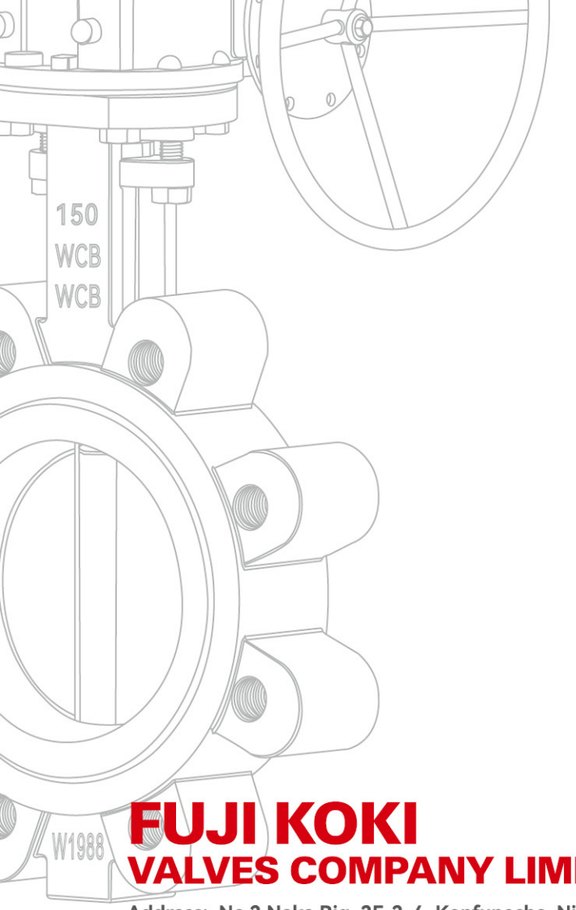

FUJI KOKI
VALVES COMPANY LIMITED
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City: Chuo-ku
State: Tokyo
Postcode: 103-0024
Country: Japan
Website: www.fkv.jp

FUJI KOKI VALVE

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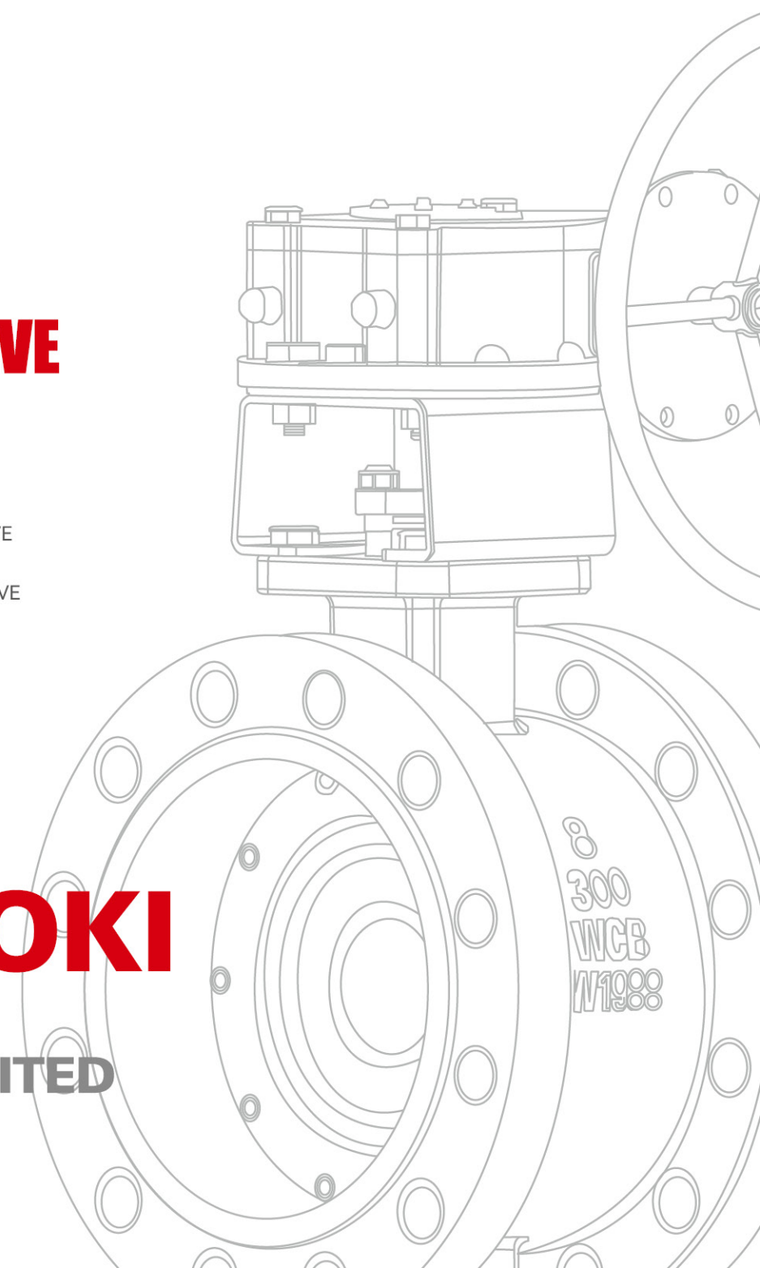
FKV®

BUTTERFLY VALVE SERIES

- ◎ TOB TRIPLE OFFSET BUTTERFLY VALVE
- ◎ DOB DOUBLE OFFSET BUTTERFLY VALVE
- ◎ CBV CONCENTRIC BUTTERFLY VALVE
- ◎ ACB ANTI-CORROSION BUTTERFLY VALVE



FUJI KOKI VALVES COMPANY LIMITED

FKV®

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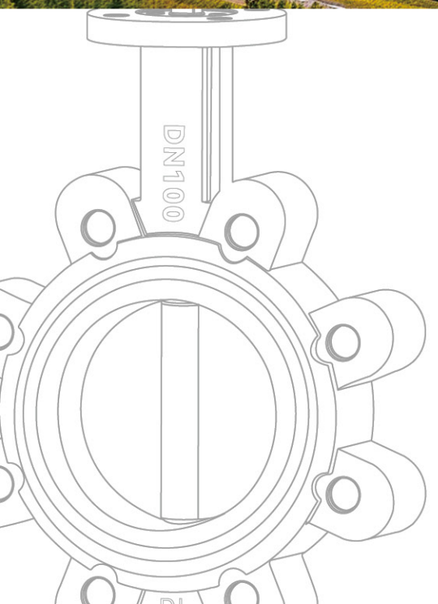


FUJI KOKI VALVE

FKV®

TRIPLE OFFSET
BUTTERFLY VALVE

TOB SERIES www.fkv.jp

TRIPLE OFFSET BUTTERFLY VALVE
Summary and Design Features

FKV®

Product Summary

Industrial valves require higher temperature and pressure ranges that are beyond the capacity of conventional butterfly valves. For this reason has developed the metal-seated triple offset butterfly valve as a solution for the toughest industrial applications. Triple offset series butterfly valve offers a light-weight, cost-effective, and compact design with a low operating torque. Additionally, it can replace traditional gate, globe, and ball valves in most industry applications.

The triple offset series butterfly valve has a true metal-seated, quarter-turn design for bi-dlrectional service. It is tire safe by design, and it eliminates the innate problem of material aging and deformation in sot seated butterfly valves. All-metal construction and increased material compatibility make butterfly valves ideal for most process and control applications.

Triple Offset Frictionless Design

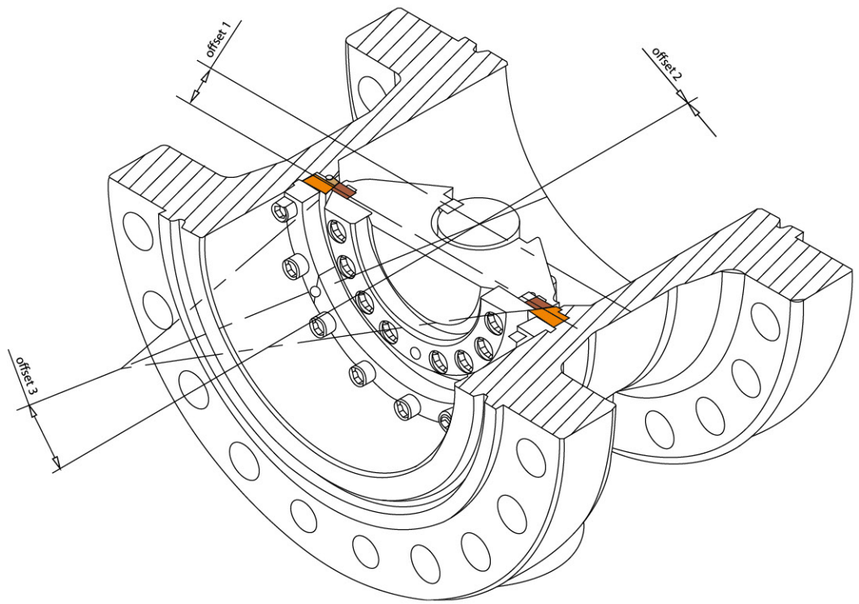
Offset 1: The shaft is offset from seat plane, allowing a continuous seating surface.

Offset 2: The shaft centerline is offset from disc centerline to lift the disc rapidly off and away from the seat when the valve is open.

Offset 3: The cone axis is offset from seal centerline, eradicating disc-seat friction.

Product Range

Size	NPS 3"-60" (DN80-DN1500)
Pressure Rating	Class 150-2500LB
Temperature Range	-196°C to +650°C
Body Materials	Carbon Steel, Stainless Steel, Alloy Steel, Duplex Steel
Disc Sealing Surface	Graphite/Metal laminated, Solid metal
End Connection	Wafer, Lug, Double Flange, Butt-welding
Design Standard	API 609, ASME B16.34, EN 593, ISO 10631
Flange Ends	ASME B16.5/B16.25, ASME B16.47, EN 1092, ISO 7005
Face-to-Face	API 609, ASME B16.10, EN 558, ISO 5752
Inspection and Testing	API 598, EN 12266-1, ISO 5208



Design Features

1.Low Operating Torque

Triple offset butterfly valve series combine triple offset with flexible laminated metal and graphite to assure a tight and uniform seal and reduce operating torque.

2.Zero Leakage

Laminated seal rings are designed to self align and allow valves to meet zero leakage per API 598.

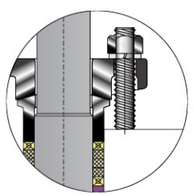
3.Fire Safe Design

Standard triple offset series butterfly valves are not soft seated and can fulfill the fire-safe requirements of API 607.

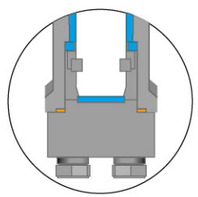
4.Anti-blowout Shaft

Double anti-blowout design satisfies API 609 and ASME B31.1 requirements through both internal and external stem retention.

Top Retention: Packing gland follower retains the stem integral collar.
Bottom Retention: T shaped attachment prevents stem blow-out.



Top Retention



Bottom Retention

5.Low Emission Shaft Seal

Our can supply low-emission stem seal with leakage rate up to 20 ppm. (20ppm per sniffing method with helium gas.)

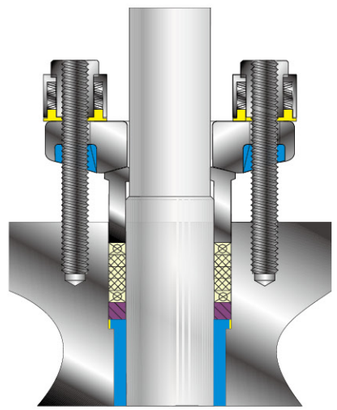
a. Shaft is fully guided by shaft bearing & gland follower to reduce side load due to line pressure thrust.

b. The packing set is pre-compressed and is a combination of braided graphite rings and die formed flexible graphite rings.

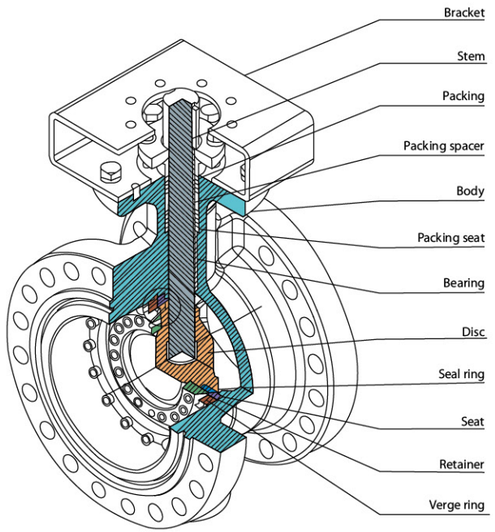
c. Controlled Ra0.4-Ra0.8 finish on the shaft and Ra1.6 on the stuffing box provides optimum packing and shaft sealing.

d. Optional live loaded gland flange available to provide constant packing compression to reduce fugitive emissions.

