

# Valtek® Multi-Z Severe Service Valves



## Eliminate cavitation in high pressure drop applications

Operators in the power generation, oil and gas, and chemical industries are frequently confronted with extreme pressure differentials in their processes. To combat this, they need valves with continuous, steady-state flow curves with appropriate flow characteristics, long service life and low maintenance costs.

The Valtek® Multi-Z axial flow control valve eliminates cavitation often associated with high pressure drops. It is ideal for processes with entrained solids and in services where high rangeability is required.

Available in globe and angle configurations as well as a variety of standard materials, the Multi-Z valve:

- Effectively minimizes noise levels
- Passes solids up to 24.7 mm (1.0 in) without plugging
- Utilizes long strokes for finer control resolution

In addition to standard trims, a wide range of engineered trims are available with customized capacity and cavitation resistance for unusual or difficult applications.

### Avoid costly safety recertification

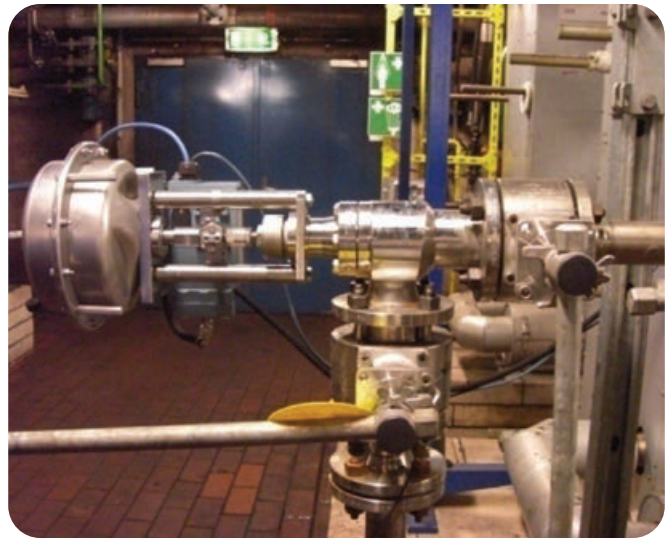
Operators can avoid an expensive and time-consuming re-evaluation of safety relief systems in a maintenance of certification (MOC) review by choosing the Valtek Multi-Z valve with standard trim to replace existing equipment.

That's because verified valve flow capacities (Cv) of the Multi-Z valve exactly match commonly accepted industry standard capacities.

### Solids and cavitation completely under control

Flowserve designed the Valtek Multi-Z valve to accommodate solids in liquid media, minimize high sound levels, tolerate high temperatures, eliminate cavitation formation and with a variety of materials to resist corrosion. The Multi-Z valve reduces cavitation by employing the following pressure drop mechanisms:

- Directional changes
- Frictional losses in small passages
- Mutual impingement of opposing streams
- Sudden expansion and contraction
- Turbulent mixing



