

HIGH PERFORMANCE BUTTERFLY VALVE

PRODUCT DETAILS

SIZE: 2" - 24"

TYPE: Lug, Wafer

PRESSURE RATING: Class 150, 300

BODY MATERIAL: Stainless Steel and Cast Steel

SEAT MATERIAL: Soft Seat (PTFE/RTFE) NBR, EPDM, VITON, Metal Seat (A240 Tp 316/304), Fire-Safe Seat

OPERATION: Lever, Gear, Actuators

DRILLING: ANSI 150, JIS 10/16K, DIN PN 10/16, ANSI 300, JIS 20K, 30K, DIN PN 25/40

VALVE RATING

TOP FLANGE MOUNTING PAD: ISO 5211

BASIC DESIGN: API 609, MSS-SP-68, BS 5155, ISO 5752

Pressure / Temp Rating: ANSI B16.34

SHELL/SEAT TEST: API 598, MSS-SP-61

WORKING PRESSURE: Class 150 [285 psig] Class 300 [740 psig]. Metal to Metal seat leakage is rated at Class IV per ASME/FCI 70-2

FIRE-SAFE: API 607 [7th Edition-2016]

NACE: MR0175

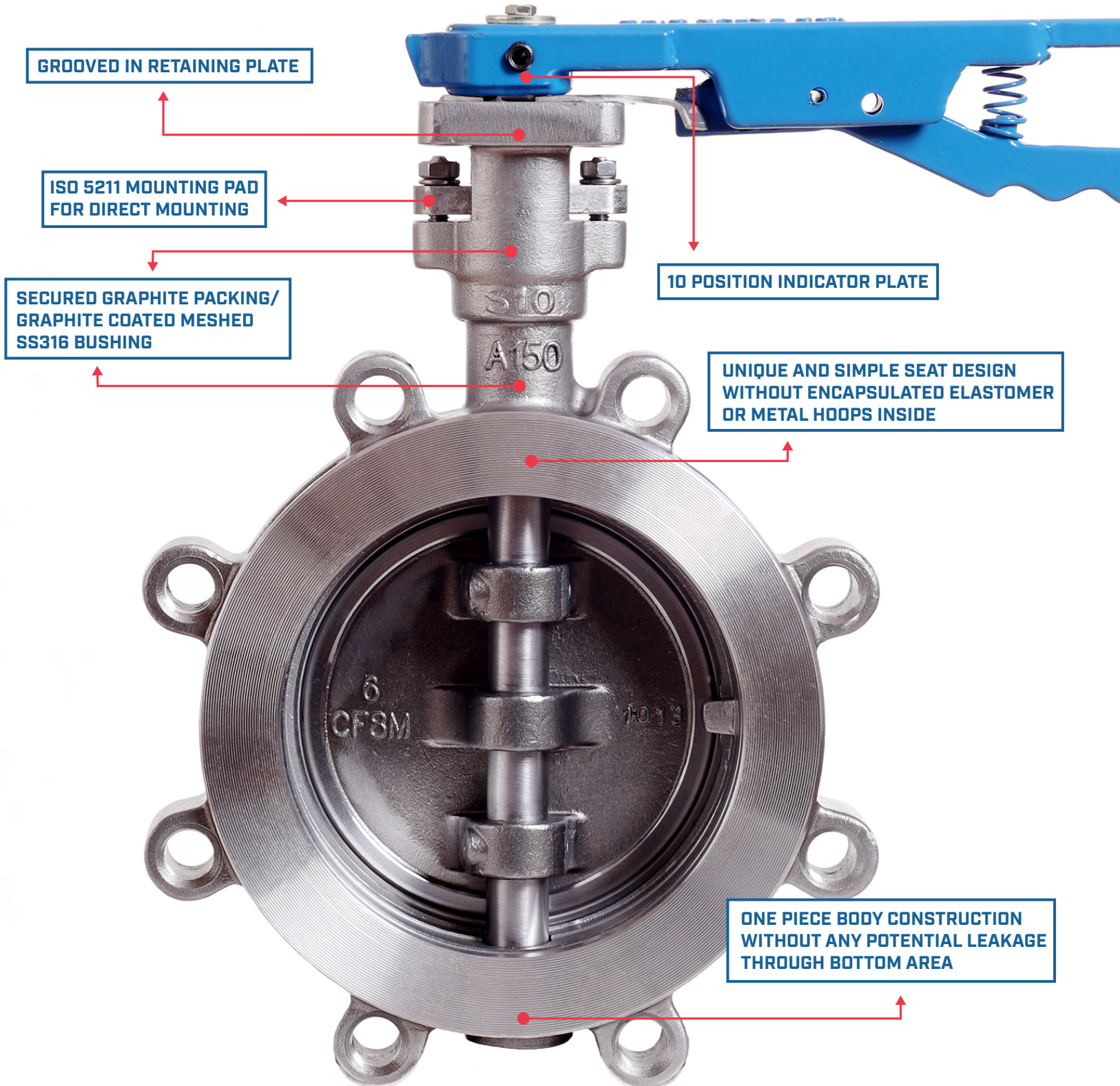
LOW-EMISSION: 50 ppm per ISO 15848 2-12"

FEATURES & BENEFITS

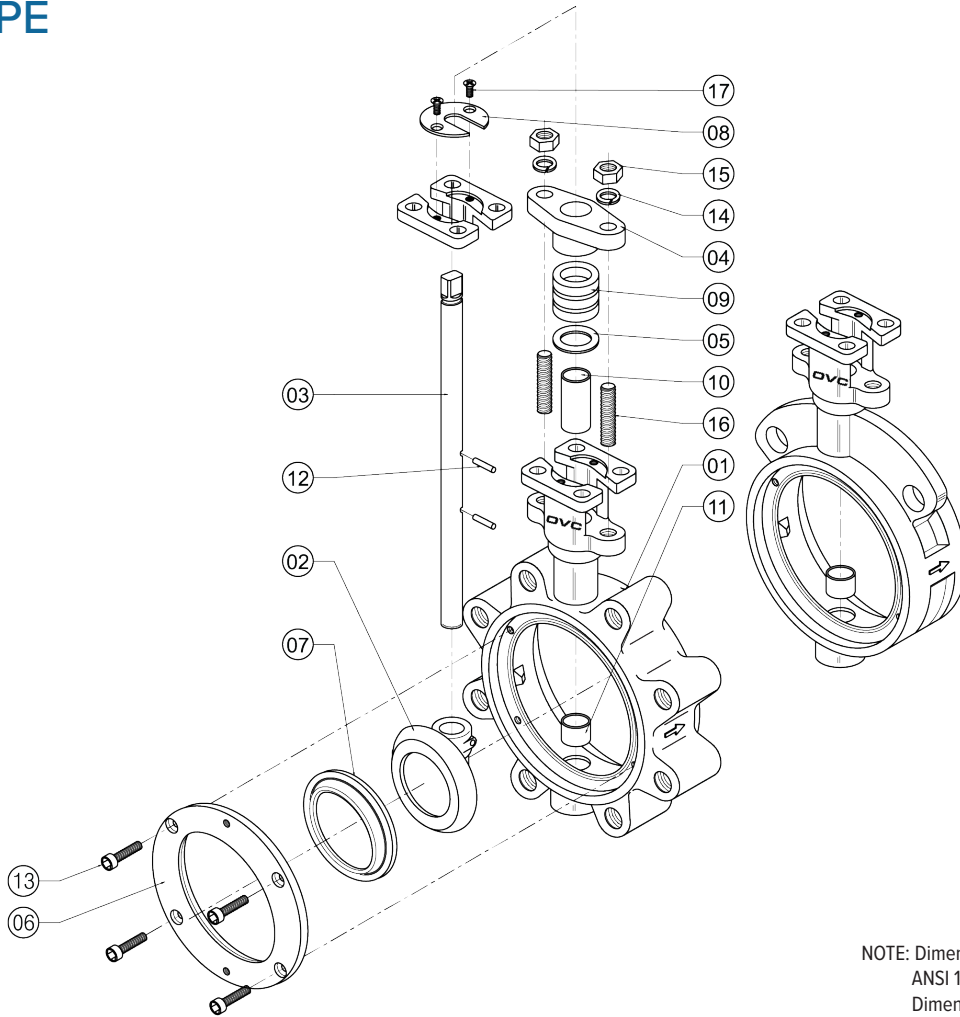
- Tight shut-off design.
- One-piece body materials are either cast steel or stainless steel for excellent corrosion resistance.
- High strength one-piece stem in A564 Gr. 630 / PH 17-4 materials.
- ISO 5211 mounting pad with square shaft 2"-12" Key Type Connection 14"-24" permits direct mount actuation for both Manual (Lever & Gear), pneumatic and electric actuators.
- Double off-set configuration with conical angled disc design. Maximize flow and minimize resistance providing high Cv.
- Seat available in either Soft (PTFE/RTFE) NBR, EPDM, VITON or Metal (A240 Tp 316/304), Fire-safe seat. Both Soft seats and Metal seats are interchangeable.
- Gland Flange preventing uneven load distribution against packing.
- Internal travel stop design to prevent over travel of the disc, minimizing possible seat damage.
- Retainer ring surface finish is 125 to 200 AARH and is compatible with both standard gasket and spiral wound gasket designs. Outside diameter is recessed within gasket sealing surface to prevent external leakage.
- The heavy duty handle and 10 position notch plates allow for positioning the valve disc to precise angle stops.



QUALITY IS OUR BENCHMARK FOR PERFORMANCE.



WAFER TYPE LUG TYPE



NOTE: Dimension Class 150:
ANSI 150, JIS 10/16K, DIN PN 10/16
Dimension Class 300
ANSI 300, JIS 20/30K, DIN PN 25/40

NO.	DESCRIPTION	MATERIAL	QTY
1	Body	A216 WCB / A351 CF8M	1
2	Disc	A351 CF8M	1
3	Stem	A 564 Gr. 630	1
4	Gland Flange	A216 WCB / A351 CF8M	1
5	Packing Retainer	A276 Tp 316	1
6	Retainer Ring	A351 CF8M	1
7	Seat	PTFE/RTFE/METAL A240/NBR/EPDM/MITON	1
8	Top Retainer	A283D-A36/A276 Tp316	1
9	Grand Packing	Graphite	3
10	Upper Bearing	Graphite + 316 SS	1
11	Lower Bearing	Graphite + 316 SS	1
12	Disc Pin	A276 Tp 316	2
13	Hex Socket Bolt	A283D - A36/A276 316 SS	4 - 14
14	Spring Washer	A283D - A36/A276 316 SS	2
15	Hex Nut	A283D - A36/A276 316 SS	2
16	Stud Bolt	A283D - A36/A276 316 SS	2
17	Flat Head Screw	A283D - A36/A276 316 SS	2

NOTES: Metal seat type will supply with graphite seat ring.

OVC HIGH PERFORMANCE FEATURES

- OVC High Performance Butterfly Valve both in Lug & Wafer features a carbon steel body and stainless steel body.
- It is ideally suited for Commercial, Industrial, and Mechanical HVAC series.
- Both Body and Disc are carefully manufactured by Investment Casting Methods.
- Carbon steel body include powder coated epoxy finish, direct mount actuation, internally cast over-travel stopper, dual offset design, one piece blowout proof 17-4 PH; Stainless Steel Shaft with 316 stainless steel and graphite coated meshed stainless steel.
- Gland flange applies load against packing gland to prevent external leakage and is fully adjustable.
- OVC High Performance Lug body provides bi-directional dead end services and includes an arrow on the body to indicate the preferred flow directions.

Dead End Service:

- For dead end service pressure range without downstream flange connection.
 - Preferred Flow Direction: Up to 327 PSI
 - Non-Preferred Flow Direction: Up to 240 PSI

- OVC High Performance Butterfly Valve provides excellent proportion controls and also features positive shutoff. Unique shape of soft seat is simple.
- There are no encapsulated elastomer O-ring to swell or no metal hoops to corrode. Installation is simple and mistake proof.
- Glass reinforced RTFE, PTFE, for common soft seated design.
- High temperatures 5100 RTFE, Carbon filled Teflon available for options.

