# Fisher™ EW Series (EWD/EWS/EWT) Sliding-Stem Control Valves through NPS 12x8

Fisher EW Series easy-e™ valves (figures 1, 2, 3, and 4) feature large internal cavities with expanded end connections and a variety of unbalanced and balanced plug designs. Sizes available from NPS 4x2[(1)] through 12x8. These combinations provide good fluid control in economical, high-capacity valve bodies that keep valve outlet velocities within practical limits.

These valves meet a variety of service requirements, such as power plants where oversized piping is used to limit fluid flow velocity. They also perform well in noise abatement applications; for example, high-pressure gas reducing stations where sonic velocities are often encountered at the outlet of conventional valve bodies.

The Fisher EW product line is available for a wide range of applications, including sulfide and chloride stress-cracking environments common to the oil and gas production industries. To discuss available constructions, contact your Emerson sales office and include the applicable codes and standards required for these environments.

W2777-I

## The easy-e Valve Family

EW Series valves are part of the versatile easy-e family of Fisher industrial control valves. easy-e valves share the following characteristics:

- Multiple trim material choices
- Trim temperature capability with metal seats standard to 427°C (800°F)
- Interchangeable, restricted-capacity trims and full-size trims to match variable process flow demands
- Different cage/plug styles that provide particular flow characteristics for highly-specialized applications. The standard cage comes in three different flow characteristics:
  - quick-opening
  - linear
  - equal percentage
- Cavitrol™ III cages are available to eliminate cavitation damage and Whisper Trim™ III cages are available to help attenuate aerodynamic noise.
- 316 stainless steel packing box parts are standard (including packing flange, studs, and nuts)

The temperature limits of EWT valves can be extended above 232°C (450°F) by using PEEK

(PolyEtherEtherKetone) anti-extrusion rings in combination with a spring-loaded PTFE seal. The PEEK anti-extrusion rings expand to close off the clearance gap between the plug and the cage where the PTFE seal may extrude at high temperatures and pressures. The temperature limits are extended to 316°C (600°F) for non-oxidizing service and to 260°C (500°F) for oxidizing service.

**Note**

Refer to Fisher Bulletin 51.1:EWN, EWN Series valves with Whisper Trim III cages (D100024X012) for further information.

**Note**

Refer to Fisher Bulletin 80.3:010, WhisperFlo™ Aerodynamic Noise Attenuation Trim (D102362X012) for further information.

# Features

- Compliance with the Clean Air Act— ENVIRO-SEAL™ packing systems provide an improved stem seal to help prevent the loss of valuable or hazardous process fluid. The ENVIRO-SEAL packing systems feature PTFE or Graphite ULF packing with live-loading for reduced packing maintenance.
- Noise Attenuation—In an EW Series valve, noise produced by high flow rates and large pressure drops can be reduced by up to 18 dbA with a Whisper Trim I cage, by up to 30 dbA with a Whisper Trim III cage, and by up to 40 dbA with a WhisperFlo cage.
- Piping Economy—Expanded end connections of EW Series valve bodies may reduce the need for line swages while accommodating oversized piping arrangements used to limit fluid flow velocities.
- Temperature Compensation—On designs with the seat ring threaded into the valve body (figure 4), the hung cage feature helps reduce gasketing problems caused by thermal expansion and contraction of long parts, such as the cage assembly.
- Standard Trim Parts across the easy-e product line—Included are FGM gaskets, packing flange, studs, and nuts.
- High-Temperature, Class IV or Class V Shutoff—Optional multiple piston rings (figure 14) for EWD and EWD-1 valve bodies permit Class IV shutoff up to 593°C (1100°F).
  Use of C-seal trim for EWD (see figure 5) permits Class V shutoff up to 593°C (1100°F).
- Increased Pressure/Temperature Ratings—NPS 12x8 CL900 EW Series valve bodies with buttwelding end connections are capable of increased ASME ratings called Intermediate Standard Ratings. The extra strength of the valve body allows these valves to be used where pressures and temperatures exceed Standard Class ratings in ASME B16.34.

  See Bulletin 59.1:027, Increased Pressure/ Temperature Ratings for EH and EW Series Steel Valves (D100076X012) for further information.
- Sour Service Capability— Unless otherwise noted, references are to NACE MR0175-2002. Optional materials are available to meet NACE MR0103 and NACE MR0175 / ISO 15156. Material requirements under these standards vary by edition and year of issue; the specific standard must be specified.

## Table of Contents

Specifications

**Valve Body Configurations**

See Available Configurations section

**Valve Body Sizes**

See table 2

**End Connection Styles**

Flanged: ■ CL150, 300, 600, and 900 raised-face or ring-type joint flanges per ASME B16.5, ■ raised-face per EN 1092-1/B
Buttwelding: Styles per ASME B16.25 schedules that are consistent with ASME B16.34 are Schedule ■ 40 or ■ 80 for all CL300 and 600 valves, Schedule ■ 80 or ■ XXS for NPS 8x6 CL900 valves, or Schedule ■ 80, ■ 100, or ■ 120 for NPS 12x8 CL900 valves

**Maximum Inlet Pressures and Temperatures(1)**

Consistent with applicable ■ CL300, ■ 600(2), or ■ 900 pressure/temperature ratings per ASME B16.34 unless limited as follows:
Valves With All Except Cavitrol III or Whisper Trim III Cages: Where limited by individual pressure/temperature capabilities in figure 8 or 9 or temperature capabilities in table 11, 12, 13, or 20.
Valves With Cavitrol III Cages: Where limited by individual pressure/temperature capabilities in figure 12 or temperature capabilities in table 16 or 20
Valves With Whisper Trim III Cages: Where limited by individual pressure/temperature capabilities in figure 15 or 16 or temperature capabilities in table 18 or 20

**Maximum Pressure Drops(1, 3)**

Same as maximum inlet pressure for specific construction defined above, except where further limited as follows:
Valves With All Except Cavitrol III or Whisper Trim III Cages: See figure 8 or 9
Valves With Cavitrol III Cages: See figure 12
Valves With Whisper Trim III Cages: 0.999 $\Delta P/P_1$ maximum for levels A1 through D3

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

See tables 3 and 4

**Construction Materials**

Valve, Bonnet, and Bonnet Spacer If Used: ■ WCC carbon steel, ■ LCC carbon steel, ■ WC9 chrome moly steel, ■ CF8M (316 SST), ■ other materials upon request
Valve Plug, Cage, and Metal Seating Parts
*Valves With All* Except *Cavitrol III or Whisper Trim III Cages:* See table 5 or 14
*Valves With Cavitrol III Cages:* See table 15
*Valves With Whisper Trim III Cages:* See table 17, 18, or 19
All Other Parts: See table 20

**Material Temperature Capabilities(1)**

Valve Body/Trim Combinations
*Valves With All* Except *Cavitrol III or Whisper Trim III Cages:* See figure 8 or 9 and table 11, 12, or 13
*Valves With Cavitrol III Cages:* See figure 12 and table 16
*Valves With Whisper Trim III Cages:* See figure 15 or 16 and table 18
All Other Parts: See table 20

**Flow Characteristics**

Standard Cages: ■ Quick-opening, ■ linear, or ■ equal percentage
Cavitrol and Whisper Trim Cages: Linear

**Flow Directions**

Valves with Standard Cages
*EWD, EWD-1, EWT, and EWT-1:* Normally down(5)
*EWS and EWS-1:* Normally up(6)
Valves with Cavitrol Cages: Always down(5)
Valves with Whisper Trim III Cages: Always up(6)

**Flow Coefficients and Noise Level Prediction**

Refer to Fisher Catalog 12

**Port Diameters and Maximum Valve Plug Travels**

See table 21

- continued -

Specifications (continued)

**Yoke Boss and Stem Diameters**

See table 21

**Typical Bonnet Styles (see table 23)**

■ Plain, ■ style 1 cast extension, ■ style 2 cast extension, ■ ENVIRO-SEAL bellows seal bonnet

**Packing Arrangements**

■ Standard PTFE, ■ Double PTFE, ■ Graphite, ■ ENVIRO-SEAL PTFE, ■ ENVIRO-SEAL Duplex, ■ ENVIRO-SEAL Graphite ULF, ■ HIGH-SEAL

**Approximate Weights**

See table 22

**Optional Safety Instrumented System Classification**

EWD, EWD-1, EWT, and EWT-1: SIL3 capable — certified by exida Consulting LLC

**Options**

■ Lubricator, ■ lubricator/isolating valve, ■ drilled and tapped connection in extension bonnet for leak-off service, ■ valve body drain plug, ■ ENVIRO-SEAL bellows seal bonnet for positive stem sealing of hard-to-handle fluids at temperatures up to 566°C (1000°F), ■ style 3 fabricated extension bonnet made on order to a specific length for cryogenic service, ■ special seismic service bonnet, ■ packings suitable for nuclear service, and ■ forged bonnet for 5 in. (127 mm) yoke boss on NPS 8x6 CL900 valve, ■ Class V shutoff for EWT above 232°C (450°F) using PEEK anti-extrusion rings ■ Class V shutoff for EWD up to 593°C (1100°F) using C-seal trim

1. The pressure/temperature limits in this bulletin and any applicable standard or code limitation should not be exceeded.
2. Certain bonnet bolting material selections may require a CL600 easy-e valve assembly to be derated. Contact your Emerson sales office for more information.
3. Only NPS 12x8 CL900 valve bodies with threaded (-1) seat rings can take full CL900 pressure drops; CL900 valve bodies with clamped (no dash number) seat rings are limited to CL600 pressure drops. Also, there are two different NPS 8x6 CL900 valve bodies, one for use only with Cavitrol III cages and the other for use with all other constructions. An NPS 8x6 CL900 valve body with Cavitrol III cage can take full CL900 pressure drops. For information on other NPS 8x6 constructions that can take full CL900 pressure drops, contact your Emerson Automation Solutions sales office. All other NPS 8x6 constructions are limited to CL600 pressure drops (1440 psid flowing drop) even though installed in a CL900 valve body.
4. Restriction based on excessive noise if max ΔP/P1 ratio for a given cage level is exceeded.
5. Down:in through cage and out through seat ring (direction shown in figure 1).
6. Up:in through seat ring and out through cage as shown in figure 13.

ENVIRO-SEAL Packing System Specifications

**Applicable Stem Diameters**

■ 19.1 (3/4), ■ 25.4 (1), and ■ 31.8 (1-1/4) diameter valve stems

**Maximum Pressure/Temperature Limits(1)**

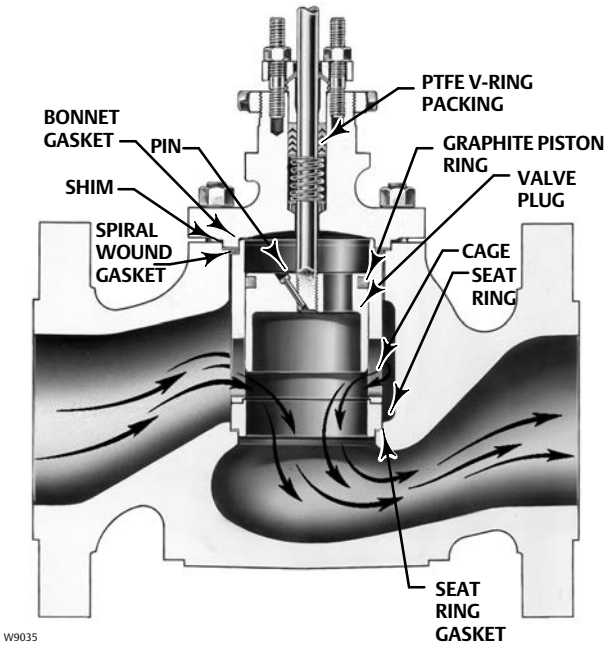
To Meet the EPA Fugitive Emission Standard of 100 PPM(2)
*For ENVIRO-SEAL PTFE and ENVIRO-SEAL Duplex packing systems:* full CL300 up to 232°C (450°F)
*For ENVIRO-SEAL Graphite ULF packing system:* 1500 psig (104 bar) at 316°C (600°F)

**Construction Materials**

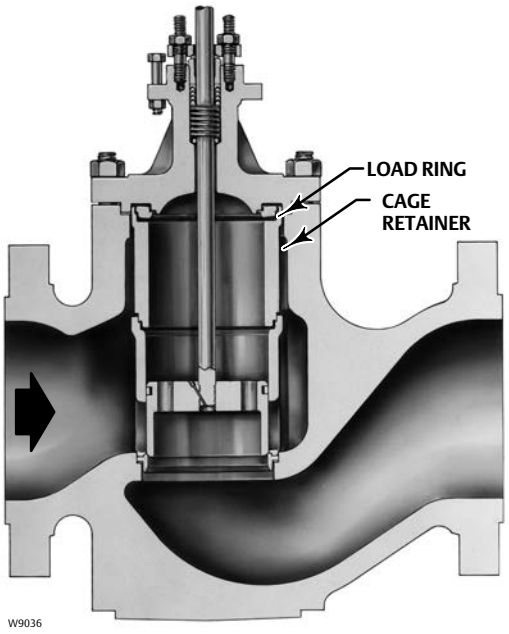
PTFE Packing Systems:
*Packing Ring and Lower Wiper:* PTFE V-ring(3)
*Male and Female Adaptor Rings:* Carbon-filled PTFE V-ring
Graphite ULF Packing Systems: Graphite rings
Anti-Extrusion Washer: Filled PTFE (not required for graphite packing)
Lantern Ring: S31600 (316 stainless steel) (not required for graphite packing)
Packing Box Flange: S31600
Spring: ■ 17-7PH stainless steel, ■ N06600, or ■ S17700
Packing Follower: S31600 lined with carbon-filled PTFE
Packing Box Studs: Strain-hardened 316 stainless steel
Packing Box Nuts: 316 stainless steel SA194 Grade 8M

1. Refer to the valve specifications in this bulletin for pressure/temperature limits of valve parts. Do not exceed the pressure/temperature rating of the valve. Do not exceed any applicable code or standard limitation.
2. The Environmental Protection Agency (EPA) has set a limit of 100 parts per million (ppm) for fugitive emissions from a valve in selected VOC (Volatile Organic Compound) services.
3. In vacuum service, it is not necessary to reverse the ENVIRO-SEAL PTFE packing rings.

Figure 1. Fisher EWD Valve with Standard Cage



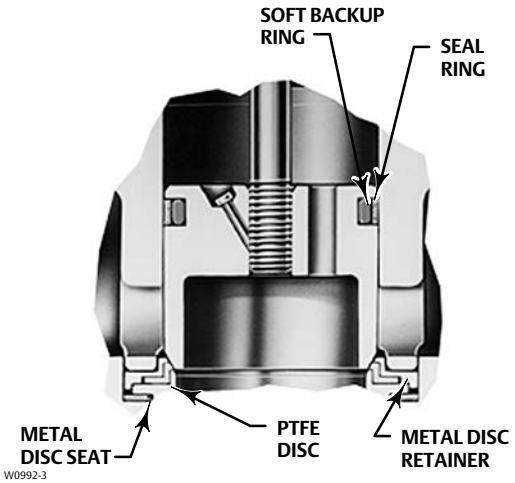

**TYPICAL OF CONSTRUCTIONS THROUGH NPS 12x6**



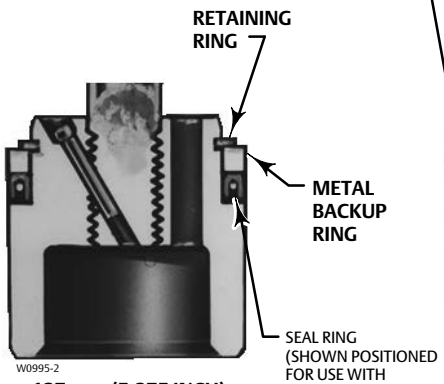

**NPS 12x8 CONSTRUCTION**

NOTE:
The NPS 10x8 valve is similar in appearance to sizes through NPS 12x6. However, the NPS 10x8 uses the load ring shown for the NPS 12x8. It does not use the cage retainer.

