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Grinnell[®]
VALVES & CONTROLS

Series 8000 Butterfly Valves



Body

One piece cast bodies are available in both wafer and tapped lug design. Standard long neck body provides full clearance for 2-inches of insulation on ANSI 150 pipe flanges.

Stems

Heavy-duty, two-piece design allows for easy maintenance. Stems are secured by the use of retaining pins.

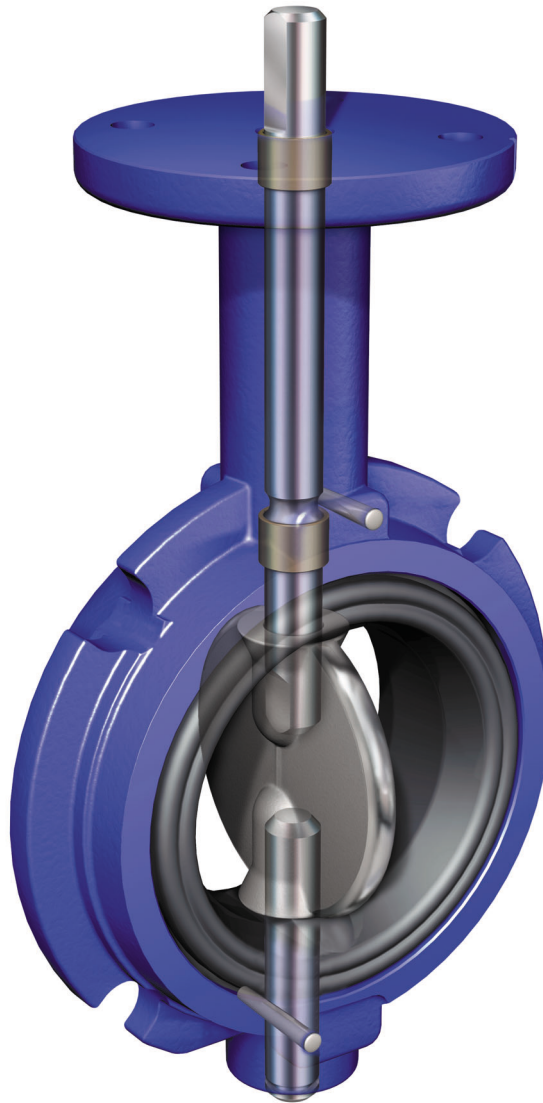
Bearings

Two bronze or Teflon®* bearings are standard on 2" through 12". Sizes above 12" have full-length bearings on upper and lower stems.

Stem/Disc Attachment

Rectangular drive ensures proper disc connection. No pins or bolts are exposed to flow.

** Teflon® is a registered trademark of the E.I. DuPont de Nemours Company*



Seat

Elastomer, reinforced with phenolic backing ring, enables valve to be used on pressure or vacuum service. Seat can be field replaced. Grinnell's special double seal design eliminates the need for flange gaskets.

Three stem seal O-rings are molded into the seat liner to back up the primary stem seal.

Disc

Streamlined for maximum flow and minimum seat wear. Ease of maintenance due to the elimination of bolts, pins, etc., as disc to stem connectors.

Dead-End Service

A unique patented lip, integral to the body, prevents the liner from moving downstream, eliminating seat and flange leakage.

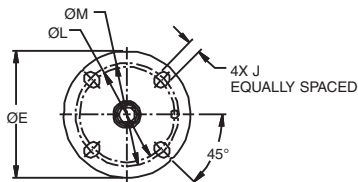
This feature allows lug valve to be used in uni-directional, dead-end service applications at full rated pressure without the use of downstream flange.

Grinnell is a leading manufacturer of valves for industrial, commercial and construction markets. Series 8000 Butterfly Valves are produced on state-of-the art valve machining equipment. Each valve is tested to 110 percent of rated working pressure prior to shipment to ensure quality.