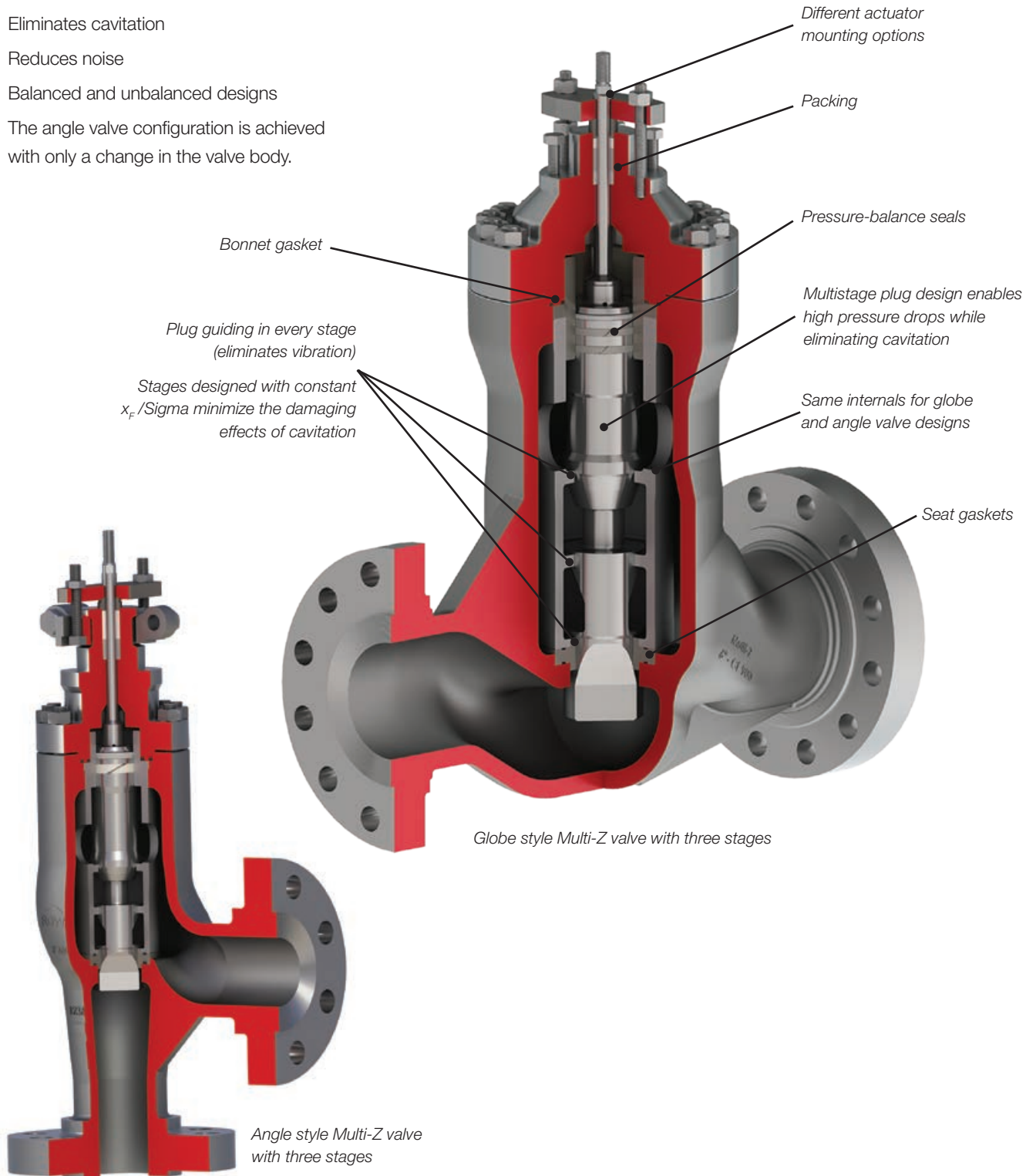
## Specifications\*

|                            |  |
|----------------------------|--|
| <b>Size</b>                | ANSI 1 to 8 in (globe and angle cast)  |
| <b>Pressure class</b>      | Size 1 to 6 NPS: Class 300 to 2500<br>Size 8 NPS: Class 300 to 1500  |
| <b>Body materials</b>      | Carbon steel (WCC or A105)<br>Low-temperature carbon steel (LCC)<br>Stainless steel (CF8M or 316SS)<br>Chrome Moly (WC9)<br>Duplex 22%                         |
| <b>Body type</b>           | Globe and angle  |
| <b>End connections</b>     | Flanged<br>RTJ<br>Buttweld<br>Socket weld  |
| <b>Trim type</b>           | Balanced or unbalanced<br>Three to six stages of pressure reduction, as required by the service conditions   |
| <b>Shutoff</b>             | ANSI Class IV and V  |
| <b>Flow characteristic</b> | Linear or modified equal percentage  |
| <b>Stem sealing</b>        | PTFE<br>Graphite SAS 225<br>SureSeal HP LL<br>SureSeal HP 325<br>SureGuard XT<br>PTFE/Graphite V-ring  |
| <b>Actuator</b>            | Piston type VL / VL-C / VL-ES<br>Spring diaphragm type KP (stainless steel)<br>Spring diaphragm type FlowAct (carbon steel)<br>Electric<br>Hydraulic<br>Manual |
| <b>Certifications</b>      | PED (EU), TR CU (Russia), CRN (Canada)<br>Fugitive emissions ISO 15848-1<br>SIL 3 capable  |

\*These options are suitable for the majority of applications. For custom applications, a wide variety of trims, materials and options are available.

## Features

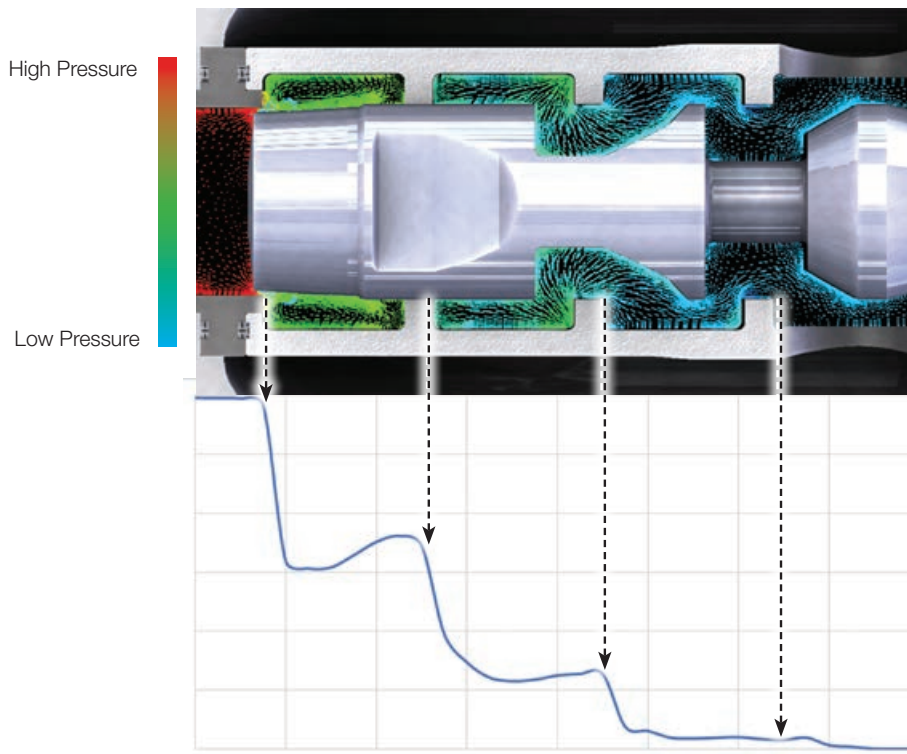
- Tolerance to solids in the medium
- Eliminates cavitation
- Reduces noise
- Balanced and unbalanced designs
- The angle valve configuration is achieved with only a change in the valve body.



