

# FDG TECHNOLOGIES LIMITED

## BUTTERFLY VALVE



**VALVE SOLUTIONS**  
for Corrosive  
Applications

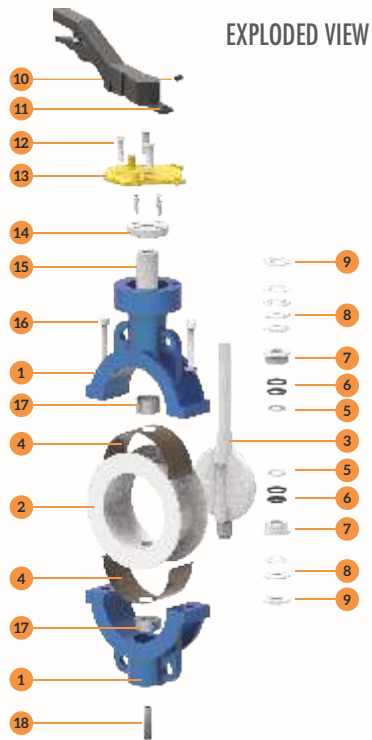
## GENERAL PRODUCT INFORMATION

BUTTERFLY VALVES	FEATURE OFFERED	OPTIONS AVAILABLE
<b>APPLICATIONS</b>	MOST CORROSIVE & AGGRESSIVE CHEMICALS & VAPOURS	
<b>STANDARDS FOLLOWED</b>	DESIGN : API 609 WAFER & LUG FACE TO FACE DIMENSIONS : API 609 CATEGORY : A CONNECTION RATING : ANSI B 16.5 TEST : API 598	TEST : ISO 9393-2 OR BS EN 12266-1-2003
<b>BODY</b>	ASTM A 216 GR. WCB	ASTM A 351 GR. CF8 OR 8M
<b>DISC LINING MATERIALS</b>	PFA	FEP/PVDF/ETFE/ECTFE & PPH
<b>SEAT / LINERS</b>	ISOSTATICALLY MOULDED PTFE	ISOSTATICALLY MOULDED TFM / OR MPTFE
<b>VALVE PAINTING</b>	EPOXY 2 PART PAINT	PU PAINT
<b>TEMPERATURE</b>	- 40 DEG.F TO 450 DEG. F (PFA)	LINING IN FEP, ETFE & PVDF IS AVAILABLE WITH DIFF TEMPERATURE RANGE
<b>DISC SEALING</b>	CLASS VI, TIGHT SHUT OFF AS PER API 598	
<b>SHAFT SEALS</b>	LOADED PACKING WITH GLAND COVERS ON TOP & BOTTOM	
<b>MAX. PRESSURE</b>	225 PSI	
<b>FLOW DIRECTION</b>	BI-DIRECTIONAL	
<b>SPARK TEST FOR LINED COMPONENTS</b>	20 KVDC	

# BUTTERFLY VALVES

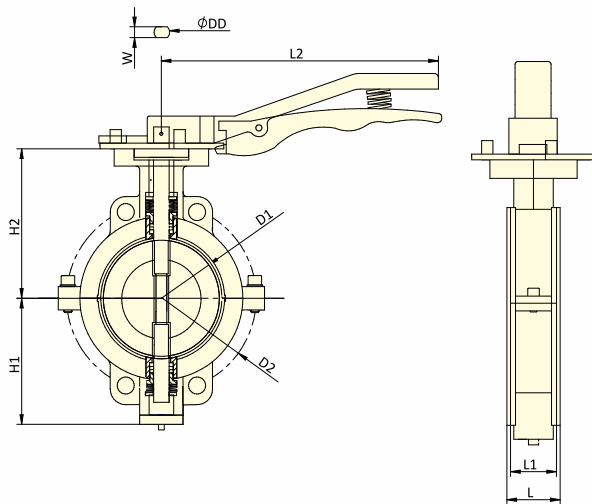
## LEVER OPERATED – WAFER

### MATERIAL LIST



PART NO.	DESCRIPTION	MATERIAL OF CONSTRUCTION	QTY.
1	Body	ASTM A 216 GR. WCB	2
2	Seat	PTFE / MPTFE / TFM	1
3	Disc	ASTM A 890 GR. 4A + PFA	1
4	Seat Pad	VITON / SILICON	2
5	Washer	PTFE	2
6	Gland Seals	VITON	4
7	T-Bush	SS 304	2
8	Disc Springs	50 Crv 4	6
9	Retainer	SS 304	2
10	Pin For Handle	STEEL	1
11	Handle	WCB	1
12	Allen CSK	HT 12.9	3
13	Teeth Plate	WCB / SS	1
14	Thrust Collar Top	SS 304	1
15	Sleeve	SS 304	1
16	Body Bolts	ASTM 193 GR. B7	2
17	Bush	PFA	1
18	Grub Screw	STEEL	1

