



Shanghai Changhao High Pressure Pipe Co., Ltd.

## Valve Manual



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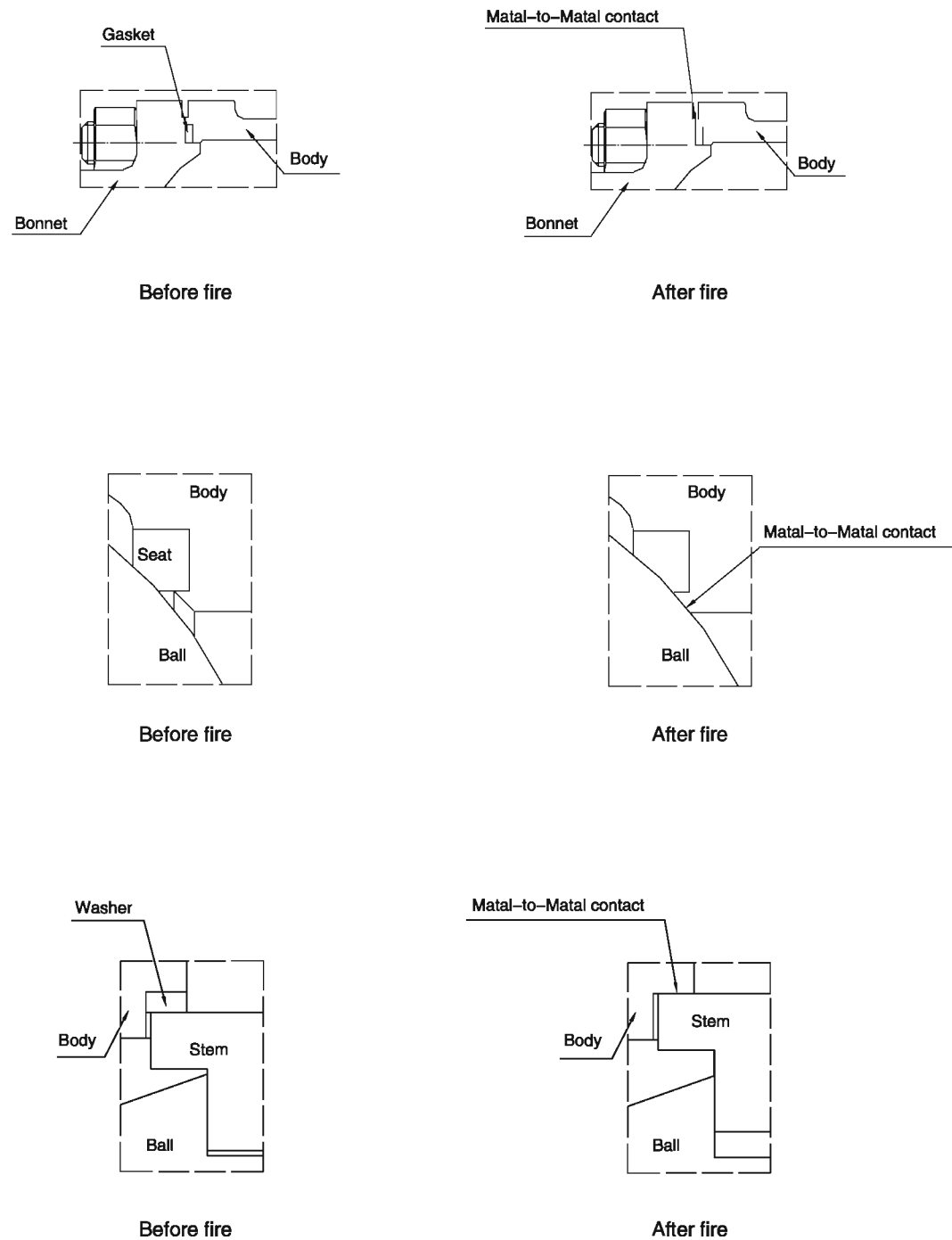
Web: [www.changhaopipe.com](http://www.changhaopipe.com)

Email: [sales2@changhaopipe.com](mailto:sales2@changhaopipe.com)

floating type ball valves are manufactured to BS 5351 specification, tested to BS 6755/API 598. The construction is the side entry type full port and end entry/side entry type reduced port. All valves are lever operated, the gear operator or the actuator are supplied at demand. The following are some of the major design features:

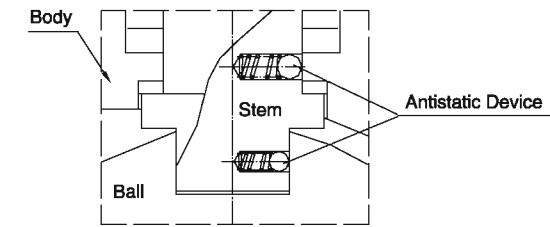
1. Fire Safe:

Designed and tested to BS 5146/API 607 to grant their operation suitability in case of fire.



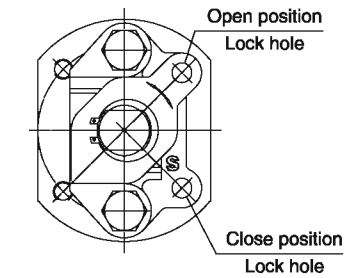
2. Antistatic:

Ametallic contact is always granted between ball and stem/body to discharge eventual statics build-up during service.



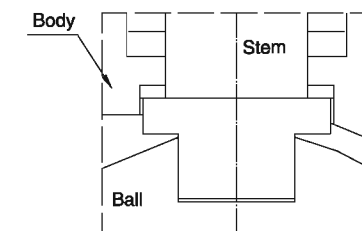
3. Locking Device:

To avoid misoperation, the valve may be locked by open or closed position locking device with popular padlock design. It's very important to lock the valve to prevent the valve from being operated by error, especially when the valve is installed in field or the valve should not be opened or closed during technical process.



4. Blowout Resistance of Stem:

To prevent stem from being blow out by the pressure entrapped in valve cavity when the fluid flows through the valve, the lower part of stem is incorporated with a raised collar. In this case, should the stem packing, thrust-washer be destroyed by fire or such damages cause by any other reason, the fluid pressure in valve body pushes stem's raised collar closely against the upper sealing surface of the body to avoid fluid leakage.



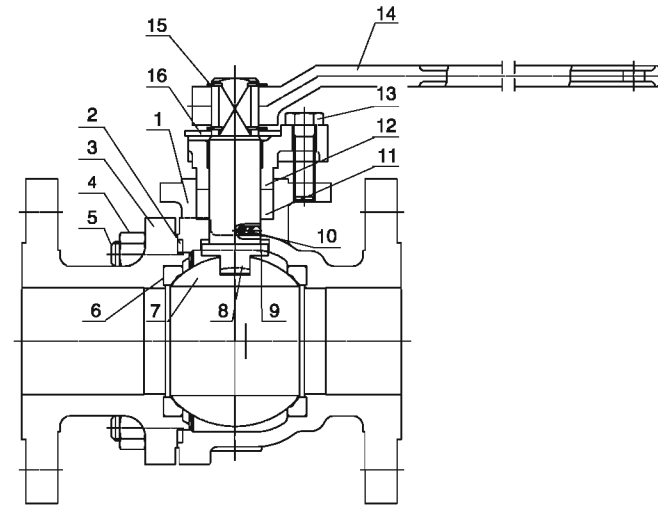
5. Easy Maintenance:

A very limited number of components and easily accessible.

6. Low Torque:

Although the seats are preloaded against the ball producing a friction between ball and seats with no pressure in the valve, as soon as the valve is pressurized such a friction decreases in a remarkable way since the ball is floated against the downstream seat freeing the upstream one

● Class150/300 Casting Steel Floating Ball Valve



● Technical Specification

Temp. & pressure: ASME B16.34、BS5351

Wall thickness: ASME B16.34、BS5351

Bore dimension: API 6D、BS5351

Face to face: ASME B16.10、BS2080

Flanges dimensions: ASME B16.5、BS1560

Test & inspection: API 598、API 6D、BS5146

Body material: WCB、LCB、LCC、CF8、CF8M、CF3、CF3M

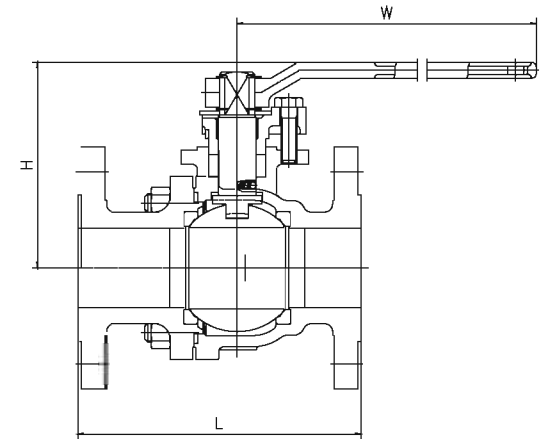
● Form of Major Part Material

Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
1	Body	ASTM A216-WCB	ASTM A352-LCB/LCC	ASTM A351-CF8/CF8M
2	Gasket	304+Graphite	304+Graphite	304+Graphite
3	Bonnet	ASTM A216-WCB	ASTM A352-LCB/LCC	ASTM A351-CF8/CF8M
4	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
5	Stud	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
6	Seat	PTFE	PTFE	PTFE
7	Ball	ASTM A182-F304	ASTM A182-F304	ASTM A182-F304/F316
8	Stem	ASTM A182-F304	ASTM A182-F304	ASTM A182-F304/F316
9	Gasket	304+PTFE	304+PTFE	304+PTFE
10	Antistatic device	ASTM A182-F304	ASTM A182-F304	ASTM A182-F304/F316
11	Packing	PTFE/Graphit	PTFE/Graphit	PTFE/Graphit
12	Packing gland	ASTM A216-WCB	ASTM A352-LCB/LCC	ASTM A351-CF8/CF8M
13	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
14	Lever	ASTM A216-WCB	ASTM A216-WCB	ASTM A216-WCB
15	Back stop	Carbon Steel	Carbon Steel	Carbon Steel
16	Stopper plate	Carbon Steel	Carbon Steel	Carbon Steel

● Class150 Dimension Chart

		Unit(mm)											
Norm.	in	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10
Di.	mm	15	20	25	40	50	65	80	100	125	150	200	250
Ball Bore		15	20	25	40	50	65	80	100	125	150	200	250
L		108	117	127	165	178	190	203	229	356	394	457	533
H		84	88	95	120	130	160	185	210	220	295	335	
W		130	130	140	250	250	400	400	450	450	1050	1500	

1/2" ~ 4": Lever operation
6" ~ 8": Optional gear operation
10": Gear operation
Test pressure
Shell: Hydrostatic 3.10MPa(450psi)
Seat: Air 0.55MPa(80psi)
Options
Packing and gasket
CF8M(316SS) ball and stem

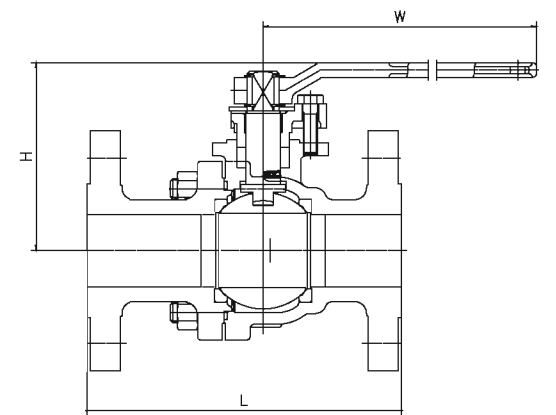


CLASS150

● Class300 Dimension Chart

		Unit(mm)										
Norm.	in	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8
Di.	mm	15	20	25	40	50	65	80	100	125	150	200
Ball Bore		15	20	25	40	50	65	80	100	125	150	200
L		140	152	165	191	216	241	283	305	381	403	502
H		84	88	95	120	140	160	180	208	220	335	
W		130	130	140	250	250	400	400	450	450	1050	

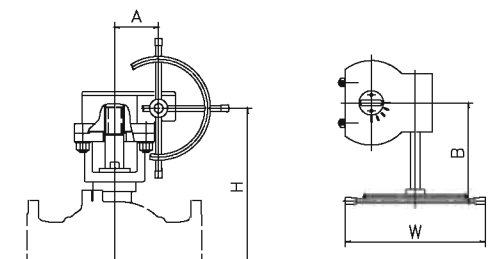
1/2" ~ 4": Lever operation
6" ~ 8": Optional gear operation
10": Gear operation
Test pressure
Shell: Hydrostatic 7.76MPa(1125psi)
Seat: Air 0.55MPa(80psi)
Options
Packing and gasket
CF8M(316SS) ball and stem



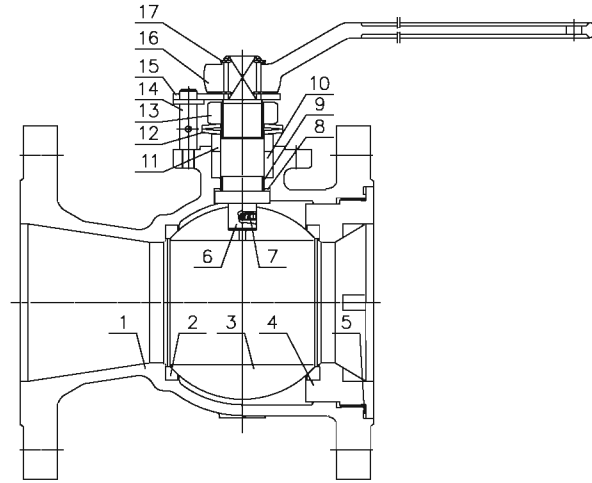
CLASS300

● Gear operation Dimention

Class	150	300	Gear operator			
			H	W	B	A
Valve size (inch)	6	6	325	350	205	125
	8	8	415	355	320	185
	10	-	475	365	340	360



● Class150/300 Uni-body Floating Ball Valve



● Technical Specification

Temp. & pressure: ASME B16.34、BS5351

Wall thickness: ASME B16.34、BS5351

Bore dimension: API 6D、BS5351

Face to face: ASME B16.10、BS2080

Flanges dimensions: ASME B16.5、BS1560

Test & inspection: API 598、API 6D、BS5146

Body material: WCB、LCB、LCC、CF8、CF8M、CF3、CF3M

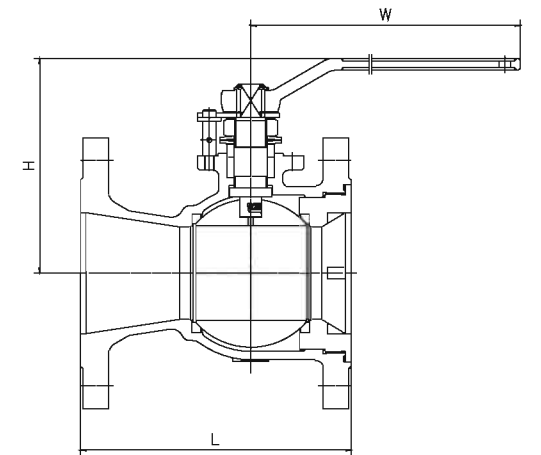
● Form of Major Part Material

Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
1	Body	ASTM A216-WCB	ASTM A352-LCB/LCC	ASTM A351-CF8/CF8M
2	Seat	PTFE	PTFE	PTFE
3	Ball	ASTM A182-F6a	ASTM A182-F304	ASTM A182-F304/F316
4	Bonnet	ASTM A105	ASTM A105	ASTM A182-F304/F316
5	Gasket	304+Graphite	304+Graphite	304+Graphite
6	Stem	ASTM A182-F6a	ASTM A182-F304	ASTM A182-F304/F316
7	Antistatic device	ASTM A182-F304	ASTM A182-F304	ASTM A182-F304/F316
8	Gasket	304+PTFE	304+PTFE	304+PTFE
9	Stem bearing	304+PTFE	304+PTFE	304+PTFE
10	Packing	PTFE/Graphite	PTFE/Graphite	PTFE/Graphite
11	Gland ring	ASTM A182-F6a	ASTM A182-F304	ASTM A182 F304/F316
12	Spring washer	Stainless Steel	Stainless Steel	Stainless Steel
13	Gland nut	ASTM A194-2H/2HM	ASTM A194-2H/2HM	ASTM A194-2H/2HM
14	Stopper pin	Stainless Steel	Stainless Steel	Stainless Steel
15	Stopper plate	Stainless Steel	Stainless Steel	Stainless Steel
16	Lever	ASTM A216-WCB	ASTM A216-WCB	ASTM A216-WCB
17	Back stop	Carbon Steel	Carbon Steel	Carbon Steel

● Class150 Dimension Chart

		Unit(mm)									
Norm.	in	1/2	3/4	1	1 1/2	2	3	4	6	8	10
Di.	mm	15	20	25	40	50	80	100	150	200	250
Ball Bore		10	12.5	17	30	38	58	76	114	144	187
L		108	117	127	165	178	203	229	267	292	330
H		103	106	115	135	120	155	170	260	300	355
W		130	130	130	140	250	250	400	750	1050	1500

Valve operator
1/2" ~ 10": Lever operation
6" ~ 10": Optional gear operation
Test pressure
Shell: Hydrostatic 3.10MPa(450psi)
Seat: Air 0.55MPa(80psi)
Options
Packing and gasket
CF8M(316SS) ball and stem

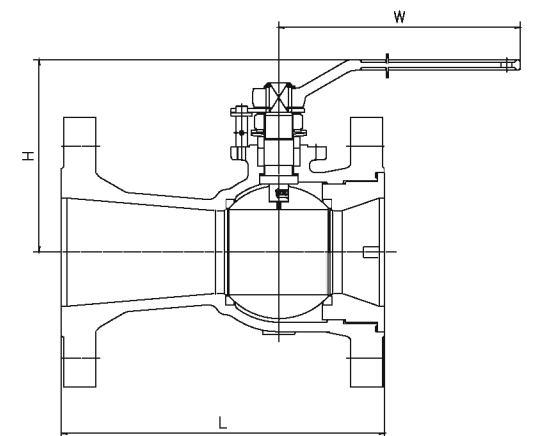


CLASS150

● Class300 Dimension Chart

		Unit(mm)									
Norm.	in	1/2	3/4	1	1 1/2	2	3	4	6	8	8
Di.	mm	15	20	25	40	50	80	100	150	200	200
Ball Bore		10	12.5	17	30	38	58	76	114	144	187
L		140	152	165	190	216	283	305	403	419	457
H		103	106	115	135	120	155	170	260	300	355
W		130	130	130	140	250	250	400	750	1050	1500

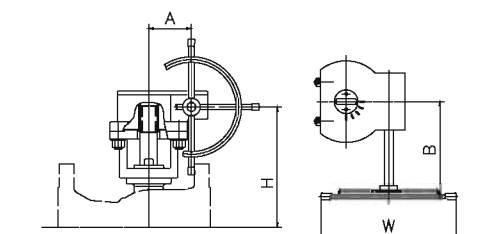
Valve operator
1/2" ~ 10": Lever operation
6" ~ 10": Optional gear operation
Test pressure
Shell: Hydrostatic 7.76MPa(1125psi)
Seat: Air 0.55MPa(80psi)
Options
Packing and gasket
CF8M(316SS) ball and stem



CLASS300

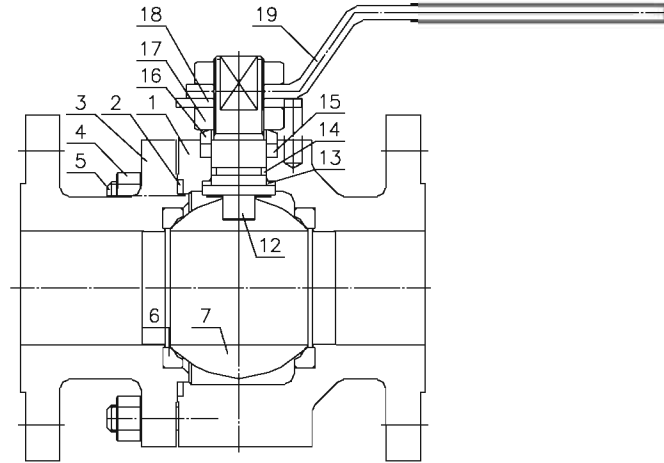
● Gear operation Dimention

Class	150	300	Gear operator			
			H	W	B	A
Valve size (inch)	6	6	257	350	205	125
	8	8	306	350	320	185
	10	10	365	400	320	185





● Class150/300 Forged Steel Floating Ball Valve



● Technical Specification

Temp. & pressure: ASME B16.34、BS5351

Wall thickness: ASME B16.34、BS5351

Bore dimension: API 6D、BS5351

Face to face: ASME B16.10、API 6D

Flanges dimensions: ASME B16.5、BS1560

Test & inspection: API 598、API 6D、BS5146

Body material: A105、LF2、F304、F316、F304L、F316L

● Form of Major Part Material

Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
1	Body	ASTM A105	ASTM A350 LF2	ASTM A182 F316
2	O-ring	VITON	VITON	VITON
3	Bonnet	ASTM A105	ASTM A350 LF2	ASTM A182 F316
4	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
5	Stud	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
6	Seat	RPTFE	RPTFE	RPTFE
7	Ball	ASTM A105+ENP	ASTM A350 LF2+ENP	ASTM A182 F316
12	Stem	ASTM A182-F6a	ASTM A182-F6a	ASTM A182 F316
13	Stem washer	304+PTFE	304+PTFE	316 +PTFE
14	O-ring	VITON	VITON	VITON
15	Packing	PTFE/Graphite	PTFE/Graphite	PTFE/Graphite
16	Packing gland	Carbon Steel	Carbon Steel	Stainless Steel
17	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
18	Stopper plate	Carbon Steel	Carbon Steel	Stainless Steel
19	Lever	Carbon Steel	Carbon Steel	Stainless Steel

● Class150 Dimension Chart

Norm. Dia.	Unit(mm)												
	in	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8	10
mm	15	20	25	40	50	65	80	100	125	150	200	250	
Ball Bore	15	20	25	40	50	65	80	100	125	150	200	250	
L	108	117	127	165	178	190	203	229	356	394	457	533	
H	84	88	95	120	130	160	185	210	220	295			
W	130	130	140	250	250	400	400	450	450	1050			

1/2" ~ 4": Lever operation

6" ~ 8": Optional gear operation

10": Gear operation

Test pressure

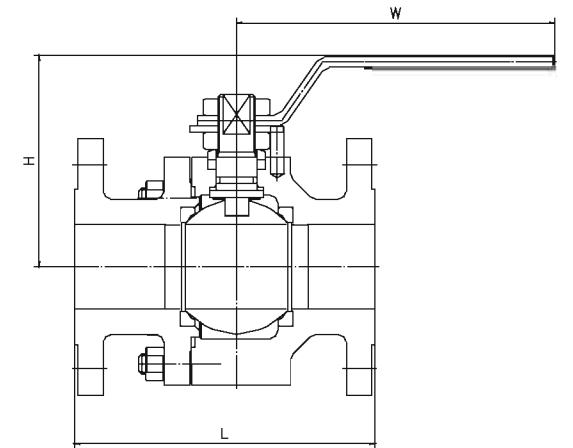
Shell: Hydrostatic 3.10MPa(450psi)

Seat: Air 0.55MPa(80psi)

Options

Packing and gasket

CF8M(316SS) ball and stem



CLASS150

● Class300 Dimension Chart

Norm. Dia.	Unit(mm)											
	in	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8
mm	15	20	25	40	50	65	80	100	125	150	200	
Ball Bore	15	20	25	40	50	65	80	100	125	150	200	
L	140	152	165	191	216	241	283	305	381	403	502	
H	84	88	95	120	140	160	180	208	220	335		
W	130	130	140	250	250	400	400	450	450	1050		

1/2" ~ 4": Lever operation

6" ~ 8": Optional gear operation

10": Gear operation

Test pressure

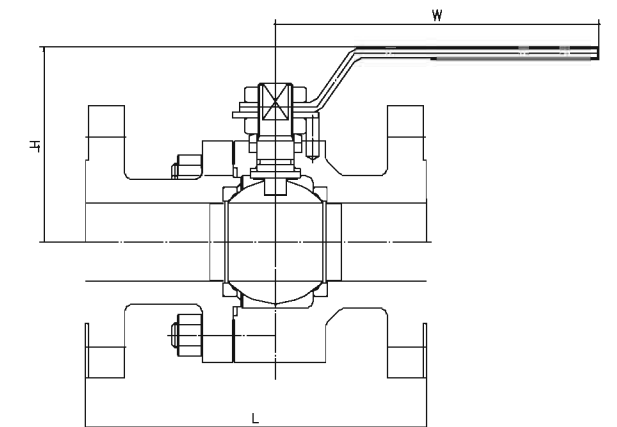
Shell: Hydrostatic 7.76MPa(1125psi)

Seat: Air 0.55MPa(80psi)

Options

Packing and gasket

CF8M(316SS) ball and stem

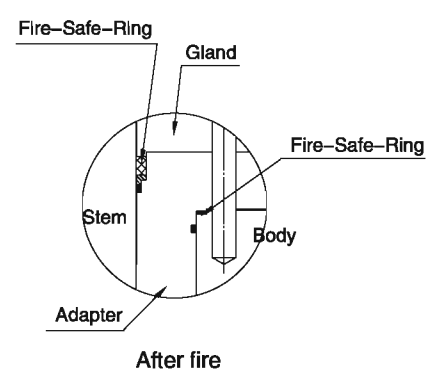
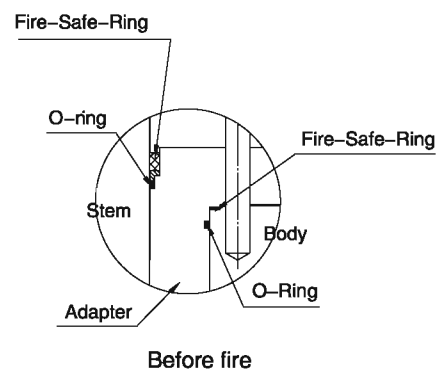
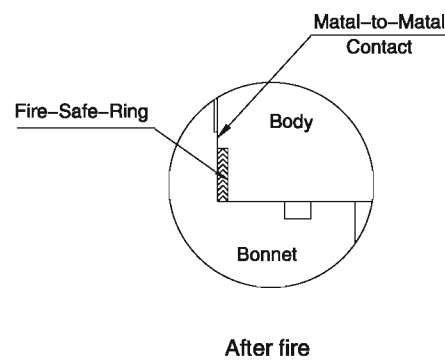
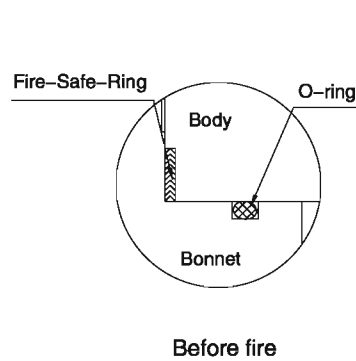
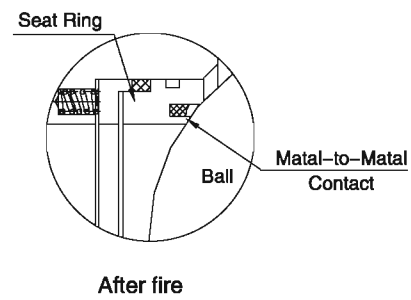
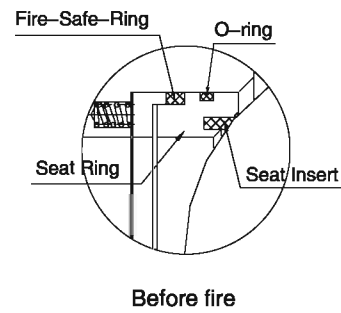


CLASS300

Trunnion mounted type ball valves are manufactured to API 6D specification and tested to API 598/API 607. The construction is side entry three pieces full and reduced port. The valves are lever operated and where recommended or when required are gear operated or actuated. The following are some of the major design features:

1. Fire-safe:

All size and pressure classes have been successfully fire-safetested according to the relevant API and BS specifications. Test certifications are available on request.

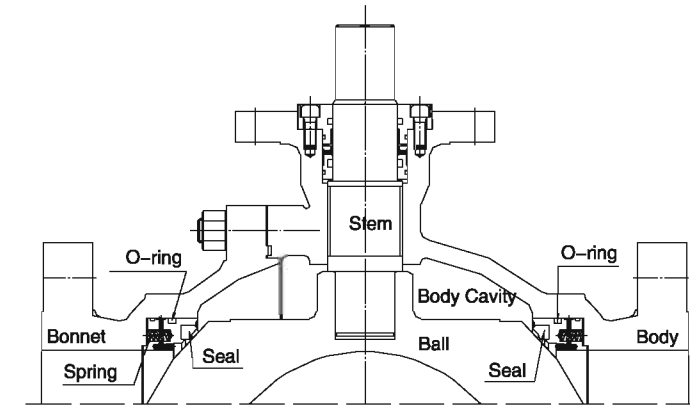


2. Antistatic:

Electrical continuity of all valve components, prevent static build-up.

3. Double Block & Bleed:

The body cavity is isolated when the ball is in either fully closed or fully opened position, the medium entrapped in it can easily be bled to avoid overpressure

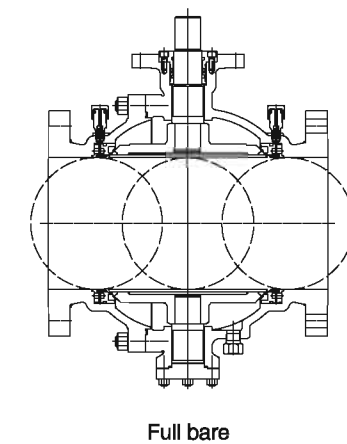
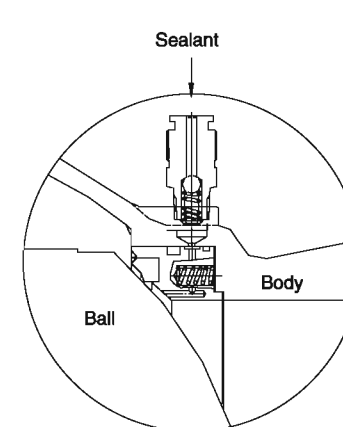
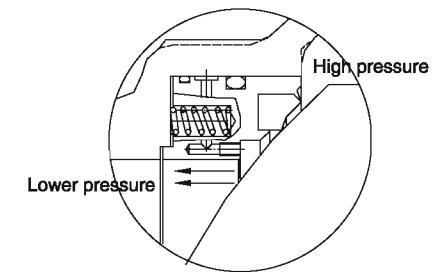
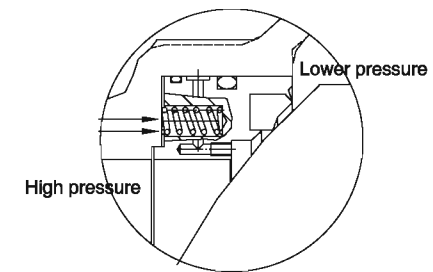


4. Seat Ring Sealing:

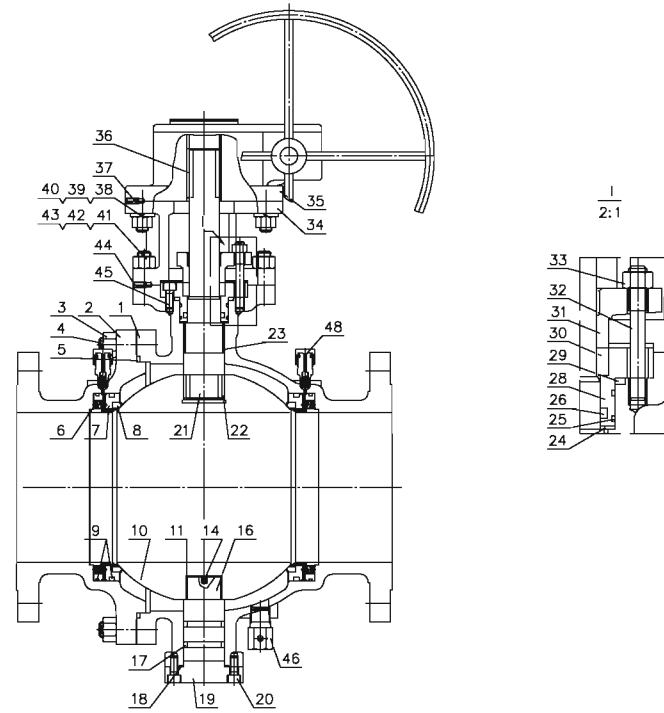
As line pressure increases, our seat design originates a piston effect forcing the sealing resilient insert against the ball. In absence of the pressure or with low pressures, the seats are forced against the ball by the set of preloaded springs. (see sketch)

5. Pressure relieving:

If excessive pressure builds up in the body cavity exceeding the seats spring pressure, the seat automatically relieves.



