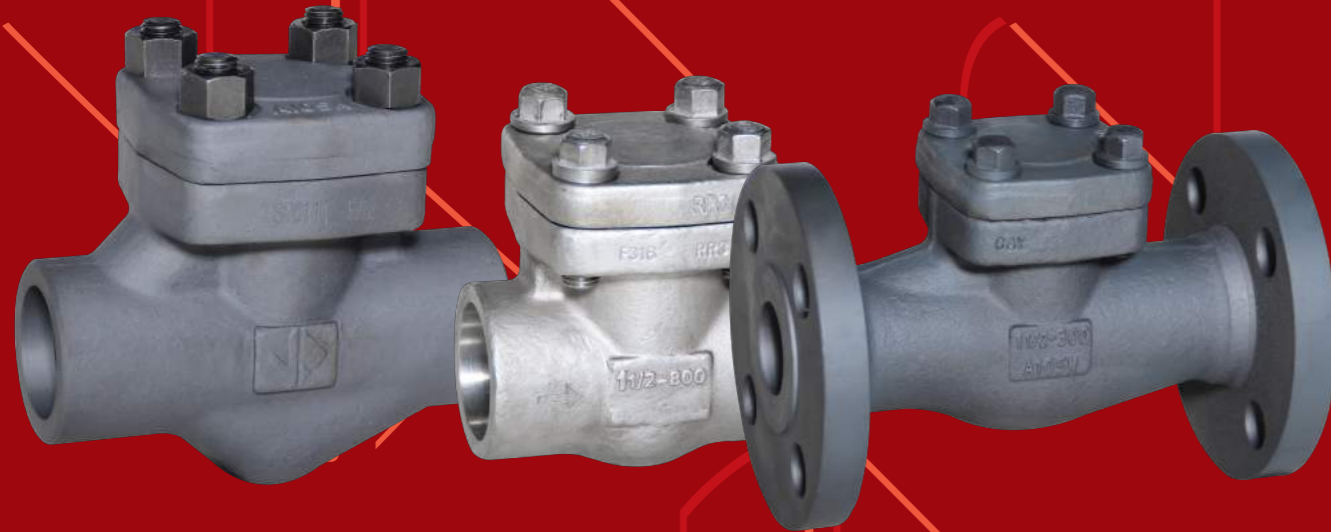
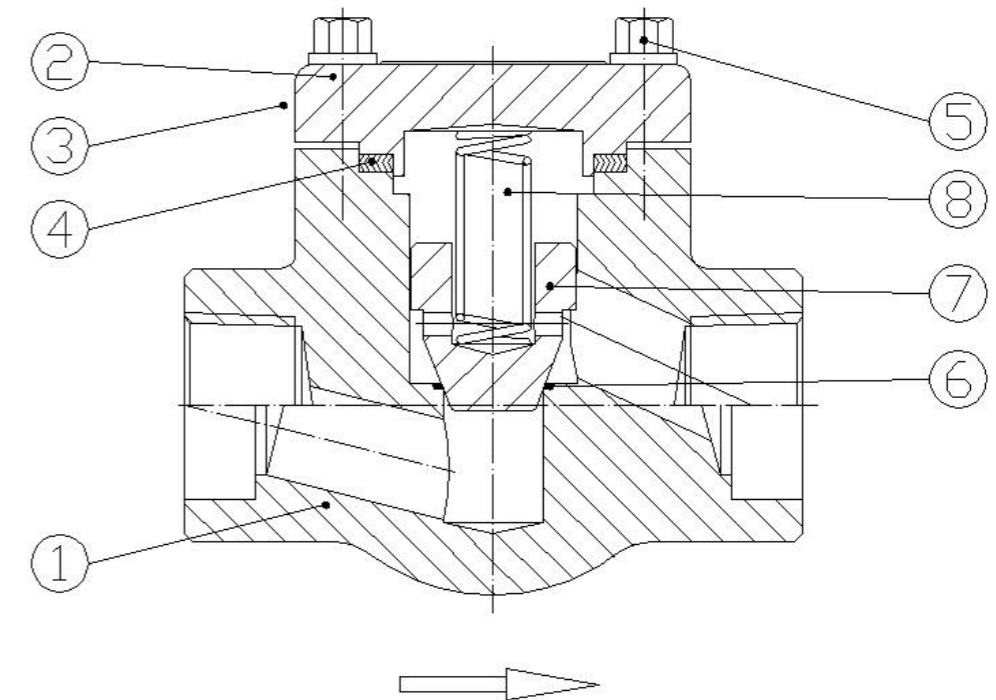


