

easy-e[®] Cryogenic Sliding-Stem Control Valves

easy-e[®] cryogenic valves are globe-style, single-port, valves featuring stainless steel construction materials and fabricated extension bonnets. Design ET-C and EWT-C valves are pressure-balanced, whereas the Design EZ-C valve is an unbalanced design. These cryogenic valves are designed to provide throttling or on-off control of liquids and gases at cryogenic temperatures as low as -198°C (-325°F).

When required, these rugged valves can reliably provide tight shut-off for special applications within the chemical and hydrocarbon processing industries, such as certain liquefied natural gas services.

The high-capacity Design ET-C and EWT-C valves with pressure-balanced trim allow the use of smaller, lower-cost actuators, reducing installed costs in high-pressure and high-flow-rate applications.

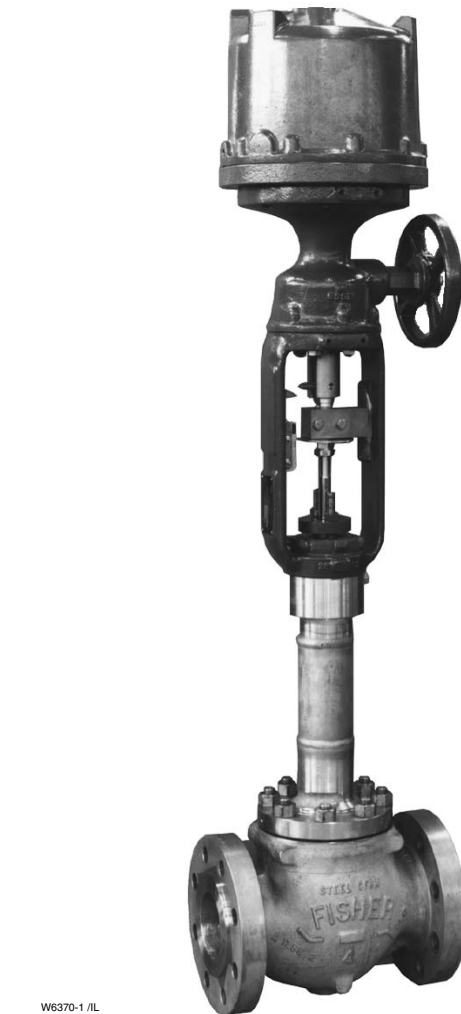
Note

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The easy-e Valve Family

These valves are part of the versatile easy-e family of industrial control valves (see figure 1). Special features include:

- **Designs ET-C and EWT-C:** Different cage/plug styles provide particular flow characteristics for highly-specialized applications. The standard cage comes in two different flow characteristics: ■ equal percentage and ■ linear.



W6370-1 /IL

Figure 1. Typical easy-e[®] Cryogenic Valve with Extension Bonnet and 585C Actuator

- **Design EZ-C:** Interchangeable, restricted-capacity trims and full-sized trims match a variety of process flow demands for highly-specialized applications. The standard plug is designed with three different flow characteristics: ■ equal percentage, ■ linear, and ■ quick-opening.



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Features

- **Cryogenic Spring-Loaded Seal Ring**—The seal ring and associated valve parts in the Design ET-C and EWT-C valves are specifically designed and manufactured for excellent performance at low temperatures.

- **Stable Control**—Rugged cage guiding in the Design ET-C and EWT-C valves stabilizes the valve plug at all points in its travel to reduce vibration, mechanical noise, and the need for hydraulic snubbers.

- **Cost Effective Operation and Economical Maintenance**—Increased wear resistance of hardened stainless steel trim means long-lasting service. Balanced valve plug construction in the Design ET-C and EWT-C valves permits use of smaller, lower-cost Fisher® actuators.

- **Piping Economy**—Expanded end connections of EW Series valves may reduce the need for line swages while accommodating oversized piping arrangements used to limit fluid flow velocities.

- **Cryogenic Design Features**—The stainless steel valve body and bonnet with fabricated extension are designed to meet low temperature requirements. The unique metal-to-metal seat design provides repeatable tight shutoff, reducing maintenance costs.

- **Rugged Metal Seat**—The metal-to-metal seat is designed and manufactured to provide long-lasting, reliable, tight shutoff at both ambient and cryogenic temperatures without the need for periodic lapping. This reduces the need for soft seats, even in applications with stringent shutoff requirements.

- **Fugitive Emission Protection**—The optional ENVIRO-SEAL® packing systems provide an improved stem seal to help prevent the loss of valuable or hazardous process fluids, and keep emissions below the EPA limit of 100 ppm. Additionally, these live-loaded packing systems can provide long life and reliability at low temperatures to help reduce maintenance costs and downtime.

- **Thoroughly Tested**—Extensive cryogenic testing during the development of the valve design reduces the need for expensive cold testing for most applications, which results in quicker delivery and greater value.

- **Easy Maintenance**—Quick-change trim, with a clamped-in seat ring, reduces the disassembly/assembly time. The valve body can stay in the pipeline during removal of trim parts for inspection or maintenance.

- **Sour Service Capability**—For NACE applications, consult your Emerson Process Management™ sales office.

Table 1. Designs ET-C and EWT-C Typical Trim Material

| Trim Designation | Valve Plug | Valve Stem | Cage | Seat Ring |
|------------------|---|------------|--------------------------|------------|
| 429 | S31600 SST with CoCr-A (Alloy 6) hard-faced seat | S20910 | Chrome-plated S31600 SST | S31600 SST |

Table 2. Design EZ-C Typical Combinations of Metal Trim Parts for Equal Percentage (Including Micro-Form), Linear, and Quick-Opening Valve Plugs

| Trim Designation | Valve Plug | Valve Stem | Seat Ring | Seat Ring Retainer | Guide Bushing |
|------------------|---|-------------------|-----------|--------------------|---------------|
| 327 | S31600 SST with CoCr-A (Alloy 6) hard-faced Seat and Guide | S20910 (XM-19) | S31600 | CF8M | R30006 |
| 328 | S31600 SST with CoCr-A (Alloy 6) hard-faced Seat | | | | |

Table 3. Maximum Allowable Actuator Thrust for Standard Bonnet Extension Length

| VALVE DESIGN | VALVE SIZE, INCHES | STEM DIAMETER | | MAXIMUM ALLOWABLE STEM LOAD FOR S20910 (XM-19) STEM MATERIAL | |
|----------------|--------------------|---------------|--------|--|--------|
| | | mm | Inches | N | Lb |
| ET-C and EWT-C | 3 | 12.7 | 1/2 | 15,301 | 3440 |
| | | 19.1 | 3/4 | 45,459 | 10,220 |
| | 4, 6X4, 8X4 | 12.7 | 1/2 | 16,458 | 3700 |
| | | 19.1 | 3/4 | 46,971 | 10,560 |
| | 6, 8X6, 12X6 | 19.1 | 3/4 | 36,385 | 8180 |
| | | 25.4 | 1 | 81,487 | 18,320 |
| | 8, 10X8 | 19.1 | 3/4 | 41,366 | 9300 |
| | | 25.4 | 1 | 87,003 | 19,560 |
| EZ-C | 1 | 9.5 | 3/8 | 5382 | 1210 |
| | | 12.7 | 1/2 | 13,166 | 2960 |
| | 1.5 | 9.5 | 3/8 | 5338 | 1200 |
| | | 12.7 | 1/2 | 13,166 | 2960 |
| | 2 | 12.7 | 1/2 | 14,367 | 3230 |
| | | 19.1 | 3/4 | 44,169 | 9930 |
| | 3 | 12.7 | 1/2 | 15,301 | 3440 |
| | | 19.1 | 3/4 | 45,459 | 10,220 |
| | 4 | 12.7 | 1/2 | 16,458 | 3700 |
| | | 19.1 | 3/4 | 46,971 | 10,560 |