● Carbon Steel/Stainless Steel Ball Valve



● Technical Specification

Temp. & pressure: ASME B16.34、BS5351

Wall thickness: ASME B16.34、BS5351

Bore dimension: API 6D、BS5351

Face to face: ASME B16.10、API 6D

Flanges dimensions: ASME B16.5(MSS SP-44)、BS1560

Test & inspection: API 598、API 6D、BS5146

Body material: WCB、LCB、LCC、CF8、CF8M、CF3、CF3M

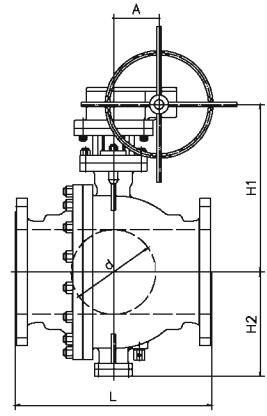
● Form of Major Part Material

Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
1	Body	ASTM A216-WCB	ASTM A352-LCB/LCC	ASTM A351-CF8/CF8M
2	Bonnet	ASTM A216-WCB	ASTM A352-LCB/LCC	ASTM A351-CF8/CF8M
3	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
4	Bolt	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
5	O-ring	VITON	VITON	VITON
6	Spring	INCONELX-750	INCONELX-750	INCONELX-750
7	Seat ring	ASTM A105	ASTM A182 G304	ASTM A182 F304/F316
8	Seat insert	RPTFE	RPTFE	RPTFE
9	O-ring	VITON	VITON	VITON
10	Ball	ASTM A182-F6a	ASTM A182-F304	ASTM A182 F304/F316
11	Stem bearing	304+PTFE	304+PTFE	304+PTFE
14	Spring	ASTM A276-316	ASTM A276-316	ASTM A276-316
16	Lower stem	ASTM A182-F6a	ASTM A182-F304	ASTM A182 F304/F316

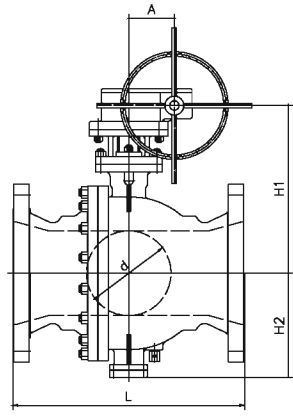
Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
17	O-ring	VITON	VITON	VITON
18	Gasket	304+Graphite	304+Graphite	304+Graphite
19	Bottom cover	ASTM A105	ASTM A182-F304	ASTM A182-F304/F316
20	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
21	Upper stem	ASTM A182-F6a	ASTM A182-F304	ASTM A182-F304/F316
22	Key	ANSI 1045	ASTM A182-F304	ASTM A182-F304/F316
23	Radial bearing	304+PTFE	304+PTFE	304+PTFE
24	Axial bearing	304+PTFE	304+PTFE	304+PTFE
25	O-ring	VITON	VITON	VITON
26	O-ring	VITON	VITON	VITON
28	Gland	ASTM A105	ASTM A182-F304	ASTM A182-F304/F316
29	Gasket	304+Graphite	304+Graphite	304+Graphite
30	Packing	Graphite	Graphite	Graphite
31	Packing gland	ASTM A216-WCB	ASTM A352-LCB /LCC	ASTM A351-CF8/CF8M
32	Bolt	ASTM A193-B7/B7M	ASTM A1320 L7	ASTM A193-B7M/B8
33	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
34	Yoke	ASTM A216-WCB	ASTM A352-LCB /LCC	ASTM A182-F304/F316
35	Gear box	Cast iron	Cast iron	Cast iron
36	Key	ANSI 1045	ANSI A182-F304	ASTM A182-F304/F316
37	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
38	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
39	Spring gasket	65Mn	65Mn	65Mn
40	Bolt	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
41	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
42	Gasket	65Mn	65Mn	65Mn
43	Bolt	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
44	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
45	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
46	Drain plug	ANSI 1045	ASTM A182-F304	ASTM A182-F304/F316
48	Sealant injection	ANSI 1045	ANSI 1045	ASTM A182 F316



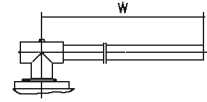
● Class150 Carbon Steel/Stainless Steel Ball Valve



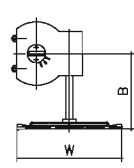
Q347F-150Lb



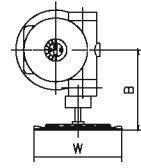
RQ347F-150Lb



2" ~ 6" Full bore ball valve  
3" ~ 8" Reduce bore ball valve



Up to 8" Full bore valve  
Up to 10" Reduce bore valve

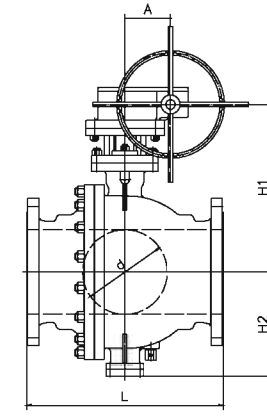


Up to 20" Ball valve

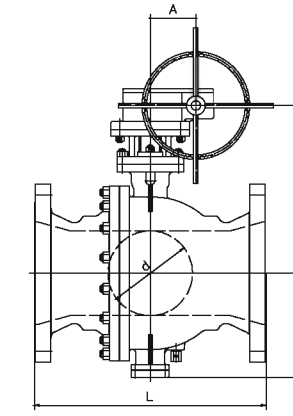
● Dimension Chart

NPS	d	L	H <sub>1</sub>	H <sub>2</sub>	W	A	B
2	2	7	6.94	3.74	13.78	-	-
3x2x3	2	8	6.94	3.74	13.78	-	-
3	3	8	8.46	4.72	15.75	-	-
4x3x4	3	9	8.46	4.72	15.75	-	-
4	4	9	10	5.59	19.69	-	-
6x4x6	4	15.5	10	5.59	19.69	-	-
6	6	15.5	13	8.66	41.34	-	-
8x6x8	6	18	13	8.66	41.34	-	-
8	8	18	17.63	10.20	11.81	4.13	7.48
10x8x10	8	21	17.63	10.20	11.81	4.13	7.48
10	10	21	19.88	12	13.78	4.92	8.07
12x10x12	10	24	19.88	12	13.78	4.92	8.07
12	12	24	21.89	13.70	15.75	7.28	12.59
14x12x14	12	27	21.89	13.70	15.75	7.28	12.59
14	13.25	27	24.40	15.55	19.69	7.68	13.78
16x14x16	13.25	30	24.40	15.55	19.69	7.68	13.78
16	15.25	30	27.55	17.71	19.69	7.68	13.78
18x16x18	15.25	34	27.55	17.71	19.69	7.68	13.78
18	17.25	34	29.52	19.09	19.69	8.46	14.96
20x18x20	17.25	36	29.52	19.09	19.69	8.46	14.96
20	19.25	36	31.69	20.67	19.69	8.46	14.96
22x18x22	17.25	40	29.52	19.09	19.69	8.46	14.96
22	21.25	40	35.04	24.21	19.69	8.46	14.96
24x20x24	19.25	42	31.69	20.67	19.69	8.46	14.96
24	23.25	42	43.70	26.77	19.69	11.02	18.11
26x22x26	21.25	45	35.04	24.21	19.69	8.46	14.96
26	25	45	44.88	28.15	19.69	11.02	18.11
28x24x28	23.25	49	43.70	26.77	19.69	11.02	18.11
28	27	49	46.45	29.52	19.69	11.02	18.11
30x24x30	23.25	51	43.70	26.77	19.69	11.02	18.11
30	29	51	48.03	33.46	19.69	11.02	18.11
32x26x32	25	54	44.88	28.15	19.69	11.02	18.11
32	30.75	54	49.21	36.22	19.69	11.02	18.11
34x28x34	27	58	46.45	29.52	19.69	11.02	18.11
34	32.75	58	51.18	38.78	19.69	11.02	18.11
36x30x36	29	60	48.03	33.46	19.69	11.02	18.11
36	34.5	60	53.15	43.34	25.59	7.87	25.20

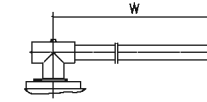
● Class300 Carbon Steel/Stainless Steel Ball Valve



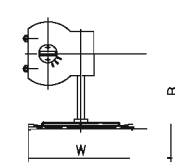
Q347F-300Lb



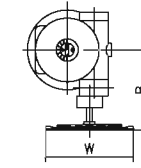
RQ347F-300Lb



2" ~ 6" Full bore ball valve  
3" ~ 8" Reduce bore ball valve



Up to 8" Full bore valve  
Up to 10" Reduce bore valve



Up to 20" Ball valve

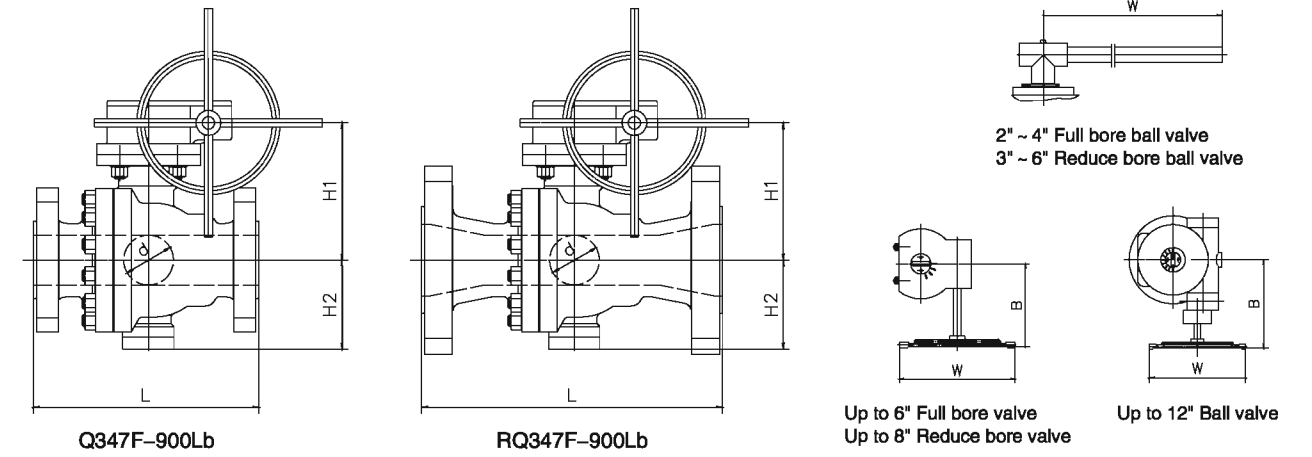
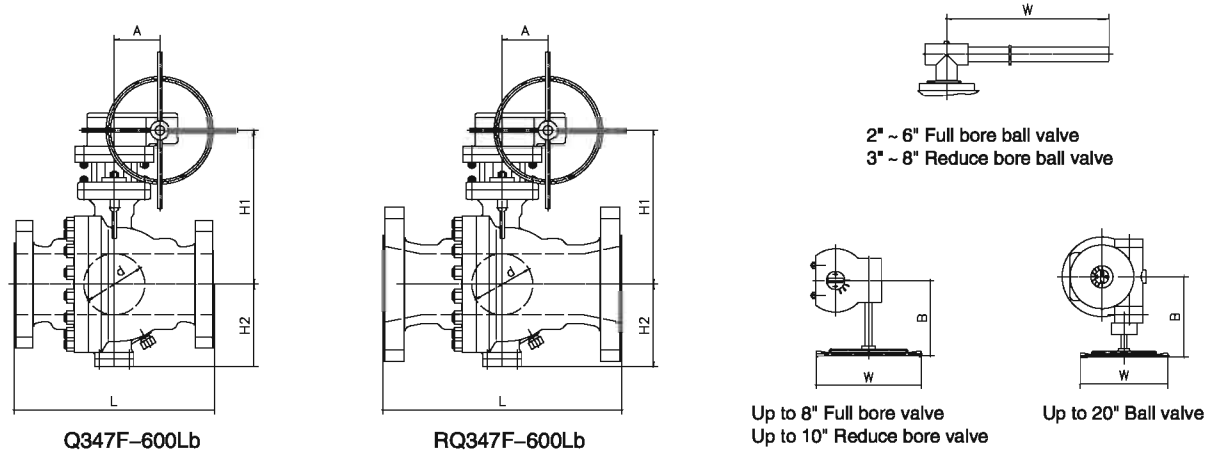
● Dimension Chart

NPS	d	L	H <sub>1</sub>	H <sub>2</sub>	W	A	B
2	2	8.5	6.94	3.74	13.78	-	-
3x2x3	2	11.125	6.94	3.74	13.78	-	-
3	3	11.125	8.46	4.72	15.75	-	-
4x3x4	3	12	8.46	4.72	15.75	-	-
4	4	12	10	5.59	19.69	-	-
6x4x6	4	15.875	10	5.59	19.69	-	-
6	6	15.875	13	8.66	41.34	-	-
8x6x8	6	19.75	13	8.66	41.34	-	-
8	8	19.75	17.63	10.20	11.81	4.13	7.48
10x8x10	8	22.375	17.63	10.20	11.81	4.13	7.48
10	10	22.375	19.88	12	13.78	4.92	8.07
12x10x12	10	25.5	19.88	12	13.78	4.92	8.07
12	12	25.5	21.89	13.70	15.75	7.28	12.59
14x12x14	12	30	21.89	13.70	15.75	7.28	12.59
14	13.25	30	24.40	15.55	19.69	7.68	13.78
16x14x16	13.25	33	24.40	15.55	19.69	7.68	13.78
16	15.25	33	27.55	17.71	19.69	7.68	13.78
18x16x18	15.25	36	27.55	17.71	19.69	7.68	13.78
18	17.25	36	29.52	19.09	19.69	8.46	14.96
20x18x20	17.25	39	29.52	19.09	19.69	8.46	14.96
20	19.25	39	31.69	20.67	19.69	8.46	14.96
22x18x22	17.25	43	29.52	19.09	19.69	8.46	14.96
22	21.25	43	35.04	24.21	19.69	8.46	14.96
24x20x24	19.25	45	31.69	20.67	19.69	8.46	14.96
24	23.25	45	43.70	26.77	19.69	11.02	18.11
26x22x26	21.25	49	35.04	24.21	19.69	8.46	14.96
26	25	49	44.88	28.15	19.69	11.02	18.11
28x24x28	23.25	53	43.70	26.77	19.69	11.02	18.11
28	27	53	46.45	29.52	19.69	11.02	18.11
30x24x30	23.25	55	43.70	26.77	19.69	11.02	18.11
30	29	55	48.03	33.46	19.69	11.02	18.11
32x26x32	25	60	44.88	28.15	19.69	11.02	18.11
32	30.75	60	49.21	36.22	19.69	11.02	18.11
34x28x34	27	64	46.45	29.52	19.69	11.02	18.11
34	32.75	64	51.18	38.78	19.69	11.02	18.11
36x30x36	29	68	48.03	33.46	19.69	11.02	18.11
36	34.5	68	53.15	43.34	25.59	7.87	25.20



● Class600 Carbon Steel/Stainless Steel Ball Valve

● Class900 Carbon Steel/Stainless Steel Ball Valve



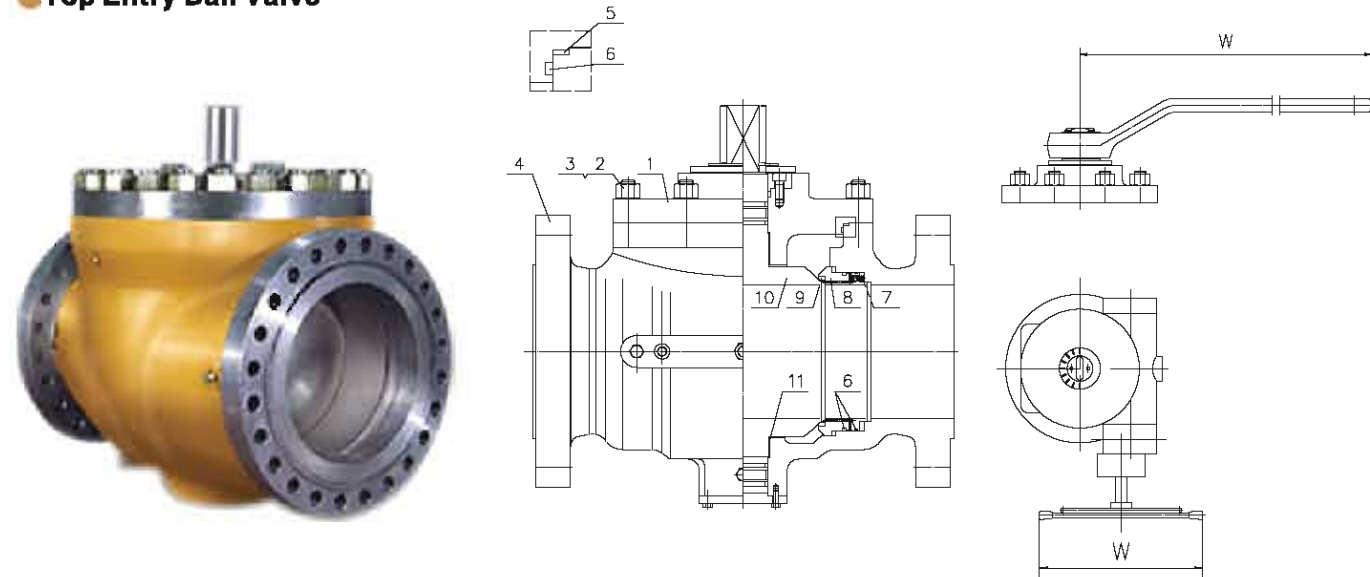
● Dimension Chart

inch								mm							
NPS	d	L	H <sub>1</sub>	H <sub>2</sub>	W	A	B	DN	d	L	H <sub>1</sub>	H <sub>2</sub>	W	A	B
2	2	11.5	7.56	5.59	23.6	-	-	50	51	292	192	142	600	-	-
3x2x3	2	14	7.56	5.59	23.6	-	-	80x50x80	51	356	192	142	600	-	-
3	3	14	10.98	6.77	39.37	-	-	80	76	356	279	172	1000	-	-
4x3x4	3	17	10.98	6.77	39.37	-	-	100x80x100	76	432	279	172	1000	-	-
4	4	17	12.40	8.07	59.06	-	-	100	102	432	315	205	1500	-	-
6x4x6	4	22	12.40	8.07	59.06	-	-	150x100x150	102	559	315	205	1500	-	-
6	6	22	12.72	10.71	19.69	7.28	12.60	150	152	559	323	272	500	185	320
8x6x8	6	26	12.72	10.71	19.69	7.28	12.60	200x150x200	152	660	323	272	500	185	320
8	8	26	15.00	13.19	19.69	7.28	12.60	200	203	660	381	335	500	185	320
10x8x10	8	31	15.00	13.19	19.69	7.28	12.60	250x200x250	203	787	381	335	500	185	320
10	10	31	20.39	15.98	19.69	8.46	14.96	250	254	787	518	406	500	215	380
12x10x12	10	33	20.39	15.98	19.69	8.46	14.96	300x250x300	254	838	518	406	500	215	380
12	12	33	22.36	18.15	19.69	8.46	14.96	300	305	838	568	461	500	215	380
14x12x14	12	35	22.36	18.15	19.69	8.46	14.96	350x300x350	305	899	568	461	500	215	380
14	13.25	35	26.18	20.20	19.69	8.46	14.96	350	337	899	665	513	500	215	380
16x14x16	13.25	39	26.18	20.20	19.69	8.46	14.96	400x350x400	337	991	665	513	500	215	380
16	15.25	39	28.74	22.95	19.69	8.46	14.96	400	387	991	730	583	500	215	380
18x16x18	15.25	43	28.74	22.95	19.69	8.46	14.96	450x400x450	387	1092	730	583	500	215	380
18	17.25	43	31.30	25.43	19.69	8.46	14.96	450	438	1092	795	646	500	215	380
20x18x20	17.25	47	31.30	25.43	19.69	8.46	14.96	500x450x500	438	1194	795	646	500	215	380
20	19.25	47	32.48	27.80	24.02	8.46	14.96	500	489	1194	825	706	500	215	380
24x20x24	19.25	55	32.48	27.80	24.02	8.46	14.96	550x450x550	489	1397	825	706	500	215	380
24	23.25	55	38.31	32.72	24.02	11.02	18.11	600	591	1397	973	831	500	280	460
26x22x26	21.25	57	34.06	27.99	19.69	8.46	14.96	650x550x650	540	1448	865	711	500	215	380
26	25	57	37.20	32.48	24.02	11.81	19.69	650	635	1448	945	825	610	300	500
28x24x28	23.25	61	36.22	30.16	19.69	11.02	18.11	700x600x700	591	1549	920	766	500	280	460
28	27	61	40.78	35.04	24.02	11.81	19.69	700	686	1549	1038	890	610	300	500
30x24x30	23.25	65	38.31	32.72	19.69	11.02	18.11	750x600x750	591	1651	920	766	500	280	460
30	29	65	42.83	36.93	24.02	11.81	19.69	750	737	1651	1088	938	610	300	500

● Dimension Chart

inch								mm							
NPS	d	L	H <sub>1</sub>	H <sub>2</sub>	W	A	B	DN	d	L	H <sub>1</sub>	H <sub>2</sub>	W	A	B
2	2	14.5	7.56	5.59	23.6	-	-	50	51	368	192	142	600	-	-
3x2x3	2	15	7.56	5.59	23.6	-	-	80x50x80	51	381	192	142	600	-	-
3	3	15	10.98	6.77	39.37	-	-	80	76	381	279	172	1000	-	-
4x3x4	3	18	10.98	6.77	39.37	-	-	100x80x100	76	457	279	172	1000	-	-
4	4	18	12.40	8.07	59.06	-	-	100	102	457	315	205	1500	-	-
6x4x6	4	24	12.40	8.07	59.06	-	-	150x100x150	102	610	315	205	1500	-	-
6	6	24	12.72	10.71	19.69	7.28	12.60	150	152	610	323	272	500	185	320
8x6x8	6	29	12.72	10.71	19.69	7.28	12.60	200x150x200	152	737	323	272	500	185	320
8	8	29	15.00	13.19	19.69	7.28	12.60	200	203	737	381	335	500	185	320
10x8x10	8	33	15.00	13.19	19.69	7.28	12.60	250x200x250	203	838	381	335	500	185	320
10	10	33	20.39	15.98	19.69	8.46	14.96	250	254	838	518	406	500	215	380
12x10x12	10	38	20.39	15.98	19.69	8.46	14.96	300x250x300	254	965	518	406	500	215	380
12	12	38	22.36	18.15	19.69	8.46	14.96	300	305	965	568	461	500	215	380
14x12x14	12	40.5	22.36	18.15	19.69	8.46	14.96	350x300x350	305	1029	568	461	500	215	380
14	12.75	40.5	26.18	20.20	19.69	8.46	14.96	350	324	1029	665	513	500	215	380
16x14x16	12.75	44.5	26.18	20.20	19.69	8.46	14.96	400x350x400	324	1130	665	513	500	215	380
16	14.75	44.5	28.74	22.95	19.69	8.46	14.96	400	375	1130	730	583	500	215	380
18x16x18	14.75	48	28.74	22.95	19.69	8.46	14.96	450x400x450	375	1219	730	583	500	215	380
18	16.75	48	31.30	25.43	19.69	8.46	14.96	450	426	1219	795	646	500	215	380
20x18x20	16.75	52	31.30	25.43	19.69	8.46	14.96	500x450x500	426	1321	795	646	500	215	380
20	18.625	52	32.48	27.80	24.02	8.46	14.96	500	473	1321	825	706	500	215	380
24x20x24	18.625	61	32.48	27.80	24.02	8.46	14.96	550x450x550	473	1549	825	706	500	215	380
24	22.5	61	38.31	32.72	24.02	11.02	18.11	600	572	1549	973	831	500	280	460

● Top Entry Ball Valve



● Technical Specification

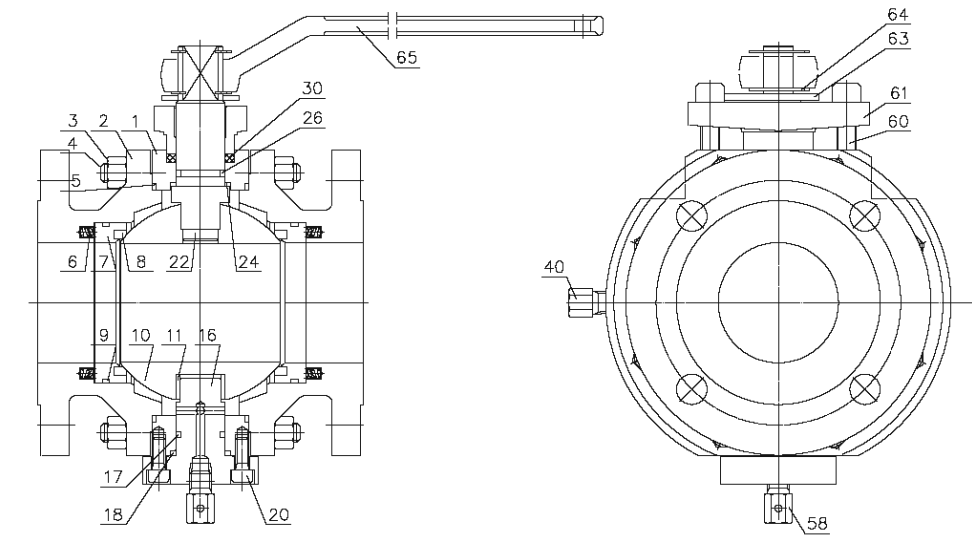
Temp. & pressure: ASME B16.34、BS5351  
 Wall thickness: ASME B16.34、BS5351  
 Bore dimension: API 6D  
 Face to face: ASME B16.10、API 6D  
 Flanges dimensions: ASME B16.5(MSS SP-44)  
 Test & inspection: API 598、API 6D、BS5146  
 Body material: WCB、LCB、LCC、CF8、CF8M、CF3、CF3M

● Form of Major Part Material

Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
1	Body	ASTM A216-WCB	ASTM A352-LCB/LCC	ASTM A351-CF8/CF8M
2	Bonnet	ASTM A216-WCB	ASTM A352-LCB/LCC	ASTM A351-CF8/CF8M
3	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
4	Bolt	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
5	Gasket	304+PTFE	304+PTFE	304+PTFE
6	O-ring	VITON	VITON	VITON
7	Spring	INCONELX-750	INCONELX-750	INCONELX-750
8	Seat ring	ASTM A105	ASTM A182 F304/F318	ASTM A182 F304/F316
9	Seat insert	RPTFE	RPTFE	RPTFE
10	Ball	ASTM A182-F6a	ASTM A182-F304	ASTM A182 F304/F316
11	Stem bearing	304+PTFE	304+PTFE	304+PTFE

● Forged Trunnion Mounted Ball Valve

2" ~ 4" Class150/300、DN50 ~ 100 PN2.0 ~ 5.0



● Technical Specification

Temp. & pressure: ASME B16.34  
 Wall thickness: ASME B16.34  
 Bore dimension: API 6D  
 Face to face: ASME B16.10、API 6D

Flanges dimensions: ASME B16.5

Test & inspection: API 6D

Body material: A105、LF2、LF3、F304、F316、F304L、F316L

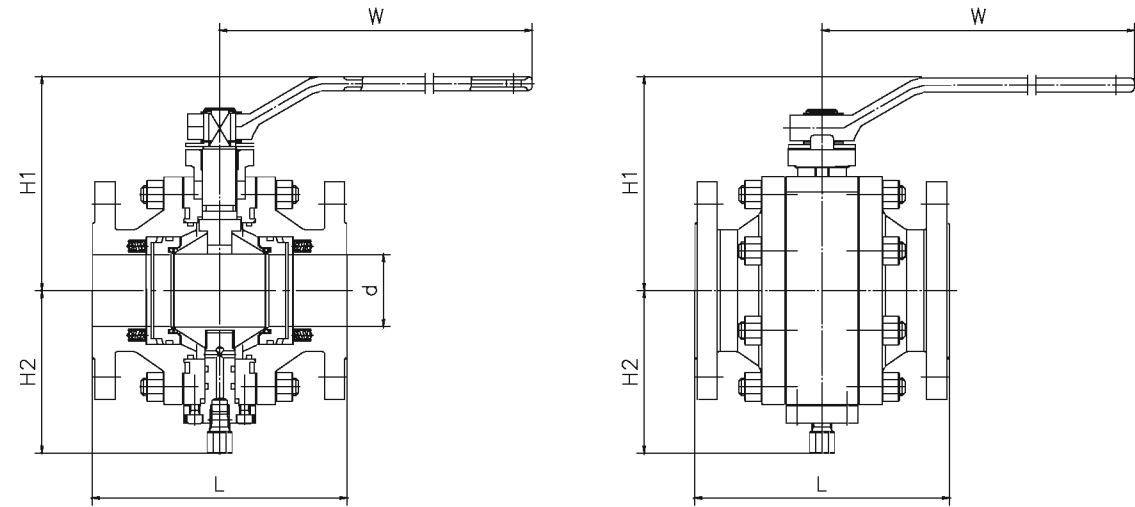
● Form of Major Part Material

Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
1	Body	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-F304/F316
2	Bonnet	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-F304/F316
3	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
4	Bolt	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
5	O-ring	VITON	VITON	VITON
6	Spring	INCONELX-750	INCONELX-750	INCONELX-750
7	Seat ring	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-F304/F316
8	Seat insert	RPTFE	RPTFE	RPTFE
9	O-ring	VITON	VITON	VITON
10	Ball	ASTM A105	ASTM A182-F304	ASTM A182-F304/F316
11	Stem bearing	304+PTFE	304+PTFE	304+PTFE
16	Lower stem	ASTM A105	ASTM A182-F304	ASTM A182-F304/F316
17	O-ring	VITON	VITON	VITON
18	Gasket	304+Graphite	304+Graphite	304+Graphite
20	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
22	Stem	ASTM A182-F6a	ASTM A182-F304	ASTM A182-F304/316
24	Stem washer	304+PTFE	304+PTFE	304+PTFE
26	O-ring	VITON	VITON	VITON
30	Packing	Graphite	Graphite	Graphite
58	Drain valve	Carbon steel	Carbon steel	Carbon steel
60	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
61	Gland flange	Carbon steel	Carbon steel	Carbon steel
63	Stopper	Carbon steel	Carbon steel	Carbon steel
64	Snap ring	Carbon steel	Carbon steel	Carbon steel
65	Lever	Carbon steel	Carbon steel	Carbon steel



● Forged Trunnion Mounted Ball Valve

2" ~ 4" Class150/300、DN50 ~ 100 PN2.0 ~ 5.0



● Class150/300 Dimention & Weight

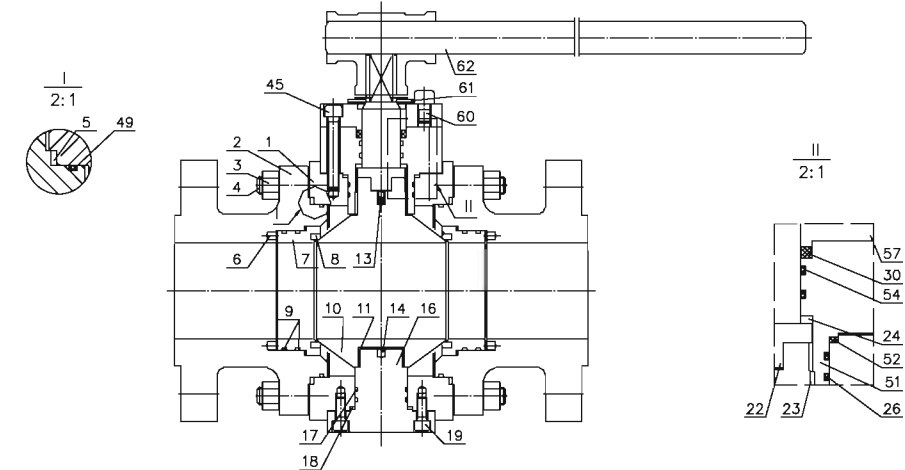
Class	NPS	Dimensions(inch)					Weight (kg)
		d	L	H1	H2	W	
150Lb	2	2	7	6.02	6.5	15.74	28
	3	3	8	7.68	8.03	23.63	55
	4	4	9	8.39	8.54	33.46	80
300Lb	2	2	8.5	6.02	6.5	15.74	30
	3	3	11.125	7.68	8.03	23.63	60
	4	4	12	8.39	8.54	33.46	100

