



Series 8500 Grayline Butterfly Valves Sizing Guide

C_v Value* - Valve Sizing Coefficient (Water @ 60°F Sp. Gr = 1.0)

Valve Size	Disc Angle Open								
	10°	20°	30°	40°	50°	60°	70°	80°	90° Full Open
2	0	1	5	12	25	47	90	118	140
2-1/2	0	2	10	26	39	97	129	192	244
3	0	7	21	45	62	110	203	326	452
4	0	20	44	81	120	199	351	570	689
5	0	29	71	134	199	336	577	1142	1440
6	0	39	103	203	307	507	876	1427	1980
8	1	58	178	382	587	964	1640	2632	3870
10	9	83	274	605	980	1661	2678	3919	6450
12	11	106	378	904	1553	2489	4130	5432	9800
14	13	117	567	1386	2087	3074	4840	8347	14655
16	17	206	834	1953	2938	4046	6766	12671	17868
18	20	316	1129	2247	3627	5289	8459	16234	23173
20	25	474	1478	2957	4678	7745	10973	19211	29645
24	30	683	2187	4268	6165	9737	15432	28376	38879
30	37	2080	4406	9546	17010	28147	44545	66818	73426
36	60	3050	6730	12740	20220	32500	52500	79600	87500

*C_v Value is the flow rate (US gal/min) of water at 60°F passing through the valve when the disc is fully open and the differential pressure between the two ends of the valve is 1 psi(lb/in²).

For optimum throttling characteristics, a butterfly valve should be sized to throttle within the range of 25° to 70° disc opening.

FLOW CALCULATIONS FOR LIQUIDS

To determine the flow rate or pressure drop of liquid passing through a butterfly valve use the following formulae:

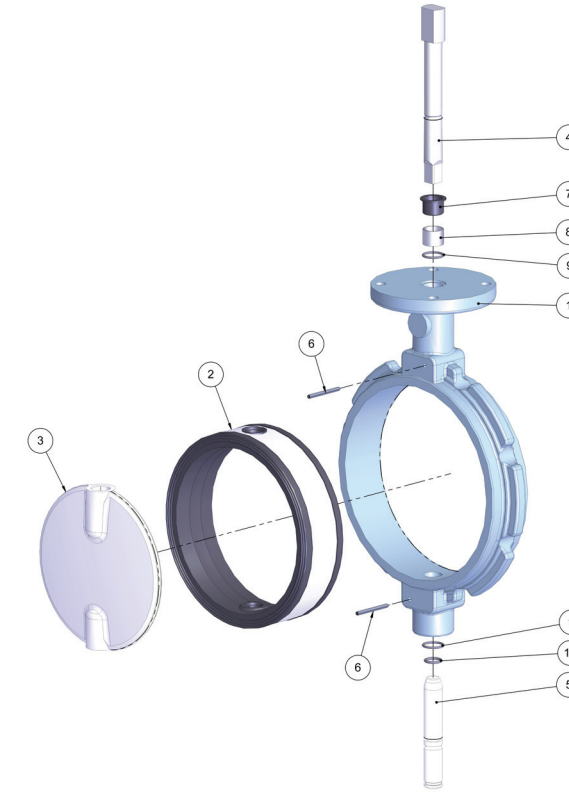
$$Q_L = C_v \times \sqrt{\frac{\Delta P}{S_L}}$$

Where: Q_L = Flow of liquid in gallons per minute (GPM)
 C_v = Flow coefficient from above table
 ΔP = Pressure drop across two ends of valve
 S_L = Specific Gravity of liquid (1.0 for water)

