650	1150	3420	1710	1200	7400	1750	1180	7900

All dimensions in mm and weights in kg. Dimensions of valves in ASME Classes 3500 & 4100 available on demand

Check valves of size 20" and above in class 600 are offered in pressure-seal design. Please contact us for further details

Ordering Information

Series	Type	Class	Ends	API Trim
L	H - ASME B16.34 Gate	6 - 600	B - Butt-weld	5 - Trim 5
	Q - ASME B16.34 Globe	9 - 900		8 - Trim 8
	S - ASME B16.34 Check	A - 1500		12 - Trim 12
		B - 2500		16 - Trim 16
		C - 3100		
		D - 3500		
		E - 4100		
		F - 4500		



Check Valves can be offered with dashpot arrangement based on customer demand.

High pressure gate valves can be supplied with a variety of arrangements to equalize upstream and downstream pressures. Typically globe valves are used as bypass valves.

Further, to prevent centre cavity over-pressurization, the cavity is connected to the upstream side of the valve. This connection may be done with or without a pressure equalizing valve.

Requirement of bypass and cavity relief arrangement is to be specified by the user. (For guidance on center cavity relief, Refer ASME B16.34, Clause 2.3.3)



Type 1:

The upstream and downstream sides of the valve are connected by a bypass pipe fitted with a globe valve. The gate valve is bidirectional.



Type 2:

There is an additional connection between centre cavity and upstream for cavity relief. The gate valve is unidirectional.



Type 3:

In this arrangement, the centre cavity is connected to a bypass pipe. Globe valves are provided on the downstream side and the connection between centre cavity and bypass. Entrapped fluid is relieved using the centre cavity valve. The gate valve is unidirectional.



Type 4:

The arrangement consists of a connection between the centre cavity and a bypass pipe, with one valve each on the upstream and downstream of the bypass pipe. Based on the flow direction, one valve can act as bypass valve and the other, as a pressure equalizing valve. The gate valve is thus bidirectional.



Type 5:

An additional valve is provided on the connection between the centre cavity and the bypass pipe. The gate valve is bidirectional.



Bellow Seal Valves

Bellow Seal Valves are used in services where leakage through stem packing area needs to be eliminated. These valves find application in lines handling hazardous fluids in nuclear and thermal power as well as hydrocarbon industries. The bellows conform to MSS SP 117 and can be offered in stainless steel, Inconel or Hastelloy.

Reheater Isolating Device

Reheater Isolating Device (RID) is used to isolate reheater lines during hydrostatic tests. The device has a disc that can be inserted from the top between hard-faced seat rings to effect sealing. After hydrostatic tests, the disc is removed and the device effectively becomes an integral part of the piping. RID eliminates the need to physically isolate lines during tests.

The body-bonnet connection of this device is of pressure-seal design.

Quick Closing Non-return Valve

Quick Closing Non-Return Valves (QCNRV) are swing check valves where quick closing is achieved using special actuation mechanisms. These are used to protect turbines and compressors from damage due to back flow.

Vacuum Service Valves

Vacuum Service Valves are offered in a variety of sizes and pressure classes. Stem finish and integrity of gland packing are crucial for these valves. The valves can also be offered with lantern-ring arrangement based on customer demand.



Angle Globe Valves

In Angle Globe Valves, the inlet and outlet are at right angles to each other. These valves find application in lines where pipe configuration or pressure drop is a concern.

Angle Globe Valves can be offered in pressure-seal as well as bolted bonnet designs based on line pressure.

Accessories

L&T Gate, Globe & Check Valves are supplied with a range of accessories to address process and plant requirements.

- Electric, Pneumatic and Hydraulic Actuators
- Position Indicators
- Extension Spindle
- Gear Units
- Locking Arrangement
- Live Loading

Gate, Globe & Check Valves - ASME Class 150 to 600

L&T offers a versatile range of cast steel gate, globe and check valves in bolted bonnet construction. The gate and globe valves are of outside screw-and-yoke design. The check valves are swing-type. This range is available with flanged and butt-weld ends and can be supplied with IBR certification.

Stem

Single-piece forged stems are used in gate and globe valves for superior strength. In a gate valve, the forged T-head engages with a slot in the disc. The globe valve disc is fitted to the stem using a disc nut, which allows the disc to swivel and align with the seat.

Disc

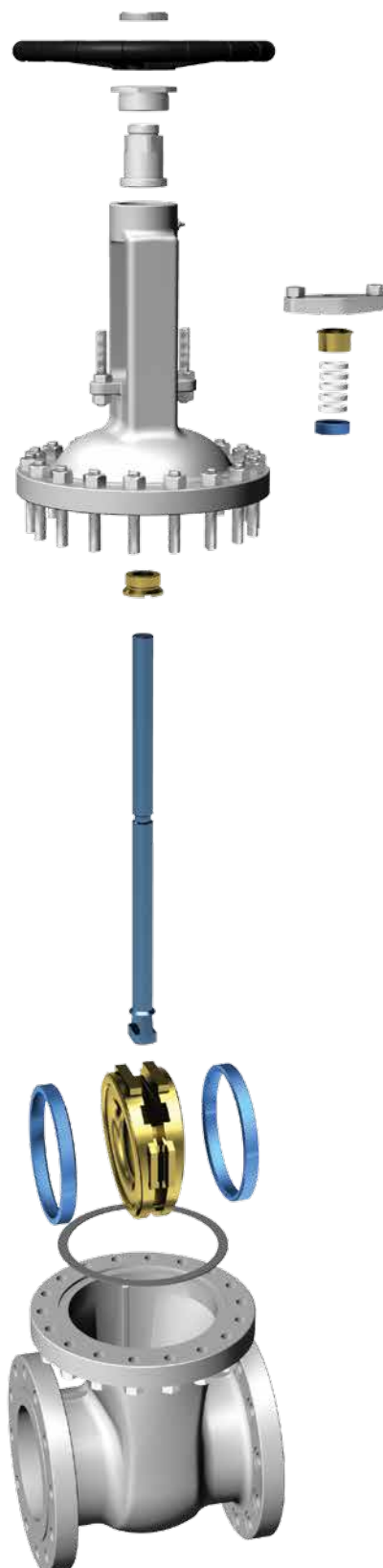
Gate valve discs are of single-piece cast flexible wedge design. In these torque-seated valves, the flexible wedge compensates for seat distortion and eliminates disc-jamming.

Seat

In gate and check valves, seat rings are seal-welded to the body. This eliminates leakage path between seat ring and body as well as accidental loosening due to temperature fluctuations or vibrations.

Body-bonnet Joint

Class 150 gate valves in sizes 3" and above are offered with oval-shaped body-bonnet joints. As a standard, 2" gate valves as well as globe and check valves have circular body-bonnet joints.



