

Valtek® Mark One™ Control Valves



Body assembly

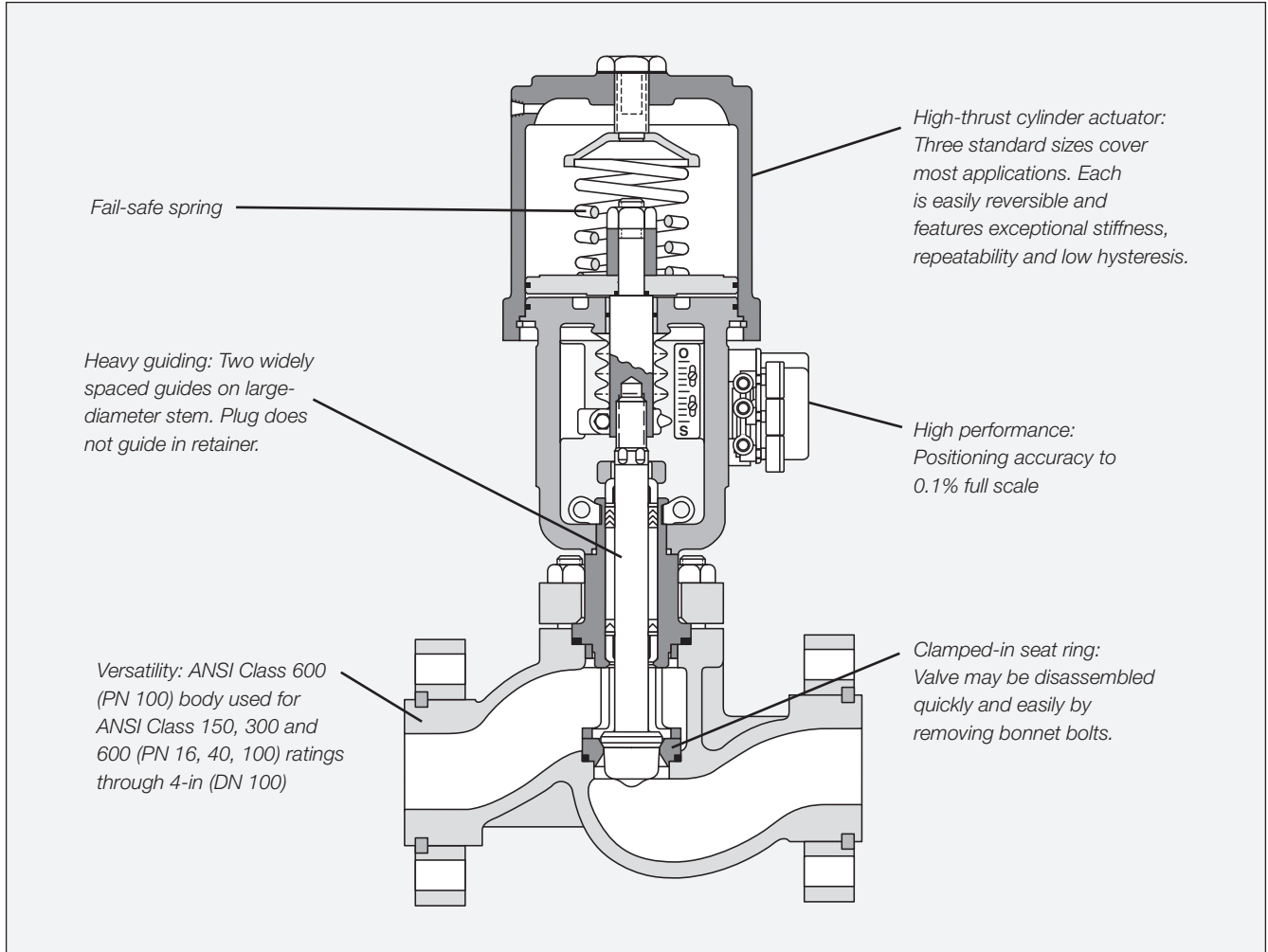


Figure 1: Valtek Mark One globe control valve

The Valtek Mark One globe control valve offers superior performance in liquid and gaseous services, while also permitting easy, fast and inexpensive maintenance.

The spring-cylinder actuated Mark One valve provides stiffness and maintains high positioning accuracy, repeatability, controlled high speed and faithful response. The Mark One valve handles to 150 psig (10.3 barg) supply air and has the thrust to shut off against much higher fluid pressures.

The Mark One valve is designed so the spring, supply air pressure and fluid pressure combine to produce exceptionally tight shutoff. A self-aligning seat ring further enhances the shutoff capability.

The Mark One valve is typically double top-stem guided and completely avoids contact between the plug and seat retainer. Many globe valve maintenance problems can be traced to cage-guiding. The close metal-to-metal contact between the cage and plug often result in galling and sticking.

The clamped-in seat and top-entry trim permits easy, quick maintenance. Plus, with the Mark One valve's high degree of parts interchangeability, fewer inventory parts are required. In addition, the actuator is lighter, smaller and easier to handle than comparable diaphragm actuators.

The Valtek Mark One control valve is the industry choice for a simple, reliable, tough globe valve.

Advantages and features

| Advantages | Features |
|--|---|
| <p>Design lower total lifetime cost</p> | <ul style="list-style-type: none"> • High interchangeability between sizes and other Valtek control products • Valve design minimizes requirements for stocking spare parts • Rugged, heavy-duty parts provide extended life • Actuator design allows simple, easy maintenance |
| <p>Versatile</p> | <ul style="list-style-type: none"> • Globe, angle, three-way and jacket styles offer multiple face-to-face standards |
| <p>Trim that does not stick or gall</p> | <ul style="list-style-type: none"> • Double-stem guiding located out of flow stream • Generous clearance between plughead and seat retainer • Eliminates galling associated with cage-guiding |
| <p>Easy, fast and inexpensive</p> | <ul style="list-style-type: none"> • Top-entry servicing • Clamped-in seat ring • Evenly compressed gasket — controlled gasket compression • Separable flanges • High degree of parts interchangeability • Small, lightweight design |
| <p>Leakproof when closed</p> | <ul style="list-style-type: none"> • Self-aligning seat ring • Assisted shutoff from fluid pressure, cylinder spring, cylinder pressure • High-thrust, spring-cylinder actuator • Spring fails valve to desired position, pneumatics provide additional force |
| <p>Built for toughest service</p> | <ul style="list-style-type: none"> • Corrosion-resistant construction • High thrust overcomes high pressures • Anti-cavitation and noise-trim options • Heavy-duty plug stem • Factory Mutual approved as a fuel service valve (0.75–3 in/DN 20–80) |
| <p>Compact and easy to install</p> | <ul style="list-style-type: none"> • Cylinder actuator smaller than most competitor actuators • Lower center of gravity than comparable actuators • Lighter weight means less pipe stress from static and dynamic loads • Separable end flanges allow the valve to be installed in many orientations and compensate for flange misalignment |
| <p>Reliable, predictable service</p> | <ul style="list-style-type: none"> • Stiff, high-thrust cylinder actuator • Accurate positioning • High repeatability • Faithful response • Controlled, high-speed stroking action |

Components

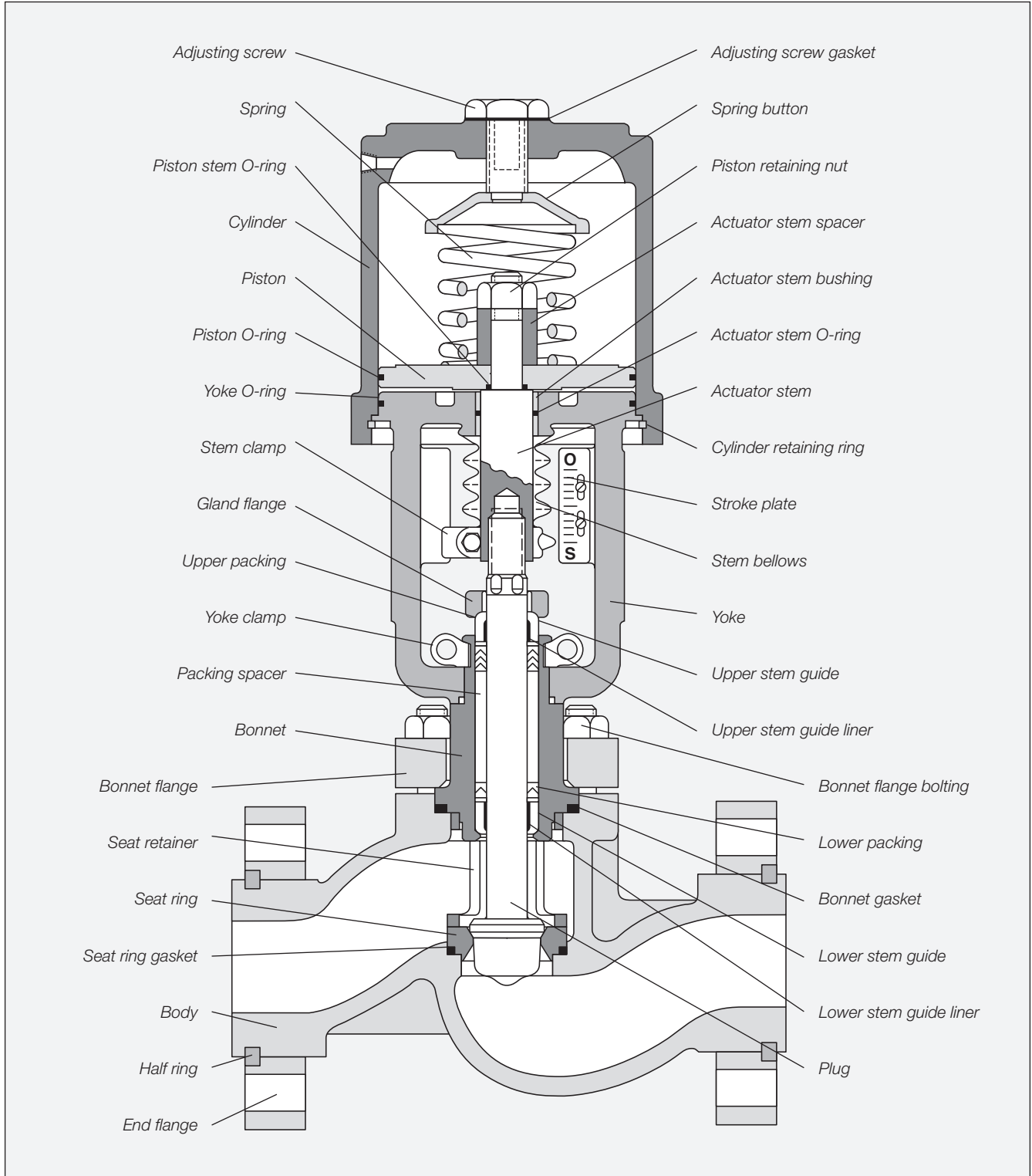


Figure 2: Mark One control valve

Body styles

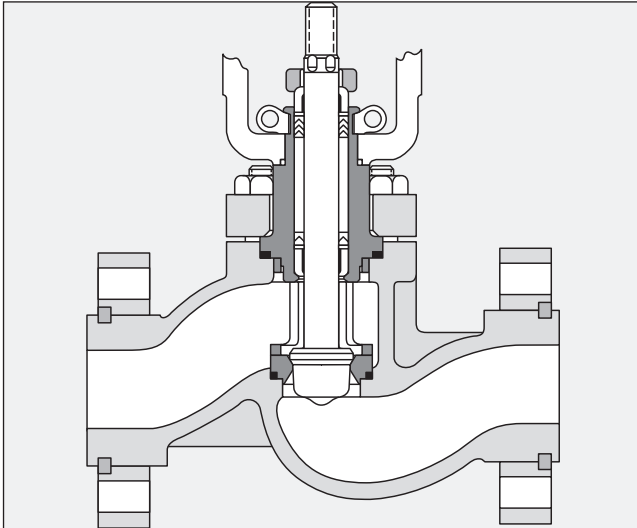


Figure 3: *Globe-style body*

Globe-style bodies feature smooth, streamlined, constant-area internal passages with no pockets, permitting high capacity with minimum turbulence. They are designed with nearly constant wall thickness, providing lower weight and cost when manufactured in expensive stainless or alloy steels.