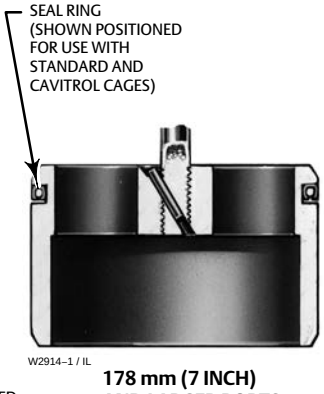
Figure 2. Fisher EWT Trim Details




**STANDARD CONSTRUCTION (SEAT PARTS ALSO TYPICAL OF OPTIONAL EWS PTFE SEATING)**



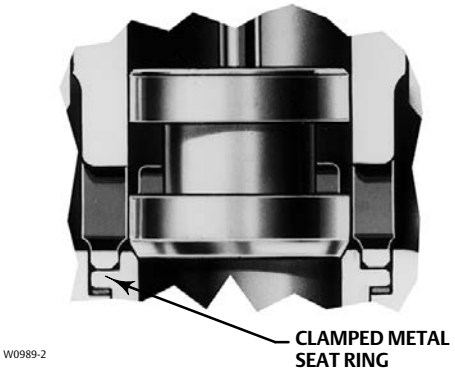

**137 mm (5.375 INCH) AND SMALLER PORTS**




**178 mm (7 INCH) AND LARGER PORTS**

**VALVE PLUG WITH OPTIONAL PRESSURE-ASSISTED SEAL RING**

Figure 3. Fisher EWS Trim Details Showing Standard Cage and Seating Construction




# C-seal Trim Description

C-seal trim (figure 5) is available for valves with port diameters from 2.875 inches through 8 inches.

With C-seal trim, a balanced valve can achieve high-temperature, Class V shutoff. Because the C-seal plug seal is formed from metal (N07718 nickel alloy) rather than an elastomer, a valve equipped with the C-seal trim can be applied in processes with a fluid temperature of up to 593°C (1100°F).

# ENVIRO-SEAL and HIGH-SEAL Packing Systems

Fisher ENVIRO-SEAL and HIGH-SEAL packing systems (figure 17) offer excellent sealing capabilities. These systems easily install in your existing valves or can be purchased with new valves. These systems help you seal your process to conserve valuable process fluid and to protect the environment against the emission of hazardous or polluting fluids. The long-life and reliability of these systems also reduce your maintenance cost and downtime.

For applications requiring compliance with environmental protection regulations, the unique ENVIRO-SEAL packing system and, for hazardous service, the ENVIRO-SEAL bellows seal bonnet (figure 18) are offered. The emission control packing system or seal bonnet keeps emission concentrations below the EPA 100 ppm requirement.

For an excellent stem seal in applications that are not environmentally-sensitive, the HIGH-SEAL Graphite ULF packing system is offered. The HIGH-SEAL packing system provides excellent sealing at pressure/temperature ratings beyond ENVIRO-SEAL limits.

ENVIRO-SEAL packing systems, available with PTFE, Graphite ULF, or Duplex packing, and the HIGH-SEAL Graphite ULF packing system feature live-loading and unique packing-ring arrangements for long-term, consistent sealing performance.

Figure 4. Fisher NPS 12x8 CL900 EWT-1 Valve

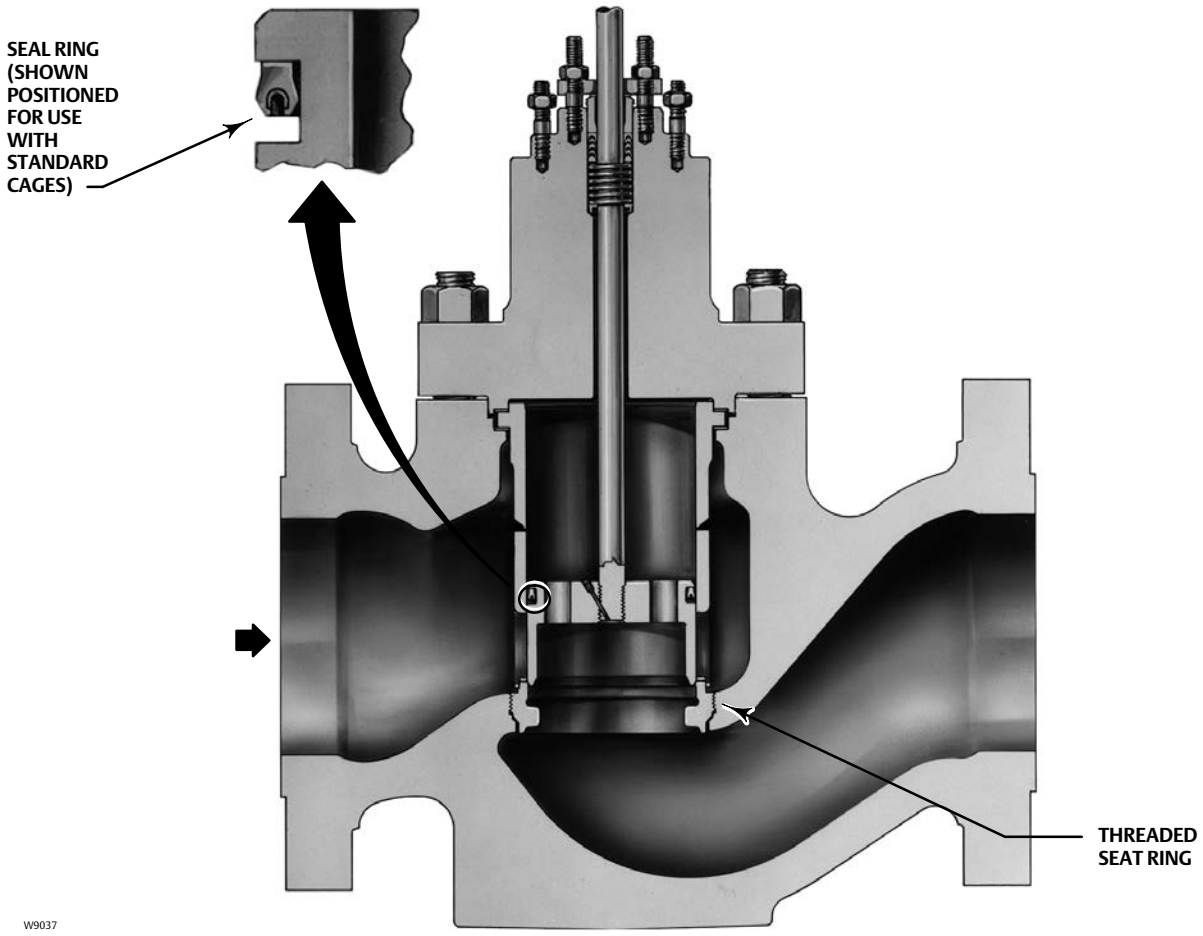
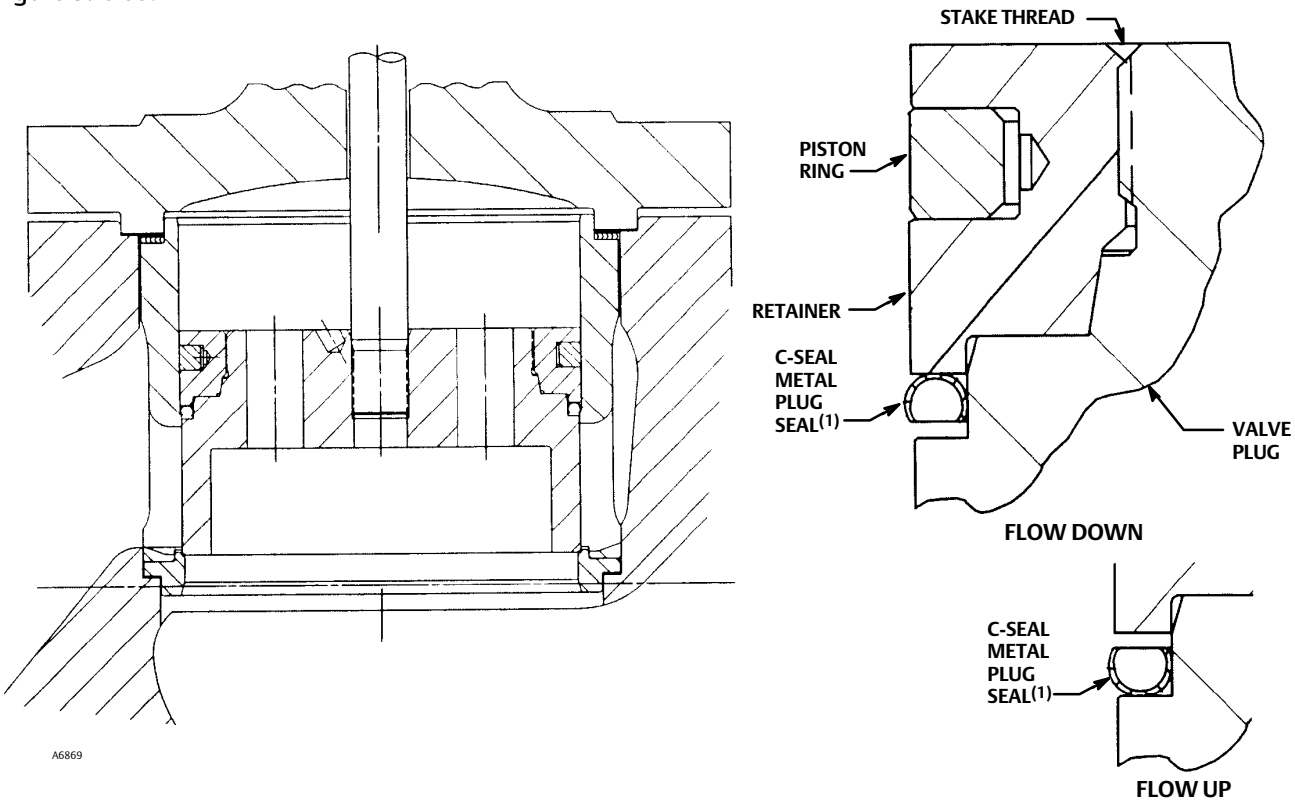


Figure 5. C-seal Trim




NOTES:
1. Reverse the orientation of the C-Seal plug seal proper shutoff when valve is used in a process with different fluid flow direction.

Figure 6. Typical Balanced TSO Trim

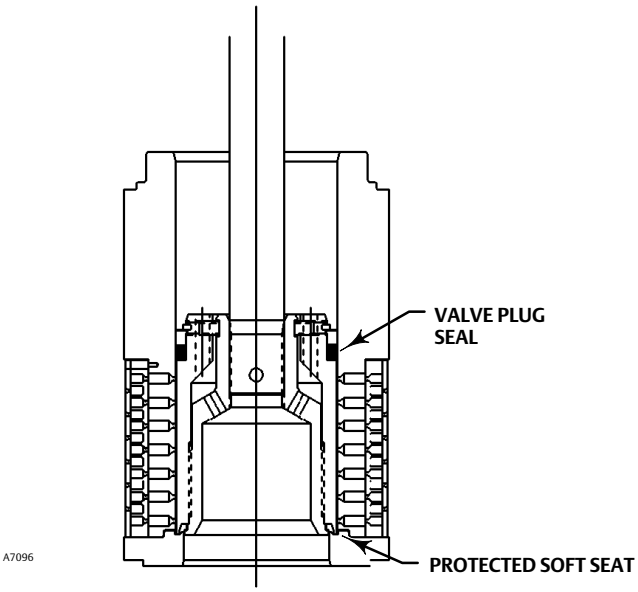
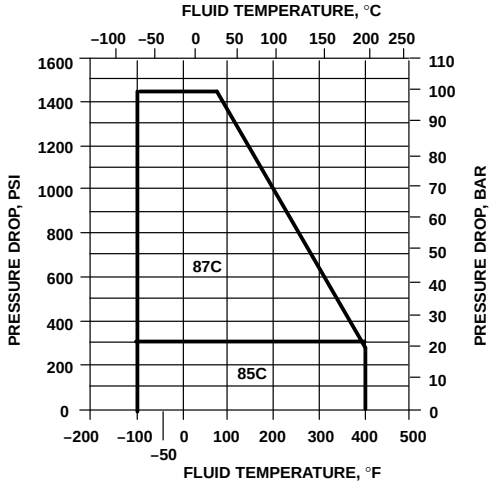


Table 1. Metal Trim Part Materials for Compatibility with NACE MR0175-2002 (Sour Service) Specifications, Environmental Restrictions Apply, Refer to Standard

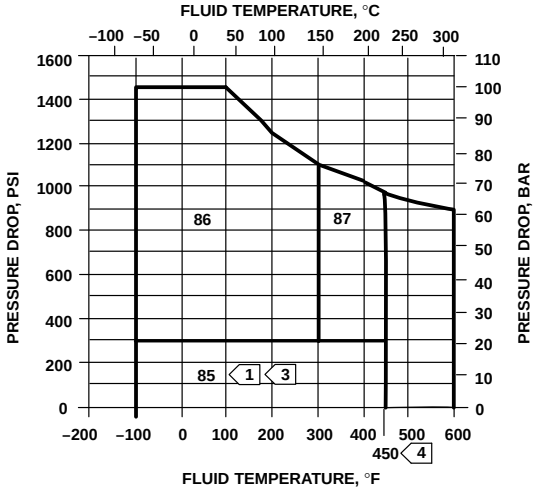
| Trim Designation | Valve Plug | Cage | Seat Ring for Standard Metal Seat Construction | Disk Seat and Retainer for Optional PTFE-Seat Construction | Valve Stem, Packing Follower, Lantern Ring, Packing Box Ring, and Pin | Load Ring(1) |
|---|---|---|---|---|---|---|
| 85(3) | S31600 | 316 SST with electroless nickel coating (ENC) | S31600 | --- | S20910 (Valve Stem) S31600 (All Other Parts) | N05500 |
| 85C(2,3) | S31600 | 316 SST with electroless nickel coating (ENC) | --- | S31600 | | |
| 86(3) | S31600 with seat hard faced with CoCr-A hardfacing alloy | 316 SST with electroless nickel coating (ENC) | R30006 (alloy 6) | --- | | |
| 87 | S31600 with seat and guide hard faced with CoCr-A hardfacing alloy | 316 SST with electroless nickel coating (ENC) | R30006 (alloy 6) | --- | | |
| 87C(2) | S31600 with seat and guide hard faced with CoCr-A hardfacing alloy | 316 SST with electroless nickel coating (ENC) | --- | S31600 | | |

1. NPS 10x8 and 12x8 valve body only.
2. 85C and 87C are trims for PTFE-seat constructions in EWS and EWT valves.
3. Not for use with Whisper Trim I with 5-3/8 inch and larger ports.

Figure 7. Typical Trim for NACE MR0175-2002 (Sour Service) (tables 11, 12, and 13 should be used along with these graphs to determine specific limits based on valve size and trim selection)




**FOR STANDARD PTFE SEATING WITH ALL 2 BODY MATERIALS**




**FOR OPTIONAL METAL SEATING WITH 2 CF8M MATERIAL**

NOTES:
1. Use trim 87 instead of trim 85 for non-lubricating fluids such as superheated steam or dry gasses between 149°C (300°F) and 316°C (600°F).
2. Do not exceed the maximum pressure and temperature for the class rating of the body material used, even through the trims shown may have higher capabilities.
3. Use trim 85 up to 99 BAR (1440 PSI) with clean dry gas. For process fluids other than clean dry gas, use trim 85 only up to 21 bar (300 PSI).
4. Trim 87 temperature limit can be extended above 232°C (450°F) If PEEK anti-extrusion rings and spring-loaded seal ring are used.

Table 2. Available Valve Constructions[1]

| VALVE | VALVE SIZE[2], NPS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CL150, 300, or 600 | | | | | | | | CL900 | |
| | 4x2 | 6x4 | 8x4 | 8x6 | 10x6[3] | 12x6 | 10x8 | 12x8 | 8x6 | 12x8 |
| EWD | x | x | x | x | x | x | x | x | x | x |
| EWD-1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | x |
| EWS | x | x | x | x | x | x | x | x | x | x |
| EWS-1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | x |
| EWT | x | x | x | x | x | x | x | x | x | x |
| EWT-1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | x |

1. X indicates available construction.
2. Two-number valve size designates end connection size x effective trim size.
3. NPS 10x6 has a valve outlet area identical to the NPS 8x6.

# Available Configurations

All configurations covered in this bulletin use a single-port, globe-style valve body with cage guiding and push-down-to-close valve plug action. This valve style is combined with different plug styles and either a clamped seat ring (no dash number suffix) or a seat ring threaded into the valve body (-1 suffix).

