

W-K-M DynaCentric High Performance Butterfly Valves



**COOPER CAMERON
VALVES**

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W-K-M DYNACENTRIC HIGH PERFORMANCE BUTTERFLY VALVES

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Model MB-1 (Lug)*



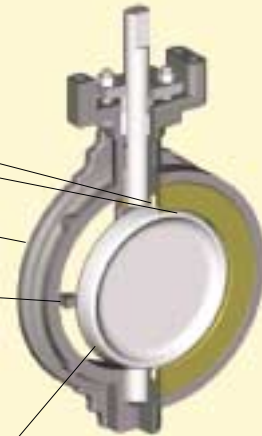
MB-1 Model
2½" through 12" Class 150 & Class 300
3" Class 600

Model MA-1 (Lug)



MA-1 Model
3" through 12" Class 600
14" through 24" Class 150 & Class 300
30" Class 150

Model MB-1 (Wafer)



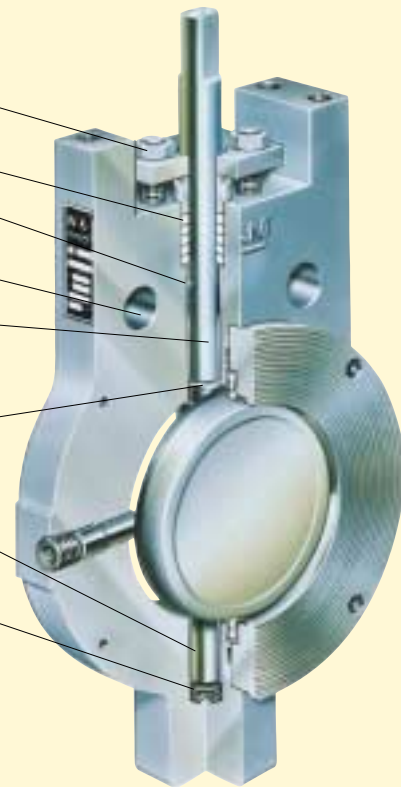
MB-1 Features:

- Inset seat retainer.*
- Uninterrupted sealing surface.
- Contoured body for lighter weight.
- Integrally cast internal stop.

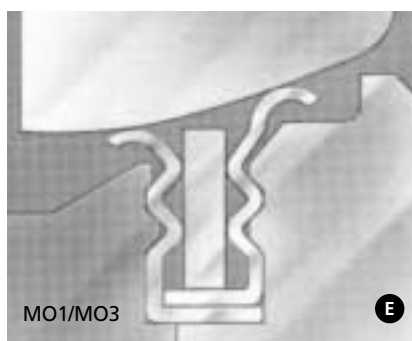
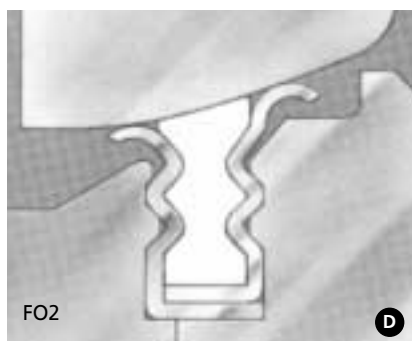
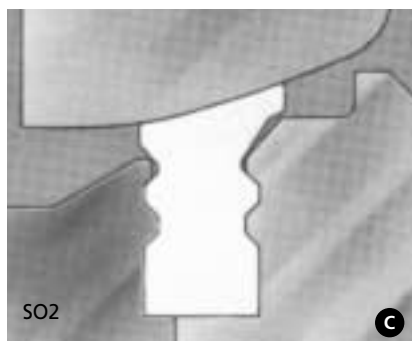
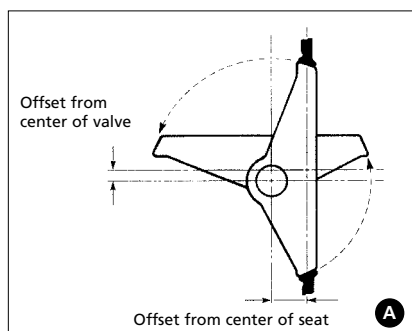
Features Common to Both Models:

- Heavy-duty eccentric disc with wide sealing area.
- Stainless steel fasteners.
- Deep stuffing box.
- Positively retained stems.
- Close tolerance guides assure proper valve/flange alignment.
- Standard stems are 17-4 PH Stainless Steel, condition H1150 double-aged.
- Thrust bearing reduces body wear.
- Low friction, high load upper and lower stem journal bearings lower operating torque.
- Stem/disc springs allow thermal expansion and provide constant grounding.

Model MA-1 (Wafer)



*Bolted retainer plate option is available for model B lug valves for bi-directional, end-of-line service (see footnote on page 5).



The high performance butterfly valve that brings low cost and light weight to high pressure water, oil, steam, gas and slurry applications.

W-K-M DynaCentric butterfly valves satisfy a wide range of industrial applications. Available in carbon steel or stainless steel as well as lug and wafer body styles.

The DynaCentric butterfly valve offers the high performance of ball and gate valves with the low-cost, lightweight benefits of a butterfly valve design. It is ideal for handling water, oil, steam, gas and slurries.

Engineered for heavy-duty, maintenance-free performance in a variety of uses, the W-K-M DynaCentric High Performance butterfly valve is most commonly selected for the following applications:

- Chemical and petrochemical processing
- Utilities
- Pulp and paper
- Oil and gas production
- Fuel handling systems
- Air conditioning and refrigeration
- Marine

Features and Benefits

Two body styles

Flangeless wafer and threaded lug styles are available.

Heavy-duty disc

Designed to withstand the higher stresses associated with high pressure applications. Wide disc edge provides greater sealing area.

Thrust bearing/disc spacer

A corrosion resistant, single component thrust bearing/disc spacer reduces body wear and assures positive centering of disc in the valve bore.

Internal stop

Prevents disc over-travel and seat damage caused by disc over-travel. Assures proper disc alignment in closed position.

A Disc design reduces seat wear

Precision machined from carbon or alloy steels, the rugged valve disc is designed for gradual engagement into seat to prevent pinching or cutting.

Eccentric positioning of stem allows disc to swing free of seat in open position, reducing operating torque and wear. Special surface coatings such as stellite overlay are available for critical or severe service conditions.

B Positively retained stem prevents blowouts

The tamper-proof design not only meets but exceeds the requirements of ANSI B16.34. The disc, disc pins and stem design meet ASME requirements for maximum torsional and bending stress. Additional blowout prevention is provided by stem retainer pins inserted in the stem below the stuffing box.

Three seat designs

C The standard polymer seat (SO2) is bi-directional with an extended pressure responsive sealing lip. The SO2 seat design is capable of drop tight sealing to 740 PSI.

D The patented fire-tested, bi-directional metallic seats with TFE seat insert (FO2) provide a metal-to-metal pressure responsive triple seal. DynaCentric valves with the FO2 seat design and high temperature seals have been fire-tested and are qualified to meet the stringent requirements of API 607, 4th edition. This unique design provides fire-test capabilities regardless of flow direction. The FO2 seat design is capable of drop tight sealing to 1480 PSI.

E Valves constructed of 316 stainless steel and assembled with the proper trims and Ni-Cr Alloy (UNS No. 6625) seats (M03) are capable of handling temperatures to 1000°F. Metal seats of 316SS (M01) are suitable for temperatures to 750°F.

Deep stuffing box for extended life

Deep stuffing box design includes stainless steel fasteners as standard and is available with TFE chevron or high-temperature compression packing for long life and positive stem seal. Live loaded packing assemblies and double stuffing box with purge/monitor port available upon special request for critical applications.

Valves are readily automated.



SPECIFICATIONS See page 5 for technical specifications.

Sizes

2½" through 30"

Working pressure

ANSI Class 150, 2½" through 30"

ANSI Class 300, 2½" through 24"

ANSI Class 600, 3" through 12"

Operating Temperatures

Up to 1000°F (538°C)

Body Styles

Flangeless wafer, threaded lug.

Standard Materials

Body - carbon steel, stainless steel

Stem - 17-4 stainless steel

Disc - stainless steel

Seat - SO2 - RTFE

FO2 - fire tested

MO1/ MO3 - metal seat

Optional Materials

Seat/seal trims available for hundreds of different ladings. Additional materials listed on page 5.

Special Service Valves

High Temperature

DynaCentric valves for high temperature service are equipped with a 316 stainless steel seat (M01), 316 stainless steel stem bearings and high temperature seals. This seat/seal combination is rated up to 750°F in carbon steel bodies. Ni-Cr Alloy (UNS No. 6625) seats (M03) and stainless steel bodies can be utilized up to 1000°F. Leakage rates for metal seated valves can be provided within the service limits of ANSI/FCI 70-2 Class V on request. Standard leakage rate of metal seated valves is less than .005ml/PSI/NPS. DynaCentric valves furnished with this seat perform well in steam, hot oil and heat transfer fluids.

Vacuum Service

The drop-tight sealing capabilities of DynaCentric valves make them an excellent selection for vacuum service. S01, S02, and F02 seat-seal codes are suitable for vacuum service to 20 microns absolute. Inverted packing or purged stuffing box configuration is available on request.

