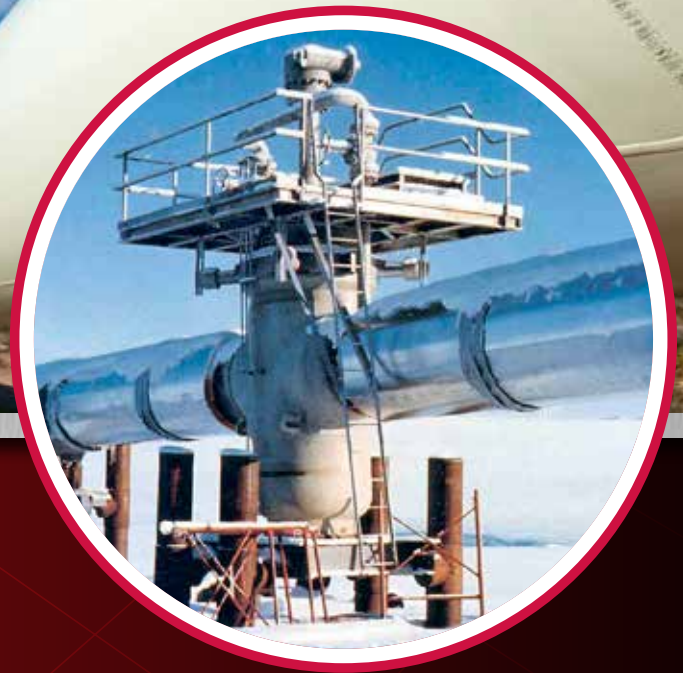


WKM Saf-T-Seal Gate Valves

Through-conduit, double block-and-bleed slab gate valves with fully protected seat faces for long-lasting, drop-tight shutoff in liquid pipelines

TECHNOLOGY



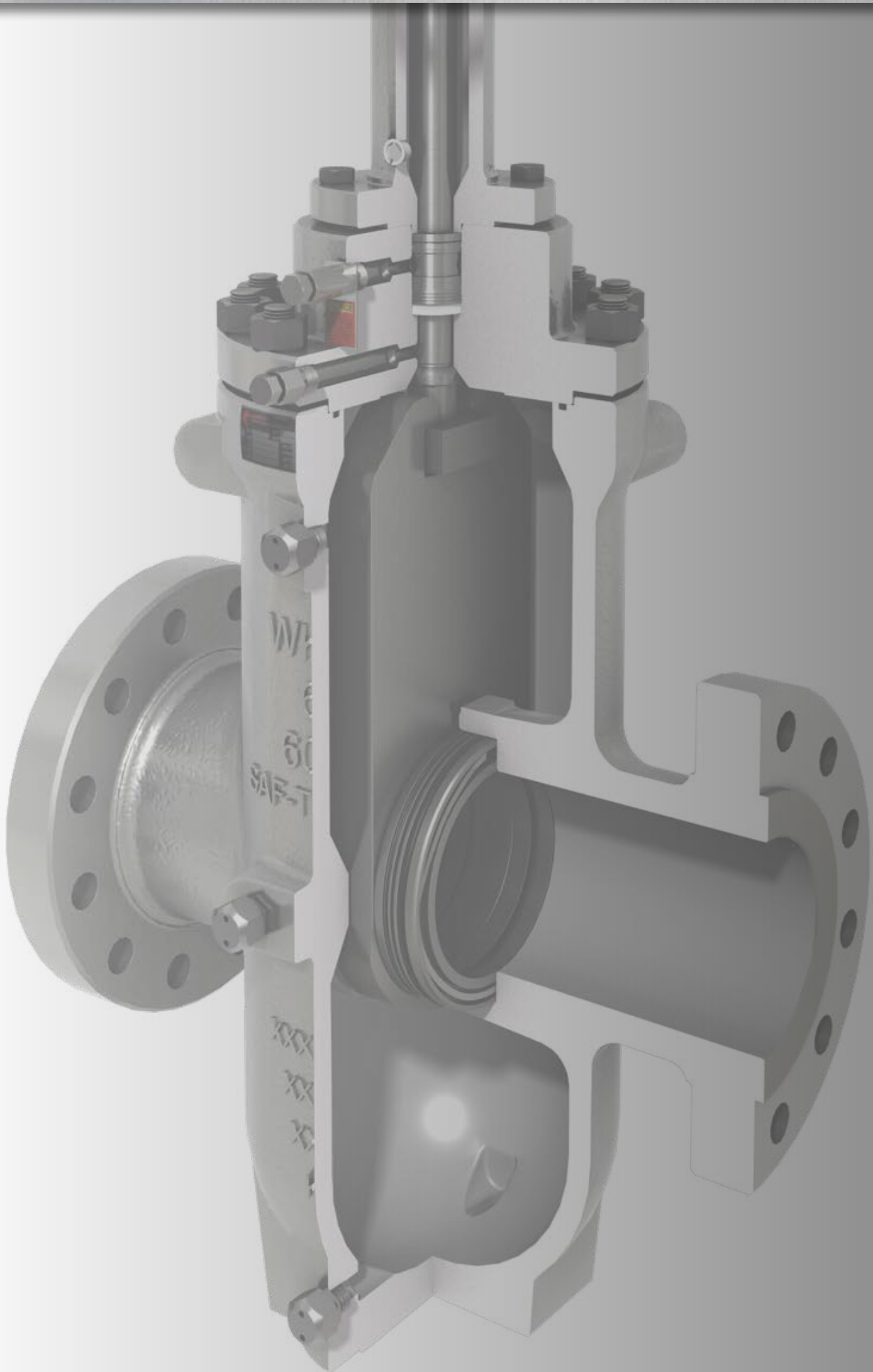


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WKM Saf-T-Seal Gate Valves



Ville Platte, La.,
USA

Cameron is a leading provider of valves and measurement systems to the oil and gas industry. Our products are primarily used to control, direct and measure the flow of oil and gas as it is moved from individual wellheads through flowlines, gathering lines and transmission systems to refineries, petrochemical plants and industrial centers for processing.

Cameron provides a wide range of valves for use in natural gas, LNG, crude oil and refined products transmission lines. The traditional CAMERON® fully welded ball valve product line has been combined with the GROVE®, RING-O®, TOM WHEATLEY®, ENTECH™ and TK® product lines. This broad offering has strengthened Cameron's ability to serve as a single source for customer requirements. Cameron also provides critical service valves for refinery, chemical and petrochemical processing businesses, and for associated storage terminal applications, particularly through the ORBIT® and GENERAL VALVE® lines. These brands are complemented by WKM®, TBV™ and TEXSTEAM™ valve products and considerably expand the scope of our product offerings.

Cameron's WKM Saf-T-Seal™ gate valve's smooth continuous bore reduces turbulence. Additionally, the seat faces are outside the flow stream and are protected from contact with the lading whether the valve is in the open or closed position. The WKM Saf-T-Seal gate valve's full bore makes it possible to run pigs, scrapers or hot tap cutters through the valves without danger of damaging the valve, lodging the scraper, or jamming it with metal cuttings.

DESIGN

Cameron's WKM Saf-T-Seal valve's through-conduit design provides the following specific advantages that result in reliable performance and long life:

Protection of Seat Faces

- Seat faces are outside the flow stream and in full contact with the gate, in both open and closed positions, greatly extending the seat life.

Smooth, Continuous Conduit for Flow

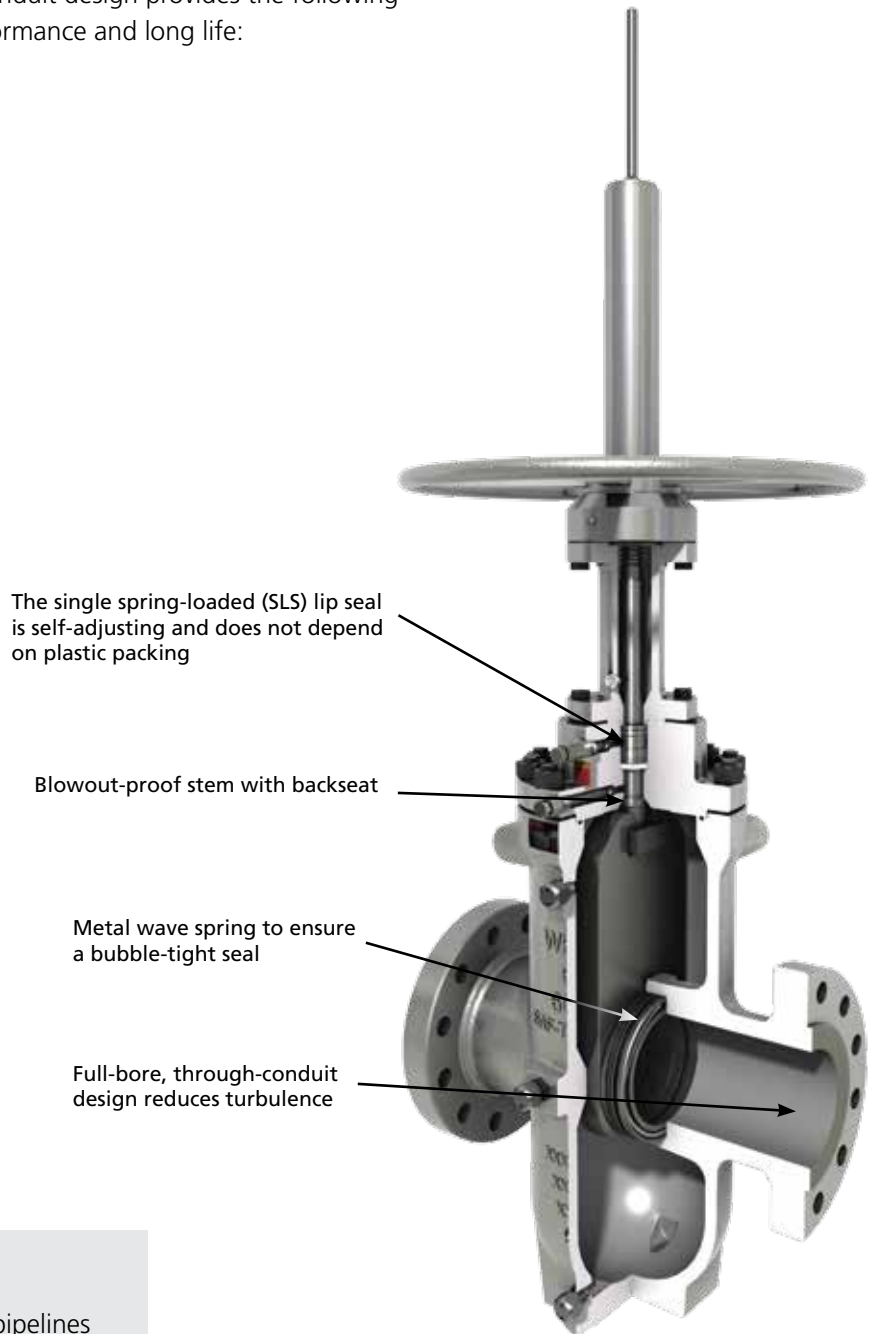
- Destructive turbulence is reduced. In a full-bore valve, pressure drop through the valve is no greater than that through an equal length of equal diameter pipe.

Block-and-Bleed Capability

- In the closed position, the valve forms a tight seal on both seats simultaneously. This allows the body cavity to be bled.

Commonly Used Applications

- Mainline and manifold valves in liquids pipelines
- Storage wells (salt domes, etc.)
- Water flood
- Safety valves (emergency shutdown valves (ESDVs) pipelines, wellheads and salt domes)



FEATURES

1. Through-Conduit Slab Gate Valve

- Provides a tight pressure-activated seal
- Full-bore design reduces pressure drop and allows passage of all types of scrapers (pigs)
- Nickel-plated internals

2. Cameron's SLS Stem Seal System or Vee Packing with Injectable Plastic Packing

3. Double-Sealing, Replaceable, Floating Seats

- Block-and-bleed per API 6D
- Simple one-piece design is resistant to dirty service
- Insert initiates the seal and helps clean the gate
- Excess body pressure is automatically vented upstream
- Seats may be lubricated to promote long life, reduce operating torques, or effect a seal in an emergency situation
- Easily removed and replaced while the valve is in-line
- Double seal established by initial plastic-to-metal seal in addition to metal-to-metal seal, both upstream and downstream

4. Bolted Bonnet Valve is In-Line Repairable

- Seal is made by an O-ring or flat metal gasket for standard applications (spiral-wound metal gasket with a non-asbestos filler for high-temperature applications)

5. Single-Piece Cast Body Center Section

- Provides the necessary strength to resist pipeline bending moments
- Smooth shape reduces stress concentrations
- Made from pressure vessel quality steel

6. Valve Stroke is Established by Manufacturing Tolerances

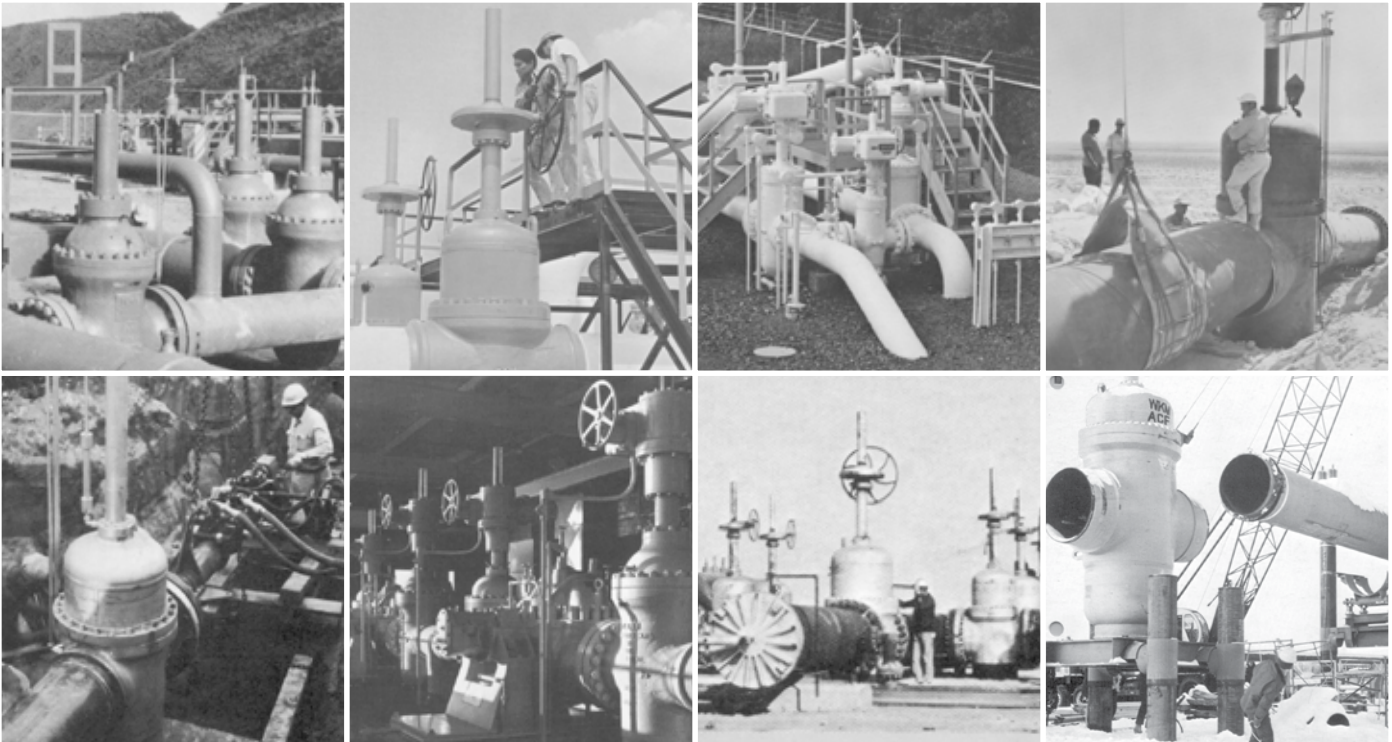
- Cannot get out of adjustment

7. Upgrades

- Stem backseat with test port
- SLS stem seal contained entirely in the bonnet, reducing a potential leak path
- Seat with wave spring to seal on low-pressure air
- Complies to API 6D and B16.34

OPTIONS

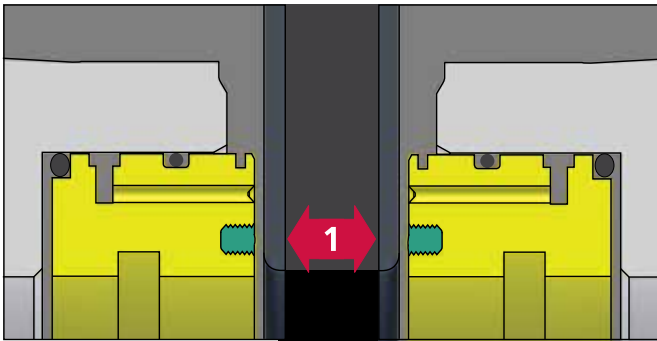
- Position indicator rods standard on handwheel- and bevel gear-operated valves
- Handwheel operators, bevel gear operators, or less gearing (bare stem)
- Saf-T-Gard hydraulic actuators or piston or diaphragm pneumatic actuators for surface safety applications
- Lubrication/packing/drain extensions
- Stem/yoke tube extensions
- Variety of coatings (coal tar epoxy for buried service, two- to three-part coating systems for marine environments, inorganic zinc-rich epoxy, etc.)
- Retrofits available for stem and body fitting extensions on buried service or difficult-to-reach valves, 6" (150 mm) increments
- HF-6 overlay available for gate and seal sealing surfaces



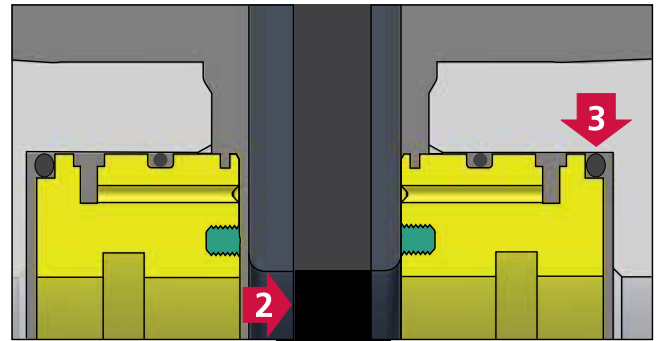
WKM Saf-T-Seal valves have a legacy of solid, innovative solutions around the globe.