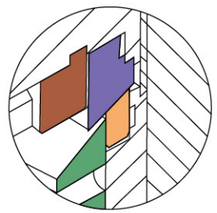
e. Optional shaft seal design available per shell MESC 77/312 & TA-Luft.



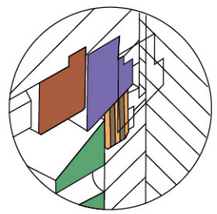
Main Component Diagram



Body Structure



Full metal seal



Multilayer seal

Sealing Structure

Main Material List

Part	Standard Material
Body	ASTM A216 WCB/STL.21 OVERLAY
Disc	ASTM A216 WCB
Ring Retainer	ASTM A105N NICKEL PLATED
Gasket	Spiral Wound Graphite
Seal Ring	Laminated UNS31803+Graphite
Screw	ASTM A193 B8
Washer	AISI 304
Stem	17-4PH
Pin	AISI 304
Key	17-4PH
Gland Flange	ASTM A105N
Packing Follower	ASTM A276 420
Bolt	ASTM A193 B7M
Nut	ASTM A194 2HM
Washer	AISI 1566
Packing	Reinforced Graphite/Graphite

Part	Standard Material
Spacer	ASTM A276 316L
Bearing	ASTM A276 316L NITRIDED
Blowout Proof Block	ASTM A276 316L NITRIDED
Bolt	ASTM A193 B8
Washer	AISI 304
Thrust Bearing	ASTM A276 316L NITRIDED
Gasket	Graphite
Bottom Flange	ASTM A105N
Stud	ASTM A193 B7M
Washer	AISI 1566
Bracket	AISI 1020
Key	17-4PM
Stud	ASTM A193 B7M
Washer	AISI 1566
Pin	AISI 304
Retainer Device	AISI 316

Flow Coefficient (Cv Value)

NPS (in)	150LB Disc Opening Angle									300LB Disc Opening Angle								
	10°	20°	30°	40°	50°	60°	70°	80°	90°	10°	20°	30°	40°	50°	60°	70°	80°	90°
3"	6	16	24	24	51	75	112	144	160	6	16	24	35	51	75	112	144	160
4"	12	29	44	44	93	136	203	261	290	12	29	44	64	93	136	203	261	290
6"	32	79	119	119	253	371	553	711	790	32	79	119	174	253	371	553	711	790
8"	58	146	219	219	467	686	1022	1314	1460	53	133	200	293	426	625	931	1197	1330
10"	101	253	380	380	810	1189	1771	2277	2530	84	211	317	464	675	992	1477	1899	2110
12"	159	398	597	597	1274	1871	2786	3582	3980	146	365	548	803	1168	1716	2555	3285	3650
14"	222	556	834	834	1779	2613	3892	5004	5560	185	462	693	1016	1478	2171	3234	4158	4620
16"	318	794	1191	1191	2541	3732	5558	7146	7940	251	628	942	1382	2010	2952	4396	5652	6280
18"	382	956	1434	1434	3059	4493	6692	8604	9560	344	859	1289	1890	2749	4037	6013	7731	8590
20"	544	1360	2040	2040	4352	6392	9520	12240	13600	418	1045	1568	2299	3344	4912	7315	9405	10450
24"	752	1880	2820	2820	6016	8836	13160	16920	18800	651	1628	2442	3582	5210	7652	11396	14652	16280
28"	1072	2680	4020	4020	8576	12596	18760	24120	26800	936	2340	3510	5148	7488	10998	16380	21060	23400
30"	1228	3070	4605	4605	9824	14429	21490	27630	30700	1160	2900	4350	6380	9280	13630	20300	26100	29000
32"	1400	3500	5250	5250	11200	16450	24500	31500	35000	1304	3260	4890	7172	10432	15322	22820	29340	32600
36"	1720	4300	6450	6450	13760	20210	30100	38700	43000	1660	4150	6228	9130	13280	19505	29050	37350	41500
40"	2276	5690	8535	8535	18208	26743	39830	51210	56900	1996	4990	7485	10978	15968	23453	34930	44910	49900
42"	2468	6170	9255	9255	19744	28999	43190	55530	61700	-	-	-	-	-	-	-	-	-
48"	3240	8100	12150	12150	25920	38070	56700	72900	81000	-	-	-	-	-	-	-	-	-

NPS (in)	600LB Disc Opening Angle									900LB Disc Opening Angle								
	10°	20°	30°	40°	50°	60°	70°	80°	90°	10°	20°	30°	40°	50°	60°	70°	80°	90°
3"	6	15	23	33	48	71	105	135	150	-	-	-	-	-	-	-	-	-
4"	10	25	38	55	80	118	175	225	250	-	-	-	-	-	-	-	-	-
6"	24	60	90	132	192	282	420	540	600	22	49	73	98	147	220	318	440	489
8"	43	108	162	238	346	508	756	972	1080	42	91	136	182	273	409	591	819	910
10"	68	170	255	374	544	799	1190	1530	1700	65	142	213	284	425	638	922	1276	1418
12"	101	252	378	554	806	1184	1764	2268	2520	97	210	315	421	631	946	1367	1892	2103
14"	163	407	610	895	1302	1912	2848	3661	4068	141	307	461	614	921	1382	1996	2764	3071
16"	215	538	807	1184	1722	2529	3766	4842	5380	196	426	639	852	1279	1918	2770	3836	4262
18"	299	747	1121	1643	2390	3511	5229	6723	7470	255	555	832	1109	1664	2495	3604	4991	5545
20"	393	982	1473	2160	3142	4615	6874	8838	9820	337	733	1100	1467	2200	3300	4767	6601	7334
24"	598	1494	2241	3287	4781	7022	10458	13446	14940	468	1017	1526	2034	3051	4577	6611	9154	10171

Notes:

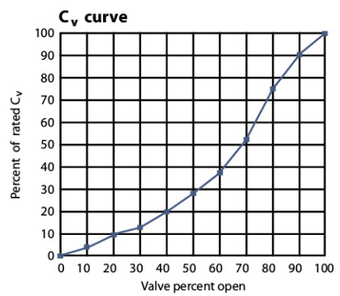
1. Definition:

Cv: The volume of water in gpm at 15°C that will pass through a valve with a pressure drop of 1 PSI.

Kv: The volume of water in m^3/hr at 15°C that will pass through a valve with a pressure drop of 1 bar.

2. Flow direction: vertical to shaft.

3. Cv=1.155 Kv

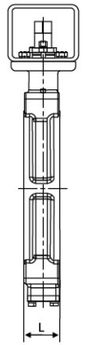


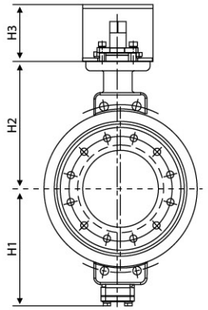
Operating Torque

NPS(in)	150LB N.m	150LB ISO 5211 Top Flange	150LB Stem Diamete Wafer	150LB Stem Diamete RF	300LB N.m	300LB ISO 5211 Top Flange	300LB Stem Diamete Wafer	300LB Stem Diamete RF
3"	80	F07	48	114	144	F07	48	114
4"	142	F07	54	127	258	F07	54	127
6"	362	F10	57	140	798	F12	59	140
8"	785	F12	64	152	1960	F14	73	152
10"	1080	F14	71	165	2270	F16	83	165
12"	1510	F14	81	178	2780	F16	92	178
14"	2458	F16	92	190	5680	F25	117	190
16"	2850	F25	102	216	6835	F25	133	216
18"	4536	F25	114	222	7358	F30	149	222
20"	5474	F25	127	229	10518	F30	159	229
24"	8240	F25	154	267	18393	F30	181	267
28"	11682	F30	165	292	27478	F35	229	292
30"	14340	F30	190	318	32971	F35	229	318
32"	17856	F30	190	318	41150	F40	241	318
36"	23345	F30	203	330	53700	F40	241	330
40"	28200	F35	216	410	68370	F40	300	410
48"	44400	F40	254	470	92970	F48	350	470
56"	64240	F40	318	530	141600	F48	390	530
60"	73520	F40	318	530	128000	F48	440	530

NPS(in)	600LB N.m	600LB ISO 5211 Top Flange	600LB Stem Diamete Wafer	600LB Stem Diamete RF	900LB N.m	900LB ISO 5211 Top Flange	900LB Stem Diamete Wafer	900LB Stem Diamete RF
3"	340	F10	54	180	560	F12	71	195
4"	633	F12	64	190	836	F14	92	229
6"	1630	F16	78	210	2180	F16	102	267
8"	3540	F16	102	230	4692	F16	140	292
10"	5462	F25	114	250	6596	F25	155	330
12"	6018	F25	140	270	7955	F30	178	356
14"	10913	F25	155	290	17838	F30	290	381
16"	15757	F30	178	310	23600	F35	310	406
18"	19805	F35	200	330	33734	F35	330	432
20"	25808	F35	216	350	44707	F40	350	457
24"	44799	F40	232	390	67240	F40	350	508
28"	66593	F40	292	430	124700	F48	390	548
30"	79506	F48	318	450	158845	F60	410	570
32"	90160	F48	318	470	179855	F60	425	580
36"	117500	F48	330	510	214580	F60	440	615
40"	155240	F60	410	550	314630	F60	465	640
48"	227000	F60	470	630	426875	-	-	-
56"	278000	F60	530	710	506785	-	-	-
60"	314000	F60	600	710	637890	-	-	-

1. Above torque value are calculated based on room temperature, if other size torque required, please contact with FKV valves.
2. When sizing the actuator, please consider safety fact 1.2~1.5.
3. For more details, the valve torque will be changed under different working temperature, and the torque will be changed for different seat materials. please contact with FKV valves.





Main Dimension & Weight(Wafer)

Class 150LB

NPS(in)	L	H1	H2	H3	Weight(kg)
3"	48	120	125	120	10
4"	54	150	160	120	11
6"	57	190	200	140	21
8"	64	220	235	140	32
10"	71	250	265	160	45
12"	81	290	305	160	80
14"	92	320	330	200	90
16"	102	350	360	200	110
18"	114	375	400	200	170
20"	127	415	450	250	190
24"	154	450	480	250	290
28"	165	515	535	250	392
30"	165	580	610	280	472
32"	190	590	620	280	528
36"	200	640	670	280	648
40"	216	700	730	300	926.4
48"	276	800	830	300	1496.8
56"	390	950	945	300	2000

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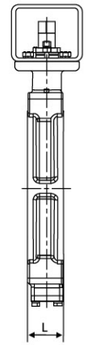
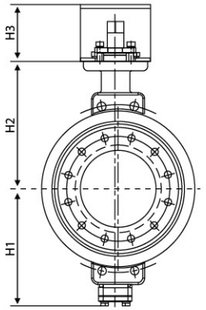
TRIPLE OFFSET BUTTERFLY VALVE
Dimension & Weight





Main Dimension & Weight(Wafer)

Class 300LB

NPS(in)	L	H1	H2	H3	Weight(kg)
3"	48	125	135	120	11
4"	54	160	165	120	13
6"	59	200	210	140	24
8"	73	235	240	140	36
10"	83	260	270	160	57.6
12"	92	300	310	160	80
14"	117	325	335	160	110
16"	133	365	370	200	160
18"	149	400	410	200	240
20"	159	450	460	200	300
24"	181	520	540	250	400
28"	209	580	610	250	656
30"	241	600	630	250	800
32"	241	630	660	280	928
36"	260	700	730	280	1148
40"	300	720	740	280	1420
48"	320	820	860	300	2120

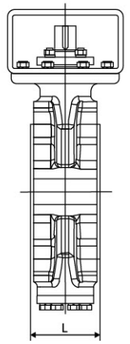
Main Dimension & Weight(Wafer)

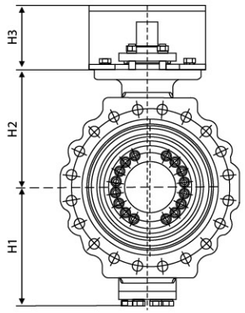
Class 600LB

NPS(in)	L	H1	H2	H3	Weight(kg)
4"	64	175	180	120	42
6"	78	225	235	140	50
8"	102	265	275	140	60
10"	117	310	320	160	105
12"	140	335	340	160	150
14"	155	375	385	160	220
16"	178	410	420	200	348.8
18"	200	440	450	200	509.6
20"	216	485	490	200	608
24"	232	550	610	250	710.4

