

# Bellows-Sealed Valves

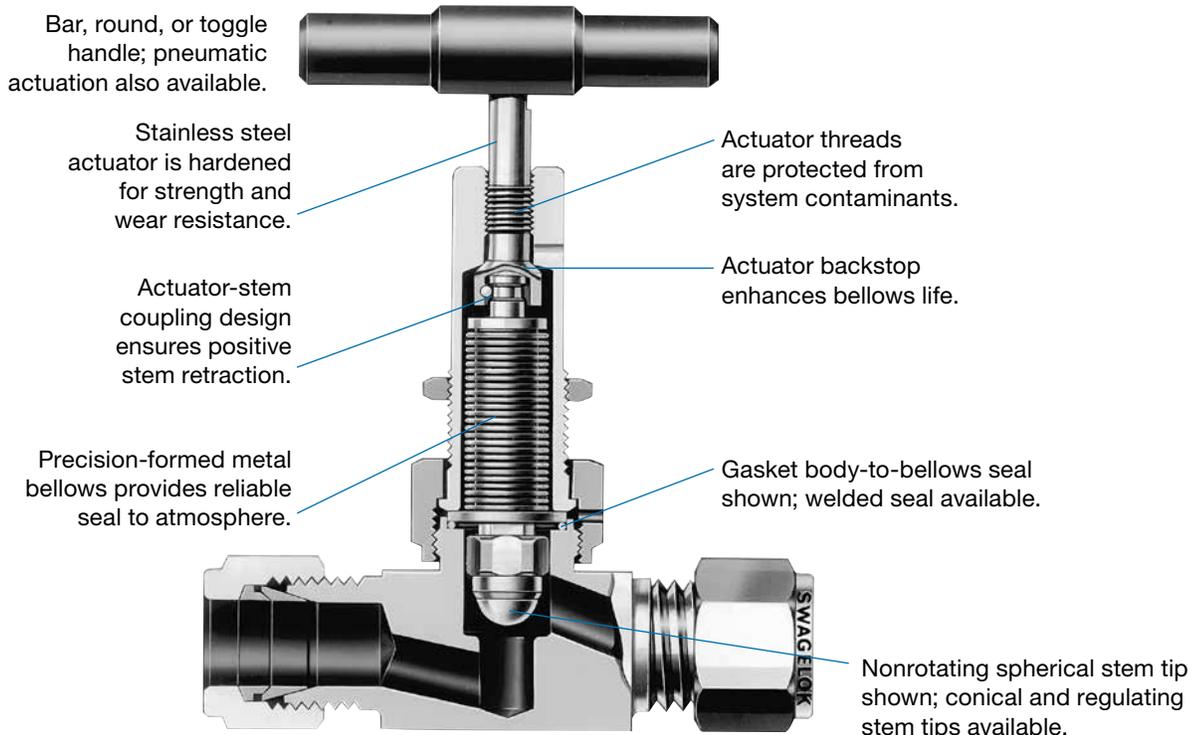


## B Series

- Working pressures up to 1000 psig (68.9 bar)
- Temperatures up to 900°F (482°C)
- 1/4, 3/8, 1/2, and 3/4 in.; 6, 10, and 12 mm end connections
- Brass, stainless steel, and alloy 400 materials

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## Features

Swagelok® B series bellows-sealed valves are available in a variety of models for system versatility.

- Gasketed or welded body-to-bellows seals
- Stem tips for shutoff or regulating service
- Flow coefficients ( $C_v$ ) from 0.12 to 1.2
- Variety of end connections:
  - Swagelok tube fittings—1/4 to 1/2 in. and 6 to 12 mm
  - Tube socket weld ends—1/4 to 1/2 in.
  - Tube butt weld ends—1/4 to 3/4 in.
  - Female VCR® face seal fittings—1/4 and 1/2 in.
  - Integral male VCR face seal fittings—1/4 and 1/2 in.
- Panel and bottom mounting