C6, C2B and C2C Models

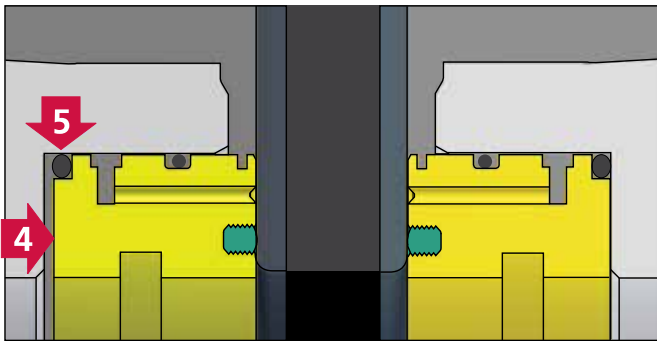
AUTOMATIC RELIEF OF EXCESS BODY PRESSURE



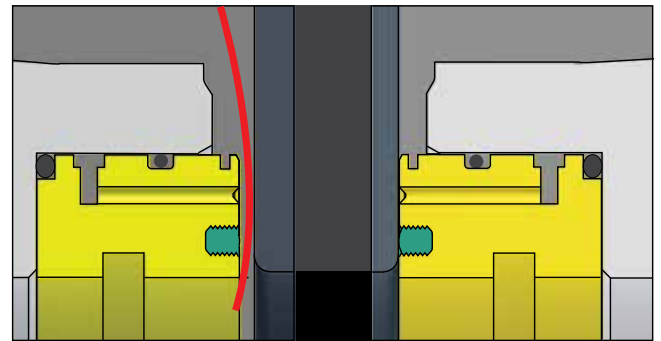
1. When the gate is in the closed position and there is an equal pressure through the valve, an initial seal (1) is formed by the raised plastic ring on the faces of the seats. The seat inserts clean both sides of the gate each time the valve is opened or closed.



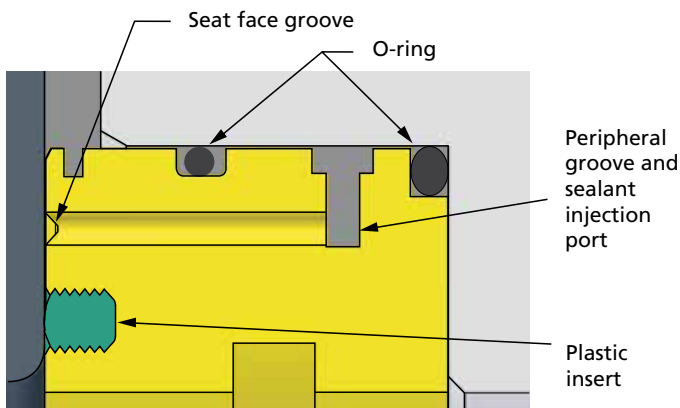
2. As line pressure (2) is applied to the valve, it acts on the gate, forcing it against the plastic ring on the downstream seat and compressing it until the gate rests against the steel seat. Thus, a double seal is formed; first, a plastic-to-metal seal then metal-to-metal. The seal also is forced firmly into its recess. The O-ring (3) prevents any downstream flow around the seat.



3. An upstream seal is provided by the force of line pressure acting against the upstream seat (4), moving the seat against the gate and providing a tight plastic-to-metal seal. At the same time, the O-ring (5) forms a tight seal with the seat recess.



4. The valve automatically relieves itself of excessive body pressure. When body pressure exceeds line pressure, from causes such as thermal expansion, the upstream seat is forced back into its recess and the excess pressure in the body is bled between the seat and the gate into the line.



Emergency Sealant Injection

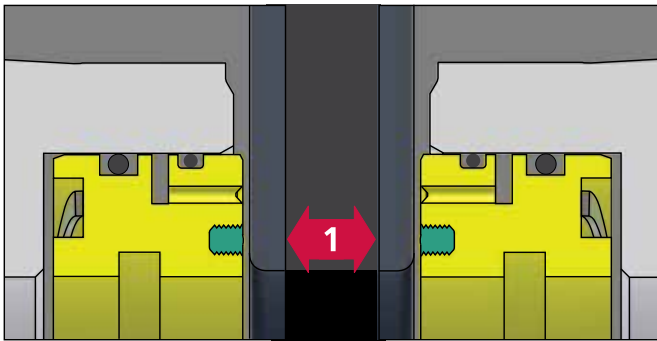
In valves 6" (150 mm) and larger, the sealant can be pumped through body fittings directly into a groove on the face of the seat. In smaller valves, the sealant is injected through fittings into the valve body.

Repacking Under Pressure

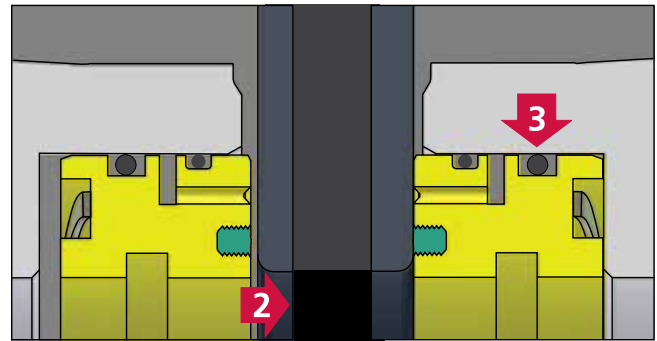
The WKM Saf-T-Seal gate valve is equipped with Cameron's SLS stem packing in an enclosed packing box. Plastic packing is not required. Plastic stem packing can be added while the valve is under pressure in case of an emergency.

C6B Model

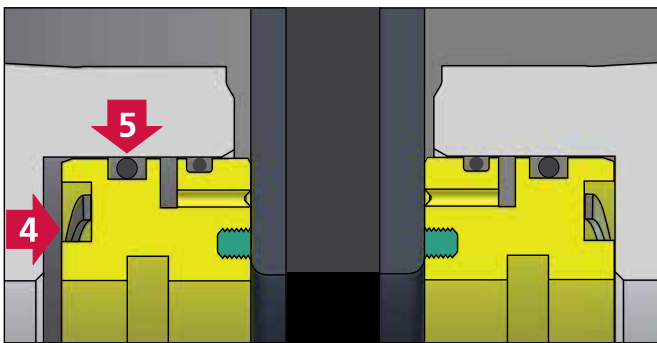
AUTOMATIC RELIEF OF EXCESS BODY PRESSURE



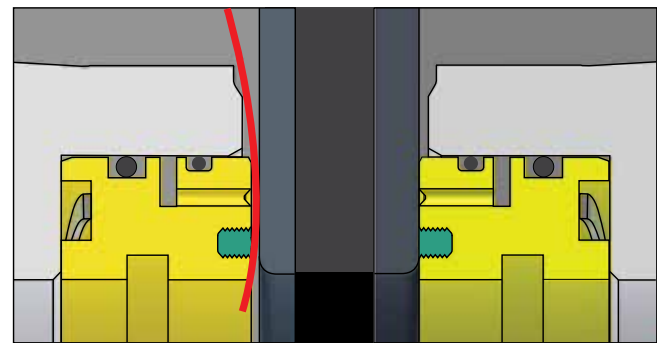
1. When the gate is in the closed position and there is an equal pressure through the valve, an initial seal (1) is formed by the raised plastic ring on the faces of the seats. The seat inserts clean both sides of the gate each time the valve is opened or closed.



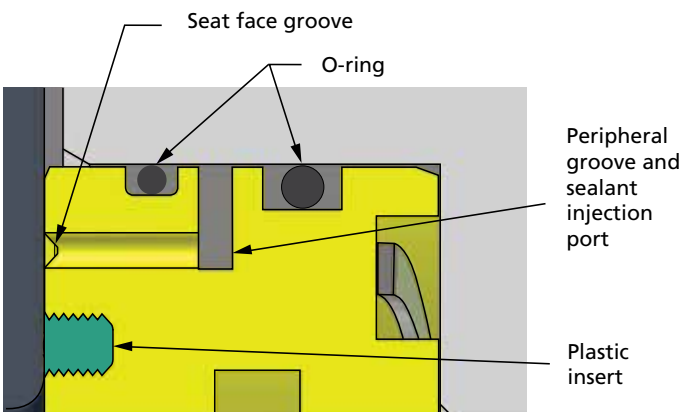
2. As line pressure (2) is applied to the valve, it acts on the gate, forcing it against the plastic ring on the downstream seat and compressing it until the gate rests against the steel seat. Thus, a double seal is formed; first, a plastic-to-metal seal then metal-to-metal. The seal is also forced firmly into its recess. The O-ring (3) prevents any downstream flow around the seat.



3. An upstream seal is provided by the force of line pressure acting against the upstream seat (4), moving the seat against the gate and providing a tight plastic-to-metal seal. At the same time, the O-ring (5) forms a tight seal with the seat recess.



4. The valve automatically relieves itself of excessive body pressure. When body pressure exceeds line pressure from causes such as thermal expansion, the upstream seat is forced back into its recess and the excess pressure in the body is bled between the seat and the gate into the line.



Emergency Sealant Injection

In valves 6" (150 mm) and larger, the sealant can be pumped through body fittings directly into a groove on the face of the seat. In smaller valves, the sealant is injected through fittings into the valve body.

Repacking Under Pressure

The WKM Saf-T-Seal gate valve is equipped with Cameron's SLS stem packing in an enclosed packing box. Plastic packing is not required. Plastic stem packing can be added while the valve is under pressure in case of an emergency.

Single Spring-Loaded (SLS) Seal

FEATURES AND BENEFITS

The SLS stem seal system is designed to provide optimum performance while requiring reduced maintenance. This seal is hydrocarbon fugitive emissions-tested and has demonstrated seal ability up to 500 ppm leakage.

Testing and Certifications

- Fire tests per API 6FA, BS 6755 Part 11
- ISO 10497

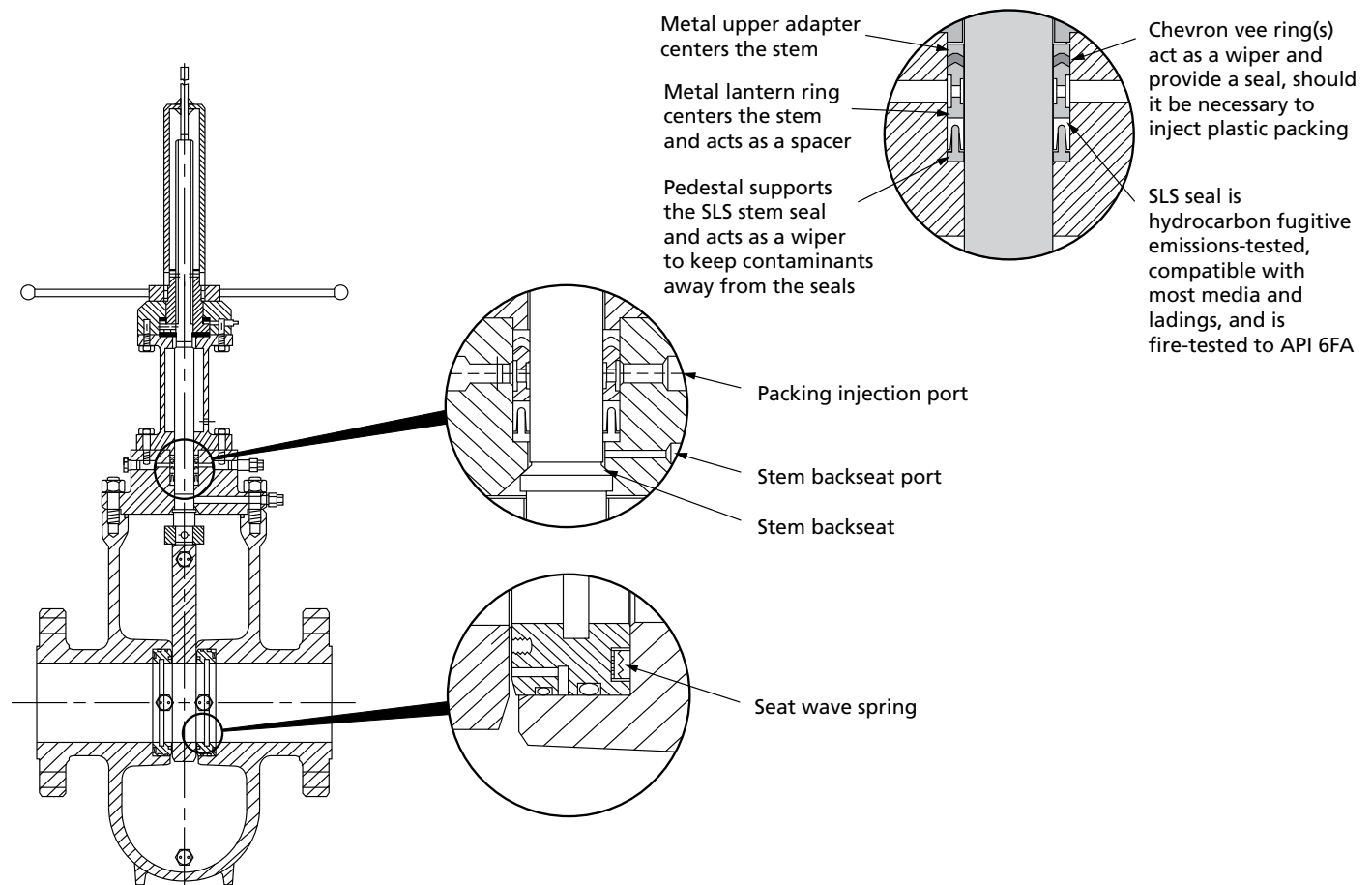
Design

- Single spring-loaded lip seal
- Lantern ring
- Chevron ring(s)
- Lower pedestal
- Upper adapter

Features

- Self-adjusting seal designed to reduce maintenance
- No plastic packing required to establish an effective seal*
- Four separate sealing bands to promote reliability
- Filled PTFE shell backed with a corrosion-resistant alloy spring (making it suitable for virtually all line media)
- Metal spring provides an initial seal and uniform loading over a wide temperature range
- Lantern ring acts as a spacer in conjunction with the upper adapter as a bearing to center the stem
- Lower pedestal support seal acts as a stem scraper to keep contaminants away from sealing members
- Chevron ring(s) act as an emergency seal, should it be necessary to inject plastic packing, and keeps foreign matter away from the seal

Model C6B Details



Standard on C6B model. Can be retrofitted or requested for C6, C2B and C2C models.

* Plastic packing can be injected into packing box to affect a temporary seal while the valve is under pressure.