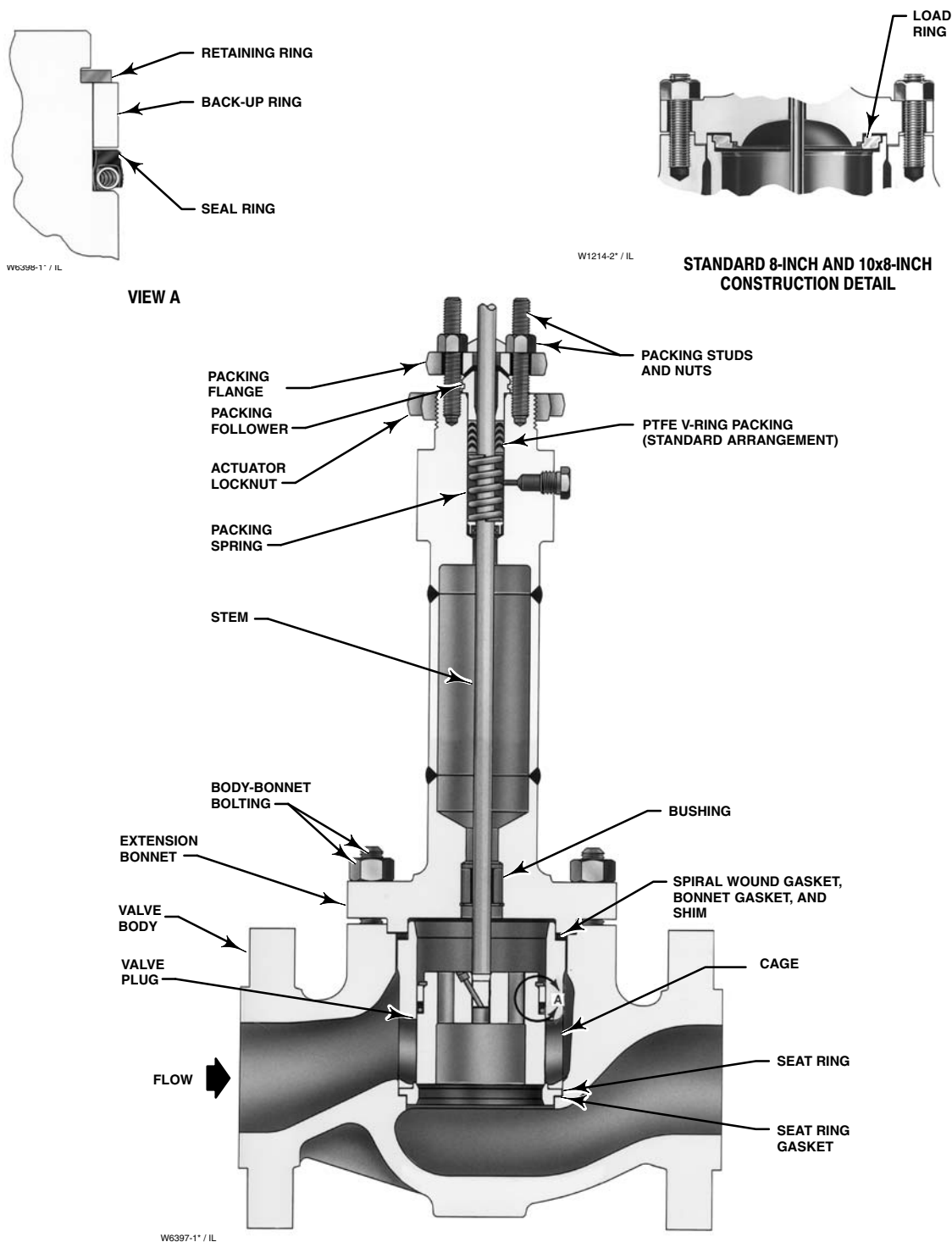


Figure 2. Design ET-C and EWT-C Valve Detail

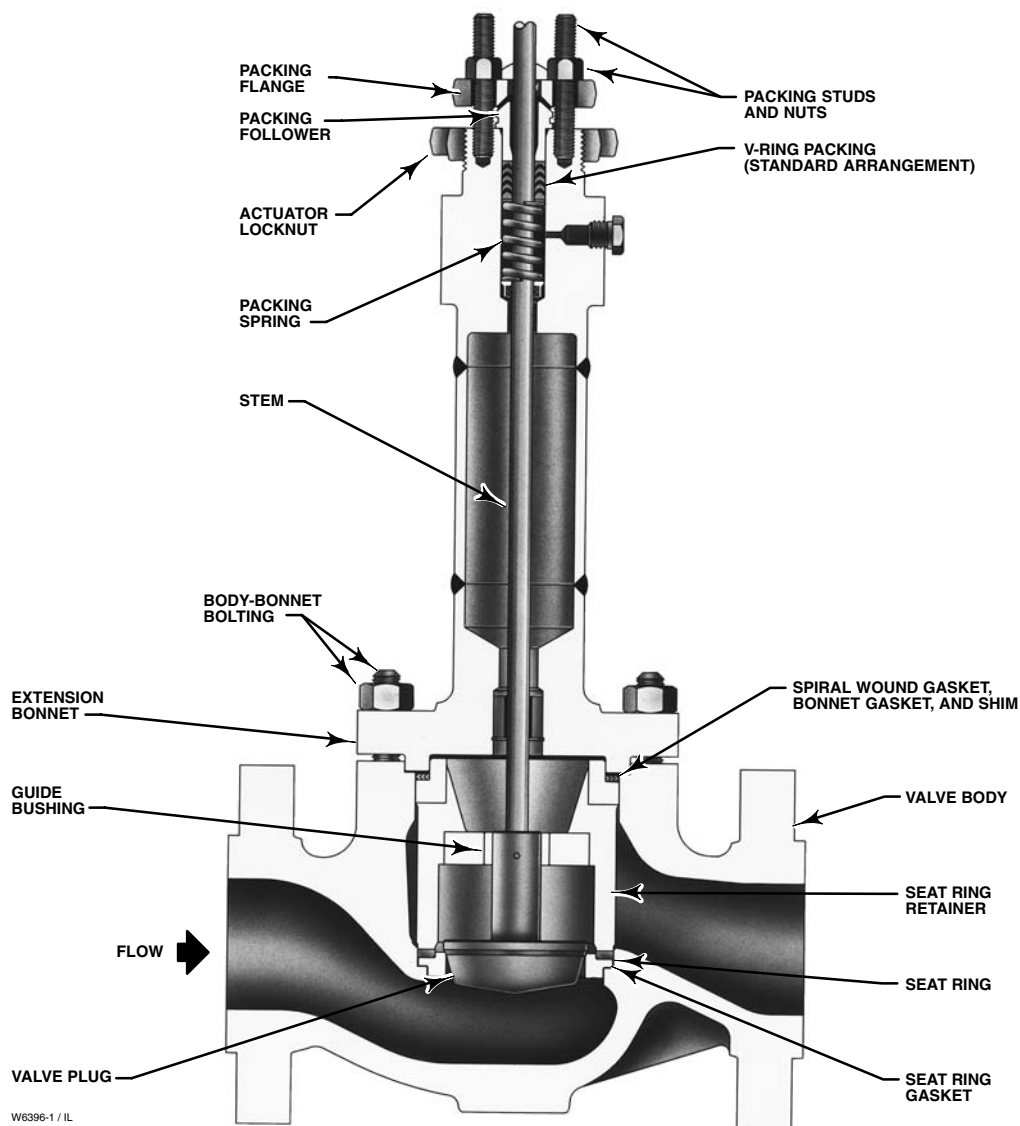


Figure 3. Design EZ-C Valve Assembly Detail

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Table 4. Designs ET-C and EWT-C Port Diameters, Valve Plug Travel, Stem and Yoke Diameters

| VALVE SIZE, INCHES | | PORT DIAMETER | MAXIMUM VALVE PLUG TRAVEL | VALVE STEM AND YOKE BOSS DIAMETERS | | | |
|--------------------|--------------|---------------|---------------------------|------------------------------------|-----------|----------|--------|
| Design ET-C | Design EWT-C | | | Standard | | Optional | |
| | | Stem | Yoke Boss | Stem | Yoke Boss | | |
| mm | | | | | | | |
| 3 | --- | 87.3 | 38.1 | 12.7 | 71 | 19.1 | 90 |
| 4 | 6X4, 8X4 | 111.1 | 50.8 | | | | |
| 6 | 8X6, 12X6 | 177.8 | 50.2 | 19.1 | 90.5 | 25.4 | 127.0 |
| 8 | 10X8 | 203.2 | 76.2 | | | | |
| Inches | | | | | | | |
| 3 | --- | 3.4375 | 1.5 | 1/2 | 2-13/16 | 3/4 | 3-9/16 |
| 4 | 6X4, 8X4 | 4.375 | 2 | | | | |
| 6 | 8X6, 12X6 | 7 | 2 | 3/4 | 3-9/16 | 1 | 5 |
| 8 | 10X8 | 8 | 3 | | | | |

Table 5. Design EZ-C Port Diameters, Valve Plug Travel, and Stem and Yoke Diameters

| VALVE SIZE, INCHES | PORT DIAMETER, INCHES | | | MAXIMUM PLUG TRAVEL | VALVE STEM AND YOKE BOSS DIAMETERS | | | |
|--------------------|--------------------------------------|---------------------------------|---------------|---------------------|------------------------------------|----------|-----------|----------|
| | Design EZ-C | Equal Percentage ⁽¹⁾ | Quick Opening | | Linear | Standard | | Optional |
| Stem | | | | Yoke Boss | | Stem | Yoke Boss | |
| mm | | | | | | | | |
| 1 | 6.4, 9.5, 12.7, 19.1, and 25.4 | 25.4 | 25.4 | 19 | 9.5 | 54 | 12.7 | 71 |
| 1.5 | 6.4, 9.5, 12.7, 19.1, 25.4, and 38.1 | 38.1 | 38.1 | | | | | |
| 2 | 6.4, 9.5, 12.7, 19.1, 25.4, and 50.8 | 50.8 | 50.8 | 29 | 12.7 | 71 | 19.1 | 90 |
| 3 | 50.8 and 76.2 | 76.2 | 76.2 | | | | | |
| 4 | 50.8 and 101.6 | 101.6 | 101.6 | 51 | | | | |
| Inches | | | | | | | | |
| 1 | 0.25, 0.375, 0.5, 0.75, and 1 | 1 | 1 | 0.75 | 3/8 | 2-1/8 | 1/2 | 2-13/16 |
| 1.5 | 0.25, 0.375, 0.5, 0.75, 1, and 1.5 | 1.5 | 1.5 | | | | | |
| 2 | 0.25, 0.375, 0.5, 0.75, 1, and 2 | 2 | 2 | 1.125 | 1/2 | 2-13/16 | 3/4 | 3-9/16 |
| 3 | 2 and 3 | 3 | 3 | | | | | |
| 4 | 2 and 4 | 4 | 4 | 2 | | | | |

1. 6.4 through 19.1 mm (0.25 through 0.75 inch) port diameters use Micro-Form valve plugs.

Table 6. Bolting Materials

| VALVE DESIGN | BODY-BONNET BOLTING | |
|-----------------------|---|--------------------------|
| | Studs | Nuts |
| ET-C, EWT-C, and EZ-C | SA-193-B8M ⁽¹⁾ Strain Hardened | SA-194-8M ⁽¹⁾ |
| | S20910 (XM-19) | SA-194-8M |
| | | SA-194-8MA |

1. Standard stud and nut combination.

Table 7. Design EZ-C Maximum Allowable Pressure Drop for N06600/Graphite Spiral Wound Gasket (1- and 1.5-Inch Valve Size) (Flow Up Only)⁽¹⁾

| TEMPERATURE, °C ⁽³⁾ | BAR ⁽²⁾ | | | | | | | | | | |
|--------------------------------|--------------------------------|-------|-------|--------|------|------|------|------|------|-------|-------|
| | Design EZ-C Valve Size, Inches | | | | | | | | | | |
| | 1 | | | | | 1.5 | | | | | |
| | Port Diameter, mm | | | | | | | | | | |
| | 6.4 | 9.5 | 12.7 | 19.1 | 25.4 | 6.4 | 9.5 | 12.7 | 19.1 | 25.4 | 38.1 |
| -198 to 93 | 94.5 | 96.2 | 97.9 | 104.1* | 114* | 77.9 | 79.0 | 80.0 | 82.7 | 87.6 | 105* |
| 93 | 89.6* | 91.4* | 93.1* | 98.6* | 108* | 73.8 | 74.5 | 75.2 | 78.6 | 82.7 | 99.3* |
| 149 | 85.5* | 87.2* | 88.9* | 94.5* | 103* | 70.3 | 71.4 | 72.4 | 75.2 | 79.3* | 94.5* |

| TEMPERATURE, °F ⁽³⁾ | PSI ⁽²⁾ | | | | | | | | | | |
|--------------------------------|--------------------------------|-------|-------|-------|-------|------|-------|------|------|-------|-------|
| | Design EZ-C Valve Size, Inches | | | | | | | | | | |
| | 1 | | | | | 1.5 | | | | | |
| | Port Diameter, Inches | | | | | | | | | | |
| | 0.25 | 0.375 | 0.5 | 0.75 | 1 | 0.25 | 0.375 | 0.5 | 0.75 | 1 | 1.5 |
| -325 to 100 | 1370 | 1395 | 1420 | 1510* | 1660* | 1130 | 1145 | 1160 | 1200 | 1270 | 1520* |
| 200 | 1300* | 1325* | 1350* | 1430* | 1570* | 1070 | 1080 | 1090 | 1140 | 1200 | 1440* |
| 300 | 1240* | 1265* | 1290* | 1370* | 1500* | 1020 | 1035 | 1050 | 1090 | 1150* | 1370* |

1. Design EZ-C should not be used in flow down service including on-off applications.
 2. Pressure drop cannot exceed maximum inlet pressure as indicated in the specification table on page 2.
 3. Pressure drops at intermediate temperatures may be interpolated.
 * Pressure drops are in excess of Class 600 pressure ratings per ASME B16.34 for CF8M body material.

Table 8. Design EZ-C Maximum Allowable Pressure Drop for N06600/Graphite Spiral Wound Gasket (2- through 4-Inch Valve Size) (Flow Up Only)⁽¹⁾

| TEMPERATURE, °C ⁽³⁾ | BAR ⁽²⁾ | | | | | | | | | |
|--------------------------------|--------------------------------|------|------|------|------|-------|------|-------|------|-------|
| | Design EZ-C Valve Size, Inches | | | | | | | | | |
| | 2 | | | | | 3 | | | 4 | |
| | Port Diameter, mm | | | | | | | | | |
| | 6.4 | 9.5 | 12.7 | 19.1 | 25.4 | 50.8 | 50.8 | 75.2 | 50.8 | 101.6 |
| -198 to 93 | 67.6 | 68.2 | 68.7 | 70.3 | 73.1 | 101* | 69.6 | 97.2 | 65.5 | 114* |
| 93 | 63.4 | 64.1 | 64.8 | 66.9 | 69.6 | 95.8* | 66.2 | 92.4* | 62.1 | 108* |
| 149 | 60.7 | 61.4 | 62.1 | 63.4 | 66.2 | 91.7* | 62.7 | 88.3* | 58.6 | 103* |

| TEMPERATURE, °F ⁽³⁾ | PSI ⁽²⁾ | | | | | | | | | |
|--------------------------------|--------------------------------|-------|-----|------|------|-------|------|-------|-----|-------|
| | Design EZ-C Valve Size, Inches | | | | | | | | | |
| | 2 | | | | | 3 | | | 4 | |
| | Port Diameter, Inches | | | | | | | | | |
| | 0.25 | 0.375 | 0.5 | 0.75 | 1 | 2 | 2 | 3 | 2 | 4 |
| -325 to 100 | 980 | 985 | 990 | 1020 | 1060 | 1470* | 1010 | 1410 | 950 | 1650* |
| 200 | 920 | 930 | 940 | 970 | 1010 | 1390* | 960 | 1340* | 900 | 1560* |
| 300 | 880 | 890 | 900 | 920 | 960 | 1330* | 910 | 1280* | 850 | 1490* |

1. Design EZ-C should not be used in flow down service including on-off applications.
 2. Pressure drop cannot exceed maximum inlet pressure as indicated in the specification table on page 2.
 3. Pressure drops at intermediate temperatures may be interpolated.
 * Pressure drops are in excess of Class 600 pressure ratings per ASME B16.34 for CF8M body material.