$$\Delta P = S_L \times \left(\frac{Q_L}{C_v} \right)^2$$



Series 8500 Grayline Butterfly Valves Material Specifications



EXTRA VALUE FOR LESS

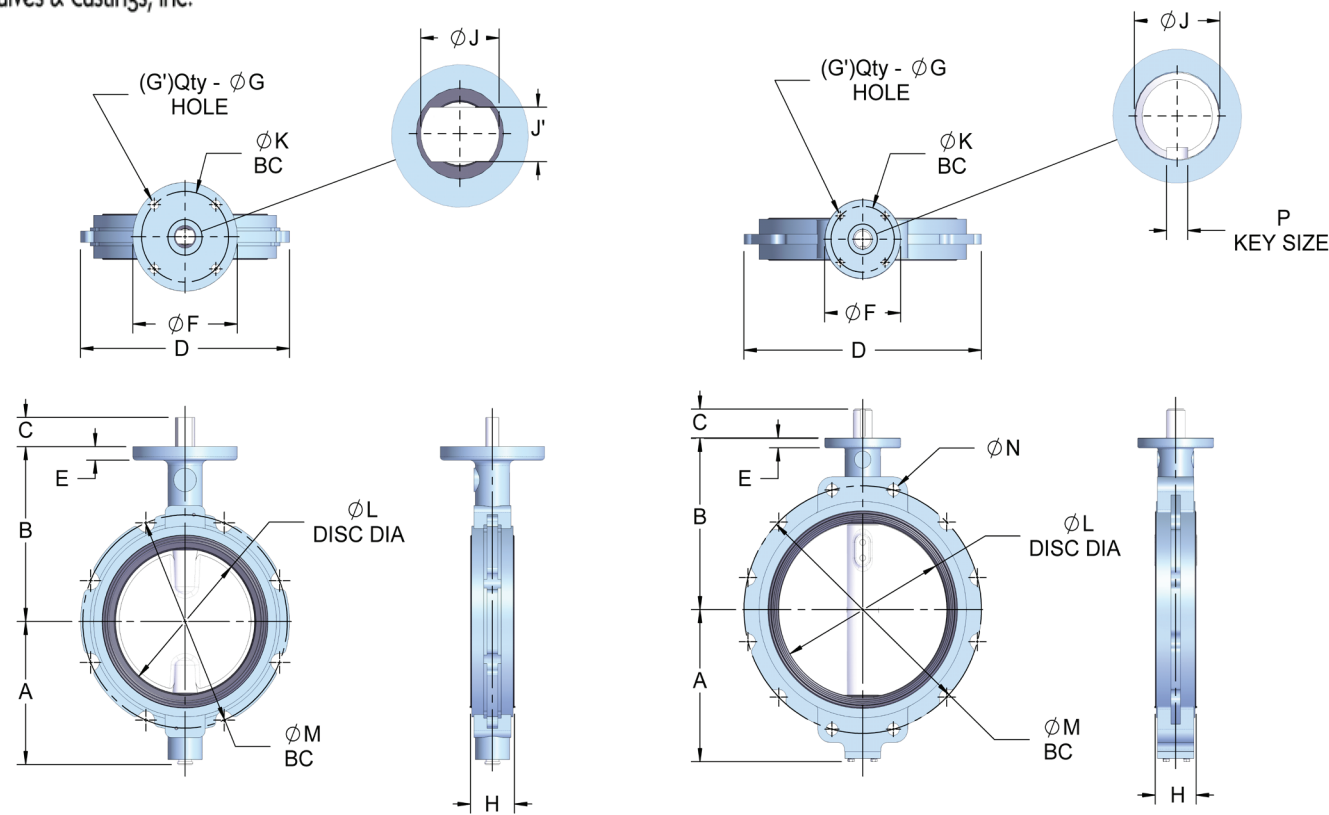
- The 8500 Series valves are designed to meet most popular standards: such as ANSI & API.
- They offer low torque for durable and less expensive actuation compared to ball, plug & gate valves.
- They provide more versatility, lighter weight and easier installation than ball and plug valves.
- They can also be used for throttling applications.

Ref No	Component	Material	ASTM Spec
1	Body	Cast Iron	ASTM A126 CLASS B
2	Seat	Buna-N	ASTM D2000
3	Disc	Stainless Steel	ASTM A351, CF8
4	Stem	Stainless Steel	ASTM A276, S420
5	Stem	Stainless Steel	ASTM A276, S420
6	Spring Pin	Stainless Steel	ASTM A276, S321
7	Top Bearing	Nylon	
8	Bottom Bearing	Nylon	
9	O-Ring	Buna-N	ASTM D2000
10	O-Ring	Buna-N	ASTM D2000

Series 8500 Grayline Butterfly Valves are available in a variety of styles and materials to fit almost any commercial, industrial or speciality application. Stainless steel disc and Buna-N seat makes the 8500 perfect for corrosive situations.



