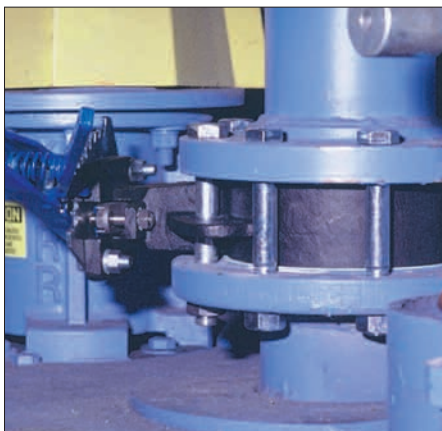


KEYSTONE

K-LOK® High Performance Butterfly Valve Sizes 2 thru 12" ASME Class 150

Features and Benefits

- Uninterrupted gasket surfaces eliminate problems associated with seat retaining screws in the gasket surface and allows use of standard spiral wound gaskets.
- Unique interference seat design with energized elastomer O-ring allows bi-directional ANSI Class VI shutoff at lower pressures. The seat is further energized by line pressure, providing the same tight bi-directional shutoff at full-rated pressure.
- Heavy duty circular key holds the seat and retaining ring in place, providing bi-directional, dead-end service at full-rated pressure. This eliminates the need for easily corroded and hard-to-remove retention screws.
- Valve stem designed to API 609 standards is blow-out resistant.
- Seat retaining ring is housed within the flange gasket ID to eliminate potential emission path.
- Face-to-face conforms to MSS-SP-68 and can be configured to ISO 5752 short.
- Adjustable packing utilizes unique rocker-shaped gland bridge that compensates for uneven adjustment of gland nuts.
- Extended neck allows for two inches of clearance for insulation.



General Application

High performance applications such as steam, chill water, water, utility lines, gasoline, natural gas, air, oil, jet fuels and process lines. Consult factory for appropriate materials for specific services.

Industry Compliance

ASME B16.34
API 609
MSS-SP68
CRN Registration
PED Compliant in some configurations

Technical Data

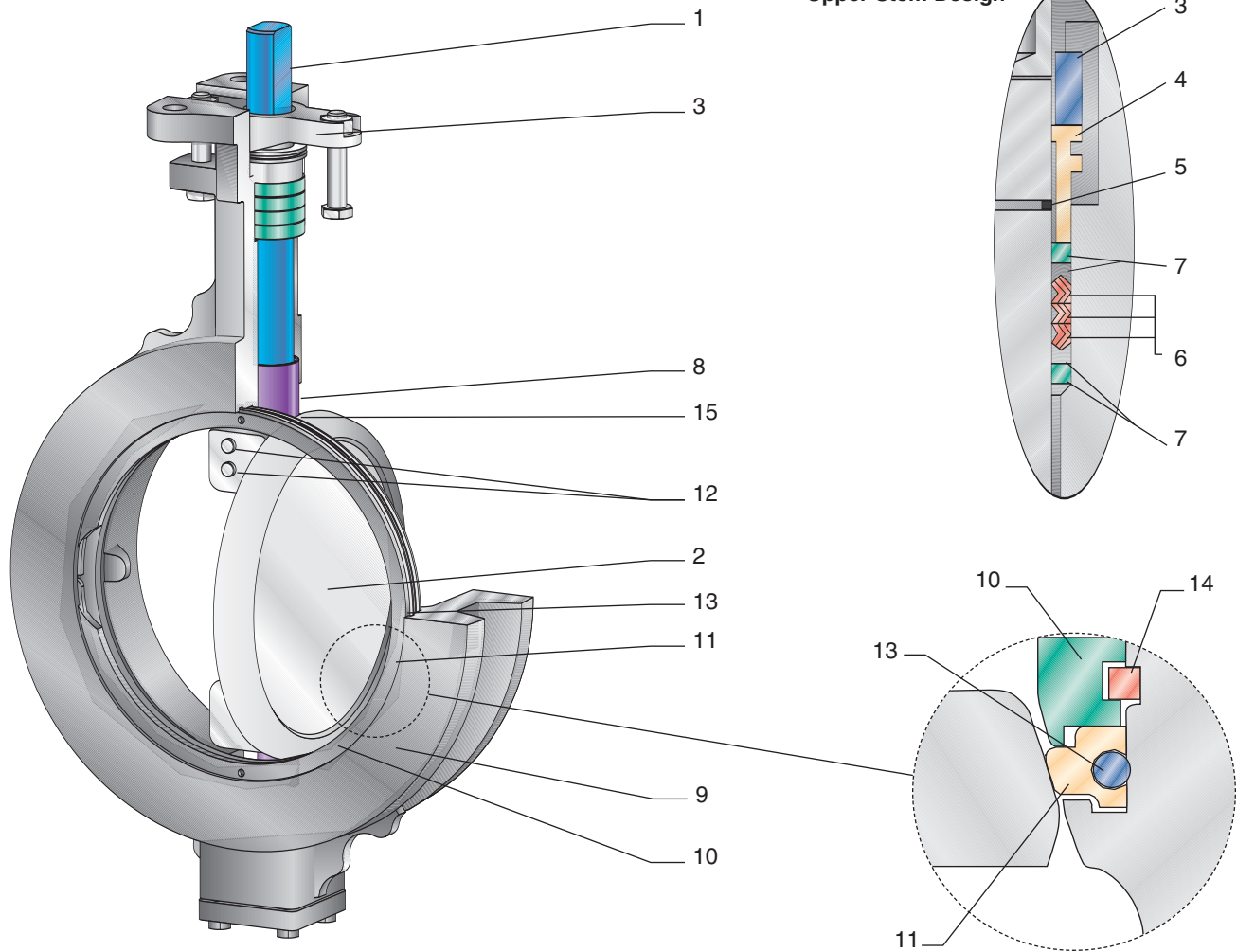
| | |
|--------------|-------------------------------------|
| Size Range: | 2 thru 12-inch [50 thru 300 mm] |
| Rating: | ASME Class 150 |
| Pressure: | 285 psi bi-directional, dead-end |
| Vacuum: | 50 microns |
| Temperature: | -20°F to 350°F |