EWD: Balanced valve plug (figure 1) with clamped seat ring and metal-to-metal seating for all general applications over a wide range of pressure drops and temperatures.

EWD-1: NPS 12x8 CL900 EWD valve body, with threaded seat ring.

EWS: Unbalanced valve plug (figure 3) with clamped seat ring and metal-to-metal or optional metal-to-PTFE seating for all general applications requiring better shutoff capabilities than can be obtained with the EWD valve body.

EWS-1: NPS 12x8 CL900 EWS valve body, with threaded seat ring and metal-to-metal seating.

EWT: Balanced valve plug (figure 2) with metal-to-PTFE seating (for stringent shutoff requirements) standard in all EWT valves (except those with Cavitrol III cages). Metal-to-metal seating for higher temperatures is standard for all EWT valve bodies with Cavitrol III cages and optional for these valves with other cages.

EWT-1: NPS 12x8 CL900 EWT valve body, with threaded seat ring and with metal-to-metal seating (figure 4).

# Material Selection Guidelines

Regardless of valve construction, select the valve body/bonnet material from the specifications table, keeping in mind that the valve service conditions cannot exceed the ASME pressure/temperature limitations for the selected valve body. Then, perform steps 1 and 2 under the appropriate valve design heading to complete the selection process.

## EWD, EWS, or EWT Valve with all except Cavitrol III or Whisper Trim III Cages

1. Choose a trim combination for the service conditions according to figure 7 and 8, while making sure from tables 1 and 5 that this combination provides the desired trim materials. Then, make sure from table 11, 12, or 13 that the valve body/trim temperature limits are not exceeded.

2. Finally, check in table 20 that packing and other valve parts are available in materials that meet the desired service conditions.

## EWD-1, EWS-1, or EWT-1 Valve with Standard Cage

1. Choose a trim combination for the service conditions according to figure 9, while making sure from table 7 that this combination provides the desired trim materials.

2. Finally, check in table 20 that packing and other valve parts are available in materials that meet the desired service conditions.

Table 3. Shutoff Classifications per ANSI/FCI 70-2 and IEC 60534-4

| Valve | Seating | Shutoff Class |
|---|---|---|
| EWD or EWD-1 | Metal | II (standard) |
| | | III (optional for NPS 6x4 through 12x8 valves) |
| | | IV (optional for NPS 6x4 through 12x8 valves with optional multiple graphite piston rings) |
| EWS or EWS-1 | Metal | IV (standard) |
| | | V (optional, consult your Emerson sales office) |
| EWS | PTFE | VI |
| EWT with all except Cavitrol III cages | PTFE | V (optional) |
| | Metal | IV |
| | | V(1) |
| EWT with 1-stage Cavitrol III cage | Metal | IV (standard) |
| | | V (optional) |
| EWT with 2-stage Cavitrol III cage or 2- or 3-stage Cavitrol III cage | Metal or PTFE | V |
| EWT-1 | Metal | IV |

1. Class V shutoff for EWT requires spring-loaded seal ring, radius-seat plug, and wide-bevel seat ring. Not available with 8-inch port, quick-opening cage. Not available with S31600 (316 SST) valve plug and seat ring (trims 4, 29, 85).

Table 4. C-seal Shutoff Classification

| Valve | Valve Size, NPS | Port Diameter, mm (Inches) | Cage Style | ANSI/FCI Leakage Class |
|---|---|---|---|---|
| EWD (CL300, 600) | 6x4x2 1/2 | 73 (2.875) | Eq. %, Linear, Whisper I, Cav III (2-Stage) | Class V to 593°C (1100°F) [for port diameters from 73 through 203.2 mm (2.875 though 8-inch) with optional C-seal trim] |
| | 6x4 | 111.1 (4.375) | Eq. %, Linear, Whisper I, Cav III (1-Stage), Whisper III | |
| | 8x4 | | | |
| | 6x4 | 87.3 (3.4375) | Whisper III | |
| | 8x4 | | | |
| | 8x6 | 136.5 (5.375) | Cav III (2-Stage), Whisper III | |
| | 12x6 | | | |
| | 10x6(1) | 136.5 (5.375) | Whisper III | |
| | 8x6 | 177.8 (7) | Eq. %, Linear, Whisper I, Cav III (1-Stage), Whisper III | |
| | 10x6(1) | | | |
| | 12x6 | | | |
| | 10x8 | 203.2 (8) | Eq. %, Linear, Whisper I, Cav III (1-Stage), Whisper III | |
| | 12x8 | | | |
| | 10x8 | 177.8 (7) | Whisper III | |
| | 12x8 | | | |

1. NPS 10x6 has a valve outlet area identical to the NPS 8x6.

## EWT Valve with Cavitrol III Cage

1. Choose a trim combination for the service conditions according to figure 12, while making sure from table 15 that this combination provides the desired trim materials. Then, make sure from table 16 that the valve body/trim temperature limits are not exceeded.

2. Finally, check in table 20 that packing and other valve parts are available in materials that meet the desired service conditions.

## EWD, EWS, or EWT Valve with Whisper Trim III Cage

1. Choose a trim combination for the service conditions from table 17. Then, make sure from table 18 that the valve body/trim temperature limits are not exceeded.

2. Finally, check in table 20 that packing and other valve parts are available in materials that meet the desired service conditions.

Table 5. Fisher EWD, EWS, and EWT Metal Trim Part Combinations(1) Except for Valves with Cavitrol III or Whisper Trim III Cages

| TRIM DESIGNATIONS | VALVE PLUG | CAGE | SEAT | |
|---|---|---|---|---|
| | | | Disk Seat, Retainer for PTFE Seat Constructions | Seat Ring for Metal Seat Constructions |
| 1 (standard trim for all valves except EWT and those in CF8M. Trim 57 is standard for EWT. Trim 29 is standard for all valves in CF8M) | S41600 heat treated | 17-4 SST HT | --- | S41600 or CA15(5) (S41000) for EWD, EWS<br>CA6NM for EWD-1, EWS-1, EWT-1 |
| 3 and 3H(2)(7) | S31600 with seat and guide hard faced with CoCr-A hardfacing alloy | R30006 or R30016 (alloy 6)(3) | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) |
| 4(6) | S31600 | 17-4 SST HT | S31600 | S31600 |
| 5(8) and 5H(2)(8) | S31600 with seat and guide hard faced with CoCr-A hardfacing alloy | R31233 | R30006 disk seat and retainer(9) | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) |
| 6(9) | S31600 with seat and guide hard faced with CoCr-A hardfacing alloy | S31603 CRPL | R30006 disk seat and retainer(9) | R30006 (alloy 6) |
| 27 | S31600 with seat and guide hard faced with CoCr-A hardfacing alloy | 316 SST with electroless nickel coating (ENC) | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) |
| 28(6) | S31600 with seat hard faced with CoCr-A hardfacing alloy | 316 SST with electroless nickel coating (ENC) | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) |
| 29(6) (standard for all valves in CF8M) | S31600 | 316 SST with electroless nickel coating (ENC) | S31600 | S31600 |
| 37 and 37H(2)(7) | S31600 with seat and guide hard faced with CoCr-A hardfacing alloy | 17-4 SST HT | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) | S31600 with seat hard faced with CoCr-A hardfacing alloy(4) |
| 57 (standard for all EWT valve bodies in all materials except CF8M) | S41600 heat treated | 17-4 SST HT | S31600 | --- |

1. Nonferrous alloy combinations are also available. Consult your Emerson sales office for details.
2. Trims 3H, 5H, and 37H have clearances for high-temperature service.
3. Available only in linear, quick-opening, equal percentage, and Whisper Trim I cages.
4. Solid cast alloy 6 seat ring is used instead for NPS 4x2, 10x8, and 12x8 valve sizes.
5. CA15 is used for NPS 8x6 CL900 EWD and EWS.
6. Not for use with Whisper Trim I with 5-3/8 inch and larger ports.
7. With C-Seal trim, 3H, and 37H use solid cast Alloy 6 seat ring for NPS 8x4, 10x8, and 12x8 sizes.
8. Available only for NPS 8x6, 12x6, 10x8, 12x8 sizes Whisper Trim I cages.
9. Available only for NPS 10x8 and 12x8 Whisper Trim I cages.

## EWD-1, or EWT-1 Valve with Whisper Trim III Cage

1. Choose a trim combination for the service conditions according to figure 15 or 16, while making sure from table 19 that this combination provides the desired trim materials.

2. Finally, check in table 20 that packing and other valve parts are available in materials that meet the desired service conditions.

# ANSI/FCI Class VI Shutoff Capabilities

EWS valves with metal seat constructions and EWT valves with soft seat and metal seat constructions can provide ANSI/FCI Class VI shutoff capabilities. See tables 6 and 7.

Table 6. Class VI Shutoff Availability

| Valve | Port Size, Inches | Seat | Minimum Seat Load |
|---|---|---|---|
| EWS | ≤ 7 | Metal | 300 lbs/lineal inch |
| EWT | ≥ 3.4375 ≤ 7 | Soft | See Catalog 14 |
| EWT | ≥ 3.4375 ≤ 7 | Metal | 300 lbs/lineal inch |

Table 7. Class VI Trim Materials

| VALVE | CAGE | VALVE PLUG | SEAT RING | SEAL RING | TRIM TEMPERATURE LIMIT | |
|---|---|---|---|---|---|---|
| | | | | | °C | °F |
| EWS | 316 SST/ ENC | S31600/CoCr-A (alloy 6) seat | S31600 | NA | Not a limiting factor | |
| EWT | 316 SST / ENC | S31600 | S31600/PTFE | UHMWPE(1) R30003 | -29 to 66 | -20 to 150 |
| | 316 SST / ENC | S31600/CoCr-A seat | S31600 | UHMWPE R30003 | -101 to 66 | -150 to 150 |
| | 17-4 SST (17-4PH SST) | S41600 | S31600/PTFE | UHMWPE R30003 | -29 to 66 | -20 to 150 |
| | 17-4 SST | S41600 | S31600 | UHMWPE R30003 | -29 to 66 | -20 to 150 |

1. UHMWPE (Ultra High Molecular Weight Polyethylene)

# Fisher TSO (Tight Shutoff) Trim Capabilities

See figure 6 and tables 8, 9, and 10. For additional information contact your Emerson sales office.

Table 8. TSO (Tight Shutoff) Leakage Class

| Leakage Class | Maximum Leakage | Test Medium | Test Pressure | Test Procedure |
|---|---|---|---|---|
| TSO (Tight Shutoff) | Valves with TSO trim are factory tested to a more stringent Fisher test requirement of no leakage at time of shipment. | Water | Service ΔP(1) | ANSI/FCI Class V test procedure B |

1. Specify service Δ P when ordering.

Table 9. TSO Shutoff Availability

| VALVE | CONSTRUCTION |
|---|---|
| EWT | Std or Cavitrol III trim. Replaceable, protected soft seat |

Table 10. Port Diameters, Valve Plug Travel, Yoke Boss Diameters for TSO (Tight Shutoff) Trim

| VALVE | TRIM | MAX TRAVEL | | YOKE BOSS SIZE | | PORT DIAMETER | | | | $C_V$ REDUCTION AT 100% TRAVEL(1) | UNBALANCE AREA |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Nominal | | Actual TSO | | | |
| | | mm | Inch | mm | Inch | mm | Inch | mm | Inch | | Inch² |
| EWT NPS 6x4 | Std | 50.8 | 2 | 90 | 3-9/16 | 111 | 4.375 | 106 | 4.1875 | 4% (linear)<br>3% (equal percent) | 0.154 |
| EWT NPS 8x6 and 10x6(2) | Std | 50.8 | 2 | 90<br>127 | 3-9/16<br>5 | 179 | 7 | 173 | 6.8125 | 2% | 0.30 |
| | | 102 | 4 | 90 | 3-9/16 | | | | | 2% | |

1. This column lists the percent reduction of published maximum $C_V$ of the trim listed in the TRIM column.
2. NPS 10x6 has a valve outlet area identical to the NPS 8x6.

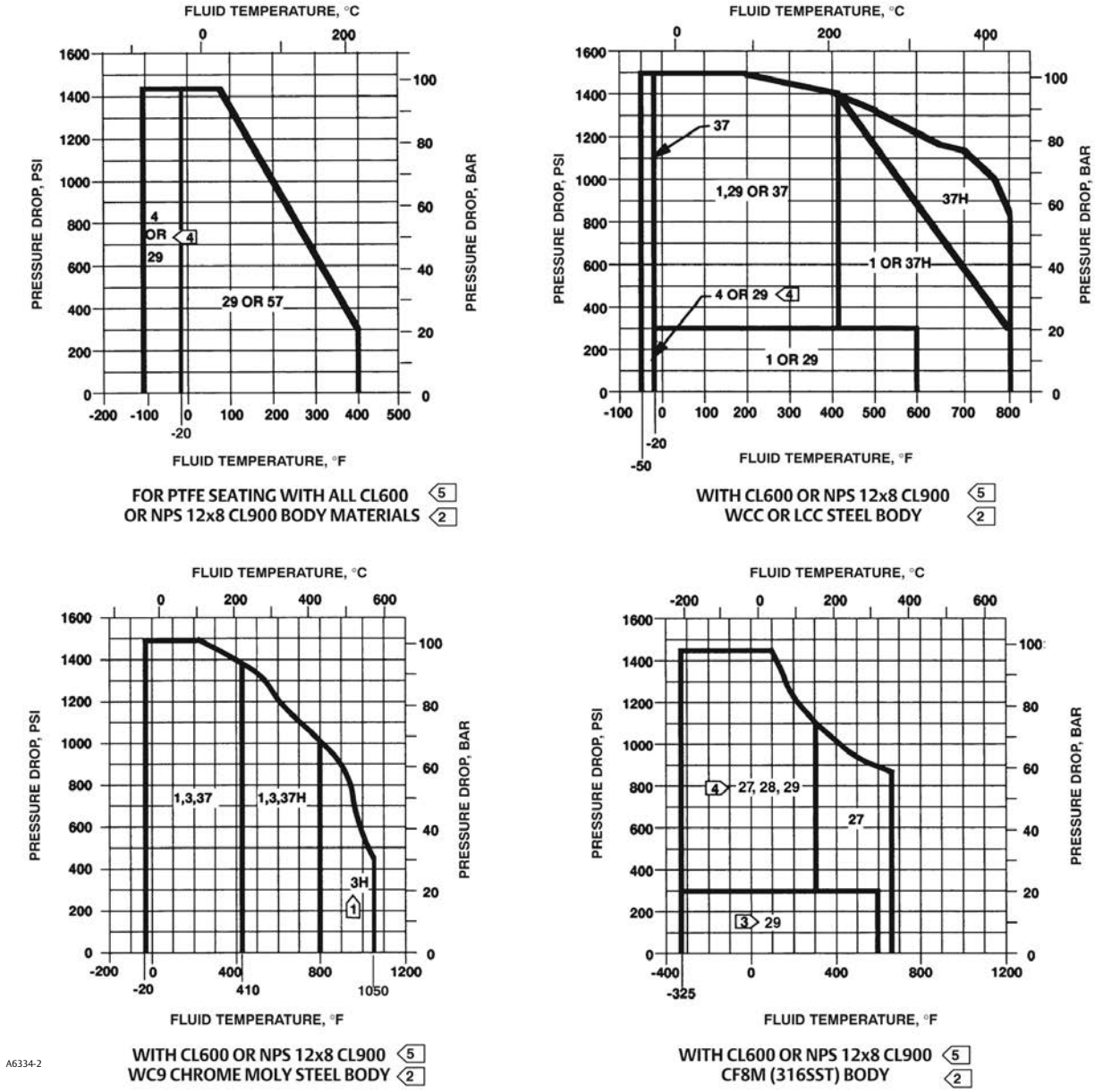
# Installation

Unless limited by seismic criteria, the valve body can be installed in any position (as long as sufficient support is provided if a fabricated extension bonnet is used). However, the normal method is with the actuator vertical above the valve, because non-vertical positions may cause uneven trim wear and decreased trim life.

Flow through the valve body must be in the direction indicated by the flow direction arrow on the valve body. Consider installing an upstream strainer, especially if the valve body includes slotted or multihole Whisper Trim or Cavitrol cages.