Table 9. Design ET-C and EWT-C Valve Dimensions

| VALVE SIZE, INCHES | RAISED-FACE FLANGE | | | G | D | | |
|-----------------------|--------------------|-----------|-----------|-------|----------------------------|------------|----------|
| | A | | | | Stem Diameter, mm (Inches) | | |
| | Class 150 | Class 300 | Class 600 | | 12.7 (1/2) | 19.1 (3/4) | 25.4 (1) |
| mm | | | | | | | |
| 3 | 298 | 318 | 337 | 97 | 533 | 533 | --- |
| 4 | 353 | 368 | 394 | 129 | 533 | 533 | --- |
| 6X4 | 451 | 473 | 508 | 135 | 568 | 568 | --- |
| 8X4 | 543 | 568 | 610 | 176 | 570 | 570 | --- |
| 6 | 451 | 473 | 508 | 140 | --- | 762 | 762 |
| 8X6 | 543 | 568 | 610 | 183 | --- | 797 | 797 |
| 12X6 | 737 | 775 | 819 | 254 | --- | 865 | 865 |
| 8 | 453 | 568 | 610 | 191 | --- | 762 | 762 |
| 10X8 | 673 | 708 | 752 | 273 | --- | 762 | 762 |
| Inches | | | | | | | |
| 3 | 11.75 | 12.50 | 13.25 | 3.81 | 21.00 | 21.00 | --- |
| 4 | 13.88 | 14.50 | 15.50 | 5.06 | 21.00 | 21.00 | --- |
| 6X4 | 17.75 | 18.62 | 20.00 | 5.31 | 22.38 | 22.38 | --- |
| 8X4 | 21.38 | 22.38 | 24.00 | 6.94 | 22.44 | 22.44 | --- |
| 6 | 17.75 | 18.62 | 20.00 | 5.50 | --- | 30.00 | 30.00 |
| 8X6 | 21.38 | 22.38 | 24.00 | 7.19 | --- | 31.38 | 31.38 |
| 12X6 | 29.00 | 30.50 | 32.25 | 10.00 | --- | 34.06 | 34.06 |
| 8 | 21.38 | 22.38 | 24.00 | 7.50 | --- | 30.00 | 30.00 |
| 10X8 | 26.50 | 27.88 | 29.62 | 10.75 | --- | 30.00 | 30.00 |

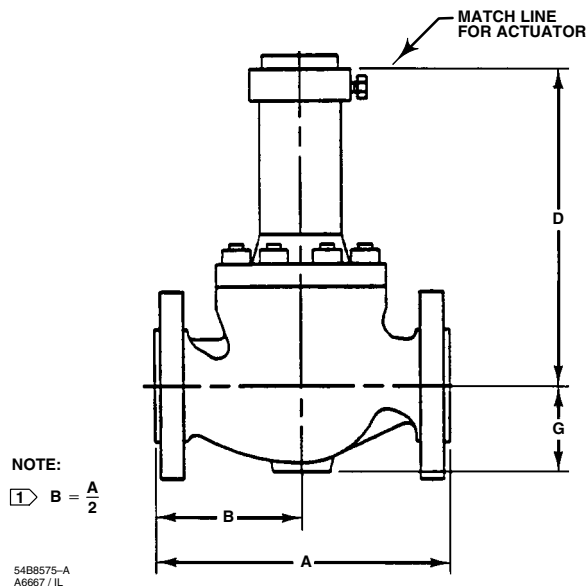


Figure 4. Design ET-C and EWT-C Valve Dimensions (also see table 9)

Table 10. Design EZ-C Valve Dimensions

| VALVE SIZE, INCHES | RAISED-FACE FLANGE | | | G | D | | |
|-----------------------|--------------------|-----------|-----------|------|----------------------------|------------|------------|
| | A | | | | Stem Diameter, mm (Inches) | | |
| | Class 150 | Class 300 | Class 600 | | 9.5 (3/8) | 12.7 (1/2) | 19.1 (3/4) |
| mm | | | | | | | |
| 1 | 184 | 197 | 210 | 61 | 535 | 549 | --- |
| 1.5 | 222 | 235 | 251 | 71 | 535 | 548 | --- |
| 2 | 254 | 267 | 286 | 78 | --- | 533 | 533 |
| 3 | 299 | 318 | 337 | 97 | --- | 535 | 535 |
| 4 | 353 | 368 | 394 | 129 | --- | 535 | 535 |
| Inches | | | | | | | |
| 1 | 7.25 | 7.75 | 8.25 | 2.38 | 21.06 | 21.62 | --- |
| 1.5 | 8.75 | 9.25 | 9.88 | 2.81 | 21.06 | 21.56 | --- |
| 2 | 10.00 | 10.50 | 11.25 | 3.06 | --- | 21.00 | 21.00 |
| 3 | 11.75 | 12.50 | 13.25 | 3.81 | --- | 21.06 | 21.06 |
| 4 | 13.88 | 14.50 | 15.50 | 5.06 | --- | 21.06 | 21.06 |

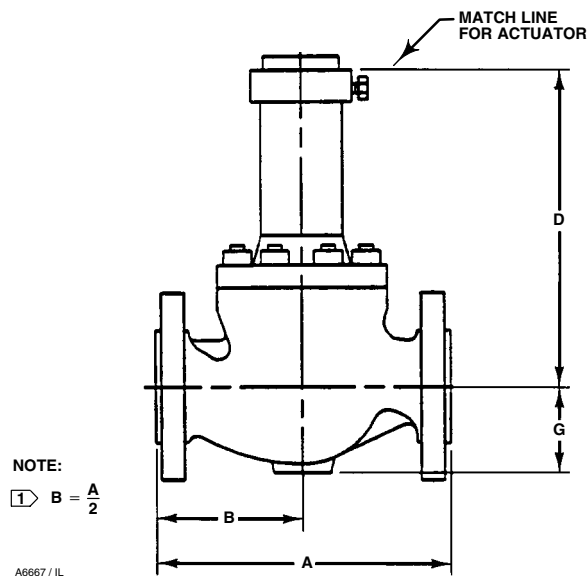


Figure 5. Design EZ-C Valve Dimensions (also see table 10)

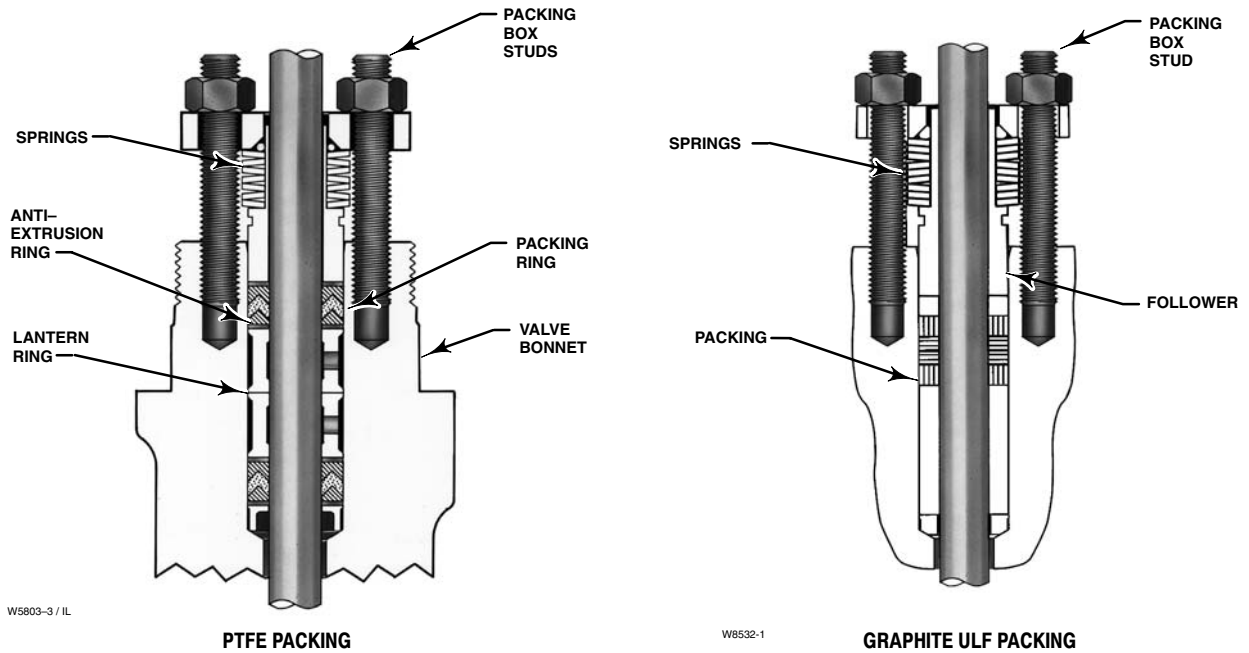


Figure 6. ENVIRO-SEAL® Packing Systems

Coefficients

Table 11. Design ET-C, Class 125 to 600, Linear Cage, Flow Down

| Linear | | | | | | | | | | | | | | | Linear Characteristic | |
|--------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|-------------------------------|
| Valve Size, Inches | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | F _L ⁽¹⁾ |
| | mm | Inches | mm | Inches | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 3 | 87.3 | 3.4375 | 38 | 1.5 | C _v | 14.5 | 32.9 | 52.1 | 70.4 | 88.5 | 105 | 118 | 133 | 142 | 148 | 0.82 |
| | | | | | K _v | 12.5 | 28.5 | 45.1 | 60.9 | 76.6 | 90.8 | 102 | 115 | 123 | 128 | --- |
| | | | | | X _T | 0.671 | 0.699 | 0.697 | 0.720 | 0.733 | 0.718 | 0.707 | 0.650 | 0.630 | 0.620 | --- |
| | | | | | F _d | 0.26 | 0.32 | 0.35 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.28 | 0.29 | 0.30 |
| 4 | 111.1 | 4.375 | 51 | 2 | C _v | 23.3 | 50.3 | 78.1 | 105 | 127 | 152 | 181 | 203 | 223 | 236 | 0.82 |
| | | | | | K _v | 20.2 | 43.5 | 67.6 | 90.8 | 110 | 131 | 157 | 176 | 193 | 204 | --- |
| | | | | | X _T | 0.691 | 0.714 | 0.720 | 0.731 | 0.764 | 0.757 | 0.748 | 0.762 | 0.732 | 0.688 | --- |
| | | | | | F _d | 0.31 | 0.36 | 0.38 | 0.38 | 0.37 | 0.35 | 0.32 | 0.30 | 0.27 | 0.28 | --- |
| 6 | 177.8 | 7 | 51 | 2 | C _v | 46.3 | 107 | 171 | 228 | 279 | 327 | 367 | 402 | 420 | 433 | 0.84 |
| | | | | | K _v | 40.0 | 92.6 | 148 | 197 | 241 | 283 | 317 | 348 | 363 | 375 | --- |
| | | | | | X _T | 0.656 | 0.727 | 0.744 | 0.781 | 0.803 | 0.800 | 0.784 | 0.758 | 0.755 | 0.740 | --- |
| | | | | | F _d | 0.21 | 0.26 | 0.29 | 0.30 | 0.31 | 0.31 | 0.31 | 0.28 | 0.28 | 0.28 | --- |
| 8 | 203.2 | 8 | 51 | 2 | C _v | 60.2 | 129 | 206 | 285 | 363 | 444 | 526 | 581 | 640 | 688 | 0.87 |
| | | | | | K _v | 52.1 | 112 | 178 | 247 | 314 | 384 | 455 | 503 | 554 | 595 | --- |
| | | | | | X _T | 0.704 | 0.721 | 0.657 | 0.651 | 0.683 | 0.713 | 0.740 | 0.801 | 0.821 | 0.839 | --- |
| 8 | 203.2 | 8 | 76 | 3 | C _v | 91.4 | 207 | 325 | 440 | 550 | 639 | 711 | 760 | 795 | 846 | 0.87 |
| | | | | | K _v | 79.1 | 179 | 281 | 381 | 476 | 553 | 615 | 657 | 688 | 732 | --- |
| | | | | | X _T | 0.651 | 0.624 | 0.677 | 0.746 | 0.786 | 0.803 | 0.823 | 0.836 | 0.843 | 0.807 | --- |
| | | | | | F _d | 0.23 | 0.28 | 0.30 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | 0.31 | --- |