CHECK VALVES

Forged steel, piston, ball or swing check. Full or standard port. Bolted or welded cover joint. T-Pattern or Y-Pattern. Integral body seat for piston or ball check. Separate seat ring design for the swing check valve.



CHECK VALVES



The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design. It is also available in either T-Pattern or Y-Pattern configurations.

The cover is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34.

3. BODY-COVER JOINT. Two different cover joint designs are available. These are either the bolted cover or the threaded and seal welded type.

The bolted cover joint design valve uses a contained, controlled compression, spiral wound type gasket.

5. COVER BOLTING. The cover bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.

6. SEAT. The body seat for the piston and ball check valves is an integral weld overlay and is part of the valve trim. The swing check valve is supplied with a separate seat ring which is pressed into the valve body and wedged into place, forming a seal with the body.

7. PISTON, BALL OR DISC. The piston, ball or disc is forged steel and is part of the valve trim. The seating surface of the piston and ball check is of the tapered or plug type design. The seating surface of the swing check is of the flat seat design.

8. SPRING. The spring is optional and supplied only upon request.



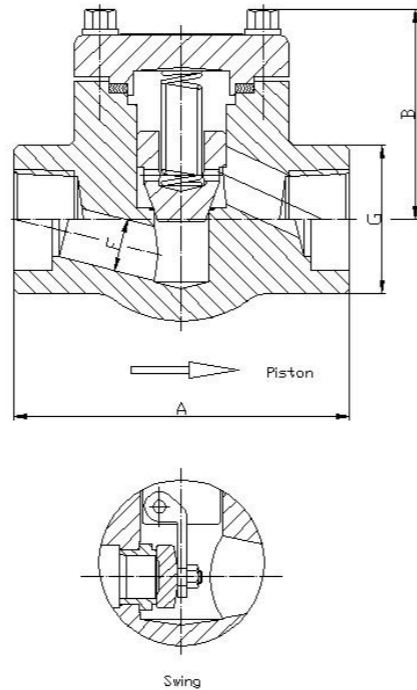
CHECK VALVES- BOLTED BONNET- FULL & STANDARD PORT

150-800 LB.
900-1500 LB.

Design construction:

ASME B16.34 - BS 5352
Testing according to API 598
Marking MSS SP25
Spring on request only
Spiral-wound gasket
Socket Weld Ends to ASME B16.11
Screwed Ends (NPT) to ASME B1.20.1
Butt Welding Ends to ASME B16.25

Ratings:
- carbon steel class 800 1975 psig @ 100°F
138 bar + 38°C
- carbon steel class 1500 3705 psig @ 100°F
255 bar + 38°C