Dimensions are shown in figure 19.

Figure 8. Typical Trim Used in Fisher EWD, EWS, or EWT Valves Except Those with Cavitrol III or Whisper Trim III Cages (tables 11, 12, and 13 should be used along with these graphs to determine specific limits based on valve size and trim selection)




NOTES:
1 Be especially careful to specify service temperature fi trim 3,4, or 37 is selected, as different thermal expansion rates require special plug clearances, also, use trim 37H instead of trim 4 for non-lubricating fluids such as superheated steam or dry gasses between 149°C (300°F) AND 316°C (600°F).
2 Do not exceed the maximum pressure and temperature for the class rating of the body material used, even through the trims shown may have higher capabilities.
3 Use trim 27 instead of trim 29 for non-lubricating fluids such as superheated steam or dry gasses between 149°C (300°F) AND 316°C (600°F).
4 Trims 4 AND 29 may be used over 300 PSI only with clean, dry gas.
5 EWD, EWS, and EWT NPS 12x8 CL900 limited to CL600 pressure drops. See figure 9 and 10 EWD-1, EWS-1, and EWT-1 for full CL900 NPS 12x8 pressure drops.

Table 11. Valve/Trim Temperature Capabilities[1] for CL300 or 600 Fisher EWD, EWS, and EWT Valves with 2-Inch (51 mm) or 3-Inch (76 mm) Travel (Except those with Cavitrol III or Whisper Trim III Cages) (figures 7 and 8 should be used along with this table to determine specific limits based on valve size and trim selection)

| VALVE/BONNET MATERIAL | TRIM DESIGNATION FROM TABLE 5 | VALVE SIZE, NPS | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|
| | | | °C Min | °C Max | °F Min | °F Max |
| WCC steel | 1 | 4 x 2 | -29 | 399 | -20 | 750 |
| | | 6 x 4 | -29 | 343 | -20 | 650 |
| | | 8 x 4 | -29 | 329 | -20 | 625 |
| | | 8 x 6 or 10 x 6[3] | -29 | 316 | -20 | 600 |
| | | 12 x 6 | -29 | 260 | -20 | 500 |
| | | 12 x 8 or 10 x 8 | -29 | 427 | -20 | 800 |
| | 29, 85 | 4 x 2 | -29 | 316 | -20 | 600 |
| | | 6 x 4 | -29 | 221 | -20 | 430 |
| | | 8 x 4 | -29 | 218 | -20 | 425 |
| | | 8 x 6 or 10 x 6[3] | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 174 | -20 | 345 |
| | | 12 x 8 or 10 x 8 | -29 | 316 | -20 | 600 |
| | 5[4] | 8X6, 12X6, 10X8, or 12X8 | -29 | 316 | -20 | 600 |
| | 5H[4] | 8X6, 12X6, 10X8, or 12X8 | 316 | 427 | 600 | 800 |
| | 6[4] | 10X8 | -29 | 316 | -20 | 600 |
| | 37 | 4 x 2 through 12 x 8 | -29 | 210 | -20 | 410 |
| | 37H | 4 x 2 through 12 x 8 | 210 | 427 | 410 | 800 |
| | 57 | 4 x 2 through 12 x 8 | -29 | 204 | -20 | 400 |
| LCC steel | 1 | 4 x 2 | -29 | 343 | -20 | 650 |
| | | 6 x 4 | -29 | 343 | -20 | 650 |
| | | 8 x 4 | -29 | 329 | -20 | 625 |
| | | 8 x 6 or 10 x 6[3] | -29 | 329 | -20 | 625 |
| | | 12 x 6 | -29 | 260 | -20 | 500 |
| | | 10 x 8 or 12 x 8 | -29 | 343 | -20 | 650 |
| | 29, 85 | 4 x 2 | -46 | 316 | -50 | 600 |
| | | 6 x 4 | -46 | 218 | -50 | 425 |
| | | 8 x 4 | -46 | 218 | -50 | 425 |
| | | 8 x 6 or 10 x 6[3] | -46 | 204 | -50 | 400 |
| | | 12 x 6 | -46 | 163 | -50 | 325 |
| | | 10 x 8 or 12 x 8 | -46 | 316 | -50 | 600 |
| | 5[4] | 8X6, 12X6, 10X8, or 12X8 | -46 | 316 | -46 | 600 |
| | 6[4] | 10X8 | -46 | 316 | -50 | 600 |
| | 37 | 4 x 2 through 12 x 8 | -46 | 210 | -50 | 410 |
| | 37H | 4 x 2 through 12 x 8 | 210 | 343 | 410 | 650 |
| | 57 | 4 x 2 through 12 x 8 | -29 | 204 | -20 | 400 |

-continued-

Table 11. Valve/Trim Temperature Capabilities(1) for CL300 or 600 Fisher EWD, EWS, and EWT Valves with 2-Inch (51 mm) or 3-Inch (76 mm) Travel (Except those with Cavitrol III or Whisper Trim III Cages) (figures 7 and 8 should be used along with this table to determine specific limits based on valve size and trim selection) (continued)

| VALVE/BONNET MATERIAL | TRIM DESIGNATION FROM TABLE 5 | VALVE SIZE, NPS | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|
| | | | °C Min | °C Max | °F Min | °F Max |
| WC9 chrome moly steel | 1 | 4 x 2 | -29 | 399 | -20 | 750 |
| | | 6 x 4 | -29 | 343 | -20 | 650 |
| | | 8 x 4 | -29 | 329 | -20 | 625 |
| | | 8 x 6 or 10 x 6(3) | -29 | 316 | -20 | 600 |
| | | 12 x 6 | -29 | 260 | -20 | 500 |
| | | 12 x 8 or 10 x 8 | -29 | 427 | -20 | 800 |
| | 3 | 4 x 2 through 12 x 8 | -29 | 427(5) | -20 | 800(5) |
| | 3H | 4 x 2 through 12 x 8 | 427 | 566 | 800 | 1050 |
| | 5(4) | 8 x 6, 12 x 6, 10 x 8, or 12 x 8 | -29 | 316 | -20 | 600 |
| | 5H(4) | 8 x 6, 12 x 6, 10 x 8, or 12 x 8 | 316 | 566 | 600 | 1050 |
| | 6(4) | 10 x 8 | -29 | 316 | -20 | 600 |
| | 27, 87 | 4 x 2 | -29 | 343 | -20 | 650 |
| | | 6 x 4 | -29 | 221 | -20 | 430 |
| | | 8 x 4 | -29 | 218 | -20 | 425 |
| | | 8 x 6 or 10 x 6(3) | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 163 | -20 | 325 |
| | | 12 x 8 or 10 x 8 | -29 | 343 | -20 | 650 |
| | 29, 85 | 4 x 2 | -29 | 316 | -20 | 600 |
| | | 6 x 4 | -29 | 221 | -20 | 430 |
| | | 8 x 4 | -29 | 218 | -20 | 425 |
| | | 8 x 6 or 10 x 6(3) | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 163 | -20 | 325 |
| | | 12 x 8 or 10 x 8 | -29 | 316 | -20 | 600 |
| | 37 | 4 x 2 through 12 x 8 | -29 | 210 | -20 | 410 |
| | 37H | 4 x 2 through 12 x 8 | 210 | 427 | 410 | 800 |
| | 57 | 4 x 2 through 12 x 8 | -29 | 204 | -20 | 400 |
| LCC steel<br>CF8M (316 SST) | 5(4) | 8 x 6, 12 x 6, 10 x 8, or 12 x 8 | -198(4) | 316(1) | -325(4) | 600(1) |
| | 6(4) | 10 x 8 | -198(4) | 316(1) | -325(4) | 600(1) |
| | 27 | 4 x 2 through 12 x 8 | -198(2) | 343 | -325(2) | 650 |
| | 28 | 4 x 2 through 12 x 8 | -198(2) | 149 | -325(2) | 300 |
| | 29, 85 | 4 x 2 through 12 x 8 | -198(2) | 316 | -325(2) | 600 |

1. For metal trim parts only.
2. May be used down to -254°C (-425°F) if manufacturing process includes Charpy Impact test.
3. NPS 10x6 has a valve outlet area identical to the NPS 8x6.
4. Available for Whisper Trim I cages.
5. For Trim 3, upper temperature to 316°C (600°F) when used for Whisper Trim I cages.

Table 12. 4-Inch (102 mm) Travel Whisper Trim I Fisher EWD and EWT Valve Body/Trim Temperature Capabilities[1] (CL150 - 600 and NPS 8 x 6, CL900) (figure 8 should be used along with this table to determine specific limits based on valve size and trim selection)

| BODY/BONNET MATERIAL[2] | TRIM DESIGNATION FROM TABLE 5 | VALVE SIZE, NPS | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|
| | | | °C | | °F | |
| | | | Min | Max | Min | Max |
| WCC steel | 1 | 8 x 6 or 10 x 6[3] | -29 | 329 | -20 | 625 |
| | | 12 x 6 | -29 | 285 | -20 | 545 |
| | 3 | 8 x 6 or 10 x 6[3] or 12 x 6 | -29 | 316 | -20 | 600 |
| | 3H | 8 x 6 or 10 x 6[3] or 12 x 6 | 316 | 427 | 600 | 800 |
| | 5 | 8 x 6, 12 x 6, 10 x 8 or 12 X 8 | -29 | 316 | -20 | 600 |
| | 5H | 8 x 6, 12 x 6, 10 x 8 or 12 x 8 | 316 | 427 | 600 | 800 |
| | | 8 x 6 or 10 x 6[3] or 12 x 6 | -29 | 204 | -20 | 400 |
| | 37 | 8 x 6 or 10 x 6[3] or 12 x 6 | -29 | 210 | -20 | 410 |
| | 37H | 8 x 6 or 10 x 6[3] | 210 | 427 | 410 | 800 |
| | | 12 x 6 | 210 | 363 | 410 | 685 |
| LCC steel | 1 | 8 x 6 or 10 x 6[3] | -29 | 329 | -20 | 625 |
| | 5 | 8 x 6, 12 x 6, 10 x 8 or 12 x 8 | -46 | 316 | -50 | 600 |
| | 6 | 10 x 8 | -46 | 316 | -50 | 600 |
| | 4 and 57 | 8 x 6 or 10 x 6[3] | -46 | 204 | -50 | 400 |
| | 37 | 8 x 6 or 10 x 6[3] | -29 | 210 | -20 | 410 |
| | 37H | 8 x 6 or 10 x 6[3] | 210 | 343 | 410 | 650 |
| WC9 Chrome moly steel | 3 | 4 x 2 through 12 x 8 | -29 | 316 | -20 | 600 |
| | 3H | 4 x 2 through 12 x 8 | 316 | 566 | 600 | 1050 |
| | 5 | 8 x 6, 12 x 6, 10 x 8 or 12 x 8 | -29 | 316 | -20 | 600 |
| | 5H | 8 x 6, 12 x 6, 10 x 8 or 12 x 8 | 316 | 566 | 600 | 1050 |
| | 6 | 10 x 8 | -29 | 316 | -20 | 600 |

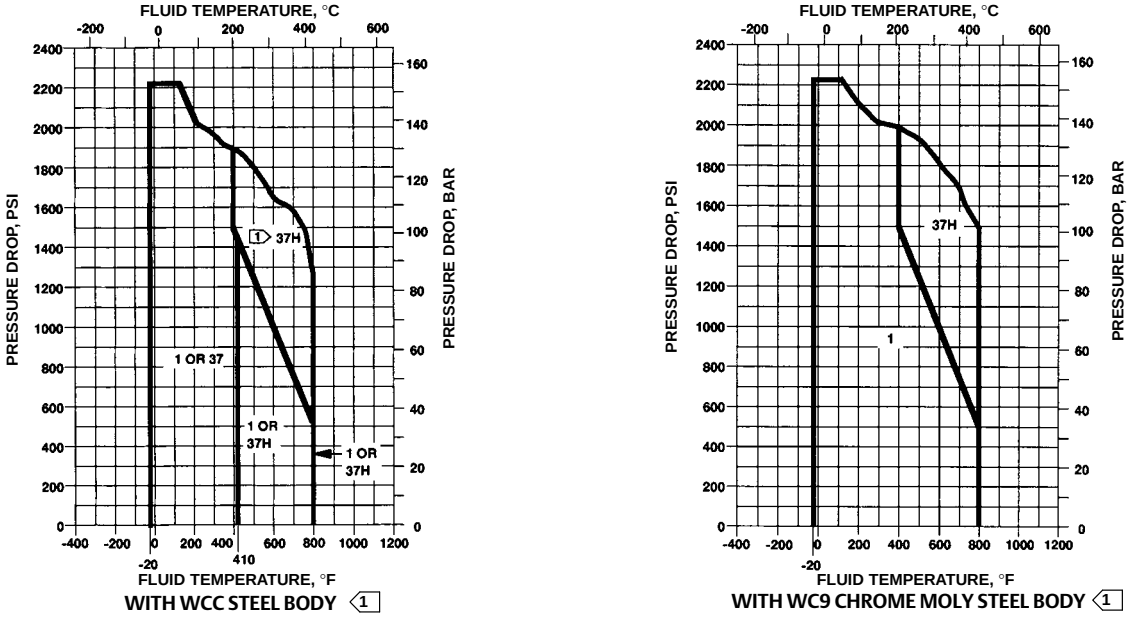
1. For metal trim parts only.
2. Same material also used for bonnet spacer.
3. NPS 10x6 has a valve outlet area identical to the NPS 8x6.

Table 13. Fisher CL900 EWD, EWS, and EWT Valve Body/Trim Temperature Capabilities[1] (figure 8 should be used along with this table to determine specific limits based on valve size and trim selection)

| BODY/BONNET MATERIAL | TRIM DESIGNATION FROM TABLE 5 | VALVE SIZE, NPS | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|
| | | | °C | | °F | |
| | | | Min | Max | Min | Max |
| WCC steel | 1 | 8 x 6<br>12 x 8 | -29<br>-29 | 316<br>427 | -20<br>-20 | 600<br>800 |
| | 29, 85 | 8 x 6<br>12 x 8 | -29<br>-29 | 204<br>316 | -20<br>-20 | 400<br>600 |
| | 37 | 8 x 6 or 12 x 8 | -29 | 210 | -20 | 410 |
| | 37H | 8 x 6 or 12 x 8 | 210 | 427 | 410 | 800 |
| | 57 | 8 x 6 or 12 x 8 | -29 | 204 | -20 | 400 |
| LCC steel | 1 | 8 x 6 only | -29 | 329 | -20 | 625 |
| | 4, 37 | 8 x 6 only | -46 | 210 | -50 | 410 |
| | 37H | 8 x 6 only | 210 | 371 | 410 | 700 |
| | 57 | 8 x 6 only | -29 | 204 | -20 | 400 |
| | 29, 85 | 8 x 6 only | -46 | 204 | -50 | 400 |
| WC9 chrome moly steel | 1 | 8 x 6<br>12 x 8 | -29<br>-29 | 316<br>427 | -20<br>-20 | 600<br>800 |
| | 3 | 8 x 6 | -29 | 427 | -20 | 800 |
| | 3H | 8 x 6 | 427 | 566 | 800 | 1050 |
| | 3 | 12 x 8 | -29 | 427 | -20 | 800 |
| | 3H | 12 x 8 | 427 | 566 | 800 | 1050 |
| | 27, 87 | 8 x 6<br>12 x 8 | -29<br>-29 | 204<br>343 | -20<br>-20 | 400<br>650 |
| | 29, 85 | 8 x 6<br>12 x 8 | -29<br>-29 | 204<br>316 | -20<br>-20 | 400<br>600 |
| | 37 | 8 x 6 or 12 x 8 | -29 | 210 | -20 | 410 |
| | 37H | 8 x 6 or 12 x 8 | 210 | 427 | 410 | 800 |
| | 57 | 8 x 6 or 12 x 8 | -29 | 204 | -20 | 400 |
| 316 SST (CF8M) | 27, 87 | 8 x 6 or 12 x 8 | -198[2] | 343 | -325[2] | 650 |
| | 29, 85 | 8 x 6 or 12 x 8 | -198[2] | 316 | -325[2] | 600 |

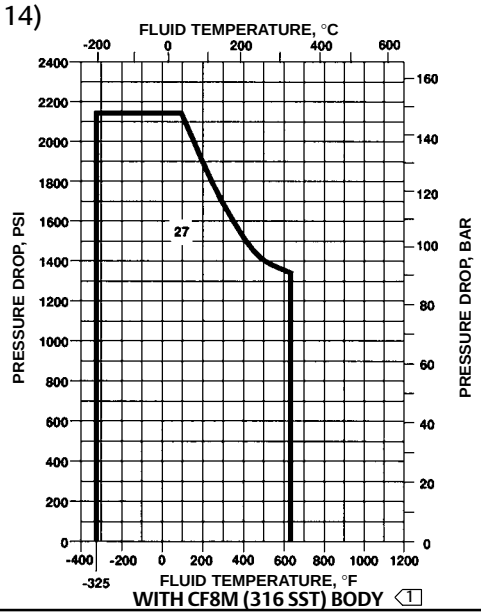
1. For metal trim parts only.
2. May be used down to -254°C (-425°F) if manufacturing process includes Charpy impact test.