TRIPLE OFFSET BUTTERFLY VALVE

Dimension & Weight





Main Dimension & Weight(Lug)

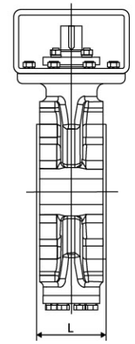
Class 150LB

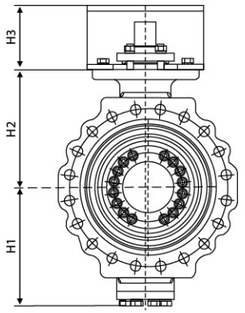
NPS(in)	L	H1	H2	H3	Weight(kg)
3"	48	120	125	120	10
4"	54	150	160	120	11
6"	57	190	200	140	21
8"	64	220	235	140	32
10"	71	250	265	160	45
12"	81	290	305	160	80
14"	92	320	330	200	90
16"	102	350	360	200	110
18"	114	375	400	200	170
20"	127	415	450	250	190
24"	154	450	480	250	290
28"	165	515	535	250	392
30"	165	580	610	280	472
32"	190	590	620	280	528
36"	200	640	670	280	648
40"	216	700	730	300	926.4
48"	276	800	830	300	1496.8
56"	390	950	945	300	2000

TOB SERIES www.fkv.jp

TRIPLE OFFSET BUTTERFLY VALVE

Dimension & Weight





Main Dimension & Weight(Lug)

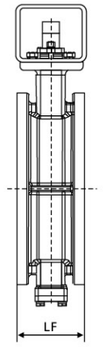
Class 300LB

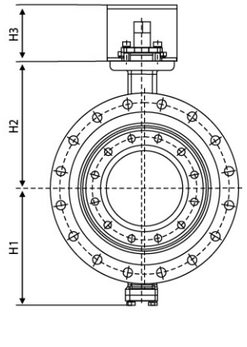
NPS(in)	L	H1	H2	H3	Weight(kg)
3"	48	125	135	120	11
4"	54	160	165	120	13
6"	59	200	210	140	24
8"	73	235	240	140	36
10"	83	260	270	160	57.6
12"	92	300	310	160	80
14"	117	325	335	160	110
16"	133	365	370	200	160
18"	149	400	410	200	240
20"	159	450	460	200	300
24"	181	520	540	250	400
28"	209	580	610	250	656
30"	241	600	630	250	800
32"	241	630	660	280	928
36"	260	700	730	280	1148
40"	300	720	740	280	1420
48"	320	820	860	300	2120

Main Dimension & Weight(Lug)

Class 600LB

NPS(in)	L	H1	H2	H3	Weight(kg)
4"	64	175	180	120	42
6"	78	225	235	140	50
8"	102	265	275	140	60
10"	117	310	320	160	105
12"	140	335	340	160	150
14"	155	375	385	160	220
16"	178	410	420	200	348.8
18"	200	440	450	200	509.6
20"	216	485	490	200	608
24"	232	550	610	250	710.4





Main Dimension & Weight(Flange)

Class 150LB

NPS(in)	LF	H1	H2	H3	Weight(kg)
3"	114	120	125	120	30
4"	127	150	160	120	45
6"	140	190	200	140	55
8"	152	220	235	140	90
10"	165	250	265	160	125
12"	178	290	305	160	165
14"	190	320	330	200	200
16"	216	350	360	200	260
18"	222	375	400	200	315
20"	229	415	450	250	395
24"	267	450	480	250	570
28"	292	515	535	250	702
30"	318	580	610	280	990
32"	318	590	620	280	1015
36"	330	640	670	280	1585
40"	410	700	730	300	1995
48"	470	800	830	300	3240
52"	670	875	875	300	4050
56"	710	950	945	300	4450
60"	750	1030	1020	400	5652

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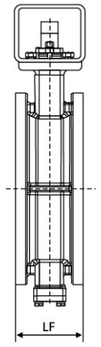
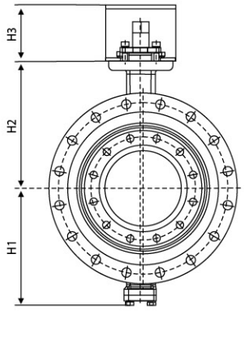
TRIPLE OFFSET BUTTERFLY VALVE
Dimension & Weight





Main Dimension & Weight(Flange)

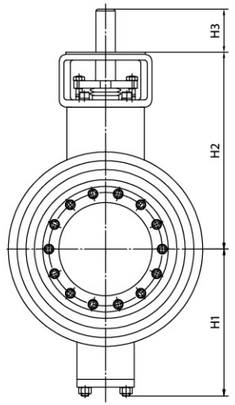
Class 300LB

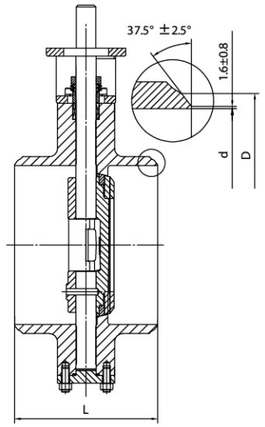
NPS(in)	LF	H1	H2	H3	Weight(kg)
3"	114	125	135	120	35
4"	127	160	165	120	45
6"	140	200	210	140	80
8"	152	235	240	140	120
10"	165	260	270	160	175
12"	178	300	310	160	235
14"	190	325	335	160	320
16"	216	365	370	200	420
18"	222	400	410	200	495
20"	229	450	460	200	605
24"	267	520	540	250	905
28"	292	580	610	250	1382
30"	318	600	630	250	1735
32"	318	630	660	280	1805
36"	330	700	730	280	2460
40"	410	720	740	280	2270
48"	470	820	860	300	3875

Main Dimension & Weight(Flange)

Class 600LB

NPS(in)	LF	H1	H2	H3	Weight(kg)
4"	190	175	180	120	75
6"	210	225	235	140	130
8"	230	265	275	140	205
10"	250	310	320	160	320
12"	270	335	340	160	440
14"	290	375	385	160	490
16"	310	410	420	200	690
18"	330	440	450	200	820
20"	350	485	490	200	1100
24"	390	550	610	250	1620





Main Dimension(Buttweld)

Class 150LB

NPS(in)	L	D	d	H1	H2	H3	Weight(kg)
3"	180	190	152.4	118	221	25	18
4"	190	230	190.5	130	243	30	20
5"	200	255	245.9	153	261	35	32
6"	210	280	241.3	165	273	40	41
8"	230	345	298.5	198	309	45	56
10"	250	405	362	235	337	50	69
12"	270	485	431.8	274.5	382.5	67	101
14"	290	535	476.3	314	435	81	148
16"	310	595	539.8	344	457	87	193
18"	330	635	577.9	369	510	98	221
20"	350	700	635	410.5	579	105	306
24"	390	815	749.3	472.5	635	117	469
28"	430	925	863.3	529.5	671	117	684
32"	470	1060	977.9	648	800	120	954
36"	510	1170	1085.8	708.2	862	128	1293
40"	550	1290	1200.2	766.2	955	170	1431
48"	630	1510	1422.4	884	1088	182	2121

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TRIPLE OFFSET BUTTERFLY VALVE
Dimension & Weight

Main Dimension & Weight(Buttweld)

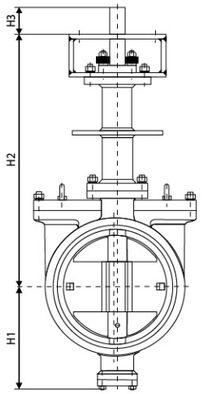
Class 300LB

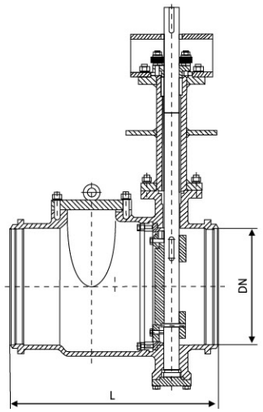
NPS(in)	L	D	d	H1	H2	H3	Weight(kg)
3"	180	210	168.3	145	159	34	19
4"	190	255	200	165	194	34	21
5"	200	280	235	200	269	64	35
6"	210	320	269.9	200	269	64	45
8"	230	380	330.2	235	285	79	60
10"	250	445	387.4	275	325	79	74
12"	270	520	450.8	315	387	79	134
14"	290	585	514.4	350	410	79	159
16"	310	650	571.5	385	465	109	253
18"	330	710	628.6	415	528	109	300
20"	350	775	685.8	450	561	129	344
24"	390	915	812.8	530	636	129	526
28"	430	1035	939.8	590	800	199	740
32"	470	1150	1054.1	720	860	199	1187
36"	510	1270	1168.4	780	940	199	1395
40"	550	1240	1155.7	750	910	199	1645
48"	630	1465	1371.6	850	1000	249	2296

Main Dimension & Weight(Buttweld)

Class 600LB

NPS(in)	L	D	d	H1	H2	H3	Weight(kg)
3"	180	210	168.3	145	202	44	21
4"	190	275	215.9	180	208	44	24
5"	200	330	266.7	210	235	79	40
6"	210	355	292.1	225	302	79	59
8"	230	420	349.2	265	315	79	68
10"	250	510	431.8	310	376	79	111
12"	270	560	489	340	442	109	153
14"	290	605	527	365	457	109	243
16"	310	685	603.2	410	561	129	303
18"	330	745	654	450	610	129	340
20"	350	815	723.9	485	645	129	412
24"	390	940	838.2	555	730	178	607





Main Dimension & Weight(Cryogenic Side Entry)

Class 150LB

DN(mm)	NPS(in)	L	H1	H2	H3	ISO 5211	Weight(kg)
200	8"	482	209	705	60	F12	130
250	10"	602	239	750	60	F14	160
300	12"	620	264	795	80	F14	250
350	14"	649	304	810	80	F16	330
400	16"	692	340	840	90	F25	360
450	18"	712	395	885	90	F25	450
500	20"	761	401	970	90	F25	510
600	24"	827	463	1065	90	F25	670
700	28"	881	532	1150	120	F30	1120
750	30"	951	572	1240	150	F30	1425
800	32"	974	620	1280	150	F30	1590
900	36"	980	682	1330	150	F30	2015
1000	40"	1015	752	1495	150	F35	2433
1050	42"	1015	752	1495	150	F35	2550

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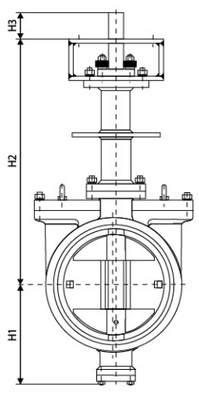
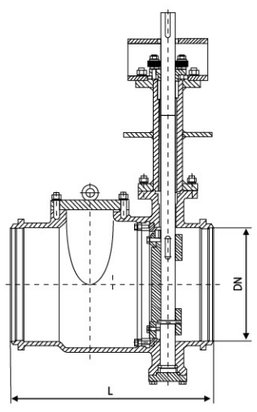
TRIPLE OFFSET BUTTERFLY VALVE
Dimension & Weight





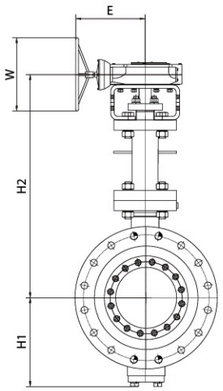
Main Dimension & Weight(Cryogenic Side Entry)

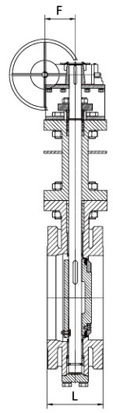
Class 300LB

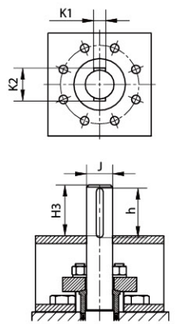
DN(mm)	NPS(in)	L	H1	H2	H3	ISO 5211	Weight(kg)
200	8"	562	205	720	60	F14	200
250	10"	612	245	800	80	F14	240
300	12"	649	280	825	80	F14	300
350	14"	713	315	880	90	F25	430
400	16"	733	362	900	100	F25	570
450	18"	781	403	985	120	F25	730
500	20"	796	440	990	150	F30	900
600	24"	887	500	1135	150	F35	1200
650	26"	910	554	1350	150	F35	1300
700	28"	941	605	1350	150	F35	1700
750	30"	1001	620	1380	160	F40	1900
800	32"	1020	662	1420	180	F40	2250
900	36"	1104	729	1520	180	F40	2875
1000	40"	1183	797	1575	200	F40	4300
1050	42"	1183	797	1575	200	F40	4500