### SECTIONAL VIEW



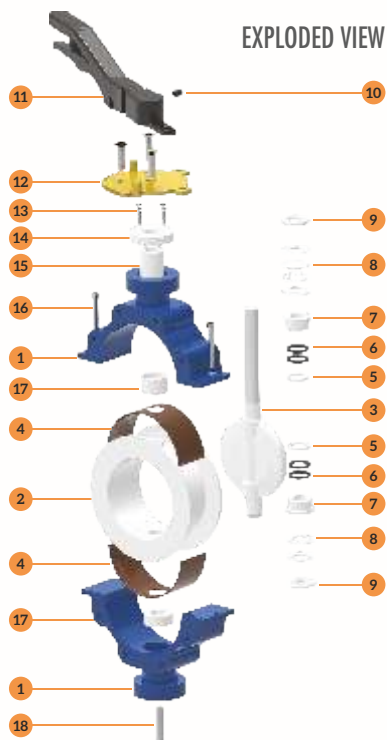
### DIMENSIONS

Size	L ± .12		L1 ± .04		D1 ± .08		D2 ± .08		H1 ± .31		H2 ± .31		L2 ± .31		ØDD		W	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
2"	1.85	47	1.69	43	1.97	60	4.76	121	3.27	83	4.6	117	10.47	266	0.55	14	0.43	11
2.5"	1.97	50	1.81	46	2.55	65	5.51	140	3.54	90	5.39	137	10.47	266	0.55	14	0.43	11
3"	1.97	50	1.81	46	2.95	75	6	152	3.54	90	5.04	128	10.47	266	0.55	14	0.43	11
4"	2.2	56	2.04	52	3.93	100	7.5	191	4.52	115	6.14	156	10.47	266	0.71	18	0.55	14

All Dimension are in Inches & mm.  
PCD of the Valve can be provided in ANSI / DIN / JIS

# BUTTERFLY VALVES

## LEVER OPERATED – FULL LUG

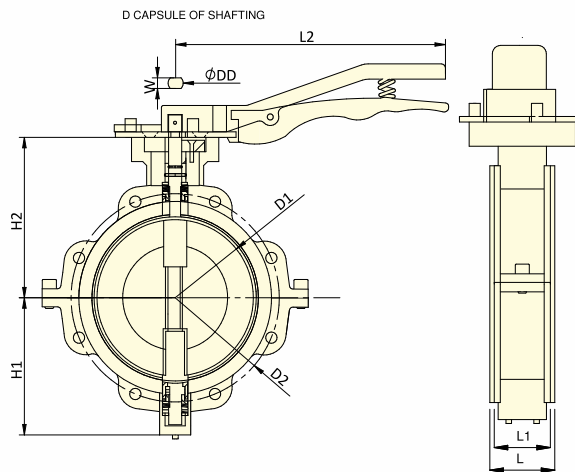


EXPLODED VIEW

### MATERIAL LIST

PART NO.	DESCRIPTION	MATERIAL OF CONSTRUCTION	QTY.
1	Body	ASTM A 216 GR. WCB	2
2	Seat	PTFE / MPTFE / TFM	1
3	Disc	ASTM A 890 GR. 4A + PFA	1
4	Seat Pad	VITON / SILICON	2
5	Washer	PTFE	2
6	Gland Seals	VITON	4
7	T-Bush	SS 304	2
8	Disc Springs	50 Crv 4	6
9	Retainer	SS 304	2
10	Pin For Handle	STEEL	1
11	Handle	WCB	1
12	Teeth Plate	WCB / SS	1
13	Thrust Collar CSK Bolts	HT 12.9	4
14	Thrust Collar Top	HT 12.9	1
15	Sleeve	SS 304	1
16	Body Bolts	ASTM 193 GR. B7	2
17	Bush	PFA	2
18	Grub Screw	STEEL	1