Sour Oil and Gas Service

DynaCentric valves with sour gas trims are available for H₂S service in accordance with NACE MR-01-75, latest issue.

Low Temperature Service

DynaCentric valves for temperatures to -50°F are available in both 316 stainless steel construction and low temperature carbon steel.

Oxygen Service

DynaCentric valves provide the positive shut-off and tight sealing necessary for gaseous oxygen service. Due to the risk of explosion and fire inherent in such service, positive grounding for the disc and stem with the Belleville disc springs is standard. Positive safeguards have been established in order to conform to the requirement that valves for oxygen service must be completely free of oil, grease, combustible material, slag, metal shavings, paint, rust or various fibers. All parts are cleaned of contaminants with solvent and inspected under black light. After assembly and testing with nitrogen, each valve is individually tagged and sealed in a polyethylene bag. Valves for such service may be supplied in any

materials, but 316 stainless steel or Ni-Cu Alloy (UNS No. 5500) are recommended.

Steam Service

DynaCentric butterfly valves are ideally suited for applications in steam service. Reinforced TFE seats (S02) with high temperature packing are the standard stem service seal materials. For higher saturation pressures, 316 stainless steel seats with reinforced TFE inserts (FO2) are available. The combination of rotary operation, streamlined flow and positive shut-off can result in years of maintenance-free service without the seizures on cool-down, flashing or stem leakage associated with conventional globe or gate valves.

Enhanced Fugitive Emission Control

The valve stuffing box can be modified for live loaded packing assemblies, or include a double stuffing box with purge/monitor port.



Chemical Processing



Pulp and Paper



Power Generation

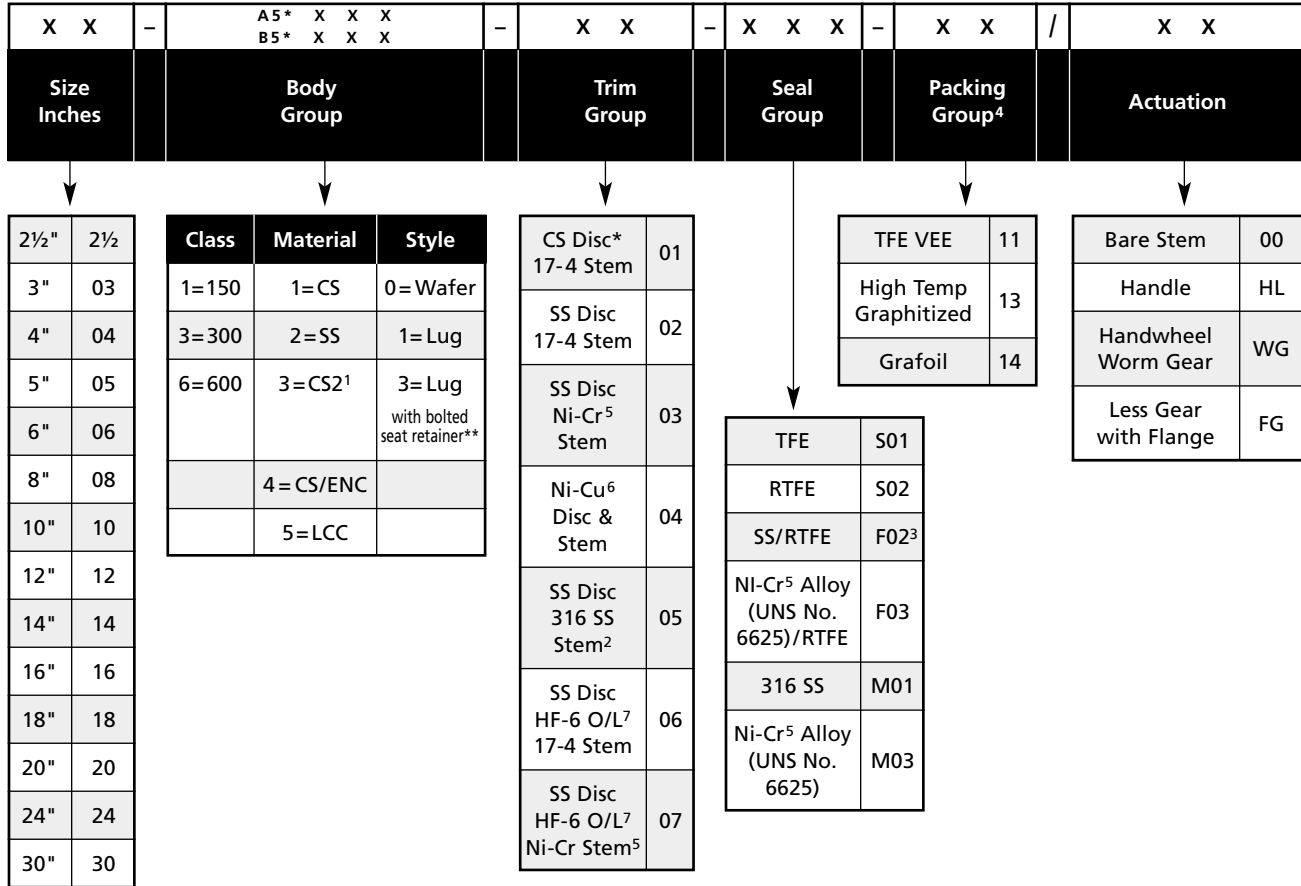
Standards and Compliance

DynaCentric valves comply with the following design and testing standards: ANSI B16.5 (Steel Pipe Flanges and Flange Fittings); ANSI B16.34 (Steel Valves); ANSI/FCI 70-2 (Control Valve Seat Leakage); MSS-SP-6 (Standard Finishes for Pipe Flanges); MSS-SP-25 (Standard Marking System for Valves); MSS-SP-55 (Quality Standard for Steel Castings); MSS-SP-68, API 609 (Butterfly Valves).

In addition, DynaCentric valves can be supplied to comply with these standards: ANSI B31.1 (Power Piping); ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping); MSS-SP-61 (Pressure Testing of Steel Valves); and API 598 (Valve Inspection and Testing); and API 607, fire-test specifications.

DynaCentric valves trimmed for sour gas service in accordance with NACE MR-01-75 (latest issue) are available from W-K-M in both carbon steel and alloy construction.

How to Order – Example: std wafer carbon steel 3" Class 150 with handle: 03-B5110-02-S02-11/HL



***Model/Size Availability:**

- Model B 2½" & 5" Class 150 & Class 300 Lug
- 4" & 6" through 12" Class 150 & Class 300 Lug & Wafer
- 3" Class 150, Class 300 & Class 600 Lug & Wafer
- Model A 4" & 6" through 12" Class 600 Lug & Wafer
- 14" through 24" Class 150 & Class 300 Lug & Wafer
- 30" Class 150 Lug

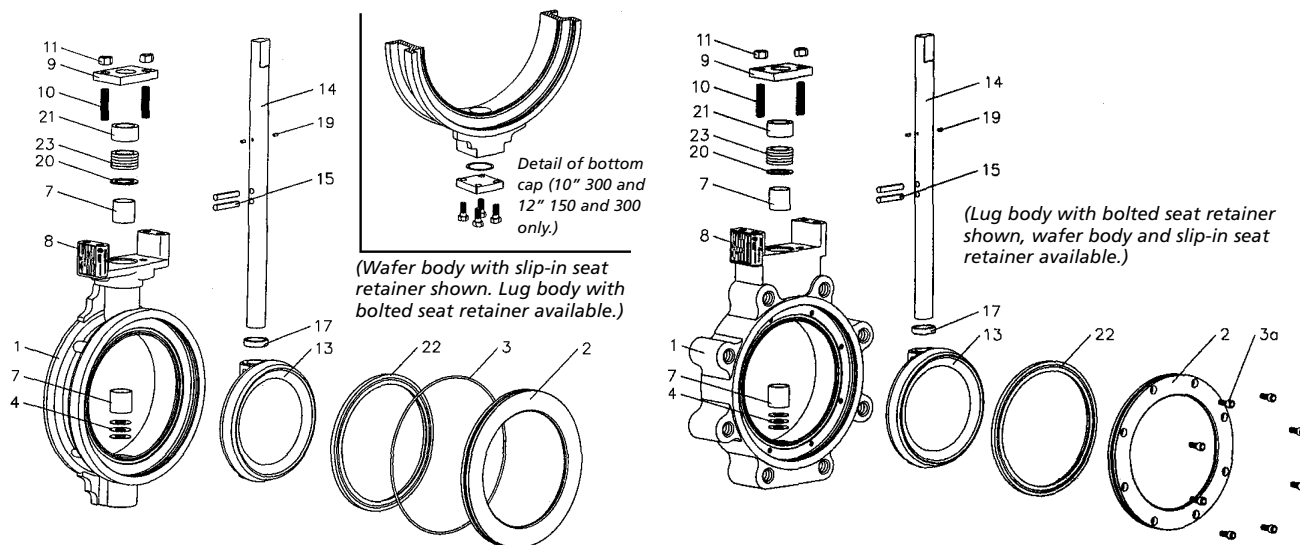
- 1 Controlled hardness carbon steel (H₂S Service).
- 2 Valves equipped with 316 SS stems may require derating depending on size and class. See page 9 for actual valve ratings.
- 3 Standard seat for Class 600 valves.
- 4 SS packing adjustment studs and nuts are standard.
- * Carbon steel discs (14" and larger—consult factory).
- 5 Ref. "inconel."
- 6 Ref. "monel."
- 7 Ref. "Stellite" overlay

**Model B valves come standard with an unbolted inset seat retainer, held firmly in place for shipping and handling by an interference fit o-ring retention design (see page 1). By design, the seat retainer is secured in place by the piping flange during normal installation procedure.

