BUTTERFLY VALVES

High Performance Butterfly
MAIN FEATURE OF DESIGN

Body Styles
- Wafer
- Tapped lug
- Through drilled lug
- Double flanged
- Butt weld

Seat Designs
- Triple offset-zero leakage
- Double offset-zero leakage
- Concentric-rubber seated designs

Flange Face Finishes
- Raised face
- RTJ
- Large & small groove
- Lens ring
- Other special designs

Trip Designs
- Triple offset
- Double offset
- Concentric design
- Anti-cavitation/lownoise design

Bonnet Designs
- Standard -50 to +200°C
- Medium temperature open design 201 to 650°C
- High temperature design 651 to 1000°C Cryogenic -50 to -200°C

Pressure Ratings
- ANSI/ASME class 125 lb to 600 lb
- DIN/BS PN1.0 to PN10.0
- JIS 5K to 63K

Size Range
- 50 to 1600mm (2 to 64 inches)

Materials
- All commercial available materials in either cast, forged or plate forms.

Actuation
- Manual
- Pneumatic, spring return & double acting
- Electric
- Hydraulic
- Electro hydraulic
- Hydraulic+fail safe+counter weight for turbine isolation applications

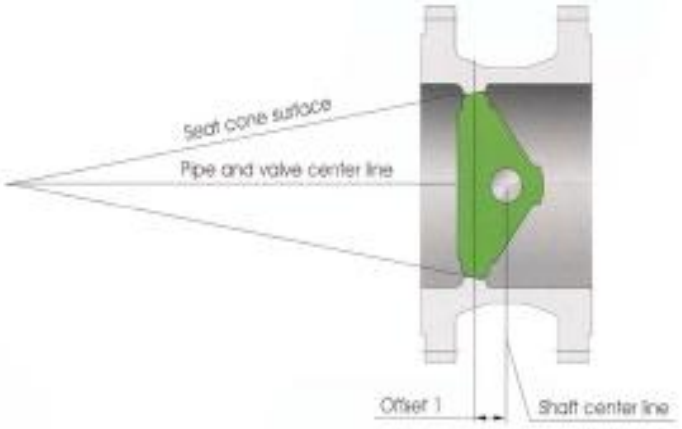
Face to Face Dimension
- API 609 table 1 and 2
- BS 5155
- ISO 5752
- ASME B16.10
- DIN
- Special designs

General Options
- Low emission gland packing
- Live loaded gland packing
- Lubricated gland & isolator
- Hard faced Trims-nitride, stellite, tungsten carbide etc...
- Stem jacketed, full & partial
- Sub sea design
- Fire-safe, API 607, API 6FA & BS EN12266-2
- Characterised discs

The Evolution of Triple Offset Design

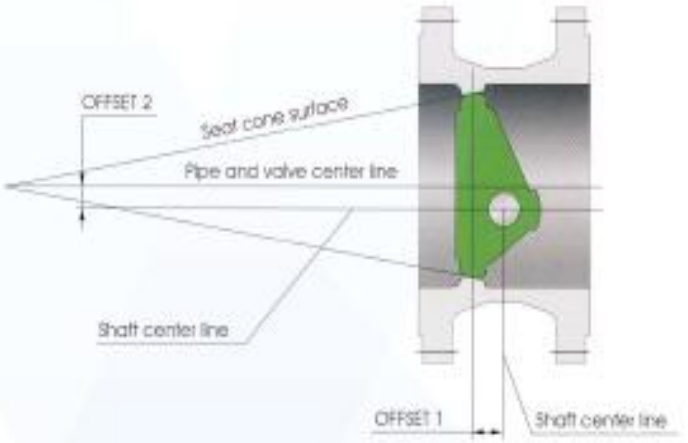
1. Single Offset

The center of rotation is moved back from the centerline of the valve disc. The seat and seal are designed conically and on center, this design release a frictional, interference seal and so it is applicable only to soft-seated valves.