### SECTIONAL VIEW



### DIMENSIONS

Size	L ± .12		L1 ± .04		D1 ± .08		D2 ± .08		H1 ± .31		H2 ± .31		L2 ± .31		ØDD		W	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
2"	1.85	47	1.69	43	1.97	60	4.76	121	3.27	83	4.6	117	10.47	266	0.55	14	0.43	11
2.5"	1.97	50	1.81	46	2.55	65	5.51	140	3.54	90	5.39	137	10.47	266	0.55	14	0.43	11
3"	1.97	50	1.81	46	2.95	75	6	152	3.62	92	5.03	128	10.47	266	0.55	14	0.43	11
4"	2.2	56	2.04	52	3.93	100	7.5	191	4.52	115	6.18	157	10.47	266	0.71	18	0.55	14

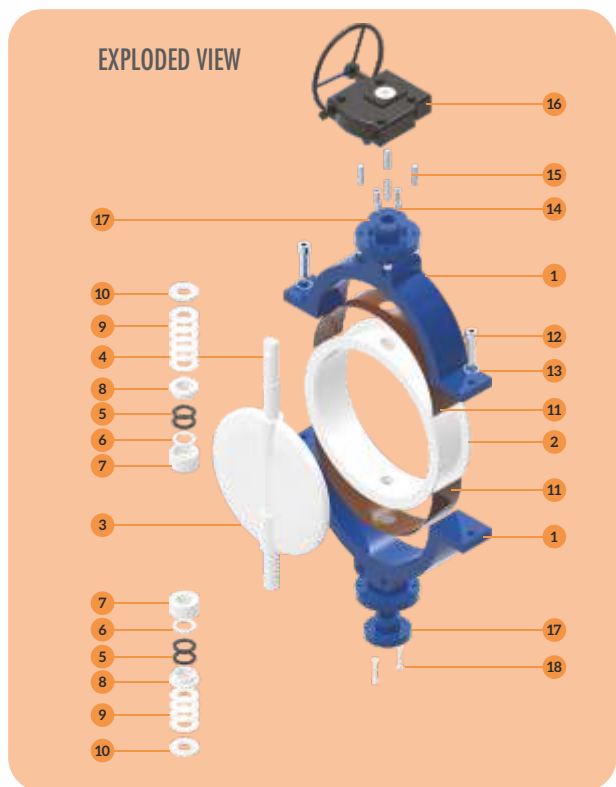
All Dimension are in Inches & mm.  
PCD of the Valve can be provided in ANSI / DIN / JIS

# BUTTERFLY VALVES

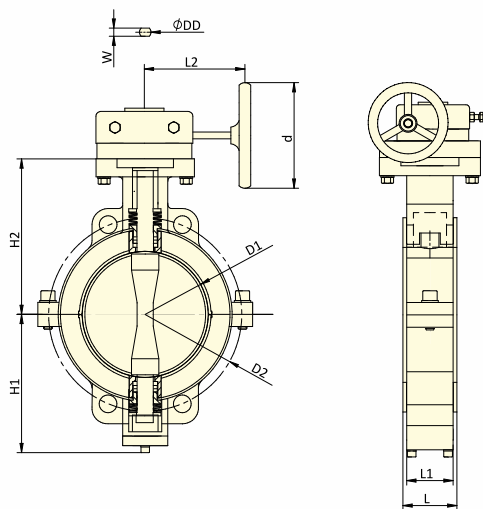
## GEAR OPERATED – WAFER

### MATERIAL LIST

PART NO.	DESCRIPTION	MATERIAL OF CONSTRUCTION	QTY.
1	Body	ASTM A 216 GR. WCB	2
2	Seat	PTFE / MPTFE / TFM	1
3	Disc	ASTM A 890 GR. 4A + PFA	1
4	Stem	ASTM A 890 GR. 4A Integral	1
5	Gland Seals	VITON	4
6	Washer	PTFE	2
7	Bush	PFA	2
8	T-Bush	SS 304	2
9	Disc Springs	50 Crv 4	10
10	Retainer	SS 304	2
11	Seat Pads	VITON / SILICON	2
12	Body Bolts	ASTM 193 GR. B7	4
13	Spring Washer	STEEL	2
14	Gland Bolts	HT 12.9	2
15	Gearbox Mounting Stud	SS 304	4
16	Gear Box	Cast Iron Epoxy Painted	1
17	Thrust Collar	SS 304	2
18	Bottom Cover Bolts	HT 12.9	2