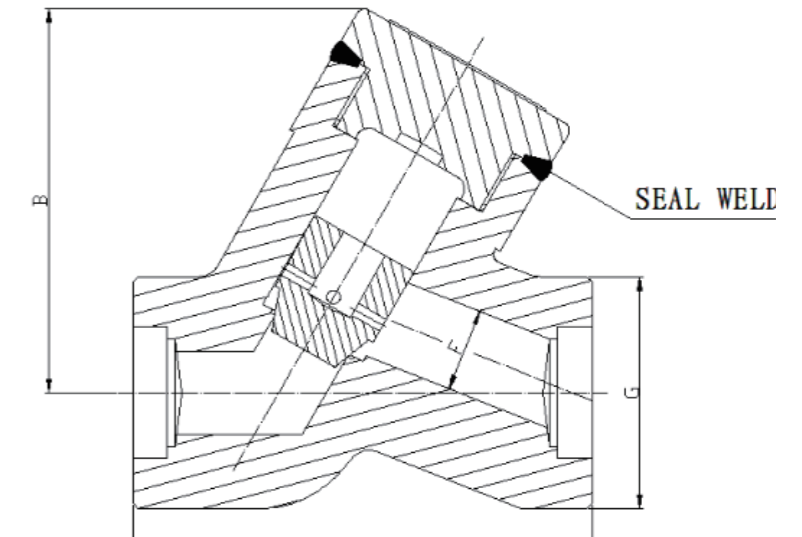
CHECK VALVES- WELDED BONNET- FULL PORT (Y TYPE)

800-1500LB .

Design construction:

ASME B16.34 Limited Class - BS 5352
Testing according to API 598
Marking MSS SP25
Body bonnet weld to ASME IX
Spring on request only
Socket Weld Ends to ASME B16.11
Screwed Ends (NPT) to ASME B1.20.1
Butt Welding Ends to ASME B16.25

Ratings:
- carbon steel class 800 2000 psig @ 100°F
138 bar + 38°C
- carbon steel class 1690 4225 psig @ 100°F
291 bar + 38°C



150-800 LB.	DN	R.P	mm	8	10	15	20	25	32	40	50	-	
			(in)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	-	
	F	F.P	mm	-	8	10	15	20	25	32	40	50	
			(in)	-	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	
	A	R.P	lift	79	79	79	92	111	120	152	172	200	
		F.P	swing	79	79	79	92	111	120	120	140	170	
	H	R.P	lift	61	61	61	61	78	84	103	118	132	
		F.P	swing	61	61	61	61	78	84	101	120	133	
	kg	R.P	lift	1.5	1.4	1.2	1.4	2.3	3.9	5.6	8.9	12.5	
		F.P	swing	1.3	1.2	1.0	1.1	1.9	3.4	4.5	7.3	10.0	

900-1500 LB.	NPS	(in)	1/2	3/4	1	1 1/4	1 1/2	2
	DN	mm	15	20	25	32	40	50
	F		13	18	24	29	36.5	46.5
	A	lift	111	111	130	152	172	220
		swing	111	111	120	140	140	162
	H	lift	79	97	104	120	139	158
		swing	79	97	115	133	149	166
	kg	lift	3.4	4.8	6.9	10.7	8.8	12.3
swing		3.6	4.3	10.7	14.6	12.6	15.5	

800-1500LB.	NPS	(in)	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
	DN	mm	5	10	15	20	25	32	40	50
	F		7	10	13	18	24	29	36.5	46.5
	A	class800	98	98	98	98	120	130	140	170
		class1500	102	102	102	102	130	150	190	200
	H	class800	84	84	84	84	102	114	114	145
		class1500	90	90	90	101	125	132	142	203
	kg	class800	3.0	2.8	2.7	3.7	6.5	9.0	10.1	11.0
		class1500	3.2	3.1	3.0	4.1	7.2	11.0	12.0	13.8