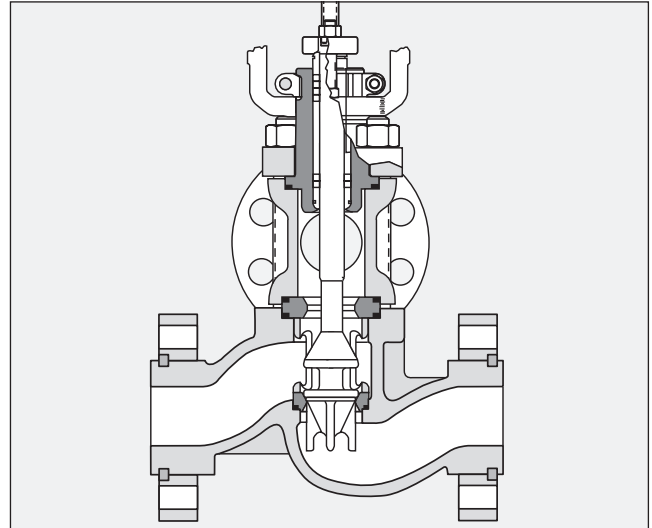


Figure 4: *Three-way body*

Three-way bodies are used for either combining or diverting services. Due to Flowserve's excellent parts interchangeability, a standard globe valve easily converts to three-way service with the addition of a three-way adaptor, upper seat ring, two gaskets, three-way plug and longer bonnet flange studs.

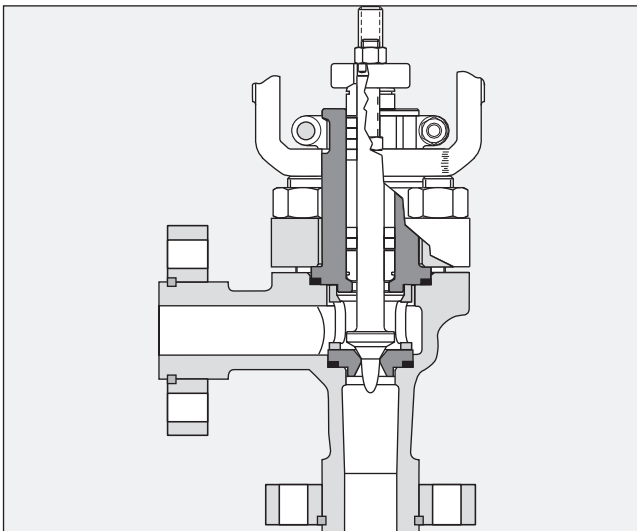


Figure 5: *Angle-style body*

Except for the body and 1.5-in (DN 40) seat ring, the angle-style Mark One valve is completely interchangeable with the globe style; all other valve parts remain the same. For additional body protection, a venturi seat ring, extending to the outlet flange, is available.

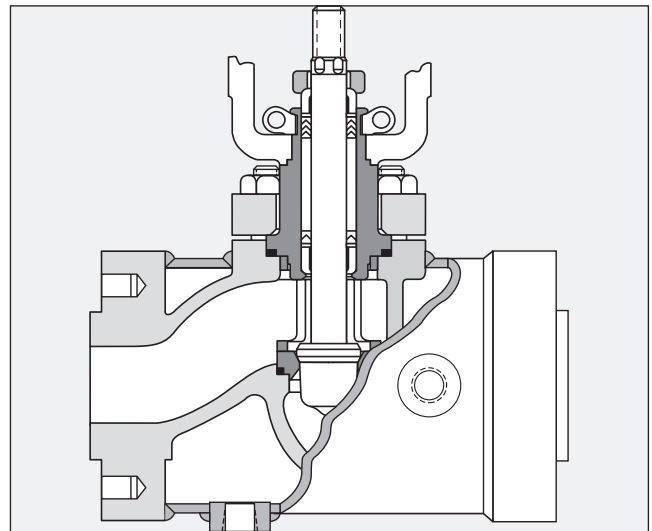


Figure 6: *Steam-jacketed body*

The steam-jacketed Mark One valve uses a standard globe-style body with oversized, blind flanges for a full jacket or standard flanges for a partial jacket. The jacket is rated for 150 psig (10.3 barg) and is equipped with a 0.75-in NPT supply and drain connection.

End connections, flanges and bolting

Mark One body facings come standard as raised face for either separable and integral flanges. To achieve better sealing with mating piping, the flange face is machined with spiral grooved serration. Other optional facings include smooth face, flat face, ring-joint, large and small tongue, and large and small groove.

Separable end flanges

Interchangeable separable flanges are standard for valve bodies 0.5- through 4-in (DN 15–100) in ANSI Class 150, 300 and 600 (PN 16, 40 and 100). With separable end flanges, an ANSI Class 600 (PN 100) body can be adapted for ANSI Class 150, 300 or 600 (PN 16, 40 and 100) service by simply changing the end flanges.

Separable flanges are usually furnished in carbon steel for maximum cost savings, although stainless steel can be specified if needed.

Bonnet flange

The bonnet flange incorporates the same separable design as the end flanges and is normally manufactured in carbon steel; however, it can be specified in stainless steel when required.

Bonnet flange bolting

All sizes use studs and nuts that are furnished in 304 and 316 stainless steel, suitable for -253°C to 816°C (-423°F to 1500°F). These temperature limits are for maximum pressure permitted by ANSI B16.34, latest edition.

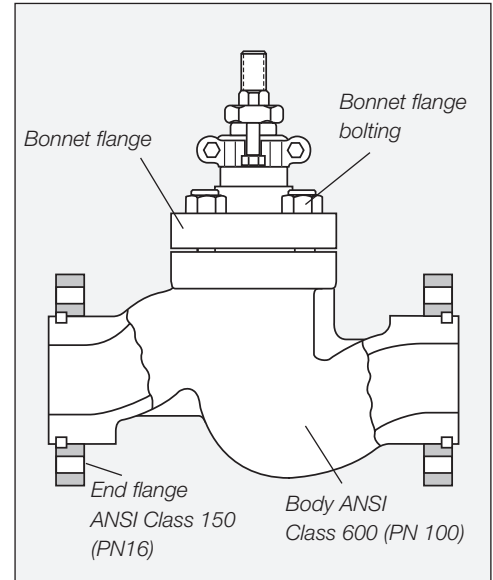


Figure 7: Separable end and bonnet flanges

Table 1: End Connections

| End Connection | Valve Size | | Rating Class | | ANSI/ISA Face-to-Face Standard |
|----------------------------------|------------|---------|--------------|---------|--------------------------------|
| | in | DN | ANSI | PN | |
| Separable Flange | 0.5–4 | 12–100 | 150–600 | 16–100 | S75.20 |
| Integral Flange-Steel and Alloys | 0.5–48 | 15–1200 | 150 | 12 | S75.03 |
| | 0.5–48 | 15–1200 | 300–600 | 40–100 | |
| | 0.5–24 | 15–600 | 900–2500 | 160–400 | |
| Screwed (NPT) | 0.5–2 | 15–50 | 150–600 | 16–100 | S75.12 |
| | 0.5–2 | 15–50 | N/A | 160–400 | |
| Socketweld | 0.5–4 | 15–50 | 150–600 | 16–100 | S75.15 |
| | 0.5–4 | 15–50 | 900–2500 | 160–400 | |
| Buttweld | 0.5–4 | 15–11 | 150–600 | 16–100 | S75.15 |
| | 6–36 | 150–900 | 150–600 | 16–100 | |
| | 0.5–24 | 15–600 | 900–2500 | 160–400 | |

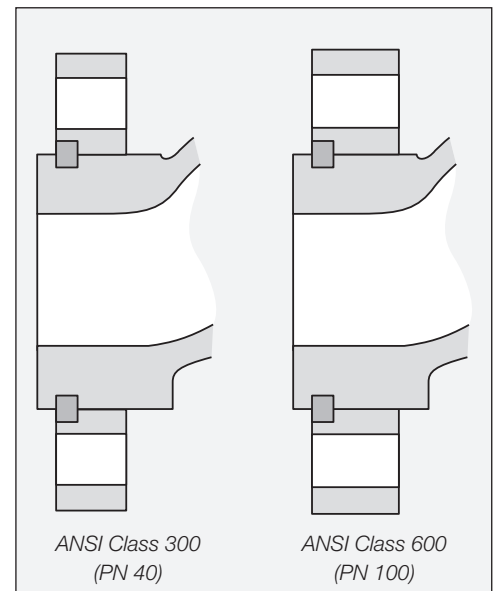


Figure 8: End flanges

End connections, flanges and bolting

The Mark One valve is designed with the bonnet and seat ring gaskets fully retained. Since the bonnet bottoms metal-to-metal in the body, the bonnet gasket compression is determined by the depth of the gasket step on the bonnet, which is machined to provide the required gasket compression.

When the bonnet is fully installed, force is transmitted through the seat retainer to secure the seat ring in position. The body, seat retainer and seat ring are all machined to close tolerances to provide the proper gasket compression. Unlike the bonnet, the seat ring does not always bottom in the body, allowing this small clearance to compensate for manufacturing tolerances and thermal expansion.

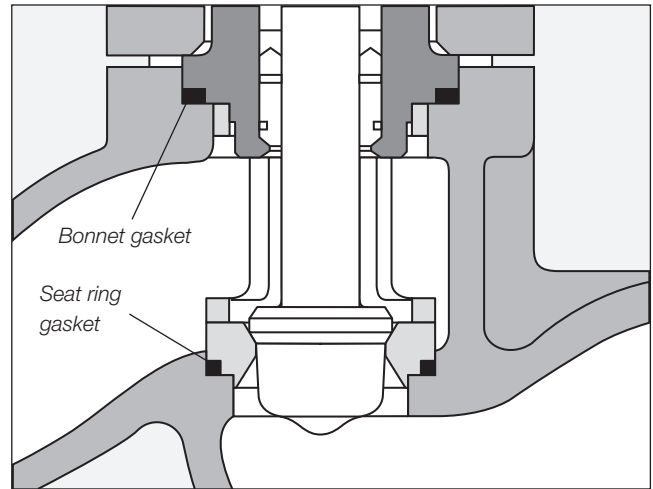


Figure 9: Body gaskets

Table 2: Gasket Specifications

| End Connection | Type | Gasket Material | Maximum Gasket Temp. | | Minimum Gasket Temp. | |
|-------------------|---------------------------|------------------------|----------------------|-------------------|----------------------|-------------------|
| | | | °C | °F | °C | °F |
| Standard Gaskets | Flat | PTFE | 177 | 350 | -130 | -200 |
| | Spiral-wound ³ | 316 S.S./Graphite | 816 ² | 1500 ² | -196 | -320 |
| Alternate Gaskets | Flat | KEL-F | 177 | 350 | -196 ¹ | -320 ¹ |
| | Flat | FEP | 204 | 400 | -196 | -320 |
| | Spiral-wound ³ | 316 S.S./Thermiculite® | 816 | 1500 | -30 | -20 |
| | Metal O-ring | Inconel® X-750 | 816 | 1500 | -30 ¹ | -20 ¹ |

¹ Lower temperature available upon request.

² Limited to (427°C) 8000°F for oxidizing service.

³ Alloy spiral windings available upon request.

Yoke clamps

The actuator is typically attached to the Mark One body assembly with two precision-cast, stainless steel yoke clamps. In some cases, however, the actuator is bolted directly to the bonnet. Each clamp has an inclined plane surface which, when bolted together, securely fastens the actuator yoke to the bonnet.