Figure 9. Typical Trim Used in Fisher EWD, EWS, and EWT NPS 8x6 CL900 Valves with Standard Cages and EWD-1, EWS-1, and EWT-1 NPS 12x8 CL900 Valves with Standard Cages (see table 14)




NOTE:
1 Do not exceed the maximum pressure and temperature for the class rating of the body material used, even through the trims shown may have higher capabilities.

Figure 10. Typical Trim Used in NPS 8x6 CL900 Fisher EWD, EWS, EWT and NPS 12x8 CL900 EWD-1, EWS-1, and EWT-1 Valves with Standard Cages (see table 14)




NOTE:
1 Do not exceed the maximum pressure and temperature for the class rating of the body material used, even through the trims shown may have higher capabilities.

Table 14. NPS 8x6 CL900 Fisher EWD, EWS, EWT and NPS 12x8 CL900 EWD-1, EWS-1, and EWT-1 Metal Trim Part Combinations Except for Valves with Whisper Trim III Cages

| Trim Designation | Valve Plug | Cage | Seat Ring |
|---|---|---|---|
| 1 | S41600 (416 SST) heat treated | 17-4 SST H900 | Heat-treated CA6NM(1) |
| 27 | 316 SST with seat and guide hard-faced with CoCr-A | 316 SST with electroless nickel coating (ENC) | 316 SST with seat hard-faced with CoCr-A |
| 37 and 37H(2) | S31600 with seat and guide hard-faced with CoCr-A | 17-4 SST H900 | S31600 with seat hard-faced with CoCr-A |

1. CA6NM is similar to 410 SST.
2. Trim 37H has clearances for high-temperature service.

Figure 11. Detail of 2-Stage Cavitrol III Cage in CL300 or 600 Fisher EWT Valve

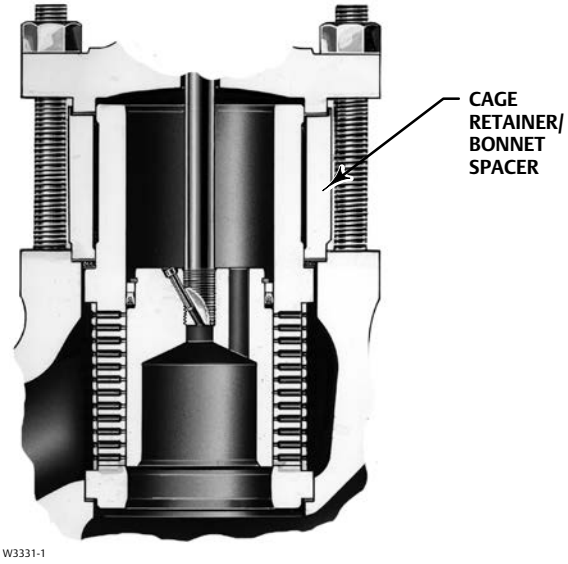
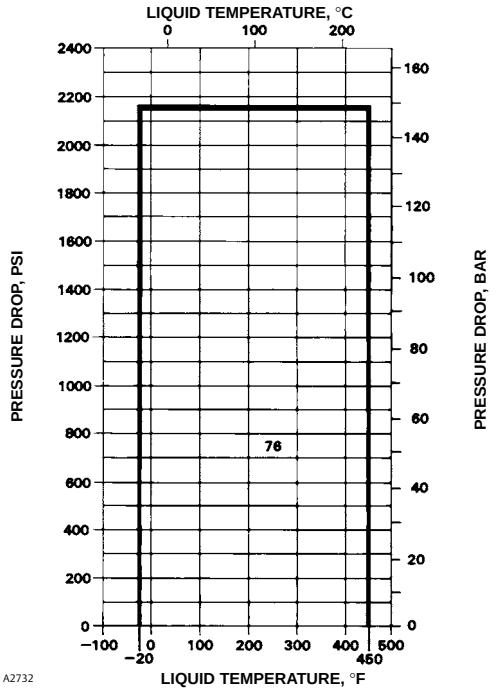



Figure 12. Typical Trim Used in Cavitrol III Cage Constructions with Steel or Stainless Steel Valves (see tables 15)




NOTE:
Do not exceed the maximum pressure and temperature for the class rating of the body material used, even through the trims shown may have higher capabilities.

Table 15. Cavitrol III(1) Metal Trim Part Combination

| Trim Designation | Valve Plug | Cage | Cage Retainer(2) | Seat Ring |
|---|---|---|---|---|
| 76 | Heat-treated S42000 (420 SST) | 17-4 SST H900 | S31600 (316 SST) | S17400 with H900 heat-treat condition |

1. Available only in EWT valve.
2. Not used in NPS 12x8 or 8x6 CL900 valves.

Table 16. Cavitrol III Valve Body/Trim Temperature Capabilities

| TRIM DESIGNATION FROM TABLE 15 | VALVE BODY and BONNET | | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|
| | | | °C | | °F | |
| | | | Min | Max | Min | Max |
| 76 | WCC carbon steel or WC9 chrome moly steel | | -29 | These materials not limiting factors | -20 | These materials not limiting factors |
| | LCC carbon steel | | -46 | | -50 | |
| | S31600 (316 SST) | NPS 4x2 valve | -29 | 204 | -20 | 400 |
| | | NPS 6x4 valve | -29 | 149 | -20 | 300 |
| | | NPS 8x4 valve | -29 | 135 | -20 | 275 |
| | | NPS 8x6 or 10x6(1) valve(2) | -29 | 121 | -20 | 250 |
| | | NPS 12x6 valve | -29 | 107 | -20 | 225 |
| | | NPS 12x8 valve(3) | -29 | 177 | -20 | 350 |

1. NPS 10x6 has a valve outlet area identical to the NPS 8x6.
2. This valve body/trim combination not available in CL900 valve.
3. This valve body/trim combination available in all NPS 12x8 rating classes.

Figure 13. Fisher EWT Metal-Seat Valve with Whisper Trim I Cage

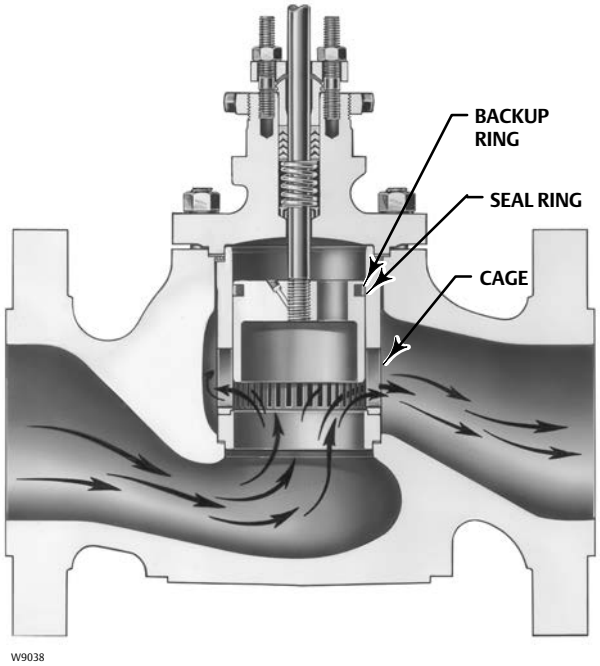



Figure 14. Fisher EWD Valve with Whisper Trim III Cage (shown with optional drain plug)

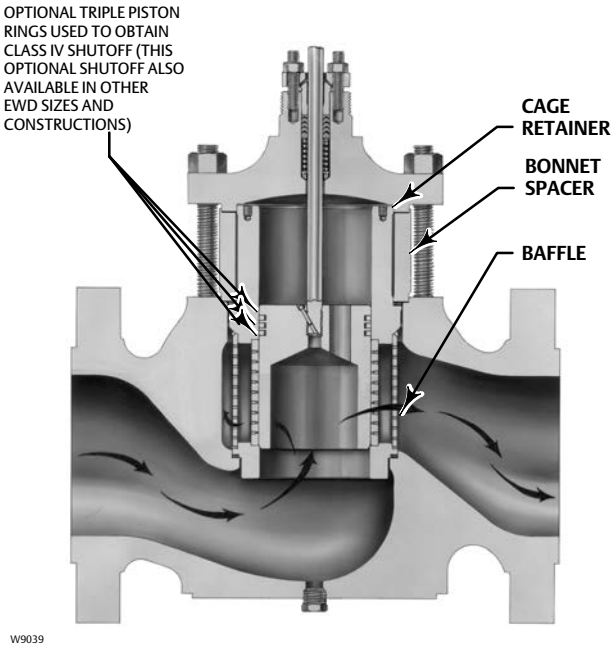


Table 17. Metal Trim Part Combinations for Fisher EWD, EWS, and EWT Valves with Whisper Trim III Cages

| Trim Designation | Valve Plug | Cage | Cage Retainer | Baffle (for Level D3 Cage Only) | Seat Ring for Metal-Seat Construction | Disk Seat and Retainer for PTFE-Seat Construction | Stem |
|---|---|---|---|---|---|---|---|
| 19.1 through 111.1, 177.8 and 203.2 mm (0.75 through 4.375, 7 and 8 Inch) Port Sizes | | | | | | | |
| 301G | S41600 | 17-4 SST | -- | Steel | S41600 | -- | S31600 |
| 301GC(3) | S41600 | 17-4 SST | -- | Steel | -- | S41600/ S31600 | S31600 |
| 312G(1) | S31600/CoCr-A Seat & Guide | 316/ENC Electroless Nickel Coated | -- | S31600 | R30006 | -- | S20910 |
| 312GC(1)(3) | S31600/CoCr-A Seat & Guide | 316/ENC Electroless Nickel Coated | -- | S31600 | -- | R30006/ S31600 | S20910 |
| 315G(1) | S31600/CoCr-A Seat & Guide | 316 SST Chrome | -- | S31600 | R30006 | -- | S20910 |
| 315GC(1)(3) | S31600/CoCr-A Seat & Guide | 316 SST Chrome | -- | S31600 | -- | R30006/ S31600 | S20910 |
| 318G(2) | F22/CoCr-A Seat & Guide | 2.25 Cr-1 Mo Nitrided(7) | -- | WC9 | R30006 | -- | S41000/ S42200(4) |
| 306 | S31803/Ultimet Seat & Guide | 2205 Duplex(6) Plate | -- | S31803 | S31803/Ultimet | -- | S31803 |
| 307G | S31600/CoCr-A Seat & Guide | 17-4 SST | -- | Steel | R30006 | -- | S31600 |
| 307GH(5) | S31600/CoCr-A Seat & Guide | 17-4 SST | -- | Steel | R30006 | -- | S31600 |
| 136.5 mm (5.375 Inch) Port | | | | | | | |
| 301 | S17400 | 416 SST | WCC/ENC | Steel | S41600 | -- | S31600 |
| 301 A(2) | S17400 | 416 SST | WCC/Nitrided | Steel | S41600 | -- | S31600 |
| 301 C(3) | S17400 | 416 SST | WCC/ENC | Steel | -- | S41600/ S31600 | S31600 |
| 304 | S31600/CoCr-A Seat & Guide | 416 SST | WCC/ENC | Steel | S31600/ CoCr-A Seat | -- | S31600 |
| 312(1) | S31600/CoCr-A Seat & Guide | 316/ENC Electroless Nickel Coated | 316/ENC Electroless Nickel Coated | S31600 | R30006 | -- | S20910 |
| 312C(1)(3) | S31600/CoCr-A Seat & Guide | 316/ENC Electroless Nickel Coated | 316/ENC Electroless Nickel Coated | S31600 | -- | R30006/ S31600 | S20910 |
| 315(2) | S31600/CoCr-A Seat & Guide | 316 SST/ Electrolyzed Chrome Coat | S31600/ Electrolyzed Chrome Coat | S31600 | S31600/CoCr-A | -- | S31600 |
| 318(2) | S31600/CoCr-A Seat & Guide | 2.25 Cr-1 Mo Nitrided | WC9 Nitrided(7) | WC9 | S31600/ CoCr-A Seat | -- | S41000/ S42200(4) |
| 306 | S31803/Ultimet Seat & Guide | 2205 Duplex(6) Chrome Plate | -- | S31803 | S31803/Ultimet | -- | S31803 |

1. NACE compatible trims meets NACE MR0175 2002, MR0175/ISO15156, MR0103.
2. Not for use with EWT construction.
3. Not for use with EWD construction.
4. Trims 318G and 318 use S41000 stem up to 538°C (1000°F) and S42200 stem above 538°C (1000°F).
5. For high temperature service.
6. 22 Cr- 5 Ni duplex stainless steel.
7. With C-seal construction use F22 alloy steel/CoCr-A/Nitrided cage material.

Table 18. Valve/Trim Temperature Capabilities for Fisher EWD, EWS, and EWT Valves with Whisper Trim III Cages

| VALVE/BONNET/ BONNET SPACER MATERIAL | TRIM DESIGNATION FROM TABLE 17 | VALVE SIZE, NPS | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|
| | | | °C | | °F | |
| | | | Min | Max | Min | Max |
| **19.1 through 111.1, 177.8 and 203.2 mm (0.75 through 4.375, 7 and 8 Inch) Port Size** | | | | | | |
| WCC or WC9 | 301G | 4 x 2 | -29 | 399 | -20 | 750 |
| | | 6 x 4 | -29 | 316 | -20 | 625 |
| | | 8 x 4 | -29 | 316 | -20 | 625 |
| | | 8 x 6 or 10 x 6 | -29 | 427 | -20 | 800 |
| | | 10 x 8 | -29 | 427 | -20 | 800 |
| | | 12 x 8 | -29 | 427 | -20 | 800 |
| | 301GC | 4 x 2 | -29 | 204 | -20 | 400 |
| | | 6 x 4 | -29 | 204 | -20 | 400 |
| | | 8 x 4 | -29 | 204 | -20 | 400 |
| | | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 10 x 8 | -29 | 204 | -20 | 400 |
| | | 12 x 8 | -29 | 204 | -20 | 400 |
| | 312G | 4 x 2 | -29 | 316 | -20 | 600 |
| | | 6 x 4 | -29 | 218 | -20 | 425 |
| | | 8 x 4 | -29 | 218 | -20 | 425 |
| | | 8 x 6 or 10 x 6 | -29 | 316 | -20 | 600 |
| | | 10 x 8 | -29 | 316 | -20 | 600 |
| | | 12 x 8 | -29 | 316 | -20 | 600 |
| | 312GC | 4 x 2 | -29 | 204 | -20 | 400 |
| | | 6 x 4 | -29 | 204 | -20 | 400 |
| | | 8 x 4 | -29 | 204 | -20 | 400 |
| | | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 10 x 8 | -29 | 204 | -20 | 400 |
| | | 12 x 8 | -29 | 204 | -20 | 400 |
| | 315G | 4 x 2 | -29 | 316 | -20 | 600 |
| | | 6 x 4 | -29 | 218 | -20 | 425 |
| | | 8 x 4 | -29 | 218 | -20 | 425 |
| | | 8 x 6 or 10 x 6 | -29 | 316 | -20 | 600 |
| | | 10 x 8 | -29 | 316 | -20 | 600 |
| | | 12 x 8 | -29 | 316 | -20 | 600 |
| | 315GC | 4 x 2 | -29 | 204 | -20 | 400 |
| | | 6 x 4 | -29 | 204 | -20 | 400 |
| | | 8 x 4 | -29 | 204 | -20 | 400 |
| | | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 10 x 8 | -29 | 204 | -20 | 400 |
| | | 12 x 8 | -29 | 204 | -20 | 400 |
| | 318G (WC9 only) | 4 x 2 | -29 | 593 | -20 | 1100 |
| | | 6 x 4 | -29 | 593 | -20 | 1100 |
| | | 8 x 4 | -29 | 593 | -20 | 1100 |
| | | 8 x 6 or 10 x 6 | -29 | 593 | -20 | 1100 |
| | | 10 x 8 | -29 | 593 | -20 | 1100 |
| | | 12 x 8 | -29 | 593 | -20 | 1100 |
| | 306 | 4 x 2 | -29 | 316 | -20 | 600 |
| | | 6 x 4 | -29 | 316 | -20 | 600 |
| | | 8 x 4 | -29 | 316 | -20 | 600 |
| | | 8 x 6 or 10 x 6 | -29 | 316 | -20 | 600 |
| | | 10 x 8 | -29 | 316 | -20 | 600 |
| | | 12 x 8 | -29 | 316 | -20 | 600 |
| | 307G | 4 x 2 through 12 x 8 | -29 | 210 | -20 | 410 |
| | 307GH | 4 x 2 through 12 x 8 | 210 | 427 | 410 | 800 |