tyco / Flow Control

Total Flow Control Solutions™

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Specifications



| Materials | | | | |
|-----------|--------------------------------|-------------------|--|----------------|
| Part | Material | Material Standard | Optional Material | |
| 1 | Stem | 17-4PH | ASTM A 564 Cond. H1075 or H 1100 | 316 SS Cond. B |
| 2 | Disc | 316 SS | ASTM A 351-CF8M | |
| 3 | Gland bridge | 17-4SS HT | ASTM A747-CB 7C1-1 | |
| 4 | Packing gland follower | 316 SS | ASTM A 276-316 | |
| 5 | Blowout-resistant ring | 18-8 SS | | |
| 6 | Packing | TFE | Die Formed TFE Braid | Graphite |
| 7 | Anti-extrusion ring | 316 SS | ASTM A 276-316 | |
| 8 | Bearings (upper & lower) | CS SS | TFE impregnated/fiber reinforced TFE impregnated/fiber reinforced | |
| 9 | Body | CS SS | ASTM A216-WCB ASTM A351-CF8M | |
| 10 | Seat retaining ring | CS SS | ASTM A36 ASTM A240 | |
| 11 | Seat | RTFE | Reinforced polytetrafluoroethylene | PTFE |
| 12 | Wedge pins | 17-4PH | ASTM A564 | 316 SS Cond. B |
| 13 | Seat backing O-ring | | PFA Encapsulated FKM | |
| 14 | Circular key | 304 SS | ASTM A240 | |
| 15 | Thrust bearing (upper & lower) | 316 SS | Nitrided | |

Specifications

Principles of Design

K-LOK is an ideal control valve designed to provide an inherent equalinear characteristic that is suitable for most linear and equal percentage applications. The valve offers a high flow capacity, thin profile disc with a rangeability of 33:1. The use of tangentially located disc/stem wedge pins removes engagement clearances and eliminates valve hysteresis.

While the valve is throttling, the stem's double offset location causes the disc to cam away from the seat, reducing wear and deformation. When the disc closes, a drop tight seal is assured. (See page 4 for additional information.)

Design Features

Stem (1) is manufactured from materials that provide maximum strength and stability. The stem surface is finished to better than Ra 31 for maximum sealing interface between the stem and the packing.

Gland bridge (3) incorporates a rocker shape to compensate for uneven adjustment of the gland nuts. The upper gland nuts are captured in the bridge for ease of maintenance.

Packing gland follower (4) has a circular groove for easy field removal.

Blowout-resistant ring (5) is standard on all Figure 310/312 valves.