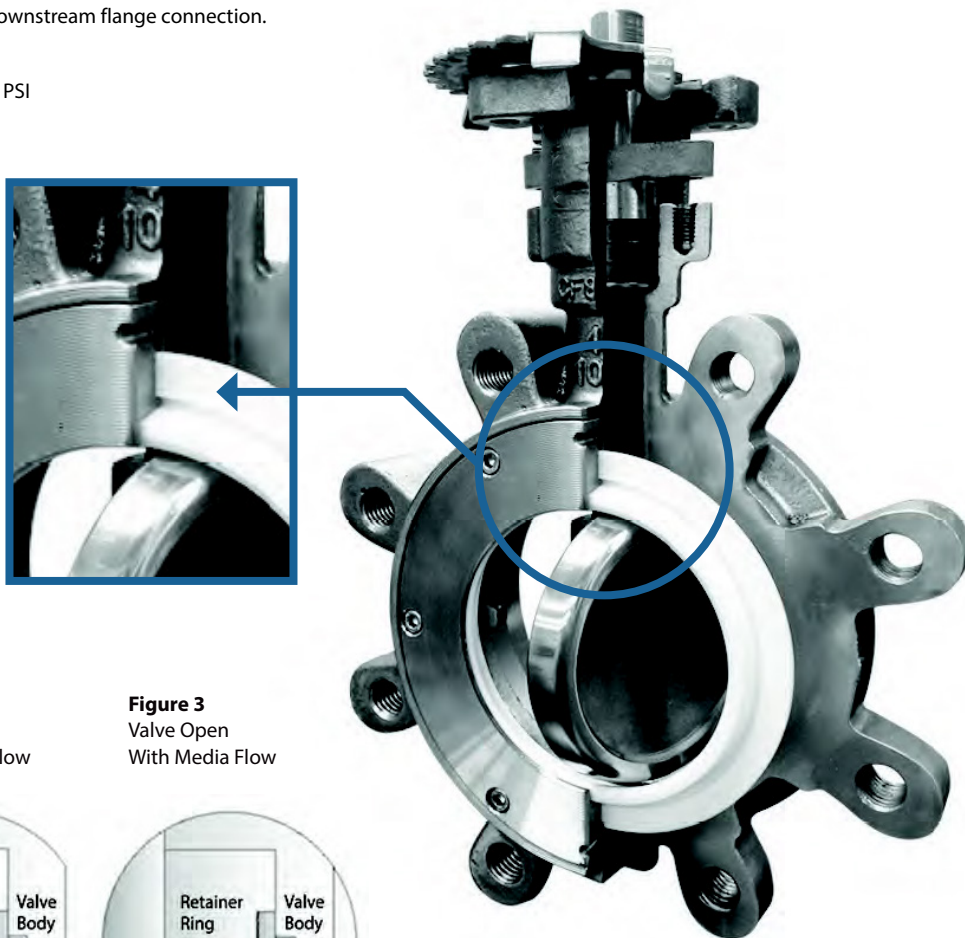
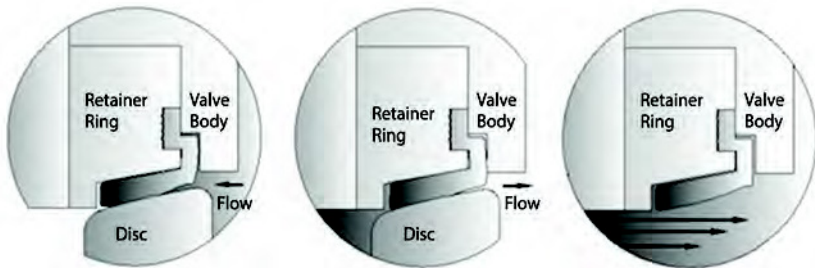


Figure 1
Valve Closed
With Right to Left Flow

Figure 2
Valve Closed
With Left to Right Flow

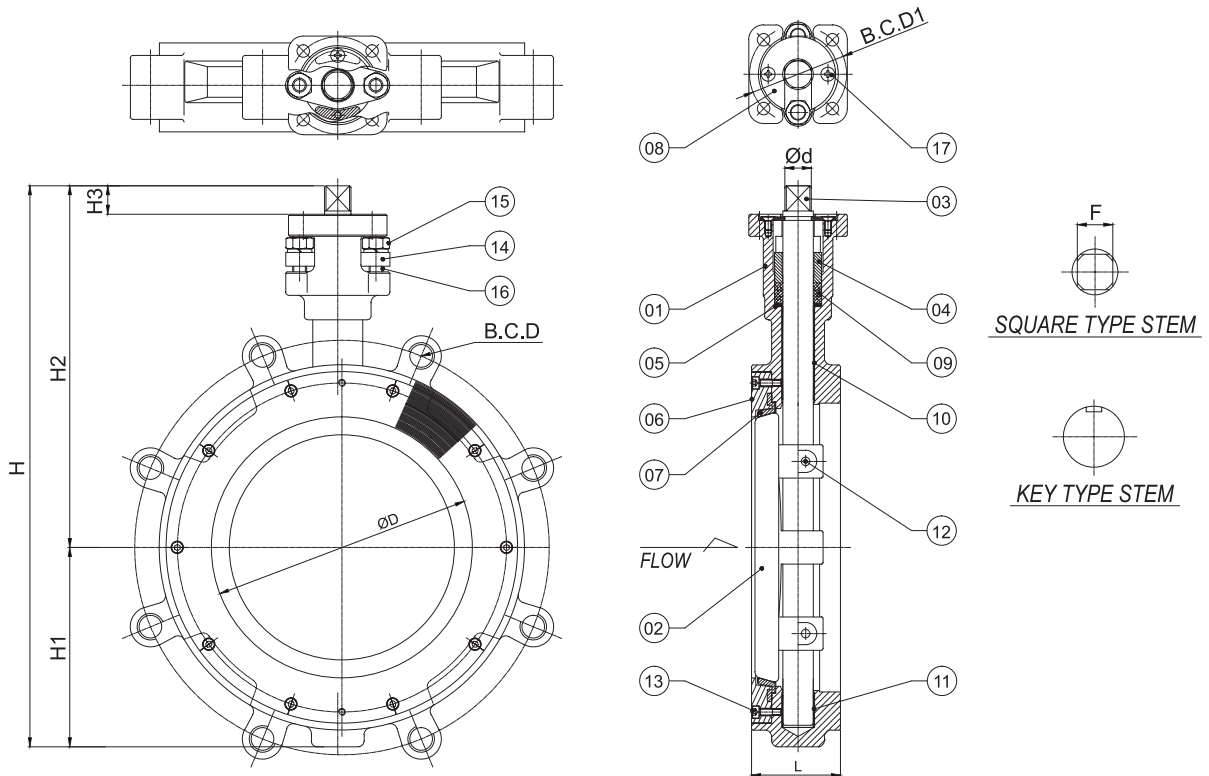
Figure 3
Valve Open
With Media Flow



- Retainer Ring retain seat in valve. Standard surface finish with 125 to 200 AARH and is compatible with both standard gasket and spiral wound gasket design. Outside diameter is recessed within gasket sealing surface to provide external leakage. Hex socket bolt force wedge rign outward to lock seat.
- High strength one-piece stem in A564 Gr. 630/PH 17-4 A351 CF8M DISC are welded together with secured pin during factory assembly. Welded pins are staked to prevent loosening. They pass through the disc and shaft behind the sealing surface.
- Over-travel stopper prevents disc from rotating into the wrong quadrant.

MODEL: HPSS150, HPCS150

Lug Type, Class 150



Dimension

SIZE (mm)	H	H1	H2	H3	Ød	F	ØD	B.C.D1	L
50	219.2	60.0	159.2	15.2	13	11	42.0	70	44
65	242.2	70.0	172.2	15.2	16	14	61.0	70	46
80	250.2	76.5	173.7	15.2	16	14	74.0	70	48
100	281.2	90.0	191.2	17.7	16	14	94.0	70	54
125	318.7	104.0	214.7	17.7	18	14	118.0	70	57
150	346.0	115.0	231.0	19.0	22	17	140.0	70	58
200	404.0	143.5	260.5	20.5	22	17	188.0	70	64
250	468.5	170.0	298.5	20.5	28	22	238.5	102	71.5
300	524.1	197.0	327.1	24.1	28	22	280.0	102	81
350	682.5	279.5	403.0	70.0	38		T.B.A	140	92
400	804.1	318.5	485.6	88.5	45			165	102
450	856.7	338.2	518.5	88.5	55			165	114
500	878.5	360.0	518.5	88.5	55			165	127
600	1009.78	424.26	585.5	93.5	65			165	154

MODEL: HPSS150, HPCS150
Lug Type, Class 150

Dimension

SIZE (inch)	H	H1	H2	H3	ød	F	øD	B.C.D1	L
2"	8.63	2.36	6.27	0.60	0.51	0.43	1.65	2.76	1.73
2 1/2"	9.54	2.76	6.78	0.60	0.63	0.55	2.40	2.76	1.81
3"	9.85	3.01	6.84	0.60	0.63	0.55	2.91	2.76	1.89
4"	11.07	3.54	7.53	0.70	0.63	0.55	3.70	2.76	2.13
5"	12.55	4.09	8.45	0.70	0.71	0.55	4.65	2.76	2.24
6"	13.62	4.53	9.09	0.75	0.87	0.67	5.51	2.76	2.28
8"	15.91	5.65	10.26	0.81	0.87	0.67	7.40	2.76	2.52
10"	18.44	6.69	11.75	0.81	1.10	0.87	9.39	4.02	2.81
12"	20.63	7.76	12.88	0.95	1.10	0.87	11.02	4.02	2.81
14"	26.87	11.00	15.87	2.76	1.50		T.B.A	5.51	3.62
16"	31.66	12.54	19.12	3.48	1.77			6.50	4.02
18"	33.73	13.31	20.41	3.48	2.17			6.50	4.49
20"	34.59	14.17	20.41	3.48	2.17			6.50	5.00
24"	39.76	16.70	23.05	3.48	2.56			6.50	6.06

Material selection

NO.	DESCRIPTION	#150 HPCS150		#150 HPSS150		QTY
		SOFT SEAT	METAL SEAT	SOFT SEAT	METAL SEAT	
1	Body	A216 WCB		A351 CF8M		1
2	Disc	A351 CF8M				1
3	Stem	A564 Gr. 630				1
4	Gland Flange	A216 WCB		A351 CF8M		1
5	Packing Retainer	A276 Tp 316				1
6	Retainer Ring	A351 CF8M				1
7	Seat	PTFE/RTFE/METAL A240/NBR/EPDM/VITON				1
8	Top Retainer	A283D-A36		A276 Tp 316		1
9	Grand Packing	GRAPHITE				3
10	Upper Bearing	R.TFE+316SS				1
11	Lower Bearing	R.TFE+316SS				1
12	Disc Pin	A276 Tp 316				2
13	Hex Socket Bolt	A283D-A36		A276 316SS		4 ~ 14
14	Spring Washer	A283D-A36		A276 316SS		2
15	Hex Nut	A283D-A36		A276 316SS		2
16	Stud Bolt	A283D-A36		A276 316SS		2
17	Flat Head Screw	A283D-A36		A276 316SS		2

MODEL: HPSS150, HPCS150

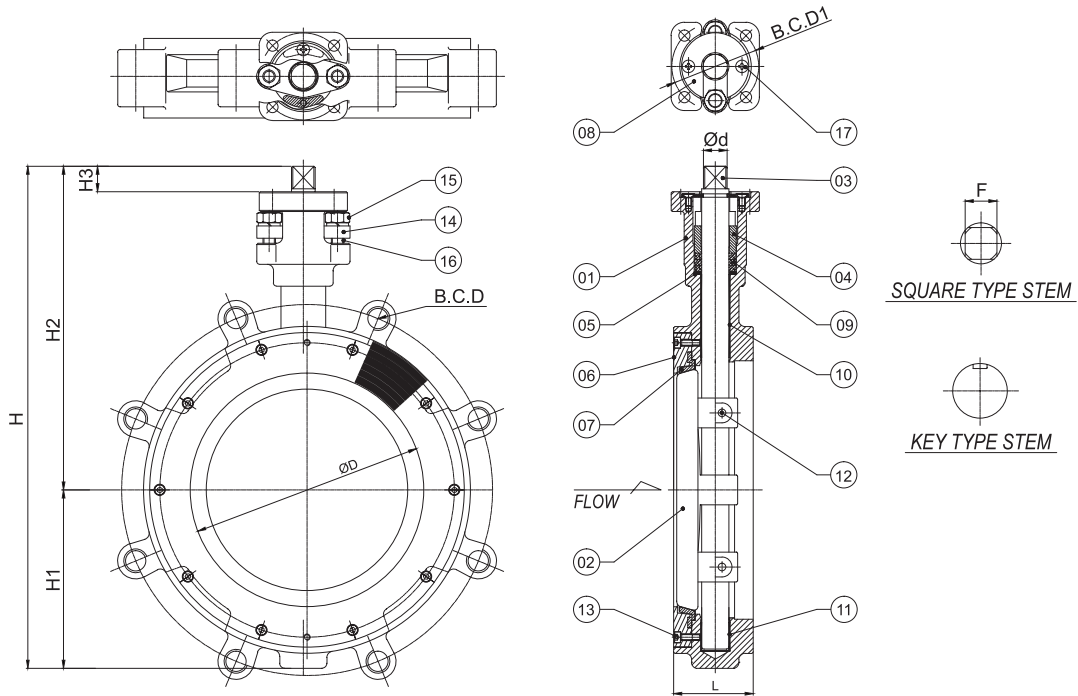
Lug Type, Class 150

Drilling

SIZE	PN10			PN16			ANSI 150 LBS			JIS 10K			JIS 16K		
mm	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h
50A	125	4	18	125	4	18	120.7	4	19.1	120	4	19	120	8	19
65A	145	4	18	145	4	18	139.7	4	19.1	140	4	19	140	8	19
80A	160	8	18	160	8	18	152.4	4	19.1	150	8	19	160	8	23
100A	180	8	18	180	8	18	190.5	8	19.1	175	8	19	185	8	23
125A	210	8	18	210	8	18	215.9	8	22.2	210	8	23	225	8	25
150A	240	8	22	240	8	22	241.3	8	22.2	240	8	23	260	12	25
200A	295	8	22	295	12	22	298.5	8	22.2	290	12	23	305	12	25
250A	350	12	22	355	12	26	362.0	12	25.4	355	12	25	380	12	27
300A	400	12	22	410	12	26	431.8	12	25.4	400	16	25	430	16	27
350A	460	16	22	470	16	26	476.3	12	28.6	445	16	25	480	16	33
400A	515	16	26	525	16	30	539.8	16	28.6	510	16	27	540	16	33
450A	565	20	26	585	20	30	577.9	16	31.8	565	20	27	605	20	33
500A	620	20	26	650	20	33	635.0	20	31.8	620	20	27	660	20	33
600A	725	20	30	770	20	36	749.3	20	34.9	730	24	33	770	24	39