Standard Model B Lug valves with the standard seat retainer (style code "1") can be mounted in end of line applications provided the valve is installed with the seat retainer facing upstream, against the pipe flange. All lug valves with o-ring retained seat retainers are shipped with an instruction tag showing proper installation. Bi-directional end-of-line capability is available with bolted seat retainers. For this option on the Model B Lug valves, use "3" as the Style Code. Example: 3" Class 150 Lug Carbon Steel valve with bolted seat retainer with handle would be coded: 03-B5113-02-S02-11/HL

Note: Other materials of construction and valve options are available on application.

MB-1 DynaCentric Butterfly Valves
 2½" through 12" Class 150 and Class 300
 3" Class 600



Standard Materials of Construction

Group	Item	Carbon Steel	Stainless Steel	Carbon Steel (H ₂ S)
BODY	1. Body	A216 Gr WCC	A351 Gr CF8M	A316 Gr WCC
	2. Seat Retainer	A516 Gr 70	A276 Type 316	A516 Gr 70
	3. Seat Retainer O-Ring	Nitrile		
	3a. Seat Retainer Screw	A193 Gr B7	18-8 SS	
	4. Stem/Disc Spring	18-8 SS		
	7. Stem Bearing	TFE/Steel	Teflon/316 SS	
	8. Nameplate	18-8 SS		
	9. Gland Retainer	Carbon Steel	Stainless Steel	Carbon Steel
	10. Gland Retainer Stud	18-8 SS		
	11. Gland Retainer Nut	18-8 SS		
	25. Bottom Cover	Carbon Steel	Stainless Steel	Carbon Steel Rc-22
	26. Bottom Cover Gasket	Composite Fiber		
	27. Bottom Cover Screw	A193 Gr B7	18-8 SS	A193 Gr B7
TRIM	13. Disc	A351 Gr CF8M†		
	14. Stem	A564 Type 630, H1150 + H1150		
	15. Stem Pins	A564 Type 630, H1150 + H1150		
	17. Disc Spacer	316 SS		
	18. Stem Key (8" to 12" only)	Carbon Steel		
	19. Stem Retainer Pins	316 SS		
	20. Packing Spacer	316 SS		
	21. Gland Ring	316 SS		
SEAL	22. Seat	See Note (1)		
PACKING	23. Packing Set	TFE VEE, High Temperature, Graphitized or Grafoil		

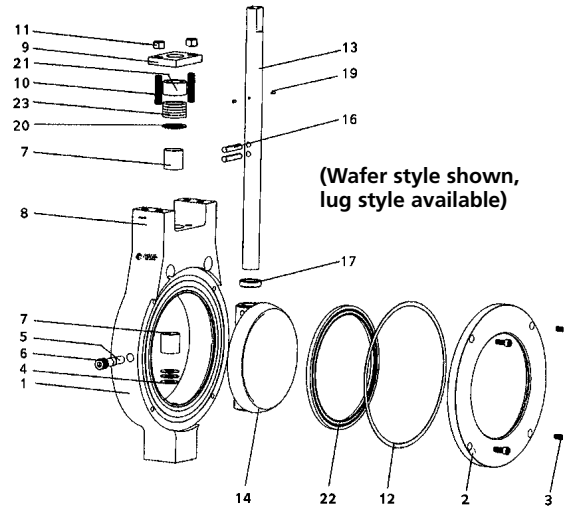
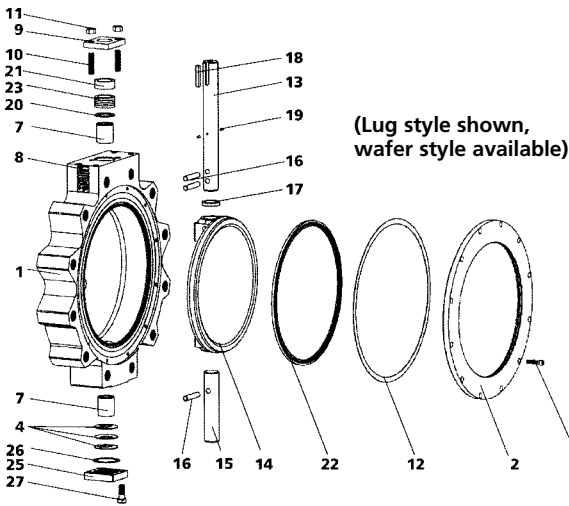
Note (1): Seat assemblies consist of the following:
 TYPE S — Class 150—Virgin TFE (available in Class 150 only) Standard Class 150 and 300—Reinforced TFE
 TYPE F — Metal, Fire-Tested, Class 150, 300 and 600—Stainless Steel with Reinforced TFE Insert
 TYPE M — Metal, High Temperature, Class 150, 300 and 600—316 Stainless Steel with 316 Stainless Steel Insert

† Hard Chrome Plated on FO2, MO1 and MO3.

MA-1 DynaCentric Butterfly Valves

14" through 30" Class 150, 14" through 24" Class 300, 10" & 12" Class 600

4" through 8" Class 600



Standard Materials of Construction

Group	Item	Carbon Steel	Stainless Steel	Carbon Steel (H ₂ S)
BODY	1. Body	A216 Gr WCC	A351 Gr CF8M	A216 Gr WCC RC-22
	2. Seat Retainer	A516 Gr 70	A276 Type 316	A516 Gr 70 RC-22
	3. Seat Retainer Screw	A193 Gr B7	18-8 SS	
	4. Stem/Disc Spring	18-8 SS		
	5. Stop Pin	316 SS		
	6. Stop Pin Plug	Carbon Steel	316 SS	
	7. Stem Bearing	Teflon/Steel	Teflon/316 SS	
	8. Nameplate	18-8 SS		
	9. Gland Retainer	Carbon Steel	Stainless Steel	Carbon Steel
	10. Gland Retainer Stud	18-8 SS		
	11. Gland Retainer Nut	18-8 SS		
	12. Body Gasket	See Note (2)		
	25. Bottom Cover Plate	Carbon Steel	Stainless Steel	Carbon Steel RC-22
	26. Bottom Cover Gasket	Composite Fiber		
27. Bottom Cover Screw	A193 Gr B7	18-8 SS	A193 Gr B7	
TRIM	13. Upper Stem	A564 Type 630, H1150 + H1150		
	14. Disc	A216 Gr WCC††	A351 Gr CF8M†	
	15. Lower Stem	A564 Type 630, H1150 + H1150		
	16. Stem Pins	A564 Type 630, H1150 + H1150		
	17. Disc Spacer	316 SS		
	18. Stem Key (8" and larger)	Carbon Steel		
	19. Stem Retainer Pins	316 SS		
	20. Packing Spacer	316 SS		
SEAL	21. Gland Ring	316 SS		
	22. Seat	See Note (1)		
PACKING	23. Packing Set	TFE VEE; High Temperature, Graphitized or Grafoil		

Note (1): Seat assemblies consist of the following:

- TYPE S — Class 150 only—Virgin TFE, Class 150 and 300—Reinforced TFE
- TYPE F — Metal, Fire-Tested, Class 150, 300 and 600—Stainless Steel with Reinforced TFE Insert
- TYPE M—Metal, High Temperature, Class 150, 300 and 600—316 Stainless Steel with 316 Stainless Steel Insert

Note (2): Standard valves do not require body gaskets. FO2 fire tested, fire safe and high temperature, MO1/MO3 valves are equipped with composite fiber body gaskets.

† Hard Chrome Plated on FO2, MO1 and MO3.

†† Electroless Nickel Plated. (14" through 30")

Seat-Seal Material Codes and Ratings

Material Codes

This chart is an abbreviated guide to the chemical resistance and pressure-temperature limitations of seat-seal materials used in DynaCentric valves. Complete ratings curves are shown

below. For additional information, please consult your DynaCentric representative or the factory.