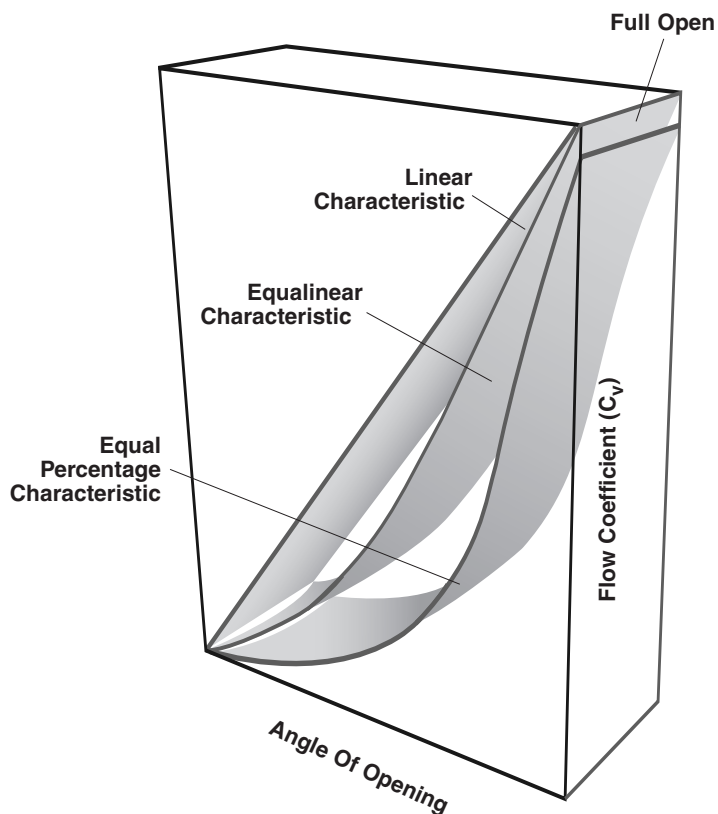
Packing (6) utilizes a combination of force-dried, soft-braided rings and solid TFE 'V' rings to provide a superior stem seal.

Bearings (8) of press fit steel or stainless steel are located near the disc to minimize the possibility of deflection.

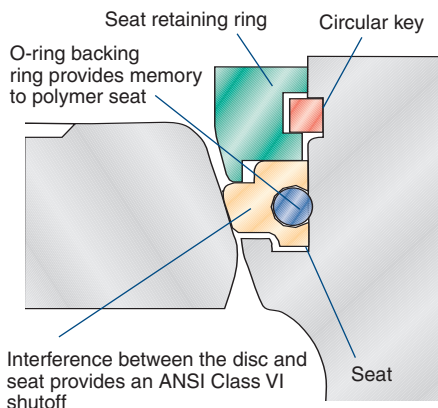
Body (9) features an extended neck that allows for two inches of insulation and integral cast travel stop. Non-interrupted flange gasket surfaces allow for the use of standard spiral wound gaskets.

Seat retaining ring (10) is located within the flange gasket ID. This allows for an uninterrupted flange sealing surface and maximum emissions control.

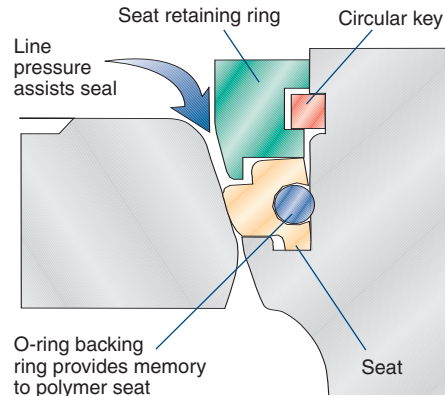
Seat (11) is an advanced patented bi-directional dual-lock seat design* that provides an interference disc/seat seal at vacuum-to-low pressures and utilizes line



Vacuum 50 microns to Low Pressure



Medium to High Pressure



pressure to achieve maximum sealability at medium-to-high pressures.

Wedge pins (12) are tangentially located for maximum strength and then welded in place after final assembly and testing.

Seat backing O-ring (13) is available in a variety of materials to meet customer requirements. (Materials and applications are listed on page 8.)

Circular key (14) provides bi-directional, dead-end service at full-rated pressure. Removable in the field for quick seat replacement.

Integrally cast mounting pad allows direct mounting of Keystone actuators.

Flange location webs allow precise alignment of valve between pipe flanges during installation.

*Patented

Specifications

Disc and seat design

K-LOK disc geometry maximizes flow capacity by increasing the available flow area through the valve. This increase in disc efficiency results in a high valve C_v .

Two-piece stem vs. one-piece stem

The improved C_v may be easily explained by comparing the aspect ratio of the K-LOK two-piece stem and disc arrangement to that of a through-stem design. This unique disc configuration provides a universal inherent flow characteristic which is referred to as equalinear.