● PN2.0/PN5.0 Dimention & Weight

PN	DN	Dimensions(mm)					Weight (kg)
		d	L	H1	H2	W	
2.0MPa	50	50	177.8	153	165	400	28
	80	76.2	203.2	195	205	600	55
	100	101.6	228.6	215	220	850	80
5.0MPa	50	50	215.9	153	165	400	30
	80	76.2	282.6	195	205	600	60
	100	101.6	304.8	215	220	850	100

● Forged Trunnion Mounted Ball Valve

2" ~ 4" Class600 ~ 1500、DN50 ~ 100 PN10.0 ~ 25.0



● Technical Specification

Temp. & pressure: ASME B16.34

Wall thickness: ASME B16.34

Bore dimension: API 6D

Face to face: ASME B16.10、API 6D

Flanges dimensions: ASME B16.5

Test & inspection: API 6D

Body material: A105、LF2、LF3、F304、F316、F304L、F316L

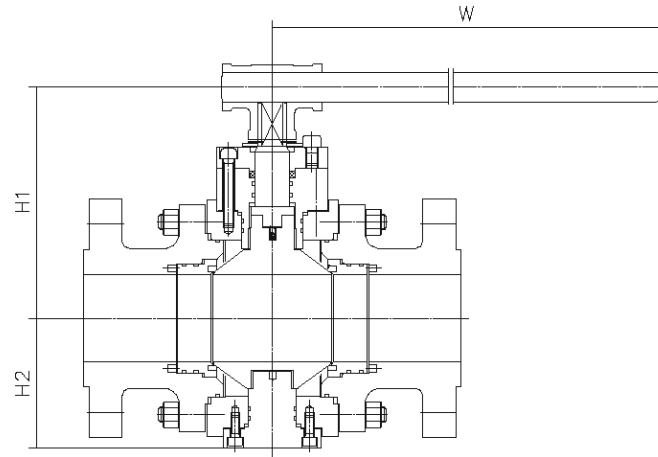
● Form of Major Part Material

Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
1	Body	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-304/316
2	Bonnet	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-304/316
3	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
4	Bolt	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
5	O-ring	VITON	VITON	VITON
6	Spring	INCONELX-750	INCONELX-750	INCONELX-750
7	Seat ring	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-F304/F316
8	Seat insert	RPTFE	RPTFE	RPTFE
9	O-ring	VITON	VITON	VITON
10	Ball	ASTM A105	ASTM A182-F304	ASTM A182-F304/F316
11	Stem bearing	304+PTFE	304+PTFE	304+PTFE
13	Spring	ASTM A276-316	ASTM A276-316	ASTM A276-316
14	Spring	ASTM A276-316	ASTM A276-316	ASTM A276-316
16	Lower stem	ASTM A105	ASTM A182-F304	ASTM A182-F304/F316
17	O-ring	VITON	VITON	VITON
18	Gasket	304+Graphite	304+Graphite	304+Graphite
19	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
22	Stem	ASTM A182-F6a	ASTM A182-F304	ASTM A182-F304/316
23	Ball bearing	304+PTFE	304+PTFE	304+PTFE
24	Stem washer	304+PTFE	304+PTFE	304+PTFE
26	O-ring	VITON	VITON	VITON
30	Packing	Graphite	Graphite	Graphite
45	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
49	O-ring	VITON	VITON	VITON
51	Flange adapter	ASTM A105	ASTM A182-F304	ASTM A182-F304/316
52	Gasket	304+Graphite	304+Graphite	304+Graphite
54	O-ring	VITON	VITON	VITON
57	Gland	ASTM A105	ASTM A182-F304	ASTM A182-F304/316
58	Drain Valve	Carbon steel	Carbon steel	Stainless steel
60	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
61	Stopper	Carbon steel	Carbon steel	Carbon steel
62	Lever	Carbon steel	Carbon steel	Carbon steel



● Forged Trunnion Mounted Ball Valve

2" ~ 4" Class600 ~ 1500, DN50 ~ 100 PN10.0 ~ 25.0



● Class600~900 Dimention & Weight

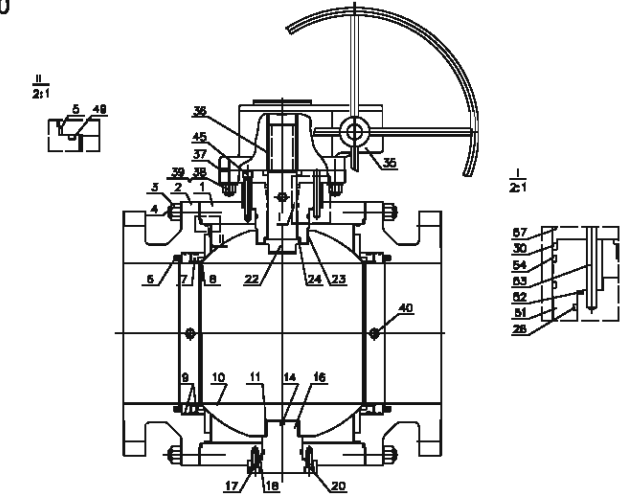
Class	NPS	Dimensions(Inch)					Weight (kg)
		d	L	H <sub>1</sub>	H <sub>2</sub>	W	
600Lb	2	2	11.5	8.59	5.55	23.15	32
	3	3	14	8.21	6.57	49.25	64
	4	4	17	9.61	7.97	51.22	122
900Lb	2	2	14.5	8.59	5.55	23.15	48
	3	3	15	8.21	6.57	49.25	78
1500Lb	4	4	18	-	7.97	-	138
	2	2	14.5	6.59	5.55	45.7	55
	3	3	18.5	8.21	6.57	49.25	87
	4	4	21.5	-	7.97	-	162

● PN10.0~PN25.0 Dimention & Weight

PN	DN	Dimensions(mm)					Weight (kg)
		d	L	H <sub>1</sub>	H <sub>2</sub>	W	
10.0MPa	50	50	292	167.5	141	586	32
	80	76.2	355.6	208.5	167	1251	64
	100	101.6	431.8	244	202.5	1300	122
15.0MPa	50	50	368.3	167.5	141	588	48
	80	76.2	381	208.5	167	1251	78
	100	101.6	457.2	-	202.5	-	138
25.0MPa	50	50	388.3	167.5	141	1160	55
	80	76.2	469.9	208.5	167	1251	97
	100	101.6	546.1	-	202.5	-	162

● Forged Trunnion Mounted Ball Valve

6" ~ 40" Class150 ~ 900, DN150 ~ 1000 PN2.0 ~ 15.0



● Technical Specification

Temp. & pressure: ASME B16.34

Wall thickness: ASME B16.34

Bore dimension: API 6D

Face to face: ASME B16.10, API 6D

Flanges dimensions: ASME B16.5(MSS SP-44), BS1560

Test & inspection: API 6D, BS5146

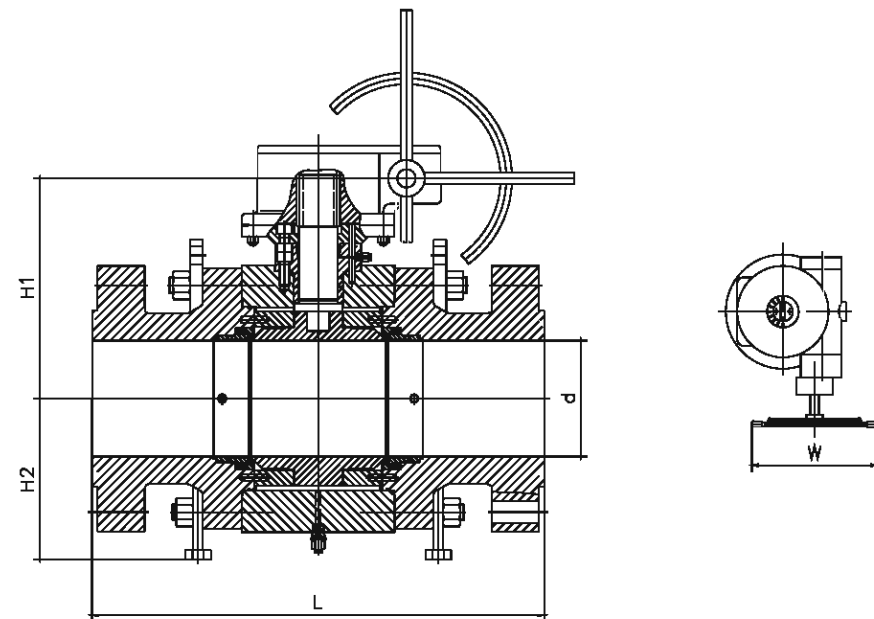
Body material: A105, LF2, LF3, F304, F316, F304L, F316L

● Form of Major Part Material

Parts No.	Parts Name	Materials		
		Carbon Steel	Low Temp. Steel	Stainless Steel
1	Body	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-304/316
2	Bonnet	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-304/316
3	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
4	Bolt	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
5	O-ring	VITON	VITON	VITON
6	Spring	INCONELX-750	INCONELX-750	INCONELX-750
7	Seat ring	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-F304/F316
8	Seat insert	RPTFE	RPTFE	RPTFE
9	O-ring	VITON	VITON	VITON
10	Ball	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-F304/F316
11	Stem bearing	304+PTFE	304+PTFE	304+PTFE
14	Spring	ASTM A276-316	ASTM A276-316	ASTM A276-316
16	Lower stem	ASTM A105	ASTM A350-LF2/LF3	ASTM A182-F304/F316
17	O-ring	VITON	VITON	VITON
18	Gasket	304+Graphite	304+Graphite	304+Graphite
20	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
22	Upper stem	ASTM A182-F6a	ASTM A350-LF2/LF3	ASTM A182-F304/F316
23	Ball bearing	304+PTFE	304+PTFE	304+PTFE
24	Axial bearing	304+PTFE	304+PTFE	304+PTFE
26	O-ring	VITON	VITON	VITON
30	Packing	Graphite	Graphite	Graphite
35	Gear box	Cast iron	Cast iron	Cast iron
36	Key	ANSI 1045	ASTM A182-F304	ASTM A182-F304/F316
37	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
38	Nut	ASTM A194-2H/2HM	ASTM A194 4	ASTM A194-2HM/8
39	Spring gasket	65Mn	65Mn	65Mn
40	Injection valve	Carbon steel	Carbon steel	Stainless steel
45	Screw	ASTM A193-B7/B7M	ASTM A320 L7	ASTM A193-B7M/B8
49	O-ring	VITON	VITON	VITON
51	Flange adapter	ASTM A105	ASTM A182-F304	ASTM A182-F304/F316
52	Gasket	304+Graphite	304+Graphite	304+Graphite
53	Pin	Carbon steel	Carbon steel	Stainless steel
54	O-ring	VITON	VITON	VITON
57	Gland	ASTM A105	ASTM A182-F304	ASTM A182-F304/F316
58	Drain Valve	Carbon steel	Carbon steel	Stainless steel

**Forged Trunnion Mounted Ball Valve**

6" ~ 16" Class1500、DN150~400 PN25.0



**Class1500 Dimention & Weight**

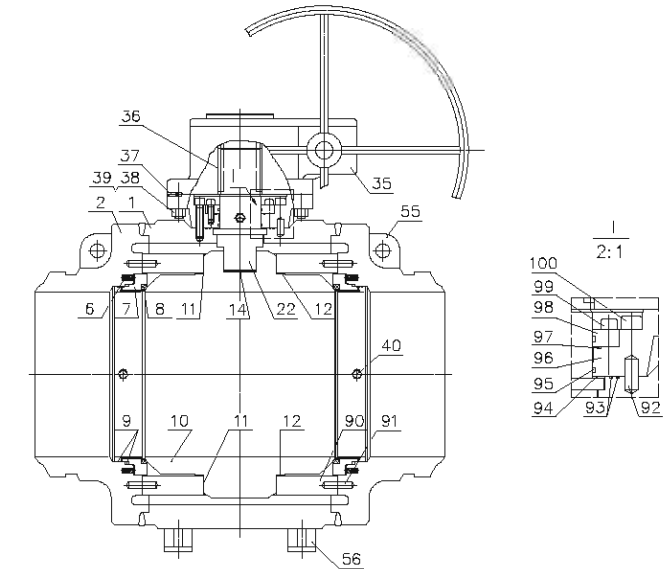
Class	NPS	Dimensions(inch)					Weight (kg)
		d	L	H <sub>1</sub>	H <sub>2</sub>	W	
1500Lb	6	5.75	27.75	14.98	9.85	31.5	592
	8	7.625	32.75	19.29	13.78	31.5	935
	10	9.5	39	20.07	14.96	31.5	1900
	12	11.375	44.5	22.05	16.14	31.5	2285
	14	12.5	49.5	25	16.69	31.5	3940
	16	14.25	54.5	26.97	22.44	31.5	5430

**PN10.0~PN25.0 Dimention & Weight**

PN	DN	Dimensions(mm)					Weight (kg)
		d	L	H <sub>1</sub>	H <sub>2</sub>	W	
25.0MPa	150	146	704.9	380	250	800	592
	200	194	831.9	490	350	800	935
	250	241	990.6	510	380	800	1900
	300	289	1130.3	580	410	800	2285
	350	317.5	1257.3	635	500	800	3940
	400	362	1384.3	885	570	800	5430

**Full Weld Ball Valve**

6" ~ 40" Class150 ~ 1500、DN150 ~ 1000 PN2.0 ~ 25.0



**Technical Specification**

Temp. & pressure: ASME B16.34

Wall thickness: ASME B16.34

Bore dimension: API 6D

Face to face: ASME B16.10、API 6D

Flanges dimensions: ASME B16.25

Test & inspection: API 6D、BS5146

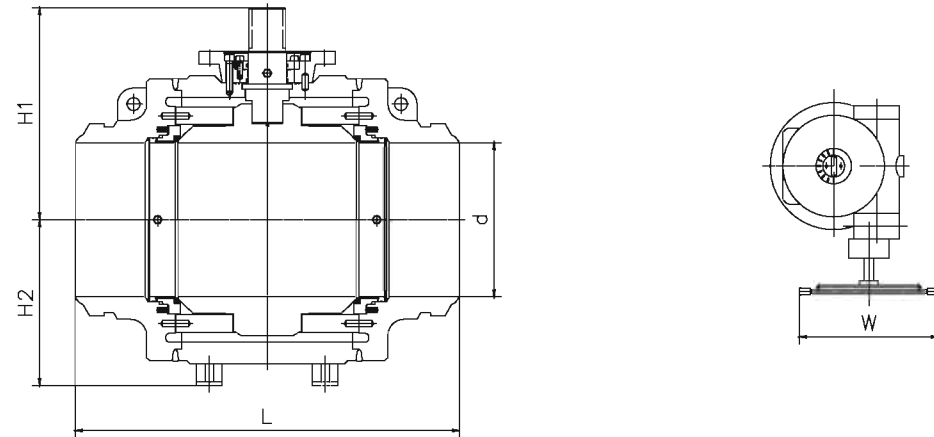
Body material: A105、LF2、LF3、F304、F316、F304L、F316L

**Form of Major Part Material**

Parts No.	Parts Name	Materials		Parts No.	Parts Name	Materials	
		Carbon Steel				Carbon Steel	
1	Body	ASTM A105		40	Injection valve	Carbon steel	
2	Bonnet	ASTM A105		55	Stationary plante	Carbon steel	
6	Spring	INCONELX-750		56	Support	Carbon steel	
7	Seat ring	ASTM A105		56	Drain/Vent valve	Carbon steel	
8	Seat insert	RPTFE/VITON		90	Trunnion	ASTM A105	
9	O-ring	VITON		91	Parallel pin	ANSI 1025	
10	Ball	ASTM A105		92	Pin	ANSI 1025	
11	Radial bearing	304+PTFE		93	O-ring	VITON	
12	Thust washer	304+PTFE		94	Stem washer	304+PTFE	
14	Spring	ASTM A278-316		95	O-ring	VITON	
22	Upper stem	ASTM A182-F6a		96	Gland	ASTM A105	
35	Gear box	Cast iron		97	O-ring	VITON	
36	Key	ANSI 1045		98	Backup ring	ASTM A105	
37	Screw	ASTM A193-B7/B7M		99	Screw	ASTM A193-B7/B7M	
38	Bolt	ASTM A193-B7/B7M		100	Screw	ASTM A193-B7/B7M	
39	Hexagon nut	ASTM A194-2H/2HM					

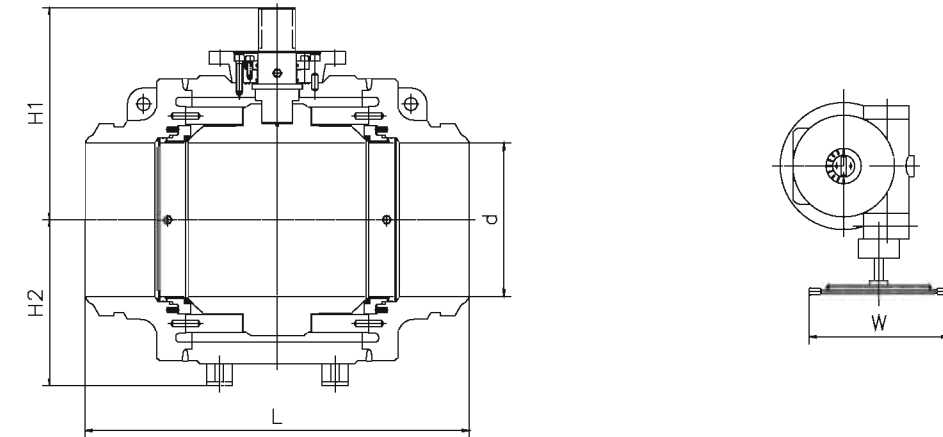
● Full Weld Ball Valve

6" ~ 40" Class150 ~ 600, DN150 ~ 800 PN2.0 ~ 10.0



● Full Weld Ball Valve

6" ~ 24" Class900 ~ 1500, DN150 ~ 600 PN15.0 ~ 25.0



● Class150~900 Dimention & Weight

Class	NPS	Dimensions(Inch)					Weight (kg)
		d	L	H <sub>1</sub>	H <sub>2</sub>	W	
150Lb	6	6	18	11.93	7.28	18.1	185
	8	8	20.5	13.47	8.9	18.1	276
	10	10	22	14.9	10.7	27.8	385
	12	12	25	16.44	12.25	27.8	535
	14	13.25	30	17.9	13.7	27.8	735
	16	15.25	33	21.95	16.4	31.5	1585
	18	17.25	36	23.54	17.83	31.5	2340
	20	19.25	39	24.8	18.86	31.5	2520
	24	23.25	45	27.79	23.11	31.5	3985
	26	25	49	30.59	23.63	31.5	4800
	28	27	53	31.49	25.59	31.5	5760
	30	29	55	33.85	27.24	31.5	6715
300Lb	32	30.75	60	35.75	28.98	31.5	8120
	6	6	22	12.17	9.65	18.1	230
	8	8	26	14.1	11.81	27.8	445
	10	10	31	16.1	13.38	27.8	658
	12	12	33	18.68	15.35	31.5	952
	14	13.25	35	19.75	16.85	31.5	1330
	16	15.25	39	20.96	18.70	31.5	2040
	18	17.25	43	25.04	21.45	31.5	2890
	20	19.25	47	26.75	22.44	31.5	3350
	22	21.25	51	28.56	24.72	31.5	4165
	24	23.25	55	30.12	27.56	31.5	5650

● PN2.0~10.0 Dimention & Weight

PN	DN	Dimensions(mm)					Weight (kg)
		d	L	H <sub>1</sub>	H <sub>2</sub>	W	
2.0MPa	150	152	457	303	185	460	185
	200	203	521	342	226	460	276
	250	254	559	378.5	272	705	385
	300	305	635	418	311	705	535
	350	337	762	455	348	705	735
	400	387	838	558	417	800	1585
	450	438	914	598	453	800	2340
	500	489	991	630	479	800	2520
	600	591	1143	705	587	800	3985
	650	635	1245	777	600	800	4800
	700	686	1346	800	650	800	5760
	750	737	1397	860	692	800	6715
5.0MPa	800	781	1524	908	736	800	8120
	150	152	558.8	309	245	460	230
	200	203	660.4	358	300	705	445
	250	254	787.4	409	340	705	658
	300	305	838.2	474.4	390	800	952
	350	337	889	502	428	800	1330
	400	387	990.6	532.3	475	800	2040
	450	438	1092.2	636	545	800	2890
	500	489	1193.8	674.8	570	800	3350
	550	540	1295.4	725	628	800	4165
	600	591	1397	765	700	800	5650

● Class900~1500 Dimention & Weight

Class	NPS	Dimensions(Inch)					Weight (kg)	
		d	L	H <sub>1</sub>	H <sub>2</sub>	W		
900Lb	6	6	24	12	11.81	27.8	330	
	8	8	29	15.6	15.74	31.5	595	
	10	10	33	16.93	16.93	31.5	935	
	12	12	38	18.3	17.91	31.5	1485	
	14	12.75	40.5	21.45	21.45	31.5	1955	
	16	14.75	44.5	24.21	24.21	31.5	2975	
	18	16.75	48	26.97	25.39	31.5	4010	
	20	18.625	52	29.52	26.97	31.5	4710	
	24	22.5	61	35.23	30.51	31.5	8285	
	1500Lb	6	5.75	27.75	14.96	11.81	31.5	503
		8	7.625	32.75	19.29	15.75	31.5	795
		10	9.5	39	20.07	16.93	31.5	1615
12		11.375	44.5	22.05	18.11	31.5	1945	
14		12.5	49.5	25	21.65	31.5	3350	
16		14.25	54.5	26.97	24.40	31.5	4615	

● PN2.0~10.0 Dimention & Weight

PN	DN	Dimensions(mm)					Weight (kg)	
		d	L	H <sub>1</sub>	H <sub>2</sub>	W		
15.0 MPa	150	152	609.6	305	300	705	330	
	200	203	736.6	395	400	800	595	
	250	254	838.2	430	430	800	935	
	300	305	965.2	465	455	800	1485	
	350	324	1028.7	545	545	800	1955	
	400	375	1130.3	615	615	800	2975	
	450	425.5	1219.2	685	645	800	4010	
	500	473	1320.8	750	685	800	4710	
	600	571.5	1549.4	895	775	800	8285	
	25.0 MPa	150	146	704.9	380	300	800	503
		200	194	831.9	490	400	800	795
		250	241	990.6	510	430	800	1615
300		289	1130.3	560	460	800	1945	
350		317.5	1257.3	635	550	800	3350	
400		362	1384.3	685	620	800	4615	



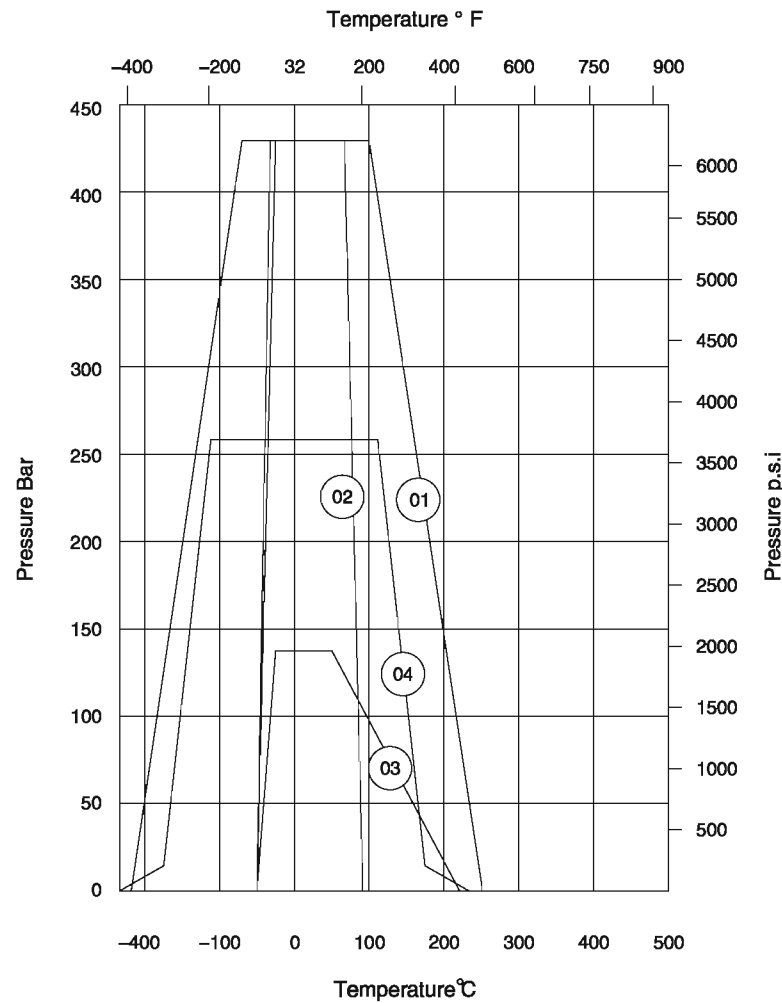
**● Pressure-temperature Rating**

The pressure-temperature ratings of ball valves are determined, not only by valve shell materials, but more essentially by sealing materials, used for ball seats, gland packing and gaskets. Sealing materials may be high molecule, asbestos, or rubber, but the choice is limited by the characteristics of the service fluid, working temperatures, working pressures, velocity of fluid, and operational frequency of valves.

As it is very difficult to predetermine the exact pressure-temperature rating for all kinds of fluid under all imaginable conditions. We have prepared general rating charts for nonshock fluid service here, base on our past experiences both in the field and in our laboratory.

In case of extraordinary service conditions as mentioned blow, conta

**● Seat Materil Pressure-temperature Limits**



- 01 Peek
- 02 Delrin
- 03 PTFE+15% Fiberglass
- 03 KEL-F

**● Technical Specification**

Design and Manufacture: Cast steel gate valve to API 600 (ISO 10434) or API 6D; Cast stainless steel gate valve to API 600; Forged steel gate valve to API 602.

Inspection and Test: API 598, API 600 or API 6D.

End flange dimension: ASME B16.5 (for NPS ≤ 24), ASME B16.47 series B, API 605 or ASME B16.47 series A, MSS SP-44 (for NPS > 24).

BW end dimension: ASME B16.25.

Socket-weld dimension: ASME B16.11.

Face to face and end to end: ASME B16.10.

Pressure-temperature ratings: ASME B16.34.

**● Design of Disc**

Gate Valves with NPS ≥ 2 are of wedge flexible gate; Gate valves with NPS < 2 are of wedge solid gate.

**● Body and Bonnet Connection**

The body and bonnet of Class 150 ~ Class 900 gate valves are usually connected with studs and nuts. And the body and bonnet of Class 1500 ~ Class 2500 gate valves are usually of pressurized seal design.

**● Gasket of Cover Flange**

Carbon steel or stainless steel + flexible graphite combined gasket is used for Class 150 gate valve; Stainless steel + flexible graphite wounded gasket is used for Class 300 gate valve; Stainless steel + flexible graphite wounded gasket is used for Class 600 gate valve, and ring joint gasket is also optional for Class 600 gate valve; Ring Joint gasket is used for Class 900 gate valve; Pressurized seal design is used for Class 1500 ~ Class 2500 gate valve.

**● Actuation**

Hand wheel or gear box is usually used for gate valve actuation. Chain wheel and electric actuator can be also used for gate valve actuation if being requested by the customers.

**● Packing Seal**

Molded flexible graphite is used for packing material. PTFE or combined packing material can be also used if being requested by the customer. The internal surface of the stuffing box, of which area is contacted with the packing, is of excellent finish (Ra 3.2 μm). The stem surface, contacting with the packing, should be rolled and pressed after being precisely machined, so as to reach to the high finish and compactness (Ra 0.8 μm) and ensure the reliable tightness of the stem area.

**● Belleville Spring Loaded Packing Impacting System**

If being requested by the customer, the Belleville spring loaded packing impacting system can be adopted for enhancing the durability and reliability of the packing seal.

**Back Seating Design**

All our gate valves have the back seating design. In most cases, the carbon steel gate valve is fitted with a renewable back seat. For stainless steel gate valve, the back seat is machined directly in the bonnet or is machined after welding. When the gate valve is at fully open position, the sealing of the back seat can be very reliable. However, as per the requirement of API 600, it is not advisable to add or change packing by the mean of back seating when the valve is pressure containing.

**Seat**

For carbon steel gate valve, the seat is usually forged steel. The sealing surface of the seat is spray welded with hard alloy specified by the customer. Renewable threaded seat is used for NPS ≤ 10 gate valves, and welded on seat can be also optional if being requested by the customer. Welded on seat is used for NPS ≤ 10 carbon steel gate valves. For Stainless steel gate valve, integral seat is usually adopted, or to weld hard alloy directly integrally. Threaded or welded on seat is also optional for stainless steel gate valve if being requested by the customer.

**Stem Design**

The stem is of integral forged design. The minimum diameter of the stem shall per the standard requirement. The connection of the stem and disc is T type. The strength of the connecting area is bigger than that of the T threaded part of the stem. The strength test of that area conforms to API 591.

**Stem Nut**

Usually, the stem nut is made of ASTM A439 D2. It is also can be made of copper ally if being requested by the customer. For large sized gate valves (NPS 10 for Class 150, NPS 6 for Class 300, NPS 6 for Class 600, NPS 5 for Class 900), rolling bearing is fitted at the two sides of the stem nut in order to minimize the open and close torque of the gate valve.

**Special Gate Valve**

Besides the common gate valves, Our Company also makes cryogenic gate valve, Jacketed Gate Valve, Bellow Sealed Gate Valve, EXTension Stem Gate Valve for underground application, Flat Gate Valve, etc.