Ordering Information

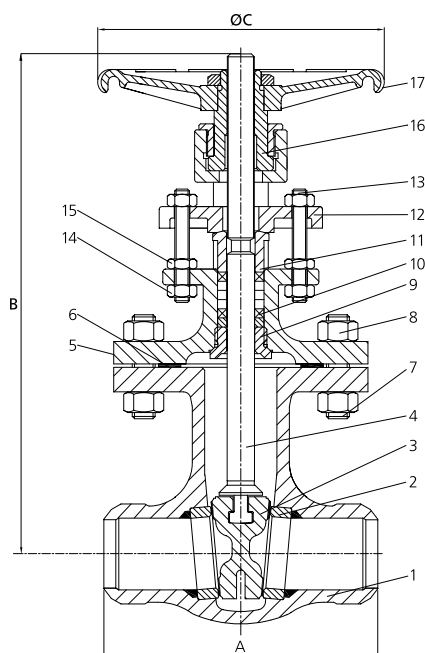
Series	Type	Class	Ends*	API Trim
L	K - ASME B16.34 Gate	1 - 150	B - Butt-weld	5 - Trim 5
	D - ASME B16.34 Globe	3 - 300	F - Flanged	8 - Trim 8
	E - ASME B16.34 Check	6 - 600		12 - Trim 12
	G - API 600 Gate			16 - Trim 16
	R - BS 1873 Globe			
	N - BS 1868 Check			

*ASME B16.34 valves are available with Butt-weld ends only



Gate Valves - ASME Class 150, 300 & 600 (API 600, ASME B16.34)

L&T Gate Valves with bolted bonnet and flexible wedge are available in ASME classes 150 to 600. The valves are offered with flanged and butt-weld ends in sizes up to 24", above which butt-weld end is the standard.



No.	Components	Materials
1	Body	A 216 Gr. WCB
2	Seat Ring	A 105 + HF
3	Disc	A 217 Gr. CA15/ A 216 Gr. WCB + 13% Cr
4	Stem	A 182 Gr. F6a
5	Bonnet	A 216 Gr. WCB
6	Gasket - Cl. 150	Corrugated soft steel with Graphite Filler
6	Gasket - Cl. 300 & Cl. 600	Spirally-wound SS316 with Graphite filler
7	Stud	A 193 Gr. B7
8	Hex. Nut	A 194 Gr. 2H
9	Bonnet Bush	A 276 Type 410
10	Packing	Die-moulded Graphite packing with braided end-rings
11	Gland	A 276 Type 410
12	Gland Flange	A 105
13	Stud	A 193 Gr. B7
14	Hex. Nut	A 194 Gr. 2H
15	Lock Nut	A 194 Gr. 2H
16	Yoke Sleeve	B 148 UNS C95400
17	Handwheel	IS:1865 Gr. SG400/15/ Steel

HF - Hard-Faced with Stellite 6 or equivalent

Valves in other materials available on demand

Dimensions

Size		Class 150						Class 300					
NPS	DN	A		B	ØC	Wt.		A		B	ØC	Wt.	
		FL	BW			FL	BW	FL	BW			FL	BW
2	50	178	216	379	200	20	20	216	216	406	200	23	20
3	80	203	282	486	250	32	30	282	282	507	250	50	44
4	100	229	305	591	250	47	46	305	305	600	250	72	63
6	150	267	403	795	350	93	85	403	403	815	350	155	120
8	200	292	419	995	350	151	120	419	419	1015	400	236	190
10	250	330	457	1040	400	198	187	457	457	1035	400	340	280
12	300	356	502	1100	400	294	270	502	502	1080	630	510	400
14	350	381	572	1200	400	430	379	762	762	1180	630	834	728
16	400	406	610	1350	400	570	500	838	838	1350	710	1080	990
18	450	432	660	1490	500	630	603	914	914	1480	710	1200	1140
20	500	457	711	1580	630	840	808	991	991	1625	900	1480	1355
22	550		762	1580	630	900	850		1092	1625	900	1500	1375
24	600	508	813	1875	710	1170	1160	1143	1143	1940	900	2320	1800
26	650		864	1875	710		1179		1245	1965	900		1950
28	700		914	2320	900		2175		1346	2450	1000		3000
30	750		914	2320	900		2062		1397	2460	1000		3600
32	800		965	2625	900		2100		1496	3365	1000		4650
34	850		1016	3670	900		3001		1626	4100	1000		5500
36	900		1016	2715	900		3100		1727	2890	1000		6800
38	950		1042	2715	900		3175		1900	4450	1000		7500
40	1000		1067	3200	1000		4700		1900	4550	1000		7800
42	1050		1100	4400	1000		6000		1900	3450	1000		8100

All dimensions in mm and weights in kg



Size		Class 600					
NPS	DN	A		B	ØC	Wt.	
		FL	BW			FL	BW
2	50	292	292	425	200	31	31
3	80	356	356	524	250	62	56
4	100	432	432	605	350	114	100
6	150	559	559	850	300	243	220
8	200	660	660	870	500	524	470
10	250	787	787	972	710	761	680
12	300	838	838	1100	710	910	875
14	350	893	889	1275	800	1140	985
16	400	991	991	1440	900	1690	1690
18	450	1096	1092	1595	1000	2035	1865

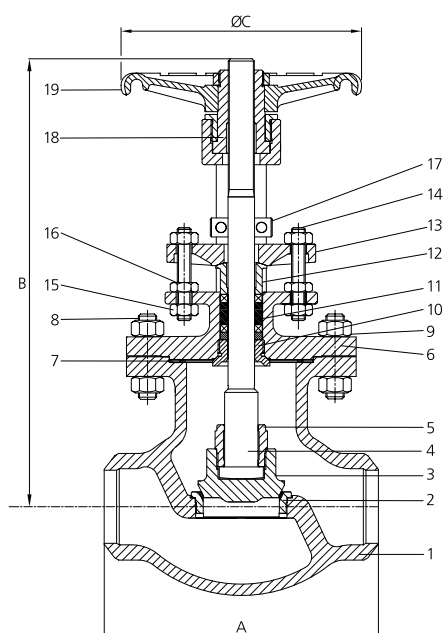
All dimensions in mm and weights in kg

L&T Gate Valves of size 20" and above in ASME class 600 are offered with pressure-seal bonnet and pillar-yoke design as a standard. Please refer page no. 11 for dimension details of valves 20" and above.

Globe Valves - ASME Class 150, 300 & 600 (BS1873, ASME B16.34)

L&T Globe Valves with bolted bonnet and plug-type disc are available in ASME classes 150 to 600.

Up to 12", the valves are offered with flanged and butt-weld ends, above which butt-weld end is the standard.



No.	Components	Materials
1	Body	A 216 Gr. WCB
2	Seat Ring	A 182 Gr. F6a + HF
3	Disc	A 182 Gr. F6a/ A 216 Gr. WCB + 13% Cr
4	Stem	A 182 Gr. F6a
5	Disc Nut	A 276 Type 410
6	Bonnet	A 216 Gr. WCB
7	Gasket	Spirally-wound SS316 with Graphite filler
8	Stud	A 193 Gr. B7
9	Hex. Nut	A 194 Gr. 2H
10	Bonnet Bush	A 276 Type 410
11	Packing	Die-moulded Graphite packing with braided end-rings
12	Gland	A 276 Type 410
13	Gland Flange	A 105
14	Stud	A 193 Gr. B7
15	Hex. Nut	A 194 Gr. 2H
16	Lock Nut	A 194 Gr. 2H
17	Stem Guide	A 276 Type 410
18	Yoke Sleeve	B 148 UNS C95400
19	Handwheel	IS:1865 Gr. SG400/ 15
--	Grease Nipple	Steel