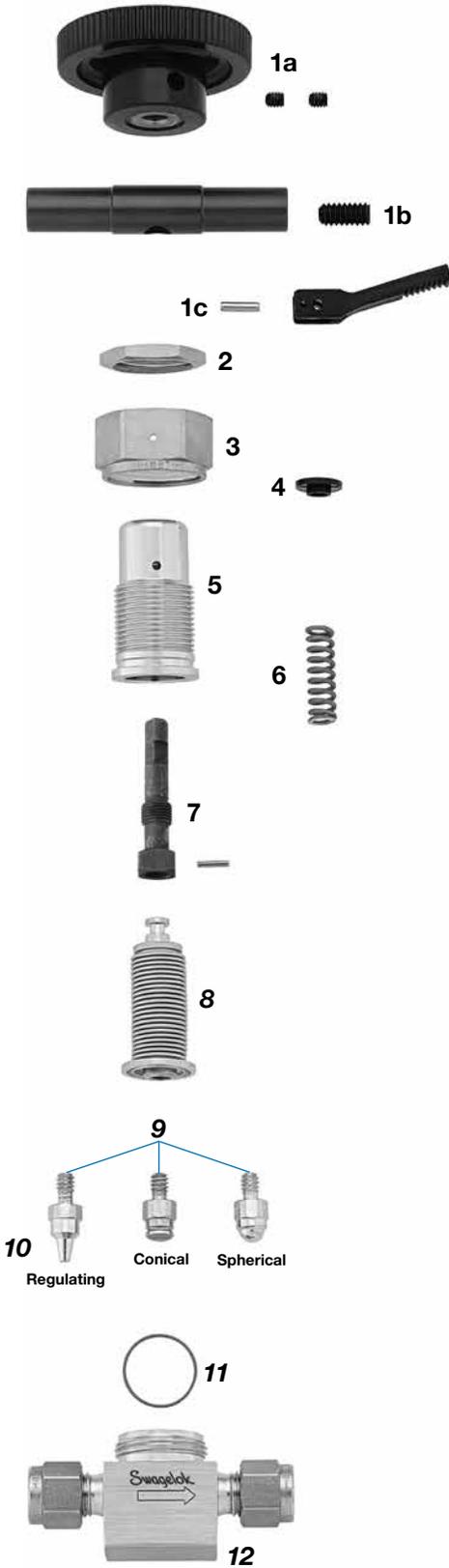
## Technical Data

| Body-to-Bellows Seal | Valve Body Materials     | Stem Tip                                          | Handle Type | $C_v$ <sup>①</sup>                                          | Internal Volume <sup>①</sup><br>in. <sup>3</sup> (cm <sup>3</sup> ) | Series <sup>②</sup> |
|----------------------|--------------------------|---------------------------------------------------|-------------|-------------------------------------------------------------|---------------------------------------------------------------------|---------------------|
| Gasket               | Brass, 316 SS, alloy 400 | Metal (regulating)                                | Round       | 0.20                                                        | 0.16 (2.6)                                                          | 4BRG                |
|                      |                          |                                                   |             | 0.36                                                        | 0.10 (1.6)                                                          | 4BK                 |
|                      |                          | PCTFE (conical)                                   | Bar         | 1.0                                                         | 0.24 (3.9)                                                          | 6BK                 |
|                      |                          |                                                   |             | 1.2                                                         | 0.26 (4.3)                                                          | 8BK                 |
|                      |                          |                                                   | Toggle      | 0.36                                                        | 0.11 (1.8)                                                          | 4BKT                |
|                      |                          |                                                   |             | Metal (spherical in brass and 316 SS; conical in alloy 400) | Round                                                               | 0.36                |
|                      |                          | Bar                                               | 1.0         |                                                             | 0.24 (3.9)                                                          | 6BG                 |
|                      |                          |                                                   | 1.2         | 0.26 (4.3)                                                  | 8BG                                                                 |                     |
| Weld                 | 316 SS, alloy 400        | Metal (regulating)                                | Round       | 0.12                                                        | 0.16 (2.6)                                                          | 4BRW                |
|                      |                          |                                                   |             | 0.33                                                        | 0.10 (1.6)                                                          | 4BW                 |
|                      |                          | Metal (spherical in 316 SS; conical in alloy 400) | Bar         | 1.0                                                         | 0.24 (3.9)                                                          | 6BW                 |
|                      |                          |                                                   |             | 1.1                                                         | 0.26 (4.3)                                                          | 8BW                 |

① Determined using valves with Swagelok tube fitting end connections.

② **R** designates regulating stem tip; **G** designates gasket body-to-bellows seal; **K** designates PCTFE stem tip (conical); **T** designates toggle handle; **W** designates welded body-to-bellows seal.

## Materials of Construction



| Component                         | Series                          | Valve Body Materials                      |                                                                          |                                      |
|-----------------------------------|---------------------------------|-------------------------------------------|--------------------------------------------------------------------------|--------------------------------------|
|                                   |                                 | Brass <sup>①</sup>                        | 316 SS                                                                   | Alloy 400                            |
| Material Grade/ASTM Specification |                                 |                                           |                                                                          |                                      |
| 1a Handle<br>Set screws           | 4BG, 4BRG, 4BK,<br>4BW, 4BRW    | Green phenolic                            |                                                                          |                                      |
|                                   |                                 | Alloy steel/ANSI 18.3                     |                                                                          |                                      |
| 1b Handle<br>Set screw            | 6BG, 8BG, 6BK,<br>8BK, 6BW, 8BW | Green anodized aluminum 2024-T4/B211      |                                                                          |                                      |
|                                   |                                 | Alloy steel/ANSI 18.3                     |                                                                          |                                      |
| 1c Handle<br>Handle pin           | 4BKT                            | Black nylon                               |                                                                          |                                      |
|                                   |                                 | 302 SS                                    |                                                                          |                                      |
| 2 Panel<br>mount nut              | All                             | Brass/B16                                 | 316 SS/B783                                                              |                                      |
| 3 Bonnet nut                      | All except 4BKT                 | Brass/B16                                 | Silver-plated 316 SS/A479                                                |                                      |
|                                   | 4BKT                            | Silver-plated<br>brass/B16                |                                                                          |                                      |
| 4 Washer                          | 4BKT                            | Nylon                                     |                                                                          |                                      |
| 5 Bonnet                          | All                             | Brass/B16                                 | 316 SS/A479                                                              |                                      |
| 6 Spring                          | 4BKT                            | S17700/AMS 5678                           |                                                                          |                                      |
| 7 Actuator<br>Actuator pin        | All except 4BKT                 | 416 SS/A582                               |                                                                          |                                      |
|                                   | 4BKT                            | 303 SS/A582                               |                                                                          |                                      |
| 8 Stem                            | All                             | 316 SS/A479                               |                                                                          | Alloy 400/B164                       |
|                                   | All                             | 321 SS/A269                               |                                                                          | Alloy 400/B165                       |
|                                   | All                             | 316 SS/A479                               |                                                                          | Alloy 400/B164                       |
| 9 Stem<br>adapter                 | All                             | 316 SS/A479                               |                                                                          | Alloy 400/B164                       |
| 10 Stem tip                       | 4BRG, 4BRW                      | Chrome-plated 316 SS/A479<br>(regulating) |                                                                          | Alloy K-500/AMS<br>4676 (regulating) |
|                                   | 4BK, 6BK,<br>8BK, 4BKT          | PTFE/D1430 (conical)                      |                                                                          |                                      |
|                                   | 4BG, 6BG, 8BG,<br>4BW, 6BW, 8BW | Cobalt-based alloy (spherical)            |                                                                          | Alloy K-500/AMS<br>4676 (conical)    |
| 11 Gasket                         | 4BG, 6BG,<br>8BG, 4BRG          | Silver-plated 316 SS/A580                 |                                                                          | Silver-plated alloy<br>400/AMS 4730  |
|                                   | 4BK, 6BK,<br>8BK, 4BKT          | PTFE-coated 316 SS/A580                   |                                                                          | PTFE-coated alloy<br>400/AMS 4730    |
| 12 Body                           | All                             | Brass/B16                                 | 316 SS/A479                                                              | Alloy 400/B164                       |
|                                   | Wetted<br>lubricant             | 4BG, 6BG, 8BG,<br>4BW, 6BW, 8BW           | Fluorinated-based (spherical stem<br>tip, pneumatically actuated valves) |                                      |
| Nonwetted<br>lubricant            | All                             | Molybdenum disulfide-based                |                                                                          |                                      |

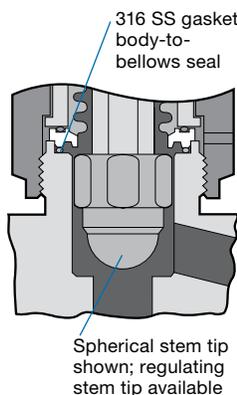
Wetted components listed in *italics*.

