

Butterfly Valves (300 PSI/2065 kPa)

SERIES 706



SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

The Series 706 grooved end butterfly valve offers an easily installed alternative to cumbersome, multi-bolt wafer or lug-type flanged valves. The valve offers excellent flow characteristics with exceptionally low torque operation. The resilient EPDM seat is rated for water services up to +230°F/+110°C. For services with oil content, the valve is available with Grade “T” nitrile seat, rated for petroleum, air with oil vapors, vegetable and mineral oils up to +180°F/+82°C.

The offset disc is polyphenylene sulfide (PPS) coated for corrosion resistance. It securely retains the resilient seat for bi-directional working pressure to 300psi/2065kPa.

The single piece body is cast of durable ductile iron (ASTM A-536, grade 65-45-12), as is the narrow profile disc. The disc rides on stout stainless steel (age hardened 17-4PH) upper and lower stems with all other wetted hardware of stainless steel construction.

Series 706 butterfly valves 14 – 24”/350 – 600mm are available with a standard hand wheel gear operator. Memory stops and chain wheels are available options, as are electric, pneumatic or hydraulic actuators in two or three-way configurations.

For additional information on actuator sizing, flow rate and pressure differential limitations, request 08.19.

Victaulic now offers the Advanced Groove System (AGS) line for 14 – 24”/350 – 600mm sizes. Request publication 20.06 for more information on the Vic®-300 AGS butterfly valve. Contact the Victaulic sales representative in your area for availability.

NOTE: Series 706 valves are designed for direct connection with Victaulic grooved couplings. They may NOT be connected to flanged components with Style 741 Vic-Flange® adapters.



PATENTED

JOB/OWNER	CONTRACTOR	ENGINEER
System No. _____	Submitted By _____	Spec Sect _____ Para _____
Location _____	Date _____	Approved _____
		Date _____

www.victaulic.com

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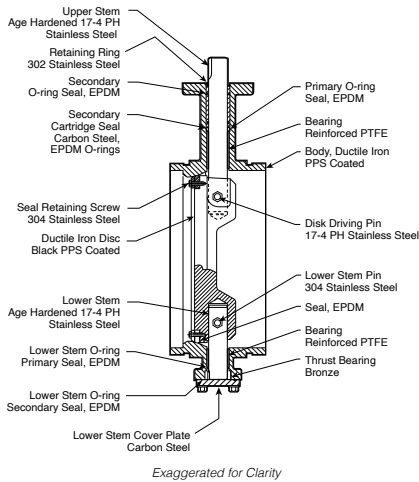
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MATERIAL SPECIFICATIONS



Exaggerated for Clarity

Body: Ductile iron conforming to ASTM A-536, grade 65-45-12

Body Coating:

Exterior: Polyphenylene sulfide (PPS) prime coat

Interior: PPS top coat, UL classified in accordance with ANSI/NSF 61 for cold +86°F/+30°C and hot +180°F/+82°C potable water service.

Disc: Ductile iron conforming to ASTM A-536, black PPS coated.

Seat: PPS coated

Gasket/Seal:

- **Grade “E” EPDM**

EPDM (Green color code). Temperature range –30°F to +230°F/–34°C to +110°C. Recommended for cold and hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. **NOT RECOMMENDED FOR PETROLEUM SERVICES.**

- **Grade “T” nitrile**

Nitrile (Orange color code). Temperature range –20°F to +180°F/–29°C to +82°C. Recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range. Not recommended for hot water services over +150°F/+66°C or for hot dry air over +140°F/+60°C.

* Services listed are General Service Recommendations only. It should be noted that there are services for which these gaskets are not recommended. Reference should always be made to the latest Victaulic Gasket Selection Guide for specific gasket service recommendations and for a listing of services which are not recommended.