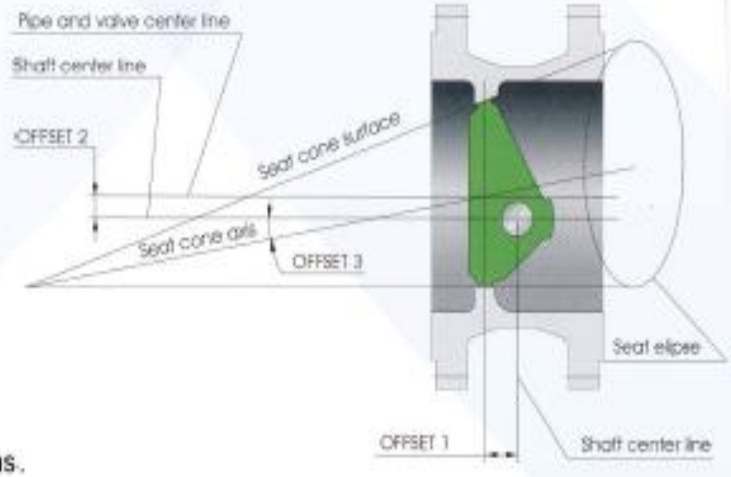
2. Double Offfset

The center of rotation is moved from the center-line of the valve body. The seat and seal design remains conically and on center. This design again release on frictional, interference seal but the length of rotation over which this friction occurs is reduced, allowing a larger range of process resistant seat materials to be used. However these materials must be relatively soft or highly elastic to prevent "jamming"



3. Triple Offset

The centerline of the cone is rotated away from the valve centerline resulting in an ellipsoidal profile and providing the third offset. With this geometry, seat seal interference is completely eliminated ensuring long sealing life. The result is a torque seated, process pressure aided FRICTIONLESS seal. The geometry allows the body seat to be used as the closed limit stop, aiding operator adjustment. The Triple Offset design is ideally suited to metal seated valves providing bubble-tight performance on high temperature, high pressure and fire safe applications.



High Performance Butterfly

Standard Specification

Design	API 609, BS 5155, MSS SP-68
Valve sizes	2" (50mm)~48" (1200mm); for larger sizes, please contact sales office
Pressure Classes	Class150lb~600lb, for higher classes, please contact sales office
Body Styles	Lugged/Wafer Flangeless/Double Flanged/Butt Weld End
Flange Connection	ANSI/ASME B16.5\B16.47 Series; JIS10K~30K, MSS, BS, DIN, ISO, also available on request
Face to Face Dimensions	LUG and WAFER Type: API 609, ISO 5782, MSS SP-68 DOUBLE FLANGED Type: API 609, ISO 5782/BS5155
Pressure Temperature Ratings	ASME/ANSI B16.34: for Steel ASME/ANSI B16.24: for Bronze
Pressure Tests	API 598
Fire-safe	Designed inherently Fire-safe. Tested to API 607/API 6FA/ BS EN 12266-2
Marking	API 609 / MSS SP-25
Operators	Manual, Electric, Pneumatic, Hydraulic, Other types

Typical Seat Design

(1) TRIPLE OFFSET-ZERO LEAKAGE

Fig.1 Triple offset metal seal

Fig.2 Triple offset laminated seal

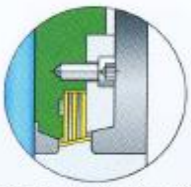


Fig.3 Triple offset laminated seal

Fig.4 Triple offset metal seal

(2) DOUBLE OFFSET-ELASTICITY SEATED-ZERO LEAKAGE

Fig.5 Rubber seal(integral body seat)

Fig.6 Rubber seal(Replacement seat)

Fig.7 Rubber seal

Fig.8 PTFE seal

(3) CONCENTRIC METAL and SOFT SEAL

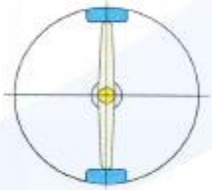


Fig.9 Concentric-Metal seal(CLASS II LEAKAGE)