TRIPLE OFFSET BUTTERFLY VALVE

Dimension & Weight







Main Dimension(Cryogenic Top Entry)

Class 150LB

NPS(in)	L	H1	H2	H3	h	W	E	F	J	K1	K2	ISO 5211
6"	140	185	670	52	50	300	282	71	26	8	32	F12
8"	152	220	690	64.5	56	600	305	86	28	8	34	F14
10"	165	250	800	57.5	56	600	305	86	32	10	38	F14
12"	178	280	825	65.5	63	600	346	104.5	35	10	41	F14
14"	190	310	960	85.5	80	600	346	104.5	40	12	46	F16
16"	216	370	1010	78.5	80	600	348	130	45	14	52	F16
18"	222	390	1085	105	100	600	398	130	50	14	57	F25
20"	229	425	1115	104.5	110	600	398	130	55	16	63	F25
24"	267	500	1180	107.5	110	600	480	182	60	18	68	F25
28"	292	560	1380	156.5	160	800	471	209	85	22	95	F35
30"	318	630	1480	160	160	600	511	256	95	25	105	F35
32"	318	630	1495	161.5	160	600	511	256	95	25	105	F35
36"	330	675	1525	156	160	600	511	256	105	28	117	F35
40"	410	715	1950	154	160	800	650	247	115	32	129	F40
42"	410	770	1660	159	160	800	705	280	115	32	129	F40
48"	470	910	1860	168.5	190	800	790	343	135	36	151	F48

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TRIPLE OFFSET BUTTERFLY VALVE

Dimension & Weight

Main Dimension(Cryogenic Top Entry)

Class 300LB

NPS(in)	L	H1	H2	H3	h	W	E	F	J	K1	K2	ISO 5211
6"	140	195	650	52.5	50	300	212	55	28	8	34	F12
8"	152	230	705	65.5	63	600	275	81	35	10	41	F14
10"	165	280	870	85	80	600	346	104.5	40	12	46	F16
12"	178	320	905	86.5	80	600	346	104.5	45	14	52	F16
14"	190	365	1005	105	100	600	398	130	55	16	63	F25
16"	216	405	1065	104	100	600	398	140	60	18	68	F25
18"	222	430	1130	114.5	110	600	429.5	182	65	18	73	F25
20"	229	470	1165	116	120	600	410	182	70	20	79	F30
24"	267	535	1280	115	120	800	450.5	209	75	20	84	F35
28"	292	615	1435	160.5	160	800	450.5	209	95	25	105	F35
30"	318	670	1650	161	160	800	650	279	115	32	129	F40
32"	318	685	1695	161	160	800	650	246.4	115	32	129	F40
36"	330	770	1850	186	185	800	731.5	343	135	32	151	F48
40"	410	765	1950	186	185	800	731.5	343	135	32	151	F48
42"	410	790	1970	195	200	800	764.5	381	145	36	161	F48
48"	470	910	2080	191	200	800	764.5	381	155	40	173	F48

Main Dimension(Cryogenic Top Entry)

Class 600LB

NPS(in)	L	H1	H2	H3	h	W	E	F	J	K1	K2	ISO 5211
6"	210	235	772	105	100	600	275	130	40	12	46	F16
8"	230	275	837	105	100	600	346	140	50	14	57	F25
10"	250	310	925	105	100	600	398	140	55	16	63	F25
12"	270	370	970	115	110	600	410	140	65	18	73	F25
14"	290	395	1080	115	110	600	410	182	70	20	79	F30
16"	310	440	1115	155	150	600	451	209	75	20	84	F35
18"	330	485	1415	165	160	600	471	279	95	25	105	F35
20"	350	520	1355	165	160	800	650	279	105	28	117	F35
24"	390	570	1490	165	160	800	650	279	115	32	129	F40
28"	430	650	1660	205	200	800	793.2	381	135	36	151	F48
30"	470	690	1720	205	200	800	793.2	381	155	40	173	F48
32"	470	725	1800	205	200	800	793.2	381	155	40	173	F48
36"	510	810	1870	275	270	800	1095	450	175	45	195	F60

DOUBLE OFFSET
BUTTERFLY VALVE

DOB SERIES www.fkv.jp

Product Summary

Industrial valves normally require wider temperature and pressure ranges, which conventional resilient seated butterfly valve can not comply, this have led to development of high performance butterfly valve.
Double offset series butterfly valve is double offset design which has an advantage of light weight, compact design, cost effective and low operation torque.

The double offset shaft and disc arrangement provides camming action to the disc which disengages from the seat at minimal rotation. This design minimizes wear points at the top and bottom of the seat typical with conventional butterfly valves.

Product Range

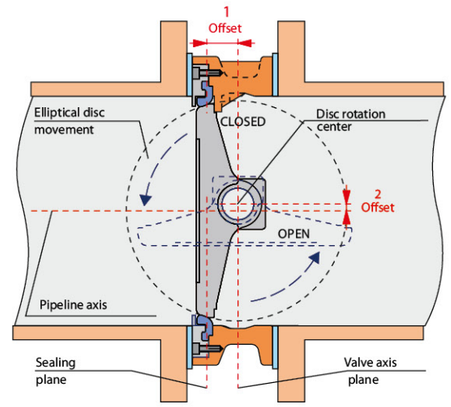
Size	NPS 2"~48"(DN50~DN1200)
Pressure Rating	Class 150~600LB
Temperature Range	-50°C to +220°C, -100°C to +360°C(Metal Seat)
End Connection	Wafer, Lug, Double Flange
Body Materials	Carbon Steel, Stainless Steel, Alloy Steel, Duplex Steel
Seat	NBR, EPDM, VITON, PTFE, RPTFE
Design Standard	API 609, ASME B16.34, MSS SP-67 EN 593
Face to Face	API 609, ASME B16.10, EN 558, ISO 5752
Flange Ends	ASME B16.5, ASME B16.47, EN 1092, ISO 5752 Series 20, BS 5155 Series 4
Inspection and Testing	API 598, EN 12266-1, ISO 5208

Double Offset Frictionless Design

Due to the double offset movement, the rotation of the disc is eccentric over the seat.

The rotational circular movement of the disc turns into an elliptical movement.So, the disc achieves just a few degrees contact with the seat before the valve is fully closed.

Double offset design characteristics:
• Longer lifetime, minimum friction between disc and seat.
• Tight sealing in closed position regardless the pressure due to the strain of disc over the seat.
• Self sealing mechanism that assures tight sealing and low torque values.
• The offset shaft design allows an easy replacement of seat without dismantling the shaft or other inner components assures quick on site maintenance.
•Colossus double offset butterfly valves provide the high performance of ball and gate valves with the low cost and light weight characteristics of butterfly valves.



Low Emission Shaft Seal

FKV standard emission control is 20 ppm.

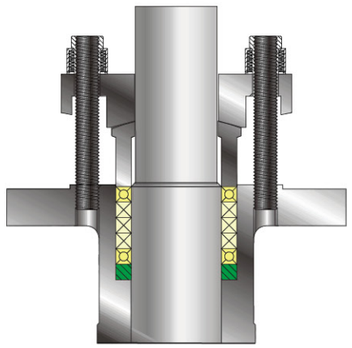
a. Shaft is fully guided by shaft bearing & gland follower to avoid any side load due to line pressure thrust.

b. The packing set is pre-compressed and is a combination of braided graphite rings top and bottom with die formed flexible graphite rings between.

c. Controlled Ra0.4~Ra0.8 finish on the shaft and Ra1.6 on the stuffing box provides optimum packing and shaft sealing performance.

d. Optional live loaded gland flange is available to provide constant packing compression to reduce fugitive emission from shaft seal.

e. Optional shaft seal design per shell MESC 77/312 & TA-Luft is also available upon request.



Seat Structure

1.Double Offset PTFE Seat Butterfly Valve

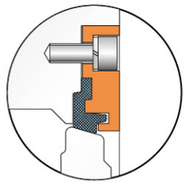
A surplus between PTFE seat and disc ensures the seal in low pressure. The force of medium always pushes seat contacting to sealing surface and becomes more reliable in high pressure. The disc surface is a sphere design to reduce frictional force, and the seat can be replaced easily.

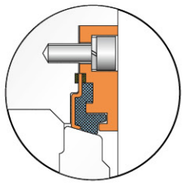
2.Double Offset Fire Safe PTFE Butterfly Valve

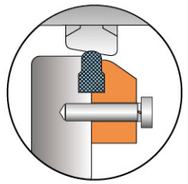
Fire Safe Seat with dual seal including primary PTFE seat insert and metal seat. In the event that the PTFE insert is destroyed, the secondary metal seat provides effective shut-off. The DOV fire safe certificate approved by Lioyd's Register.

3.Double offset Rubber Seat Butterfly Valve

A variety of rubber seat, to meet the needs of a larger size. The disc surface is designed into sphere type to reducing contacting area and frictional force which extends life. Seat can be replaced or recharge easily.


PTFE/R-PTFE


PTFE FIRE


RUBBER

Seat Application

Soft seat: R-PTFE

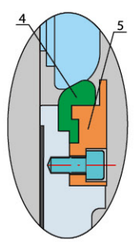
Temperature: From -50°C to +220°C.
Class VI tighness, 0% leakage, Class 150/300/600LB.

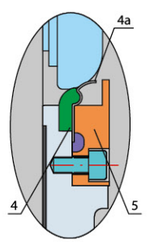
The retainer, 5, holds and isolates the R-PTFE polymer, 4, from direct contact with the pipe flange, keeping the seat in static position, without deformations.
Packings, which are used in the top of the valve shaft, are chevron type 60°, and made of PTFE material; as a special request they can be made of graphite.
The R-PTFE seat (PTFE+ 25% Glass fiber) can be used with all kinds of chemicals, except alkali metals in the elemental state, chlorine trifluoride, elemental fluorine at high temperatures and pressures or its by-products, concentrated nitric acid and sulfuric acid to 65% or higher.

Fire safe certifcate for soft seat.

Generally, the use of R-PTFE seat is recommended in very aggressive chemical circuits and in circuits where different kinds of products are used, such as:

- Vacuum Services
- Chemical
- Petroleum products
- Ethylene
- LPG/ LNG
- Vegetable oils
- Derivatives of hydrocarbons
- Steam
- Air
- Drinking water
- Saturated water
- Seawater





Hard seat: Metal-Metal

Temperature: From -100°C to +360°C.
Special design for 500°C.
Class V tighness, Class 150/300/600LB.

Metal seat, 4, can be rigid or flexible, depending on the service.
The spherical surface of the disc in these seats is coated with hard chromium or it can be stellited if service demands it.

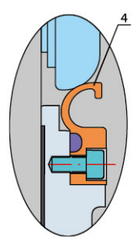
Packings are made of graphite and bushes are stainless steel coated with a PTFE alloy and graphite.

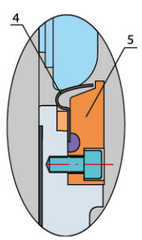
Metal-Metal seat complies with BS 6755 part 2 or API 6FA/607 (Fire Safety).

It is usually used in services where the R-PTFE is not suitable due to temperature or any other exceptions.