Additional stem tip options available. See **Options**, page 10.

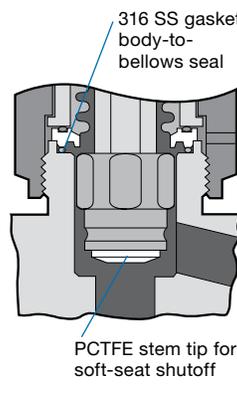
① Valves with welded body-to-bellows seal (4BRW, 4BW, 6BW, 8BW) not available in brass.

### Gasket Seal

#### BG Series

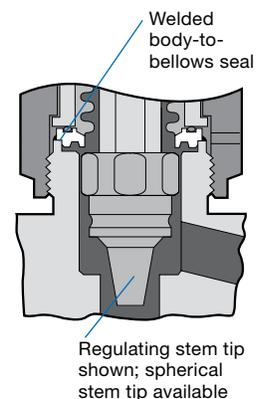


#### BK Series



### Welded Seal

#### BW Series



## Pressure-Temperature Ratings

### BG, BRG, BW, and BRW Series

**G** designates gasket body-to-bellows seal; **R** designates regulating stem tip; **W** designates welded body-to-bellows seal.

BRW series valves are not recommended for shutoff above 600°F (315°C).

Ratings apply to manual valves and to valves with 5 series pneumatic actuators. For actuator ratings, see page 8.

| Material                    | Brass <sup>①</sup>                  |            | 316 SS      |              | Alloy 400        |
|-----------------------------|-------------------------------------|------------|-------------|--------------|------------------|
|                             | BG                                  | BRG        | BW          | BRW, BG, BRG | BW, BRW, BG, BRG |
| <b>Temperature, °F (°C)</b> | <b>Working Pressure, psig (bar)</b> |            |             |              |                  |
| -20 (-28) to 100 (37)       | 1000 (68.9)                         | 450 (31.0) | 1000 (68.9) | 1000 (68.9)  | 700 (48.2)       |
| 200 (93)                    | 710 (48.9)                          | 350 (24.1) | 830 (57.1)  | 830 (57.1)   | 610 (42.0)       |
| 300 (148)                   | 430 (29.6)                          | 250 (17.2) | 660 (45.4)  | 660 (45.4)   | 530 (36.5)       |
| 400 (204)                   | 150 (10.3)                          | 150 (10.3) | 500 (34.4)  | 500 (34.4)   | 450 (31.0)       |
| 500 (260)                   | —                                   | —          | 450 (31.0)  | 450 (31.0)   | 375 (25.8)       |
| 600 (315)                   | —                                   | —          | 400 (27.5)  | 400 (27.5)   | —                |
| 650 (343)                   | —                                   | —          | 360 (24.8)  | —            | —                |
| 700 (371)                   | —                                   | —          | 330 (22.7)  | —            | —                |
| 750 (398)                   | —                                   | —          | 300 (20.6)  | —            | —                |
| 800 (426)                   | —                                   | —          | 260 (17.9)  | —            | —                |
| 850 (454)                   | —                                   | —          | 230 (15.8)  | —            | —                |
| 900 (482)                   | —                                   | —          | 200 (13.7)  | —            | —                |

For more information about pressure ratings of valves with tube fitting end connections, see Swagelok *Tubing Data* (MS-01-107).

① Due to the brass bonnet threads, cycle life of brass valves may be reduced when operated frequently at pressures above 450 psig (31.0 bar). Brass valves only available with manual or 1 series pneumatic actuators.

### Handle Temperature Gradient

#### 316 SS Valves

| When Valve Seat Is | Valve Handle Is |
|--------------------|-----------------|
| 600°F (315°C)      | 195°F (90°C)    |
| 900°F (482°C)      | 275°F (135°C)   |

### BK Series

**K** designates PCTFE stem tip.

Ratings apply to manual valves and to valves with 1 series or 5 series pneumatic actuators. For actuator ratings, see page 8.

| Actuation Mode              | Manual and 5 Series Pneumatic Actuators |             |            | 1 Series Pneumatic Actuators          |               |                         |
|-----------------------------|-----------------------------------------|-------------|------------|---------------------------------------|---------------|-------------------------|
|                             |                                         |             |            | Normally Closed                       | Normally Open | Double Acting           |
| Material                    | Brass <sup>①</sup>                      | 316 SS      | Alloy 400  | Brass, <sup>①</sup> 316 SS, Alloy 400 |               |                         |
| <b>Temperature, °F (°C)</b> | <b>Working Pressure, psig (bar)</b>     |             |            |                                       |               |                         |
| -20 (-28) to 100 (37)       | 1000 (68.9)                             | 1000 (68.9) | 700 (48.2) | 125 (8.6)                             | 500 (34.4)    | 700 (48.2)              |
| 200 (93)                    | 710 (48.9)                              | 830 (57.1)  | 610 (42.0) | 125 (8.6)                             | 500 (34.4)    | 700 (48.2) <sup>②</sup> |

For more information about pressure ratings of valves with tube fitting end connections, see Swagelok *Tubing Data* (MS-01-107).

① Due to the brass bonnet threads, cycle life of brass valves may be reduced when operated frequently at pressures above 450 psig (31.0 bar). Brass valves only available with manual or 1 series pneumatic actuators.