2" to 4" (50 mm to 100 mm) Classes 600, 900 and 1500

MODEL M (HANDWHEEL OPERATED)

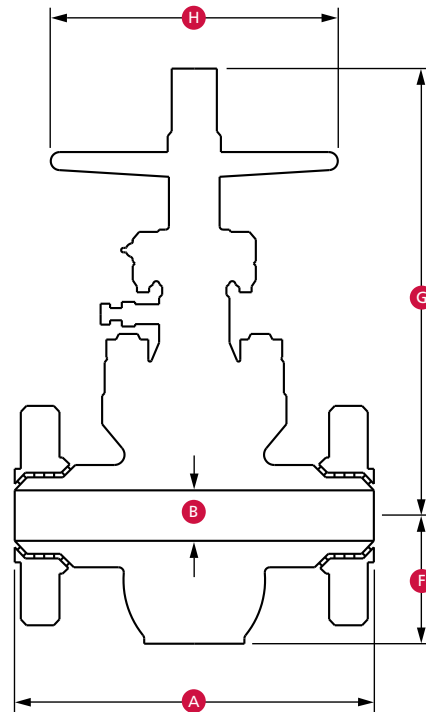
| Max. WP at 100° F (38° C) | |
|---------------------------|-------------------------------|
| Class 600: | 1500 psi CWP 2250 psi Test |
| Class 900: | 2250 psi CWP 3375 psi Test |
| Class 1500: | 3750 psi CWP 5625 psi Test |

PRINCIPAL DIMENSIONS

N = Number of turns to fully open or close valve

SN = Stem nut

BGO = Bevel gear operator



Class 600

| Size in. (mm) | A | B | F | G | * H | N | Weight lb (kg) | | |
|------------------|-----------------|----------------|------------------|-----------------|-------------|--------|----------------|--------------|--------------|
| | | | | | | | FE | WE | F x W |
| 2 (50) | 11-1/2 (292) | 2-1/16 (52) | 4-13/16 (122) | 17-3/4 (451) | 12 (305) | 15-3/4 | 90 (41) | 72 (33) | 84 (38) |
| 3 (80) | 14 (356) | 3-3/16 (81) | 6-15/16 (176) | 24-3/8 (619) | 12 (305) | 20-1/4 | 180 (82) | 144 (65) | 155 (70) |
| 4 (100) | 17 (432) | 4-1/8 (105) | 8-5/8 (219) | 29 (737) | 14 (356) | 19-1/2 | 345 (156) | 259 (117) | 245 (111) |

Class 900

| | | | | | | | | | |
|------------|-----------------|----------------|-----------------|-----------------|-------------|--------|--------------|--------------|--------------|
| 2 (50) | 14-1/2 (368) | 2-1/16 (52) | 5-1/16 (129) | 17-3/4 (451) | 12 (305) | 15-3/4 | 150 (68) | 72 (33) | 105 (48) |
| 3 (80) | 15 (381) | 3-3/16 (81) | 7-5/16 (186) | 24-3/8 (619) | 12 (305) | 20-1/4 | 265 (120) | 193 (88) | 247 (112) |
| 4 (100) | 18 (457) | 4-1/8 (105) | 9-1/16 (230) | 29 (737) | 18 (457) | 19-1/2 | 515 (234) | 390 (177) | 417 (189) |

Class 1500

| | | | | | | | | | |
|------------|-----------------|----------------|-----------------|-----------------|-------------|--------|--------------|--------------|--------------|
| 2 (50) | 14-1/2 (368) | 2-1/16 (52) | 5-1/16 (129) | 17-3/4 (451) | 12 (305) | 15-3/4 | 220 (100) | 150 (68) | 154 (70) |
| 3 (80) | 18-1/2 (470) | 3-3/16 (81) | 7-5/16 (186) | 24-3/8 (619) | 12 (305) | 20-1/4 | 450 (204) | 328 (149) | 370 (168) |
| 4 (100) | 21-1/2 (546) | 4-1/8 (105) | 9-1/16 (230) | 29 (737) | 18 (457) | 19-1/2 | 720 (327) | 547 (248) | 583 (264) |

* Some valves may require a gear operator to meet API 6D.

6" to 12" (150 mm to 300 mm) Classes 150, 300, 600 and 900

MODELS C6 AND C6B (HANDWHEEL AND BEVEL GEAR OPERATED)

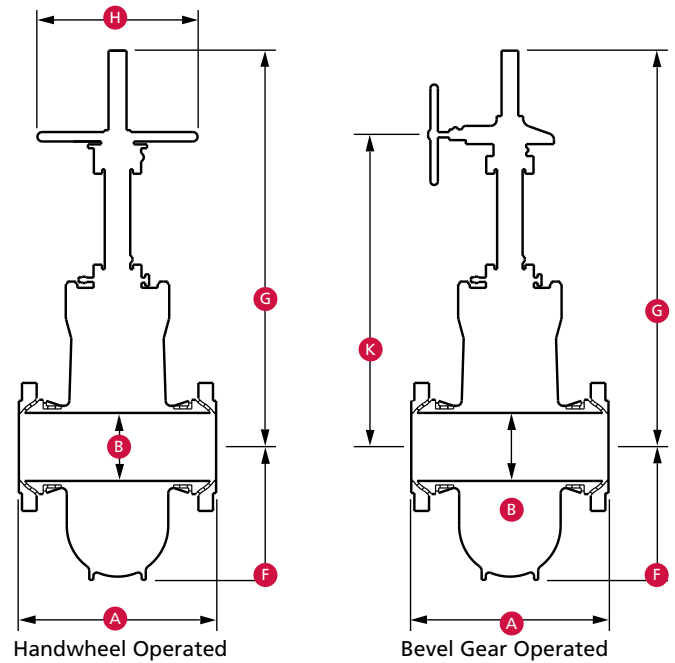
| Max. WP at 100° F (38° C) | |
|---------------------------|-------------------------------|
| Class 150: | 290 psi CWP 450 psi Test |
| Class 300: | 750 psi CWP 1125 psi Test |
| Class 600: | 1500 psi CWP 2250 psi Test |
| Class 900: | 2250 psi CWP 3375 psi Test |

PRINCIPAL DIMENSIONS

N = Number of turns to fully open or close valve

SN = Stem nut

BGO = Bevel gear operator



Class 150 (Model C6)

| Size in. (mm) | A | B | F | G (HWO) | G (BGO) | * H | K | N (SN) | N (BGO) | Weight lb (kg) | | |
|------------------|-----------------|-------------|-----------------|------------------|------------------|-------------|------------------|-----------|------------|----------------|--------------|--------------|
| | | | | | | | | | | FE | WE | W XF |
| 6 (150) | 10-1/2 (267) | 6 (152) | 13-1/2 (343) | 45-3/8 (1153) | 46-3/8 (1178) | 24 (610) | 30-3/4 (781) | 29 | 116 | 245 (111) | 215 (98) | 230 (104) |
| 8 (200) | 11-1/2 (292) | 8 (203) | 16-1/2 (419) | 52-3/8 (1330) | 55-3/8 (1407) | 24 (610) | 35-7/8 (911) | 37 | 148 | 365 (166) | 320 (145) | 342 (155) |
| 10 (250) | 13 (330) | 10 (254) | 19-1/2 (495) | 59-1/2 (1511) | 60-1/2 (1537) | 24 (610) | 40-7/8 (1038) | 45 | 180 | 515 (234) | 459 (208) | 488 (221) |
| 12 (300) | 14 (356) | 12 (305) | 22-3/4 (578) | 68-5/8 (1743) | 69-5/8 (1768) | 24 (610) | 46-1/8 (1172) | 53 | 212 | 677 (307) | 594 (269) | 635 (288) |

Class 300 (Model C6)

| | | | | | | | | | | | | |
|-------------|-----------------|-------------|-----------------|------------------|------------------|-------------|------------------|----|-----|---------------|--------------|--------------|
| 6 (150) | 15-7/8 (403) | 6 (152) | 13-1/2 (343) | 45-3/8 (1153) | 46-3/8 (1178) | 24 (610) | 30-3/4 (781) | 29 | 116 | 316 (143) | 271 (123) | 294 (133) |
| 8 (200) | 16-1/2 (419) | 8 (203) | 16-1/2 (419) | 54-3/8 (1381) | 55-3/8 (1407) | 24 (610) | 35-7/8 (911) | 37 | 148 | 520 (236) | 459 (208) | 489 (222) |
| 10 (250) | 18 (457) | 10 (254) | 19-1/2 (495) | 59-1/2 (1511) | 60-1/2 (1537) | 24 (610) | 40-7/8 (1038) | 45 | 180 | 773 (351) | 695 (315) | 731 (332) |
| 12 (300) | 19-3/4 (502) | 12 (305) | 22-5/8 (578) | 68-5/8 (1743) | 69-5/8 (1768) | 24 (610) | 46-1/8 (1172) | 53 | 212 | 1035 (469) | 930 (422) | 983 (446) |

Class 600 (Model C6B)

| Size in. (mm) | A | B | F | G (HWO) | G (BGO) | * H | K | N (SN) | N (BGO) | Weight lb (kg) | | |
|------------------|-------------|-------------|-----------------|------------------|------------------|-------------|-------------------|-----------|------------|----------------|---------------|----------------|
| | | | | | | | | | | FE | WE | W XF |
| 6 (150) | 22 (559) | 6 (152) | 13-5/8 (346) | 45-3/8 (1153) | 46-3/8 (1178) | 24 (610) | 30-3/4 (781) | 29 | 116 | 600 (272) | 439 (199) | 650 (295) |
| 8 (200) | 26 (660) | 8 (203) | 16-3/4 (425) | 56-3/8 (1432) | 57-3/8 (1457) | 24 (610) | 37-13/16 (960) | 37 | 148 | 970 (440) | 737 (334) | 853 (387) |
| 10 (250) | 31 (787) | 10 (254) | 20 (508) | 59-1/2 (1511) | 61-1/2 (1562) | 24 (610) | 40-7/8 (1038) | 45 | 180 | 1736 (787) | 1584 (718) | 1656 (751) |
| 12 (300) | 33 (838) | 12 (305) | 23-1/4 (591) | 68-7/8 (1743) | 70-1/2 (1791) | 30 (762) | 47-1/4 (1200) | 53 | 318 | 2374 (1077) | 2010 (912) | 2156 (9143) |

Class 900 (Model C6B)

| | | | | | | | | | | | | |
|-------------|-------------|-------------|-----------------|------------------|------------------|-------------|-------------------|----|-----|----------------|----------------|----------------|
| 6 (150) | 24 (610) | 6 (152) | 13-7/8 (352) | 45-1/8 (1146) | 46-1/8 (1222) | 24 (610) | 30-3/4 (781) | 29 | 116 | 650 (295) | 500 (227) | 575 (261) |
| 8 (200) | 29 (737) | 8 (203) | 17-1/8 (435) | 56-1/8 (1426) | 57-1/8 (1451) | 24 (610) | 37-13/16 (960) | 37 | 148 | 1200 (544) | 950 (431) | 1050 (476) |
| 10 (250) | 33 (838) | 10 (254) | 20-1/2 (521) | 59-1/2 (1511) | 60-3/4 (1543) | 30 (762) | 42-1/16 (1068) | 45 | 180 | 2150 (975) | 1830 (830) | 1980 (898) |
| 12 (300) | 38 (965) | 12 (305) | 23-3/4 (603) | 71-3/4 (1822) | 73-1/8 (1857) | 30 (762) | 48-1/2 (1232) | 53 | 318 | 3250 (1474) | 2500 (1134) | 2650 (1202) |

Flange dimensions conform to ASME B16.5, 1981. Information on power-actuated and other types of valves available on application.

* Some valves may require a gear operator to meet API 6D.

14" to 36" (350 mm to 900 mm) Classes 150 and 300

MODELS C6B AND C2B
(BEVEL GEAR OPERATED)

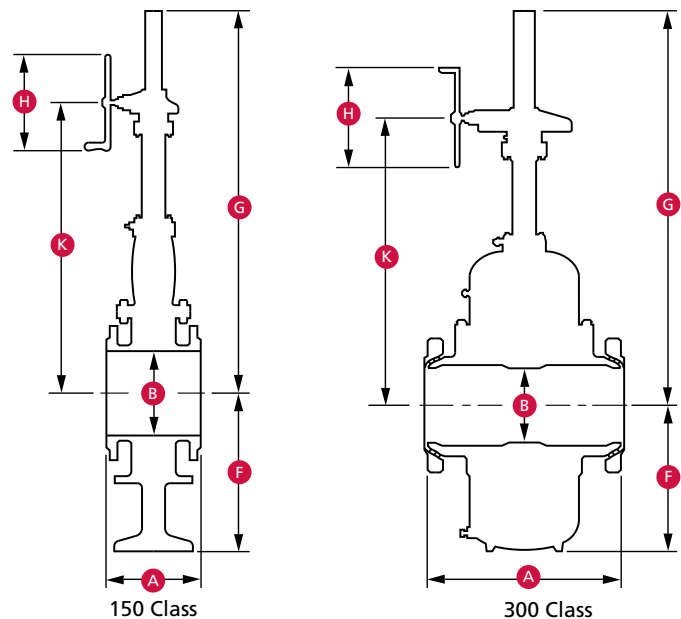
| Max. WP at 100° F (38° C) | |
|---------------------------|------------------------------|
| Class 150: | 290 psi CWP 450 psi Test |
| Class 300: | 750 psi CWP 1125 psi Test |

PRINCIPAL DIMENSIONS

N = Number of turns to fully open or close valve

SN = Stem nut

BGO = Bevel gear operator



Class 150 (Model C6B)

| Size in. (mm) | A | B | F | G | * H | K | N (SN) | N (BGO) | Weight lb (kg) | | |
|------------------|-------------|-----------------|--------------------|-------------------|-------------|-------------------|-----------|------------|----------------|----------------|----------------|
| | | | | | | | | | FE | WE | WXF |
| 14 (350) | 15 (381) | 13-1/4 (337) | 25-1/4 (641) | 76 (1930) | 24 (610) | 51-3/4 (1314) | 36-3/4 | 146-7/8 | 872 (396) | 760 (345) | 817 (371) |
| 16 (400) | 16 (406) | 15-1/4 (387) | 28-3/8 (721) | 82-7/8 (2105) | 24 (610) | 56-7/8 (1445) | 41-3/4 | 166-7/8 | 1309 (594) | 1163 (528) | 1235 (560) |
| 18 (450) | 17 (432) | 17-1/4 (438) | 31-3/8 (797) | 90 (2286) | 24 (610) | 62 (1575) | 46-1/16 | 184-3/8 | 1781 (808) | 1603 (727) | 1690 (767) |
| 20 (500) | 18 (457) | 19-1/4 (489) | 34-1/2 (876) | 98-1/4 (2496) | 24 (610) | 67-1/4 (1708) | 41-1/2 | 166 | 2351 (1066) | 2119 (961) | 2235 (1014) |
| 24 (600) | 20 (508) | 23-1/4 (591) | 41-1/8 (1045) | 113 (2870) | 24 (610) | 78 (1981) | 50-1/4 | 301-1/2 | 2892 (1312) | 2514 (1140) | 2703 (1226) |
| 26 (650) | 22 (559) | 25 (635) | 43-13/16 (1113) | 120-1/4 (3054) | 24 (610) | 84-5/8 (2149) | - | - | 3521 (1597) | 3172 (1439) | 3327 (1509) |
| 28 (700) | 24 (610) | 27 (686) | 46-7/8 (1191) | 127-1/4 (3232) | 24 (610) | 90-1/8 (2289) | 57-7/8 | 347-1/4 | 4098 (1859) | 3506 (1590) | 3802 (1725) |
| 30 (750) | 26 (660) | 29 (737) | 50 (1270) | 136-1/4 (3461) | 24 (610) | 95-1/2 (2426) | 62-1/2 | 500 | 4916 (2230) | 4231 (1919) | 4573 (2074) |
| 36 (900) | 32 (813) | 34-1/2 (876) | 59 (1499) | 157 (3988) | 36 (914) | 113-3/8 (2880) | 46-1/8 | 368-3/4 | 5842 (2650) | 5264 (2388) | 5521 (2504) |

Flange dimensions on valves through 24" (600 mm) conform to American National Standards Institute Standard 816.5, 1974.
Larger sizes conform to MSS-SP-44.

Class 300 (Model C2B)

| | | | | | | | | | | | |
|-------------|--------------|-----------------|------------------|-------------------|-------------|-------------------|---------|---------|------------------|------------------|------------------|
| 14 (350) | 30 (762) | 13-1/4 (337) | 25-1/2 (648) | 75-5/8 (1921) | 24 (610) | 49-1/2 (1257) | 29-3/8 | 117-1/2 | 1454 (660) | 1266 (574) | 1361 (617) |
| 16 (400) | 33 (838) | 15-1/4 (387) | 28-1/8 (714) | 80-5/8 (2048) | 24 (610) | 54-1/2 (1384) | 41-3/4 | 166-7/8 | 2182 (990) | 1939 (880) | 2058 (933) |
| 18 (450) | 36 (914) | 17-1/4 (438) | 31 (787) | 88 (2235) | 24 (610) | 60-3/4 (1543) | 37-3/8 | 224-1/4 | 2969 (1347) | 2672 (1212) | 2816 (1277) |
| 20 (500) | 39 (991) | 19-1/4 (489) | 34-1/2 (876) | 97-3/4 (2483) | 24 (610) | 67 (1702) | 41-1/2 | 249 | 3919 (1778) | 3532 (1602) | 3725 (1690) |
| 24 (600) | 45 (1143) | 23-1/4 (591) | 41-1/8 (1045) | 114-1/8 (2899) | 24 (610) | 78-3/4 (2000) | 50-1/4 | 402 | 5868 (2662) | 5287 (2398) | 5545 (2515) |
| 26 (650) | 49 (1245) | 25 (635) | 43-3/4 (1111) | 120-1/4 (3054) | 24 (610) | 83-1/4 (2115) | - | - | 6830 (3098) | 5844 (2651) | 6337 (2874) |
| 28 (700) | 53 (1346) | 27 (686) | 47 (1194) | 129-3/4 (3296) | 24 (610) | 90-1/4 (2292) | - | - | 8194 (3717) | 7051 (3198) | 7623 (3458) |
| 30 (750) | 55 (1397) | 29 (737) | 50-5/8 (1286) | 139-1/8 (3534) | 36 (914) | 96-3/4 (2457) | 39-1/16 | 312-1/2 | 9736 (4416) | 8773 (3979) | 9201 (4174) |
| 36 (900) | 68 (1727) | 34-1/2 (876) | 59-1/4 (1505) | 161 (4089) | 36 (914) | 112-3/4 (2864) | 46-1/8 | 368-3/4 | 15,441 (7004) | 13,607 (6172) | 14,524 (6588) |

Flange dimensions conform to ASME B16.5, 1981.