Besides the applications mentioned for R-PTFE, metal-metal seat is also valid for:

- Saturated Steam
- Thermal insulation gases
- Bitumen / Asphalt
- Corrosive liquid
- Thermal Oil
- Cogeneration





Operating Torque and Flow Coefficient (Cv value)

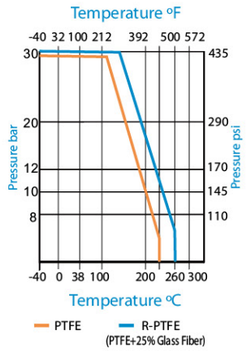
NPS (in)	150LB				300LB				600LB			
	N.m		ISO 5211 Top Flange	Cv	N.m		ISO 5211 Top Flange	Cv	N.m		ISO 5211 Top Flange	Cv
	Stem Downstream	Stem Upstream			Stem Downstream	Stem Upstream			Stem Downstream	Stem Upstream		
2"	21	30	F07	65	/	/	F07	65	/	/	F07	48
2.5"	24	34	F07	113	53	76	F07	113	78	88	F07	86
3"	26	36	F07	172	55	78	F07	172	113	164	F07	132
4"	36	52	F07	385	79	113	F07	385	215	305	F07	270
6"	95	136	F07 & F10	1050	237	339	F10	1050	463	655	F12	850
8"	177	237	F07 & F10	2180	418	599	F12	1895	1107	1582	F14	1400
10"	324	463	F10 & F14	3280	791	1130	F14	3050	1898	2712	F16	2010
12"	514	735	F12	5100	1186	1695	F16	4800	2373	3390	F25	2980
14"	751	1074	F14	5800	1740	2486	F16	5395	3390	4858	F25	3900
16"	1187	1480	F16	9287	3005	4293	F25	7900	5141	7344	F25	5000
18"	1740	2486	F16	11400	3559	5084	F25	10086	7276	10390	F25	6000
20"	2136	3051	F16 & F25	13800	4824	6892	F25	11300	9830	14010	F30	8000
24"	3480	4972	F16 & F25	21600	7513	10734	F25	16980	13897	19772	F30	11000
26"	4580	5980	F25 & F30	21600	/	/	F25	16980	/	/	F30	11000
28"	5029	7176	F25 & F30	28080	/	/	F30	23000	/	/	F35	13000
30"	5933	8475	F25 & F30	38740	16609	23727	F35	26520	24518	35025	F35	15400
32"	6644	9492	F25 & F30	44070	/	/	F35	31200	/	/	F40	17500
36"	8701	12430	F25 & F30	55800	22936	32766	F35	39450	/	/	F48	22360
40"	15375	16560	F30	68860	31478	44968	F40	50160	/	/	F48	27600
48"	29870	31415	F30	99200	45555	65079	F40	74500	/	/	F60	39750

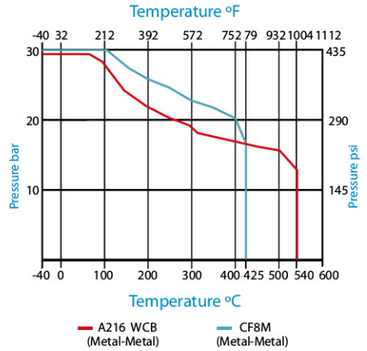
Note:
1. Above torque value are calculated based on room temperature, if other size torque required, please contact with FKV valves.
2. When sizing the actuator, please consider safety fact 1.2~1.5.
3. For more details, the valve torque will be changed under different working temperature, and the torque will be changed for different seat materials. please contact with FKV valves.
4. Cv value is based on 90° disc open angle.

Pressure and Temperature

Research and simulation of material mechanical properties evolution subjected to high or very low temperaatures.

The charts show the range of temperature and pressure depending on disc and seat materials.





Main Material List

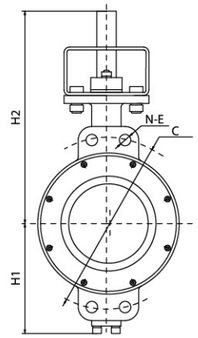
Item	Designation	Material
1	Body	CF8M or A216 WCB
2	Shaft	F316
3	Bush	CF8M+ PTFE+ Gr
4	Packing Washer	CF8M+ PTFE+ Gr
5	Bracket	CF8M or A216 WCB
6	Shaft Retainer Ring	F316
7	Screw	A4 (F316)
8	Bottom Cover Screw	A4 (F316)
9	Pin	A4 (F316)
10	Bottom Cover	CF8M or A216 WCB
11	Gland Flange	CF8M
12	Gland Bolt	A4 (F316)
13	Nut	A4 (F316)
14	Spring Washer	A4 (F316)
15	Bracket Top Bearing	CF8M + PTFE + Gr
16	Screw	A4 (F316)
17	Spring Washer	A4 (F316)

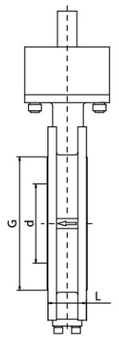
Hard Seat (Metal - Metal)

Item	Designation	Material
1	Disc	CF8M + hard chrome (polished)
2	Gasket	Graphite
3	Packing	Graphite
4	Bottom Cover Seal	Graphite
Metal- Metal. FLEXIBLE Type		
5	Seat (sheet)	F316L
6	Retainer	F316L
Metal - Metal. RIGID Type		
7	Seat (machined)	F316L

Soft Seat (R - PTFE)

Item	Designation	Material
1	Disc	CF8M (grinding and polishing)
2	Retainer	F316L
R-PTFE		
3	RPTFE Seat	PTFE + 25% Glass Fiber
4	Packing	PTFE
5	Cap Packing	PTFE
R- PTFE / FIRE SAFE		
6	RPTFE Seat	PTFE + 25% Glass Fiber
7	Flexible Seat	F316L
8	Gasket	Graphite
9	Packing	Graphite
10	Cap Packing	Graphite





Main Dimension & Weight(Wafer)

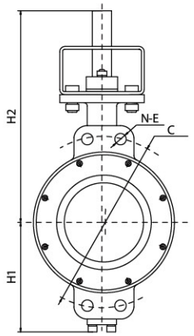
Class 150LB

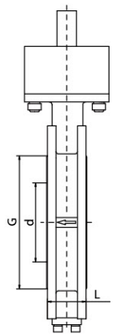
NPS(in)	L	d	G	C	N	E	H1	H2	Weight(kg)
2"	43	51	92	120.7	2	Φ19	80	160	4
3"	48	86	127	152.5	2	Φ19	80	180	7
4"	54	110	157	190.5	2	Φ19	100	200	10
5"	57	131	186	216	2	Φ22	119	235	14
6"	57	156	216	241.5	2	Φ22	135	252	11
8"	64	203	270	298.5	2	Φ22	190	293	25
10"	71	254	324	362	2	Φ25	250	337	39
12"	81	305	381	432	2	Φ25	290	373	51
14"	92	337	413	476	2	Φ29	300	521	80
16"	102	387	470	539.5	4	Φ29	340	555	104
18"	114	438	533	578	4	Φ32	380	620	153
20"	127	489	584	635	4	1⅛	390	673	192
24"	154	591	692	749.5	4	1¼-8	470	772	288
28"	165	692	762	795	4	Φ22	485	935	340
					4	3/4-10			
30"	190	743	813	846	2	Φ22	517	993	510
					6	3/4-10			
32"	190	781	964	900	1	Φ22	537	1000	595
					7	3/4-10			
36"	203	876	972	1010	8	7/8-9	610	1113	680
40"	216	976	1080	1120.5	4	Φ29	684	1220	1054
					4	1-8			
48"	254	1168	1289	1335	3	Φ32	800	1370	1849
					5	1⅛-8			

Note: 1. Flange Dimensions of 26" and large size are according to ASME B16.47 B Series.

DOUBLE OFFSET BUTTERFLY VALVE

Dimension & Weight





Main Dimension & Weight(Wafer)

Class 300LB

NPS(in)	L	d	G	C	N	E	H1	H2	Weight(kg)
2"	43	44	92	127	2	Φ19	80	151	6
3"	48	86	127	168.5	2	Φ22	88	-	9
4"	54	110	157	200	2	Φ22	110	-	11
5"	59	127	186	235	2	Φ22	128	233	14
6"	59	152	216	269.9	2	Φ22	149	-	18
8"	73	203	270	330	4	Φ25	235	321	33
10"	83	254	324	387	4	1-8	290	393	26
12"	92	305	381	451	4	1⅛-8	305	433	40
14"	117	337	413	514.5	4	1⅛-8	348	622	125
16"	133	388	470	571.5	4	1¼-8	365	718	139
18"	149	432	533	628.5	4	1¼-8	415	745	252
20"	159	483	584	686	4	1¼-8	430	864	284
24"	181	584	692	813	4	1½-8	501	929	509

Main Dimension & Weight(Wafer)

Class 600LB

NPS(in)	L	d	G	C	N	E	H1	H2	Weight(kg)
3"	54	88	127	168	4	3/4-10	102	231	11
4"	64	114	157	216	4	7/8-9	124	269	20
6"	78	164	216	292	4	1-8	166	394	50
8"	102	200	270	349	4	1⅛-8	256	529	70
10"	117	248	324	432	4	1¼-8	308	611	112
12"	140	298.5	381	489	4	1¼-8	348	675	163

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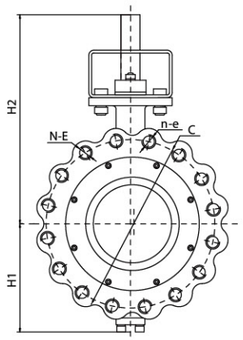
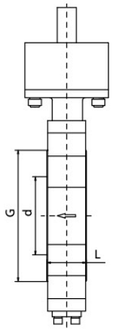
DOUBLE OFFSET BUTTERFLY VALVE

Dimension & Weight



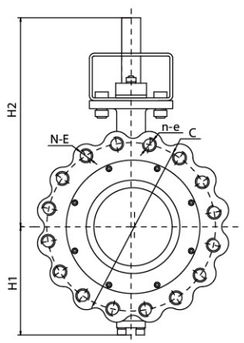


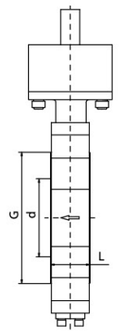
Main Dimension & Weight(Lug)

Class 150LB

NPS(in)	L	d	G	C	N	E	n	e	H1	H2	Weight(kg)
2"	43	51	92	120.7	4	5/8-11	-	-	62.50	194	6
3"	48	86	127	152.5	4	5/8-11	-	-	80	182	9
4"	54	110	157	190.5	8	5/8-11	-	-	100	200	12
5"	57	131	186	216	8	3/4-10	-	-	119	252	16
6"	57	156	216	241.5	8	3/4-10	-	-	135	280	14
8"	64	203	270	298.5	8	3/4-10	-	-	190	310	32
10"	71	254	324	362	12	7/8-9	-	-	250	354	48
12"	81	305	381	432	12	7/8-9	-	-	290	373	70
14"	92	337	413	476	12	1-8	-	-	300	525	102
16"	102	387	470	539.5	16	1-8	-	-	340	550	144
18"	114	438	533	578	16	1⅛-8	-	-	380	637	188
20"	127	489	584	635	16	1⅛-8	4	1⅛-8	390	720	244
24"	154	591	692	749.5	16	1¼-8	4	1¼-8	470	797	378
28"	165	692	762	795	36	3/4-10	4	3/4-10	470	875	486
30"	190	743	813	846	37	3/4-10	7	3/4-10	517	945	655
32"	190	781	864	900	41	3/4-10	7	3/4-10	537	1000	755
36"	203	876	972	1010	39	7/8-9	5	7/8-9	610	1051	820
40"	216	976	1080	1120.5	40	1-8	4	1-8	684	1074	1054
48"	254	1168	1289	1335	39	1⅛-8	5	1⅛-8	800	1247	1849

Note: 1. Flange Dimensions of 26" and large size are according to ASME B16.47 B Series.





Main Dimension & Weight(Lug)

Class 300LB

NPS(in)	L	d	G	C	N	E	n	e	H1	H2	Weight(kg)
2"	43	44	92	127	8	5/8-11	-	-	80	151	10
3"	48	86	127	168.5	8	3/4-10	-	-	88	-	13
4"	54	110	157	200	8	3/4-10	-	-	110	-	16
5"	59	127	186	235	8	3/4-10	-	-	128	233	19
6"	59	152	216	269.9	12	3/4-10	-	-	149	-	24
8"	73	203	270	330	12	7/8-9	-	-	235	321	45
10"	83	254	324	387	12	1-8	4	1-8	290	393	49
12"	92	305	381	451	12	1⅛-8	4	1⅛-8	305	433	74
14"	117	337	413	514.5	16	1⅛-8	4	1⅛-8	348	622	194
16"	133	388	470	571.5	16	1¼-8	4	1¼-8	365	718	245
18"	149	432	533	628.5	20	1¼-8	4	1¼-8	415	745	393
20"	159	483	584	686	20	1¼-8	4	1¼-8	430	864	490
24"	181	584	692	813	20	1½-8	4	1½-8	501	929	834

Main Dimension & Weight(Lug)

Class 600LB

NPS(in)	L	d	G	C	N	E	n	e	H1	H2	Weight(kg)
3"	54	88	127	168	8	3/4-10	-	-	102	231	14
4"	64	114	157	216	8	7/8-9	-	-	124	269	35
6"	78	164	216	292	10	1-8	2	1-8	166	394	70
8"	102	200	270	349	8	1⅛-8	4	1⅛-8	256	529	90
10"	117	248	324	432	12	1¼-8	4	1¼-8	309	611	162
12"	140	298.5	381	489	16	1¼-8	4	1¼-8	348	675	218

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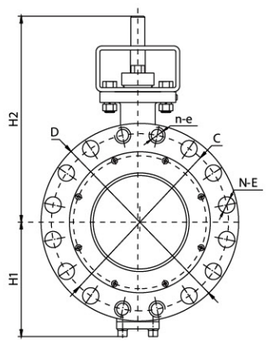
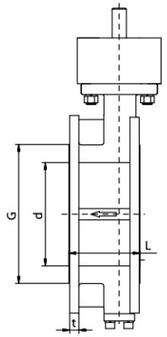
DOUBLE OFFSET BUTTERFLY VALVE
Dimension & Weight