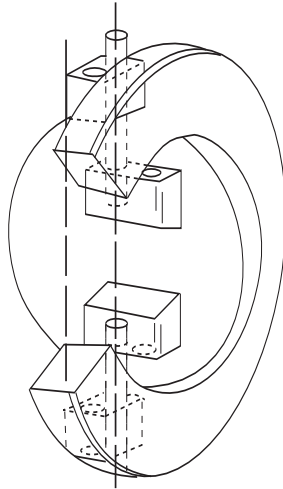
Double offset disc/stem

The K-LOK design uses a double offset disc/stem design. The first offset is achieved by locating the stems downstream of the centerline of the seat. This allows for a total unobstructed 360 degrees sealing surface.

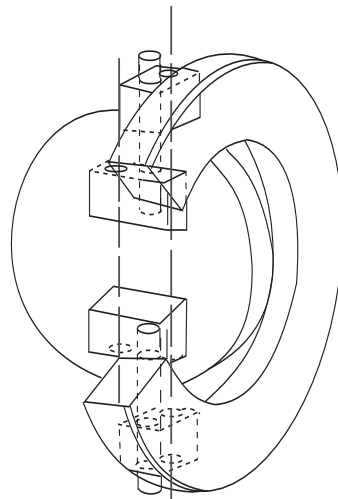
The second offset locates the stems off the center of the vertical axis of the seat.

The combination of these two offsets creates a camming effect as the disc swings into and out of the seat. The disc lifts quickly out of the seat in the first few degrees of travel and does not contact the seat again until it is nearly closed. There is minimum wear between the seat and disc, so operating torques are reduced and seat life is extended.

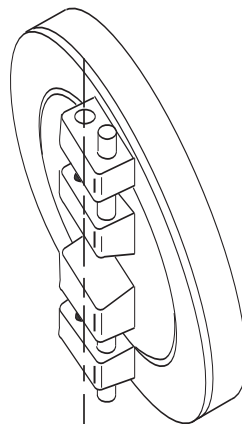
First Offset



Second Offset

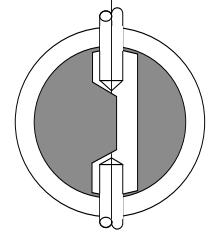
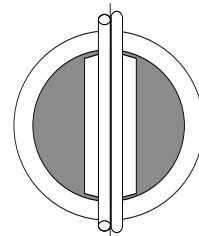


Double Offset



Competitor:
with one-piece stem

K-LOK:
with two-piece stem



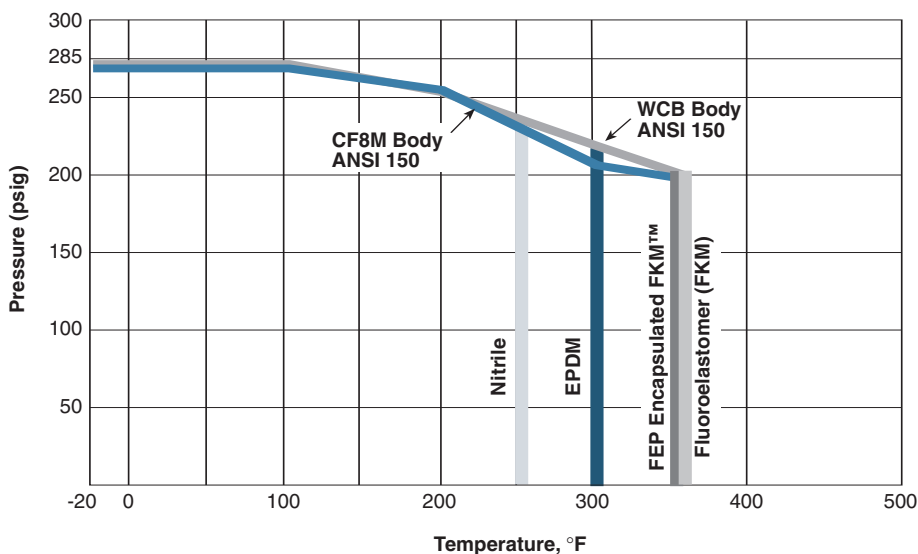
Aspect Ratio = Open Area ÷ Disc Area

Specifications

C_v Valves vs. Travel Position (installed in the preferred flow direction)

