

Masoneilan™ 21000 Series

Complete Line of Rugged,
Top Guided, Globe Valves with
Lo-dB™ and Anti-Cavitation
Capabilities



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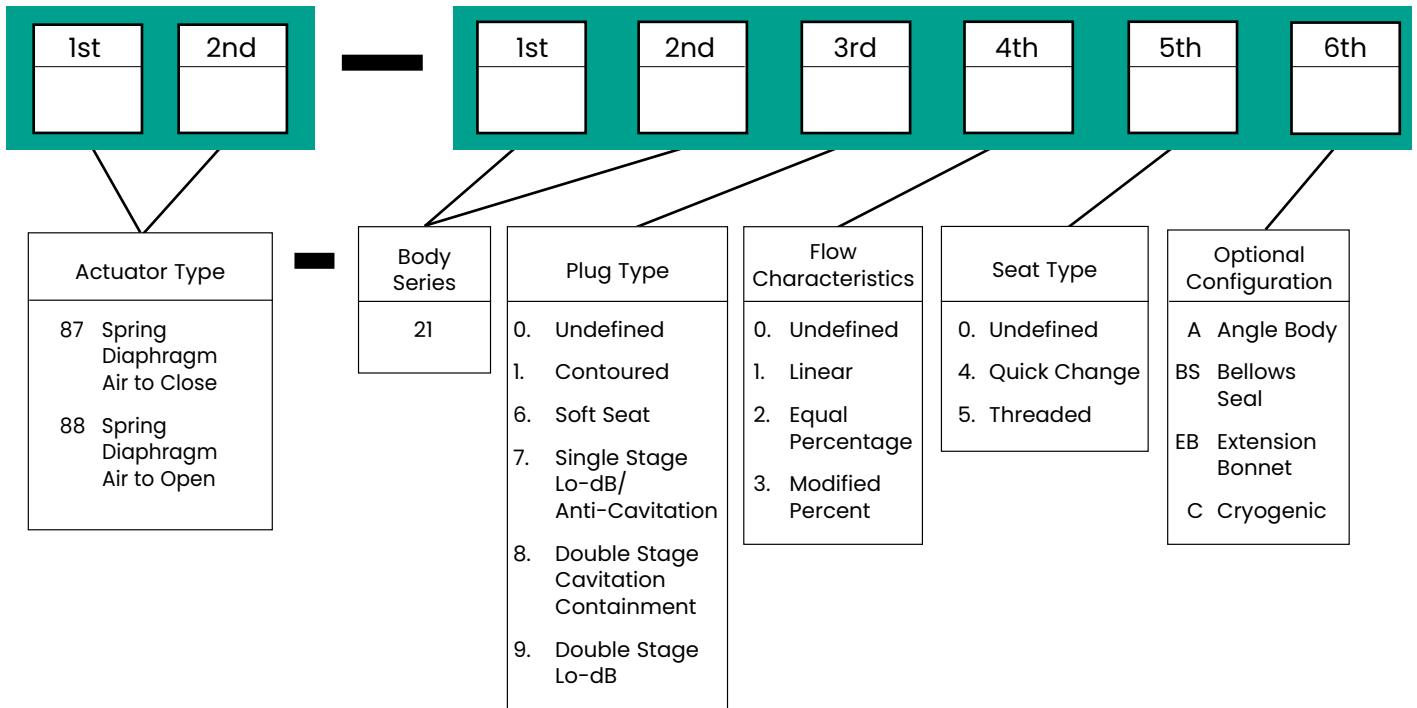
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Numbering system



Temperature range/seat leakage

Contoured Trim

| Valve Size | | Body ¹ Rating | Seat Type | Packing Material | Temperature Range ² | | | | Cryogenic Extension | | Seat Leakage IEC 60534-4 and ANSI/ FCI 70.2 Class | |
|------------|-----------|--|------------------------|--|--------------------------------|--------------------|------------------|--------------------|---------------------|------------------|---|---|
| Inch | mm | | | | Standard Bonnet | | Extension Bonnet | | min. | max. | | |
| | | | | | min. | max. | min. | max. | | | | |
| 0.75 to 8 | 20 to 200 | ASME Class 150 to 2500 and equivalent PN | Metal | PTFE, LE or LE FireSafe Packing | -20°F (-29°C) | +450°F (+232°C) | -50°F (-46°C) | +800°F (+427°C) | | | IV | V |
| | | | | Graphite Packing | -20°F (-29°C) | +800°F (+427°C) | -50°F (-46°C) | +800°F (+427°C) | | | | |
| | | | | V-ring | | | | | -320°F (-196°C) | -20°F (-29°C) | | |
| | | | Soft Seat ⁶ | Any | -20°F (-29°C) | +450°F (+232°C) | -50°F (-46°C) | +450°F (+232°C) | | | VI | |

Lo-dB/Anti-Cavitation Trim (1 or 2 Stage Design)³

| Valve Size | | Body ¹ Rating | Seat Type | Packing Material | Temperature Range ² | | | | Cryogenic Extension | | Seat Leakage IEC 60534-4 and ANSI/ FCI 70.2 Class | |
|------------|-----------|--|--------------|--|--------------------------------|--------------------|------------------|--------------------|---------------------|------------------|---|---|
| Inch | mm | | | | Standard Bonnet | | Extension Bonnet | | min. | max. | | |
| | | | | | min. | max. | min. | max. | | | | |
| 0.75 to 8 | 20 to 200 | ASME Class 150 to 2500 and equivalent PN | Metal | PTFE, LE or LE FireSafe Packing | -20°F (-29°C) | +450°F (+232°C) | -50°F (-46°C) | +800°F (+427°C) | | | IV | V |
| | | | | Graphite Packing | -20°F (-29°C) | +800°F (+427°C) | -50°F (-46°C) | +800°F (+427°C) | | | | |
| | | | | V-ring | | | | | -320°F (-196°C) | -20°F (-29°C) | | |

- ASME Class 900-1500 available only in 0.75 to 4 inch (20 to 100 mm) sizes.
ASME Class 2500 available only in 0.75 to 2 inch (20 to 50 mm) sizes.
- See Materials of Construction Tables for other temperature limitations.
- 2-Stage design only available with Quick Change seat rings.
- 2-Stage Anti-Cavitation Trim not available in 6 inch (150 mm) and 8 inch (200 mm) size.
- See separate Technical Specification for Masoneilan Low Emissions packing systems.
- Soft seat is limited to a maximum of 1000 psi (70 bar) shut-off and a maximum of 450°F (232°C).
- Masoneilan 21000 Series products meet design and materials requirements of PED Directive 2014/68/EU.

Ratings/connections¹

| Valve Size | | ASME Class 150 (PN 20) | | | | | ASME Class 300 (PN 50) | | | | | ASME Class 600 (PN 100) | | | | |
|------------|-----|------------------------|----|-----|-----|----|------------------------|----|-----|-----|----|-------------------------|----|-----|-----|----|
| Inch | mm | RF | SW | THD | RTJ | BW | RF | SW | THD | RTJ | BW | RF | SW | THD | RTJ | BW |
| 0.75 | 20 | X | X | X | | | X | X | X | X | | X | X | X | X | |
| 1 | 25 | X | X | X | | | X | X | X | X | | X | X | X | X | |
| 1.5 | 40 | X | X | X | | | X | X | X | X | | X | X | X | X | |
| 2 | 50 | X | X | X | | X | X | X | X | X | X | X | X | X | X | X |
| 3 | 80 | X | | | | X | X | | | X | X | X | | | X | X |
| 4 | 100 | X | | | | X | X | | | X | X | X | | | X | X |
| 6 | 150 | X | | | | X | X | | | X | X | X | | | X | X |
| 8 | 200 | X | | | | X | X | | | X | X | X | | | X | X |

| Valve Size | | ASME Class 900 (PN 150) | | | | | ASME Class 1500 (PN 250) | | | | | ASME Class 2500 (PN 420) | | | | |
|------------|-----|-------------------------|----|-----|-----|----|--------------------------|----|-----|-----|----|--------------------------|----|-----|-----|----|
| Inch | mm | RF | SW | THD | RTJ | BW | RF | SW | THD | RTJ | BW | RF | SW | THD | RTJ | BW |
| 0.75 | 20 | X | X | | X | | X | X | | X | | X | X | | X | |
| 1 | 25 | X | X | | X | | X | X | | X | | X | X | | X | |
| 1.5 | 40 | X | X | | X | | X | X | | X | | X | X | | X | |
| 2 | 50 | X | X | | X | X | X | X | | X | X | X | X | | X | X |
| 3 | 80 | X | | | X | X | X | | | X | X | | | | | |
| 4 | 100 | X | | | X | X | X | | | X | X | | | | | |

1. Standard flange of Ra 125-250. Other flange facings and surface finishes available.

C_V and F_L versus travel

Contoured Trim

Direction: FLOW-TO-OPEN (FTO)
Flow Characteristic: LINEAR

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
|---|---------------------------|-------------|------------------|-------|--------|------|----------------------|------|-------|-------|-------|-------|-------|-------|-------|------|-----|
| F _L : | | | | | | | 0.93 | 0.93 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | 0.9 | 0.9 | 0.9 | 0.9 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _V | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | |
| Close clearance 0.75 and 1 ¹ | Close clearance 20 and 25 | 150-600 | 0.125 | 3.2 | 0.8 | 20.3 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.1 | |
| | | | 0.25 | 6.4 | 0.8 | 20.3 | 0.02 | 0.04 | 0.06 | 0.07 | 0.09 | 0.11 | 0.13 | 0.15 | 0.18 | 0.2 | |
| | | | 0.25 | 6.4 | 0.8 | 20.3 | 0.03 | 0.06 | 0.08 | 0.11 | 0.13 | 0.16 | 0.19 | 0.23 | 0.27 | 0.3 | |
| | | | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.08 | 0.11 | 0.14 | 0.18 | 0.22 | 0.26 | 0.3 | 0.36 | 0.4 | |
| | | | 0.25 | 6.4 | 0.8 | 20.3 | 0.06 | 0.12 | 0.17 | 0.22 | 0.27 | 0.32 | 0.38 | 0.45 | 0.54 | 0.6 | |
| | | | 0.25 | 6.4 | 0.8 | 20.3 | 0.08 | 0.16 | 0.22 | 0.29 | 0.36 | 0.43 | 0.51 | 0.6 | 0.72 | 0.8 | |
| | | | 0.25 | 6.4 | 0.8 | 20.3 | 0.1 | 0.2 | 0.28 | 0.36 | 0.45 | 0.54 | 0.64 | 0.76 | 0.9 | 1 | |
| 0.75 | 20 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.15 | 0.31 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.50 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.34 | 0.68 | 1.02 | 1.36 | 1.72 | 2.11 | 2.51 | 2.93 | 3.36 | 3.80 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.54 | 1.07 | 1.60 | 2.15 | 2.72 | 3.33 | 3.96 | 4.62 | 5.30 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.09 | 2.15 | 3.21 | 4.30 | 5.45 | 6.65 | 7.92 | 9.24 | 10.60 | 12 | |
| 1 | 25 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.15 | 0.31 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.50 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.34 | 0.68 | 1.02 | 1.36 | 1.73 | 2.11 | 2.51 | 2.93 | 3.36 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.54 | 1.08 | 1.61 | 2.15 | 2.72 | 3.33 | 4.0 | 4.63 | 5.31 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.09 | 2.16 | 3.22 | 4.31 | 5.45 | 6.66 | 7.93 | 9.25 | 10.6 | 12 | |
| 1.5 | 40 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.15 | 0.31 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.50 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.34 | 0.68 | 1.02 | 1.36 | 1.73 | 2.11 | 2.51 | 2.93 | 3.36 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.54 | 1.08 | 1.61 | 2.15 | 2.72 | 3.33 | 4.0 | 4.63 | 5.31 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.18 | 2.33 | 3.48 | 4.66 | 5.9 | 7.2 | 8.58 | 10 | 11.5 | 13 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 2.11 | 4.18 | 6.06 | 7.91 | 9.89 | 11.67 | 13.65 | 15.39 | 16.65 | 18 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 2.27 | 4.49 | 6.7 | 8.97 | 11.3 | 13.9 | 16.5 | 19.3 | 22.1 | 25 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 3.17 | 6.29 | 9.38 | 12.6 | 15.9 | 19.4 | 23.1 | 27 | 31 | 35 | |
| 2 | 50 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.15 | 0.31 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.50 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.34 | 0.68 | 1.02 | 1.36 | 1.73 | 2.11 | 2.51 | 2.93 | 3.36 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.54 | 1.08 | 1.61 | 2.15 | 2.72 | 3.33 | 4.0 | 4.63 | 5.31 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.36 | 2.7 | 4.02 | 5.38 | 6.81 | 8.32 | 9.91 | 11.6 | 13.3 | 15 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 2.22 | 4.41 | 6.4 | 8.35 | 10.44 | 12.32 | 14.4 | 16.25 | 17.58 | 19 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 2.36 | 4.67 | 6.97 | 9.33 | 11.8 | 14.4 | 17.2 | 20.1 | 23 | 26 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 4.17 | 8.27 | 12.3 | 16.5 | 20.9 | 25.5 | 30.4 | 35.5 | 40.7 | 46 | |
| 3 | 80 | 150-1500 | 0.994 | 25.2 | 1.5 | 38.1 | 2.34 | 4.65 | 6.74 | 8.79 | 11.0 | 12.97 | 15.16 | 17.1 | 18.5 | 20 | |
| | | | 1.25 | 31.8 | 1.5 | 38.1 | 2.81 | 5.57 | 8.31 | 11.1 | 14.1 | 17.2 | 20.5 | 23.9 | 27.4 | 31 | |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 4.26 | 8.45 | 12.6 | 16.9 | 21.3 | 26.1 | 31.1 | 36.2 | 41.6 | 47 | |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 8.43 | 16.7 | 24.26 | 31.65 | 39.57 | 46.68 | 54.58 | 61.57 | 66.6 | 72 | |
| | | | 2.625 | 66.7 | 1.5 | 38.1 | 9.97 | 19.8 | 29.5 | 39.5 | 49.9 | 61 | 72.7 | 84.8 | 97.3 | 110 | |
| 4 | 100 | 150-1500 | 0.994 | 25.2 | 1.5 | 38.1 | 2.34 | 4.65 | 6.74 | 8.79 | 11.0 | 12.97 | 15.16 | 17.1 | 18.5 | 20 | |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 4.44 | 8.81 | 13.1 | 17.6 | 22.3 | 27.2 | 32.4 | 37.8 | 43.3 | 49 | |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 8.67 | 17.2 | 24.93 | 32.53 | 40.67 | 47.97 | 56.1 | 63.28 | 68.45 | 74 | |
| | | | 2.625 | 66.7 | 1.5 | 38.1 | 10.3 | 20.3 | 30.3 | 40.6 | 51.3 | 62.7 | 74.7 | 87.1 | 99.9 | 113 | |
| | | | 3.5 | 88.9 | 1.5 | 38.1 | 17.7 | 35.1 | 52.3 | 70 | 88.6 | 108 | 129 | 150 | 172 | 195 | |
| 6 | 150 | 150-600 | 2.000 | 50.8 | 2 | 50.8 | 9.5 | 18.8 | 27.3 | 35.6 | 44.5 | 52.5 | 61.4 | 69.3 | 74.9 | 81 | |
| | | | 2.625 | 66.7 | 2 | 50.8 | 11.4 | 22.7 | 33.8 | 45.2 | 57.2 | 69.9 | 83.2 | 97.2 | 111 | 126 | |
| | | | 3.5 | 88.9 | 2 | 50.8 | 18.9 | 37.4 | 55.7 | 74.6 | 94.5 | 115 | 137 | 160 | 184 | 208 | |
| | | | 4.375 | 111 | 2 | 50.8 | 35.13 | 69.7 | 101 | 131.9 | 164.9 | 194.5 | 227.4 | 256.5 | 277.5 | 300 | |
| | | | 5 | 127 | 2 | 50.8 | 36.3 | 71.9 | 107 | 143 | 182 | 222 | 264 | 308 | 354 | 400 | |
| 8 | 200 | 150-600 | 3.5 | 88.9 | 2 | 50.8 | 20 | 40 | 60 | 80 | 101 | 124 | 148 | 172 | 197 | 224 | |
| | | | 4.375 | 111 | 2 | 50.8 | 37 | 74 | 108 | 141 | 176 | 207 | 243 | 274 | 296 | 320 | |
| | | | 5 | 127 | 2 | 50.8 | 37 | 75 | 112 | 148 | 187 | 230 | 274 | 319 | 365 | 415 | |
| | | | 6.25 | 158.7 | 2.5 | 63.5 | 57 | 115 | 173 | 228 | 289 | 355 | 422 | 493 | 563 | 640 | |

Standard Bellows Seal construction available for ASME Class 150 - 300 (PN 20 - PN 50) and capacities of C_V = 1.7 and higher.

