

# easy-e<sup>®</sup> Cryogenic Sliding-Stem Control Valves

easy-e<sup>®</sup> 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  $-198^{\circ}\text{C}$  ( $-325^{\circ}\text{F}$ ).

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.

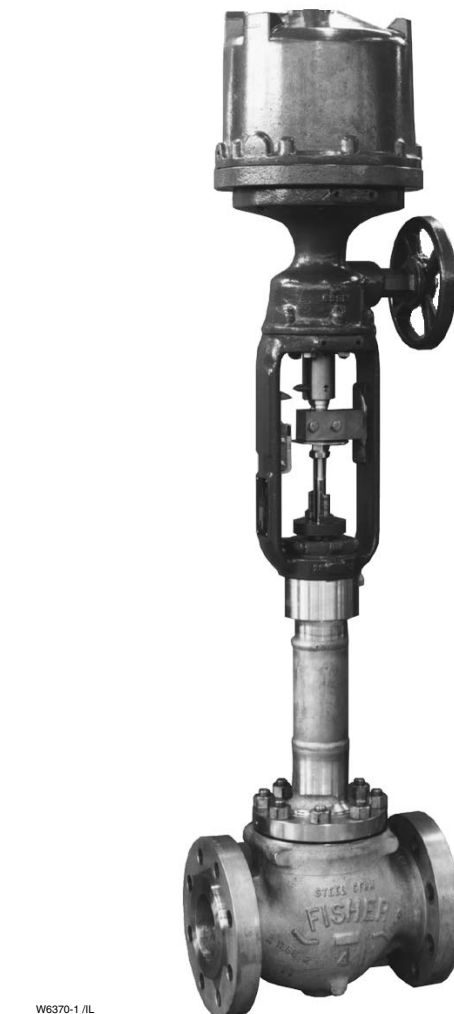
## Note

**Neither Emerson, Emerson Process Management, nor any of their affiliated entities assumes responsibility for the selection, use and maintenance of any product. Responsibility for the selection, use, and maintenance of any product remains with the purchaser and end-user.**

## 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<sup>®</sup> 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)<br>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<br>CoCr-A (Alloy 6)<br>hard-faced Seat and<br>Guide | S20910<br>(XM-19) | S31600    | CF8M               | R30006        |
| 328              | S31600 SST with<br>CoCr-A (Alloy 6)<br>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<br>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 |