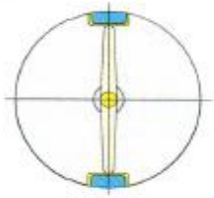
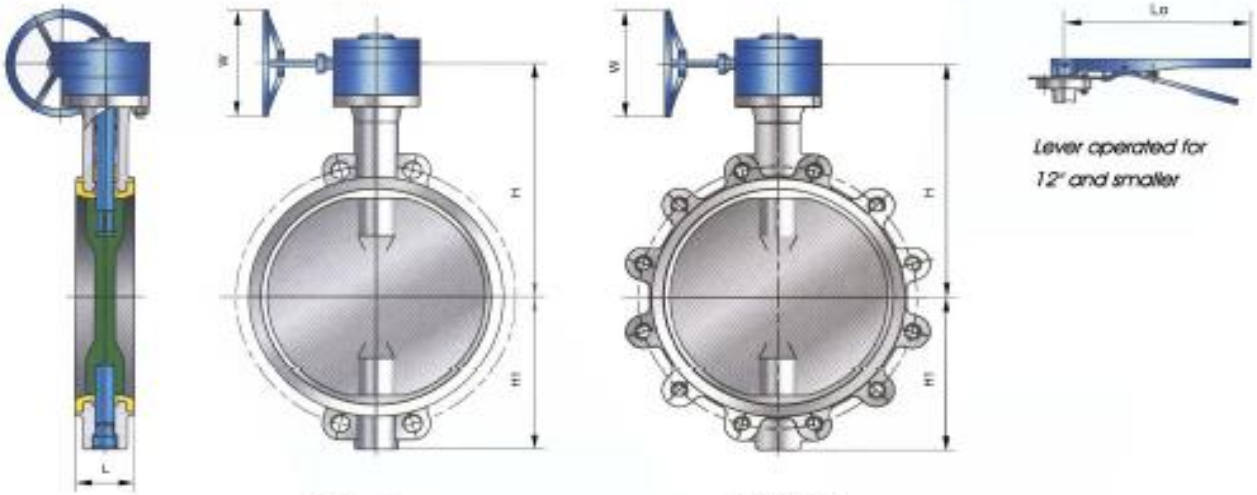


Fig.9 Concentric-Soft(Rubber or PTFE Lined)seal

Center Line Butterfly Valves

Center Line Construction, Rubber Seat, Wafer Lug Type

Class 150



Wafer type

Lug type

Lever operated for 12" and smaller

Parts List

Part Name	Material
Body	Ductile iron
Seat	NBR
Disc	ASTM A351 Gr.CF8
Stem	ASTM A276 410
O-Ring	NBR
Bearing	Metal backed PTFE
Plug	ASTM A276 420
Bolt	Carbon steel

Notes:

1. Size 2" ~12" for ASME 150/200psi
2. Size 14"~24" for ASME 150psi
3. Lever operated for 12" and smaller
4. Gear operated for 12" and smaller
5. Face to Face : API 609A
6. Flange End : ASME Class 150

