Fisher™ EH and EHA Control Valves

EH (globe)

■ EHS (NPS 1-1/2x1 through 8x6), ■ EHD (NPS 2 through 20), and ■ EHT (NPS 2 through 16x12)

EHA (angle)

■ EHAS (NPS 3 through 6), ■ EHAD (NPS 3 through 8), and ■ EHAT (NPS 3 through 8)

X1083


W9768-1

EH Series Valves

These valves are specially designed for high-pressure applications. Fisher EH valve configurations incorporate proven techniques in flow-stream contouring for higher capacities and in valve trim design for reliability in severe applications.

The temperature limits of EHT 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.

Unless otherwise noted, all NACE references are to NACE MR0175-2002. Contact your Emerson Automation Solutions sales office for information on NACE MR0175/ISO 15156 or NACE MR0103.

Features

- **Improved Cage Design**—Drilled-hole cages, offering excellent strength and additional resistance to destructive vibration, are standard. Special materials of construction are readily available.
- **Piping Economy**—The availability of expanded end connections on EH valves may eliminate the need for line swages while accommodating oversized piping arrangements.

- **O-ring Seat Ring Gasket Construction**—Use of O-ring construction provides excellent shut-off with minimal seat ring installation torques for temperatures up to 232°C (450°F). O-ring construction is standard on EHT valves. The flat sheet seat ring gasket construction is available for elevated design temperatures and/or NACE constructions where a suitable O-ring material is not available.

- **Increased Pressure/Temperature Ratings**—Steel EH and EHA valves with buttwelding end connections have Intermediate Standard Ratings. With nondestructive testing, these valves can conform to ASME Intermediate Special Ratings, which allow even higher pressure/temperature applications. See table 7 for specific ratings.

- **Long Trim Life**—Hardened materials of construction for the cage, valve plug, cage guiding, and other trim parts are standard for all applications, providing excellent wear resistance. In all applications, rugged cage guiding provides increased valve plug stability. Increased stability results in reduced vibration and other mechanical stresses, which contributes to long trim life.

- **Control of Low Flow Rates/Tight Shut-off**—Micro-Form or Micro-Flute valve plugs (figure 5 or 6) provide superb rangeability in high-pressure, low-flow applications. A choice of several restricted port diameters helps match valve capacity to required flow, helps provide necessary control with full travel, and helps prevent throttling near the seat.

1. For EHA valves only, and in low-flow applications where cavitation damage may occur, the Micro-Flat style valve plug can be used. For low-flow applications where cavitation damage may occur and the minimum required C_v is equal to or greater than 0.05, Cavitrol III with Micro-Flat trim can be used in both EH and EHA valves. Please contact your Emerson Automation Solutions sales office for more information.

2. For soot-blower applications, a special trim design is available to address noise, vibration, tight shutoff, and thermal cycling which is seen in this application. Please contact your Emerson Automation Solutions sales office for more information.

- **High-Temperature, Class V Shutoff**—Use of the metal C-seal (see figure 17) permits Class V shutoff up to 593°C (1100°F) for up to 4-3/8 inch port in CL2500 rated valves and 5-3/8 inch port in CL1500 rated valves. The metal Bore Seal will permit Class V shutoff up 593°C (1100°F) for 5-3/8 inch ports and larger.

- **Excellent Stem Sealing**—HIGH-SEAL packing systems provide excellent sealing to conserve valuable or hazardous process fluid and to protect against the emission of hazardous or polluting fluids to atmosphere. This system (figure 1) features graphite packing material and heavy-duty live loading.

- **High Capacity**—Careful consideration of aerodynamic and hydrodynamic principles in the design of the flow stream passages results in 30 to 40 percent higher capacity than conventional valves with comparable port sizes and travels.

(continued on page 5)

Table of Contents

Specifications

Available Configurations

See table 1

Common Characteristics: EH valves are single-port, high-pressure, globe-style valves with metal seats, cage guiding, and push- down- to- close valve plug action. EHA valves are angle versions of EH valves
EHD/EHAD: Uses a balanced valve plug(1) with graphite valve plug piston rings; also, see tables 4 and 5
EHS/EHAS: Uses an unbalanced valve plug. For low-flow applications, smaller valve sizes are available with specialized valve plug designs. See tables 4(1) and 5
EHT/EHAT: Uses a balanced valve plug(1) with a pressure-assisted PTFE valve plug seal ring; also, see tables 4 and 5

NPS 20 Valve Rating

■ Intermediate Standard Class 2185 (per ASME B16.34) or ■ other ratings available per customer specifications

Valve Sizes

■ **Globe Valves:** Tables 4 and 6
■ **Angle Valves:** Table 5

End Connection Styles(2)

Buttwelding Ends (BWE): See table 6 for all available ASME B16.25 schedules that are compatible with ASME B16.34 pressure/temperature ratings
Flanged Ends: ■ CL900, ■ CL1500, or ■ CL2500 ■ ring-type joint (RTJ) or ■ raised-face (RF) flanges according to ASME B16.5. Flanged ends for EHA valves are available in CL900 and 1500 only
Socketweld Ends (SWE): See table 6 for those valve sizes available with socketweld end connections according to ASME B16.11 that are compatible with ASME B16.34

Maximum Inlet Pressures and Temperatures(2,3)

Consistent with applicable CL900, 1500, or 2500 pressure/temperature ratings (for EH valves) according to ASME B16.34 unless limited by individual temperature limits shown in the Material Temperature Capabilities specification(7) or in figure 20.

In addition, both steel EH and EHA valves with BWE connections have increased pressure/ temperature ratings as shown in table 7

Maximum Pressure Drops(3)

Valve With Standard Cage: See figures 20, 21, and 22
Valve With Cavitrol™ III Cage: 149 bar (2160 psi) for two-stage cage and 207 bar (3000 psi) for three-stage cage. Consult Fisher Bulletin 80.2:030, Fisher Cavitrol III One-, Two-, and Three-Stage Trims (D100196X012) for more information

Valve With DST Trim:
■ 103 bar (1500 psi) for three-stage trim,
■ 207 bar (3000 psi) for four-stage trim, and
■ 289 bar (4200 psi) for six-stage trim.
Consult Fisher bulletin 80.2:021, Fisher Dirty Service Anti-Cavitation Trim (DST) (D102310X012) for more information

Valve With Whisper Trim™ III Cage:
■ 0.6 $\Delta P/P_1$ maximum for Levels A1 and A3,
■ 0.75 $\Delta P/P_1$ maximum for Levels B1 and B3,
■ 0.85 $\Delta P/P_1$ maximum for Levels C1 and C3,
■ 0.99 $\Delta P/P_1$ maximum for Levels D1 and D3

Valve with WhisperFlo™ Trim:
■ **Levels X, Y, and Z:** 0.94 $\Delta P/P_1$ maximum. If greater than 0.94 $\Delta P/P_1$, consult your Emerson Automation Solutions sales office

Construction Materials

All Except NPS 20 Valve
Body and Bonnet: ■ WCC steel, ■ LCC steel, ■ WC9 chrome-moly steel, ■ C12A chrome-moly alloy, or ■ CF8M (316 SST or 316H SST for service above 538°C [1000°F])
Trim: Trim materials are listed in table 10 and 11. Special materials for trim and valve body are available. Please consult your Emerson Automation Solutions sales office
Other Parts: See tables 12 and 13
Yoke Temperature Limit (NPS 8 to 20 Valves): Standard bonnet with cast iron yoke is limited to 537°C (1000°F)

NPS 20 Valve
Valve Body and Bonnet: SA 217 Grade WC9 steel
Cage: Cast M152 SST
Valve Plug: CF8M (316 stainless steel) with alloy 6 seat and guide
Seat Ring: CF8M with CoCr-A (alloy 6) seat or N06600 with CoCr-A seat
Seat Ring Bolting: N07718
Valve Stem: ■ SA 286 Grade 660 Condition 2 stainless steel or ■ other materials upon request
Piston Rings: Graphite
Cage & Seat Ring Gaskets: Silver-plated N04400
Body/Bonnet Bolting: ■ B7/2H, ■ B16/Gr-7
Packing Rings: Carbon/graphite composition, graphite, and zinc
Packing Box Bushing: Graphite
Packing Box Flange, Studs, and Nuts: S31600 (316 stainless steel) (other materials are available on request)
Packing Springs: ■ G61500 (6150 steel), ■ S17700 (17-7 stainless steel), or ■ N07718

- continued -

Specifications (continued)

Shutoff Classifications

See table 9

For NPS 20 valves, one-half of Class IV leakage (0.005% of valve capacity at full travel) per ANSI/FCI 70-2 and IEC 60534-4

Material Temperature Capabilities(3)

EHD/EHAD and EHS/EHAS: Up to 593°C (1100°F) unless limited by selection of standard trim materials (table 10 and 11 and figures 20, 21, and 22), Cavitrol III and Whisper Trim III trim materials (table 10), or other parts (table 12)
EHT/EHAT: Up to 316°C (600°F) unless limited by selection of standard trim materials (tables 10 and 11 and figures 20, 21, and 22), Cavitrol III and Whisper Trim III trim materials (table 10), or other parts (tables 12 and 13)

Flow Characteristic

Standard Cage: ■ Equal percentage, ■ modified equal percentage(4), or ■ linear
Micro-Form Valve Plug (for EHS and EHAS only): ■ Equal percentage or ■ modified equal percentage(4).
Micro-Flute Valve Plug (for EHS and EHAS only): ■ Equal percentage or ■ modified equal percentage(4)
Micro-Flat Valve Plug (EHAS only): ■ Linear
Cavitrol III, Whisper Trim III, or WhisperFlo: ■ Linear
Special cages: Special characterized flow characteristic cages are available. Please consult your local Emerson Automation Solutions sales office

Flow Direction

Standard Cage
■ *EHD:* Normal flow down(8)
■ *EHS:* Normal flow up(5)
■ *EHT:* Normal flow down(8)
■ *EHAD:* Normal flow down
■ *EHAS:* Normal flow up
■ *EHAT:* Normal flow down

Cavitrol III Cage: Flow down

Whisper Trim III cage: Flow up

WhisperFlo Trim: Flow up

For NPS 20 Valves: ■ Flow up through seat ring and out through cage openings (for standard and Whisper cages)

Flow Coefficients

See Fisher Catalog 12 section 1

Noise Levels

See Fisher Catalog 12, section 3 for noise predictions methods

NPS 20 Valve Maximum Flow Coefficient

Approximately 92,000 C_g or 2600 C_v for modified equal percentage characteristics

Port Diameters

See tables 17 and 18 for NPS 1 through 6 for NPS 1 through 6

NPS 8 and 10x8 Valves
CL1500: 178 mm (7 inch) port diameter
CL2500: 137 mm (5.375 inch) port diameter
NPS 12, 14, and 14x12 Valves
CL1500: 254 mm (10 inch) port diameter
CL2500: 178 mm (7 inch) port diameter
NPS 16x12 Valves
CL1500: 254 mm (10 inch) port diameter
CL2500: 254 mm (10 inch) port diameter
NPS 20 Valves: 355.6 mm (14 inches)

Valve Plug Travel and Stem Diameters(9)

See tables 14, 17, and 18

5 Inch H(10) Boss Diameter: 31.8 mm (1.25 inches) stem diameter
7 Inch Boss Diameter: 50.8 mm (2 inches) stem diameter
NPS 20 Valves: *Valve Plug Travel:* 85.7 mm (9.125 inches)
Valve Stem Diameter: 50.4 mm (2 inches)

Bonnet Style

■ Standard bonnet (figures 3 and 4) for all valve sizes, standard bonnet with cast iron yoke is limited to 537°C (1000°F)
■ Optional Style 1 extension bonnet for NPS 1 and 2 globe valves, see figure 24

Packing Arrangements

■ Single, ■ double, and ■ leakoff standard packing arrangements, or optional ■ HIGH-SEAL packing systems; see Fisher Bulletin 59.1:061, ENVIRO-SEAL™ and HIGH-SEAL Packing Systems for Sliding-Stem Valves (D101633X012)

- continued -

Specifications (continued)

Yoke Boss Diameters for Actuator Mounting

See table 19

NPS 8 and 10 CL2500 Valves: 127 mm (5 inch H[10]) yoke boss diameter
All Other Sizes and Ratings: ■ 127 mm (5 inch H[10]) or ■ 178 mm (7 inch) yoke boss diameter
NPS 20 Valve: 178 mm (7 inches)