### SECTIONAL VIEW



### DIMENSIONS

Size	L ± .12		L1 ± .04		D1 ± .08		D2 ± .08		H1 ± .31		H2 ± .31		L2 ± .31		ØDD		W	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
6"	2.36	60	2.2	56	5.9	150	9.49	241	6.37	162	7.63	194	9.52	242	0.79	20	0.55	14
8"	2.52	64	2.36	60	7.87	200	11.75	298	7.2	183	9.25	235	9.52	242	0.98	25	0.79	19
10"	2.83	72	2.68	68	9.84	250	14.25	362	9.21	234	9.88	251	11.49	292	1.1	28	0.86	22
12"	3.3	84	3.07	78	11.81	300	17	432	10.66	271	11.57	294	11.49	292	1.1	28	0.86	22
14"	3.3	84	3.07	78	13.78	350	18.7	476	12.2	310	12.79	325	11.49	292	1.1	28	0.86	22
16"	4.25	108	4.01	102	15.74	400	21.25	540	13.18	335	13.58	345	13.18	335	1.41	36	1.1	28
18"	4.72	120	4.49	114	17.71	450	22.75	578	15.55	395	14.76	375	13.18	335	1.41	36	1.1	28
20"	5.23	133	5	127	19.44	494	25	635	16.73	425	16.33	415	13.58	345	1.79	45.5	1.41	36
24"	6.29	160	6.06	154	23.54	600	29.52	749	18.7	475	19.48	495	13.58	345	2	51	1.45	37

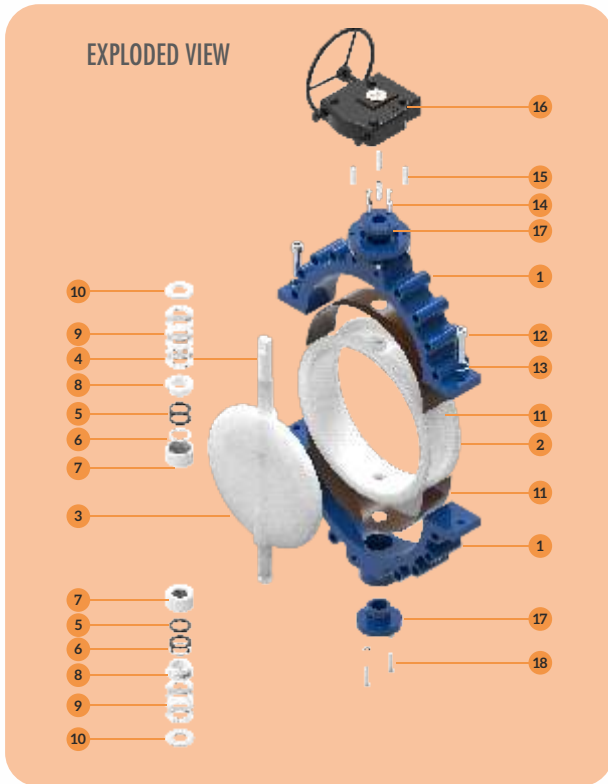
All Dimension are in Inches & mm. | PCD of the Valve can be provided in ANSI / DIN / JIS