Stem–Upper/Lower: Stainless steel age hardened 17-4 PH

Bearing: Reinforced PTFE

Thrust Washer: Bronze

Disc Driving Pin: 17-4 PH stainless steel

Stem Seal: EPDM

Bottom Cover Plate O-ring: EPDM

Cover Plate: Steel

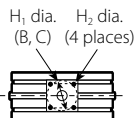
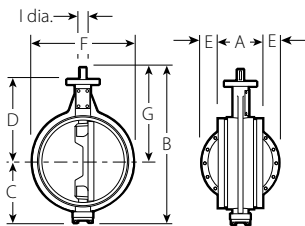
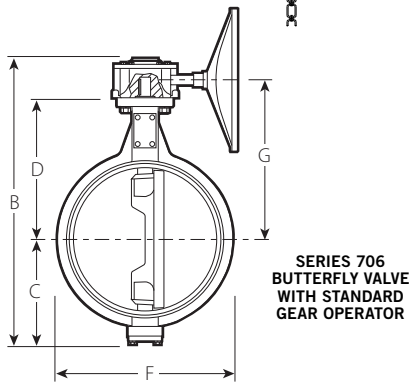
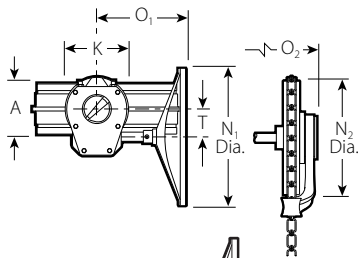
Gasket Retaining Segment: 304 stainless steel

Seal Retaining Screw: 304 stainless steel.

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DIMENSIONS



SERIES 706 BUTTERFLY VALVE WITHOUT STANDARD GEAR OPERATOR

Size		Dimensions – Inches/millimeters													No. Turns to Close	Approx. Wgt. Each
Nom. Size In./mm	Act. Outside Dia. In./mm	E – E A	Over. Hgt. B	C	D	F	G	K	Handwheel		Chain Wheel		T			
									N ₁	O ₁	N ₂	O ₂				
16 400	16.000 406.4	7.00 178	28.45 723	10.94 278	14.10 358	18.00 457	15.85 403	7.00 178	19.70 500	14.34 364	21.50 546	17.47 444	3.38 86	7.75	187.0 84.8	
18 450	18.000 457.0	8.00 203	31.00 787	12.31 313	15.00 381	20.00 508	16.87 429	9.00 229	27.60 700	15.55 395	30.00 762	18.68 474	4.38 111	11	257.0 116.6	
20 500	20.000 508.0	8.50 216	34.01 864	14.06 357	16.10 409	23.00 584	17.97 456	10.82 275	27.60 700	18.43 468	30.00 762	21.60 549	5.38 137	11	355.0 161.0	
24 600	24.000 610.0	10.00 254	40.01 1016	16.06 408	20.10 511	26.70 678	21.97 558	10.82 275	27.60 700	20.51 521	30.00 762	23.60 599	5.38 137	18	522.0 236.8	

Size		Dimensions – Inches/millimeters										Mounting †	Approx. Wgt. Ea. w/o Oper.
Nom. Size In./mm	Act. Outside Dia. In./mm	End to End A	Overall Height B	C	D	E	F	G	Mounting †				
									H ₁	H ₂	I Dia.		
14 350	14.000 355.6	7.00 178	24.45 621	9.68 246	12.89 327	2.66 68	16.00 406	14.77 375	5.00 127	0.563 14	1.38 35	125.0 56.7	
16 400	16.000 406.4	7.00 178	27.14 689	10.94 278	14.10 358	3.66 93	18.00 457	16.20 412	5.00 127	0.563 14	1.50 38	153.0 69.4	
18 450	18.000 457.0	8.00 203	29.56 751	12.31 313	15.00 381	4.15 105	20.00 508	17.25 438	5.00 127	0.563 14	1.75 45	199.0 90.3	
20 500	20.000 508.0	8.50 216	32.64 829	14.06 357	16.10 409	4.93 125	23.00 584	18.58 472	6.00 152	0.563 14	2.00 51	285.0 129.3	
24 600	24.000 610.0	10.00 254	38.89 988	16.06 408	20.10 511	6.18 157	26.70 678	22.83 580	6.00 152	0.563 14	2.25 57	451.0 204.6	

† Key: 14" – 5/16 Sq.; 16 & 18" – 3/8 Sq.; 20 & 24" – 1/2 Sq.

Note: Dimensions provided "without operator" are for sizing data only. Series 706 should never be installed without operators.