1. At 100% travel.

Table 12. Design ET-C, Class 125 to 600, Equal Percentage Cage, Flow Down

| Equal Percentage | | | | | | | | | | | | | | | Equal Percentage Characteristic | |
|--------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|-------------------------------|
| Valve Size, Inches | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | F _L ⁽¹⁾ |
| | mm | Inches | mm | Inches | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 3 | 87.3 | 3.4375 | 38 | 1.5 | C _v | 4.32 | 7.53 | 10.9 | 17.1 | 27.2 | 43.5 | 66.0 | 97.0 | 120 | 136 | 0.82 |
| | | | | | K _v | 3.74 | 6.51 | 9.43 | 14.8 | 23.5 | 37.6 | 57.1 | 83.9 | 104 | 118 | --- |
| | | | | | X _T | 0.774 | 0.706 | 0.682 | 0.635 | 0.616 | 0.602 | 0.663 | 0.693 | 0.670 | 0.675 | --- |
| | | | | | F _d | 0.52 | 0.63 | 0.68 | 0.39 | 0.36 | 0.29 | 0.26 | 0.28 | 0.30 | 0.32 | --- |
| 4 | 111.1 | 4.375 | 51 | 2 | C _v | 5.85 | 11.6 | 18.3 | 30.2 | 49.7 | 79.7 | 125 | 171 | 205 | 224 | 0.82 |
| | | | | | K _v | 5.06 | 10.0 | 15.8 | 26.1 | 43.0 | 68.9 | 108 | 148 | 177 | 194 | --- |
| | | | | | X _T | 0.731 | 0.650 | 0.643 | 0.645 | 0.632 | 0.625 | 0.672 | 0.742 | 0.737 | 0.716 | --- |
| | | | | | F _d | 0.45 | 0.42 | 0.40 | 0.33 | 0.30 | 0.28 | 0.23 | 0.24 | 0.26 | 0.28 | --- |
| 6 | 177.8 | 7 | 51 | 2 | C _v | 12.9 | 25.8 | 43.3 | 67.4 | 104 | 162 | 239 | 316 | 368 | 394 | 0.85 |
| | | | | | K _v | 11.2 | 22.3 | 37.5 | 58.3 | 90.0 | 140 | 207 | 273 | 318 | 341 | --- |
| | | | | | X _T | 0.688 | 0.680 | 0.682 | 0.709 | 0.700 | 0.720 | 0.736 | 0.744 | 0.780 | 0.778 | --- |
| | | | | | F _d | 0.39 | 0.44 | 0.47 | 0.33 | 0.29 | 0.22 | 0.22 | 0.24 | 0.25 | 0.26 | --- |
| 8 | 203.2 | 8 | 51 | 2 | C _v | 18.5 | 38.0 | 58.4 | 86.7 | 130 | 189 | 268 | 371 | 476 | 567 | 0.85 |
| | | | | | K _v | 16.0 | 32.9 | 50.5 | 75.0 | 112 | 163 | 232 | 321 | 412 | 490 | --- |
| | | | | | X _T | 0.727 | 0.623 | 0.600 | 0.588 | 0.580 | 0.587 | 0.599 | 0.611 | 0.671 | 0.724 | --- |
| | | | | | F _d | 0.28 | 0.26 | 0.23 | 0.20 | 0.17 | 0.22 | 0.24 | 0.25 | 0.25 | 0.26 | --- |
| 8 | 203.2 | 8 | 76 | 3 | C _v | 27.0 | 58.1 | 105 | 188 | 307 | 478 | 605 | 695 | 761 | 818 | 0.86 |
| | | | | | K _v | 23.4 | 50.3 | 90.8 | 163 | 266 | 413 | 523 | 601 | 658 | 708 | --- |
| | | | | | X _T | 0.644 | 0.654 | 0.636 | 0.611 | 0.643 | 0.615 | 0.725 | 0.809 | 0.804 | 0.807 | --- |
| | | | | | F _d | 0.28 | 0.26 | 0.23 | 0.20 | 0.17 | 0.22 | 0.24 | 0.25 | 0.25 | 0.26 | --- |

1. At 100% travel.

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Table 13. Design ET-C, Class 125 to 600, Whisper Trim® I Cage, Flow Up

| Whisper Trim I | | | | | | | | | | | | | Linear Characteristic | | |
|--------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-----------------------|-------|-------|
| Valve Size, Inches | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | |
| | mm | Inches | mm | Inches | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 3 | 87.3 | 3.4375 | 38 | 1.5 | C _v | 16.5 | 40.3 | 70.8 | 88.0 | 92.1 | 90.7 | 90.3 | 92.6 | 95.6 | 99.1 |
| | | | | | K _v | 14.3 | 34.9 | 61.2 | 76.1 | 79.7 | 78.5 | 78.1 | 80.1 | 82.7 | 85.7 |
| | | | | | X _T | 0.685 | 0.471 | 0.331 | 0.378 | 0.532 | 0.753 | 0.929 | 0.983 | 0.968 | 0.923 |
| 4 | 111.1 | 4.375 | 51 | 2 | C _v | 33.9 | 76.6 | 117 | 135 | 137 | 137 | 141 | 149 | 157 | 169 |
| | | | | | K _v | 29.3 | 66.3 | 101 | 117 | 119 | 119 | 122 | 129 | 136 | 146 |
| | | | | | X _T | 0.607 | 0.385 | 0.352 | 0.467 | 0.682 | 0.887 | 0.977 | 0.958 | 0.921 | 0.811 |
| 6 | 177.8 | 7 | 51 | 2 | C _v | 55.8 | 125 | 196 | 245 | 270 | 286 | 297 | 308 | 323 | 338 |
| | | | | | K _v | 48.3 | 108 | 170 | 212 | 234 | 247 | 257 | 266 | 279 | 292 |
| | | | | | X _T | 0.294 | 0.323 | 0.286 | 0.322 | 0.406 | 0.494 | 0.579 | 0.644 | 0.673 | 0.662 |
| 8 | 203.2 | 8 | 76 | 3 | C _v | 100 | 226 | 337 | 436 | 502 | 581 | 641 | 655 | 659 | 681 |
| | | | | | K _v | 86.5 | 195 | 292 | 377 | 434 | 503 | 554 | 567 | 570 | 589 |
| | | | | | X _T | 0.456 | 0.490 | 0.470 | 0.427 | 0.452 | 0.468 | 0.521 | 0.624 | 0.703 | 0.701 |
| | | | 29 | 4 | C _v | 142 | 303 | 428 | 542 | 611 | 652 | 669 | 689 | 700 | 726 |
| | | | | | K _v | 123 | 262 | 370 | 469 | 529 | 564 | 579 | 596 | 606 | 628 |
| | | | | | X _T | 0.549 | 0.450 | 0.436 | 0.441 | 0.513 | 0.624 | 0.707 | 0.709 | 0.729 | 0.718 |

Table 14. Design ET-C, Class 125 to 600, Whisper Trim® III Cage, Flow Up

| Whisper Trim III | | | | | | | | | | | | | | | Linear Characteristic ⁽²⁾ | |
|-----------------------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|------|------|------|------|------|------|------|------|--------------------------------------|-------------------------------|
| Valve Size, Inches | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | X _T ⁽¹⁾ |
| | mm | Inches | mm | Inches | | Minimum ⁽³⁾ | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| A3 ΔP/P₁ ≤ 0.6 | | | | | | | | | | | | | | | | |
| 6 ⁽⁴⁾ | 136.5 | 5.375 | 76 | 3 | C _v | 4.67 | 68.2 | 92.0 | 129 | 163 | 196 | 228 | 257 | 279 | 295 | 0.714 |
| | | | | | K _v | 4.04 | 59.0 | 79.6 | 112 | 141 | 170 | 197 | 222 | 241 | 255 | --- |
| B3 ΔP/P₁ ≤ 0.75 | | | | | | | | | | | | | | | | |
| 6 ⁽⁴⁾ | 136.5 | 5.375 | 76 | 3 | C _v | 4.67 | 38.2 | 66.9 | 94.5 | 120 | 144 | 167 | 190 | 211 | 228 | 0.473 |
| | | | | | K _v | 4.04 | 33.0 | 57.9 | 81.7 | 104 | 125 | 144 | 164 | 183 | 197 | --- |
| C3 ΔP/P₁ ≤ 0.85 | | | | | | | | | | | | | | | | |
| 6 ⁽⁴⁾ | 136.5 | 5.375 | 76 | 3 | C _v | 4.67 | 28.0 | 41.3 | 55.3 | 69.3 | 83.0 | 97.0 | 110 | 124 | 138 | 0.563 |
| | | | | | K _v | 4.04 | 24.2 | 35.7 | 47.8 | 59.9 | 71.8 | 83.9 | 95.2 | 107 | 119 | --- |
| D3 ΔP/P₁ ≤ 0.99 | | | | | | | | | | | | | | | | |
| 6 ⁽⁴⁾ | 136.5 | 5.375 | 76 | 3 | C _v | 4.67 | 6.67 | 9.50 | 19.9 | 31.4 | 46.0 | 61.0 | 75.7 | 89.7 | 104 | 0.563 |
| | | | | | K _v | 4.04 | 5.77 | 8.22 | 17.2 | 27.2 | 39.8 | 52.8 | 65.5 | 77.6 | 90.0 | --- |

1. This column lists X_T factors for Whisper Trim III cages at 100% travel.
2. Level D exhibits an equal percentage characteristic for the first 38 mm (1.5 inches) of travel, then linear characteristic.
3. This coefficient is minimum rather than 10% open. Valves should not be required to throttle at less than the specified minimum coefficient for an extended period of time. Erosion damage to the valve may result.
4. For other sizes, contact your Emerson Process Management sales office.