## Principle of cavitation elimination

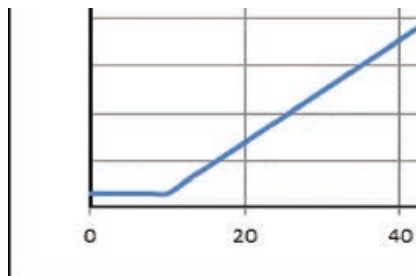
Cavitation, the rapid formation and collapse of vapor bubbles in a liquid, occurs when the pressure of the medium temporarily drops below the vapor pressure and then rapidly recovers. Cavitation creates erosion of valve body walls and other components, ultimately leading to the degradation of performance and valve life.

The Multi-Z valve trim prevents cavitation by controlling the pressure drop as the system medium is directed through multiple trim stages (i.e., three to six, depending on the application). The Multi-Z valve trim designs are optimized to ensure the medium pressure does not drop below the vapor pressure of the process fluid. The computational fluid dynamics (CFD) plot below illustrates the pressure drop across the Multi-Z valve trim. The trim design adheres to ISA-RP75.23.



The trim is available with linear or modified equal percentage characteristics. Custom plug contours are available for unusual applications. The Multi-Z valve utilizes long stroke lengths through the complete product range, providing better control resolution.

**Figure 1:** CFD analysis illustrates pressure drop across number of trim stages.



**Figure 2:** Flow curve

When the Multi-Z valve first opens, the staging is held closed. This allows the seating surfaces to open wide, preventing seat damage (see Figure 2).

## Industry applications<sup>1</sup>

|                   |                                 |
|-------------------|---------------------------------|
| <b>Refinery</b>   | Charge pump recirculation       |
|                   | Amine letdown                   |
|                   | Cold high-pressure letdown      |
| <b>Oilfield</b>   | Produced water injection        |
|                   | High-pressure injection control |
| <b>Power</b>      | Boiler feed water recirculation |
|                   | Boiler feed water startup       |
| <b>All Plants</b> | High pressure drop applications |
|                   | Water letdown                   |

<sup>1</sup> Multi-Z valves are not suitable for oxygen applications.

## Packing options

**Table 1: Packing**

| Description  | PTFE                             | Graphite SAS 225 | SureSeal HP LL                               | Graphite SAS402-4 (BAM)            | SureSeal HP 325 LL   | SureGuard XT (fire-safe option) | PTFE/ Graphite V-ring              |
|--|----------------------------------|------------------|--|------------------------------------|----------------------|---------------------------------|------------------------------------|
| Material   | PTFE Rope and PTFE With Graphite | Graphite         | PTFE/ Graphite                               | Graphite                           | PTFE/Graphite/ Nomex | Perfluoro-elastomer             | Spring-loaded PTFE                 |
| Maximum Temperature, °C (°F)                       | 220 (428)                        | 550 (1,020)      | 280 (536)                                    | 550 (1,020)                        | 220 (428)            | 288 (550)                       | 220 (428)                          |
| Maximum Pressure at Ambient Temperature, bar (psi) | 400 (5,800)                      | 500 (7,250)      | 280 (4,061)                                  | 500 (7,250)                        | 400 (5,800)          | 276 (4,000)                     | 325 (4,713)                        |
| Certifications                                     | None                             | None             | ISO 15848 Class A (Class B; Class C) TA-Luft | BAM Certificate for Oxygen Service | TA-Luft              | None                            | BAM Certificate for Oxygen Service |
| Reference Image                                    |                                  |                  |  |                                    |                      |                                 |                                    |

Note: Metal bellows seal option available upon request.