1. Close clearance 0.75 and 1 are available in quick change trim only (Model 21114).

2. Models 21614 and 21615 available only in Cv ranges as indicated by green background.

C_v and F_L versus travel

Contoured Trim

Direction: FLOW-TO-OPEN (FTO)
Flow Characteristic: EQUAL PERCENTAGE

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
|--------------------|------|-------------|------------------|-------|----------|-------|----------------------|------|------|------|-------|-------|-------|--------|--------|------|-------|
| F _L : | | | | | | | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | 0.90 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | |
| 0.75 | 20 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.05 | 0.08 | 0.11 | 0.18 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.12 | 0.17 | 0.24 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.18 | 0.27 | 0.38 | 0.62 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.43 | 0.6 | 0.86 | 1.22 | 2.32 | 4.3 | 6.8 | 9.13 | 10.7 | 12 | |
| 1 | 25 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.05 | 0.08 | 0.11 | 0.18 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.12 | 0.17 | 0.24 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.18 | 0.27 | 0.38 | 0.62 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.4 | 0.6 | 0.86 | 1.22 | 2.32 | 4.3 | 6.8 | 9.13 | 10.7 | 12 | |
| 1.5 | 40 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.05 | 0.08 | 0.11 | 0.18 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.12 | 0.17 | 0.24 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.18 | 0.27 | 0.38 | 0.62 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.4 | 0.59 | 0.82 | 1.34 | 2.32 | 3.87 | 6.01 | 8.57 | 11.1 | 13 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.43 | 0.73 | 1.14 | 1.73 | 2.69 | 4.61 | 6.93 | 10.76 | 14.84 | 18 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.77 | 1.13 | 1.58 | 2.58 | 4.46 | 7.45 | 11.6 | 16.5 | 21.4 | 25 | |
| 2 | 50 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.05 | 0.08 | 0.11 | 0.18 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.12 | 0.17 | 0.24 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.18 | 0.27 | 0.38 | 0.62 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.46 | 0.68 | 0.95 | 1.55 | 2.68 | 4.47 | 6.93 | 9.88 | 12.9 | 15 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.46 | 0.77 | 1.2 | 1.82 | 2.84 | 4.87 | 7.32 | 11.36 | 15.67 | 19 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.8 | 1.17 | 1.64 | 2.68 | 4.64 | 7.75 | 12 | 17.1 | 22.3 | 26 | |
| 3 | 80 | 150-1500 | 0.994 | 25.2 | 1.5 | 38.1 | 0.48 | 0.81 | 1.26 | 1.92 | 2.99 | 5.13 | 7.7 | 11.96 | 16.49 | 20 | |
| | | | 1.25 | 31.8 | 1.5 | 38.1 | 0.95 | 1.4 | 1.96 | 3.2 | 5.53 | 9.24 | 14.3 | 20.4 | 26.6 | 31 | |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 1.45 | 2.12 | 2.97 | 4.85 | 8.39 | 14 | 21.7 | 31 | 40.3 | 47 | |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 1.73 | 2.93 | 4.55 | 6.91 | 10.76 | 18.45 | 27.72 | 43 | 59.36 | 72 | |
| | | | 2.625 | 66.7 | 1.5 | 38.1 | 4 | 5.5 | 7.88 | 11.2 | 21.2 | 39.4 | 62.3 | 83.7 | 98.5 | 110 | |
| | | | 4 | 100 | 150-1500 | 0.994 | 25.2 | 1.5 | 38.1 | 0.74 | 1.14 | 1.76 | 2.07 | 2.99 | 5.13 | 7.7 | 11.96 |
| 1.625 | 41.3 | 1.5 | | | | 38.1 | 1.51 | 2.21 | 3.09 | 5.06 | 8.74 | 14.6 | 22.7 | 32.3 | 42 | 49 | |
| 2.000 | 50.8 | 1.5 | | | | 38.1 | 2.73 | 4.22 | 6.51 | 7.66 | 11.1 | 18.97 | 28.49 | 44.24 | 61 | 74 | |
| 2.625 | 66.7 | 1.5 | | | | 38.1 | 3.47 | 5.09 | 7.14 | 11.7 | 20.2 | 33.7 | 52.2 | 74.5 | 96.8 | 113 | |
| 3.5 | 88.9 | 1.5 | | | | 38.1 | 7 | 9.7 | 14 | 19.9 | 37.6 | 69.8 | 110 | 148 | 175 | 195 | |
| 6 | 150 | 150-600 | 2 | 50.8 | 2 | 50.8 | 2.99 | 4.62 | 7.13 | 8.38 | 12.1 | 20.76 | 31.19 | 48.42 | 66.78 | 81 | |
| | | | 2.625 | 66.7 | 2 | 50.8 | 3.87 | 5.68 | 7.96 | 13 | 22.5 | 37.5 | 58.3 | 83 | 108 | 126 | |
| | | | 3.5 | 88.9 | 2 | 50.8 | 6.4 | 9.37 | 13.1 | 21.5 | 37.1 | 62 | 96.2 | 137 | 178 | 208 | |
| | | | 4.375 | 111 | 2 | 50.8 | 11 | 17.1 | 26.4 | 31 | 44.85 | 76.89 | 115.5 | 179.34 | 247.35 | 300 | |
| | | | 5 | 127 | 2 | 50.8 | 14.4 | 20 | 28.7 | 40.7 | 77.2 | 143 | 227 | 304 | 358 | 400 | |
| 8 | 200 | 150-600 | 3.5 | 88.9 | 2 | 50.8 | 7 | 10 | 15 | 24 | 40 | 72 | 112 | 154 | 197 | 224 | |
| | | | 4.375 | 111 | 2 | 50.8 | 8 | 13 | 20 | 31 | 48 | 82 | 123 | 191 | 264 | 320 | |
| | | | 5 | 127 | 2 | 50.8 | 13 | 19 | 28 | 44 | 74 | 133 | 207 | 285 | 365 | 415 | |
| | | | 6.25 | 158.7 | 2.5 | 63.5 | 20 | 30 | 43 | 68 | 115 | 205 | 320 | 440 | 562 | 640 | |

1. Close clearance 0.75 and 1 are available in quick change trim only (Model 21114).
2. Models 21614 and 21615 available only in Cv ranges as indicated by green background.

C_v and F_L versus travel

Contoured Plug

Direction: FLOW-TO-OPEN (FTO)
Flow Characteristic: MODIFIED PERCENT

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
|--------------------|-----|-------------|------------------|------|--------|------|----------------------|-------|-------|--------|--------|--------|--------|--------|--------|------|-----|
| F _L : | | | | | | | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | 0.9 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | |
| 0.75 | 20 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.07 | 0.14 | 0.28 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.09 | 0.15 | 0.31 | 0.64 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.14 | 0.24 | 0.49 | 1 | 1.78 | 2.59 | 3.5 | 4.5 | 5.38 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.32 | 0.74 | 1.27 | 3.25 | 5.47 | 7.78 | 9.6 | 10.85 | 11.57 | 12 | |
| 1 | 25 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.07 | 0.14 | 0.28 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.09 | 0.15 | 0.31 | 0.64 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.14 | 0.24 | 0.49 | 1 | 1.78 | 2.59 | 3.5 | 4.5 | 5.38 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.32 | 0.74 | 1.27 | 3.25 | 5.47 | 7.78 | 9.6 | 10.85 | 11.57 | 12 | |
| 1.5 | 40 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.07 | 0.14 | 0.28 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.09 | 0.15 | 0.31 | 0.64 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.14 | 0.24 | 0.49 | 1 | 1.78 | 2.59 | 3.5 | 4.5 | 5.38 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.29 | 0.52 | 1.07 | 2.18 | 3.86 | 5.62 | 7.6 | 9.77 | 11.65 | 13 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.41 | 0.71 | 1.48 | 3.01 | 5.34 | 7.78 | 10.53 | 13.53 | 16.13 | 18 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.68 | 1.55 | 2.66 | 6.77 | 11.4 | 16.2 | 20 | 22.6 | 24.11 | 25 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 0.95 | 2.17 | 3.72 | 9.48 | 15.97 | 22.69 | 28 | 31.65 | 33.76 | 35 | |
| 2 | 50 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.07 | 0.14 | 0.28 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.09 | 0.15 | 0.31 | 0.64 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.14 | 0.24 | 0.49 | 1 | 1.78 | 2.59 | 3.5 | 4.5 | 5.38 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.34 | 0.59 | 1.23 | 2.51 | 4.45 | 6.48 | 8.77 | 11.28 | 13.44 | 15 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.43 | 0.75 | 1.56 | 3.18 | 5.64 | 8.21 | 11.11 | 14.28 | 17 | 19 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.59 | 1.03 | 2.14 | 4.35 | 7.71 | 11.23 | 15.2 | 19.54 | 23.3 | 26 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 1.24 | 2.85 | 4.89 | 12.46 | 20.99 | 29.82 | 36.81 | 41.59 | 44.37 | 46 | |
| 3 | 80 | 150-1500 | 0.994 | 25.2 | 1.5 | 38.1 | 0.45 | 0.79 | 1.64 | 3.35 | 5.93 | 8.64 | 11.7 | 15 | 17.92 | 20 | |
| | | | 1.25 | 31.8 | 1.5 | 38.1 | 0.7 | 1.23 | 2.55 | 5.19 | 9.19 | 13.4 | 18.13 | 23.3 | 27.78 | 31 | |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 1.06 | 1.86 | 3.86 | 7.87 | 13.94 | 20.3 | 27.49 | 35.33 | 42.12 | 47 | |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 1.63 | 2.85 | 5.92 | 12.05 | 21.36 | 31.11 | 42.11 | 54.12 | 64.53 | 72 | |
| | | | 2.625 | 66.7 | 1.5 | 38.1 | 2.97 | 6.82 | 11.68 | 29.79 | 50.18 | 71.3 | 88 | 99.46 | 106.1 | 110 | |
| 4 | 100 | 150-1500 | 0.994 | 25.2 | 1.5 | 38.1 | 0.45 | 0.79 | 1.64 | 3.35 | 5.93 | 8.64 | 11.7 | 15 | 17.92 | 20 | |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 1.11 | 1.94 | 4.03 | 8.2 | 14.53 | 21.17 | 28.66 | 36.83 | 43.91 | 49 | |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 1.67 | 2.93 | 6.08 | 12.39 | 21.95 | 31.98 | 43.28 | 55.63 | 66.32 | 74 | |
| | | | 2.625 | 66.7 | 1.5 | 38.1 | 2.56 | 4.48 | 9.29 | 18.92 | 33.52 | 48.83 | 66.09 | 84.94 | 101.27 | 113 | |
| | | | 3.5 | 88.9 | 1.5 | 38.1 | 5.27 | 12.1 | 20.7 | 52.8 | 88.96 | 126.4 | 156.04 | 176.32 | 188.08 | 195 | |
| 6 | 150 | 150-600 | 2.000 | 50.8 | 2 | 50.8 | 1.83 | 3.21 | 6.66 | 13.56 | 24.02 | 35 | 47.38 | 60.89 | 72.6 | 81 | |
| | | | 2.625 | 66.7 | 2 | 50.8 | 2.85 | 4.99 | 10.36 | 21.1 | 37.37 | 54.44 | 73.7 | 94.7 | 112.92 | 126 | |
| | | | 3.5 | 88.9 | 2 | 50.8 | 4.71 | 8.25 | 17.1 | 34.82 | 61.69 | 89.88 | 121.66 | 156.35 | 186.41 | 208 | |
| | | | 4.375 | 111 | 2 | 50.8 | 6.79 | 11.89 | 24.66 | 50.22 | 88.98 | 129.63 | 175.47 | 225.51 | 268.86 | 300 | |
| | | | 5 | 127 | 2 | 50.8 | 10.8 | 24.8 | 42.48 | 108.32 | 182.48 | 259.28 | 320.08 | 361.68 | 385.8 | 400 | |

C_v and F_L versus travel

Contoured Plug

Direction: FLOW-TO-CLOSE (FTC)
Flow Characteristic: LINEAR TRIM

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|--------------------|-----|-------------|------------------|-------|--------|------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| F _L : | | | | | | | 0.53 | 0.56 | 0.60 | 0.68 | 0.75 | 0.78 | 0.81 | 0.84 | 0.85 | 0.86 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | |
| 0.75 | 20 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.225 | 0.39 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.5 | 1.7 |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.51 | 0.85 | 1.02 | 1.36 | 1.72 | 2.11 | 2.51 | 2.93 | 3.36 | 3.8 |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.81 | 1.34 | 1.6 | 2.15 | 2.72 | 3.33 | 3.96 | 4.62 | 5.3 | 6 |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.635 | 2.69 | 3.21 | 4.3 | 5.45 | 6.65 | 7.92 | 9.24 | 10.6 | 12 |
| 1 | 25 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.225 | 0.39 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.5 | 1.7 |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.51 | 0.85 | 1.02 | 1.36 | 1.73 | 2.11 | 2.51 | 2.93 | 3.36 | 3.8 |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.81 | 1.35 | 1.61 | 2.15 | 2.72 | 3.33 | 4 | 4.63 | 5.31 | 6 |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.635 | 2.70 | 3.22 | 4.31 | 5.45 | 6.66 | 7.93 | 9.25 | 10.6 | 12 |
| 1.5 | 40 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.225 | 0.39 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.5 | 1.7 |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.51 | 0.85 | 1.02 | 1.36 | 1.73 | 2.11 | 2.51 | 2.93 | 3.36 | 3.8 |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.81 | 1.35 | 1.61 | 2.15 | 2.72 | 3.33 | 4 | 4.63 | 5.31 | 6 |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.77 | 2.91 | 3.48 | 4.66 | 5.9 | 7.2 | 8.58 | 10 | 11.5 | 13 |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 3.15 | 5.22 | 6.1 | 7.91 | 9.89 | 11.67 | 13.65 | 15.39 | 16.65 | 18 |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 3.40 | 5.61 | 6.7 | 8.97 | 11.3 | 13.9 | 16.5 | 19.3 | 22.1 | 25 |
| 2 | 50 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.225 | 0.39 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.5 | 1.7 |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.51 | 0.85 | 1.02 | 1.36 | 1.73 | 2.11 | 2.51 | 2.93 | 3.36 | 3.8 |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.81 | 1.35 | 1.61 | 2.15 | 2.72 | 3.33 | 4 | 4.63 | 5.31 | 6 |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 2.04 | 3.38 | 4.02 | 5.38 | 6.81 | 8.32 | 9.91 | 11.6 | 13.3 | 15 |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 3.33 | 5.51 | 6.4 | 8.35 | 10.44 | 12.3 | 14.4 | 16.25 | 17.58 | 19 |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 3.54 | 5.84 | 6.97 | 9.33 | 11.8 | 14.4 | 17.2 | 20.1 | 23 | 26 |
| 3 | 80 | 150-1500 | 1.625 | 41.3 | 0.8 | 20.3 | 4.76 | 7.86 | 9.38 | 12.6 | 15.9 | 19.4 | 23.1 | 27 | 31 | 35 |
| | | | 0.994 | 25.2 | 1.5 | 38.1 | 3.5 | 5.8 | 6.74 | 8.79 | 11 | 12.97 | 15.2 | 17.1 | 18.5 | 20 |
| | | | 1.25 | 31.8 | 1.5 | 38.1 | 4.22 | 6.96 | 8.31 | 11.1 | 14.1 | 17.2 | 20.5 | 23.9 | 27.4 | 31 |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 6.39 | 10.56 | 12.6 | 16.9 | 21.3 | 26.1 | 31.1 | 36.2 | 41.6 | 47 |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 12.6 | 20.9 | 24.26 | 31.65 | 39.57 | 46.68 | 54.58 | 61.57 | 66.6 | 72 |
| 4 | 100 | 150-1500 | 2.625 | 66.7 | 1.5 | 38.1 | 14.96 | 24.75 | 29.5 | 39.5 | 49.9 | 61 | 72.7 | 84.8 | 97.3 | 110 |
| | | | 0.994 | 25.2 | 1.5 | 38.1 | 3.5 | 5.8 | 6.74 | 8.79 | 11 | 12.97 | 15.2 | 17.1 | 18.5 | 20 |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 6.66 | 11.01 | 13.1 | 17.6 | 22.3 | 27.2 | 32.4 | 37.8 | 43.3 | 49 |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 12.95 | 21.46 | 24.93 | 32.53 | 40.67 | 47.97 | 56.1 | 63.28 | 68.45 | 74 |
| | | | 2.625 | 66.7 | 1.5 | 38.1 | 15.45 | 25.38 | 30.3 | 40.6 | 51.3 | 62.7 | 74.7 | 87.1 | 99.9 | 113 |
| 6 | 150 | 150-600 | 3.5 | 88.9 | 1.5 | 38.1 | 26.55 | 43.88 | 52.3 | 70 | 88.6 | 108 | 129 | 150 | 172 | 195 |
| | | | 2.000 | 50.8 | 2 | 50. | 14.18 | 23.49 | 27.29 | 35.6 | 44.5 | 52.5 | 61.4 | 69.2 | 74.9 | 81 |
| | | | 2.625 | 66.7 | 2 | 50. | 17.1 | 28.38 | 33.8 | 45.2 | 57.2 | 69.9 | 83.2 | 97.2 | 111 | 126 |
| | | | 3.5 | 88.9 | 2 | 50. | 28.35 | 46.75 | 55.7 | 74.6 | 94.5 | 115 | 137 | 160 | 184 | 208 |
| | | | 4.375 | 111 | 2 | 50. | 52.5 | 87 | 101 | 131.9 | 164.9 | 194.5 | 227.4 | 256.5 | 277.5 | 300 |
| 8 | 200 | 150-600 | 5 | 127 | 2 | 50. | 54.45 | 89.88 | 107 | 143 | 182 | 222 | 264 | 308 | 354 | 400 |
| | | | 3.5 | 88.9 | 2 | 50. | 30 | 50 | 60 | 80 | 101 | 124 | 148 | 172 | 197 | 224 |
| | | | 4.375 | 111 | 2 | 50. | 54.5 | 92.8 | 108 | 141 | 176 | 207 | 243 | 274 | 296 | 320 |
| | | | 5 | 127 | 2 | 50. | 55.5 | 93.75 | 112 | 148 | 187 | 230 | 274 | 319 | 365 | 415 |
| | | | 6.25 | 158.7 | 2.5 | 63. | 85.5 | 143.7 | 173 | 228 | 289 | 355 | 422 | 493 | 563 | 640 |

1. Close clearance 0.75 and 1 are available in quick change trim only (Model 21114).
2. Models 21614 and 21615 available only in Cv ranges as indicated by green background.