Unlike conventional threaded clamps, the clamp design permits easy removal, even under extremely corrosive conditions. Associated bolts and locknuts are supplied in plated carbon steel, although stainless steel is also available when required.

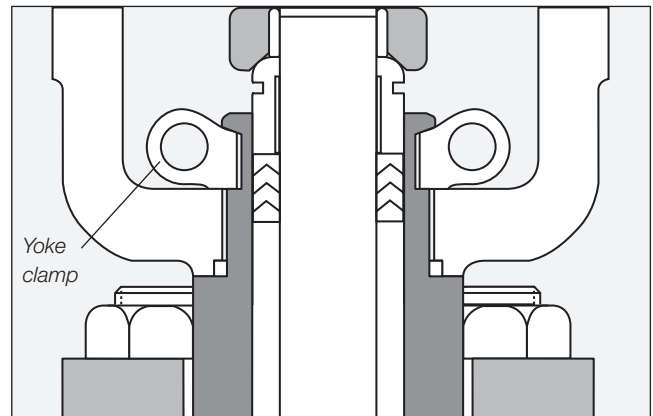


Figure 10: Yoke clamp

Bonnet types

Standard bonnet

The Mark One bonnet is usually constructed of the same material as the body and handles temperatures from -30°C to 400°C (-20°F to 750°F). See Table 4 on page 10 for packing limitations.

Extended bonnet

The extended bonnet protects the packing from excessive heat or cold, which may inhibit valve performance. The bonnet is constructed of carbon steel for temperatures from -30°C to 427°C (-20°F to 800°F) and of 304 or 316 stainless steel for -100°C to 816°C (-150°F to 1500°F).

Cold box extended bonnet

The cold box extended bonnet permits stagnated, moderate temperature gas to form in the bonnet, which protects the packing from the service fluid. Typically manufactured from 304 or 316 stainless steel, it handles temperatures down to -253°C (-423°F). Standard construction consists of stainless steel bonnet flange and bolting.

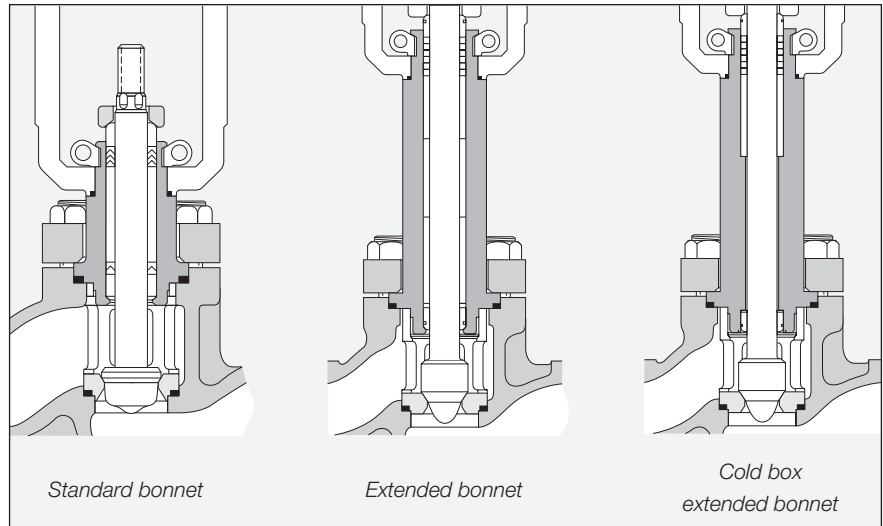


Figure 11: Mark One bonnet types

Mark One K-bellows seal

(see Figure 12: Mark One with K-Bellows on page 9)

The K-Bellows can be designed for virtually any process condition. The externally pressurized, hydro-formed bellows design is robust and reliable. Hydro-formed bellows are manufactured from thin metal sheets that are rolled into a tube with the edge of the tube fused together.

The K-Bellows is welded to a seal at the top of the bonnet and stretches down the valve stem to the end where it is welded just above the plug head. The shroud-less design is popular in the chemical industry.

Bellows materials: Bellows materials should be selected based on the most difficult requirements for the application. For example, a bellows sealed valve installed in a dry chlorine service should determine material selection based on moisture accessing the system.

A carbon steel, stainless steel or alloy body should be chosen with Monel® or Hastelloy® C trim. A Hastelloy C bellows should always be recommended. Even though Monel is available, it should not be recommended. Monel is an excellent choice for dry chlorine, but does not do well against wet chlorine.

Bellows length: Bellows cycle life is related to the length of the bellows. The Mark One includes various bellows seal lengths. The K-Bellows can be designed with lengths that maximize cycle life for a specific application.

Placement of the neutral position: The neutral position is the position where the bellows is completely relaxed. The Mark One K-Bellows is designed in the neutral position at 50% of the valve stroke. The cycle life of the bellows seal is extended, as it only absorbs 50% of the total valve stroke.

Pressure limitations: ANSI pressure classes 150, 300, 600, 900 and 1500 are standard. Higher-pressure bellows can be engineered upon request.

Temperature limitations: The temperature limit depends on the bellows type and material used. K-Bellows can operate at temperatures ranging from -80°C to 400°C (-90°F to 750°F).

Size limitations: K-Bellows are typically available on valve sizes 6 and smaller. Larger sizes can be designed upon request.

NOTE: Bellows seals are designed for special service conditions and not to valve's design class; therefore, complete and accurate service conditions must be specified.

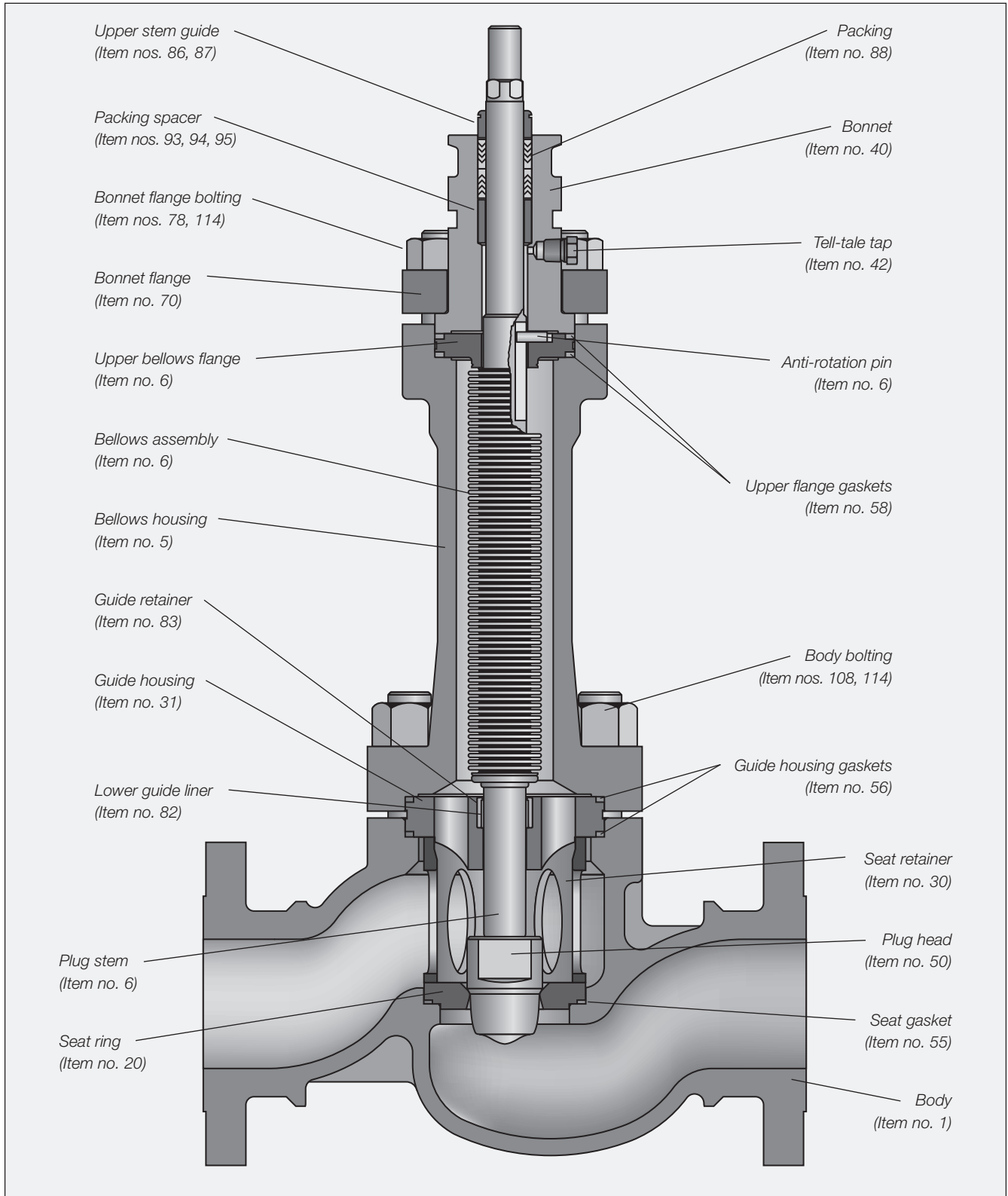


Figure 12: Mark One with K-Bellows

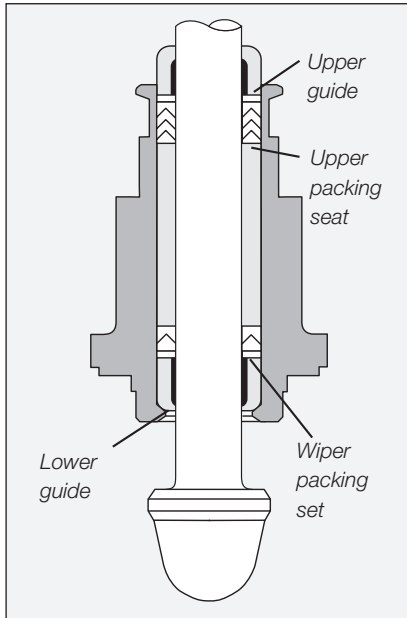
NOTE: Item numbers correspond directly to the valve's bill of material.

Packing and guiding

Packing box

Standard Valtek packing boxes are deeper than most conventional types, providing the following advantages:

1. The spacing between the wiper set and the main upper packing set prevents contamination of the upper packing. The upper set is positioned far enough away from the wiper set to avoid contact with any part of the plug stem that has been exposed to the flowing medium. The wiper set is designed to minimize the amount of fluid on the plug stem.
2. Bonnets are designed to permit a wide variety of packing configurations, including a double set of packing, without changing bonnets.



3. Two widely spaced stem guides, when used with the Mark One valve's large plug stem diameter, provide exceptional guiding. The upper stem guide also acts as a packing follower; the lower guide is situated close to the plug head for additional guiding support, ensuring accurate alignment of plug and seat ring.
4. Graphite-lined stainless steel guides provide superior guiding over wide temperature ranges and completely eliminate guide/stem galling. A variety of guides are available for various applications, including solid brass, Alloy 6 and glass-filled PTFE-lined stainless steel.
5. For standard and environmental packing systems, see technical bulletin VLENTB0040-01.