## Standard trim design

**Table 2: Cavitation protection, flow capacity and maximum particulate size**

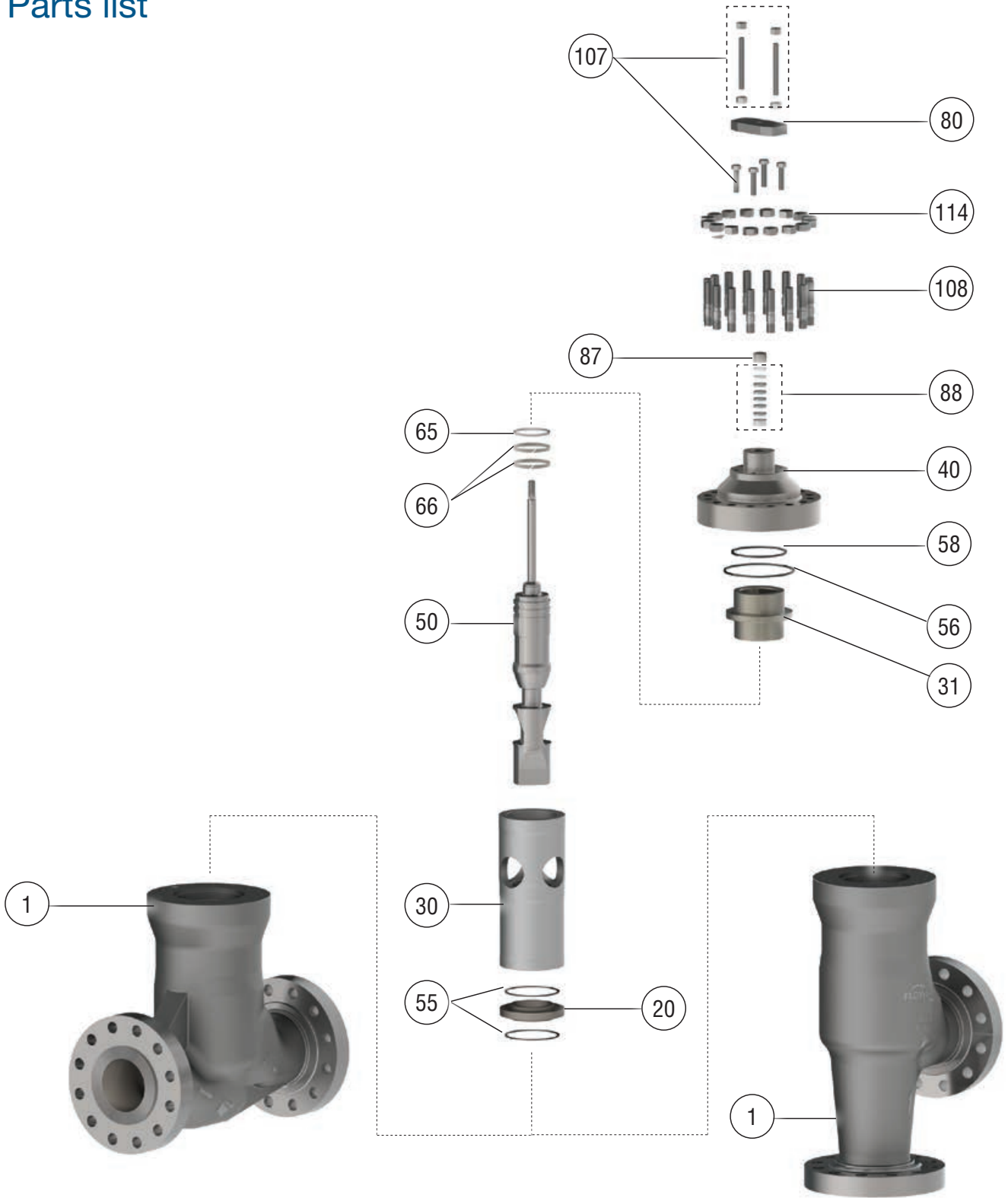
| Trim Label | Sigma MR | Stages                  | Size                    | 1 in       | 1.5 in     | 2 in       | 3 in       | 4 in        | 6 in        | 8 in <sup>*2</sup> |
|------------|----------|-------------------------|-------------------------|------------|------------|------------|------------|-------------|-------------|--------------------|
|            |          |                         | Stroke mm (in)          | 10 (0.39)  | 15 (0.59)  | 15 (0.59)  | 25 (0.98)  | 40 (1.58)   | 60 (2.36)   | 60 (2.36)          |
| <b>CC3</b> | 1.041    | 3 <sup>*1</sup>         | Max. Cv                 | 2.0        | 3.8        | 9.0        | 20         | 34          | 65          | 135                |
|            |          |                         | Min. Control Cv         | 0.12       | 0.29       | 0.29       | 0.59       | 0.92        | 1.5         | 2.1                |
|            |          |                         | Max. Part. Size mm (in) | 2.2 (0.09) | 2.1 (0.08) | 6.3 (0.25) | 8.9 (0.35) | 11.3 (0.45) | 14.4 (0.57) | 24.7 (0.97)        |
| <b>CA4</b> | 1.008    | 4                       | Max. Cv                 | 1.0        | 1.9        | 4.5        | 10         | 16.5        | 34          | 70                 |
|            |          |                         | Min. Control Cv         | 0.09       | 0.23       | 0.23       | 0.49       | 0.75        | 1.2         | 1.7                |
|            |          |                         | Max. Part. Size mm (in) | 0.3 (0.01) | 0.3 (0.01) | 0.9 (0.04) | 1.4 (0.05) | 1.6 (0.06)  | 2.4 (0.09)  | 3.9 (0.15)         |
| <b>CB4</b> | 1.012    |                         | Max. Cv                 | 1.4        | 2.5        | 6.0        | 13         | 22          | 45          | 90                 |
|            |          |                         | Min. Control Cv         | 0.09       | 0.23       | 0.23       | 0.49       | 0.75        | 1.2         | 1.7                |
|            |          |                         | Max. Part. Size mm (in) | 0.5 (0.02) | 0.5 (0.02) | 1.3 (0.05) | 1.9 (0.07) | 2.3 (0.09)  | 3.4 (0.13)  | 5.5 (0.22)         |
| <b>CC4</b> | 1.018    |                         | Max. Cv                 | 1.7        | 3.2        | 7.5        | 16.5       | 28          | 56          | 115                |
|            |          |                         | Min. Control Cv         | 0.09       | 0.23       | 0.23       | 0.49       | 0.75        | 1.2         | 1.7                |
|            |          |                         | Max. Part. Size mm (in) | 0.7 (0.03) | 0.7 (0.03) | 2.1 (0.08) | 3.0 (0.12) | 3.6 (0.14)  | 5.3 (0.21)  | 9.1 (0.36)         |
| <b>CA6</b> | 1.004    |                         | Max. Cv                 | 0.8        | 1.4        | 3.5        | 7.5        | 12          | 25          | 50                 |
|            |          |                         | Min. Control Cv         | 0.07       | 0.18       | 0.18       | 0.37       | 0.58        | 0.95        | 1.3                |
|            |          |                         | Max. Part. Size mm (in) | 0.4 (0.01) | 0.3 (0.01) | 0.9 (0.04) | 1.3 (0.05) | 1.5 (0.06)  | 2.2 (0.09)  | 3.5 (0.14)         |
| <b>CB6</b> | 1.006    | Max. Cv                 | 1.0                     | 1.8        | 4.5        | 9.5        | 16         | 35          | 65          |                    |
|            |          | Min. Control Cv         | 0.07                    | 0.18       | 0.18       | 0.37       | 0.58       | 0.95        | 1.3         |                    |
|            |          | Max. Part. Size mm (in) | 0.4 (0.02)              | 0.4 (0.02) | 1.2 (0.05) | 1.6 (0.06) | 2.0 (0.08) | 3.2 (0.13)  | 4.9 (0.19)  |                    |
| <b>CC6</b> | 1.012    | Max. Cv                 | 1.4                     | 2.5        | 6.0        | 13         | 22         | 45          | 91          |                    |
|            |          | Min. Control Cv         | 0.07                    | 0.18       | 0.18       | 0.37       | 0.58       | 0.95        | 1.3         |                    |
|            |          | Max. Part. Size mm (in) | 0.7 (0.03)              | 0.7 (0.03) | 2.0 (0.08) | 2.7 (0.11) | 3.3 (0.13) | 4.9 (0.19)  | 8.7 (0.34)  |                    |