HF - Hard-Faced with Stellite 6 or equivalent

Valves in other materials available on demand

Globe Valves in sizes 10" and above are offered with insitu hardfaced integral seat rings

Dimensions

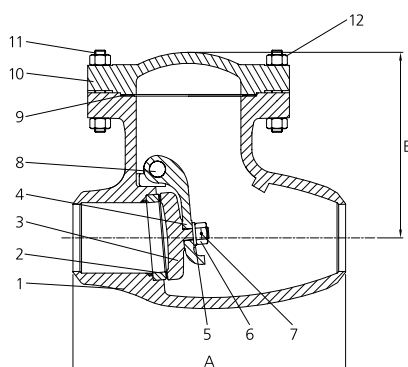
Size		Class 150						Class 300						Class 600					
		A		B	ØC	Wt.		A		B	ØC	Wt.		A		B	ØC	Wt.	
NPS	DN	FL	BW			FL	BW	FL	BW			FL	BW	FL	BW			FL	BW
2	50	203	203	375	200	22	18	267	267	390	200	31	28	295	292	425	250	38	34
3	80	241	241	420	250	37	36	318	318	430	250	50	45	356	356	650	350	81	72
4	100	292	292	510	350	63	60	356	356	570	350	88	67	432	432	810	500	138	110
6	150	406	406	610	350	104	95	444	444	735	450	180	163	599	559	895	710	440	347
8	200	495	495	795	450	208	195	559	559	875	710	405	363	663	660	930	900	680	365
10	250	622	622	895	710	356	337	622	622	950	800	555	493	787		1315	900		439
12	300	698	698	913	800	620	579	711	711	1050	900	820	611	838		1550	900		765
14	350		775	930	900		700		838	1200	1000		985	889		1700	1000		985
16	400		914	1019	900		890		864	1300	1000		1419	991		1895	1000		1459
18	450		978	1291	1000		979		978	1540	1000		1925	1092		1925	1000		1950

All dimensions in mm and weights in kg

Check Valves - ASME Class 150, 300 & 600 (BS1868, ASME B16.34)

L&T Check Valves with bolted cover, swing-type disc and internal hinge are available in ASME classes 150 to 600.

The valves are offered with flanged and butt-weld ends in sizes up to 24", above which butt-weld end is the standard. Valves are also offered with dashpot arrangement based on customer demand.



No.	Components	Materials
1	Body	A 216 Gr. WCB
2	Seat Ring	A 105 + HF
3	Disc	A 217 CA15/ A 216 Gr. WCB + 13% Cr
4	Hinge	A 216 Gr. WCB
5	Washer	SS 304
6	Hinge Nut	SS 304
7	Split Pin	SS 304
8	Hinge-pin	A 276 Type 410
9	Gasket	Spirally-wound SS316 with Graphite filler
10	Cover	A 216 Gr. WCB
11	Stud	A 193 Gr. B7
12	Hex. Nut	A 194 Gr. 2H

HF - Hard-Faced with Stellite 6 or equivalent

Valves in other materials available on demand

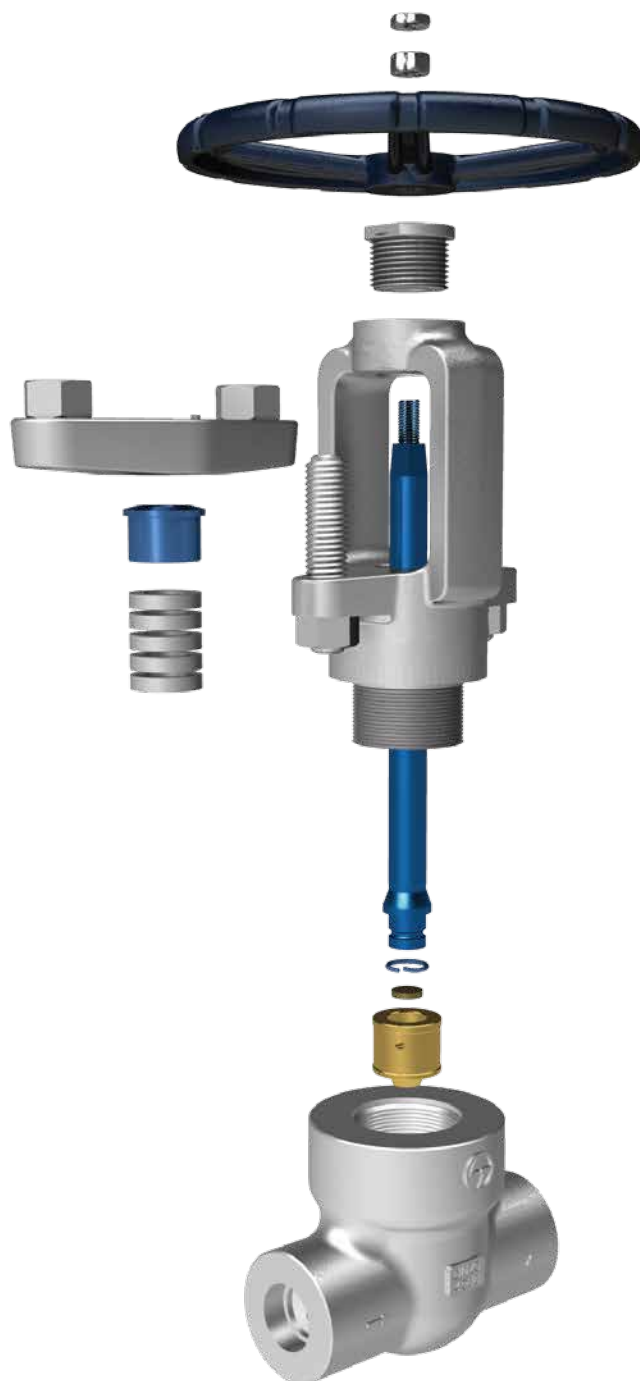
Dimensions

Size		Class 150					Class 300					Class 600				
		A		B	Wt.		A		B	Wt.		A		B	Wt.	
NPS	DN	FL	BW		FL	BW	FL	BW		FL	BW	FL	BW		FL	BW
2	50	203	203	135	17	15	267	267	145	23	18	292	292	165	32	29
3	80	241	241	150	27	25	318	318	170	38	34	356	356	195	45	40
4	100	292	292	190	43	40	356	356	210	62	45	432	432	248	86	78
6	150	356	356	270	68	64	444	444	260	117	111	559	559	306	320	120
8	200	495	495	310	118	95	533	533	370	190	171	660	660	383	420	210
10	250	622	622	350	195	150	622	622	357	265	215	787	787	423	547	347
12	300	698	698	380	310	255	711	711	450	300	235	838	838	468	780	520
14	350	787	787	383	470	395	838	838	418	360	260	889	889	502	893	580
16	400	864	864	428	680	615	864	864	495	665	635		991	601		850
18	450	978	978	466	710	650	978	978	622	890	840		1092	665		1150
20	500	978	978	503	750	680	1016	1016	595	1085	900	L&T Check Valves of size 20" and above in ASME class 600 are offered with pressure-seal cover design as a standard. Please contact us for dimention details				
22	550		1067	562	890	810		1118	586	1160	950					
24	600	1295	1295	595	1035	965	1346	1346	695	1750	1500					
26	650		1295	569		1070		1346	695		1550					
28	700		1448	740		1450		1499	779		2300					
30	750		1524	824		2200		1594	1050		2700					
32	800		1524	824		2300		1700	1120		2950					
34	850		1900	1023		4050		1850	1120		3170					
36	900		1900	1023		4100		1900	1250		3350					
38	950		1900	1023		4400		1900	1350		3570					
40	1000		1900	1200		4800		1900	1400		3890					
42	1050		1900	1200		4850		1900	1410		4120					

All dimensions in mm and weights in kg

Forged Steel Globe & Check Valves - ASME Class 1500, 2500 & 4500 (ASME B16.34)

L&T forged steel globe and check valves in sizes up to 2" complement the high pressure gate, globe and check valves range. The T-pattern valves are IBR-certified and are available in a variety of materials.