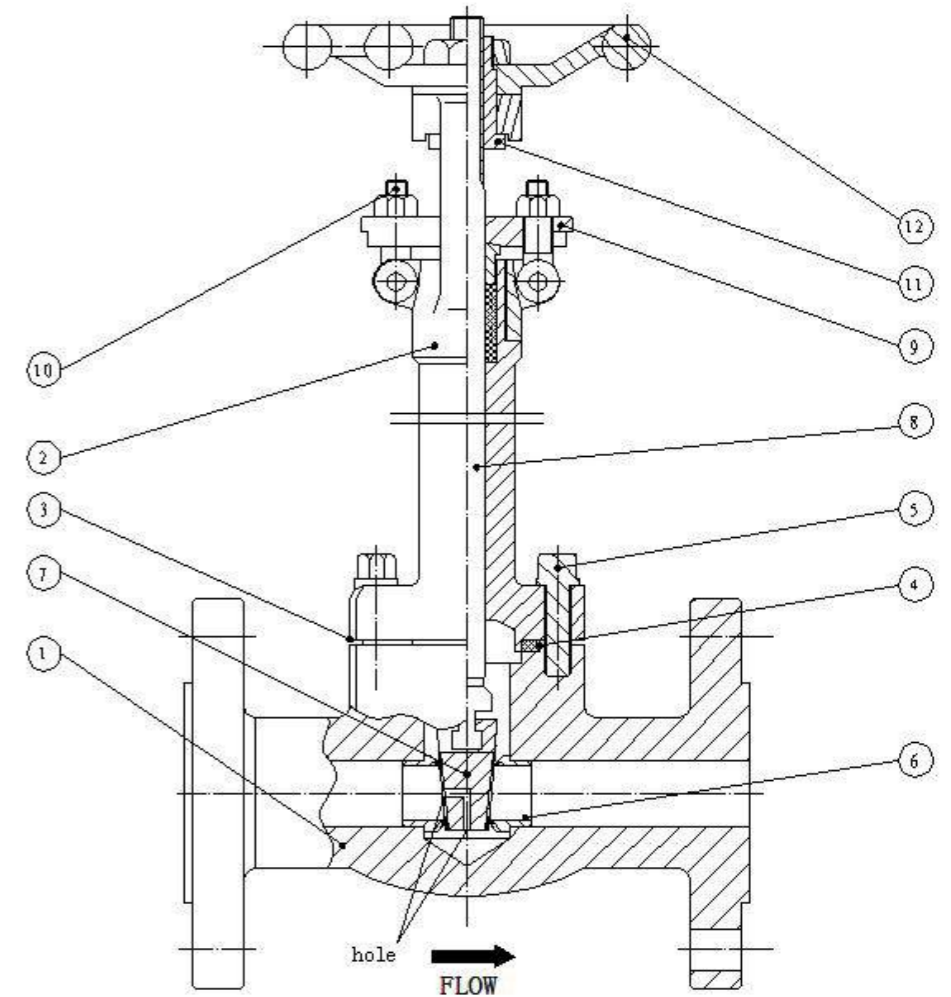
CRYOGENIC VALVES



CRYOGENIC VALVES

Typical cryogenic gate valve shown. Forged steel, outside screw and yoke (OS&Y), rising stem, non-rising handwheel. Full or standard port. Bolted or welded bonnet joint. Integral backseat.

Operating temperature
 1)LF2 (≥ -46 C)
 2)LF3 (< -46 C ≥ -101 C)
 3)F304amd F316 ($< 101.1 \sim \geq 196$ C)



- 1. BODY.** The body is forged steel and designed to the basic dimensional requirements of the applicable specifications such as API 602 and ASME B16.34. The body is available in both the full or standard port design.
- 2. BONNET.** The bonnet is forged steel and extended to act as a gas column to keep stem packing at a sufficient distance away from the frost line. The bonnet also has an integral backseat and incorporates the stuffing box, which has dimensions per the applicable specifications such as API 602.
- 3. BODY-BONNET JOINT.** Two different bonnet joint designs are available. These are either the bolted bonnet or the threaded and seal welded type.
- 4. GASKET.** The bolted bonnet joint design valve uses a contained, controlled compression, spiral wound type gasket.
- 5. BONNET BOLTING.** The bonnet bolting is manufactured of alloy steel in accordance with the requirements of the applicable specifications such as API 602 and ASME B16.34.
- 6. SEAT RINGS.** The seat rings are steel and make up part of the valve trim. They are pressed into the valve body and wedged into place, forming a seal with the body. The seat ring is vented on the up-stream side to prevent high pressure build up if the temperature rises in the column. The seating surfaces are ground and lapped.