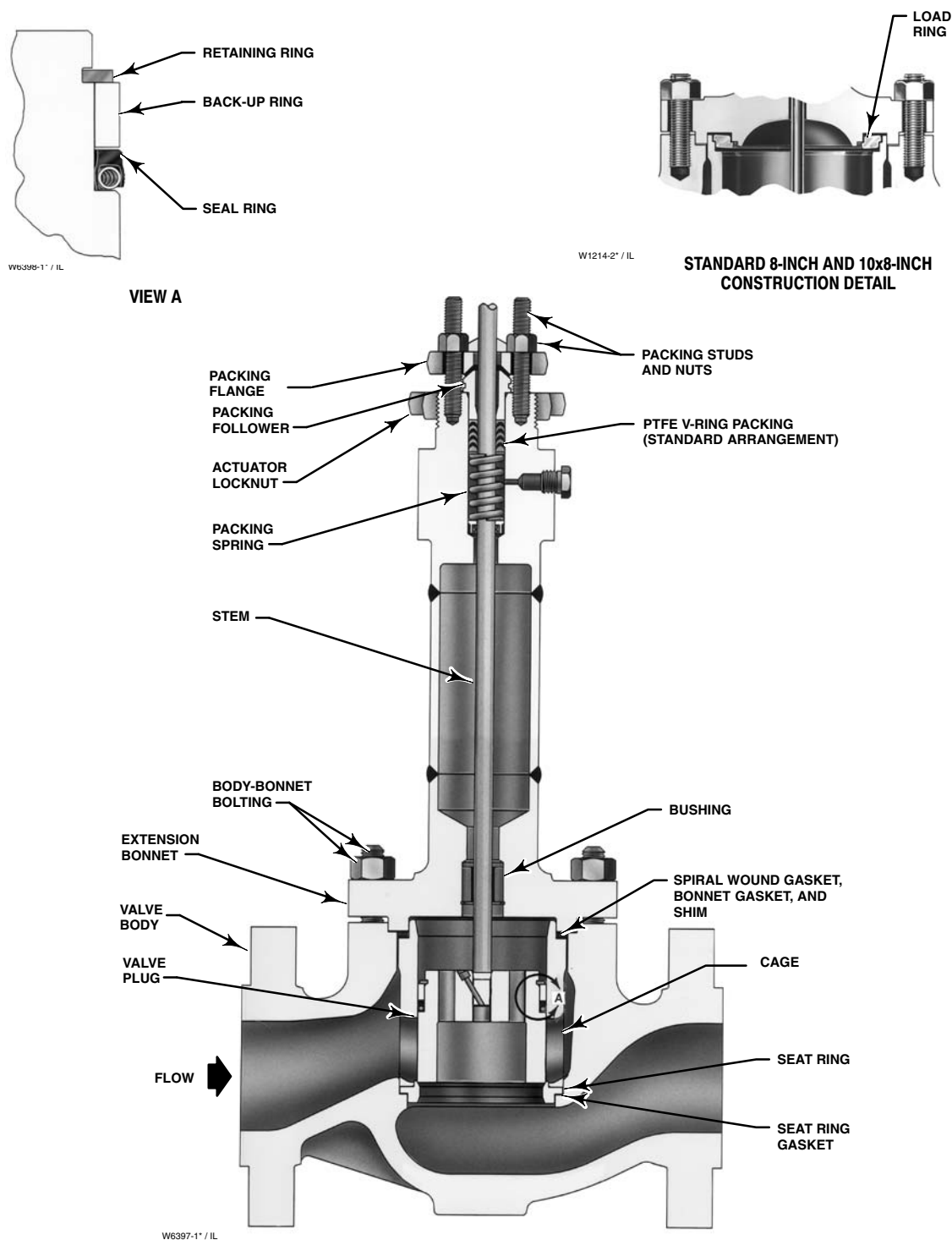


Figure 2. Design ET-C and EWT-C Valve Detail

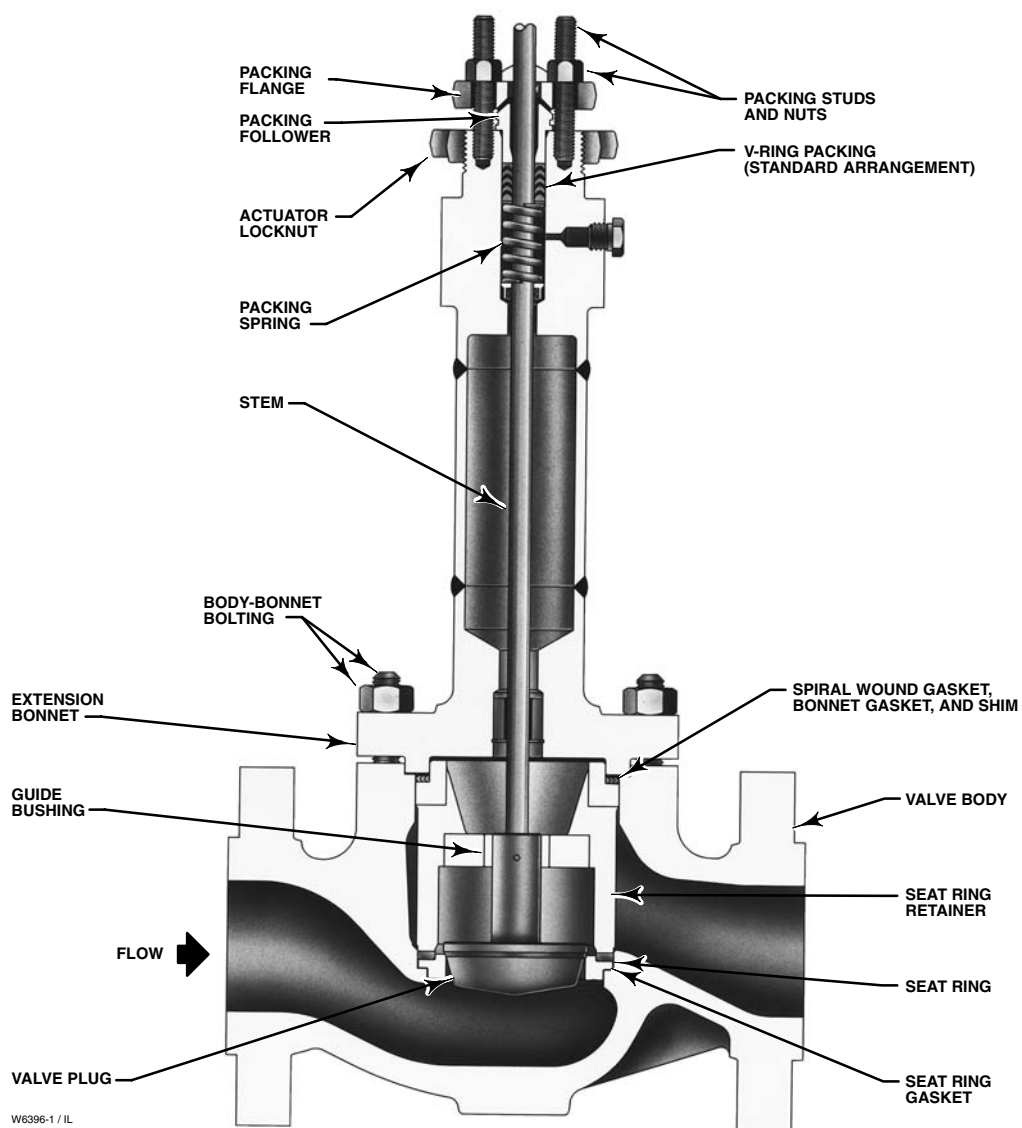


Figure 3. Design EZ-C Valve Assembly Detail

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

| VALVE SIZE, INCHES |              | PORT<br>DIAMETER | MAXIMUM<br>VALVE PLUG<br>TRAVEL | VALVE STEM AND YOKE BOSS<br>DIAMETERS |           |          |           |
|--------------------|--------------|------------------|---------------------------------|---------------------------------------|-----------|----------|-----------|
|                    |              |                  |                                 | Standard                              |           | Optional |           |
| Design ET-C        | Design EWT-C |                  |                                 | 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<br>SIZE,<br>INCHES                                                                   | PORT DIAMETER, INCHES                |                                 |               | MAXIMUM<br>PLUG<br>TRAVEL | VALVE STEM AND YOKE BOSS<br>DIAMETERS |         |              |         |
|--------------------------------------------------------------------------------------------|--------------------------------------|---------------------------------|---------------|---------------------------|---------------------------------------|---------|--------------|---------|
|                                                                                            |                                      |                                 |               |                           | Standard                              |         | Optional     |         |
|                                                                                            | Design<br>EZ-C                       | Equal Percentage <sup>(1)</sup> | Quick Opening |                           | Linear                                | Stem    | Yoke<br>Boss | Stem    |
| 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          | 38                        |                                       |         |              |         |
| 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             | 1.5                       |                                       |         |              |         |
| 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. |                                      |                                 |               |                           |                                       |         |              |         |

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 <sup>(1)</sup> Strain Hardened | SA-194-8M <sup>(1)</sup> |
|                       | 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)<sup>(1)</sup>*

| TEMPER-<br>ATURE,<br>°C <sup>(3)</sup>                                                                                                                                                                                                                                                                                                                                            | BAR <sup>(2)</sup>             |       |       |        |       |       |       |      |      |       |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------|-------|--------|-------|-------|-------|------|------|-------|-------|
|                                                                                                                                                                                                                                                                                                                                                                                   | 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* |
| TEMPER-<br>ATURE,<br>°F <sup>(3)</sup>                                                                                                                                                                                                                                                                                                                                            | PSI <sup>(2)</sup>             |       |       |        |       |       |       |      |      |       |       |
|                                                                                                                                                                                                                                                                                                                                                                                   | 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  |
| 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.<br>2. Pressure drop cannot exceed maximum inlet pressure as indicated in the specification table on page 2.<br>3. Pressure drops at intermediate temperatures may be interpolated.<br>* 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)<sup>(1)</sup>*

| TEMPER-<br>ATURE,<br>°C <sup>(3)</sup>                                                                                                                                                                                                                                                                                                                                           | BAR <sup>(2)</sup>             |       |      |      |      |       |       |       |      |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------|------|------|------|-------|-------|-------|------|-------|
|                                                                                                                                                                                                                                                                                                                                                                                  | 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*  |
| TEMPER-<br>ATURE,<br>°F <sup>(3)</sup>                                                                                                                                                                                                                                                                                                                                           | PSI <sup>(2)</sup>             |       |      |      |      |       |       |       |      |       |
|                                                                                                                                                                                                                                                                                                                                                                                  | 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   |
| 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.<br>2. Pressure drop cannot exceed maximum inlet pressure as indicated in the specification table on page 2.<br>3. Pressure drops at intermediate temperatures may be interpolated.<br>* 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,<br>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    |