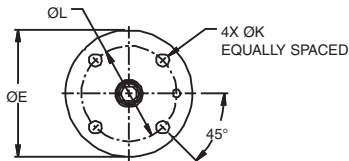
Pressure Rating

- 250 psig WOG (non-shock) 2" thru 12"
- 150 psig WOG (non-shock) 14" thru 36"
- 150 psig WOG (non-shock) TFE Seat
- 250 psig WOG (non-shock) uni-directional, dead-end service 2" through 12"
- 150 psig WOG (non-shock) uni-directional, dead-end service, 14" through 36"
- Full Vacuum Service
- Patented design complies with MSS-SP-67 and API 609**
- Coast Guard approved to 46CFR56.20-15(b) (1).

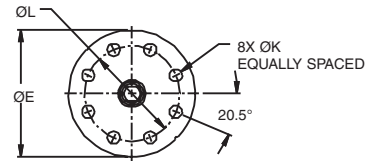
*** Butterfly valves can be shell tested per spec, on request.*



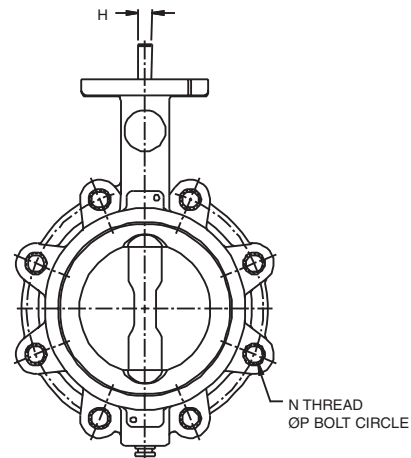
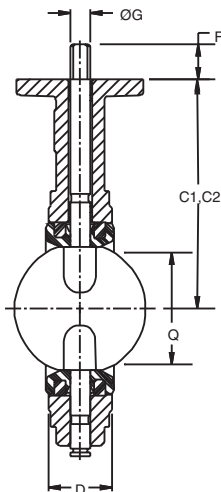
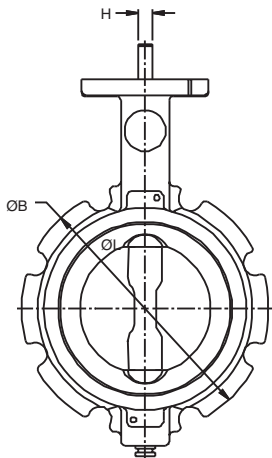
2" - 6" VALVES