Table 15. Design EWT-C, Class 300 and 600, Linear Cages, Flow Down

| Linear | | | | | | | | | | | | | | | Linear Characteristic | | |
|-----------------------------------|---------------|--------|---|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-----------------------|-------|-------------------------------|
| Valve Size, Inches ⁽¹⁾ | Port Diameter | | Coeffs. for 6 mm (0.25 in.) Travel ⁽²⁾ | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | F _L ⁽³⁾ |
| | mm | Inches | | mm | Inches | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 6 x 4 | 111.1 | 4.375 | --- | 51 | 2 | C _V | 21.4 | 49.0 | 78.7 | 109 | 137 | 166 | 201 | 245 | 286 | 320 | 0.86 |
| | | | | | | K _V | 18.5 | 42.4 | 68.1 | 94.3 | 119 | 144 | 174 | 212 | 247 | 277 | --- |
| | | | | | | X _T | 0.686 | 0.717 | 0.651 | 0.648 | 0.654 | 0.661 | 0.672 | 0.670 | 0.695 | 0.725 | --- |
| 8 x 4 | 111.1 | 4.375 | --- | 51 | 2 | C _V | 23.2 | 51.0 | 80.6 | 111 | 141 | 173 | 211 | 254 | 299 | 340 | 0.82 |
| | | | | | | K _V | 20.1 | 44.1 | 69.7 | 96.0 | 122 | 150 | 183 | 220 | 259 | 294 | --- |
| | | | | | | X _T | 0.694 | 0.711 | 0.691 | 0.661 | 0.668 | 0.669 | 0.676 | 0.688 | 0.727 | 0.753 | --- |
| 8 x 6 | 177.8 | 7 | --- | 51 | 2 | C _V | 44.0 | 108 | 170 | 234 | 293 | 354 | 405 | 474 | 552 | 617 | 0.88 |
| | | | | | | K _V | 38.1 | 93.4 | 147.1 | 202 | 253 | 306 | 350 | 410 | 477 | 534 | --- |
| | | | | | | X _T | 0.796 | 0.726 | 0.758 | 0.742 | 0.772 | 0.767 | 0.801 | 0.748 | 0.702 | 0.656 | --- |
| 12 x 6 | 7 | 177.8 | --- | 2 | 51 | C _V | 51.7 | 111 | 176 | 249 | 319 | 391 | 458 | 540 | 632 | 729 | 0.81 |
| | | | | | | K _V | 44.7 | 96.0 | 152 | 215 | 276 | 338 | 396 | 467 | 547 | 631 | --- |
| | | | | | | X _T | 0.716 | 0.710 | 0.691 | 0.656 | 0.639 | 0.639 | 0.661 | 0.649 | 0.639 | 0.633 | --- |
| 10 x 8 | 203.2 | 8 | --- | 76 | 3 | C _V | 95.9 | 212 | 336 | 459 | 586 | 696 | 798 | 876 | 928 | 975 | 0.91 |
| | | | | | | K _V | 83.0 | 183 | 291 | 397 | 507 | 602 | 690 | 758 | 803 | 843 | --- |
| | | | | | | X _T | 0.683 | 0.617 | 0.610 | 0.641 | 0.657 | 0.694 | 0.715 | 0.748 | 0.795 | 0.843 | --- |
| 12 x 8 | 8 | 203.2 | --- | 3 | 76 | C _V | 104 | 223 | 348 | 490 | 638 | 781 | 907 | 999 | 1080 | 1160 | 0.80 |
| | | | | | | K _V | 90.0 | 193 | 301 | 424 | 552 | 676 | 785 | 864 | 934 | 1003 | --- |
| | | | | | | X _T | 0.700 | 0.694 | 0.647 | 0.692 | 0.697 | 0.693 | 0.711 | 0.741 | 0.738 | 0.696 | --- |

1. The first number indicates both body inlet and outlet sizes. The second number indicates nominal port size.
2. When sizing self-operated regulators, use coefficients listed for 6mm (0.25 inch) travel.
3. At 100% travel.

Table 16. Design EWT-C, Class 300 and 600, Equal Percentage Cages, Flow Down

| Equal Percentage | | | | | | | | | | | | | | | Equal Percentage Characteristic | |
|-----------------------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|-------------------------------|
| Valve Size, Inches ⁽¹⁾ | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | F _L ⁽²⁾ |
| | mm | Inches | mm | Inches | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 6 x 4 | 111.1 | 4-3/8 | 51 | 2 | C _V | 7.34 | 13.1 | 19.8 | 30.6 | 46.6 | 69.1 | 108 | 168 | 225 | 271 | 0.87 |
| | | | | | K _V | 6.35 | 11.3 | 17.1 | 26.5 | 40.3 | 59.8 | 93.4 | 145 | 195 | 234 | --- |
| | | | | | X _T | 0.996 | 0.808 | 0.711 | 0.640 | 0.605 | 0.605 | 0.630 | 0.613 | 0.662 | 0.712 | --- |
| 8 x 4 | 111.1 | 4-3/8 | 51 | 2 | C _V | 8.01 | 14.1 | 21.1 | 31.7 | 47.2 | 73.5 | 118 | 180 | 240 | 286 | 0.85 |
| | | | | | K _V | 6.93 | 12.2 | 18.3 | 27.4 | 40.8 | 63.6 | 102 | 156 | 208 | 247 | --- |
| | | | | | X _T | 0.684 | 0.671 | 0.643 | 0.617 | 0.566 | 0.591 | 0.566 | 0.573 | 0.645 | 0.675 | --- |
| 8 x 6 | 177.8 | 7 | 51 | 2 | C _V | 13.2 | 26.4 | 45.4 | 71.1 | 112 | 178 | 256 | 342 | 431 | 508 | 0.91 |
| | | | | | K _V | 11.4 | 22.8 | 39.3 | 61.5 | 96.9 | 154 | 221 | 296 | 373 | 439 | --- |
| | | | | | X _T | 0.837 | 0.837 | 0.719 | 0.683 | 0.596 | 0.573 | 0.626 | 0.682 | 0.688 | 0.684 | --- |
| 12 x 6 | 177.8 | 7 | 51 | 2 | C _V | 23.6 | 36.2 | 52.8 | 76.3 | 110 | 164 | 248 | 348 | 453 | 565 | 0.79 |
| | | | | | K _V | 20.4 | 31.3 | 45.7 | 66.0 | 95.2 | 142 | 215 | 301 | 392 | 489 | --- |
| | | | | | X _T | 0.628 | 0.664 | 0.694 | 0.714 | 0.703 | 0.739 | 0.695 | 0.683 | 0.658 | 0.627 | --- |
| 10 x 8 | 203.2 | 8 | 76 | 3 | C _V | 32.3 | 65.7 | 111 | 184 | 303 | 462 | 635 | 778 | 876 | 924 | 0.89 |
| | | | | | K _V | 27.9 | 56.8 | 96.0 | 159 | 262 | 400 | 549 | 673 | 758 | 799 | --- |
| | | | | | X _T | 0.725 | 0.720 | 0.687 | 0.634 | 0.585 | 0.582 | 0.595 | 0.615 | 0.652 | 0.802 | --- |
| 12 x 8 | 203.2 | 8 | 76 | 3 | C _V | 28.4 | 61.0 | 112 | 196 | 311 | 481 | 687 | 839 | 992 | 1090 | 0.81 |
| | | | | | K _V | 24.6 | 52.8 | 96.9 | 170 | 269 | 416 | 594 | 726 | 858 | 943 | --- |
| | | | | | X _T | 0.666 | 0.665 | 0.667 | 0.664 | 0.659 | 0.667 | 0.664 | 0.662 | 0.663 | 0.663 | --- |

1. The first number indicates both body inlet and outlet sizes. The second number indicates nominal port size.
2. At 100% travel.

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Table 17. Design EWT-C, Class 300 and 600, Whisper Trim® I Cages, Flow Up

| Whisper Trim I | | | | | | | | | | | | | | | Linear Characteristic | |
|-----------------------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|-------------------|
| Valve Size, Inches ⁽¹⁾ | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | FL ⁽²⁾ |
| | mm | Inches | mm | Inches | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 6 x 4 | 111.1 | 4.375 | 51 | 2 | C _V | 30.9 | 69.9 | 110 | 149 | 187 | 223 | 253 | 281 | 307 | 325 | --- |
| | | | | | K _V | 26.7 | 60.5 | 95.2 | 129 | 162 | 193 | 219 | 243 | 266 | 281 | --- |
| | | | | | X _T | 0.668 | 0.476 | 0.382 | 0.351 | 0.349 | 0.358 | 0.367 | 0.382 | 0.401 | 0.416 | --- |
| 8 x 4 | 111.1 | 4.375 | 51 | 2 | C _V | 36.2 | 77.6 | 116 | 155 | 193 | 231 | 266 | 298 | 326 | 345 | --- |
| | | | | | K _V | 31.3 | 67.1 | 100 | 134 | 167 | 200 | 230 | 258 | 282 | 298 | --- |
| | | | | | X _T | 0.447 | 0.403 | 0.356 | 0.333 | 0.331 | 0.329 | 0.334 | 0.341 | 0.350 | 0.368 | --- |
| 8 x 6 | 177.8 | 7 | 51 | 2 | C _V | 42.8 | 99.7 | 164 | 224 | 290 | 352 | 422 | 473 | 523 | 545 | --- |
| | | | | | K _V | 37.0 | 86.2 | 142 | 194 | 251 | 304 | 365 | 409 | 452 | 471 | --- |
| | | | | | X _T | 0.550 | 0.409 | 0.364 | 0.350 | 0.334 | 0.326 | 0.310 | 0.326 | 0.329 | 0.350 | --- |
| | | | 102 | 4 | C _V | 113 | 266 | 355 | 475 | 522 | 522 | 522 | 522 | 519 | 522 | --- |
| | | | | | K _V | 97.7 | 230 | 307 | 411 | 452 | 452 | 452 | 452 | 449 | 452 | --- |
| | | | | | X _T | 0.412 | 0.285 | 0.357 | 0.354 | 0.469 | 0.632 | 0.777 | 0.854 | 0.919 | 0.917 | --- |
| 12 x 6 | 7 | 177.8 | 51 | 2 | C _V | 49.0 | 126 | 196 | 269 | 340 | 406 | 476 | 540 | 598 | 641 | --- |
| | | | | | K _V | 42.4 | 109 | 170 | 233 | 294 | 351 | 412 | 467 | 517 | 554 | --- |
| | | | | | X _T | 0.547 | 0.300 | 0.286 | 0.270 | 0.264 | 0.267 | 0.263 | 0.264 | 0.273 | 0.273 | --- |
| | | | 102 | 4 | C _V | 113 | 258 | 343 | 469 | 572 | 641 | 755 | 828 | 884 | 953 | --- |
| | | | | | K _V | 97.7 | 223 | 297 | 406 | 495 | 554 | 653 | 716 | 765 | 824 | --- |
| | | | | | X _T | 0.432 | 0.320 | 0.393 | 0.363 | 0.380 | 0.424 | 0.408 | 0.437 | 0.468 | 0.476 | --- |
| 10 x 8 | 203.2 | 8 | 76 | 3 | C _V | 99.2 | 229 | 339 | 430 | 515 | 605 | 691 | 763 | 806 | 826 | --- |
| | | | | | K _V | 85.8 | 198 | 293 | 372 | 515 | 523 | 598 | 660 | 697 | 714 | --- |
| | | | | | X _T | 0.791 | 0.490 | 0.439 | 0.447 | 0.462 | 0.465 | 0.463 | 0.478 | 0.518 | 0.591 | --- |
| | | | 102 | 4 | C _V | 146 | 300 | 433 | 551 | 664 | 755 | 824 | 857 | 866 | 903 | --- |
| | | | | | K _V | 126 | 260 | 375 | 477 | 574 | 653 | 713 | 741 | 749 | 781 | --- |
| | | | | | X _T | 0.596 | 0.465 | 0.441 | 0.451 | 0.459 | 0.488 | 0.535 | 0.616 | 0.720 | 0.761 | --- |
| 12 x 8 | 8 | 203.2 | 76 | 3 | C _V | 147 | 268 | 358 | 445 | 537 | 624 | 702 | 772 | 842 | 900 | --- |
| | | | | | K _V | 127 | 232 | 310 | 385 | 465 | 540 | 607 | 668 | 728 | 779 | --- |
| | | | | | X _T | 0.256 | 0.272 | 0.390 | 0.422 | 0.406 | 0.411 | 0.439 | 0.473 | 0.480 | 0.508 | --- |
| | | | 102 | 4 | C _V | 181 | 329 | 449 | 563 | 674 | 778 | 866 | 931 | 972 | 1000 | --- |
| | | | | | K _V | 157 | 285 | 388 | 487 | 583 | 673 | 749 | 805 | 841 | 865 | --- |
| | | | | | X _T | 0.329 | 0.350 | 0.408 | 0.425 | 0.431 | 0.452 | 0.494 | 0.540 | 0.583 | 0.644 | --- |

1. The first number indicates both body inlet and outlet size. The second number indicates nominal port size.
2. At 100% travel.