Approximate Weight

See tables 20 and 21

Options

■ Flat sheet seat ring gasket constructions[6], ■ driver for removing and installing of seat ring retainer, ■ Class V shutoff for EHT above 232°C (450°F) to 316°C (600°F) by using PEEK anti-extrusion rings, ■ Class V shutoff for EHD up to 593°C (1100°F) using C-seal trim or Bore Seal (refer to table 9, ■ lubricator/isolating valve for packing lubrication, and ■ liner with integral seat ring (EHA Series valves only)

Options for NPS 20 Valve

Tool Kit: Includes tools useful during maintenance [3 sets of lifting eyes, 2 hoist rings, flushing plate with either ■ two O-rings for use when flushing fluid is 149°C (300°F) or less or ■ two silver-plated N04400 gaskets for use when flushing fluid is over 149°C (300°F), valve stem lifting nut, lapping fixture and handle, and tamping tools]
Special Cage Characterization: Standard, Cavitrol, or Whisper Trim cage openings as necessary to provide the required installed flow characteristic

1. In flow up applications only, NPS 6-14 EHD and EHT and NPS 8 EHAD and EHAT valves are available with a diverter cone valve plug construction to provide increased stability for higher pressure drops. See figures 7 and 12. Diverter cone valve plug construction is also used for NPS 6 EHD and EHT and NPS 8 EHAD and EHAT requiring Whisper Trim III Level A, B, or C cages.
2. EN (or other) ratings and end connections can usually be supplied; please consult your Emerson Automation Solutions sales office.
3. The pressure or temperature limits in this bulletin and any applicable standard limitations should not be exceeded.
4. Modified equal percentage characteristic is equal-percentage for the first 90% of travel, then quick-opening for additional capacity.
5. EHS may be used for flow down in special cases. Please consult your sales office. NPS 1 and 2 valves with Micro-Form plugs can only be used for flow up applications
6. O-ring seat ring gasket construction is preferred where temperature allows and is standard for EHT valves. See table 12.
7. For temperatures above 204°C (400°F), the following CF8M (316 SST) valves must be derated: NPS 8 and 10 ASME Special CL1500 or 2500 valves; NPS 12 and 14 ASME Standard or Special CL2500 valves. For more information, contact your sales office.
8. NPS 8 to 14 flow up for boiler feedwater service with pressure drop greater than 69 bar (1000 psi) when a diverter plug is used.
9. Valves using an equal percentage cage may be traveled an additional 13 mm (0.5 inch) if desired to obtain additional capacity; flow characteristic becomes modified equal percentage.
10. H indicates heavy actuator-to-body bolting.

Features (continued)

- Long Thermal-Cycle Life—The seat ring design minimizes operational stresses, thereby reducing chances of distortion and resultant leakage caused by temperature cycling. The hung cage design allows thermal expansion of the cage without affecting the seat ring gasket loading.

- Operational Economy—Balanced trim constructions reduce forces acting on the valve plug, reducing actuator thrust requirements and permitting the use of smaller actuators. This makes the NPS 8 -14 EH Series valves economical for high-pressure, high-flow service. Actuator selection for NPS 20 valves can be made from electromechanical or electrohydraulic styles that use readily available power sources.

- Reliability—All aspects of the control valve (material selection, trim components, packing, and control accuracy) are designed, built, and tested to assure performance and reliability. Extensive metallurgical evaluation results in state-of-the-art cage, valve plug, and stem materials that help ensure trim life and dependable performance.

- Control Accuracy—The NPS 20 cage and valve plug deliver accurate control of high pressure and high capacity flow. Each cage has milled openings and is flow tested for the required flow characteristic. With precise cage openings, accurate installed characteristics result; valves in parallel have the same flow at the same plug position. The cone-shaped plug reduces fluid turbulence, ensure plug stability, and aids positioning accuracy.

- Easy Maintenance—The bonnet lifts off to allow trim access. The separate seat ring and cage allow parts removal and maintenance. The globe configuration reduces the uneven trim wear and resultant maintenance downtime normally associated with slant configurations. Installation with the stem vertical above the bonnet also makes trim removal and installation easy.

- Control Flexibility—Special cage characterization (standard, Whisper Trim, or Cavitrol trim) can be supplied to satisfy almost any combination of flow and noise or cavitation abatement. Cage characterization and efficient flow passages provide close control for low flow, high pressure drop and high flow, low pressure drop conditions. A choice of actuator styles allows wide selection of power and control capabilities.

Figure 1. Typical HIGH-SEAL Packing System

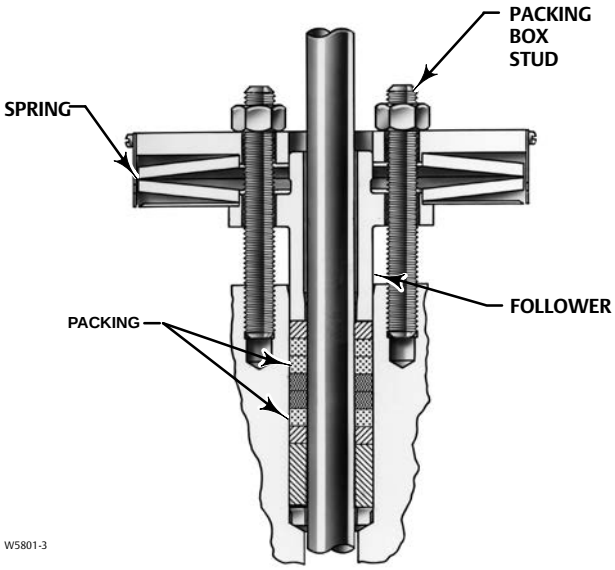
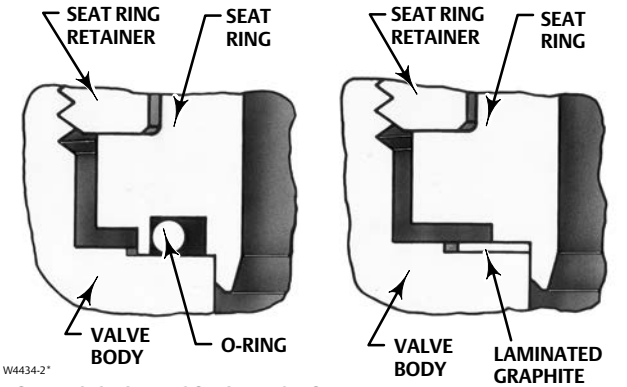


Figure 2. Seat Ring Gasket Constructions



O-RING GASKET CONSTRUCTION, STANDARD CONSTRUCTION FOR EHT, CAVITROL TRIMS, AND SOUR SERVICE 1

LAMINATED GRAPHITE GASKET CONSTRUCTION

NOTES:
1 Preferred for all other body constructions where temperature allows.

Table 1. Availability Chart

Valve Size, NPS(1)	CL1500	CL1500 Intermediate	CL2500	CL2500 Intermediate
1-1/2 x 1	---	---	EHS	EHS
2 x 1	---	---	EHS	---
2	---	---	---	EHD, EHS, EHT
3 x 2	---	---	EHD, EHS, EHT	EHD, EHS, EHT
3	---	EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT
4 x 3	---	---	EHD, EHS, EHT	---
4	---	EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT
6 x 4	---	---	EHD, EHS, EHT	---
6	---	EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT
8 x 6	---	---	EHD, EHS, EHT	---
8	EHD, EHT	EHD, EHT EHAD, EHAT	EHD, EHT EHAD, EHAT	EHD, EHT
10 x 8	EHD, EHT	EHD, EHT	EHD, EHT	EHD, EHT
12	EHD, EHT	EHD, EHT	EHD, EHT	EHD, EHT
14	---	---	EHD, EHT	---
14 x 12	EHD, EHT	EHD, EHT	EHD, EHT	EHD, EHT
16 x 12	---	---	EHD, EHT	---
20	EHD	---	EHD(2)	---

1. Two numbers indicate end connection by nominal valve size. For example, 3 x 2 indicates 3 inch end connection with NPS 2 valve size.
2. CL2185

Table 2. Liquid Flow Coefficients, C_v, at Maximum Travel with Equal Percentage Cage (Modified Equal Percentage Characteristic) (NPS 8 through 14 Valves)(1)

VALVE DESIGN	PRESSURE RATING	VALVE SIZE, NPS	
		8 and 10x8	12 and 14x12
EHD, EHT	CL1500	912	1830
	CL2500	584	1010

1. See Fisher Catalog 12 for additional sizing data.

Figure 3. NPS 3 Fisher EH Valve with 657 Actuator

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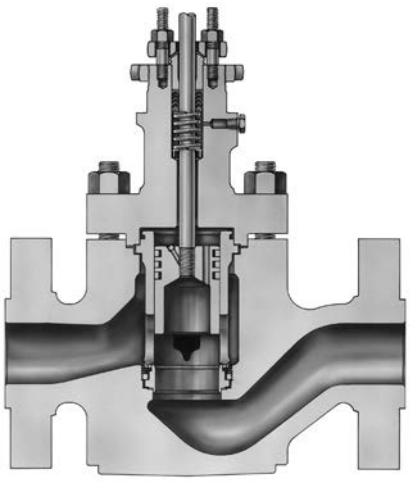
Figure 4. Fisher EHD Valve Body Assembly



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NPS 1-1/2 x 1 through 6 Globe Valves NPS 3 through 8 Angle Valves

EH Series valves (figure 3) offer higher capacities, rugged cage guiding, hardened trim materials, and are available with special trims for noise attenuation and cavitation abatement. An EH valve package can be created for specific service conditions from a variety of special features, including oversized ends, intermediate ratings, special trim materials, and special trim configurations.

Because of flow capacity and severe service capabilities, both EH and EHA valves are used for many high-pressure applications in process industries such as power generation, hydrocarbon production, chemical processing, and refining.

The EHD (figure 4) uses a balanced valve plug and is well suited for general applications where extremely tight shutoff is not required.

The EHS (figures 5 and 6) has an unbalanced valve plug and provides up to Class V shutoff.

The EHT has a balanced valve plug and offers up to Class V shutoff with process temperatures below 232°C (450°F).

EHA valves — EHAD, EHAT, and EHAS — are angle versions of the EH valve.

EH valves are available in CL2500 ratings. EHA valves are available in CL2500. Because these valves feature a thicker body wall, both EH and EHA valves are available with intermediate ratings. See the Features section in this bulletin.

EHA valves provide many of the same features available with EH valves. One important feature is the availability of special trims for aerodynamic noise attenuation, for cavitating liquid service, and for sour service.

Trims (NPS 1-1/2 x 1 through 6 Globe Valves)

Figure 5. Fisher EHS Trim with Micro-Form Valve Plug

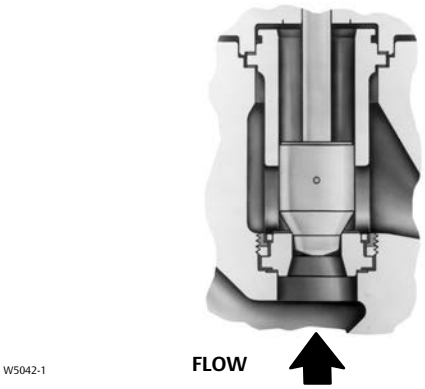


Figure 6. Fisher EHS Trim with Micro-Flute Valve Plug

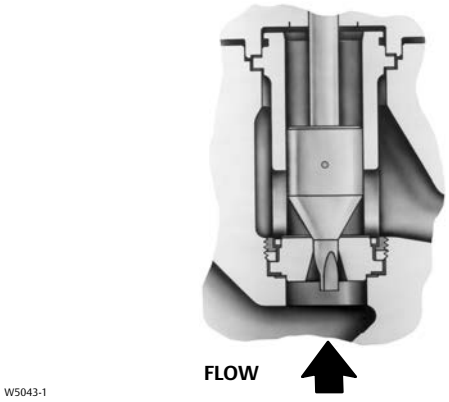
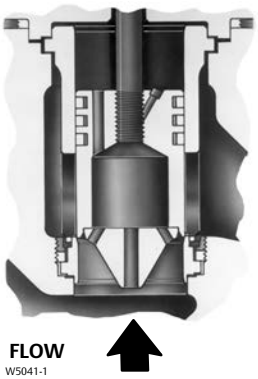


Figure 7. Diverter Cone Plug Used in NPS 6 Fisher EHD and EHT Valves (Flow Up Only)



Diverter cone valve plug used for flowing ΔP> 207 bar (3000 psi) or for Whisper Trim III Level A, B, or C cages.