SIZE	PN10			PN16			ANSI 150 LBS			JIS 10K			JIS 16K		
inch	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h
2"	4.92	4	0.71	4.92	4	0.71	4.75	4	0.75	4.72	4	0.75	4.72	8	0.75
2 1/2"	5.71	4	0.71	5.71	4	0.71	5.50	4	0.75	5.51	4	0.75	5.51	8	0.75
3"	6.30	8	0.71	6.30	8	0.71	6.00	4	0.75	5.91	8	0.75	6.30	8	0.91
4"	7.09	8	0.71	7.09	8	0.71	7.50	8	0.75	6.89	8	0.75	7.28	8	0.91
5"	8.27	8	0.71	8.27	8	0.71	8.50	8	0.87	8.27	8	0.91	8.86	8	0.98
6"	9.45	8	0.87	9.45	8	0.87	9.50	8	0.87	9.45	8	0.91	10.24	12	0.98
8"	11.61	8	0.87	11.61	12	0.87	11.75	8	0.87	11.42	12	0.91	12.01	12	0.98
10"	13.78	12	0.87	13.98	12	1.02	14.25	12	1.00	13.98	12	0.98	14.96	12	1.06
12"	15.75	12	0.87	16.14	12	1.02	17.00	12	1.00	15.75	16	0.98	16.93	16	1.06
14"	18.11	16	0.87	18.50	16	1.02	18.75	12	1.13	17.52	16	0.98	18.90	16	1.30
16"	20.28	16	1.02	20.67	16	1.18	21.25	16	1.13	20.08	16	1.06	21.26	16	1.30
18"	22.24	20	1.02	23.03	20	1.18	22.75	16	1.25	22.24	20	1.06	23.82	20	1.30
20"	24.41	20	1.02	25.59	20	1.30	25.00	20	1.25	24.41	20	1.06	25.98	20	1.30
24"	28.54	20	1.18	30.31	20	1.42	29.50	20	1.37	28.74	24	1.30	30.31	24	1.54

MODEL: HPSS300, HPCS300
Lug Type, Class 300



Dimension

SIZE (mm)	H	H1	H2	H3	ϕd	F	ϕD	B.C.D1	L
50	219.2	60.0	159.2	15.2	13	11	42.0	70	44
65	242.2	70.0	172.2	15.2	16	14	61.0	70	47
80	250.2	76.5	173.7	15.2	16	14	74.0	70	48
100	281.2	90.0	191.2	17.7	16	14	94.0	70	54
125	318.7	104.0	214.7	17.7	18	14	118.0	70	57
150	346.0	115.0	231.0	19.0	22	17	140.0	70	58
200	404.0	143.5	260.5	20.5	28	22	188.0	102	73
250	468.5	170.0	298.5	20.5	28	22	238.5	102	82.5
300	526.1	199.0	327.1	24.1	28	22	280.0	102	92

SIZE (inch)	H	H1	H2	H3	ϕd	F	ϕD	B.C.D1	L
2"	8.63	2.36	6.27	0.60	0.51	0.43	1.65	2.76	1.73
2 1/2"	9.54	2.76	6.77	0.60	0.63	0.55	2.40	2.76	1.85
3"	9.85	3.01	6.84	0.60	0.63	0.55	2.91	2.76	1.89
4"	11.07	3.54	7.53	0.70	0.63	0.55	3.70	2.76	2.13
5"	12.55	4.09	8.45	0.70	0.91	0.55	4.65	2.76	2.24
6"	13.62	4.53	9.09	0.75	0.87	0.67	5.51	2.76	2.28
8"	15.91	5.65	10.26	0.81	1.10	0.87	7.40	4.02	2.87
10"	18.44	6.69	11.75	0.81	1.10	0.87	9.39	4.02	3.25
12"	20.71	7.83	12.88	0.95	1.10	0.87	11.02	4.02	3.62

MODEL: HPSS150, HPCS150

Lug Type, Class 150

Material selection

NO.	DESCRIPTION	#300 HPCS300		#300 HPSS300		QTY
		SOFT SEAT	METAL SEAT	SOFT SEAT	METAL SEAT	
1	Body	A216 WCB		A351 CF8M		1
2	Disc	A351 CF8M				1
3	Stem	A564 Gr. 630				1
4	Gland Flange	A216 WCB		A351 CF8M		1
5	Packing Retainer	A276 Tp 316				1
6	Retainer Ring	A351 CF8M				1
7	Seat	PTFE/RTFE/METAL A240/NBR/EPDM/VITON				1
8	Top Retainer	A283D-A36		A276 Tp 316		1
9	Grand Packing	GRAPHITE				3
10	Upper Bearing	R.TFE+316SS				1
11	Lower Bearing	R.TFE+316SS				1
12	Disc Pin	A276 Tp 316				2
13	Hex Socket Bolt	A283D-A36		A276 316SS		4 ~ 14
14	Spring Washer	A283D-A36		A276 316SS		2
15	Hex Nut	A283D-A36		A276 316SS		2
16	Stud Bolt	A283D-A36		A276 316SS		2
17	Flat Head Screw	A283D-A36		A276 316SS		2

Drilling

SIZE	ANSI 300			JIS 16/20K			JIS 30K			PN25			PN40		
	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h
50	127.0	8	19	120.0	8	19	130.0	8	19	125	4	18	125	4	18
65	149.2	8	22.2	140.0	8	19	160.0	8	23	145	8	18	145	8	18
80	168.3	8	22.2	160.0	8	23	170.0	8	23	160	8	18	160	8	18
100	200.0	8	22.2	185.0	8	23	195.0	8	25	190	8	22	190	8	22
125	235.0	8	22.2	225.0	8	25	230.0	8	25	220	8	26	220	8	26
150	269.9	12	22.2	260.0	12	25	275.0	12	27	250	8	26	250	8	26
200	330.2	12	25.4	305.0	12	25	320.0	12	27	310	12	26	320	12	30
250	387.4	16	28.57	380.0	12	27	390.0	12	33	370	12	30	385	12	33
300	450.8	16	31.75	430.0	16	27	450.0	16	33	430	16	30	450	16	33

SIZE	ANSI 300			JIS 16/20K			JIS 30K			PN25			PN40		
	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h	B.C.D	n	h
2"	5.00	8	3/4"	4.72	8	0.75	5.12	8	0.75	4.92	4	0.71	4.92	4	0.71
2 1/2"	5.87	8	7/8"	5.51	8	0.75	6.30	8	0.91	5.71	8	0.71	5.71	8	0.71
3"	6.63	8	7/8"	6.30	8	0.91	6.69	8	0.91	6.30	8	0.71	6.30	8	0.71
4"	7.87	8	7/8"	7.28	8	0.91	7.68	8	0.98	7.48	8	0.87	7.48	8	0.87
5"	9.25	8	7/8"	8.86	8	0.98	9.06	8	0.98	8.66	8	1.02	8.66	8	1.02
6"	10.63	12	7/8"	10.24	12	0.98	10.83	12	1.06	9.84	8	1.02	9.84	8	1.02
8"	13.00	12	1"	12.01	12	0.98	12.60	12	1.06	12.20	12	1.02	12.60	12	1.18
10"	15.25	16	1-1/8"	14.96	12	1.06	15.35	12	1.30	14.57	12	1.18	15.16	12	1.30
12"	17.75	16	1-1/4"	16.93	16	1.06	17.72	16	1.30	16.93	16	1.18	17.72	16	1.30

TORQUE DATA

Lbs per inch		CLASS 150				CLASS 300			
SIZE		Actual Torque: lbf.inch				Actual Torque: lbf.inch			
		RTFE & PTFE + 216 SEATS		METAL SEAT		RTFE & PTFE + 216 SEATS		METAL SEAT	
mm	inch	150 PSIG	285 PSIG	150 PSIG	285 PSIG	150 PSIG	500 PSIG	150 PSIG	500 PSIG
50A	2"	200	270	564	677	220	520	900	1550
65A	2 1/2"	200	270	564	677	220	520	900	1550
80A	3"	200	270	564	677	220	520	900	1550
100A	4"	225	470	903	1128	250	670	1200	1850
125A	5"	540	680	1467	2144	600	1120	2800	5700
150A	6"	540	680	1467	2144	600	1120	2800	5700
200A	8"	910	1620	2031	2595	1000	2440	4100	8100
250A	10"	1620	2530	3385	4288	1800	4640	6800	14500
300A	12"	2530	3600	4513	5190	2790	7480	9100	23600
350A	14"	3720	5970	CONSULT OVC		4130	10200	CONSULT OVC	
400A	16"	5530	9180			6140	17070		
450A	18"	6840	11900			7600	20400		
500A	20"	10020	16970			11140	31530		
600A	24"	18330	32290			20370	58820		

N.m		CLASS 150				CLASS 300			
SIZE		Actual Torque: N.m				Actual Torque: N.m			
		RTFE & PTFE + 316 SEATS		METAL SEAT		RTFE & PTFE + 316 SEATS		METAL SEAT	
mm	inch	10 BAR	20 BAR	10 BAR	20 BAR	10 BAR	35 BAR	10 BAR	35 BAR
50A	2"	23	31	64	76	25	59	102	175
65A	2 1/2"	23	31	64	76	25	59	102	175
80A	3"	23	31	64	76	25	59	102	175
100A	4"	25	53	102	127	28	76	136	209
125A	5"	61	77	166	242	68	127	316	644
150A	6"	61	77	166	242	68	127	316	644
200A	8"	103	183	229	293	113	276	463	915
250A	10"	183	286	382	484	203	524	768	1638
300A	12"	286	407	510	586	315	845	1028	2666
350A	14"	420	675	CONSULT OVC		467	1152	CONSULT OVC	
400A	16"	625	1037			694	1929		
450A	18"	773	1345			859	2305		
500A	20"	1132	1917			1259	3562		
600A	24"	2071	3648			2302	6646		

TORQUE DATA

kgf.m		CLASS 150				CLASS 300			
SIZE		Actual Torque: kgf.m				Actual Torque: kgf.m			
		TEFLON SEAT		METAL SEAT		TEFLON SEAT		METAL SEAT	
mm	inch	10 kg/cm ²	20 kg/cm ²	10 kg/cm ²	20 kg/cm ²	10 kg/cm ²	35 kg/cm ²	10 kg/cm ²	35 kg/cm ²
50A	2"	2	3	6	8	3	6	10	18
65A	2 1/2"	2	3	6	8	3	6	10	18
80A	3"	2	3	6	8	3	6	10	18
100A	4"	3	5	10	13	3	8	14	21
125A	5"	6	8	17	25	7	13	32	66
150A	6"	6	8	17	25	7	13	32	66
200A	8"	10	19	23	30	12	28	47	93
250A	10"	19	29	39	49	21	53	78	167
300A	12"	29	41	52	60	32	86	105	272
350A	14"	43	69	CONSULT OVC		48	118	CONSULT OVC	
400A	16"	64	106			71	197		
450A	18"	79	137			88	235		
500A	20"	115	196			128	363		
600A	24"	211	372			235	678		

The torques listed are applicable to sea water, lubricating type of hydro carbons and most media at temperature 0~82 °C (32~180 °F).

The operating speed of the actuator must be considered in order to avoid water hammer when the valve is closed in junction with liquid.

The factors that affect the torque required to operate Butterfly Valves:

- Valve Diameter
- Shaft Diameter
- Bearing Friction Coefficient
- Type of Seat Material
- Shut-off Pressure
- Velocity
- Shape of Disc
- System Head Characteristics
- Piping Arrangement

Actuator torques can be calculated using the following formulas:

- $T_a = T_b + T_s + T_h = 1.2T_b \pm T_d$
- $T_s = C_s D^2$
- $T_b = 4.17 D^2 d f p$
- $T_d = C_t D^3 P$
- $T_h = 3.06 D^4$
- $V = C_f \sqrt{p} = Q / 0.785 D^2$

T_a : The required actuator torque(lb-ft)

T_s : Seating or unseating torque(lb-ft)

T_d : Dynamic torque(lb-ft)

T_h : Hydrostatic torque(lb-ft)

Q : Flow (cubic for per second)

V : Velocity (feet per second)

D : Diameter of valve (feet)

d : Diameter of Shaft (inch)

P : Pressure drop across valve(psi)

C_s : Coefficient of Seating or unseating torque

C_t : Coefficient of dynamic torque

C_f : Coefficient of flow

f : Bearing friction coefficient

FLOW COEFFICIENT CHARTS

- The size of Butterfly Valve used for control purpose should be calculated on the basis of the operating characteristics. In order to achieve optimum control, the flow coefficient (Cv, Kv) below need to be considered.