C_v and F_L versus travel

Contoured Plug

Direction: FLOW-TO-CLOSE (FTC)
Flow Characteristic: EQUAL PERCENT

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
|--------------------|-----|-------------|------------------|-------|--------|------|----------------------|------|------|-------|-------|-------|-------|--------|--------|------|------|
| F _L : | | | | | | | 0.53 | 0.53 | 0.55 | 0.63 | 0.72 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | |
| 0.75 | 20 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.1 | 0.1 | 0.2 | 0.22 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.2 | 0.2 | 0.3 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.3 | 0.4 | 0.5 | 0.64 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.6 | 0.8 | 1.2 | 1.48 | 2.32 | 4.3 | 6.8 | 9.13 | 10.7 | 12 | |
| 1 | 25 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.1 | 0.1 | 0.2 | 0.22 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.2 | 0.2 | 0.3 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.3 | 0.4 | 0.5 | 0.64 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.6 | 0.8 | 1.2 | 1.48 | 2.32 | 4.3 | 6.8 | 9.13 | 10.7 | 12 | |
| 1.5 | 40 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.1 | 0.1 | 0.2 | 0.22 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.2 | 0.2 | 0.3 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.3 | 0.4 | 0.5 | 0.64 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.6 | 0.8 | 1.1 | 1.48 | 2.32 | 3.87 | 6.01 | 8.57 | 11.1 | 13 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.66 | 1.03 | 1.58 | 1.86 | 2.69 | 4.61 | 6.93 | 10.76 | 14.84 | 18 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 1.2 | 1.6 | 2.2 | 2.76 | 4.46 | 7.45 | 11.6 | 16.5 | 21.4 | 25 | |
| 2 | 50 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.1 | 0.1 | 0.2 | 0.22 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.2 | 0.2 | 0.3 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.3 | 0.4 | 0.5 | 0.64 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.7 | 1.0 | 1.3 | 1.64 | 2.68 | 4.47 | 6.93 | 9.88 | 12.9 | 15 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.7 | 1.08 | 1.67 | 1.97 | 2.84 | 4.87 | 7.32 | 11.36 | 15.67 | 19 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 1.2 | 1.6 | 2.3 | 2.76 | 4.64 | 7.75 | 12 | 17.1 | 22.3 | 26 | |
| 3 | 80 | 150-1500 | 0.994 | 25.2 | 1.5 | 38.1 | 0.74 | 1.14 | 1.76 | 2.07 | 2.99 | 5.13 | 7.7 | 11.96 | 16.49 | 20 | |
| | | | 1.25 | 31.8 | 1.5 | 38.1 | 1.4 | 2.0 | 2.7 | 3.4 | 5.53 | 9.24 | 14.3 | 20.4 | 26.6 | 31 | |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 2.2 | 3.0 | 4.2 | 5.24 | 8.39 | 14 | 21.7 | 31 | 40.3 | 47 | |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 2.66 | 4.1 | 6.34 | 7.45 | 10.76 | 18.45 | 27.72 | 43 | 59.36 | 72 | |
| | | | 2.625 | 66.7 | 1.5 | 38.1 | 6.0 | 7.7 | 11.0 | 13.5 | 21.2 | 39.4 | 62.3 | 83.7 | 98.5 | 110 | |
| | | | 3.5 | 88.9 | 1.5 | 38.1 | 10.5 | 13.6 | 19.6 | 24.1 | 37.6 | 69.8 | 110 | 148 | 175 | 195 | |
| 4 | 100 | 150-1500 | 0.994 | 25.2 | 1.5 | 38.1 | 0.74 | 1.14 | 1.76 | 2.07 | 2.99 | 5.13 | 7.7 | 11.96 | 16.49 | 20 | |
| | | | 1.625 | 41.3 | 1.5 | 38.1 | 2.3 | 3.1 | 4.3 | 5.41 | 8.74 | 14.6 | 22.7 | 32.3 | 42 | 49 | |
| | | | 2.000 | 50.8 | 1.5 | 38.1 | 2.73 | 4.22 | 6.51 | 7.66 | 11.1 | 18.97 | 28.49 | 44.24 | 61 | 74 | |
| | | | 2.625 | 66.7 | 1.5 | 38.1 | 5.2 | 7.1 | 10.0 | 12.55 | 20.2 | 33.7 | 52.2 | 74.5 | 96.8 | 113 | |
| | | | 3.5 | 88.9 | 1.5 | 38.1 | 10.5 | 13.6 | 19.6 | 24.1 | 37.6 | 69.8 | 110 | 148 | 175 | 195 | |
| 6 | 150 | 150-600 | 2.000 | 50.8 | 2 | 50.8 | 3 | 4.62 | 7.13 | 8.38 | 12.1 | 20.76 | 31.19 | 48.42 | 66.78 | 81 | |
| | | | 2.625 | 66.7 | 2 | 50.8 | 5.8 | 8.0 | 11.1 | 13.9 | 22.5 | 37.5 | 58.3 | 83 | 108 | 126 | |
| | | | 3.5 | 88.9 | 2 | 50.8 | 9.6 | 13.1 | 18.3 | 23 | 37.1 | 62 | 96.2 | 137 | 178 | 208 | |
| | | | 4.375 | 111 | 2 | 50.8 | 11.1 | 17.1 | 26.4 | 31 | 44.85 | 76.89 | 115.5 | 179.34 | 247.35 | 300 | |
| | | | 5 | 127 | 2 | 50.8 | 21.6 | 28.0 | 40.2 | 49.4 | 77.2 | 143 | 227 | 304 | 358 | 400 | |
| 8 | 200 | 150-600 | 3.5 | 88.9 | 2 | 50.8 | 10.5 | 14.0 | 21.0 | 25.75 | 40 | 72 | 112 | 154 | 197 | 224 | |
| | | | 4.375 | 111 | 2 | 50.8 | 11.8 | 18.2 | 28.2 | 33.1 | 48 | 82 | 123 | 191 | 264 | 320 | |
| | | | 5 | 127 | 2 | 50.8 | 19.5 | 26.6 | 39.2 | 47.9 | 74 | 133 | 207 | 285 | 365 | 415 | |
| | | | 6.25 | 158.7 | 2.5 | 63.5 | 30.0 | 42.0 | 60.2 | 73.9 | 115 | 205 | 320 | 440 | 562 | 640 | |

1. Close clearance 0.75 and 1 are available in quick change trim only (Model 21114).
2. Models 21614 and 21615 available only in C_v ranges as indicated by green background.

C_v and F_L versus travel

Contoured Plug

Direction: FLOW-TO-CLOSE (FTC)
Flow Characteristic: MODIFIED PERCENT

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | | |
|--------------------|-----|-------------|------------------|------|--------|------|----------------------|------|------|------|------|-------|-------|-------|-------|------|------|--|
| F _L : | | | | | | | 0.53 | 0.53 | 0.55 | 0.63 | 0.72 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | | |
| 0.75 | 20 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.06 | 0.09 | 0.19 | 0.3 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.13 | 0.21 | 0.43 | 0.68 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.2 | 0.33 | 0.68 | 1.08 | 1.78 | 2.59 | 3.51 | 4.51 | 5.38 | 6 | | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.48 | 1.03 | 1.79 | 3.91 | 5.47 | 7.78 | 9.6 | 10.85 | 11.57 | 12 | | |
| 1 | 25 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.06 | 0.09 | 0.19 | 0.3 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.13 | 0.21 | 0.43 | 0.68 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.2 | 0.33 | 0.68 | 1.08 | 1.78 | 2.59 | 3.51 | 4.51 | 5.38 | 6 | | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.48 | 1.03 | 1.79 | 3.91 | 5.47 | 7.78 | 9.6 | 10.85 | 11.57 | 12 | | |
| 1.5 | 40 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.06 | 0.09 | 0.19 | 0.3 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.13 | 0.21 | 0.43 | 0.68 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.2 | 0.33 | 0.68 | 1.08 | 1.78 | 2.59 | 3.51 | 4.51 | 5.38 | 6 | | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.44 | 0.72 | 1.48 | 2.34 | 3.86 | 5.62 | 7.6 | 9.77 | 11.65 | 13 | | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.61 | 0.99 | 2.05 | 3.24 | 5.34 | 7.78 | 10.53 | 13.53 | 16.13 | 18 | | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 1 | 2.15 | 3.73 | 8.15 | 11.4 | 16.2 | 20 | 22.6 | 24.11 | 25 | | |
| 2 | 50 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.06 | 0.09 | 0.19 | 0.3 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.13 | 0.21 | 0.43 | 0.68 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.2 | 0.33 | 0.68 | 1.08 | 1.78 | 2.59 | 3.51 | 4.51 | 5.38 | 6 | | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.51 | 0.83 | 1.71 | 2.7 | 4.45 | 6.48 | 8.77 | 11.28 | 13.44 | 15 | | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.65 | 1.05 | 2.17 | 3.42 | 5.64 | 8.21 | 11.11 | 14.28 | 17 | 19 | | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.88 | 1.43 | 2.96 | 4.68 | 7.71 | 11.23 | 15.2 | 19.54 | 23.3 | 26 | | |
| 3 | 80 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.06 | 0.09 | 0.19 | 0.3 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.13 | 0.21 | 0.43 | 0.68 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.2 | 0.33 | 0.68 | 1.08 | 1.78 | 2.59 | 3.51 | 4.51 | 5.38 | 6 | | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.44 | 0.72 | 1.48 | 2.34 | 3.86 | 5.62 | 7.6 | 9.77 | 11.65 | 13 | | |
| | | | 0.994 | 25.2 | 1.5 | 38.1 | 0.68 | 1.1 | 2.28 | 3.6 | 5.93 | 8.64 | 11.7 | 15 | 17.92 | 20 | | |
| | | | 1.25 | 31.8 | 1.5 | 38.1 | 1.05 | 1.7 | 3.53 | 5.58 | 9.19 | 13.4 | 18.13 | 23.3 | 27.78 | 31 | | |
| 4 | 100 | 150-1500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.06 | 0.09 | 0.19 | 0.3 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.13 | 0.21 | 0.43 | 0.68 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.2 | 0.33 | 0.68 | 1.08 | 1.78 | 2.59 | 3.51 | 4.51 | 5.38 | 6 | | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.51 | 0.83 | 1.71 | 2.7 | 4.45 | 6.48 | 8.77 | 11.28 | 13.44 | 15 | | |
| | | | 0.994 | 25.2 | 1.5 | 38.1 | 0.68 | 1.1 | 2.28 | 3.6 | 5.93 | 8.64 | 11.7 | 15 | 17.92 | 20 | | |
| | | | 1.25 | 31.8 | 1.5 | 38.1 | 1.05 | 1.7 | 3.53 | 5.58 | 9.19 | 13.4 | 18.13 | 23.3 | 27.78 | 31 | | |
| 6 | 150 | 150-600 | 0.25 | 6.4 | 0.8 | 20.3 | 0.06 | 0.09 | 0.19 | 0.3 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.13 | 0.21 | 0.43 | 0.68 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.2 | 0.33 | 0.68 | 1.08 | 1.78 | 2.59 | 3.51 | 4.51 | 5.38 | 6 | | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.44 | 0.72 | 1.48 | 2.34 | 3.86 | 5.62 | 7.6 | 9.77 | 11.65 | 13 | | |
| | | | 0.994 | 25.2 | 1.5 | 38.1 | 0.68 | 1.1 | 2.28 | 3.6 | 5.93 | 8.64 | 11.7 | 15 | 17.92 | 20 | | |
| | | | 1.25 | 31.8 | 1.5 | 38.1 | 1.05 | 1.7 | 3.53 | 5.58 | 9.19 | 13.4 | 18.13 | 23.3 | 27.78 | 31 | | |

C_v and F_L versus travel

Direction: FLOW-TO-OPEN (FTO)
 Flow Characteristic: LINEAR
 Rating: ASME 2500 (PN 420)

Contoured Plug

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
|--------------------|----|-------------|------------------|------|--------|------|----------------------|------|------|------|------|------|------|------|------|-----|------|
| F _L : | | | | | | | 0.93 | 0.93 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | 0.9 | 0.9 | 0.9 | 0.90 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | |
| 0.75 | 20 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.15 | 0.31 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.34 | 0.68 | 1.02 | 1.36 | 1.7 | 2.11 | 2.5 | 2.9 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.54 | 1.07 | 1.60 | 2.2 | 2.7 | 3.33 | 4 | 4.6 | 5.30 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.70 | 1.40 | 2.20 | 2.80 | 3.60 | 4.40 | 5.30 | 6.20 | 7.00 | 8 | |
| 1 | 25 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.15 | 0.31 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.50 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.34 | 0.68 | 1.02 | 1.36 | 1.73 | 2.11 | 2.5 | 2.9 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.54 | 1.08 | 1.61 | 2.2 | 2.7 | 3.33 | 4.0 | 4.6 | 5.3 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.9 | 1.8 | 2.7 | 3.6 | 4.5 | 5.6 | 6.6 | 7.7 | 9 | 10 | |
| 1.5 | 40 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.15 | 0.31 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.50 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.34 | 0.68 | 1.02 | 1.36 | 1.7 | 2.11 | 2.5 | 2.93 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.54 | 1.08 | 1.61 | 2.15 | 2.7 | 3.33 | 4.0 | 4.6 | 5.3 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.18 | 2.3 | 3.5 | 4.7 | 5.9 | 7.2 | 8.6 | 10 | 11.5 | 13 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 2.1 | 4.2 | 6.1 | 7.9 | 9.9 | 11.7 | 13.7 | 15.4 | 16.7 | 18 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 2.3 | 4.5 | 6.7 | 9.0 | 11.3 | 13.9 | 16.5 | 19.3 | 22.1 | 25 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 3.2 | 6.3 | 9.4 | 12.6 | 15.9 | 19.4 | 23.1 | 27 | 31 | 35 | |
| 2 | 50 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.15 | 0.31 | 0.46 | 0.61 | 0.77 | 0.94 | 1.12 | 1.31 | 1.50 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.34 | 0.68 | 1.02 | 1.36 | 1.7 | 2.11 | 2.5 | 2.9 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.54 | 1.08 | 1.61 | 2.2 | 2.7 | 3.33 | 4.0 | 4.6 | 5.3 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 1.4 | 2.7 | 4.0 | 5.4 | 6.8 | 8.3 | 9.9 | 11.6 | 13.3 | 15 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 2.2 | 4.4 | 6.4 | 8.4 | 10.4 | 12.3 | 14.4 | 16.3 | 17.6 | 19 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 2.4 | 4.7 | 7.0 | 9.3 | 11.8 | 14.4 | 17.2 | 20.1 | 23 | 26 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 3.2 | 6.3 | 9 | 12 | 16 | 19 | 23 | 27 | 31 | 35 | |

1. Close clearance 0.75 and 1 are available in quick change trim only (Model 21114).
2. Models 21614 and 21615 available only in C_v ranges as indicated by green background.