Figure 8. Fisher EHD Valve Assembly (NPS 8 through 14 Globe Valves)

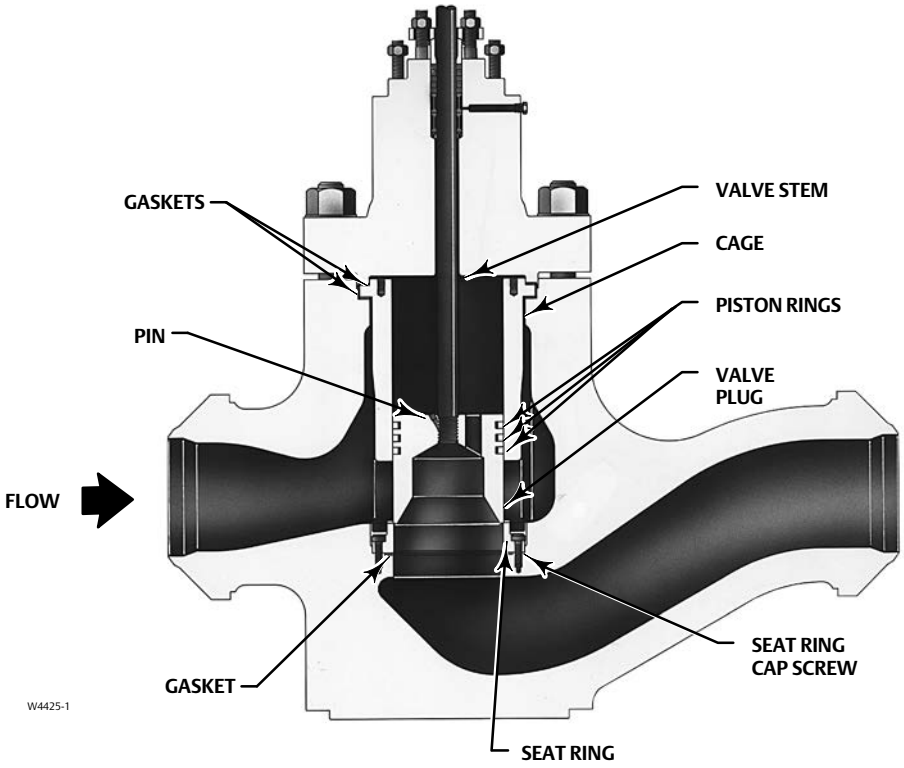
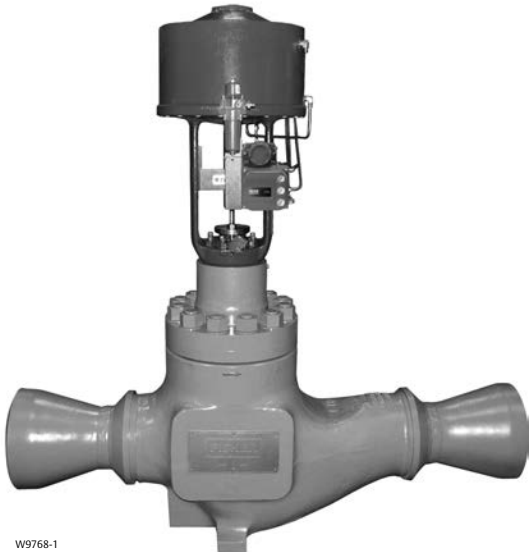


Figure 9. NPS 8 Fisher EH Valve with Welded Pipe Expanders and 585C Actuator



NPS 8 through 14 Globe Valves

EH Series control valves (figure 9) are large, high-pressure globe valves that incorporate proven techniques in flow-stream contouring and in seat ring and valve plug design. These features, along with rugged cage guiding and hardened trim materials, make the EH Series valves reliable high-capacity valves.

These valves are used for many high-pressure applications in the power, process, oil production, chemical, refining, and other industries. The EHD valve (figure 8) is well-suited to general applications where extremely tight shutoff is not required, and the EHT valve (figure 10) offers up to Class V shutoff for applications with relatively low process temperatures.

Principle of Operation (NPS 8 through 14 Globe Valves)

EHD and EHT valves, shown in figures 8 and 10, are balanced valve designs. When the valves are opening or closing, pressure registers on top of the valve plug through the balancing holes in the plug. The force of the pressure on top of the plug balances the force of the pressure on the bottom of the plug to reduce the actuator force required.

Figure 10. Fisher EHT Trim (NPS 8 through 14 Globe Valves)

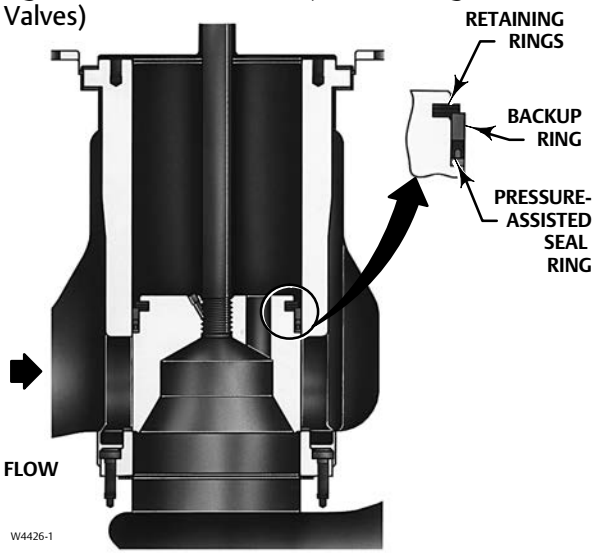


Figure 11. Fisher EHD Trim with Whisper Trim III Level D Cage (NPS 8 through 14 Globe Valves)

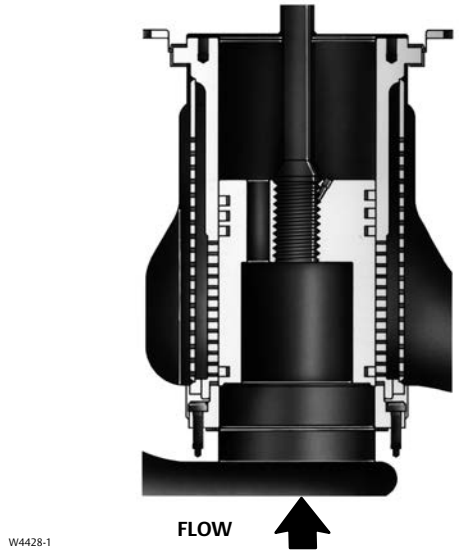
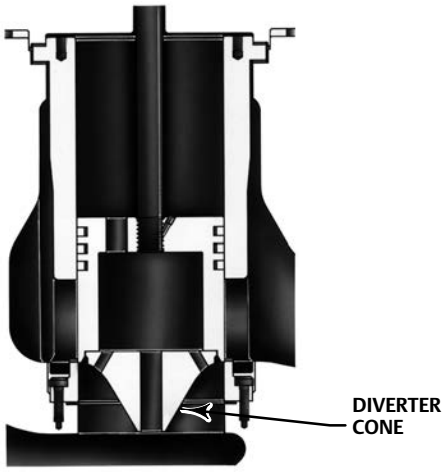
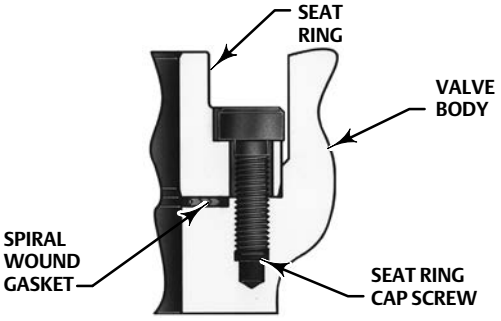


Figure 12. Diverter Cone Valve Plug Used in Fisher EHD and EHT Valves (NPS 8 through 14 Globe Valves, Flow Up Only)

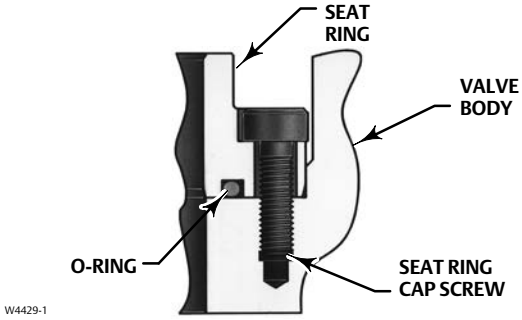


DIVERTER CONE VALVE PLUG USED IN BOILER FEEDWATER SERVICE FOR FLOWING ΔP> 1000 PSI (69 BAR) AND IN OTHER APPLICATIONS FOR FLOWING ΔP> 138 BAR (2000 PSI) OR FOR WHISPER TRIM III LEVEL A, B, OR C CAGES

Figure 13. Seat Ring Gasket Constructions (NPS 8 through 14 Globe Valves)

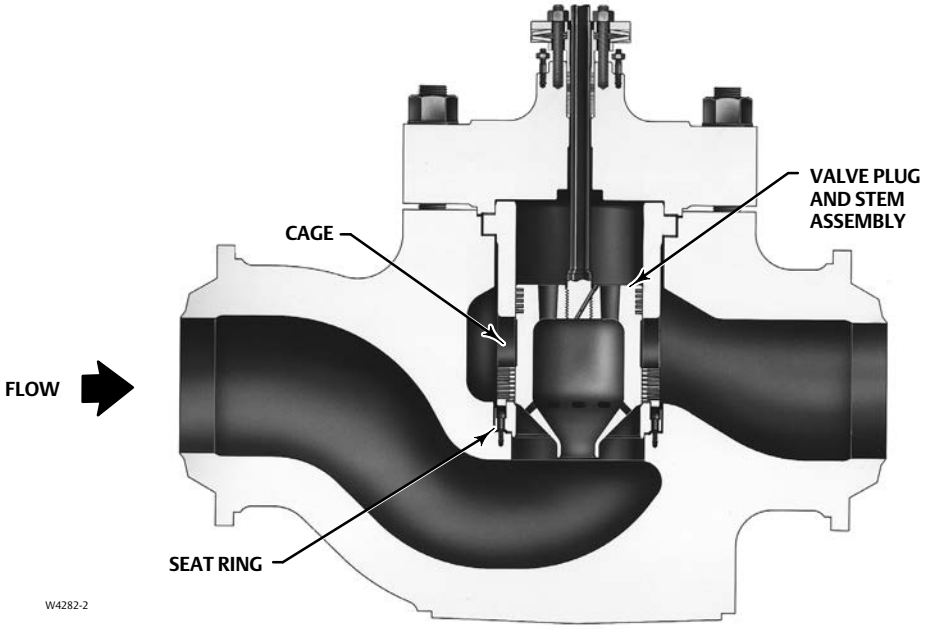


SPIRAL WOUND GASKET CONSTRUCTION (STANDARD CONSTRUCTION FOR HIGH TEMPERATURE APPLICATIONS)



O-RING GASKET CONSTRUCTION (STANDARD CONSTRUCTION FOR SOUR SERVICE AND OPTIONAL FOR OTHER VALVE CONSTRUCTIONS)

Figure 14. Sectional of NPS 20 Fisher EHD Control Valve Assembly



NPS 20 Globe Valves

The NPS 20 EHD control valve (figure 15) is a large, high-pressure, single-port, globe valve designed to closely and dependably control high-pressure, high-temperature media in the power and hydrocarbon industries. For example, NPS 20 EHD control valves are used in sliding pressure systems to control high-pressure steam in fossil-fueled power plants.

Advanced, yet successfully field-proven, the NPS 20 EHD control valve usually incorporates special design features to satisfy specific customer requirements. For example, figure 14 illustrates a specially characterized cage. Both Whisper Trim cage holes and large cage windows provide the customer-required flow characteristic. Additionally, the drilled Whisper Trim holes in the cage provide noise abatement.

Standard construction details such as the cone-shaped valve plug and stem assembly, separate seat ring, and HIGH-SEAL packing arrangement are also shown in figure 14.