Flat Gate Valve

Cryogenic Gate Valve

Bellow Sealed Gate Valve

Extension Stem Gate Valve for Underground Application

**Technical Specification**

Design and Manufacture: API 600 (ISO 10434) or API 6D

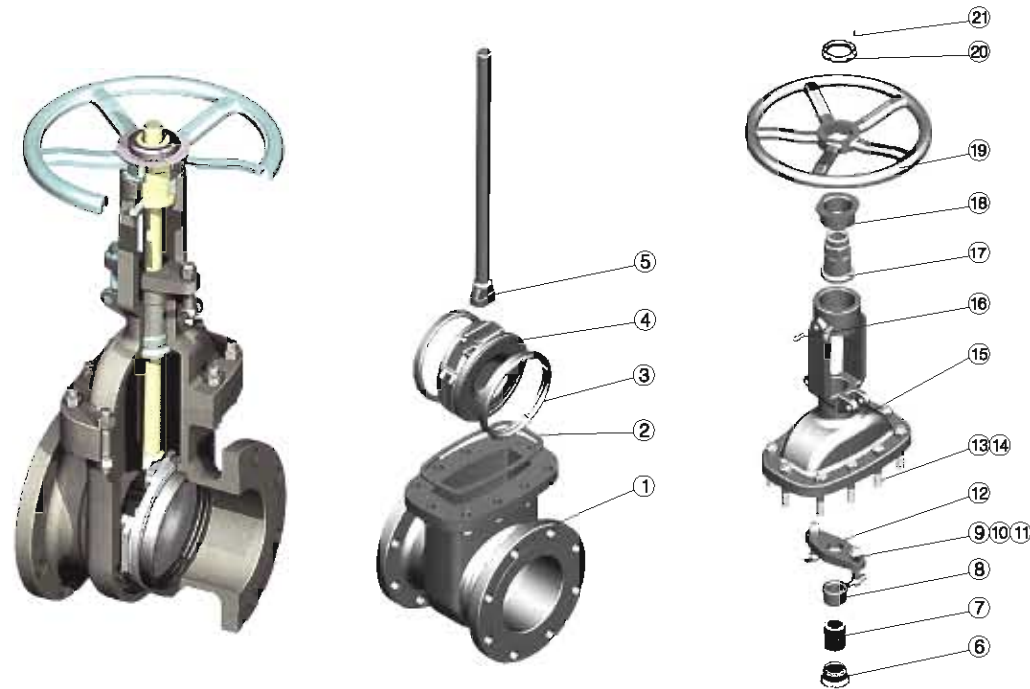
Inspection and Test: API 596, API 600 or API 6D

End flange dimension: ASME B16.5 (for NPS ≤ 24), ASME B16.47 series B, API 605 or ASME B16.47 series A, MSS SP-44 (for NPS > 24)

BW end dimension: ASME B16.25

Face to face and end to end: ASME B16.10

Pressure-temperature ratings: ASME B16.34

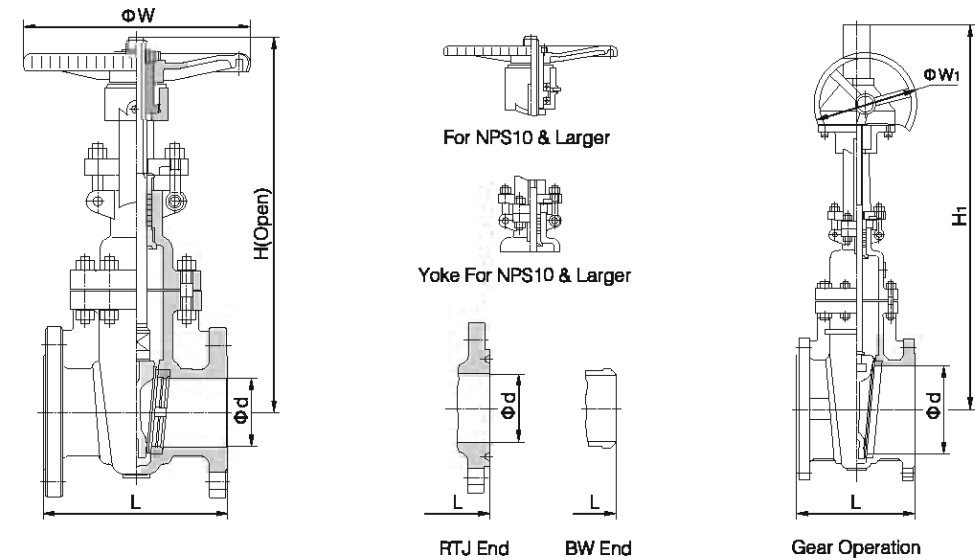


Form of Major Part Material

Parts No.	Parts Name	Materials				
		WCB/Trim 1	WCB/Trim 5	WCB/Trim 8	CF8/304	CF8M/316
1	Body	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
2	Gasket	Soft Iron + Graphite or 304 + Graphite			304 + Graphite	316 + Graphite
3	Seat ring	A105 + 13Cr	A105 + STL	A105 + STL	ASTM A351 CF8	ASTM A351 CF8M
4	Gate	ASTM A216 WCB + 13Cr	ASTM A216 WCB + STL	ASTM A216 WCB + 13Cr	ASTM A351 CF8	ASTM A351 CF8M
5	Stem	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F304	ASTM A182 F316
6	Backseat bushing	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A351 CF8	ASTM A351 CF8M
7	Packing	Graphite	Graphite	Graphite	Graphite	Graphite
8	Gland	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F304	ASTM A182 F316
9	Gland eyebolt	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B8	ASTM A193 B8M
10	Eyebolt nut	ASTM A194 2H	ASTM A194 2H	ASTM A194 2H	ASTM A194 8	ASTM A194 8M
11	Eyebolt pin	ASTM A36	ASTM A36	ASTM A36	304ss	316ss
12	Gland flange	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
13	Bonnet bolt	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B8	ASTM A193 B8M
14	Bonnet nut	ASTM A194 2H	ASTM A194 2H	ASTM A194 2H	ASTM A194 8	ASTM A194 8M
15	Bonnet	ASTM A216 WCB	ASTM A216 WCB	ASTM A218 WCB	ASTM A351 CF8	ASTM A351 CF8M
16	Nipple	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel
17	Stem nut	ASTM A439 D2	ASTM A439 D2	ASTM A439 D2	ASTM A439 D2	ASTM A439 D2
18	Yoke sleeve nut	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel
19	Hand wheel	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron
20	Hand wheel nut	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel
21	Set screw	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7

Note: The chart above only lists out some common composition of steel gate valve parts. We may provide other different parts material composition according to the customer's request or the actual valve working condition.

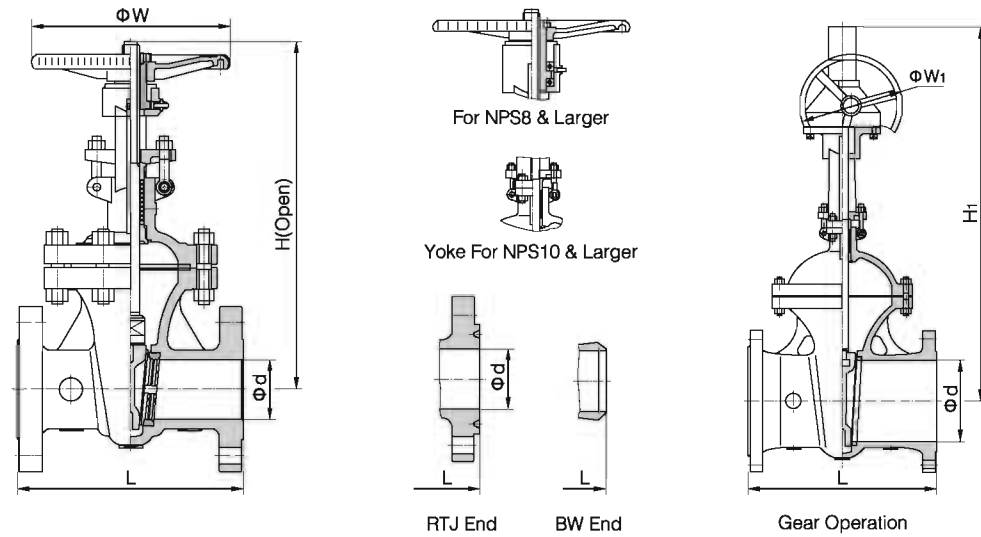
Class150 Cast Steel Gate Valve



Class	Size		Dimensions(mm)								Weight(kg)	
	NPS	DN	L			d	H	H1	W	W1	H.W	G.O
			RF	RTJ	BW							
Class150	1/2	15	108	119	108	14	195	-	120	-	4	-
	3/4	20	117	130	117	19	210	-	120	-	5	-
	1	25	127	140	127	25	240	-	140	-	7	-
	1 1/4	32	140	153	140	32	300	-	180	-	10	-
	1 1/2	40	165	178	165	38	395	-	200	-	14	-
	2	50	178	191	216	51	400	-	200	-	19	-
	2 1/2	65	191	203	241	64	435	-	200	-	25	-
	3	80	203	216	283	76	515	-	250	-	33	-
	4	100	229	241	305	102	595	-	280	-	49	-
	5	125	254	267	381	127	725	-	280	-	62	-
	6	150	267	279	403	152	780	820	300	310	77	104
	8	200	292	305	419	203	975	1020	350	310	123	150
	10	250	330	343	457	254	1150	1200	400	310	188	215
	12	300	356	368	502	305	1380	1430	450	310	288	315
	14	350	381	394	572	337	1545	1580	500	310	385	435
	18	400	406	419	610	387	1733	1780	500	460	500	552
	18	450	432	445	680	438	1915	1990	500	460	801	653
	20	500	457	470	711	489	2122	2220	600	460	764	816
	24	600	508	521	813	591	2520	2600	600	460	1007	1185
	26	650	559	-	864	633	-	2800	-	600	-	1550
	28	700	610	-	914	684	-	3050	-	600	-	1880
30	750	610	-	914	735	-	3130	-	600	-	2300	
32	800	711	-	965	779	-	3280	-	600	-	2550	
34	650	762	-	1016	830	-	3500	-	600	-	2950	
36	900	711	-	1016	874	-	3720	-	600	-	3390	

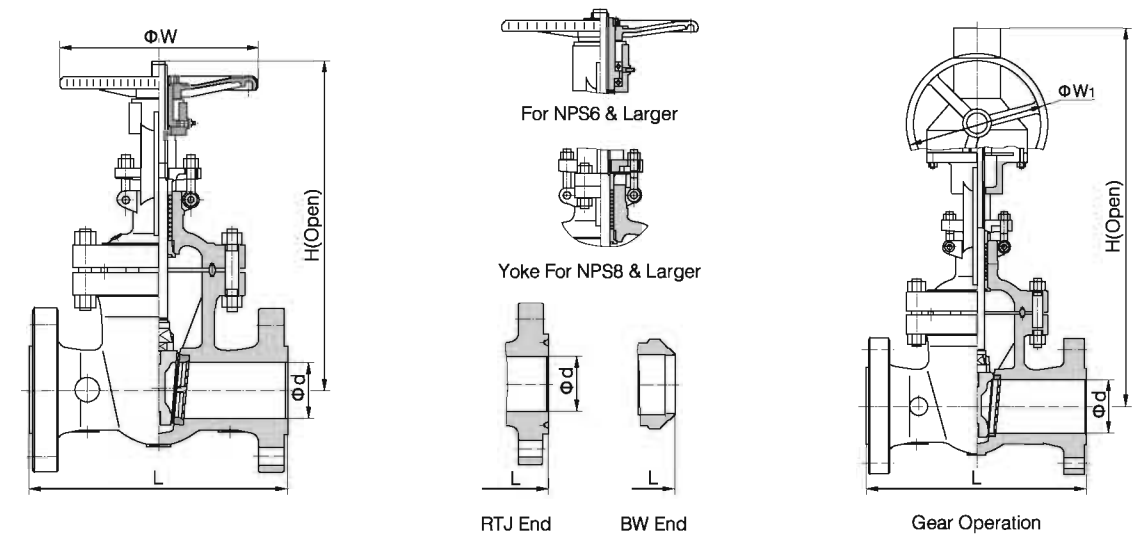


● Class300 Cast Steel Gate Valve



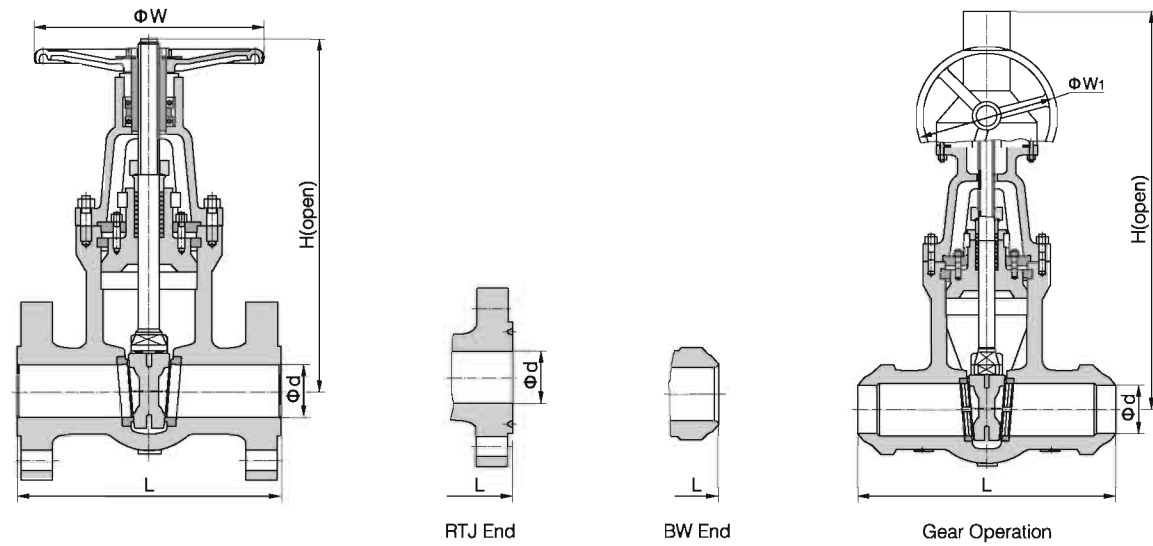
Class	Size		Dimensions(mm)								Weight(kg)	
	NPS	DN	L			d	H	H <sub>1</sub>	W	W <sub>1</sub>	H.W	G.O
			RF	RTJ	BW							
Class300	1/2	15	140	151	140	14	198	-	120	-	6	-
	3/4	20	152	165	152	19	215	-	140	-	7	-
	1	25	165	178	165	25	245	-	160	-	10	-
	1 1/4	32	178	191	178	32	306	-	180	-	15	-
	1 1/2	40	190	203	190	38	400	-	200	-	21	-
	2	50	216	232	216	51	420	-	200	-	25	-
	2 1/2	65	241	257	241	64	446	-	200	-	30	-
	3	80	283	298	283	76	537	-	250	-	48	-
	4	100	305	321	305	102	619	650	280	310	73	100
	5	125	381	397	381	127	722	750	300	310	99	126
	6	150	403	419	403	152	806	835	350	310	130	186
	8	200	419	435	419	203	1000	1030	400	310	208	235
	10	250	457	473	457	254	1240	1280	450	310	334	386
	12	300	502	518	502	305	1425	1460	500	310	450	502
	14	350	762	778	762	337	1585	1620	600	460	704	756
	16	400	838	854	838	387	1790	1830	500	460	923	965
	18	450	914	930	914	438	1960	2000	650	460	1131	1224
	20	500	991	1010	991	489	2158	2220	750	460	1345	1400
24	600	1143	1165	1143	591	2576	2620	900	600	2122	2385	
26	650	1245	1270	1245	633	-	2850	-	600	-	3000	
28	700	1346	1372	1346	684	-	3080	-	600	-	3300	
30	750	1397	1422	1397	735	-	3180	-	600	-	3550	
32	800	1524	1553	1524	779	-	3300	-	600	-	4400	
34	850	1626	1654	1626	830	-	3550	-	600	-	5200	
36	900	1727	1756	1727	874	-	3760	-	600	-	6050	

● Class600 & Class900 Cast Steel Gate Valve

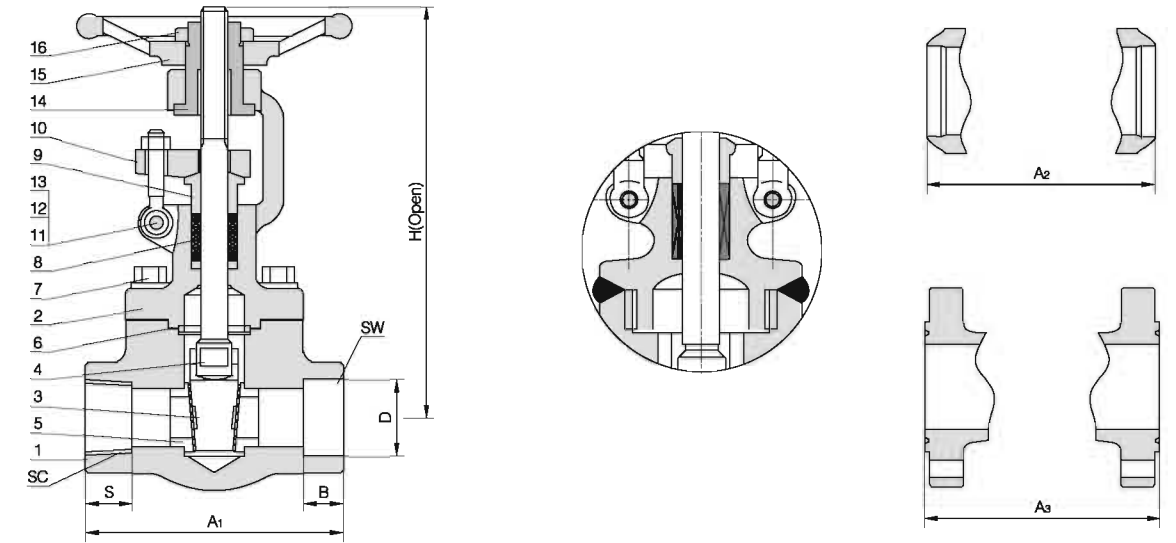


Class	Size		Dimensions(mm)								Weight(kg)	
	NPS	DN	L			d	H	H <sub>1</sub>	W	W <sub>1</sub>	H.W	G.O
			RF	RTJ	BW							
Class600	2	50	292	295	292	51	444	-	200	-	32	-
	2 1/2	65	330	333	330	64	500	-	250	-	52	-
	3	80	356	359	356	76	558	585	280	310	60	87
	4	100	432	435	432	102	665	695	300	310	107	134
	5	125	508	511	508	127	760	790	350	310	175	227
	6	150	559	562	559	152	868	900	450	310	216	268
	8	200	660	664	660	203	1073	1110	500	310	399	451
	10	250	787	791	787	254	1263	1300	650	460	605	657
	12	300	838	841	838	305	1600	1650	700	460	851	893
	14	350	889	892	889	337	1705	1750	900	460	1177	1232
	16	400	991	994	991	387	1835	1900	900	460	1513	1568
	18	450	1092	1095	1092	438	-	2020	-	600	-	1980
Class900	2	50	368	371	368	51	500	-	280	-	70	-
	2 1/2	65	419	422	419	64	550	-	280	-	110	-
	3	80	381	384	381	76	610	660	300	310	140	167
	4	100	457	460	457	102	702	750	350	310	200	227
	5	125	559	562	559	127	850	900	400	310	258	285
	6	150	610	613	610	152	980	1060	500	460	358	410
	8	200	737	740	737	203	1100	1140	650	460	550	600
	10	250	838	841	838	254	1320	1370	700	460	1000	1100
	12	300	965	968	965	305	1500	1560	900	460	1215	1310
	14	350	1029	1038	1029	322	1900	1950	900	600	1600	1700
	16	400	1130	1140	1130	373	2050	2100	900	600	2150	2330

● Class1500 & Class2500 Cast Steel Gate Valve



Class	Size		Dimensions(mm)								Weight(kg)	
	NPS	DN	L			d	H	H <sub>1</sub>	W	W <sub>1</sub>	H.W	G.O
			RF	RTJ	BW							
Class 1500	2	50	368	371	368	51	510	-	280	-	70	-
	2 1/2	65	419	422	419	64	560	-	300	-	110	-
	3	80	470	473	470	76	620	670	350	310	175	202
	4	100	546	549	546	102	728	770	400	310	270	300
	5	125	673	676	673	127	870	920	450	310	378	405
	6	150	705	711	705	144	1000	1070	500	460	520	575
	8	200	832	841	832	192	1130	1180	750	460	820	915
	10	250	991	1000	991	239	1360	1410	900	600	1560	1750
Class 2500	12	300	1130	1146	1130	287	-	1620	-	600	-	2120
	14	350	1257	1276	1257	315	-	2020	-	600	-	2600
	16	400	1384	1407	1384	360	-	2180	-	600	-	3450
	2	50	451	454	451	42	530	580	280	310	100	130
	2 1/2	65	508	514	508	52	580	630	300	310	150	180
	3	80	578	584	578	62	650	700	350	310	245	275
	4	100	673	683	673	87	750	800	400	310	390	420
	5	125	794	807	794	96	900	960	500	460	550	580
6	150	914	927	914	131	1040	1100	600	460	780	835	
8	200	1022	1038	1022	179	1150	1200	750	460	1260	1355	
10	250	1270	1292	1270	223	1400	1460	900	600	2380	2565	
12	300	1422	1445	1422	265	-	1660	-	600	-	3250	



● Technical Specification

Steel Gate Valves, API 602  
 Steel Valves, ASME B16.34  
 Face to Face, Manufacturer Standard  
 Face to Face, Flanged, ASME B16.10  
 End Flanges, ASME B16.5  
 Buttwelding Ends, ASME B16.25  
 Socket-welding Ends, ASME B16.11  
 Screwed Ends, ASME B1.20.1  
 Inspection and Test, API 598

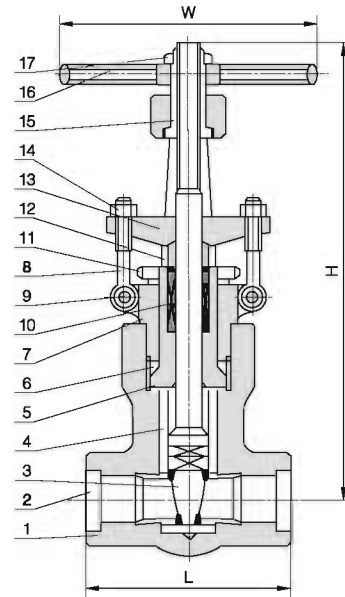
● Design Description

Outside Screw and Yoke (OS&Y)  
 Bolted Bonnet  
 Choice of WB, Welding Bonnet  
 Single Wedge, Fully Guided  
 Renewable Seat Rings  
 Yoke Integral with Bonnet  
 Rising Stem and Non-rising Handwheel  
 SW, Socket-welding Ends  
 SC, Screwed Ends  
 BW, Buttwelding Ends  
 Flanged Ends

● Form of Major Part Material

No.	Part Name	ASTM Material								
		Carbon Steel	1.25Cr-0.5Mo	2.25Cr-1Mo	304 Type	316 Type	304L Type	316L Type	20 Alloy	
1	Body	A105	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
2	Bonnet	A105	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
3	Wedge	A105+13Cr *1	A182 F11+HF	A182 F22+HF	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
4	Stem	A182 F6a	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
5	Seat Ring	A105+13Cr *1	A182 F11+HF	A182 F22+HF	NA	NA	NA	NA	Na	
6	Bonnet Gasket	304+Graphit	304+Graphit	304+Graphit	304+Graphit	316+Graphit	304L+Graphit	316L+Graphit	316+Graphit	
7	Bonnet Bolt	A193 B7	A193 B7	A193 B16	A193 B8	A193 B8M	A193 B8M	A193 B8M	A193 B8M	
8	Packing	Graphite	Graphite	Graphite	Graphite *2	Graphite *2	Graphite *2	Graphite *2	Graphite *2	
9	Gland	A276 410	A276 410	A276 410	A276 304	A276 316	A276 304L	A276 316L	20-Alloy	
10	Gland Flange	A105	A105	A105	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
11	Eyebolt	Carbon Steel	A193 B7	A193 B7	A193 B8	A193 B8	A193 B8	A193 B8	A193 B8	
12	Eyebolt Nut	Carbon Steel	A194 2H	A194 2H	A194 8	A194 8	A194 8	A194 8	A194 8	
13	Eyebolt Pin	A276 410	A276 410	A276 412	A276 304	A276 304	A276 304	A276 304	A276 304	
14	Stem Nut	Bronze	Bronze *3	Bronze *3	Bronze	Bronze	Bronze	Bronze	Bronze	
15	Hand wheel	Malleable iron	Malleable iron	Malleable iron	Malleable iron	Malleable iron	Malleable iron	Malleable iron	Malleable iron	
16	Wheel Nut	Carbon Steel	Carbon Steel	Carbon Steel	Carbon Steel+Zn	Carbon Steel+Zn	Carbon Steel+Zn	Carbon Steel+Zn	Carbon Steel+Zn	
*1	PN ≥ 600 Class seal face will be HF									
*2	PTFE Optional									
*3	Ductile Ni-Resist iron Optional									





**Technical Specification**

- Steel Gate Valves, API 602
- Steel Valves, ASME B16.34
- Face to Face, Manufacturer Standard
- Face to Face, Flanged, ASME B16.10
- End Flanges, ASME B16.5
- Buttwelding Ends, ASME B16.25
- Socket-welding Ends, ASME B16.11
- Screwed Ends, ASME B1.20.1
- Inspection and Test, API 598

**Design Description**

- Outside Screw and Yoke (OS&Y)
- Pressure Seal Bonnet
- Single Wedge, Fully Guided
- Renewable Seat Rings
- Rising stem and non-rising handwheel
- SW, Socket-welding Ends
- SC, Screwed Ends
- BW, Buttwelding Ends
- Flanged Ends

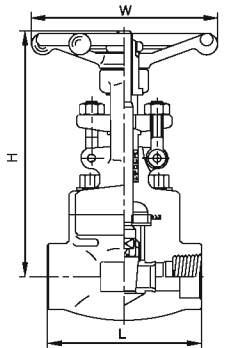
**Form of Major Part Material**

No.	Part Name	CS to ASTM	AS to ASTM	SS to ASTM	
		Type A 105N	Type F22	Type F304(L)	Type F316(L)
1	Body	A105N	A182 F22	A182 F304(L)	A182 F316(L)
2	Seat Ring	A276 420	A276 304	A276 304(L)	A276 316(L)
3	Wedge	A182/F430+STL	A182 F304+STL	A182 F304(L)+STL	A182 F316(L)+STL
4	Stem	A182 F6a A276-410	A182 F22	A182 F304(L)	A182 F316(L)
5	From Seal Place	A105N	A182 F304	A182 F304(L)	F316(L)
6	From Packing Ring	F182 F304	A182 F304 F22	A276 304(L)	A276 316L
7	Bonnet	A105N	A182 F22	A182 F304(L)	A182 F316(L)
8	Gland Eyebolt	A193 B7	A193 B16	A193 B8	A193 B8M
9	Cylindrical Pin	A276 F420	A276 F420	A182 F304	A182 F304
10	Stem Packing	Graphite+304	Graphite+304	Graphite+316	Graphite+316
11	Promotes the Nut	A194 2H	A194 4	A194 8	A194 8M
12	Gland	A276 F420	A276 F420	A182 F304	A182 F304
13	Gland Flange	A105	F22	A182 F304	A182 F304
14	Gland Nut	A194 2H	A194 4	A194 8	A194 8M
15	Yoke Nut	A276-410	A276-410	A276 F410	A276 F410
16	Hand Wheel	A197	A197	A197	A197
17	Lock Nut	A194 2H	A194 4	A194 8	A194 8M

**Class800 Main Outline Dimensions & Weight**

Bold fastening valve cover, outside screw stem & yoke (OS&Y)  
Designs according to API 602.

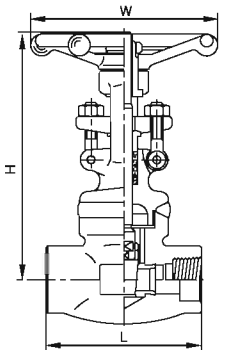
R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	79	79	92	111	120	120	140	178
W	100	100	100	125	160	160	180	200
H	161	161	163	196	223	251	290	333
d	8	10.5	13.5	18	24	29	36.5	45
Weight(kg)	2.3	2.22	2.39	4.24	5.7	7.05	10.9	16.8



**Class800 Main Outline Dimensions & Weight**

Weld joint valve cover, outside screw stem & yoke (OS&Y).  
Designs according to API 602.

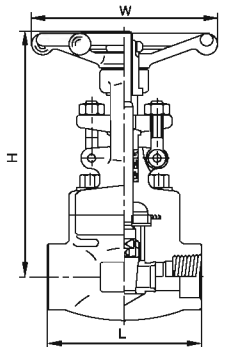
R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	79	79	92	111	120	120	140	178
W	100	100	100	125	160	160	180	200
H	161	161	163	196	223	251	290	333
d	8	10.5	13.5	18	24	29	36.5	45
Weight(kg)	1.9	1.9	2.1	3.2	5.2	6.9	10.4	15.8



**Class800 Main Outline Dimensions & Weight**

Bold fastening valve cover, outside screw stem & yoke (OS&Y).  
Designs according to API 602.

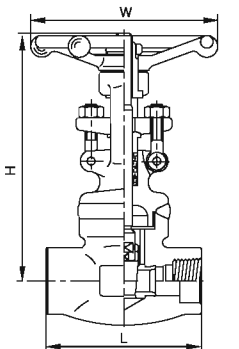
R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	92	111	111	120	120	140	178	180
W	100	125	125	160	160	180	200	220
H	191	191	192	219	243	296	316	370
d	8	10.5	13.5	18	24	29	36.5	45
Weight(kg)	2.4	4.4	4.3	6	7.2	11.4	16	23



**Class800 Main Outline Dimensions & Weight**

Weld joint valve cover, outside screw stem & yoke (OS&Y).  
Designs according to API 602.

R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	92	111	111	120	120	140	178	180
W	100	125	125	160	160	180	200	220
H	171	207	207	240	258	330	355	370
d	8	10.5	13.5	18	24	29	36.5	45
Weight(kg)	2.3	4	4	4.8	7.1	11	16	22.8

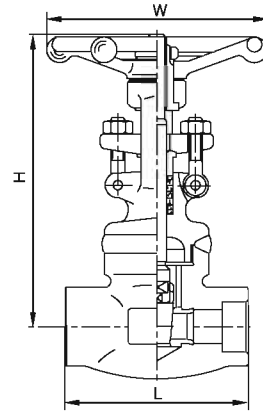




**Class2500 Main Outline Dimensions & Weight**

Weld joint valve cover, outside screw stem & yoke (OS&Y).  
Designs according to ASME B16.34

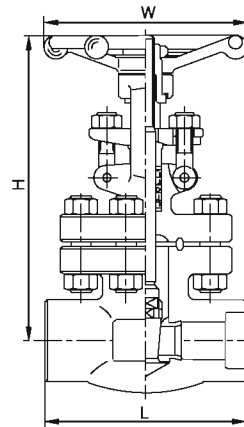
NPS	3/8	1/2	3/4	1	1 1/4
L	111	120	120	120	140
W	125	160	160	180	220
H	215	218	220	238	281
d	14	14	14	19	25
Weight(kg)	7	8.7	8.5	11.7	17



**Class1500~2500 Main Outline Dimensions & Weight**

Bolt fastening cover, outside screw stem & yoke (OS&Y).  
Designs according to ASME B16.34

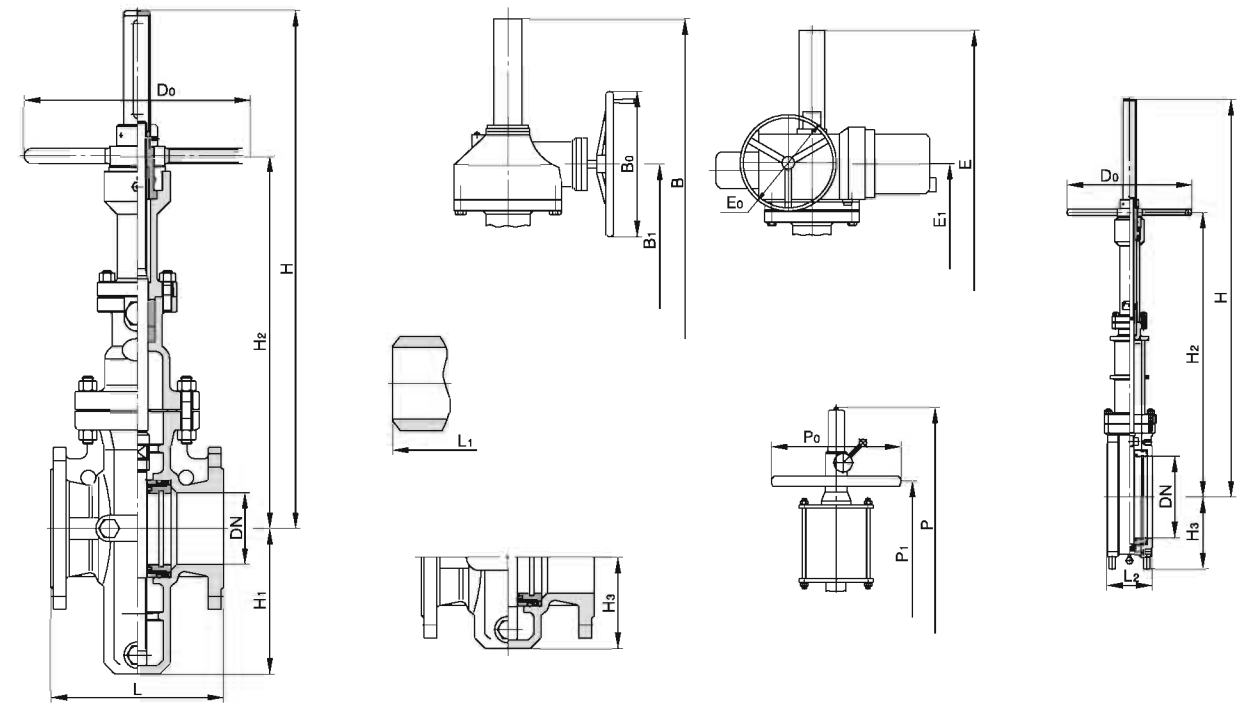
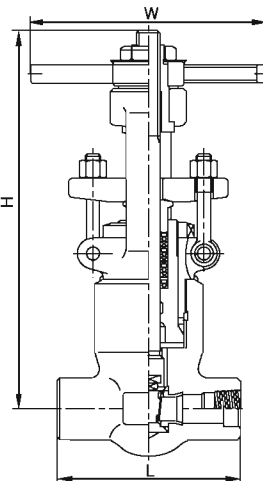
NPS	Class	1/2	3/4	1	1 1/2	2
L	1500	110	150	150	210	235
	2500	150	150	210	235	235
W	1500	110	130	130	180	250
	2500	130	130	250	300	300
H	1500	277	300	390	400	435
	2500	293	300	390	435	435
d	1500	14	17	22	35	37
	2500	14	14	14	25	30
Weight(kg)	1500	5.1	11	12.1	22	37
	2500	11	11.3	22.4	38	38