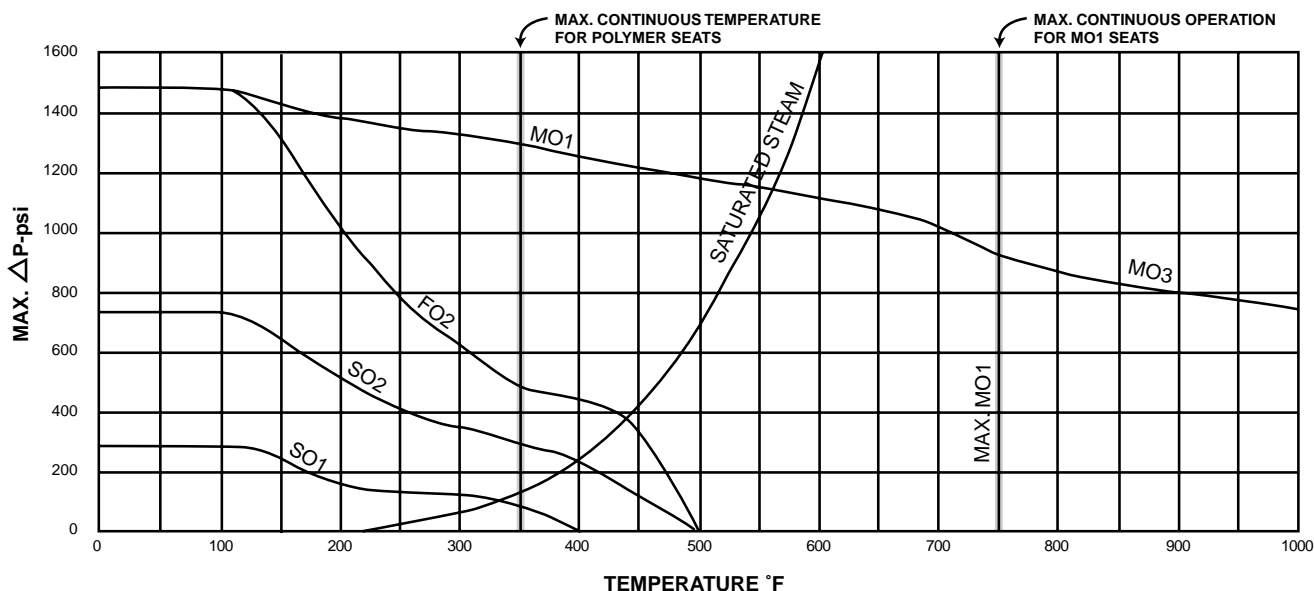
Seal Code	Seat Material	ANSI/FCI 70-2 Shutoff Class	Service Application
S01	TFE	6 (VI)	Seats are virgin TFE. Use where lading contamination from glass or other fillers is not desirable, such as in food service. Available in Class 150 valves only. Temperature range is -50°F to +400°F. Drop tight.
S02	RTFE	6 (VI)	Seat material is TFE reinforced with inert materials for use at elevated temperatures and pressures. Same chemical resistance as virgin TFE except slightly affected by hot alkaline solutions. Suitable for saturated steam to 100 psig. [†] Temperature range is -50°F to +500°F. Drop tight.
F02	SS/RTFE	6 (VI)	Seat consists of stainless steel rings with a reinforced TFE insert. Recommended trim for fire-test applications and for higher pressure steam service. [†] Temperature is -50°F to +500°F. Drop tight.
F03	Ni-Cr Alloy (UNS No. 6625) / RTFE	6 (VI)	Seat consists of Ni-Cr Alloy (UNS No. 6625) with a reinforced TFE insert. Recommended trim for fire-test applications and for higher pressure steam service. [†] Temperature range is -50°F to +500°F. Drop tight.
M01	316 SS	*	Recommended trim for saturated steam above 250 PSI, hot oils and gases, and temperatures to 750°F. Pressure/temperature range is same as body rating. Meets ANSI/FCI 70-2.
M03	Ni-Cr Alloy (UNS No. 6625)	*	Same as M01 but for temperatures from 750°F to 1000°F.

*Standard leakage rate of metal seated valves is less than .005 ml/PSI/NPS. Class V Shut-off can be furnished on request.

[†]Consult factory for steam applications with higher pressure.

Pressure-Temperature Limitations

Seat ratings are based on differential pressures with the disc in the fully closed position and refer to seat only. Body pressure/temperature ratings appear on page 9.



Valve Body Pressure Ratings

Pressure/Temperature Ratings for DynaCentric Valve Bodies with Standard Stems

Temp °F	Class 150		Class 300		Class 600	
	CS	316 SS	CS	316 SS	CS	316 SS
-20 to 100	285	275	740	720	1480	1440
200	260	235	675	620	1350	1240
300	230	215	655	560	1315	1120
400	200	195	635	515	1270	1025
500	170	170	600	480	1200	955
600	140	140	550	450	1095	900
650	125	125	535	445	1075	890
700	110	110	535	430	1065	870
750	95	95	505	425	1010	855
800	80	80	410	420	825	845
850	—	65	—	420	—	835
900	—	50	—	415	—	830
950	—	35	—	385	—	775
1000	—	20	—	350	—	700

Stem Material: A564 Type 630, H1150 + H1150.
In accordance with ANSI B16.34.

Ratings shown above are maximum working pressure ratings for the valve body at various temperatures. All pressures are PSIG. Practical pressure limitations according to actual service conditions are determined by the seat ratings shown on page 8.

These valve body ratings are based on the following material specifications: CS-ASTM A516 Grade 70 and A216 Grade WCC (NOTE: Carbon steel listed is not recommended for prolonged usage above 800°F.) 316 SS-ASTM A351 Grade CF8M.

Maximum Shut-Off Pressures for DynaCentric Valves with 316 Stainless Steel Stems (CWP)

Size (in)	ΔP Max.—316 SS Stems		
	Class 150	Class 300	Class 600
2½	285	650	—
3	285	650	650
4	285	325	650
5	285	325	—
6	285	325	650
8	285	325	650
10	125	325	650
12	125	325	650
14	125	325	—
16	125	325	—
18	125	325	—
20	125	325	—
24	125	325	—

Stem Material: ASTM A276 Type316; Cond. A.
30,000 Minimum Yield
75,000 Minimum Tensile

Valves with 17-4 PH stems are only recommended up to a maximum temperature of 650°F. Ni-Cr Alloy (UNS No. 7718) stems are required for temperatures above 650°.

NOTE: Cold working pressures for the DynaCentric valves equipped with 316 SS stems will be derated. See table above. Ni-Cr Alloy (UNS No. 7718) or Ni-Cu Alloy (UNS No. 5500) stems can be furnished for applications requiring high corrosion resistance and full ANSI ratings.

Valve Sizing Formulas

Proper valve selection is dependent on several factors for both liquid and gas flow, as well as the physical limitations of the valve as established by the manufacturer. The following information is presented for handy and quick reference.

The flow coefficient (C_V) is the most universally accepted measure of a valve’s capacity to handle flow. A dimensionless

entity, C_V is defined as the number of gallons per minute of water at standard conditions (60°F and 14.7 psia) which will flow through a given flow restriction with a pressure drop of 1 psi. Once determined, the C_V of a valve provides a capacity index by which one is able to readily estimate the required size of a flow restriction for controlling the fluid flow of any system.

For liquid service:

$$C_V = Q_L \sqrt{\frac{S_G}{\Delta P}}$$

$$Q_L = C_V \sqrt{\frac{\Delta P}{S_G}}$$

$$\Delta P = S_G \left(\frac{Q_L}{C_V}\right)^2$$

For gas service:

$$C_V = \frac{Q_G}{1360} \sqrt{\frac{S_G T_R}{\Delta P \times P_1}}$$

$$Q_G = 1360 C_V \sqrt{\frac{\Delta P \times P_1}{S_G T_R}}$$

$$\Delta P = \frac{S_G T_R}{P_1} \left(\frac{Q_G}{1360 C_V}\right)^2$$

For steam service (saturated):

$$C_V = \frac{W}{2.1 \sqrt{\Delta P(P_1 + P_2)}}$$

$$W = 2.1 C_V \sqrt{\Delta P(P_1 + P_2)}$$

For steam service (superheated):

$$C_V = \frac{W(1 + 0.0007 T_S)}{2.1 \sqrt{\Delta P(P_1 + P_2)}}$$

$$W = \frac{2.1 C_V \sqrt{\Delta P(P_1 + P_2)}}{(1 + 0.0007 T_S)}$$

These formulas are generally accurate for gas flows where ΔP ≤ .1P₁.

For ΔP > .1P₁, consult factory for assistance in sizing.

Where:

- C_V = valve flow coefficient
- P₁ = upstream pressure, psia
- P₂ = downstream pressure, psia
- ΔP = pressure drop P₁ – P₂, psi
- Q_G = gas flow rate, SCFH
- Q_L = liquid flow rate, U.S. gpm
- S_G = specific gravity of fluid
- T_R = temperature, °R (460 + °F)
- T_S = steam superheat, °F
- W = flow rate, lbs/hr
- P_V = vapor pressure, psia

Cavitation

DynaCentric valves, because of their inherently high flow capacities, have a greater tendency to cavitate at high pressure drops. Cavitation occurs in liquids if the static pressure of the flowing liquid decreases to a value less than the fluid under pressure. This phenomenon can create accelerated wear and deterioration of valves and piping as well as annoying noise and vibration problems. To avoid cavitation in piping, the following formula should be employed:

$$\Delta P_{max} = 0.33 (P_1 - P_V).$$

This formula can also be safely used where reducers are employed.

Reducers

When valves are mounted between pipe reducers, a loss in valve capacity occurs with an additional pressure drop across the system due to contractions and sudden enlargements.

This arrangement is often employed with DynaCentric valves where the desired C_V for the control valve results in a valve size that is smaller than the line size.