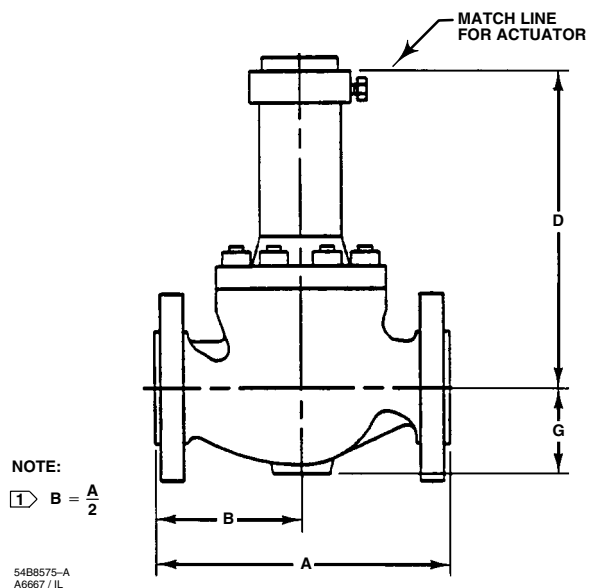


Figure 4. Design ET-C and EWT-C Valve Dimensions (also see table 9)

Table 10. Design EZ-C Valve Dimensions

| VALVE SIZE,<br>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      |

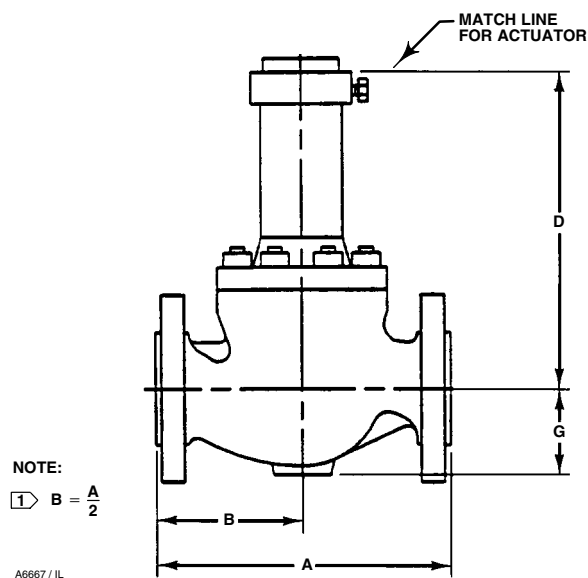


Figure 5. Design EZ-C Valve Dimensions (also see table 10)