CLASS 150 SIZE		DISC OPENING															
		20°		30°		40°		50°		60°		70°		80°		90°	
mm	inch	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv
50	2"	5	6	12	14	22	25	34	39	48	56	66	76	85	99	88	102
65	2 1/2"	8	9	18	21	32	37	48	56	69	80	95	110	122	142	126	146
80	3"	12	14	28	32	49	57	75	87	108	125	147	171	191	221	197	228
100	4"	23	27	54	63	98	114	147	171	214	248	291	338	377	437	389	451
125	5"	37	43	86	100	155	180	234	271	338	392	461	535	597	692	616	714
150	6"	57	66	133	154	240	278	361	419	523	607	713	827	922	1070	951	1103
200	8"	107	124	249	289	448	520	676	784	978	1135	1366	1584	1726	2002	1779	2064
250	10"	182	211	424	492	764	886	1152	1336	1667	1934	2274	2638	2941	3411	3032	3517
300	12"	250	290	584	677	1051	1219	1585	1838	2293	2660	3128	3628	4043	4690	4170	4837
350	14"	338	392	788	914	1419	1646	2139	2481	3097	3592	4223	4898	5629	6530	5911	6857
400	16"	458	531	1060	1230	1922	2229	2898	3361	4194	4865	5719	6634	7625	8845	8006	9287
450	18"	590	684	1376	1596	3339	3873	3735	4332	5405	6270	7371	8550	9716	11270	9828	11400
500	20"	714	828	1666	1932	2998	3478	4521	5244	6543	7590	8923	10350	11897	13800	12431	14420
600	24"	1086	1260	2535	2940	4562	5292	6802	7890	9957	11550	13578	15750	18104	21000	19009	22050

CLASS 300 SIZE		DISC OPENING															
		20°		30°		40°		50°		60°		70°		80°		90°	
mm	inch	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv	Kv	Cv
50	2"	5	6	11	13	21	24	31	36	45	52	61	71	82	95	86	100
65	2 1/2"	7	8	16	19	29	34	45	52	65	75	88	102	117	136	123	143
80	3"	11	13	26	30	46	53	70	81	101	117	137	159	183	212	192	223
100	4"	22	25	50	58	90	104	135	157	197	228	267	310	357	414	375	435
125	5"	34	40	79	92	142	165	214	248	311	361	423	491	565	655	593	688
150	6"	52	60	120	139	216	250	325	377	471	546	641	744	855	992	897	1041
200	8"	94	109	220	255	396	459	597	692	863	1001	1177	1365	1569	1820	1647	1911
250	10"	158	183	367	426	661	767	997	1156	1442	1673	1967	2282	2622	3042	2753	3194
300	12"	218	253	509	590	916	1063	1381	1602	1999	2319	2727	3163	3635	4217	3817	4428
350	14"	281	326	655	760	1179	1368	1778	2063	2574	2986	3510	4072	4681	5430	4916	5702
400	16"	375	435	875	1015	1575	1827	2375	2755	3438	3988	4688	5438	6767	7850	7106	8243
450	18"	478	555	1116	1295	2009	2331	3030	3515	4386	5088	5981	6938	7974	9250	8372	9712
500	20"	543	630	1267	1470	2281	2646	3440	3990	4978	5775	6789	7875	8750	10150	9188	10658
600	24"	833	966	1943	2254	3497	4057	5274	6118	7634	8855	10409	12075	13879	16100	13970	16205

FLOW COEFFICIENT CHARTS

- Cv is in imperial units, the water flow in U.S. gallons per minute which passes through the valve giving a pressure drop of 1 PSI at a temperature of 68°F.
- In metric units the same coefficient is called Kv and correspond to the flow rate in m3/h passing through the valve giving a pressure drop of 1 bar at a temperature of 20°C.
- The approximate corresponding formulas are :

$$Q = Cv \cdot \sqrt{\frac{\Delta p \cdot 62.4}{D}}$$

where :

Q = valve flow rate in gpm (USGPM)

Δp = pounds per square inch (psi) pressure drop through the valve

62.4 = conversion factor for fluids computed in relation to water

D = pounds per cu.ft (pct) fluid density

$$Q = Kv \cdot \sqrt{\frac{\Delta p \cdot 1000}{D}}$$

where :

Q = valve flow rate in m3/h

Δp = pressure drop through the valve in bar

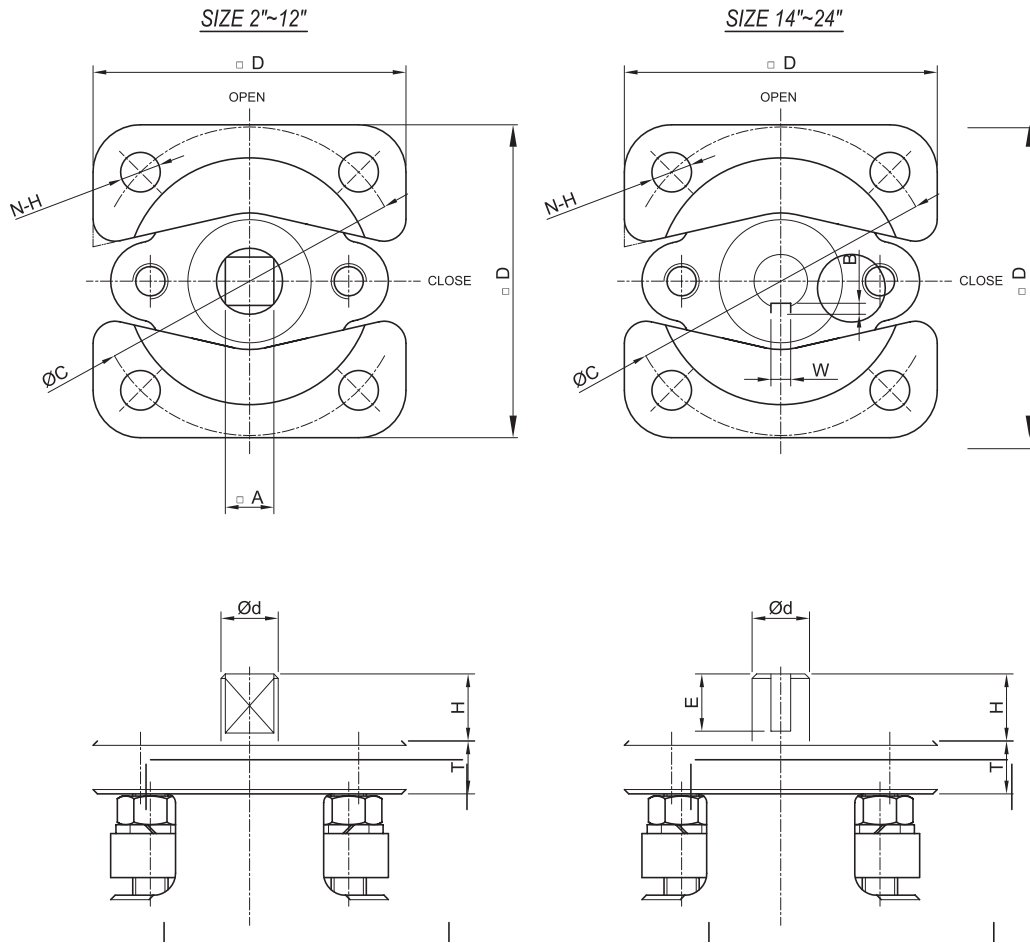
1000 = conversion factor for fluids computed in relation to water.

D = Kg/m³ fluid density

The relation between Cv and Kv, expressed in the above mentioned unit of measure, is as follows; $Cv = 1.16Kv$

BUTTERFLY VALVE TOP FLANGE DIMENSION

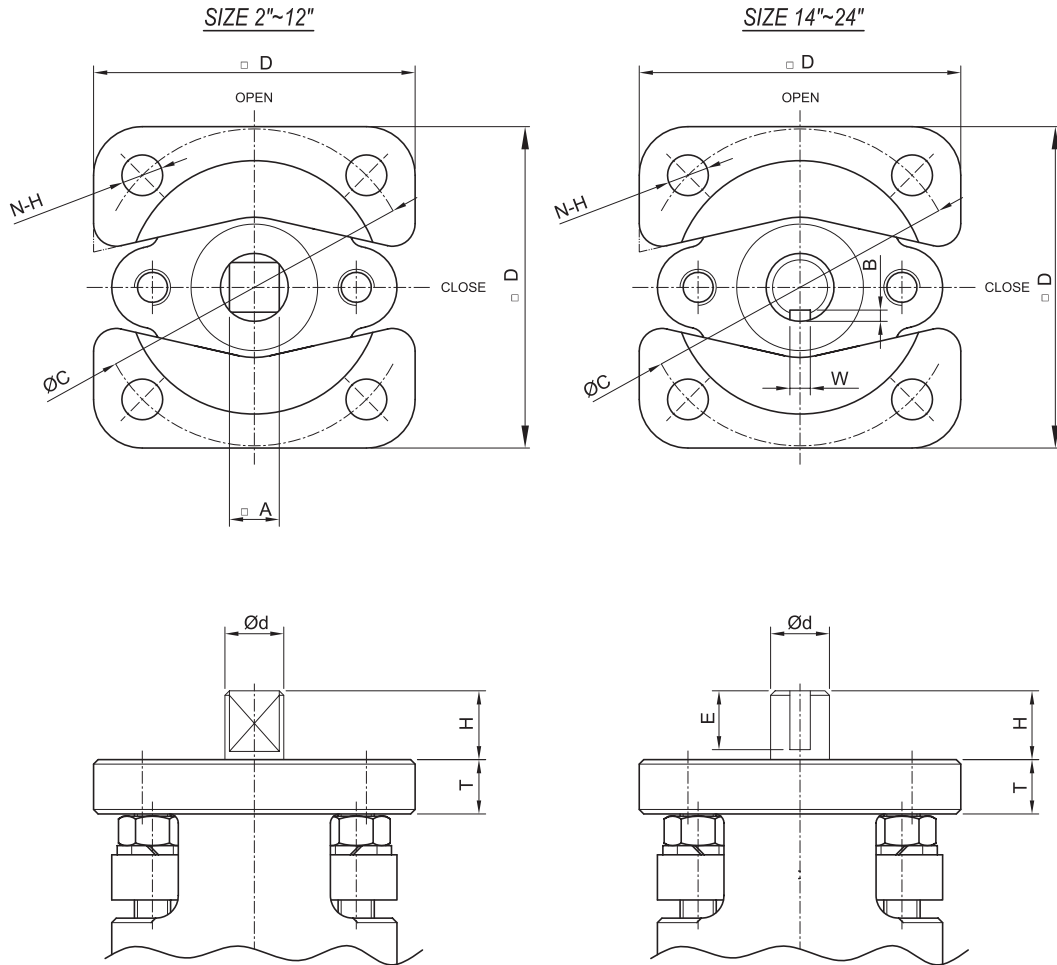
High Performance Class 150



SIZE		ød	T	øC	N	øh	A	D	B	W	H	E	ISO MOUNTING FLG
inch	mm												
2"	50	13	12	70	4	9.0	11	71	-	-	15.2	-	F07
2 1/2"	65	16	12	70	4	9.0	14	71	-	-	15.2	-	F07
3"	80	16	12	70	4	9.0	14	71	-	-	15.2	-	F07
4"	100	16	12	70	4	9.0	14	71	-	-	17.7	-	F07
5"	125	18	14	70	4	9.0	16	71	-	-	17.7	-	F07
6"	150	22	14	70	4	9.0	17	71	-	-	19	-	F07
8"	200	22	16	70	4	9.0	17	71	-	-	20.5	-	F07
10"	250	25.4	18	102	4	11	22	95	-	-	20.5	-	F10
12"	300	28	18	102	4	11	22	95	-	-	24.1	-	F10
14"	350	38	18	140	4	18	-	140	5	12	70	60	F14
16"	400	45	20	165	4	22	-	160	5	12	88.5	70	F16
18"	450	55	20	165	4	22	-	160	5	12	88.5	70	F16
20"	500	55	20	165	4	22	-	160	5	12	88.5	70	F16
24"	600	55	20	165	4	22	-	160	5	12	93.5	70	F16