- 7. WEDGE.** The wedge, which is a solid design, is forged or investment cast steel and is part of the valve trim. The seating surfaces are ground and lapped.
- 8. STEM.** The stem is forged steel and part of the valve trim. It contains an integral back seat shoulder, which mates with the integral backseat of the bonnet. The stem is designed to the basic dimensional requirements of the applicable specifications such as API 602.
- 9. GLAND AND FLANGE.** The gland, gland flange assembly utilizes a separate, two piece design. This self aligning design allows the flange to be unevenly tightened while the gland maintains its parallel alignment with the stem and stuffing box.
- 10. GLAND BOLTS AND NUTS.** The steel/stainless steel gland bolt and nut assembly is a stud, Eye bolt arrangement. This design allows complete removal from the valve when service is required. The use of industry standard thread full length studs and nuts also allows easy replacement should these items be lost or in need of replacement.
- 11. YOKE SLEEVE.** The yoke sleeve is of forged stainless steel material having a high melting point and is resistant to wear and corrosion.
- 12. HANDWHEEL.** The handwheel is forged carbon steel of an open spoke design. This robust construction along with appropriate sizing allows for ease of operation.

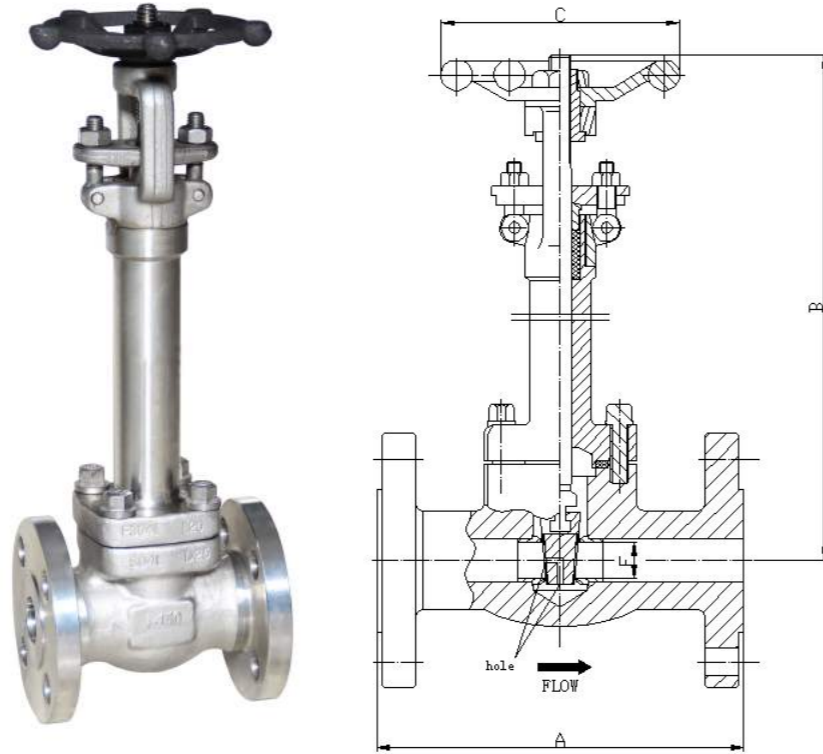


CRYOGENIC VALVES- GATE TYPE- BOLTED BONNET- FULL & STANDARD PORT

150LB. -800LB.

Design construction:

API 602- ASME B16.34- BS 5352- BS 6364
 Testing according to API 598
 Marking MSS SP25
 Outside Screw and Yoke (OS&Y)
 Self aligning two piece packing gland
 Spiral wound gasket
 Integral backseat
 Face to face according to ASME B16.10
 Flanges according to ASME B16.5
 Welded body- bonnet joint also available
 Ratings: stainless steel A182- F316
 - class 150 = 275 psig @ 100°F
 19 bar + 38°C
 - class 300 = 720 psig @ 100°F
 49 bar + 38°C