C_v and F_L versus travel

Direction: FLOW-TO-OPEN (FTO)
Flow Characteristic: EQUAL PERCENT
Rating: ASME 2500 (PN 420)

Contoured Plug

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
|--------------------|----|-------------|------------------|------|--------|------|----------------------|------|------|------|------|------|------|-------|-------|------|------|
| F _L : | | | | | | | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.91 | 0.91 | 0.91 | 0.90 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | |
| 0.75 | 20 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.05 | 0.08 | 0.11 | 0.18 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.12 | 0.17 | 0.24 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.18 | 0.27 | 0.38 | 0.62 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.29 | 0.41 | 0.56 | 0.9 | 1.5 | 2.9 | 4.5 | 6 | 7 | 8 | |
| 1 | 25 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.05 | 0.08 | 0.11 | 0.18 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.12 | 0.17 | 0.24 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.18 | 0.27 | 0.38 | 0.62 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.36 | 0.51 | 0.7 | 1.1 | 1.9 | 3.6 | 5.6 | 7.4 | 9 | 10 | |
| 1.5 | 40 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.05 | 0.08 | 0.11 | 0.18 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.12 | 0.17 | 0.24 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.18 | 0.27 | 0.38 | 0.62 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.4 | 0.59 | 0.82 | 1.34 | 2.32 | 3.87 | 6.01 | 8.57 | 11.1 | 13 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.43 | 0.73 | 1.14 | 1.73 | 2.69 | 4.61 | 6.93 | 10.76 | 14.84 | 18 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.72 | 1.02 | 1.4 | 2.2 | 3.8 | 7.2 | 11 | 15 | 18 | 20 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 0.9 | 1.28 | 1.76 | 2.8 | 4.7 | 9 | 14 | 19 | 22 | 25 | |
| 2 | 50 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.05 | 0.08 | 0.11 | 0.18 | 0.3 | 0.5 | 0.8 | 1.1 | 1.5 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.12 | 0.17 | 0.24 | 0.39 | 0.68 | 1.13 | 1.76 | 2.5 | 3.26 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.18 | 0.27 | 0.38 | 0.62 | 1.07 | 1.79 | 2.77 | 3.95 | 5.14 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.46 | 0.68 | 0.95 | 1.55 | 2.68 | 4.47 | 6.93 | 9.88 | 12.9 | 15 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.46 | 0.77 | 1.2 | 1.82 | 2.84 | 4.87 | 7.32 | 11.36 | 15.67 | 19 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.8 | 1.17 | 1.64 | 2.68 | 4.64 | 7.75 | 12 | 17.1 | 22.3 | 26 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 1.3 | 1.8 | 2.5 | 3.9 | 6.6 | 13 | 20 | 26 | 31 | 35 | |

1. Close clearance 0.75 and 1 are available in quick change trim only (Model 21114).
2. Models 21614 and 21615 available only in C_v ranges as indicated by green background.

C_v and F_L versus travel

Direction: FLOW-TO-OPEN (FTO)
Flow Characteristic: MODIFIED PERCENT
Rating: ASME 2500 (PN 420)

Contoured Trim

| | | | | | | | Percent of Travel: | | | | | | | | | | |
|------------|----|-------------|------------------|------|--------|------|----------------------|------|------|------|------|-------|-------|-------|-------|------|------|
| | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| | | | | | | | F _L : | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.92 | 0.92 | 0.91 | 0.91 | 0.90 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | |
| 0.75 | 20 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.07 | 0.14 | 0.28 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.09 | 0.15 | 0.31 | 0.64 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.14 | 0.24 | 0.49 | 1 | 1.78 | 2.59 | 3.5 | 4.5 | 5.38 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.21 | 0.49 | 0.87 | 2.17 | 3.65 | 5.19 | 6.4 | 7.23 | 7.71 | 8 | |
| 1 | 25 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.07 | 0.14 | 0.28 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.09 | 0.15 | 0.31 | 0.64 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.14 | 0.24 | 0.49 | 1 | 1.78 | 2.59 | 3.5 | 4.5 | 5.38 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.26 | 0.58 | 1.06 | 2.71 | 4.56 | 6.48 | 8.0 | 9.04 | 9.64 | 10 | |
| 1.5 | 40 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.07 | 0.14 | 0.28 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.09 | 0.15 | 0.31 | 0.64 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.14 | 0.24 | 0.49 | 1 | 1.78 | 2.59 | 3.5 | 4.5 | 5.38 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.29 | 0.52 | 1.07 | 2.18 | 3.86 | 5.62 | 7.6 | 9.77 | 11.65 | 13 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.41 | 0.71 | 1.48 | 3.01 | 5.34 | 7.78 | 10.53 | 13.53 | 16.13 | 18 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.68 | 1.55 | 2.66 | 6.77 | 11.4 | 16.2 | 20 | 22.6 | 24.11 | 25 | |
| 2 | 50 | 2500 | 0.25 | 6.4 | 0.8 | 20.3 | 0.04 | 0.07 | 0.14 | 0.28 | 0.5 | 0.73 | 0.99 | 1.28 | 1.52 | 1.7 | |
| | | | 0.375 | 9.5 | 0.8 | 20.3 | 0.09 | 0.15 | 0.31 | 0.64 | 1.13 | 1.64 | 2.22 | 2.86 | 3.4 | 3.8 | |
| | | | 0.5 | 12.7 | 0.8 | 20.3 | 0.14 | 0.24 | 0.49 | 1 | 1.78 | 2.59 | 3.5 | 4.5 | 5.38 | 6 | |
| | | | 0.812 | 20.6 | 0.8 | 20.3 | 0.34 | 0.59 | 1.23 | 2.51 | 4.45 | 6.48 | 8.77 | 11.28 | 13.44 | 15 | |
| | | | 0.994 | 25.2 | 0.8 | 20.3 | 0.43 | 0.75 | 1.56 | 3.18 | 5.64 | 8.21 | 11.11 | 14.28 | 17 | 19 | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.59 | 1.03 | 2.14 | 4.35 | 7.71 | 11.23 | 15.2 | 19.54 | 23.3 | 26 | |

1. 2 inch size valve with 2 inch (50.8mm) orifice diameter is only available with quick change trim for ASME Class 150 to 600.
2. The .75 and 1 inch valves with C_v 8 is available in quick change trim only.

C_v and F_L versus travel

Single Stage Lo-dB / Anti-Cavitation Trim
Single Stage Cavitation Containment

Direction: FLOW-TO-OPEN (FTO) Lo-dB
FLOW-TO-CLOSE (FTC) ANTI/CAV
Flow Characteristic: LINEAR

| Percent of Travel: | | | | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
|--------------------|-----|-------------|-------------------|-------|--------|------|----------------------|------|------|------|------|------|------|------|------|------|------|
| F _L : | | | | | | | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Rated C _v | | | | | | | | | | |
| Inch | mm | | Inch | mm | Inch | mm | | | | | | | | | | | |
| 0.75 | 20 | 150-2500 | 0.812 | 20.26 | 0.8 | 20.3 | 0.24 | 0.56 | 0.96 | 1.44 | 2.08 | 2.68 | 3.2 | 3.56 | 3.84 | 4 | |
| | | | | | | | 0.48 | 1.12 | 1.92 | 2.88 | 4.16 | 5.36 | 6.4 | 7.12 | 7.68 | 8 | |
| 1 | 25 | 150-2500 | 0.812 | 20.26 | 0.8 | 20.3 | 0.24 | 0.56 | 0.96 | 1.44 | 2.08 | 2.68 | 3.2 | 3.56 | 3.84 | 4 | |
| | | | | | | | 0.48 | 1.12 | 1.92 | 2.88 | 4.16 | 5.36 | 6.4 | 7.12 | 7.68 | 8 | |
| 1.5 | 40 | 150-2500 | 1.25 | 31.8 | 0.8 | 20.3 | 0.48 | 1.12 | 1.92 | 2.88 | 4.16 | 5.36 | 6.4 | 7.12 | 7.68 | 8 | |
| | | | | | | | 0.9 | 2.1 | 3.6 | 5.4 | 7.8 | 10.1 | 12.0 | 13.4 | 14.4 | 15 | |
| 2 | 50 | 150-2500 | 1.25 | 31.8 | 0.8 | 20.3 | 0.48 | 1.12 | 1.92 | 2.88 | 4.16 | 5.36 | 6.4 | 7.12 | 7.68 | 8 | |
| | | | | | | | 0.9 | 2.1 | 3.6 | 5.4 | 7.8 | 10.1 | 12.0 | 13.4 | 14.4 | 15 | |
| | | | 1.625 | 41.3 | | | 1.5 | 3.5 | 6.0 | 9 | 13 | 16.8 | 20 | 22.3 | 24 | 25 | |
| | | | 2.00 ¹ | 50.8 | | | 1.8 | 4.2 | 7.2 | 10.8 | 15.6 | 20.2 | 24 | 26.8 | 28.8 | 30 | |
| 3 | 80 | 150-1500 | 2.00 | 50.8 | 1.5 | 38.1 | 1.8 | 4.2 | 7.2 | 10.8 | 15.6 | 20.2 | 24 | 26.8 | 28.8 | 30 | |
| | | | 2.625 | 66.7 | | | 2.9 | 6.7 | 11.5 | 17.3 | 24.9 | 32.2 | 38.4 | 42.7 | 46.1 | 48 | |
| | | | 4.5 | 10.5 | | | 18 | 27 | 39 | 50.3 | 60 | 66.8 | 72 | 75 | | | |
| 4 | 100 | 150-1500 | 2.00 | 50.8 | 1.5 | 38.1 | 1.8 | 4.2 | 7.2 | 10.8 | 15.6 | 20.2 | 24 | 26.8 | 28.8 | 30 | |
| | | | 2.625 | 66.7 | | | 3.8 | 8.8 | 15.1 | 22.7 | 32.8 | 42.2 | 50.4 | 56.1 | 60.5 | 63 | |
| | | | 3.50 | 88.9 | | | 6 | 14 | 24 | 36 | 52 | 67 | 80 | 89 | 96 | 100 | |
| 6 | 150 | 150-600 | 5.00 | 127.0 | 2 | 50.4 | 9 | 21 | 36 | 54 | 78 | 101 | 120 | 134 | 144 | 150 | |
| | | | | | | | 12 | 28 | 48 | 72 | 104 | 134 | 160 | 178 | 192 | 200 | |
| 8 | 200 | 150-600 | 6.25 | 157.8 | 2.5 | 63.5 | 18 | 31 | 65 | 98 | 120 | 161 | 196 | 228 | 263 | 290 | |

1. 2 inch size valve with 2 inch (50.8mm) orifice diameter is only available with quick change trim for ASME Class 150 to 600.
2. The .75 and 1 inch valves with Cv 8 is available in quick change trim only.

C_v and F_L versus travel

Double Stage Anti-Cavitation Trim

Direction: FLOW-TO-CLOSE (FTC)
Flow Characteristic: LINEAR

| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Percent of Travel: | | | | | | | | | | | |
|------------|-----|-------------|------------------|------|--------|------|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| inch | mm | | inch | mm | inch | mm | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | | |
| | | | | | | | F _L : | | | | | | | | | | | |
| | | | | | | | 0.975 | 0.975 | 0.975 | 0.975 | 0.975 | 0.975 | 0.975 | 0.975 | 0.975 | 0.975 | 0.975 | 0.975 |
| | | | | | | | Rated C _v | | | | | | | | | | | |
| 0.75 | 20 | 150-2500 | 0.812 | 20.6 | 0.8 | 20.3 | 0.14 | 0.32 | 0.55 | 0.83 | 1.2 | 1.54 | 1.8 | 2.1 | 2.2 | 2.3 | | |
| | | | | | | | 0.27 | 0.63 | 1.08 | 1.62 | 2.3 | 3 | 3.6 | 4 | 4.3 | 4.5 | | |
| 1 | 25 | 150-2500 | 0.812 | 20.6 | 0.8 | 20.3 | 0.14 | 0.32 | 0.55 | 0.83 | 1.2 | 1.54 | 1.8 | 2.1 | 2.2 | 2.3 | | |
| | | | | | | | 0.27 | 0.63 | 1.08 | 1.62 | 2.3 | 3 | 3.6 | 4 | 4.3 | 4.5 | | |
| 1.5 | 40 | 150-2500 | 0.812 | 20.6 | 0.8 | 20.3 | 0.14 | 0.32 | 0.55 | 0.83 | 1.2 | 1.54 | 1.8 | 2.1 | 2.2 | 2.3 | | |
| | | | 1.25 | 31.8 | 0.8 | 20.3 | 0.27 | 0.63 | 1.08 | 1.62 | 2.3 | 3 | 3.6 | 4 | 4.3 | 4.5 | | |
| | | | | | | | 0.51 | 1.19 | 2 | 3.1 | 4.4 | 5.7 | 6.8 | 7.6 | 8.2 | 8.5 | | |
| 2 | 50 | 150-2500 | 1.25 | 31.8 | 0.8 | 20.3 | 0.27 | 0.63 | 1.08 | 1.62 | 2.3 | 3 | 3.6 | 4 | 4.3 | 4.5 | | |
| | | | | | | | 0.51 | 1.19 | 2 | 3.1 | 4.4 | 5.7 | 6.8 | 7.6 | 8.2 | 8.5 | | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 0.8 | 1.9 | 3.4 | 5 | 7.3 | 9.4 | 11.2 | 12.5 | 13.4 | 14 | | |
| 3 | 80 | 150-1500 | 2.625 | 66.7 | 1.5 | 38.1 | 1.6 | 3.8 | 6.4 | 9.7 | 14.1 | 18.1 | 21.6 | 24 | 25.9 | 27 | | |
| | | | | | | | 2.5 | 5.9 | 10.1 | 15.1 | 21.8 | 28.1 | 33.6 | 37.4 | 40.3 | 42 | | |
| 4 | 100 | 150-1500 | 2.625 | 66.7 | 1.5 | 38.1 | 2.4 | 5.6 | 9.6 | 14.4 | 20.8 | 26.8 | 32 | 35.6 | 38.4 | 40 | | |
| | | | 3.5 | 88.9 | | | 3.7 | 8.7 | 14.9 | 22.3 | 32.2 | 41.5 | 49.6 | 55.2 | 59.5 | 62 | | |

Double stage anti-cavitation trim not available with Bellows Seal construction.

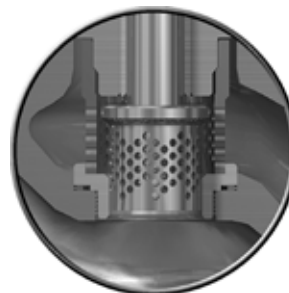
Double Stage Lo-dB Trim

Direction: FLOW-TO-OPEN (FTO)
Flow Characteristic: LINEAR

| Valve Size | | ASME Rating | Orifice Diameter | | Travel | | Percent of Travel: | | | | | | | | | | |
|------------|-----|-------------|------------------|------|--------|------|----------------------|------|------|------|------|------|------|------|------|------|------|
| inch | mm | | inch | mm | inch | mm | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| | | | | | | | F _L : | | | | | | | | | | |
| | | | | | | | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| | | | | | | | Rated C _v | | | | | | | | | | |
| 0.75 | 20 | 150-2500 | 0.812 | 20.6 | 0.8 | 20.3 | 0.21 | 0.49 | 0.84 | 1.26 | 1.8 | 2.4 | 2.8 | 3.1 | 3.4 | 3.5 | |
| | | | | | | | 0.34 | 0.8 | 1.37 | 2.1 | 3 | 3.8 | 4.6 | 5.1 | 5.5 | 5.7 | |
| 1 | 25 | 150-2500 | 0.812 | 20.6 | 0.8 | 20.3 | 0.21 | 0.49 | 0.84 | 1.26 | 1.8 | 2.4 | 2.8 | 3.1 | 3.4 | 3.5 | |
| | | | | | | | 0.34 | 0.8 | 1.37 | 2.1 | 3 | 3.8 | 4.6 | 5.1 | 5.5 | 5.7 | |
| 1.5 | 40 | 150-2500 | 1.25 | 31.8 | 0.8 | 20.3 | 0.42 | 0.98 | 1.68 | 2.5 | 3.6 | 4.7 | 5.6 | 6.2 | 6.7 | 7 | |
| | | | | | | | 0.8 | 1.8 | 3.1 | 4.7 | 6.8 | 8.7 | 10.4 | 11.6 | 12.5 | 13 | |
| 2 | 50 | 150-2500 | 1.25 | 31.8 | 0.8 | 20.3 | 0.8 | 1.8 | 3.1 | 4.7 | 6.8 | 8.7 | 10.4 | 11.6 | 12.5 | 13 | |
| | | | 1.625 | 41.3 | 0.8 | 20.3 | 1.3 | 2.9 | 5 | 7.6 | 10.9 | 14.1 | 16.8 | 18.7 | 20.2 | 21 | |
| 3 | 80 | 150-1500 | 2.625 | 66.7 | 1.5 | 38.1 | 2.4 | 5.6 | 9.6 | 14.4 | 20.8 | 26.8 | 32 | 35.6 | 38.4 | 40 | |
| | | | 3.5 | 88.9 | 1.5 | 38.1 | 3.8 | 8.8 | 15.1 | 22.7 | 32.8 | 42.2 | 50.4 | 56.1 | 60.5 | 63 | |
| 4 | 100 | 150-1500 | 2.625 | 66.7 | 1.5 | 38.1 | 3.2 | 7.4 | 12.7 | 19.1 | 27.6 | 35.5 | 42.4 | 47.2 | 50.9 | 53 | |
| | | | 3.5 | 88.9 | 1.5 | 38.1 | 4.9 | 11.6 | 19.9 | 29.9 | 43.2 | 55.6 | 66.4 | 73.9 | 79.7 | 83 | |
| 6 | 150 | 150-600 | 3.5 | 88.9 | 1.5 | 38.1 | 7.5 | 17.5 | 30 | 45 | 65 | 84 | 100 | 111 | 120 | 125 | |