BUTTERFLY VALVE TOP FLANGE DIMENSION

High Performance Class 300



SIZE		ød	T	øC	N	øh	A	D	B	W	H	E	ISO MOUNTING FLG
inch	mm												
2"	50	13	12	70	4	9.0	11	71	-	-	15.2	-	F07
2 1/2"	65	16	12	70	4	9.0	14	71	-	-	15.2	-	F07
3"	80	16	12	70	4	9.0	14	71	-	-	15.2	-	F07
4"	100	16	12	70	4	9.0	14	71	-	-	17.7	-	F07
5"	125	18	14	70	4	9.0	16	71	-	-	17.7	-	F07
6"	150	22	14	70	4	9.0	17	71	-	-	19	-	F07
8"	200	28	16	102	4	11	22	95	-	-	20.5	-	F10
10"	250	25.4	18	102	4	11	22	95	-	-	20.5	-	F10
12"	300	28	18	102	4	11	22	95	-	-	24.1	-	F10

CROSS COMPARISON CHART

Lug Type, Class 150

DESIGN	OVC	BRAY	FLOWSEAL	WKM
NON-FIRE SAFE	HPSS150LL-XX		XXX-1LA-221RTH-H	XX-B5123-02-502-13-HL
FIRE SAFE	HPSS150LLFS-XX	41-XXX-0-1100102K	XXX-1LA-221JCF-H	XX-B5123-02-F02-13-HL

DESIGN	OVC	DELVAL	ABZ	PRATT
NON-FIRE SAFE	HPSS150LL-XX	45-XXX-444U5L0	ABZolute 402 SERIES - Soft Seat	HP2-150-XXX-763-A-00
FIRE SAFE	HPSS150LLFS-XX	45-XXX-444F5L0	ABZolute 402 SERIES - Fire Safe	HP2-150-XXX-763-H-00

TORQUE COMPARISON CHART

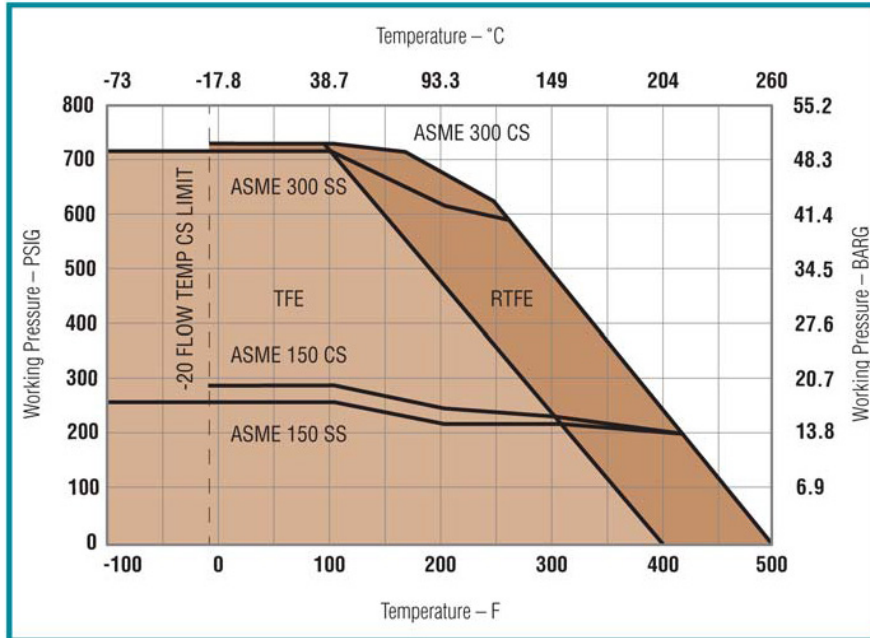
Lug Type, Class 150

SIZE	CLASS	OVC	PRATT	WKM	BRAY	DELVAL	AT-PS
		285 PSIG	285 PSIG	285 PSIG	285 PSIG	285 PSIG	285 PSIG
2"	150	270	360	N/A	N/A	239	257
2½"	150	270	382	263	840	260	374
3"	150	270	416	368	900	304	503
4"	150	470	618	681	1100	434	817
5"	150	680	922	1040	1850	616	CF
6"	150	680	1259	1587	2100	920	1630
8"	150	1620	1911	2247	3200	1548	3335
10"	150	2530	2810	4077	5100	2158	5200
12"	150	3600	4440	6686	8100	2977	6800

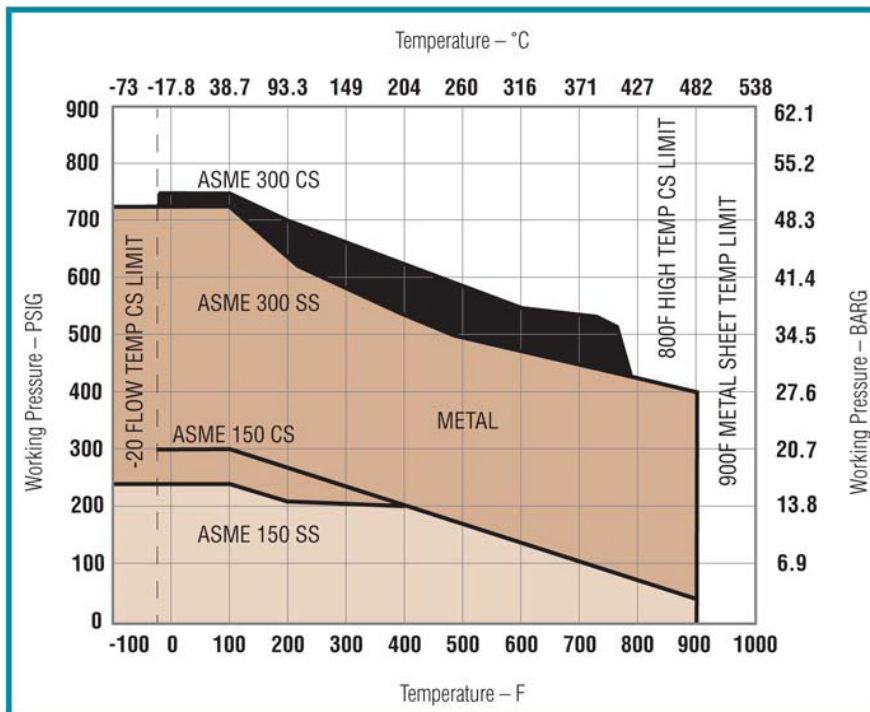
TECHNICAL DATA

Pressure vs. Temperature

Soft Seat (PTFE & RTFE)



Metal Seat & Fire Safe Seat



Elastomer general table

Elastomer seats have been chosen to satisfy every service need. Application suggested derive from recommendation given by the elastomers, manufactures and are purely indicative. Since many factors influence corrosion and abrasion (type of fluid, concentration, temperature, turbulence, impurities etc.), the final choice is to be taken by the customer, based on characteristics and specific application.

NAME	COMPOSITION	GENERAL APPLICATION	TEMPERATURE LIMIT		OTHER LIMIT	AVAILABILITY
EPDM	Ethylene- propylene Terpolymer	Water- steam Sea water Brine Esters Ketone Alkalis Caustic Soda	-30° C +110° C	-22° F +194° F	Not recommended for hydrocarbons - oils - fats	In stock for immediate delivery
EPDM HIGH/TEMP (HT)			-30° C +130° C	-22° F +266° F		
BUNA-N	Copolymer of Butadiene and high Acrylonitrile	Hydrocarbons Natural Gas Oil and fat Air Gasoline	-20° C +90° C	-4° F +194° F	Not recommended for solvents - Benzene - Xylol	
NEOPRENE	Chloro butadiene	Fats Oils Diluted mineral acids Alkalis	-20° C +90° C	-4° F +194° F	Not recommended for Ketones, thinners, Concentrated Acids	
HYPALON	Chlorosulfonated Polyethylene	Mineral acids Organic acids Oxidising substances Fats	-18° C +100° C	0° F +212° F	Not recommended for Nitric acid - Steam Ketones	
VITON	Fluorocarbon polymer	Acids Oils Hydrocarbon	-10° C +160° C	+14° F +320° F	Not recommended for Steam - Freon22 - Solvent- Ketones - Esters - Alkalis	In stock in limited quantities
NATURAL RUBBER	Latex (vegetable)	Abrasive products	-35° C +65° C	-30° F +150° F	Not recommended for Steam - Oil - Hydrocarbons	
SILICON	Organic silicon Polymer	Food & Beverage	-30° C +150° C	-22° F +300° F	Not recommended for Steam - Solvents - Hydrocarbons	

NOTE: The above table is merely indicative. The customer is expected to make the final decision on the suitability of seat materials for their specific applications.

Material selection guide

Code:

E = Excellent
 G = Good - slightly attacked
 F = Fair - moderately attacked, probably unsuitable
 U = Not recommended
 - = No data

	METALS						ELASTOMERS					
	CARBON STEEL AND DUCTILE IRON	410SS (STEMS ONLY)	316SS	ALUMI-NUM BRONZE	HASTEL-LOY C	MONEL	EPDM	BUNA N	NEO-PRENE	HYPALON	VITON	NATURAL RUBBER
Acetaldehyde	U	U	E	U	E	F	G	U	U	U	-	F
Acetic acid 50%, 50°C	U	U	E	U	E	F	G	U	G	G	U	U
Acetic acid - Anhydride	U	U	E	U	E	F	U	U	U	G	U	U
Acetone	G	G	E	E	E	E	G	U	U	U	U	U
Acetylene	G	E	E	E	-	-	U	F	U	U	U	U
Acrylonitrile	G	G	E	E	-	E	U	U	U	U	U	U
Air (Dry)	E	E	E	E	-	E	E	E	E	E	-	-
Alcohol - Amyl	F	G	E	E	-	E	-	F	F	G	G	-
Alcohol - Butyl	F	G	E	E	E	E	-	F	G	U	-	-
Alcohol - Ethyl	U	-	E	E	E	E	E	G	G	G	G	G
Alcohol- Methyl	U	-	E	E	E	E	E	G	G	G	U	G
Alum - Ammonium	U	-	G	-	-	-	-	G	G	F	G	F
Alum - Chrome	U	-	G	-	-	-	-	G	G	F	G	F
Alum - Potassium	U	-	G	-	-	-	-	-	G	-	-	-
Alumina	G	G	G	G	E	G	E	E	F	G	G	G
Aluminum Chloride	U	U	U	U	-	E	E	E	E	E	E	E
Aluminum Fluoride	U	-	G	-	-	G	-	G	G	-	G	-
Aluminum Hydroxide	U	-	G	-	-	-	-	G	G	-	G	-
Aluminum Sulphate	U	G	G	U	E	-	-	E	E	E	-	-
Amines	U	F	E	-	-	-	-	F	-	-	-	-
Ammonia, Anhydrous	F	G	E	U	-	-	E	G	-	-	U	-
Ammonia Gas 150°F	U	U	E	U	-	-	G	-	-	U	-	-
Ammonia solutions	F	G	E	U	E	G	E	G	G	G	U	G
Ammonium Chloride 50%, 180°F	U	F	G	U	E	G	-	-	E	E	-	-
Ammonium Hydroxide	U	G	E	U	E	F	E	U	E	E	G	U
Ammonim Nitrate 5%, 60°F	F	G	E	U	E	G	-	E	E	F	-	-
Ammonium Phosphate	U	F	G	U	G	G	E	E	E	E	-	G
Ammonium Sulphate	U	F	G	U	G	G	E	E	E	E	E	-
Amyl Acetate	F	G	E	E	E	G	-	U	-	F	F	U
Amylchloride	F	G	E	E	E	-	U	U	U	U	U	U
Aniline 90%, 70°F	F	G	E	F	E	-	G	U	U	U	G	U
Asphalt	E	E	E	E	E	E	-	U	U	U	E	U
Barium Carbonate, 60°F	U	-	-	G	E	G	E	E	E	-	-	-
Barium Chloride	U	-	-	-	E	G	E	E	E	E	E	E
Barium Hydroxide	F	E	E	U	-	-	-	E	E	E	-	U
Barium Sulphate	U	-	E	G	-	G	E	E	E	E	E	E
Barium Sulphide	F	E	E	U	-	-	-	E	E	-	-	-
Beer (beverage)	U	E	E	U	E	-	E	-	-	-	-	-
Beet sugar solution	U	E	E	U	-	-	-	E	E	G	-	-
Benzaldehyde	F	E	E	E	-	-	G	U	U	U	U	U
Benzene (benzol), 70°F	F	E	E	E	E	G	U	U	U	U	G	U
Benzoic Acid 5%	U	G	E	-	E	G	-	F	F	F	-	-
Borax	U	F	E	U	E	E	-	G	E	E	-	G
Boric acid 5%, 200°F	U	F	E	F	E	G	E	E	-	E	-	-
Brine	U	-	-	-	-	G	E	E	E	E	-	-
Bromine - Gas	U	U	U	-	E	F	U	U	U	U	G	U
Bromine - Water	U	U	U	-	E	F	U	U	U	U	G	U
Butadiene	F	G	E	-	-	-	-	G	-	-	G	-
Butane- Butylene	G	E	E	E	E	E	U	G	G	G	G	U
Butyl Acetate	G	E	E	E	-	-	F	U	U	U	U	U