Use the following equation to obtain the corrected flow coefficients for the DynaCentric valve when installed in combination with reducers.

$$R = \frac{1}{\sqrt{1 + \frac{1.5 \left(1 - \frac{d^2}{D^2}\right)^2}{890} \left(\frac{C_V}{d^2}\right)^2}} \quad C_{VR} = C_V R$$

Where:

- C_V = sizing coefficient determined by standard calculations
- d = nominal valve size, inches
- D = line size, inches
- C_{VR} = corrected flow coefficient for valve between reducers

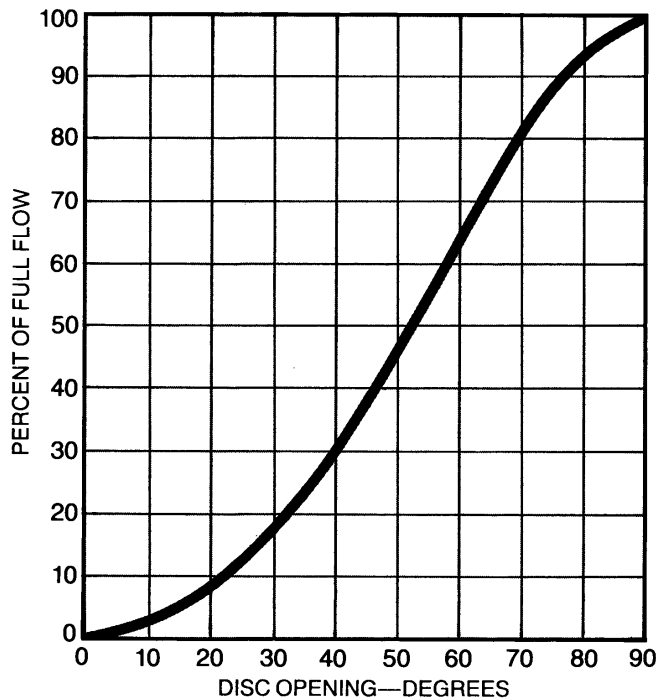
Flow Characteristics (C_v)

The practical control range of this type of valve occurs where continuous throttling can be effected without significant loss of accuracy or decrease in valve life.

The usable rangeability for DynaCentric valves is between 20° and 70° opening, resulting in a ratio of 10:1. In sizing the DynaCentric valve for throttling applications, a full open C_v should be selected that is approximately 1.8 times the C_v determined from calculations. Under normal flow conditions, this selection will provide a valve opening of 50°–60°.

C_v values equal the flow of water in U.S. gallons per minute per 1 PSI pressure drop.

Typical Characteristic Curve



Series 5100, Class 150

Valve Size	Disc Angle, Degrees Open							
	20	30	40	50	60	70	80	90
2½	8	17	31	46	66	82	97	103
3	14	31	54	81	115	144	169	180
4	31	66	117	176	250	312	367	400
5	54	114	201	302	429	536	630	670
6	85	180	317	476	677	846	995	1058
8	174	371	654	981	1395	1744	2049	2180
10	300	638	1125	1688	2401	3001	3526	3751
12	440	936	1651	2477	3523	4403	5174	5504
14	523	1110	1959	2939	4180	5225	6139	6531
16	659	1401	2473	3709	5276	6594	7748	8243
18	886	1883	3323	4985	7089	8862	10412	11077
20	1066	2266	3998	5998	8530	10662	12528	13328
24	1554	3302	5828	8741	12432	15540	18260	19425

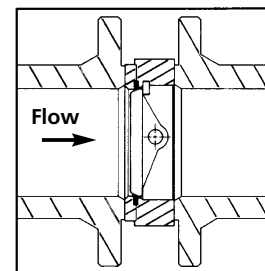
Series 5300, Class 300

Valve Size	Disc Angle, Degrees Open							
	20	30	40	50	60	70	80	90
2½	8	17	31	46	66	82	97	103
3	14	31	54	81	115	144	169	180
4	31	66	117	176	250	312	367	400
5	54	114	201	302	429	536	630	670
6	85	180	317	476	677	846	995	1058
8	174	371	654	981	1395	1744	2049	2180
10	268	570	1005	1508	2145	2681	3150	3351
12	399	849	1498	2247	3196	3995	4693	4993
14	428	910	1606	2409	3426	4282	5032	5353
16	609	1295	2285	3428	4876	6094	7161	7618
18	848	1730	2983	4504	6303	7594	8379	8855
24	1290	2629	4534	6847	9580	11542	12738	15520

Series 5600, Class 600

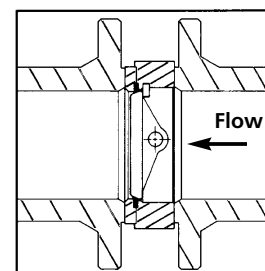
Valve Size	Disc Angle, Degrees Open							
	20	30	40	50	60	70	80	90
3	14	31	54	81	115	144	169	180
4	23	50	88	132	188	234	275	293
6	67	141	249	374	532	665	781	831
8	155	330	583	874	1243	1554	1826	1942
10	241	512	904	1356	1929	2411	2833	3014
12	336	714	1260	1890	2688	3360	3948	4200

The Torque Values shown in these tables are net required operating torques for actuator sizing. An appropriate safety factor is included for normal wet operating torque.



SO seats upstream - Valve torque (in.lb.)

	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
0-50psi	111	155	348	503	728	1125	2154	3291	4277	6334	8129	11685	15770
100psi	136	190	395	583	860	1290	2430	3790	5050	7469	9533	13556	18540
200psi	179	250	490	737	1110	1600	2990	4790	6610	9740	12340	17297	24080
285psi	214	300	570	871	1330	1900	3460	5640	7930	11670	14276	20477	28790
300psi	225	315	590	899	1370	1950	3550	5790	8160	12010	15147	21038	29620
400psi	271	380	680	1053	1630	2280	4100	6800	9720	14281	17955	24780	35160
500psi	318	445	780	950	1880	2610	4660	7800	11270	16551	20762	28521	40700
600psi	364	510	875	1368	2140	2940	5220	8800	12820	18821	23570	32262	46240
700psi	411	575	970	1526	2400	3270	5780	9800	14380	21092	26377	36003	51780
740psi	429	600	1020	1597	2500	3400	6000	10200	15000	22000	27500	37500	54000



SO seats downstream - Valve torque (in.lb.)

	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
0-50psi	111	155	348	503	728	1125	2154	3291	4277	6334	8129	11685	15770
100psi	143	200	419	618	911	1364	2563	4013	5380	7947	10131	14371	19714
200psi	208	291	561	846	1276	1841	3381	5458	7586	11174	14134	19743	27603
285psi	263	368	681	1040	1587	2247	4077	6686	9462	13917	17536	24309	34308
300psi	272	381	702	1074	1642	2319	4200	6903	9793	14401	18137	25114	35491
400psi	337	472	844	1302	2007	2796	5018	8348	11999	17628	22140	30486	43379
500psi	402	563	986	1530	2373	3274	5836	9793	14205	20855	26143	35858	51268
600psi	466	653	1128	1757	2738	3751	6654	11237	16411	24082	30146	41230	59156
700psi	531	744	1269	1985	3104	4229	7473	12682	18618	27309	34149	46601	67045
740psi	557	780	1326	2076	3250	4420	7800	13260	19500	28800	35750	48750	70200

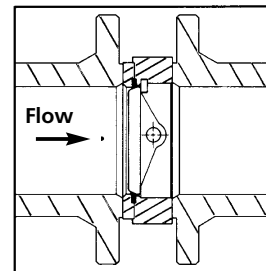
For severe service, additional safety factor should be added:

Dry gas or slurry.....1.25 Low Temperature..... 1.20
 Emergency Shutdown..... 1.60

The Torque Values shown in these tables are net required operating torques for actuator sizing. An appropriate safety factor is included for normal wet operating torque.

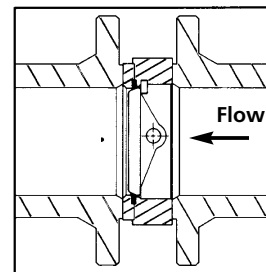
FO/MO seats upstream - Valve torque (in.lb.)

	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
0-50psi	238	333	609	920	1389	2710	4422	6547	7728	9709	13116	18395	25623
100psi	261	366	694	1046	1578	3050	5043	7595	8956	11218	15432	21289	29746
200psi	308	431	863	1300	1957	3729	6286	9689	11412	14235	20063	27079	37991
285psi	348	487	1006	1514	2278	4307	7343	11470	13500	16800	24000	32000	45000
300psi	355	497	1032	1552	2335	4409	7531	11784	13868	17253	24695	32868	46237
400psi	401	562	1201	1805	2714	5089	8773	13878	16325	20270	29326	38658	54482
500psi	449	628	1370	2058	3092	5769	10016	15973	18781	23288	33958	44447	62728
600psi	495	693	1539	2311	3470	6448	11259	18068	21237	26305	38589	50237	70974
700psi	542	759	1707	2563	3849	7128	12503	20162	23693	29323	43221	56026	79219
740psi	561	785	1775	2665	4000	7400	13000	21000	24675	30530	48074	58342	82518
800psi	589	824	1876	2816	4227	7808	13746	22257					
900psi	636	890	2045	3069	4605	8488	14989	24351					
1000psi	682	955	2214	3322	4984	9167	16232	26446					
1100psi	729	1021	2383	3575	5382	9847	17476	28541					
1200psi	776	1086	2552	3828	5741	10527	18719	30635					
1300psi	823	1152	2721	4080	6119	11206	19962	32730					
1400psi	870	1218	2890	4333	6497	11886	21205	34824					
1480psi	907	1270	3025	4535	6800	12430	22200	36500					



FO/MO seats downstream - Valve torque (in.lb.)