Figure 15. NPS 20 Fisher EHD Valve with Electromechanical Actuator

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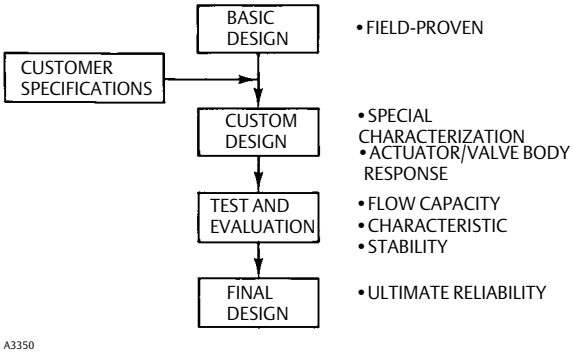
Figure 16. Custom Design Sequence (NPS 20 Globe Valves)



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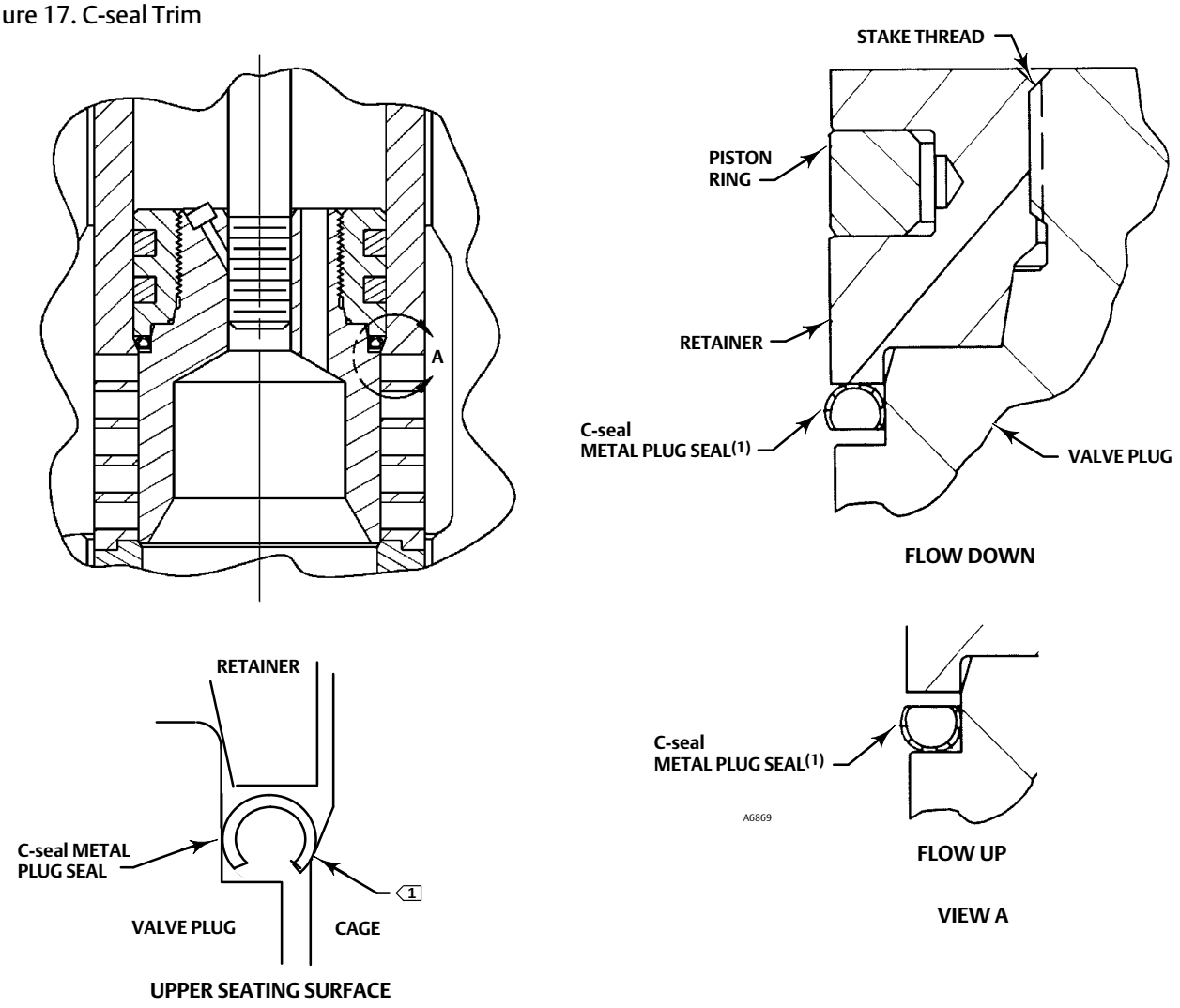
Custom Design Capability (NPS 20 Globe Valves)

Sliding pressure systems, as well as other control systems, have specific performance characteristics that require special control valve constructions. These special constructions must perform dependably and provide accurate system operation and plant reliability.

As shown in figure 16, the basic NPS 20 EHD valve configuration can be designed to meet customer specifications. Special cage characterization and actuator/valve response characteristics can be designed and then confirmed through exhaustive testing and evaluation. Flow testing of these large valves takes place at the Emerson Innovation Center, Fisher Technology, the largest facility of its kind in the world.

The final control valve assembly provides reliable, dependable performance. This performance delivers controllability for not only the control valve but also the plant control system, sliding pressure or otherwise.

Figure 17. C-seal Trim

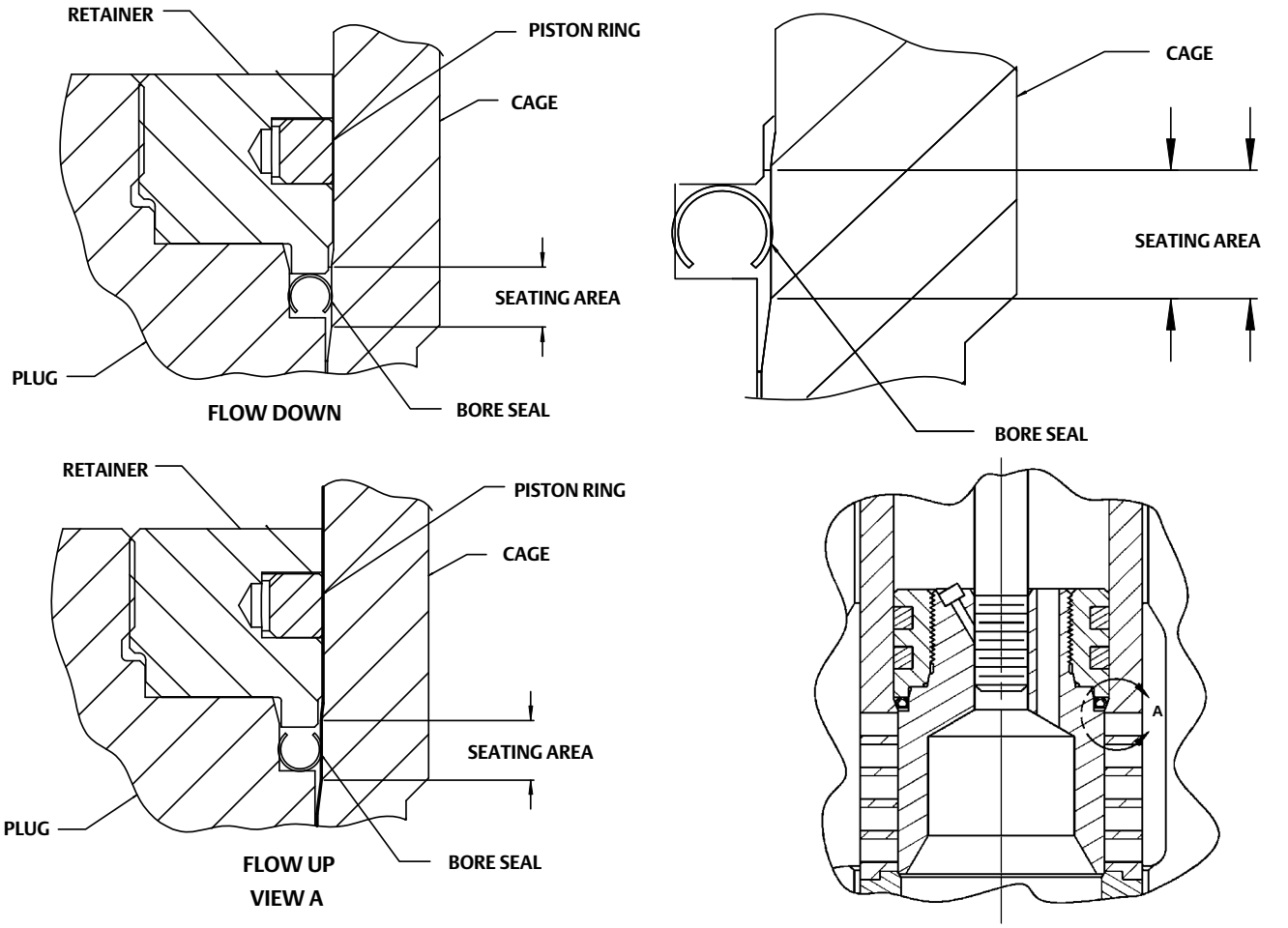


NOTES:
1 Reverse the orientation of the C-seal plug seal for proper shutoff when valve is used in a process with different fluid flow direction.

C-seal Trim Description

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).

Figure 18. Bore Seal



Bore Seal Description

The Bore Seal (figure 18) is available for the EHD only and employs a variation of the proven C-seal trim with enhancements for use with the larger port EH hung cage. The Bore Seal is required for Class V shutoff applications where the service temperature exceeds 316°C (600°F). See table 3 for availability and temperature limits.

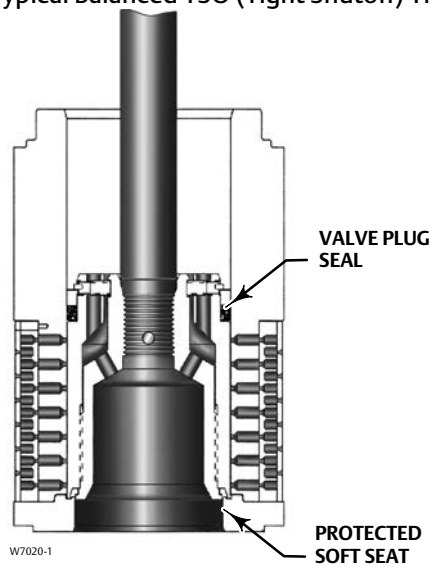
The Bore Seal employs a metal C-shaped seal ring that is secured to the outside diameter of the valve plug. When the valve plug comes into contact with the seat ring to close the valve, the Bore Seal is compressed against the cage wall, thereby blocking a secondary leakage path that exists between the plug and cage wall. When the valve plug is not in contact with the seat ring (i.e. valve open), the Bore Seal is not engaged and the piston rings that are also secured to the outside diameter of the plug assume the role of blocking this secondary leakage path.

Table 3. Bore Seal Availability and Temperature Limits (EHD only)

VALVE (PRESSURE CLASS)	VALVE SIZE, NPS	TRIM DESIGNATION(1)	VALVE BODY MATERIAL	TEMPERATURE LIMIT		ANSI/FCI/IEC SHUTOFF CLASS
				°C	°F	
EHD (CL1500 - CL2500)	8, 10, 12, and 14	75	WCC/WC9	-29 to 427	-20 to 800	V
		95	WCC	315 to 427	600 to 800	
			WC9	315 to 593	600 to 1100	
		96	WCC/WC9	-29 to 427	-20 to 800	

1. See tables 11 and 13 for materials.

Figure 19. Typical Balanced TSO (Tight Shutoff) Trim



Fisher TSO (Tight Shutoff) Trim Capabilities

TSO trim consists of a protected soft seat plus PEEK anti-extrusion rings with a spring-loaded PTFE plug seal. Used only in flow down applications, TSO trim offers unparalleled shutoff integrity, resulting in long plug and seat life.

See figure 19 and tables 8 and 9. For additional information contact your Emerson Automation Solutions sales office.

Table 4. Available Globe Valve Configurations and Valve Sizes(1) (NPS 1-1/2 x 1 through 6 Globe Valves)

AVAILABLE CONFIGURATIONS			VALVE SIZES (NPS) AND PRESSURE RATING					
Valve Design	Valve Plug Style	Cage Style	1-1/2 x 1, 2 x 1	2	3 x 2	3, 4 x 3	4, 6 x 4	6, 8 x 6
			CL2500	CL3273	CL2500	CL2500	CL2500	CL2500
EHS	Micro-Form	Quick-Opening(2)	X	X	X	---	---	---
	Standard	Standard(3)	---	X	X	X	X	X
		Whisper Trim III	---	X	X	X	X	X
		Cavitrol III: 2-stage 3-stage	 X ---	 --- X	 --- X	 --- ---	 --- ---	 --- ---
EHT	Standard	Standard(3)	---	---	X	X	X	X
		Whisper Trim III	---	---	X	X	X	X
		Cavitrol III: 2-stage 3-stage	 --- ---	 --- ---	 X ---	 X X	 X X	 X X
EHD	Standard	Standard(3)	---	---	X	X	X	X
		Whisper Trim III	---	---	X	X	X	X

X—Indicates available construction.
1. Two numbers indicate end connection by nominal valve size. For example, 3 x 2 indicates 3 inch end connection with NPS 2 valve size.
2. Linear cage used on NPS 2 and 3 x 2 valves.
3. Standard cages are equal percentage, modified equal percentage, and linear cages.