| Size (in.) | Angle of Opening | | | | | | | | |
|------------|------------------|-----|-----|-----|-------|-------|-------|-------|-------|
| | 10° | 20° | 30° | 40° | 50° | 60° | 70° | 80° | 90° |
| 2 | 0 | 4 | 14 | 25 | 35 | 42 | 46 | 50 | 52 |
| 2½ | 0 | 12 | 26 | 47 | 72 | 95 | 121 | 137 | 142 |
| 3 | 0 | 14 | 30 | 53 | 82 | 111 | 142 | 161 | 168 |
| 4 | 11 | 39 | 79 | 123 | 183 | 260 | 347 | 443 | 496 |
| 5 | 24 | 66 | 133 | 202 | 295 | 425 | 574 | 755 | 859 |
| 6 | 32 | 85 | 170 | 255 | 371 | 538 | 729 | 968 | 1,106 |
| 8 | 36 | 148 | 302 | 457 | 677 | 1,016 | 1,423 | 2,034 | 2,344 |
| 10 | 41 | 221 | 455 | 691 | 1,032 | 1,571 | 2,228 | 3,271 | 3,781 |
| 12 | 45 | 288 | 596 | 907 | 1,358 | 2,082 | 2,968 | 4,409 | 5,102 |

Pressure/Temperature Rating For Body and Backing Ring Materials



PTFE and RTFE Bi-Directional Seating and Un-seating Torque Values (clean water service)

| Size (in.) | Shaft Mounting Code | Seating and Un-seating Torque (lbs. in.) | | | | | | |
|------------|---------------------|--|-------|-------|-------|-------|-------|-------|
| | | System Shutoff Pressure (psig) | | | | | | |
| | | 0 | 50 | 100 | 150 | 200 | 250 | 285 |
| 2 | BBG | 92 | 101 | 109 | 118 | 126 | 135 | 141 |
| 2½ | BAC | 142 | 158 | 175 | 191 | 208 | 224 | 236 |
| 3 | BAC | 175 | 195 | 215 | 235 | 255 | 274 | 288 |
| 4 | BAC | 260 | 296 | 333 | 369 | 406 | 442 | 468 |
| 5 | BAD | 327 | 411 | 495 | 579 | 664 | 748 | 807 |
| 6 | BAD | 448 | 563 | 677 | 792 | 906 | 1,021 | 1,101 |
| 8 | CAE | 500 | 760 | 1019 | 1,279 | 1,539 | 1,798 | 1,980 |
| 10 | CAF | 678 | 1,119 | 1,560 | 2,000 | 2,441 | 2,882 | 3,191 |
| 12 | CAF | 970 | 1,604 | 2,238 | 2,873 | 3,507 | 4,141 | 4,585 |

Notes

- Torques are applicable to PTFE and RTFE seats.
- For other service conditions, select the torque applicable for the maximum differential pressure and multiply by the following factor:
 Water : x 1.0
 Lubricious Service : x 0.75
 Dry Service : x 1.9
 Heavy Solids : x 2.5

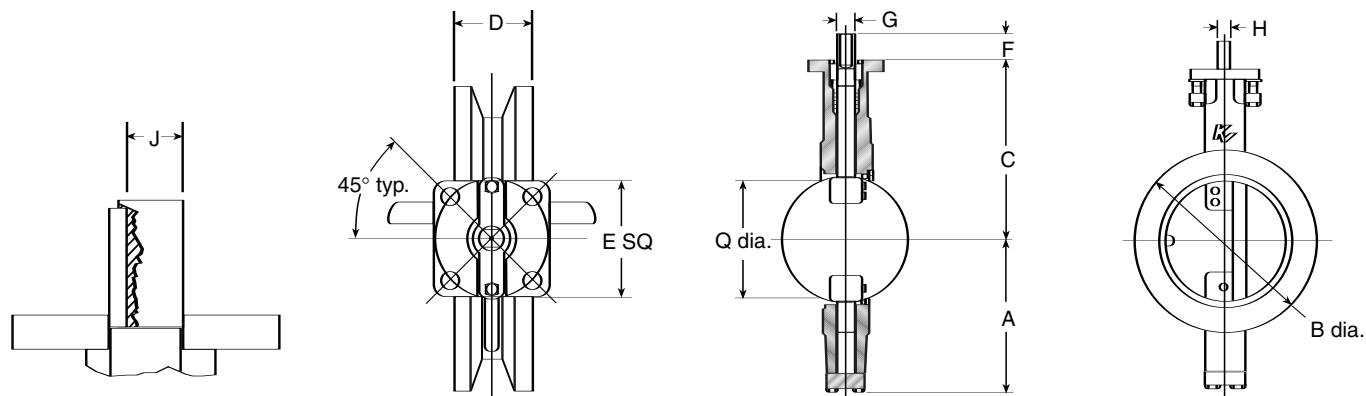
Seating and Un-seating Torque

Seating and un-seating torques are a function of the size of the valve and the shutoff pressure of the system.