# BUTTERFLY VALVES

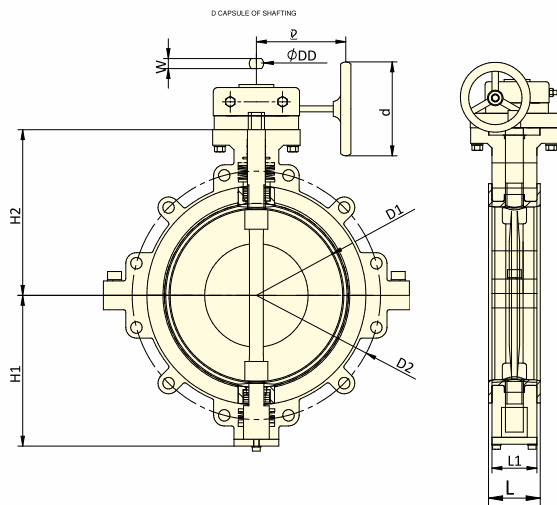
## GEAR OPERATED – FULL LUG

### MATERIAL LIST

PART NO.	DESCRIPTION	MATERIAL OF CONSTRUCTION	QTY.
1	Body	ASTM A 216 GR. WCB	2
2	Seat	PTFE / MPTFE / TFM	1
3	Disc	ASTM A 890 GR. 4A + PFA	1
4	Stem	ASTM A 890 GR. 4A Integral	1
5	Gland Seals	VITON	4
6	Washer	PTFE	2
7	Bush	PFA	2
8	T-Bush	SS 304	2
9	Disc Springs	50 Crv 4	10
10	Retainer	SS 304	2
11	Seat Pads	VITON / SILICON	2
12	Body Bolts	ASTM 193 GR. B7	2
13	Spring Washer	STEEL	2
14	Gland Bolts	HT 12.9	2
15	Gearbox Mounting Stud	SS 304	4
16	Gear Box	Cast Iron Epoxy Painted	1
17	Thrust Collar	SS 304	2
18	Bottom Cover Bolts	HT 12.9	2



### SECTIONAL VIEW



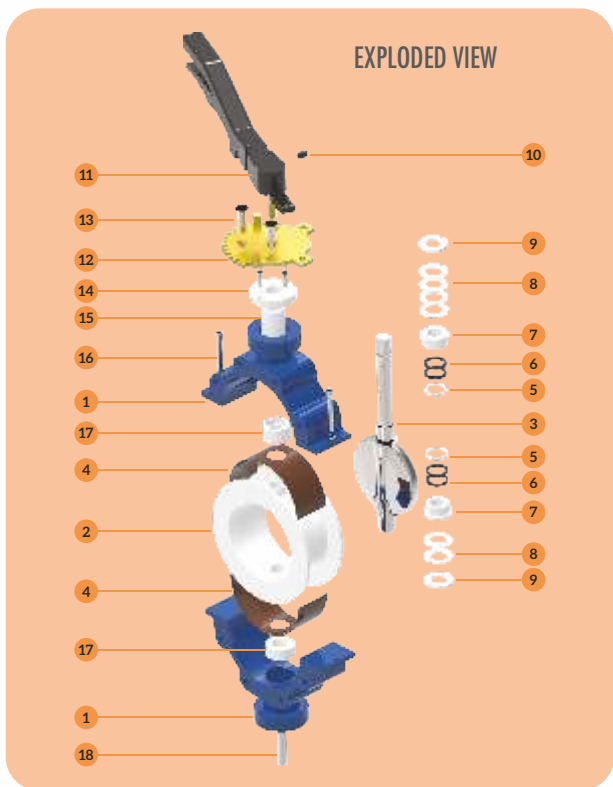
### DIMENSIONS

Size	L ± .12		L1 ± .04		D1 ± .08		D2 ± .08		H1 ± .31		H2 ± .31		L2 ± .31		ØDD		W	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM	INCH	MM
6"	2.36	60	2.2	56	5.9	150	9.49	241	6.4	163	7.48	190	9.52	242	0.79	20	0.55	14
8"	2.52	64	2.36	60	7.87	200	11.75	298	7.79	198	9.13	232	9.52	242	0.98	25	0.74	19
10"	2.83	72	2.68	68	9.84	250	14.25	362	8.58	218	9.84	250	11.49	292	1.1	28	0.86	22
12"	3.3	84	3.07	78	11.81	300	17	432	10.43	265	11.33	288	11.49	292	1.1	28	0.86	22
14"	3.3	84	3.07	78	13.78	350	18.7	476	12.55	319	12.44	316	11.49	292	1.1	28	0.86	22
16"	4.25	108	4.01	102	15.74	400	21.25	540	13.19	335	13.58	345	13.18	335	1.41	36	1.1	28
18"	4.72	120	4.49	114	17.71	450	22.75	578	15.74	400	14.72	374	13.18	335	1.41	36	1.1	28
20"	5.23	133	5	127	19.44	494	25	635	16.73	425	16.33	415	13.58	345	1.79	45.5	1.41	36
24"	6.29	160	6.06	154	23.54	600	29.52	749	19.37	492	19.88	505	13.58	345	2	51	1.45	37

All Dimension are in Inches & mm. | PCD of the Valve can be provided in ANSI / DIN / JIS