Information on power-actuated and other types of valves available on application.

* Some valves may require a gear operator to meet API 6D.

14" to 36" (350 mm to 900 mm) Classes 600 and 900

MODELS C6 AND C6B (HANDWHEEL AND BEVEL GEAR OPERATED)

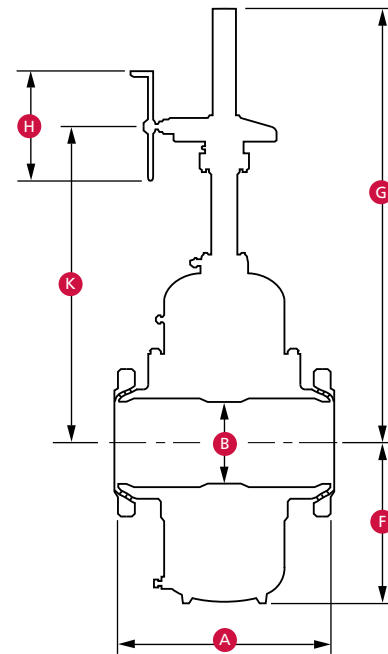
| Max. WP at 100° F (38° C) | |
|---------------------------|-------------------------------|
| Class 600: | 1500 psi CWP 2250 psi Test |
| Class 900: | 2250 psi CWP 3375 psi Test |

PRINCIPAL DIMENSIONS

N = Number of turns to fully open or close valve

SN = Stem nut

BGO = Bevel gear operator



Class 600 (Model C6B)

| Size in. (mm) | A | B | F | G | * H | K | N (SN) | N (BGO) | Weight lb (kg) | | |
|------------------|--------------|-----------------|------------------|-------------------|-------------|-------------------|-----------|------------|-------------------|-------------------|-------------------|
| | | | | | | | | | FE | WE | WXF |
| 14 (350) | 35 (889) | 13-1/4 (337) | 26 (660) | 75-3/8 (1915) | 24 (610) | 51-1/2 (1308) | 29-3/8 | 176-1/4 | 3232 (1466) | 2828 (1283) | 3030 (1374) |
| 16 (400) | 39 (991) | 15-1/4 (387) | 29-1/8 (740) | 83-1/2 (2121) | 24 (610) | 56-3/4 (1441) | 33-3/8 | 200-1/4 | 4023 (1825) | 3515 (1594) | 3767 (1709) |
| 18 (450) | 43 (1092) | 17-1/4 (438) | 32-3/8 (822) | 91-1/2 (2324) | 24 (610) | 62-1/2 (1588) | 37-3/8 | 224-1/4 | 5617 (2548) | 4110 (1864) | 5252 (2382) |
| 20 (500) | 47 (1194) | 19-1/4 (489) | 35-7/8 (911) | 100-1/2 (2553) | 24 (610) | 69-3/8 (1762) | 26 | 208 | 6984 (3168) | 6070 (2753) | 6449 (2925) |
| 24 (600) | 55 (1397) | 23-1/4 (591) | 42-1/4 (1073) | 118 (2997) | 36 (914) | 83 (2108) | 31-3/8 | 251-1/4 | 11,447 (5192) | 10,014 (4542) | 10,730 (4867) |
| 26 (650) | 57 (1448) | 25 (635) | 46 (1168) | 124-5/8 (3165) | 36 (914) | 87-1/2 (2223) | 33-9/16 | 268-3/4 | 13,124 (5953) | 11,494 (5214) | 10,024 (4547) |
| 28 (700) | 61 (1549) | 27 (686) | 49-1/4 (1251) | 134 (3404) | 36 (914) | 93-1/2 (2375) | 36-3/16 | 434 | 14,293 (6483) | 12,232 (5548) | 12,624 (5726) |
| 30 (750) | 65 (1651) | 29 (737) | 52-3/4 (1340) | 142-3/4 (3626) | 36 (914) | 100-1/2 (2553) | 39-1/16 | 468-3/4 | 14,457 (6558) | 12,724 (5772) | 13,591 (6165) |
| 36 (900) | 82 (2083) | 34-1/2 (876) | 61-3/4 (1568) | 171-1/4 (4350) | 36 (914) | 117-1/2 (2985) | 46-1/8 | 553-1/8 | 26,377 (11964) | 23,967 (10871) | 25,172 (11418) |

Class 900 (Model C2C)

| | | | | | | | | | | | |
|-------------|------------------|-----------------|------------------|--------------------|-------------|--------------------|--------|---------|---|---|---|
| 14 (350) | 40-1/2 (1029) | 12-3/4 (324) | 25-9/16 (649) | 79-5/8 (2022) | 24 (610) | 55-13/16 (1418) | 20-7/8 | 166-7/8 | - | - | - |
| 16 (400) | 44-1/2 (1130) | 15-1/4 (387) | 30-7/16 (773) | 87-3/8 (2219) | 24 (610) | 60-3/16 (1529) | 20-7/8 | 166-7/8 | - | - | - |
| 18 (450) | 48 (1219) | 17-1/4 (438) | 33-7/8 (860) | 56-15/16 (1446) | 24 (610) | 64-11/16 (1643) | 23-3/8 | 187 | - | - | - |
| 20 (500) | 52 (1321) | 19-1/4 (489) | 37-1/4 (946) | 103-3/8 (2626) | 36 (914) | 71-1/8 (1807) | 26 | 208 | - | - | - |
| 24 (600) | 61 (1549) | 23-1/4 (591) | 46-1/4 (1175) | 123-1/8 (3127) | 36 (914) | 86-3/8 (2194) | - | - | - | - | - |

Flange dimensions conform to ASME B16.5, 1981.

Information on power-actuated and other types of valves available on application.

WKM Saf-T-Gard Actuators

Electric and Pneumatic

Cameron's WKM Saf-T-Seal™ gate valves can be equipped with two principal types of actuators: electric actuators and pneumatic or gas-powered motor drives.

Information Required for Sizing Electric Actuators

- Valve type: Saf-T-Seal
- Size: pipe size x bore size
- Pressure class
- Top-mounted or side-mounted
- Closing time in seconds
- Maximum differential pressure (psi)
- Type and make of actuator required
- Voltage:
 - Three-phase, 60-cycle 220 V/440 V
 - Three-phase, 50-cycle 220 V/440 V
 - Control voltage
 - Motor connection voltage
 - Any special requirements
- Enclosure:
 - Weather-proof
 - Explosion-proof, Class 1, Group D, Div. 2
 - ATEX
 - Certification required
- Accessories:
 - Reversing starter
 - Control transformer
 - Push-button station:
 - Three push buttons
 - Two lights
 - Limit switches:
 - Two train-gear limit switches (eight contacts)
 - Four train-gear limit switches (16 contacts)
- Special requirements

Information Required for Sizing Pneumatic Actuators

- Valve type: Saf-T-Seal
- Size: pipe size x bore size
- Pressure class
- Actual working pressure at which valve will be operated (psi)
- Available gas pressure to power motor drive: psi
- Top-mounted or side-mounted
- Closing time in seconds
- Maximum differential pressure (psi)
- Type and make of actuator required
- Accessories
- Special requirements

PNEUMATIC DIAPHRAGM ACTUATOR

MA 12 Series

For use with 2", 3" and 4"
(50 mm, 80 mm and 100 mm)
nominal gate valves
(Family Group Code Y55012).

Design Advantages

Stronger Actuator Mounting Arrangement

Unlike other designs, the mounting bolts on Cameron's actuators are positioned parallel to the centerline of the actuator, which loads the mounting bolts in tension. This design is not subject to bending or shear forces. This means it can withstand greater separation forces than other actuators on the market.

Corrosion-Resistant Materials

Cameron's Saf-T-Gard diaphragm actuators are manufactured to NACE MR0175. In addition, all non-stainless components are coated with Xylan to increase corrosion resistance.

Superior Diaphragm Design

Cameron's diaphragm material is stronger than most designs currently on the market, resulting in extended service life and higher operating pressures. Unique sealing grooves provide additional grip and improve the outer seal of the diaphragm housing.

Flexible Actuator Orientation

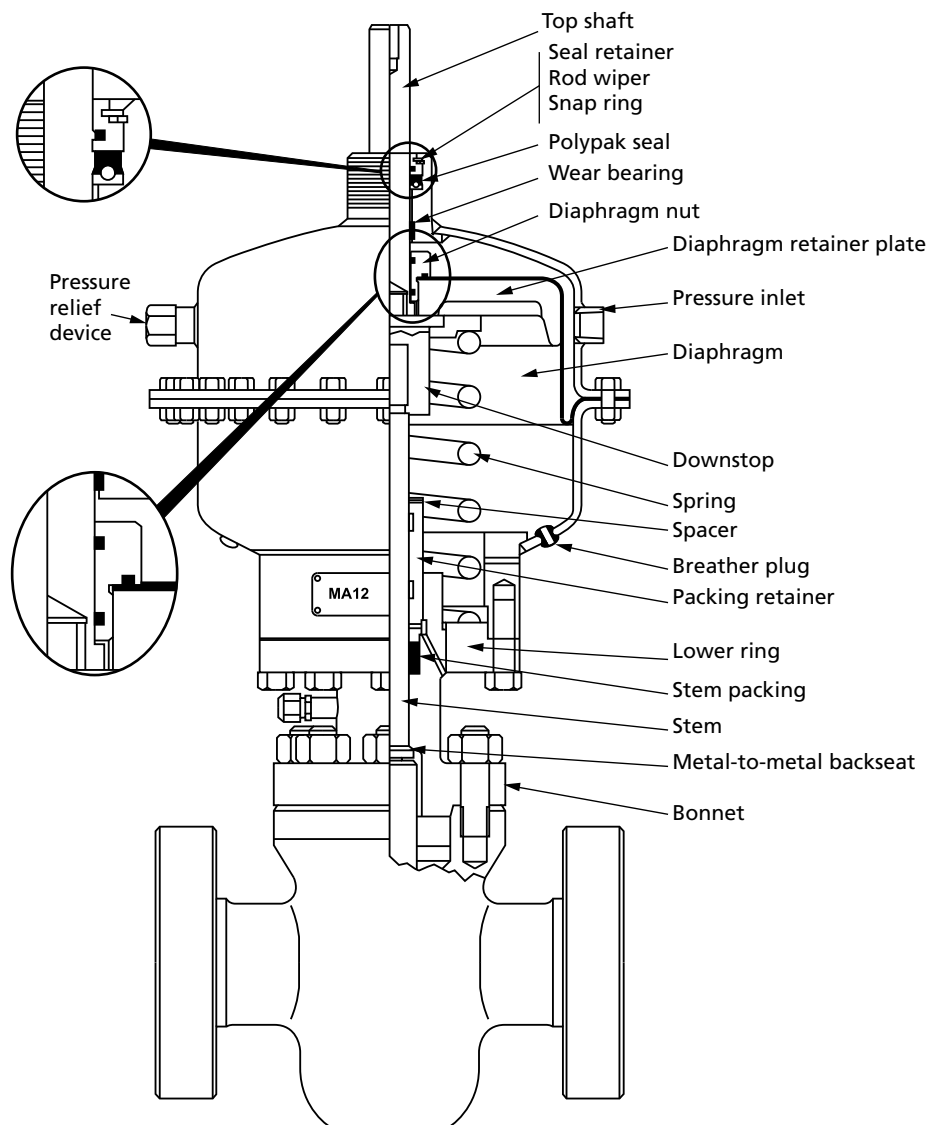
Connecting misaligned components with rigid tubing can be time-consuming and can induce high stress into the tubing connections. The MA lower ring is threaded to the bonnet, thus allowing rotation of the actuator to accommodate precise alignment.

Description

Cameron's Saf-T-Gard diaphragm actuator was developed by using the quality features of field proven products and then combining them with innovative technology. Particular attention has been given to safety, ease of maintenance and cost of manufacturing.

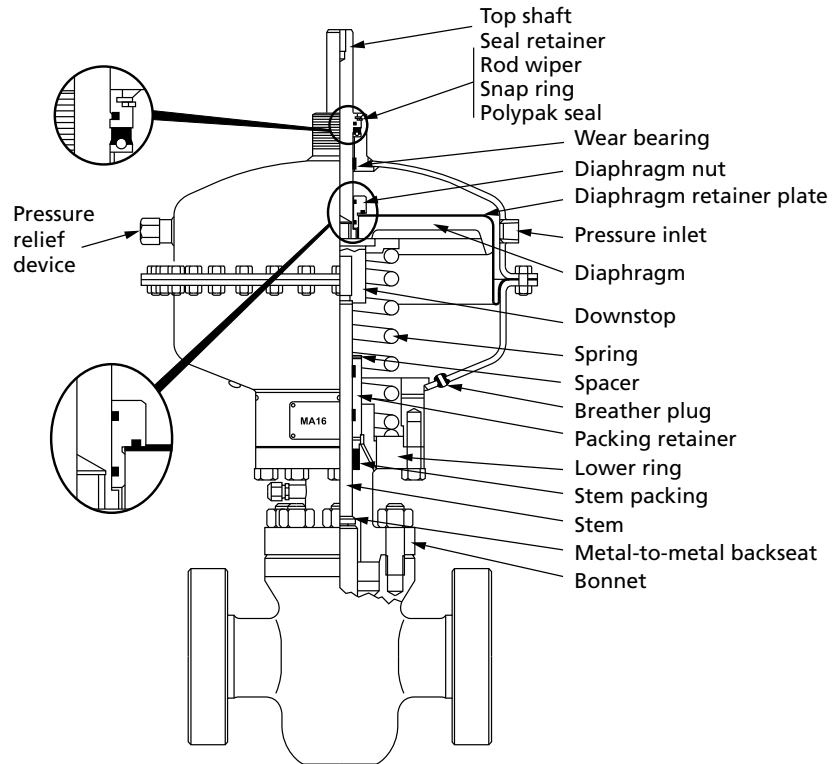
Designed for use with all manufacturers' gate valves in nominal sizes of 2" to 6" (50 mm to 150 mm), its simple design and operating principle helps to avoid most of the problems commonly associated with piston type actuators such as galling, misalignment, distortion and O-ring failures.

The Saf-T-Gard diaphragm actuators are interchangeable with other models in the product line, which reduces the amount of spare parts necessary for maintenance.



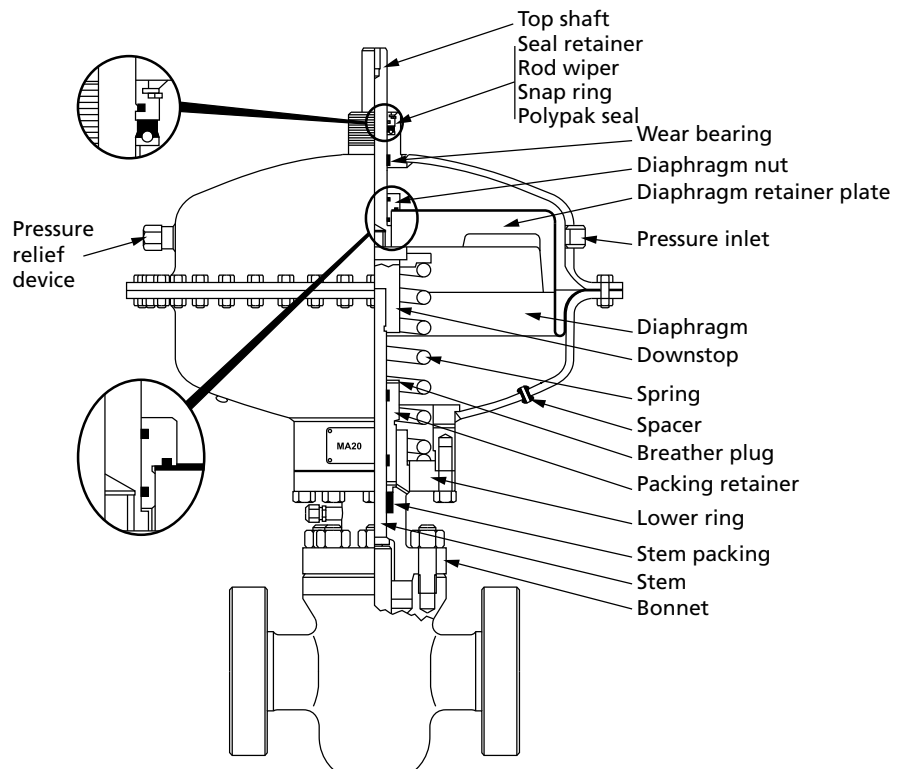
MA 16 Series

For use with 2", 3", 4" and 5" (50 mm, 80 mm, 100 mm and 125 mm) nominal gate valves (Family Group Code Y55016).