② 610 psig (42.0 bar) for alloy 400 valves with double-acting pneumatic actuators.

### BKT Series

**K** designates PCTFE stem tip; **T** designates toggle handle.

100 psig (6.8 bar) at -20 to 200°F (-28 to 93°C).

## Flow Data at 70°F (20°C)

**R** designates regulating stem tip; **G** designates gasket body-to-bellows seal; **W** designates welded body-to-bellows seal; **K** designates PCTFE stem tip; **T** designates toggle handle.

4BRG, 4BRW

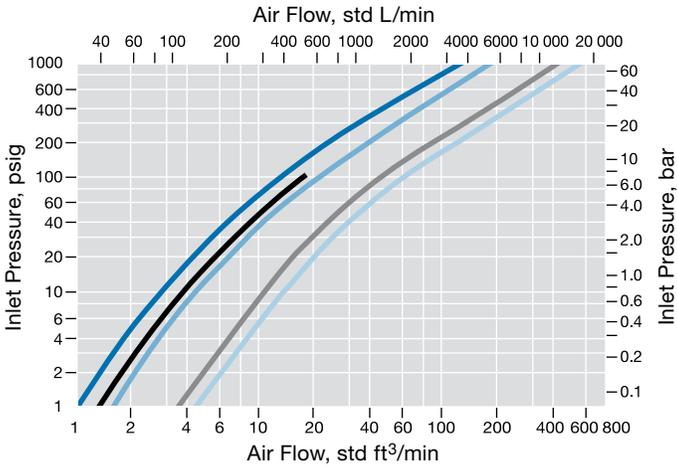
4BG, 4BW, 4BK

8BG, 8BW, 8BK

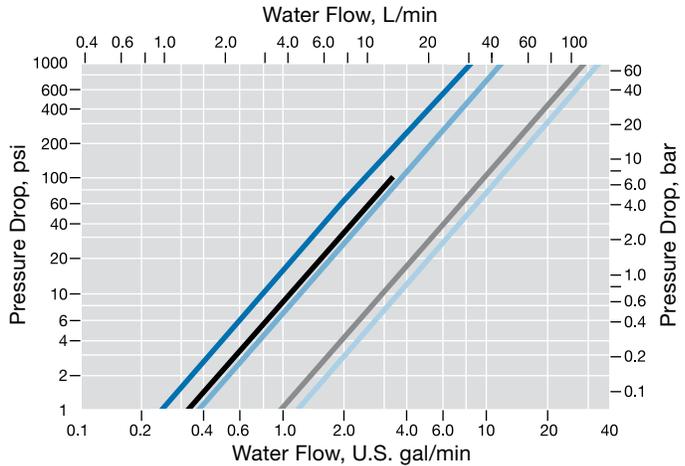
4BKT

6BG, 6BW, 6BK

### Air



### Water

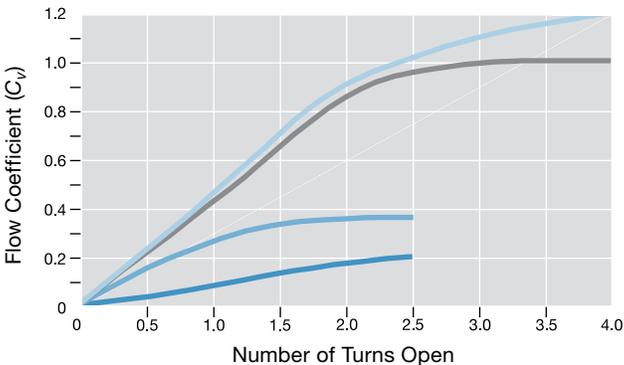


## Flow Coefficient at Turns Open

Maximum number of turns open for valves with welded body-to-bellows seal:

■ 4BRW, 4BW—1.5 turns

■ 6BW, 8BW—3 turns



## Testing

Every B series valve is factory tested with helium for 5 s to a maximum leak rate of  $4 \times 10^{-9}$  std  $\text{cm}^3/\text{s}$  at the seat, envelope, and all seals.

## Cleaning and Packaging

Swagelok B series valves with VCR end connections and all BK series valves are processed in accordance with Swagelok *Special Cleaning and Packaging (SC-11)* (MS-06-63), to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C.

Swagelok B series valves with other end connections are processed in accordance with Swagelok *Standard Cleaning and Packaging (SC-10)* (MS-06-62); special cleaning and packaging are available as an option.

## Ordering Information and Dimensions

### Stainless Steel Valves

Select an ordering number.

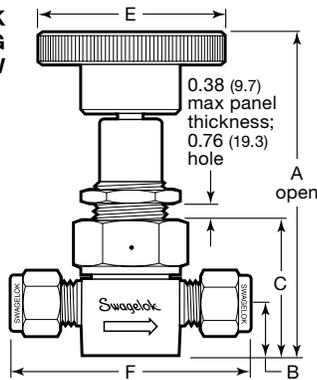
### Brass and Alloy 400 Valves

Replace **SS** with **B** for brass or **M** for alloy 400.

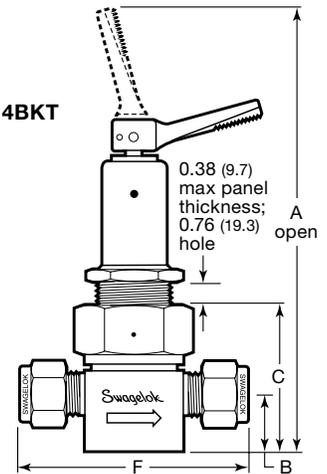
Example: **B-4BG**

Dimensions, in inches (millimeters), are for reference only and are subject to change.