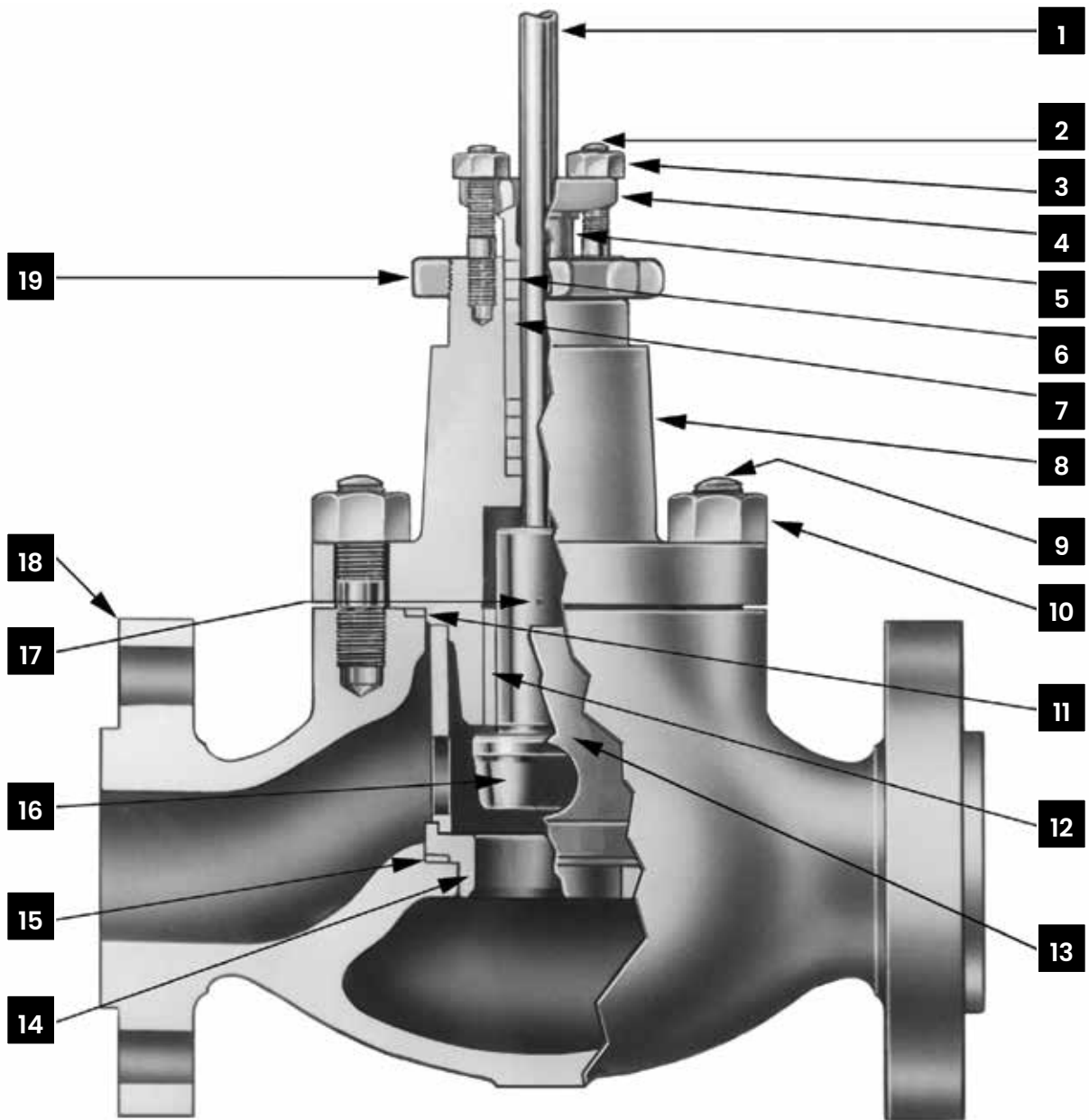


Single Stage Lo-dB /
Anti-Cavitation Trim

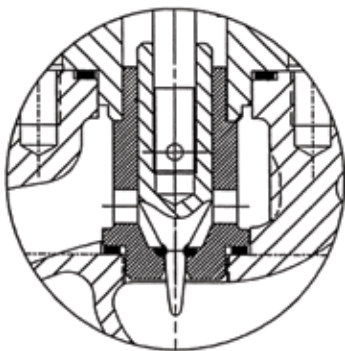


Double Stage Lo-dB /
Anti-Cavitation Trim

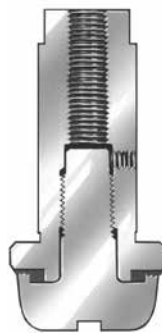
Materials of construction



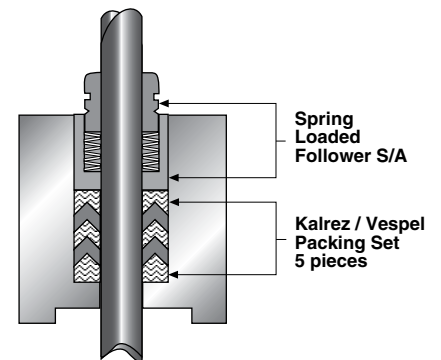
Standard Construction



21000 Close Clearance
Low Flow Trim



Soft Seated
Plug S/A



LE Packing System (Optional)
Low Emission Stem Packing

Materials of construction

Standard Carbon Steel Version

| Ref. No. | Temperature Range | -20°F | 450°F | 650°F | 800°F |
|------------------------------|---|---|---------|---------------------------|---------|
| | | (-29°C) | (232°C) | (343°C) | (427°C) |
| | Description | Standard Materials | | | |
| 1 | Plug Stem | 17-4 PH STAINLESS STEEL H1075 ¹ | | | |
| | | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| | | HARDENED ASTM A638 GRADE 660 | | | |
| | | ASTM B637 ALLOY | | | |
| 2 | Packing Flange Stud | ASTM A193 GRADE B8 CLASS 1 | | | |
| 3 | Packing Flange Nut | ASTM A194 GRADE 8 | | | |
| 4 | Packing Flange | LOW CARBON STEEL ZINC PLATED | | | |
| 5 | Packing Follower | SOLUTION ANNEALED 316L STAINLESS STEEL | | | |
| 6 | Packing | PTFE PACKING / LE PACKING | | FLEXIBLE GRAPHITE PACKING | |
| | | CARBON CORE BRAIDED PTFE PACKING WITH EXTENSION BONNET | | | |
| 7 | Lantern Ring (Optional) | AUSTENITIC STAINLESS STEEL | | | |
| 8 | Valve Bonnet | ASTM A216 GRADE WCC/WCB/EN 1.0619/1.0625 or A105 | | | |
| 9 | Body Stud | ASTM A193 GRADE B7 | | | |
| 10 | Body Stud Nut | ASTM A194 GRADE 2H | | | |
| 11 | Body Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | | |
| 12 | Guide Bushing ⁶ | HARDENED 440C STAINLESS STEEL ² | | | |
| | | Stellite or Equivalent NO. 6 | | | |
| 13 | Cage / Retainer ⁴ | SOLUTION ANNEALED 304 STAINLESS STEEL | | | |
| | | CA6NM CLASS B STAINLESS STEEL ³ | | | |
| | Close Clearance Cage/Seat | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| | | HARDENED 410 STAINLESS STEEL | | | |
| Stellite or Equivalent NO. 6 | | | | | |
| 14 | Seat Ring | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| | | HARDENED 410 STAINLESS STEEL | | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING | | | |
| | | HARDENED 440C STAINLESS STEEL (from 0.75" to 3" only) | | | |
| 15 | Seat Ring Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | | |
| 16 | Plug | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| | | SOLUTION ANNEALED 316 SS W/ TEFLON™ SEAT | | | |
| | | HARDENED 410 STAINLESS STEEL | | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING ON SEAT ⁵ | | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING ON SEAT AND GUIDE ⁵ | | | |
| | Stellite or Equivalent NO. 6 ⁷ | | | | |
| | Close Clearance Plug | Stellite or Equivalent NO. 6 ⁷ | | | |
| 17 | Plug Pin | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| 18 | Valve Body | ASTM A216 GRADE WCC/WCB / EN 1.0619/1.0625 | | | |
| 19 | Drive Nut | LOW CARBON STEEL GRADES DICHROMATE ZINC PLATED | | | |

1. 17-4 PH ST.ST will be substituted when required due to the differential pressure.

2. 440C bushing not used in combination with 316 trim.

3. Standard material for two stage lo-db (drilled hole) cages.

4. Required for Quick Change trim only.

5. Use Solid Stellite or Equivalent plug for C_v smaller than 1.7.

6. Guide bushings not used with close clearance trim.

7. Solid Stellite or Equivalent is not available for Lo-db/Anti-Cavitation plugs.

Materials of construction

Standard Stainless Steel Version

| Ref. No. | Temperature Range | -20°F (-29°C) | 450°F (232°C) | 650°F (343°C) | 800°F (427°C) |
|----------|---|---|------------------|---------------------------|------------------|
| | Description | Standard Materials | | | |
| 1 | Plug Stem | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| | | HARDENED ASTM A638 GRADE 660 | | | |
| | | ASTM B637 ALLOY | | | |
| 2 | Packing Flange Stud | ASTM A193 GRADE B8 CLASS 1 | | | |
| 3 | Packing Flange Nut | ASTM A194 GRADE 8 | | | |
| 4 | Packing Flange | ASTM A216 GRADE WCC ZINC PLATING | | | |
| 5 | Packing Follower | AUSTENITIC STAINLESS STEEL | | | |
| 6 | Packing | PTFE PACKING / LE PACKING | | FLEXIBLE GRAPHITE PACKING | |
| | | PTFE PACKING / LE PACKING WITH EXTENSION BONNET | | | |
| 7 | Lantern Ring (Optional) | AUSTENITIC STAINLESS STEEL | | | |
| 8 | Valve Bonnet | ASTM A351 GRADE CF8M | | | |
| 9 | Body Stud | ASTM A193 GR B7 – ZINC PLATING | | ASTM A193 GRADE B7 | |
| 10 | Body Stud Nut | ASTM A194 GR 2H – ZINC PLATING | | ASTM A194 GRADE 2H | |
| 11 | Body Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | | |
| 12 | Guide Bushing ⁴ | NITRONIC 60 ASTM A479 | | | |
| | | Stellite or Equivalent NO. 6 | | | |
| 13 | Cage / Retainer ¹ | SOLUTION ANNEALED 304 STAINLESS STEEL | | | |
| | | CA6NM CLASS B STAINLESS STEEL ² | | | |
| | Close Clearance Cage/Seat | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| | | HARDENED 410 STAINLESS STEEL | | | |
| | | Stellite or Equivalent NO. 6 | | | |
| 14 | Seat Ring | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING | | | |
| 15 | Seat Ring Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | | |
| 16 | Plug | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| | | SOLUTION ANNEALED 316 SS W/ TEFLON™ SEAT | | | |
| | | HARDENED 410 STAINLESS STEEL | | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING ON SEAT ³ | | | |
| | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING ON SEAT AND GUIDE ³ | | | | |
| | | Stellite or Equivalent NO. 6 ⁵ | | | |
| | Close Clearance Plug | Stellite or Equivalent NO. 6 ⁵ | | | |
| 17 | Plug Pin | SOLUTION ANNEALED 316 STAINLESS STEEL | | | |
| 18 | Valve Body | ASTM A351 GRADE CF8M | | | |
| 19 | Drive Nut | ASTM A216 GRADE WCC | | | |

1. Required for Quick Change trim only.

2. Standard material for two stage lo-db (drilled hole) cages.

3. Use Solid Stellite or Equivalent plug for Cv smaller than 1.7.

4. Guide bushings not used with close clearance trim.

5. Solid Stellite or Equivalent is not available for Lo-db/Anti-Cavitation plugs.

Materials of construction

Standard Chrome Moly Version

| Ref. No. | Temperature Range | -20°F (-29°C) | 450°F (232°C) | 650°F (343°C) | 800°F (427°C) | |
|------------------------------|---|---|------------------|---------------------------|------------------|--|
| | Description | Standard Materials | | | | |
| 1 | Plug Stem | 17-4 PH STAINLESS STEEL H1075 ¹ | | | | |
| | | SOLUTION ANNEALED 316 STAINLESS STEEL | | | | |
| | | HARDENED ASTM A638 GRADE 660 | | | | |
| | | ASTM B637 ALLOY | | | | |
| 2 | Packing Flange Stud | ASTM A193 GRADE B8 CLASS 1 | | | | |
| 3 | Packing Flange Nut | ASTM A194 GRADE 8 | | | | |
| 4 | Packing Flange | ASTM A216 GRADE WCC ZINC PLATING | | | | |
| 5 | Packing Follower | AUSTENITIC STAINLESS STEEL | | | | |
| 6 | Packing | PTFE PACKING / LE PACKING | | FLEXIBLE GRAPHITE PACKING | | |
| | | PTFE PACKING / LE PACKING WITH EXTENSION BONNET | | | | |
| 7 | Lantern Ring (Optional) | AUSTENITIC STAINLESS STEEL | | | | |
| 8 | Valve Bonnet | ASTM A217 GRADE WC9 CLASS 3 | | | | |
| 9 | Body Stud | ASTM A193 GRADE B7 | | | | |
| 10 | Body Stud Nut | ASTM A194 GRADE 2H | | | | |
| 11 | Body Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | | | |
| 12 | Guide Bushing ⁵ | HARDENED 440C STAINLESS STEEL | | | | |
| | | Stellite or Equivalent NO. 6 | | | | |
| 13 | Cage / Retainer ² | SOLUTION ANNEALED 304 STAINLESS STEEL | | | | |
| | | CA6NM CLASS B STAINLESS STEEL ³ | | | | |
| | Close Clearance Cage/Seat | SOLUTION ANNEALED 316 STAINLESS STEEL | | | | |
| HARDENED 410 STAINLESS STEEL | | | | | | |
| Stellite or Equivalent NO. 6 | | | | | | |
| 14 | Seat Ring | SOLUTION ANNEALED 316 STAINLESS STEEL | | | | |
| | | HARDENED 410 STAINLESS STEEL | | | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING | | | | |
| 15 | Seat Ring Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | | | |
| 16 | Plug | SOLUTION ANNEALED 316 STAINLESS STEEL | | | | |
| | | SOLUTION ANNEALED 316 SS W/ TEFLON™ SEAT | | | | |
| | | HARDENED 410 STAINLESS STEEL | | | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING ON SEAT ⁴ | | | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING ON SEAT AND GUIDE ⁴ | | | | |
| | Stellite or Equivalent NO. 6 ⁶ | | | | | |
| | Close Clearance Plug | Stellite or Equivalent NO. 6 ⁶ | | | | |
| 17 | Plug Pin | SOLUTION ANNEALED 316 STAINLESS STEEL | | | | |
| 18 | Valve Body | ASTM A217 GRADE WC9 CLASS 3 | | | | |
| 19 | Drive Nut | ASTM A216 GRADE WCC | | | | |

1. 17-4 PH ST.ST will be substituted when required due to the differential pressure.