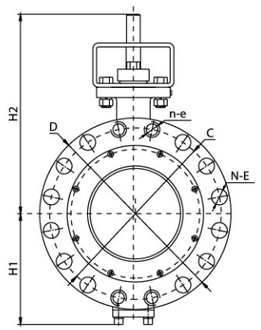


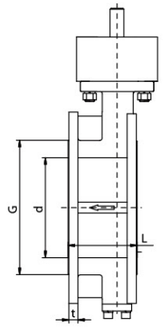
Main Dimension & Weight(Double Flange)

Class 150LB

NPS(in)	L	d	D	G	C	N	E	n	e	t	H1	H2	Weight (kg)
2"	108	51	150	92	120.7	4	Φ19	-	-	19	62.50	194	8
3"	114	86	190	127	152.5	4	Φ19	-	-	24	80	182	12
4"	127	110	230	157	190.5	4	Φ19	4	5-8/11	24	100	200	16
5"	140	131	255	186	216	4	Φ22	4	3-4/10	24	119	252	21
6"	140	156	280	216	241.5	4	Φ22	4	3-4/10	25.4	135	280	21
8"	152	203	345	270	298.5	4	Φ22	4	3-4/10	28.6	190	310	54
10"	165	254	405	324	362	8	Φ25	4	7/8-9	30	250	354	82
12"	178	305	485	381	432	8	Φ25	4	7/8-9	32	290	373	136
14"	190	337	535	413	476	8	Φ29	4	1-8	35	300	525	151
16"	216	387	595	470	539.5	12	Φ29	4	1-8	36.6	340	550	213
18"	222	438	635	533	578	12	Φ32	4	1⅛-8	39.7	380	637	313
20"	229	489	700	584	635	16	Φ32	4	1⅛-8	43	390	720	386
24"	267	591	815	692	749.5	16	Φ35	4	1¼-8	47.7	470	797	552
28"	292	692	837	762	795	34	Φ22	6	1/4	44.5	470	875	578
30"	318	743	887	813	846	37	Φ22	7	3/4-10	44.5	517	945	798
32"	318	781	941	864	900	40	Φ22	8	3/4-10	46	537	1000	929
36"	330	876	1057	972	1010	39	Φ25	5	7/8-9	52	610	1051	1015
40"	410	976	1175	1080	1120.5	37	Φ29	7	1-8	55.6	684	1074	1441
48"	470	1168	1392	1289	1335	40	Φ32	4	1⅛-8	65	800	1247	2502

Note: 1. Flange Dimensions of 26" and large size are according to ASME B16.47 B Series.





Main Dimension & Weight(Double Flange)

Class 300LB

NPS(in)	L	d	D	G	C	N	E	n	e	t	H1	H2	Weight (kg)
2"	108	44	165	92	127	4	Φ19	4	5/8-11	22.3	80	151	13
3"	114	86	210	127	168.5	4	Φ22	4	3/4-10	28.5	88	-	17
4"	127	110	255	157	200	4	Φ22	4	3/4-10	31.8	110	-	21
5"	140	127	280	186	235	4	Φ22	4	3/4-10	35	128	233	28
6"	140	152	320	216	269.9	8	Φ22	4	3/4-10	36.6	149	-	34
8"	152	203	380	270	330	8	Φ25	4	7/8-9	41.2	235	321	63
10"	165	254	445	324	387	12	Φ29	4	1-8	47.8	290	393	73
12"	178	305	520	381	451	12	Φ32	4	1⅛-8	50.8	305	433	108
14"	190	337	584	413	514.5	16	Φ32	4	1⅛-8	53.9	348	622	264
16"	216	388	648	470	571.5	16	Φ35	4	1¼-8	57.2	365	718	335
18"	222	432	711	533	628.5	20	Φ35	4	1¼-8	60.5	415	745	533
20"	229	483	775	584	686	20	Φ35	4	1¼-8	63.5	430	864	674
24"	267	584	914	692	813	20	Φ41	4	1½-8	69.9	501	929	1121

Main Dimension & Weight(Double Flange)

Class 600LB

NPS(in)	L	d	D	G	C	N	E	n	e	t	H1	H2	Weight (kg)
3"	180	88	210	127	168	4	Φ22	4	3/4-10	38.2	102	231	24
4"	190	114	273	157	216	8	Φ25	-	-	44.5	124	269	49
6"	210	164	356	216	292	10	Φ29	2	1-8	54.1	166	394	100
8"	230	200	419	270	349	8	Φ32	4	1⅛-8	62	256	529	126
10"	250	248	508	324	432	12	Φ35	4	1¼-8	69.9	309	611	220
12"	270	298.5	559	381	489	16	Φ35	4	1¼-8	73.1	348	675	305

CONCENTRIC
BUTTERFLY VALVE

CBV SERIES www.fkv.jp

Product Summary

Concentric butterfly valve series are safety and low cost products in FKV corporation for the passage install rubber seat, it can apply to most of corrosive medium. So no medium contact with body and the material of it is steel or cast iron. It is one of most economic valve under low and medium pressure.

Concentric butterfly valve widely apply to all kinds of industrial on-off control system. Compared to normal globe valve and ball valve. it has many advantages, like light weight, low cost. With rapidly development of rubber material industry, soft seat butterfly not only is used to all kinds of water draining system, but also replaced to some flow control system by steps.

Main Material List

Part	Cast Iron	Ductile Iron	Cast Steel	Stainless Steel
Body	ASTM A126 B	ASTM A536 60-40-18	ASTM A216 WCB	ASTM A351 CF8M
Stem	ASTM A182 F6a	ASTM A182 F6a	ASTM A182 F6a	17 4PH
Seat	EPDM/NBR/ VITON	EPDM/NBR/ VITON	EPDM/NBR/ VITON	EPDM/NBR/ VITON
Disc	ASTM A351 CF8/CF8M	ASTM A351 CF8/CF8M	ASTM A351 CF8/CF8M	ASTM A351 CF8/CF8M
Pin	SS 304	SS 304	SS 304	SS 316
Bearing Bushing	PTFE	PTFE	PTFE	PTFE
Hexagon Bolt	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7	ASTM A193 B8
Hexagon Nut	ASTM A194 2H	ASTM A194 2H	ASTM A194 2H	ASTM A194 8

Rubber Seat Temperature Range

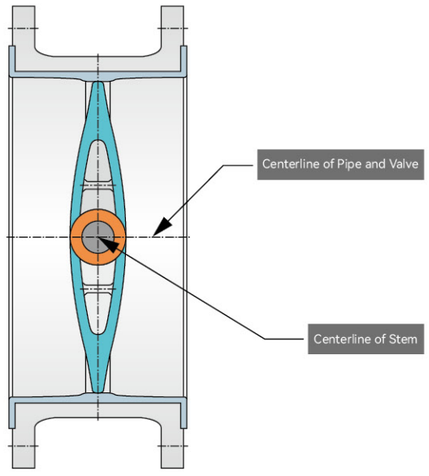
Material	Temperature Range
NBR	-20°C to +100°C
EPDM	-35°C to +135°C
VITON	-20°C to +200°C

Product Range

Size	NPS 2"~64"(DN50~DN1600)
Pressure Rating	Class 125~150LB, PN 10/16
Temperature Range	-10°C to +80°C
Body Material	Ductile Iron, Cast Steel, Stainless Steel
End Connection	Wafer, Lug, Double-Flange
Design Standards	API 609, ASME B16.34, EN 593, ISO 10631
Face to Face	EN 558 Series 13/20, ISO 5752 Series 13/20 API 609 Table 1/3, BS 5155 Series 4
Flanges Ends	ASME B16.5, ASME B16.47-A/B ISO 7005, DIN 2501, EN 1092-1/2
Top Flanges	ISO 5211
Inspction and Testing	API 598, EN 12266-1, ISO 5208

The Design of Concentric Rubber Seat Butterfly Valve

The disk sealing center of the butterfly valve coincides with the gyration center of the stem. The valve creates a specific seal pressure between the seat and the seal surface of the disk a by certain amount of interference, so as to ensure the sealing effect of the seal pair.

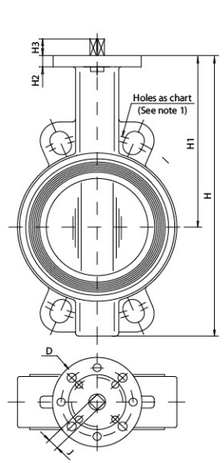


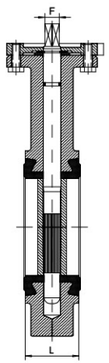
Operating Torque and Flow Coefficient (Cv value)

NPS(in)	125LB					150LB				
	N.m	ISO 5211 Top Flange	Stem Diameter		Cv	N.m	ISO 5211 Top Flange	Stem Diameter		Cv
			Wafer	RF				Wafer	RF	
2"	10	F07	43	108	130	10	F07	43	108	130
2.5"	18	F07	46	112	230	18	F07	46	112	230
3"	25	F07	46	114	340	25	F07	46	114	340
4"	30	F07	52	127	648	30	F07	52	127	648
6"	110	F10	56	140	1830	110	F10	56	140	1830
8"	190	F10	60	152	3400	190	F10	60	152	3400
10"	360	F10	68	165	5270	360	F10	68	165	5270
12"	760	F12	78	178	7590	760	F12	78	178	7590
14"	820	F12	78	190	10332	820	F12	78	190	10332
16"	1180	F14	102	216	13727	1180	F14	102	216	13727
18"	1320	F16	114	222	17372	1320	F16	114	222	17372
20"	2077	F16	127	229	21447	2077	F16	127	229	21447
24"	4200	F16	154	267	30884	4200	F16	154	267	30884
28"	4800	F25	165	292	42038	4800	F25	165	292	42038
30"	6200	F25	190	318	48258	6200	F25	190	318	48258
32"	8000	F25	190	318	54900	8000	F25	190	318	54900
36"	11000	F25	203	330	69490	11000	F25	203	330	69490
40"	13800	F25	216	410	80420	13800	F25	216	410	80420
48"	18920	F30	254	470	123600	18920	F30	254	470	123600
56"	24500	F35	279	530	202480	24500	F35	279	530	202480
60"	29360	F35	279	530	232400	29360	F35	279	530	232400

Note:

1. Above torque value are calculated based on room temperature, if other size torque required, please contact with FKV valves.
2. When sizing the actuator, please consider safety fact 1.2~1.5.
3. For more details, the valve torque will be changed under different working temperature, and the torque will be changed for different seat materials. please contact with FKV valves.
4. Cv value is based on 90° disc open angle.