# METAL DISC BUTTERFLY VALVES

## LEVER & GEAR OPERATED - FULL LUG & WAFER

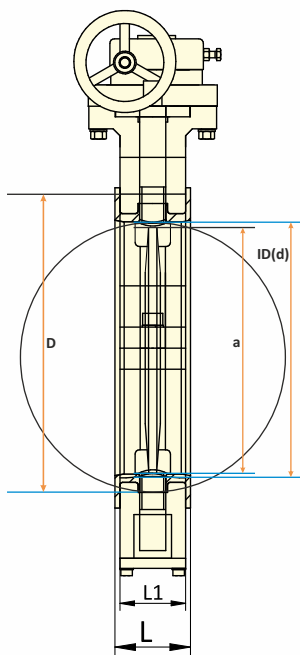


### MATERIAL LIST

PART NO.	DESCRIPTION	MATERIAL OF CONSTRUCTION	QTY.
1	Body	ASTM A 216 GR. WCB	2
2	Seat	PTFE / MPTFE / TFM	1
3	Disc	Duplex / Super / Duplex / AL. Bronze / Cf8 / CF8M	1
4	Seat Pad	VITON / SILICON	2
5	Washer	PTFE	2
6	Gland Seals	VITON	4
7	T-Bush	SS 304	2
8	Disc Springs	50 Crv 4	6
9	Retainer	SS 304	2
10	Pin For Handle	STEEL	1
11	Handle	WCB	1
12	Teeth Plate	WCB / SS	1
13	Allen CSK Bolts	HT 12.9	3
14	Thrust Collar Top	SS 304	1
15	Sleeve	SS 304	1
16	Body Bolts	ASTM 193 GR. B7	2
17	Bush	PFA	2
18	Grub Screw	STEEL	1

