

HIGH PERFORMANCE BUTTERFLY VALVE

Features:

- Bi-directional Bubble-tight Shutoff
- Double Off-Set Configuration with Conical Angled Disc
- Available in Wafer or Lug Style
- Stocked in Carbon by Stainless and All Stainless Steel Configurations
- Dead-end Service Rated to Full 285 PSI Pressure Differential in the Preferred Flow Direction*
- Easy access reverse packing gland (up to 12")
- ISO Top-works for Manual or Direct Mount Actuation (up to 12")
- Low Maintenance
- Manufactured in ISO 9001 Facility

Valve Ratings

- Design: API 609
- Mounting Pad: ISO 5211
- End Flange: ANSI B16.5
- Wall Thickness: ANSI B16.36
- Face to Face: API 609
- Pressure/Temp Rating: ANSI B16.34
- Material Rating: ANSI B16.34
 - Body: CS - 3.2 MPa (464 PSI)
 - SS - 3.0 MPa (435 PSI)
 - Seat Hydro: 2.3 MPa (333 PSI)
 - Seat Air: 0.6 MPa (87 PSI)

Options

FNW offers many options and modifications for valves. These include, but are not limited to: Actuation including chain wheels, square drive nuts, worm-gear operators, and pneumatic and electric operators. Also available are various control accessories, stem extensions, and custom mounting hardware. Contact FNW with your specific application needs.

* Preferred Flow Direction is defined as having the seat retainer ring facing upstream. For non-preferred flow direction (seat retainer ring facing downstream), a downstream flange is required on 10 inch and larger valves for full 285 PSI differential. Without a downstream flange, dead-end service in the non-preferred flow direction is limited to 230 PSI for 10 and 12 inch valves, 150 PSI for 14 inch and larger valves. Pressures listed are for non-shock ambient temperatures.



Standard Materials

Item	Description	Qty	Material		Remarks	Item	Description	Qty	Material		Remarks
			CS Body	SS Body					CS Body	SS Body	
1	BODY	1	A216 WCB	A351 CF8M		22	UPPER STEM BEARING	1	316+PTFE		
2	RETAINER RING	1	A105	A351 CF8M		23	LOWER STEM BEARING	1	316+PTFE		
3	SEAT	1	RTFE (25%FG)			24	DISC WASHER	2	A182 316		
4	DISC	1	A351 CF8M			25	DISC SPRING	1	A182 316		
5	STEM	1	A 564 630 (UNS S17400)		17-4PH	26	GASKET	1	PTFE		8-24 Inch
6	STEM PIN	1 Set	A 564 630 (UNS S17400)		17-4PH	27	LOWER GLAND FLANGE	1	A105	A182 F316	8-24 Inch
7	RETAINING RING WASHER	1 Set	AISI 1066	A276 321		28	LOWER GLAND BOLT	4	A193 B7	A193 B8	8-24 Inch
8	RETAINING RING BOLT	1 Set	A193 B8			29	LOWER GLAND WASHER	4	AISI 1066	A276 321	8-24 Inch
9	SPACER	1	A182 316			30	LOWER BRACKET NUT	8	A194 2H	A194 8	14-24 Inch
10	PACKING GLAND STUD	2	A193 B7	A193 B8		31	LOWER BRACKET WASHER	8	AISI 1066	A276 321	14-24 Inch
11	PACKING GLAND NUT	2	A194 2H	A194 8		32	LOWER BRACKET BOLT	8	A193 B7	A193 B8	14-24 Inch
12	PACKING GLAND WASHER	2	AISI 1066	A276 321		33	BRACKET	1	AISI 1020		14-24 Inch
13	PACKING	1	PTFE			34	UPPER BRACKET BOLT	4	A193 B7	A193 B8	14-24 Inch
14	PACKING GLAND RING	1	A182 316			35	UPPER BRACKET WASHER	4	AISI 1066	A276 321	14-24 Inch
15	PACKING GLAND FLANGE	1	A105	A182 F316		36	KEY	2	AISI 1045	A182 F321	14-24 Inch
16	LEVER PLATE BOLT	2	A193 B7	A193 B8		37	PIN	2	A276 321		14-24 Inch
17	LEVER PLATE NUT	2	A194 2H	A194 8		38	GEAR OPERATOR	1	WCB		8-24 Inch
18	LEVER PLATE WASHER	2	AISI 1066	A276 321		39	LEVER RETAINING WASHER	1	AISI 1066		
19	LEVER	1	A536, GR. 65-45-12			40	LEVER RETAINING BOLT	1	A193 B7		
20	RIVET	2	A182 304			41	NOTCHED LEVER PLATE	1	STEEL (Cr PLATED)		3-6 Inch
21	NAMEPLATE	1	A182 304								