Main Dimension & Weight(Wafer)

PN10/16 & Class 150LB

Size		L	H	H1	H2	H3	D	F	J	Weight (kg)
mm	inch									
32	1¼"	33	205	140	20	14	88	9.8	8	2
40	1½"	33	205	140	20	14	88	9.8	8	2
50	2"	43	228	156	20	14	88	9.8	8	3.5
65	2½"	46	248	161	20	16	88	12	9	4.5
80	3"	46	265	169	20	16	88	14	11	5
100	4"	52	298	187	20	20	88	14	11	6.5
125	5"	56	331	206	20	20	105	18	14	8
150	6"	56	349	215	20	20	105	18	14	9
200	8"	60	430	255	20	24	105	22	17	15
250	10"	68	461	248	20	24	150	25	19	21.5
300	12"	78	524	280	20	24	150	28	22	30
350	14"	78	570	300	20	29	170	28	22	39
400	16"	102	644	340	20	29	170	35	27	52

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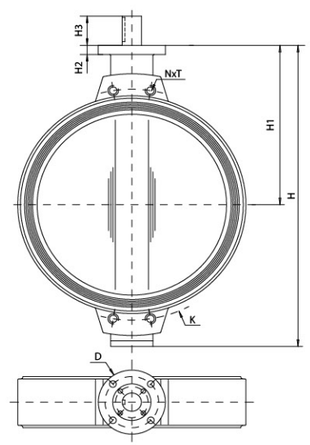
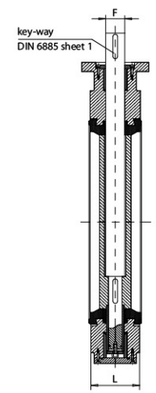
CONCENTRIC BUTTERFLY VALVE
Dimension & Weight

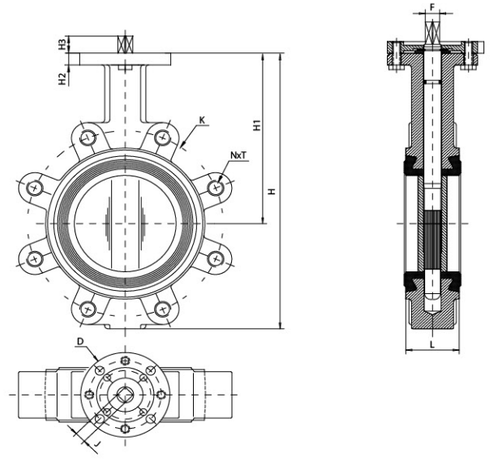




Main Dimension & Weight(Wafer)

PN10/16 & Class 150LB

Size		L	H	H1	H2	H3	D	F	PN10		PN16		150LB		Weight (kg)
mm	inch								K	NxT	K	NxT	K	NxT	
450	18"	114	736	390	25	80	175	50	565	4xM24	585	4xM27	578	4x1⅛"	87
500	20"	127	825	440	25	80	175	50	620	4xM24	650	4xM30	635	4x1⅛"	117
600	24"	154	965	507	30	90	250	60	725	4xM27	770	4xM33	749	4x1¼"	177
700	28"	165	1100	575	30	90	300	60	840	4xM27	840	4xM33	863	4x1¼"	258
750	30"	190	1150	600	30	110	300	65	900	4xM30	900	4xM33	914	4x1¼"	296
800	32"	190	1248	655	30	110	300	65	950	4xM30	950	4xM36	978	4x1½"	330
900	36"	203	1325	685	30	110	300	80	1050	4xM30	1050	4xM36	1086	4x1½"	505
1000	40"	216	1454	754	30	110	300	80	1160	4xM33	1170	4xM39	1200	4x1½"	661
1100	44"	216	1580	815	30	110	300	80	1270	4xM33	1270	4xM39	1314	4x1½"	840
1200	48"	254	1721	873	35	110	300	100	1380	4xM36	1390	4xM45	1422	4x1½"	1020
1300	52"	360	1910	1005	35	130	350	120	-	-	-	-	1537	4x1¾"	1650
1400	56"	360	1990	1025	35	130	350	120	1590	4xM39	1590	4xM45	1651	4x1¾"	1900
1600	64"	360	2320	1190	40	160	415	150	1820	4xM45	1820	4xM52	1880	4x1⅞"	2750



Main Dimension & Weight(Lug)

PN10/16 & Class 150LB

Size		L	H	H1	H2	H3	D	F	J	PN10		PN16		150LB		Weight (kg)
mm	inch									K	NxT	K	NxT	K	NxT	
32	1¼"	33	205	140	20	14	88	9.5	8	100	4xM16	100	4xM16	88.9	4x1/2"	3
40	1½"	33	205	140	20	14	88	9.5	8	110	4xM16	110	4xM16	98.5	4x1/2"	3
50	2"	43	228	156	20	14	88	9.5	8	125	4xM16	125	4xM16	120.6	4x5/8"	3.5
65	2½"	46	248	161	20	16	88	12	9	145	4xM16	145	4xM16	139.7	4x5/8"	4.5
80	3"	46	265	169	20	16	88	14	11	160	8xM16	160	8xM16	152.4	4x5/8"	6.5
100	4"	52	298	187	20	20	88	14	11	180	8xM16	180	8xM16	190.5	8x5/8"	8
125	5"	56	331	206	20	20	105	17	14	210	8xM16	210	8xM16	215.9	8x3/4"	11
150	6"	56	349	215	20	20	105	17	14	240	8xM20	240	8xM20	241.3	8x3/4"	12
200	8"	60	430	255	20	24	105	21	17	295	8xM20	295	12xM20	298.5	8x3/4"	18.5
250	10"	68	460	248	20	24	150	25	19	350	12xM20	355	12xM24	362	12x7/8"	28.5
300	12"	78	523	280	20	24	150	28	22	400	12xM20	410	12xM24	431.8	12x7/8"	42
350	14"	78	570	300	20	29	170	28	22	460	16xM20	470	16xM24	476.3	12x1"	53
400	16"	102	644	340	20	29	170	35	27	515	16xM24	525	16xM27	539.8	16x1"	77

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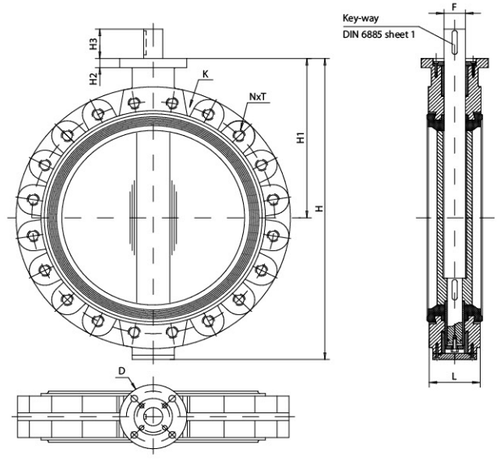
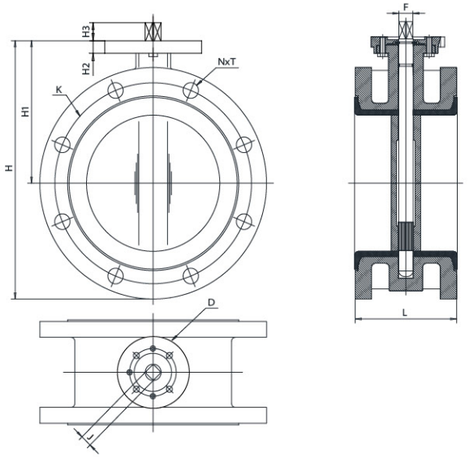
CONCENTRIC BUTTERFLY VALVE
Dimension & Weight



Main Dimension & Weight(Lug)

PN10/16 & Class 150LB

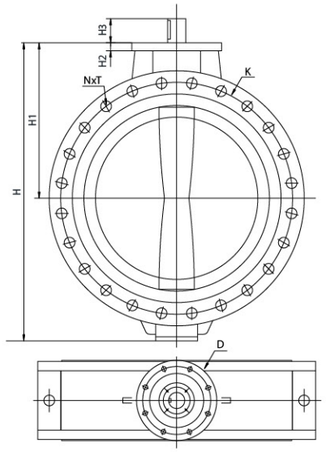
Size		L	H	H1	H2	H3	D	F	PN10		PN16		150LB		Weight (kg)
mm	inch								K	NxT	K	NxT	K	NxT	
450	18"	114	738	390	25	80	175	50	565	20xM24	585	20xM27	578	16x1⅛"	110
500	20"	127	825	440	25	80	175	50	620	20xM24	650	20xM30	635	20x1⅛"	135
600	24"	154	965	507	30	90	250	60	725	20xM27	770	20xM33	749.3	20x1¼"	210
700	28"	165	1100	575	30	90	300	60	840	24xM27	840	24xM33	863	28x1¼"	290
750	30"	190	1150	600	30	110	300	65	900	24xM30	900	24xM33	914	28x1¼"	360
800	32"	190	1248	655	30	110	300	65	950	24xM30	950	24xM36	978	28x1½"	450
900	36"	203	1325	685	30	110	300	80	1050	28xM30	1050	28xM36	1086	32x1½"	550
1000	40"	216	1454	754	30	110	300	80	1160	28xM33	1170	28xM39	1200	36x1½"	760
1100	44"	216	1580	815	30	110	300	80	1270	32xM33	1270	32xM39	1314	40x1½"	1020
1200	48"	254	1720	873	35	110	300	100	1380	32xM36	1390	32xM45	1422	44x1½"	1460
1400	56"	360	1990	1025	35	130	350	120	1590	36xM39	1590	36xM45	1651	48x1¾"	2450
1600	64"	360	2320	1190	40	160	415	150	1820	40xM45	1820	40xM52	1880	52x1⅞"	2940



Main Dimension & Weight(Flange)

PN10/16 & Class 150LB

Size		L	H	H1	H2	H3	D	F	J	PN10		PN16		150LB		Weight (kg)
mm	inch									K	NxT	K	NxT	K	NxT	
50	2"	108	239	156	20	14	88	9.8	8	125	4x19	125	4x19	120.6	4x19	8
65	2½"	112	253	160	20	16	88	12	9	145	4x19	145	4x19	139.7	4x19	8.5
80	3"	114	268	168	20	16	88	14	11	160	8x19	160	8x19	152.4	4x19	10.5
100	4"	127	300	185	20	20	88	14	11	180	8x19	180	8x19	190.5	8x19	12
125	5"	140	335	207	20	20	105	18	14	210	8x19	210	8x19	215.9	8x23	16
150	6"	140	358	215	20	20	105	18	14	240	8x23	240	8x23	241.3	8x23	22
200	8"	152	425	256	20	24	105	22	17	295	8x23	295	12x23	298.5	8x23	30
250	10"	165	452	251	20	24	150	25	19	350	12x23	355	12x27	362	12x26	47
300	12"	178	523	280	20	24	150	28	22	400	12x23	410	12x27	431.8	12x26	62
350	14"	190	569	304	20	29	170	28	22	460	16x23	470	16x27	476.3	12x29	90
400	16"	216	643	340	20	29	170	35	27	515	16x27	525	16x30	539.8	16x29	123



Main Dimension & Weight(Flange)

PN10/16 & Class 150LB

Size		L	H	H1	H2	H3	D	F	PN10		PN16		150LB		Weight (kg)
mm	inch								K	NxT	K	NxT	K	NxT	
450	18"	222	736	390	25	80	175	50	565	20x27	585	20x30	578	16x32	142
500	20"	229	825	440	25	80	175	50	620	20x27	650	20x33	635	20x32	190
600	24"	267	965	507	30	90	250	60	725	20x30	770	20x36	749	20x36	285
700	28"	292	1100	575	30	90	300	60	840	24x30	840	24x36	863	28x36	390
800	32"	318	1248	655	30	110	300	65	950	24x33	950	24x39	978	28x41	480
900	36"	330	1325	685	30	110	300	80	1050	28x33	1050	28x39	1086	32x41	650
1000	40"	410	1457	754	30	110	300	80	1160	28x36	1170	28x42	1200	36x41	920
1200	48"	470	1721	873	35	110	300	100	1380	32x39	1390	32x48	1422	44x41	2000
1400	56"	530	1990	1025	35	130	350	120	1590	36x42	1590	36x48	1651	48x48	2700
1600	64"	600	2320	1190	40	160	415	150	1820	40x48	1820	40x56	1879.6	52x51	3810

ANTI-CORROSION
BUTTERFLY VALVE

ACB SERIES www.fkv.jp

Product Summary

PTFE/PFA lined anti-corrosion butterfly valve is suitable for toxic and highly corrosive chemical media;
After multiple sealing and safety tests, it has no pollution to the environment;
Detachable split structure design;
The insulation height complies with the device regulations;
The insulation level meets the equipment regulations;
Can be installed in any position;
Detachable, materials can be recycled;
The material meets FDA standards.

Product Range

Size	NPS 2"-36"(DN50-DN900)
Pressure Rating	Class 150LB, PN10/16
Temperature Range	-20°C to +180°C, -10°C to +160°C(Vacuum)
End Connection	Wafer, Lug, Double Flange
Design Standards	API 609, EN 593, ASME B16.34
Face to Face	ASME B16.10, JIS B2002,EN 558 Series 20, DIN3202 T3 K1, ISO 5752 Series20 API 609 Table 1, BS 5155
Flange Ends	ASME B16.5, ASME B16.47, DIN 2501, AWWA C 207, BS 10 Table D and E
Sealing Grade	DIN 3230 T3 BO, API 598 Table 5, ASME B16.104 Class VI, EN 12266-2
Inspection and Testing	API 598, ISO 5208

Application Media and Industry

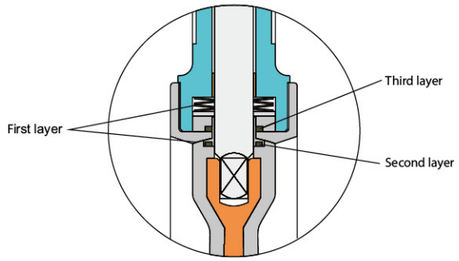
Highly corrosive chemical media and toxic media;
Equipment purification industry;
Pharmaceutical industry;
Adhesive, papermaking, and fuel transportation industries;
Food industry;
Paint production and processing industry;
Dangerous goods transportation industry;
Damp chlorine gas;
Material processing, such as galvanizing and pickling;
Mining;
Fuel transportation and storage.