Material selection guide

Code: E = Excellent G = Good - slightly attacked F = Fair - moderately attacked, probably unsuitable U = Not recommended - = No data	METALS						ELASTOMERS					
	CARBON STEEL AND DUCTILE IRON	410SS (STEMS ONLY)	316SS	ALUMI- NUM BRONZE	HASTEL- LOY C	MONEL	EPDM	BUNA N	NEO- PRENE	HYPALON	VITON	NATURAL RUBBER
Butyric Acid 5%	U	G	E	-	E	-	U	U	U	F	U	U
Calcium Carbonate 60°F	F	-	-	-	E	E	E	E	E	E	E	E
Calcium Chlorate 20%	-	G	E	-	E	G	-	-	E	E	-	-
Calcium Chloride	F	G	G	F	E	G	E	E	E	E	E	G
Calcium Chloride solution	F	G	E	F	E	-	E	E	E	E	E	G
Calcium Hydroxide 50%, 175°F	F	E	E	U	E	E	E	E	E	E	E	E
Calcium Hypochlorite	-	G	G	-	-	-	-	F	G	E	-	-
Calcium Sulphate	F	E	E	E	-	G	E	E	E	E	E	E
Carbon Dioxide	F	E	E	E	-	-	G	G	G	E	E	G
Carbon Tetachloride	U	G	G	F	-	G	U	U	U	U	E	U
Carbonic Acid	U	G	G	-	E	G	-	E	-	-	-	-
Chlorine gas - dry 70°F	U	F	G	F	E	F	U	U	U	G	E	U
Chlorobenzene 90%	F	E	E	E	-	E	U	U	U	U	G	U
Chromic Acid 5%, 70°F	U	G	E	U	-	-	U	U	U	E	E	U
Citric Acid 5%, 150°F	U	F	E	F	E	G	E	G	E	-	E	U
Coffee (food)	U	U	E	U	-	-	E	U	E	E	E	E
Copper Sulphate	F	G	E	U	-	U	E	E	E	E	E	G
Cyclohexane	F	E	E	E	-	-	U	E	U	U	E	U
Dextrose (food)	U	U	E	-	-	-	-	E	-	-	-	-
Diacetone	U	-	-	E	-	-	E	U	U	U	U	U
Dichloroethene	U	-	F	-	-	-	U	U	U	U	G	U
Diesel Fuels	F	E	E	G	E	E	U	E	-	-	E	-
Diethyl Amine	F	E	E	E	-	-	F	U	U	U	U	F
Dowtherms	G	E	E	E	-	-	U	U	G	G	E	U
Drilling Mud	G	-	E	-	-	E	U	E	-	E	-	U
Ethers	U	-	E	E	E	G	U	U	U	U	-	U
Ethyl Acetate	F	G	E	-	E	E	G	U	U	U	U	U
Ethyl Chloride 5%	F	G	E	E	E	G	E	E	F	U	E	F
Ethyl Glycol	G	E	E	E	-	E	E	E	G	E	E	G
Ethylene Oxide	G	G	E	-	-	-	U	U	U	U	U	U
Fats	E	E	E	E	-	-	U	E	G	G	-	-
Ferric Chloride	U	U	-	U	U	E	-	F	G	E	-	-
Ferric Nitrate	U	-	E	-	-	E	G	F	F	F	-	-
Ferric Sulphate 5%	U	-	G	U	-	E	-	E	E	-	E	-
Ferrous Sulphate	F	G	E	U	-	-	G	E	G	G	G	G
Fluorine	U	U	U	U	-	G	-	G	F	G	-	-
Fluosilicic Acid	U	F	G	E	-	-	-	E	G	E	-	-
Formaldehyde 70°F	U	G	E	E	E	G	E	G	E	E	E	-
Formic acid 5%, 150°F	U	G	E	E	E	G	-	U	E	G	U	U
Freon	F	E	E	E	E	E	U	G	G	G	G	U
Fruit Juices (food)	U	U	E	U	E	-	G	G	G	-	-	-
Fuel Oil	F	E	E	E	E	G	U	F	F	U	E	U
Gallic Acid 5%, 200°F	U	-	E	-	E	-	-	G	G	F	G	-
Gasoline	F	E	E	G	-	G	U	E	F	U	E	U
Glucose	U	F	E	G	E	G	-	E	E	-	E	-
Glycerine/ Glycerol	F	E	E	G	E	G	-	E	E	E	E	-
Heptane	F	G	E	E	-	-	U	E	G	G	E	U
Hexane	F	G	E	E	-	-	U	G	G	G	E	U
Hydrobromic Acid 200°F	U	U	U	U	E	U	U	U	U	U	U	U
Hydrochloric Acid 15%, 60°F	U	U	U	U	E	U	E	U	U	E	E	-

Material selection guide

Code: E = Excellent G = Good - slightly attacked F = Fair - moderately attacked, probably unsuitable U = Not recommended - = No data	METALS						ELASTOMERS					
	CARBON STEEL AND DUCTILE IRON	410SS (STEMS ONLY)	316SS	ALUMI-NUM BRONZE	HASTEL-LOY C	MONEL	EPDM	BUNA N	NEO-PRENE	HYPALON	VITON	NATURAL RUBBER
Hydrochloric Acid 37%, 60°F	U	U	U	U	E	U	U	U	U	E	E	U
Hydrofluoric Acid 20%	U	F	U	U	E	F	-	U	G	F	E	U
Hydrofluoric Acid 20-60%	U	U	U	U	E	U	-	U	U	U	E	U
Hydrogen	F	G	E	F	-	-	E	E	E	E	E	E
Hydrogen Peroxide 90%	U	F	G	U	U	E	-	U	U	E	G	U
Hydrogen Sulfide	F	F	G	F	-	-	E	U	G	F	U	U
Iodine Solution	U	U	U	U	E	E	-	U	U	F	F	U
Iso-octane	F	E	E	E	E	E	U	E	G	E	E	-
Isopropyl Alcohol	F	E	E	E	E	E	-	G	F	E	E	-
Isopropyl Ether	F	E	E	E	E	E	U	E	F	G	E	U
Kerosene	E	E	E	E	E	E	U	E	F	F	E	U
Lactic Acid 5%	U	F	G	U	E	G	-	F	E	E	-	-
Lubricating Oil	E	E	E	E	E	E	U	E	G	G	E	U
Magnesium Chloride 4%	F	F	G	F	E	G	E	E	E	E	E	E
Magnesium Hydroxide	F	E	E	G	-	-	E	G	E	E	E	G
Magnesium Sulphate	F	G	E	E	E	E	E	E	E	E	E	G
Mercuric Chloride 3%	U	U	F	U	E	G	E	E	E	-	-	-
Mercury	E	E	E	U	E	E	E	E	E	E	E	E
Methane	U	-	E	E	-	-	U	E	G	G	E	U
Methyl Acetate	F	G	E	E	-	-	F	U	U	U	U	U
Methyl Acetone	F	E	E	E	-	-	G	U	U	U	U	U
Methyl Chloride	G	G	E	E	-	-	U	U	U	U	E	U
Methyl Ethyl Ketone	E	E	E	E	-	-	U	U	U	U	U	U
Milk (food)	U	U	E	-	E	-	E	E	E	E	E	E
Mineral Oil	F	-	F	-	E	-	U	E	G	G	E	U
Molasses (food)	U	U	E	U	-	-	E	-	E	-	-	-
Napthalene	F	E	E	E	-	-	U	U	-	-	G	U
Natural gas	G	E	E	E	-	-	U	E	U	E	E	U
Nickel Chloride	U	-	F	-	E	-	-	E	E	-	-	-
Nitric acid less 40%, 70°F	U	-	-	U	G	U	U	U	U	E	E	U
Nitric Acid more 40%, 70°F	U	U	U	U	G	U	U	U	U	-	F	U
Nitrobenzene	U	-	E	-	-	-	U	U	U	U	G	U
Oleum	U	U	F	-	G	-	U	U	U	U	E	U
Olive Oil	-	-	E	-	-	-	G	E	G	G	E	U
Oxalic Acid	U	F	G	U	G	-	G	U	U	G	G	U
Oxygen 200°F	E	E	E	E	E	E	E	G	G	G	E	F
Oxygen 300°F	E	E	E	E	E	E	U	U	U	U	G	U
Palmitic Acid	U	G	E	G	-	-	-	E	G	G	-	-
Perchloroethylene	F	G	E	-	-	-	U	F	U	U	E	U
Petroleum	U	G	G	F	E	G	U	E	G	G	E	U
Phenol	U	-	E	-	E	E	U	U	U	U	E	U
Phosphoric Acid 5%	U	F	G	U	E	G	F	F	G	E	E	F
Phosphoric Acid 85%, 70°F	U	U	G	U	F	-	F	F	G	E	-	F
Picric Acid 80%	U	-	E	-	E	F	U	-	G	E	-	-
Potassium Cyanide	F	G	E	U	-	-	-	E	E	-	E	-
Potassium Hydroxide 5%	F	G	E	U	E	E	-	E	E	E	E	-
Potassium Nitrate	F	G	E	F	E	G	E	E	E	E	E	E
Potassium Phosphate	U	-	G	-	-	-	-	E	E	-	E	-
Potassium Sulfide	U	G	E	-	-	-	-	E	-	-	-	-
Potassium Sulfite	U	-	E	-	-	-	G	F	G	G	-	-

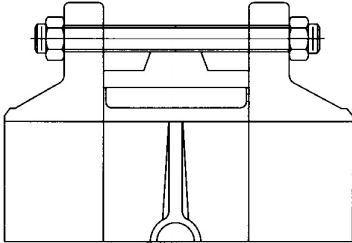
Material selection guide

	METALS						ELASTOMERS					
	CARBON STEEL AND DUCTILE IRON	410SS (STEMS ONLY)	316SS	ALUMI-NUM BRONZE	HASTEL-LOY C	MONEL	EPDM	BUNA N	NEO-PRENE	HYPALON	VITON	NATURAL RUBBER
Code: E = Excellent G = Good - slightly attacked F = Fair - moderately attacked, probably unsuitable U = Not recommended - = No data												
Propane	F	E	E	E	-	-	U	E	E	E	E	-
Resins	U	E	E	E	E	-	-	-	F	F	G	F
Sea Water 70°F	U	U	G	G	E	E	E	G	E	G	E	-
Soap solution (stearate)	U	F	E	E	E	G	E	E	E	E	E	-
Sodium Acetate 5%	U	F	E	E	E	G	E	G	G	-	U	-
Sodium Bisulfate	U	F	E	-	-	-	-	E	E	-	E	-
Sodium Carbonate	U	G	E	G	E	E	E	E	E	E	E	E
Sodium Chloride 30%, 180°F	U	F	E	E	E	E	E	E	E	E	E	E
Sodium Cyanide	U	-	E	U	-	-	-	E	E	-	E	-
Sodium Fluoride 5%, 60°F	U	-	-	F	E	G	-	-	-	-	E	-
Sodium Hydroxide 50%, 122°F	U	F	G	U	E	G	E	U	G	E	U	G
Sodium Hydroxide 50%, 176°F	U	F	G	U	E	G	G	U	-	G	U	U
Sodium Hypochlorite 5%, 60°F	U	-	G	U	E	E	G	U	G	G	E	U
Sodium Nitrate	U	G	E	G	E	G	E	G	E	E	-	G
Sodium Perborate	U	G	E	-	-	-	-	G	G	-	E	-
Sodium Peroxide	U	G	E	U	-	-	E	G	G	G	E	G
Sodium Phosphate 5%	U	G	E	-	E	G	E	E	E	E	E	E
Sodium Silicate	U	G	E	G	E	G	E	E	E	E	E	E
Sodium Sulfide 70%	U	G	E	U	E	-	-	-	-	-	E	-
Sodium Sulfide	U	-	-	U	E	G	G	E	G	G	-	-
Sodium Sulphate 80%, 60°F	U	G	E	G	E	G	E	E	E	E	E	G
Steam 300°F	U	U	E	G	-	E	E	U	U	U	U	U
Stearic Acid 90%, 200°F	U	G	E	F	E	F	-	G	G	G	-	-
Sulphur (Molten)	U	F	G	U	E	U	E	-	E	E	E	-
Sulphur Dioxide	U	G	E	F	E	E	G	U	U	F	E	U
Sulphur Trioxide	U	G	E	-	E	-	-	U	U	U	E	U
Sulfuric Acid 10%	U	U	G	U	E	U	E	U	E	E	E	F
Sulfuric Acid 50%	U	U	U	U	G	U	F	U	G	E	E	U
Sulfuric Acid 93%, 70°F	U	U	U	U	U	U	U	U	U	U	E	U
Sulphurous Acid 80%, 100°F	U	U	U	U	E	U	U	U	-	G	E	U
Tannic Acid 150%	U	F	E	G	E	-	-	U	G	G	E	F
Tar	F	E	E	E	E	E	U	U	U	U	G	U
Tartaric Acid 150°F	U	G	E	G	E	-	-	E	E	E	-	G
Thinner	U	E	E	E	-	E	U	U	U	U	U	U
Toluol and Toluene	U	E	E	E	-	-	U	U	U	U	G	U
Tributyl Phosphate	U	F	E	-	-	-	U	U	U	G	F	F
Trichloroethylene	-	-	E	E	-	-	U	U	U	U	E	U
Tricresyl Phosphate	U	U	U	U	-	-	G	U	U	U	E	U
Triethanolamine	U	U	-	-	-	G	E	G	E	E	U	U
Turpentine	U	U	E	G	-	-	U	U	U	U	E	U
Vinegar 70°F	U	-	E	-	E	-	G	E	G	G	E	-
Water- Demineralized	U	-	E	E	-	E	E	G	E	E	E	G
Water- Distilled	U	U	E	U	E	-	E	G	E	E	-	-
Water Fresh	F	E	E	E	E	E	E	G	E	E	-	E
Water Mineral	F	G	E	E	E	E	E	G	-	-	-	-
Water - Sewage	U	G	E	E	E	E	E	G	-	-	-	-
Whiskey and Wines	U	U	E	G	E	E	E	E	G	G	-	-
Xylene, Xylol	F	E	E	E	-	-	U	U	U	U	E	U
Zinc Chloride 5%, 160°F	U	U	F	U	G	G	E	E	E	E	E	E
Zinc Sulphate 25%, 180°F	U	G	E	E	E	G	-	E	E	E	-	-

FLANGE BOLTING DATA

Wafer Type Valve

Recommended stud length for tightening OVC Wafer type valve between flanges.