# INSTALLATION DETAILS OF LINED BUTTERFLY VALVE

## WAFER & LUGGED CONSTRUCTION

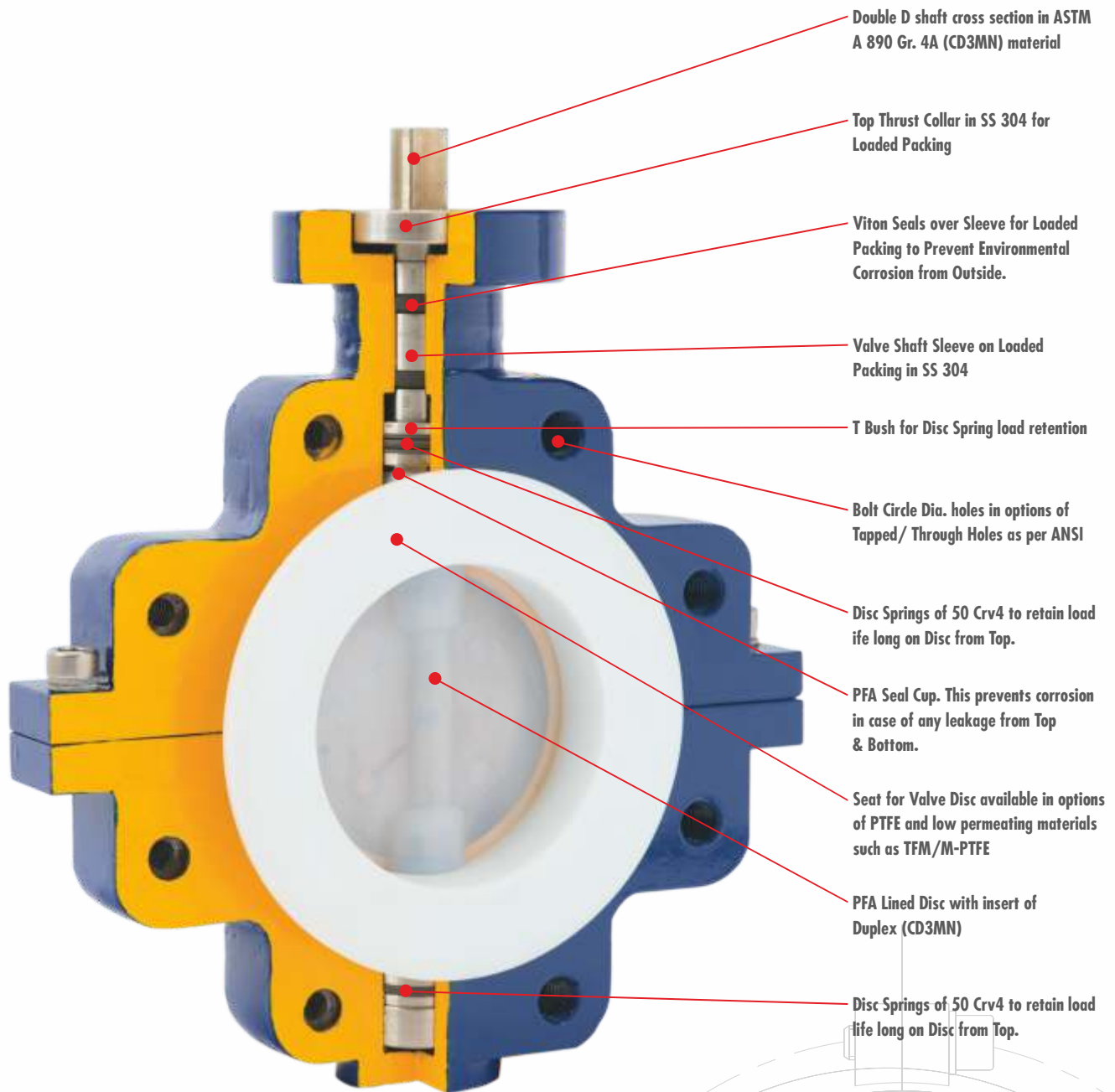


### MINIMUM PIPE ID REQUIRED FOR FULL DISC OPENING

Size (MM)	F / F		D		a		Pipe I.D Req.(d)	
	INCH	MM	INCH	MM	INCH	MM	INCH	MM
600	6.29	160	27.6	700	22.6	575	23.0	585
500	5.23	133	23.0	584	18.7	477	19.3	490
450	4.72	120	21.0	534	16.9	430	17.3	440
400	4.25	108	18.5	470	15.1	384	15.4	390
350	3.3	84	16.2	412	13.3	338	13.5	344
300	3.3	84	15.0	380	11.3	286	11.5	292
250	2.83	72	12.7	323	9.3	236	9.5	242
200	2.52	64	10.6	270	7.4	187	7.6	193
150	2.36	60	8.5	216	5.4	136	5.5	140
125	2.36	60	7.3	185	4.2	107	4.4	110
100	2.2	56	6.2	157	3.2	80	3.3	83
80	1.97	50	5.0	127	2.1	52	2.2	55
65	1.97	50	4.1	105	1.42	36	1.54	39
50	1.85	47	3.6	92	VALVE DISC OPEN INSIDE "L"			

L = Face to face dimension of Butterfly Valve  
 a = Chord of disc in open position  
 ID (d) = Minimum Pipe ID Required  
 50mm to 100mm size Lever Type, Above 100mm size Gear Type

VALVE FEATURES





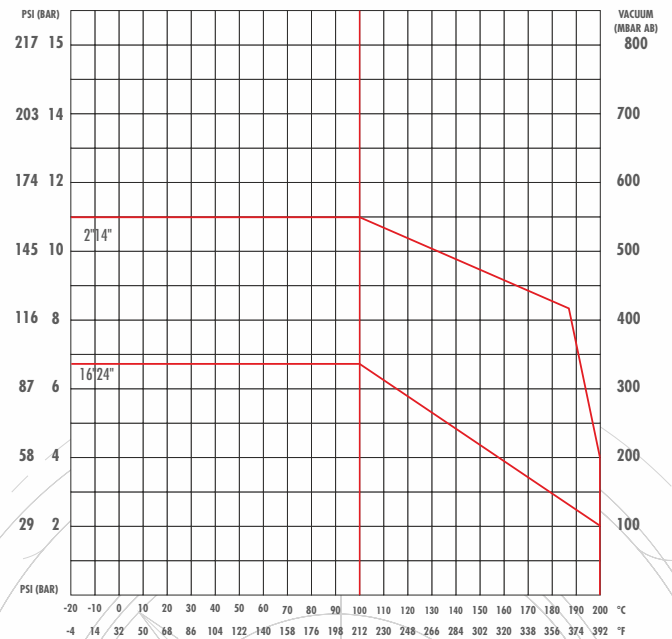
**C<sub>v</sub> VALUES FOR BUTTERFLY VALVE AT DIFFERENT POSITIONS**