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PERFORMANCE

C_v values

Series 706 butterfly valves have excellent flow characteristics due to the narrow profile disc design with separate upper and lower stems.

C_v values for flow of water at +60°F/+16°C with various disc positions are shown in the tables below.

Formulas for C_v Values:

$$\Delta P = \frac{Q^2}{C_v^2}$$

$$Q = C_v \times \sqrt{\Delta P}$$






Where:

Q = Flow (GPM)

ΔP = Pressure Drop (psi)

C_v = Flow Coefficient

Nom. Size In./mm	Actual Outside Dia. In./mm	C _v (Full Open)	Nom. Size In./mm	Actual Outside Dia. In./mm	C _v (Full Open)	Nom. Size In./mm	Actual Outside Dia. In./mm	C _v (Full Open)
14 350	14.000 355.6	9360	18 450	18.000 457.0	15900	24 600	24.000 610.0	28900
16 400	16.000 406.4	12400	20 500	20.000 508.0	19800			

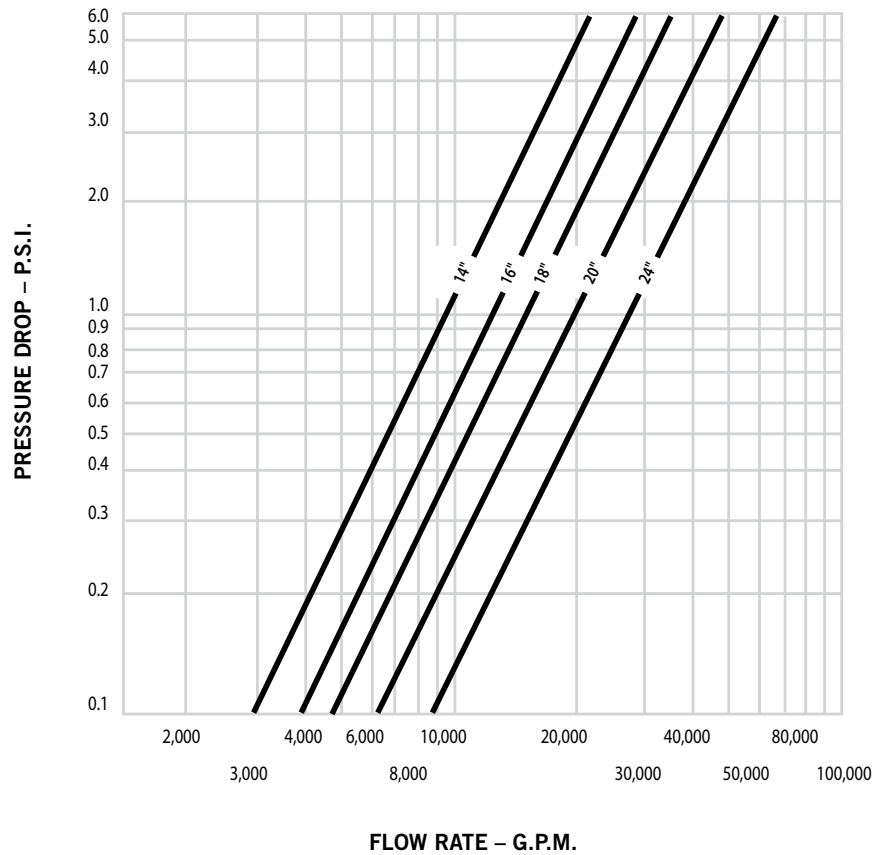
Size		FLOW COEFFICIENTS – C _v				
Nominal Size In./mm	Actual Outside Dia. In./mm	Disc Position (Degrees open)				
		 70°	 60°	 50°	 40°	 30°
14 350	14.000 355.6	4350	3040	2130	1490	900
16 400	16.000 406.4	5680	3940	2730	1880	1130
18 450	18.000 457.2	7200	4970	3420	2340	1400
20 500	20.000 508.0	8810	6010	4080	2740	1610
24 600	24.000 609.6	12700	8580	5760	3800	2210

NOTE: Because of strong dynamic effects, flow instabilities and poor control, Victaulic butterfly valves should only be used for throttling with the disc between 30° and 75° open.