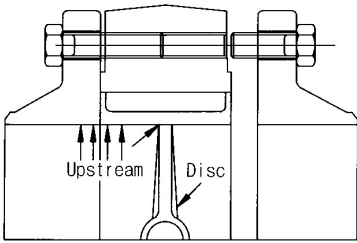


Valve Size		JIS 10K FLANGES		DIN PN10 FLANGES		DIN PN 16 FLANGES		ANSI150 FLANGES	
mm	inch	Studs Dia and Length (mm)	N° studs	Studs Dia and Length (mm)	N° studs	Studs Dia and Length (mm)	N° studs	Studs Dia and Length (mm)	N° studs
50	2"	M16 X 130	4	M16 X 130	4	M16 X 130	4	5/8" X 5-1/8"	4
65	2 1/2"	M16 X 130	4	M16 X 130	4	M16 X 130	4	5/8" X 5--1/8"	4
80	3"	M16 X 140	8	M16 X 140	4	M16 X 140	8	5/8" X 5-1/2"	4
100	4"	M16 X 150	8	M16 X 150	8	M16 X 150	8	5/8" X 5-1/2"	8
125	5"	M20 X 150	8	M16 X 150	8	M16 X 150	8	3/4" X 6-3/8"	8
150	6"	M20 X 160	8	M20 X 160	8	M20 X 160	8	3/4" X 6-3/8"	8
200	8"	M20 X 170	12	M20 X 170	8	M20 X 170	12	3/4" X 6-1/4"	8
250	10"	M22 X 190	12	M20 X 180	12	M24 X 190	12	7/8" X 7-1/2"	12
300	12"	M22 X 200	16	M20 X 190	12	M24 X 200	12	7/8" X 8-3/8"	12
350	14"	M22 X 220	16	M20 X 230	16	M24 X 220	16	1" X 8-3/4"	12
400	16"	M24 X 240	16	M22 X 230	16	M27 X 240	16	1" X 10"	16
450	18"	M24 X 250	20	M24 X 250	20	M27 X 250	20	1-1/8" X 11-1/8"	16
500	20"	M24 X 280	20	M24 X 250	20	M30 X 280	20	1-1/8" X 12"	20
600	24"	M30 X 300	24	M27 X 300	20	M33 X 300	20	1-1/4" X 13-13/16"	20

For pipe conveying oil, the flange needs 8 studs instead of 4.

Lug Type Valve

Recommended screw length for tightening OVC Lug type valve between flanges.



VALVE SIZE		JIS10K FLANGES		DIN PN10 FLANGES		DIN PN16 FLANGES		ANSI 150 FLANGES	
mm	Inch	Studs Dia and length (mm)	N° Studs	Studs Dia and length (mm)	N° Studs	Studs Dia and length (mm)	N° Studs	Studs Dia and length (mm)	N° Studs
50	2"	M16 X 35	8	M16 X 35	8	M16 X 35	8	5/8" X 1-1/2"	8
65	2 1/2"	M16 X 35	8	M16 X 35	8	M16 X 35	8	5/8" X 1-1/2"	8
80	3"	M16 X 35	16	M16 X 35	8	M16 X 35	16	5/8" X 1-1/2"	8
100	4"	M16 X 40	16	M16 X 40	16	M16 X 40	16	5/8" X 1-3/4"	16
125	5"	M20 X 45	16	M16 X 45	16	M16 X 45	16	3/4" X 1-3/4"	16
150	6"	M20 X 45	16	M20 X 45	16	M20 X 45	16	3/4" X 2"	16
200	8"	M20 X 50	24	M20 X 50	16	M20 X 50	24	3/4" X 2-1/4"	16
250	10"	M22 X 55	24	M20 X 55	24	M24 X 55	24	7/8" X 2-1/4"	24
300	12"	M22 X 60	32	M20 X 60	24	M24 X 60	24	7/8" X 2-1/2"	24
350	14"	M22 X 60	32	M20 X 60	32	M24 X 60	32	1" X 2-1/2"	24
400	16"	M24 X 70	32	M24 X 70	32	M27 X 70	32	1" X 3-1/4"	32
450	18"	M24 X 80	40	M24 X 80	40	M27 X 80	40	1-1/8" X 3-1/4"	32
500	20"	M24 X 80	40	M24 X 80	40	M30 X 80	40	1-1/8" X 3-1/4"	40
600	24"	M30 X 90	48	M27 X 90	40	M33 X 90	40	1-1/4" X 3-1/2"	40

For pipe conveying oil, the flange needs 16 screws instead of 8.

N.B - For lug type valves with free holes use the same studs as referred in Wafer Type Valve table.

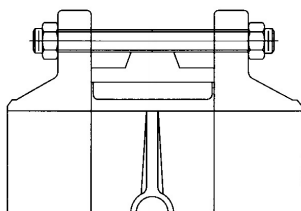
End Pipe Service

- Due to the particular seat perimeter, OVC Lug type butterfly valves can also be installed at the end of pipe.
- That means on single flange service. In this case it is possible to remove downstream piping and make maintenance operations.
- For this particular service weld neck or socket flanges are necessary. When valve is correctly installed on single flange by mean of screws will have zero leakage, no fluid infiltrations between flange and seat.
- We suggest not to use other types of flanges which would cause such infiltrations and make the seat slide into the body.
- Lug type butterfly valves were expressly designed for this service. But they cannot intercept liquids with pressure over than 10.5 bar. They are not suitable for gas or air lines on single flange service.
- After having removed the downstream piping, we suggest to protect the valve with a blind flange.

FLANGE BOLTING DATA

Wafer Type Valve

Recommended stud length for tightening OVC Wafer type valve between flanges.

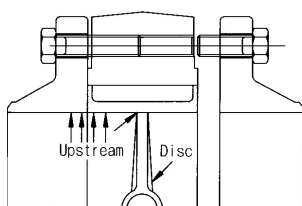


VALVE SIZE		JIS20K FLANGES		PN25 FLANGES		ANSL300 FLANGES		JIS30K FLANGES		P40 FLANGES	
mm	inch	Studs Dia and length (mm)	N° Studs	Studs Dia and Length (mm)	N° Studs	Studs Dia and Length (Inch)	N° Studs	Studs Dia and Length (mm)	N° Studs	Studs Dia and Length (mm)	N° Studs
50	2"	M16 x 135	8	M16 X 135	4	5/8" X 5-3/8"	8	M16 X 135	8	M16 X 135	4
65	2 1/2"	M16 x 150	8	M16 X 150	8	3/4" X 5-7/8"	8	M20 X 150	8	M16 X 150	8
80	3"	M20 x 160	8	M16 X 160	8	3/4" X 6-3/8"	8	M20 X 160	8	M16 X 160	8
100	4"	M20 x 170	8	M20 X 170	8	3/4" X 6-3/4"	8	M22 X 170	8	M20 X 170	8
125	5"	M22 x 180	8	M24 X 180	8	3/4" X 7"	8	M22 X 180	8	M24 X 180	8
150	6"	M22 x 180	12	M24 X 180	8	3/4" X 7-1/8"	12	M24 X 180	12	M24 X 180	8
200	8"	M22 X 215	12	M24 X 215	12	7/8" X 8-1/2"	12	M24 X 215	12	M27 X 215	12
250	10"	M24 X 245	12	M27 X 245	12	1" X 9-5/8"	16	(M30 X 3) X 245	12	M30 X 245	12
300	12"	M24 X 265	16	M27 X 265	16	1-1/8" X 10-3/8"	16	(M30 X 3) X 265	16	M30 X 265	16
350	14"	(M30 X 3) X 300	16	M30 X 300	16	1-1/8" X 11-3/4"	20	(M30 X 3) X 300	16	M33 X 300	16
400	16"	(M30 X 3) X 325	16	M33 X 325	16	1-1/4" X 12-3/4"	20	(M36 x 3) X 325	16	M36 X 325	16
450	18"	(M30 X 3) X 345	20	M33 X 345	20	1-1/4" X 13-5/8"	24	-	-	-	-
500	20"	(M30 X 3) X 365	20	M33 X 365	20	1-1/4" X 12-3/8"	24	-	-	-	-
600	24"	(M30 X 3) X 415	24	M36 X 415	20	1-1/2" X 16-1/4"	24	-	-	-	-

For pipe conveying oil, the flange needs 8 studs instead of 4.

Lug Type Valve

Recommended screws length for tightening OVC Lug type valve between flanges.



VALVE SIZE		JIS20K FLANGES		PN25 FLANGES		ANSL300 FLANGES		JIS30K FLANGES		P40 FLANGES	
mm	inch	Studs Dia and length (mm)	N° Studs	Studs Dia and Length (mm)	N° Studs	Studs Dia and Length (Inch)	N° Studs	Studs Dia and Length (mm)	N° Studs	Studs Dia and Length (mm)	N° Studs
50	2"	M16 X 40	16	M16 X 40	8	5/8" X 1-1/2"	16	M16 X 40	16	M16 X 40	8
65	2 1/2"	M16 X 45	16	M16 X 45	16	3/4" X 1-3/4"	16	M20 X 45	16	M16 X 45	16
80	3"	M20 X 50	16	M16 X 50	16	3/4" X 1-3/4"	16	M20 X 50	16	M16 X 50	16
100	4"	M20 X 55	16	M20 X 55	16	3/4" X 2-1/4"	16	M22 X 55	16	M20 X 55	16
125	5"	M22 X 60	16	M 24 X 60	16	3/4" X 2-1/4"	16	M22 X 60	16	M24 X 60	16
150	6"	M22 X 60	24	M24 X 60	16	3/4" X 2-1/2"	24	M24 X 60	24	M24 X 60	16
200	8"	M22 X 75	24	M24 X 75	24	7/8" X 2-7/8"	24	M24 X 75	24	M27 X 75	24
250	10"	M24 X 85	24	M27 X 85	24	1" X 3-1/4"	32	(M30 X 3) X 85	24	M30 X 85	24
300	12"	M24 X 95	32	M 27 X 95	32	1-1/8" X 3-1/2"	32	(M30 X 3) X 95	32	M30 X 95	32
350	14"	(M30 X 3) X 110	32	M30 X 110	32	1-1/8" X 4-1/4"	40	(M30 X 3) X 110	32	M33 X 110	32
400	16"	(M30 X 3) X 120	32	M33 X 120	32	1-1/4" X 4-3/4"	40	(M36 X 3) X 120	32	M16 X 120	32
450	18"	(M30 X 3) X 130	40	M33 X 130	40	1-1/4" X 5-1/4"	48	-	-	-	-
500	20"	(M30 X 3) X 140	40	M33 X 140	40	1-1/4" X 5-1/2"	48	-	-	-	-
600	24"	(M36 X 3) X 155	48	M36 X 155	40	1-1/2" X 6-1/4"	48	-	-	-	-

For pipe conveying oil, the flanges needs 16 screws instead of 8.

N.B - For Lug type valves with free holes use the same studs as referred in Wafer Type Valve table.

End Pipe Service

- Due to the particular seat perimeter, OVC Lug type butterfly valves can also be installed at the end of the pipe.
- That means on single flange service. In this case it is possible to remove downstream piping and make maintenance operations.
- For this particular service weld neck or socket flanges are necessary. When valve is correctly installed on single flange by means of screws will have zero leakage, no fluid infiltrations between flange and seat.
- We suggest not to use other types of flanges which would cause such infiltrations and make the seat slide into the body.
- Lug type butterfly valves were expressly designed for this service. But they cannot intercept liquids with pressure over then 10.5 bar. They are not suitable for gas or air lines on single flange service.
- After having removed the downstream piping we suggest to protect the valve with a blind flange.