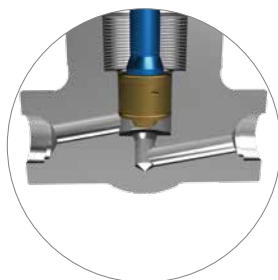
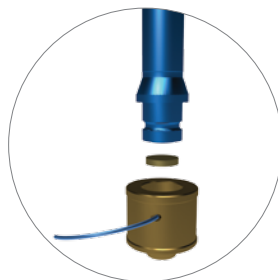
Body-bonnet Connection

The body-bonnet connection of these valves is of threaded construction. To enhance the seal, the body-bonnet joint is seal-welded.



Stem-disc Assembly

The disc of a globe valve is connected to the stem using a wire inserted through a hole in the disc. This unique stem-disc connection enables the disc to rotate freely on the stem, align perfectly with the seat and produce a tight seal.

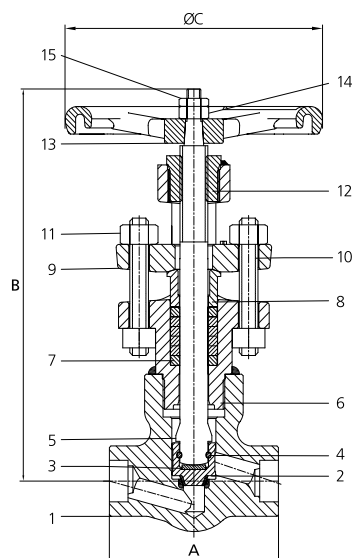


Seat and Disc

Forged steel valves have integral seats that are machined and hard-faced insitu for longer service life. As a standard, the valves are offered with 3 mm hard-facing.

The discs are guided during opening/ closing to ensure proper sealing and to minimize seat damage.

Forged Steel Globe Valves - ASME Class 1500, 2500 & 4500 (ASME B16.34)



Dimensions

Size		Class 1500/ 2500				Class 4500			
NPS	DN	A	B	ØC	Wt.	A	B	ØC	Wt.
½	15	115	263	175	7	130	283	175	10
¾	20	115	263	175	7	130	283	175	10
1	25	130	291	225	10	165	316	225	15
1 ¼	32	178	365	275	18	188	407	275	27
1 ½	40	178	365	275	18	188	407	275	27
2	50	202	422	300	26	230	436	300	45

All dimensions in mm and weights in kg

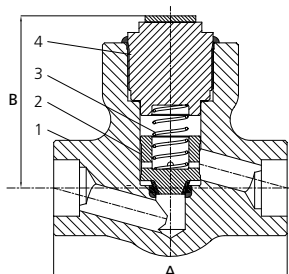
Valves in ASME Classes 1500 & 2500 are available in sizes up to 6"

Materials of Construction

No.	Components	Materials			
		A105	F22	F91	F304
1	Body (Integral Seat)	A 105	A 182 Gr. F22 Cl. 3	A 182 Gr. F91	A 182 Gr. F304
2	Disc	A 479 Type 410 + HF	A 479 Type 410 + HF	A 479 Type 316 + HF	A 479 Type 316 + HF
3	Disc Washer	A 479 Type 410	A 479 Type 410	A 479 Type 431	A 479 Type XM19
4	Retainer Wire	A 479 Type 430	A 479 Type 430	A 479 Type 430	A 479 Type 316
5	Stem	A 182 Gr. F6a	A 182 Gr. F6a	A 479 Type 431	A 479 Type XM19
6	Bonnet	A 105	A 182 Gr. F22 Cl. 3	A 182 Gr. F91	A 182 Gr. F304
7	Packing	Die-moulded Graphite Packing with Braided end-rings			
8	Gland	A 276 Type 410			
9	Gland Flange	A 105	A 105	A 105	A 182 Gr. F304
10	Stud	A 193 Gr. B7	A 193 Gr. B16	A 193 Gr. B16	A 193 Gr. B8 Cl. 1
11	Heavy Hex Nut	A 194 Gr. 2H	A 194 Gr. 7	A 194 Gr. 7	A 194 Gr. 8
12	Yoke Bush	B 148	B 148	B 148	Aluminium Bronze
13	Handwheel	IS 1865 Gr. SG400/ 15			
14	Heavy Hex Nut	A 194 Gr. 2H	A 194 Gr. 7	A 194 Gr. 7	A 194 Gr. 8
15	Lock Nut	A 194 Gr. 2H	A 194 Gr. 7	A 194 Gr. 7	A 194 Gr. 8
--	Identification Plate	Stainless Steel			

HF - Hard-Faced with Stellite 6 or equivalent

Forged Steel Check Valves - ASME Class 1500, 2500 & 4500 (ASME B16.34)



Dimensions

Size		Class 1500/ 2500			Class 4500		
NPS	DN	A	B	Wt.	A	B	Wt.
1/2	15	115	83	3	130	85	5
3/4	20	115	83	3	130	85	5
1	25	130	95	3.5	165	97	8
1 1/4	32	178	122	8.5	188	127	16
1 1/2	40	178	122	8.5	188	127	16
2	50	202	140	13	230	146	29

All dimensions in mm and weights in kg

Valves in ASME Classes 1500 & 2500 are available in sizes up to 6"

Materials of Construction

No.	Components	Materials			
		A105	F22	F91	F304
1	Body (Integral Seat)	A 105	A 182 Gr. F22 Cl. 3	A 182 Gr. F91	A 182 Gr. F304
2	Disc	A 479 Type 410 + HF	A 479 Type 410 + HF	A 479 Type 316 + HF	A 479 Type 316 + HF
3	Spring	Inconel X750			
4	Cover	A 105	A 182 Gr. F22 Cl. 3	A 182 Gr. F91	A 182 Gr. F304
--	Identification Plate	Stainless Steel			

HF - Hard-Faced with Stellite 6 or equivalent

Ordering Information

Series	Type	Class	Ends	API Trim
L	F - Forged Steel Globe	A - 1500	L - Socket weld	5 - Trim 5
	L - Forged Steel Check	B - 2500	B - Butt-weld	16 - Trim 16
		F - 4500		

Pressure Temperature Table - Standard Class (ASME B16.34, 2013)