**Class1500~2500 Main Outline Dimensions & Weight**

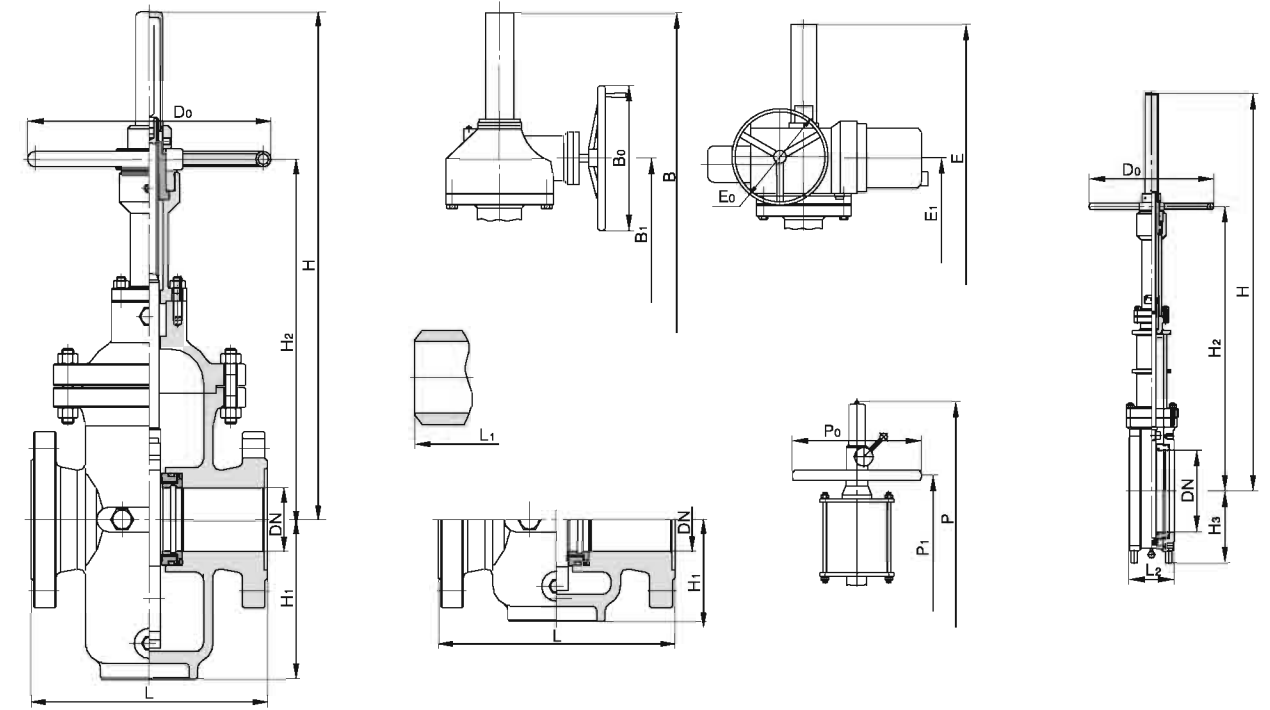
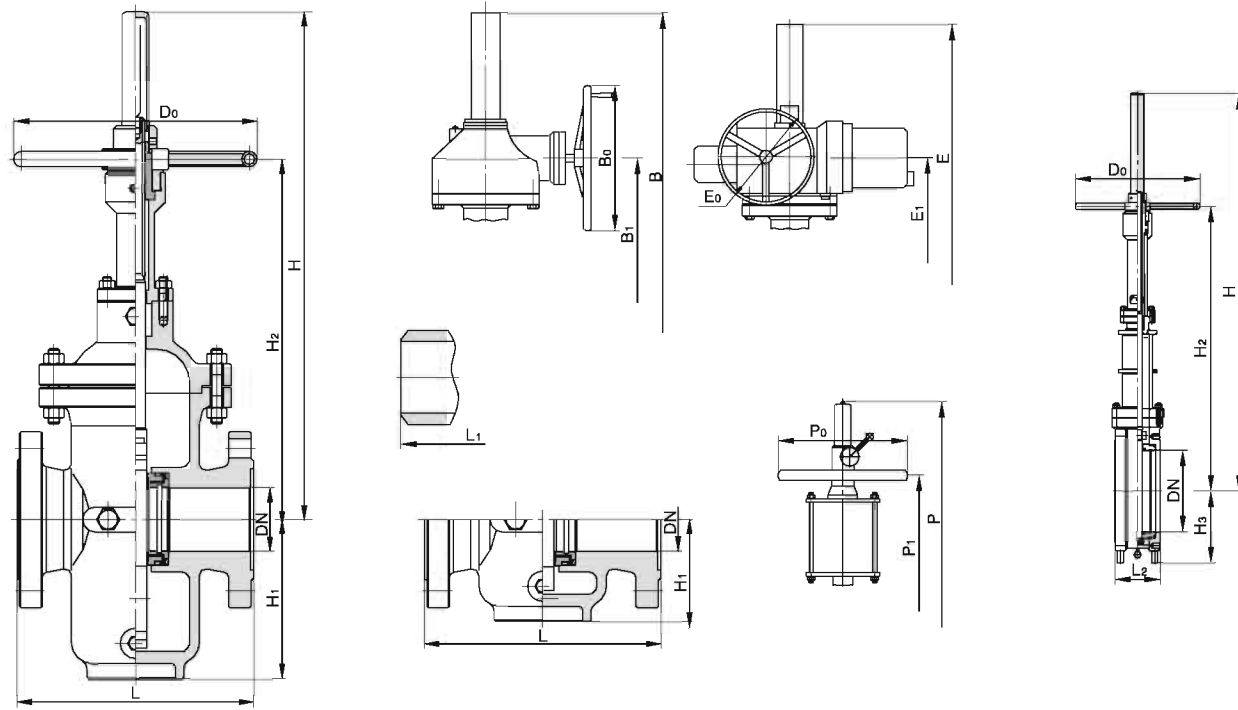
Pressure seal bonnet, outside screw stem & yoke (OS&Y).  
Designs according to ASME B16.34

NPS	Class	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	900-1500	140	140	140	140	178	178	216
	2500	186	186	186	186	232	232	279
W	900-1500	200	200	200	200	280	280	300
	2500	200	200	200	200	280	280	300
H	900-1500	318	318	318	322	467	468	540
	2500	325	325	325	327	467	468	540
d	900-1500	14	14	14	19	25	30	36.5
	2500	14	14	14	19	25	30	36.5
Weight(kg)	900-1500	11.5	11.5	10.8	10.5	19.6	21.0	55.4
	2500	12.3	12.3	11.6	10.8	26.0	28.4	60.0



**Class150 Main Size of Outside**

NPS (in)	Flange L	Butt welding L1	Light-duty L2	Hand-operated			Geared driving			Geared driving	Air-operated and Fluid driving			Electric driving device			Electric driving device	Non-diversion hole type H3	Diversion hole type H1
				H	H2	D0	B	B1	B0		P	P1	P0	E	E1	E0			
1	127	127	-	360	250	180	-	-	-	-	-	-	-	-	-	-	60	85	
1 1/4	140	140	-	375	260	180	-	-	-	-	-	-	-	-	-	-	71	103	
1 1/2	165	165	-	410	290	250	-	-	-	-	-	-	-	-	-	-	75	115	
2	178	216	-	450	315	250	-	-	-	-	525	430	250	-	-	-	85	122	
2 1/2	190	241	-	550	420	300	-	-	-	-	648	560	300	-	-	-	91	154	
3	203	283	-	610	428	300	-	-	-	-	730	630	300	-	-	-	109	169	
4	229	305	150	700	494	300	770	650	310	BA-0	850	720	300	912	790	200	SMC-04	121	193
6	267	403	150	895	625	350	965	800	310	BA-0	1120	920	350	1107	920	500	SMC-03	178	283
8	292	419	180	1130	784	350	1200	960	310	BA-0	1430	1160	350	1390	1120	500	SMC-03	211	352
10	330	457	180	1290	937	400	1360	1080	310	BA-0	1665	1380	400	1550	1250	500	SMC-03	215	440
12	356	502	200	1480	1080	450	1560	1200	310	BA-0	1930	1550	450	1740	1400	305	SMC-00	245	514
14	381	572	200	1660	1283	500	1740	1350	460	BA-1	2185	1750	450	1913	1550	305	SMC-00	280	602
16	406	610	218	1850	1417	500	1930	1500	460	BA-1	2450	2000	500	2103	1620	305	SMC-00	310	678
18	432	660	218	2080	1489	600	2160	1680	460	BA-1	2755	2250	500	2365	1830	305	SMC-0	346	785
20	457	711	229	2300	1672	700	2420	1850	460	BA-1	3050	2450	600	2585	1980	305	SMC-0	363	855
24	508	813	248	2680	2012	800	2800	2120	460	BA-2	3580	2900	800	2990	2300	305	SMC-1	442	1045
28	610	914	286	3080	2250	800	3200	2450	460	BA-2	4130	3350	800	3390	2600	305	SMC-1	505	1190
32	660	965	286	3491	2550	1000	3640	2800	460	BA-2	-	-	-	3850	2980	305	SMC-1	560	1350
36	711	1016	-	3897	2850	1000	4050	3080	600	BA-3	-	-	-	4260	3200	458	SMC-2	610	1510
40	811	-	-	4317	3250	1200	4467	3400	600	BA-3	-	-	-	4677	3600	458	SMC-2	715	1715



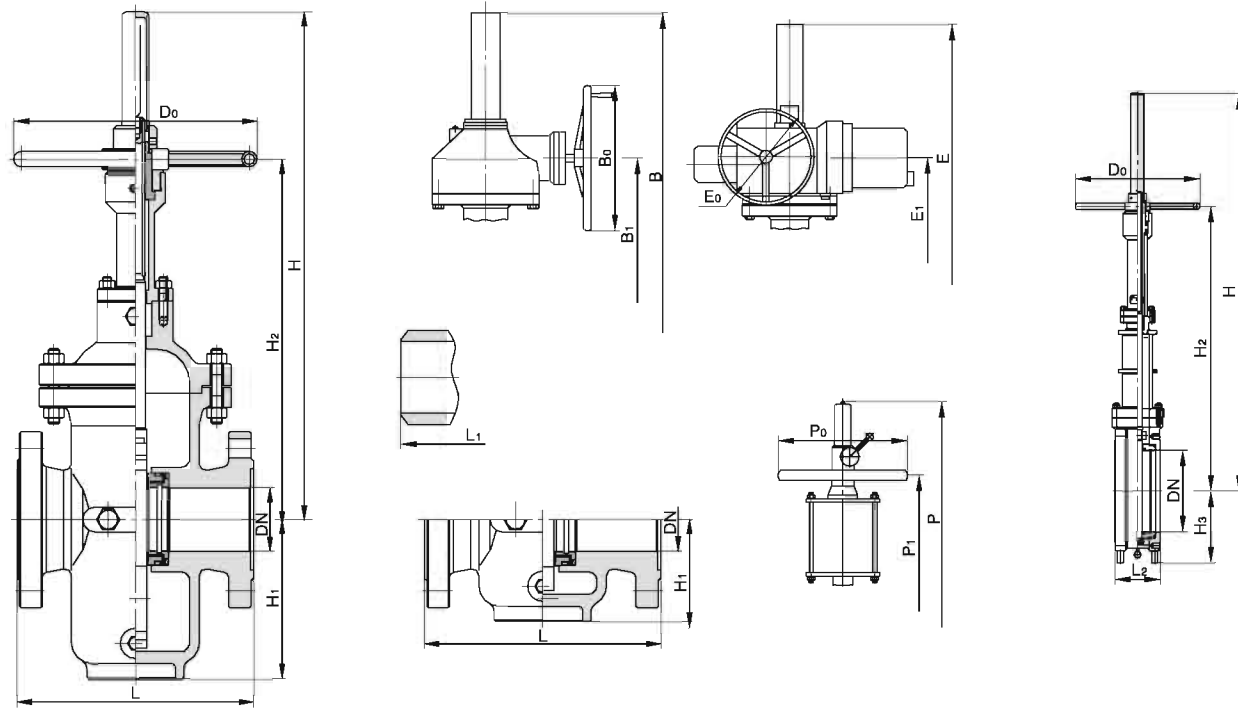
● Class300 Main Size of Outside

NPS (in)	Flange L	Butt welding L1	Light- duty L2	Hand-operated			Geared driving				Air-operated and Fluid driving			Electric driving device			Non-diversion hole type H3	Diversion hole type H1	
				H	H2	D0	B	B1	B0	P	P1	P0	E	E1	E0				
1	165	165	-	370	260	180	-	-	-	-	-	-	-	-	-	-	70	90	
1 1/4	178	178	-	385	270	180	-	-	-	-	-	-	-	-	-	-	80	115	
1 1/2	190	190	-	420	300	250	-	-	-	-	-	-	-	-	-	-	85	130	
2	216	216	-	458	325	250	-	-	-	-	533	435	200	-	-	-	100	137	
2 1/2	241	241	-	555	420	300	-	-	-	-	653	565	200	-	-	-	106	169	
3	283	283	-	615	430	300	-	-	-	-	735	635	250	-	-	-	124	184	
4	305	305	150	710	500	300	770	650	310	BA-0	860	730	250	912	790	200	SMC-04	146	218
6	403	403	150	900	625	350	965	800	310	BA-0	1125	925	350	1155	960	500	SMC-03	206	311
8	419	419	180	1135	790	350	1200	960	310	BA-0	1435	1165	350	1390	1120	305	SMC-00	241	382
10	457	457	180	1401	1040	400	1360	1090	310	BA-0	1776	1450	400	1543	1240	305	SMC-00	251	476
12	502	502	200	1580	1150	450	1560	1200	310	BA-1	2030	1620	450	1745	1400	305	SMC-0	281	545
14	762	762	200	-	-	-	1740	1350	460	BA-1	2305	1900	500	1945	1580	305	SMC-0	325	645
16	838	838	218	-	-	-	1930	1540	460	BA-1	2558	2100	600	2135	1640	305	SMC-0	360	728
18	914	914	218	-	-	-	2160	1700	460	BA-1	2835	2320	700	2385	1840	305	SMC-1	400	800
20	991	991	229	-	-	-	2420	1850	460	BA-2	3120	2510	800	2660	2050	305	SMC-1	430	930
24	1143	1143	248	-	-	-	2800	2120	460	BA-2	3670	2980	900	3010	2310	305	SMC-1	497	1100
28	1346	1346	286	-	-	-	3200	2460	460	BA-2	-	-	-	3480	2680	458	SMC-2	560	1260
32	1524	1524	286	-	-	-	3640	2800	460	BA-2	-	-	-	3890	3020	458	SMC-2	620	1420
36	1727	1727	-	-	-	-	4050	3080	600	BA-3	-	-	-	4260	3200	458	SMC-2	610	1510

● Class400 Main Size of Outside

NPS (in)	Flange L	Butt welding L1	Hand-operated H	Light- duty L2	Hand-operated			Geared driving				Air-operated and Fluid driving			Electric driving device			Non-diversion hole type H3	Diversion hole type H1
					H	H2	D0	B	B1	B0	P	P1	P0	E	E1	E0			
2	292	292	458	325	300	505	430	310	BA-0	533	435	200	647	560	200	SMC-04	108	158	
2 1/2	330	330	555	420	300	560	470	310	BA-0	653	565	200	702	610	200	SMC-04	125	190	
3	356	356	615	430	350	610	510	310	BA-0	735	635	250	752	650	500	SMC-03	145	225	
4	406	406	710	500	350	770	650	310	BA-0	860	730	250	912	790	500	SMC-03	165	255	
6	495	495	900	625	400	965	800	310	BA-0	1125	925	350	1138	950	305	SMC-00	220	330	
8	597	597	1135	790	500	1200	960	310	BA-0	1435	1165	350	1373	1100	305	SMC-00	280	410	
10	673	673	1401	1040	500	1370	1090	460	BA-1	1776	1450	400	1575	1280	305	SMC-0	330	490	
12	762	762	1580	1150	600	1560	1200	460	BA-1	2030	1620	450	1725	1390	305	SMC-0	380	570	
14	826	826	-	-	-	1740	1350	460	BA-1	2305	1900	500	1930	1570	305	SMC-1	430	650	
16	902	902	-	-	-	1970	1540	460	BA-2	2558	2100	600	2210	1700	305	SMC-1	480	735	
18	978	978	-	-	-	2260	1700	460	BA-2	2835	2320	700	2500	1940	305	SMC-1	530	810	
20	1054	1054	-	-	-	2420	1850	460	BA-2	3120	2510	800	2630	2020	458	SMC-2	580	905	
24	1232	1232	-	-	-	2800	2120	600	BA-3	-	-	-	3050	2350	458	SMC-2	670	1070	
28	1397	1397	-	-	-	3230	2460	600	BA-3	-	-	-	3480	2680	458	SMC-2	770	1230	





● Class600 Main Size of Outside

NPS (in)	Flange	Butt welding	Hand-operated		Geared driving			Geared driving	Air-operated and Fluid driving	Electric driving device			Electric driving device	Non-diversion hole type	Diversion hole type			
	L	L <sub>1</sub>	H	H <sub>2</sub>	D <sub>0</sub>	B	B <sub>1</sub>			B <sub>0</sub>	P	P <sub>1</sub>		P <sub>0</sub>	E	E <sub>1</sub>	E <sub>0</sub>	H <sub>3</sub>
2	292	292	468	335	300	505	430	310	BA-0	543	445	200	647	560	200	SMC-04	108	158
2 1/2	330	330	565	430	300	560	470	310	BA-0	663	570	200	702	610	200	SMC-04	125	190
3	356	356	625	440	350	610	510	310	BA-0	745	640	250	752	650	500	SMC-03	145	225
4	432	432	720	510	350	770	650	310	BA-0	870	740	250	950	820	500	SMC-03	165	255
6	559	559	910	630	400	965	800	310	BA-0	1135	930	350	1138	950	305	SMC-0	220	330
8	660	660	1145	800	500	1200	960	310	BA-1	1445	1170	350	1403	1130	305	SMC-0	280	410
10	787	787	1411	1050	500	1370	1090	460	BA-1	1786	1460	400	1575	1280	305	SMC-0	330	490
12	838	838	1590	1160	600	1560	1200	460	BA-1	2040	1630	450	1750	1410	305	SMC-1	380	570
14	889	889	-	-	-	1740	1350	460	BA-2	-	-	-	1930	1570	305	SMC-1	430	650
16	991	991	-	-	-	1970	1540	460	BA-2	-	-	-	2210	1700	305	SMC-1	480	735
18	1092	1092	-	-	-	2260	1700	460	BA-2	-	-	-	2500	1940	458	SMC-2	530	810
20	1194	1194	-	-	-	2420	1850	460	BA-2	-	-	-	2630	2020	458	SMC-2	580	905

● Technical Specification

Design and Manufacture: Cast steel check valve to BS 1868, ASME B16.34 and API 6D; Forged steel check valve to API 602.

Inspection and Test: API 598 or API 6D.

End flange dimension: ASME B16.5 (for NPS ≤ 24), ASME B16.47 series B, API 605 or ASME B16.47 series A, MSS SP-44 (for NPS > 24).

BW end dimension: ASME B16.25.

Socket-weld dimension: ASME B16.11.

Face to face and end to end: ASME B16.10.

Pressure-temperature ratings: ASME B16.34.

Wall thickness dimension: API 600 and BS 1868.

● The Features of check Valve

Bolted Bonnet; Swing and lift disc; Metallic seating surfaces.

● Body and Bonnet Connection

The body and bonnet of Class 150 ~ Class 900 check valves are usually with studs and nuts. And the body and bonnet of Class 1500 ~ Class 2500 check valves are usually of pressurized seal design.

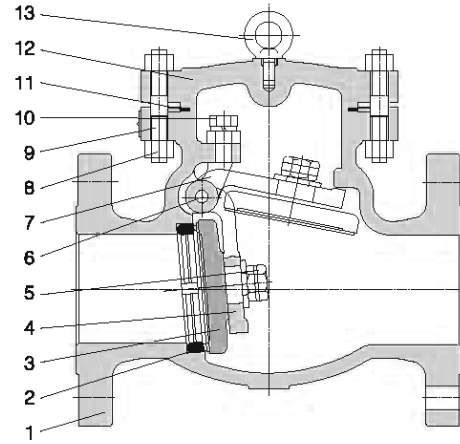
● Body-To-Bonnet Joint

Stainless steel + flexible graphite wounded gasket is used for Class 150 and Class 300 check valve; Stainless steel + flexible graphite wounded gasket is used for Class 600 check valve, and joint gasket is also optional for Class 600 check valve; Ring Joint gasket is used for Class 900 check valve; Pressurized seal design is used for Class 1500 ~ Class 2500 check valve.

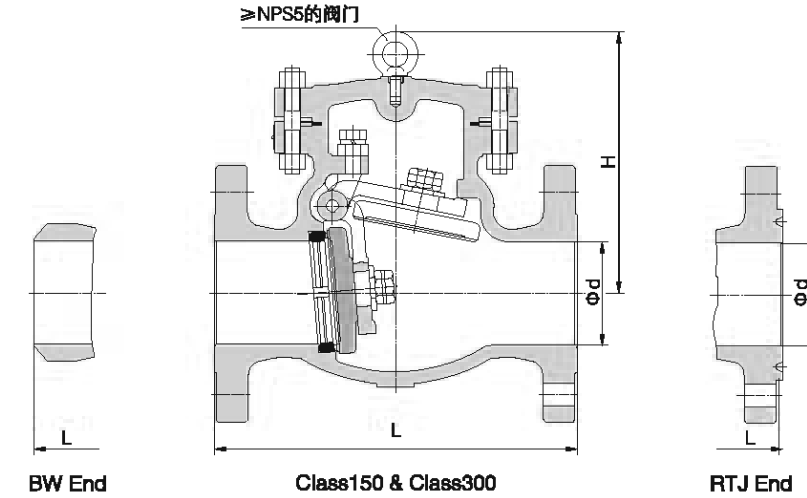
● Seat

For carbon steel check valve, the seat is usually forged steel. The sealing surface of the seat is spray welded with hard alloy specified by the customer. Renewable threaded seat is used for NPS ≤ 10 check valves, and welded on seat can be also optional if being requested by the customer. Welded on seat is used for NPS ≥ 12 carbon steel check valves. For Stainless steel check valve, integral seat is usually adopted, or to weld hard alloy directly integrally. Threaded or welded on seat is also optional for stainless steel check valve if being requested by the customer.





● Class 150 & Class 300 Cast Steel Swing Check Valve



● Technical Specification

Design and Manufacture: BS1868 or API 6D

Inspection and Test: API 598 or API 6D

End flange dimension: ASME B16.5、ASME B16.47 A、MSS SP-44; ASME B16.47 B、API 605

BW end dimension: ASME B16.25

Face to face and end to end: ASME B16.10

Pressure-temperature ratings: ASME B16.34

Wall thickness dimension: API 600 and BS 1868

● Form of Major Part Material

Parts No.	Parts Name	Materials				
		WCB/Trim 1	WCB/Trim 5	WCB/Trim 8	CF8/304	CF8M/316
1	Body	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
2	Seat ring	A105 + 13Cr	A105 + STL	A105 + STL	ASTM A351 CF8	ASTM A351 CF8M
3	Disc	ASTM A216 WCB + 13Cr	ASTM A216 WCB + STL	ASTM A216 WCB + 13Cr	ASTM A351 CF8	ASTM A351 CF8M
4	Arm	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
5	Nut	ASTM A194 2H	ASTM A194 2H	ASTM A194 2H	ASTM A194 8	ASTM A194 8M
6	Arm pin	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F304	ASTM A182 F318
7	Yoke	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
8	Bonnet nut	ASTM A194 2H	ASTM A194 2H	ASTM A194 2H	ASTM A194 8	ASTM A194 8M
9	Bonnet bolt	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B8	ASTM A193 B8M
10	Bolt	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B8	ASTM A193 B8M
11	Gasket	304 sheet + Graphite	304 sheet + Graphite	304 sheet + Graphite	304 + Graphite	316 + Graphite
12	Bonnet	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
13	Eye bolt	ASTM A181	ASTM A181	ASTM A181	ASTM A181	ASTM A181

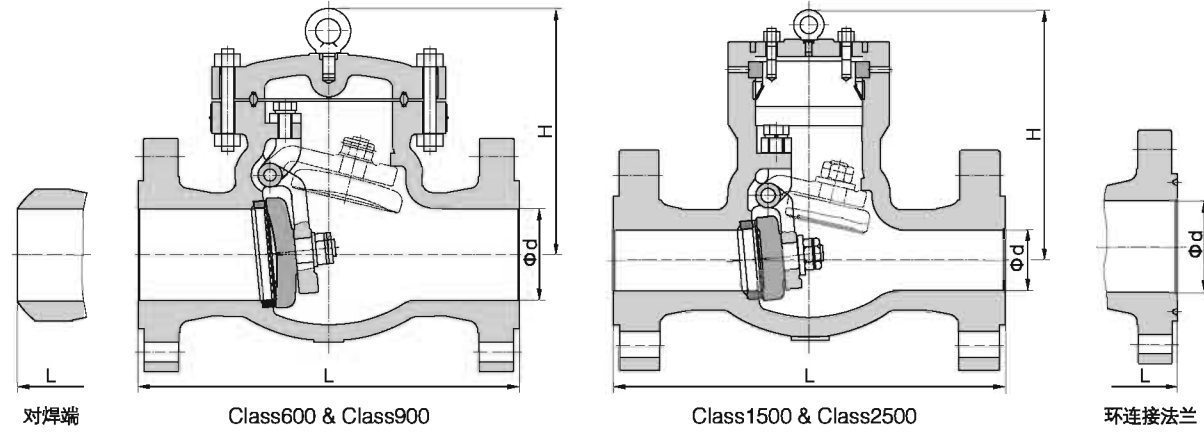
Note: The chart above only lists out some common composition of steel check valve parts. We may provide other different parts material composition according to the customer's request or the actual valve working condition.

Size		Class 150						Class 300					
NPS	DN	Dimensions(mm)					Weight (kg)	Dimensions(mm)					Weight (kg)
		L			d	H		L			d	H	
RF	RTJ	BW	RF	RTJ			BW	RF	RTJ	BW			
2	50	203	216	203	51	132	15	267	283	267	51	144	20
2 1/2	65	216	229	216	64	147	20	292	308	292	64	149	35
3	80	241	254	241	76	176	27	318	333	318	76	210	40
4	100	292	305	292	102	198	45	356	371	356	102	260	61
5	125	330	343	330	127	255	58	400	416	400	127	295	80
6	150	356	368	356	152	320	69	445	460	445	152	326	130
8	200	495	508	495	203	380	131	533	549	533	203	380	190
10	250	622	635	622	254	440	219	622	638	622	254	440	296
12	300	699	711	699	305	480	321	711	727	711	305	520	450
14	350	787	800	787	337	530	380	838	854	838	337	540	640
16	400	864	876	864	367	580	560	864	879	864	367	588	850
18	450	978	991	978	438	618	630	978	994	978	438	670	1030
20	500	978	991	978	489	657	770	1016	1035	1016	489	720	1330
24	600	1295	1308	1295	591	760	960	1346	1368	1346	591	850	1950
26	650	1285	-	1285	633	840	1250	1346	1372	1348	633	920	2300
28	700	1448	-	1448	684	920	1580	1499	1524	1499	684	1150	2600
30	750	1524	-	1524	735	960	1950	1594	1619	1594	735	1280	3200

## Cast Steel Swing Check Valve

## Cast Steel Lift Check Valve

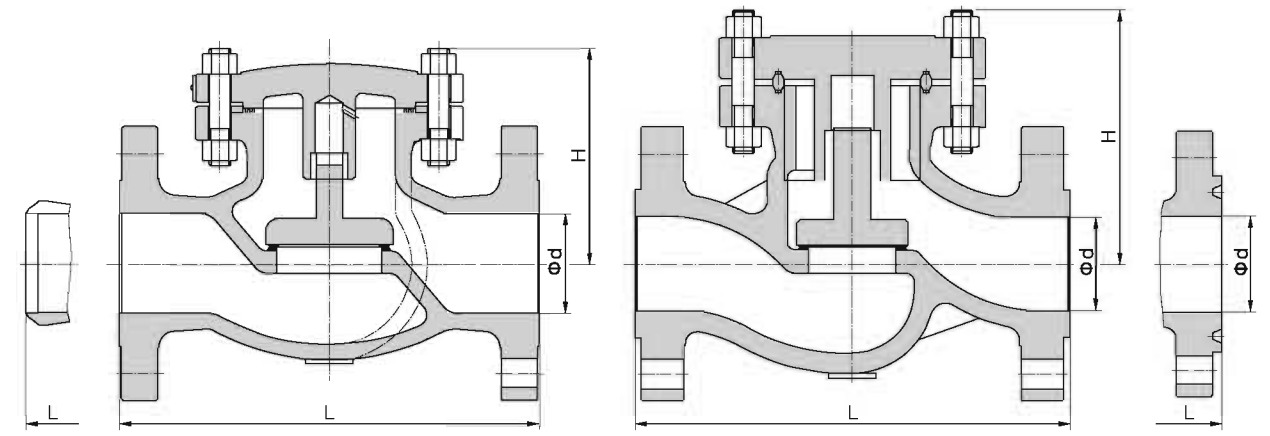
### Class 600~Class 2500 Cast Steel Swing Check Valve



Size		Class 600						Class 900					
NPS	DN	Dimensions(mm)					Weight (kg)	Dimensions(mm)					Weight (kg)
		L			d	H		L			d	H	
RF	RTJ	BW	RF	RTJ			BW	RF	RTJ	BW			
2	50	292	295	292	51	170	28	368	371	368	51	200	48
2 1/2	65	330	333	330	64	178	40	419	422	419	64	220	75
3	80	356	359	356	76	246	68	381	384	381	76	280	95
4	100	432	435	432	102	290	117	457	460	457	102	320	135
5	125	508	511	508	127	320	155	559	562	559	127	360	200
6	150	559	562	559	152	360	192	610	613	610	152	400	264
8	200	660	664	660	203	430	340	737	740	737	203	480	424
10	250	787	791	787	254	502	515	838	841	838	254	560	730
12	300	838	841	838	305	554	750	965	968	965	305	632	1070
14	350	889	892	889	337	595	890	1029	1038	1029	322	680	1180
16	400	991	994	991	387	680	1303	1130	1140	1130	373	780	1790
18	450	1092	1095	1092	438	778	1800	1219	1232	1219	423	880	2500
20	500	1194	1200	1194	489	970	2150	1321	1334	1321	471	1050	3080
24	600	1397	1407	1397	591	1100	3200	1549	1568	1549	522	1200	4600

Size		Class 1500						Class 2500					
NPS	DN	Dimensions(mm)					Weight (kg)	Dimensions(mm)					Weight (kg)
		L			d	H		L			d	H	
RF	RTJ	BW	RF	RTJ			BW	RF	RTJ	BW			
2	50	368	371	368	51	210	48	451	454	451	42	230	68
2 1/2	65	419	422	419	64	240	75	508	514	508	52	260	100
3	80	470	473	470	76	303	120	578	584	578	62	330	165
4	100	546	549	546	102	340	180	673	683	673	87	370	260
5	125	673	676	673	127	380	294	794	807	794	96	410	440
6	150	705	711	705	144	430	385	914	927	914	131	460	580
8	200	832	841	832	192	500	634	1022	1038	1022	179	530	970
10	250	991	1000	991	239	590	1140	1270	1292	1270	223	620	1700
12	300	1130	1146	1130	287	660	1650	1422	1445	1422	265	690	2600
14	350	1257	1276	1257	315	710	2000	-	-	-	-	-	-
16	400	1384	1407	1384	360	820	2700	-	-	-	-	-	-