Table 3: Guides

| Standard Materials | Max Temp. | Min Temp. | Maximum Pressure |
|-----------------------------|-----------------|-------------------|--|
| Graphite-lined SS*** | 816°C (1500°F) | -196°C (-320°F) | 1400 psig/96.6 barg to 2 in/DN 50 1000 psig/69.0 barg 3–4 in/DN 80–100 850 psig/58.6 barg 6 in DN 150 and up |
| Glass-filled | 148.9°C (300°F) | -198.3°C (-325°F) | 1400 psig/96.5 barg @ 60°F/15.5°C |
| Solid Bronze | 260°C (500°F) | -253°C (-423°F) | Same as body |
| Solid Alloy 6 | 816°C (1500°F) | -253°C (-423°F) | Same as body |

Table 4: Packing

| Bonnet Type | Packing Material | Service Fluid Temperature Limitation | |
|-----------------------------|--------------------------------------|--------------------------------------|--------|
| Standard** Bonnet | PTFE, PTFE/AFP and Glass-filled PTFE | 260°C | 500°F |
| | Graphite/AFP | 400°C | 750°F |
| | Graphite/AFP, Inconel wire | 400°C | 750°F |
| | Graphite*** | 400°C | 750°F |
| Extended** Bonnet | PTFE, PTFE/AFP and Glass-filled PTFE | 316°C | 600°F |
| | Graphite/AFP | 650°C | 1200°F |
| | Graphite/AFP, Inconel wire | 650°C | 1200°F |
| | Graphite*** | 816°C | 1500°F |
| Cryogenic Extended Length** | | | |
| 15, 18-in (38, 46 cm) | PTFE | -196°C | -320°F |
| 24, 27-in (38, 46 cm) | PTFE | -253°C | -423°F |

*Temperatures assume environmental temperature is less than 32°C (90°F); 8–12-in (DN 200–300) ANSI Class 150–600 (PN 160–400) and 3–12-in (DN 80–300) ANSI Class 900–2500 (PN 160–400) handles temperatures to 454°C (850°F).

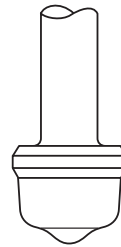
**ANSI B16.34 specifies acceptable pressure temperature limits for pressure-retaining materials. Consult the factory for additional information.

***Do not use graphite above 427°C (800°F) in oxidizing service such as air or oxygen. The use of graphite packing may require oversize actuators or heavier springs due to added friction.

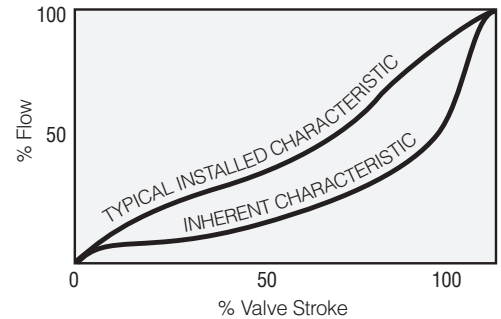
Flow characteristics, trim types

Equal percentage

Equal percentage is the characteristic most commonly used in process control. The change in flow per unit of valve stroke is directly proportional to the flow occurring just before the change is made. While the flow characteristic of the valve may be equal percentage, most control loops produce an installed characteristic, which approaches linear when the overall system pressure drop is large relative to that across the valve.

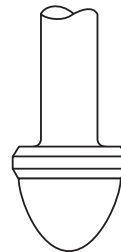


Equal percentage

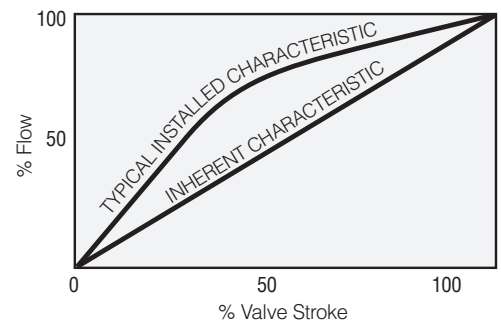


Linear

Linear inherent characteristic produces equal changes in flow per unit of valve stroke, regardless of plug position. Linear plugs are used on those systems where the valve pressure drop is a major portion of the total system pressure drop.

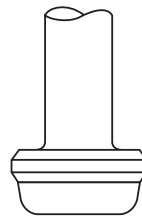


Linear



Quick-open

Quick-open plugs are used for on-off service and are primarily designed to produce maximum flow quickly.



Quick-open

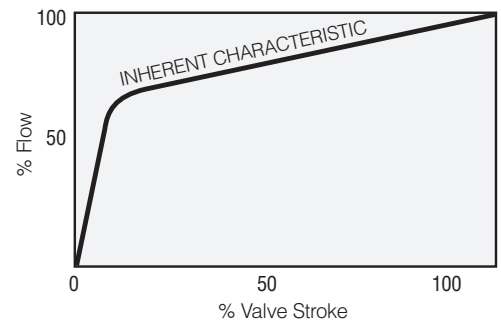


Figure 13: Flow characteristics

Trim types

Three trim types are available. Standard full-area trim provides maximum C_v . Reduced trim is available in a wide variety of sizes when lower C_v values and large bodies are required. Integral trim uses a special seat machined into the body and an oversized plug to provide additional C_v beyond the capabilities of full-area trim.

Mark One valves can be converted from one trim type to another, since all seat rings and plugs with a given size and pressure class are completely interchangeable. Integral trim is available by removing the seat ring and changing the plug.

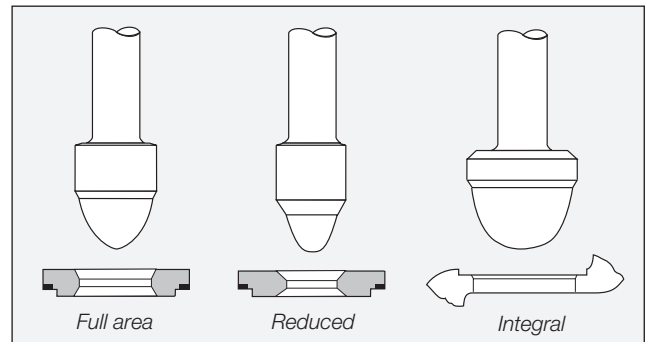
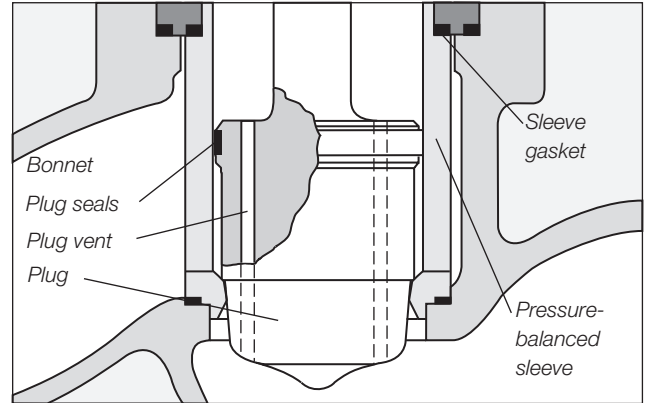
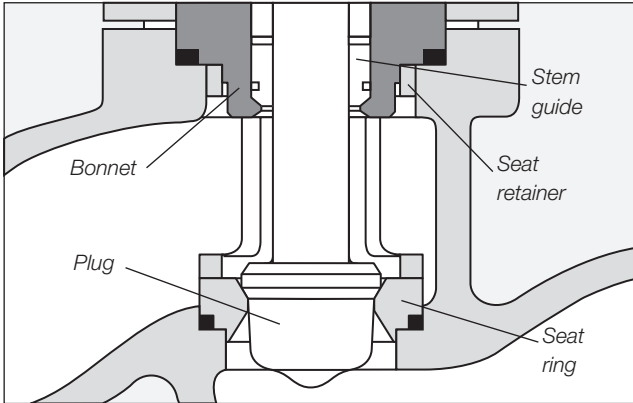


Figure 14: Typical trim types

Standard and pressure-balanced trims



Mark One valve trim is designed to avoid the difficulties associated with screwed-in seats and cage-guiding. The seat ring is clamped into the body by the bonnet and seat retainer; thus, removal of the seat is easy, even under extremely corrosive conditions.

Unlike cage-guided trims that easily gall and stick, Mark One plugs are double-stem guided, avoiding contact between the seat retainer and plug. Because no contact is made with the plug, the retainer can be constructed of stainless steel, rather than costly hard materials. The flow characteristic is determined by the plug contour, rather than by the opening in the retainer.

Low-noise seat designs have been developed for better noise control in standard Mark One valves.

Metal seats

Metal-seated valves handle Class IV shutoff (ANSI B16.104, 1976 – FCI 70-2). This class calls for maximum permissible seat leakage of 0.01% of rated valve capacity. All Valtek control valves are seat-leak tested after assembly and substantially lower in leakage than called for by this class. This exceptional seat tightness is obtained by aligning the seat ring with the plug during assembly. Additional seat tightness using metal seats is available as an option.

In high-pressure drop applications, pressure-balanced trim is used to reduce the thrust necessary to stroke the plug by reducing the trim off-balance area. Because the pressure-balanced plug fits closely to the retainer, this trim should only be used in generally clean services.

Flow direction is under-the-plug for fail-closed and over-the-plug for fail-open. The seal area less the stem area is designed to be slightly larger than the seat area; therefore, the plug is off-balanced to close for flow under the seat and off-balanced to open for flow over the seat.

Soft seats

The Mark One soft seat is used in applications requiring ANSI Class VI 'bubble-tight' shutoff. Its design consists of an elastomer sandwiched between two metal pieces. The assembled soft seat is interchangeable with the hard seat for a given size and pressure rating. Inserts are often constructed of PTFE; therefore, maximum pressure is 6250 psi (430 bar) and the maximum temperature is 176°C (350°F) for PTFE and 232°C (450°F) for reinforced PTFE. For temperatures below -65°C (-85°F), PTFE soft seats can be used in high-pressure applications.

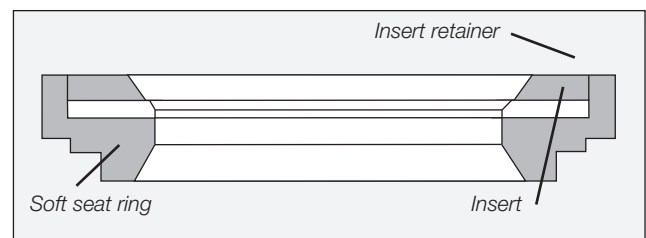


Figure 15: Typical soft seat configuration

Table 5: Standard Seal Temperature Ranges

| PTFE Sleeve | -1960°C (-3200°F) @ full rating or 1500°C (3000°F) @ 150 psig (10.3 barg) | |
|------------------------------|---|-----------------|
| Rene 41 | 427°C to 871°C | 800°F to 1600°F |
| Spring Energized PTFE | -221°C to 302°C | -365°F to 575°F |
| Viton | -40°C to 225°C | -40°F to 437°F |

Trim materials, data

Standard plug and seat ring material is 316 stainless steel, except special alloy bodies where trims are finished in the same material as the body. A wide variety of services are successfully handled by stainless steel trim parts. Nevertheless, a general rule is for temperatures above 316°C (600°F). Alloy 6 is stocked for many valve trim parts. This material offers a good combination of relative hardness and corrosion resistance. Special alloys, such as Alloy 20, Hastelloy C and Monel, are also available.