Temp in °C	WCB, LF2, A105						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.6	51.1	102.1	153.2	255.3	425.5	765.9
50	19.2	50.1	100.2	150.4	250.6	417.7	751.9
100	17.7	46.6	93.2	139.8	233.0	388.3	699.0
150	15.8	45.1	90.2	135.2	225.4	375.6	676.1
200	13.8	43.8	87.6	131.4	219.0	365.0	657.0
250	12.1	41.9	83.9	125.8	209.7	349.5	629.1
300	10.2	39.8	79.6	119.5	199.1	331.8	597.3
325	9.3	38.7	77.4	116.1	193.6	322.6	580.7
350	8.4	37.6	75.1	112.7	187.8	313.0	563.5
375	7.4	36.4	72.7	109.1	181.8	303.1	545.5
400	6.5	34.7	69.4	104.2	173.6	289.3	520.8
425	5.5	28.8	57.5	86.3	143.8	239.7	431.5
450	4.6	23.0	46.0	69.0	115.0	191.7	345.1
475	3.7	17.4	34.9	52.3	87.2	145.3	261.5
500	2.8	11.8	23.5	35.3	58.8	97.9	176.3
538	1.4	5.9	11.8	17.7	29.5	49.2	88.6

Temp in °C	WCC, LCC						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.8	51.7	103.4	155.1	258.6	430.9	775.7
50	19.5	51.7	103.4	155.1	258.6	430.9	775.7
100	17.7	51.5	103.0	154.6	257.6	429.4	773.0
150	15.8	50.2	100.3	150.5	250.8	418.1	752.6
200	13.8	48.6	97.2	145.8	243.2	405.4	729.7
250	12.1	46.3	92.7	139.0	231.8	386.2	694.8
300	10.2	42.9	85.7	128.6	214.4	357.1	642.6
325	9.3	41.4	82.6	124.0	206.6	344.3	619.6
350	8.4	40.0	80.0	120.1	200.1	333.5	600.3
375	7.4	37.8	75.7	113.5	189.2	315.3	567.5
400	6.5	34.7	69.4	104.2	173.6	289.3	520.8
425	5.5	28.8	57.5	86.3	143.8	239.7	431.5
450	4.6	23.0	46.0	69.0	115.0	191.7	345.1
475	3.7	17.1	34.2	51.3	85.4	142.4	256.3
500	2.8	11.6	23.2	34.7	57.9	96.5	173.7
538	1.4	5.9	11.8	17.7	29.5	49.2	88.6

Temp in °C	LCB						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	18.4	48.0	96.0	144.1	240.1	400.1	720.3
50	18.2	47.5	94.9	142.4	237.3	395.6	712.0
100	17.4	45.3	90.7	136.0	226.7	377.8	680.1
150	15.8	43.9	87.9	131.8	219.7	366.1	659.1
200	13.8	42.5	85.1	127.6	212.7	354.4	638.0
250	12.1	40.8	81.6	122.3	203.9	339.8	611.7
300	10.2	38.7	77.4	116.1	193.4	322.4	580.3
325	9.3	37.6	75.2	112.7	187.9	313.1	563.7
350	8.4	36.4	72.8	109.2	182.0	303.3	545.9
375	7.4	35.0	69.9	104.9	174.9	291.4	524.6
400	6.5	32.6	65.2	97.9	163.1	271.9	489.3
425	5.5	27.3	54.6	81.9	136.5	227.5	409.5
450	4.6	21.6	43.2	64.8	107.9	179.9	323.8
475	3.7	15.7	31.3	47.0	78.3	130.6	235.0
500	2.8	11.1	22.1	33.2	55.4	92.3	166.1
538	1.4	5.9	11.8	17.7	29.5	49.2	88.6

Temp in °C	WC6, F11						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.8	51.7	103.4	155.1	258.6	430.9	775.7
50	19.5	51.7	103.4	155.1	258.6	430.9	775.7
100	17.7	51.5	103.0	154.4	257.4	429.0	772.2
150	15.8	49.7	99.5	149.2	248.7	414.5	746.2
200	13.8	48.0	95.9	143.9	239.8	399.6	719.4
250	12.1	46.3	92.7	139.0	231.8	386.2	694.8
300	10.2	42.9	85.7	128.6	214.4	357.1	642.6
325	9.3	41.4	82.6	124.0	206.6	344.3	619.6
350	8.4	40.3	80.4	120.7	201.1	335.3	603.3
375	7.4	38.9	77.6	116.5	194.1	323.2	581.8
400	6.5	36.5	73.3	109.8	183.1	304.9	548.5
425	5.5	35.2	70.0	105.1	175.1	291.6	524.7
450	4.6	33.7	67.7	101.4	169.0	281.8	507.0
475	3.7	31.7	63.4	95.1	158.2	263.9	474.8
500	2.8	25.7	51.5	77.2	128.6	214.4	385.9
538	1.4	14.9	29.8	44.7	74.5	124.1	223.4
550	1.4	12.7	25.4	38.1	63.5	105.9	190.6
575	1.4	8.8	17.6	26.4	44.0	73.4	132.0
600	1.4	6.1	12.2	18.3	30.5	50.9	91.6
625	1.4	4.3	8.5	12.8	21.3	35.5	63.9
650	1.1	2.8	5.7	8.5	14.2	23.6	42.6

Temp in °C	WC9, F22						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.8	51.7	103.4	155.1	258.6	430.9	775.7
50	19.5	51.7	103.4	155.1	258.6	430.9	775.7
100	17.7	51.5	103.0	154.6	257.6	429.4	773.0
150	15.8	50.3	100.3	150.6	250.8	418.2	752.8
200	13.8	48.6	97.2	145.8	243.4	405.4	729.8
250	12.1	46.3	92.7	139.0	231.8	386.2	694.8
300	10.2	42.9	85.7	128.6	214.4	357.1	642.6
325	9.3	41.4	82.6	124.0	206.6	344.3	619.6
350	8.4	40.3	80.4	120.7	201.1	335.3	603.3
375	7.4	38.9	77.6	116.5	194.1	323.2	581.8
400	6.5	36.5	73.3	109.8	183.1	304.9	548.5
425	5.5	35.2	70.0	105.1	175.1	291.6	524.7
450	4.6	33.7	67.7	101.4	169.0	281.8	507.0
475	3.7	31.7	63.4	95.1	158.2	263.9	474.8
500	2.8	28.2	56.5	84.7	140.9	235.0	423.0
538	1.4	18.4	36.9	55.3	92.2	153.7	276.6
550	1.4	15.6	31.3	46.9	78.2	130.3	234.5
575	1.4	10.5	21.1	31.6	52.6	87.7	157.9
600	1.4	6.9	13.8	20.7	34.4	57.4	103.3
625	1.4	4.5	8.9	13.4	22.3	37.2	66.9
650	1.4	2.8	5.7	8.5	14.2	23.6	42.6