SIZE	20°	30°	40°	50°	60°	70°	80°	90°
2"	5.8	13	28	49	74	107	137	155
2.5"	9.3	22	47	81	125	180	232	263
3"	17	38	83	145	220	313	388	455
4"	23	56	110	188	296	447	563	678
5"	44	95	191	296	528	748	945	1177
6"	70	151	273	458	748	1108	1415	1734
8"	110	267	539	922	1369	2105	2796	3538
10"	203	406	824	1346	1867	2807	4234	5232
12"	307	605	1154	1995	3091	4599	6914	8363
14"	406	765	1369	2088	3341	5278	8329	10161
16"	591	1142	1717	2842	4907	7598	10730	13166
18"	771	1456	2587	4466	7250	10672	14210	17284
20"	1032	1879	3456	6206	9454	13688	18050	20880
24"	1125	2494	4849	8607	13166	19082	24592	28420

**BREAK TORQUE VALUES FOR BUTTERFLY VALVES**

SIZE	TORQUE IN Nm	TORQUE IN LB INCH
2"	30	265
2.5"	30	265
3"	30	265
4"	60	530
5"	110	972
6"	125	1105
8"	180	1591
10"	360	3183
12"	480	4243
14"	800	7072
16"	1200	10608
18"	2018	17840
20"	2460	21746
24"	3075	27183

**PRESSURE - TEMPERATURE GRAPH FOR WCB+ PFA / PTFE LINED BUTTERFLY VALVES**



WEIGHT / VALVE

SIZE	KGS.		LBS.	
	INCHES	WAFER	FULLLUG	WAFER
2"	5.00	6.50	11	14.30
2.5"	6.00	7.50	13	16.50
3"	7.00	8.60	15	19.00
4"	9.00	13.40	20	16.08
5"	20.00	23.00	44	50.60
6"	23.00	25.50	51	56.10
8"	26.00	30.50	57	67.10
10"	45.00	51.00	112	112.20
12"	62.00	75.00	136	165.00
14"	66.00	80.00	145	176.00
16"	112.00	135.00	246	297.00
18"	157.00	189.00	346	415.80
20"	288.00	346.00	634	761.20
24"	420.00	504.00	924	1109.00

CODE USED

TYPE OF VALVE	CODE
WAFER TYPE BUTTERFLY	BF1
FULL LUG BUTTERFLY	BF2

BODY CASTINGS	CODE
ASTM A 216 GR. WCB	C1
ASTM A 351 GR. CF8	C2
ASTM A 351 GR. CF8M	C3
ALLOY 20	C4
ASTM A 890 GR. 4A(CD3MN)	C5

TRIM INSERTS	CODE
ALLOY 20	T4
ASTM A 890 GR. 4A(CD3MN)	T5
SUPER DUPLEX	T6

OPERATION	CODE
LEVER	L
GEAR	G
BARE STEM	B

CODE USED

LINING MATERIAL	CODE
PFA	L1
FEP	L2
PVDF	L3
ETFE	L4
ANTISTATIC PFA	L7

SEAT WITH BACKING PADS	CODE
PTFE WITH SILICON	PS
PTFE WITH VITON	PV
TFM WITH SILICON	TS
TFM WITH VITON	TV

FASTNERS	CODE
SS 304	F2
SS 316	F3
HIGH TENSILE	F4
ASTM A 193 GR. B7	F5

LOCKING	CODE
PROVIDED	Y
NOT PROVIDED	N

SIZE													
2"	2.5"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
CODE													
02	2H	03	04	05	06	08	10	12	14	16	18	20	24

HOW TO READ

CODE	BF2-C1-T5-L-L1-TV-(CBR)-F5-N-04	
VALVE TYPE	BUTTERFLY FULL LUG	BF2
CASTING	ASTM A 216 GR. WCB	C1
TRIM INSERT	ASTMA 890 GR. 4A(CD3MN)	T5
OPERATION	LEVER	L
LINING MATERIAL	PFA	L1
SEAT/LINER	PTFE WITH SILICON BACKING PADS	PS
SEAT/LINER OPTION	8mm TFM THICKNESS	(CBR)
FASTNERS	ASTM A 193 GR. B7	F5
LOCKING	NO	N
SIZE	4"	04