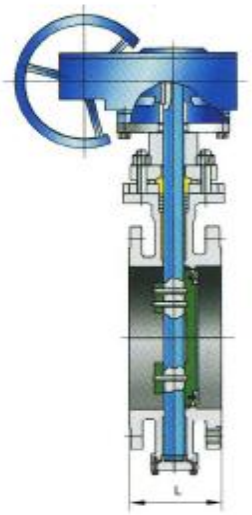
Dimensions and Weights

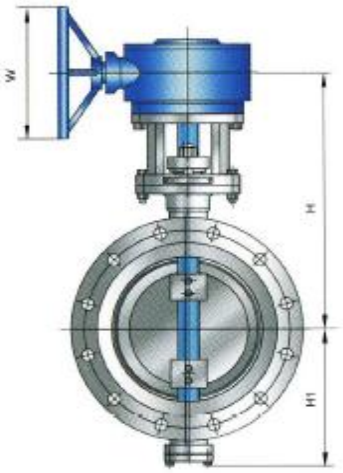
Size (in)	L (mm)	H1 (mm)	H (mm)	W (mm)	Lo (mm)	Wt.(kg)(Gear operated)		Wt.(kg)(Lever operated)	
						Wafer	Lug	Wafer	Lug
2	43	74	180	80	200	10	11	4	5
2-1/2	46	79	196	80	200	10	12	5	6
3	46	85	205	100	200	11	13	5	7
4	52	101	215	100	200	12	15	6	9
5	56	112	230	100	240	14	18	9	13
6	56	125	245	100	240	16	19	10	13
8	60	160	280	180	240	20	24	14	18
10	68	192	315	180	280	28	34	22	25
12	78	242	355	180	280	39	46	35	38
14	78	277	410	315	—	67	77	—	—
16	102	302	425	350	—	89	108	—	—
18	114	341	462	400	—	109	125	—	—
20	127	366	495	480	—	128	168	—	—
24	154	424	586	480	—	230	280	—	—
28	165	520	690	400	—	284	312	—	—
32	190	590	738	400	—	368	442	—	—
36	200	656	838	300	—	713	856	—	—
40	216	720	945	300	—	864	1010	—	—

High Performance Buterfly Valves

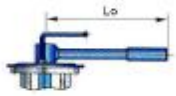
Double Offset Construction, Rubber Seat, Double Flanged Type

Class 150





Electric actuator



Lever operated for 6" and smaller

Seal ring on the disc

Seal ring on the body

Parts List

Part Name	Material
Body	ASTM A216 Gr.WCB
Seat surface	18Cr-8Ni
Seal ring	EPDM
Disc	ASTM A216 Gr.WCB
Stem	ASTM A276 410
Retaining ring	ASTM A105
Bearing	Metal backed PTFE
Gland	ASTM A276 410
Gland flange	ASTM A216 Gr.WCB
Packing	Graphite

Notes:

1. Lever operated for 6" and smaller
2. Gear operated for 8" and larger
3. Face to Face : API 609 B
   a. Short pattern : for ISO 5752 basic series 13
   b. Long pattern : ASME B16.10 for flanged gate valves
4. Flange End : ASME B16.5, B16.47A

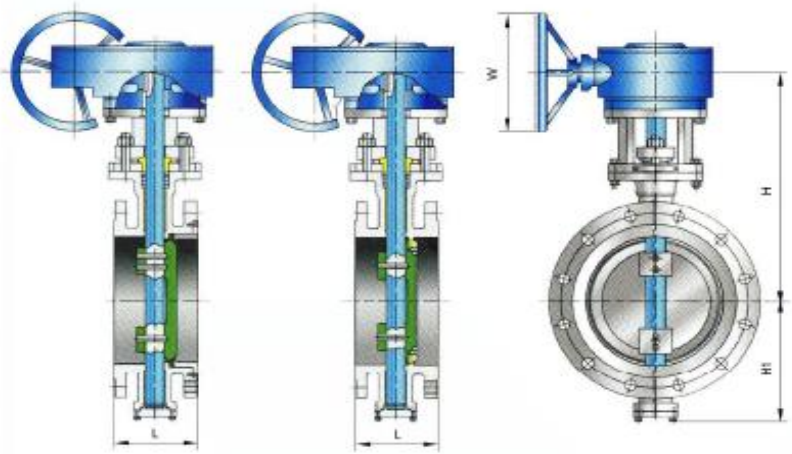
Dimensions and Weights

Size (in)	L (mm)		H1 (mm)	H (mm)	W 9mm)	Lo (mm)	WT.(kg)	
	Short pattern	Long pattern					Short pattern	Long pattern
2	108	178	110	135	—	150	20	22
3	114	203	125	155	—	180	29	33
4	127	229	147	162	—	200	33	38
6	140	267	166	240	—	300	74	86
8	152	292	215	375	180	—	86	143
10	165	330	238	396	180	—	142	213
12	178	356	283	446	180	—	167	251
14	190	281	302	472	315	—	218	326
16	216	406	338	555	350	—	275	413
18	222	432	381	605	400	—	315	472
20	229	457	408	638	480	—	395	593
24	267	508	495	738	480	—	580	870
28	292	610	561	976	480	—	657	986
30	318	610	590	1016	610	—	717	1076
32	318	660	650	1160	610	—	880	1320
36	330	711	700	1205	480	—	1042	1569
40	410	—	750	1294	480	—	1760	—
42	410	—	780	1350	480	—	1820	—
48	470	—	892	1523	480	—	2660	—