Table 18. Design EWT-C, Class 300 and 600, Whisper Trim® III Cages, Flow Up

| Whisper Trim III | | | | | | | | | | | | | | | Linear Characteristic ⁽¹⁾ | |
|-----------------------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|------|------|------|------|------|-----|-----|-----|--------------------------------------|-------------------------------|
| Valve Size, Inches ⁽²⁾ | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | X _T ⁽⁴⁾ |
| | mm | Inches | mm | Inches | | Minimum ⁽³⁾ | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| A3 ΔP/P₁ ≤ 0.6 | | | | | | | | | | | | | | | | |
| 8 x 6 | 136.5 | 5-3/8 | 127 | 5 | C _v | 4.00 | 97.6 | 159 | 215 | 270 | 326 | 383 | 427 | 457 | 460 | 0.710 |
| | | | | | K _v | 3.46 | 84 | 138 | 186 | 234 | 282 | 331 | 369 | 395 | 398 | --- |
| 12 x 6 | 136.5 | 5-3/8 | 165 | 6-1/2 | C _v | 4.00 | 151 | 238 | 324 | 407 | 492 | 573 | 651 | 697 | 698 | 0.589 |
| | | | | | K _v | 3.46 | 131 | 206 | 280 | 352 | 426 | 496 | 563 | 603 | 604 | --- |
| B3 ΔP/P₁ ≤ 0.75 | | | | | | | | | | | | | | | | |
| 8 x 6 | 136.5 | 5-3/8 | 127 | 5 | C _v | 4.67 | 72.3 | 108 | 143 | 178 | 213 | 248 | 280 | 314 | 347 | 0.563 |
| | | | | | K _v | 4.04 | 62.5 | 93.4 | 124 | 154 | 184 | 215 | 242 | 272 | 300 | --- |
| 12 x 6 | 136.5 | 5-3/8 | 165 | 6-1/2 | C _v | 4.67 | 94.0 | 141 | 187 | 233 | 278 | 324 | 370 | 413 | 457 | 0.563 |
| | | | | | K _v | 4.04 | 81.3 | 122 | 162 | 202 | 240 | 280 | 320 | 357 | 395 | --- |
| C3 ΔP/P₁ ≤ 0.85 | | | | | | | | | | | | | | | | |
| 8 x 6 | 136.5 | 5-3/8 | 127 | 5 | C _v | 4.67 | 50.0 | 74.7 | 99.3 | 124 | 149 | 173 | 197 | 221 | 245 | 0.563 |
| | | | | | K _v | 4.04 | 43.3 | 64.6 | 85.9 | 107 | 129 | 150 | 170 | 191 | 212 | --- |
| 12 x 6 | 136.5 | 5-3/8 | 165 | 6-1/2 | C _v | 4.67 | 64.0 | 96.0 | 127 | 160 | 191 | 222 | 254 | 284 | 315 | 0.563 |
| | | | | | K _v | 4.04 | 55.4 | 83.0 | 110 | 138 | 165 | 192 | 220 | 246 | 272 | --- |
| D3 ΔP/P₁ ≤ 0.99 | | | | | | | | | | | | | | | | |
| 8 x 6 | 136.5 | 5-3/8 | 127 | 5 | C _v | 4.67 | 12.7 | 31.4 | 55.0 | 79.7 | 104 | 128 | 152 | 177 | 201 | 0.563 |
| | | | | | K _v | 4.04 | 11.0 | 27.2 | 47.6 | 68.9 | 90.0 | 111 | 131 | 153 | 174 | --- |
| 12 x 6 | 136.5 | 5-3/8 | 165 | 6-1/2 | C _v | 4.67 | 23.8 | 53.3 | 85.0 | 116 | 148 | 180 | 211 | 243 | 273 | 0.563 |
| | | | | | K _v | 4.04 | 20.6 | 46.1 | 73.5 | 100 | 128 | 156 | 183 | 210 | 236 | --- |

1. Level D exhibits an equal percentage characteristic for the first 1.5 inch (38 mm) of travel, then linear characteristic.
 2. The first number indicates the body inlet and outlet size. The second number indicates nominal port size.
 3. Valves should not be required to throttle at less than the specified minimum coefficient for an extended period of time. Erosion damage to the valve seats may result.
 4. This column lists X_T factors for cages at 100% travel.

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Table 19. Design EZ-C, Quick Opening Valve Plug, Flow Up

| Quick Opening | | | | | | | | | | | | | | | | Quick Opening Characteristic | |
|--------------------|---------------|--------|-------------------------------|--------|------------------|--|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------------------|-------------------------------|
| Valve Size, Inches | Port Diameter | | Maximum Travel ⁽¹⁾ | | Flow Coefficient | Coeffs. for 6 mm (0.25 Inch) Travel ⁽²⁾ | Valve Opening—Percent of Total Travel | | | | | | | | | | F _L ⁽³⁾ |
| | mm | Inches | mm | Inches | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 1 | 25.4 | 1 | 19 | 0.75 | C _v | 14.7 | 4.39 | 10.3 | 14.0 | 15.5 | 16.2 | 16.6 | 16.8 | 16.8 | 16.9 | 16.9 | 0.94 |
| | | | | | K _v | 12.7 | 3.80 | 8.91 | 12.1 | 13.4 | 14.0 | 14.4 | 14.5 | 14.5 | 14.6 | 14.6 | --- |
| | | | | | X _T | 14.7 | 0.400 | 0.449 | 0.523 | 0.539 | 0.535 | 0.512 | 0.500 | 0.500 | 0.494 | 0.494 | --- |
| | | | | | F _d | --- | 0.20 | 0.29 | 0.39 | 0.48 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |
| 1.5 | 38.1 | 1.5 | 19 | 0.75 | C _v | 22.6 | 5.64 | 11.9 | 20.6 | 27.4 | 30.5 | 32.4 | 33.4 | 33.7 | 34.1 | 34.2 | 0.96 |
| | | | | | K _v | 19.5 | 4.88 | 10.3 | 17.8 | 23.7 | 26.4 | 28.0 | 28.9 | 29.2 | 29.5 | 29.6 | --- |
| | | | | | X _T | 22.6 | 0.623 | 0.734 | 0.726 | 0.814 | 0.843 | 0.857 | 0.861 | 0.860 | 0.853 | 0.848 | --- |
| | | | | | F _d | --- | 0.16 | 0.24 | 0.32 | 0.39 | 0.45 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |
| 1.5 ⁽⁴⁾ | 25.4 | 1 | 19 | 0.75 | C _v | 15.7 | 4.17 | 8.94 | 14.6 | 17.4 | 18.3 | 18.8 | 18.9 | 19.0 | 19.1 | 19.4 | 0.90 |
| | | | | | K _v | 13.6 | 3.61 | 7.73 | 12.6 | 15.1 | 15.8 | 16.3 | 16.3 | 16.4 | 16.5 | 16.8 | --- |
| | | | | | X _T | 15.7 | 0.617 | 0.791 | 0.793 | 0.904 | 0.925 | 0.924 | 0.922 | 0.915 | 0.905 | 0.878 | --- |
| | | | | | F _d | --- | 0.17 | 0.27 | 0.35 | 0.42 | 0.47 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |
| 2 | 50.8 | 2 | 29 | 1.125 | C _v | 34.0 | 13.0 | 30.1 | 44.3 | 52.4 | 56.4 | 57.8 | 58.4 | 58.5 | 58.6 | 58.6 | 0.94 |
| | | | | | K _v | 29.4 | 11.2 | 26.0 | 38.3 | 45.3 | 48.8 | 50.0 | 50.5 | 50.6 | 50.7 | 50.7 | --- |
| | | | | | X _T | 34.0 | 0.548 | 0.663 | 0.765 | 0.813 | 0.818 | 0.833 | 0.831 | 0.836 | 0.834 | 0.834 | --- |
| | | | | | F _d | --- | 0.17 | 0.28 | 0.36 | 0.43 | 0.49 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |
| 2 ⁽⁴⁾ | 25.4 | 1 | 19 | 0.75 | C _v | 15.8 | 4.35 | 9.79 | 14.9 | 16.6 | 17.3 | 17.5 | 17.5 | 17.6 | 17.7 | 17.9 | 0.86 |
| | | | | | K _v | 13.7 | 3.76 | 8.47 | 12.9 | 14.4 | 15.0 | 15.1 | 15.1 | 15.2 | 15.3 | 15.5 | --- |
| | | | | | X _T | 15.8 | 0.524 | 0.594 | 0.695 | 0.877 | 0.937 | 0.944 | 0.958 | 0.952 | 0.942 | 0.921 | --- |
| | | | | | F _d | --- | 0.17 | 0.27 | 0.35 | 0.42 | 0.47 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |
| 3 | 76.2 | 3 | 38 | 1.5 | C _v | 53.8 | 30.8 | 65.1 | 92.4 | 110 | 118 | 123 | 126 | 128 | 129 | 129 | 0.91 |
| | | | | | K _v | 46.5 | 26.6 | 56.3 | 79.9 | 95.2 | 102 | 106 | 109 | 111 | 112 | 112 | --- |
| | | | | | X _T | 53.8 | 0.672 | 0.714 | 0.713 | 0.742 | 0.784 | 0.785 | 0.783 | 0.776 | 0.774 | 0.774 | --- |
| | | | | | F _d | --- | 0.17 | 0.27 | 0.35 | 0.42 | 0.47 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |
| 3 ⁽⁴⁾ | 50.8 | 2 | 29 | 1.125 | C _v | 32.2 | 9.99 | 27.6 | 44.9 | 61.0 | 71.9 | 78.4 | 83.1 | 86.2 | 87.5 | 88.4 | 0.95 |
| | | | | | K _v | 27.9 | 8.64 | 23.9 | 38.8 | 52.8 | 62.2 | 67.8 | 71.9 | 74.6 | 75.7 | 76.5 | --- |
| | | | | | X _T | 32.2 | 0.527 | 0.511 | 0.652 | 0.720 | 0.780 | 0.820 | 0.814 | 0.798 | 0.790 | 0.779 | --- |
| | | | | | F _d | --- | 0.18 | 0.28 | 0.36 | 0.42 | 0.48 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |
| 4 | 101.6 | 4 | 51 | 2 | C _v | 68.2 | 50.8 | 116 | 159 | 185 | 201 | 212 | 219 | 222 | 223 | 223 | 0.88 |
| | | | | | K _v | 59.0 | 43.9 | 100 | 138 | 160 | 174 | 183 | 189 | 192 | 193 | 193 | --- |
| | | | | | X _T | 68.2 | 0.733 | 0.653 | 0.724 | 0.805 | 0.809 | 0.816 | 0.809 | 0.812 | 0.831 | 0.835 | --- |
| | | | | | F _d | --- | 0.18 | 0.28 | 0.36 | 0.42 | 0.48 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |
| 4 ⁽⁴⁾ | 50.8 | 2 | 29 | 1.125 | C _v | 37.4 | 13.5 | 32.3 | 52.2 | 66.2 | 74.4 | 81.1 | 85.0 | 85.8 | 86.3 | 86.7 | 0.85 |
| | | | | | K _v | 32.4 | 11.7 | 27.9 | 45.2 | 57.3 | 64.4 | 70.2 | 73.5 | 74.2 | 74.6 | 75.0 | --- |
| | | | | | X _T | 37.4 | 0.490 | 0.556 | 0.609 | 0.672 | 0.793 | 0.772 | 0.728 | 0.714 | 0.711 | 0.704 | --- |
| | | | | | F _d | --- | 0.18 | 0.28 | 0.36 | 0.42 | 0.48 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | --- |

1. When using Type 655-EZ as a control valve for on-off service, the maximum travel for sizing purposes is 19 mm (0.75 inch).
 2. When sizing self-operated regulators, use coefficients listed for 6 mm (0.25 inch) travel.
 3. At 100% travel.
 4. Restricted trim.