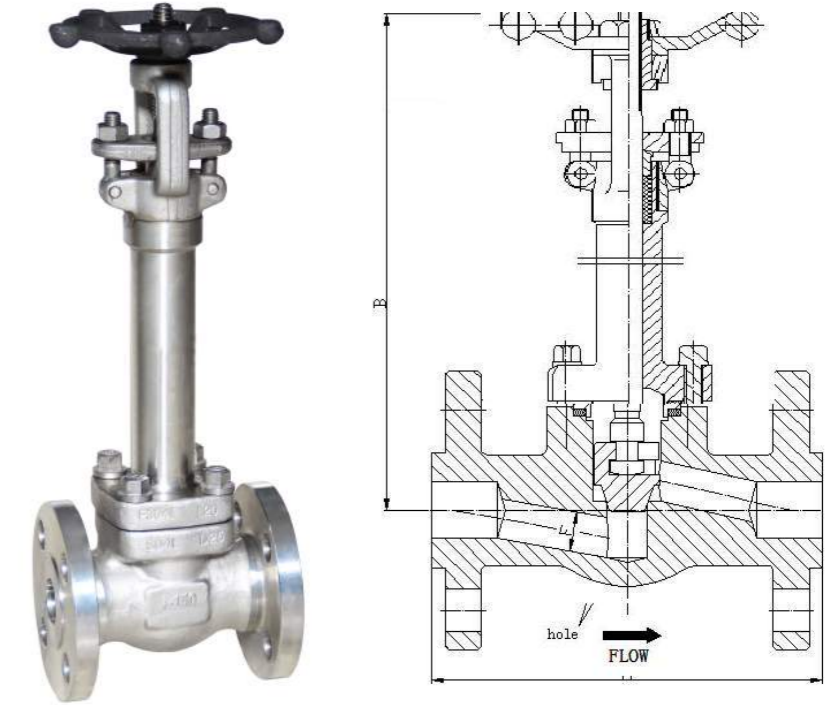


CRYOGENIC VALVES-GLOBE TYPE- BOLTED BONNET- FULL & STANDARD PORT

150LB. -800LB.

Design construction:

API 602- ASME B16.34- BS 5352- BS 6364
 Testing according to API 598
 Marking MSS SP25
 Outside Screw and Yoke (OS&Y)
 Self aligning two piece packing gland
 Spiral wound gasket
 Integral backseat
 Face to face according to ASME B16.10
 Flanges according to ASME B16.5
 Welded body- bonnet joint also available
 Ratings: stainless steel A182- F316
 - class 150 = 275 psig @ 100°F
 19 bar + 38°C
 - class 300 = 720 psig @ 100°F
 49 bar + 38°C



150LB.-800LB.	NPS	(in)	1/2	3/4	1	1 1/4	1 1/2	2
	DN	mm	15	20	25	32	40	50
	D		13	18	24	29	36.5	46.5
	L	SW:NPT OR RC	92	111	120	120	140	178
		CL150;CL300	140	152	165	178	190	216
		CL600	165	190	216	229	241	292
		PN1.6-4.0	130	150	160	180	200	250
		PN6.4-10.0	170	190	210	230	250	250
	H		333	360	407	475	475	551
	W		125	125	160	160	180	200
KG		7.1	9.4	13.5	15.0	17.8	28.0	
	CL300/CL600	7.0/8.0	9.4/11.1	12.5/13.4	19.8/21.5	20.1/22.6	24.0/27.0	

150LB.-800LB.	NPS	(in)	1/2	3/4	1	1 1/4	1 1/2	2
	DN	mm	15	20	25	32	40	50
	D		13	18	24	29	36.5	46.5
	L	SW:NPT OR RC	92	111	120	172	172	200
		CL150;CL300	152	178	203	216	229	267
		CL600	165	190	216	229	241	292
		PN1.6-4.0	130	150	160	190	200	230
		PN6.4-10.0	170	190	210	230	260	300
	H		339	370	410	474	474	546
	W		125	125	160	180	180	200
KG	SW:NPT OR RC	7.2	9.5	13.5	20.6	19.8	29.0	
	CLASS300	8.4	10.2	15.0	23.0	22.0	33.4	
	CLASS600	9.6	12.7	18.1	25.8	25	36	