4BG, 4BK  
4BW, 4BRG  
4BRW



4BKT

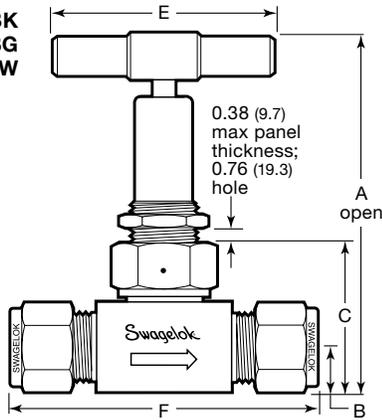


| End Connections                  |         | Ordering Number | Series | Dimensions, in. (mm) |             |             |             |             |             |             |             |             |             |   |
|----------------------------------|---------|-----------------|--------|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---|
| Type                             | Size    |                 |        | Orifice              | A           | B           | C           | D           | E           | F           | G           | H           | J           | K |
| Fractional Swagelok tube fitting | 1/4 in. | SS-4BG          | 4BG    | 0.16 (4.1)           | 3.64 (92.5) | 0.56 (14.2) | 1.45 (36.8) | 1.00 (25.4) | 1.88 (47.8) | 2.46 (62.5) | 1.06 (26.9) | 1.00 (25.4) | —           | — |
|                                  |         | SS-4BK          | 4BK    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-4BW          | 4BW    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-4BRG         | 4BRG   |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-4BRW         | 4BRW   |                      |             |             |             |             |             |             |             |             |             |   |
|                                  | 3/8 in. | SS-6BG          | 6BG    | 0.26 (6.6) port      | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 3.09 (78.5) | 1.57 (39.9) | 1.13 (28.7) | —           | — |
|                                  |         | SS-6BK          | 6BK    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-6BW          | 6BW    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  | 1/2 in. | SS-8BG          | 8BG    | 0.30 (7.6)           | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 3.30 (83.8) | 1.57 (39.9) | 1.13 (28.7) | —           | — |
| SS-8BK                           |         | 8BK             |        |                      |             |             |             |             |             |             |             |             |             |   |
| SS-8BW                           |         | 8BW             |        |                      |             |             |             |             |             |             |             |             |             |   |
| Metric Swagelok tube fitting     | 6 mm    | SS-6BG-MM       | 4BG    | 0.16 (4.1)           | 3.64 (92.5) | 0.56 (14.2) | 1.45 (36.8) | 1.00 (25.4) | 1.88 (47.8) | 2.46 (62.5) | 1.06 (26.9) | 1.00 (25.4) | —           | — |
|                                  |         | SS-6BK-MM       | 4BK    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-6BW-MM       | 4BW    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-6BKT-MM      | 4BKT   |                      |             |             |             |             |             |             |             |             |             |   |
|                                  | 10 mm   | SS-10BG-MM      | 6BG    | 0.28 (7.1) port      | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 3.11 (79.0) | 1.57 (39.9) | 1.13 (28.7) | —           | — |
|                                  |         | SS-10BK-MM      | 6BK    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-10BW-MM      | 6BW    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  | 12 mm   | SS-12BG-MM      | 8BG    | 0.30 (7.6)           | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 3.30 (83.8) | 1.57 (39.9) | 1.13 (28.7) | —           | — |
|                                  |         | SS-12BK-MM      | 8BK    |                      |             |             |             |             |             |             |             |             |             |   |
| SS-12BW-MM                       |         | 8BW             |        |                      |             |             |             |             |             |             |             |             |             |   |
| Tube butt weld                   | 1/4 in. | SS-4BG-BW4      | 4BG    | 0.10 (2.5)           | 3.64 (92.5) | 0.56 (14.2) | 1.45 (36.8) | 1.00 (25.4) | 1.88 (47.8) | 1.68 (42.7) | 1.00 (25.4) |             | 0.25 (6.4)  | — |
|                                  |         | SS-4BK-BW4      | 4BK    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-4BW-BW4      | 4BW    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-4BKT-BW4     | 4BKT   |                      |             |             |             |             |             |             |             |             |             |   |
|                                  | 3/8 in. | SS-6BG-BW6      | 6BG    | 0.19 (4.8)           | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 2.18 (55.4) | 1.50 (38.1) | 1.13 (28.7) | 0.38 (9.7)  | — |
|                                  |         | SS-6BK-BW6      | 6BK    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  |         | SS-6BW-BW6      | 6BW    |                      |             |             |             |             |             |             |             |             |             |   |
|                                  | 1/2 in. | SS-8BG-BW8      | 8BG    | 0.26 (6.6)           | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 2.18 (55.4) | 1.50 (38.1) | 1.13 (28.7) | 0.50 (12.7) | — |
|                                  |         | SS-8BK-BW8      | 8BK    |                      |             |             |             |             |             |             |             |             |             |   |
| SS-8BW-BW8                       |         | 8BW             |        |                      |             |             |             |             |             |             |             |             |             |   |

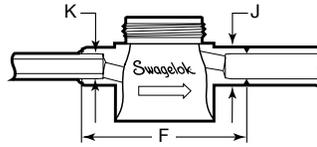
Dimensions shown with Swagelok tube fitting nuts finger-tight.  
**J** = tube butt weld diameter; **K** = tube socket weld diameter.

## Ordering Information and Dimensions

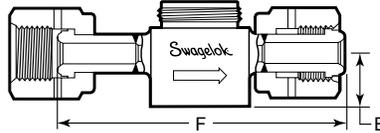
6BG, 6BK  
6BW, 8BG  
8BK, 8BW



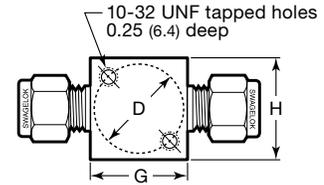
### Tube Socket Weld and Tube Butt Weld Ends