MA 20 Series

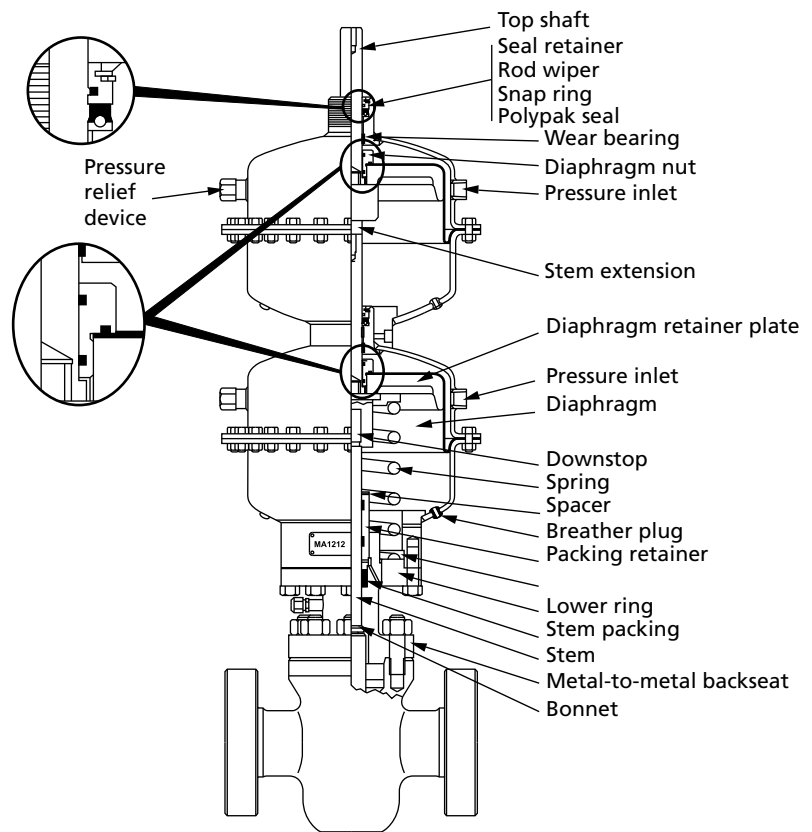
For use with 2", 3", 4", 5" and 6" (50 mm, 80 mm, 100 mm, 125 mm and 150 mm) nominal gate valves (Family Group Code Y55020).



MA 1212 Series

For use with 2", 3" and 4"
(50 mm, 80 mm and 100 mm)
nominal gate valves
(Family Group Code Y55012).

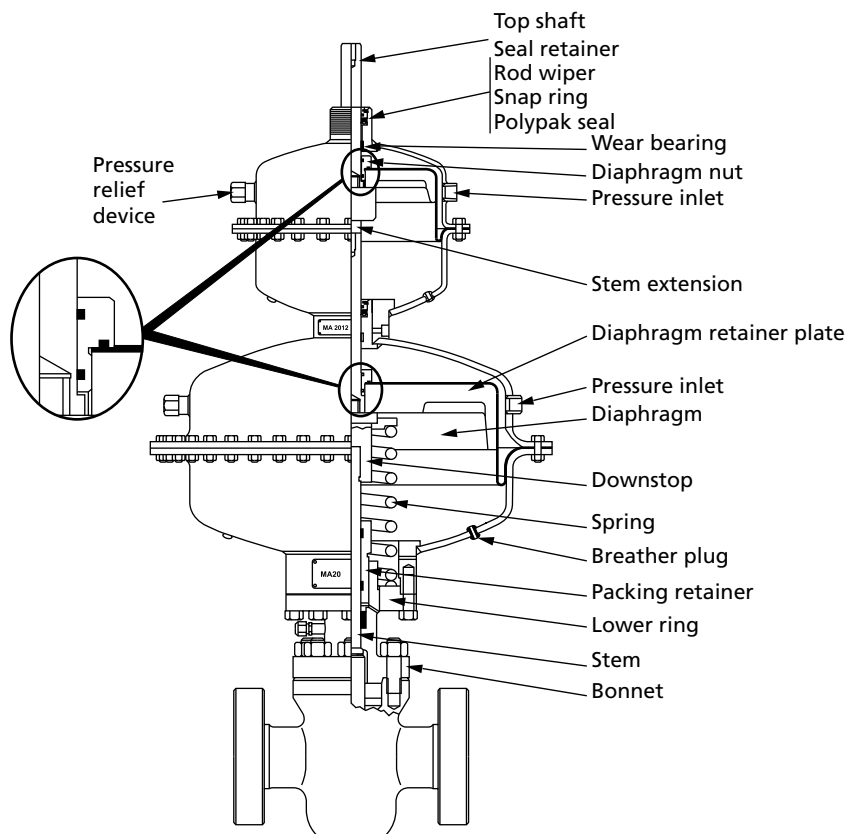
The MA 1212 series doubles
the area affected by applied
control pressure.



MA 2012 Series

For use with 2", 3" and 4"
(50 mm, 80 mm and 100 mm)
nominal gate valves
(Family Group Code Y55020).

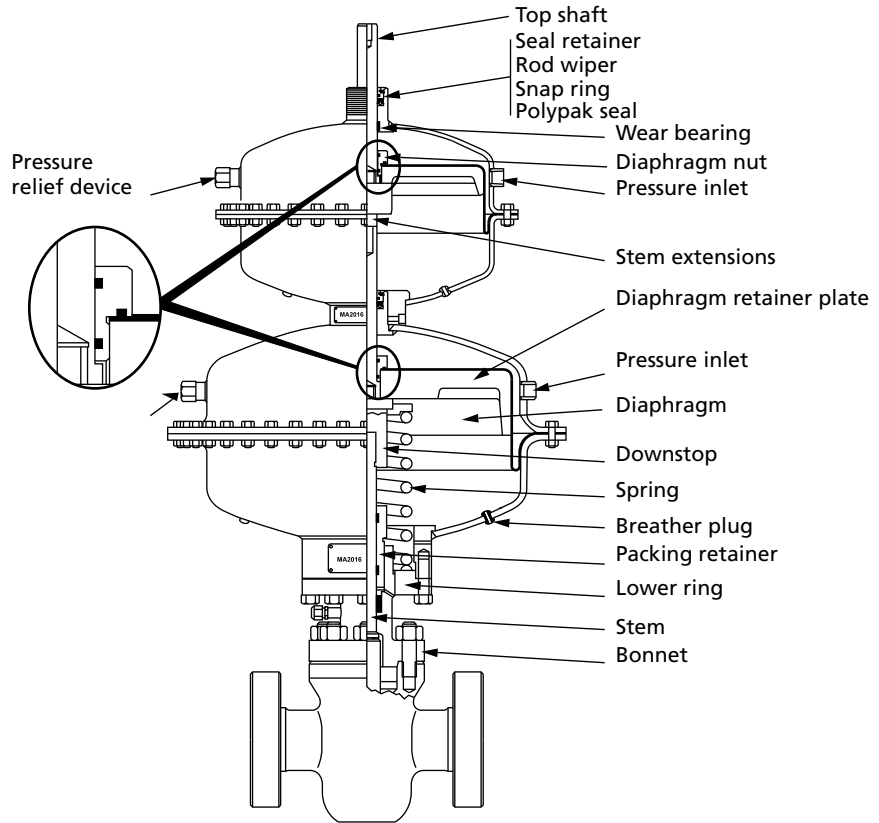
The MA 2012 series increases
the area affected by applied
control pressure.



MA 2016 Series

For use with 2", 3", 4" and 6" (50 mm, 80 mm, 100 mm and 150 mm) nominal gate valves (Family Group Code Y55020).

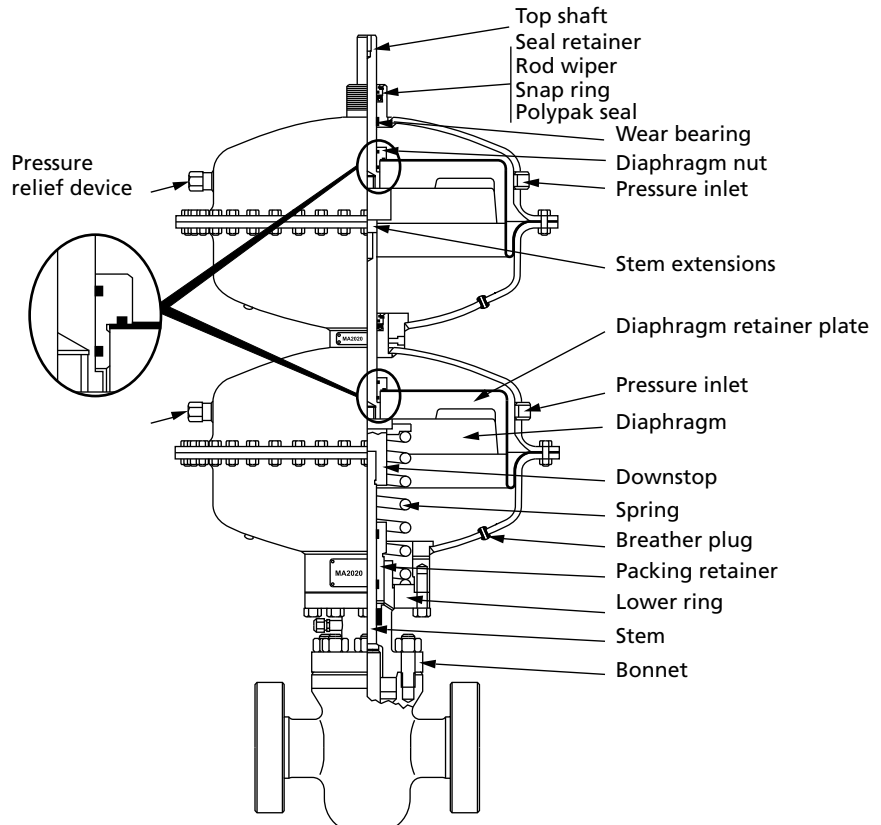
The MA 2016 series increases the area affected by applied control pressure.



MA 2020 Series

For use with 2", 3", 4", 5", 6" and 8" (50 mm, 80 mm, 100 mm, 125 mm, 150 mm and 200 mm) nominal gate valves (Family Group Code Y55020).

The MA 2020 series increases the area affected by applied control pressure.



PNEUMATIC PISTON ACTUATOR

MP 13 Series

For use with 2", 3" and 4"
(50 mm, 80 mm and 100 mm)
nominal gate valves
(Family Group Code Y55013).

Description

Cameron's pneumatic piston actuator series is designed for use with all manufacturers' gate valves in nominal sizes of 2" to 4" (50 mm to 100 mm). Its remarkably simple design and operating principle make this piston actuator suitable for a variety of applications. Cameron's piston actuators are interchangeable and very versatile because they operate with many types of supply gas, compressed air, nitrogen or well gas.

Design Advantages

Stronger Actuator Mounting Arrangement

Unlike other designs, the mounting bolts on Cameron's actuators are positioned parallel to the centerline of the actuator, which loads the mounting bolts in tension. This design is not subject to bending and shear forces. This means it can withstand greater separation forces than other actuators on the market.

Corrosion-Resistant Materials

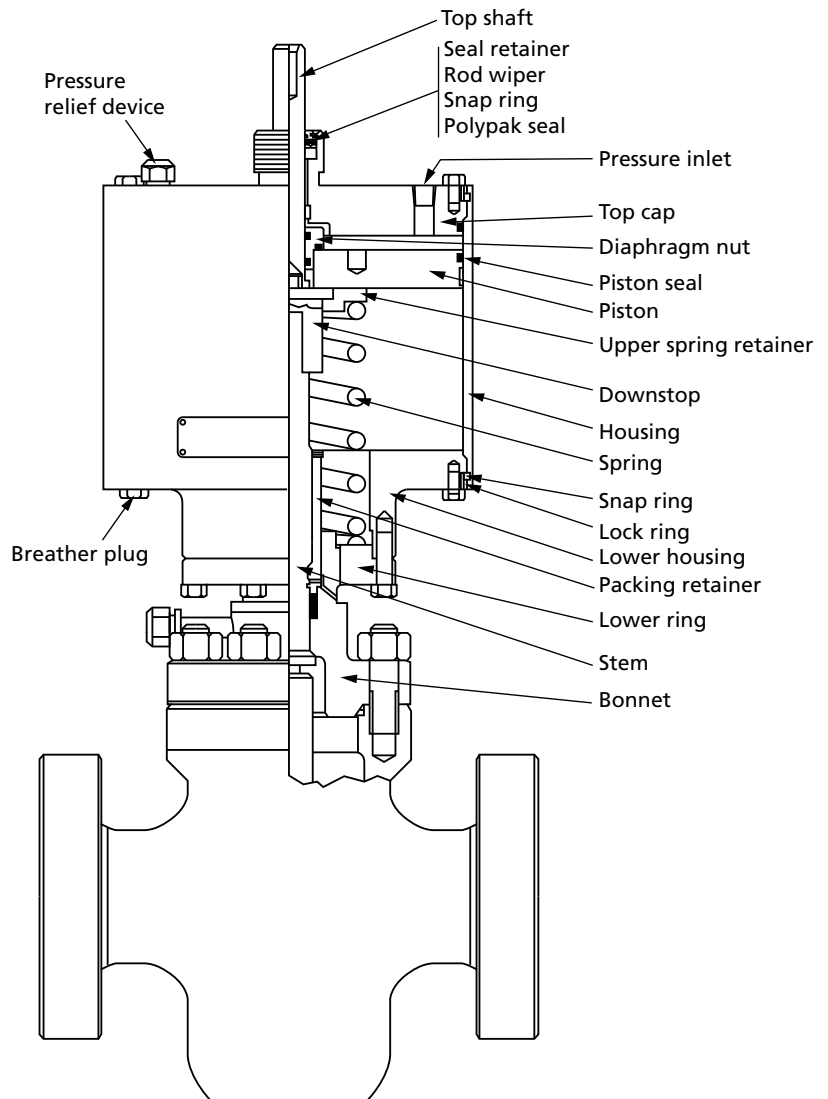
Cameron's piston actuators are manufactured to NACE MR0175. In addition, all non-stainless components are coated with Xylan to increase corrosion resistance.

Superior Diaphragm Design

Cameron's piston actuators utilize a single-piece stainless steel snap ring to facilitate easy cylinder removal. The dynamic piston has a large wear bearing that reduces any internal metal-to-metal contact.

Flexible Actuator Orientation

Connecting misaligned components with rigid tubing can be time-consuming and can induce high stress into the tubing connections. The MA lower ring is threaded to the bonnet, thus allowing rotation of the actuator to accommodate precise alignment.



OPERATING SIZE REQUIREMENTS

Model M – 2” to 4” (50 mm to 100 mm) ASME Classes 150 to 1500

| Valve Size in. (mm) | ASME Class | ASME Working Pressure (psig) | Stem Thread | | | Recommended Operating Thrust (lbf) | Recommended Operating Torque (ft-lbf) | Block-and-Bleed Thrust (lbf) | Block-and-Bleed Torque (ft-lbf) | Maximum Allowable Thrust (lbf) | Maximum Allowable Torque (ft-lbf) | Total Stem Travel in. (mm) | Stem Nut Turns-to-Open Valve |
|---------------------|------------|------------------------------|-------------|-----------|----------|------------------------------------|---------------------------------------|------------------------------|---------------------------------|--------------------------------|-----------------------------------|----------------------------|------------------------------|
| | | | Size in. | Pitch in. | Lead in. | | | | | | | | |
| 2 (50) | 150 | 290 | 0.875 | 0.167 | 0.167 | 457 | 3 | 535 | 4 | 12,597 | 93 | 2.63 (67) | 15.8 |
| 2 (50) | 300 | 750 | 0.875 | 0.167 | 0.167 | 1183 | 9 | 1383 | 10 | 12,597 | 93 | 2.63 (67) | 15.8 |
| 2 (50) | 600 | 1500 | 0.875 | 0.167 | 0.167 | 2366 | 17 | 2766 | 20 | 12,597 | 93 | 2.63 (67) | 15.8 |
| 2 (50) | 900 | 2250 | 0.875 | 0.167 | 0.167 | 3549 | 26 | 4149 | 30 | 12,597 | 93 | 2.63 (67) | 15.8 |
| 2 (50) | 1500 | 3750 | 0.875 | 0.167 | 0.167 | 5914 | 43 | 6915 | 51 | 12,597 | 93 | 2.63 (67) | 15.8 |
| 3 (80) | 150 | 290 | 1.000 | 0.200 | 0.200 | 803 | 7 | 1115 | 9 | 16,027 | 136 | 4.03 (102) | 20.2 |
| 3 (80) | 300 | 750 | 1.000 | 0.200 | 0.200 | 2078 | 18 | 2884 | 25 | 16,027 | 136 | 4.03 (102) | 20.2 |
| 3 (80) | 600 | 1500 | 1.000 | 0.200 | 0.200 | 4155 | 35 | 5769 | 49 | 16,027 | 136 | 4.03 (102) | 20.2 |
| 3 (80) | 900 | 2250 | 1.000 | 0.200 | 0.200 | 6233 | 53 | 8653 | 74 | 16,027 | 136 | 4.03 (102) | 20.2 |
| 3 (80) | 1500 | 3750 | 1.000 | 0.200 | 0.200 | 10,388 | 88 | 14,422 | 123 | 16,027 | 136 | 4.03 (102) | 20.2 |
| 4 (100) | 150 | 290 | 1.250 | 0.250 | 0.250 | 1327 | 14 | 1783 | 19 | 25,442 | 271 | 4.88 (124) | 19.5 |
| 4 (100) | 300 | 750 | 1.250 | 0.250 | 0.250 | 3432 | 37 | 4610 | 49 | 25,442 | 271 | 4.88 (124) | 19.5 |
| 4 (100) | 600 | 1500 | 1.250 | 0.250 | 0.250 | 6864 | 73 | 9221 | 98 | 25,442 | 271 | 4.88 (124) | 19.5 |
| 4 (100) | 900 | 2250 | 1.250 | 0.250 | 0.250 | 10,297 | 110 | 13,831 | 147 | 25,442 | 271 | 4.88 (124) | 19.5 |
| 4 (100) | 1500 | 3750 | 1.250 | 0.250 | 0.250 | 17,161 | 183 | 23,052 | 245 | 25,442 | 271 | 4.88 (124) | 19.5 |