2. Required for Quick Change trim only.

3. Standard material for two stage Lo-db (drilled hole) cages.

4. Use Solid Stellite or Equivalent plug for Cv smaller than 1.7.

5. Guide bushings not used with close clearance trim.

6. Solid Stellite or Equivalent is not available for Lo-db/Anti-Cavitation plugs.

Materials of construction

NACE Materials Construction

| Ref . No. | Temperature Range | -50°F (-46°C) | -20°F (-29°C) | 450°F (232°C) |
|-----------|------------------------------|---|------------------|------------------|
| | | NACE Materials ¹ | | |
| 1 | Plug Stem ⁸ | SOLUTION ANNEALED 316 STAINLESS STEEL | | |
| | | ASTM B637 ALLOY UNS NO7750 ² | | |
| | | SOLUTION ANNEALED 316L STAINLESS STEEL | | |
| 2 | Packing Flange Stud | ASTM A194 GRADE 8 | | |
| 3 | Packing Flange Nut | ASTM A194 GRADE 8 | | |
| 4 | Packing Flange | LOW CARBON STEEL ZINC PLATED | | |
| 5 | Packing Follower | SOLUTION ANNEALED 316L STAINLESS STEEL | | |
| 6 | Packing | CARBON CORE BRAIDED PTFE PACKING | | |
| 7 | Lantern Ring (Optional) | SOLUTION ANNEALED 304 STAINLESS STEEL | | |
| 8 | Valve Bonnet | ASTM A216 GRADE WCC/WCB / EN 1.0619/1.0625 | | |
| | | ASTM A105 / 1.0436 EN 10222-2 | | |
| | | ASTM A351 GRADE CF8M / EN 1.4408 | | |
| 9 | Body Stud | ASTM A193 GR B7 – ZINC PLATING ^{3,7} | | |
| | | ASTM A193 GR B7M ZINC PLATING ^{4,7} | | |
| | | ASTM A193 GRADE B7 ³ | | |
| | | ASTM A193 GRADE B7M ⁴ | | |
| 10 | Body Stud Nut | ASTM A194 GR 2H – ZINC PLATING ^{3,7} | | |
| | | ASTM A194 GR 2HM ZINC PLATING ^{4,7} | | |
| | | ASTM A194 GRADE 2H ³ | | |
| | | ASTM A194 GRADE 2HM ⁴ | | |
| 11 | Body Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | |
| 12 | Guide Bushing ⁶ | Stellite or Equivalent NO. 6 | | |
| 13 | Cage / Retainer ⁴ | SOLUTION ANNEALED 304 STAINLESS STEEL | | |
| | Close Clearance Cage/Seat | SOLUTION ANNEALED 316 STAINLESS STEEL Stellite or Equivalent NO. 6 | | |
| 14 | Seat Ring | SOLUTION ANNEALED 316 STAINLESS STEEL | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING | | |
| 15 | Seat Ring Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | |
| 16 | Plug | SOLUTION ANNEALED 316 STAINLESS STEEL | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING ON SEAT | | |
| | | 316 STAINLESS STEEL WITH Stellite or Equivalent NO. 6 HARDFACING ON SEAT AND GUIDE Stellite or Equivalent NO. 6 ^{6,9} | | |
| | Close Clearance Plug | Stellite or Equivalent NO. 6 ^{6,9} | | |
| 17 | Plug Pin | SOLUTION ANNEALED 316 STAINLESS STEEL | | |
| 18 | Valve Body | ASTM A216 GRADE WCC/WCB / EN 1.0619/1.0625 | | |
| | | ASTM A105 / 1.0436 EN 10222-2 | | |
| | | ASTM A351 GRADE CF8M / EN 1.4408 | | |
| 19 | Drive Nut | ASTM A216 GRADE WCC | | |

- Materials and processes in accordance with the requirements of NACE specification MR0103. Applications requiring compliance to MR0175, 2003 Rev. or ISO 15156 would require engineering review.
- Inconel 718 will be substituted in applications when required due to the differential pressure.
- Materials designated for these parts conform to NACE non-exposed bolting requirements.
- Materials designated for these parts conform to NACE exposed bolting requirements.

- Consult Masoneilan for NACE Applications above ANSI Class 600 (PN 100) rating or above 450°F (232°C).
- Optional component and materials for Close Clearance low flow trim option.
- To be used with stainless steel body and bonnet.
- Guide bushing not used with close clearance trim.
- Solid Stellite or Equivalent is not available for Lo-dB/Anti-Cavitation plugs.

Materials of construction

Cryogenic Construction

| Ref. No. | Temperature Range | -320°F (-196°C) | -50°F (-46°C) | -20°F (-29°C) |
|----------|----------------------------|--|------------------|------------------|
| | Description ^{3,4} | Standard Materials ^{1,2,5} | | |
| 1 | Plug Stem | SOLUTION ANNEALED 316 STAINLESS STEEL | | |
| | | HARDENED ASTM A638 GRADE 660 | | |
| 2 | Packing Flange Stud | ASTM A193 GRADE B8 CLASS 1 | | |
| 3 | Packing Flange Nut | ASTM A194 GR 8 | | |
| 4 | Packing Flange | ASTM A351 GRADE CF8M | | |
| 5 | Packing Follower | SOLUTION ANNEALED 316L STAINLESS STEEL | | |
| 6 | Packing | TEFLON™ V-Ring | | |
| 7 | Lantern Ring (Optional) | AUSTENITIC STAINLESS STEEL | | |
| 8 | Valve Bonnet | ASTM A351 GRADE CF8M / EN 1.4408 | | |
| | | ASTM A479 TYPE 316 | | |
| | | ASTM A312 TYPE 316 | | |
| 9 | Body Stud ⁶ | ASTM A193 GRADE B8 CLASS 2 (for studs ≤ Ø 3/4" 0.75"; 1"; 1.5"; 2"; 3" => 150/300/600 lb 4"; 6" => 150/300 lb | | |
| | | ASTM A453 GRADE 660 CLASS A for studs > 3/4" 0.75"; 1", 1.5" & 2" => 900/1500/2500 lb 3" => 900/1500 lb - 4" => 600/900/1500 lb 6" => 600 lb - 8" => 150/300/600 lb | | |
| 10 | Body Stud Nut | ASTM A194 GR 8 | | |
| 11 | Body Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | |
| 12 | Guide Bushing ⁶ | STELLITE NO.6 (UNS 30006) (STANDARD) | | |
| | | ASTM A479 UNS S21800 (OPTIONAL) | | |
| 13 | Cage | SOLUTION ANNEALED 304 STAINLESS STEEL (STANDARD) | | |
| | | SOLUTION ANNEALED 316 STAINLESS STEEL (OPTIONAL) | | |
| | | ASTM A479 TYPE 316 | | |
| 14 | Seat Ring | SOLUTION ANNEALED 316 STAINLESS STEEL (STANDARD) | | |
| | | HARDFACING STELLITE NO.6 ON 316 STAINLESS STEEL | | |
| 15 | Seat Ring Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | |
| 16 | Plug | SOLUTION ANNEALED 316 STAINLESS STEEL (STANDARD) | | |
| | | HARDFACING STELLITE NO.6 ON 316 STAINLESS STEEL | | |
| 17 | Plug Pin | SOLUTION ANNEALED 316 STAINLESS STEEL | | |
| 18 | Valve Body | ASTM A351 GRADE CF8M / EN 1.4408 | | |
| 19 | Drive Nut | LOW CARBON STEEL GRADES DICHROMATE ZINC PLATED | | |

1. Materials recommended for Cryogenic Liquid Natural Gas (LNG) applications -320°F (-196°C). Consult factory for suitability in other cryogenic applications.
2. Consult factory for NACE applications.
3. Trim offerings limited to Quick Change designs only.
4. Consult factory for proper actuator sizing to provide correct valve shut-off.
5. JIS and EN material equivalents are available.

Bellows seal design features 21000 BS Series

Standard construction

Bellows seal configuration is fully compatible with the standard 21000 Series trim and actuator options providing equivalent capacity capabilities for each valve size. The standard packing box design and packing design options are used as a secondary stem seal.

Rugged design

The formed bellows construction is an externally pressurized design that is capable of operating up to the full valve ANSI B16.34 pressure rating. Guides are located above and below the bellows providing excellent stability to withstand flow induced and mechanical vibration.

Extended life

The bellows assembly is designed for 50% compression/extension (zero stress) at the valve mid-stroke position to help maximize cycle life. Bellows torsional stresses are also reduced with the anti-rotation feature provided by flats on the plug stem.

High quality

Each bellows subassembly is helium leak tested to verify weld integrity, and is also hydro-statically tested as part of the complete valve assembly. Mechanical travel stops are also designed into both the bellows and valve assemblies to prevent over compression or extension.

Smart solution

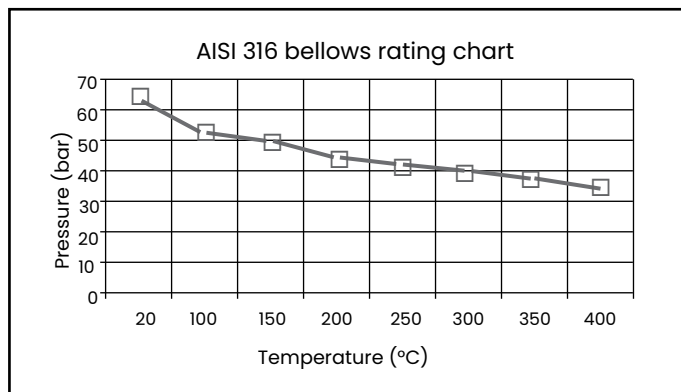
Bellows installed cycle life can be monitored in the field by utilizing Masoneilan's SVI™ Digital Positioner with actual process data. This advanced preventative maintenance option will help improve plant safety by identifying potential hazardous failures before they happen, and cut cost by reducing premature bellows replacement.

Bellows materials standard material

316/316L stainless steel

Optional materials

- Hastelloy C276
- Monel 400
- Inconel 625



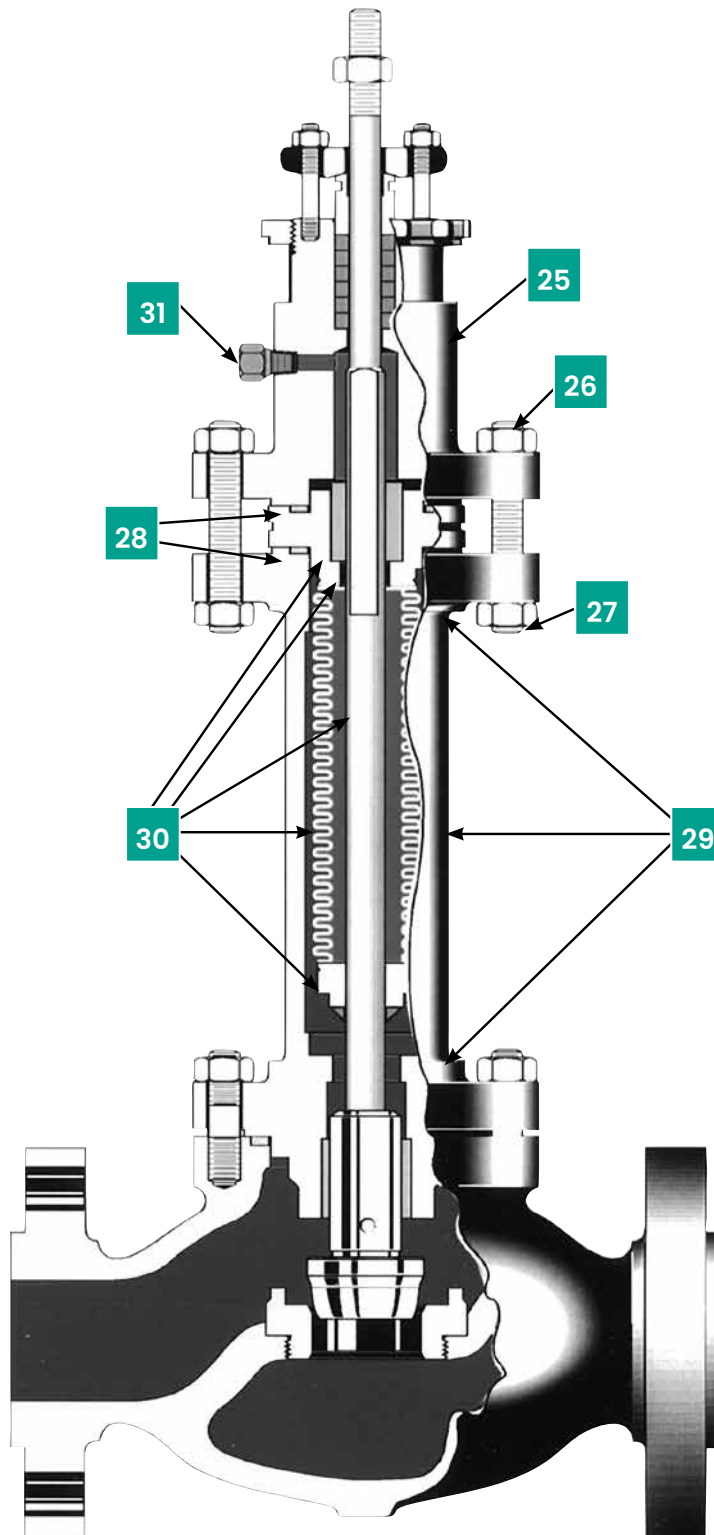
Size and ratings

Pressure ratings: ASME Class 150 and 300 – PN 20 and PN 50

| Valve size | Bellows design stroke | | Life cycle ratings ¹ | | |
|------------|-----------------------|------|---------------------------------|---------------------|-----------------------|
| | Inches | mm | 100% | 50% | 25% |
| .75"-2" | 75 | 19 | 100,000 Full Cycles | 600,000 Full Cycles | 3,000,000 Full Cycles |
| 3"-4" | 1.50 | 38.1 | | | |
| 6" | 2.00 | 50.8 | | | |

1. Minimum expected average cycle life for Class 300 (PN 50) bellows operating at constant pressure.
 2. Consult Masoneilan for Bellows applications above ASME Class 300 (PN 50).

Materials of construction



Bellows seal construction

Materials of construction

Bellows Seal – Carbon Steel Body Version¹

| Ref. No. | Temperature Range | | | -20°F (-29°C) | 800°F (427°C) |
|--|--|---|---------------------------------------|---------------|---------------|
| Ref. No. | Description | Materials | | | |
| 25 | Valve Bonnet | ASTM A216 GRADE WCC/WCB or ASTM A105 | | | |
| 26 | Bonnet Stud | ASTM A193 GRADE B7 | | | |
| 27 | Bonnet Stud Nut | ASTM A194 GRADE 2H | | | |
| 28 | Bonnet Spacer Gasket | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | | |
| 29 | Carbon Steel Bonnet Extension Assembly | Upper Flange | ASTM A216 GRADE WCC or ASTM A105 | | |
| | | Spacer | ASTM A106 GRADE B HRC 22 MAXIMUM | | |
| | | Lower Flange | ASTM A216 GRADE WCC | | |
| 30 | Stainless Steel Bellows and Stem Assembly | Stem | SOLUTION ANNEALED 316 STAINLESS STEEL | | |
| | | Guide Bushing | ASTM A479 | | |
| | | Bellows | 316 ST. ST. ASTM A240/A312 | | |
| | | Upper Adapter | GENERAL SERVICE ANNEALED 316L ST ST | | |
| | | Lower Adapter | | | |
| | | Hastelloy C Bellows and Stem Assembly | Stem | ASTM B574 | |
| | Guide Bushing | | Stellite or Equivalent NO. 6 | | |
| | Bellows | | Hastelloy C276 ASTM B575/B622 | | |
| | Upper Adapter | | ASTM B574 | | |
| | Monel 400 ³ Bellows and Stem Assembly | Stem | ASTM B164 CLASS A | | |
| | | Guide Bushing | Stellite or Equivalent NO. 6 | | |
| | | Bellows | ASTM B164 CLASS A | | |
| Upper Adapter | | ASTM B164 CLASS A | | | |
| Inconel 625 ³ Bellows and Stem Assembly | Stem | INCONEL X-750 | | | |
| | Guide Bushing | Stellite or Equivalent NO. 6 | | | |
| | Bellows | ASTM B446 | | | |
| | Upper Adapter | ASTM B446 | | | |
| 31 | Plug – 1/8" NPT | ASTM A234 GRADE WPB | | | |
| Ref. No. | Temperature Range | | | -20°F (-29°C) | 800°F (427°C) |

1. Materials for other components are same as listed for Standard Carbon Steel Construction.
2. Items No. 1 (plug stem) and 8 (bonnet) in Standard Materials of Construction tables are replaced by items above.
3. Optional Hastelloy C, Monel 400 and Inconel 625 Bellows Construction available.