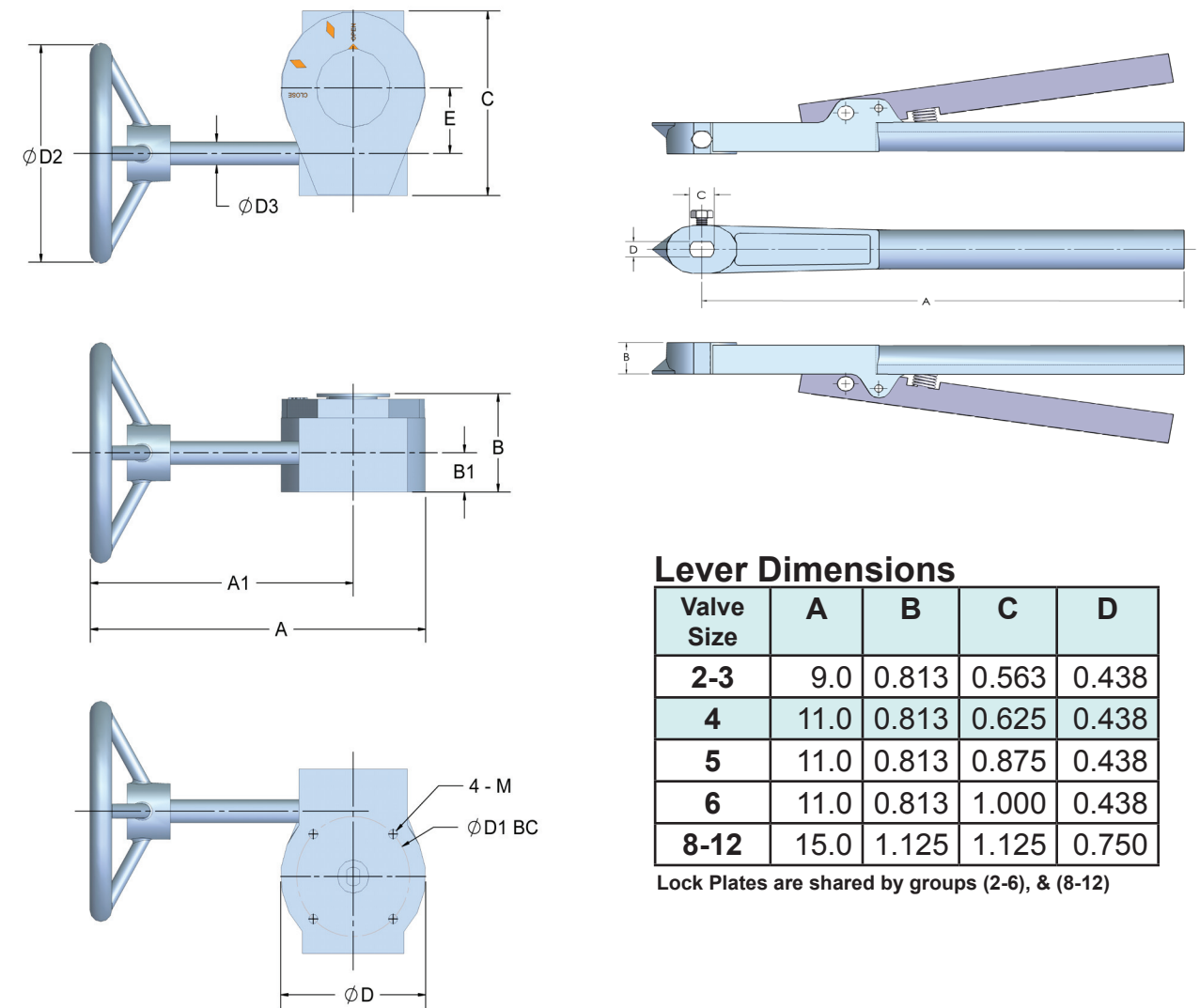
Series 8500 Grayline Butterfly Valves Dimensional Information