Dimensions (Inches)

Size ¹	Ød	ØG	ØC	Lug		Wafer		L	A	B	L1	L2	L3	W	ØP mm (ISO)	M-Øn mm	H	ØX	K	K1
				N ²	E ³	N ²	E													
3	3.39	5.00	6.00	4	5/8-1UNC	2	0.748	1.89	7.09	3.15	10.51	-	-	-	Ø102 (F10)	4-Ø12	0.63	0.63	0.55	-
4	4.33	6.18	7.50	8	5/8-1UNC	2	0.748	2.13	7.87	4.09	10.51	-	-	-	Ø102 (F10)	4-Ø12	0.75	0.79	0.67	-
5	5.16	7.32	8.50	8	3/4-10UNC	2	0.866	2.24	9.25	4.68	12.21	-	-	-	Ø102 (F10)	4-Ø12	0.83	0.95	0.75	-
6	6.14	8.35	9.50	8	3/4-10UNC	2	0.866	2.24	9.92	5.31	12.21	-	-	-	Ø102 (F10)	4-Ø12	0.83	0.98	0.75	-
8	7.99	10.63	11.75	8	3/4-10UNC	2	0.866	2.52	12.21	7.48	-	2.48	9.05	11.81	Ø125 (F12)	4-Ø14	1.18	1.10	0.87	-
10	10.00	12.76	14.25	12	7/8-9UNC	2	0.945	2.80	13.94	9.84	-	2.48	9.05	11.81	Ø125 (F12)	4-Ø14	1.18	1.26	1.06	-
12	12.01	15.00	17.00	12	7/8-9UNC	2	0.945	3.19	17.72	11.42	-	3.15	10.63	15.75	Ø140 (F14)	4-Ø18	1.18	1.38	1.06	-
14	13.27	16.26	18.75	12	1-8UNC	2	1.142	3.62	18.90	11.81	-	4.72	16.54	19.69	Ø165 (F16)	4-Ø22	3.74	1.38	1.50	0.39
16	15.24	18.50	21.25	16	1-8UNC	4	1.142	4.02	19.88	13.39	-	4.72	16.54	19.69	Ø165 (F16)	4-Ø22	4.09	1.58	1.65	0.47
18	17.24	20.98	22.76	16	1-1/8-8UN	4	1.260	4.49	23.62	14.96	-	4.96	18.11	23.62	Ø254 (F25)	8-Ø18	3.23	1.81	1.95	0.55
20	19.25	22.99	25.00	20	1-1/8-8UN	4	1-1/8-8UN	5.00	29.13	15.35	-	5.43	20.08	23.62	Ø254 (F25)	8-Ø18	3.27	1.97	2.11	0.55
24	23.27	27.24	29.50	20	1-1/4-8UN	4	1-1/4-8UN	6.06	33.86	18.50	-	5.43	20.47	29.92	Ø254 (F25)	8-Ø18	4.13	2.36	2.52	0.71

1 8" and larger valves are standard with gear operator. Gear operators for 6" and smaller valves are available as an option.

2 The N value for lug valves is tapped holes per side. For wafer valves, the number represents through holes unless tapped are indicated.

3 Large body valves have blind tapped holes at the top and bottom of the valve, near the stem. For high performance butterfly valves, ANSI B16.5 requires all bolts, 1-1/8" and larger, have an 8-UN thread series.