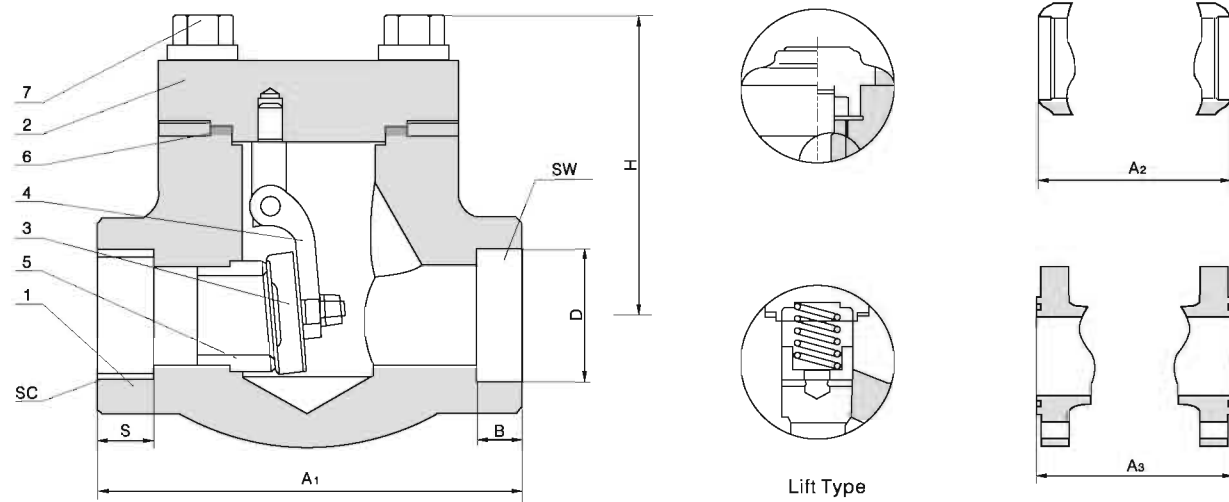
### Class 150~Class 900 Cast Steel Lift Check Valve



Size		Class 150						Class 300					
NPS	DN	Dimensions(mm)					Weight (kg)	Dimensions(mm)					Weight (kg)
		L			d	H		L			d	H	
RF	RTJ	BW	RF	RTJ			BW	RF	RTJ	BW			
1/2	15	108	119	108	13	76	3	152	162	152	13	78	5
3/4	20	117	130	117	19	76	4	178	191	178	19	82	6
1	25	127	140	127	25	98	5	203	216	203	25	102	8
1 1/4	32	140	153	140	32	102	7	216	229	216	32	106	11
1 1/2	40	165	178	165	38	115	8	229	242	229	38	118	13
2	50	203	216	203	51	140	15	267	283	267	51	140	26
2 1/2	65	216	229	216	64	162	22	292	308	292	64	164	33
3	80	241	254	241	76	168	28	318	333	318	76	178	50
4	100	292	305	292	102	194	42	356	371	356	102	195	86
5	125	356	368	356	127	210	60	400	416	400	127	223	120
6	150	406	419	406	152	226	75	445	460	445	152	245	180
8	200	495	508	495	203	250	118	533	549	533	203	280	220
10	250	622	635	622	254	275	194	622	638	622	254	336	310
12	300	699	711	699	305	332	320	711	727	711	305	380	510

Size		Class 600						Class 900					
NPS	DN	Dimensions(mm)					Weight (kg)	Dimensions(mm)					Weight (kg)
		L			d	H		L			d	H	
RF	RTJ	BW	RF	RTJ			BW	RF	RTJ	BW			
2	50	292	295	292	51	152	32	368	371	368	50	180	50
2 1/2	65	330	333	330	64	167	45	419	422	419	64	200	65
3	80	356	359	356	76	178	68	381	384	381	74	235	88
4	100	432	435	432	102	215	98	457	460	457	100	270	140
5	125	508	511	508	125	240	155	559	562	559	125	300	210
6	150	559	562	559	152	279	230	610	613	610	150	350	300
8	200	660	664	660	200	328	300	737	740	737	200	400	390





**Technical Specification**

- Steel Check Valves, API 602
- Steel Valves, ASME B16.34
- Face to Face, Manufacturer Standard
- Face to Face, Flanged, ASME B16.10
- End Flanges, ASME B16.5
- Buttwelding Ends, ASME B16.25
- Socket-welding Ends, ASME B16.11
- Screwed Ends, ASME B1.20.1
- Inspection and Test, API 598

**Design Description**

- Bolted Bonnet Cap
- Choice of WB, Welding Bonnet
- Lift or Swing Type
- Seat Rings Integral with Body of Lift
- Horizontal or Vertical Service
- Socket Weld Ends
- SW, Socket-welding Ends
- SC, Screwed Ends
- BW, Buttwelding Ends
- Flanged Ends

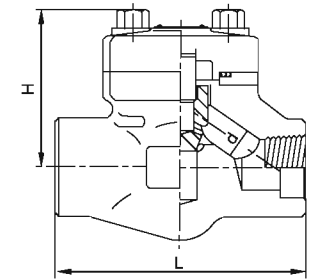
**Form of Major Part Material**

No.	Part Name	ASTM Material							
		Carbon Steel	F11	F22	304 Type	316 Type	304L Type	316L Type	20 Alloy
1	Body	A105	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy
2	Bonnet	A105	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy
3	Disc	A182 F6a	A182 F11+HF	A182 F22+HF	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy
4	Hinge	A182 F6a	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy
5	Seat	A182 F6a	A182 F11+HF	A182 F22+HF	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy
6	Bonnet Gasket	304+Graphit	304+Graphit	304+Graphit	304+Graphit	316+Graphit	304L+Graphit	316L+Graphit	316+Graphit
7	Bonnet Bolt	A193 B7	A193 B7	A193 B16	A193 B8	A193 B8M	A193 B8	A193 B8M	A193 B8M

**Class800 Main Outline Dimensions & Weight**

Bold valve cover.  
Designs according to BS5,352.

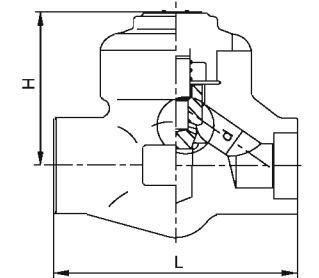
R.P		1/2	3/4	1	1 1/4	1 1/2	2	
F.P		1/4	3/8	1/2	3/4	1	1 1/4	1 1/2
L	Lift	79	79	92	111	120	152	172
	Swing	79	79	92	111	120	140	178
H	Lift	61	61	61	78	84	84	118
	Swing	61	61	61	78	84	84	120
d	Lift	7	9	13	17.5	23	30	35
	Swing	8	10.5	13.5	18	24	29	36.5
Weight (kg)	Lift	1.2	1.5	1.7	3.3	4.2	4.2	10.5
	Swing	1.4	15	1.7	3.3	4.2	4.2	8.5



**Class800 Main Outline Dimensions & Weight**

Weld valve cover.  
Designs according to BS5,352.

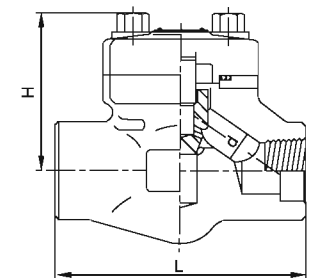
R.P		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P		1/4	3/8	1/2	3/4	1	1 1/4	1 1/2
L		79	79	92	111	120	152	172
H		61	61	61	78	84	103	118
d		7	9	13	17.5	23	30	35
Weight(kg)		1.2	1.3	1.5	3.0	3.9	6.0	10



**Class900~1500 Main Outline Dimensions & Weight**

Bold valve cover.  
Designs according to BS5,352.

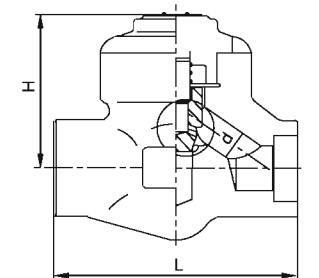
R.P		1/2	3/4	1	1 1/4	1 1/2	2	
F.P		1/4	3/8	1/2	3/4	1	1 1/4	1 1/2
L	Lift	92	111	111	120	152	172	200
	Swing	92	111	111	120	120	140	178
H	Lift	61	78	78	84	103	118	132
	Swing	61	78	78	84	101	120	133
d	Lift	7	12	15	20	28	32	40
	Swing	8	10.5	13.5	18.7	24	29	45
Weight (kg)	Lift	1.5	3.4	3.3	4.2	6.3	10.5	12.5
	Swing	1.5	3.4	3.3	4.2	5.0	8.5	10.9



**Class900~1500 Main Outline Dimensions & Weight**

Weld valve cover.  
Designs according to BS5,352.

R.P		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P		1/4	3/8	1/2	3/4	1	1 1/4	1 1/2
L		92	111	111	120	152	172	200
H		61	78	78	84	103	118	132
d		7	12	15	20	28	32	40
Weight(kg)		1.3	3.1	3.1	3.9	5.8	10.0	11.5





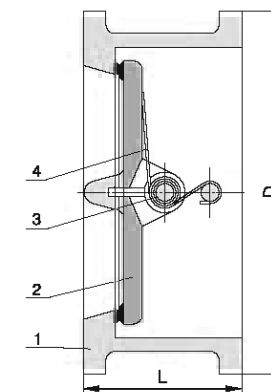
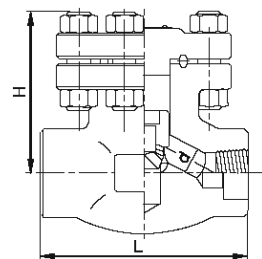
## Forged Steel Check Valve

## Wafer Type Double Disc Swing Check Valve

### Class900~1500 Main Outline Dimensions & Weight

Bold valve cover.  
Designs according to BS5,352.

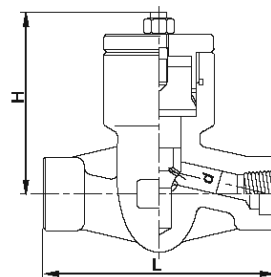
F.P		1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L		110	110	110	110	150	150	210	235
H		166	166	171	207	240	258	330	355
d	Lift	9	10	12	15	20	28	32	40
	Swing	8	10.5	13.5	18	24	29	38.5	45
Weight (kg)	Lift	2	2.1	1.9	4	5.1	7.2	12.1	14
	Swing	1.9	2.3	2.3	4.35	5.25	7.8	12.5	14.6



### Class900~1500 Main Outline Dimensions & Weight

Pressure seal bonnet.  
Designs according to BS5,352.

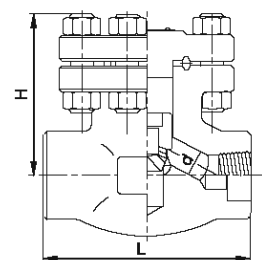
R.P		1/2	3/4	1	1 1/4	1 1/2	2
F.P		3/8	1/2	3/4	1	1 1/4	1 1/2
L		140	140	140	178	216	218
H		117	117	117	152	195	195
d		12	15	20	28	28	40
Weight (kg)		7.5	7.0	6.8	18.5	18.5	22



### Class2500 Main Outline Dimensions & Weight

Bold valve cover.  
Designs according to BS5,352.

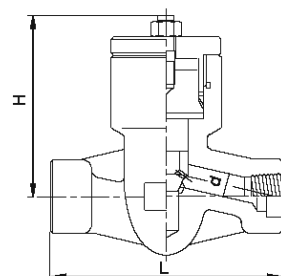
F.P		1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L		150	150	150	150	210	235	235	235
H		166	166	171	207	240	256	330	355
d		7.5	10.5	11	14	19	25	28	35
Weight (kg)		1.9	2.3	17	46	62	73	58	85



### Class2500 Main Outline Dimensions & Weight

Pressure seal bonnet.  
Designs according to BS5,352.

F.P		1/2	3/4	1	1 1/4	1 1/2	2
L		186	186	186	232	232	279
H		117	117	117	152	150	195
d		11	14	14	25	28	35
Weight (kg)		11.8	11	11	23	26.4	39



### Technical Specification

Structural formation: Dual-disc swing type check valve

Design standard: API 594

Face to face: ASME B16.0

Flanged ends: ASME B16.5

Test & inspection: API 598

### Form of Major Part Material

Parts No.	Parts Name	Materials
1	Body	ASTM A216-WCB, ASTM A351-CF8, CF8M, CF8C, CF3, CF3M
2	Disc	ASTM A216-WCB, ASTM A351-CF8, CF8M, CF8C, CF3, CF3M
3	Pivot	ASTM A182 Gr.F6a, ASTM A182 F22, ASTM A182-F304, F316, F321, F304L, F316L
4	Spring	AISI 9260, AISI 6150, ASTM A182-F304, F316, F321, F304L, F316L

### Main Size of Outside & Weight

Model: H76H, H76Y

Class	DN (mm)	NPS (in)	Dimensions(mm)		Weight (kg)	Class	DN (mm)	NPS (in)	Dimensions(mm)		Weight (kg)	Class	DN (mm)	NPS (in)	Dimensions(mm)		Weight (kg)
			L	D					L	D					L	D	
150	50	2	80	103	2	300	50	2	80	110	3.5	900	50	2	60	110	3.5
	65	2 1/2	67	122	3.2		65	2 1/2	67	148	5		65	2 1/2	67	129	5
	80	3	73	135	4		80	3	73	248	7		80	3	73	148	7
	100	4	73	173	6		100	4	73	180	10		100	4	79	192	12
	125	5	88	198	9		125	5	86	215	18.5		125	5	105	240	22.5
	150	6	98	222	12		150	6	98	250	19		150	6	137	265	35
300	200	8	127	279	22	900	200	8	127	307	33	900	200	8	165	319	45
	250	10	146	339	38		250	10	146	361	54		250	10	213	399	77
	300	12	181	409	54		300	12	181	422	88		300	12	229	456	110
	350	14	184	450	80		350	14	222	485	128		350	14	273	489	135
	400	16	191	514	118		400	16	232	539	189		400	16	305	562	183
	450	18	203	549	210		900	50	2	70	142		6.5	900	50	2	70
500	20	219	806	240	65	2 1/2		83	164	9	65	2 1/2	83		164	9	
600	24	222	717	410	900	80	3	83	167	14	900	80	3	83	167	14	
						100	4	102	205	24		100	4	102	205	24	
900	150	6	159	288	43	900	150	6	159	288	43	900	150	6	159	288	43
							200	8	206	358	56		200	8	206	358	56

### ● Technical Specification

Design and Manufacture: Cast steel globe valve to BS 1873 and ASME B16.34; Forged steel globe valve to API 602.

Inspection and Test: API 598.

End flange dimension: ASME B16.5 .

BW end dimension: ASME B16.25.

Socket-weld dimension: ASME B16.11.

Face to face and end to end: ASME B16.10.

Pressure-temperature ratings: ASME B16.34.

### ● The features of globe valve

Bolted Bonnet; Outside Screw and Yoke; Rising stems; Metallic seating surfaces.

### ● Body and Bonnet Connection

The body and bonnet of Class 150 ~ Class 900 globe valves are usually with studs and nuts. And the body and bonnet of Class 1500 ~ Class 2500 globe valves are usually of pressurized seal design.

### ● Gasket of Cover Flange

Stainless steel + flexible graphite wounded gasket is used for Class 150 and Class 300 globe valve; Stainless steel + flexible graphite wounded gasket is used for Class 600, and ring joint gasket is also optional for Class 600. Ring joint gasket is used for Class 900 globe valve; Pressurized seal design is used for Class 1500 ~ Class 2500 globe valve.

### ● Actuation

Hand wheel, impact hand wheel & gear box is usually used for globe valve actuation. Chain wheel and electric actuator can be also used for globe valve actuation if being requested by the customers.

### ● Packing Seal

Molded flexible graphite is used for packing material. PTFE or combined packing material can be also used if being requested by the customer. The internal surface of the stuffing box, of which area is contacted with the packing, is of excellent finish (Ra 3.2  $\mu$  m). The stem surface, contacting with the packing, should be rolled and pressed after being precisely machined, so as to reach to the high finish and compactness (Ra 0.8  $\mu$  m) and ensure the reliable tightness of the stem area.

### ● Belleville Spring Loaded Packing Impacting System

If being requested by the customer, the Belleville spring loaded packing impacting system can be adopted for enhancing the durability and reliability of the packing seal.

### ● Back Seating Design

All our globe valves have the back seating design. In most cases, the carbon steel globe valve is fitted with a renewable back seat. For stainless steel globe valve, the back seat is machined directly in the bonnet or is machined after welding. When the globe valve is at fully open position, the sealing of the back seat can be very reliable. However, as per the requirement of API, it is not advisable to add or change packing by the mean of back seating when the valve is pressure containing.

### ● Seat

For carbon steel globe valve, the seat is usually forged steel. The sealing surface of the seat is spray welded with hard alloy specified by the customer. Renewable threaded seat is used for NPS  $\leq$  10 globe valves, and welded on seat can be also optional if being requested by the customer. Welded on seat is used for NPS  $\geq$  12 carbon steel globe valves. For Stainless steel globe valve, integral seat is usually adopted, or to weld hard alloy directly integrally. Threaded or welded on seat is also optional for stainless steel globe valve if being requested by the customer.

### ● Stem Design

The stem is of integral forged design. The minimum diameter of the stem shall per the standard requirement.

### ● Stem Nut

Usually, the stem nut is made of ASTM A439 D2. It is also can be made of copper alloy if being requested by the customer. For large sized globe valve, rolling bearing is fitted at the two sides of stem nut in order to minimize the open and close torque of the globe valve.

### ● Special Gate Valve

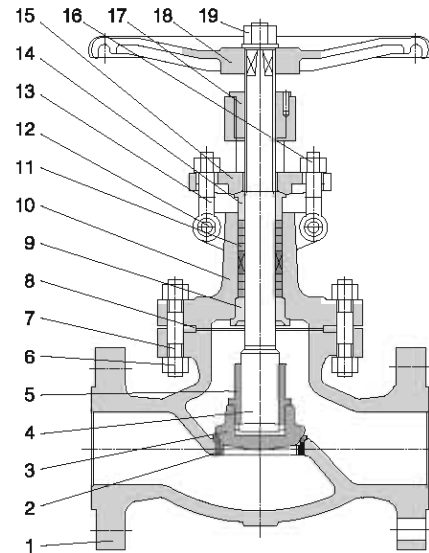
Besides the common globe valves, Our company also makes cryogenic globe valve, Bellow sealed globe valve, Jacketed globe valve, etc.



Bellow Sealed Globe Valve



Forged Steel Globe Valve



**Technical Specification**

Design and Manufacture: BS1873 or ASME B16.34  
 Inspection and Test: API 598  
 End flange dimension: ASME B16.5  
 BW end dimension: ASME B16.25

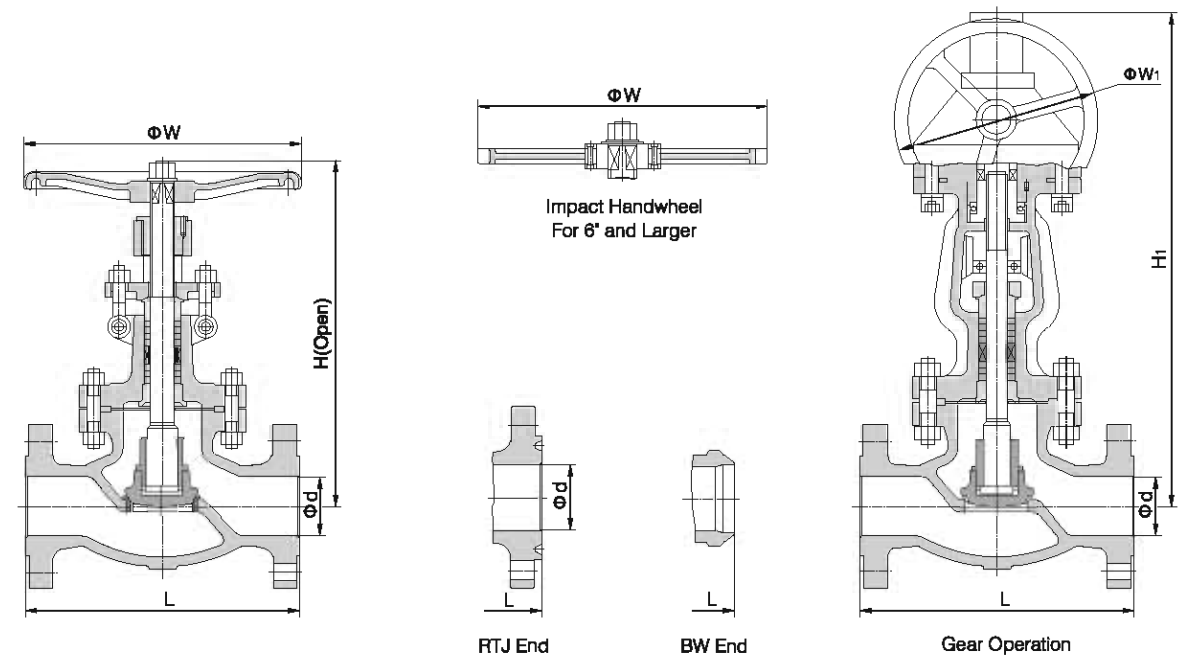
Socket-weld dimension: ASME B16.11  
 Face to face and end to end: ASME B16.10  
 Pressure-temperature ratings: ASME B16.34

**Form of Major Part Material**

Parts No.	Parts Name	Materials				
		WCB/Trim 1	WCB/Trim 5	WCB/Trim 8	CF8/304	CF6M/316
1	Body	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
2	Seat ring	A105+13Cr	A105+STL	A105+STL	ASTM A351 CF8	ASTM A351 CF8M
3	Disc	ASTM A216 WCB + 13Cr	ASTM A216 WCB + STL	ASTM A216 WCB + 13Cr	ASTM A351 CF6	ASTM A351 CF8M
4	Stern	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F304	ASTM A182 F316
5	Disc nut	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
6	Bonnet nut	ASTM A194 2H	ASTM A194 2H	ASTM A194 2H	ASTM A194 8	ASTM A194 8M
7	Bonnet bolt	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B8	ASTM A193 B8M
8	Gasket	304 sheet + Graphite	304 sheet + Graphite	304 sheet + Graphite	304 + Graphite	316 + Graphite
9	Backseat bushing	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A351 CF8	ASTM A351 CF8M
10	Bonnet	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
11	Packing	Graphite	Graphite	Graphite	Graphite	Graphite
12	Eyebolt pin	ASTM A36	ASTM A36	ASTM A36	304ss	316ss
13	Gland eyebolt	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B8	ASTM A193 B8M
14	Gland	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F304	ASTM A182 F316
15	Gland flange	ASTM A216 WCB	ASTM A216 WCB	ASTM A216 WCB	ASTM A351 CF8	ASTM A351 CF8M
16	Eyebolt nut	ASTM A194 2H	ASTM A194 2H	ASTM A194 2H	ASTM A194 8	ASTM A194 8M
17	Stern nut	ASTM A439 D2	ASTM A439 D2	ASTM A439 D2	ASTM A439 D2	ASTM A439 D2
18	Hand wheel	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron	Ductile Iron
19	Hand wheel nut	Carbon steel	Carbon steel	Carbon steel	Carbon steel	Carbon steel

Note: The chart above only lists out some common composition of steel check valve parts. We may provide other different parts material composition according to the customer's request or the actual valve working condition.

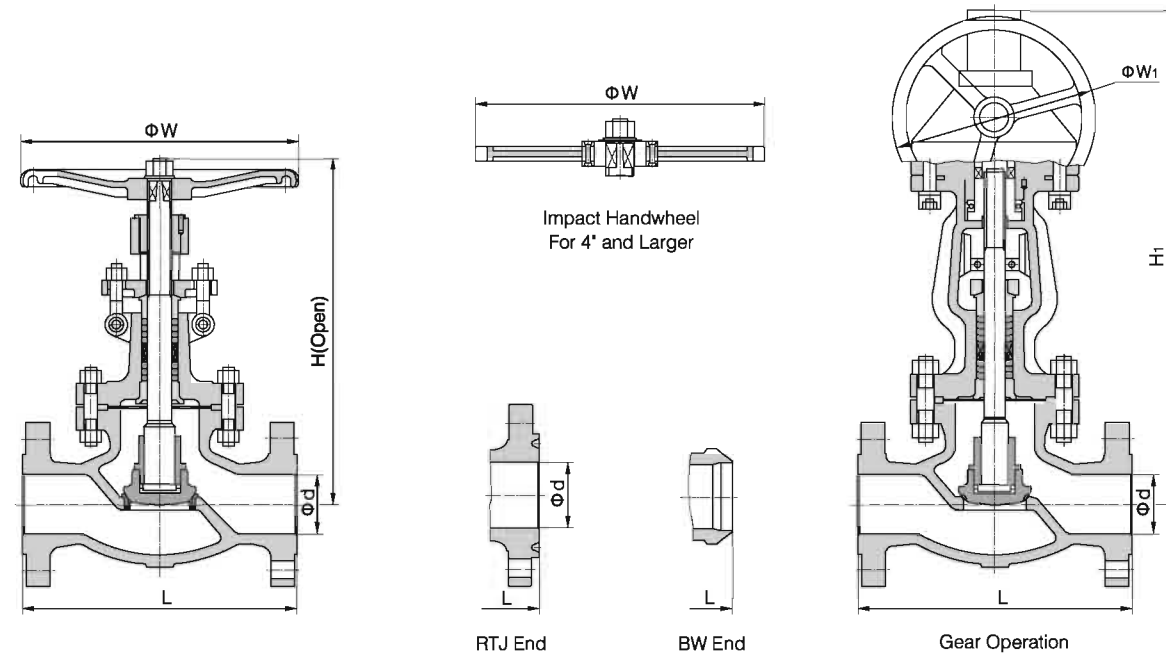
**Cast Steel Globe Valve Class 150**



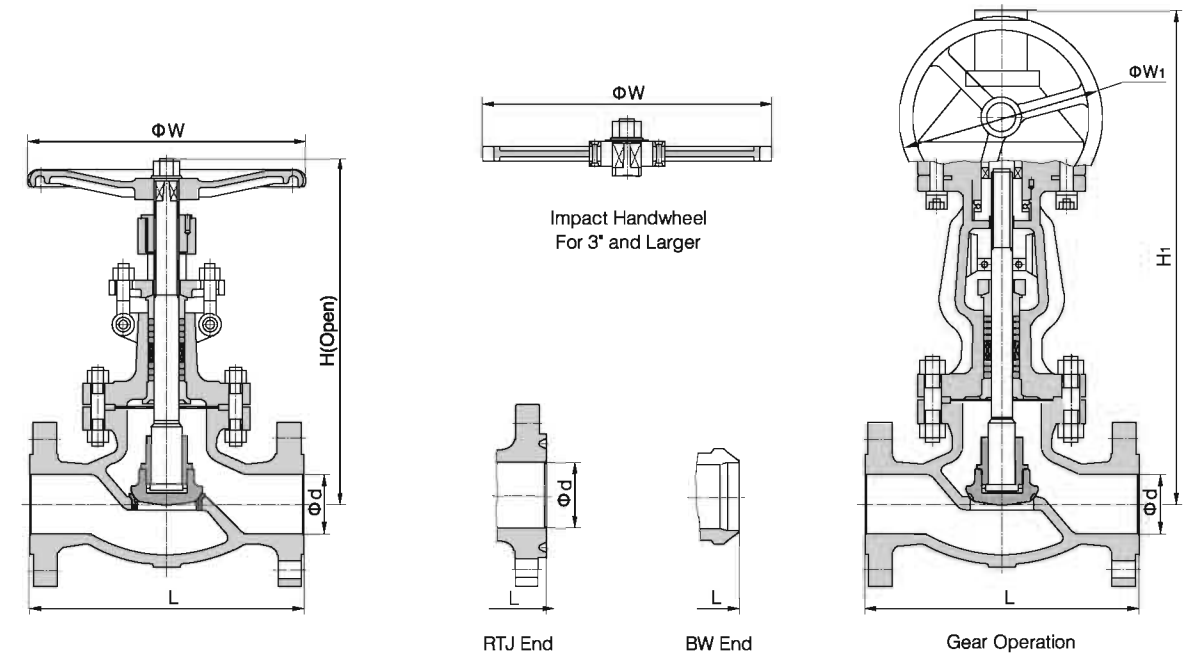
Class	Size		Dimensions(mm)							Weight(kg)		
	NPS	DN	L			d	H	H <sub>1</sub>	W	W <sub>1</sub>	H.W	G.O
			RF	RTJ	BW							
150	1/2	15	108	119	108	13	182	-	100	-	4	-
	3/4	20	117	130	117	19	193	-	100	-	6	-
	1	25	127	140	127	25	217	-	100	-	6	-
	1 1/4	32	140	152	140	32	235	-	135	-	12	-
	1 1/2	40	165	178	165	38	258	-	135	-	16	-
	2	50	203	218	203	51	330	-	200	-	25	-
	2 1/2	65	216	229	216	64	360	-	250	-	42	-
	3	80	241	254	241	76	390	-	280	-	46	-
	4	100	292	305	292	102	445	-	300	-	74	-
	5	125	356	369	356	127	480	-	350	-	111	-
	6	150	406	419	406	152	520	556	350	310	165	258
	8	200	495	508	495	203	600	858	400	310	275	300
10	250	622	635	622	254	773	805	450	460	400	450	
12	300	898	711	698	305	880	955	500	460	624	725	



● Cast Steel Globe Valve Class 300

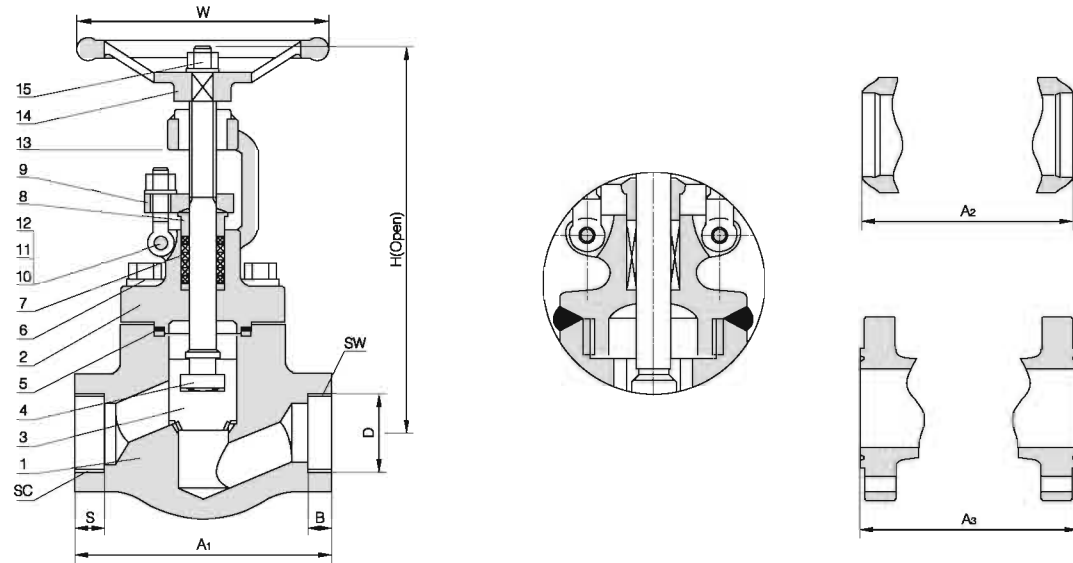


● Cast Steel Globe Valve Class 600/900



Class	Size		Dimensions(mm)								Weight(kg)	
	NPS	DN	L			d	H	H <sub>1</sub>	W	W <sub>1</sub>	H.W	G.O
			RF	RTJ	BW							
300	1/2	15	152	164	152	14	185	-	100	-	5	-
	3/4	20	178	191	178	19	195	-	100	-	7	-
	1	25	203	216	203	25	220	-	135	-	10	-
	1 1/4	32	216	229	216	32	240	-	135	-	14	-
	1 1/2	40	229	241	229	38	260	-	160	-	19	-
	2	50	267	283	267	51	385	-	200	-	25	-
	2 1/2	65	292	308	292	64	420	-	200	-	42	-
	3	80	318	333	318	76	440	-	280	-	46	-
	4	100	356	371	356	102	515	-	350	-	74	-
	5	125	400	416	400	127	580	-	350	-	111	-
	6	150	444	460	444	152	660	690	400	310	165	195
	8	200	559	575	559	203	900	950	550	460	275	327
10	250	622	638	622	254	950	990	600	460	400	452	
12	300	711	727	711	305	1030	1080	700	460	624	725	

Class	Size		Dimensions(mm)								Weight(kg)	
	NPS	DN	L			d	H	H <sub>1</sub>	W	W <sub>1</sub>	H.W	G.O
			RF	RTJ	BW							
600	2	50	292	295	292	51	360	-	250	-	32	-
	2 1/2	65	330	333	330	64	410	-	280	-	42	-
	3	80	356	359	356	76	465	-	300	-	63	-
	4	100	432	435	432	102	545	575	400	310	107	138
	5	125	508	511	508	127	625	660	500	310	185	215
	6	150	559	562	559	152	785	820	550	460	290	342
	8	200	660	664	660	200	930	960	650	460	540	645
	2	50	368	371	368	51	480	-	350	-	55	-
900	2 1/2	65	419	422	419	64	520	-	350	-	68	-
	3	80	381	384	381	76	564	630	400	310	95	128
	4	100	457	460	457	102	685	720	450	310	160	210
	5	125	559	562	559	127	780	840	550	460	270	325
	6	150	610	613	610	152	950	1015	650	460	410	480