\*1: Three-stage trim is not available as standard for Class 2500 designs.

\*2: 8 in and larger sizes are not available as standard in Class 2500 designs.

Contact factory to discuss available options for custom applications.

# Parts list





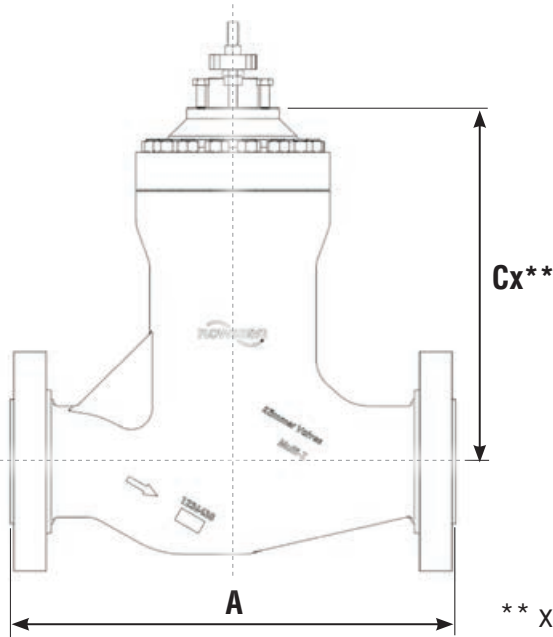
**Table 3: Materials of construction**

| Item Number | Component             | Material Details      |                   |                  |
|-------------|-----------------------|-----------------------|-------------------|------------------|
|             |                       | Material              | Temperature Range |                  |
| 1           | Body                  | WCC (CS cast)         | -29°C to 427°C    | -20°F to 800°F   |
|             |                       | A352 LCC              | -254°C to 454°C   | -425°F to 85°F   |
|             |                       | CF8M (316 SS cast)    | -29°C to 593°C    | -20°F to 1,100°F |
|             |                       | WC9                   | -46°C to 343°C    | -50°F to 650°F   |
|             |                       | Duplex SS 22% Cr      | -29°C to 316°C    | -20°F to 600°F   |
| 40          | Bonnet                | Carbon Steel          | -29°C to 427°C    | -20°F to 800°F   |
|             |                       | Low-temperature CS    | -254°C to 454°C   | -425°F to 850°F  |
|             |                       | 316 SS                | -29°C to 593°C    | -20°F to 1,100°F |
|             |                       | Cr-Mo WC9; F22        | -46°C to 343°C    | -50°F to 650°F   |
|             |                       | Duplex SS 22% Cr      | -29°C to 316°C    | -20°F to 600°F   |
| 50          | Plug                  | <b>Standard</b>       | <b>NACE</b>       |                  |
|             |                       | 1.4112                | 1.4462            |                  |
|             |                       | 416 SS HT             | Duplex 22% Cr     |                  |
|             |                       | 420 SS HT             | Inconel® 718      |                  |
|             |                       | 17-4PH H1025          | Nitronic® 50      |                  |
|             |                       | -                     | 17-4PH H1150D     |                  |
| 51          | Stem                  | <b>Standard</b>       | <b>NACE</b>       |                  |
|             |                       | 1.4112                | 1.4462            |                  |
|             |                       | 416 SS HT             | Duplex 22% Cr     |                  |
|             |                       | 420 SS HT             | Inconel 718       |                  |
|             |                       | -                     | Nitronic 50       |                  |
|             |                       | -                     | 17-4PH H1150D     |                  |
| 30/31       | Liner/PB Sleeve       | <b>Standard</b>       | <b>NACE</b>       |                  |
|             |                       | 1.4112                | 1.4462            |                  |
|             |                       | 416 SS HT             | Duplex 22% Cr     |                  |
|             |                       | 420 SS HT             | Inconel 718       |                  |
|             |                       | -                     | Nitronic 50       |                  |
|             |                       | -                     | 17-4PH H1150D     |                  |
| 20          | Seat Ring             | <b>Standard</b>       | <b>NACE</b>       |                  |
|             |                       | 1.4112                | 1.4462            |                  |
|             |                       | 416 SS HT             | Duplex 22% Cr     |                  |
|             |                       | 420 SS HT             | Inconel 718       |                  |
|             |                       | -                     | Nitronic 50       |                  |
|             |                       | -                     | 17-4PH H1150D     |                  |
| 88          | Packing               | See Table 1           |                   |                  |
| 65          | Pressure Balance Seal | <b>Material</b>       | <b>Max. Temp.</b> |                  |
|             |                       | PTFE V-ring           | 250°C             | 480°F            |
|             |                       | O-ring Energized PTFE | 250°C             | 480°F            |
|             |                       | Metallic Piston Rings | 400°C             | 750°F            |
| 56          | Bonnet Gasket         | -                     | -                 | -                |
| 58          | Sleeve Gasket         | -                     | -                 | -                |
| 66          | Guide Rings           | -                     | -                 | -                |
| 80          | Gland Flange          | -                     | -                 | -                |
| 87          | Packing Gland         | -                     | -                 | -                |
| 88          | Packing               | -                     | -                 | -                |
| 107         | Upper Bolting Kit     | -                     | -                 | -                |