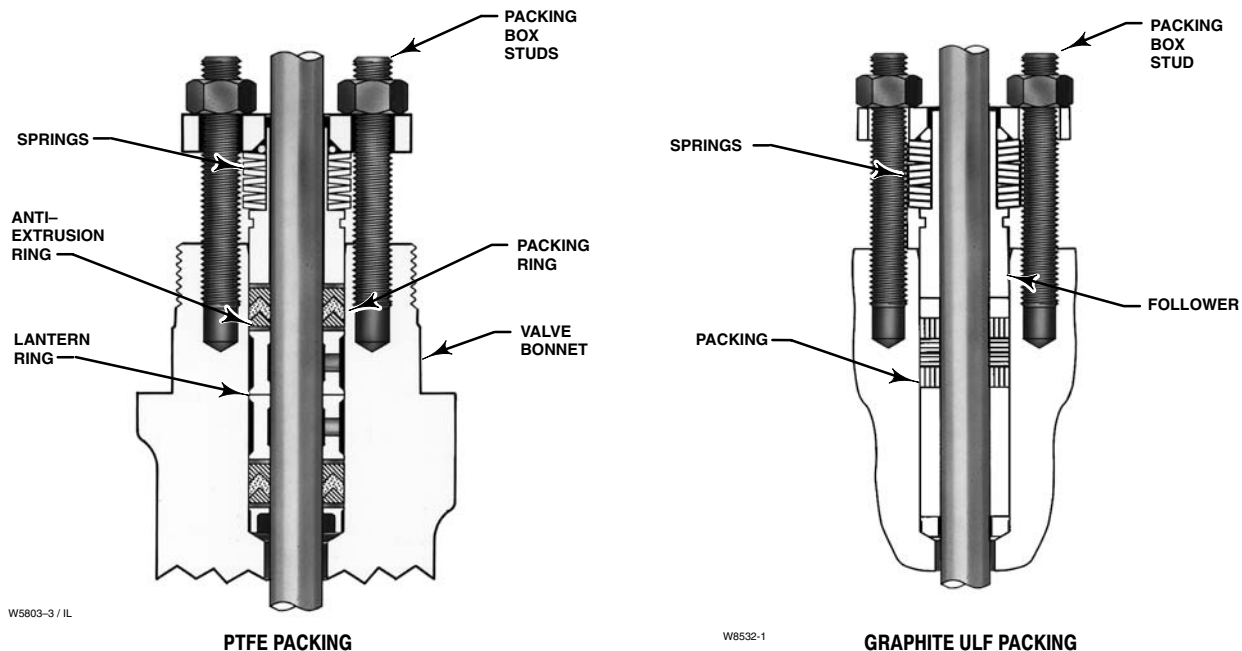


Figure 6. ENVIRO-SEAL® Packing Systems

## Coefficients

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

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

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 <sub>L</sub> <sup>(1)</sup> |
|                    | mm            | Inches | mm             | Inches |                  | 10                                    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100                             |                               |
| 3                  | 87.3          | 3.4375 | 38             | 1.5    | C <sub>v</sub>   | 4.32                                  | 7.53  | 10.9  | 17.1  | 27.2  | 43.5  | 66.0  | 97.0  | 120   | 136                             | 0.82                          |
|                    |               |        |                |        | K <sub>v</sub>   | 3.74                                  | 6.51  | 9.43  | 14.8  | 23.5  | 37.6  | 57.1  | 83.9  | 104   | 118                             | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 0.774                                 | 0.706 | 0.682 | 0.635 | 0.616 | 0.602 | 0.663 | 0.693 | 0.670 | 0.675                           | ---                           |
|                    |               |        |                |        | F <sub>d</sub>   | 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 <sub>v</sub>   | 5.85                                  | 11.6  | 18.3  | 30.2  | 49.7  | 79.7  | 125   | 171   | 205   | 224                             | 0.82                          |
|                    |               |        |                |        | K <sub>v</sub>   | 5.06                                  | 10.0  | 15.8  | 26.1  | 43.0  | 68.9  | 108   | 148   | 177   | 194                             | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 0.731                                 | 0.650 | 0.643 | 0.645 | 0.632 | 0.625 | 0.672 | 0.742 | 0.737 | 0.716                           | ---                           |
|                    |               |        |                |        | F <sub>d</sub>   | 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 <sub>v</sub>   | 12.9                                  | 25.8  | 43.3  | 67.4  | 104   | 162   | 239   | 316   | 368   | 394                             | 0.85                          |
|                    |               |        |                |        | K <sub>v</sub>   | 11.2                                  | 22.3  | 37.5  | 58.3  | 90.0  | 140   | 207   | 273   | 318   | 341                             | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 0.688                                 | 0.680 | 0.682 | 0.709 | 0.700 | 0.720 | 0.736 | 0.744 | 0.780 | 0.778                           | ---                           |
|                    |               |        |                |        | F <sub>d</sub>   | 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 <sub>v</sub>   | 18.5                                  | 38.0  | 58.4  | 86.7  | 130   | 189   | 268   | 371   | 476   | 567                             | 0.85                          |
|                    |               |        |                |        | K <sub>v</sub>   | 16.0                                  | 32.9  | 50.5  | 75.0  | 112   | 163   | 232   | 321   | 412   | 490                             | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 0.727                                 | 0.623 | 0.600 | 0.588 | 0.580 | 0.587 | 0.599 | 0.611 | 0.671 | 0.724                           | ---                           |
|                    |               |        |                |        | F <sub>d</sub>   | 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 <sub>v</sub>   | 27.0                                  | 58.1  | 105   | 188   | 307   | 478   | 605   | 695   | 761   | 818                             | 0.86                          |
|                    |               |        |                |        | K <sub>v</sub>   | 23.4                                  | 50.3  | 90.8  | 163   | 266   | 413   | 523   | 601   | 658   | 708                             | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 0.644                                 | 0.654 | 0.636 | 0.611 | 0.643 | 0.615 | 0.725 | 0.809 | 0.804 | 0.807                           | ---                           |
|                    |               |        |                |        | F <sub>d</sub>   | 0.28                                  | 0.26  | 0.23  | 0.20  | 0.17  | 0.22  | 0.24  | 0.25  | 0.25  | 0.26                            | ---                           |