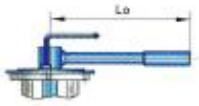
High Performance Butterfly Valves

Triple Offset Construction, Laminated or Metal Seat, Double Flanged Type

Class 150



Electric actuator



Lever operated for 6" and smaller

Seal ring on the body

Seal ring on the disc

Parts List

Part Name	Material
Body	ASTM A216 Gr.WCB
Seat ring	304+Graph.
Disc	ASTM A216 Gr.WCB ENP
Stem	ASTM A276 410
Retaining ring	ASTM A105
Bearing	Metal backed graph.
Gasket	304+Graph.
Gland	ASTM A276 410
Gland flange	ASTM A216 Gr.WCB
Packing	Graphite

Notes:

1. Lever operated for 6" and smaller
2. Gear operated for 8" and larger
3. Face to Face : API 609B
   a. Short pattern : for ISO 5752 basic series 13
   b. Long pattern : ASME B16.10 for flanged gate valves
4. Flange End : ASME B16.5, B16.47A

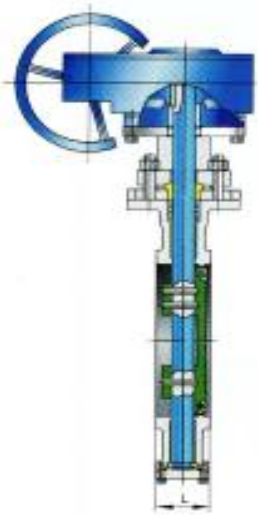
Dimensions and Weights

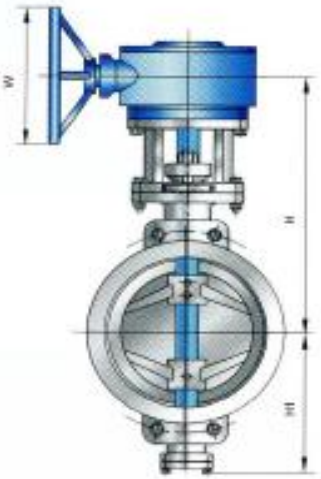
Size (in)	L (mm)		H1 (mm)	H (mm)	W (mm)	Lo (mm)	WT (kg) (Gear operated)	
	Short pattern	Long pattern					Short pattern	Long pattern
2	108	178	110	135	—	150	20	22
3	114	203	125	155	—	180	29	33
4	127	229	147	162	—	200	33	38
6	140	267	166	240	—	300	74	86
8	152	292	215	375	180	—	86	143
10	165	330	238	396	180	—	142	213
12	178	356	283	446	180	—	167	251
14	190	281	302	472	315	—	218	326
16	216	406	338	555	350	—	275	413
18	222	432	381	605	400	—	315	472
20	229	457	408	638	480	—	395	593
24	267	508	495	738	480	—	580	870
28	292	610	561	976	480	—	657	986
30	318	610	590	1016	610	—	717	1076
32	318	660	650	1160	610	—	880	1320
36	330	711	700	1205	480	—	1042	1569
40	410	—	750	1294	480	—	1760	—
42	410	—	780	1350	480	—	1820	—
48	470	—	892	1523	480	—	2660	—