Specific torque ratings can be found in the Seating/Un-seating chart at the intersection of the 'size' row and the 'shutoff pressure' column.

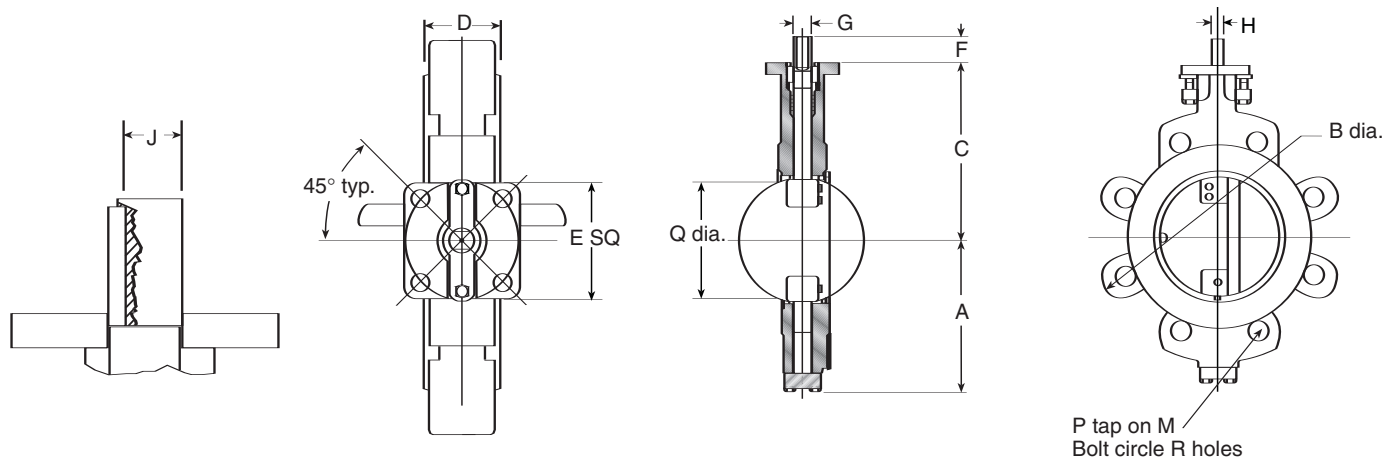
All torques listed are for normal service conditions (i.e. operating frequency is a minimum of once per month; disc corrosion is expected to be mild or minor, the media is a clean gas, liquid or steam, and is non-abrasive) and the chemical effects upon the seat are minor.

Dimensions



Wafer Style

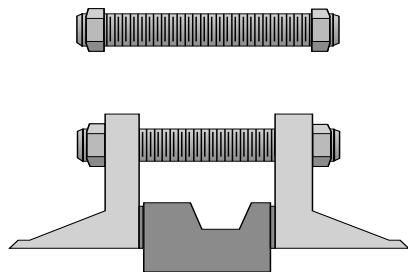
| Size (in.) | Valve Dimensions MSS | | | | | | | | | | | Top Plate Drilling | | | Weight (lbs.) | Adapt. Code |
|------------|----------------------|-------|-------|-------|------|------|------|------|------|------|-----------|--------------------|-----------|-----------|---------------|-------------|
| | A | B | C | Q | E | D | F | G | H | J | KEY | Bolt Circle | No. Holes | Hole Dia. | | |
| 2 | 3.78 | 6.38 | 4.94 | 1.97 | 3.19 | 1.69 | 0.87 | 0.47 | 3/8 | N/A | N/A | 3 1/4 | 4 | 7/16 | 8 | BBG |
| 2 1/2 | 4.17 | 7.17 | 5.39 | 2.64 | 3.19 | 1.89 | 1.22 | 0.62 | 7/16 | N/A | N/A | 3 1/4 | 4 | 7/16 | 9 | BAC |
| 3 | 4.65 | 7.87 | 5.73 | 2.91 | 3.19 | 1.89 | 1.22 | 0.62 | 7/16 | N/A | N/A | 3 1/4 | 4 | 7/16 | 12 | BAC |
| 4 | 5.24 | 9.21 | 6.71 | 3.86 | 3.19 | 2.13 | 1.22 | 0.62 | 7/16 | N/A | N/A | 3 1/4 | 4 | 7/16 | 19 | BAC |
| 5 | 6.34 | 10.87 | 7.28 | 5.00 | 3.19 | 2.25 | 1.22 | 0.75 | 1/2 | N/A | N/A | 3 1/4 | 4 | 7/16 | 25 | BAD |
| 6 | 7.01 | 12.20 | 8.01 | 5.75 | 3.19 | 2.25 | 1.22 | 0.75 | 1/2 | N/A | N/A | 3 1/4 | 4 | 7/16 | 31 | BAD |
| 8 | 8.03 | 14.25 | 9.41 | 7.64 | 4.65 | 2.50 | 1.22 | 0.87 | 5/8 | N/A | N/A | 5 | 4 | 9/16 | 50 | CAE |
| 10 | 9.45 | 16.77 | 10.83 | 9.21 | 4.65 | 2.81 | 2.00 | 1.12 | N/A | 0.98 | 1/4 x 1/4 | 5 | 4 | 9/16 | 68 | CAF |
| 12 | 10.59 | 19.29 | 12.07 | 11.42 | 4.65 | 3.19 | 2.00 | 1.12 | N/A | 0.98 | 1/4 x 1/4 | 5 | 4 | 9/16 | 99 | CAF |