Table 5. Available Angle Valve Configurations and Valve Sizes (NPS 1 through 6 Angle Valves)

AVAILABLE CONFIGURATIONS			VALVE SIZES (NPS) AND PRESSURE RATING	
Valve Design	Valve Plug Style	Cage Style	1 - 4	6[4]
			CL2500	CL3230
EHAS	Micro-Form	Quick-Opening[1]	X[3]	- - -
	Micro-Flute	Quick-Opening	- - -	- - -
	Standard	Standard[2]	X	X
		Whisper Trim III	X	X
		Cavitrol III: 2-stage 3-stage	- - - - - -	- - - - - -
EHAT	Standard	Standard[2]	X	X
		Whisper Trim III	X	X
		Cavitrol III: 2-stage 3-stage	X X	X X
EHAD	Standard	Standard[2]	X	X
		Whisper Trim III	X	X

X—Indicates available construction.
1. Linear cage used on NPS 2 and 3 valves.
2. Standard cages are equal percentage, modified equal percentage, and linear cages.
3. Not available in NPS 4 and larger.
4. Intermediate CL3230. Contact your Emerson Automation Solutions sales office.

Table 6. Globe Valve Sizes and End Connection Styles[1] (NPS 1-1/2 x 1 through 6 Globe Valves)

VALVE SIZE, NPS	CL2500[2]					
	BWE			SWE	RTJ	RF
	SCH 80	SCH 160	SCH XXS			
1-1/2 x 1	X	- - -	X	X	X	X
2 x 1	X	- - -	X	X	X	X
2[3]	- - -	- - -	X	- - -	- - -	- - -
3 x 2	X	- - -	X	- - -	X	X
3	X	- - -	X	- - -	X	X
4 x 3	X	- - -	X	- - -	X	X
4	X	- - -	X	- - -	X	X
6 x 4	X	- - -	X	- - -	X	X
6	X	- - -	X	- - -	X	X
8 x 6	X	X	- - -	- - -	X	X

X—Indicates available construction.
1. EN (or other) ratings and end connections can usually be supplied; consult your Emerson Automation Solutions sales office.
2. For valve ratings of EH Series valves with BWE connections, refer to separate bulletin. Increased Pressure/Temperature Ratings for EH Series and EW Series Steel Valves (D100075X012 or D100076X012).
3. Intermediate CL3273 only.

Table 7. Increased Pressure/Temperature Ratings for Steel Fisher EH Series Globe Valves with Buttwelding End Connections[1]

VALVE SIZE, NPS	CL1500	CL2500
	Intermediate Rating (ASME B16.34)	Intermediate Rating (ASME B16.34)
1	- - -	3862[2]
1-1/2 x 1	- - -	3021
2	- - -	3273
3	- - -	2932
4	- - -	3294
6	- - -	2987
8	1866	2943
10x8	1568	2522
12	1650	2940
14 x 12	1650	2754

1. See Fisher bulletin 59.1:026 (D100075X012) for additional information.
2. Intermediate rating of 4080 is available with special bolting materials in most valve body materials. Contact your Emerson Automation Solutions sales office.

Table 8. Port Diameters, Valve Plug Travel, Yoke Boss Diameters for TSO (Tight Shutoff) Trim

VALVE DESIGN	TRIM	MAX TRAVEL		YOKE BOSS SIZE		PORT DIAMETER				C_V REDUCTION AT 100% TRAVEL(1)
						Nominal		Actual TSO		
		mm	Inch	mm	Inch	mm	Inch	mm	Inch	
EHT NPS 6	CAV III 3-Stage CL2500	95.3	3.75	90 127	3-9/16 5	111	4.375	106	4.1875	0%
EHT NPS 6	Std CL2500	76.2	3	90 127	3-9/16 5	111	4.375	106	4.1875	5% (linear) 5% (equal %)

1. This column lists the percent reduction of published maximum C_V of the trim listed in the TRIM column.

Table 9. Shutoff Classifications per ANSI/FCI 70-2 and IEC 60534-4

Valve Design		Port Diameter, mm (inch)		ANSI/FCI Leakage Class
EHD/EHAD		47.6 mm (1.875 inch) and smaller		II
		58.7 mm (2.3125 inch) to 92.1 mm (3.625 inch)		II—Standard III—Optional
		111.1 mm (4.375 inch) and larger		III—Standard IV—Optional
	Valve Size, NPS	**Port Diameter, mm (inch)**	**Cage Style**	**ANSI/FCI Leakage Class**
EHD (CL1500)	8 10x8	177.8 (7)	Eq. %, Mod. Eq. % Linear (std. cage) Linear (Whisper III, A1, B3, C3)	V - Standard to 593°C (1100°F) (for port diameters from 177.8 (7 inch) through 254 mm (10 inch) with optional Bore Seal)
	12 14 x 12	254 (10)		
EHD (CL2500)	4 6 x 4	73 (2.875)	Eq. %, Mod. Eq. %, Linear (std. cage), Linear (Whisper III, A1, B3, C3)	V - Standard to 593°C (1100°F) (for port diameters from 73 through 136.5 mm [2.875 through 5.375 inches] with optional C-seal trim)
			Linear (Cav III, 2-stage)	
	6 8 x 6	111.1 (4.375)	Eq. %, Mod. Eq. %, Linear (std. cage), Linear (Whisper III, A1, B3, C3, D3)	
			Linear (Cav III, 2- and 3-stage)	
	8 10x8	136.5 (5.375)	Eq. %, Mod. Eq. %, Linear (std. cage), Linear (Whisper III, A1, B3, C3, D3)	V - Standard to 593°C (1100°F) (for port diameters from 136.5 through 177.8 mm [5.375 through 7-inches] with optional Bore seal)
	12 14x12	177.8 (7)		
EHS, EHAS, EHT, EHAT		All	Cavitrol III	V
EHS, EHAS, EHT, EHAT		All	Std or w/ Micro-Form or w/ Micro-Flute	IV—Standard, V—Optional
EHT w/ TSO (Tight Shutoff)		See table 8	See table 8	TSO - Optional TSO is not an ASME leakage class. Valves with TSO trim are factory tested to a more stringent Fisher test requirement of no leakage at time of shipment. Test medium is water. Specify service ΔP when ordering. Test procedure is ANSI/FCI Class V test procedure B.
EHT w/ PEEK(1) Anti-Extrusion Rings		25.4 (1) to 254 (10)	All	V to 316°C (600°F)

1. PEEK (PolyEtherEtherKetone)

Trim Selection Guidelines for NPS 1-1/2 x 1 through 6 Globe Valves

Please refer to the following descriptions as a guideline for the selection of appropriate trims:

- Trim 49--Trim 49 is the standard trim for C12A valve body materials and should only be used with C12A valve body materials. C12A should only be used when the pressure and temperature capabilities for WC9 valve body materials are not acceptable.

- Trim 50--Trim 50 is the standard trim for carbon steel and alloy steel body materials and is recommended for general and severe service applications up to 427°C (800°F). Typical applications for Trim 50 include services in water, boiler feedwater, non-sour hydrocarbons, and steam. The S41600 (416 stainless steel) heat-treated plug and seat ring have a hardness similar to CoCr-A (Alloy 6).

- Trim 53--Trim 53 should be used in all high temperature applications between 427°C (800°F) and 566°C (1050°F) unless chlorides are present. The presence of chlorides could lead to stress corrosion cracking of the CA28MWV (422 stainless steel) cage.

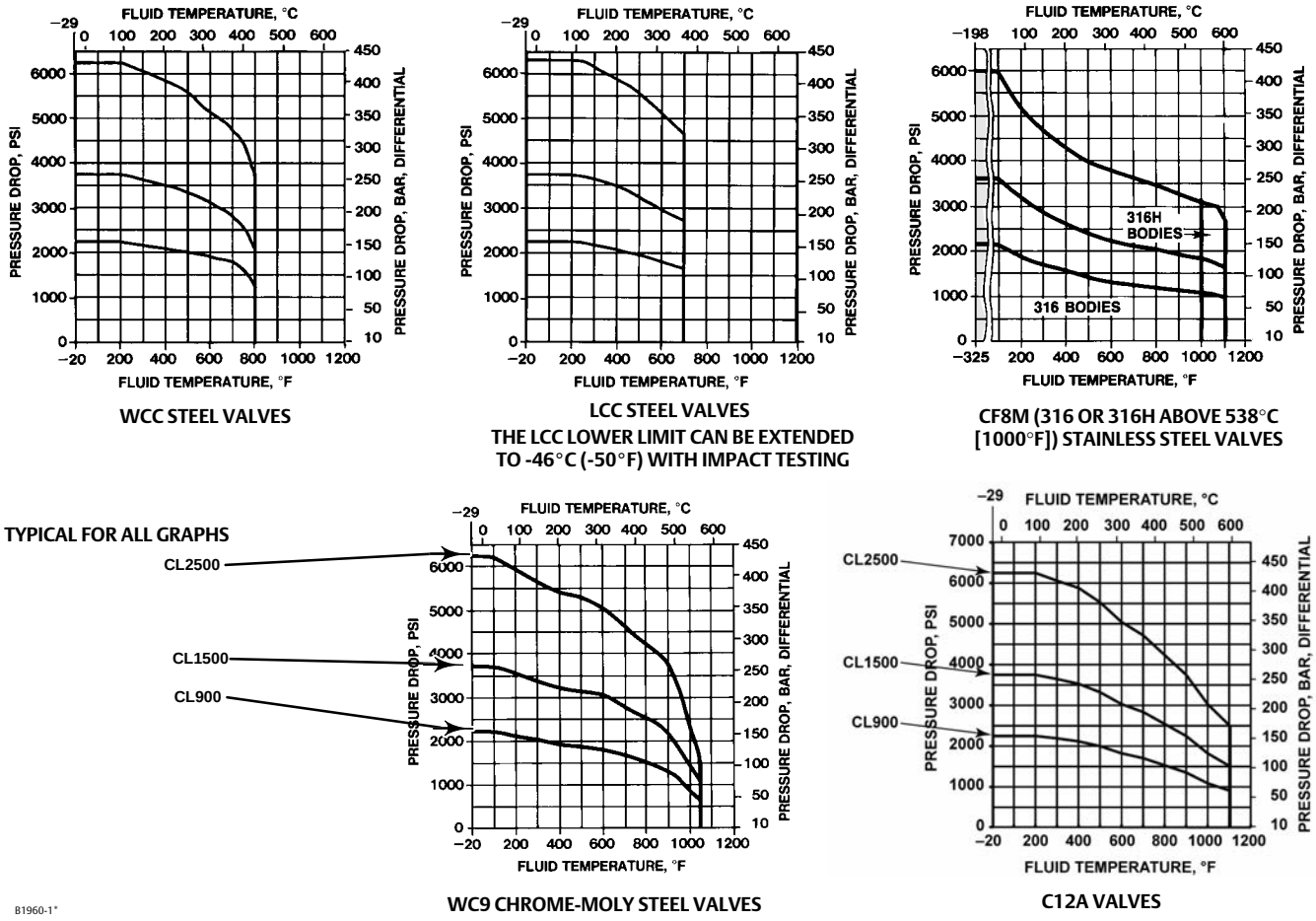
- Trim 54--Trim 54 is the standard trim for stainless steel body materials. It should be used where hard-faced trim is specified.

- Trim 56--Trim 56 should be used for sour service.

- Trim 57--Trim 57 shall be used for boiler feedwater service when limits exceed those specified for Trim 50.

Care should be taken when specifying this trim in small sizes for applications where chlorides are present due to stress corrosion cracking problems with S44004 (440C stainless steel).

Figure 20. Pressure/Temperature Limits for CL2500 Valves (NPS 1-1/2 x 1 through 6 Globe)



Note:
Do not exceed the maximum pressure and temperature for the pressure rating of the body material and valve size used. Refer to tables 4 and 5 for pressure/temperature limits of the trim used. Intermediate pressure/temperature ratings are found in separate bulletin, Increased pressure/temperature ratings for EH AND EW series steel valves.

Material Selection Guidelines

Please use these numbered steps as a guideline for the selection of materials:

3. Determine the pressure/temperature rating of the valve size and material required. Inlet pressure and temperature must always be limited by the applicable ASME pressure/temperature rating.

4. Select the desired valve style from the Available Configurations specification and from the shutoff classifications listed in table 9.

5. Select desired materials from tables 10, 11, 12, and 13 and figures 20, 21, and 22. The temperature capabilities determined from figures 20, 21, and 22 may be further limited by the temperature capabilities of materials selected from tables 10, 11, 12, and 13. Refer to figures 20, 21, and 22 to determine pressure drop limits of the body-trim combinations selected.