8" - 24" VALVES



30" - 36" VALVES



Dimensions

Size	B	C1	C2	D	E	F	G	H	J	K	L	M	N	P	**Q	Key
2"	5.09	5.75	3.93	1.63	4.00	1.09	0.56	0.43	0.406	-	3.00	3.25	0.625-11	4.75	1.41	-
2.5"	5.81	6.25	4.50	1.75	4.00	1.09	0.56	0.43	0.406	-	3.00	3.25	0.625-11	5.50	1.82	-
3"	6.25	6.50	4.87	1.75	4.00	1.09	0.56	0.43	0.406	-	3.00	3.25	0.625-11	6.00	2.62	-
4"	7.81	7.25	6.00	2.00	4.00	1.09	0.62	0.43	0.406	-	3.00	3.25	0.625-11	7.50	3.62	-
5"	8.75	7.75	6.00	2.12	4.00	1.09	0.87	0.43	0.406	-	3.00	3.25	0.750-10	8.50	4.67	-
6"	9.75	8.38	6.50	2.14	4.00	1.09	1.000	0.43	0.406	-	3.00	3.25	0.750-10	9.50	5.68	-
8"	12.00	9.62	8.31	2.35	6.00	1.62	1.12	0.75	-	0.562	5.00	-	0.750-10	11.75	7.54	-
10"	14.50	11.00	9.00	2.63	6.00	1.62	*1.12	0.75	-	0.562	5.00	-	0.875-9	14.25	9.65	-
12"	17.50	12.50	10.28	3.00	6.00	1.62	*1.12	0.75	-	0.562	5.00	-	0.875-9	17.00	11.49	-
14"	19.45	13.25	N/A	3.06	6.00	2.25	1.50	-	-	0.562	5.00	-	1.00-8	18.75	12.97	3/8 x 3/8
16"	22.06	14.75	N/A	4.01	6.00	2.25	*1.50	-	-	0.562	5.00	-	1.00-8	21.25	14.85	3/8 x 3/8
18"	23.44	15.75	N/A	4.48	6.75	3.00	1.75	-	-	0.562	5.00	-	1 1/8 - 7	22.75	16.76	3/8 x 3/8
20"	25.68	16.25	N/A	4.99	6.75	3.00	*1.75	-	-	0.562	5.00	-	1 1/8 - 7	25.00	18.72	3/8 x 3/8
24"	30.06	19.12	N/A	6.00	8.00	3.50	2.25	-	-	0.813	6.50	-	1 1/4 - 7	29.50	22.59	1/2 x 1/2
30"	38.75	24.75	N/A	6.51	9.25	5.38	3.00	-	-	0.687	7.50	-	1 1/4 - 7	36.00	28.60	3/4 x 1/2
36"	45.75	28.38	N/A	7.88	11.75	5.38	3.62	-	-	0.687	10.25	-	1 1/2 - 6	42.75	34.48	7/8 x 5/8

C1 Dimensions apply to Cast Iron and Ductile Iron bodies ONLY.
 C2 Dimensions apply to Aluminum Bronze bodies ONLY.
 * Actual shaft diameter is 1.375-10", 1.500-12", 1.625-16", 2.000-20".
 ** Q Dimension is the minimum allowable pipe or flange inside diameter at the centered body face to protect the disc sealing edge against damage when opening the valve.

Valve Sizing

Rate of flow through a valve depends upon the pressure drop. The most common method of presenting this information is by C_v . The C_v is the valve coefficient of flow and represents the flow of water in gallons per minute (GPM) with a 1 psi pressure drop through

the valve. The higher the C_v the greater the flow and the better the control characteristics. Throttling characteristics are shown in the same manner with C_v 's at the various disc openings. Tabulated below are the C_v 's for the Series 8000 Butterfly Valve.

C_v Chart (Water @ 70°F, Specific Gravity = 1.00)

Valve Size	Disc position (Degrees Open)								
	25°	30°	40°	50°	60°	70°	80°	90°	
2"	3	7	19	36	63	84	115	120	
2 1/2"	4	10	24	47	78	113	182	194	
3"	14	21	45	84	133	203	382	430	
4"	30	52	100	165	270	420	703	830	
5"	85	130	210	345	525	825	1,350	1,500	
6"	165	225	360	570	820	1,260	1,875	1,980	
8"	210	300	480	780	1,320	2,280	3,780	3,870	
10"	405	575	850	1,200	1,900	3,300	6,100	6,450	
12"	550	750	1,200	1,875	2,850	5,025	9,300	9,800	
14"	650	825	1,500	2,300	3,500	6,200	9,700	10,500	
16"	800	1,000	1,850	2,900	4,600	7,500	10,600	13,500	
18"	1,100	1,400	2,450	3,800	5,000	9,700	13,850	18,000	
20"	1,400	1,650	3,050	4,800	7,400	12,500	17,750	23,000	
24"	2,000	2,400	4,200	6,600	10,500	17,000	23,000	31,000	
30"	2,900	3,500	6,200	9,700	15,000	25,000	35,000	46,000	
36"	4,300	5,200	9,200	14,000	22,000	37,000	51,000	68,000	

Torque Data

Torque is the rotary effort required to operate a valve. This turning force in a butterfly valve is determined by three factors – the friction of the disc and seat due to interference for sealing, bearing friction, and fluid dynamic torque.