### Butt Welded Female VCR Fitting Ends



### Bottom



| End Connections                     |                 | Ordering Number          | Series     | Dimensions, in. (mm) |             |             |             |             |             |             |             |             |             |             |            |
|-------------------------------------|-----------------|--------------------------|------------|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|
| Type                                | Size            |                          |            | Orifice              | A           | B           | C           | D           | E           | F           | G           | H           | J           | K           |            |
| Tube socket weld and tube butt weld | 1/4 and 3/8 in. | SS-4BG-TW                | 4BG        | 0.16 (4.1)           | 3.64 (92.5) | 0.56 (14.2) | 1.45 (36.8) | 1.00 (25.4) | 1.88 (47.8) | 1.68 (42.7) | 1.00 (25.4) |             | 0.38 (9.7)  | 0.25 (6.4)  |            |
|                                     |                 | SS-4BK-TW                | 4BK        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     |                 | SS-4BW-TW                | 4BW        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     |                 | SS-4BRG-TW               | 4BRG       |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     | 3/8 and 1/2 in. | SS-4BRW-TW               | 4BRW       | 0.28 (7.1) port      | 4.18 (106)  | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 2.27 (57.7) | 1.51 (38.4) | 1.13 (28.7) | 0.50 (12.7) | 0.38 (9.7) |
|                                     |                 | SS-6BG-TW                | 6BG        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     |                 | SS-6BK-TW                | 6BK        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     | 1/2 and 3/4 in. | SS-6BW-TW                | 6BW        | 0.30 (7.6)           | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 2.27 (57.7) | 1.50 (38.1) | 1.13 (28.7) | 0.75 (19.1) | 0.50 (12.7) |            |
|                                     |                 | SS-8BG-TW                | 8BG        |                      |             |             |             |             |             |             |             |             |             |             |            |
| SS-8BK-TW                           |                 | 8BK                      |            |                      |             |             |             |             |             |             |             |             |             |             |            |
| Butt welded female VCR fitting      | 1/4 in.         | SS-8BW-TW                | 8BW        | 0.16 (4.1)           | 3.64 (92.5) | 0.56 (14.2) | 1.45 (36.8) | 1.00 (25.4) | 1.88 (47.8) | 2.76 (70.1) | 1.00 (25.4) |             |             |             |            |
|                                     |                 | SS-4BG-V51               | 4BG        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     |                 | SS-4BK-V51               | 4BK        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     | 1/2 in.         | SS-4BW-V51               | 4BW        | 0.30 (7.6)           | 4.19 (106)  | 0.50 (12.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 5.19 (132)  | 1.51 (38.4) | 1.13 (28.7) |             |             |            |
|                                     |                 | SS-6BG-V19               | 6BG        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     |                 | SS-6BK-V19               | 6BK        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     |                 | SS-6BW-V19               | 6BW        |                      |             |             |             |             |             |             |             |             |             |             |            |
|                                     |                 | SS-8BK-V19 <sup>①</sup>  | 8BK        |                      |             |             |             |             |             |             |             |             |             |             |            |
| SS-8BG-V47                          | 8BG             | 0.57 (14.5)              |            |                      |             |             |             |             |             |             |             |             |             |             |            |
| SS-8BK-V47                          | 8BK             |                          | 4.49 (114) | 1.50 (38.1)          |             |             |             |             |             |             |             |             |             |             |            |
| SS-8BW-V47                          | 8BW             |                          |            |                      | 3.12 (79.2) | 1.25 (31.8) |             |             |             |             |             |             |             |             |            |
| Integral male VCR fitting           | 1/4 in.         | SS-4BK-VCR               | 4BK        | 0.16 (4.1)           | 3.64 (92.5) | 0.44 (11.2) | 1.45 (36.8) | 1.00 (25.4) | 1.88 (47.8) | 2.24 (56.9) | 1.00 (25.4) |             |             |             |            |
|                                     | 1/2 in.         | SS-8BG-VCR<br>SS-8BK-VCR | 8BK        | 0.29 (7.4) port      | 4.19 (106)  | 0.46 (11.7) | 1.57 (39.9) | 1.13 (28.7) | 2.50 (63.5) | 3.00 (76.2) | 1.50 (38.1) | 1.13 (28.7) |             |             |            |

J = tube butt weld diameter; K = tube socket weld diameter.

① End connections are socket welded.

## Pneumatic Actuators

### Features

- Reliable piston design for enhanced cycle life
- Low actuation pressures
- Aluminum and stainless steel components



### Actuator Series

- 1 series actuator for BK series valves with brass, stainless steel, and alloy 400 bodies
- 5 series actuator for BG, BK, and BW series valves with stainless steel and alloy 400 bodies—not for valves with brass bodies

### Actuation Modes

**Normally closed**—air opens, spring closes

**Normally open**—air closes, spring opens

**Double acting**—air opens and closes

### Materials of Construction

| Component         | Actuator Series  |               |
|-------------------|------------------|---------------|
|                   | 1                | 5             |
|                   | Material         |               |
| Housing           | Aluminum         | Cast aluminum |
| External hardware | Stainless steel  |               |
| O-rings           | Fluorocarbon FKM |               |

### Technical Data

| Valve Series     | Valve $C_v$ <sup>①</sup> | Actuator Series | Pressure Rating<br>psig (bar) | Temperature Rating<br>°F (°C) | Air Displacement<br>in. <sup>3</sup> (cm <sup>3</sup> ) | Weight<br>lb (kg)                         |
|------------------|--------------------------|-----------------|-------------------------------|-------------------------------|---------------------------------------------------------|-------------------------------------------|
| 4BK              | 0.30                     | 1               | 40 to 150<br>(2.7 to 10.3)    |                               | 0.068 (1.11)                                            | N/A                                       |
| 6BK              | 0.86                     |                 |                               |                               |                                                         |                                           |
| 8BK              | 0.96                     |                 |                               |                               |                                                         |                                           |
| 4BK, 4BG         | 0.36                     | 5               | 50 to 150<br>(3.4 to 10.3)    | -10 to 300<br>(-23 to 148)    | 0.83 (13.6)                                             | C—6.7 (3.0)<br>O—4.6 (2.1)<br>D—4.5 (2.0) |
| 4BW              | 0.33                     |                 |                               |                               |                                                         |                                           |
| 6BK, 6BG,<br>6BW | 1.0                      |                 |                               |                               |                                                         |                                           |
| 8BK, 8BG         | 1.2                      |                 |                               |                               |                                                         |                                           |
| 8BW              | 1.1                      |                 |                               |                               |                                                         |                                           |

① Determined using valves with Swagelok tube fitting end connections.