Cv (Flow Coefficients)

Size	Disc Opening								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
3"	6	16	24	36	52	76	113	146	162
4"	15	37	55	80	117	172	256	329	365
6"	39	98	147	215	313	460	685	880	978
8"	70	176	264	387	563	827	1,232	1,584	1,760
10"	131	328	492	722	1,050	1,542	2,296	2,952	3,280
12"	196	490	735	1,078	1,568	2,303	3,430	4,410	4,900
14"	214	536	804	1,179	1,715	2,519	3,752	4,824	5,360
16"	307	768	1,152	1,690	2,458	3,610	5,376	6,912	7,680
18"	380	950	1,425	2,090	3,040	4,465	6,650	8,550	9,500
20"	537	1,342	2,013	2,952	4,294	6,307	9,394	12,078	13,420
24"	752	1,880	2,820	4,136	6,016	8,836	13,160	16,920	18,800

The size of butterfly valve used for control purposes should be calculated on the basis of the operating characteristics. In order to achieve optimum control, the flow coefficient (Cv) of a valve needs to be considered. Cv is the volume of water in U.S. gallons per minute that passes through the valve at a pressure drop of 1 PSI at 68°F. Flow for a given Cv is typically calculated from the following formula.

$$Q = Cv \times \sqrt{\frac{\Delta P \times 62.4}{D}}$$

Where:

Q = Valve flow rate in gallons per minute (US GPM)

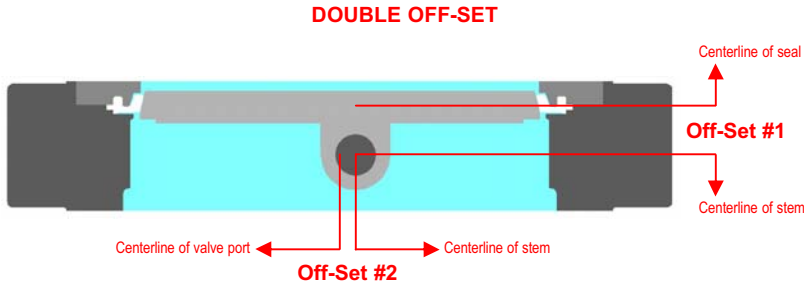
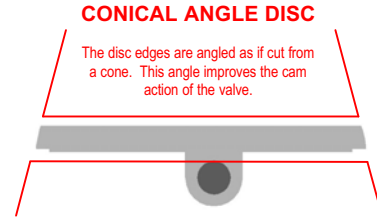
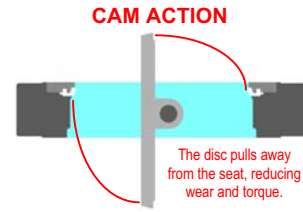
ΔP = Pounds per square inch (PSI) pressure drop across valve

62.4 = Conversion factor for fluids computed in relation to water

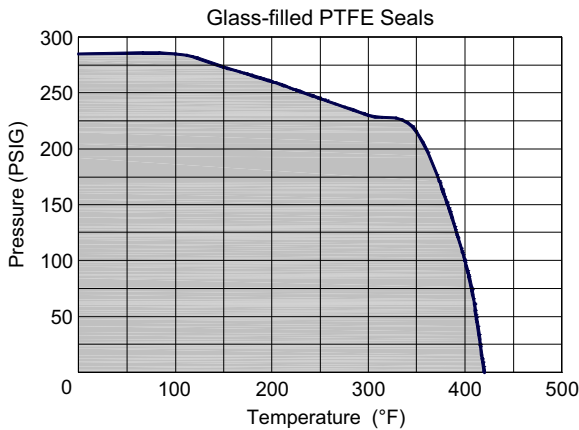
D = Density of fluids in pounds per cubic foot

Double Off-Set Design

The valve is designed with two offsets. The first offset is between the seat sealing surface and the centerline of the valve stem, putting the stem behind the sealing surface. Since the stem does not penetrate the sealing surface, there is a complete, uninterrupted, 360° seat seal. The second offset is between the centerline of the valve stem and the centerline of the valve port. This double-offset creates an eccentric seating action that reduces seat wear and torque. The disc cams into the seat for a bubble tight shut-off. The cam action is improved by the conical angle of the valve disc.



Pressure/Temperature



Torques (In-Lbs)

Size	Differential Pressure*	
	150 PSI	285 PSI
3	270	338
4	436	578
5	657	858
6	962	1,292
8	1,726	2,359
10	2,616	3,683
12	3,878	5,567
14	5,555	7,942
16	7,415	10,708
18	9,494	13,965
20	13,868	20,108
24	21,522	31,919

* Differential pressures shown are for the preferred flow (valve retaining ring facing upstream pressure).

Weights (Lbs.)

Size	Wafer	Lug
3	8	10
4	11	13
5	15	18
6	17	20
8	36	43
10	50	59
12	67	86
14	110	125
16	134	170
18	191	223
20	248	300
24	360	450

Figure Number Matrix