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FLOW CHARACTERISTICS



MAXIMUM ALLOWABLE PRESSURE DROPS

Size		Maximum Allowable Pressure Drops* – psi/kPa					
Nominal Outside Diameter Inches/mm	Actual Outside Diameter Inches/mm	Disc Position (Degrees open)					
		90°	70°	60°	50°	40°	30°
14	14.000	0.54	2.5	5.1	10	21	59
350	355.6	4	17	35	69	145	407
16	16.000	0.54	2.6	5.4	11	24	65
400	406.4	4	18	37	76	165	448
18	18.000	0.54	2.6	5.5	12	25	70
450	457.0	4	18	38	83	172	483
20	20.000	0.54	2.7	5.8	13	28	81
500	508.0	4	19	40	90	193	558
24	24.000	0.54	2.8	6.1	14	31	82
600	610.0	4	19	42	97	214	565

*Based on a maximum recommended velocity of 16 ft./sec.

Note: High pipeline velocities and/or throttling with the disc less than 30 degrees open, may result in noise, vibration, cavitation, severe line erosion, and loss of control.

WARNING

Failure to follow instructions, operating restrictions and warnings can result in serious personal injury and damage to the equipment.

- Do not exceed the maximum allowable pressure drop (psi) as described in the table above.

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MAXIMUM ALLOWABLE FLOW RATES

The maximum allowable flow rate has been determined using the maximum allowable pressure drop and the C_v values. The Victaulic Series 706 butterfly valves are rated to the full valve working pressure for ON-OFF service. To ensure proper operation of the valves when the valves are open, flow through the valves should not exceed the values in the tables below.

Series 706

Size		MAXIMUM ALLOWABLE FLOW RATES – GPM/LPM					
Nominal Outside Diameter In./mm	Actual Outside Diameter In./mm	Disc Position (Degrees open)					
		90°	70°	60°	50°	40°	30°
14	14.000	6880	6890	6900	6910	6910	6890
350	355.6	26050	26090	26130	26160	26160	26090
16	16.000	9120	9120	9130	9140	9130	9140
400	406.4	34530	34530	34570	34610	34570	34610
18	18.000	11700	11700	11700	11700	11700	11800
450	457.0	44300	44300	44300	44300	44300	44680
20	20.000	14600	14600	14600	14600	14600	14600
500	508.0	55280	55280	55280	55280	55280	55280
24	24.000	21300	21300	21200	21200	21200	17400
600	610.0	80650	80650	80270	80270	80270	65880

WARNING

Failure to follow instructions, operating restrictions and warnings can result in serious personal injury and damage to the equipment.

- Do not exceed the maximum allowable pressure drop (psi) as described in the table above.

VALVE TORQUE REQUIREMENTS

Victaulic Series 706 valves have low torque requirements for operating the valve. This results in less manual effort, smaller gear operators or smaller actuators to open and close the valve.

Size		OPERATING TORQUES Inch Pounds per psi/Newton Meters per kPa					
Nominal Outside Dia. In./mm	Actual Outside Dia. In./mm	Disc Position (Degrees open)					
		90°	70°	60°	50°	40°	30°
14	14.000	620	460	270	140	110	90
350	355.6	10.2	7.5	4.4	2.3	1.8	1.5
16	16.000	970	710	420	220	160	130
400	406.4	15.9	11.6	6.9	3.6	2.6	2.1
18	18.000	1430	1050	620	330	240	200
450	457.0	23.5	17.2	10.2	5.4	3.9	3.3
20	20.000	2050	1500	890	470	340	280
500	508.0	33.6	24.6	14.6	7.7	5.6	4.6
24	24.000	3700	2700	1600	830	600	490
600	610.0	60.7	44.3	26.2	13.6	9.8	8.0

WARNING

Failure to follow instructions, operating restrictions and warnings can result in serious personal injury and damage to the equipment.

- Do not exceed the maximum allowable torque (In. Lb.) as described in the last two columns of the above table above.