The safety seal of the stem terminal adopts the principle of multiple seals

1. The first layer of sealing transmits pre pressure to the spherical arc-shaped surface of the lining valve plate shaft head through an elastic disc spring;

2. The second layer of sealing is achieved by adding elastic PTFE sealing rings into the grooves machined on the upper and lower hubs of the plate. The sealing rings are wrapped in pure PTFE material on the surface of the seat. During the valve assembly process, the sealing rings are compressed and squeezed by the plate and seat, generating upward and downward pressure on the surfaces of the plate and seat, thus achieving sealing;

3. The third layer of sealing is located in the middle of the stem, using a combination of pressure blocks and O-ring seals. Through the compression of the elastic disc spring and valve assembly process, pre pressure is transmitted axially, causing the O-ring seal to tighten the protruding lining of the seat.



Multiple sealing types

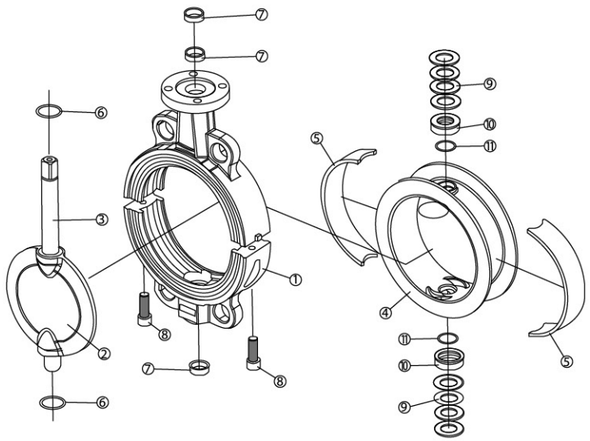
Lining Material

Name	Characteristic	Usage Temperature
Polytetrafluoroethylene (PTFE)	It has excellent chemical corrosion resistance, with a thickness of not less than 3mm, ensuring a high-density lining of at least 2.16 gr/cm^3.	-40°C to +200°C
Enhanced polytetrafluoroethylene (TFM)	Compared to PTFE, it has a lower melt viscosity, which enables better particle fusion during the molding process and provides higher impermeability to prevent harmful electrostatic discharge.	-40°C to +200°C
Soluble polytetrafluoroethylene (PFA)	By fully inheriting the excellent performance of PTFE and being able to be processed by hot melt molding, PFA can perfectly bond with metal surfaces.	-40°C to +200°C
Ultra high molecular weight polyethylene (UHMWPE)	It has outstanding wear resistance, low friction coefficient, and self-lubricating properties, and has extremely high impact strength.	-40°C to +80°C

ANTI-CORROSION BUTTERFLY VALVE

Material Specifications

Main Component Diagram



① Body
② Disc
③ Stem
④ Seat
⑤ Elastic body
⑥ O-ring
⑦ Self lubricating positioning sleeve
⑧ Install screws
⑨ Four level loading elastic washer
⑩ Gland
⑪ O-ring

Main Material List

Name	Material	ASTM	German Card
Body	Ductile Iron	A395	GGG-40
	Carbon Steel	A216	-
	Stainless Steel	304	X5CrNi189
		316	X5CrNiMo17 12
		316L	X2CrNiMo18 143
Seat	Tetrafluoroethylene	PTFE	PTFE
	Soluble Tetrafluoroethylene	PFA	PFA
	FEP	FEP	FEP
	Modified Tetrafluoroethylene	TFM	TFM
	Supramolecular Amount Of Ethylene	UHMWPE	UHMWPE
Disc	Carbon Steel/Tetrafluoroethylene	WCB/PTFE	-
	Carbon Steel/Soluble Tetrafluoroethylene	WCB/PFA	-
	Stainless Steel	304	X5CrNi189
		316	X5CrNiMo17 12
		316L	X2CrNiMo18 143
Shaft	Alloy Steel	420	X20Cr13
		630	X5CrNiCuNb174
Sealing Gasket	Silicone Rubber	VMQ	MVQ
Cone-Shaped Sealing Ring	Tetrafluoroethylene	PTFE	-
O-Ring Seal	Viton	FKM	FPM
Pressure Ring	Stainless Steel	304	X5CrNi189
Belleville Spring	Elastic Steel	H2600	60SiCr7
Seal Ring	Tetrafluoroethylene	PTFE	-
Stem Shaft Sleeve	Steel/Tetrafluoroethylene	Steel/PTFE	-
Bolt	Stainless Steel	B8M	A4-70

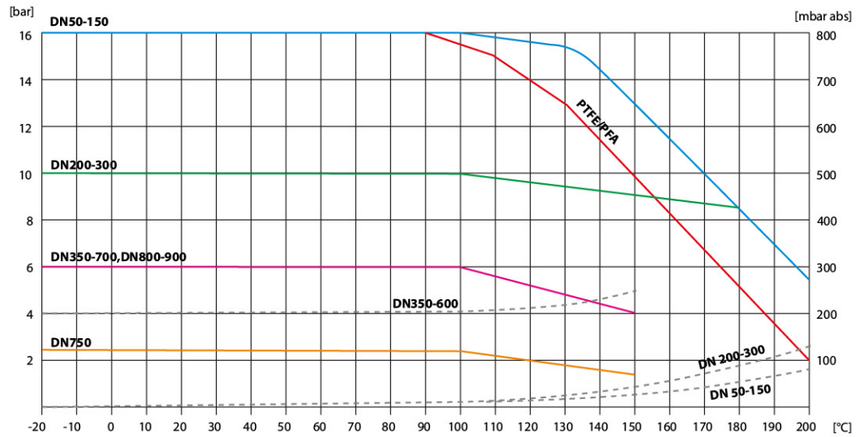
ANTI-CORROSION BUTTERFLY VALVE

Technical Parameter

Torque Value

DN(mm)	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	750	800	900
NPS(in)	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	32"	36"
MD(N.m)	25	40	59	75	90	157	270	375	510	675	900	1100	1300	1750	2100	2500	3100	4000

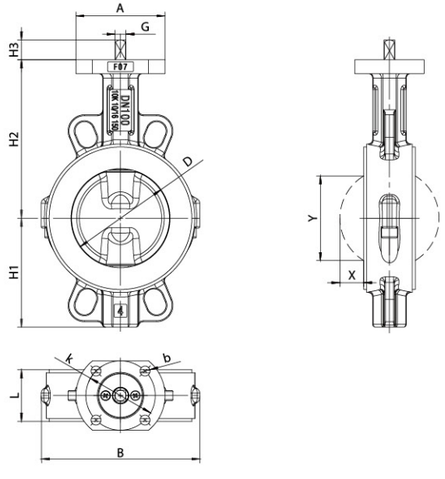
Pressure/Temperature/True Curve Chart



Kv Value

DN(mm)	NPS(in)	Disc Opening Angle							
		20°	30°	40°	50°	60°	70°	80°	90°
50	2"	5	11	24	42	64	92	118	134
65	2½"	8	19	41	70	108	155	200	227
80	3"	15	33	72	125	190	270	335	392
100	4"	20	48	95	165	255	385	485	585
125	5"	38	82	165	255	455	645	815	1015
150	6"	60	130	235	395	645	955	1220	1495
200	8"	95	230	465	795	1180	1815	2410	3050
250	10"	175	350	710	1160	1610	2420	3650	4510
300	12"	265	522	995	1720	2665	3965	5960	7210
350	14"	350	660	1180	1800	2880	4550	7180	8760
400	16"	510	985	1480	2450	4230	6550	9250	11350
450	18"	665	1255	2230	3850	6250	9200	12250	14900
500	20"	890	1620	2980	5350	8150	11800	15560	18000
600	24"	970	2150	4180	7420	11350	16450	21200	24500
700	28"	1060	2560	4868	8412	14359	23901	37638	48633
750	30"	1217	2939	5588	8675	16484	27437	43207	55829
800	32"	1402	3328	6351	11169	19073	32074	51820	63905
900	36"	1915	4259	7897	13849	23887	41112	66771	81016

The Kv values listed in the table represent the water flow rate at a temperature of 5°C to 30°C and a pressure of Δ p=1 bar;
Medium flow rate:
Liquid: Max. 4.5 meters per second
Gas: Max. 70 meters per second
There is a linear relationship between flow rate and opening between 30° and 70°; prevent cavitation.



Main Dimension & Weight(Wafer)

PN10/16 & Class 150LB

DN (mm)	NPS (in)	L	H1	H2	H3	D	A	k	b	G	X	Y	B	Wafer (kg)
50	2"	43	68	134	20	50	65	50	4x8	9	4	26	100	2.9
65	2½"	46	78	145	20	65	65	50	4x8	9	10	46	120	3.4
80	3"	46	80	150	20	80	65	50	4x8	9	16	64	140	3.6
100	4"	52	110	160	20	100	90	70	4x10	11	24	85	160	5
125	5"	56	130	178	20	125	90	70	4x10	14	35	112	190	7.9
150	6"	56	140	197	20	150	90	70	4x10	14	47	139	220	9.7
200	8"	60	175	239	20	200	125	102	4x12	17	70	191	277	16.5
250	10"	68	215	278	30	250	125	102	4x12	22	91	241	330	23.1
300	12"	78	250	315	30	300	150	125	4x14	22	111	290	380	38.3
350	14"	78	255	350	35	350	150	125	4x14	22	131	330	440	50
400	16"	102	285	380	35	400	175	140	4x18	27	149	387	490	68
450	18"	114	320	425	65	450	175	140	4x18	48	168	436	550	100
500	20"	127	360	450	65	500	210	165	4x18	48	187	484	590	122
600	24"	154	415	555	80	600	300	254	8x18	60	223	580	690	180
700	28"	165	480	605	80	700	300	254	8x18	72	269	684	-	-
800	32"	190	550	660	110	800	350	298	8x22	80	307	781	-	-
900	36"	203	600	710	130	900	350	298	8x22	98	349	877	-	-

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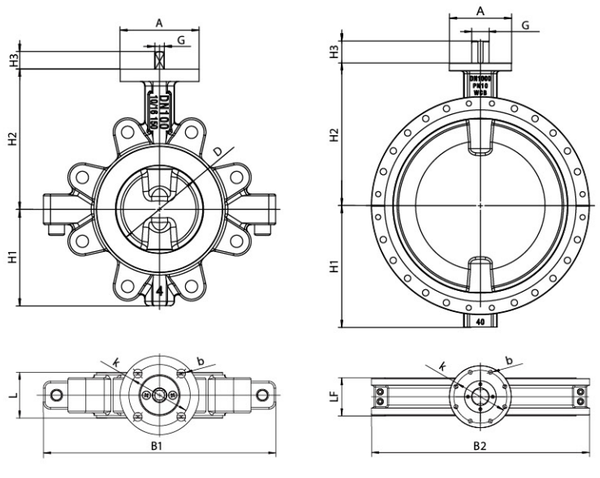
ANTI-CORROSION BUTTERFLY VALVE
Dimension & Weight



Main Dimension & Weight(Lug/Flange)

PN10/16 & Class150LB

DN (mm)	NPS (in)	L	LF	H1	H2	H3	D	A	k	b	G	B1	B2	Lug (kg)	Flange (kg)
50	2"	43	108	68	134	20	50	65	50	4x8	9	165	-	3.6	-
65	2½"	46	112	78	145	20	65	65	50	4x8	9	175	-	4.3	-
80	3"	46	114	80	150	20	80	65	50	4x8	9	230	-	5.9	-
100	4"	52	127	110	160	20	100	90	70	4x10	11	265	-	8.3	-
125	5"	56	140	130	178	20	125	90	70	4x10	14	295	-	10.4	-
150	6"	56	140	140	197	20	150	90	70	4x10	14	320	-	11.1	-
200	8"	60	152	175	239	20	200	125	102	4x12	17	400	-	23.5	-
250	10"	68	165	215	278	30	250	125	102	4x12	22	460	-	32.3	-
300	12"	78	178	250	315	30	300	150	125	4x14	22	510	-	50	-
350	14"	78	190	255	350	35	350	150	125	4x14	22	564	-	87	-
400	16"	102	216	285	380	35	400	175	140	4x18	27	620	-	98	-
450	18"	114	222	320	425	65	450	175	140	4x18	48	-	630	-	140
500	20"	127	229	360	450	65	500	210	165	4x18	48	-	700	-	175
600	24"	154	267	415	555	80	600	300	254	8x18	60	-	820	-	275
700	28"	165	292	480	605	80	700	300	254	8x18	72	-	930	-	423
800	32"	190	318	550	660	110	800	350	298	8x22	80	-	1060	-	670
900	36"	203	330	600	710	130	900	350	298	8x22	98	-	1160	-	880