	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
0-50psi	238	333	609	920	1389	2710	4422	6547	7728	9709	13116	18395	25623
100psi	274	383	733	1105	1665	3211	5326	8051	9314	11660	16085	22135	30942
200psi	344	482	979	1474	2218	4212	7134	11059	12485	15562	22023	29616	41579
285psi	405	567	1188	1787	2687	5063	8672	13615	15181	18880	27070	35974	50621
300psi	416	582	1225	1842	2770	5214	8943	14066	15656	19465	27961	37096	52216
400psi	487	682	1471	2211	3322	6215	10751	17074	18828	23367	33899	44577	62854
500psi	558	781	1717	2579	3875	7216	12560	20082	21999	27270	39837	52057	73491
600psi	629	881	1963	2948	4427	8218	14368	23089	25171	31172	45775	59538	84129
700psi	701	981	2209	3316	4979	9219	16177	26097	28342	35075	51713	67018	94766
740psi	729	1021	2308	3464	5200	9620	16900	27300	29611	36636	54088	70011	99021
800psi	771	1080	2455	3685	5531	10221	17985	29105					
900psi	843	1180	2701	4054	6084	11222	19794	32112					
1000psi	914	1280	2947	4422	6636	12224	21602	35120					
1100psi	985	1379	3193	4791	7188	13225	23410	38127					
1200psi	1056	1479	3440	5160	7741	14227	25219	41135					
1300psi	1128	1579	3686	5529	8293	15228	27027	44143					
1400psi	1199	1678	3932	5897	8845	16230	28836	47150					
1480psi	1256	1758	4129	6192	9287	17031	30283	49557					

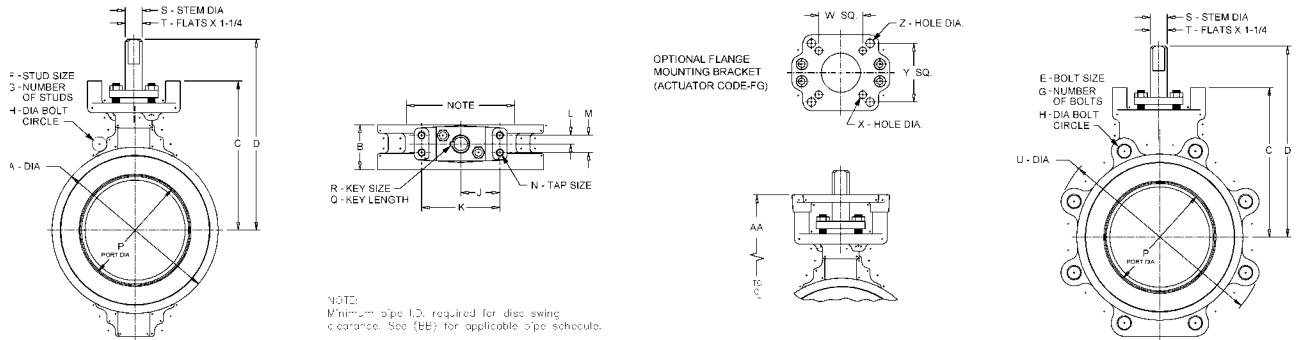


For severe service, additional safety factor should be added:

Dry gas or slurry.....1.25
 Emergency Shutdown..... 1.60

Low Temperature..... 1.20
 High Temperature (600° - 700°F)..... 1.30
 Extended High Temp. (750° - 1000°F).....1.50

Dimensional Data



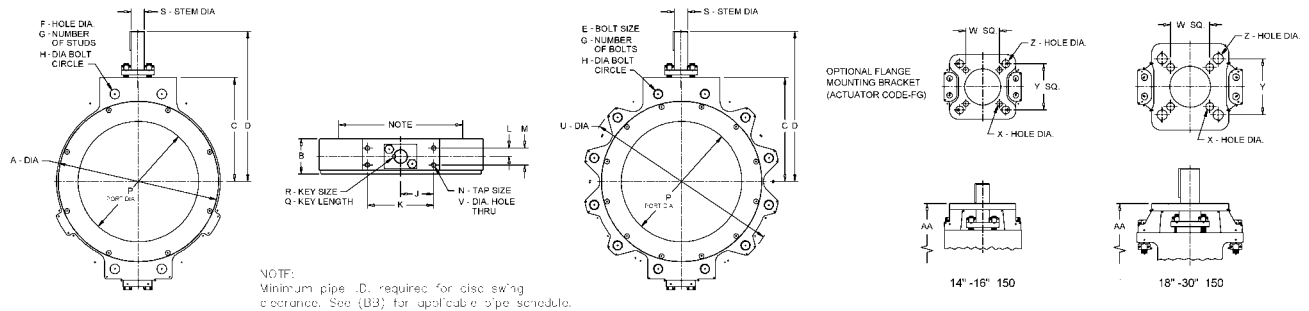
Series B5100, Class 150, 285 psi CWP* (inches)

Valve Size	A	B	C	D	E	F	G**	H	J	K	L	M	N	P
2½"	4.13	1.87	5.81	7.94	5/8-11	5/8	4	5.50	2.00	4.00	0.44	0.88	3/8-16	2.09
3"	5.00	2.00	5.50	7.63	5/8-11	5/8	4	6.00	2.00	4.00	0.44	0.88	3/8-16	2.62
4"	6.19	2.12	6.38	8.50	5/8-11	5/8	8	7.50	2.00	4.00	0.44	0.88	3/8-16	3.63
5"	7.31	2.25	7.50	9.63	3/4-10	3/4	8	8.50	2.00	4.00	0.44	0.88	3/8-16	4.50
6"	8.50	2.28	7.63	9.75	3/4-10	3/4	8	9.50	2.00	4.00	0.44	0.88	3/8-16	5.62
8"	10.62	2.50	8.88	11.58	3/4-10	3/4	8	11.75	2.13	4.25	0.63	1.25	3/8-16	7.61
10"	12.75	2.81	9.88	12.62	7/8-9	7/8	12	14.25	2.13	4.25	0.63	1.25	3/8-16	9.50
12"	15.00	3.19	11.25	14.81	7/8-9	7/8	12	17.00	2.75	5.50	0.81	1.62	1/2-13	11.50

Valve Size	Q	R	S	T	U	W	X	Y	Z	AA	BB	Weight-lbs. Lug Body	Weight-lbs. Wafer Body
2½"	-	-	0.500	0.375	6.75	2.25	0.34	3.00	0.41	6.69	Sch 160	14	-
3"	-	-	0.625	0.437	7.25	2.25	0.34	3.00	0.41	6.38	Sch 160	16	11
4"	-	-	0.625	0.437	8.75	2.25	0.34	3.00	0.41	7.26	Sch 80	22	16
5"	-	-	0.875	0.625	10.00	2.25	0.34	3.00	0.41	8.38	Sch 80	33	23
6"	-	-	0.875	0.625	10.86	2.25	0.34	3.00	0.41	8.50	Sch 40	38	29
8"	1.56	0.250 Sq.	1.125	-	13.25	-	-	3.50	0.56	10.00	Sch 40	83	57
10"	1.56	0.250 Sq.	1.125	-	16.00	-	-	3.50	0.56	11.00	Sch 40	125	90
12"	2.00	0.312 Sq.	1.375	-	18.75	3.50	0.56	5.31	0.69	12.75	Sch 40	175	150

* Pressure ratings are in accordance with ANSI B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.