Table 20. Design EZ-C, Linear Valve Plug, Flow Up

| Linear | | | | | | | | | | | | | | | Linear Characteristic | |
|--------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------|-------------------------------|
| Valve Size, Inches | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | F _L ⁽¹⁾ |
| | mm | Inches | mm | Inches | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 1 | 25.4 | 1 | 19 | 0.75 | C _v | 2.21 | 3.87 | 5.29 | 6.56 | 8.2 | 9.82 | 11.1 | 12.1 | 13.0 | 13.6 | 0.96 |
| | | | | | K _v | 1.91 | 3.35 | 4.58 | 5.67 | 7.09 | 8.49 | 9.60 | 10.5 | 11.2 | 11.8 | --- |
| | | | | | X _T | 0.638 | 0.601 | 0.638 | 0.634 | 0.638 | 0.629 | 0.636 | 0.680 | 0.769 | 0.834 | --- |
| 1.5 | 38.1 | 1.5 | 19 | 0.75 | C _v | 3.99 | 7.53 | 11.1 | 14.8 | 18.7 | 22.5 | 25.8 | 29.2 | 31.2 | 31.9 | 0.96 |
| | | | | | K _v | 3.45 | 6.51 | 9.6 | 12.8 | 16.2 | 19.5 | 22.3 | 25.3 | 27.0 | 27.6 | --- |
| | | | | | X _T | 0.633 | 0.651 | 0.657 | 0.691 | 0.674 | 0.674 | 0.696 | 0.704 | 0.757 | 0.818 | --- |
| 1.5 ⁽²⁾ | 25.4 | 1 | 19 | 0.75 | C _v | 1.96 | 3.42 | 4.94 | 6.11 | 7.8 | 9.3 | 10.9 | 13 | 15.1 | 16.7 | 0.96 |
| | | | | | K _v | 1.70 | 2.96 | 4.27 | 5.29 | 6.75 | 8.04 | 9.43 | 11.2 | 13.1 | 14.4 | --- |
| | | | | | X _T | 0.469 | 0.578 | 0.600 | 0.690 | 0.652 | 0.655 | 0.637 | 0.625 | 0.719 | 0.796 | --- |
| 2 | 50.8 | 2 | 29 | 1.125 | C _v | 6.08 | 11.9 | 18.0 | 24.1 | 30.1 | 36.4 | 42.8 | 49.9 | 52.0 | 52.4 | 0.95 |
| | | | | | K _v | 5.26 | 10.3 | 15.6 | 20.8 | 26.0 | 31.5 | 37.0 | 43.2 | 45.0 | 45.3 | --- |
| | | | | | X _T | 0.560 | 0.644 | 0.655 | 0.675 | 0.701 | 0.724 | 0.779 | 0.773 | 0.862 | 0.924 | --- |
| 2 ⁽²⁾ | 25.4 | 1 | 19 | 0.75 | C _v | 1.88 | 3.41 | 4.95 | 6.49 | 8.06 | 9.67 | 11.23 | 12.79 | 14.35 | 15.7 | 0.94 |
| | | | | | K _v | 1.63 | 2.95 | 4.28 | 5.61 | 6.97 | 8.36 | 9.71 | 11.1 | 12.4 | 13.6 | --- |
| | | | | | X _T | 0.609 | 0.593 | 0.597 | 0.624 | 0.621 | 0.626 | 0.642 | 0.633 | 0.750 | 0.910 | --- |
| 3 | 76.2 | 3 | 38 | 1.5 | C _v | 15.4 | 29.6 | 43.4 | 58.3 | 71.8 | 83.9 | 93.8 | 103 | 108 | 110.4 | 0.92 |
| | | | | | K _v | 13.3 | 25.6 | 37.5 | 50.4 | 62.1 | 72.6 | 81.1 | 89.1 | 93.4 | 95.5 | --- |
| | | | | | X _T | 0.622 | 0.642 | 0.692 | 0.691 | 0.690 | 0.721 | 0.759 | 0.788 | 0.839 | 0.888 | --- |
| 3 ⁽²⁾ | 50.8 | 2 | 29 | 1.125 | C _v | 6.59 | 13.3 | 20.7 | 28.1 | 36.0 | 44.0 | 55.6 | 67.5 | 76.2 | 80.4 | 0.94 |
| | | | | | K _v | 5.70 | 11.5 | 17.9 | 24.3 | 31.1 | 38.1 | 48.1 | 58.4 | 65.9 | 69.5 | --- |
| | | | | | X _T | 0.564 | 0.500 | 0.522 | 0.609 | 0.577 | 0.594 | 0.563 | 0.582 | 0.677 | 0.749 | --- |
| 4 | 101.6 | 4 | 51 | 2 | C _v | 21.3 | 39.7 | 57.5 | 75.8 | 100 | 129 | 157 | 180 | 199 | 209 | 0.89 |
| | | | | | K _v | 18.4 | 34.3 | 49.7 | 65.6 | 86.5 | 112 | 136 | 156 | 172 | 181 | --- |
| | | | | | X _T | 0.554 | 0.628 | 0.684 | 0.723 | 0.665 | 0.608 | 0.677 | 0.826 | 0.862 | 0.866 | --- |
| 4 ⁽²⁾ | 50.8 | 2 | 29 | 1.125 | C _v | 6.16 | 12.8 | 20.0 | 27.8 | 36.1 | 45.1 | 58.8 | 67.5 | 78.8 | 86.8 | 0.90 |
| | | | | | K _v | 5.33 | 11.1 | 17.3 | 24.0 | 31.2 | 39.0 | 50.9 | 58.4 | 68.2 | 75.1 | --- |
| | | | | | X _T | 0.740 | 0.644 | 0.642 | 0.619 | 0.602 | 0.605 | 0.552 | 0.614 | 0.644 | 0.736 | --- |

1. At 100% travel.
2. Restricted trim.

easy-e Cryogenic Valves

Table 21. Design EZ-C, Equal Percentage Valve Plug, Flow Up

| Equal Percentage | | | | | | | | | | | | | | | Equal Percentage Characteristic | |
|--------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|-------------------------------|
| Valve Size, Inches | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | F _L ⁽¹⁾ |
| | mm | Inches | mm | Inches | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| 1 | 25.4 | 1 | 19 | 0.75 | C _v | 0.79 | 1.25 | 1.80 | 2.53 | 3.63 | 5.28 | 7.59 | 10.7 | 12.7 | 13.2 | 0.96 |
| | | | | | K _v | 0.683 | 1.08 | 1.56 | 2.19 | 3.14 | 4.57 | 6.57 | 9.26 | 11.0 | 11.4 | --- |
| | | | | | X _T | 0.641 | 0.634 | 0.598 | 0.586 | 0.584 | 0.596 | 0.646 | 0.680 | 0.757 | 0.886 | --- |
| | | | | | F _d | 0.091 | 0.11 | 0.13 | 0.16 | 0.19 | 0.24 | 0.30 | 0.37 | 0.43 | 0.50 | --- |
| 1.5 | 38.1 | 1.5 | 19 | 0.75 | C _v | 0.795 | 1.23 | 1.91 | 2.95 | 4.30 | 6.46 | 9.84 | 16.4 | 22.2 | 28.1 | 0.97 |
| | | | | | K _v | 0.688 | 1.06 | 1.65 | 2.55 | 3.72 | 5.59 | 8.51 | 14.2 | 19.2 | 24.3 | --- |
| | | | | | X _T | 0.726 | 0.676 | 0.733 | 0.645 | 0.589 | 0.558 | 0.597 | 0.653 | 0.777 | 0.840 | --- |
| | | | | | F _d | 0.077 | 0.086 | 0.10 | 0.12 | 0.15 | 0.17 | 0.22 | 0.27 | 0.34 | 0.40 | --- |
| 1.5 ⁽²⁾ | 25.4 | 1 | 19 | 0.75 | C _v | 0.770 | 1.23 | 1.78 | 2.58 | 3.67 | 5.54 | 8.30 | 12.0 | 15.1 | 17.3 | 0.98 |
| | | | | | K _v | 0.666 | 1.06 | 1.54 | 2.23 | 3.17 | 4.79 | 7.18 | 10.4 | 13.1 | 15.0 | --- |
| | | | | | X _T | 0.654 | 0.619 | 0.601 | 0.605 | 0.561 | 0.534 | 0.518 | 0.575 | 0.704 | 0.861 | --- |
| 2 | 50.8 | 2 | 29 | 1.125 | C _v | 1.65 | 2.61 | 4.30 | 6.62 | 11.1 | 20.7 | 32.8 | 44.7 | 50.0 | 53.8 | 0.95 |
| | | | | | K _v | 1.43 | 2.26 | 3.72 | 5.73 | 9.60 | 17.9 | 28.4 | 38.7 | 43.3 | 46.5 | --- |
| | | | | | X _T | 0.655 | 0.581 | 0.520 | 0.559 | 0.552 | 0.529 | 0.653 | 0.801 | 0.903 | 0.899 | --- |
| | | | | | F _d | 0.069 | 0.085 | 0.11 | 0.13 | 0.18 | 0.23 | 0.30 | 0.37 | 0.44 | 0.50 | --- |
| 2 ⁽²⁾ | 25.4 | 1 | 19 | 0.75 | C _v | 1.02 | 1.50 | 2.05 | 2.78 | 3.90 | 5.57 | 8.16 | 11.8 | 14.5 | 15.9 | 0.92 |
| | | | | | K _v | 0.882 | 1.30 | 1.77 | 2.40 | 3.37 | 4.82 | 7.06 | 10.2 | 12.5 | 13.8 | --- |
| | | | | | X _T | 0.596 | 0.616 | 0.600 | 0.580 | 0.572 | 0.555 | 0.523 | 0.547 | 0.671 | 0.905 | --- |
| 3 | 76.2 | 3 | 38 | 1.5 | C _v | 3.11 | 5.77 | 9.12 | 13.7 | 21.7 | 36.0 | 60.4 | 86.4 | 104 | 114 | 0.92 |
| | | | | | K _v | 2.69 | 4.99 | 7.89 | 11.9 | 18.8 | 31.1 | 52.2 | 74.7 | 90.0 | 98.6 | --- |
| | | | | | X _T | 0.619 | 0.595 | 0.598 | 0.619 | 0.594 | 0.563 | 0.586 | 0.729 | 0.778 | 0.781 | --- |
| | | | | | F _d | 0.062 | 0.081 | 0.10 | 0.12 | 0.16 | 0.20 | 0.26 | 0.33 | 0.40 | 0.46 | --- |
| 3 ⁽²⁾ | 50.8 | 2 | 29 | 1.125 | C _v | 2.11 | 3.11 | 4.58 | 6.76 | 10.7 | 20.7 | 34.3 | 48.3 | 61.5 | 71.6 | 0.92 |
| | | | | | K _v | 1.83 | 2.69 | 3.96 | 5.85 | 9.26 | 17.9 | 29.7 | 41.8 | 53.2 | 61.9 | --- |
| | | | | | X _T | 0.874 | 0.699 | 0.643 | 0.626 | 0.587 | 0.451 | 0.493 | 0.587 | 0.648 | 0.734 | --- |
| 4 | 101.6 | 4 | 51 | 2 | C _v | 4.90 | 8.19 | 13.5 | 20.1 | 31.2 | 52.6 | 96.7 | 140 | 170 | 190 | 0.90 |
| | | | | | K _v | 4.24 | 7.08 | 11.7 | 17.4 | 27.0 | 45.5 | 83.6 | 121 | 147 | 164 | --- |
| | | | | | X _T | 0.594 | 0.573 | 0.560 | 0.568 | 0.572 | 0.564 | 0.532 | 0.707 | 0.807 | 0.834 | --- |
| | | | | | F _d | 0.052 | 0.065 | 0.080 | 0.10 | 0.13 | 0.17 | 0.23 | 0.31 | 0.38 | 0.44 | --- |
| 4 ⁽²⁾ | 50.8 | 2 | 29 | 1.125 | C _v | 1.96 | 3.05 | 4.43 | 6.98 | 11.9 | 22.3 | 36.7 | 50.9 | 61.8 | 72.7 | 0.92 |
| | | | | | K _v | 1.70 | 2.64 | 3.83 | 6.04 | 10.3 | 19.3 | 31.7 | 44.0 | 53.5 | 62.9 | --- |
| | | | | | X _T | 0.619 | 0.575 | 0.624 | 0.610 | 0.678 | 0.639 | 0.646 | 0.673 | 0.778 | 0.781 | --- |