-continued-

Table 18. Valve/Trim Temperature Capabilities for Fisher EWD, EWS, and EWT Valves with Whisper Trim III Cages (continued)

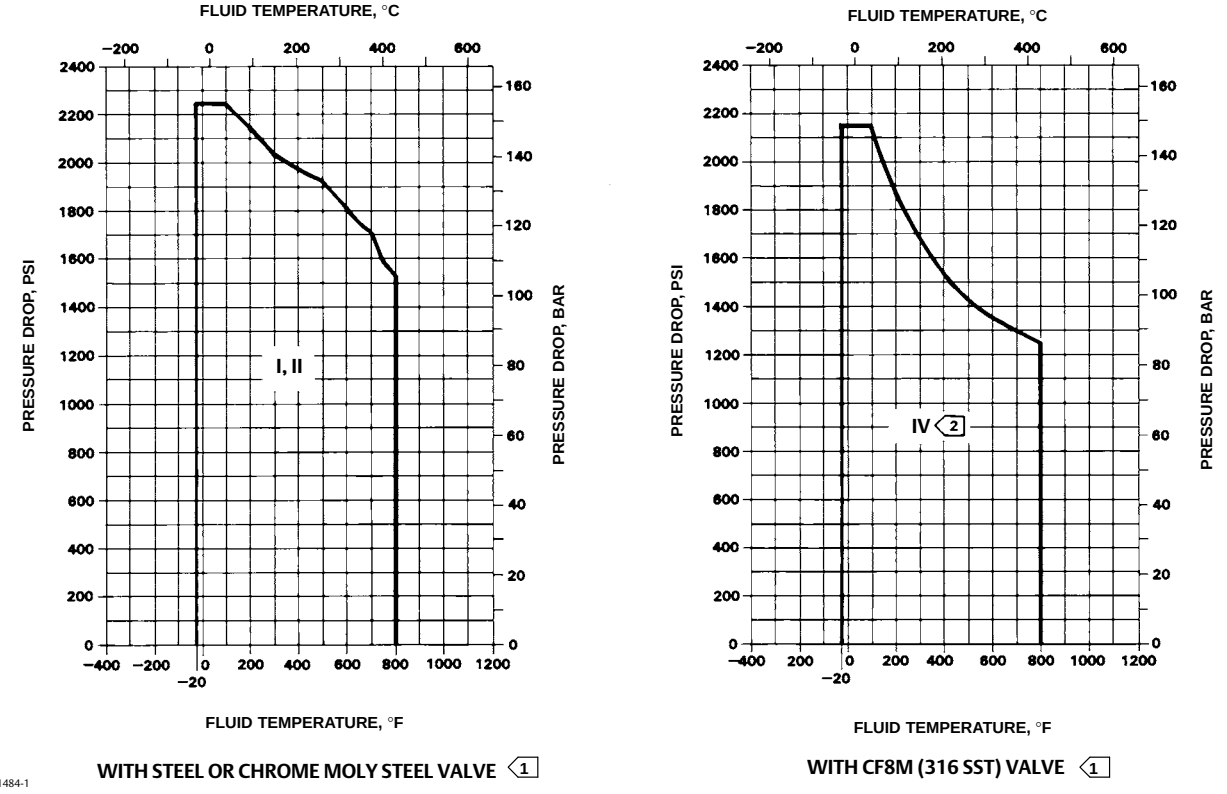
| VALVE/BONNET/ BONNET SPACER MATERIAL | TRIM DESIGNATION FROM TABLE 17 | VALVE SIZE, NPS | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|
| | | | °C | | °F | |
| **19.1 through 111.1, 177.8 and 203.2 mm (0.75 through 4.375, 7 and 8 Inch) Port Size** | | | | | | |
| CF8M | 301G | 4 x 2 | -29 | 149 | -20 | 300 |
| | | 6 x 4 | -29 | 149 | -20 | 300 |
| | | 8 x 4 | -29 | 149 | -20 | 300 |
| | | 8 x 6 or 10 x 6 | -29 | 149 | -20 | 300 |
| | | 10 x 8 | -29 | 149 | -20 | 300 |
| | | 12 x 8 | -29 | 149 | -20 | 300 |
| | 301GC | 4 x 2 | -29 | 149 | -20 | 300 |
| | | 6 x 4 | -29 | 149 | -20 | 300 |
| | | 8 x 4 | -29 | 149 | -20 | 300 |
| | | 8 x 6 or 10 x 6 | -29 | 149 | -20 | 300 |
| | | 10 x 8 | -29 | 149 | -20 | 300 |
| | | 12 x 8 | -29 | 149 | -20 | 300 |
| | 312G | 4 x 2 | -198 | 343 | -325 | 650 |
| | | 6 x 4 | -198 | 343 | -325 | 650 |
| | | 8 x 4 | -198 | 343 | -325 | 650 |
| | | 8 x 6 or 10 x 6 | -198 | 343 | -325 | 650 |
| | | 10 x 8 | -198 | 343 | -325 | 650 |
| | | 12 x 8 | -198 | 343 | -325 | 650 |
| | 312GC | 4 x 2 | -73 | 204 | -100 | 400 |
| | | 6 x 4 | -73 | 204 | -100 | 400 |
| | | 8 x 4 | -73 | 204 | -100 | 400 |
| | | 8 x 6 or 10 x 6 | -73 | 204 | -100 | 400 |
| | | 10 x 8 | -73 | 204 | -100 | 400 |
| | | 12 x 8 | -73 | 204 | -100 | 400 |
| | 315G | 4 x 2 | -198 | 316 | -325 | 600 |
| | | 6 x 4 | -198 | 316 | -325 | 600 |
| | | 8 x 4 | -198 | 316 | -325 | 600 |
| | | 8 x 6 or 10 x 6 | -198 | 316 | -325 | 600 |
| | | 10 x 8 | -198 | 316 | -325 | 600 |
| | | 12 x 8 | -198 | 316 | -325 | 600 |
| | 315GC | 4 x 2 | -73 | 204 | -100 | 400 |
| | | 6 x 4 | -73 | 204 | -100 | 400 |
| | | 8 x 4 | -73 | 204 | -100 | 400 |
| | | 8 x 6 or 10 x 6 | -73 | 204 | -100 | 400 |
| | | 10 x 8 | -73 | 204 | -100 | 400 |
| | | 12 x 8 | -73 | 204 | -100 | 400 |
| | 306 | 4 x 2 | -29 | 316 | -20 | 600 |
| | | 6 x 4 | -29 | 316 | -20 | 600 |
| | | 8 x 4 | -29 | 316 | -20 | 600 |
| | | 8 x 6 or 10 x 6 | -29 | 316 | -20 | 600 |
| | | 10 x 8 | -29 | 316 | -20 | 600 |
| | 306 | 12 x 8 | -29 | 316 | -20 | 600 |

-continued-

Table 18. Valve/Trim Temperature Capabilities for Fisher EWD, EWS, and EWT Valves with Whisper Trim III Cages (continued)

| VALVE/BONNET/ BONNET SPACER MATERIAL | TRIM DESIGNATION FROM TABLE 17 | VALVE SIZE, NPS | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|
| | | | °C | | °F | |
| **136.5 mm (5.375 Inch) Port** | | | | | | |
| WCC or WC9 | 301 | 8 x 6 or 10 x 6 | -29 | 338 | -20 | 640 |
| | | 12 x 6 | -29 | 313 | -20 | 595 |
| | 301A | 8 x 6 or 10 x 6 | -29 | 338 | -20 | 640 |
| | | 12 x 6 | -29 | 313 | -20 | 595 |
| | 301C | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 204 | -20 | 400 |
| | 304 | 8 x 6 or 10 x 6 | -29 | 343 | -20 | 650 |
| | | 12x6 | -29 | 338 | -20 | 640 |
| | 312 | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 177 | -20 | 350 |
| | 312C | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 177 | -20 | 350 |
| | 315 | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 177 | -20 | 350 |
| | 318 (WC9 only) | 8 x 6 or 10 x 6 | -29 | 427 | -20 | 1100 |
| | | 12 x 6 | -29 | 427 | -20 | 1100 |
| | 306 | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 204 | -20 | 400 |
| CF8M | 301 | 8 x 6 or 10 x 6 | -29 | 149 | -20 | 300 |
| | | 12 x 6 | -29 | 121 | -20 | 250 |
| | 301C | 8 x 6 or 10 x 6 | -29 | 149 | -20 | 300 |
| | | 12 x 6 | -29 | 121 | -20 | 250 |
| | 304 | 8 x 6 or 10 x 6 | -29 | 149 | -20 | 300 |
| | | 12 x 6 | -29 | 121 | -20 | 250 |
| | 312 | 8 x 6 or 10 x 6 | -29 | 343 | -20 | 650 |
| | | 12 x 6 | -29 | 343 | -20 | 650 |
| | 312C | 8 x 6 or 10 x 6 | -29 | 204 | -20 | 400 |
| | | 12 x 6 | -29 | 204 | -20 | 400 |
| | 315 | 8 x 6 or 10 x 6 | -198 | 427 | -325 | 800 |
| | | 12 x 6 | -198 | 427 | -325 | 800 |
| | 306 | 8 x 6 or 10 x 6 | -29 | 316 | -20 | 600 |
| | | 12 x 6 | -29 | 316 | -20 | 600 |

Figure 15. Typical Trim Used in Fisher EWD-1 Valves with Whisper Trim III Cages (see table 19)



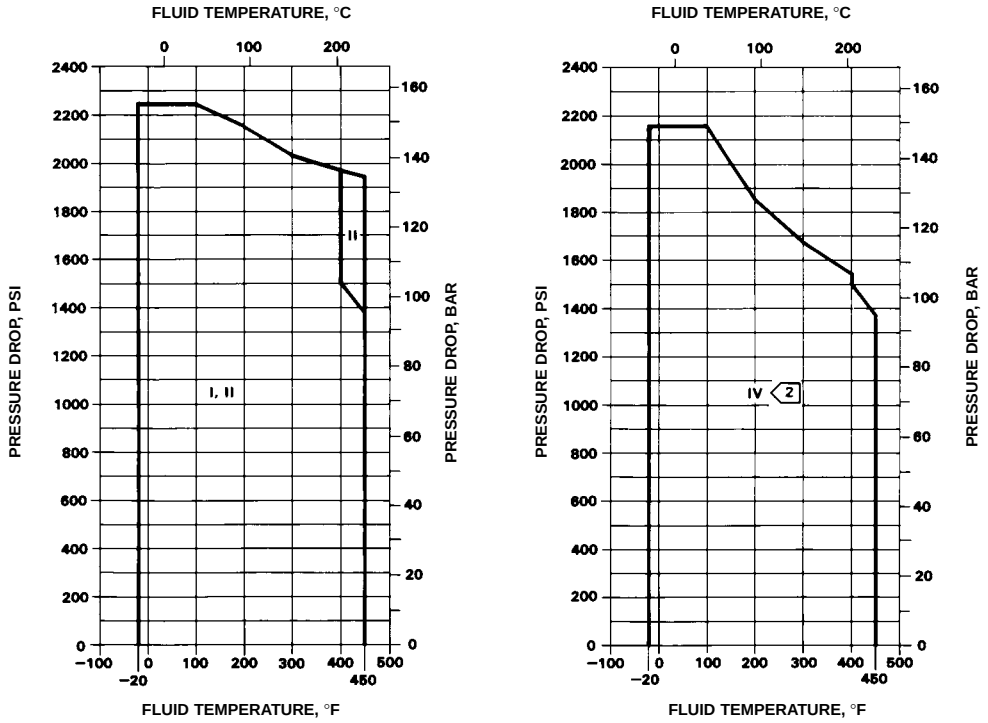

NOTE:
1 Do not exceed the maximum pressure and temperature for the class rating of the body material used, even through the trims shown may have higher capabilities..
2 May be used down to -101°C (-150°F) with level A, B, OR C cage, or with level D cage that has an 18-8 SST baffle.

Table 19. Fisher EWD-1 and EWT-1 Metal Trim Part Combinations for Valves with Whisper Trim III Cages

| Trim Designation | Valve Plug | Cage | Seat Ring |
|---|---|---|---|
| I | Heat-treated CA6NM(1) | 17-4 SST H1025 | Heat-treated CA6NM |
| II | S31600 (316 SST) with seat and guide hard faced with CoCr-A | 17-4 SST H1025 | N06600 with seat hard faced with CoCr-A |
| IV | CF8M (316 SST) with seat and guide hard faced with CoCr-A | 17-4 SST H1025 | CF8M with seat hard faced with CoCr-A |

1. CA6NM is similar to 410 SST.

Figure 16. Typical Trim Used in Fisher EWT-1 Valves with Whisper Trim III Cages (see table 19)




NOTE:
1 Do not exceed the maximum pressure and temperature for the class rating of the body material used, even through the trims shown may have higher capabilities.
2 May be used down to -101°C (-150°F) with level A, B, OR C cage, or with level D cage that has an 18-8 SST baffle.