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VALVE TORQUE REQUIREMENTS

Size		Seating/Unseating Torque Inch Pounds/Newton Meters						
Nominal Outside Diameter Inches/mm	Actual Outside Diameter Inches/mm	Differential Pressure – psi/kPa						
		0/0	50/345	100/690	150/1035	175/1200	235/1620	300/2070
14	14.000	2970	3830	4600	5000	5500	7400	9660
350	355.6	335.6	432.7	519.8	565.0	621.5	836.2	1091.6
16	16.000	3875	4820	5620	6000	6500	10000	15200
400	406.4	437.8	544.6	635.1	678.0	734.5	1130.0	1717.6
18	18.000	4900	6005	6820	7100	7500	14000	25000
450	457.0	553.6	678.5	770.7	802.3	847.5	1582.0	2825.0
20	20.000	6060	7310	10200	14000	17500	27500	46400
500	508.0	684.7	825.9	1152.6	1582.0	1977.5	3107.5	5243.2
24	24.000	8720	10130	14800	20000	24000	48000	102000
600	610.0	985.2	1144.5	1672.4	2260.0	2712.0	5424.0	11526.0

Source: These torque values were derived from test data with non-lubricated valves in water at ambient temperatures with EPDM seals. For other material and service conditions, apply a suitable service factor.

Torque Factors: All torque values are for normal conditions (i.e. the valve is operated at least once a quarter, disc corrosion is expected to be minor, the media is clean and non-abrasive, and the chemical effects upon the elastomer are minor).

Typical fluid torque factors commonly used in the industry are: Water: 1.0; Lubricated service: 0.8; Dry gases: Lubricated nitrile “T” seat seals are recommended for dry gases wherever chemically appropriate. See material torque factor below.

Material Torque Factors: “E” = 1.0; “O” = 1.2; “T” = 0.8

Cycling Factor: Torque will typically increase as the valve is cycled. A factor of 1.5 should be applied for the first 5000 cycles and another 1.5 applied for all additional cycles. The higher number should be used if there are more than one cycle per hour.

Actuation Factor: There are no actuation safety factors applied. A factor consistent with the consequences of not actuating should be applied. A minimum factor of 1.2 is recommended for directly actuated valves and 1.5 for 3-way assemblies.

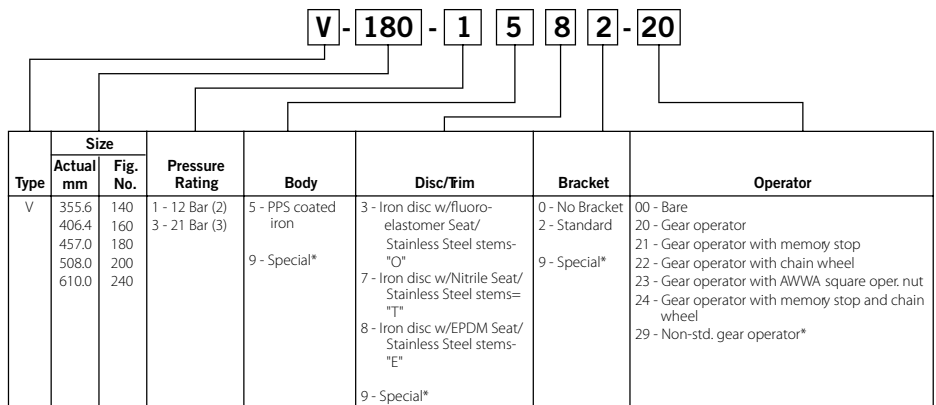
Combining Torque Factors: When multiple torque factors apply, they are combined by multiplying them. Example: For an EPDM seal and a 5000 cycle factor the combined factor would be 1.0 X (1.5) = 1.5.

Note: Under certain high flow conditions, the hydrodynamic torque can exceed the seating torque. Large butterfly valves are not recommended for use in a free discharge condition, such as filling an empty line with fluid at the full rated pressure.

Contact Victaulic for other services.

NUMBERING SYSTEM

Butterfly Valve Numbering System for Series 706



NOTES:
 (2) Series 709
 (3) Series 706
 * Details required

Butterfly Valves (300 PSI/2065 kPa)

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INSTALLATION

Reference should always be made to the I-100 Victaulic Field Installation Handbook for the product you are installing. Handbooks are included with each shipment of Victaulic products for complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

WARRANTY

Refer to the Warranty section of the current Price List or contact Victaulic for details.

NOTE

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

For complete contact information, visit www.victaulic.com

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