Note: These values include a safety factor and are valid for water and lubricating fluids only at 70° Fahrenheit. Since torques are greatly increased for dry and nonlubricating fluids and temperature variations, contact the factory for accurate values in these applications.

Breakaway torque at 70° Fahrenheit

Breakaway torque is the total of the torques resulting from bearing friction and disc/seat interference friction at a given pressure differential. This value is normally the highest required torque to operate a valve, and is used to size the actuator. Listed below are recommended sizing torques to open and close the valve at pressures shown in wet services.

Breakaway torque in inch pounds for wet service applications/standard disc

Line Pressure	Size															
	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24	30	36
50	85	126	180	355	562	918	1,440	2,466	3,510	5,200	6,900	9,000	11,000	16,000	18,700	27,500
100	108	153	207	414	652	1,035	1,692	3,010	4,140	6,000	8,000	10,500	14,000	21,000	22,000	32,500
150	126	175	256	472	715	1,152	1,944	3,550	5,616	7,500	9,500	12,000	15,200	28,000	27,700	37,000
200	144	198	297	531	787	1,269	2,205	4,095	7,686	--	--	--	--	--	--	--
250	162	221	339	590	869	1,386	2,476	4,660	10,556	--	--	--	--	--	--	--

Note: For Teflon® seated valves, contact the factory.

Materials Description

Seats

NBR – Rated for temperatures 0°F to 180°F. NBR is also commonly identified as Buna-N, Nitrile, or Hycar®. It is an excellent general purpose elastomer suitable for use with air, water as well as most petroleum oils and greases, automotive gasolines (except those which have additives), alcohols and glycols, L-P gases, propane and butane, fuel oils and many other fluids. It also exhibits good abrasion resistance, and excellent resistance to compression set.

Viton® – Rated for temperatures 0°F to 300° Viton® is an E.I. DuPont trademark. Fluorel is 3M's trademark for the equivalent fluorocarbon elastomer. This material offers higher temperature resistance and outstanding chemical resistance. It is resistant to hydrocarbon products and mineral acids, both dilute and concentrated solutions. However, it is never to be used in steam applications and is relatively poor in water service.

EPDM – Rated for temperatures -20°F to 250°F. EPDM is an abbreviation of a compound called Ethylene Propylene Diene Monomer. It is also commonly called EPT, Nordel, and EPR. EPDM is used extensively in the HVAC (Heating, Ventilation, Air Conditioning) industry due to its resistance to polar compounds such as water, phosphate esters, ketones, alcohols, and glycols. The EPDM material is also applicable for handling concentrated sulfuric acid, 20% sodium hypochlorite (bleach), chlorinated water for swimming pools, and other alkaline solutions EPDM is not resistant to hydrocarbon solvents and oils, chlorinated hydrocarbons, turpentine, or any other petroleum based oils.

Teflon® – Rated for temperatures -20°F to 250°F. The Teflon® liner overlays silicone which is bonded to a rigid phenolic ring on the outside seat perimeter. Teflon® extends over the seat faces and outside flange seal diameter, completely covering the EPDM layer of the seat which provides the resilience for sealing valve stems and the closed disc.

Special Valve Seats

Food grade NBR – Rated for temperatures 0°F to 180°F. FDA approved NBR seat in which all ingredients in the elastomer conform to CFR part 21, section 177.2600. Service conditions are equivalent to those recommended for regular NBR including applications where FDA approval is required.

Food Grade EPDM – Rated for temperatures -20°F to 250°F. FDA approved EPDM seat in which all ingredients in the elastomer conform to CFR part 21, section 177.2600. Service conditions are equivalent to those recommended for regular EPDM including applications where FDA approval is required.

White Neoprene – Rated for temperatures 0°F to 180°F. FDA approved white Neoprene seat in which all ingredients in the elastomer conform to CFR part 21, section 177.2600. Neoprene has excellent resistance to alcohols, glycols, dilute mineral acids, concentrated caustics, and aqueous salt solutions. White Neoprene is generally used in sanitary applications and although it is slightly inferior to BUNA-N in oil resistance, it is markedly better than most elastomers in these applications.