1. At 100% travel.

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

| Whisper Trim I           |                  |        |                   |        |                          |                                       |       |       |       |       |       |       |       |       | Linear<br>Characteristic |
|--------------------------|------------------|--------|-------------------|--------|--------------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------------------------|
| Valve<br>Size,<br>Inches | Port<br>Diameter |        | Maximum<br>Travel |        | Flow<br>Coeffi-<br>cient | 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 <sub>V</sub>           | 16.5                                  | 40.3  | 70.8  | 88.0  | 92.1  | 90.7  | 90.3  | 92.6  | 95.6  | 99.1                     |
|                          |                  |        |                   |        | K <sub>V</sub>           | 14.3                                  | 34.9  | 61.2  | 76.1  | 79.7  | 78.5  | 78.1  | 80.1  | 82.7  | 85.7                     |
|                          |                  |        |                   |        | X <sub>T</sub>           | 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 <sub>V</sub>           | 33.9                                  | 76.6  | 117   | 135   | 137   | 137   | 141   | 149   | 157   | 169                      |
|                          |                  |        |                   |        | K <sub>V</sub>           | 29.3                                  | 66.3  | 101   | 117   | 119   | 119   | 122   | 129   | 136   | 146                      |
|                          |                  |        |                   |        | X <sub>T</sub>           | 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 <sub>V</sub>           | 55.8                                  | 125   | 196   | 245   | 270   | 286   | 297   | 308   | 323   | 338                      |
|                          |                  |        |                   |        | K <sub>V</sub>           | 48.3                                  | 108   | 170   | 212   | 234   | 247   | 257   | 266   | 279   | 292                      |
|                          |                  |        |                   |        | X <sub>T</sub>           | 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 <sub>V</sub>           | 100                                   | 226   | 337   | 436   | 502   | 581   | 641   | 655   | 659   | 681                      |
|                          |                  |        |                   |        | K <sub>V</sub>           | 86.5                                  | 195   | 292   | 377   | 434   | 503   | 554   | 567   | 570   | 589                      |
|                          |                  |        |                   |        | X <sub>T</sub>           | 0.456                                 | 0.490 | 0.470 | 0.427 | 0.452 | 0.468 | 0.521 | 0.624 | 0.703 | 0.701                    |
|                          |                  |        | 29                | 4      | C <sub>V</sub>           | 142                                   | 303   | 428   | 542   | 611   | 652   | 669   | 689   | 700   | 726                      |
|                          |                  |        |                   |        | K <sub>V</sub>           | 123                                   | 262   | 370   | 469   | 529   | 564   | 579   | 596   | 606   | 628                      |
|                          |                  |        |                   |        | X <sub>T</sub>           | 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 <sup>(2)</sup> |                               |
|----------------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|------|------|------|------|------|------|------|------|--------------------------------------|-------------------------------|
| Valve Size, Inches         | Port Diameter |        | Maximum Travel |        | Flow Coefficient | Valve Opening—Percent of Total Travel |      |      |      |      |      |      |      |      |                                      | X <sub>T</sub> <sup>(1)</sup> |
|                            | mm            | Inches | mm             | Inches |                  | Minimum <sup>(3)</sup>                | 20   | 30   | 40   | 50   | 60   | 70   | 80   | 90   | 100                                  |                               |
| A3 ΔP/P <sub>1</sub> ≤0.6  |               |        |                |        |                  |                                       |      |      |      |      |      |      |      |      |                                      |                               |
| 6 <sup>(4)</sup>           | 136.5         | 5.375  | 76             | 3      | C <sub>V</sub>   | 4.67                                  | 68.2 | 92.0 | 129  | 163  | 196  | 228  | 257  | 279  | 295                                  | 0.714                         |
|                            |               |        |                |        | K <sub>V</sub>   | 4.04                                  | 59.0 | 79.6 | 112  | 141  | 170  | 197  | 222  | 241  | 255                                  | ---                           |
| B3 ΔP/P <sub>1</sub> ≤0.75 |               |        |                |        |                  |                                       |      |      |      |      |      |      |      |      |                                      |                               |
| 6 <sup>(4)</sup>           | 136.5         | 5.375  | 76             | 3      | C <sub>V</sub>   | 4.67                                  | 38.2 | 66.9 | 94.5 | 120  | 144  | 167  | 190  | 211  | 228                                  | 0.473                         |
|                            |               |        |                |        | K <sub>V</sub>   | 4.04                                  | 33.0 | 57.9 | 81.7 | 104  | 125  | 144  | 164  | 183  | 197                                  | ---                           |
| C3 ΔP/P <sub>1</sub> ≤0.85 |               |        |                |        |                  |                                       |      |      |      |      |      |      |      |      |                                      |                               |
| 6 <sup>(4)</sup>           | 136.5         | 5.375  | 76             | 3      | C <sub>V</sub>   | 4.67                                  | 28.0 | 41.3 | 55.3 | 69.3 | 83.0 | 97.0 | 110  | 124  | 138                                  | 0.563                         |
|                            |               |        |                |        | K <sub>V</sub>   | 4.04                                  | 24.2 | 35.7 | 47.8 | 59.9 | 71.8 | 83.9 | 95.2 | 107  | 119                                  | ---                           |
| D3 ΔP/P <sub>1</sub> ≤0.99 |               |        |                |        |                  |                                       |      |      |      |      |      |      |      |      |                                      |                               |
| 6 <sup>(4)</sup>           | 136.5         | 5.375  | 76             | 3      | C <sub>V</sub>   | 4.67                                  | 6.67 | 9.50 | 19.9 | 31.4 | 46.0 | 61.0 | 75.7 | 89.7 | 104                                  | 0.563                         |
|                            |               |        |                |        | K <sub>V</sub>   | 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<sub>T</sub> 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 <sup>(1)</sup> | Port Diameter |        | Coeffs. for 6 mm (0.25 in.) Travel <sup>(2)</sup> | Maximum Travel |        | Flow Coefficient | Valve Opening—Percent of Total Travel |       |       |       |       |       |       |       |       |       | F <sub>L</sub> <sup>(3)</sup> |
|                                   | mm            | Inches |                                                   | mm             | Inches |                  | 10                                    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   |                               |
| 6 x 4                             | 111.1         | 4.375  | ---                                               | 51             | 2      | C <sub>V</sub>   | 21.4                                  | 49.0  | 78.7  | 109   | 137   | 166   | 201   | 245   | 286   | 320   | 0.86                          |
|                                   |               |        |                                                   |                |        | K <sub>V</sub>   | 18.5                                  | 42.4  | 68.1  | 94.3  | 119   | 144   | 174   | 212   | 247   | 277   | ---                           |
|                                   |               |        |                                                   |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 23.2                                  | 51.0  | 80.6  | 111   | 141   | 173   | 211   | 254   | 299   | 340   | 0.82                          |
|                                   |               |        |                                                   |                |        | K <sub>V</sub>   | 20.1                                  | 44.1  | 69.7  | 96.0  | 122   | 150   | 183   | 220   | 259   | 294   | ---                           |
|                                   |               |        |                                                   |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 44.0                                  | 108   | 170   | 234   | 293   | 354   | 405   | 474   | 552   | 617   | 0.88                          |
|                                   |               |        |                                                   |                |        | K <sub>V</sub>   | 38.1                                  | 93.4  | 147.1 | 202   | 253   | 306   | 350   | 410   | 477   | 534   | ---                           |
|                                   |               |        |                                                   |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 51.7                                  | 111   | 176   | 249   | 319   | 391   | 458   | 540   | 632   | 729   | 0.81                          |
|                                   |               |        |                                                   |                |        | K <sub>V</sub>   | 44.7                                  | 96.0  | 152   | 215   | 276   | 338   | 396   | 467   | 547   | 631   | ---                           |
|                                   |               |        |                                                   |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 95.9                                  | 212   | 336   | 459   | 586   | 696   | 798   | 876   | 928   | 975   | 0.91                          |
|                                   |               |        |                                                   |                |        | K <sub>V</sub>   | 83.0                                  | 183   | 291   | 397   | 507   | 602   | 690   | 758   | 803   | 843   | ---                           |
|                                   |               |        |                                                   |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 104                                   | 223   | 348   | 490   | 638   | 781   | 907   | 999   | 1080  | 1160  | 0.80                          |
|                                   |               |        |                                                   |                |        | K <sub>V</sub>   | 90.0                                  | 193   | 301   | 424   | 552   | 676   | 785   | 864   | 934   | 1003  | ---                           |
|                                   |               |        |                                                   |                |        | X <sub>T</sub>   | 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