BOLTING TORQUE

Recommended bolt tightening torques

VALVE SIZE		CONNECTION BOLT SIZE	MINIMUM	MAXIMUM
150 Class	2"	5/8"	20	60
	2 1/2"	5/8"	20	60
	3"	5/8"	20	60
	4"	5/8"	20	60
	5"	3/4"	30	100
	6"	3/4"	30	100
	8"	3/4"	30	100
	10"	7/8"	50	200
	12"	7/8"	50	200
	14"	1"	70	250
	16"	1"	70	250
	18"	1 1/8"	100	350
	20"	1 1/8"	100	350
	24"	1 1/4"	150	450

VALVE SIZE		CONNECTION BOLT SIZE	MINIMUM	MAXIMUM
300 Class	2"	5/8"	20	60
	2 1/2"	3/4"	30	100
	3"	3/4"	30	100
	4"	3/4"	30	100
	5"	3/4"	30	100
	6"	3/4"	30	100
	8"	3/4"	50	200
	10"	1"	70	250
	12"	1 1/8"	100	350
	14"	1 1/8"	100	350
	16"	1 1/4"	150	450
	18"	1 1/4"	150	450
	20"	1 1/4"	150	450
	24"	1 1/2"	200	600

OVC BUTTERFLY VALVE WEIGHT LIST

150 Class High Performance Butterfly Valve

SIZE	HPSS150W/ HPCS150W			HPSS150L/ HPCS150L		
	BARE SHAFT	W/ LEVER	W/ GEAR	BARE SHAFT	W/ LEVER	W. GEAR
2"	4.6	5.2	8.0	4.7	5.3	8.1
2.5"	4.7	5.3	8.1	4.8	5.4	8.2
3"	4.8	5.4	8.2	4.9	5.5	8.3
4"	6.8	7.4	10.3	8.3	8.9	11.7
5"	8.5	9.1	12	10.5	11.1	13.9
6"	10.2	10.9	13.9	12.4	13.0	16.0
8"	16.2	18.2	22.9	18.6	20.6	25.3
10"	25.2	22.2	32.4	31.4	33.4	38.5
12"	34.7	36.7	44.3	43.5	45.6	53.1
14"	81.9	-	91.4	85.6	-	95.0
16"	108.5	-	118.8	114.4	-	124.7
18"	157.8	-	168.4	165.5	-	176.2
20"	167.7	-	191.3	177.4	-	201.0
24"	289.1	-	312.6	301.5	-	325.1

300 Class High Performance Butterfly Valve

SIZE	HPSS300W/ HPCS300W			HPSS300L/ HPCS300L		
	BARE SHAFT	W/ LEVER	W/ GEAR	BARE SHAFT	W/ LEVER	W. GEAR
2"	4.6	5.2	8.0	4.7	5.3	8.1
2.5"	4.7	5.3	8.1	4.8	5.4	8.2
3"	4.8	5.4	8.2	4.9	5.5	8.3
4"	6.8	7.4	10.3	8.3	8.9	11.7
5"	8.5	9.1	12.0	10.5	11.1	13.9
6"	10.2	10.9	13.9	12.4	13.0	16.0
8"	16.2	18.2	22.9	18.6	21.6	25.3
10"	25.2	27.2	32.4	31.4	33.4	38.5
12"	34.7	36.7	44.3	43.5	45.6	53.1
14"	81.9	-	91.4	85.6	-	95.0
16"	108.5	-	118.8	114.4	-	124.7
18"	157.8	-	168.4	165.5	-	176.2
20"	167.7	-	191.3	177.4	-	201.0
24"	289.1	-	312.6	301.5	-	325.1

Installation Instructions

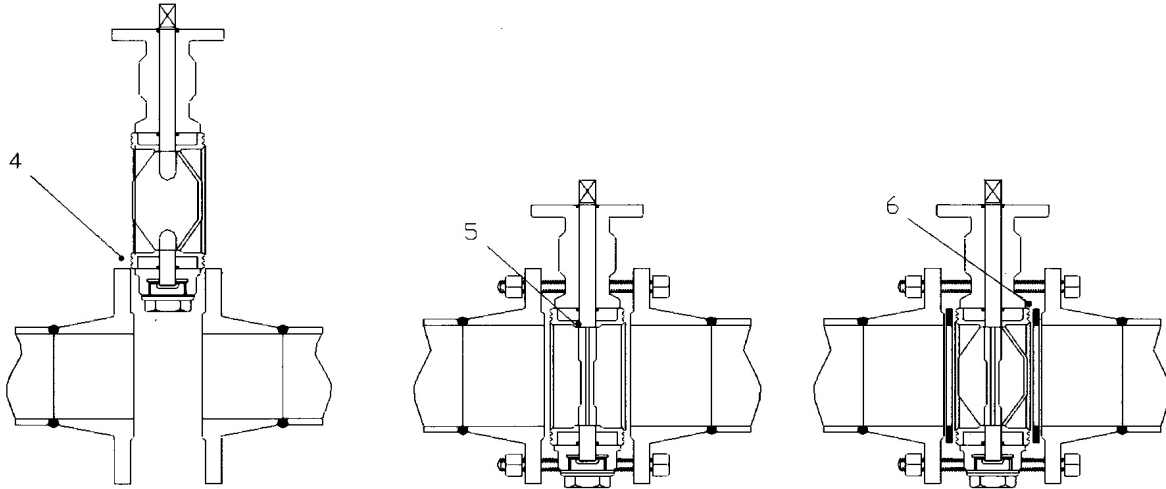
General Information on Butterfly Valves

- Before shipment, seat surface and stems can be lubricated with a mixture of silicon free grease and it can be removed with solvent. In case the valve is for oxygen, hydrogen and chlorine service, the seat duly selected, when cleaned and degreased, can be used with food products.
- Butterfly valve with disc and stems in stainless steel and with the seat duly selected, when cleaned and degreased, can be used with food products.
- The valve can be installed in the pipeline in any position.
- Before installing the valve, the pipeline must be cleaned from dirt and welding residues. Otherwise seat may be damaged.
- Pipe must be free of tension.
- Wafer and Lug type butterfly valves can be installed directly in between flanges without interposing any gasket. A single series of 'O' rings as of the seat profile of the vulcanized rubber guarantees a thorough external tightness.
- Installation in line related to wafer butterfly valve (on the existing pipe).
- Verify the distance between two flanges to be equal to face-to-face valve dimension.
- In order to facilitate installation of the valve, allow with adequate tools sufficient room in between flanges.
- Insert in the lower part of flanges at least two flange-bolts.
- Close disc at 70° when you do not use valve.
- Insert the valve in between flanges, valve shall be held by the two flange-bolts previously fitted in the lower part of flanges.
- Insert the flange-bolt through centering lugs of valve.
- Insert all the remaining flange-bolts aligning the valve with the flanges and tightening flange-bolts manually.
- Maintain the valve aligned, gradually remove flange spreaders and partially tighten bolts.
- Control open/close operation of valve would be easy and smooth.
- Open the valve and complete cross tighten the bolts to adequate torque.
- Installation of Lug type butterfly valves has same procedure of wafer type using studs instead of bolts and nuts.
- Installation in line related to wafer butterfly valve (in the new pipeline).
- Centering the two flanges with the valve body.
- Span the body with some flange-bolts and partially tighten the bolts.
- Finish tightening by uniform cross bolting.
- Use the flange-valve-flange unit to fit up and pipe centering.
- Tack-weld the flanges to the pipe.
- Remove the bolting and the valve from the flanges.
Important: Do not complete flanges welding procedure when the valve is inserted as high heat temperature can damage valve seat.
- Weld flanges to the pipe and wait until completely cooled.
- Install the valve following the installation instructions on existing pipeline.

Installing Procedure

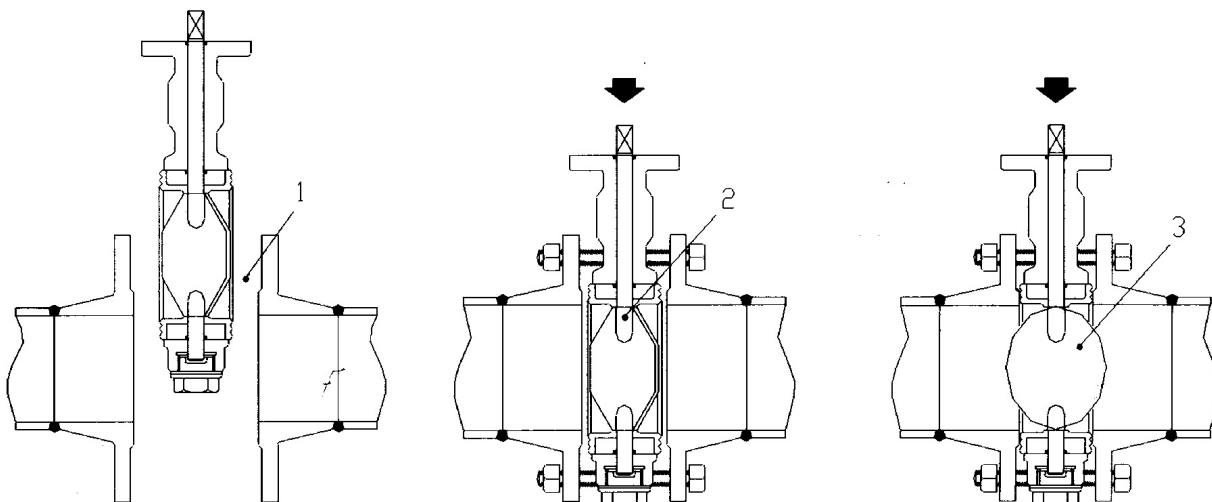
Correct Installing Procedure

- Spread flanges to facilitate valve insertion with disc in semi-closed position.
- This avoids disc edge to be damaged during installation and reduce interference; moreover reduces initial torque.
- Disc has to be completely open after having aligned valve in between flanges before tightening all bolts.



Incorrect Installing Procedure

- A pipe flange spreaded enough can tear rubber, open disc when installing the valve, may hit against pipe flanges and may cause damage to disc profile.
- Valve installation with totally closed disc can distort seat during bolt tightening and may increase initial torque.
- Do not use gaskets between valve and flanges.



Operating Instructions

Manual Operation

- Open and close operations are obtained with a quarter turn by handlever (90°). Handlever is supplied in plate epoxy coated from 50mm—150mm and ductile iron epoxy coated lever for 200mm, 250mm, & 300mm. When watching to the lever position, it is easy to identify whether the valve is opened or closed.
- The valve is in the open position when the lever is in line with the pipe (i.e. in line transversal to the valve).
- The valve is in closed position when the lever is transversal to the pipe. (i.e. in line with the valve)

Remote Control

- When the manual operation is not required, the valve can be operated automatically with remote control by means of an actuator either pneumatic or electric or gas over oil.
- When it is required pneumatic actuator with the valve, no assembly problems arise since the valve is supplied with actuator directly fitted.
- Usually the valve is supplied without limit switch as this makes part of the operators, when required.

Maintenance & Repair

- OVC butterfly valve features minimize wear and maintenance requirements. No routine lubrication required.
- In case of perfect valve closing, leakage is due to seat damage or to damaged disc edge. It will be then necessary to disassemble the valve and replace damaged parts.
- Precautions before disassembling the valve from the line.
- Fluid flowing in a pipe could be corrosive, toxic, flammable or contaminated.
- Before removing valve, inspect that no pressure is present in line, either upstream or downstream of the valve.
- Suggestion is made as to close valve upstream and downstream to isolate the valve to be repaired.
- Following safety precautions are recommended when repairing the valve.
 - Always wear protective glasses or eye shields.
 - Always wear gloves and overalls.
 - Wear protective footwear.
 - Ensure easy availability of running water.
 - Have ready an adequate fire extinguisher if media is flammable.
- Shut almost completely the disc. Remove all nuts and after all bolts with the exception of the two lowest sustaining the valve.
- Spread the flanges with proper tools and remove valve to substitute seat and disc (do not use the valve to spread flanges, as seat damage may result.)

Disassembling of Valves

- Remove locking screws between valve top parts of stem and operator or remove fixing bolts and nuts between top flange and gear operator.
- In case of lever operator, remove fixing bolts and nuts between top flange & indicator plate.
- Remove retainer plate screw.
- Pull out upper stem & packing.
- Un-tighten a screw M5 on the lower stem to pull it out.
- Remove disc: pushing and turning it out from the seat.
- Remove seat from the valve body applying pressure to by light wooden hammer blow or by using soft tools.

Assembling of Valves

- Lubricate with seat protection grease outside seat area and insert it in the valve body for longer seat life.
- Match perfectly seat holes with body holes using a round bar with a conical end.
- Apply seat protection grease on internal seat surface where contact with disc edge.
- Insert disc: pushing and rotating it towards the seat location, the square connection aligned to the valve neck.
- Before inserting upper stem, put packing into body, retainer plate to stem, then pull upper stem down to disc and fasten the retainer plate screw up.
- Install indicating plate or assemble gear unit.
- Insert lever into stem by light wooden hammer and fasten bolt.