Table 6: Material Harness Ratings

| Trim Material | Hardness Rockwell C | Corrosion Resistance* |
|-------------------------|---------------------|------------------------------|
| 316 S.S. | 8 | Excellent |
| Alloy 6 | 44 | Good to excellent |
| 416 S.S. | 40 | Fair |
| 440C S.S. | 56 | Fair |
| 17-4 PH | 40 | Excellent |
| Colmonoy | 45-50 | Fair to good |
| Tungsten Carbide | 72 | Good on bases; poor on acids |

*General rule only. Check specific application

Table 7: Standard Unbalanced Valve/Actuator Data

| Valve Size | | Rating Class | | Full Area Trim Size | | Seat Area | | Stem Diameter | | Stem Area | | Std. Act. Size* | Stroke | |
|-------------|------------|--------------|---------|---------------------|------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------|------|
| in | DN | ANSI | PN | in | cm | in ² | cm ² | in ² | cm ² | in ² | cm ² | | in | cm |
| 0.5 | 15 | 150-600 | 16-100 | 0.50 | 1.3 | 0.20 | 1.3 | 0.56 | 1.43 | 0.25 | 1.60 | 25 | 0.75 | 1.9 |
| 0.75 | 20 | 15-2500 | 16-400 | 0.72 | 1.8 | 0.41 | 2.6 | 0.56 | 1.43 | 0.25 | 1.60 | 25 | 0.75 | 1.9 |
| 1 | 25 | 150-600 | 16-100 | 0.81 | 2.1 | 0.52 | 3.3 | 0.56 | 1.43 | 0.25 | 1.60 | 25 | 0.75 | 1.9 |
| | | 900-1500 | 160-250 | 0.81 | 2.1 | 0.52 | 3.3 | 0.56 | 1.43 | 0.25 | 1.60 | 25 | 0.75 | 1.9 |
| | | 2500 | 400 | 0.72 | 1.8 | 0.41 | 2.6 | 0.56 | 1.43 | 0.25 | 1.60 | 25 | 0.75 | 1.9 |
| 1.5 | 40 | 150-600 | 16-100 | 1.25 | 3.2 | 1.20 | 7.9 | 0.88 | 2.22 | 0.60 | 3.88 | 25 | 1.00 | 2.5 |
| | | 900-1500 | 160-250 | 1.25 | 3.2 | 1.20 | 7.9 | 0.88 | 2.22 | 0.60 | 3.88 | 50 | 1.00 | 2.5 |
| | | 2500 | 400 | 1.00 | 2.5 | 0.79 | 5.1 | 0.88 | 2.22 | 0.60 | 3.88 | 50 | 0.75 | 1.9 |
| 2 | 50 | 150-600 | 16-100 | 1.62 | 4.1 | 2.07 | 13.4 | 0.88 | 2.22 | 0.60 | 3.88 | 25 | 1.50 | 3.8 |
| | | 900-1500 | 160-250 | 1.62 | 4.1 | 2.07 | 13.4 | 0.88 | 2.22 | 0.60 | 3.88 | 50 | 1.50 | 3.8 |
| | | 2500 | 400 | 1.25 | 3.2 | 1.23 | 7.9 | 0.88 | 2.22 | 0.60 | 3.88 | 50 | 1.00 | 2.5 |
| 3 | 80 | 150-600 | 16-100 | 2.62 | 6.7 | 5.41 | 34.9 | 1.13 | 2.86 | 0.99 | 6.39 | 50 | 2.00 | 5.1 |
| | | 900-1500 | 160-250 | 2.62 | 6.7 | 5.41 | 34.9 | 1.50 | 3.81 | 1.77 | 11.40 | 100 | 2.00 | 5.1 |
| | | 2500 | 400 | 2.00 | 5.1 | 3.14 | 20.3 | 1.13 | 2.86 | 0.99 | 6.39 | 100 | 1.50 | 3.8 |
| 4 | 100 | 150-600 | 16-100 | 3.50 | 8.9 | 9.62 | 62.1 | 1.13 | 2.86 | 0.99 | 6.39 | 50 | 2.50 | 6.4 |
| | | 900-1500 | 160-250 | 3.50 | 8.9 | 9.62 | 62.1 | 1.50 | 3.81 | 1.77 | 11.40 | 100 | 2.50 | 6.4 |
| | | 2500 | 400 | 2.62 | 6.7 | 5.41 | 34.9 | 1.50 | 3.81 | 1.77 | 11.40 | 100 | 2.00 | 5.1 |
| 6 | 150 | 150 | 16 | 5.00 | 12.7 | 19.63 | 126.7 | 1.13 | 2.86 | 0.99 | 6.39 | 50 | 3.00 | 7.6 |
| | | 300-1500 | 40-250 | 5.00 | 12.7 | 19.63 | 126.7 | 2.00 | 5.08 | 3.14 | 20.30 | 100 | 3.00 | 7.6 |
| | | 2500 | 400 | 4.00 | 10.2 | 12.57 | 81.1 | 2.00 | 5.08 | 3.14 | 20.30 | 100 | 3.00 | 7.6 |
| 8 | 200 | 150 | 16 | 6.25 | 15.9 | 30.68 | 197.9 | 1.50 | 3.81 | 1.77 | 11.40 | 100 | 4.00 | 10.2 |
| | | 300-600 | 40-100 | 6.25 | 15.9 | 30.68 | 197.9 | 2.00 | 5.08 | 3.14 | 20.30 | 100 | 4.00 | 10.2 |
| | | 900-1500 | 160-250 | 6.25 | 15.9 | 30.68 | 197.9 | 2.50 | 6.35 | 4.91 | 31.70 | 100 | 4.00 | 10.2 |
| | | 2500 | 400 | 5.00 | 12.7 | 19.63 | 126.7 | 2.50 | 6.35 | 4.91 | 31.70 | 100 | 3.00 | 7.6 |
| 10 | 250 | 150 | 16 | 8.75 | 22.2 | 60.13 | 388.0 | 2.00 | 5.08 | 3.14 | 20.30 | 100 | 4.00 | 10.2 |
| | | 300-600 | 40-100 | 8.75 | 22.2 | 60.13 | 388.0 | 2.50 | 6.35 | 4.91 | 31.70 | 100 | 4.00 | 10.2 |
| | | 900-1500 | 160-250 | 8.00 | 20.3 | 50.27 | 324.3 | 3.00 | 7.62 | 7.07 | 45.60 | 100 | 4.00 | 10.2 |
| | | 2500 | 400 | 6.25 | 15.9 | 30.68 | 197.9 | 3.00 | 7.62 | 7.07 | 45.60 | 100 | 4.00 | 10.2 |
| 12 | 300 | 150 | 16 | 9.50 | 24.1 | 70.88 | 457.3 | 2.00 | 5.08 | 3.14 | 20.30 | 100 | 4.00 | 10.2 |
| | | 300-600 | 40-100 | 9.50 | 24.1 | 70.88 | 457.3 | 3.00 | 7.62 | 7.07 | 45.60 | 100 | 4.00 | 10.2 |
| | | 900-2500 | 160-400 | 8.00 | 20.3 | 50.27 | 324.3 | 3.00 | 7.62 | 7.07 | 45.60 | 100 | 4.00 | 10.2 |
| 14 | 350 | 150 | 16 | 11.00 | 27.9 | 95.03 | 613.1 | 3.00 | 7.62 | 7.07 | 45.60 | 100 | 4.00 | 10.2 |
| | | 300-600 | 40-100 | 11.00 | 27.9 | 95.03 | 613.1 | 3.00 | 7.62 | 7.07 | 45.60 | 100 | 4.00 | 10.2 |

*Minimum standards actuator size. Oversized actuators may be required for large pressure drops.

Trim data, hard-facing

Table 8: Standard Pressure-balanced Valve/Actuator Data

| Valve Size | Rating Class | | Full Area Trim Size* | | Seat Area | | Stem Center Diameter | | Stem Area | | Sleeve Area | | Off-balance Area | | | | Std. Act. Size | Stroke | | |
|------------|--------------|------|----------------------|-------|-----------|--------|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------|-------|-------------------|-------|----------------|--------|-----|----|
| | in | DN | ANSI | PN | in | cm | in ² | cm ² | in ² | cm ² | in ² | cm ² | Flow-under to Close | | Flow-over to Open | | | in | cm | |
| 2 | 50 | 600 | 100 | 1.62 | 4.1 | 2.07 | 14.4 | 0.562 | 3.63 | 0.25 | 3.63 | 2.58 | 16.6 | 0.26 | 1.7 | 0.51 | 3.3 | 25 | 1 | 3 |
| | | 1500 | 250 | 1.62 | 4.1 | 2.07 | 14.4 | 0.562 | 3.63 | 0.25 | 3.63 | 2.41 | 15.5 | 0.09 | 0.6 | 0.34 | 2.2 | 50 | 1 | 3 |
| | | 2500 | 400 | 1.25 | 3.2 | 1.23 | 7.9 | 0.562 | 3.63 | 0.25 | 3.63 | 1.55 | 10.0 | 0.07 | 0.5 | 0.32 | 2.1 | 50 | 1 | 3 |
| 3 | 80 | 600 | 100 | 2.62 | 6.7 | 5.41 | 34.9 | 0.875 | 5.65 | 0.60 | 3.88 | 6.77 | 43.7 | 0.76 | 4.9 | 1.36 | 8.8 | 50 | 1.5 | 4 |
| | | 1500 | 250 | 2.62 | 6.7 | 5.41 | 34.9 | 0.875 | 5.65 | 0.60 | 3.88 | 6.49 | 41.9 | 0.48 | 3.1 | 1.08 | 7.0 | 100 | 2 | 5 |
| | | 2500 | 400 | 2.00 | 5.0 | 3.14 | 20.3 | 0.875 | 5.65 | 0.60 | 3.88 | 3.86 | 24.9 | 0.12 | 0.8 | 0.72 | 4.6 | 100 | 1.5 | 4 |
| 4 | 100 | 600 | 100 | 3.50 | 9.0 | 9.62 | 62.0 | 0.875 | 5.65 | 0.60 | 3.88 | 11.41 | 73.6 | 1.19 | 7.7 | 1.79 | 11.5 | 50 | 2 | 5 |
| | | 1500 | 250 | 3.50 | 9.0 | 9.62 | 62.0 | 1.125 | 7.26 | 0.99 | 6.41 | 11.41 | 73.6 | 0.80 | 5.2 | 1.79 | 11.5 | 100 | 2 | 5 |
| | | 2500 | 400 | 2.62 | 6.7 | 5.41 | 34.9 | 1.125 | 7.26 | 0.99 | 6.41 | 6.77 | 43.7 | 0.37 | 2.4 | 1.36 | 8.8 | 100 | 2 | 5 |
| 6 | 150 | 150 | 16 | 5.00 | 13.0 | 19.63 | 126.7 | 1.125 | 7.26 | 0.99 | 6.41 | 22.69 | 146.4 | 2.06 | 13.3 | 3.06 | 19.7 | 50 | 2.5 | 6 |
| | | 600 | 100 | 5.00 | 13.0 | 19.63 | 126.7 | 1.5 | 9.70 | 1.77 | 11.40 | 23.76 | 153.3 | 2.36 | 15.2 | 4.13 | 26.6 | 100 | 2.5 | 6 |
| | | 1500 | 250 | 5.00 | 13.0 | 19.63 | 126.7 | 1.5 | 9.70 | 1.77 | 11.40 | 22.69 | 146.4 | 1.29 | 8.3 | 3.06 | 19.7 | 100 | 2.5 | 6 |
| | | 2500 | 400 | 4.00 | 10.0 | 12.57 | 81.1 | 1.5 | 9.70 | 1.77 | 11.40 | 15.03 | 97.0 | 0.69 | 4.4 | 2.46 | 15.9 | 100 | 2.5 | 6 |
| 8 | 200 | 600 | 100 | 6.25 | 15.9 | 30.68 | 197.9 | 1.5 | 9.70 | 1.77 | 11.40 | 35.78 | 230.9 | 3.33 | 21.5 | 5.10 | 32.9 | 100 | 3 | 19 |
| | | 1500 | 250 | 6.25 | 15.9 | 30.68 | 197.9 | 2.0 | 13.00 | 3.14 | 20.30 | 35.78 | 230.9 | 1.96 | 12.6 | 5.10 | 32.9 | 100 | 4 | 26 |
| | | 2500 | 400 | 5.00 | 13.0 | 19.63 | 126.7 | 2.0 | 13.00 | 3.14 | 20.30 | 23.76 | 153.3 | 0.99 | 6.4 | 4.13 | 26.6 | 100 | 3 | 19 |
| 10 | 250 | 600 | 100 | 8.00 | 20.0 | 50.27 | 324.3 | 2.0 | 13.00 | 3.14 | 20.30 | 58.36 | 376.5 | 4.95 | 31.9 | 8.09 | 52.2 | 100 | 3 | 19 |
| | | 1500 | 250 | 8.00 | 20.0 | 50.27 | 324.3 | 2.5 | 16.00 | 4.91 | 31.70 | 58.36 | 376.5 | 3.18 | 20.5 | 8.09 | 52.2 | 100 | 4 | 26 |
| | | 2500 | 400 | 6.25 | 15.9 | 30.68 | 197.9 | 2.5 | 16.00 | 4.91 | 31.70 | 37.12 | 239.5 | 1.53 | 9.9 | 6.44 | 41.6 | 100 | 4 | 26 |
| 12 | 300 | 600 | 100 | 9.50 | 24.0 | 70.88 | 457.3 | 2.5 | 16.00 | 4.91 | 31.70 | 82.52 | 532.4 | 6.73 | 43.4 | 11.64 | 75.1 | 100 | 4 | 26 |
| | | 1500 | 250 | 9.50 | 24.0 | 70.88 | 457.3 | 2.5 | 16.00 | 4.91 | 31.70 | 79.53 | 513.1 | 3.74 | 24.1 | 8.65 | 55.8 | 100 | 4 | 26 |
| | | 2500 | 400 | 8.00 | 20.0 | 50.27 | 324.3 | 2.5 | 16.00 | 4.91 | 31.70 | 56.75 | 366.2 | 1.57 | 10.1 | 6.48 | 41.8 | 100 | 4 | 26 |
| 14 | 350 | 150 | 16 | 11.00 | 28 | 95.03 | 613.1 | 2.5 | 16.00 | 4.91 | 31.70 | 108.43 | 699.6 | 8.49 | 54.8 | 13.40 | 86.5 | 100 | 8 | 52 |
| | | 600 | 100 | 11.00 | 28.0 | 95.03 | 613.1 | 3.0 | 19.00 | 7.07 | 45.60 | 106.05 | 684.2 | 3.95 | 25.5 | 11.02 | 71.1 | 100 | 8 | 52 |
| | | 1500 | 250 | 11.00 | 28.0 | 95.03 | 613.1 | 3.0 | 19.00 | 7.07 | 45.60 | 103.87 | 670.2 | 1.77 | 11.4 | 8.84 | 57.0 | 100 | 8 | 52 |
| 16 | 400 | 600 | 100 | 12.75 | 32.4 | 127.68 | 823.8 | 3.0 | 19.00 | 7.07 | 45.60 | 148.49 | 958.1 | 13.74 | 88.7 | 20.81 | 134.3 | 100 | 8 | 52 |
| | | 1500 | 250 | 12.75 | 32.4 | 127.68 | 823.8 | 3.0 | 19.00 | 7.07 | 45.60 | 140.61 | 907.2 | 5.86 | 37.8 | 12.93 | 83.4 | 100 | 8 | 52 |