| <b>Equal Percentage</b>           |               |        |                |        |                  |                                       |       |       |       |       |       |       |       |       |       | Equal Percentage Characteristic |
|-----------------------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------|
| Valve Size, Inches <sup>(1)</sup> | Port Diameter |        | Maximum Travel |        | Flow Coefficient | Valve Opening—Percent of Total Travel |       |       |       |       |       |       |       |       |       | F <sub>L</sub> <sup>(2)</sup>   |
|                                   | 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 <sub>V</sub>   | 7.34                                  | 13.1  | 19.8  | 30.6  | 46.6  | 69.1  | 108   | 168   | 225   | 271   | 0.87                            |
|                                   |               |        |                |        | K <sub>V</sub>   | 6.35                                  | 11.3  | 17.1  | 26.5  | 40.3  | 59.8  | 93.4  | 145   | 195   | 234   | ---                             |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 8.01                                  | 14.1  | 21.1  | 31.7  | 47.2  | 73.5  | 118   | 180   | 240   | 286   | 0.85                            |
|                                   |               |        |                |        | K <sub>V</sub>   | 6.93                                  | 12.2  | 18.3  | 27.4  | 40.8  | 63.6  | 102   | 156   | 208   | 247   | ---                             |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 13.2                                  | 26.4  | 45.4  | 71.1  | 112   | 178   | 256   | 342   | 431   | 508   | 0.91                            |
|                                   |               |        |                |        | K <sub>V</sub>   | 11.4                                  | 22.8  | 39.3  | 61.5  | 96.9  | 154   | 221   | 296   | 373   | 439   | ---                             |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 23.6                                  | 36.2  | 52.8  | 76.3  | 110   | 164   | 248   | 348   | 453   | 565   | 0.79                            |
|                                   |               |        |                |        | K <sub>V</sub>   | 20.4                                  | 31.3  | 45.7  | 66.0  | 95.2  | 142   | 215   | 301   | 392   | 489   | ---                             |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 32.3                                  | 65.7  | 111   | 184   | 303   | 462   | 635   | 778   | 876   | 924   | 0.89                            |
|                                   |               |        |                |        | K <sub>V</sub>   | 27.9                                  | 56.8  | 96.0  | 159   | 262   | 400   | 549   | 673   | 758   | 799   | ---                             |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 28.4                                  | 61.0  | 112   | 196   | 311   | 481   | 687   | 839   | 992   | 1090  | 0.81                            |
|                                   |               |        |                |        | K <sub>V</sub>   | 24.6                                  | 52.8  | 96.9  | 170   | 269   | 416   | 594   | 726   | 858   | 943   | ---                             |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sup>(1)</sup> | Port Diameter |        | Maximum Travel |        | Flow Coefficient | Valve Opening—Percent of Total Travel |       |       |       |       |       |       |       |       |       | F <sub>L</sub> <sup>(2)</sup> |
|                                   | mm            | Inches | mm             | Inches |                  | 10                                    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100   |                               |
| 6 x 4                             | 111.1         | 4.375  | 51             | 2      | C <sub>V</sub>   | 30.9                                  | 69.9  | 110   | 149   | 187   | 223   | 253   | 281   | 307   | 325   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 26.7                                  | 60.5  | 95.2  | 129   | 162   | 193   | 219   | 243   | 266   | 281   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 36.2                                  | 77.6  | 116   | 155   | 193   | 231   | 266   | 298   | 326   | 345   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 31.3                                  | 67.1  | 100   | 134   | 167   | 200   | 230   | 258   | 282   | 298   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 42.8                                  | 99.7  | 164   | 224   | 290   | 352   | 422   | 473   | 523   | 545   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 37.0                                  | 86.2  | 142   | 194   | 251   | 304   | 365   | 409   | 452   | 471   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 0.550                                 | 0.409 | 0.364 | 0.350 | 0.334 | 0.326 | 0.310 | 0.326 | 0.329 | 0.350 | ---                           |
|                                   |               |        | 102            | 4      | C <sub>V</sub>   | 113                                   | 266   | 355   | 475   | 522   | 522   | 522   | 522   | 519   | 522   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 97.7                                  | 230   | 307   | 411   | 452   | 452   | 452   | 452   | 449   | 452   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 49.0                                  | 126   | 196   | 269   | 340   | 406   | 476   | 540   | 598   | 641   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 42.4                                  | 109   | 170   | 233   | 294   | 351   | 412   | 467   | 517   | 554   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 0.547                                 | 0.300 | 0.286 | 0.270 | 0.264 | 0.267 | 0.263 | 0.264 | 0.273 | 0.273 | ---                           |
|                                   |               |        | 102            | 4      | C <sub>V</sub>   | 113                                   | 258   | 343   | 469   | 572   | 641   | 755   | 828   | 884   | 953   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 97.7                                  | 223   | 297   | 406   | 495   | 554   | 653   | 716   | 765   | 824   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 99.2                                  | 229   | 339   | 430   | 515   | 605   | 691   | 763   | 806   | 826   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 85.8                                  | 198   | 293   | 372   | 515   | 523   | 598   | 660   | 697   | 714   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 0.791                                 | 0.490 | 0.439 | 0.447 | 0.462 | 0.465 | 0.463 | 0.478 | 0.518 | 0.591 | ---                           |
|                                   |               |        | 102            | 4      | C <sub>V</sub>   | 146                                   | 300   | 433   | 551   | 664   | 755   | 824   | 857   | 866   | 903   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 126                                   | 260   | 375   | 477   | 574   | 653   | 713   | 741   | 749   | 781   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 147                                   | 268   | 358   | 445   | 537   | 624   | 702   | 772   | 842   | 900   | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 127                                   | 232   | 310   | 385   | 465   | 540   | 607   | 668   | 728   | 779   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 0.256                                 | 0.272 | 0.390 | 0.422 | 0.406 | 0.411 | 0.439 | 0.473 | 0.480 | 0.508 | ---                           |
|                                   |               |        | 102            | 4      | C <sub>V</sub>   | 181                                   | 329   | 449   | 563   | 674   | 778   | 866   | 931   | 972   | 1000  | ---                           |
|                                   |               |        |                |        | K <sub>V</sub>   | 157                                   | 285   | 388   | 487   | 583   | 673   | 749   | 805   | 841   | 865   | ---                           |
|                                   |               |        |                |        | X <sub>T</sub>   | 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 <sup>(1)</sup> |                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|----------------|--------|------------------|---------------------------------------|------|------|------|------|------|-----|-----|-----|--------------------------------------|-------------------------------|
| Valve Size, Inches <sup>(2)</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Port Diameter |        | Maximum Travel |        | Flow Coefficient | Valve Opening—Percent of Total Travel |      |      |      |      |      |     |     |     |                                      | X <sub>T</sub> <sup>(4)</sup> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | mm            | Inches | mm             | Inches |                  | Minimum <sup>(3)</sup>                | 20   | 30   | 40   | 50   | 60   | 70  | 80  | 90  | 100                                  |                               |
| A3 ΔP/P <sub>1</sub> ≤ 0.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |        |                |        |                  |                                       |      |      |      |      |      |     |     |     |                                      |                               |
| 8 x 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 136.5         | 5-3/8  | 127            | 5      | C <sub>V</sub>   | 4.00                                  | 97.6 | 159  | 215  | 270  | 326  | 383 | 427 | 457 | 460                                  | 0.710                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |                |        | K <sub>V</sub>   | 3.46                                  | 84   | 138  | 186  | 234  | 282  | 331 | 369 | 395 | 398                                  | ---                           |
| 12 x 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 136.5         | 5-3/8  | 165            | 6-1/2  | C <sub>V</sub>   | 4.00                                  | 151  | 238  | 324  | 407  | 492  | 573 | 651 | 697 | 698                                  | 0.589                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |                |        | K <sub>V</sub>   | 3.46                                  | 131  | 206  | 280  | 352  | 426  | 496 | 563 | 603 | 604                                  | ---                           |
| B3 ΔP/P <sub>1</sub> ≤ 0.75                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |        |                |        |                  |                                       |      |      |      |      |      |     |     |     |                                      |                               |
| 8 x 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 136.5         | 5-3/8  | 127            | 5      | C <sub>V</sub>   | 4.67                                  | 72.3 | 108  | 143  | 178  | 213  | 248 | 280 | 314 | 347                                  | 0.563                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |                |        | K <sub>V</sub>   | 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 <sub>V</sub>   | 4.67                                  | 94.0 | 141  | 187  | 233  | 278  | 324 | 370 | 413 | 457                                  | 0.563                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |                |        | K <sub>V</sub>   | 4.04                                  | 81.3 | 122  | 162  | 202  | 240  | 280 | 320 | 357 | 395                                  | ---                           |
| C3 ΔP/P <sub>1</sub> ≤ 0.85                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |        |                |        |                  |                                       |      |      |      |      |      |     |     |     |                                      |                               |
| 8 x 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 136.5         | 5-3/8  | 127            | 5      | C <sub>V</sub>   | 4.67                                  | 50.0 | 74.7 | 99.3 | 124  | 149  | 173 | 197 | 221 | 245                                  | 0.563                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |                |        | K <sub>V</sub>   | 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 <sub>V</sub>   | 4.67                                  | 64.0 | 96.0 | 127  | 160  | 191  | 222 | 254 | 284 | 315                                  | 0.563                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |                |        | K <sub>V</sub>   | 4.04                                  | 55.4 | 83.0 | 110  | 138  | 165  | 192 | 220 | 246 | 272                                  | ---                           |