Lug Style

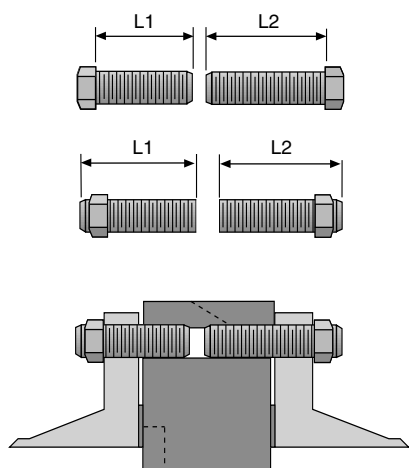
| Size (in.) | Valve Dimensions MSS | | | | | | | | | | | Tapped Lug Data | | | Top Plate Data | | | Weight (lbs.) | Adapt. Code |
|------------|----------------------|-------|-------|-------|------|------|------|------|------|------|--------|-----------------|----|-------------|----------------|-----------|-----|---------------|-------------|
| | A | B | C | Q | E | D | F | G | H | J | M | P | R | Bolt Circle | No. Holes | Hole Dia. | | | |
| 2 | 3.78 | 6.25 | 4.94 | 1.97 | 3.19 | 1.69 | 0.87 | 0.50 | 3/8 | N/A | 4.750 | 5/8 - 11UNC-2B | 4 | 3 1/4 | 4 | 7/16 | 12 | BBG | |
| 2 1/2 | 4.17 | 7.01 | 5.39 | 2.64 | 3.19 | 1.89 | 1.22 | 0.62 | 7/16 | N/A | 5.500 | 5/8 - 11UNC-2B | 4 | 3 1/4 | 4 | 7/16 | 15 | BAC | |
| 3 | 4.65 | 7.50 | 5.73 | 2.91 | 3.19 | 1.89 | 1.22 | 0.62 | 7/16 | N/A | 6.000 | 5/8 - 11UNC-2B | 4 | 3 1/4 | 4 | 7/16 | 18 | BAC | |
| 4 | 5.24 | 9.65 | 6.71 | 3.86 | 3.19 | 2.13 | 1.22 | 0.62 | 7/16 | N/A | 7.500 | 5/8 - 11UNC-2B | 8 | 3 1/4 | 4 | 7/16 | 32 | BAC | |
| 5 | 6.34 | 11.02 | 7.28 | 5.00 | 3.19 | 2.25 | 1.22 | 0.75 | 1/2 | N/A | 8.500 | 3/4 - 10UNC-2B | 8 | 3 1/4 | 4 | 7/16 | 40 | BAD | |
| 6 | 7.01 | 11.73 | 8.01 | 5.75 | 3.19 | 2.25 | 1.22 | 0.75 | 1/2 | N/A | 9.500 | 3/4 - 10UNC-2B | 8 | 3 1/4 | 4 | 7/16 | 46 | BAD | |
| 8 | 8.03 | 13.50 | 9.41 | 7.64 | 4.65 | 2.50 | 1.22 | 0.87 | 5/8 | N/A | 11.750 | 3/4 - 10UNC-2B | 8 | 5 | 4 | 9/16 | 69 | CAE | |
| 10 | 9.45 | 16.93 | 10.83 | 9.21 | 4.65 | 2.81 | 2.00 | 1.12 | N/A | 0.98 | 14.250 | 7/8 - 9UNC-2B | 12 | 5 | 4 | 9/16 | 121 | CAF | |
| 12 | 10.59 | 19.02 | 12.07 | 11.42 | 4.65 | 3.19 | 2.00 | 1.12 | N/A | 0.98 | 17.000 | 7/8 - 9UNC-2B | 12 | 5 | 4 | 9/16 | 159 | CAF | |