**Technical Specification**

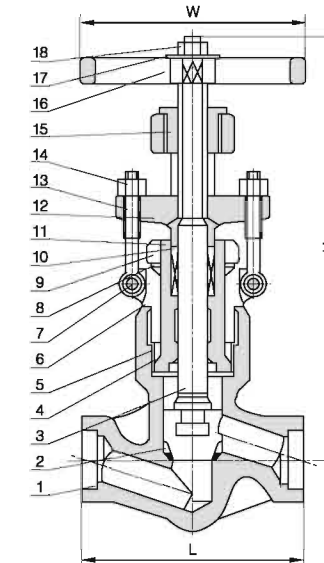
Steel Globe Valves, API 602  
 Steel Valves, ASME B16.34  
 Face to Face, Manufacturer Standard  
 Face to Face, Flanged, ASME B16.10  
 End Flanges, ASME B16.5  
 Buttwelding Ends, ASME B16.25  
 Socket-welding Ends, ASME B16.11  
 Screwed Ends, ASME B1.20.1  
 Inspection and Test, API 598

**Design Description**

Outside Screw and Yoke (OS&Y)  
 Bolted Bonnet  
 Choice of WB, Welding Bonnet  
 Seat Rings Integral with Body  
 Yoke Integral with Bonnet  
 Rising Stem and Handwheel  
 Horizontal Service  
 SW, Socket-welding Ends  
 SC, Screwed Ends  
 BW, Buttwelding Ends

**Form of Major Part Material**

No.	Part Name	ASTM Material								
		Carbon Steel	F11	F22	304 Type	316 Type	304L Type	316L Type	20 Alloy	
1	Body	A105	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
2	Bonnet	A105	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
3	Disc	A182 F6a	A182 F11+HF	A182 F22+HF	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
4	Stem	A182 F6a	A182 F11	A182 F22	A182 F304	A182 F316	A182 F304L	A182 F316L	20-Alloy	
5	Bonnet Gasket	304+Graphit	304+Graphit	304+Graphit	304+Graphit	316+Graphit	304L+Graphit	316L+Graphit	316+Graphit	
6	Bonnet Bolt	A193 B7	A193 B7	A193 B16	A193 B8	A193 B8	A193 B8	A193 B8	A193 B8	
7	Packing	Graphite	Graphite	Graphite	Graphite *2	Graphite *2	Graphite *2	Graphite *2	Graphite *2	
8	Gland	A276 410	A276 410	A276 410	A276 304	A276 316	A276 304L	A276 316L	20-Alloy	
9	Gland Flange	A182 F6a	A182 F11	A182 F22	A182 F304	A182 F304	A182 F304	A182 F304	A182 F304	
10	Eyebolt	Carbon Steel	A193 B7	A193 B7	A193 B8	A193 B8	A193 B8	A193 B8	A193 B8	
11	Eyebolt Nut	Carbon Steel	A194 2H	A194 2H	A194 8	A194 8	A194 8	A194 8	A194 8	
12	Eyebolt Pin	A276 410	A276 410	A276 410	A276 304	A276 304	A276 304	A276 304	A276 304	
13	Yoke Sleeve	Bronze	Bronze *3	Bronze *3	Bronze	Bronze	Bronze	Bronze	Bronze	
14	Hand wheel	Malleable iron	Malleable iron	Malleable iron	Malleable iron	Malleable iron	Malleable iron	Malleable iron	Malleable iron	
15	Wheel Nut	Carbon Steel	Carbon Steel	Carbon Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	
*1	PN ≥ 600 Class seal face will be HF									
*2	PTFE Optional									
*3	Ductile Ni-Resist iron Optional									
Na	Integral with vessel									



**Technical Specification**

Steel Globe Valves, API 602  
 Steel Valves, ASME B16.34  
 Face to Face, Manufacturer Standard  
 Face to Face, ASME B16.10  
 Buttwelding Ends, ASME B16.25  
 Socket-welding Ends, ASME B16.11  
 Screwed Ends, ASME B1.20.1  
 Inspection and Test, API 598

**Design Description**

Outside Screw and Yoke (OS&Y)  
 Pressure Seal Bonnet  
 Choice of WB, Welding Bonnet  
 Single wedge, Fully Guided  
 Renewable Seat Rings  
 Yoke Integral with Bonnet  
 Rising Stem and Handwheel  
 SW, Socket-welding Ends  
 SC, Screwed Ends  
 BW, Buttwelding Ends

**Form of Major Part Material**

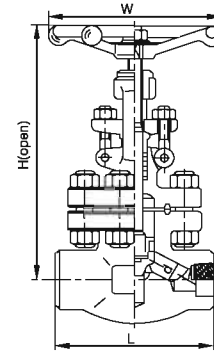
No.	Part Name	CS to ASTM	AS to ASTM	SS to ASTM	
		Type A 105N	Type F22	Type F304(L)	Type F316(L)
1	Body	A105N	A182 F22	A182 F304(L)	A182 F316(L)
2	Disc	A276 420+STL	A276 304+STL	A276 304(L)+STL	A276 316(L)+STL
3	Stem	A276-410	A182 F22	A182 F304(L)	A182 F316(L)
4	Seal Place	A105	A182 F22	A182 F304(L)	A182 F316(L)
5	Packing Ring	A182 F304	A182 F304	A182 F304(L)	F316(L)
6	Bonnet	A105N	A182 F22	A182 F304(L)	A182 F316(L)
7	Pin	A276 420	A276 420	A182 F304	A182 F304
8	Gasket	A105N	A182 F22	A182 F304(L)	A182 F316(L)
9	Promotes the Nut	A194 2H	A194 4	A194 8	A194 8M
10	Stem Packing	Flexible graphite+304	Flexible graphite+304	Flexible graphite+316	Flexible graphite+316
11	Gland	A276 420	A276 420	A182 F304	A182 F304
12	Gland Flange	A105	A105	A182 F304	A182 F304
13	Gland Eyebolt	A193 B7	A193 B16	A193 B8	A193 B8M
14	Gland Nut	A194 2H	A194 4	A194 8	A194 8M
15	Yoke Nut	A276 420	A276 420	A276 420	A276 420
16	Hand Wheel	A197	A194 4	A197	A197
17	Nameplate	SS	SS	SS	SS
18	Stem Nut	C.S	C.S	SS	SS



**Class900~1500 Main Outline Dimensions & Weight**

Bold fastening valve cover(RJ), reduced port, outside screw stem & yoke (OS&Y).  
The terminal connection or receives for the thread inserts welds, designs according to BS5.352

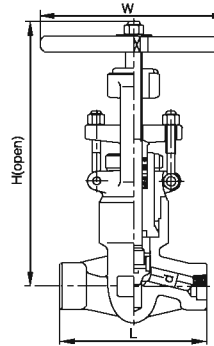
F.P	1/2	3/4	1	1 1/4	2	2 1/2
L	110	110	150	150	210	235
W	110	110	130	210	180	250
H	227	227	300	307	40	448
d	9	12	15	20	32	40
Weight(kg)	5	5	10	11.5	22	37



**Class900~1500 Main Outline Dimensions & Weight**

Pressure seal bonnet, reduced port, outside screw stem & yoke (OS&Y).BS 5352

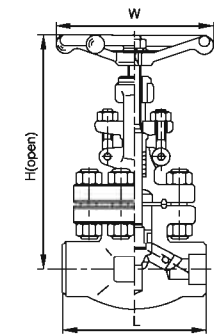
F.P	1/2	3/4	1	1 1/4	1 1/2	2
L	140	140	140	178	178	216
W	200	200	200	280	280	300
H	320	320	320	440	440	490
d	12	15	20	28	32	40
Weight(kg)	11.5	10.8	10.5	19.6	21.1	55.4



**Class2500 Main Outline Dimensions & Weight**

Bold fastening valve cover(RJ), full port (OS&Y).  
The terminal connection for receives inserts welds, designs according to ASME B16.34

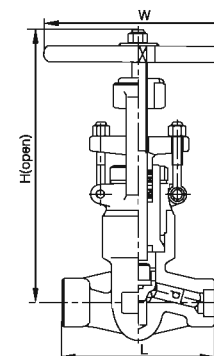
F.P	1/2	3/4	1	1 1/2	2
L	150	150	210	235	235
W	130	130	250	300	300
H	293	300	390	435	435
d	11	14	19	28	35
Weight(kg)	10	10.3	22.4	38	38



**Class2500 Main Outline Dimensions & Weight**

Reduced port (OS&Y).  
The terminal connection for receives inserts welds, designs according to ASME B16.34

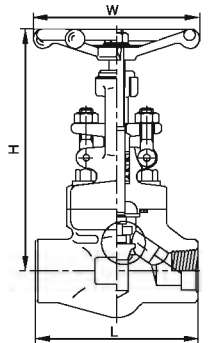
F.P	1/2	3/4	1	1 1/4	1 1/2	2
L	186	186	186	232	232	279
W	200	200	200	280	280	300
H	375	378	380	490	490	540
d	11	14	19	25	28	35
Weight(kg)	12.3	11.6	10.8	26.0	28.4	60



**Class800 Main Outline Dimensions & Weight**

Bold fastening valve cover, outside screw stem & yoke (OS&Y).  
designs according to BS5,352.

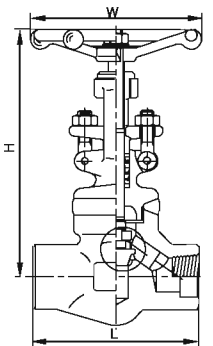
R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	79	79	92	111	120	152	172	200
W	100	100	100	125	160	160	180	200
H	164	164	164	203	224	260	300	355
d	7	9	13	17.5	23	30	35	46
Weight(kg)	1.9	2.28	2.37	4.3	5.75	7.8	12.5	17.5



**Class800 Main Outline Dimensions & Weight**

Weld joint valve cover, outside screw stem & yoke (OS&Y).  
Designs according to BS5,352.

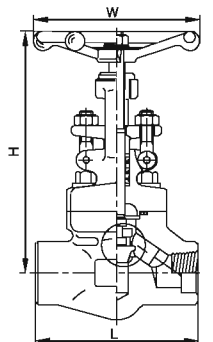
R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	79	79	92	111	120	152	172	200
W	100	100	100	125	160	160	180	200
H	164	164	164	203	224	260	300	355
d	7	9	13	17.5	23	30	35	46
Weight(kg)	1.7	1.7	1.9	3.3	5.2	6.8	10.6	13.8



**Class900~1500 Main Outline Dimensions & Weight**

Bold fastening valve cover, outside screw stem & yoke (OS&Y).  
Designs according to BS5,352.

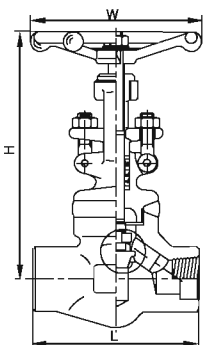
R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	92	111	111	120	152	172	200	220
W	100	125	125	160	160	180	200	240
H	171	207	207	240	258	330	355	370
d	7	12	15	20	28	32	40	45
Weight(kg)	2.3	3.7	3.6	6.8	7.6	11.6	15	21.9



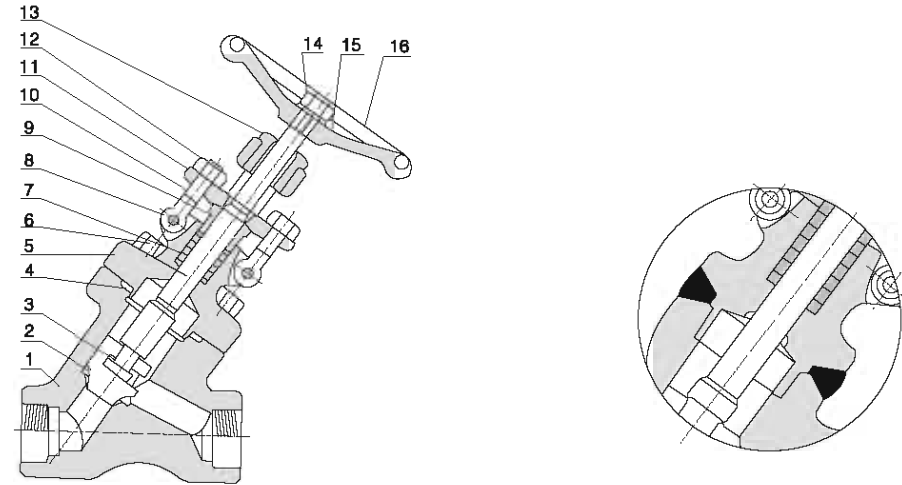
**Class900~1500 Main Outline Dimensions & Weight**

Weld joint valve cover, outside screw stem & yoke (OS&Y).  
Designs according to BS5,352.

R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	92	111	111	120	152	172	200	220
W	100	125	125	160	160	180	200	240
H	171	207	207	240	258	330	355	370
d	7	12	15	20	28	32	40	45
Weight(kg)	2.0	3.4	3.3	6.0	5.6	10.3	14.2	18.5







**Technical Specification**

Steel Globe Valves, API 602  
 Steel Valves, ASME B16.34  
 Face to Face, Manufacturer Standard  
 Face to Face, Flanged, ASME B16.10  
 End Flanges, ASME B16.5  
 Buttwelding Ends, ASME B16.25  
 Socket-welding Ends, ASME B16.11  
 Screwed Ends, ASME B1.20.1  
 Inspection and Test, API 598

**Design Description**

Outside Screw and Yoke (OS&Y)  
 Bolted Bonnet  
 Choice of WB, Welding Bonnet  
 Loose Disc, Choice of Plug or Ball  
 Seat Rings Integral with Body  
 Yoke Integral with Bonnet  
 Rising Stem and Handwheel  
 Horizontal Service  
 SW, Socket-welding Ends  
 SC, Screwed Ends  
 BW, Buttwelding Ends

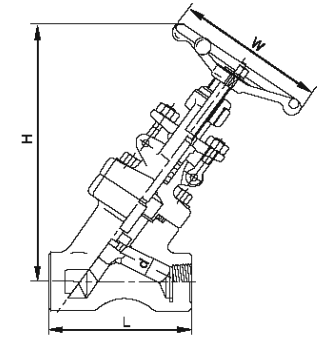
**Form of Major Part Material**

No.	Components name	A105 F6a	A105 F6aHFS	LF2 304	F11 F6aHF	F304(L) 304(L)	F316(L) 316(L)	F91 410HF
1	Body	A105	A105+HF	LF2	F11+HF	F304(L)	F316(L)	F51
2	Disc	F6a	F6a	F304	F6aHF	F304(L)	F316(L)	F51
3	Stem	410	410	304	410	304(L)	316(L)	F51
4	Gasket	304+Corrugated SS+Graphite						
5	Bonnet	A105	A105	LF2	F11	F304(L)	F316(L)	F51
6	Bolt	B7	B7	F7	B16	B8(M)	B8(M)	B8M
7	Pin	410	410	410	410	304	304	304
8	Gland	410	410	304	410	304	316	F51
9	Gland Eyebolt	B7	B7	L7	B18	B8(M)	B8(M)	B8M
10	Gland	A105	A105	LF2	F11	F304	F304	F304
11	Gland nut	2H	2H	2H	2H	8(M)	8(M)	BM
12	Yoke Nut	410	410	410	410	410	410	410
13	Locks the nut	35	35	35	35	35	35	35
14	Name plate	AL	AL	AL	AL	AL	AL	AL
15	Handwheel	A197	A197	A197	A197	A197	A197	A197

**Class800 Main Outline Dimensions & Weight**

Bolt fastening valve cover, outside screw stem & yoke (OS&Y).  
 Designs according to BS5,352.

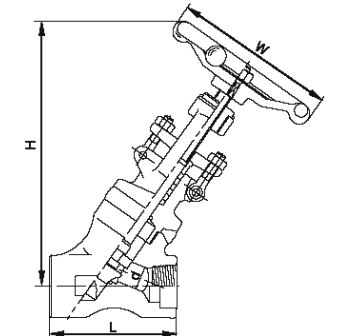
R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	98	98	98	111	140	140	155	170
W	100	100	100	125	160	160	180	200
H	180	180	180	188	280	280	295	350
d	7	9	13	17.5	23	30	35	46
Weight(kg)	2.6	2.6	3.8	4.6	9.3	9.3	14	19.6



**Class800 Main Outline Dimensions & Weight**

Weld joint valve cover, outside screw stem & yoke (OS&Y).  
 Designs according to BS5,352.

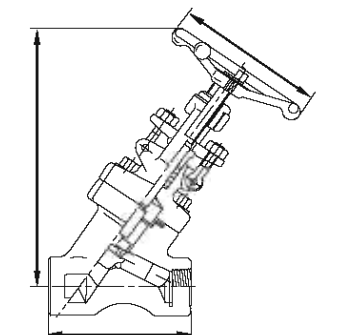
R.P	-	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2
F.P	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	79	79	92	100	140	140	155	170
W	100	100	100	125	160	160	180	200
H	198	198	198	207	80	280	295	350
d	7	9	13	17.5	23	30	35	46
Weight(kg)	1.8	1.8	2.0	3.5	8.0	8.0	12	16



**Class900~1500 Main Outline Dimensions & Weight**

Bolt fastening valve cover, outside screw stem & yoke (OS&Y).  
 Designs according to BS5,352.

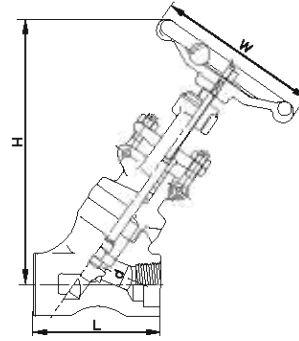
F.P	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	98	111	111	140	140	155	170
W	100	125	125	160	160	180	200
H	175	175	215	216	254	305	350
d	9	12	15	20	28	32	40
Weight(kg)	2.8	4.8	4.6	9.3	9.3	14	19.6



● **Class900~1500 Main Outline Dimensions & Weight**

Weld joint valve cover, outside screw stem & yoke (OS&Y).  
Designs according to BS5,352.

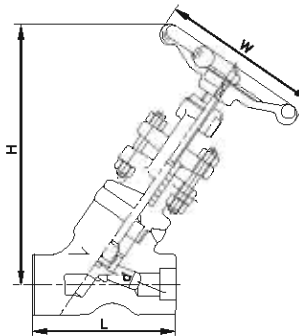
F.P	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	92	100	100	140	140	155	170
W	100	125	125	160	160	180	200
H	175	207	207	280	280	295	350
d	9	12	15	20	28	32	40
Weight(kg)	1.8	3.5	3.5	8.0	8.0	12	16



● **Class2500 Main Outline Dimensions & Weight**

Weld joint valve cover, outside screw stem & yoke (OS&Y).  
Designs according to BS16.34

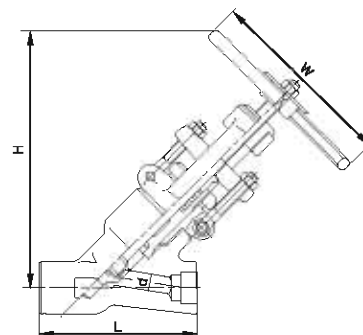
F.P	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	188	186	186	186	232	232	310
W	200	200	200	200	280	280	300
H	329	329	329	329	350	350	383
d	9	11	14	19	25	28	35
Weight(kg)	12.3	12.3	11.6	10.8	28.0	26.4	43.8



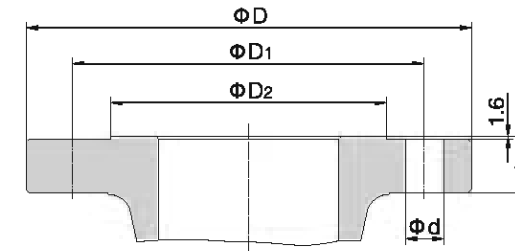
● **Class2500 Main Outline Dimensions & Weight**

Pressure seal bonnet, outside screw stem & yoke (OS&Y).  
Designs according to BS16.34

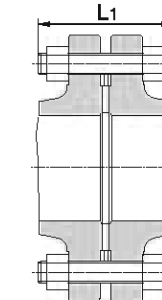
F.P	3/8	1/2	3/4	1	1 1/4	1 1/2	2
L	188	186	186	186	232	232	310
W	200	200	200	200	280	280	300
H	333	333	333	333	406	406	383
d	9	11	14	19	25	28	35
Weight(kg)	12.3	12.3	11.6	10.8	28.0	26.4	43.8



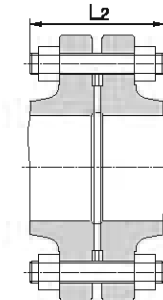
● **Steel Pipe Flanges ASME B 16.5 RF**



Class150 & Class300 RF Flanges



Length of Stud Bolt

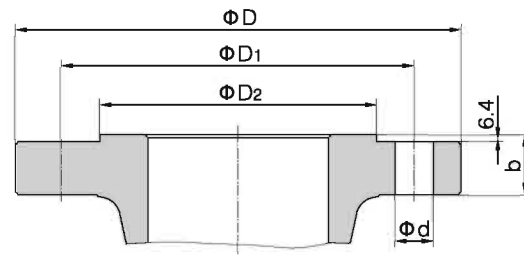


Length of Machine Bolt

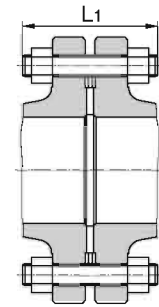
Class	Nominal Size		D		D1		D2		b		d		Bolt		L1		L2	
	NPS	DN	in	mm	in	mm	in	mm	in	mm	in	mm	Number	Diarm	in	mm	in	mm
150	1/2	15	3.50	90	2.35	60.5	1.38	35	0.38	10	0.62	16	4	1/2	2.25	57	2.00	51
	3/4	20	3.88	100	2.75	69.9	1.69	43	0.41	10.5	0.62	16	4	1/2	2.50	64	2.00	51
	1	25	4.25	110	3.12	79.2	2.00	51	0.44	11.5	0.62	16	4	1/2	2.50	64	2.25	57
	1 1/4	32	4.62	120	3.50	88.9	2.50	64	0.50	13	0.62	16	4	1/2	2.75	70	2.25	57
	1 1/2	40	5.00	130	3.88	98.6	2.88	73	0.56	14.5	0.62	16	4	1/2	2.75	70	2.50	64
	2	50	6.00	150	4.75	120.7	3.62	92	0.62	16	0.75	19	4	5/8	3.25	83	2.75	70
	2 1/2	65	7.00	180	5.50	139.7	4.12	105	0.69	18	0.75	19	4	5/8	3.50	89	3.00	76
	3	80	7.50	190	6.00	152.4	5.00	127	0.75	19.5	0.75	19	4	5/8	3.50	89	3.00	76
	4	100	9.00	230	7.50	190.5	6.19	157	0.94	24	0.75	19	8	5/8	3.50	89	3.00	76
	5	125	10.00	255	8.50	215.9	7.31	188	0.94	24	0.88	22	6	3/4	3.75	95	3.25	83
	6	150	11.00	280	9.50	241.3	8.50	216	1.00	25.5	0.88	22	8	3/4	4.00	102	3.25	83
	8	200	13.50	345	11.75	298.5	10.62	270	1.12	29	0.88	22	8	3/4	4.25	108	3.50	89
	10	250	16.00	405	14.25	362.0	12.75	324	1.19	30.5	1.00	25	12	7/8	4.50	114	4.00	102
	12	300	19.00	485	17.00	431.8	15.00	381	1.25	32	1.00	25	12	7/8	4.75	121	4.00	102
	14	350	21.00	535	18.75	476.3	16.25	413	1.38	35	1.12	28	12	1	5.25	133	4.50	114
	16	400	23.50	595	21.25	539.8	18.50	470	1.44	37	1.12	28	18	1	5.25	133	4.50	114
18	450	25.00	635	22.75	577.9	21.00	533	1.56	40	1.25	32	16	1 1/8	5.75	146	5.00	127	
20	500	27.50	700	25.00	635.0	23.00	584	1.69	43	1.25	32	20	1 1/8	6.25	159	5.50	140	
24	600	32.00	815	29.50	749.3	27.25	692	1.88	48	1.38	35	20	1 1/4	6.75	171	8.00	152	
300	1/2	15	3.75	95	2.82	67.0	1.38	35	-	-	0.62	16	4	1/2	2.50	64	2.25	57
	3/4	20	4.62	120	3.25	83.0	1.69	43	-	-	0.75	19	4	5/8	3.00	76	2.50	64
	1	25	4.88	125	3.50	89.0	2.00	51	0.69	18	0.75	19	4	5/8	3.00	76	2.50	64
	1 1/4	32	5.25	135	3.88	99.0	2.50	64	0.75	19.5	0.75	19	4	5/8	3.25	83	2.75	70
	1 1/2	40	6.12	155	4.50	114.0	2.88	73	0.81	21	0.88	22	4	3/4	3.50	89	3.00	76
	2	50	6.50	165	5.00	127.0	3.62	92	0.88	22.5	0.75	19	8	5/8	3.50	89	3.00	76
	2 1/2	65	7.50	190	5.88	149.4	4.12	105	1.00	25.5	0.88	22	6	3/4	4.00	102	3.25	83
	3	80	8.25	210	6.82	168.1	5.00	127	1.12	29	0.88	22	8	3/4	4.25	108	3.50	89
	4	100	10.00	255	7.88	200.2	6.19	157	1.25	32	0.88	22	8	3/4	4.50	114	3.75	95
	5	125	11.00	280	9.25	235.0	7.31	188	1.38	35	0.88	22	8	3/4	4.75	121	4.25	108
	6	150	12.50	320	10.62	269.7	8.50	216	1.44	37	0.88	22	12	3/4	4.75	121	4.25	108
	8	200	15.00	380	13.00	330.2	10.62	270	1.62	41.5	1.00	25	12	7/8	5.50	140	4.75	121
	10	250	17.50	445	15.25	387.4	12.75	324	1.88	48	1.12	28	18	1	6.25	159	5.50	140
	12	300	20.50	520	17.75	450.9	15.00	381	2.00	51	1.25	32	16	1 1/8	6.75	171	5.75	146
	14	350	23.00	585	20.25	514.4	16.25	413	2.12	54	1.25	32	20	1 1/8	7.00	178	6.25	159
	16	400	25.50	650	22.50	571.5	18.50	470	2.25	57.5	1.38	35	20	1 1/4	7.50	191	8.50	165
18	450	28.00	710	24.75	628.7	21.00	533	2.38	60.5	1.38	35	24	1 1/4	7.75	197	6.75	171	
20	500	30.50	775	27.00	685.8	23.00	584	2.50	83.5	1.38	35	24	1 1/4	8.00	203	7.25	184	
24	600	36.00	915	32.00	812.8	27.25	692	2.75	70	1.62	41	24	1 1/2	9.00	229	8.00	203	



Steel Pipe Flanges ASME B 16.5 RF



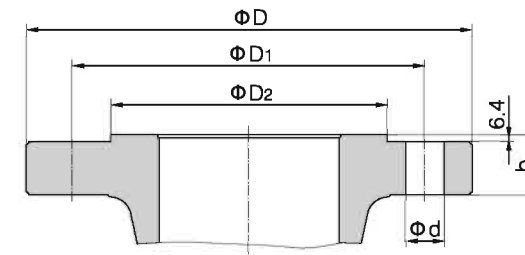
Class 600–Class 2500 RF Flanges



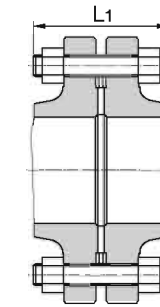
Length of Stud Bolt

Class	Nominal Size		D		D <sub>1</sub>		D <sub>2</sub>		b		d		Bolt		L <sub>1</sub>	
	NPS	DN	in	mm	in	mm	in	mm	in	mm	in	mm	Number	Diam	in	mm
600	1/2	15	3.75	95	2.62	66.5	1.38	35	0.56	14	0.62	16	4	1/2	3.00	76
	3/4	20	4.62	120	3.25	82.6	1.69	43	0.62	16	0.75	19	4	5/8	3.50	89
	1	25	4.88	125	3.50	88.9	2.00	51	0.69	18	0.75	19	4	5/8	3.50	89
	1 1/4	32	5.25	135	3.88	98.6	2.50	64	0.81	21	0.75	19	4	5/8	3.75	95
	1 1/2	40	6.12	155	4.50	114.3	2.88	73	0.88	22	0.88	22	4	3/4	4.25	108
	2	50	6.50	165	5.00	127.0	3.62	92	1.00	25	0.75	19	8	5/8	4.25	108
	2 1/2	65	7.50	190	5.88	149.4	4.12	105	1.12	28	0.88	22	8	3/4	4.75	121
	3	80	8.25	210	6.62	168.1	5.00	127	1.25	32	0.88	22	8	3/4	5.00	127
	4	100	10.75	275	8.50	215.9	6.19	157	1.50	38	1.00	25	8	7/8	5.75	146
	5	125	13.00	330	10.50	266.7	7.31	186	1.75	44	1.12	28	8	1	6.50	165
	6	150	14.00	355	11.50	292.1	8.50	216	1.88	48	1.12	28	12	1	6.75	171
	8	200	16.50	420	13.75	349.3	10.62	270	2.19	56	1.25	32	12	1 1/8	7.50	191
	10	250	20.00	510	17.00	431.8	12.75	324	2.50	63.5	1.38	35	16	1 1/4	8.50	216
	12	300	22.00	560	19.25	489.0	15.00	381	2.62	67	1.38	35	20	1 1/4	8.75	222
	14	350	23.75	605	20.75	527.1	16.25	413	2.75	70	1.50	38	20	1 1/4	9.25	235
	16	400	27.00	685	23.75	603.3	18.50	470	3.00	76.5	1.62	41	20	1 1/2	10.00	254
18	450	29.25	745	25.75	654.1	21.00	533	3.25	83	1.75	44	20	1 5/8	10.75	273	
20	500	32.00	815	28.50	723.9	23.00	584	3.50	89	1.75	44	24	1 5/8	11.25	286	
24	600	37.00	940	33.00	838.2	27.25	692	4.00	102	2.00	51	24	1 7/8	13.00	330	
900	1/2	15	4.75	120	3.25	82.6	1.38	35	0.88	22.5	0.88	22	4	3/4	4.25	108
	3/4	20	5.12	130	3.50	88.9	1.69	43	1.00	25.5	0.88	22	4	3/4	4.50	114
	1	25	5.88	150	4.00	101.6	2.00	51	1.12	29	1.00	25	4	7/8	5.00	127
	1 1/4	32	6.25	160	4.38	111.3	2.50	64	1.12	29	1.00	25	4	7/8	5.00	127
	1 1/2	40	7.00	180	4.88	124.0	2.88	73	1.25	32	1.12	28	4	1	5.50	140
	2	50	8.50	215	6.50	165.1	3.62	92	1.50	38.5	1.00	25	8	7/8	5.75	146
	2 1/2	65	9.62	245	7.50	190.5	4.12	105	1.62	41.5	1.12	28	8	1	6.25	159
	3	80	9.50	245	7.50	190.5	5.00	127	1.50	38.5	1.00	25	8	7/8	5.75	146
	4	100	11.50	290	9.25	235.0	6.19	157	1.75	44.5	1.25	32	8	1 1/8	6.75	171
	5	125	13.75	350	11.00	279.4	7.31	186	2.00	51	1.38	35	8	1 1/4	7.50	191
	6	150	15.00	380	12.50	317.5	8.50	216	2.19	56	1.25	32	12	1 1/8	7.50	191
	8	200	18.50	470	15.50	393.7	10.62	270	2.50	63.5	1.50	38	12	1 3/8	8.75	222
	10	250	21.50	545	18.50	469.9	12.75	324	2.75	70	1.50	38	16	1 3/8	9.25	235
	12	300	24.00	610	21.00	533.4	15.00	381	3.12	79.5	1.50	38	20	1 3/8	10.00	254
	14	350	25.25	640	22.00	558.8	16.25	413	3.38	86	1.62	41	20	1 1/2	10.75	273
	16	400	27.75	705	24.25	616.0	18.50	470	3.50	89	1.75	44	20	1 5/8	11.25	286
18	450	31.00	785	27.00	685.8	21.00	533	4.00	102	2.00	51	20	1 7/8	12.75	324	
20	500	33.75	855	29.50	749.3	23.00	584	4.25	108	2.12	54	20	2	13.75	349	
24	600	41.00	1040	35.50	901.7	27.25	692	5.50	140	2.62	67	20	2 1/2	17.25	438	