Black Neoprene – Rated for temperatures 0°F to 180°F. FDA approved black Neoprene seat in which all ingredients in the elastomer conform to CFR part 21, section 177.2600. Neoprene offers excellent physical properties where resistance to alcohols, glycols, dilute mineral acids, concentrated caustics, aqueous salt solutions, and mild abrasion resistance is required. The black grade provides better abrasion and oil resistance than the white grade Neoprene, and although it is slightly inferior to BUNA-N in oil resistance, it provides excellent service in water/oil, air/oil services.

Hypalon – Rated for temperatures 0°F to 225°F. Hypalon is the E.I. DuPont trademark for chlorosulfonated polyethylene. Hypalon is resistant to most chemicals and greases and is particularly unaffected by aqueous salt solutions, alcohols, weak and concentrated alkalies, and concentrated sulfuric acid. It is not recommended for gasoline, jet fuels, ketones, or chlorinated solvents. Hypalon has excellent abrasion resistance and is unaffected by prolonged immersion in water.

Disc Coatings

PVDF Coated Disc – Rated for temperatures -20°F to 275°F. Polyvinylidene fluoride also known as Kynar® is a strong, tough fluoroplastic material that is particularly suited to corrosion resistant applications in severe environments. The coating has a high degree of mechanical strength, and is chemically resistant to most acids and bases over a broad temperature range. (min. thickness 20 mils).

Rubber Covered Disc – Rated for temperatures -20°F to 250°F. EPDM rubber covered disc provides excellent wear and abrasion characteristics for use in highly abrasive environments. The EPDM elastomer also provides the disc with chemical resistance for handling certain acids, esters, ketones and all types of water service where normal metal discs cannot be used due to chemical and/or abrasive conditions. The EPDM covered discs are not recommended for use in hydrocarbon solvents and oils, chlorinated hydrocarbons, turpentine, or any other petroleum based oils. Other rubber materials available upon request.

Citadel Coating

The Citadel Coating is electrostatically applied, thermoset polyester powder coating, applied in-house at our factory. The Citadel Coating provides excellent protection against corrosion and performs as well in most acids, acid salts, alkaline salts, and neutral salts.

The Citadel Coating stands head and shoulders above the standard epoxy coatings with regard to adhesion, chip resistance, wear endurance and nylon coatings, which will chalk and leave an "oxidized" look to the finish when exposed to U.V. light for prolonged periods of time. In contrast, the Citadel Coating will remain bright, shiny and intact.

Notes:

- A. Phenolic reinforced seats standard on 2" thru 36"
- B. Letter identification of phenolic reinforced liners on I.D. of liner is:

NB = NBR	EP = EPDM	CR = Black Neoprene
EM = Food-Grade EPDM	FK = Viton®	CS = Hypalon
CF = White Neoprene		

Hycar – Trademark of B.F. Goodrich
 Viton®, Nordel and Teflon® – Trademarks of E.I. DuPont.
 Kynar – Trademark of Pennwalt Corp.