### Ordering Information

#### Actuators with Stainless Steel Valves

Add an actuator series designator, then an actuation mode designator to the valve ordering number.

Example: SS-4BG-5C

| Actuator Series | Designator | Actuation Mode  | Designator |
|-----------------|------------|-----------------|------------|
| 1               | -1         | Normally closed | C          |
|                 |            | Normally open   | O          |
| 5               | -5         | Double acting   | D          |

#### Actuators with Alloy 400 or Brass Valves

Replace **SS** with **M** for alloy 400 or **B** for brass.

Example: M-4BG-5C

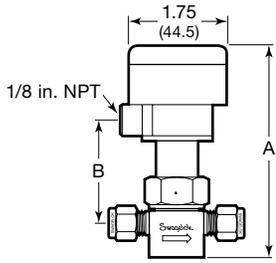
5 series actuators cannot be used with brass valves.

# Pneumatic Actuators

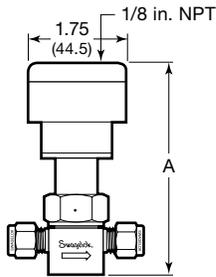
## Dimensions

Dimensions, in inches (millimeters), are for reference only and are subject to change.

### 1 Series

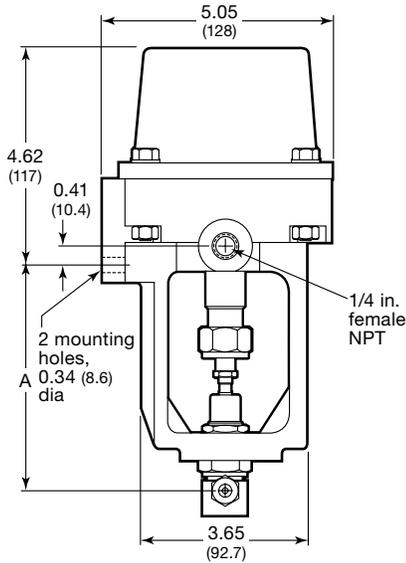


**Normally Closed and Double Acting**

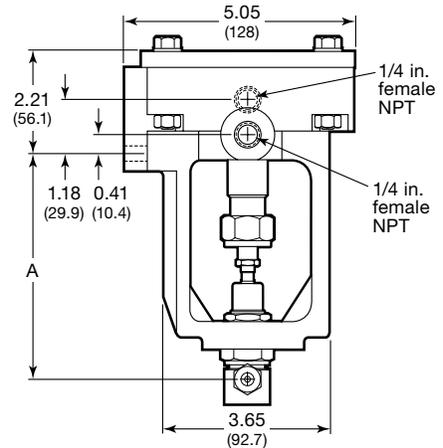


**Normally Open**

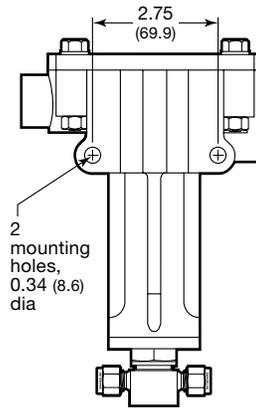
### 5 Series



**Normally Closed, Side**



**Normally Open and Double Acting, Side**



**Normally Open and Double Acting, Back**

### 1 Series

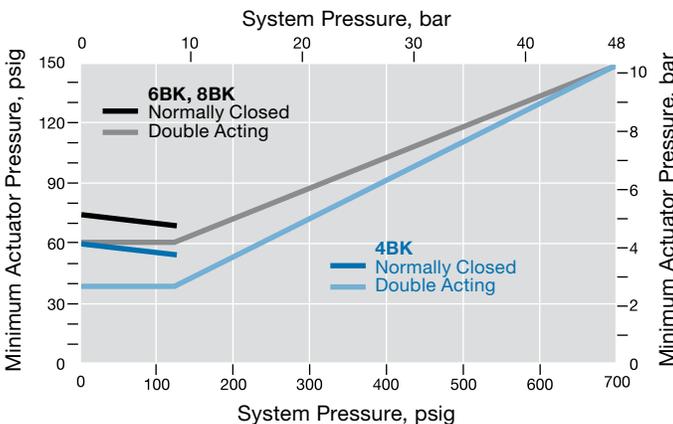
| Valve Series | Dimensions, in. (mm) |             |
|--------------|----------------------|-------------|
|              | A                    | B           |
| 4BK          | 3.65 (92.7)          | 1.72 (43.7) |
| 6BK, 8BK     | 3.76 (95.5)          | 1.90 (48.3) |

### 5 Series

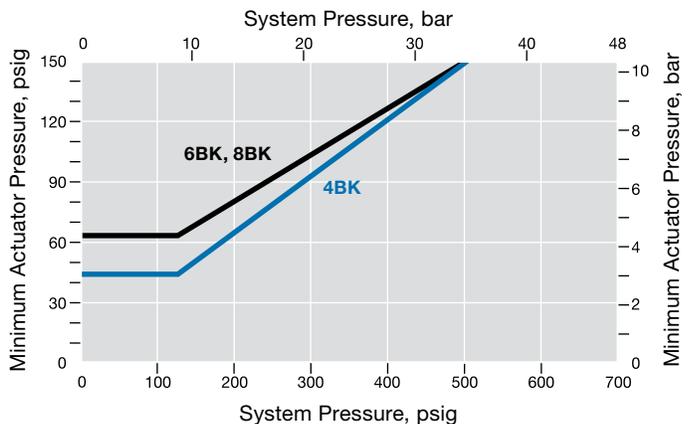
| Valve Series                 | A          |
|------------------------------|------------|
|                              | in. (mm)   |
| 4BG, 4BK, 4BW                | 4.87 (124) |
| 6BG, 6BK, 6BW, 8BG, 8BK, 8BW | 5.05 (128) |

## Pneumatic Actuator Performance

### 1 Series Normally Closed and Double Acting



### 1 Series Normally Open



### 5 Series

The minimum actuation pressure for normally closed, normally open, and double-acting actuators is 50 psig (3.5 bar).

