Butterfly Valves (300 PSI/2065 kPa)

SERIES 706

SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

PATENTED

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 300 psi/2065 kPa.

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 17-4 PH) upper and lower stems with all other wetted hardware of stainless steel construction.

Series 706 butterfly valves 14 – 24"/350 – 600 mm 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 – 600 mm 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.

JOB/OWNER

System No. _____

Location _____

CONTRACTOR

Submitted By _____

Date _____

ENGINEER

Spec Sect _____ Para _____

Approved _____

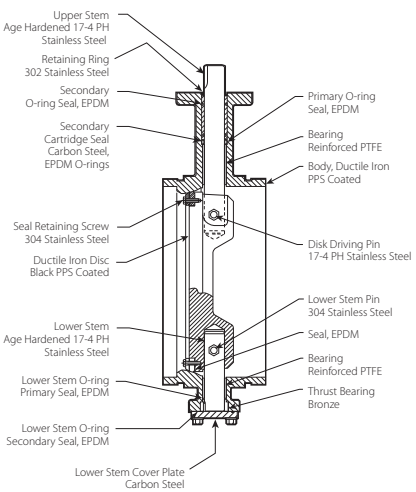
Date _____

www.victaulic.com

Butterfly Valves (300 PSI/2065 kPa)

SERIES 706

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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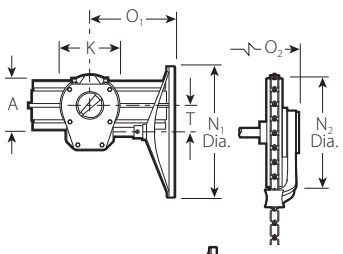
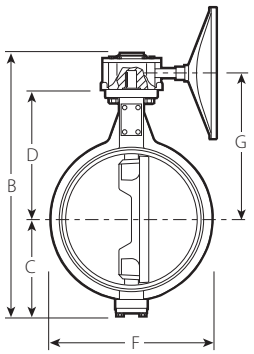
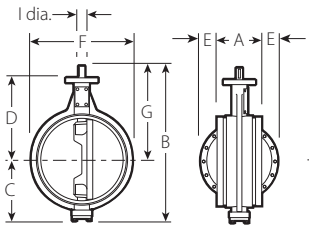
DIMENSIONS

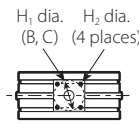




SERIES 706 BUTTERFLY VALVE WITH STANDARD GEAR OPERATOR

Size		Dimensions – Inches/millimeters													Approx. Wgt. Each
									Handwheel		Chain Wheel				
Nom. Size In./mm	Act. Outside Dia. In./mm	E – E A	Over. Hgt. B	C	D	F	G	K	N_1	O_1	N_2	O_2	T	No. Turns to Close	Lbs./kg
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





SERIES 706 BUTTERFLY VALVE WITHOUT STANDARD GEAR OPERATOR

Size		Dimensions – Inches/millimeters										Approx. Wgt. Ea. w/o Oper.
									Mounting †			
Nom. Size In./mm	Act. Outside Dia. In./mm	End to End A	Overall Height B	C	D	E	F	G	H_1	H_2	I Dia.	Lbs./kg
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" – ½ Sq.

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

Butterfly Valves (300 PSI/2065 kPa)

SERIES 706

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			

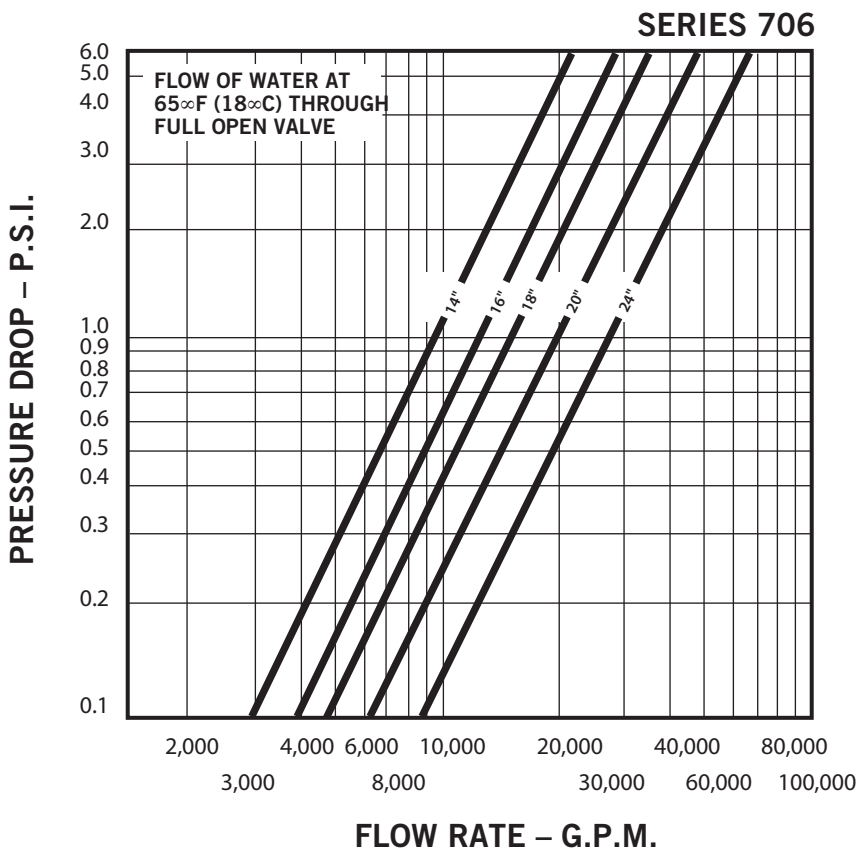
Size		FLOW COEFFICIENTS – C_V				
		Disc Position (Degrees open)				
Nominal Size In./mm	Actual Outside Dia. In./mm	 70°	 60°	 50°	 40°	 30°
14 350	14.000 355.6	4350	3040	2130	1490	900
16 400	16.000 406.4	5680	3940	2730	1880	1130
18 450	18.000 457.2	7200	4970	3420	2340	1400
20 500	20.000 508.0	8810	6010	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.