| D3 ΔP/P <sub>1</sub> ≤ 0.99                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |        |                |        |                  |                                       |      |      |      |      |      |     |     |     |                                      |                               |
| 8 x 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 136.5         | 5-3/8  | 127            | 5      | C <sub>V</sub>   | 4.67                                  | 12.7 | 31.4 | 55.0 | 79.7 | 104  | 128 | 152 | 177 | 201                                  | 0.563                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |                |        | K <sub>V</sub>   | 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 <sub>V</sub>   | 4.67                                  | 23.8 | 53.3 | 85.0 | 116  | 148  | 180 | 211 | 243 | 273                                  | 0.563                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |               |        |                |        | K <sub>V</sub>   | 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.<br>2. The first number indicates the body inlet and outlet size. The second number indicates nominal port size.<br>3. Valves should not be required to throttle at less than the specified minimum coefficient for and extended period of time. Erosion damage to the valve seats may result.<br>4. This column lists X <sub>T</sub> 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 <sup>(1)</sup> |        | Flow Coefficient | Coeffs. for 6 mm (0.25 Inch) Travel <sup>(2)</sup> | Valve Opening—Percent of Total Travel |       |       |       |       |       |       |       |       |                              | F <sub>L</sub> <sup>(3)</sup> |
|                                                                                                                                                                                                                                                                             | mm            | Inches | mm                            | Inches |                  |                                                    | 10                                    | 20    | 30    | 40    | 50    | 60    | 70    | 80    | 90    | 100                          |                               |
| 1                                                                                                                                                                                                                                                                           | 25.4          | 1      | 19                            | 0.75   | C <sub>V</sub>   | 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 <sub>V</sub>   | 12.7                                               | 3.80                                  | 8.91  | 12.1  | 13.4  | 14.0  | 14.4  | 14.5  | 14.5  | 14.6  | 14.6                         | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 14.7                                               | 0.400                                 | 0.449 | 0.523 | 0.539 | 0.535 | 0.512 | 0.500 | 0.500 | 0.494 | 0.494                        | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | F <sub>d</sub>   | ---                                                | 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 <sub>V</sub>   | 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 <sub>V</sub>   | 19.5                                               | 4.88                                  | 10.3  | 17.8  | 23.7  | 26.4  | 28.0  | 28.9  | 29.2  | 29.5  | 29.6                         | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 22.6                                               | 0.623                                 | 0.734 | 0.726 | 0.814 | 0.843 | 0.857 | 0.861 | 0.860 | 0.853 | 0.848                        | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | F <sub>d</sub>   | ---                                                | 0.16                                  | 0.24  | 0.32  | 0.39  | 0.45  | 0.50  | 0.50  | 0.50  | 0.50  | 0.50                         | ---                           |
| 1.5 <sup>(4)</sup>                                                                                                                                                                                                                                                          | 25.4          | 1      | 19                            | 0.75   | C <sub>V</sub>   | 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 <sub>V</sub>   | 13.6                                               | 3.61                                  | 7.73  | 12.6  | 15.1  | 15.8  | 16.3  | 16.3  | 16.4  | 16.5  | 16.8                         | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 15.7                                               | 0.617                                 | 0.791 | 0.793 | 0.904 | 0.925 | 0.924 | 0.922 | 0.915 | 0.905 | 0.878                        | ---                           |
| 2                                                                                                                                                                                                                                                                           | 50.8          | 2      | 29                            | 1.125  | C <sub>V</sub>   | 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 <sub>V</sub>   | 29.4                                               | 11.2                                  | 26.0  | 38.3  | 45.3  | 48.8  | 50.0  | 50.5  | 50.6  | 50.7  | 50.7                         | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 34.0                                               | 0.548                                 | 0.663 | 0.765 | 0.813 | 0.818 | 0.833 | 0.831 | 0.836 | 0.834 | 0.834                        | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | F <sub>d</sub>   | ---                                                | 0.17                                  | 0.28  | 0.36  | 0.43  | 0.49  | 0.50  | 0.50  | 0.50  | 0.50  | 0.50                         | ---                           |
| 2 <sup>(4)</sup>                                                                                                                                                                                                                                                            | 25.4          | 1      | 19                            | 0.75   | C <sub>V</sub>   | 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 <sub>V</sub>   | 13.7                                               | 3.76                                  | 8.47  | 12.9  | 14.4  | 15.0  | 15.1  | 15.1  | 15.2  | 15.3  | 15.5                         | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 15.8                                               | 0.524                                 | 0.594 | 0.695 | 0.877 | 0.937 | 0.944 | 0.958 | 0.952 | 0.942 | 0.921                        | ---                           |
| 3                                                                                                                                                                                                                                                                           | 76.2          | 3      | 38                            | 1.5    | C <sub>V</sub>   | 53.8                                               | 30.8                                  | 65.1  | 92.4  | 110   | 118   | 123   | 126   | 128   | 129   | 129                          | 0.91                          |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | K <sub>V</sub>   | 46.5                                               | 26.6                                  | 56.3  | 79.9  | 95.2  | 102   | 106   | 109   | 111   | 112   | 112                          | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 53.8                                               | 0.672                                 | 0.714 | 0.713 | 0.742 | 0.784 | 0.785 | 0.783 | 0.776 | 0.774 | 0.774                        | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | F <sub>d</sub>   | ---                                                | 0.17                                  | 0.27  | 0.35  | 0.42  | 0.47  | 0.50  | 0.50  | 0.50  | 0.50  | 0.50                         | ---                           |
| 3 <sup>(4)</sup>                                                                                                                                                                                                                                                            | 50.8          | 2      | 29                            | 1.125  | C <sub>V</sub>   | 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 <sub>V</sub>   | 27.9                                               | 8.64                                  | 23.9  | 38.8  | 52.8  | 62.2  | 67.8  | 71.9  | 74.6  | 75.7  | 76.5                         | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 32.2                                               | 0.527                                 | 0.511 | 0.652 | 0.720 | 0.780 | 0.820 | 0.814 | 0.798 | 0.790 | 0.779                        | ---                           |
| 4                                                                                                                                                                                                                                                                           | 101.6         | 4      | 51                            | 2      | C <sub>V</sub>   | 68.2                                               | 50.8                                  | 116   | 159   | 185   | 201   | 212   | 219   | 222   | 223   | 223                          | 0.88                          |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | K <sub>V</sub>   | 59.0                                               | 43.9                                  | 100   | 138   | 160   | 174   | 183   | 189   | 192   | 193   | 193                          | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 68.2                                               | 0.733                                 | 0.653 | 0.724 | 0.805 | 0.809 | 0.816 | 0.809 | 0.812 | 0.831 | 0.835                        | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | F <sub>d</sub>   | ---                                                | 0.18                                  | 0.28  | 0.36  | 0.42  | 0.48  | 0.50  | 0.50  | 0.50  | 0.50  | 0.50                         | ---                           |
| 4 <sup>(4)</sup>                                                                                                                                                                                                                                                            | 50.8          | 2      | 29                            | 1.125  | C <sub>V</sub>   | 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 <sub>V</sub>   | 32.4                                               | 11.7                                  | 27.9  | 45.2  | 57.3  | 64.4  | 70.2  | 73.5  | 74.2  | 74.6  | 75.0                         | ---                           |
|                                                                                                                                                                                                                                                                             |               |        |                               |        | X <sub>T</sub>   | 37.4                                               | 0.490                                 | 0.556 | 0.609 | 0.672 | 0.793 | 0.772 | 0.728 | 0.714 | 0.711 | 0.704                        | ---                           |
| 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).<br>2. When sizing self-operated regulators, use coefficients listed for 6 mm (0.25 inch) travel.<br>3. At 100% travel.<br>4. Restricted trim. |               |        |                               |        |                  |                                                    |                                       |       |       |       |       |       |       |       |       |                              |                               |