ASTM References

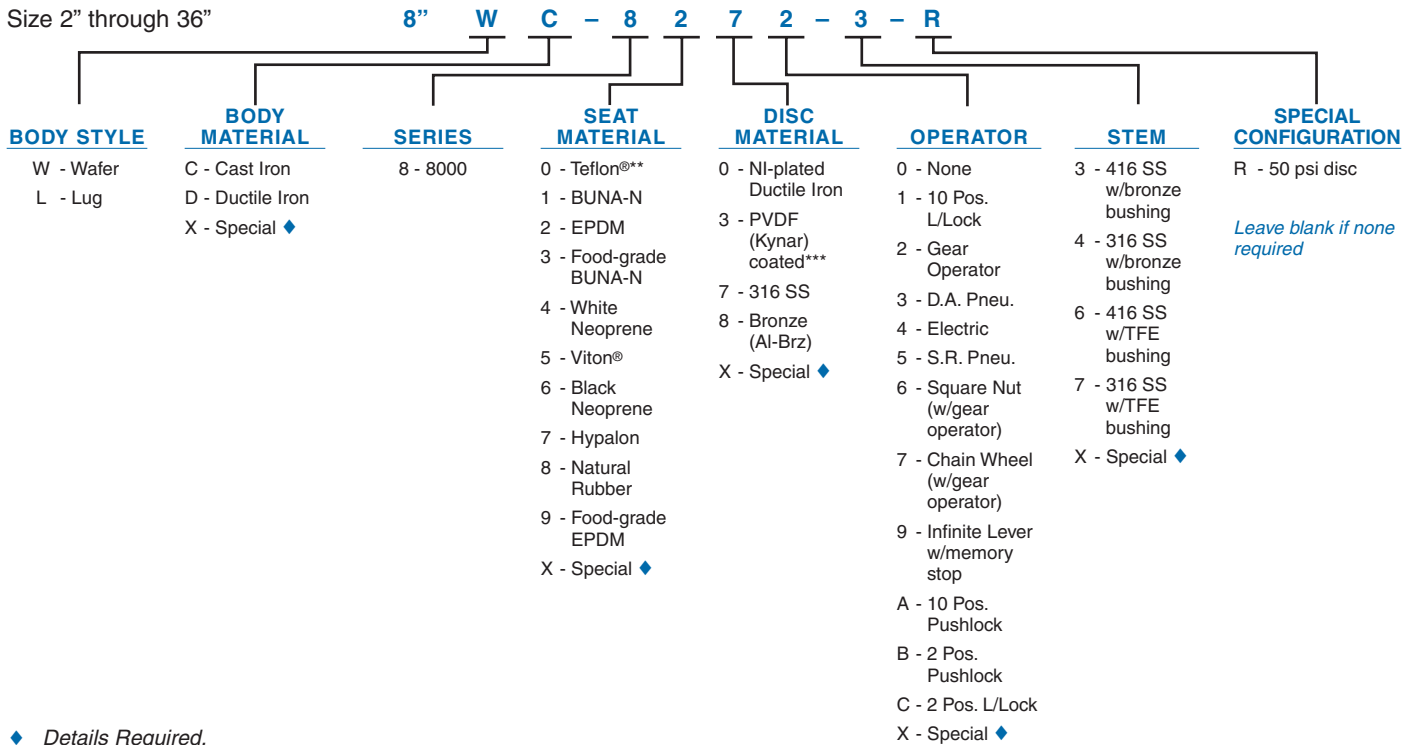
Body		Disc		Stem		Bearings	
Material	Specifications	Material	Specifications	Material	Specifications	Material	Specifications
Cast Iron	A126 CL.B	Ductile Iron	A536, 65-45-12	416 S.S.	A582 Type 416	Bronze	B584 C93200
Ductile Iron	A536, 65-45-12 & A395, 60-40-18	316 S.S.	A351-CF8M	316 S.S.	A276 Type 316	Teflon®	Gar-Fil*
Aluminum Bronze	B148, C95400	Aluminum Bronze	B148, C95400				

* Gar-Fil is a trademark of Garlock Bearings, Inc.

How to Order

Order By Figure Number

Size 2" through 36"



♦ Details Required.

* Viton®, an E.I. DuPont Trademark, or 3M's Fluorel will be supplied.

** Teflon®, an E.I. DuPont Trademark, or equivalent will be supplied.

*** Kynar®, a Pennwalt Corp. Trademark, or equivalent will be supplied.

Note: Operator designations 3, 4 and 5 must have details.



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9700 West Gulf Bank Road
Houston, Texas 77040
Phone: (877) 791-3208
Fax: (713) 937-5418

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