Center Line Butterfly Valves

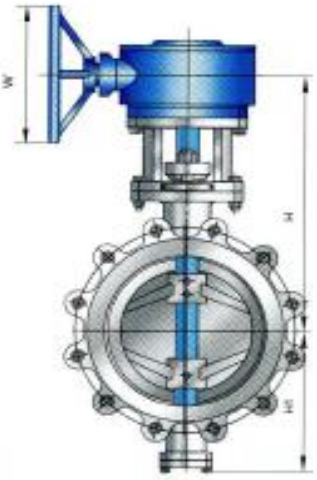
Triple Offset Construction, Metal Seat, Lug & Wafer Type

Class 150





Wafer type



Lug type

Electric actuator

Lever operated for 6" and smaller

Parts List

Part Name	Material
Body	ASTM A216 Gr.WCB
Seat	304SS
Disc	ASTM A351 Gr.CF8
Stem	ASTM A276 410
Retaining ring	ASTM A105
Bearing	Metal backed graph.
Gasket	304+Graph.
Gland	ASTM A276 410
Gland flange	ASTM A216 Gr.WCB
Packing	Graphite

Seat detail

Notes:

1. Lever operated for 6" and smaller
2. Gear operated for 8" and larger
3. Face to Face : API 609B(2"~24") MSS SP-68(28"~48") for ISO 5752 basic series 20
4. Flange End : ASME B16.5, B16.47A

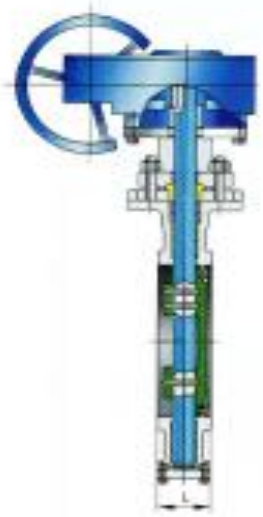
Dimensions and Weights

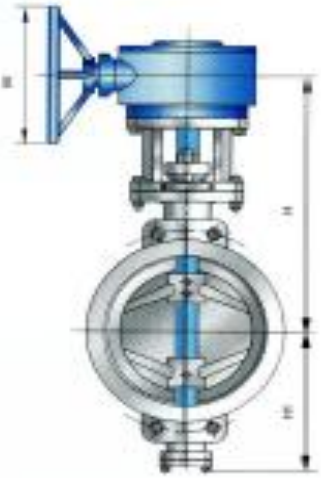
Size (in)	L (mm)	H1 (mm)	H (mm)	W (mm)	Lo (mm)	WT.(kg) (Gear operated)		WT.(kg) (Electric operated)	
						Wafer	Lug	Wafer	Lug
2	43	110	135	—	150	10	11	78	78.7
3	48	125	155	—	180	11	13	79.6	81.4
4	54	147	162	—	200	13	16	82	84.4
6	57	166	240	—	300	26	28	96	101.6
8	64	215	375	180	—	36	43	98	105
10	71	238	396	180	—	53	64	122	133
12	81	283	446	180	—	74	86	165	177
14	92	302	472	315	—	110	127	202	218
16	102	338	555	350	—	138	159	239	260
18	114	381	605	400	—	180	211	296	327
20	127	408	638	480	—	196	225	368	397
24	154	495	738	480	—	400	462	552	614
28	165	561	976	480	—	560	655	730	825
30	190	590	1016	610	—	685	812	892	1019
32	190	650	1160	610	—	726	868	955	1097
36	203	700	1205	480	—	920	1056	1162	1298
40	216	750	1294	480	—	1283	1470	1621	1808
42	229	780	1350	480	—	1488	1723	1786	2021
48	254	892	1523	480	—	1645	1895	2342	2592

High Performance Butterfly Valves

Triple Offset Construction, Metal Seat, Wafer Lug Type

Class 300





Wafer type

Lug type

Electric actuator

Lever operated for 6" and smaller

Parts List

Part Name	Material
Body	ASTM A216 Gr.WCB
Seat	304SS
Disc	ASTM A351 Gr.CF8
Stem	ASTM A276 410
Retaining ring	ASTM A105
Bearing	Metal backed graph.
Gasket	304+Graph.
Gland	ASTM A276 410
Gland flange	ASTM A216 Gr.WCB
Packing	Graphite