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

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

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

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

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 <sub>L</sub> <sup>(1)</sup> |
|                    | 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 <sub>V</sub>   | 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 <sub>V</sub>   | 0.065                                 | 0.076 | 0.107 | 0.151 | 0.204 | 0.283 | 0.401 | 0.554 | 0.762 | 1.06  | 1.31                            | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 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 <sub>V</sub>   | 0.086                                 | 0.112 | 0.172 | 0.266 | 0.388 | 0.536 | 0.763 | 1.12  | 1.56  | 2.10  | 2.66                            | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 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 <sub>V</sub>   | 0.115                                 | 0.163 | 0.276 | 0.426 | 0.636 | 0.934 | 1.32  | 1.83  | 2.59  | 3.61  | 4.25                            | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 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 <sub>V</sub>   | 0.239                                 | 0.324 | 0.538 | 0.835 | 1.27  | 1.88  | 2.72  | 3.95  | 5.64  | 7.07  | 7.65                            | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 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 <sub>V</sub>   | 0.083                                 | 0.105 | 0.164 | 0.261 | 0.376 | 0.519 | 0.747 | 1.09  | 1.56  | 2.21  | 2.77                            | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 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 <sub>V</sub>   | 0.125                                 | 0.172 | 0.279 | 0.435 | 0.636 | 0.926 | 1.33  | 1.85  | 2.66  | 3.77  | 4.48                            | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 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 <sub>V</sub>   | 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 <sub>V</sub>   | 0.291                                 | 0.375 | 0.591 | 0.865 | 1.29  | 1.91  | 2.75  | 3.99  | 5.82  | 7.68  | 8.82                            | ---                           |
|                    |               |        |                |        | X <sub>T</sub>   | 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. |               |        |                |        |                  |                                       |       |       |       |       |       |       |       |       |       |                                 |                               |

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<sup>(1)</sup>, ■ 8X4, ■ 8X6, ■ 12X6, and ■ 10X8 inch

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

### End Connection Styles<sup>(2)</sup>

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

### Maximum Inlet Pressure<sup>(2)</sup>

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 | 3                  | 94                                     | 1370 |
|                | 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<sup>(2)</sup>

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)<sup>(6)</sup>.
- 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<sup>(5)</sup>

#### 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<sup>(3)</sup> 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<sup>(4)</sup> and Packing Box Ring:** S31600 SST

### Material Temperature Capabilities<sup>(2)</sup>

**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.

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## Emerson Process Management

Marshalltown, Iowa 50158 USA  
Cernay 68700 France  
Sao Paulo 05424 Brazil  
Singapore 128461

[www.Fisher.com](http://www.Fisher.com)