## Options and Accessories

### Special Cleaning and Packaging (SC-11)

Swagelok B series valves with VCR end connections and all BK series valves are processed in accordance with Swagelok *Special Cleaning and Packaging (SC-11)* (MS-06-63), to ensure compliance with product cleanliness requirements stated in ASTM G93 Level C.

To order special cleaning and packaging for B series valves with other end connections, add **-SC11** to the valve ordering number.

Example: SS-4BG-**SC11**

### BG, BK, and BW Series

#### Vacuum Stem Tip/Adapters

Vacuum stem tip/adapters help eliminate gas pockets or trapped volumes.

Features include:

- Slotted adapter threads
- Vented adapter cavity
- Copper stem tip on BG and BW series
- PCTFE stem tip on BK series
- Pressure rating equal to that of the standard valve
- Temperature rating of 200°F (93°C) for BK series
- Temperature rating of 400°F (204°C) for BG and BW series.

To order, add an adapter designator to the valve ordering number.



| Valve Series | Vacuum Stem Tip/Adapter Designator |
|--------------|------------------------------------|
| BG, BW       | -VD                                |
| BK           | -VA                                |

Example: B-4BG-**VD**

### Bellows-Sealed 3-Valve Manifolds

The Swagelok 3-valve manifold uses B or U series bellows-sealed valves for systems with difficult fluid containment requirements.

For more information, see the Swagelok *Bellows-Sealed 3-Valve Manifolds—V3 Series* catalog, MS-02-07.



### BG and BK Series

#### Polyimide Stem Tips

- Provide soft-seat shutoff for temperatures up to 400°F (204°C) or where PCTFE is not compatible with the system fluid
- Are available in manually or pneumatically actuated BG and BK series valves
- Are rated to the same pressure as the standard valve.

To order, add **-VP** to the valve ordering number.

Example: SS-4BG-**VP**

#### Copper Stem Tips

- Provide metal soft-seat shutoff for temperatures up to 400°F (204°C) or where PCTFE is not compatible with the system fluid
- Are available in manually or pneumatically actuated BG and BK series valves
- Are rated to the same pressure as the standard valve.

To order, add **-CU** to the valve ordering number.

Example: SS-4BG-**CU**

### 4BKT Series

#### Colored Toggle Handles

Black handles are standard for toggle-operated 4BKT series valves. For other colors, add a handle color designator to the valve ordering number.

Example: SS-4BKT-**BL**

| Handle Color | Designator |
|--------------|------------|
| Blue         | -BL        |
| Green        | -GR        |
| Orange       | -OG        |
| Red          | -RD        |
| White        | -WH        |
| Yellow       | -YW        |

## Pneumatic Actuator Options and Accessories

### 1 Series (BK Series)

#### Indicator Switches

- Transmit a signal to an electrical device indicating either the open or closed position of a pneumatically actuated valve.
- Feature a single-pole, single-throw switch rated at:
  - 1/2 A for 115 V (ac) for normally open switch;
  - 1/4 A for 115 V (ac) for a normally closed switch;
  - -40 to 185°F (-40 to 85°C) temperature.
- Include a 24 in. (61 cm) wire lead with an inline clip.
- Are available factory assembled on normally closed BK series valves with 1 series pneumatic actuators or in kits for field assembly.



#### Factory-Assembled Indicator Switches

To order a valve with an indicator switch, add **M** for a normally open switch or **M-2** for a normally closed switch to the valve ordering number.

Examples: SS-4BK-1CM  
SS-4BK-1CM-2

#### Indicator Switch Kits for Field Assembly

To order a kit for an existing valve, use ordering number **MS-ISK-BK-1CM** for a normally open switch or **MS-ISK-BK-1CM-2** for a normally closed switch.

## Maintenance Kits

Stem tip/adaptor kits, bellows kits, and gasket kits are available for BG, BRG, BK, and BKT series valves. See the Swagelok *Bellows-Sealed Valve Maintenance Kits* catalog, MS-02-66.

- ⚠ **To increase service life, ensure proper valve performance, and prevent leakage, apply only as much torque as is required to achieve positive shutoff.**

**Caution: Do not mix or interchange parts with those of other manufacturers.**

### 5 Series (BG, BK, and BW Series)

#### Microswitches

- Signal OPEN or CLOSED position of valve to panel or process controller
- Feature single-pole, double-throw switch
- Meet NEMA standard for type 1 and type 3 enclosures
- Include stainless steel mounting bracket
- Are available factory assembled on BG, BK, and BW series valves with 5 series pneumatic actuators or in kits for field assembly.



#### Factory-Assembled Microswitches

To order a valve with a microswitch, add **M** to the valve ordering number.

Example: SS-4BG-5CM

#### Microswitch Kits for Field Assembly

To order a kit for an existing valve, use ordering number **MS-5CMK-4B** for 4B series valves or **MS-5CMK-8B** for 6B and 8B series valves.

#### Actuator Conversion Kits

The actuator conversion kit converts a B series valve with a Swagelok 3 series pneumatic actuator to a valve with a 5 series pneumatic actuator.

| Valve Series                 | Actuation Mode  | Actuator Conversion Kit Ordering Number |
|------------------------------|-----------------|-----------------------------------------|
| 4BG, 4BK, 4BW                | Normally closed | MS-5CK-4B                               |
|                              | Normally open   | MS-5OK-4B                               |
|                              | Double acting   | MS-5DK-4B                               |
| 6BG, 6BK, 6BW, 8BG, 8BK, 8BW | Normally closed | MS-5CK-8B                               |
|                              | Normally open   | MS-5OK-8B                               |
|                              | Double acting   | MS-5DK-8B                               |

## Oxygen Service Hazards

For more information about hazards and risks of oxygen-enriched systems, see the Swagelok *Oxygen System Safety* technical report (MS-06-13).

## About this document

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### Safe Product Selection

**When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

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