Model C6B – 6” to 12” (150 mm to 300 mm) ASME Classes 600 to 900

| Valve Size in. (mm) | ASME Class | ASME Working Pressure (psig) | Stem Thread | | | Recommended Operating Thrust (lbf) | Recommended Operating Torque (ft-lbf) | Block-and-Bleed Thrust (lbf) | Block-and-Bleed Torque (ft-lbf) | Maximum Allowable Thrust (lbf) | Maximum Allowable Torque (ft-lbf) | Total Stem Travel in. (mm) | Stem Nut Turns-to-Open Valve |
|---------------------|------------|------------------------------|-------------|-----------|----------|------------------------------------|---------------------------------------|------------------------------|---------------------------------|--------------------------------|-----------------------------------|----------------------------|------------------------------|
| | | | Size in. | Pitch in. | Lead in. | | | | | | | | |
| 6 (150) | 600 | 1500 | 1.250 | 0.250 | 0.250 | 9839 | 105 | 14,307 | 152 | 26,783 | 283 | 7.25 (184) | 29 |
| 6 (150) | 900 | 2250 | 1.250 | 0.250 | 0.250 | 14,758 | 157 | 21,460 | 228 | 27,685 | 335 | 7.25 (184) | 29 |
| 8 (200) | 600 | 1500 | 1.750 | 0.250 | 0.250 | 17,099 | 237 | 21,507 | 298 | 45,807 | 557 | 9.25 (235) | 37 |
| 8 (200) | 900 | 2250 | 1.750 | 0.250 | 0.250 | 25,649 | 355 | 32,261 | 447 | 49,637 | 604 | 9.25 (235) | 37 |
| 10 (250) | 600 | 1500 | 1.750 | 0.250 | 0.250 | 23,859 | 330 | 29,078 | 403 | 46,726 | 569 | 11.25 (286) | 45 |
| 10 (250) | 900 | 2250 | 1.750 | 0.250 | 0.250 | 35,789 | 495 | 43,617 | 604 | 57,297 | 697 | 11.25 (286) | 45 |
| 12 (300) | 600 | 1500 | 1.750 | 0.250 | 0.250 | 32,032 | 443 | 41,381 | 573 | 69,033 | 840 | 13.31 (338) | 53 |
| 12 (300) | 900 | 2250 | 2.000 | 0.250 | 0.250 | 49,816 | 770 | 62,072 | 959 | 80,522 | 1109 | 13.31 (338) | 53 |
| 14 (350) | 150 | 290 | 1.500 | 1.390 | 0.400 | 7149 | 104 | 16,674 | 242 | 9053 | 131 | 14.75 (375) | 36.875 |
| 14 (350) | 600 | 1500 | 2.000 | 1.864 | 0.500 | 39,183 | 741 | 64,831 | 1226 | 46,824 | 886 | 14.75 (375) | 29.50 |
| 16 (400) | 150 | 290 | 1.500 | 1.390 | 0.400 | 9177 | 133 | 27,543 | 399 | 11,448 | 166 | 16.75 (425) | 41.875 |
| 16 (400) | 600 | 1500 | 2.000 | 1.864 | 0.500 | 49,676 | 940 | 69,091 | 1307 | 59,215 | 1120 | 16.75 (425) | 33.50 |
| 18 (450) | 150 | 290 | 1.500 | 1.390 | 0.400 | 11,594 | 168 | 22,596 | 327 | 13,960 | 202 | 18.50 (470) | 46.25 |
| 18 (450) | 600 | 1500 | 2.250 | 2.113 | 0.500 | 63,501 | 1303 | 98,175 | 2014 | 72,208 | 1481 | 18.75 (470) | 37.50 |
| 20 (500) | 150 | 290 | 1.750 | 1.614 | 0.500 | 14,380 | 249 | 31,621 | 548 | 17,230 | 298 | 20.75 (527) | 41.50 |
| 20 (500) | 600 | 1500 | 2.750 | 2.536 | 0.500 | 79,986 | 1858 | 145,272 | 3375 | 89,122 | 2070 | 20.75 (527) | 41.50 |
| 24 (600) | 150 | 290 | 2.000 | 1.864 | 0.500 | 20,606 | 390 | 21,390 | 405 | 26,347 | 498 | 25.125 (638) | 50.25 |
| 24 (600) | 600 | 1500 | 3.250 | 3.036 | 0.800 | 114,674 | 3510 | 219,495 | 6718 | 136,279 | 4171 | 25.00 (635) | 31.25 |

- Note:
1. Recommended operating thrust and torque are the loads required to open or close the valve with full differential pressure across the gate. The operator should be sized for these values.
 2. Maximum allowable thrust and torque values are maximum allowable loads of the valve.
 3. When block-and-bleed or double block-and-bleed service is specified, operators should be sized for these values.
 4. Unless otherwise stated, handwheel rim pull for manual and motor operators shall not exceed 120 lb (54 kg).
 5. All torque and thrust values are based on maximum working pressure at ambient temperature.

Models C6, C2B, C2C – 6" to 36" (150 mm to 900 mm) ASME Classes 150 to 900

| Valve Size in. (mm) | ASME Class | ASME Working Pressure (psig) | Stem Thread | | | Recommended Operating Thrust (lbf) | Recommended Operating Torque (ft-lbf) | Maximum Allowable Thrust (lbf) | Maximum Allowable Torque (ft-lbf) | Block-and-Bleed Thrust (lbf) | Block-and-Bleed Torque (ft-lbf) | Total Stem Travel in. (mm) | Stem Nut Turns-to-Open Valve |
|---------------------|------------|------------------------------|-------------|-----------|----------|------------------------------------|---------------------------------------|--------------------------------|-----------------------------------|------------------------------|---------------------------------|----------------------------|------------------------------|
| | | | Size in. | Pitch in. | Lead in. | | | | | | | | |
| 6 (150) | 150 | 290 | 1.250 | 0.250 | 0.250 | 1902 | 18 | 31,785 | 307 | 2762 | 27 | 7.25 (184) | 29 |
| 6 (150) | 300 | 750 | 1.250 | 0.250 | 0.250 | 4919 | 47 | 31,785 | 307 | 7143 | 69 | 7.25 (184) | 29 |
| 6 (150) | 600 | 1500 | 1.250 | 0.250 | 0.250 | 9836 | 95 | 31,785 | 307 | 14,285 | 138 | 7.25 (184) | 29 |
| 6 (150) | 900 | 2250 | 1.250 | 0.250 | 0.250 | 14,757 | 142 | 31,785 | 307 | 21,428 | 207 | 7.25 (184) | 29 |
| 8 (200) | 150 | 290 | 1.500 | 0.250 | 0.250 | 3106 | 34 | 52,036 | 574 | 4153 | 46 | 9.25 (235) | 37 |
| 8 (200) | 300 | 750 | 1.500 | 0.250 | 0.250 | 8033 | 89 | 52,036 | 574 | 10,740 | 119 | 9.25 (235) | 37 |
| 8 (200) | 600 | 1500 | 1.500 | 0.250 | 0.250 | 16,067 | 177 | 52,036 | 574 | 21,481 | 237 | 9.25 (235) | 37 |
| 8 (200) | 900 | 2250 | 1.500 | 0.250 | 0.250 | 24,100 | 266 | 52,036 | 574 | 32,221 | 356 | 9.25 (235) | 37 |
| 10 (250) | 150 | 290 | 1.500 | 0.250 | 0.250 | 4413 | 49 | 52,036 | 574 | 5817 | 64 | 11.25 (286) | 45 |
| 10 (250) | 300 | 750 | 1.500 | 0.250 | 0.250 | 11,413 | 126 | 52,036 | 574 | 15,045 | 168 | 11.25 (286) | 45 |
| 10 (250) | 600 | 1500 | 1.500 | 0.250 | 0.250 | 22,828 | 252 | 52,036 | 574 | 30,090 | 332 | 11.25 (286) | 45 |
| 10 (250) | 900 | 2250 | 1.500 | 0.250 | 0.250 | 34,239 | 378 | 52,036 | 574 | 45,135 | 498 | 11.25 (286) | 45 |
| 12 (300) | 150 | 290 | 1.500 | 0.250 | 0.250 | 5993 | 66 | 52,036 | 574 | 7755 | 86 | 13.25 (337) | 53 |
| 12 (300) | 300 | 750 | 1.500 | 0.250 | 0.250 | 15,500 | 171 | 52,036 | 574 | 20,056 | 221 | 13.25 (337) | 53 |
| 12 (300) | 600 | 1500 | 1.500 | 0.250 | 0.250 | 30,999 | 342 | 52,036 | 574 | 40,113 | 443 | 13.25 (337) | 53 |
| 12 (300) | 900 | 2250 | 1.750 | 0.250 | 0.250 | 48,045 | 597 | 77,223 | 960 | 60,169 | 748 | 13.25 (337) | 53 |
| 14 (350) | 150 | 290 | 1.500 | 0.200 | 0.400 | 7149 | 95 | 54,521 | 722 | 9063 | 120 | 14.69 (373) | 36.73 |
| 14 (350) | 300 | 750 | 2.000 | 0.250 | 0.500 | 19,594 | 338 | 101,611 | 1754 | 23,439 | 405 | 14.69 (373) | 29.38 |
| 14 (350) | 600 | 1500 | 2.000 | 0.250 | 0.500 | 39,187 | 676 | 101,611 | 1754 | 46,878 | 809 | 14.69 (373) | 29.38 |
| 14 (350) | 900 | 2250 | 2.250 | 0.250 | 0.500 | 60,540 | 1129 | 135,875 | 2533 | 70,547 | 1315 | 14.69 (373) | 29.38 |
| 16 (400) | 150 | 290 | 1.500 | 0.200 | 0.400 | 9178 | 122 | 54,521 | 722 | 11,439 | 152 | 16.69 (424) | 41.73 |
| 16 (400) | 300 | 750 | 1.500 | 0.200 | 0.400 | 23,735 | 314 | 54,521 | 722 | 29,584 | 392 | 16.69 (424) | 41.73 |
| 16 (400) | 600 | 1500 | 2.000 | 0.250 | 0.500 | 49,680 | 857 | 101,611 | 1754 | 59,168 | 1021 | 16.69 (424) | 33.38 |
| 16 (400) | 900 | 2250 | 2.750 | 0.400 | 0.800 | 81,146 | 2040 | 180,794 | 4546 | 88,752 | 2232 | 16.69 (424) | 20.86 |
| 18 (450) | 150 | 290 | 1.500 | 0.200 | 0.400 | 11,594 | 154 | 54,521 | 722 | 13,974 | 185 | 18.44 (468) | 46.10 |
| 18 (450) | 300 | 750 | 1.750 | 0.250 | 0.500 | 30,500 | 484 | 72,304 | 1148 | 36,139 | 574 | 18.69 (475) | 37.38 |
| 18 (450) | 600 | 1500 | 2.250 | 0.250 | 0.500 | 63,504 | 1184 | 135,875 | 2533 | 72,278 | 1347 | 18.69 (475) | 37.38 |
| 18 (450) | 900 | 2250 | 2.750 | 0.400 | 0.800 | 99,884 | 2512 | 180,794 | 4546 | 108,418 | 2726 | 18.69 (475) | 23.36 |
| 20 (500) | 150 | 290 | 1.750 | 0.250 | 0.500 | 14,381 | 228 | 72,304 | 1148 | 17,245 | 274 | 20.75 (527) | 41.50 |
| 20 (500) | 300 | 750 | 2.000 | 0.250 | 0.500 | 37,782 | 652 | 101,611 | 1754 | 44,600 | 770 | 20.75 (527) | 41.50 |
| 20 (500) | 600 | 1500 | 2.750 | 0.400 | 0.800 | 79,982 | 2011 | 180,794 | 4546 | 89,200 | 2243 | 20.75 (527) | 25.94 |
| 20 (500) | 900 | 2250 | 3.000 | 0.400 | 0.800 | 122,624 | 3252 | 225,696 | 5986 | 133,801 | 3549 | 20.75 (527) | 25.94 |
| 22 (550) | 150 | 290 | 1.750 | 0.250 | 0.500 | 17,243 | 274 | 72,304 | 1148 | 21,470 | 341 | 22.94 (583) | 45.88 |
| 22 (550) | 300 | 750 | 2.250 | 0.250 | 0.500 | 45,845 | 855 | 135,875 | 2533 | 55,526 | 1035 | 22.94 (583) | 45.88 |
| 22 (550) | 600 | 1500 | 3.000 | 0.400 | 0.800 | 96,549 | 2561 | 225,696 | 5986 | 111,051 | 2945 | 22.94 (583) | 28.68 |
| 24 (600) | 150 | 290 | 2.000 | 0.250 | 0.500 | 20,605 | 356 | 101,611 | 1754 | 26,366 | 455 | 25.13 (638) | 50.26 |
| 24 (600) | 300 | 750 | 2.250 | 0.250 | 0.500 | 53,952 | 1006 | 135,875 | 2533 | 68,188 | 1271 | 25.13 (638) | 50.26 |
| 24 (600) | 600 | 1500 | 3.250 | 0.400 | 0.800 | 114,677 | 3200 | 275,560 | 7689 | 138,375 | 3806 | 25.13 (638) | 31.41 |
| 24 (600) | 900 | 2250 | 3.750 | 0.400 | 0.800 | 178,422 | 5474 | 390,393 | 11,977 | 204,563 | 6276 | 25.13 (638) | 31.41 |
| 30 (750) | 150 | 290 | 2.250 | 0.250 | 0.500 | 31,396 | 585 | 135,875 | 2533 | 42,018 | 783 | 31.25 (794) | 62.50 |
| 30 (750) | 300 | 750 | 3.000 | 0.400 | 0.800 | 83,626 | 2218 | 225,698 | 5986 | 108,866 | 2882 | 31.25 (794) | 39.06 |
| 30 (750) | 600 | 1500 | 3.750 | 0.400 | 0.800 | 173,437 | 5321 | 390,393 | 11,877 | 217,333 | 6668 | 31.25 (794) | 39.06 |
| 36 (900) | 150 | 290 | 2.750 | 0.400 | 0.800 | 44,184 | 1111 | 180,794 | 4546 | 57,303 | 1441 | 36.88 (937) | 46.10 |
| 36 (900) | 300 | 750 | 3.250 | 0.400 | 0.800 | 116,110 | 3240 | 275,560 | 7889 | 148,199 | 4135 | 36.88 (937) | 46.10 |
| 36 (900) | 600 | 1500 | 4.250 | 0.400 | 0.800 | 241,350 | 8075 | 525,088 | 17,568 | 296,397 | 9317 | 36.88 (937) | 46.10 |

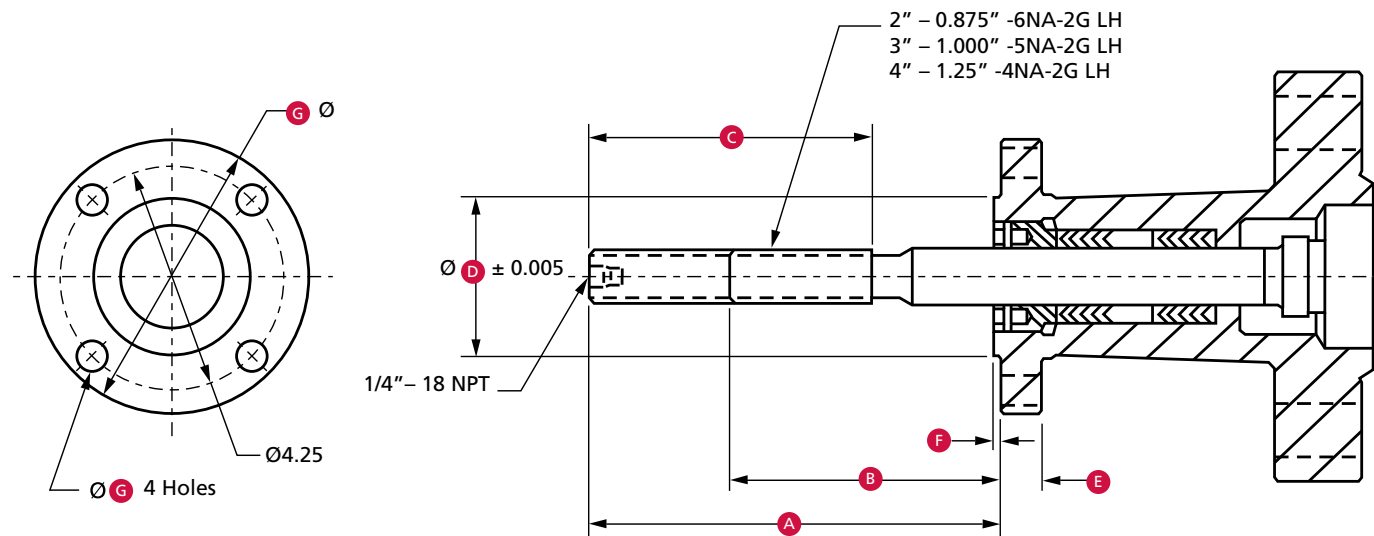
- Note:
1. Use recommended operating thrust and torque for sizing bevel gear operators.
 2. Use block-and-bleed thrust and torque for sizing power operators (electric, gas, hydraulic and more).
 3. Maximum operating thrust and torque are the maximum allowable for the valve.