Inlet pressure and temperature must always be limited by the applicable ASME pressure/ temperature rating. Contact your Emerson Automation Solutions sales office for special materials for temperatures exceeding the following maximum limits: EHD valve [593°C (1100°F)] and the EHT valve [232°C (450°F)].

Table 10. Trim Material Combinations (NPS 1-1/2 x 1 through 6 Globe Valves)

DESIGNATION	VALVE PLUG	CAGE	SEAT RING	SEAT RING RETAINER	VALVE BODY MATERIAL(6)	OPERATING TEMPERATURE RANGE		SOUR SERVICE (NACE)
						Degrees Celsius	Degrees Fahrenheit	
WITH STANDARD CAGE								
50	S41600 (416 SST) heat-treated(1) S44004 (440C SST) heat-treated for Micro-Flute valve plugs	S17400 (17-4PH SST) H1075 heat-treated	S41600 heat-treated	S17400 H1150D heat-treated chrome coat	WCC, WC9	-29 to 427	-20 to 800	No
53(2, 4)	S31600 (316 SST) with CoCr-A (Alloy 6) seat and guide	S42200 (422 SST) nitrided	Alloy 6	N07718 heat-treated chrome coat	WC9	427 to 566	800 to 1050	No
54	S31600 with CoCr-A seat and guide	CF8M (316 SST) chrome coat	Alloy 6	N07718 heat-treated chrome coat	CF8M	-73 to 593	-100 to 1100	Yes
56(3)	S31600 with CoCr-A seat and guide	CF8M ENC	Alloy 6	S17400 H1150D heat-treated chrome coat	WCC, WC9	-29 to 149	-20 to 300	Yes
					CF8M	-40 to 149	-40 to 300	
57(3)	S44004 heat-treated	S17400 H1075 heat-treated	S44004 heat-treated	S17400 H1150D heat-treated chrome coat	WCC, WC9	0 to 232	32 to 450	No
49(4, 5)	F22 with CoCr-A seat and guide	F22 nitrided	Alloy 6	N07718 heat-treated chrome coat	C12A	-29 to 593	-20 to 1100	No
WITH CAVITROL III TRIM CAGE								
58(3)	S44004 heat-treated	CB7CU-1 H1075 heat-treated	S44004	S17400 H1150D heat-treated chrome coat	WCC, WC9	0 to 232	32 to 450	No
59(3)	S31600 with CoCr-A seat and guide	CB7CU-1 H1150D heat-treated	Alloy 6	S17400 H1150D heat-treated chrome coat	WCC, WC9	-29 to 232	-20 to 450	Yes
WITH WHISPER TRIM III CAGE								
60	S41600 heat-treated S17400 H900 SST heat-treated for NPS 6 EH only	CB7CU-1 H1075 heat-treated	S41600 heat-treated	S17400 H1150D heat-treated chrome coat	WCC, WC9	-29 to 427	-20 to 800	No
61(4)	S31600 with CoCr-A seat and guide	S42200 nitrided	Alloy 6	N07718 heat-treated chrome coat	WCC	-29 to 427	-20 to 800	No
		F22 nitrided for NPS 6 EH only			WC9	-29 to 566	-20 to 1050	
62(3)	S31600 with CoCr-A seat and guide	CB7CU-1 H1150D heat-treated	Alloy 6	S17400 H1150D heat-treated chrome coat	WCC, WC9	-29 to 232	-20 to 450	Yes
63(4, 5)	F91 with CoCr-A seat and guide	S42200 nitrided	Alloy 6	N07718 heat-treated chrome coat	C12A	-29 to 593	-20 to 1100	No
	F22 with CoCr-A seat and guide for NPS 6 EH only	F22 nitrided for NPS 6 EH only						

1. S17400 H900 stainless steel heat-treated is used when a diverter cone valve plug is specified for port diameters equal to and larger than 4.375 inches.
2. This trim designation not available with the O-ring seat ring gasket construction due to temperature limitations.
3. This trim designation uses the O-ring seat ring gasket construction. See table 12 for O-ring temperature limits. For temperatures greater than 232°C (450°F), flat sheet seat ring gasket with HTS1 seal ring option (up to 316°C (600°F) is available. Consult your Emerson Automation Solutions sales office.
4. This trim is for use in EHD and EHS constructions only.
5. Trims 49 and 63 use S41000 stem instead of the standard S31600 material. S41000 is limited to 538°C (1000°F). For temperatures greater than 538°C (1000°F), S42200 stem is used. S20910 stem material should not be used with this trim.
6. If using valve body/trim combinations other than those listed, consult your sales office.

Table 11. Trim Material Combinations (NPS 8 through 14 Fisher EHD and EHT)

TRIM DESIGNATION	VALVE PLUG	VALVE PLUG STEM	CAGE	SEAT RING	SEAT RING CAP SCREWS	VALVE BODY MATERIAL(5)	OPERATING TEMPERATURE RANGE	
							°C	°F
EHD and EHT Valve with Standard Cage								
75	S42000 (420 SST)	S20910	CA6NM	S17400 H1075 heat-treated	S17400	WCC, WC9	-29 to 427	-20 to 800
77	S31600 with CoCr-A (alloy 6) seat and guide	S20910	S31600 chrome coat	S31600 with CoCr-A seat	S66286 (660 SST)	CF8M	-198 to 593	-325 to 1100
79	S31600 with CoCr-A seat and guide	S20910	CA6NM chrome coat	N06600 with CoCr-A seat	N07718	WCC	-29 to 427	-20 to 800
						WC9	-29 to 566	-20 to 1050
EHD and EHT Valve with Standard Cage for Sour Service								
82(1)	S31600 with CoCr-A seat and guide	S20910	S31600 ENC	N06600 with CoCr-A seat	N07718	WCC, WC9	-29 to 204	-20 to 400
						CF8M	-198 to 343	-325 to 650
All Valves with Whisper Trim III Cages								
95(3)	F22 with CoCr-A seat and guide	S41000 heat treated(2)	WC9/ nitrided	F22 with CoCr-A seat	N07718	WCC	315 to 427	600 to 800
						WC9	315 to 593	600 to 1100
96	S17400 with CoCr-A seat and guide	S17400 H1150D	CB7CU-1 H1075	S17400 with CoCr-A seat	S17400	WCC, WC9	-29 to 427	-20 to 800
All Valves with Whisper Trim III Cages for Sour Service(4)								
97	S17400 with CoCr-A seat and guide	S17400 H1150D dbl	S17400 H1150D ENC	S17400 with CoCr-A seat	S17400	WCC	-29 to 343	-20 to 650

1. Limit to 149°C (300°F) when using N04400 gasket material.
2. S41000 is limited to 538°C (1000°F). For temperatures greater than 538°C (1000°F), an S42200 stem is used.
3. This trim is for use in EHD constructions only.
4. Trim 97 complies with NACE MR0175/2002 and is not NACE MR0175/ISO15156 or NACE MR0103 compliant.
5. If using valve body/trim combinations other than those listed, consult your Emerson Automation Solutions sales office.

Table 12. Construction Materials and Temperature Capabilities for Parts Other than Body and Trim (NPS 1-1/2 x 1 through 6 Globe Valves)

PART		MATERIAL	TEMPERATURE CAPABILITIES	
			Degrees Celsius	Degrees Fahrenheit
Valve plug stem		S31600 (316 stainless steel)	-198 to 427	-325 to 800
		S31600/chromium coating	427 to 593	800 to 1100
		S20910 (1)	-198 to 593	-325 to 1100
		S20910/chromium coating	427 to 593	800 to 1100
EHD/EHAD piston ring		Graphite (FMS 17F27)	-46 to 427 (to 482 for nonoxidizing service)	-50 to 800 (to 900 for nonoxidizing service)
		Graphite (FMS 17F39)	-46 to 537 (to 593 for nonoxidizing service)	-50 to 1000 (to 1100 for nonoxidizing service)
EHT/EHAT seal ring		N10276 with glass and moly-filled PTFE	-73 to 232	-100 to 450
EHT/EHAT seal ring backup ring		Same as base material of valve plug	See table 10	See table 10
Spring-loaded EHT valve plug seal	Backup ring	S41600 (416 SST)	-29 to 427	-20 to 800
	Retaining ring	S30200 (302 SST) N07750(1)	-254 to 593	-425 to 1100
	Seal ring	R30003 (with glass and moly-filled PTFE)	-73 to 232(7)	-100 to 450(7)
	Anti-extrusion ring	PEEK (PolyEtherEtherKetone)	-73 to 316	-100 to 600
Cage gasket		S31600/Graphite(1)	-254 to 427 (to 593 for nonoxidizing service)	-425 to 800 (to 1100 for nonoxidizing service)
Seat ring gasket	O-ring seat ring gasket(1)	Nitrile(5)	-29 to 107(8)	-20 to 225(8)
		Ethylene-propylene(6)	-40 to 232	-40 to 450
		Fluorocarbon (not for water or steam service)(5)	-23 to 204	-10 to 400
	Flat sheet seat ring gasket	S31600/Graphite(1)	-254 to 427 (to 593 for nonoxidizing service)	-425 to 800 (to 1100 for nonoxidizing service)
Body-to-bonnet bolting(2)	Studs Nuts	Steel SA193-B7 (all body materials) Steel SA194-2H (all body materials)	-29 to 427 (WCC, WC9) -46 to 343 (LCC) -48 to 232 (CF8M [316 and 316H])	-20 to 800 (WCC, WC9) -50 to 650 (LCC) -55 to 450 (CF8M [316 and 316H])
	Studs Nuts	Steel SA193-B7 (WC9 body mat'l) Steel SA194-7 (WC9 body mat'l)	-29 to 454	-20 to 850
	Studs Nuts	Steel SA193-B16 (WC9 and C12A body mat'ls) Steel SA194-7 (WC9 and C12A body mat'ls)	-29 to 510	-20 to 950
	Studs Nuts	304 stainless steel SA320-B8 (CF8M [316, 316H body mat'ls]) 304 stainless steel SA194-8 (CF8M [316, 316H body mat'ls])	-198 to 66	-325 to 150
	Studs Nuts	316 SST SA193-B8M(3) (CF8M [316, 316H body mat'l]) 316 SST SA194-8M (CF8M [316, 316H body mat'l])	-198 to 66	-325 to 150
	Studs Nuts	316 SST SA193-B8M chrome coat(4) (CF8M [316, 316H body mat'ls]) 316 SST SA194-8M (CF8M [316, 316H body mat'ls])	-198 to 66	-325 to 150
	Studs Nuts	SST SA453 GR660 with Belleville washers (CF8M[316, 316H, body mat'ls] Steel SA194-7 (CF8M [316, 316H body mat'ls]	-29 to 427	-20 to 800
	Studs Nuts	SST SA453 GR660 rupture tested with Belleville washers (CF8M[316, 316H, body mat'ls] Steel SA194-7 (CF8M [316, 316H body mat'ls]	427 to 537	801 to 1000
	Studs Nuts	SST SA453 GR660 for sour service(1) with Belleville washers (CF8M[316, 316H, body mat'ls] Steel SA194-7M(1) (CF8M [316, 316H body mat'ls]	-29 to 427	-20 to 800
	Studs Nuts	SST SA453 GR660 rupture tested for sour service(1) with Belleville washers (CF8M[316, 316H, body mat'ls] Steel SA194-7M(1) (CF8M [316, 316H body mat'ls]	427 to 537	801 to 1000
	Studs Nuts	N07718 SST (SB037) Steel SA194-7	-29 to 566 (WC9) -29 to 593 (C12A)	-20 to 1050 (WC9) -20 to 1100 (C12A)
	Studs Nuts	Steel SA193-B7M for sour service(1) (CF8M [316 body mat'l]) Steel SA194-2HM for sour service(1) (CF8M [316 body mat'l])	-46 to 232	-50 to 450
Packing		PTFE V-ring	-40 to 232	-40 to 450
		Graphite ribbon/filament (oxidizing service to 700°F)	-254 to 537	-425 to 1000
		Graphite ribbon (high-temperature oxidizing service)	371 to 593	700 to 1100
		HIGH-SEAL packing system (see Fisher Bulletin 59.1:061, ENVIRO-SEAL and HIGH-SEAL Packing Systems for Sliding-Stem Valves (D101633X012), for further information)	See bulletin 59.1:061	See bulletin 59.1:061

-continued-

Table 12. Construction Materials and Temperature Capabilities for Parts Other than Body and Trim (NPS 1-1/2 x 1 through 6 Globe Valves) (continued)

PART	MATERIAL	TEMPERATURE CAPABILITIES	
		Degrees Celsius	Degrees Fahrenheit
Packing follower, spring, or lantern ring	S31600	-254 to 593	-425 to 1100
Packing box ring	S31600	-254 to 593	-425 to 1100
Packing flange, studs, or nuts	Steel	-29 to 427	-20 to 800
	S31600	-29 to 593	-20 to 1100

1. Complies with NACE MR0175-2002, NACE MR0175-2003, NACE MR0103, and NACE MR0175/ISO 15156.
2. Valve body materials with which these bolting materials may be used are shown in parentheses.
3. Class 1 (annealed).
4. Class 2 (strain hardened).
5. For use with all O-ring seat ring constructions without Cavitrol III trim.
6. For use with all O-ring seat ring constructions with Cavitrol III trim.
7. If used with PEEK anti-extrusion rings, PTFE/carbon seal ring may be used up to 316°C (600°F) for non-oxidizing service or up to 260°C (500°F) for oxidizing service.
8. Temperature range per DS52 Group 2.