## Table 20. Materials and Temperature Limitations for Other Parts

| PART | | | MATERIAL | | | MATERIAL TEMPERATURE CAPABILITY | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | °C Min | °C Max | °F Min | °F Max |
| Body-to-bonnet bolting (see table 24 for NACE bolting materials and temperature limits) | WCC or WC9 valve body | Studs | Steel SA-193-B7, or steel SA-193-B7M for sour service | | | -29 | 427 | -20 | 800 |
| | | Nuts | Steel SA-194-2H, or steel SA-194-2M for sour service | | | | | | |
| | LCC valve body | Studs | Steel SA-193-B7 | | | -46 | 371 | -50 | 700 |
| | | Nuts | Steel SA-194-2H | | | | | | |
| | WC9 valve body | Studs | Steel SA-193-B16 | | | -29 | 593 | -20 | 1100 |
| | | Nuts | Steel SA-194-7 | | | | | | |
| | CF8M (316 SST) valve body | Studs | Steel SA-193-B7 | | | -48 | 427 | -55 | 800 |
| | | Nuts | Steel SA-194-2H | | | | | | |
| | | Studs | Steel SA-193-B7M for sour service | | | -46 | 427 | -50 | 800 |
| | | Nuts | Steel SA-194-2HM for sour service | | | -46 | 343 | -50 | 650 |
| | | Studs | 304 SST SA-320-B8 | | | -254 | 38 | -425 | 100 |
| | | Nuts | 304 SST SA-194-8 | | | | | | |
| | | Studs | 316 SST SA-193-B8M (strain hardened) | | | -198[1] | 427 | -325[1] | 800 |
| | | Nuts | 316 SST SA-194-8M | | | | | | |
| | | Studs | 316 SST SA-193-B8M | | | -198[1] | 649 | -325[1] | 1200 |
| | | Nuts | 316 SST SA-194-8M | | | | | | |
| Disk (all soft-seat constructions) | | | PTFE | | | -73 | 204 | -100 | 400 |
| EWD piston ring | Std. for NPS 4x2 thru 12x6 | | Graphite (FMS 17F27) | | | -46[2] | 427 | -50[2] | 800 |
| | | | | | | -46[2] | 482 | -50[2] | 900 |
| | Std. for NPS 10x8 and 12x8; optional for NPS 4x2 thru 12x6 | | Graphite FMS 17F39 | Oxidizing service—all sizes | | -46[2] | 538 | -50[2] | 1000 |
| | | | | Nonoxidizing service | NPS 12x8 CL900 and 12x8 CL600 and smaller | -46[2] | 593 | -50[2] | 1100 |
| Standard NPS 4x2 through 12x6 EWT valve plug seal (except valve with Cavitrol III cage) | | Backup ring | Fluorocarbon[3] | | | -18 | 204 | 0 | 400 |
| | | | Ethylene-propylene[4] | | | -40 | 232 | -40 | 450 |
| | | | Nitrile[5] | For use with hydrocarbons | | -34 | 71 | -30 | 160 |
| | | | | For use with other fluids | | -34 | 93 | -30 | 200 |
| | | Seal ring | Carbon-filled PTFE | | | -73 | 232 | -100 | 450 |
| Spring-loaded EWT or EWT-1 valve plug seal [6] (standard for NPS 10x8 and 12x8 valve regardless of cage and all NPS 4x2 through 12x6 valves with Cavitrol III cage; optional in NPS 4x2 through 12x6 valves with other than Cavitrol III cages) | | Backup ring | S41600 (416 SST) | | | -29 | 427 | -20 | 800 |
| | | Retaining ring | S30200 (302 SST) | | | -254 | 593 | -425 | 1100 |
| | | Seal ring | PTFE with N10276 Spring | | | -73 | 232[10] | -100 | 450[10] |
| | | Anti-extrusion rings | PEEK (PolyEtherEtherKetone) | | | ---[11] | | ---[11] | |
| Valve plug stem and pin | | | S31600 (316 SST) (S20910, NACE Std) | | | -198[1] | 593 | -325[1] | 1100 |
| Load ring (NPS 10x8 and 12x8 EWD, EWS, and EWT only) | | | CB7CU-1 (17-4PH SST) | | | -102 | 316 | -150 | 600 |
| | | | N07718[7] | | | -254 | 593 | -425 | 1100 |
| | | | N05500[7] | | | -240 | 260 | -400 | 500 |
| Seat ring, bonnet and cage gaskets | | | FGM (standard) | | | -198 | 593 | -325 | 1100 |
| | | | PTFE-coated N04400 | | | -73 | 149 | -100 | 300 |
| Spiral wound gaskets | | | N06600[7]/laminated graphite FGM (standard) | | | -198 | 593 | -325 | 1100 |
| Packing (temperatures shown are material temperature capabilities) | | | PTFE V-ring | | | -40 | 232 | -40 | 450 |
| | | | PTFE/composition | | | -73 | 232 | -100 | 450 |
| | | | Graphite ribbon/filament | | | -198 | 538[9] | -325 | 1000[9] |
| | | | Graphite ribbon for high-temperature oxidizing service | | | 371 | 649 | 700 | 1200 |
| Packing flange, studs and nuts when used with standard bonnet | | | S31600 | | | -198[1] | 593 | -325[1] | 1100 |
| Packing follower, and packing spring[8] or lantern ring | | | S31600 | | | -198[1] | 593 | -325[1] | 1100 |
| Packing box ring when used with standard bonnet | | | S31600 | | | | | | |
| Extension bonnet bushing | | Trims 1 and 4 | S41600 | | | -29 | 427 | -20 | 800 |
| | | Other trims | S31600 | | | -198[1] | 593 | -325[1] | 1100 |

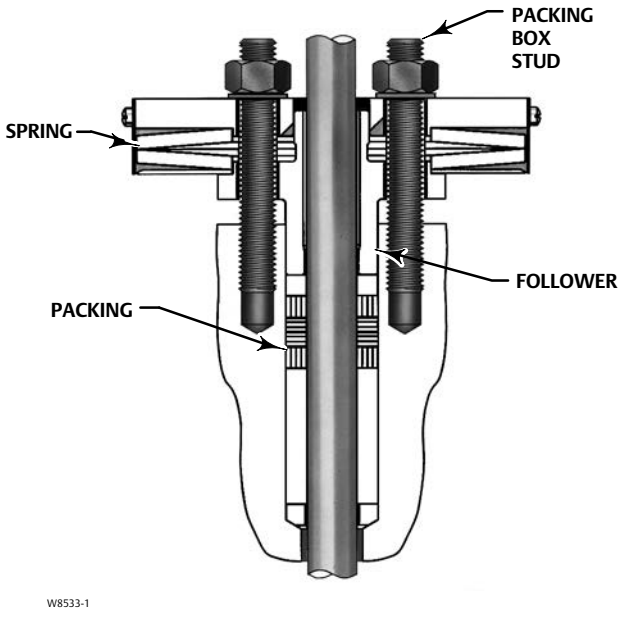
1. May be used down to -254°C (-425°F) if manufacturing process includes Charpy impact test.
2. This minimum is due to thermal expansion differential between piston ring and cage at low temperatures.
3. For high-temperature air, hydrocarbons, and certain other chemicals and solvents, but cannot be used with ammonia, steam, or hot water.
4. Has excellent moisture resistance to hot water and steam and may be used with most fire-resistant hydraulic oils, but cannot be used with petroleum-based fluids and other hydrocarbons.
5. Cannot be used with fire-resistant hydraulic oils.
6. May be used to increase hot water service capability to 232°C (450°F).
7. This material may be used for cyclic temperatures or those above 232°C (450°F).
8. Spring is used only with single PTFE V-ring packing; lantern ring replaces spring in other packings.
9. Except 371°C (700°F) on oxidizing service.
10. If used with PEEK anti-extrusion rings, PTFE/carbon seal ring may be used in temperatures up to 316°C (600°F) for non-oxidizing service or up to 260°C (500°F) for oxidizing service.
11. These materials not limiting factors.

Table 21. Port Diameters, Valve Plug Travel, and Stem and Yoke Boss Diameters[1,9]

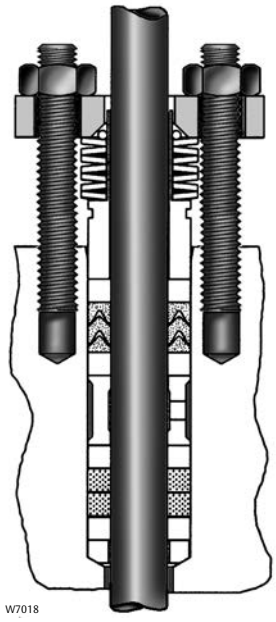
| VALVE SIZE, NPS | | PORT DIAMETER | | MAX VALVE PLUG TRAVEL | | STEM AND YOKE BOSS DIAMETERS | | | | | | | | CAGE STYLE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Standard | | | | Optional | | | | |
| | | | | | | Stem | | Yoke Boss | | Stem | | Yoke Boss | | |
| | | mm | Inch | mm | Inch | mm | Inch | mm | Inch | mm | Inch | mm | Inch | |
| 4 x 2 | | 33.3 | 1.3125 | 31.8 | 1.25 | 12.7 | 1/2 | 71.4 | 2 13/16 | 19.1 | 3/4 | 90.5 | 3 9/16 | Whisper Trim III only |
| | | 58.7 | 2.3125 | 34.9 | 1.375 | | | | | | | | | |
| | | 58.7 | 2.3125 | 28.6 | 1.125 | | | | | | | | | Quick-opening, linear, Eq.%, Whisper Trim I, WhisperTrim III, or Cavitrol[1] |
| 6 x 4, 8 x 4 | | 111 | 4.375 | 50.8 | 2 | 12.7 | 1/2 | 71.4 | 2 13/16 | 19.1 | 3/4 | 90.5 | 3 9/16 | |
| | | | | | | | | | | 25.4 or 31.8 | 1 or 1 1/4 | 127 | 5 | |
| | | 87.3 | 3.438 | 50.8 | 2 | 12.7 | 1/2 | 71.4 | 2 13/16 | 19.1 | 3/4 | 90.5 | 3 9/16 | Whisper Trim III only |
| | | | | 76.2 | 3 | 12.7 | 1/2 | 71.4 | 2 13/16 | 25.4 or 31.8 | 1 or 1 1/4 | 127 | 5 | |
| 8 x 6, 10 x 6[8], or 12 x 6 | | 178 | 7 | 50.8 | 2 | 19.1 | 3/4 | 90.5 | 3 9/16 | 25.4 or 31.8 | 1 or 1 1/4 | 127 | 5 | Quick-opening, linear, Eq.%, Whisper Trim I, or Cavitrol[1] |
| 8 x 6, 10 x 6[8], or 12 x 6 | | 178 | 7 | 76.2 | 3 | | | | | | | | | Cavitrol only[1] |
| | | | | 102[2] | 4[2] | 19.1 | 3/4 | 90.5 | 3 9/16 | - - - | | | | Whisper Trim I |
| 8 x 6, 10 x 6[8] | | 178 | 7 | 76.2 | 3 | 19.1 | 3/4 | 90.5 | 3 9/16 | 25.4 or 31.8 | 1 or 1 1/4 | 127 | 5 | Whisper Trim III only |
| | | 178 | 7 | 102 | 4 | | | | | | | | | |
| | | 137 | 5.375 | 127[3] | 5[3] | | | | | | | | | |
| 12 x 6 | | 137 | 5.375 | 165[3] | 6.5[3] | | | | | | | | | |
| 10 x 8 | | 203 | 8 | 76.2 | 3 | 19.1 | 3/4 | 90.5 | 3 9/16 | 25.4 or 31.8 | 1 or 1 1/4 | 127 | 5 | Quick-opening, linear, or Eq. % |
| | | | | 152 | 6 | | | | | | | | | Whisper Trim III only |
| | | 178 | 7 | 152 | 6 | | | | | | | | | Whisper Trim III only |
| 12 x 8 | CL300[4] or CL600[4] | 203 | 8 | 76.2 | 3 | 19.1 | 3/4 | 90.5 | 3 9/16 | 25.4 or 31.8 | 1 or 1 1/4 | 127 | 5 | Quick-opening, linear, or Eq. % |
| | | 203 | 8 | 152 | 6 | | | | | | | | | Whisper Trim III only |
| | | 178 | 7 | | | | | | | | | | | |
| | CL900 | 203 | 8 | 76.2 | 3 | 25.4 | 1 | 127 | 5 | 19.1 | 3/4 | 90.5 | 3 9/16 | Quick-opening, linear, or Eq. % |
| | | | | | | | | | | 25.4 | 1 | 127H[5] | 5H[5] | |
| | | | | | | 31.8 | 1 1/4 | | | 31.8 | 1 1/4 | | | |
| | | 197[6] | 7.75[6] | 152 | 6 | 31.8 | 1 1/4 | 127 | 5 | - - - | | | | Whisper Trim III only |
| | | 171[7] | 6.75[7] | | | | | | | | | | | |

1. Except for Cavitrol III cages, which are covered in separate documentation
2. Bonnet spacer required. This travel available only in CL300 or 600 EWD or EWT
3. Bonnet spacer required for EWD or EWT valve, but not EWS valve
4. Bonnet spacer required for EWD, EWS, and EWT valve.
5. H indicates heavy actuator-to-bonnet bolting is required
6. Port diameter for level A, B, or C cage.
7. Port diameter for level D cage
8. NPS 10x6 has a valve outlet area identical to the NPS 8x6.
9. Refer Fisher Bulletin 80.1:010 Whisper Trim III (D100191X012) for more information on Whisper Trim III.

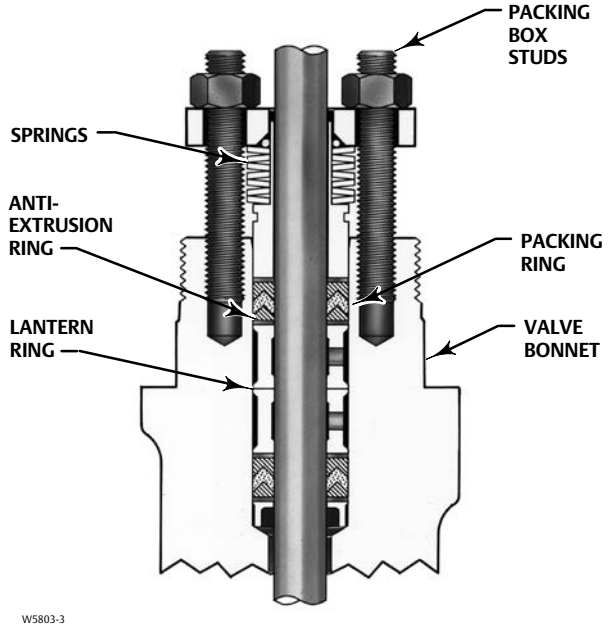
Figure 17. Typical ENVIRO-SEAL and HIGH-SEAL Packing Systems



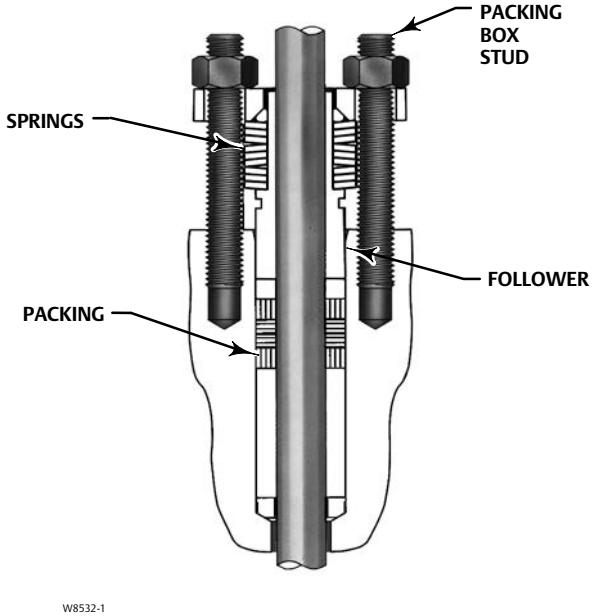

**TYPICAL HIGH-SEAL PACKING SYSTEM WITH GRAPHITE ULF PACKING**




**TYPICAL ENVIRO-SEAL PACKING SYSTEM WITH DUPLEX PACKING**




**TYPICAL ENVIRO-SEAL PACKING SYSTEM WITH PTFE PACKING**




**TYPICAL ENVIRO-SEAL PACKING SYSTEM WITH GRAPHITE ULF PACKING**

Table 22. Approximate Weights

| END CONNECTION | | VALVE SIZE, NPS | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 4 x 2 | | 6 x 4 | | 8 x 4 | | 8 x 6 | | 10 x 6(1) | | 12 x 6 | | 10 x 8 | | 12 x 8 | |
| | | kg | Lb | kg | Lb | kg | Lb | kg | Lb | kg | Lb | kg | Lb | kg | Lb | kg | Lb |
| CL300 | | 84 | 185 | 150 | 330 | 234 | 515 | 284 | 625 | 348 | 765 | 500 | 1102 | 567 | 1250 | 653 | 1440 |
| CL600 | Flanged | 100 | 220 | 195 | 430 | 272 | 600 | 308 | 680 | 431 | 950 | 721 | 1590 | 744 | 1640 | 857 | 1890 |
| | Buttwelding | 61 | 135 | 122 | 270 | 177 | 390 | 272 | 600 | 380 | 839 | 526 | 1160 | 512 | 1130 | 658 | 1450 |
| CL900 | Flanged | --- | | | | | | 612 | 1350 | --- | | | | | | 1361 | 3000 |
| | Buttwelding | --- | | | | | | 454 | 1000 | --- | | | | | | 1293 | 2850 |

1. NPS 10x6 has a valve outlet area identical to the NPS 8x6.

Figure 18. ENVIRO-SEAL Bellows Seal Bonnet

W5852-1

Table 23. Bonnet Selection Guidelines

| BONNET STYLE (CL300, 600)[1] | PACKING | IN-BODY PROCESS TEMPERATURE LIMITS[2] | |
|---|---|---|---|
| | | °C | °F |
| Plain Bonnet<br>■ Standard for NPS 2, 4, and 6 nominal trim sizes<br>■ Standard for NPS 10x8 and 12x8 valves (in cast iron, WCC). Not available in S31600 | PTFE V-ring | -18 to 232 | 0 to 450 |
| | PTFE/composition | -18 to 232 | 0 to 450 |
| | Graphite ribbon/filament | -18 to maximum shown in table 20 | 0 to maximum shown in table 20 |
| Style 1 Cast Extension Bonnet<br>■ Optional for NPS 2, 4, and 6 nominal trim sizes<br>■ Standard for NPS 10x8 and 12x8 valves (in S31600). Optional in WCC; not available in cast iron | PTFE V-ring | -46 to 427 | -50 to 800 |
| | PTFE/composition | | |
| | Graphite ribbon/filament | to maximum shown in table 20 | to maximum shown in table 20 |
| Style 2 Cast Extension Bonnet<br>■ Optional for NPS 2, 4, and 6 nominal trim sizes<br>■ Optional for NPS 10x8 and 12x8 valves (in WCC). Not available in cast iron or S31600 | PTFE V-ring | -101 to 427 | -150 to 800 |
| | PTFE/Composition | | |
| | Graphite ribbon/filament | to maximum shown in table 20 | to maximum shown in table 20 |
| ENVIRO-SEAL Bellows Seal Bonnet<br>■ Optional for NPS 2, 4, 6, and 8 nominal trim sizes. Maximum travel is 2 inches | PTFE | For exceptional stem sealing capabilities. See Bulletin 59.1:070, ENVIRO-SEAL Bellows Seal Bonnets, (D101641X012) for pressure/temperature ratings. | For exceptional stem sealing capabilities. See Bulletin 59.1:070, ENVIRO-SEAL Bellows Seal Bonnets, (D101641X012) for pressure/temperature ratings. |
| | Graphite ULF | | |

1. For CL900 valve bodies, only the plain bonnet is available. Consult your Emerson sales office for assistance if application conditions indicate the need for an extension bonnet for a CL900 valve body.
2. These in-body process temperatures assume an outside, ambient temperature of 21°C (70°F) and no insulation on the bonnet. When using any packing at low process temperatures, a cast extension bonnet may have to be used to prevent packing damage which could result from the formation of valve stem frost. Material selection for trim and other components will also be limiting factors.