Seat detail

Notes:

1. Lever operated for 4" and smaller
2. Gear operated for 6" and larger
3. Face to Face : API 609B
4. Flange End : ASME B16.5

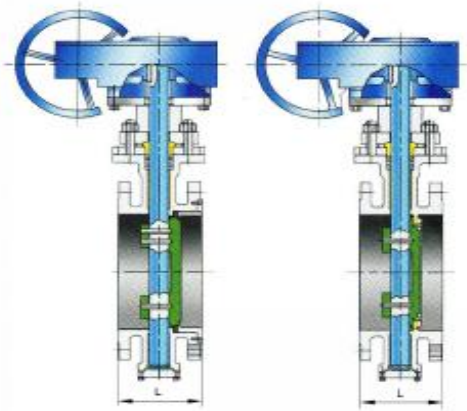
Dimensions and Weights

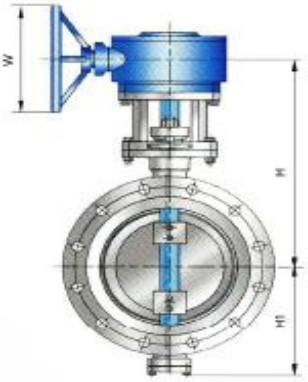
Size (in)	L (mm)	H1 (mm)	H (mm)	W (mm)	L_D (mm)	WT.(kg) (Gear operated)		WT.(kg) (Electric operated)	
						Wafer	Lug	Wafer	Lug
3	48	125	253	150	250	13	15	61	63
4	54	147	274	150	320	18	21	70	73
6	59	192	351	305	—	29	33	78	82
8	73	236	392	305	—	38	42	138	142
10	83	261	480	610	—	58	63	144	181
12	92	298	515	610	—	81	86	163	168
14	117	330	555	610	—	121	131	286	296
16	133	361	590	610	—	153	165	328	340
18	149	407	636	450	—	197	211	368	382
20	159	440	685	450	—	215	238	450	465
24	181	510	934	610	—	443	465	633	355

High Performance Butterfly Valves

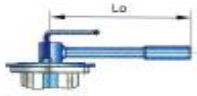
Triple Offset Construction, Laminated or Metal Seat, Double Flanged Type

Class 300

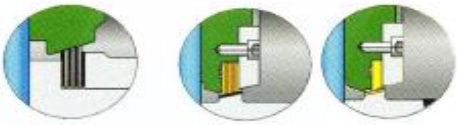




Electric actuator



Lever operated for 6" and smaller



Seal ring on the body

Seal ring on the disc

Parts List

Part Name	Material
Body	ASTM A216 Gr.WCB
Seat ring	304+Graph.
Disc	ASTM A216 Gr.WCB ENP
Stem	ASTM A276 410
Retaining ring	ASTM A105
Bearing	Metal backed graph.
Gasket	304+Graph.
Gland	ASTM A276 410
Gland flange	ASTM A216 Gr.WCB
Packing	Graphite

Notes:

1. Lever operated for 4" and smaller
2. Gear operated for 6" and larger
3. Face to Face : API 609B
   a. Short pattern : for ISO 5752 basic series 14
   b. Long pattern : ASME B16.10 for flanged gate valves
4. Flange End : ASME B16.5

Dimensions and Weights

Size (in)	L (mm)		H1 (mm)	H (mm)	W (mm)	Lo (mm)	WT (kg) (Gear operated)	
	Short pattern	Long pattern					Short pattern	Long pattern
3	180	282	125	253	150	250	29	46.4
4	190	305	147	274	150	320	35	56
6	210	403	192	351	305	—	81	130
8	230	419	236	392	305	—	94	150
10	250	457	261	480	610	—	156	250
12	270	502	298	515	610	—	183	275
14	290	762	330	555	610	—	239	358
16	310	838	361	590	610	—	302	452
18	330	914	407	636	450	—	346	518
20	350	991	440	685	450	—	434	643
24	390	1143	510	934	610	—	638	891