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# Dimensions



\*\* x = number of stages

Table 4: Globe valves, ANSI

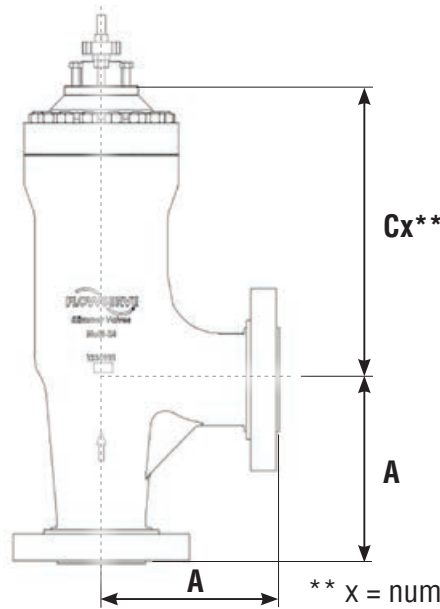
| Valve Size ANSI | Class 300       |                 |               |               |                 | Class 600                |                          |               |               |                 | Class 900                |                          |               |               |                 |
|-----------------|-----------------|-----------------|---------------|---------------|-----------------|--------------------------|--------------------------|---------------|---------------|-----------------|--------------------------|--------------------------|---------------|---------------|-----------------|
|                 | A1 <sup>1</sup> | A2 <sup>2</sup> | C3            | C4            | C6              | A1                       | A2                       | C3            | C4            | C6              | A1                       | A2                       | C3            | C4            | C6              |
| 1               | 197 (7.75)      | 197 (7.75)      | 170 (6.69)    | 192 (7.56)    | 236 (9.29)      | 292 <sup>3</sup> (11.50) | 292 <sup>3</sup> (11.50) | 170 (6.69)    | 192 (7.56)    | 236 (9.29)      | 292 (11.50)              | 292 (11.50)              | 170 (6.69)    | 192 (7.56)    | 236 (9.29)      |
| 1.5             | 235 (9.25)      | 235 (9.25)      | 247 (9.72)    | 277 (10.91)   | 337 (13.27)     | 311 <sup>3</sup> (12.25) | 311 <sup>3</sup> (12.25) | 247 (9.72)    | 277 (10.91)   | 337 (13.27)     | 311 <sup>3</sup> (12.25) | 311 <sup>3</sup> (12.25) | 269.5 (10.61) | 299.5 (11.79) | 359.5 (14.15)   |
| 2               | 267 (10.50)     | 270 (10.62)     | 247 (9.72)    | 277 (10.91)   | 337 (13.27)     | 375 <sup>3</sup> (14.75) | 378 <sup>3</sup> (14.88) | 247 (9.72)    | 277 (10.91)   | 337 (13.27)     | 375 (14.75)              | 378 (14.88)              | 269.5 (10.61) | 299.5 (11.79) | 359.5 (14.15)   |
| 3               | 318 (12.50)     | 321 (12.62)     | 316.5 (12.46) | 361.5 (14.23) | 451.5 (17.78)   | 441 <sup>3</sup> (17.38) | 445 <sup>3</sup> (17.50) | 316.5 (12.46) | 361.5 (14.23) | 451.5 (17.78)   | 441 (17.38)              | 445 (17.50)              | 316.5 (12.46) | 361.5 (14.23) | 451.5 (17.78)   |
| 4               | 368 (14.50)     | 371 (14.62)     | 415 (16.34)   | 487 (19.17)   | 631 (24.81)     | 511 <sup>3</sup> (20.12) | 514 <sup>3</sup> (20.25) | 415 (16.34)   | 487 (19.17)   | 631 (24.84)     | 511 (20.12)              | 514 (20.25)              | 470.2 (18.51) | 542.2 (21.35) | 686.2 (27.02)   |
| 6               | 473 (18.62)     | 476 (18.75)     | 614.2 (24.18) | 719.2 (28.31) | 929.2 (36.58)   | 768 <sup>3</sup> (30.25) | 772 <sup>3</sup> (30.38) | 614.2 (24.18) | 719.2 (28.31) | 929.2 (36.58)   | 768 <sup>3</sup> (30.25) | 772 <sup>3</sup> (30.38) | 614.2 (24.18) | 719.2 (28.31) | 929.2 (36.58)   |
| 8               | 568 (22.38)     | 572 (22.50)     | 724.7 (28.53) | 837.2 (32.96) | 1,062.2 (41.82) | 914 <sup>3</sup> (36.00) | 917 <sup>3</sup> (36.12) | 724.7 (28.53) | 837.2 (32.96) | 1,062.2 (41.82) | 914 (36.00)              | 917 (36.12)              | 730.2 (28.75) | 842.7 (33.18) | 1,067.7 (42.04) |