**Installation Manual is available with complete flange bolt / stud information.



Series A5100, Class 150, 285 PSI CWP* (inches)

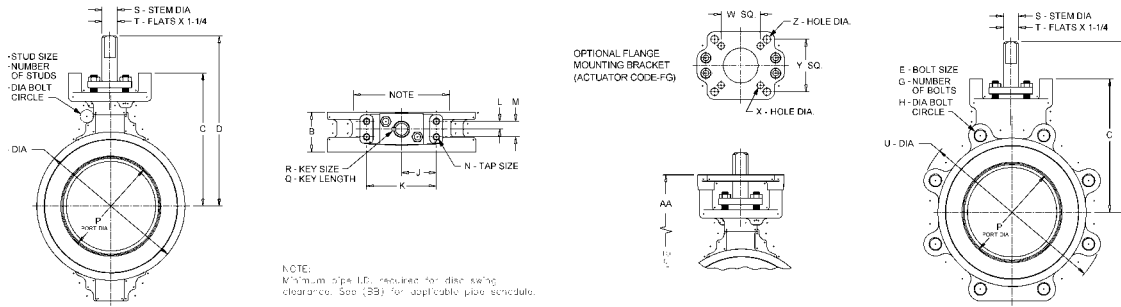
Valve Size	A	B	C	D	E	F	G**	H	J	K	L	M	N	P
14"	17.00	3.65	10.75	15.58	1-8	1.02	12	18.75	3.44	6.88	0.88	1.75	1/2-13	12.46
16"	19.25	4.14	12.28	17.83	1-8	1.02	16	21.25	3.44	6.88	0.88	1.75	1/2-13	14.30
18"	21.50	4.50	14.50	20.84	1-1/8-8	1.14	16	22.75	4.75	9.50	1.00	2.00	-	16.26
20"	23.62	5.00	15.81	22.44	1-1/8-8	1.14	20	25.00	4.75	9.50	1.00	2.00	-	18.08
24"	28.12	6.06	17.75	24.75	1-1/4-8	1.27	20	29.50	4.75	9.50	1.00	2.00	-	21.44
30"	34.50	7.63	22.88	30.94	1-1/4-8	1-1/4-8	28	36.00	6.00	12.00	1.50	3.00	3/4-10	27.90

Valve Size	Q	R	S	U	V	W	X	Y	Z	AA	BB	Weight-lbs. Lug Body	Weight-lbs. Wafer Body
14"	2.00	0.312 Sq.	1.375	20.50	-	3.50	0.57	4.78 Sq.	0.81	13.50	Sch 40	230	170
16"	2.75	0.375 Sq.	1.750	23.50	-	4.06	0.81	5.31 Sq.	0.69	15.03	Sch 40	360	270
18"	3.00	0.500 Sq.	2.000	24.75	0.69	4.78	0.81	2.88 x 6.94	0.94	17.50	Sch 40	455	330
20"	3.00	0.500 Sq.	2.000	27.25	0.69	4.78	0.81	2.88 x 6.94	0.94	18.81	Sch 40	570	390
24"	3.75	0.625 Sq.	2.500	32.00	0.69	4.78	0.81	2.88 x 6.94	0.94	20.75	Sch 40	890	640
30"	4.00	0.875 Sq.	3.500	38.75	-	-	-	3.92 x 9.47	0.81	26.88	Sch XH	1800	1300

* Pressure ratings are in accordance with ANSI B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.

**Installation Manual is available with complete flange bolt / stud information.

Dimensional Data

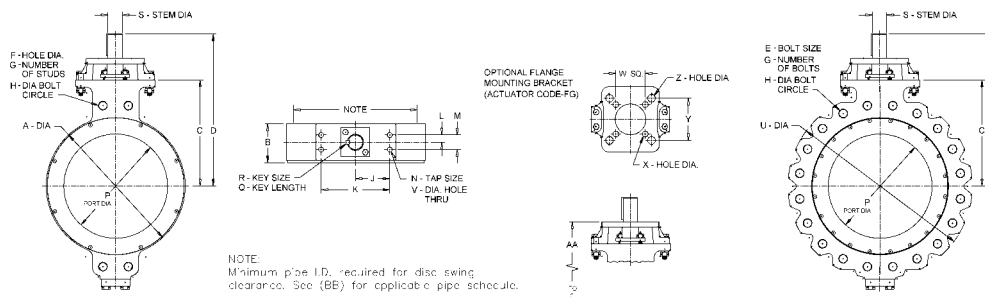


Series B5300, Class 300, 740 psi CWP* (inches)

Valve Size	A	B	C	D	E	F	G**	H	J	K	L	M	N	P
2½"	4.13	1.87	5.81	7.94	¾-10	¾	8	5.88	2.00	4.00	0.44	0.88	¾-16	2.09
3"	5.00	2.00	5.50	7.63	¾-10	¾	8	6.63	2.00	4.00	0.44	0.88	¾-16	2.62
4"	6.19	2.12	6.38	8.50	¾-10	¾	8	7.88	2.00	4.00	0.44	0.88	¾-16	3.63
5"	7.31	2.25	7.50	9.63	¾-10	¾	8	9.25	2.00	4.00	0.44	0.88	¾-16	4.50
6"	8.50	2.28	7.63	9.75	¾-10	¾	12	10.63	2.00	4.00	0.44	0.88	¾-16	5.62
8"	10.62	2.88	8.88	11.58	7/8-9	7/8	12	13.00	2.13	4.25	0.63	1.25	¾-16	7.61
10"	12.75	3.25	10.88	14.41	1-8	1	16	15.25	2.75	5.50	0.81	1.62	1/2-13	9.50
12"	15.00	3.62	12.25	16.48	1-1/8-8	1-1/8	16	17.75	2.75	5.50	0.81	1.62	1/2-13	11.50

Valve Size	Q	R	S	T	U	W	X	Y	Z	AA	BB	Weight-lbs. Lug Body	Weight-lbs. Wafer Body
2½"	-	-	0.500	0.375	7.38	2.25	0.34	3.00	0.41	6.69	Sch 160	17	-
3"	-	-	0.625	0.437	8.12	2.25	0.34	3.00	0.41	6.38	Sch 160	20	11
4"	-	-	0.625	0.437	9.38	2.25	0.34	3.00	0.41	7.26	Sch 80	25	16
5"	-	-	0.875	0.625	10.75	2.25	0.34	3.00	0.41	8.38	Sch 80	36	23
6"	-	-	0.875	0.625	12.12	2.25	0.34	3.00	0.41	8.50	Sch 40	47	29
8"	1.56	0.250 Sq.	1.125	-	14.75	-	-	3.50	0.56	10.00	Sch 40	115	61
10"	2.00	0.312 Sq.	1.375	-	17.25	3.50	0.56	5.31	0.69	12.38	Sch 40	145	110
12"	2.75	0.375 Sq.	1.750	-	20.00	3.50	0.56	5.31	0.69	13.75	Sch 40	225	170

* Pressure ratings are in accordance with ANSI B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.
 **Installation Manual is available with complete flange bolt / stud information.



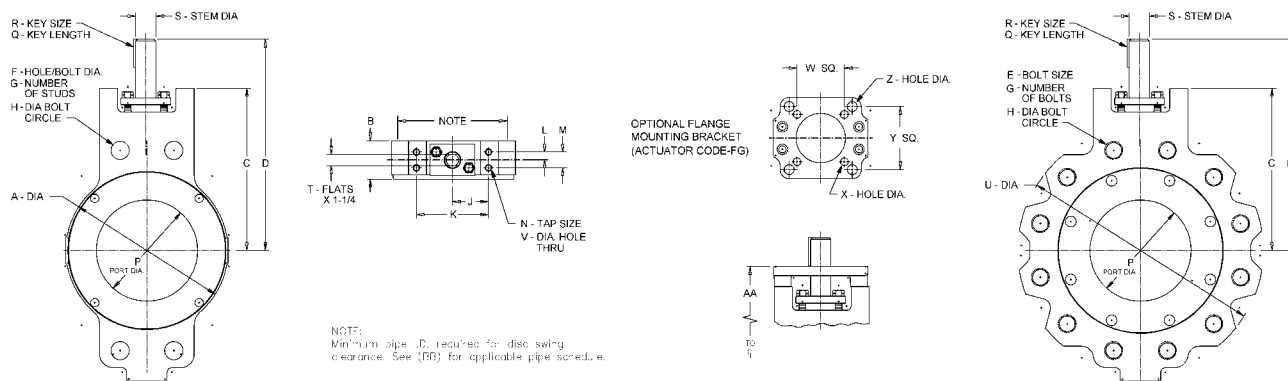
Series A5300, Class 300, 740 psi CWP* (inches)

Valve Size	A	B	C	D	E	F	G**	H	J	K	L	M	N	P
14"	17.50	4.62	13.63	19.98	1-1/8-8	1-1/8-8	20	20.25	4.75	9.50	1.00	2.00	-	12.46
16"	19.25	5.28	14.63	20.99	1-1/4-8	1-1/4-8	20	22.50	4.75	9.50	1.00	2.00	-	14.30
18"	22.00	5.93	16.16	23.16	1-1/4-8	1-1/4-8	24	24.75	4.75	9.50	1.00	2.00	-	16.26
24"	29.13	7.25	19.63	27.69	1-1/2-8	1-1/2-8	24	32.00	6.00	12.00	1.50	3.00	¾-10	21.44

Valve Size	Q	R	S	U	V	W	X	Y	Z	AA	BB	Weight-lbs. Lug Body	Weight-lbs. Wafer Body
14"	3.00	0.500 Sq.	2.000	22.75	0.69	4.78	0.81	2.88 x 6.94	0.94	16.63	Sch 80	490	290
16"	3.00	0.500 Sq.	2.000	25.50	0.69	4.78	0.81	2.88 x 6.94	0.94	17.63	Sch 80	650	360
18"	3.75	0.625 Sq.	2.500	28.00	0.69	4.78	0.81	2.88 x 6.94	0.94	19.16	Sch 80	925	480
24"	4.00	0.875 Sq.	3.500	36.00	-	-	-	3.92 x 9.47	0.81	23.63	Sch 80	1625	930

* Pressure ratings are in accordance with ANSI B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.
 **Installation Manual is available with complete flange bolt / stud information.

Dimensional Data



NOTE:
Minimum pipe I.D. required for disc swing clearance. See (BB) for applicable pipe schedule.