Table 24. Bolting Materials and Temperature Limits for Bolting Compliance with NACE MR0175-2002, NACE MR0175/ISO 15156, and NACE MR0103. Environmental restrictions may apply.

| VALVE BODY MATERIAL | | BOLTING MATERIAL | TEMPERATURE CAPABILITIES | | | |
|---|---|---|---|---|---|---|
| | | | °C | | °F | |
| | | | Min | Max | Min | Max |
| **Non-exposed bolting (Standard)** | | | | | | |
| WCC | Studs | Steel SA-193-B7 | -7 | 232 | 20 | 450 |
| | Nuts | Steel SA-194-2H | | | | |
| | Studs | Steel SA-193-B7 | 232 | 427 | 450 | 800 |
| | Nuts | Steel SA-194-2H lubricated | | | | |
| CF8M (316 SST) | Studs | Steel SA-193-B7 or B8M strain hardened | -48 | 232 | -55 | 450 |
| | Nuts | Steel SA-194-2H or 8M | | | | |
| | Studs | Steel SA-193-B8M strain hardened or B7 | 232 | 427 | 450 | 800 |
| | Nuts | Steel SA-194-8M lubricated or 2H lubricated | | | | |
| **Exposed bolting (Optional) Requires Derating of Valve[2] When These Body-to-Bonnet Bolting Materials are Used** | | | | | | |
| WCC and CF8M | Studs | Steel SA-193-B7M | -46[1] | 232 | -50[1] | 450 |
| | Nuts | Steel SA-194-2HM | | | | |
| | Studs | Steel SA-193-B7M | 232 | 427 | 450 | 800 |
| | Nuts | Steel SA-194-2HM lubricated | | | | |

1. Minimum temperature is -29°C (-20°F) with WCC valve body material.
2. Derating is not required for CL300 valves. Derating may be required for valves rated at CL600 or 900. Emerson sales office for assistance in determining the derating of valves when these body-to-bonnet bolting materials are used.

Table 25. Dimensions

| VALVE SIZE, NPS | A Class, End Connection Style(1) | | | | | | | | G (MAX) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | CL150 | CL300 | | CL600 | | CL900 | | | CL150, 300, and 600 | CL900 |
| | RF | RF | RTJ | RF, BW | RTJ | RF | RTJ | BW | | |
| | mm | | | | | | | | | |
| 4 x 2 | 352 | 368(2) | 384 | 394(2) | 397 | --- | --- | --- | 108 | --- |
| 6 x 4 | 451 | 473(2) | 489 | 508(2) | 511 | --- | --- | --- | 135 | --- |
| 8 x 4 | 543 | 568(2) | 584 | 610(2) | 613 | --- | --- | --- | 176 | --- |
| 8 x 6 | 543 | 568(2) | 584 | 610(2) | 613 | 914(3) | 917 | 972 | 183 | 198 |
| 10 x 6(4) | 603 | 603 | 619 | 625 | 629 | --- | --- | --- | 183 | --- |
| 12 x 6 | 737 | 775(2) | 791 | 819(2) | 822 | --- | --- | --- | 254 | --- |
| 10 x 8 | 673 | 708(2) | 724 | 752(2) | 756 | --- | --- | --- | 275 | --- |
| 12 x 8 | 737 | 775(2) | 791 | 819(2) | 822 | 902 | 905 | 953 | 356 | 356 |
| | Inch | | | | | | | | | |
| 4 x 2 | 13.88 | 14.50(2) | 15.12 | 15.50(2) | 15.62 | --- | --- | --- | 4.25 | --- |
| 6 x 4 | 17.75 | 18.62(2) | 19.25 | 20.00(2) | 20.12 | --- | --- | --- | 5.31 | --- |
| 8 x 4 | 21.38 | 22.38(2) | 23.00 | 24.00(2) | 24.12 | --- | --- | --- | 6.94 | --- |
| 8 x 6 | 21.38 | 22.38(2) | 23.00 | 24.00(2) | 24.12 | 36.00(3) | 36.12 | 38.25 | 7.19 | 7.81 |
| 10 x 6(4) | 23.75 | 23.75 | 24.38 | 24.62 | 24.75 | --- | --- | --- | 7.19 | --- |
| 12 x 6 | 29.00 | 30.50(2) | 31.12 | 32.25(2) | 32.38 | --- | --- | --- | 10.00 | --- |
| 10 x 8 | 26.50 | 27.88(2) | 28.50 | 29.62(2) | 29.75 | --- | --- | --- | 10.81 | --- |
| 12 x 8 | 29.00 | 30.50(2) | 31.12 | 32.25(2) | 32.38 | 35.50 | 35.62 | 37.50 | 14.00 | 14.00 |

1. End connection style abbreviations: RF - Raised Face, RTJ - Ring Type Joint, BW - Buttwelding.
2. Per ISA S75.03.
3. Per ISA S75.16.
4. NPS 10x6 has a valve outlet area identical to the NPS 8x6.

Table 26. Dimensions

| VALVE SIZE, DN | A PN, End Connection Style(1) | | | | | |
|---|---|---|---|---|---|---|
| | PN 16, RF | PN 25, RF | PN 40, RF | PN 63, RF | PN 100, RF | PN 160, RF |
| | mm | | | | | |
| 100 x 50 | --- | --- | --- | 430 | 430 | --- |
| 150 x 100 | 480 | 480 | 480 | 550 | 550 | --- |
| 200 x 100 | 600 | 600 | 600 | 650 | 650 | --- |
| 200 x 150 | --- | 600 | 600 | 650 | 650 | --- |
| 300 x 150 | 850 | 850 | 850 | 900 | 900 | --- |
| 250 x 200 | --- | --- | --- | --- | --- | --- |
| 300 x 200 | --- | 850 | 850 | 900 | 900 | 900 |

1. End connection style abbreviations: RF - Raised Face.

Figure 19. Dimensions (also see tables 25, 26, 27, and 28)

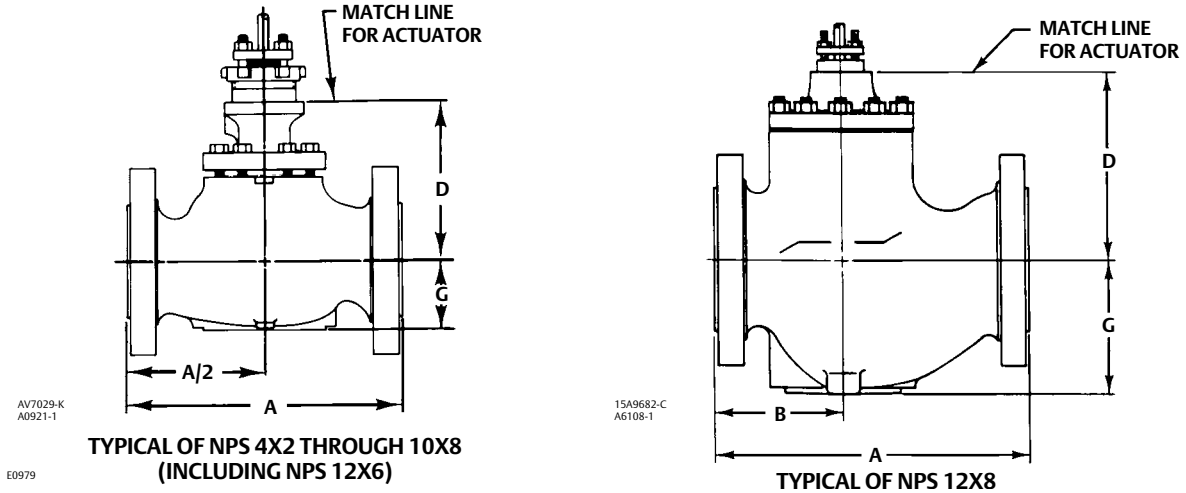


Table 27. Dimensions (Dimension B for 12 x 8 Valve Sizes)

| VALVE SIZE, NPS | Class, End Connection Style(1) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | CL150 | CL300 | | CL600 | | CL900 | | |
| | RF | RF | RTJ | RF, BW | RTJ | RF | RTJ | BW |
| | mm | | | | | | | |
| 12 x 8 | 292 | 311 | 319 | 333 | 335 | 397 | 398 | 422 |
| | Inch | | | | | | | |
| 12 x 8 | 11.50 | 12.25 | 12.56 | 13.12 | 13.18 | 15.63 | 15.69 | 16.63 |

1. End connection style abbreviations: RF - Raised Face, RTJ - Ring Type Joint, BW - Buttwelding.

Table 28. Dimensions (Dimension D for All Valve Sizes)

| CAGE STYLE | BONNET | VALVE SIZE, NPS | STEM DIA | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 12.7 mm (1/2 Inch) | | 19.1 mm (3/4 Inch) | | | | 25.4 mm (1 Inch) or 31.8 mm (1-1/4 Inch) | | | |
| | | | | | CL900 Only | | All Except CL900 | | CL300 and 600 | | CL900 | |
| | | | mm | Inch | mm | Inch | mm | Inch | mm | Inch | mm | Inch |
| All except Cavitrol III or Whisper Trim III | Plain | 4 x 2 | 216 | 8.50 | --- | --- | 213 | 8.38 | --- | --- | --- | --- |
| | | 6 x 4 | 257 | 10.12 | --- | --- | 254 | 10.00 | 300 | 11.81 | --- | --- |
| | | 8 x 4 | 259 | 10.19 | --- | --- | 256 | 10.06 | 302 | 11.88 | --- | --- |
| | | 8 x6, 10 x 6(3) | 287 | 11.31 | 409 | 16.12 | 287 | 11.31 | 332 | 13.06 | 464 | 18.25 |
| | | 12 x 6 | 356 | 14.00 | --- | --- | 356 | 14.00 | 400 | 15.75 | --- | --- |
| | | 10 x 8 | --- | --- | --- | --- | 375 | 14.75 | --- | --- | --- | --- |
| | | 12 x 8 | --- | --- | 584 | 23.00 | 411 | 16.19 | --- | --- | 608 | 23.94 |
| | Style 1 Extension | 4 x 2 | 318 | 12.50 | --- | --- | 322 | 12.69 | --- | --- | --- | --- |
| | | 6 x 4 | 359 | 14.12 | --- | --- | 363 | 14.31 | 432 | 17.00 | --- | --- |
| | | 8 x 4 | 360 | 14.19 | --- | --- | 365 | 14.38 | 433 | 17.06 | --- | --- |
| | | 8 x6, 10 x 6(3) | --- | --- | --- | --- | 394 | 15.50 | 464 | 18.25 | --- | --- |
| | | 12 x 6 | --- | --- | --- | --- | 462 | 18.19 | 532 | 20.94 | --- | --- |
| | | 10 x 8 | --- | --- | --- | --- | 421 | 16.56 | 449 | 17.69 | --- | --- |
| | | 12 x 8 | --- | --- | --- | --- | 457 | 18.00 | 486 | 19.12 | --- | --- |
| | Style 2 Extension | 4 x 2 | 516 | 20.31 | --- | --- | 513 | 20.19 | --- | --- | --- | --- |
| | | 6 x 4 | 562 | 22.12 | --- | --- | 554 | 21.81 | 595 | 23.44 | --- | --- |
| | | 8 x 4 | 564 | 22.19 | --- | --- | 556 | 21.88 | 597 | 23.50 | --- | --- |
| | | 8 x6, 10 x 6(3) | --- | --- | --- | --- | 579 | 22.81 | --- | --- | --- | --- |
| | | 10 x 8 | --- | --- | --- | --- | 621 | 24.44 | --- | --- | --- | --- |
| | | 12 x 6 | --- | --- | --- | --- | 648 | 25.50 | --- | --- | --- | --- |
| | | 12 x 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | ENVIRO-SEAL bellows seal bonnet | 4 x 2 | 435 | 17.12 | --- | --- | --- | --- | --- | --- | --- | --- |
| | | 6 x 4 | 576 | 22.69 | --- | --- | 576 | 22.69 | --- | --- | --- | --- |
| | | 8 x 4 | 578 | 22.75 | --- | --- | 578 | 22.75 | --- | --- | --- | --- |
| | | 10 x 8 | --- | --- | --- | --- | 703 | 27.69 | --- | --- | --- | --- |
| | | 8 x6, 10 x 6(3) | --- | --- | --- | --- | 608 | 23.94 | --- | --- | --- | --- |
| | | 12 x 6 | --- | --- | --- | --- | 676 | 26.62 | --- | --- | --- | --- |
| | | 12 x 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cavitrol III | Plain | 4 x 2 | 252 | 9.94 | --- | --- | 249 | 9.81 | --- | --- | --- | --- |
| | | 6 x 4 | 346 | 13.62 | --- | --- | 343 | 13.50 | 389 | 15.31 | --- | --- |
| | | 8 x 4 | 348 | 13.69 | --- | --- | 344 | 13.56 | --- | --- | --- | --- |
| | | 8 x6, 10 x 6(3) | 403 | 15.88 | --- | --- | 403 | 15.88 | --- | --- | --- | --- |
| | | 10 x 8(1) | --- | --- | --- | --- | 375 | 14.75 | 425 | 16.75 | --- | --- |
| | | 10 x 8(2) | --- | --- | --- | --- | 511 | 20.12 | 560 | 22.06 | --- | --- |
| | | 12 x 6 | 480 | 18.88 | --- | --- | 480 | 18.88 | --- | --- | --- | --- |
| | | 12 x 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Whisper Trim III | Plain | 4 x 2 | 4 x 2 | 216 | 8.50 | --- | --- | 213 | 8.38 | --- | --- | --- |
| | | 6 x 4 | 6 x 4 | 257 | 10.12 | --- | --- | 254 | 10.00 | 300 | 11.81 | --- |
| | | 8 x 4 | 8 x 4 | 259 | 10.19 | --- | --- | 256 | 10.06 | 302 | 11.88 | --- |
| | | 8 x6, 10 x 6(3) | 287 | 11.31 | 409 | 16.12 | 399 | 15.69 | 443 | 17.44 | 464 | 18.25 |
| | | 12 x 6 | 356 | 14.00 | --- | --- | 503 | 19.81 | 548 | 21.56 | --- | --- |
| | | 10 x8 | --- | --- | --- | --- | 504 | 19.83 | --- | --- | --- | --- |
| | | 12 x 8 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |

1. One-stage trim.
2. Two-stage trim.
3. NPS 10x6 has a valve outlet area identical to the NPS 8x6.

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