Temp in °C	C12A, F91						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	20.0	51.7	103.4	155.1	258.6	430.9	775.7
50	19.5	51.7	103.4	155.1	258.6	430.9	775.7
100	17.7	51.5	103.0	154.6	257.6	429.4	773.0
150	15.8	50.3	100.3	150.6	250.8	418.2	752.8
200	13.8	48.6	97.2	145.8	243.4	405.4	729.8
250	12.1	46.3	92.7	139.0	231.8	386.2	694.8
300	10.2	42.9	85.7	128.6	214.4	357.1	642.6
325	9.3	41.4	82.6	124.0	206.6	344.3	619.6
350	8.4	40.3	80.4	120.7	201.1	335.3	603.3
375	7.4	38.9	77.6	116.5	194.1	323.2	581.8
400	6.5	36.5	73.3	109.8	183.1	304.9	548.5
425	5.5	35.2	70.0	105.1	175.1	291.6	524.7
450	4.6	33.7	67.7	101.4	169.0	281.8	507.0
475	3.7	31.7	63.4	95.1	158.2	263.9	474.8
500	2.8	28.2	56.5	84.7	140.9	235.0	423.0
538	1.4	25.2	50.0	75.2	125.5	208.9	375.8
550	1.4	25.0	49.8	74.8	124.9	208.0	374.2
575	1.4	24.0	47.9	71.8	119.7	199.5	359.1
600	1.4	19.5	39.0	58.5	97.5	162.5	292.5
625	1.4	14.6	29.2	43.8	73.0	121.7	219.1
650	1.4	9.9	19.9	29.8	49.6	82.7	148.9

Temp in °C	CF8, F304						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.0	49.6	99.3	148.9	248.2	413.7	744.6
50	18.3	47.8	95.6	143.5	239.1	398.5	717.3
100	15.7	40.9	81.7	122.6	204.3	340.4	612.8
150	14.2	37.0	74.0	111.0	185.0	308.4	555.1
200	13.2	34.5	69.0	103.4	172.4	287.3	517.2
250	12.1	32.5	65.0	97.5	162.4	270.7	487.3
300	10.2	30.9	61.8	92.7	154.6	257.6	463.7
325	9.3	30.2	60.4	90.7	151.1	251.9	453.3
350	8.4	29.6	59.3	88.9	148.1	246.9	444.4
375	7.4	29.0	58.1	87.1	145.2	241.9	435.5
400	6.5	28.4	56.9	85.3	142.2	237.0	426.6
425	5.5	28.0	56.0	84.0	140.0	233.3	419.9
450	4.6	27.4	54.8	82.2	137.0	228.4	411.1
475	3.7	26.9	53.9	80.8	134.7	224.5	404.0
500	2.8	26.5	53.0	79.5	132.4	220.7	397.3
538	1.4	24.4	48.9	73.3	122.1	203.6	366.4
550	1.4(a)	23.6	47.1	70.7	117.8	196.3	353.4
575	1.4(a)	20.8	41.7	62.5	104.2	173.7	312.7
600	1.4(a)	16.9	33.8	50.6	84.4	140.7	253.2

Pressure Temperature Table - Special Class (ASME B16.34, 2013)

Temp in °C	WCB, LF2, A105						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.8	51.7	103.4	155.1	258.6	430.9	775.7
50	19.8	51.7	103.4	155.1	258.6	430.9	775.7
100	19.8	51.6	103.3	154.9	258.2	430.3	774.5
150	19.6	51.0	102.1	153.1	255.2	425.3	765.5
200	19.4	50.6	101.1	151.7	252.9	421.4	758.6
250	19.4	50.5	101.1	151.6	252.6	421.1	757.9
300	19.4	50.5	101.1	151.6	252.6	421.1	757.9
325	19.2	50.1	100.2	150.3	250.6	417.6	751.7
350	18.7	48.9	97.8	146.7	244.6	407.6	733.7
375	18.1	47.1	94.2	141.3	235.5	392.5	706.5
400	16.6	43.4	86.8	130.2	217.0	361.7	651.0
425	13.8	36.0	71.9	107.9	179.8	299.6	539.3
450	11.0	28.8	57.5	86.3	143.8	239.6	431.4
475	8.4	21.8	43.6	65.4	109.0	181.6	326.9
500	5.6	14.7	29.4	44.1	73.5	122.4	220.4
538	2.8	7.4	14.8	22.2	36.9	61.6	110.8

Temp in °C	WCC, LCC						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	20.0	51.7	103.4	155.1	258.6	430.9	775.7
50	20.0	51.7	103.4	155.1	258.6	430.9	775.7
100	20.0	51.7	103.4	155.1	258.6	430.9	775.7
150	20.0	51.7	103.4	155.1	258.6	430.9	775.7
200	20.0	51.7	103.4	155.1	258.6	430.9	775.7
250	20.0	51.7	103.4	155.1	258.6	430.9	775.7
300	20.0	51.7	103.4	155.1	258.6	430.9	775.7
325	20.0	51.7	103.4	155.1	258.6	430.9	775.7
350	19.8	51.1	102.2	153.3	255.5	425.8	766.4
375	19.3	48.4	96.7	145.1	241.9	403.1	725.6
400	19.3	43.4	86.8	130.2	217.0	361.7	651.0
425	18.0	36.0	71.9	107.9	179.8	299.6	539.3
450	14.4	28.8	57.5	86.3	143.8	239.6	431.4
475	10.7	21.4	42.7	64.1	106.8	178.0	320.4
500	7.2	14.5	29.0	43.4	72.4	120.7	217.2
538	3.7	7.4	14.8	22.2	36.9	61.6	110.8

Temp in °C	LCB						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	20.0	48.0	96.0	144.1	240.1	400.1	720.3
50	20.0	48.0	96.0	144.1	240.1	400.1	720.3
100	20.0	48.0	96.0	144.1	240.1	400.1	720.3
150	20.0	48.0	96.0	144.1	240.1	400.1	720.3
200	20.0	48.0	96.0	144.1	240.1	400.1	720.3
250	20.0	48.0	96.0	144.1	240.1	400.1	720.3
300	20.0	48.0	96.0	144.1	240.1	400.1	720.3
325	20.0	48.0	95.9	143.9	239.8	399.6	719.3
350	19.8	47.3	94.6	141.9	236.5	394.1	709.4
375	19.3	44.9	89.9	134.8	224.7	374.6	674.2
400	19.3	40.8	81.6	122.3	203.9	339.8	611.7
425	17.1	34.1	68.3	102.4	170.6	284.4	511.9
450	13.5	27.0	54.0	81.0	134.9	224.9	404.8
475	9.8	19.6	39.2	58.8	97.9	163.2	293.8
500	6.9	13.8	27.7	41.5	69.2	115.3	207.6
538	3.7	7.4	14.8	22.2	36.9	61.6	110.8

Temp in °C	WC6, F11						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.8	51.7	103.4	155.1	258.6	430.9	775.7
50	19.8	51.7	103.4	155.1	258.6	430.9	775.7
100	19.8	51.7	103.4	155.1	258.6	430.9	775.7
150	19.8	51.7	103.4	155.1	258.6	430.9	775.7
200	19.8	51.7	103.4	155.1	258.6	430.9	775.7
250	19.8	51.7	103.4	155.1	258.6	430.9	775.7
300	19.8	51.7	103.4	155.1	258.6	430.9	775.7
325	19.8	51.7	103.4	155.1	258.6	430.9	775.7
350	19.8	51.5	102.8	154.3	257.1	428.6	771.4
375	19.3	50.6	101.0	151.5	252.5	420.9	757.4
400	19.3	50.3	100.6	150.6	251.2	418.3	753.2
425	19.0	49.6	99.3	148.9	248.2	413.7	744.6
450	18.1	47.3	94.4	141.4	235.8	393.1	707.6
475	16.4	42.8	85.5	128.2	213.7	356.3	641.3
500	12.3	32.2	64.3	96.5	160.8	268.0	482.4
538	7.1	18.6	37.2	55.8	93.1	155.1	279.2
550	6.1	15.9	31.8	47.7	79.4	132.4	238.3
575	4.2	11.0	22.0	33.0	55.0	91.7	165.1
600	2.9	7.6	15.3	22.9	38.2	63.6	114.5
625	2.0	5.3	10.6	16.0	26.6	44.4	79.9
650	1.4	3.5	7.1	10.6	17.7	29.5	53.2