1. At 100% travel.
2. Restricted trim.

Table 22. Design EZ-C, Micro-Form Valve Plug, Flow Up

| Micro-Form | | | | | | | | | | | | | | | | Equal Percentage Characteristic | |
|--------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|-------------------------------|
| Valve Size, Inches | Port Diameter | | Maximum Travel | | Flow Coefficient | Valve Opening—Percent of Total Travel | | | | | | | | | | | F _L ⁽¹⁾ |
| | mm | Inches | mm | Inches | | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |
| All Sizes 1 - 2 | 6.4 | 0.25 | 19 | 0.75 | C _V | 0.075 | 0.088 | 0.124 | 0.175 | 0.236 | 0.327 | 0.464 | 0.641 | 0.881 | 1.22 | 1.52 | 0.88 |
| | | | | | K _V | 0.065 | 0.076 | 0.107 | 0.151 | 0.204 | 0.283 | 0.401 | 0.554 | 0.762 | 1.06 | 1.31 | --- |
| | | | | | X _T | 0.804 | 0.771 | 0.717 | 0.658 | 0.645 | 0.620 | 0.585 | 0.596 | 0.596 | 0.603 | 0.647 | --- |
| 1 | 9.5 | 0.375 | 19 | 0.75 | C _V | 0.099 | 0.129 | 0.199 | 0.308 | 0.448 | 0.620 | 0.882 | 1.29 | 1.80 | 2.43 | 3.07 | 0.89 |
| | | | | | K _V | 0.086 | 0.112 | 0.172 | 0.266 | 0.388 | 0.536 | 0.763 | 1.12 | 1.56 | 2.10 | 2.66 | --- |
| | | | | | X _T | 0.795 | 0.747 | 0.663 | 0.641 | 0.593 | 0.569 | 0.568 | 0.560 | 0.571 | 0.624 | 0.662 | --- |
| | 12.7 | 0.5 | 19 | 0.75 | C _V | 0.133 | 0.189 | 0.319 | 0.492 | 0.735 | 1.08 | 1.53 | 2.12 | 2.99 | 4.17 | 4.91 | 0.93 |
| | | | | | K _V | 0.115 | 0.163 | 0.276 | 0.426 | 0.636 | 0.934 | 1.32 | 1.83 | 2.59 | 3.61 | 4.25 | --- |
| | | | | | X _T | 0.787 | 0.728 | 0.639 | 0.628 | 0.591 | 0.573 | 0.585 | 0.600 | 0.618 | 0.645 | 0.803 | --- |
| | 19.1 | 0.75 | 19 | 0.75 | C _V | 0.276 | 0.374 | 0.622 | 0.965 | 1.47 | 2.17 | 3.15 | 4.57 | 6.52 | 8.17 | 8.84 | 0.97 |
| | | | | | K _V | 0.239 | 0.324 | 0.538 | 0.835 | 1.27 | 1.88 | 2.72 | 3.95 | 5.64 | 7.07 | 7.65 | --- |
| | | | | | X _T | 0.723 | 0.687 | 0.614 | 0.588 | 0.560 | 0.571 | 0.596 | 0.603 | 0.624 | 0.750 | 0.919 | --- |
| 1.5 and 2 | 9.5 | 0.375 | 19 | 0.75 | C _V | 0.096 | 0.121 | 0.190 | 0.302 | 0.435 | 0.600 | 0.864 | 1.26 | 1.80 | 2.56 | 3.20 | 0.84 |
| | | | | | K _V | 0.083 | 0.105 | 0.164 | 0.261 | 0.376 | 0.519 | 0.747 | 1.09 | 1.56 | 2.21 | 2.77 | --- |
| | | | | | X _T | 0.923 | 0.915 | 0.763 | 0.699 | 0.657 | 0.640 | 0.624 | 0.608 | 0.596 | 0.594 | 0.648 | --- |
| | 12.7 | 0.5 | 19 | 0.75 | C _V | 0.145 | 0.199 | 0.323 | 0.503 | 0.735 | 1.07 | 1.54 | 2.14 | 3.08 | 4.36 | 5.18 | 0.91 |
| | | | | | K _V | 0.125 | 0.172 | 0.279 | 0.435 | 0.636 | 0.926 | 1.33 | 1.85 | 2.66 | 3.77 | 4.48 | --- |
| | | | | | X _T | 0.851 | 0.748 | 0.686 | 0.640 | 0.617 | 0.627 | 0.602 | 0.607 | 0.607 | 0.573 | 0.705 | --- |
| | 19.1 | 0.75 | 19 | 0.75 | C _V | 0.336 | 0.434 | 0.683 | 1.00 | 1.49 | 2.21 | 3.18 | 4.61 | 6.73 | 8.88 | 10.2 | 0.92 |
| | | | | | K _V | 0.291 | 0.375 | 0.591 | 0.865 | 1.29 | 1.91 | 2.75 | 3.99 | 5.82 | 7.68 | 8.82 | --- |
| | | | | | X _T | 0.784 | 0.747 | 0.625 | 0.636 | 0.596 | 0.578 | 0.603 | 0.593 | 0.591 | 0.680 | 0.796 | --- |

1. At 100% travel.

Specifications

Available Configurations

Design ET-C: Single-port, globe-style control valve with cage guiding, balanced valve plug, and push-down-to-close valve plug action (figure 2)

Design EWT-C: Single-port, globe-style control valve with cage guiding, balanced valve plug, push-down-to-close valve plug action, and with expanded end connections (figure 2)

Design EZ-C: Single-port, globe-style control valve with post-guiding, unbalanced valve plug, and push-down-to-close valve plug action (figure 3)

Valve Sizes

Design ET-C: ■ 3-, ■ 4-, ■ 6-, and ■ 8-inch

Design EWT-C: ■ 6X4⁽¹⁾, ■ 8X4, ■ 8X6, ■ 12X6, and ■ 10X8 inch

Design EZ-C: ■ 1, ■ 1.5, ■ 2, ■ 3, and ■ 4-inch

End Connection Styles⁽²⁾

Class 150, 300, or 600 raised-face flanges per ASME B16.5

Maximum Inlet Pressure⁽²⁾

Consistent with Class ■ 150 and ■ 300 pressure-temperature ratings per ASME B16.34

■ Class 600 valves with B8M Class 2 bolting are consistent with Class 600 pressure-temperature ratings per ASME B16.34 except as shown below:

| VALVE TYPE | VALVE SIZE, INCHES | MAXIMUM INLET PRESSURE at 38°C (100°F) | |
|----------------|--------------------|--|------|
| | | Bar | Psig |
| EZ-C | 1 | 77 | 1110 |
| | 2 | 83 | 1200 |
| | 3 | 94 | 1370 |
| ET-C and EWT-C | 6, 8 x 6, 12 x 6 | 75 | 1085 |
| | 8, 10 x 8 | 96 | 1390 |

■ Class 600 valves with optional S20910 (XM-19) bolting are consistent with Class 600 pressure-temperature ratings per ASME B16.34

Maximum Pressure Drops⁽²⁾

Same as maximum inlet pressure, except where limited by spiral wound gasket for Design EZ-C (see tables 7 and 8)

Trim Material

See tables 1 and 2

Shutoff Classifications Per ANSI/FCI 70-2 and IEC 60534-4

Design ET-C and EWT-C

Metal Seat:

- Class IV is standard
- Standard air test is optional (Maximum leakage is 0.05 mL/min/psid/inch port diameter)⁽⁶⁾.
- Class VI (Consult your Emerson Process Management sales office)

Composition Seat:

- Standard air test is standard
- Class VI is optional

Design EZ-C

Metal Seat:

- Class IV is standard
- Class VI is optional

Maximum Actuator Thrust

See table 3

Conformance to Customer Specifications

Design ET-C with metal seats and Design EZ-C valves successfully passed type approval testing per SIPM (Shell) specification T-2.253.730

Flow Characteristics

Designs ET-C, EWT-C, and EZ-C

- Equal percentage
- Linear

Design EZ-C Only

- Quick-opening

Flow Direction⁽⁵⁾

Designs ET-C and EWT-C

Normally down for linear and equal percentage trims. Flow up for Whisper trims. See figure 2 .

Design EZ-C

Up through the seat ring only. See figure 3

(Continued)

Specifications (Continued)

Standard Construction Materials

Valve Body and Bonnet: CF8M (316 SST)
Body-Bonnet Bolting: SA-193-B8M Class 2 studs with SA-194-8M nuts (see table 6)
Bonnet Bushing: S31600/filled PTFE
Flat Sheet Gaskets: S31600/graphite
Spiral Wound Gasket: N06600/graphite
Packing Studs and Nuts: S31600 SST
Seal Ring (Designs ET-C and EWT-C): UHMWPE⁽³⁾ with R30003 spring
Back-Up Ring (Designs ET-C and EWT-C): S31600 (316 SST)
Retaining Ring (Designs ET-C and EWT-C): S30200 (302 SST)
Load Ring (for Design ET-C, 8-inch and for Design EWT-C, 10 x 8-inch only): N07718
Packing Follower, Lantern Ring, Packing Spring⁽⁴⁾ and Packing Box Ring: S31600 SST

Material Temperature Capabilities⁽²⁾

Designs ET-C and EWT-C
-198 to 66°C (-325 to 150°F)
Design EZ-C
-198 to 149°C (-325 to 300°F)

Bonnet Extension Length

See figures 4 and 5 for standard valve dimensions

Flow Coefficients and Noise Level Prediction

See the section titled Coefficients in this bulletin and Catalog 12

Port Diameters, Plug Travel, Yoke Boss, and Stem Diameter

See tables 4 and 5

Packing Arrangements

Standard Material

■ Single PTFE V-ring. See figures 2 and 3.

Optional Materials

■ Double PTFE V-ring and
■ Graphite ribbon/filament

ENVIRO-SEAL Packing Systems: See figure 6

Packing Material: ■ PTFE V-ring and
■ Graphite ULF

See Bulletin 59.1:061, ENVIRO-SEAL Packing Systems for Sliding-Stem Valves, for more information

Approximate Weights (Class 600 Valves)

Design ET-C:

3-Inch: 51 kg (135 lb)
4-Inch: 95 kg (210 lb)
6-Inch: 211 kg (465 lb)
8-Inch: 372 kg (820 lb)

Design EWT-C:

6X4-Inch: 200 kg (440 lb)
8X4-Inch: 277 kg (610 lb)
8X6-Inch: 318 kg (700 lb)
12X6-Inch: 730 kg (1610 lb)
10X8-Inch: 753 kg (1660 lb)

Design EZ-C:

1-inch: 15 kg (33 lb)
1.5 inch: 23 kg (48 lb)
2-inch: 41 kg (90 lb)
3-inch: 60 kg (130 lb)
4-inch: 95 kg (210 lb)

Options

Designs ET-C and EWT-C: ■ Whisper Trim[®] III and WhisperFlo[®] trim for aerodynamic noise attenuation, and ■ Cavitrol[®] III cages for liquid cavitation protection are available. Contact your Emerson Process Management sales office for information

Design EZ-C: ■ Micro-Flute and ■ Micro-Flow trim

1. Valve size number is end connection size by normal trim size. For example, a 6X4 Design EWT-C valve has 6-inch end connections with 4-inch trim (see table 4).
2. Do not exceed the pressure or temperature limits in this bulletin, and any applicable code limitations.
3. UHMWPE stands for ultra high molecular weight polyethylene.
4. A spring is used only with PTFE V-ring packing. A lantern rings replace the spring in other packing arrangements.
5. Down is in through the cage and out the seat ring (see figure 2).
6. Standard air test approximates Class V performance. Water tests, such as Class V seat leakage, are not recommended. The residual trapped moisture from these tests can cause valve and trim damage from ice crystals formed at below-freezing service temperatures.

Note

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