| Valve Size ANSI | Class 1500               |                          |               |               |                 | Class 2500               |                          |        |               |               |
|-----------------|--------------------------|--------------------------|---------------|---------------|-----------------|--------------------------|--------------------------|--------|---------------|---------------|
|                 | A1 <sup>1</sup>          | A2 <sup>2</sup>          | C3            | C4            | C6              | A1                       | A2                       | C3     | C4            | C6            |
| 1               | 292 (11.50)              | 292 (11.50)              | 170 (6.69)    | 192 (7.56)    | 236 (9.29)      | 308 <sup>3</sup> (12.12) | 308 <sup>3</sup> (12.12) | Note 4 | 198 (7.80)    | 242 (9.53)    |
| 1.5             | 311 <sup>3</sup> (12.25) | 311 <sup>3</sup> (12.25) | 269.5 (10.61) | 299.5 (11.79) | 359.5 (14.15)   | 359 <sup>3</sup> (14.12) | 359 <sup>3</sup> (14.12) | Note 4 | 320.5 (12.62) | 385.5 (15.18) |
| 2               | 375 (14.75)              | 378 (14.88)              | 269.5 (10.61) | 299.5 (11.79) | 359.5 (14.15)   | 413 (16.25)              | 416 (16.38)              | Note 4 | 320.5 (12.62) | 385.5 (15.18) |
| 3               | 460 (18.12)              | 464 (18.25)              | 349.5 (13.76) | 394.5 (15.53) | 484.5 (19.07)   | 498 <sup>3</sup> (19.62) | 502 <sup>3</sup> (19.75) | Note 4 | 493.2 (19.42) | 587.2 (23.12) |
| 4               | 530 (20.88)              | 533 (21.00)              | 470.2 (18.51) | 542.2 (21.35) | 686.2 (27.02)   | 737 (29.00)              | 746 (29.38)              | Note 4 | 650 (25.59)   | 801 (31.54)   |
| 6               | 768 (30.25)              | 778 (30.62)              | 648.2 (25.52) | 753.2 (29.65) | 963.2 (37.92)   | 819 <sup>3</sup> (32.25) | 832 <sup>3</sup> (32.75) | Note 4 | 782.2 (30.80) | 997.2 (39.26) |
| 8               | 972 (38.25)              | 981 (38.62)              | 730.2 (28.75) | 842.7 (33.18) | 1,067.7 (42.04) | Note 4                   |                          |        |               |               |

Primary dimension shown in millimeters; secondary dimension noted in parentheses shown in inches.

1. A1 End connections: Flanged RF/RFSF
2. A2 End connections: Flanged RTJ
3. Noted dimensions are 'Flowserve Standard' alternates; ANSI/ISA standard dimensions are also available for all sizes/classes.
4. Three-stage trim and 8 in sizes not available as standard for Class 2500 designs. Contact factory for custom designs.