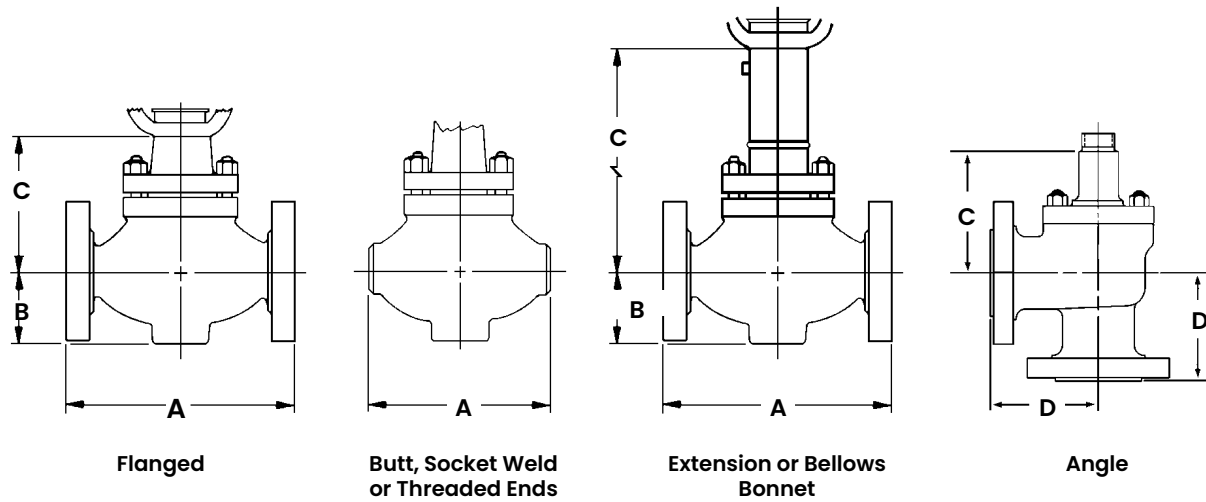
Materials of Construction

Bellows Seal – Stainless Steel Body Version¹

| Ref. No. | Temperature Range | | -20°F (-29°C) | 650°F (343°C) | 800°F (427°C) |
|---|---|--------------------------------|---|--------------------|------------------|
| | Description | Materials | | | |
| 25 | Valve Stud | | ASTM A351 GRADE CF8M or ASTM A182 GRADE F 316 | | |
| 26 | Bonnet Stud | | ASTM A193 GR B7 – ZINC PLATING | ASTM A193 GRADE B7 | |
| 27 | Bonnet Stud Nut | | ASTM A194 GR 2H – ZINC PLATING | ASTM A194 GRADE 2H | |
| 28 | Bonnet Spacer Gasket | | 316L ST ST SPIRAL WOUND GASKET WITH GRAPHITE FILLER | | |
| 29 | Carbon Steel Bonnet Extension Assembly | Upper Flange | ASTM A351 GRADE CF8M or ASTM A182 GRADE F 316 | | |
| | | Spacer | 316 St. St. ASTM A269 TY 316 | | |
| | | Lower Flange | ASTM A351 GRADE CF8M | | |
| 30 | Stainless Steel Bellows and Stem Assembly | Stem | SOLUTION ANNEALED 316 STAINLESS STEEL | | |
| | | Guide Bushing | ASTM A479 | | |
| | | Bellows | 316 St. St. ASTM A240/A312 | | |
| | | Upper Adapter Lower Adapter | GENERAL SERVICE ANNEALED 316L ST ST | | |
| | Hastelloy C ³ Bellows and Stem Assembly | Stem | ASTM B574 | | |
| | | Guide Bushing | Stellite or Equivalent NO. 6 | | |
| | | Bellows | Hastelloy C276 ASTM B575/B622 | | |
| | | Upper Adapter Lower | ASTM B574 | | |
| | Monel 400 ³ Bellows and Stem Assembly | Stem | ASTM B164 CLASS A | | |
| | | Guide Bushing | Stellite or Equivalent NO. 6 | | |
| | | Bellows | ASTM B164 CLASS A | | |
| | | Upper Adapter Lower | ASTM B164 CLASS A | | |
| Inconel 625 ³ Bellows and Stem Assembly | Stem | INCONEL X-750 | | | |
| | Guide Bushing | Stellite or Equivalent NO. 6 | | | |
| | Bellows | ASTM B446 | | | |
| | Upper Adapter Lower | ASTM B446 | | | |
| 31 | Plug – 1/8" NPT | | AUSTENITIC STAINLESS STEEL | | |

1. Materials for other components are same as listed for Standard Stainless Steel Construction.
2. Items No. 1 (plug stem) and 8 (bonnet) in Standard Materials of Construction tables are replaced by items above.
3. Optional Hastelloy C, Monel 400 and Inconel 625 Bellows Construction available.

Dimensions (inches)

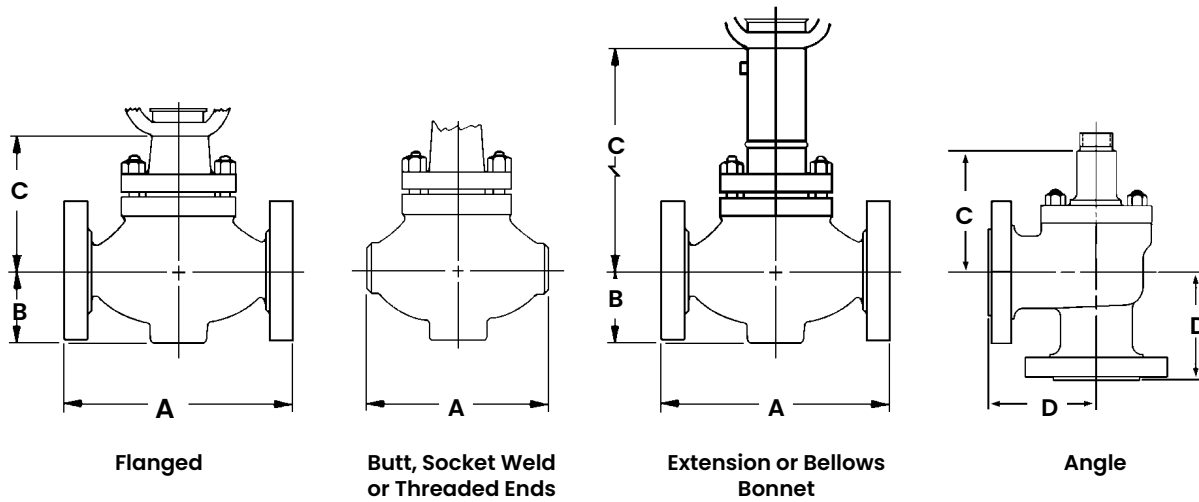


21000 Series Dimensions (inches)

| Valve Size (inches) | A | | | | | | | | | | | | | |
|---------------------|--------------------------------|----------------------------------|--------------------------|------------------------|------------------------|-------|-------------------------|-------|-------------------------|-------|--------------------------|-------|--------------------------|-------|
| | ASME Class 150-600 (PN 20-100) | ASME Class 900-1500 (PN 150-250) | ASME Class 2500 (PN 420) | ASME Class 150 (PN 20) | ASME Class 300 (PN 50) | | ASME Class 600 (PN 100) | | ASME Class 900 (PN 150) | | ASME Class 1500 (PN 250) | | ASME Class 2500 (PN 420) | |
| | BW, SW, THD | BW, SW, THD | BW, SW, THD | RF | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ |
| 0.75 | 8.25 | 8.50 | 12.50 | 7.25 | 7.63 | 8.11 | 8.11 | 8.11 | 10.75 | 10.75 | 10.75 | 10.75 | 12.12 | 12.12 |
| 1 | 8.25 | 8.50 | 12.50 | 7.25 | 7.75 | 8.25 | 8.25 | 8.25 | 11.50 | 11.50 | 11.50 | 11.50 | 12.50 | 12.50 |
| 1.5 | 9.88 | 9.25 | 13 | 8.75 | 9.25 | 9.76 | 9.88 | 9.88 | 13.12 | 13.12 | 13.12 | 13.12 | 14.12 | 14.25 |
| 2 | 11.25 | 11.50 | 14.75 | 10 | 10.50 | 11.12 | 11.25 | 11.38 | 14.75 | 14.88 | 14.75 | 14.88 | 16.25 | 16.37 |
| 3 | 13.24 | 12.50 | | 11.75 | 12.50 | 13.12 | 13.25 | 13.38 | 15.24 | 15.31 | 15.99 | 16.06 | | |
| 4 | 15.50 | 14.49 | | 13.88 | 14.50 | 15.12 | 15.50 | 15.62 | 18.27 | 18.34 | 19.02 | 19.09 | | |
| 6 | 20 | | | 17.75 | 18.62 | 19.25 | 20 | 20.12 | | | | | | |
| 8 | 24 | | | 21.38 | 22.36 | 22.83 | 24 | 24.09 | | | | | | |

| Valve Size (inches) | B | | | | | | | | | | | | |
|---------------------|-------------------------------|-------------------------|--------------------------------|----------------------------------|------|--------------------------|------|------------------------|------------------------|-------------------------|-------------------------|--------------------------|--------------------------|
| | ANSI Class 150-300 (PN 20-50) | ANSI Class 600 (PN 100) | ANSI Class 150-600 (PN 20-100) | ANSI Class 900-1500 (PN 150-250) | | ANSI Class 2500 (PN 420) | | ANSI Class 150 (PN 20) | ANSI Class 300 (PN 50) | ANSI Class 600 (PN 100) | ANSI Class 900 (PN 150) | ANSI Class 1500 (PN 250) | ANSI Class 2500 (PN 420) |
| | BW | BW | SW & THD | BW | SW | BW | SW | RF | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ |
| 0.75 | | | 1.83 | | 2.15 | | 2.42 | 2 | 2.29 | 2.29 | 2.59 | 2.59 | 2.79 |
| 1 | | | 1.83 | | 2.15 | | 2.42 | 2.19 | 2.49 | 2.49 | 2.98 | 2.98 | 3.18 |
| 1.5 | | | 2.50 | | 2.81 | | 3.17 | 2.50 | 3.08 | 3.08 | 3.57 | 3.57 | 4.06 |
| 2 | 3 | 3 | 3 | 3.53 | 3.53 | 3.87 | 3.87 | 3 | 3.28 | 3.30 | 4.26 | 4.26 | 4.66 |
| 3 | 3.69 | 3.69 | | 4.36 | | | | 3.77 | 4.16 | 4.16 | 4.72 | 5.22 | |
| 4 | 5 | 5.50 | | 5.75 | | | | 4.98 | 5.05 | 5.50 | 5.75 | 6.10 | |
| 6 | 6.26 | 7.37 | | | | | | 6.26 | 6.36 | 7.37 | | | |
| 8 | 7.68 | 7.68 | | | | | | 7.68 | 7.68 | 8.27 | | | |

Dimensions (inches)

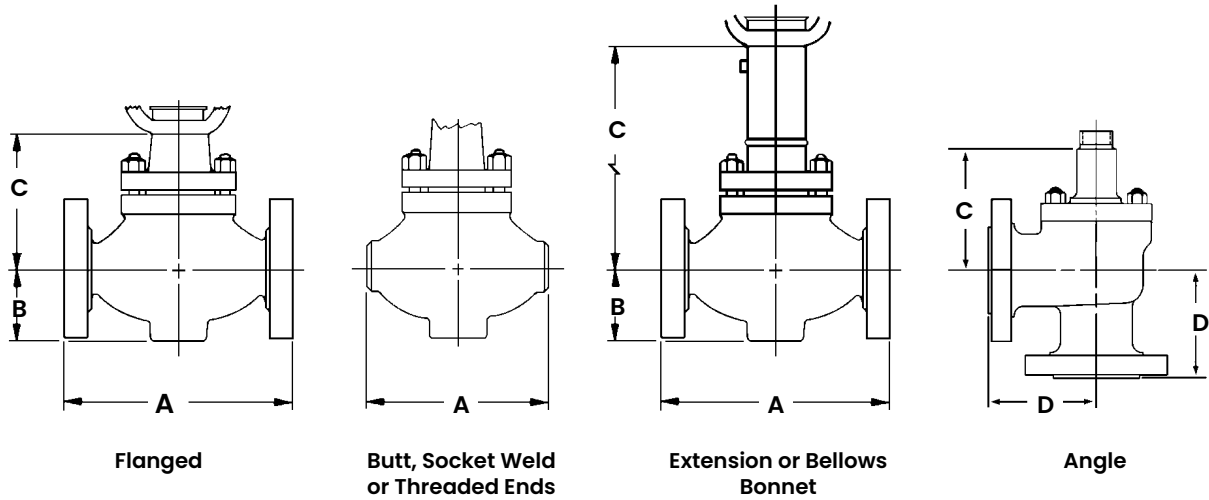


21000 Series Dimensions (inches)

| Valve Size (inches) | C | | | | | | | | | | | |
|---------------------|-------------------------------|-------------------------|----------------------------------|--------------------------|-------------------------------|-------------------------|----------------------------------|--------------------------|--------------------------------|----------------------------------|--------------------------|-------------------------------|
| | Standard Bonnet | | | | Extension Bonnet | | | | Cryogenic Extension Bonnet | | | Bellows Bonnet |
| | ASME Class 150-300 (PN 20-50) | ASME Class 600 (PN 100) | ASME Class 900-1500 (PN 150-250) | ASME Class 2500 (PN 420) | ASME Class 150-300 (PN 20-50) | ASME Class 600 (PN 100) | ASME Class 900-1500 (PN 150-250) | ASME Class 2500 (PN 420) | ASME Class 150-600 (PN 20-100) | ASME Class 900-1500 (PN 150-250) | ASME Class 2500 (PN 420) | ASME Class 150-300 (PN 20-50) |
| 0.75 | 5.65 | 5.65 | 7.69 | 7.69 | 9.78 | 9.78 | 10.76 | 10.76 | 23.70 | 23.80 | 23.80 | 16.83 |
| 1 | 5.65 | 5.65 | 7.69 | 7.69 | 9.78 | 9.78 | 10.76 | 10.76 | 23.70 | 23.80 | 23.80 | 16.83 |
| 1.5 | 5.51 | 5.51 | 9 | 9 | 10 | 10 | 11.70 | 11.70 | 23.70 | 23.70 | 23.70 | 15.22 |
| 2 | 5.51 | 5.51 | 9 | 10.70 | 10 | 10 | 11.70 | 12.30 | 23.70 | 23.70 | 23.70 | 15.22 |
| 3 | 8 | 8 | 11.35 | | 12.50 | 12.50 | 13.70 | | 27.64 | 27.78 | | 23.75 |
| 4 | 8.05 | 9.43 | 14.94 | | 12.56 | 12.56 | 17.44 | | 27.64 | 27.83 | | 23.87 |
| 6 | 11.20 | 11.13 | | | 17.06 | 16.63 | | | 31.84 | | | 43.85 |
| 8 | 16.66 | 16.66 | | | 22.78 | 22.78 | | | 34.71 | | | |

| Valve Size (inches) | D | | | | | | | | | | | | | | | | | |
|---------------------|--------------------------------|-------------|----------------------------------|------|--------------------------|------|------------------------|-------|------------------------|------|-------------------------|------|-------------------------|------|--------------------------|-----|--------------------------|-----|
| | ASME Class 150-600 (PN 20-100) | | ASME Class 900-1500 (PN 150-200) | | ASME Class 2500 (PN 420) | | ASME Class 150 (PN 20) | | ASME Class 300 (PN 50) | | ASME Class 600 (PN 100) | | ASME Class 900 (PN 150) | | ASME Class 1500 (PN 250) | | ASME Class 2500 (PN 420) | |
| | BW, SW, THD | BW, SW, THD | BW, SW, THD | RF | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ |
| 0.75 | 4.13 | 4.25 | 6.25 | 3.63 | 3.87 | 4.13 | 4.13 | 4.13 | 5.38 | 5.38 | 5.38 | 5.38 | 6.06 | 6.06 | | | | |
| 1 | 4.13 | 4.25 | 6.25 | 3.63 | 3.87 | 4.13 | 4.13 | 4.13 | 5.75 | 5.75 | 5.75 | 5.75 | 6.25 | 6.25 | | | | |
| 1.5 | 4.94 | 4.63 | 6.50 | 4.37 | 4.63 | 4.88 | 4.95 | 4.94 | 6.56 | 6.56 | 6.56 | 6.56 | 7.06 | 7.12 | | | | |
| 2 | 5.63 | 5.57 | 7.38 | 5 | 5.25 | 5.56 | 5.63 | 5.69 | 7.37 | 7.44 | 7.37 | 7.44 | 8.13 | 8.19 | | | | |
| 3 | 6.63 | | | 5.87 | 6.25 | 6.56 | 6.63 | 6.69 | | | | | | | | | | |
| 4 | 7.75 | | | 6.94 | 7.25 | 7.56 | 7.75 | 7.81 | | | | | | | | | | |
| 6 | 10.00 | | | 8.87 | 9.31 | 9.63 | 10 | 10.06 | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | |

Dimensions (mm)