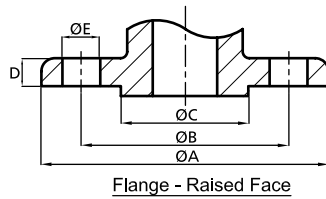
Temp in °C	WC9, F22						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.8	51.7	103.4	155.1	258.6	430.9	775.7
50	19.8	51.7	103.4	155.1	258.6	430.9	775.7
100	19.8	51.6	103.2	154.9	258.1	430.2	774.3
150	19.5	51.0	101.9	152.9	254.8	424.6	764.3
200	19.3	50.2	100.4	150.7	251.1	418.5	753.4
250	19.2	50.0	100.0	149.9	249.9	416.5	749.7
300	19.1	49.8	99.6	149.3	248.9	414.8	746.7
325	19.0	49.6	99.2	148.8	248.0	413.3	743.9
350	18.9	49.2	98.4	147.6	246.0	410.0	738.1
375	18.7	48.8	97.5	146.3	243.8	406.3	731.3
400	18.7	48.8	97.5	146.3	243.8	406.3	731.3
425	18.7	48.8	97.5	146.3	243.8	406.3	731.3
450	18.1	47.3	94.4	141.4	235.8	393.1	707.6
475	16.4	42.8	85.5	128.2	213.7	356.3	641.3
500	13.7	35.6	71.5	107.1	178.6	297.5	535.4
538	8.8	23.0	46.1	69.1	115.2	192.1	345.7
550	7.5	19.5	39.1	58.6	97.7	162.8	293.1
575	5.0	13.2	26.3	39.5	65.8	109.7	197.4
600	3.3	8.6	17.2	25.8	43.0	71.7	129.1
625	2.1	5.6	11.2	16.7	27.9	46.5	83.7
650	1.4	3.5	7.1	10.6	17.7	29.5	53.2

Temp in °C	C12A, F91						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	20.0	51.7	103.4	155.1	258.6	430.9	775.7
50	20.0	51.7	103.4	155.1	258.6	430.9	775.7
100	20.0	51.7	103.4	155.1	258.6	430.9	775.7
150	20.0	51.7	103.4	155.1	258.6	430.9	775.7
200	20.0	51.7	103.4	155.1	258.6	430.9	775.7
250	20.0	51.7	103.4	155.1	258.6	430.9	775.7
300	20.0	51.7	103.4	155.1	258.6	430.9	775.7
325	20.0	51.7	103.4	155.1	258.6	430.9	775.7
350	19.8	51.5	102.8	154.3	257.1	428.6	771.4
375	19.3	50.6	101.0	151.5	252.5	420.9	757.4
400	19.3	50.3	100.6	150.6	251.2	418.3	753.2
425	19.0	49.6	99.3	148.9	248.2	413.7	744.6
450	18.1	47.3	94.4	141.4	235.8	393.1	707.6
475	16.4	42.8	85.5	128.2	213.7	356.3	641.3
500	13.7	35.6	71.5	107.1	178.6	297.5	535.4
538	11.0	29.0	57.9	86.9	145.1	241.7	435.1
550	11.0	29.0	57.9	86.9	145.1	241.7	435.1
575	10.9	28.6	57.1	85.7	143.0	238.3	428.8
600	9.3	24.4	48.7	73.1	121.9	203.1	365.6
625	7.0	18.3	36.5	54.8	91.3	152.1	273.8
650	4.8	12.4	24.8	37.2	62.1	103.4	186.2

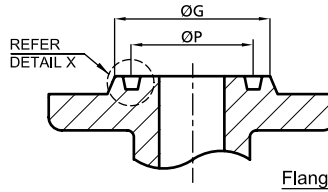
Temp in °C	CF8, F304						
	Working Pressures by Class, bar						
	150	300	600	900	1500	2500	4500
-29 to 38	19.8	51.7	103.4	155.1	258.6	430.9	775.7
50	19.4	50.5	101.0	151.5	252.5	420.8	757.4
100	17.5	45.6	91.2	136.8	228	380.0	683.9
150	15.8	41.3	82.6	123.9	206.5	344.2	619.6
200	14.8	38.5	77.0	115.4	192.4	320.7	577.2
250	13.9	36.3	72.5	108.8	181.3	302.2	543.9
300	13.2	34.5	69.0	103.5	172.5	287.5	517.5
325	12.9	33.7	67.5	101.2	168.7	281.1	506.0
350	12.7	33.1	66.1	99.2	165.3	275.5	496.0
375	12.4	32.4	64.8	97.2	162.0	270.0	486.0
400	12.2	31.7	63.5	95.2	158.7	264.5	476.1
425	12.0	31.2	62.5	93.7	156.2	260.4	468.7
450	11.7	30.6	61.2	91.8	153.0	254.9	458.9
475	11.5	30.1	60.1	90.2	150.3	250.5	450.9
500	11.3	29.6	59.1	88.7	147.8	246.4	443.5
538	11.0	28.6	57.3	85.9	143.1	238.5	429.4
550	10.9	28.4	56.8	85.1	141.9	236.5	425.7
575	10.0	26.1	52.1	78.2	130.3	217.2	399.0
600	8.1	21.1	42.2	63.3	105.5	175.8	316.5
625	6.6	17.2	34.5	51.7	86.2	143.6	258.5
650	5.4	14.1	28.2	42.2	70.4	117.3	211.2
675	4.5	11.7	23.4	35.1	58.4	97.4	175.3
700	4.1	10.7	21.3	32.0	53.3	88.9	160.0
725	3.5	9.2	18.5	27.7	46.2	77.0	138.6
750	2.8	7.4	14.8	22.1	36.7	61.2	110.3
775	2.2	5.8	11.4	17.2	28.5	47.6	85.6
800	1.8	4.4	8.8	13.2	22.0	36.6	65.6
816	1.4	3.4	7.2	10.7	17.9	29.6	53.3

Flange, Butt-Weld & Socket Weld Dimensions

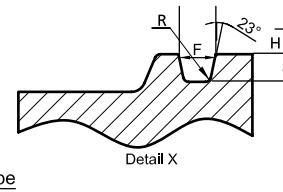
Flanged Dimensions as per ASME B16.5, 2013