*This data does not apply to ChannelStream or MegaStream™ trim.

**Minimum standard actuator size. Oversized actuators may be required for large pressure drops.

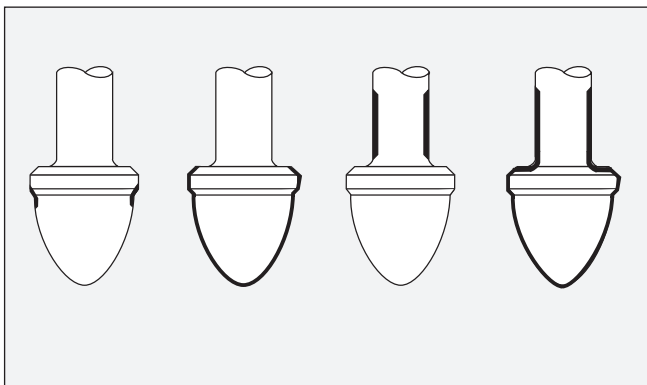


Figure 16: Hard-facing variations — plug

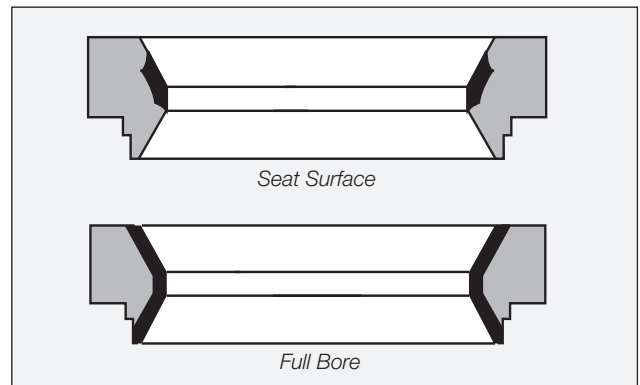


Figure 17: Hard-facing variations — seat

C_v Data

Use Performance! valve sizing software for C_v data according to trim characteristic, body rating and flow direction.

Standard materials of construction, estimated shipping weights

Table 9: Body Materials

| | |
|-----------------------------|---|
| Sizes | 0.5–48 in (DN 15–1200); Class 150–600 (PN 16–100) 0.5–24 in (DN 15–600); Class 900–2500 (PN 160–400) 0.5–12 in (DN15–300) Class 4500 (PN 700) |
| Forms | Globe, angle, three-way |
| ANSI Ratings | Class 150, 300, 600, 900, 1500, 2500 (PN 16, 40, 100, 160, 250, 400) |
| Materials | Carbon steel, stainless steel, Monel, nickel, chrome-moly, Titanium, Alloy 20, bronze, Hastelloy B, Hastelloy C, other castable materials |
| End Connections | Separable flange: 0.5–4 in (DN 15–100); Class 150–600 (PN 16–100) Integral flange; all sizes NPT: 0.5–2 in (DN 15–50) Socketweld: 0.5–4 in (DN 15–100) Grayloc: all sizes |
| Separable End Flange | Carbon steel, 316 stainless steel; other material as required |

Table 10: Bonnet Materials

| | |
|------------------|--|
| Types | Standard, standard extension, special length extension, bellows seal, cryogenic |
| Flange | Separable |
| Materials | Bonnet: same as body Bellows: stainless steel, other materials as required Bellows housing: carbon steel, 316 stainless steel, other materials as required Bonnet flange: carbon steel, 316 stainless steel, other materials as required |

Nameplate

Valves are equipped with stainless steel nameplates. An example is illustrated below.

| | |
|------------------------------------|-----------------------|
| Flowserve Corporation | |
| S/N _____ | MARK _____ SIZE _____ |
| CLASS _____ T/N _____ | Cv _____ CHAR _____ |
| <input type="radio"/> AIR TO _____ | SIGNAL _____ |
| <input type="radio"/> BODY _____ | TRIM _____ |
| TAG _____ | |
| P.O. _____ | |

**Table 11: Estimated Shipping Weights
Globe, Flanged Valves With Cylinder Actuators and Positioners**

| Size | | Weight in Pounds (kg) | | | | | | | | | | | | Add for Extd. Bonnet | |
|----------|-------|-----------------------|-----|--------------|-----|---------------|-----|---------------|-----|----------------|-----|----------------|------|----------------------|----|
| in | DN | CI 150 PN 16 | | CI 300 PN 40 | | CI 600 PN 100 | | CI 900 PN 160 | | CI 1500 PN 250 | | CI 2500 PN 400 | | | |
| 0.5–0.75 | 15–20 | 40 | 18 | 40 | 18 | 40 | 18 | | | | | | | 5 | 2 |
| 1 | 25 | 50 | 23 | 50 | 23 | 50 | 23 | 100 | 45 | 120 | 54 | 150 | 68 | 5 | 2 |
| 1.5 | 40 | 65 | 30 | 65 | 30 | 65 | 30 | 170 | 77 | 180 | 82 | 210 | 95 | 5 | 2 |
| 2 | 50 | 75 | 34 | 75 | 34 | 75 | 34 | 200 | 91 | 220 | 100 | 300 | 136 | 5 | 2 |
| 3 | 80 | 160 | 73 | 170 | 77 | 180 | 82 | 400 | 182 | 430 | 195 | 500 | 227 | 15 | 7 |
| 4 | 100 | 240 | 109 | 250 | 114 | 265 | 120 | 590 | 268 | 610 | 277 | 940 | 427 | 20 | 9 |
| 6 | 150 | 360 | 163 | 570 | 259 | 600 | 272 | 1000 | 454 | 1170 | 531 | 1400 | 636 | 40 | 18 |
| 8 | 200 | 590 | 268 | 790 | 359 | 830 | 377 | 1100 | 499 | 1320 | 599 | 1740 | 790 | 65 | 30 |
| 10 | 250 | 1050 | 477 | 1405 | 638 | 1600 | 726 | 2050 | 931 | 2200 | 999 | 2600 | 1180 | 90 | 41 |

Part identification

Nearly every part on a Valtek control valve has an identification number, along with material code number. For example, on the plug stem flats, the trim number and flow characteristic of the plug are identified.

Table 12: Oversize Actuator Weights (lb/kg)

| Original Size | Oversize | Add |
|---------------|----------|--------|
| 25 | 50 | 30/14 |
| 50 | 100 | 90/41 |
| 100 | 200 | 125/57 |

Standard materials of construction

Table 13: Packing

| | |
|-------------------------------|---|
| Configurations | Standard, twin seal, vacuum seal |
| Materials | PTFE V-ring, PTFE/AFP*, AFP/Inconel wire, glass-filled PTFE V-ring, braided PTFE, graphite, other materials as required |
| Lubrication (optional) | Lubricator with integral (and additional) isolation valve |

Table 14: Trim

| | | |
|--------------------------|--|--|
| Characteristics | Equal percentage, linear, quick-open | |
| Materials | 316 stainless steel 304 stainless steel 347 stainless steel 416 stainless steel Hastelloy B Hastelloy | Alloy 20 Nickel Titanium Monel 17-4 PH 440C |
| Hard Facings | Materials: Alloy 6, No. 5 Colmonoy Types: seat surface, full contour, full bore, lower stem guide area | |
| Soft Seat | PTFE, FEP, KEL-F, polyurethane, PEEK | |
| Pressure-balanced | Sizes: 2-inch (DN 50) and larger, Seal types: elastomer, metal | |

Table 15: Guides

| | |
|------------------|---|
| Type | Double-top stem |
| Materials | Glass-filled PTFE, graphite, Alloy 6, bronze; other materials as required |

Table 16: Gaskets

| | |
|--------------|--|
| Types | Spiral-wound: 304 or 316 stainless steel/ non-asbestos filler, PTFE, graphite Flat: PTFE, soft metal Metal O-ring: Inconel X750/silver plated |
|--------------|--|

Table 17: Actuators

| | |
|------------------------------|---|
| Types | Double-acting cylinder with positive fail-safe spring action Manual handwheel Electro-hydraulic Electro-mechanical |
| Sizes | Cylinder: 25, 50, 100 (standard); 200, 300, 400, 500, 600 (optional) Manual handwheel: 9, 12, 18, 24 in (23, 20, 46, 61 cm) diameter |
| Auxiliary | Side-mounted: continuously connected Top-mounted: continuously connected, pushonly, limit stops |
| Materials | Cylinder: anodized aluminum Piston: anodized aluminum Actuator stem: 416 stainless steel Yoke: ductile iron O-rings: nitrile |
| Action | Air-to-open, air-to-close (field reversible) |
| Max. Working Pressure | 150 psig (10.3 barg) Refer to IOM 2 for pressure limitations. |

Table 18: Positioners

| | |
|---------------------------|--|
| Types | Digital, pneumatic, electro-pneumatic |
| Input Signals | Digital: 4–20 mA, HART/FF communication Pneumatic: 3–15, 3–9, 9–15, 6–30 psig (0–1, 0–0.6, 0.6–1, 0.4–2.1 barg) and split ranges Electro-pneumatic: 4–20, 10–50 mA |
| Supply Pressure | 40–150 psig (2.8–10.3 barg) (no supply regulator required) |
| Standard Materials | Aluminum, stainless steel, nitrile, nickel-plated brass |
| Adjustments | Stroke range, zero, balance pressure |
| Action | Air-to-open, air-to-close (field reversible) |