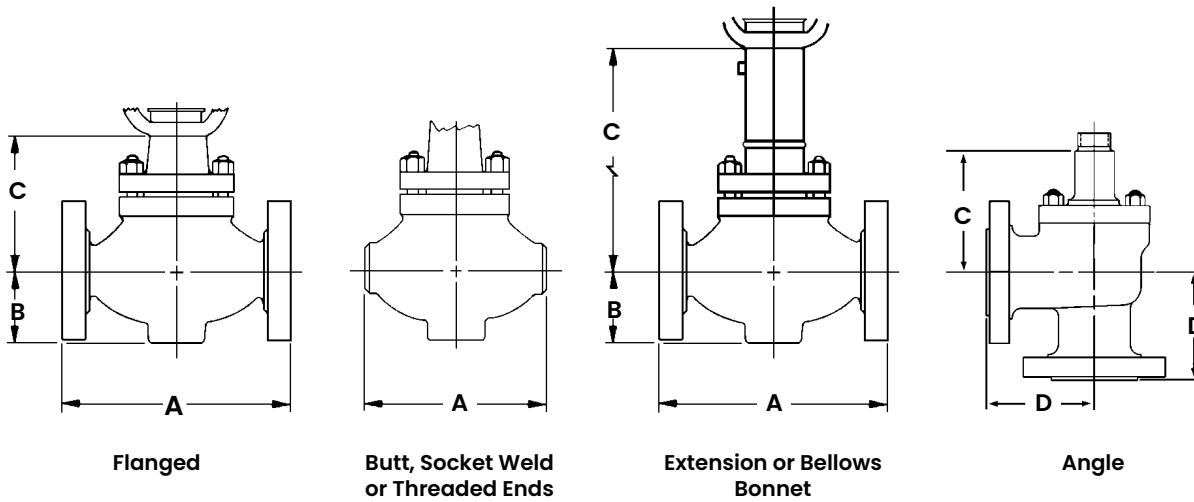


21000 Series Dimensions (mm)

| Valve Size (mm) | A | | | | | | | | | | | | | | | | | |
|-----------------|--------------------------------|-------------|----------------------------------|-----|--------------------------|-----|------------------------|-----|------------------------|-----|-------------------------|-----|-------------------------|-----|--------------------------|-----|--------------------------|-----|
| | ASME Class 150-600 (PN 20-100) | | ASME Class 900-1500 (PN 150-250) | | ASME Class 2500 (PN 420) | | ASME Class 150 (PN 20) | | ASME Class 300 (PN 50) | | ASME Class 600 (PN 100) | | ASME Class 900 (PN 150) | | ASME Class 1500 (PN 250) | | ASME Class 2500 (PN 420) | |
| | BW, SW, THD | BW, SW, THD | BW, SW, THD | RF | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ |
| 20 | 210 | 216 | 318 | 184 | 194 | 206 | 206 | 206 | 273 | 273 | 273 | 273 | 308 | 308 | | | | |
| 25 | 210 | 216 | 318 | 184 | 197 | 210 | 210 | 210 | 292 | 292 | 292 | 292 | 318 | 318 | | | | |
| 40 | 251 | 235 | 330 | 222 | 235 | 248 | 251 | 251 | 333 | 333 | 333 | 333 | 359 | 362 | | | | |
| 50 | 286 | 292 | 375 | 254 | 267 | 283 | 286 | 289 | 375 | 378 | 375 | 378 | 413 | 416 | | | | |
| 80 | 336 | 318 | | 299 | 318 | 333 | 337 | 340 | 387 | 389 | 406 | 408 | | | | | | |
| 100 | 394 | 368 | | 353 | 368 | 384 | 394 | 397 | 464 | 466 | 483 | 485 | | | | | | |
| 150 | 508 | | | 451 | 473 | 489 | 508 | 511 | | | | | | | | | | |
| 200 | 610 | | | 543 | 568 | 580 | 610 | 612 | | | | | | | | | | |

| Valve Size (mm) | B | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-------------------------------|-----|-------------------------|-----|--------------------------------|----|----------------------------------|-----|--------------------------|----------|------------------------|----------|------------------------|----------|-------------------------|----------|-------------------------|----------|--------------------------|----------|--------------------------|----------|--|
| | ANSI Class 150-300 (PN 20-50) | | ANSI Class 600 (PN 100) | | ANSI Class 150-600 (PN 20-100) | | ANSI Class 900-1500 (PN 150-250) | | ANSI Class 2500 (PN 420) | | ANSI Class 150 (PN 20) | | ANSI Class 300 (PN 50) | | ANSI Class 600 (PN 100) | | ANSI Class 900 (PN 150) | | ANSI Class 1500 (PN 250) | | ANSI Class 2500 (PN 420) | | |
| | BW | BW | SW & THD | BW | SW | BW | SW | RF | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | RF & RTJ | |
| 20 | | | 47 | | 55 | | 62 | 51 | 58 | 58 | 66 | 66 | 71 | | | | | | | | | | |
| 25 | | | 47 | | 55 | | 62 | 56 | 63 | 63 | 76 | 76 | 81 | | | | | | | | | | |
| 40 | | | 64 | | 72 | | 81 | 64 | 78 | 78 | 91 | 91 | 103 | | | | | | | | | | |
| 50 | 76 | 76 | 76 | 90 | 90 | 96 | 98 | 76 | 83 | 84 | 108 | 108 | 118 | | | | | | | | | | |
| 80 | 95 | 95 | | 111 | | | | 96 | 106 | 106 | 120 | 133 | | | | | | | | | | | |
| 100 | 127 | 140 | | 146 | | | | 127 | 128 | 140 | 146 | 155 | | | | | | | | | | | |
| 150 | 159 | 187 | | | | | | 159 | 162 | 187 | | | | | | | | | | | | | |
| 200 | 195 | 195 | | | | | | 195 | 195 | 210 | | | | | | | | | | | | | |

Dimensions (mm)



21000 Series Dimensions (mm)

| Valve Size (mm) | C | | | | | | | | | | | |
|-----------------|-------------------------------|-------------------------|----------------------------------|--------------------------|-------------------------------|-------------------------|----------------------------------|--------------------------|--------------------------------|----------------------------------|--------------------------|-------------------------------|
| | Standard Bonnet | | | | Extension Bonnet | | | | Cryogenic Extension Bonnet | | | Bellows Bonnet |
| | ASME Class 150-300 (PN 20-50) | ASME Class 600 (PN 100) | ASME Class 900-1500 (PN 150-250) | ASME Class 2500 (PN 420) | ASME Class 150-300 (PN 20-50) | ASME Class 600 (PN 100) | ASME Class 900-1500 (PN 150-250) | ASME Class 2500 (PN 420) | ASME Class 150-600 (PN 20-100) | ASME Class 900-1500 (PN 150-250) | ASME Class 2500 (PN 420) | ASME Class 150-300 (PN 20-50) |
| 20 | 144 | 144 | 195 | 195 | 249 | 249 | 273 | 273 | 602 | 604 | 604 | 427 |
| 25 | 144 | 144 | 195 | 195 | 249 | 249 | 273 | 273 | 602 | 604 | 604 | 427 |
| 40 | 140 | 140 | 228 | 228 | 254 | 254 | 297 | 297 | 602 | 602 | 602 | 387 |
| 50 | 140 | 140 | 228 | 271 | 254 | 254 | 297 | 312 | 602 | 602 | 602 | 387 |
| 80 | 203 | 203 | 288 | | 317 | 317 | 348 | | 702 | 706 | | 603 |
| 100 | 205 | 240 | 380 | | 319 | 319 | 443 | | 702 | 707 | | 606 |
| 150 | 284 | 283 | | | 424 | 422 | | | 808 | | | 1114 |
| 200 | 423 | 423 | | | 579 | | | | 882 | | | |

| Valve Size (mm) | D | | | | | | | | | | | | | |
|-----------------|--------------------------------|----------------------------------|--------------------------|------------------------|------------------------|-----|-------------------------|-----|-------------------------|-----|--------------------------|-----|--------------------------|-----|
| | ASME Class 150-600 (PN 20-100) | ASME Class 900-1500 (PN 150-250) | ASME Class 2500 (PN 420) | ASME Class 150 (PN 20) | ASME Class 300 (PN 50) | | ASME Class 600 (PN 100) | | ASME Class 900 (PN 150) | | ASME Class 1500 (PN 250) | | ASME Class 2500 (PN 420) | |
| | BW, SW, THD | BW, SW, THD | BW, SW, THD | RF | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ | RF | RTJ |
| 20 | 105 | 108 | 159 | 92 | 98 | 105 | 105 | 105 | 137 | 137 | 137 | 137 | 154 | 154 |
| 25 | 105 | 108 | 159 | 92 | 98 | 105 | 105 | 105 | 146 | 146 | 146 | 146 | 159 | 159 |
| 40 | 126 | 118 | 165 | 111 | 118 | 124 | 126 | 126 | 167 | 167 | 167 | 167 | 179 | 181 |
| 50 | 143 | 142 | 188 | 127 | 133 | 141 | 143 | 145 | 187 | 189 | 187 | 189 | 206 | 208 |
| 80 | 168 | | | 149 | 159 | 167 | 168 | 170 | | | | | | |
| 100 | 197 | | | 176 | 184 | 192 | 197 | 198 | | | | | | |
| 150 | 254 | | | 225 | 237 | 244 | 254 | 256 | | | | | | |
| 200 | | | | | | | | | | | | | | |

Weights

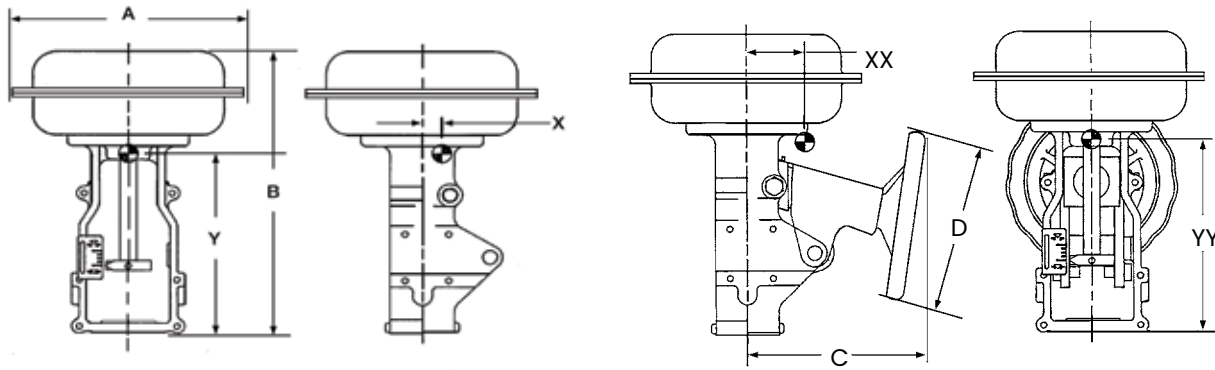
Body S/A with Standard Bonnet (lbs)

| Valve Size (inches) | ASME Class 150 – 300 (PN 20 – 50) | | ASME Class 600 (PN 100) | | ASME Class 900 – 1500 (PN 150 – 250) | | ASME Class 2500 (PN 420) | |
|------------------------|--------------------------------------|--------------|----------------------------|--------------|---|--------------|-----------------------------|--------------|
| | FLG | BW, SW & THD | FLG | BW, SW & THD | FLG | BW, SW & THD | FLG | BW, SW & THD |
| 0.75 | 36 | 27 | 38 | 27 | 57 | 44 | 70 | 44 |
| 1 | 36 | 27 | 38 | 27 | 75 | 44 | 90 | 44 |
| 1.5 | 49 | 36 | 53 | 36 | 100 | 57 | 118 | 57 |
| 2 | 57 | 44 | 64 | 44 | 144 | 82 | 255 | 154 |
| 3 | 127 | 73 | 128 | 99 | 199 | 146 | | |
| 4 | 196 | 121 | 216 | 135 | 409 | 318 | | |
| 6 | 355 | 238 | 450 | 272 | | | | |
| 8 | 682 | 610 | 771 | 610 | | | | |

Body S/A with Standard Bonnet (kg)

| Valve Size (mm) | ASME Class 150 – 300 (PN 20 – 50) | | ASME Class 600 (PN 100) | | ASME Class 900 – 1500 (PN 150 – 250) | | ASME Class 2500 (PN 420) | |
|--------------------|--------------------------------------|--------------|----------------------------|--------------|---|--------------|-----------------------------|--------------|
| | FLG | BW, SW & THD | FLG | BW, SW & THD | FLG | BW, SW & THD | FLG | BW, SW & THD |
| 20 | 16 | 12 | 17 | 12 | 26 | 20 | 32 | 20 |
| 25 | 16 | 12 | 17 | 12 | 34 | 20 | 41 | 20 |
| 40 | 22 | 16 | 24 | 16 | 45 | 26 | 53 | 26 |
| 50 | 26 | 20 | 29 | 20 | 65 | 37 | 116 | 70 |
| 80 | 58 | 33 | 58 | 45 | 90 | 66 | | |
| 100 | 89 | 55 | 98 | 61 | 186 | 144 | | |
| 150 | 161 | 108 | 204 | 123 | | | | |
| 200 | 309 | 277 | 350 | 277 | | | | |

Dimensions and Weights (in./lbs)



Shown with optional Handwheel

Dimensions and Weights

| Actuator Size | Actuator Dimensions (inches) | | | | Weights (lbs.) | |
|---------------|------------------------------|---------------|-------|-------|----------------|-------------|
| | A | B (Model 88) | C | D | Standard | w/Handwheel |
| 6 | 11.50 | 15.54 (17.52) | 10.00 | 9.00 | 45 | 60 |
| 10 | 14.50 | 19.58 (21.54) | 10.90 | 12.00 | 85 | 105 |
| 16 | 18.75 | 28.22 (30.79) | 14.00 | 18.00 | 210 | 245 |
| 23 | 23.63 | 30.71 (33.27) | 16.00 | 18.00 | 265 | 320 |

Actuator Removal Clearance = 6 inches

Center of Gravity (inches)

Without Handwheel

| Size | X | Y |
|------|-----|-------|
| 6 | .19 | 9.75 |
| 10 | .0 | 12.88 |
| 16 | .13 | 18.50 |
| 23 | .06 | 21.13 |

With Handwheel

| Size | XX | YY |
|------|------|-------|
| 6 | 1.25 | 9.13 |
| 10 | 0.88 | 12.00 |
| 16 | 1.38 | 16.75 |
| 23 | 1.38 | 19.00 |

Limit Stops (inches)

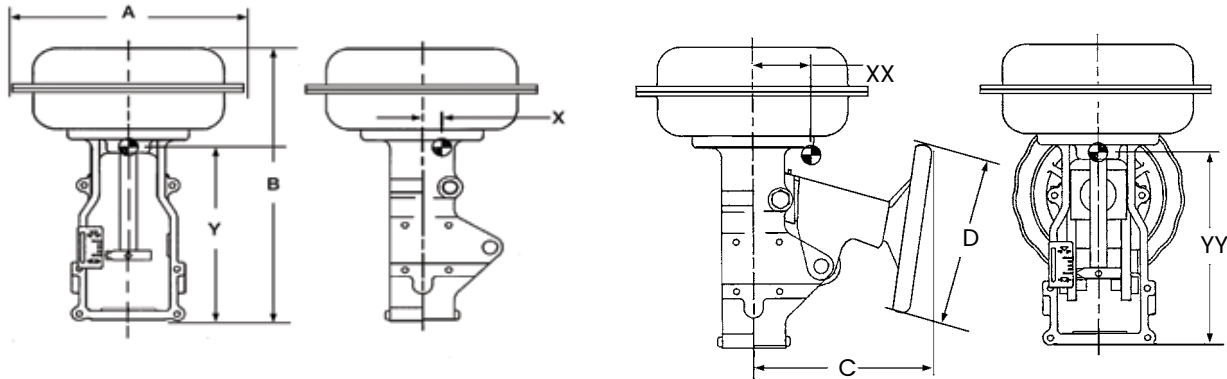
Up Stop

| Size | Model | Overall Height B |
|------|-------|------------------|
| 6 | 87 | 19.45 |
| 10 | | 25.43 |
| 16 | | 36.42 |
| 23 | | 38.84 |
| 6 | 88 | 19.16 |
| 10 | | 25.06 |
| 16 | | 35.48 |
| 23 | | 28.65 |

Down Stop

| Size | Model | Overall Height B |
|------|-------|------------------|
| 6 | 87 | 19.80 |
| 10 | | 25.98 |
| 16 | | 37.20 |
| 23 | | 39.90 |
| 6 | 88 | 19.74 |
| 10 | | 25.85 |
| 16 | | 37.46 |
| 23 | | 40.33 |

Dimensions and Weights (mm/kg)



Shown with optional Handwheel

Dimensions and Weights

| Actuator Size | Actuator Dimensions (mm) | | | | Weights (kg) | |
|---------------|--------------------------|--------------|-----|-----|--------------|-------------|
| | A | B (Model 88) | C | D | Standard | w/Handwheel |
| 6 | 302 | 395 (445) | 254 | 229 | 20 | 27 |
| 10 | 373 | 497 (547) | 277 | 305 | 39 | 48 |
| 16 | 476 | 717 (782) | 356 | 457 | 95 | 111 |
| 23 | 600 | 780 (845) | 406 | 457 | 120 | 145 |

Actuator Removal Clearance = 152mm

Center of Gravity (mm)

Without Handwheel

| Size | X | Y |
|------|---|-----|
| 6 | 5 | 248 |
| 10 | 0 | 327 |
| 16 | 3 | 470 |
| 23 | 2 | 537 |

With Handwheel

| Size | XX | YY |
|------|----|-----|
| 6 | 32 | 232 |
| 10 | 22 | 305 |
| 16 | 35 | 425 |
| 23 | 35 | 483 |

Limit Stops (mm)

Up Stop

| Size | Model | Overall Height B |
|------|-------|------------------|
| 6 | 87 | 494 |
| 10 | | 646 |
| 16 | | 925 |
| 23 | | 987 |
| 6 | 88 | 487 |
| 10 | | 636 |
| 16 | | 901 |
| 23 | | 982 |

Down Stop

| Size | Model | Overall Height B |
|------|-------|------------------|
| 6 | 87 | 503 |
| 10 | | 660 |
| 16 | | 945 |
| 23 | | 1014 |
| 6 | 88 | 501 |
| 10 | | 657 |
| 16 | | 952 |
| 23 | | 1024 |

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