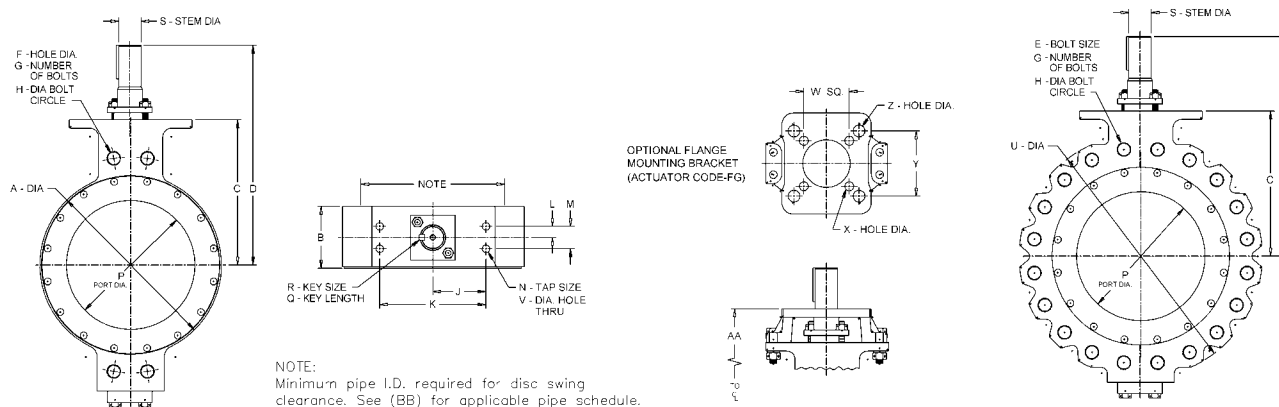
Series A560, Class 600, 1480 psi CWP* (inches)

Valve Size	A	B	C	D	E	F	G**	H	J	K	L	M	N	P
3"	5.38	1.93	5.50	7.63	3/4-10	3/4	8	6.63	2.00	4.00	0.44	0.88	3/8-16	2.62
4"	6.88	2.37	6.75	8.88	7/8-9	7/8	8	8.50	2.00	4.00	0.44	0.88	3/8-16	3.63
6"	9.00	2.91	9.00	11.68	1-8	1	12	11.50	2.13	4.25	0.63	1.25	3/8-16	5.62
8"	11.50	3.65	9.88	13.36	1-1/8-8	1-1/8	12	13.75	2.75	5.50	0.81	1.62	1/2-13	7.61
10"	13.50	4.65	12.00	16.18	1-1/4-8	1-1/4-8	12	17.00	2.75	5.50	0.81	1.62	1/2-13	9.50

Valve Size	Q	R	S	T	U	W	X	Y	Z	AA	BB	Weight-lbs. Lug Body	Weight-lbs. Wafer Body
3"	-	-	0.625	0.437	8.12	2.25	0.34	3.00	0.41	6.38	Sch 160	25	11
4"	-	-	0.875	0.625	10.50	2.25	0.34	3.00	0.41	7.63	Sch 120	53	30
6"	1.56	0.250 Sq.	1.125	-	13.63	-	-	3.50	0.56	10.12	Sch 120	85	52
8"	2.00	0.312 Sq.	1.375	-	16.12	3.50	0.56	5.31	0.69	11.38	Sch 80	165	105
10"	2.75	0.375 Sq.	1.750	-	19.50	3.50	0.56	5.31	0.69	13.50	Sch 120	329	225

* Pressure ratings are in accordance with ANSI B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.

**Installation Manual is available with complete flange bolt / stud information.



NOTE:
Minimum pipe I.D. required for disc swing clearance. See (BB) for applicable pipe schedule.

Series A560, Class 600, 1480 psi CWP* (inches)

Valve Size	A	B	C	D	E	F	G**	H	J	K	L	M	N	P
12"	16.25	5.53	12.94	19.58	1-1/4-8	1-1/4-8	20	19.25	4.75	9.50	1.00	2.00	-	11.50

Valve Size	Q	R	S	U	V	W	X	Y	Z	AA	BB	Weight-lbs. Lug Body	Weight-lbs. Wafer Body
12"	3.00	0.500 Sq.	2.000	21.75	0.69	4.78	0.81	2.88 x 6.94	0.94	15.94	Sch 80	520	360

* Pressure ratings are in accordance with ANSI B16.34 for group 1.1 carbon steel valves. Pressure ratings will vary with different body materials.

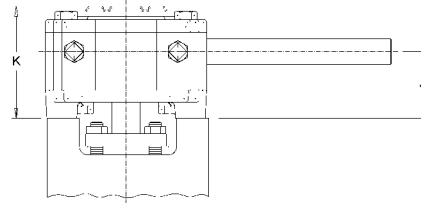
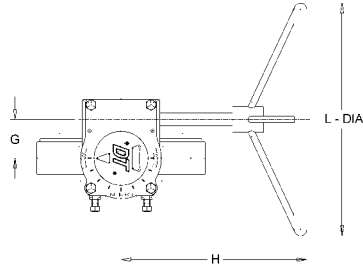
**Installation Manual is available with complete flange bolt / stud information.

W-K-M DynaCentric Valves Manual Actuators

Worm Gear Actuators

Worm gear actuators are available as optional equipment, for DynaCentric valves sizes 2½" through 8". All larger size valves require worm gear actuators or power actuation.

Handle operated valves, sizes 2½" through 8", can be converted in the field to worm gear operation. No modification is required to accommodate the addition of the worm gear unit.



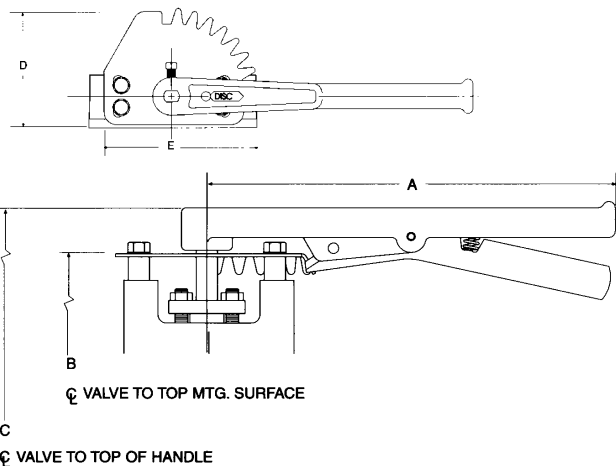
Valve Size and Class	Dimensions (inches)					Wt. (lbs.)
	G	H	J	K	L (Dia.)	
2½" 150/300	1.64	7.25	1.75	3.14	8.00	11
3" 150/300/600	1.75	7.25	2.00	3.50	8.00	15
4" 150/300/600	1.75	7.25	2.00	3.50	8.00	15
5" 150/300	1.75	7.25	2.00	3.50	8.00	15
6" 150/300	1.75	7.25	2.00	3.50	8.00	15
6" 600	2.50	10.28	2.50	4.16	12.00	23
8" 150/300	2.50	10.28	2.50	4.16	12.00	23
8" 600	3.00	14.02	3.00	4.75	18.00	39
10" 150	2.50	10.28	2.50	4.16	12.00	23
10" 300	3.00	14.02	3.00	4.75	18.00	39
10" 600	3.63	16.38	3.73	6.01	24.00	49
12" 150	3.00	14.02	3.00	4.75	18.00	39
12" 300	3.63	16.38	3.73	6.01	24.00	49
12" 600	3.63	18.95	5.23	7.51	30.00	51
14" 150	3.00	14.02	4.25	6.00	18.00	39
14" 300	3.63	18.95	5.23	7.51	30.00	51
16" 150	3.63	16.38	4.98	7.26	24.00	49
16" 300	3.63	18.95	5.23	7.51	30.00	51
18" 150	3.63	18.95	5.23	7.51	30.00	51
18" 300	4.63	19.90	4.94	7.60	30.00	106
20" 150	3.63	18.95	5.23	7.51	30.00	51
24" 150	4.63	19.90	4.94	7.60	30.00	106
24" 300	6.25	20.63	10.38	11.75	30.00	160
30" 150	6.25	20.63	10.38	11.75	30.00	160

Handle Actuators

Valve Size & Class	Handle No.	Dimensions (inches)					Wt. (lbs)
		A	B	C	D	E	
2½" 150/300	H-06	12	6.69	7.94	4.50	5.56	5
3" 150/300/600	H-16	12	6.38	7.62	4.50	5.56	5
4" 150/300	H-16	12	7.25	8.50	4.50	5.56	5
4" 600	H-36	18	7.63	8.88	4.50	5.56	9
5" 150/300	H-36	18	8.37	9.62	4.50	5.56	9
6" 150/300	H-36	18	8.50	9.75	4.50	5.56	9
6" 600	H-36	18	10.13	11.75	4.50	5.56	9
8" 150	H-36	18	10.00	11.50	4.50	5.56	9

CAUTION: Handle should only be used up to the following differential pressures:

- 2½" valves to 450 psi
- 3" valves to 400 psi
- 4" valves to 300 psi
- 5" valves to 200 psi
- 6" valves to 150 psi
- 8" valves to 50 psi



W-K-M HIGH PERFORMANCE BUTTERFLY VALVES



ON DUTY, RELIABLE SERVICE 24 / 7



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