Size (in)	Dimensions (in)															
	A	B	C	D	E	F	G'	G	H	J	J'	K	L	M	N	P
2	3.12	5.80	1.06	5.13	0.49	4.00	4	0.41	1.65	0.56	0.44	3.00	2.21	4.75	----	----
2.5	3.28	6.30	1.06	5.85	0.49	4.00	4	0.41	1.79	0.56	0.44	3.00	2.67	5.50	----	----
3	3.63	6.50	1.06	6.25	0.49	4.00	4	0.41	1.79	0.56	0.44	3.00	3.17	6.00	----	----
4	4.60	7.25	1.06	7.80	0.49	4.00	4	0.41	2.03	0.63	0.44	3.00	4.18	7.50	----	----
5	5.62	7.75	1.06	8.80	0.49	4.00	4	0.41	2.15	0.88	0.44	3.00	5.16	8.50	----	----
6	6.38	8.40	1.06	9.80	0.49	4.00	4	0.41	2.15	1.00	0.44	3.00	6.04	9.50	----	----
8	7.89	9.63	1.63	12.00	0.75	6.00	4	0.53	2.37	1.13	0.75	5.00	8.06	11.75	----	----
10	9.34	11.00	1.63	14.50	0.75	6.00	4	0.53	2.65	1.13	0.75	5.00	10.06	14.25	$\phi 1$ THRU	----
12	10.77	12.50	1.63	17.44	0.75	6.00	4	0.53	3.03	1.13	0.75	5.00	12.07	17.00	$\phi 1$ THRU	----
14	11.69	13.07	2.19	18.75	0.75	6.00	4	0.53	3.06	1.50	----	5.00	13.33	18.75	$\phi 1.00 - 8UNC-2B$	3/8 SQ
16	12.75	14.87	2.30	21.25	0.75	6.00	4	0.53	4.00	1.50	----	5.00	15.35	21.25	$\phi 1.00 - 8UNC-2B$	3/8 SQ
18	13.72	15.75	3.00	22.75	0.75	6.75	4	0.53	4.50	1.75	----	5.00	17.34	22.75	$\phi 1-1/8 - 7UNC-2B$	3/8 SQ
20	15.35	16.75	3.00	25.00	0.88	7.75	4	0.81	5.00	1.85	----	6.25	19.33	25.00	$\phi 1-1/8 - 7UNC-2B$	1/2 SQ
24	17.55	19.38	3.00	29.50	0.88	7.75	4	0.81	6.06	1.85	----	6.25	23.35	29.50	$\phi 1-1/4 - 7UNC-2B$	1/2 SQ
30	21.90	25.51	2.60	34.53	1.18	11.81	8	0.71	6.57	2.49	----	10.00	29.27	36.00	$\phi 1-1/4 - 7UNC-2B$	5/8 SQ
36	26.50	28.35	4.65	41.14	1.65	11.81	8	0.71	7.99	2.95	----	10.00	34.00	42.75	$\phi 1-1/2 - 6UNC-2B$	1 SQ



Series 8500 Grayline Butterfly Valves Dimensional Information



Lever Dimensions

Valve Size	A	B	C	D
2-3	9.0	0.813	0.563	0.438
4	11.0	0.813	0.625	0.438
5	11.0	0.813	0.875	0.438
6	11.0	0.813	1.000	0.438
8-12	15.0	1.125	1.125	0.750

Lock Plates are shared by groups (2-6), & (8-12)

Gear Box Dimensions

Valve Size	A	A1	B	B1	C	D	D1	D2	D3	E	M	Gear Ratio	WT
2 - 6	9.65	7.57	2.68	1.42	4.92	4.17	3.00	5.98	0.62	1.77	3/8-16UNC-2B	24:1	11
8 - 12	12.60	9.55	3.15	1.34	7.00	6.10	5.00	11.89	0.75	2.60	1/2-13UNC-2B	30:1	24
14	16.14	12.80	3.43	1.52	7.87	6.69	5.00	11.89	0.75	3.00	1/2-13UNC-2B	50:1	31
16-18	16.44	11.32	4.81	2.22	11.50	10.24	5.00	11.89	1.00	4.72	1/2-13UNC-2B	80:1	60
20-24	16.14	11.02	6.62	4.96	11.61	10.24	6.25	15.75	1.00	4.72	3/4-10UNC-2B	120:1	81
30	19.13	13.10	5.10	6.61	18.30	17.12	10.00	15.75	1.51	5.51	(8) M16 5/8-11UNC-2B	704:1	265
36	21.18	15.00	8.60	7.07	20.51	17.12	10.00	15.75	1.51	6.38	(8) M16 5/8-11UNC-2B	640:1	386

Handwheels are shared by groups (2-6), (8-14), (16-18), (20-24), (30), & (36)



Series 8500 Grayline Butterfly Valves Torque Data

BREAK AWAY TORQUE

Breakaway Torque is the effort required to open the valve at a given pressure differential. This is the highest required torque value to operate the valve and is used to size any actuator.

These values are based on testing performed and include a safety factor and are valid for water and lubricating fluids only.

Break Away Torques values in Inch Pounds (in-lb) for Wet Service

Valve Size	Pressure Differential (psi)			
	25	100	150	200
2	102	113	120	125
2-1/2	157	176	182	192
3	210	237	244	256
4	232	264	285	350
5	349	405	440	478
6	496	595	655	705
8	1020	1265	1408	1571
10	1596	2075	2394	2697
12	2665	3465	4077	4531
14	3540	4531	5133	----
16	4993	6641	7740	----
18	6425	8545	10080	----
20	8938	12245	14568	----
24	12030	16240	19248	----
30	20850	32885	40115	----
36	28301	44690	54478	----

The torques shown in these charts were derived from test data using water at 60 degree F (called Wet condition). For torques using dry gases (or other Dry condition), user shall contact Fresno Valves & Castings Inc.

There is no safety factor included in the numbers shown on these charts. For actuator sizing, Fresno Valves & Castings recommends that these values be multiplied by 1.5 for single valve applications, or 2.0 for 3-way (Tee) applications.