Options



310 Wafer - Recommended Flange Bolt Lengths

| Size (in.) | Qty. | Bolt Size | Lengths of Fasteners (in.) | |
|------------|------|-----------|----------------------------|------------------|
| | | | Bolts | All-thread Studs |
| 2 | 4 | 5/8 - UNC | 4 1/2 | 5 |
| 2 1/2 | 4 | 5/8 - UNC | 4 1/2 | 5 |
| 3 | 4 | 5/8 - UNC | 4 1/2 | 5 1/4 |
| 4 | 8 | 5/8 - UNC | 4 3/4 | 5 1/2 |
| 5 | 8 | 3/4 - UNC | 5 | 6 |
| 6 | 8 | 3/4 - UNC | 5 1/4 | 6 |
| 8 | 8 | 3/4 - UNC | 5 3/4 | 6 1/2 |
| 10 | 12 | 7/8 - UNC | 6 1/4 | 7 1/4 |
| 12 | 12 | 7/8 - UNC | 7 | 7 3/4 |



312 Lug - Recommended Flange Bolt Lengths

| Size (in.) | Qty. | Bolt Size | Length of fasteners (in.) | | | |
|------------|------|-----------|---------------------------|------------------|-----------------------|------------------|
| | | | Up Stream Side - L1 | | Down Stream Side - L2 | |
| | | | Bolts | All-thread Studs | Bolts | All-thread Studs |
| 2 | 4 | 5/8 - UNC | 1 1/2 | 2 1/2 | 1 3/4 | 2 1/2 |
| 2 1/2 | 4 | 5/8 - UNC | 1 3/4 | 2 1/2 | 2 | 2 1/2 |
| 3 | 4 | 5/8 - UNC | 1 3/4 | 2 1/2 | 2 | 2 3/4 |
| 4 | 8 | 5/8 - UNC | 1 3/4 | 2 1/2 | 2 | 2 3/4 |
| 5 | 8 | 3/4 - UNC | 2 | 3 | 2 1/4 | 3 |
| 6 | 8 | 3/4 - UNC | 2 | 3 | 2 1/4 | 3 1/4 |
| 8 | 8 | 3/4 - UNC | 2 | 3 | 2 1/4 | 3 1/4 |
| 10 | 12 | 7/8 - UNC | 2 1/4 | 3 1/2 | 2 1/2 | 3 3/4 |
| 12 | 12 | 7/8 - UNC | 2 1/2 | 3 3/4 | 2 3/4 | 4 |

Note

- Bolt lengths are based on ANSI Class 150 weld neck flanges per ANSI B16.5 and a gasket thickness of 0.062 inch.

Optional Flange Standards

| Standard | Size (in.) | | | | | | | | | | | | | | | | | |
|----------------|------------|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 2 | | 2 1/2 | | 3 | | 4 | | 5 | | 6 | | 8 | | 10 | | 12 | |
| | 310 | 312 | 310 | 312 | 310 | 312 | 310 | 312 | 310 | 312 | 310 | 312 | 310 | 312 | 310 | 312 | 310 | 312 |
| ASME 300 | Y | N | Y | N | Y | N | Y | Y | Y | Y | Y | N | Y | N | Y | N | Y | N |
| DIN 2632 PN-10 | Y | Y | Y | Y | Y | N | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| DIN 2633 PN-16 | Y | Y | Y | Y | Y | N | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y | Y |
| DIN 2634 PN-25 | Y | Y | Y | N | Y | N | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y | N |
| JIS B 2212 10K | Y | Y | Y | Y | Y | N | Y | Y | Y | Y | Y | Y | Y | N | Y | Y | Y | N |
| JIS B 2213 16K | Y | N | Y | N | Y | N | Y | Y | Y | Y | Y | N | Y | N | Y | Y | Y | N |

Notes

- Optional flange standard must be specified at time of order.
- Valve is rated to 285 psi. Do not exceed pressure rating.

www.keystonevalves.com

www.tycoflowcontrol.com

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