Steel Pipe Flanges ASME B 16.5 RF



Class 600–Class 2500 RF Flanges

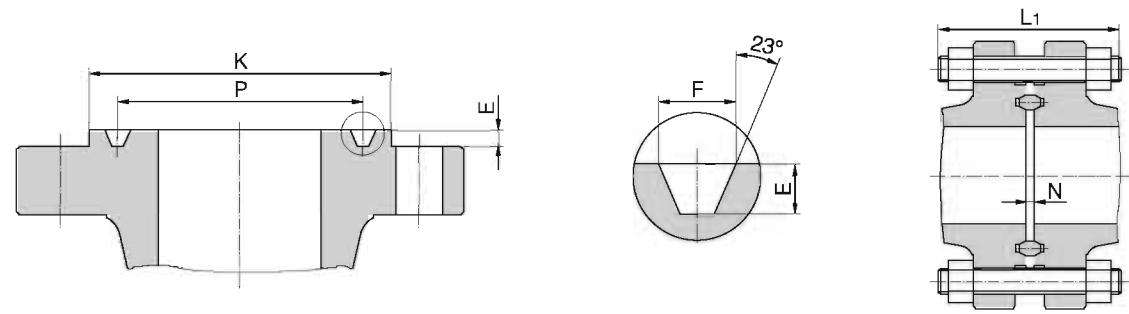


Length of Stud Bolt

Class	Nominal Size		D		D <sub>1</sub>		D <sub>2</sub>		b		d		Bolt		L <sub>1</sub>	
	NPS	DN	in	mm	in	mm	in	mm	in	mm	in	mm	Number	Diam	in	mm
1500	1/2	15	4.75	120	3.25	82.6	1.38	35	0.88	22.5	0.88	22	4	3/4	4.25	108
	3/4	20	5.12	130	3.50	88.9	1.69	43	1.00	25.5	0.88	22	4	3/4	4.50	114
	1	25	5.88	150	4.00	101.6	2.00	51	1.12	29	1.00	25	4	7/8	5.00	127
	1 1/4	32	6.25	160	4.38	111.3	2.50	64	1.12	29	1.00	25	4	7/8	5.00	127
	1 1/2	40	7.00	180	4.88	124.0	2.88	73	1.25	32	1.12	28	4	1	5.50	140
	2	50	8.50	215	6.50	165.1	3.62	92	1.50	38.5	1.00	25	8	7/8	5.75	146
	2 1/2	65	9.62	245	7.50	190.5	4.12	105	1.62	41.5	1.12	28	8	1	6.25	159
	3	80	10.50	265	8.00	203.2	5.00	127	1.88	48	1.25	32	8	1 1/8	7.00	178
	4	100	12.25	310	9.50	241.3	6.19	157	2.12	54	1.38	35	8	1 1/4	7.75	197
	5	125	14.75	375	11.50	292.1	7.31	186	2.88	73.5	1.62	41	8	1 1/2	9.75	248
	6	150	15.50	395	12.50	317.5	8.50	216	3.25	83	1.50	38	12	1 3/8	10.25	260
	8	200	19.00	485	15.50	393.7	10.62	270	3.62	92	1.75	44	12	1 5/8	11.50	292
	10	250	23.00	585	19.00	482.6	12.75	324	4.25	108	2.00	51	12	1 7/8	13.25	337
	12	300	26.50	675	22.50	571.5	15.00	381	4.88	124	2.12	54	16	2	14.75	375
	14	350	29.50	750	25.00	635.0	16.25	413	5.25	133.5	2.38	60	16	2 1/4	16.00	406
	16	400	32.50	825	27.75	704.9	18.50	470	5.75	146.5	2.62	67	16	2 1/2	17.50	445
18	450	36.00	915	30.50	774.7	21.00	533	6.38	162	2.88	73	16	2 3/4	19.50	495	
20	500	38.75	985	32.75	831.9	23.00	584	7.00	178	3.12	79	16	3	21.25	540	
24	600	46.00	1170	39.00	990.6	27.25	692	8.00	203.5	3.62	92	16	3 1/2	24.25	616	
2500	1/2	15	5.25	135	3.50	88.9	1.38	35	1.19	30.5	0.88	22	4	3/4	4.75	121
	3/4	20	5.50	140	3.75	95.3	1.69	43	1.25	32	0.88	22	4	3/4	5.00	127
	1	25	6.25	160	4.25	108.0	2.00	51	1.38	35	1.00	25	4	7/8	5.50	140
	1 1/4	32	7.25	185	5.12	130.0	2.50	64	1.50	38.5	1.12	28	4	1	6.00	152
	1 1/2	40	8.00	205	5.75	146.1	2.88	73	1.75	44.5	1.25	32	4	1 1/8	6.75	171
	2	50	9.25	235	6.75	171.5	3.62	92	2.00	51	1.12	28	8	1	7.00	178
	2 1/2	65	10.50	265	7.75	196.9	4.12	105	2.25	57.5	1.25	32	8	1 1/8	7.75	197
	3	80	12.00	305	9.00	228.6	5.00	127	2.62	67	1.38	35	8	1 1/4	8.75	222
	4	100	14.00	355	10.75	273.1	6.19	157	3.00	76.5	1.62	41	8	1 1/2	10.00	254
	5	125	16.50	420	12.75	323.9	7.31	186	3.62	92.5	1.88	48	8	1 3/4	11.75	298
	6	150	19.00	485	14.50	368.3	8.50	216	4.25	108	2.12	54	8	2	13.50	343
	8	200	21.75	550	17.25	438.2	10.62	270	5.00	127	2.12	54	12	2	15.00	381
10	250	26.50	675	21.25	539.8	12.75	324	6.50	165.5	2.62	67	12	2 1/2	19.25	489	
12	300	30.00	760	24.38	619.3	15.00	381	7.25	184.5	2.88	73	12	2 3/4	21.25	540	



Steel Pipe Flanges ASME B 16.5 RTJ



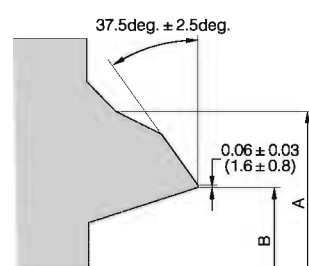
Class	Nominal Size		Ring Number	P		E		F		K		N		L <sub>1</sub>	
	NPS	DN		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
150	1	25	R15	1.875	47.63	0.25	6.35	0.344	8.74	2.50	64	0.16	4	3.00	76
	1 1/4	32	R17	2.250	57.15	0.25	6.35	0.344	8.74	2.88	73	0.16	4	3.25	83
	1 1/2	40	R19	2.562	65.07	0.25	6.35	0.344	8.74	3.25	83	0.16	4	3.25	83
	2	50	R22	3.250	82.55	0.25	6.35	0.344	8.74	4.00	102	0.16	4	3.75	95
	2 1/2	65	R25	4.000	101.60	0.25	6.35	0.344	8.74	4.75	121	0.16	4	4.00	102
	3	80	R29	4.500	114.30	0.25	6.35	0.344	8.74	5.25	133	0.16	4	4.00	102
	4	100	R36	5.875	149.23	0.25	6.35	0.344	8.74	6.75	171	0.16	4	4.00	102
	5	125	R40	6.750	171.45	0.25	6.35	0.344	8.74	7.62	194	0.16	4	4.25	108
	6	150	R43	7.625	193.68	0.25	6.35	0.344	8.74	8.62	219	0.16	4	4.50	114
	8	200	R48	9.750	247.65	0.25	6.35	0.344	8.74	10.75	273	0.16	4	4.75	121
	10	250	R52	12.000	304.80	0.25	6.35	0.344	8.74	13.00	330	0.16	4	5.00	127
	12	300	R56	15.000	381.00	0.25	6.35	0.344	8.74	16.00	406	0.16	4	5.25	133
	14	350	R59	15.625	396.88	0.25	6.35	0.344	8.74	16.75	425	0.12	3	5.75	146
	16	400	R64	17.875	454.03	0.25	6.35	0.344	8.74	19.00	483	0.12	3	5.75	146
	18	450	R68	20.375	517.53	0.25	6.35	0.344	8.74	21.50	546	0.12	3	6.25	159
	20	500	R72	22.000	558.80	0.25	6.35	0.344	8.74	23.50	597	0.12	3	6.75	171
24	600	R76	26.500	673.10	0.25	6.35	0.344	8.74	28.00	711	0.12	3	7.25	184	
300	1	25	R16	2.000	50.80	0.25	6.35	0.344	8.74	2.75	70	0.16	4	3.50	89
	1 1/4	32	R18	2.375	60.33	0.25	6.35	0.344	8.74	3.12	79	0.16	4	3.75	95
	1 1/2	40	R20	2.688	68.28	0.25	6.35	0.344	8.74	3.56	90	0.16	4	4.00	102
	2	50	R23	3.250	82.55	0.312	7.92	0.469	11.91	4.25	108	0.22	6	4.00	102
	2 1/2	65	R26	4.000	101.60	0.312	7.92	0.469	11.91	5.00	127	0.22	6	4.50	114
	3	80	R31	4.875	123.83	0.312	7.92	0.469	11.91	5.75	146	0.22	6	4.75	121
	4	100	R37	5.875	149.23	0.312	7.92	0.469	11.91	6.88	175	0.22	6	5.00	127
	5	125	R41	7.125	180.98	0.312	7.92	0.469	11.91	8.25	210	0.22	6	5.25	133
	6	150	R45	8.312	211.12	0.312	7.92	0.469	11.91	9.50	241	0.22	6	5.50	140
	8	200	R49	10.625	269.88	0.312	7.92	0.469	11.91	11.88	302	0.22	6	6.00	152
	10	250	R53	12.750	323.85	0.312	7.92	0.469	11.91	14.00	356	0.22	6	6.75	171
	12	300	R57	15.000	381.00	0.312	7.92	0.469	11.91	16.25	413	0.22	6	7.25	184
	14	350	R61	16.500	419.10	0.312	7.92	0.469	11.91	18.00	457	0.22	6	7.50	191
	16	400	R65	18.500	469.90	0.312	7.92	0.469	11.91	20.00	508	0.22	6	8.00	203
	18	450	R69	21.000	533.40	0.312	7.92	0.469	11.91	22.62	575	0.22	6	8.25	210
	20	500	R73	23.000	584.20	0.375	9.53	0.531	11.91	25.00	635	0.22	6	8.75	222
24	600	R77	27.250	692.15	0.438	11.13	0.656	11.91	29.50	749	0.25	6	10.00	254	

Class	Nominal Size		Ring Number	P		E		F		K		N		L <sub>1</sub>	
	NPS	DN		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
600	1	25	R16	2.000	50.80	0.250	6.35	0.344	8.74	2.75	70	0.16	4	3.50	89
	1 1/4	32	R18	2.375	60.33	0.250	6.35	0.344	8.74	3.12	79	0.16	4	3.75	95
	1 1/2	40	R20	2.688	68.28	0.250	6.35	0.344	8.74	3.56	90	0.16	4	4.25	108
	2	50	R23	3.250	82.55	0.312	7.92	0.469	11.91	4.25	108	0.19	5	4.25	108
	2 1/2	65	R26	4.000	101.60	0.312	7.92	0.469	11.91	5.00	127	0.19	5	4.75	121
	3	80	R31	4.875	123.83	0.312	7.92	0.469	11.91	5.75	146	0.19	5	5.00	127
	4	100	R37	5.875	149.23	0.312	7.92	0.469	11.91	6.88	175	0.19	5	5.75	146
	5	125	R41	7.125	180.98	0.312	7.92	0.469	11.91	8.25	210	0.19	5	6.50	165
	6	150	R45	8.312	211.12	0.312	7.92	0.469	11.91	9.50	241	0.19	5	6.75	171
	8	200	R49	10.625	269.88	0.312	7.92	0.469	11.91	11.88	302	0.19	5	7.75	197
	10	250	R53	12.750	323.85	0.312	7.92	0.469	11.91	14.00	356	0.19	5	8.50	216
	12	300	R57	15.000	381.00	0.312	7.92	0.469	11.91	16.25	413	0.19	5	8.75	222
	14	350	R61	16.500	419.10	0.312	7.92	0.469	11.91	18.00	457	0.19	5	9.25	235
	16	400	R65	18.500	469.90	0.312	7.92	0.469	11.91	20.00	508	0.19	5	10.00	254
	18	450	R69	21.000	533.40	0.312	7.92	0.469	11.91	22.62	575	0.19	5	10.75	273
	20	500	R73	23.000	584.20	0.375	9.53	0.531	13.49	25.00	635	0.19	5	11.50	292
24	600	R77	27.250	692.15	0.438	15.88	0.656	26.97	29.50	749	0.22	6	13.25	337	
900	1	25	R16	2.000	50.80	0.250	6.35	0.344	8.74	2.81	71	0.16	4	5.00	127
	1 1/4	32	R18	2.375	60.33	0.250	6.35	0.344	8.74	3.19	81	0.16	4	5.00	127
	1 1/2	40	R20	2.688	68.28	0.250	6.35	0.344	8.74	3.62	92	0.16	4	5.50	140
	2	50	R24	3.750	82.55	0.312	7.92	0.469	11.91	4.88	124	0.12	3	5.75	146
	2 1/2	65	R27	4.250	101.60	0.312	7.92	0.469	11.91	5.38	137	0.12	3	6.25	159
	3	80	R31	4.875	123.83	0.312	7.92	0.469	11.91	6.12	155	0.16	4	5.75	146
	4	100	R37	5.875	149.23	0.312	7.92	0.469	11.91	7.12	181	0.16	4	6.75	171
	5	125	R41	7.125	180.98	0.312	7.92	0.469	11.91	8.50	216	0.16	4	7.50	191
	6	150	R45	8.312	211.12	0.312	7.92	0.469	11.91	9.50	241	0.16	4	7.75	197
	8	200	R49	10.625	269.88	0.312	7.92	0.469	11.91	12.12	308	0.16	4	8.75	222
	10	250	R53	12.750	323.85	0.312	7.92	0.469	11.91	14.25	362	0.16	4	9.25	235
	12	300	R57	15.000	381.00	0.312	7.92	0.469	11.91	16.50	419	0.16	4	10.00	254
	14	350	R62	16.500	419.10	0.438	11.13	0.656	16.66	18.38	467	0.16	4	11.00	279
	16	400	R66	18.500	469.90	0.438	11.13	0.656	16.66	20.62	524	0.16	4	11.50	292
	18	450	R70	21.000	533.40	0.500	12.70	0.781	19.84	23.38	594	0.19	5	13.25	337
	20	500	R74	23.000	584.20	0.500	12.70	0.781	19.84	25.50	648	0.19	5	14.25	362
24	600	R78	27.250	692.15	0.625	15.88	1.062	26.97	30.38	772	0.22	6	18.00	457	
1500	1	25	R16	2.000	50.80	0.250	6.35	0.344	8.74	2.81	71	0.16	4	5.00	127
	1 1/4	32	R18	2.375	60.33	0.250	6.35	0.344	8.74	3.19	81	0.16	4	5.00	127
	1 1/2	40	R20	2.688	68.28	0.250	6.35	0.344	8.74	3.62	92	0.16	4	5.50	140
	2	50	R24	3.750	82.55	0.312	7.92	0.469	11.91	4.88	124	0.12	3	5.75	146
	2 1/2	65	R27	4.250	101.60	0.312	7.92	0.469	11.91	5.38	137	0.12	3	6.25	159
	3	80	R35	5.375	123.83	0.312	7.92	0.469	11.91	6.62	168	0.12	3	7.00	178
	4	100	R39	6.375	149.23	0.312	7.92	0.469	11.91	7.62	194	0.12	3	7.75	197
	5	125	R44	7.625	180.98	0.312	7.92	0.469	11.91	9.00	229	0.12	3	9.75	248
	6	150	R46	8.312	211.12	0.375	9.53	0.531	13.94	9.75	248	0.12	3	10.50	267
	8	200	R50	10.625	269.88	0.438	11.13	0.656	16.66	12.50	318	0.16	4	12.75	324
	10	250	R54	12.750	323.85	0.438	11.13	0.656	16.66	14.62	371	0.16	4	13.50	343
	12	300	R58	15.000	381.00	0.562	14.27	0.906	23.01	17.25	438	0.19	5	15.25	387
	14	350	R63	16.500	419.10	0.625	15.88	1.062	26.97	19.25	489	0.22	6	16.75	425
	16	400	R67	18.500	469.90	0.688	17.48	1.188	30.18	21.50	546	0.31	8	18.50	470
	18	450	R71	21.000	533.40	0.688	17.48	1.188	30.18	24.12	613	0.31	8	20.75	527
	20	500	R75	23.000	584.20	0.688	17.48	1.312	33.32	26.50	673	0.38	10	22.25	565
24	600	R79	27.250	692.15	0.812	20.62	1.438	36.53	31.25	794	0.44	11	25.50	648	
2500	1	25													



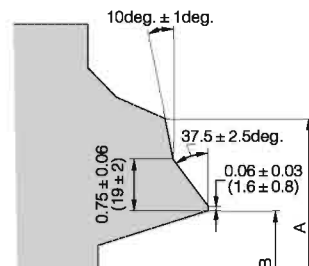
Butt-welding Ends

Butt-welding Ends



Welding end detail for joint Without Backing Ring

Welding end detail intended for use on 0.88in(22mm) and thinner nominal wall thicknesses



Welding end detail for joint Without Backing Ring

Note 1 Internal surface may be as formed or machined for dimension b at root face contour within the envelope shall be in accordance with section

Nominal Pipe Size		Schedule Number or Wall	Outside Diameter				Nominal Inside Diameter		Machined Inside Diameter		Nominal Wall Thickness	
NPS	DN		Forging or Process module, A		Moulded steel Valve, A		B		C		T	
			inch	mm	inch	mm	inch	mm	inch	mm		
2 1/2	50	40	2.88	73	2.96	75	2.469	62.7	2.479	62.97	0.203	5.2
		80					2.323	59.0	2.351	59.72	0.276	7.0
		160					2.125	54.0	2.178	55.32	0.375	9.5
		XXS					1.771	45.0	1.868	47.45	0.552	14.0
		3					3.068	77.9	3.081	78.26	0.216	5.5
3	80	40	3.5	88.9	3.59	91	2.900	73.7	2.934	74.52	0.300	7.6
		80					2.624	66.6	2.692	68.38	0.438	11.1
		160					2.300	58.4	2.409	61.19	0.600	15.2
		XXS					4.026	102.3	4.044	102.72	0.237	6.0
		4					3.826	97.2	3.869	98.27	0.337	8.6
4	100	40	4.5	114.3	4.62	117	3.624	92.0	3.692	93.78	0.438	11.1
		80					3.438	87.3	3.530	89.66	0.531	13.5
		160					3.152	80.1	3.279	83.29	0.674	17.1
		XXS					5.047	128.2	5.070	128.78	0.258	6.6
		5					4.813	122.3	4.866	123.60	0.375	9.5
5	125	40	5.56	141.3	5.69	144	4.563	115.9	4.647	118.03	0.500	12.7
		80					4.313	109.6	4.428	112.47	0.625	15.9
		160					4.063	103.2	4.209	106.91	0.750	19.1
		XXS					6.065	154.1	6.094	154.79	0.280	7.1
		6					5.761	146.3	5.828	148.03	0.432	11.0
6	150	40	6.62	168.3	6.78	172	5.501	139.7	5.600	142.24	0.562	14.3
		80					5.187	131.7	5.326	135.28	0.719	18.3
		160					4.897	124.4	5.072	128.83	0.864	21.9
		XXS					7.981	202.7	8.020	203.71	0.322	8.2
		8					7.813	198.5	7.873	199.97	0.406	10.3
8	200	40	8.62	219.1	8.78	223	7.625	193.7	7.709	195.81	0.500	12.7
		60					7.437	188.9	7.544	191.62	0.594	15.1
		80					7.187	182.5	7.326	186.08	0.719	18.3
		100					7.001	177.8	7.163	181.94	0.812	20.6
		120					6.875	174.6	7.053	179.15	0.875	22.2
		140					6.813	173.1	6.998	177.75	0.906	23.0
		XXS					10.000	254.0	10.000	254.0	0.375	9.5
		12					11.938	303.2	11.999	304.77	0.406	10.3
		14					13.124	333.3	13.192	335.08	0.438	11.1

Nominal Pipe Size		Schedule Number or Wall	Outside Diameter				Nominal Inside Diameter		Machined Inside Diameter		Nominal Wall Thickness	
NPS	DN		Forging or Process module, A		Moulded steel Valve, A		B		C		T	
			inch	mm	inch	mm	inch	mm	inch	mm		
10	250	40	10.75	273	10.94	278	10.020	254.5	10.070	255.78	0.365	9.3
		60					9.750	247.2	9.834	249.78	0.500	12.7
		80					9.562	242.9	9.670	245.62	0.594	15.1
		100					9.312	236.5	9.451	240.06	0.719	18.3
		120					9.062	230.2	9.232	234.49	0.844	21.4
		140					8.750	222.3	8.959	227.56	1.000	25.4
		160					8.500	215.9	8.740	222.00	1.125	28.6
12	300	STD	12.75	323.8	12.97	329	12.000	304.8	12.053	306.15	0.375	9.5
		40					11.938	303.2	11.999	304.77	0.406	10.3
		XS					11.750	298.5	11.834	300.58	0.500	12.7
		60					11.626	295.3	11.725	297.82	0.562	14.3
		80					11.374	288.9	11.505	292.23	0.688	17.5
		100					11.062	281.0	11.232	285.29	0.844	21.4
		120					10.750	273.1	10.959	278.36	1.000	25.4
14	350	140	14.00	355.6	14.25	362.0	10.500	266.6	10.740	272.80	1.125	28.6
		160					10.126	257.7	10.413	264.49	1.312	33.3
		STD					13.250	336.6	13.303	337.90	0.375	9.5
		40					13.124	333.3	13.192	335.08	0.438	11.1
		XS					13.000	330.2	13.084	332.33	0.500	12.7
		60					12.812	325.4	12.920	328.17	0.594	15.1
		80					12.500	317.5	12.646	321.21	0.750	19.1
16	400	100	16.00	406.4	16.25	412.8	12.124	308.0	12.318	312.88	0.938	23.8
		120					11.812	300.0	12.044	305.92	1.094	27.8
		140					11.500	292.1	11.771	298.98	1.250	31.8
		160					11.188	284.2	11.498	292.05	1.406	35.7
		STD					15.250	387.4	15.303	388.70	0.375	9.5
		40					15.000	381.0	15.084	383.13	0.500	12.7
		60					14.688	373.1	14.811	376.20	0.656	16.7
16	400	80	16.00	406.4	16.25	412.8	14.312	393.5	14.482	367.84	0.844	21.4
		100					13.938	354.0	14.155	359.54	1.031	26.2
		120					13.562	344.5	13.826	351.18	1.219	31.0
		140					13.124	333.3	13.442	341.43	1.438	36.5
		160					12.812	325.4	13.170	334.52	1.594	40.5



Butt-welding Ends

Material

Nominal Pipe Size		Schedule Number or Wall	Outside Diameter				Nominal Inside Diameter		Machined Inside Diameter		Nominal Wall Thickness							
			Forging or Process module, A		Moulded steel Valve, A		B		C		T							
			inch	mm	inch	mm	inch	mm	inch	mm	inch	mm						
18	450	STD	18.00	457.2	18.28	464.3	17.250	438.2	17.303	439.50	0.375	9.5						
		XS					17.000	431.8	17.084	433.93	0.500	12.7						
		40					16.876	428.7	16.975	431.17	0.562	14.3						
		60					16.500	419.1	16.646	422.81	0.750	19.1						
		80					16.124	409.5	16.318	414.48	0.938	23.8						
		100					15.688	398.5	15.936	404.77	1.156	29.4						
		120					15.250	387.4	15.553	395.05	1.375	34.9						
		140					14.876	377.9	15.225	386.72	1.562	39.7						
		160					14.438	366.7	14.842	376.99	1.781	45.2						
		20					500	STD	20.00	508.0	20.31	515.9	19.250	489.0	19.303	490.30	0.375	9.5
XS	19.000		482.6	19.084	484.73	0.500		12.7										
40	18.812		477.8	18.920	480.57	0.594		15.1										
60	18.376		466.8	18.538	470.87	0.812		20.6										
80	17.938		455.6	18.155	461.14	1.031		26.2										
100	17.438		443.0	17.717	450.01	1.281		32.5										
120	17.000		431.8	17.334	440.28	1.500		38.1										
140	16.500		419.1	16.896	429.16	1.750		44.5										
160	16.062		408.0	16.513	419.43	1.969		50.0										
22	550		STD	22.00	558.8	22.34		567.4					21.250	539.8	21.303	541.10	0.375	9.5
		XS	21.000				533.4		21.084	535.53	0.500	12.7						
		60	20.250				514.4		20.428	518.87	0.875	22.2						
		80	19.750				501.7		19.990	507.75	1.125	28.6						
		100	19.250				489.0		19.553	496.65	1.375	34.9						
		120	18.750				476.3		19.115	485.52	1.625	41.3						
		140	18.250				463.6		18.678	474.42	1.875	47.6						
		160	17.750				450.8		18.240	463.30	2.125	54.0						
		24	600				STD		24.00	609.6	24.38	619.3	23.250	590.6	23.303	591.90	0.375	9.5
							XS						23.000	584.2	23.084	586.33	0.500	12.7
30	22.876			581.1	22.975	583.57	0.562	14.3										
40	22.624			574.6	22.755	577.98	0.688	17.5										
60	22.062			560.4	22.263	565.48	0.969	24.6										
80	21.562			547.6	21.826	554.38	1.219	31.0										
100	20.938			531.8	21.280	540.51	1.531	38.9										
120	20.376			517.6	20.788	528.02	1.812	46.0										
140	19.876			504.9	20.350	516.89	2.062	52.4										
160	19.312			490.5	19.857	507.37	2.344	59.5										

ASTM Code	Chemical Compositions %												Mechanical				Hardness Charpy	
	C	Mn	P	S	Si	Cr	Mo	Ni	Cu	V	Nb	Tensile MPa, ≥	Yield MPa, ≥	Elongation %	Reduce %	Brinell HB, ≤	J, ≥	
A105	0.35	0.60~1.05	0.035	0.040	0.10~0.35	0.30	0.12	0.4	0.40	0.08	0.02	485	250	30	30	187		
A182 F11	0.05~0.15	0.30~0.60	0.030	0.030	0.50~1.00	1.00~1.50	1.44~0.65					415	205	20	45	121~174		
A182 F22	0.05~0.15	0.30~0.60	0.040	0.040	0.50	2.00~2.50	0.87~1.13					415	205	20	35	170		
A182 F304	0.08	2.00	0.045	0.030	1.00	18.0~20.0		8.0~11.0				515	205	30	50			
A182 F304L	0.030	2.00	0.045	0.030	1.00	18.0~20.0		8.0~13.0				485	170	30	50			
A182 F316	0.08	2.00	0.045	0.030	1.00	16.0~18.0	2.00~3.00	10.0~14.0				515	205	30	50			
A182 F316L	0.030	2.00	0.045	0.030	1.00	16.0~18.0	2.00~3.00	10.0~15.0				485	170	30	50			
A182 F51	0.030	2.00	0.030	0.020	1.00	21.0~23.0	2.5~3.5	4.5~6.5				620	450	25	45			
A182 F6a	0.15	1.00	0.040	0.030	1.00	11.5~13.5		0.50				585	380	18	35	167~229		
A193 B7	0.37~0.49	0.65~1.10	0.035	0.040	0.15~0.35	0.75~1.20						860	720	16	50	321		
A193 B7M	0.37~0.49	0.65~1.10	0.035	0.040	0.15~0.35	0.75~1.20	0.15~0.25					690	550	18	50	235		
A193 B8	0.08	2.00	0.045	0.030	1.00	18.0~20.0		8.0~11.0				515	205	30	50	223		
A193 B8M	0.08	2.00	0.045	0.030	1.00	16.0~18.0	2.00~3.00	10.0~14.0				515	205	30	50	223		
A193 B16	0.36~0.47	0.45~0.70	0.035	0.040	0.15~0.35	0.80~1.15	0.50~0.65		0.25~0.35			860	720	18	50	321		
A194 2H	≥0.40	1.00	0.040	0.050	0.04													
A194 2HM	≥0.40	1.00	0.040	0.050	0.04													
A194 8	0.08	2.00	0.045	0.030	1.00	18.0~20.0		8.0~11.0										
A194 8M	0.08	2.00	0.045	0.030	1.00	16.0~18.0	0.45~0.65	10.0~14.0										
A216 WCB	0.30	1.00	0.04	0.045	0.60	0.50	0.20	0.50	0.30	0.03		250	22	35				
A216 WCC	0.25	1.20	0.04	0.045	0.60	0.50	0.2	0.50	0.30	0.03		275	22	35				
A217 C5	0.20	0.40~0.70	0.04	0.045	0.75	4.00~6.50	0.45~0.65	0.50	0.50			415	18	35				
A217 CA15	0.15	1.00	0.040	0.040	1.50	11.5~14.0	0.50	1.00				450	18	30				
A217 WC6	0.05~0.20	0.50~0.80	0.04	0.045	0.60	1.00~1.50	0.45~0.65	0.50	0.50			275	20	35				
A217 WC9	0.05~0.18	0.40~0.70	0.04	0.045	0.60	2.00~2.75	0.90~1.20		0.50			275	20	35				
A276 410	0.08~0.15	1.00	0.040	0.030	1.00	11.5~13.5						480	275	20	45			
A276 420	≥0.15	1.00	0.040	0.030	1.00	12.0~14.0										241		
A320 L7	0.38~0.048	0.75~1.00	0.035	0.040	0.15~0.35	0.80~1.10	0.15~0.25					860	725	16	50		Avg:27; min:20	
A320 L7M	0.38~0.048	0.75~1.00	0.035	0.040	0.15~0.35	0.80~1.10	0.15~0.25					690	550	18	50	235	Avg:27; min:20	
A336 F22	0.05~0.15	0.30~0.60	0.025	0.025	0.50	2.00~2.50	0.90~1.10					310	19	40				
A350 LF1	0.30	0.60~1.35	0.035	0.040	0.15~0.30	0.30	0.12	0.40	0.40	0.08	0.02	205	28	38			Avg:18; min:14	
A350 LF2	0.30	0.60~1.35	0.035	0.040	0.15~0.30	0.30	0.12	0.40	0.40	0.08	0.02	250	30	30			Avg:20; min:16	
A351 CF3	0.03	1.50	0.040	0.040	2.00	17.0~21.0	0.50	8.0~12.0				485	205	35.0				
A351 CF3M	0.03	1.50	0.040	0.040	1.50	17.0~21.0	2.0~3.00	9.0~13.0				485	205	30.0				
A351 CF8	0.08	1.50	0.040	0.040	2.00	18.0~21.0	0.50	8.0~11.0				485	205	35.0				
A351 CF8M	0.08	1.50	0.040	0.040	1.50	18.0~21.0	2.0~3.00	9.0~12.0				485	205	30.0				
A351 CF8C	0.08	1.50	0.040	0.040	2.00	18.0~21.0	0.50	9.0~12.0				485	205	30.0				
A351 CN7M	0.07	1.50	0.040	0.040	1.50	19.0~22.0	2.0~3.00	27.5~30.5	3.0~4.0			425	170	35				
A352 LC1	0.25	0.50~0.80	0.04	0.045	0.60		0.45~0.65					450~620	240	24	35		Avg:18; min:14	
A352 LC2	0.25	0.50~0.80	0.04	0.045	0.60			2.00~3.00				485~655	275	24	35		Avg:20; min:16	
A352 LC3	0.15	0.50~0.80	0.04	0.045	0.60			3.00~4.00				485~655	275	24	35		Avg:20; min:16	
A352 LCB	0.30	1.00	0.04	0.045	0.60	0.50	0.20	0.50	0.30	0.03		450~620	240	24	35		Avg:18; min:14	
A352 LCC	0.25	1.20	0.04	0.045	0.60	0.50	0.20	0.50		0.03		485~655	275	22	35		Avg:20; min:16	
A439 D2	3.00	0.70~1.25	0.08		1.50~3.00	1.75~2.75						400	207	8.0		139~202		