TOPWORKS

Model M

Sizes 2" to 4" (50 mm to 100 mm)

Classes 150, 600, 900 and 1500



Model M

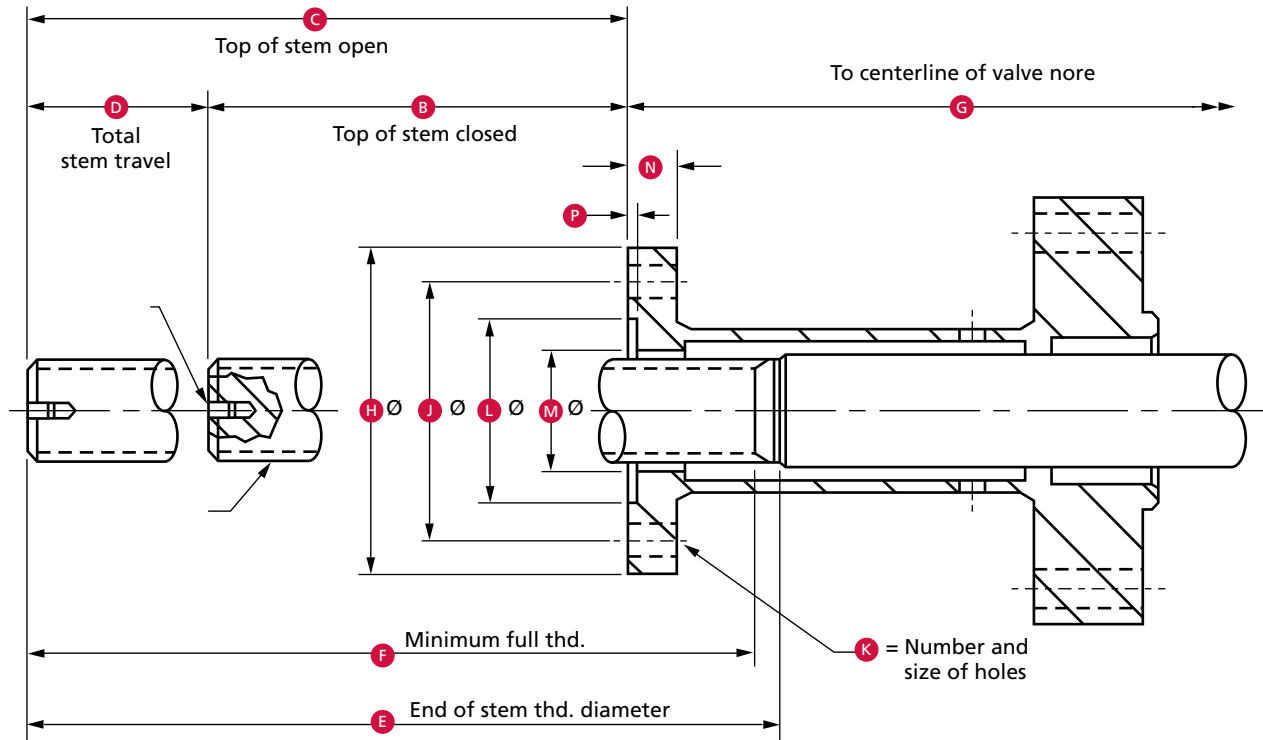
| Size in. (mm) | ASME Class | Open A | Closed | | | | | | | |
|------------------|-----------------|-------------------|-------------------|------------------|------------------|------------------|----------------|------------------|------------------|---------------|
| | | | B | C | D | E | F | G | H | J |
| 2 (50) | 600 and 1500 | 9.25 (234.95) | 6.56 (166.62) | 6.44 (163.58) | 2.808 (71.32) | 0.63 (16.00) | 0.12 (3.05) | 5.00 (127.00) | 4.00 (101.60) | 4 (101.60) |
| 3 (80) | 150 and 1500 | 12.00 (304.80) | 7.97 (202.44) | 7.75 (196.85) | 2.808 (71.32) | 0.63 (16.00) | 0.12 (3.05) | 5.00 (127.00) | 4.00 (101.60) | 4 (101.60) |
| 4 (100) | 150 and 600 | 15.00 (381.00) | 10.12 (257.05) | 9.95 (252.73) | 3.308 (84.02) | 0.625 (15.88) | 0.12 (3.05) | 5.25 (133.35) | 4.25 (107.95) | 4 (101.60) |
| 4 (100) | 900 and 1500 | 13.63 (346.20) | 8.75 (222.25) | 9.95 (252.73) | 3.308 (84.02) | 1.00 (25.40) | 0.12 (3.05) | 6.00 (152.40) | 5.00 (127.00) | 4 (101.60) |

TOPWORKS

Model C6

Sizes 6" to 12" (150 mm to 300 mm)

Class 150



Model C6

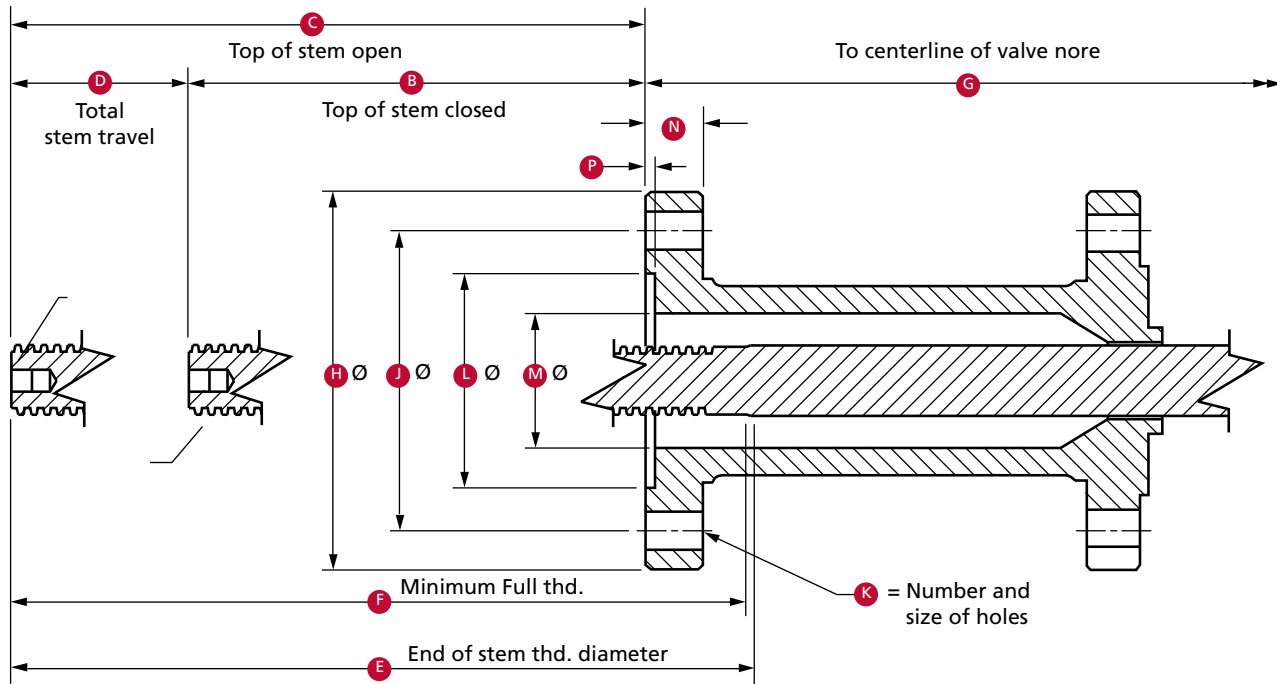
| Size in. (mm) | Series | ISO FLG | A -NA-2G-L.H. Single Lead Thd. | Closed | | Open | | | | | | | | | | |
|------------------|--------|------------|--------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|------------------|------------------|--------------------------|--|-----------------|-----------------|------------------------------------|
| | | | | B | C | D | E | F | G | H | J | K | L | M | N | P |
| 6 (150) | 150/3C | F14 | 1-1/2 - 0.250P - 0.250L | 8.50 (215.90) | 15.75 (400.05) | 7.25 (184.15) | 16.83 (427.48) | 16.31 (414.27) | 27.38 (695.45) | 6.88 (174.75) | 5.50 (139.70) | 4 - 0.658 (4 - 16.71) | 3.942 (100.127) 3.952 (100.381) | 2.62 (66.55) | 1.00 (25.40) | 0.169 (4.29) 0.183 (4.65) |
| 8 (200) | 150/3C | F14 | 1-1/2 - 0.250P - 0.250L | 10.19 (258.83) | 19.44 (493.78) | 9.25 (234.95) | 20.58 (522.73) | 20.06 (509.52) | 35.44 (900.18) | 6.88 (174.75) | 5.50 (139.70) | 4 - 0.688 (4 - 17.48) | 3.942 (100.127) 3.952 (100.381) | 2.62 (66.55) | 1.00 (25.40) | 0.169 (4.29) 0.183 (4.65) |
| 10 (350) | 150/3C | F14 | 1-1/2 - 0.250P - 0.250L | 8.19 (208.03) | 19.44 (493.78) | 11.25 (285.75) | 20.58 (522.73) | 20.06 (509.52) | 38.50 (977.90) | 6.88 (174.75) | 5.50 (139.70) | 4 - 0.688 (4 - 17.48) | 3.942 (100.127) 3.952 (100.381) | 2.62 (66.55) | 1.00 (25.40) | 0.169 (4.29) 0.183 (4.65) |
| 12 (300) | 150/3C | F14 | 1-1/2 - 0.250P - 0.250L | 9.69 (246.13) | 23.00 (584.20) | 13.31 (338.07) | 24.20 (614.68) | 23.69 (601.73) | 44.00 (1117.60) | 6.88 (174.75) | 5.50 (139.70) | 4 - 0.688 (4 - 17.48) | 3.942 (100.127) 3.952 (100.381) | 2.62 (66.55) | 1.00 (25.40) | 0.169 (4.29) 0.183 (4.65) |

TOPWORKS

Model C6B

Sizes 6" to 12" (150 mm to 600 mm)

Classes 150, 600 and 900



Model C6B

| Size in. (mm) | Class | ISO FLG | ACME Stem A | Closed B | Open C | D | E | F | G | H | J | K | L | M | N | P |
|---------------------|----------------|------------|----------------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|-------------------|--------------------|--------------------------|--------------------|------------------|-----------------|------------------|
| 6 (150) | 600 and 900 | F14 | 1-1/4 - 0.250P - 0.250L | 7.83 (198.88) | 10.02 (254.51) | 7.19 (182.63) | 16.69 (423.93) | 16.25 (412.75) | 28.06 (712.72) | 6.89 (175.01) | 5.512 (140.00) | 4 - 0.688 (4 - 17.48) | 3.945 (100.203) | 2.50 (63.50) | 1.03 (26.16) | 0.168 (4.267) |
| | | | | | | | | | | | | | 3.955 (100.457) | | | 0.188 (4.775) |
| 8 (200) | 600 and 900 | F14 | 1-3/4 - 0.250P - 0.250L | 10.17 (258.32) | 19.37 (492.00) | 9.20 (233.68) | 20.44 (519.18) | 20.00 (508.00) | 35.41 (899.41) | 6.89 (175.01) | 5.512 (140.00) | 4 - 0.688 (4 - 17.48) | 3.945 (100.203) | 2.50 (63.50) | 1.03 (26.16) | 0.168 (4.267) |
| | | | | | | | | | | | | | 3.955 (100.457) | | | 0.188 (4.775) |
| 10 (250) | 600 | F14 | 1-3/4 - 0.250P - 0.250L | 8.17 (207.52) | 19.37 (492.00) | 11.20 (284.48) | 20.44 (519.18) | 20.00 (508.00) | 38.47 (977.14) | 6.89 (175.01) | 5.512 (140.00) | 4 - 0.688 (4 - 17.48) | 3.945 (100.203) | 2.50 (63.50) | 1.03 (26.16) | 0.168 (4.267) |
| 10 (250) | 900 | F16 | 1-3/4 - 0.250P - 0.250L | 8.17 (207.52) | 19.37 (492.00) | 11.20 (284.48) | 20.44 (519.18) | 20.00 (508.00) | 38.47 (977.14) | 8.27 (210.06) | 6.496 (165.00) | 4 - 0.812 (4 - 20.62) | 5.240 (133.096) | 2.50 (63.50) | 1.50 (38.10) | 0.220 (5.588) |
| | | | | | | | | | | | | | 5.260 (133.604) | | | 0.240 (6.096) |
| 12 (300) | 600 | F16 | 1-3/4 - 0.250P - 0.250L | 9.61 (244.09) | 22.83 (579.88) | 13.22 (335.79) | 24.06 (611.12) | 23.62 (599.95) | 43.91 (1115.31) | 8.27 (210.06) | 6.496 (165.00) | 4 - 0.812 (4 - 20.62) | 5.240 (133.096) | 2.50 (63.50) | 1.50 (38.10) | 0.220 (5.588) |
| | | | | | | | | | | | | | 5.260 (133.604) | | | 0.240 (6.096) |
| 12 (300) | 900 | F16 | 2 - 0.250P - 0.250L | 9.55 (242.57) | 22.67 (575.82) | 13.12 (333.25) | 24.06 (611.12) | 23.62 (599.95) | 44.47 (1129.54) | 8.27 (210.06) | 6.496 (165.00) | 4 - 0.812 (4 - 20.62) | 5.240 (133.096) | 3.25 (82.55) | 1.50 (38.10) | 0.220 (5.588) |
| 14 (350) | 150 | FA14 | 1-1/2 - 0.200P - 0.400L | 10.68 (271.27) | 25.34 (643.64) | 14.66 (372.36) | 26.39 (670.31) | 25.69 (652.53) | 46.50 (1181.10) | 6.89 (175.01) | 5.512 (140.00) | 4 - 0.688 (4 - 17.48) | 3.945 (100.203) | 2.50 (63.50) | 1.03 (26.16) | 0.168 (4.267) |
| | | | | | | | | | | | | | 3.955 (100.457) | | | 0.188 (4.775) |
| 14 (350) | 600 | FA16 | 2 - 0.250P - 0.500L | 10.68 (271.27) | 25.34 (643.64) | 14.66 (372.36) | 27.27 (692.66) | 26.69 (677.93) | 49.75 (1263.65) | 8.25 (209.55) | 6.500 (165.10) | 4 - 0.812 (4 - 20.62) | 5.010 (127.254) | 2.88 (73.15) | 1.50 (38.10) | 0.220 (5.588) |
| | | | | | | | | | | | | | 5.020 (127.508) | | | 0.240 (6.096) |
| 16 (400) | 150 | FA14 | 1-1/2 - 0.200P - 0.400L | 10.38 (263.65) | 27.07 (687.58) | 16.69 (423.93) | 28.14 (714.76) | 27.56 (700.02) | 51.37 (1304.80) | 6.89 (175.01) | 5.512 (140.00) | 4 - 0.688 (4 - 17.48) | 3.945 (100.203) | 2.50 (63.50) | 1.03 (26.16) | 0.168 (4.267) |
| | | | | | | | | | | | | | 3.955 (100.457) | | | 0.188 (4.775) |
| 16 (400) | 600 | FA25 | 2 - 0.250P - 0.500L | 10.19 (258.83) | 28.86 (733.04) | 16.67 (423.42) | 28.20 (716.28) | 27.59 (700.79) | 53.56 (1360.42) | 11.50 (292.10) | 10.000 (254.00) | 8 - 0.688 (8 - 17.48) | 6.010 (152.654) | 3.12 (79.25) | 2.00 (50.80) | 0.220 (5.588) |
| | | | | | | | | | | | | | 6.020 (152.908) | | | 0.240 (6.096) |
| 18 (450) | 150 | FA14 | 1-1/2 - 0.200P - 0.400L | 11.68 (296.67) | 30.09 (764.29) | 18.41 (467.61) | 31.14 (790.96) | 27.56 (700.02) | 57.00 (1447.80) | 6.89 (175.01) | 5.512 (140.00) | 4 - 0.688 (4 - 17.48) | 3.945 (100.203) | 2.50 (63.50) | 1.03 (26.16) | 0.168 (4.267) |
| | | | | | | | | | | | | | 3.955 (100.457) | | | 0.188 (4.775) |
| 18 (450) | 600 | FA25 | 2-1/4 - 0.250P - 0.500L | 11.93 (303.02) | 30.62 (777.75) | 18.69 (474.73) | 32.39 (822.71) | 31.81 (807.97) | 60.19 (1528.83) | 11.50 (292.10) | 10.000 (254.00) | 8 - 0.688 (8 - 17.48) | 6.010 (152.654) | 3.00 (76.20) | 2.36 (59.94) | 0.220 (5.588) |
| | | | | | | | | | | | | | 6.020 (152.908) | | | 0.240 (6.096) |
| 20 (500) | 150 | FA14 | 1-3/4 - 0.250P - 0.500L | 10.97 (278.64) | 31.69 (804.93) | 20.72 (526.29) | 32.83 (833.88) | 32.25 (819.15) | 62.28 (1581.91) | 6.89 (175.01) | 5.512 (140.00) | 4 - 0.688 (4 - 17.48) | 3.945 (100.203) | 2.50 (63.50) | 1.03 (26.16) | 0.168 (4.267) |
| | | | | | | | | | | | | | 3.955 (100.457) | | | 0.188 (4.775) |
| 20 (500) | 600 | FA30 | 2-3/4 - 0.400P - 0.800L | 12.57 (319.28) | 33.30 (845.82) | 20.73 (526.54) | 34.88 (885.95) | 34.31 (872.24) | 65.67 (1668.02) | 13.62 (345.95) | 11.750 (298.45) | 8 - 0.875 (8 - 22.23) | 7.010 (178.054) | 3.50 (89.90) | 2.75 (69.85) | 0.220 (5.588) |
| | | | | | | | | | | | | | 7.020 (178.308) | | | 0.240 (6.096) |
| 24 (600) | 150 | FA14 | 2 - 0.250P - 0.500L | 11.03 (280.16) | 36.14 (917.96) | 25.11 (637.79) | 37.02 (940.31) | 36.44 (925.58) | 75.61 (1920.49) | 6.89 (175.01) | 5.512 (140.00) | 4 - 0.688 (4 - 17.48) | 3.945 (100.203) | 2.50 (63.50) | 1.03 (26.16) | 0.168 (4.267) |
| | | | | | | | | | | | | | 3.955 (100.457) | | | 0.188 (4.775) |
| 24 (600) | 600 | FA35 | 3-1/4 - 0.400P - 0.800L | 13.12 (333.25) | 38.26 (971.80) | 25.14 (638.56) | 39.95 (1014.73) | 39.38 (1000.25) | 80.00 (2032.00) | 16.12 (409.45) | 14.000 (355.60) | 8 - 1.120 (8 - 28.45) | 8.510 (216.154) | 4.50 (114.30) | 3.00 (76.20) | 0.223 (5.664) |
| | | | | | | | | | | | | | 8.520 (216.408) | | | 0.237 (6.020) |

FLOW COEFFICIENTS (C_v)

The following chart outlines the C_v for through-conduit gate valves having end-to-end dimensions and bore diameters in compliance with API 6D standards.