Table 13. Construction Materials and Temperature Capabilities for Parts Other than Body and Trim (NPS 8 through 14 Fisher EHD and EHT)

PART		MATERIAL	TEMPERATURE CAPABILITIES	
			°C	°F
Standard gasket construction	Cage gasket	Silver-plated N04400	-254 to 593	-425 to 1100
		S31600/Graphite(1)	-254 to 427 (to 593 for nonoxidizing service)	-425 to 800 (to 1100 for nonoxidizing service)
	Metal seat ring gasket	Graphite filled spiral wound N06600	-254 to 593	-425 to 1100
	O-ring seat ring gasket	Nitrile	-29 to 107	-20 to 225
		Ethylene-propylene	-40 to 232	-40 to 450
		Fluorocarbon	-23 to 204	-10 to 400
Sour service gasket construction	Cage gasket	Tin-plated N04400	-29 to 149	-20 to 300
		S31600/Graphite(1)	-254 to 427 (to 593 for nonoxidizing service)	-425 to 800 (to 1100 for nonoxidizing service)
	O-ring seat ring gasket	Nitrile	-29 to 107	-20 to 225
		Fluorocarbon	-23 to 149	-10 to 300
EHD piston ring		Graphite (FMS 17F27)	-46 to 427 (to 482 for nonoxidizing service	-50 to 800 (to 900 for nonoxidizing service)
		Graphite (FMS 17F39)	-46 to 537 (to 593 for nonoxidizing service)	-50 to 1000 (to 1100 for nonoxidizing service)
EHD Bore Seal		N07718	-198 to 593	-325 to 1100
EHT seal ring		PTFE with N10276 Spring	-73 to 232	-100 to 450
EHT seal ring retaining ring		S30200 (302 stainless steel)	-254 to 593	-425 to 1100
Spring-loaded EHT valve plug seal	Backup ring	S41600 (416 SST)	-29 to 427	-20 to 800
	Retaining ring	S30200 (302 SST)	-254 to 593	-425 to 1100
	Seal ring	R30003 (with glass and moly-filled PTFE)	-73 to 232(3)	-100 to 450(3)
	Anti-extrusion rings	PEEK (PolyEtherEtherKetone)	-73 to 316	-100 to 600
Packing		PTFE V-ring	-46 to 232	-50 to 450
		PTFE/composition	-73 to 232	-100 to 450
		Graphite ribbon filament	-18 to 371 (to 537 for nonoxidizing service)	0 to 700 (to 1000 for nonoxidizing service)
		Graphite Ribbon (high temperature oxidizing service)	371 to 649	700 to 1200
		HIGH-SEAL (see Bulletin 59.1:061, HIGH-SEAL Packing Systems for Sliding-Stem Valves (D101633X012) for information)		
Packing follower, spring, or lantern ring		S31600 (316 stainless steel)	-254 to 593	-425 to 1100
Packing box ring		S17400	-101 to 427	-150 to 800
		S31600	-254 to 593	-425 to 1100

-continued-

Table 13. Construction Materials and Temperature Capabilities for Parts Other than Body and Trim (NPS 8 through 14 Fisher EHD and EHT) (continued)

PART		MATERIAL		TEMPERATURE CAPABILITIES	
				°C	°F
Body-to-bonnet bolting[1]	Studs	Steel SA 193-B7	All body materials	-29 to 427 (steel bodies)	-20 to 800 (steel bodies)
	Nuts	Steel SA 194-2H		-48 to 232 (SST bodies)	-55 to 450 (SST bodies)
	Studs	Steel SA 193-B7	WC9 and C5 body materials	-29 to 482	-20 to 900
	Nuts	Steel SA 194-7			
	Studs	Steel SA 193-B16	WC9 and C5 body materials	-29 to 593	-20 to 1100
	Nuts	Steel SA 194-7			
	Studs	304 Stainless steel SA320-B8	CF8M (316 SST) body materials	-198 to 66	-325 to 150
	Nuts	316 stainless steel SA194-8			
	Studs	316 stainless steel SA193-B8M[2]	CF8M and CF8M (316H) body materials	-198 to 66	-325 to 150
	Nuts	316 stainless steel SA194-8M			
	Studs	316 stainless steel SA194-B8M	CF8M body materials	-198 to 66	-325 to 150
	Nuts	316 stainless steel SA194-B8			
	Studs	Steel SA 193-B7M	For sour service[4] CF8M body material	-48 to 232	-55 to 450
	Nuts	Steel SA 194-2HM			
	Studs	SST SA453 GR660 with Belleville washers	CF8M and CF8M (316H) body materials	-29 to 427	-20 to 800
	Nuts	Steel SA194-7			
	Studs	SST SA453 GR660 rupture tested with Belleville washers	CF8M and CF8M (316H) body materials	427 to 537	801 to 1000
	Nuts	Steel SA194-7			
	Studs	SST SA453 GR660 with Belleville washers	For sour service[4] CF8M and CF8M (316H) body materials	-29 to 427	-20 to 800
	Nuts	Steel SA194-7M			
	Studs	SST SA453 GR660 rupture tested with Belleville washers	For sour service[4] CF8M and CF8M (316H) body materials	427 to 537	801 to 1000
	Nuts	Steel SA194-7M			

1. Valve body materials with which these bolting materials may be used are shown in parentheses.
2. Class 1 (annealed).
3. If used with PEEK anti-extrusion rings, PTFE/carbon seal ring may be used up to 316°C (600°F) for non-oxidizing service or up to 260°C (500°F) for oxidizing service.
4. Complies with NACE MR0175-2002, NACE MR0175-2003, NACE MR0103, and NACE MR0175/ISO 15156.

Table 14. Valve Plug Travel[1] (NPS 8 through 14 Valves)

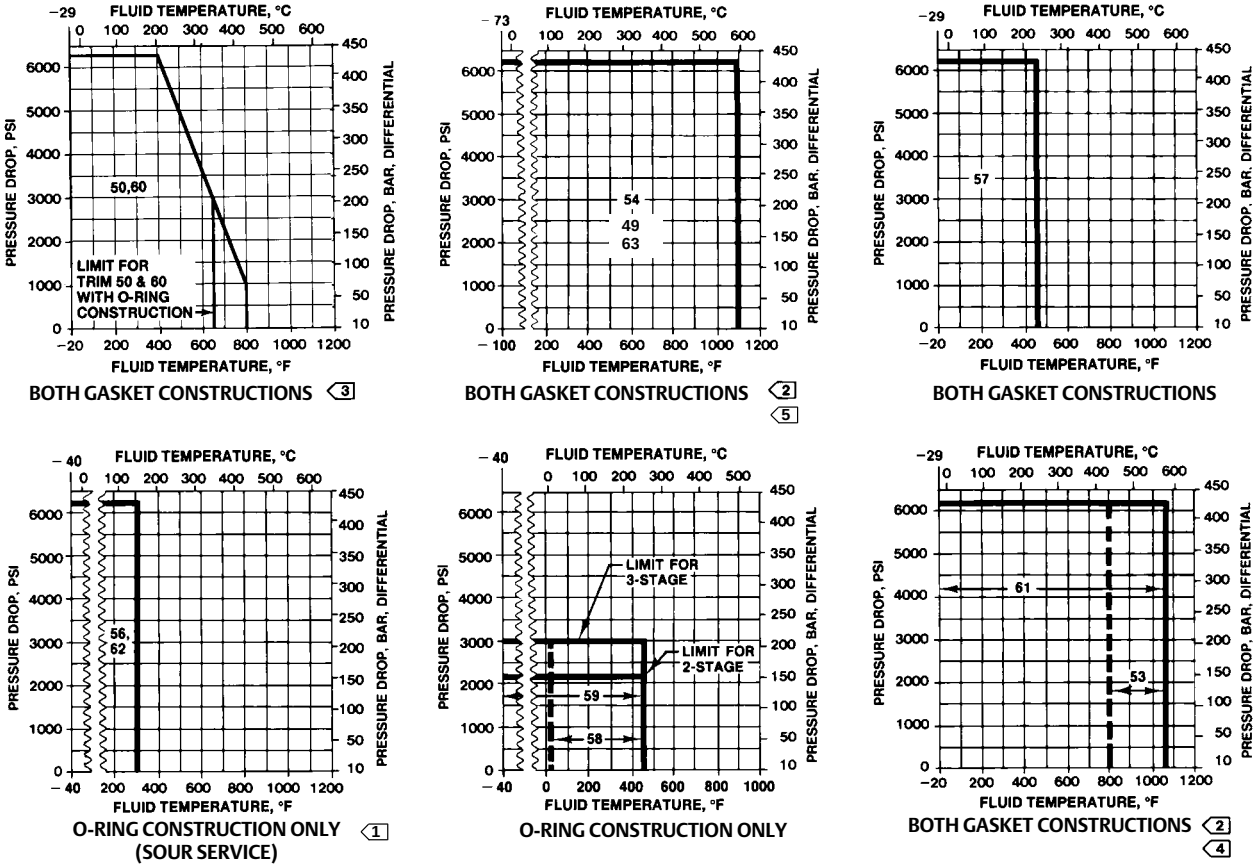
CAGE STYLE	PRESSURE RATING	EHD, EHT			
		Valve Size, NPS			
		8, 10		12, 14	
		mm	Inches	mm	Inches
Linear	CL1500	76	3	102	4
	CL2500	64	2.5	76	3
Equal Percentage[1]	CL1500	76	3	102	4
	CL2500	64	2.5	76	3
Modified Equal Percentage[1]	CL1500	89	3.5	114	4.5
	CL2500	76	3	89	3.5
Whisper Trim III Cage	CL1500	178	7	184	7.25
	CL2500	146	5.75	178	7

1. Valves using an equal percentage cage may be travelled an additional 13 mm (0.05 inch) if desired to obtain additional capacity; flow characteristic becomes modified equal percentage.