*asbestos-free packing (AFP)

Dimensions

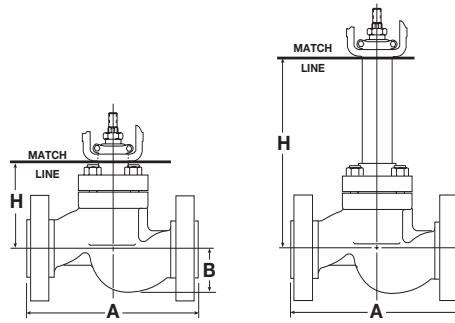


Table 19: Globe Body Dimensions – ASME Class 150, 300 and 600 (in/mm)

| Body Size | | A | | | | | | | | B | | | | H | | | | Clearance Above Actuator Required for Disassembly | |
|-----------|-----|--------------------------|------|------------------|-----|-------------------------|-----|-------------------|-----|-----|-----|-----------------|-----|-----------------|-----|-----------------|-----|---|--|
| | | ISA 75.08.07 (S75.20)* | | | | ISA 75.08.01 (S75.03)** | | | | | | | | Standard Bonnet | | Extended Bonnet | | | |
| | | Class 150-600; PN 16-100 | | Class 150; PN 16 | | Class 300; PN 40 | | Class 600; PN 100 | | | | Standard Bonnet | | Extended Bonnet | | | | | |
| NPS | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | |
| 0.5 | 15 | 8.51 | 2161 | 7.3 | 184 | 7.5 | 191 | 8.0 | 203 | 1.5 | 38 | 3.8 | 97 | 8.3 | 212 | 2.5 | 64 | | |
| 0.75 | 20 | 8.51 | 2161 | 7.3 | 184 | 7.6 | 194 | 8.1 | 206 | 1.5 | 38 | 3.8 | 97 | 8.3 | 212 | 2.5 | 64 | | |
| 1 | 25 | 8.5 | 216 | 7.3 | 184 | 7.8 | 197 | 8.3 | 210 | 1.8 | 44 | 3.8 | 97 | 8.3 | 212 | 2.5 | 64 | | |
| 1.5 | 40 | 9.5 | 241 | 8.8 | 222 | 9.3 | 235 | 9.9 | 251 | 2.3 | 59 | 5.2 | 132 | 9.7 | 246 | 4.0 | 102 | | |
| 2 | 50 | 11.5 | 292 | 10.0 | 254 | 10.5 | 267 | 11.3 | 286 | 2.3 | 57 | 5.4 | 138 | 9.9 | 252 | 4.5 | 114 | | |
| 3 | 80 | 14.0 | 356 | 11.8 | 298 | 12.5 | 318 | 13.3 | 337 | 3.4 | 86 | 6.8 | 172 | 12.3 | 312 | 5.8 | 147 | | |
| 4 | 100 | 17.0 | 432 | 13.9 | 353 | 14.5 | 368 | 15.5 | 394 | 5.2 | 133 | 8.4 | 214 | 13.9 | 354 | 7.5 | 190 | | |
| 6 | 150 | | | 17.8 | 451 | | | | | 5.5 | 139 | 10.1 | 256 | 15.6 | 395 | 10.0 | 254 | | |
| 6 | 150 | | | | | 18.6 | 473 | 20.0 | 508 | 5.8 | 146 | 12.3 | 311 | 17.8 | 451 | 10.0 | 254 | | |
| 8 | 200 | | | 21.4 | 543 | | | | | 7.1 | 180 | 12.5 | 318 | 18.0 | 457 | 10.9 | 277 | | |
| 8 | 200 | | | | | 22.4 | 568 | 24.0 | 610 | 7.5 | 190 | 14.4 | 365 | 19.9 | 505 | 11.4 | 290 | | |
| 10 | 250 | | | 26.5 | 673 | | | | | 8.4 | 214 | 14.1 | 359 | 19.6 | 498 | 11.9 | 302 | | |
| 10 | 250 | | | | | 27.9 | 708 | 29.6 | 752 | 8.9 | 227 | 14.1 | 359 | 20.6 | 524 | 12.1 | 308 | | |
| 12 | 300 | | | 29.0 | 737 | | | | | 9.6 | 243 | 14.1 | 359 | 19.6 | 498 | 12.6 | 320 | | |
| 12 | 300 | | | | | 30.5 | 775 | 32.3 | 819 | | | 16.3 | 413 | 22.8 | 578 | 12.6 | 320 | | |

*Separable flange **Integral flange †Valtek standard

Table 20: Globe Body Dimensions – ASME Class 900, 1500 and 2500 (in/mm)

| Body Size | | A | | | | | | B | | | | H | | | | | | Clearance Above Actuator Required for Disassembly | | | | | |
|-----------|-------|-----------------------------|------|------------|------|------------|-------|--------------------|-----|------------|-----|--------------------|-----|-----------------|-----|------|-----|---|-----|------|-----|------|-----|
| | | ISA 75.08.06 (S75.16 LONG)* | | | | | | Class 900 and 1500 | | Class 2500 | | Standard Bonnet | | Extended Bonnet | | | | | | | | | |
| | | Class 900 | | Class 1500 | | Class 2500 | | Class 900 and 1500 | | Class 2500 | | Class 900 and 1500 | | Class 2500 | | | | | | | | | |
| NPS | DN | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | in | mm | | |
| 0.5-1 | 15-25 | 11.5 | 292 | 11.5 | 292 | 12.5 | 318 | 1.8 | 46 | 1.8 | 46 | 5.6 | 124 | 6.8 | 173 | 10.1 | 257 | 11.3 | 287 | 3.6 | 91 | 3.6 | 91 |
| 1.5 | 40 | 13.1 | 333 | 13.1 | 333 | 15.0 | 381 | 2.7 | 69 | 2.4 | 61 | 8.7 | 221 | 8.7 | 221 | 13.2 | 335 | 13.2 | 335 | 5.6 | 142 | 5.6 | 142 |
| 2 | 50 | 14.8 | 375 | 14.8 | 375 | 16.3 | 413 | 2.8 | 71 | 3 | 76 | 8.7 | 221 | 8.7 | 221 | 13.2 | 335 | 13.2 | 335 | 6.1 | 155 | 6.1 | 155 |
| 3 | 80 | 17.4 | 441 | 18.1 | 460 | 26.0 | 660 | 4.2 | 107 | 3.7 | 94 | 11.4 | 290 | 12.9 | 328 | 18.4 | 467 | 19.9 | 506 | 8.4 | 213 | 8.3 | 211 |
| 4 | 100 | 20.1 | 511 | 20.9 | 530 | 29.0 | 737 | 4.4 | 112 | 5.4 | 137 | 12.4 | 315 | 14.6 | 371 | 19.4 | 493 | 21.6 | 549 | 9.7 | 246 | 10.7 | 272 |
| 6 | 150 | 28.1 | 714 | 30.3 | 768 | 34.0 | 864 | 7.2 | 183 | 7.3 | 185 | 19.4 | 493 | 17.4 | 442 | 26.4 | 671 | 27.3 | 693 | 12.2 | 310 | 13.6 | 345 |
| 8 | 200 | 36.0 | 914 | 38.3 | 972 | 40.3 | 1022 | 9.4 | 239 | 10.3 | 262 | 18.6 | 472 | 24.3 | 617 | 24.2 | 615 | 31.3 | 795 | 16.7 | 424 | 17.8 | 452 |
| 10 | 250 | 39.0 | 991 | 42.0 | 1067 | 54.01 | 13721 | 11.2 | 285 | 10 | 254 | 21.9 | 556 | 26 | 660 | 28.9 | 734 | 33 | 838 | 18.3 | 465 | 19.5 | 495 |
| 12 | 300 | 44.5 | 1130 | 48.0 | 1219 | 62.01 | 15751 | 14 | 356 | 12.9 | 328 | 26.6 | 676 | 28 | 711 | 33.6 | 853 | 35 | 889 | 19.4 | 493 | 20.5 | 521 |

*Integral flange †Valtek standard

Dimensions

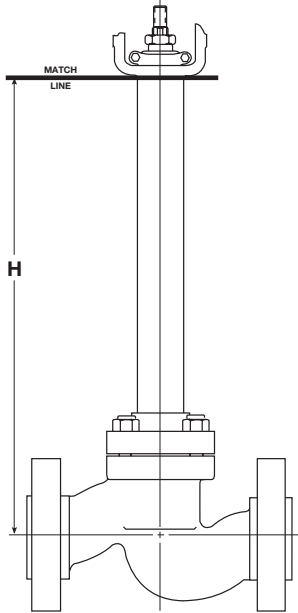


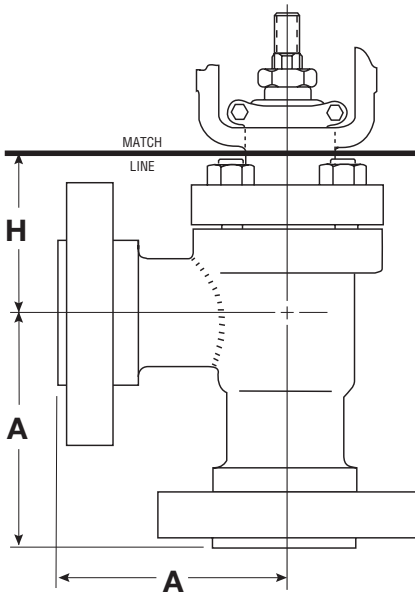
Table 21: Globe Cold Box Extended Bonnet (in/mm)*

| Body Size | | Body Rating | | H | | | | | |
|-----------|-------|-------------|--------|-----------------------------|-----|------|-----|------|-----|
| in | DN | ANSI Class | PN | Standard Cold Box Extension | | | | | |
| 0.5-1 | 15-20 | 150-600 | 16-100 | 15.0 | 381 | 24.0 | 610 | 27.0 | 686 |
| 1.5 | 40 | 150-600 | 16-100 | 15.0 | 381 | 24.0 | 610 | 27.0 | 686 |
| 2 | 50 | 150-600 | 16-100 | 15.3 | 387 | 24.3 | 616 | 27.3 | 692 |
| 3 | 80 | 150-600 | 16-100 | 18.0 | 457 | 24.0 | 610 | 27.0 | 686 |
| 4 | 100 | 150-600 | 16-100 | 18.0 | 457 | 24.0 | 610 | 27.0 | 686 |
| 6 | 150 | 150 | 16 | 18.0 | 457 | 24.0 | 610 | 27.0 | 686 |

*For all other body styles, consult factory.