# Dimensions



**Table 5: Angle valves, ANSI**

| Valve Size ANSI | Class 300      |                |                  |                  |                    | Class 600                   |                             |                  |                  |                    | Class 900                   |                             |                  |                  |                    |
|-----------------|----------------|----------------|------------------|------------------|--------------------|-----------------------------|-----------------------------|------------------|------------------|--------------------|-----------------------------|-----------------------------|------------------|------------------|--------------------|
|                 | A1             | A2             | C3               | C4               | C6                 | A1                          | A2                          | C3               | C4               | C6                 | A1                          | A2                          | C3               | C4               | C6                 |
| 1               | 98<br>(3.88)   | 98<br>(3.88)   | 170<br>(6.69)    | 192<br>(7.56)    | 236<br>(9.29)      | 146 <sup>3</sup><br>(5.75)  | 146 <sup>3</sup><br>(5.75)  | 170<br>(6.69)    | 192<br>(7.56)    | 236<br>(9.29)      | 146<br>(5.75)               | 146<br>(5.75)               | 170<br>(6.69)    | 192<br>(7.56)    | 236<br>(9.29)      |
| 1.5             | 117<br>(4.63)  | 117<br>(4.63)  | 247<br>(9.72)    | 277<br>(10.91)   | 337<br>(13.27)     | 156 <sup>3</sup><br>(6.13)  | 156 <sup>3</sup><br>(6.13)  | 247<br>(9.72)    | 277<br>(10.91)   | 337<br>(13.27)     | 156 <sup>3</sup><br>(6.13)  | 156 <sup>3</sup><br>(6.13)  | 269.5<br>(10.61) | 299.5<br>(11.79) | 359.5<br>(14.15)   |
| 2               | 133<br>(5.25)  | 135<br>(5.31)  | 247<br>(9.72)    | 277<br>(10.91)   | 337<br>(13.27)     | 187 <sup>3</sup><br>(7.38)  | 189 <sup>3</sup><br>(7.44)  | 247<br>(9.72)    | 277<br>(10.91)   | 337<br>(13.27)     | 187<br>(7.38)               | 189<br>(7.44)               | 269.5<br>(10.61) | 299.5<br>(11.79) | 359.5<br>(14.15)   |
| 3               | 159<br>(6.25)  | 160<br>(6.31)  | 316.5<br>(12.46) | 361.5<br>(14.23) | 451.5<br>(17.78)   | 221 <sup>3</sup><br>(8.69)  | 222 <sup>3</sup><br>(8.75)  | 316.5<br>(12.46) | 361.5<br>(14.23) | 451.5<br>(17.78)   | 221<br>(8.69)               | 222<br>(8.75)               | 316.5<br>(12.46) | 361.5<br>(14.23) | 451.5<br>(17.78)   |
| 4               | 184<br>(7.25)  | 186<br>(7.31)  | 415<br>(16.34)   | 487<br>(19.17)   | 631<br>(24.84)     | 256 <sup>3</sup><br>(10.06) | 257 <sup>3</sup><br>(10.13) | 415<br>(16.34)   | 487<br>(19.17)   | 631<br>(24.84)     | 256<br>(10.06)              | 257<br>(10.13)              | 470.2<br>(18.51) | 542.2<br>(21.35) | 686.2<br>(27.02)   |
| 6               | 236<br>(9.31)  | 238<br>(9.38)  | 614.2<br>(24.18) | 719.2<br>(28.31) | 929.2<br>(36.58)   | 384 <sup>3</sup><br>(15.13) | 386 <sup>3</sup><br>(15.19) | 614.2<br>(24.18) | 719.2<br>(28.31) | 929.2<br>(36.58)   | 384 <sup>3</sup><br>(15.13) | 386 <sup>3</sup><br>(15.19) | 614.2<br>(24.18) | 719.2<br>(28.31) | 929.2<br>(36.58)   |
| 8               | 284<br>(11.19) | 286<br>(11.25) | 724.7<br>(28.53) | 837.2<br>(32.96) | 1,062.2<br>(41.82) | 457 <sup>3</sup><br>(18.00) | 459 <sup>3</sup><br>(18.06) | 724.7<br>(28.53) | 837.2<br>(32.96) | 1,062.2<br>(41.82) | 457<br>(18.00)              | 459<br>(18.06)              | 730.2<br>(28.75) | 842.7<br>(33.18) | 1,067.7<br>(42.04) |

| Valve Size ANSI | Class 1500                 |                            |                  |                  |                    | Class 2500                  |                             |        |                  |                  |
|-----------------|----------------------------|----------------------------|------------------|------------------|--------------------|-----------------------------|-----------------------------|--------|------------------|------------------|
|                 | A1                         | A2                         | C3               | C4               | C6                 | A1                          | A2                          | C3     | C4               | C6               |
| 1               | 146<br>(5.75)              | 146<br>(5.75)              | 170<br>(6.69)    | 192<br>(7.56)    | 236<br>(9.29)      | 154 <sup>3</sup><br>(6.06)  | 154 <sup>3</sup><br>(6.06)  | Note 4 | 198<br>(7.80)    | 242<br>(9.53)    |
| 1.5             | 156 <sup>3</sup><br>(6.13) | 156 <sup>3</sup><br>(6.13) | 269.5<br>(10.61) | 299.5<br>(11.79) | 359.5<br>(14.15)   | 179 <sup>3</sup><br>(7.06)  | 179 <sup>3</sup><br>(7.06)  | Note 4 | 320.5<br>(12.62) | 385.5<br>(15.18) |
| 2               | 187<br>(7.38)              | 189<br>(7.44)              | 269.5<br>(10.61) | 299.5<br>(11.79) | 359.5<br>(14.15)   | 206<br>(8.13)               | 208<br>(8.19)               | Note 4 | 320.5<br>(12.62) | 385.5<br>(15.18) |
| 3               | 230<br>(9.06)              | 232<br>(9.13)              | 349.5<br>(13.76) | 394.5<br>(15.53) | 484.5<br>(19.07)   | 249 <sup>3</sup><br>(9.81)  | 251 <sup>3</sup><br>(9.88)  | Note 4 | 493.2<br>(19.42) | 587.2<br>(23.12) |
| 4               | 265<br>(10.44)             | 267<br>(10.50)             | 470.2<br>(18.51) | 542.2<br>(21.35) | 686.2<br>(27.02)   | 368<br>(14.50)              | 373<br>(14.69)              | Note 4 | 650<br>(25.59)   | 801<br>(31.54)   |
| 6               | 384<br>(15.13)             | 389<br>(15.31)             | 648.2<br>(25.52) | 753.2<br>(29.65) | 963.2<br>(37.92)   | 410 <sup>3</sup><br>(16.13) | 416 <sup>3</sup><br>(16.38) | Note 4 | 782.2<br>(30.80) | 997.2<br>(39.26) |
| 8               | 486<br>(19.13)             | 490<br>(19.31)             | 730.2<br>(28.75) | 842.7<br>(33.18) | 1,067.7<br>(42.04) | Note 4                      |                             |        |                  |                  |

Primary dimension shown in millimeters; secondary dimension noted in parentheses shown in inches.

- 1. A1 End connections: Flanged RF/RFSF
- 2. A2 End connections: Flanged RTJ
- 3. Noted dimensions are 'Flowserve Standard' alternates; ANSI/ISA standard dimensions are also available for all sizes/classes.
- 4. Three-stage trim and 8 in sizes not available as standard for Class 2500 designs. Contact factory for custom designs.

The use of non-piston actuators may change the dimension Cx.



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