C_v is the flow of water through the valve at 1 psi pressure drop in gal/min. Since C_v is a calculated number, the actual value may vary.

| Valve Size in. (mm) | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 |
|------------------------|---------|---------|---------|---------|---------|--------|--------|
| 2 (50) | 476 | 432 | 378 | 378 | 337 | 337 | 218 |
| 3 x 2 (80 x 50) | - | - | 165 | 165 | 203 | 239 | - |
| 2-1/2 (65) | - | - | 682 | 682 | 558 | 558 | 305 |
| 3 (80) | 1358 | 1155 | 1053 | 1109 | 1072 | 966 | 474 |
| 4 x 3 (100 x 80) | - | - | 534 | 529 | 597 | 677 | 624 |
| 4 (100) | 2508 | 2176 | 1925 | 1944 | 1890 | 1730 | 725 |
| 6 x 4 (150 x 100) | - | - | 886 | 944 | 943 | 1231 | - |
| 6 (150) | 5402 | 5300 | 4860 | 4577 | 4383 | 3622 | 2510 |
| 8 x 6 (200 x 150) | 2583 | 2499 | - | 3240 | 3588 | 2137 | - |
| 8 (200) | 11,261 | 11,054 | 9345 | 8886 | 8416 | 6879 | 5227 |
| 10 x 8 (250 x 200) | - | 5218 | - | 5036 | 7975 | 4859 | - |
| 12 x 8 (300 x 200) | - | 3302 | - | 3892 | - | - | - |
| 10 (250) | 19,181 | 18,856 | 15,771 | 14,533 | 14,087 | 11,283 | 8313 |
| 12 (300) | 29,435 | 28,980 | 23,834 | 22,729 | 21,025 | 16,843 | 12,282 |
| 12 x 10 (300 x 250) | 7875 | - | - | 12,799 | 7299 | - | - |
| 14 (350) | 35,605 | 30,883 | 29,921 | 28,837 | 23,846 | 20,336 | - |
| 16 x 14 (400 x 350) | - | - | - | 21,096 | - | - | - |
| 16 (400) | 49,979 | 42,224 | 41,022 | 39,144 | 33,358 | 27,548 | 21,396 |
| 20 x 16 (500 x 400) | 13,060 | - | 15,761 | - | - | - | - |
| 18 (450) | 66,156 | 55,740 | 54,277 | 51,368 | 45,004 | - | - |
| 20 (500) | 83,865 | 70,386 | 68,680 | 64,559 | 56,871 | - | - |
| 22 (550) | - | 86,869 | 85,422 | 80,279 | - | - | - |
| 24 (600) | 127,916 | 106,835 | 103,504 | 97,240 | 84,836 | - | - |
| 26 (650) | 149,428 | 123,222 | 120,829 | 114,905 | - | - | - |
| 28 (700) | 176,798 | 144,355 | 142,391 | 135,267 | - | - | - |
| 30 (750) | 212,313 | 170,229 | 163,776 | 157,401 | 133,706 | - | - |
| 36 (900) | 322,548 | 245,362 | 236,147 | 224,424 | - | - | - |

FLOW COEFFICIENTS (K_v)

The following chart outlines the K_v for through-conduit gate valves having end-to-end dimensions and bore diameters in compliance with API 6D.

K_v is the flow of water through the valve at 1 bar pressure drop in cu m/hr. Since K_v is a calculated number, the actual value may vary.

| Valve Size in. (mm) | 150 | 300 | 400 | 600 | 900 | 1500 | 2500 |
|------------------------|---------|---------|---------|---------|---------|--------|--------|
| 2 (50) | 412 | 373 | 327 | 327 | 291 | 291 | 188 |
| 3 x 2 (80 x 50) | - | - | 142 | 142 | 175 | 207 | - |
| 2-1/2 (65) | - | - | 590 | 590 | 483 | 483 | 264 |
| 3 (80) | 1175 | 999 | 911 | 959 | 927 | 835 | 410 |
| 4 x 3 (100 x 80) | - | - | 462 | 458 | 516 | 585 | 540 |
| 4 (100) | 2170 | 1882 | 1665 | 1682 | 1635 | 1496 | 627 |
| 6 x 4 (150 x 100) | - | - | 766 | 817 | 816 | 1065 | - |
| 6 (150) | 4673 | 4585 | 4204 | 3959 | 3792 | 3133 | 2172 |
| 8 x 6 (200 x 150) | 2234 | 2162 | - | 2803 | 3103 | 1849 | - |
| 8 (200) | 9742 | 9562 | 8084 | 7687 | 7280 | 5951 | 4522 |
| 10 x 8 (250 x 200) | - | 4514 | - | 4356 | 6898 | 4204 | - |
| 12 x 8 (300 x 200) | - | 2857 | - | 3367 | - | - | - |
| 10 (250) | 16,592 | 16,312 | 13,643 | 12,572 | 12,186 | 9761 | 7191 |
| 12 (300) | 25,463 | 25,070 | 20,617 | 19,662 | 18,188 | 14,570 | 10,624 |
| 12 x 10 (300 x 250) | 6812 | - | - | 11,072 | 6314 | - | - |
| 14 (350) | 30,800 | 26,715 | 25,883 | 24,945 | 20,628 | 17,591 | - |
| 16 x 14 (400 x 350) | - | - | - | 18,249 | - | - | - |
| 16 (400) | 43,234 | 36,526 | 35,486 | 33,862 | 28,856 | 23,831 | 18,509 |
| 20 x 16 (500 x 400) | 11,298 | - | 13,634 | - | - | - | - |
| 18 (450) | 57,228 | 48,218 | 46,953 | 44,436 | 38,930 | - | - |
| 20 (500) | 72,547 | 60,888 | 59,412 | 55,847 | 49,196 | - | - |
| 22 (550) | - | 75,147 | 73,894 | 69,445 | - | - | - |
| 24 (600) | 110,654 | 92,417 | 89,536 | 84,117 | 73,388 | - | - |
| 26 (650) | 129,263 | 106,593 | 104,523 | 99,399 | - | - | - |
| 28 (700) | 152,939 | 124,874 | 123,175 | 117,013 | - | - | - |
| 30 (750) | 183,661 | 147,257 | 141,674 | 136,160 | 115,662 | - | - |
| 36 (900) | 279,021 | 212,251 | 204,279 | 194,138 | - | - | - |

TRIM CHART

| Service | Trim Code | Body and Bonnet | Gate | Seat | Stem Seal | Stem | Bolting | Fittings | Temperature Range |
|---------------------------|------------------------|-------------------------------------|--|---|-----------|---|----------------------------------|-----------------|-------------------------------------|
| Waterflood, Corrosive | T-10 | WCC Carbon Steel, Internally Coated | Carbon Steel, ASME Classes 300-600, Low-Alloy Steel 900 Class, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | PTFE | Low-Alloy Steel, Nickel-Plated | Alloy Steel, NACE | Stainless Steel | -20° F to 250° F (-29° C to 121° C) |
| Standard | T-11 2" to 4" only | WCC Carbon Steel | Carbon Steel, Low-Alloy Steel, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | FKM Viton | Low-Alloy Steel, Nickel-Plated | Alloy Steel | Carbon Steel | -20° F to 250° F (-29° C to 121° C) |
| Corrosive Service | T-22 | WCC Carbon Steel | 410 Stainless Steel | 410 Stainless Steel | PTFE | 17-4 PH Stainless Steel | Alloy Steel | Stainless Steel | -20° F to 250° F (-29° C to 121° C) |
| Sour, Mildly Corrosive | T-24 2" and larger | WCC Carbon Steel | Carbon Steel, ASME Classes 300-600, Low-Alloy Steel 900 Class, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | PTFE | Low-Alloy Steel, Nickel-Plated | Alloy Steel, NACE | Stainless Steel | -20° F to 250° F (-29° C to 121° C) |
| Low-Temperature, Non-Sour | T-36 | LCC Carbon Steel, Impact-Tested | Carbon Steel, ASME Classes 300-600, Low-Alloy Steel 900 Class, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | PTFE | Low-Alloy Steel, Impact-Tested, Nickel-Plated | Alloy Steel, Impact-Tested | Stainless Steel | -50° F to 250° F (-46° C to 121° C) |
| Low-Temperature, Sour | T-37 | LCC Carbon Steel, Impact-Tested | Carbon Steel, ASME Classes 300-600, Low-Alloy Steel 900 Class, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | PTFE | Low-Alloy Steel, Impact-Tested, Nickel-Plated | Alloy Steel, NACE, Impact-Tested | Stainless Steel | -50° F to 250° F (-46° C to 121° C) |
| Anhydrous Ammonia | T-88 | WCC/A36 Carbon Steel | Carbon Steel, Low-Alloy Steel, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | PTFE | Low-Alloy Steel, Nickel-Plated | Alloy Steel, NACE | Stainless Steel | -20° F to 250° F (-29° C to 121° C) |
| Standard | T-94 | WCC Carbon Steel | Carbon Steel, ASME Classes 300-600, Low-Alloy Steel 900 Class, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | Special | Low-Alloy Steel, Nickel-Plated | Alloy Steel | Carbon Steel | -20° F to 350° F (-29° C to 177° C) |
| MTBE | T-102 6" and larger | WCC Carbon Steel | Carbon Steel, ASME Classes 300-600, Low-Alloy Steel 900 Class, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | PTFE | Low-Alloy Steel, Nickel-Plated | Alloy Steel | Carbon Steel | -20° F to 250° F (-29° C to 121° C) |
| Standard | T-101 6" and larger | WCC Carbon Steel | Carbon Steel, ASME Classes 300-600, Low-Alloy Steel 900 Class, Nickel-Plated | Carbon Steel, Nickel-Plated PTFE Insert | PTFE | Low-Alloy Steel, Nickel-Plated | Alloy Steel | Carbon Steel | -20° F to 250° F (-29° C to 121° C) |

COMMON TRIMS

Waterflood (T-10) – Carbon steel body/bonnet with wetted surface, ENP-plated, internal parts of corrosion-resistant materials.

Model M (Sizes 2" to 4", (50 mm to 100 mm), Classes 600 through 1500) Standard (T-11) – For non-corrosive aromatic service with concentration of MTBE to 100%.

Corrosive Service – Internal Parts (T-22) – For substantially the same service as T-21, but where the corrosion resistance of internal parts is desirable. The valve internal sealing members are stainless steel to gain this corrosion resistance. This trim also is usable for mildly corrosive fluids and gases when limited corrosion of the internal body surfaces can be tolerated.

Sour Gas and Oil (NACE MR0175) (T-24) – Primarily for sour gas and oil (NACE MR0175) where resistance to H₂S embrittlement is required. Also suitable for other chemicals, products or hydrocarbons when H₂S is present. May be used when CO₂ is present in smaller amounts than H₂S.

Low-Temperature - 50° F (-46° C) NACE (T-36) – For essentially non-corrosive ladings, either liquid or gaseous. The pressure-retaining components (body, bonnet and bolting) are of impact-tested materials.

Low-Temperature Sour -50° F (-46° C) NACE (T-37) – Primarily for sour gas and oil (NACE MR0175) where resistance to H₂S embrittlement is required at -50° F (-46° C) service. The pressure-retaining components (body, bonnet and bolting) are of impact-tested materials. Also suitable for other chemicals, products or hydrocarbons when H₂S is present. Can be used when CO₂ is present in smaller amounts than H₂S.

Anhydrous Ammonia (T-88) – Special elastomers and stem nut for ammonia service

Fire-Tested to API 6FA (T-94) – These valves have been qualified as fire-tested and contain a special stem packing arrangement for essentially non-corrosive ladings. The elastomer O-rings used for seal and bonnet seals are of a material that will not swell and affect the operation of the valve. Typical examples of ladings are: gasoline, benzene, toluene, carbon-tetrachloride, 1,1, 1 trichloroethane, richloroethylene perchloroethylene and phosphate ester hydraulic fluids.

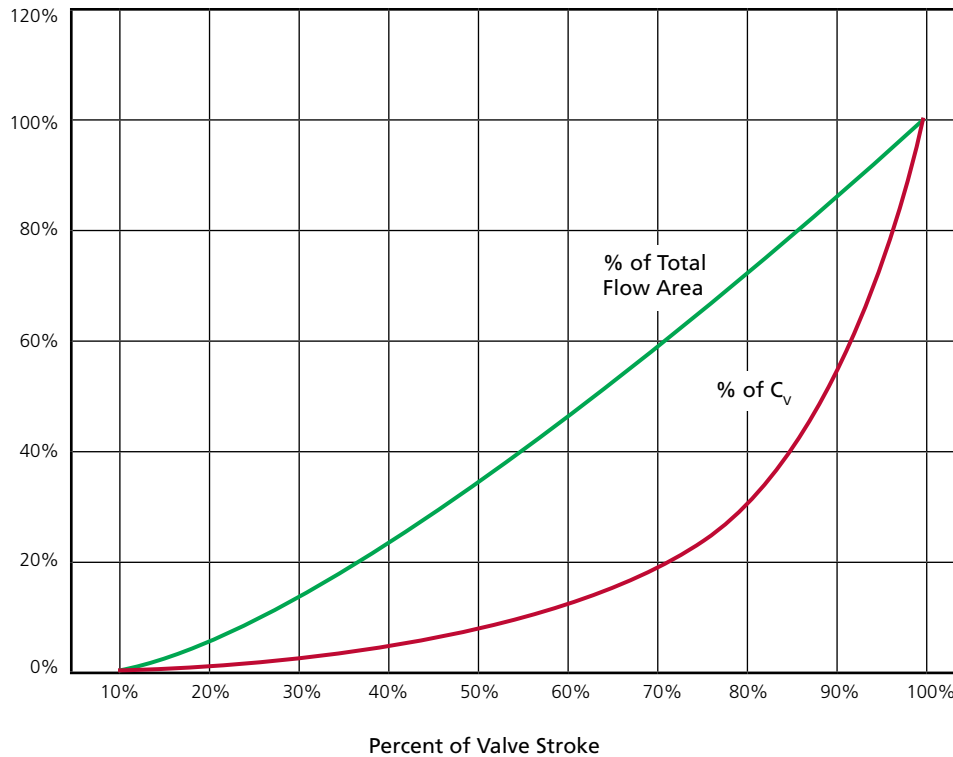
Aromatic (to 40% MTBE, Fire-Tested API 6FA or ISO 10497) (T-101) – For essentially non-corrosive, non-sour aromatic or non-aromatic service with methanol or ethanol based corrosion inhibitors where up to 40% MTBE may be present.

PARTIAL OPEN FLOW CHARACTERISTICS

The following graph approximates the flow coefficient, C_v or K_v , of gate valves as a function of the valve stroke going from closed to open. Note that this is an estimation only because of assumptions made in the valve stroke, as well as unpredictable flow characteristics around the gate-seat bore in the partially open position.

Gate valves are intended for on-off service. Intermittent throttling such as pressure equalization service is acceptable. Continuous throttling is not recommended. This information is provided only to facilitate the engineering of systems in the transition between open and closed positions of the valves. One example might be to evaluate the possibility of water hammer in liquid pipelines.

Partial Open Flow Characteristics (Through Conduit Gate Valves)



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