Flange - Raised Face



Flange - Ring Type



Detail X

Size		ASME Class 150 Raised Face (in mm)						ASME Class 300 Raised Face (in mm)							
		ØA	ØB	ØC	D	ØE	Bolt		ØA	ØB	ØC	D	ØE	Bolt	
No.	Dia						No.	Dia							
2	50	150	120.7	92.1	14.3	19.0	4	5⁄8"	165	127.0	92.1	20.7	19.0	8	5⁄8"
3	80	190	152.4	127.0	17.5	19.0	4	5⁄8"	210	168.3	127.0	27.0	22.4	8	¾"
4	100	230	190.5	157.2	22.3	19.0	8	5⁄8"	255	200.0	157.2	30.2	22.4	8	¾"
5	125	255	215.9	185.7	22.3	22.4	8	¾"	280	235.0	185.7	33.4	22.4	8	¾"
6	150	280	241.3	215.9	23.9	22.4	8	¾"	320	269.9	215.9	35.0	22.4	12	¾"
8	200	345	298.5	269.9	27.0	22.4	8	¾"	380	330.2	269.9	39.7	25.4	12	7⁄8"
10	250	405	362.0	323.8	28.6	25.4	12	7⁄8"	445	387.4	323.8	46.1	29.0	16	1"
12	300	485	431.8	381.0	30.2	25.4	12	7⁄8"	520	450.8	381.0	49.3	32.0	16	1 1⁄8"
14	350	535	476.3	412.8	33.4	29.0	12	1"	585	514.4	412.8	52.4	32.0	20	1 1⁄8"
16	400	595	539.8	469.9	35.0	29.0	16	1"	650	571.5	469.9	55.6	35.0	20	1 1⁄4"
18	450	635	577.9	533.4	38.1	32.0	16	1 1⁄8"	710	628.6	533.4	58.8	35.0	24	1 1⁄4"
20	500	700	635.0	584.2	41.3	32.0	20	1 1⁄8"	775	685.8	584.2	62.0	35.0	24	1 1⁄4"
24	600	815	749.2	692.2	46.1	35.0	20	1 1⁄4"	915	812.8	692.2	68.3	41.0	24	1 1⁄2"

Height of raised face is 2 mm.

Size					ASME Class 600 Raised Face				ASME Class 600 Ring Type					
		ØA	ØB	D	ØC	ØE	Bolt		ØG	Groove Number	ØP	Depth H	Width F	Bottom Rad. R
No	Dia													
2	50	165	127.0	25.4	92.1	19.0	8	5⁄8"	108	R23	82.55	7.92	11.91	0.8
3	80	210	168.3	31.8	127.0	22.4	8	¾"	146	R31	123.83	7.92	11.91	0.8
4	100	275	215.9	38.1	157.2	25.4	8	7⁄8"	175	R37	149.23	7.92	11.91	0.8
5	125	330	266.7	44.5	185.7	28.5	8	1"	210	R41	180.98	7.92	11.91	0.8
6	150	355	292.1	47.7	215.9	29.0	12	1"	241	R45	211.12	7.92	11.91	0.8
8	200	420	349.2	55.6	269.9	32.0	12	1 1⁄8"	302	R49	269.88	7.92	11.91	0.8
10	250	510	431.8	63.5	323.8	35.0	16	1 1⁄4"	356	R53	323.85	7.92	11.91	0.8
12	300	560	489.0	66.7	381.0	35.0	20	1 1⁄4"	413	R57	381.0	7.92	11.91	0.8
14	350	605	527.0	69.9	412.8	38.0	20	1 3⁄8"	457	R61	419.1	7.92	11.91	0.8
16	400	685	603.2	76.2	469.9	41.0	20	1 1⁄2"	508	R65	469.9	7.92	11.91	0.8
18	450	745	654.0	82.6	533.4	44.5	20	1 5⁄8"	575	R69	533.4	7.92	11.91	0.8
20	500	815	723.9	88.9	584.2	44.5	24	1 5⁄8"	635	R73	584.2	9.53	13.49	1.5
24	600	940	838.2	101.6	692.2	50.4	24	1 7⁄8"	749	R77	692.15	11.13	16.66	1.5

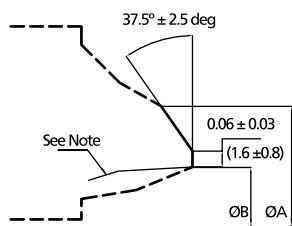
Height of raised face is 7 mm each

Flanged as per ASME B16.47, 2011 Series A (MSS SP 44) & Series B (API 605)

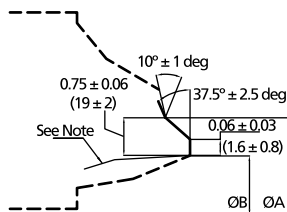
ASME Class	Size		Series A (MSS SP 44)							Series B (API 605)						
			ØA	ØB	ØC	D	ØE	Bolt		ØA	ØB	ØC	D	ØE	Bolt	
	No	Dia						No	Dia							
Cl.150	28	700	925	863.6	800	69.9	35	28	1 ¼"	835	795.3	762	46.2	22.4	40	¾"
	30	750	985	914.4	857	73.1	35	28	1 ¼"	885	846.1	813	49.3	22.4	44	¾"
	34	850	1110	1028.7	965	81.0	41	32	1 ½"	1005	957.3	921	55.7	25.4	40	⅞"
	36	900	1170	1085.8	1022	88.9	41	32	1 ½"	1055	1009.6	972	57.3	25.4	44	⅞"
	42	1050	1345	1257.3	1194	95.3	41	36	1 ½"	1225	1171.6	1130	66.8	28.5	48	1"

Height of raised face is 2 mm

Butt-weld Ends as per ASME B16.25, 2012 (Welding end detail for joint without backing ring)



For wall thickness less than 22 mm (0.88").

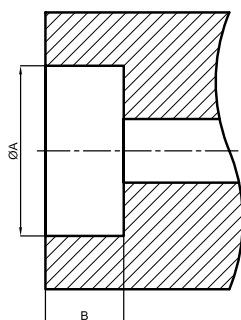


For wall thickness greater than 22 mm (0.88").

Note : Internal surface may be reformed or machined for dimensions B at root face. Contour within the envelope is manufacturer's option, unless otherwise specifically ordered for.

Size		ØA	ØB										
NPS	DN		STD	XS	30	40	60	80	100	120	140	160	XXS
3	80	91	-	-	-	78	-	74	-	-	-	67	58
4	100	117	-	-	-	102	-	97	-	92	-	87	80
5	125	144	-	-	-	128	-	122	-	116	-	110	103
6	150	172	-	-	-	154	-	148	-	140	-	132	124
8	200	223	-	-	-	203	198	194	189	183	178	173	175
10	250	278	-	-	-	255	247	242	237	230	222	216	-
12	300	329	305	298	-	303	295	289	281	273	267	257	-
14	350	362	337	330	-	333	325	318	308	300	292	284	-
16	400	413	387	-	-	381	373	364	354	344	333	325	-
18	450	464	438	432	-	429	419	410	398	387	378	367	-
20	500	516	489	483	-	478	467	456	443	432	419	408	-
24	600	619	591	584	581	575	560	548	532	518	505	491	-
28	700	721	-	-	680	-	-	-	-	-	-	-	-
30	750	772	-	-	730	-	-	-	-	-	-	-	-
32	800	825	-	-	781	778	-	-	-	-	-	-	-
34	850	876	-	-	832	829	-	-	-	-	-	-	-
36	900	927	-	-	883	877	-	-	-	-	-	-	-

Socket Weld details and table as per ASME B16.11 – 2011



Size		Socket Bore, ØA	Socket Depth, B
NPS	DN		
½"	15	21.8	9.7
¾"	20	27.2	12.7
1	25	33.9	12.7
1 ¼"	32	42.7	12.7
1 ½"	40	48.8	12.7
2	50	61.2	16.2

All dimensions in mm



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