Table 22: Angle Body (in/mm)

| Body Size | | Body Rating | | A | | H | | | | Clearance Required for Disassembly | |
|-----------|-------|-------------|--------|------|-----|-----------------|-----|-----------------|-----|------------------------------------|-----|
| in | DN | ANSI Class | PN | | | Standard Bonnet | | Extended Bonnet | | | |
| 0.5-1 | 15-25 | 150-600 | 16-100 | 4.3 | 108 | 3.1 | 78 | 7.6 | 192 | 2.5 | 64 |
| 1.5 | 40 | 150-600 | 16-100 | 4.8 | 121 | 3.6 | 92 | 8.1 | 206 | 4.0 | 102 |
| 2 | 50 | 150-600 | 16-100 | 5.8 | 146 | 3.9 | 100 | 8.2 | 214 | 4.5 | 114 |
| 3 | 80 | 150-600 | 16-100 | 7.0 | 178 | 4.9 | 124 | 10.4 | 264 | 5.8 | 147 |
| 4 | 100 | 150-600 | 16-100 | 8.8 | 222 | 6.2 | 156 | 11.7 | 295 | 7.5 | 190 |
| 6 | 150 | 150 | 16 | 8.9 | 226 | 7.1 | 180 | 12.6 | 320 | 10.0 | 254 |
| | | 300-600 | 40-100 | 11.0 | 279 | 9.5 | 241 | 15.0 | 381 | 10.0 | 254 |
| 8 | 200 | 150 | 16 | 13.0 | 330 | 9.0 | 229 | 14.5 | 368 | 13.8 | 349 |
| | | 300-600 | 40-100 | 13.0 | 330 | 10.8 | 275 | 16.3 | 414 | 13.8 | 349 |



| | | | | | | | | | | | |
|-------|-------|----------|---------|------|-----|------|-----|------|-----|------|-----|
| 0.5-1 | 15-25 | 900-1500 | 160-250 | 5.5 | 140 | 4.7 | 119 | 9.2 | 234 | 3.6 | 90 |
| | | 2500 | 400 | 6.0 | 152 | 5.8 | 147 | 10.3 | 262 | 3.6 | 90 |
| 1.5 | 40 | 900-1500 | 160-250 | 6.5 | 165 | 6.5 | 165 | 11.0 | 279 | 5.6 | 142 |
| | | 2500 | 400 | 7.5 | 191 | 7.0 | 178 | 11.5 | 292 | 5.6 | 142 |
| 2 | 50 | 900-1500 | 160-250 | 7.3 | 185 | 7.1 | 180 | 11.6 | 295 | 6.1 | 155 |
| | | 2500 | 400 | 8.9 | 226 | 7.9 | 201 | 12.4 | 315 | 6.1 | 155 |
| 3 | 80 | 900-1500 | 160-250 | 9.3 | 236 | 9.8 | 249 | 16.8 | 427 | 8.4 | 213 |
| | | 2500 | 400 | 13.0 | 330 | 11.2 | 284 | 18.2 | 462 | 8.3 | 211 |
| 4 | 100 | 900-1500 | 160-250 | 12.5 | 318 | 11.1 | 282 | 18.1 | 460 | 9.7 | 246 |
| | | 2500 | 400 | 14.5 | 368 | 12.6 | 320 | 19.6 | 498 | 10.7 | 272 |
| 6 | 150 | 900-1500 | 160-250 | 13.9 | 353 | 13.3 | 338 | 20.3 | 516 | 12.2 | 310 |
| | | 2500 | 400 | 17.0 | 432 | 16.1 | 409 | 23.1 | 537 | 13.6 | 345 |
| 8 | 200 | 900-1500 | 160-250 | 16.4 | 417 | 14.5 | 368 | 21.5 | 547 | 16.7 | 424 |
| | | 2500 | 400 | 20.1 | 511 | 20.8 | 528 | 27.8 | 706 | 17.8 | 452 |
| 10 | 250 | 900-1500 | 160-250 | 19.5 | 495 | 15.6 | 396 | 22.6 | 574 | 18.3 | 465 |
| | | 2500 | 400 | 25.0 | 635 | 21.1 | 536 | 28.1 | 714 | 16.3 | 414 |

Dimensions

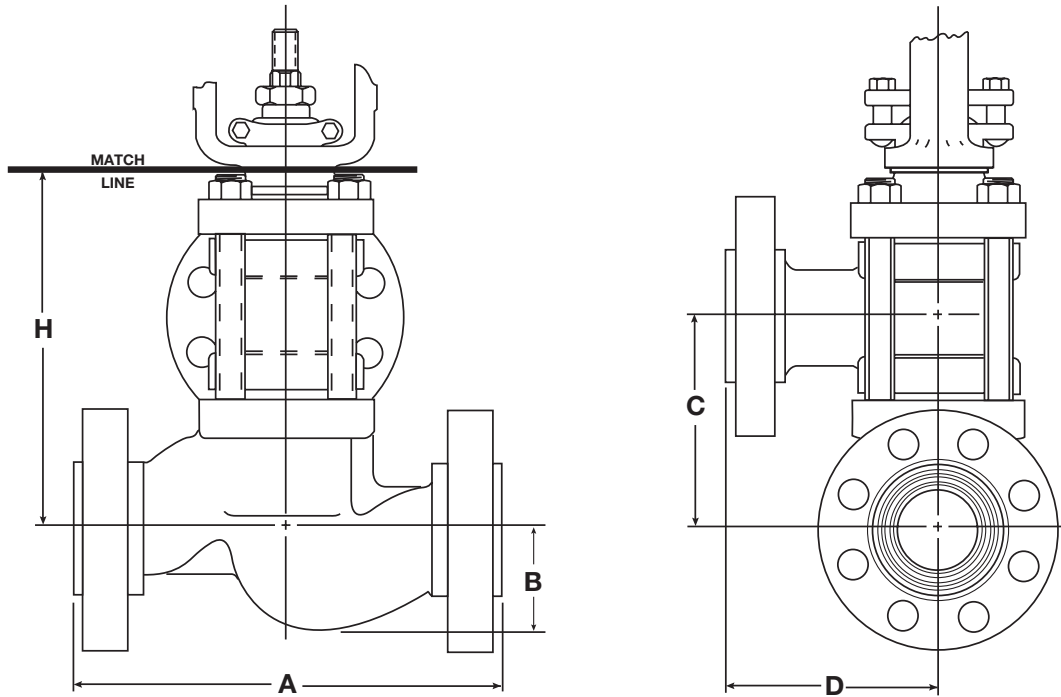


Table 23: Three-way Body (in/mm)

| Body Size | | A | | | | | | | | B | | C | | D | | H | | | | Clearance Required for Disassembly | |
|-----------|-------|--|--------------------|---------------------|--------------------|--------------------|---------------------|--------------------|--------------------|---------------------|-----|------|-----|------|-----|-----------------|-----------------|------|-----|------------------------------------|-----|
| in | DN | Sep. Flange Class* 150-600 PN 16-150 | | Integral Flange* | | | | | | | | | | | | Standard Bonnet | Extended Bonnet | | | | |
| | | Class 150 PN 16 | Class 300 PN 40 | Class 600 PN 100 | Class 150 PN 16 | Class 300 PN 40 | Class 600 PN 100 | Class 150 PN 16 | Class 300 PN 40 | Class 600 PN 100 | | | | | | | | | | | |
| 0.5-0.75 | 15-20 | 8.5 | 216 | 7.3 | 184 | 7.6 | 194 | 8.1 | 206 | 1.5 | 38 | 3.4 | 87 | 4.3 | 108 | 6.7 | 170 | 11.2 | 284 | 3.4 | 86 |
| 1 | 25 | 8.5 | 216 | 7.3 | 184 | 7.8 | 197 | 8.3 | 210 | 1.8 | 44 | 3.4 | 87 | 4.3 | 108 | 6.7 | 170 | 11.2 | 284 | 3.4 | 86 |
| 1.5 | 40 | 9.5 | 241 | 8.8 | 222 | 9.3 | 235 | 9.9 | 251 | 2.3 | 59 | 5.4 | 137 | 4.8 | 121 | 9.1 | 230 | 13.4 | 341 | 5.0 | 127 |
| 2 | 50 | 11.5 | 292 | 10.0 | 254 | 10.5 | 267 | 11.3 | 286 | 2.3 | 59 | 5.6 | 143 | 5.8 | 146 | 9.3 | 236 | 13.7 | 347 | 5.5 | 140 |
| 3 | 80 | 14.0 | 356 | 11.8 | 298 | 12.5 | 318 | 13.3 | 337 | 3.4 | 86 | 7.6 | 194 | 7.0 | 178 | 13.0 | 329 | 18.5 | 470 | 7.1 | 181 |
| 4 | 100 | 17.0 | 432 | 13.9 | 353 | 14.5 | 368 | 15.5 | 394 | 5.2 | 133 | 9.9 | 251 | 8.5 | 216 | 16.7 | 423 | 22.1 | 562 | 9.4 | 240 |
| 6 | 150 | | | 17.8 | 451 | | | | | 5.5 | 139 | 14.0 | 356 | 8.9 | 226 | 21.6 | 548 | 26.6 | 675 | 11.6 | 294 |
| 6 | 150 | | | | | 18.6 | 473 | 20.0 | 508 | 5.8 | 146 | 16.0 | 406 | 10.0 | 254 | 25.8 | 654 | 31.3 | 794 | 11.6 | 294 |
| 8 | 200 | | | 21.4 | 543 | | | | | 7.0 | 179 | 15.0 | 381 | 10.7 | 272 | 23.9 | 608 | 29.4 | 748 | 12.2 | 310 |
| 8 | 200 | | | | | 22.4 | 568 | 24.0 | 610 | 7.5 | 191 | 18.3 | 464 | 12.0 | 305 | 30.2 | 767 | 35.7 | 907 | 12.2 | 310 |

*according to ASME 75.08.07 (S75.20)

**according to ASME 75.08.01 (S75.03)

Applications



A 4-in Mark One with side-mounted handwheel operates a boiler feedwater system at a pulp plant.



This 2-in Guardian II valve operates in a chemical plant.



This cryogenic Mark One is used for aerospace testing as an O₂ vent.



This 8-in, back-pressure control valve operates in a liquid hydrocarbon plant with a 580 psi/40 bar upstream pressure.



(left) Mark One valves used to operate a PSA skid.

(right) A liquid nitrogen loading facility in Australia uses two Mark One valves for its emergency fire water system.





USA

Flowserve Flow Control Division
1350 N. Mountain Springs Parkway
Springville, UT 84663
USA
Phone: +1 801 489 8611
Fax: +1 801 489 3719

Austria

Flowserve Control Valves GmbH
Kasernengasse 6
9500 Villach
AUSTRIA
Phone: +43 (0) 4242 41181 – 0
Fax: +43 (0) 4242 41181 – 50

India

Flowserve India Controls Pvt Ltd.
Plot # 4, 1A, Road #8 EPIP
Whitefield Bangalore, Karnataka, 560066
INDIA
Phone: +91 80 40146200
Fax: +91 80 28410286

China

Flowserve Fluid Motion and
Control (Suzhou) Co., Ltd.
No. 35, Baiyu Road
Suzhou Industrial Park
Suzhou Jiangsu Province
P.R. 215021
CHINA
Phone: +(86 512) 6288 8790
Fax: +(86 512) 6288 8736

Singapore

Flowserve Pte. Ltd.
12 Tuas Avenue 20
Singapore 638824
REPUBLIC of SINGAPORE
Phone: +65 6879 8900
Fax: +65 6862 4940

Saudi Arabia

Flowserve Abahsain Flow Control Co., Ltd.
Makkah Road, Phase 4
Plot 10 & 12, 2nd Industrial City
Dammam
KINGDOM of SAUDI ARABIA
Phone: +966-3-857 3150
Fax: +966-3-857 4243

United Arab Emirates

Flowserve Gulf FZE
Building S 10112, South Zone One
Jebel Ali Freezone
P.O. Box 17678
Dubai
UNITED ARAB EMIRATES
Phone: +971 4 8153300
Fax: +971 4 8807190

Flowserve Corporation
5215 North O'Connor Blvd.
Suite 2300
Irving, Texas 75039-5421 USA
Telephone: +1 937 890 5839

Flowserve Corporation has established industry leadership in the design and manufacture of its products. When properly selected, this Flowserve product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Flowserve products should be aware that Flowserve products might be used in numerous applications under a wide variety of industrial service conditions. Although Flowserve can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Flowserve products. The purchaser/user should read and understand the Installation Instructions included with the product, and train its employees and contractors in the safe use of Flowserve products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Flowserve is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Flowserve Corporation at any one of its worldwide operations or offices.

©2019 Flowserve Corporation. All rights reserved. This document contains registered and unregistered trademarks of Flowserve Corporation. Other company, product, or service names may be trademarks or service marks of their respective companies.

VLENTB0001-04 (A4) June 2019