Butterfly Valves (300 PSI/2065 kPa)

SERIES 706

FLOW CHARACTERISTICS



MAXIMUM ALLOWABLE PRESSURE DROPS

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

*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.**

Butterfly Valves (300 PSI/2065 kPa)

SERIES 706

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					
		Disc Position (Degrees open)					
Nominal Outside Diameter In./mm	Actual Outside Diameter In./mm	90°	70°	60°	50°	40°	30°
14 350	14.000 355.6	6880 26050	6890 26090	6900 26130	6910 26160	6910 26160	6890 26090
16 400	16.000 406.4	9120 34530	9120 34530	9130 34570	9140 34610	9130 34570	9140 34610
18 450	18.000 457.0	11700 44300	11700 44300	11700 44300	11700 44300	11700 44300	11800 44680
20 500	20.000 508.0	14600 55280	14600 55280	14600 55280	14600 55280	14600 55280	14600 55280
24 600	24.000 610.0	21300 80650	21300 80650	21200 80270	21200 80270	21200 80270	17400 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					
		Disc Position (Degrees open)					
Nominal Outside Dia. In./mm	Actual Outside Dia. In./mm	90°	70°	60°	50°	40°	30°
14 350	14.000 355.6	620 10.2	460 7.5	270 4.4	140 2.3	110 1.8	90 1.5
16 400	16.000 406.4	970 15.9	710 11.6	420 6.9	220 3.6	160 2.6	130 2.1
18 450	18.000 457.0	1430 23.5	1050 17.2	620 10.2	330 5.4	240 3.9	200 3.3
20 500	20.000 508.0	2050 33.6	1500 24.6	890 14.6	470 7.7	340 5.6	280 4.6
24 600	24.000 610.0	3700 60.7	2700 44.3	1600 26.2	830 13.6	600 9.8	490 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.**

Butterfly Valves (300 PSI/2065 kPa)

SERIES 706

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
14 350	14.000 355.6	2970 335.6	3830 432.7	4600 519.8	5000 565.0	5500 621.5	7400 836.2	9660 1091.6
16 400	16.000 406.4	3875 437.8	4820 544.6	5620 635.1	6000 678.0	6500 734.5	10000 1130.0	15200 1717.6
18 450	18.000 457.0	4900 553.6	6005 678.5	6820 770.7	7100 802.3	7500 847.5	14000 1582.0	25000 2825.0
20 500	20.000 508.0	6060 684.7	7310 825.9	10200 1152.6	14000 1582.0	17500 1977.5	27500 3107.5	46400 5243.2
24 600	24.000 610.0	8720 985.2	10130 1144.5	14800 1672.4	20000 2260.0	24000 2712.0	48000 5424.0	102000 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

V - 180 - 1 5 8 2 - 20

Type	Size: Actual mm	Size: Fig. No.	Pressure Rating	Body	Disc/Trim	Bracket	Operator
V	355.6 406.4 457.0 508.0 610.0	140 160 180 200 240	1 - 12 Bar (2) 3 - 21 Bar (3)	5 - PPS coated iron 9 - Special*	3 - Iron disc w/fluoro-elastomer Seat/ Stainless Steel stems- "O" 7 - Iron disc w/Nitrile Seat/ Stainless Steel stems= "T" 8 - Iron disc w/EPDM Seat/ Stainless Steel stems- "E" 9 - Special*	0 - No Bracket 2 - Standard 9 - Special*	00 - Bare 20 - Gear operator 21 - Gear operator with memory stop 22 - Gear operator with chain wheel 23 - Gear operator with AWWA square oper. nut 24 - Gear operator with memory stop and chain wheel 29 - Non-std. gear operator*

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

Butterfly Valves (300 PSI/2065 kPa)

SERIES 706

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.

WCAS-73FPYU

For complete contact information, visit www.victaulic.com

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