Table 15. Flowing Pressure Drop Limits for NPS 6 CL2500 Fisher EHD/EHT and NPS 8 CL2500 EHAD/EHAT Valves (Without Cavitrol III or Whisper Trim III)

VALVE PRESSURE RATING	FLOW MEDIA	STEM SIZE, mm (INCHES)	MAXIMUM FLOWING PRESSURE DROP			
			Bar		PSI	
			Flowing Down	Flowing up with Diverter Cone	Flowing Down	Flowing up with Diverter Cone
CL2500	All except boiler feedwater	19.1 mm (3/4 inch)	69	- - -	1000	- - -
		50.8 mm (1-inch)	69	- - -	1000	- - -
		31.7 mm (1-1/4 inch)	138	431	2000	6250
	Boiler feedwater	31.7 mm (1-1/4 inch)	69	431	1000	6250

Figure 21. Pressure/Temperature Limits for Trim Material Combinations (NPS 1-1/2 x 1 through 6 Globe Valves) (also see table 15)

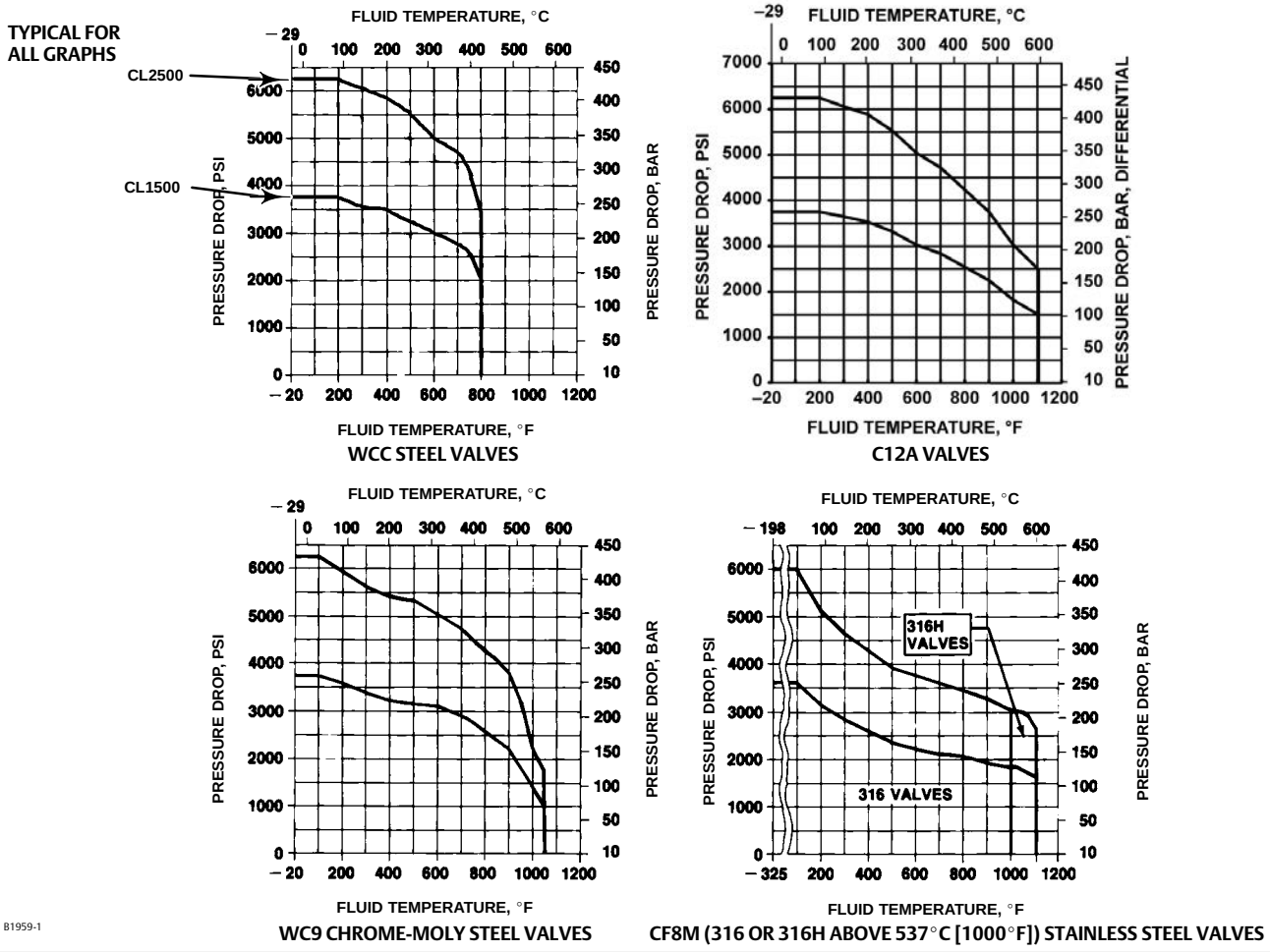


NOTES:
1 For recommended service applications, See table 15.
2 O-ring construction limited to 232°C (450°F), laminated graphite construction limited to 427°C (800°F) for oxidizing service and 593°C (1100°F) for non-oxidizing service.
3 CF8M (316 SST) valve bodies are available for use with trim 60 up to 232°C (450°F).
4 CF8M valve bodies are available for use with trim 61 up to 232°C (450°F).
5 Trim 49 and 63 are only good down to -29°C (-20°F).

Table 16. Flowing Pressure Drops Limits for Fisher EHD and EHT Valves (Without Cavitrol III or Whisper Trim III) (NPS 8 to 14 Valves)

FLOW MEDIA	VALVE STEM CONNECTOR SIZE	MAXIMUM FLOWING PRESSURE DROP BAR (PSID)	
	mm (inch)	Flowing Down	Flowing Up with Diverter Cone
All except boiler feedwater	50.8 mm (2-inch)	138 (2000)	259 (3750)
Boiler feedwater	50.8 mm (2-Inch)	69 (1000)	259 (3750)

Figure 22. Pressure/Temperature Limits for CL1500 and 2500 Valves (NPS 8 through 14 Valves)



Notes:
1. Do not exceed the maximum pressure and temperature for the pressure rating of the valve material and valve size used. Refer to figure 10 for pressure/temperature limits of the trim used. Intermediate class pressure/temperature ratings are found in separate bulletin, Increased pressure/temperature ratings for EH series and EW series steel valve bodies (D100075X012 or D100076X012).

Table 17. Additional Globe Valve Specifications (NPS 1-1/2 x 1 through 6 Globe Valves)

VALVE SIZE, NPS	PRESS-URE RATING	FLOW CHARACTERISTIC	VALVE DESIGN AND PLUG STYLE	PORT DIAMETER		VALVE PLUG TRAVEL		VALVE STEM DIAMETER	
				mm	Inches	mm	Inches	mm	Inches
1-1/2 x 1, 2 x 1	CL2500	Equal percentage	EHS w/Micro-Flute	6.4 9.5 12.7	0.25 0.375 0.5	19 19 19	0.75 0.75 0.75	12.7 12.7 12.7	1/2 1/2 1/2
			EHS w/Micro-Form	6.4 12.7 19.1	0.25 0.5 0.75	19 19 19	0.75 0.75 0.75	12.7 12.7, 19.1 12.7, 19.1	1/2 1/2, 3/4 1/2, 3/4
		Modified equal percentage	EHS w/Micro-Form	12.7 19.1	0.5 0.75	22 22	0.875 0.875	12.7, 19.1 12.7, 19.1	1/2, 3/4 1/2, 3/4
			EHS w/Micro-Flute	9.5 12.7	0.375 0.5	22 22	0.75 0.75	12.7 12.7	1/2 1/2
		Linear (Cavitrol III, 2-stage)	EHS	15.9	0.625	32	1.25	12.7, 19.1	1/2, 3/4
2[2] 3 x 2	CL2500	Equal percentage	EHS w/Micro-Form	25.4	1	22	0.875	12.7, 19.1, 25.4	1/2, 3/4, 1
			EHS, EHD, EHT	38.1	1.5	22	0.875	12.7, 19.1[1], 25.4[1]	1/2, 3/4[1], 1[1]
		Linear (cage style: Whisper Trim III, level A1)	EHS, EHD, EHT	38.1	1.5	38	1.5	12.7, 19.1[1], 25.4[1]	1/2, 3/4[1], 1[1]
		Linear	EHS, EHD, EHT	38.1	1.5	29	1.125	12.7, 19.1, 25.4	1/2, 3/4, 1
		Modified equal percentage	EHS w/Micro-Form	25.4	1	29	1.125	12.7, 19.1, 25.4	1/2, 3/4, 1
			EHS, EHD, EHT	38.1	1.5	29	1.125	12.7, 19.1[1], 25.4[1]	1/2, 3/4[1], 1[1]
		Linear (Cavitrol III, 2-stage)	EHT	31.8	1.25	51	2	12.7, 19.1	1/2, 3/4
		Linear (Cavitrol III, 3-stage)	EHS	15.9	0.625	51	2	12.7, 19.1	1/2, 3/4
3, 4 x 3	CL2500	Equal percentage	EHS, EHD, EHT	58.7	2.3125	29	1.125	12.7, 19.1, 25.4	1/2, 3/4, 1
		Modified equal percentage	EHS, EHD, EHT	58.7	2.3125	38	1.5	12.7, 19.1, 25.4	1/2, 3/4, 1
		Linear (cage style: Whisper Trim III, level A1, B1)							
		Linear (Cavitrol III, 3-stage)	EHT	33.3	1.3125	64	2.5	12.7, 19.1 25.4	1/2, 3/4, 1
		Linear (Cavitrol III, 2-stage)	EHT	47.6	1.875	64	2.5	12.7, 19.1 25.4	1/2, 3/4, 1
4, 6 x 4	CL2500	Equal percentage	EHS, EHD, EHT	73	2.875	38	1.5	19.1, 25.4	3/4, 1
		Modified equal percentage	EHS, EHD, EHT	73	2.875	51	2	19.1, 25.4	3/4, 1
		Linear (cage style: Whisper Trim III, level A1, B1, B3)							
		Linear (Cavitrol III, 3-stage)	EHT	58.7	2.3125	70	2.75	19.1, 25.4	3/4, 1
		Linear (Cavitrol III, 2-stage)	EHT	73	2.875	70	2.75	19.1, 25.4	3/4, 1
6, 8 x 6	CL2500	Equal percentage	EHS, EHD, EHT	111.1	4.375	51	2	19.1, 25.4, 31.8	3/4, 1, 1-1/4
		Modified equal percentage	EHS, EHD, EHT	111.1	4.375	76	3	19.1, 25.4, 31.8	3/4, 1, 1-1/4
		Linear (cage style: Whisper Trim III, level B3, C3, D3)	EHS, EHD, EHT	111.1	4.375	76	3	25.4, 31.8	1, 1-1/4
		Linear (cage style: Cavitrol III, 2- and 3-stage)	EHT	111.1	4.375	95	3.75	19.1, 25.4, 31.8	3/4, 1, 1-1/4

1. Available only with EHS valve body.
2. EHS Intermediate CL3273 only.

Table 18. Additional Angle Valve Specifications (NPS 1 through 6 Angle Valves)

VALVE SIZE, NPS	PRESS-URE RATING	FLOW CHARACTERISTIC	VALVE DESIGN AND PLUG STYLE	PORT DIAMETER		VALVE PLUG TRAVEL		VALVE STEM DIAMETER	
				mm	Inches	mm	Inches	mm	Inches
1 & 2	CL2500	Equal Percent	EHAS w/Micro-Flute	6.4	0.25	19	0.75	12.7	1/2
				9.5	0.375	19	0.75	12.7	1/2
				12.7	0.5	19	0.75	12.7	1/2
			EHAS w/Micro-Form	6.4	0.25	19	0.75	12.7	1/2
				12.7	0.5	19	0.75	12.7, 19.1	1/2, 3/4
				19.1	0.75	19	0.75	12.7, 19.1	1/2, 3/4
		Modified Equal Percent	EHAS w/Micro-Flute	9.5	0.375	22	0.75	12.7	1/2
				12.7	0.5	22	0.75	12.7	1/2
			EHAS w/Micro-Form	12.7	0.5	22	0.875	12.7, 19.1	1/2, 3/4
				19.1	0.75	22	0.875	12.7, 19.1	1/2, 3/4
		Linear(Cavitrol III, 2-stage)	EHAS	15.9	0.625	32	1.25	12.7, 19.1, 25.4	1/2, 3/4, 1
3	CL2500	Equal Percent	EHAS w/Micro-Form	25.4	1	22	0.875	12.7, 19.1, 25.4	1/2, 3/4, 1
			EHAS, EHAD, EHAT	38.1	1.5	22	0.875	12.7, 19.1, 25.4	1/2, 3/4, 1
		Modified Equal Percent	EHAS w/Micro-Form	25.4	1	29	1.125	12.7, 19.1, 25.4	1/2, 3/4, 1
			EHAS, EHAD, EHAT	38.1	1.5	29	1.125	12.7, 19.1, 25.4	1/2, 3/4, 1
		Linear	EHAS, EHAD, EHAT	38.1	1.5	29	1.125	12.7, 19.1, 25.4	1/2, 3/4, 1
		Linear(Cavitrol III, 2-stage)	EHAT	31.8	1.25	51	2	12.7, 19.1	1/2, 3/4
		Linear(Cavitrol III, 3-stage)	EHAS	15.9	0.625	51	2	12.7, 19.1	1/2, 3/4
		Linear(cage style: Whisper Trim III Level A1)	EHAS, EHAD, EHAT	38.1	1.5	38	1.5	12.7, 19.1, 25.4	1/2, 3/4, 1
4	CL2500	Equal Percent	EHAS, EHAD, EHAT	58.7	2.3125	29	1.125	12.7, 19.1, 25.4	1/2, 3/4, 1
		Modified Equal Percent	EHAS, EHAD, EHAT	58.7	2.3125	38	1.5	12.7, 19.1, 25.4	1/2, 3/4, 1
		Linear(Cavitrol III, 2-stage)	EHAT	33.3	1.3125	64	2.5	12.7, 19.1, 25.4	1/2, 3/4, 1
		Linear(Cavitrol III, 3-stage)	EHAT	47.6	1.875	64	2.5	12.7, 19.1, 25.4	1/2, 3/4, 1
		Linear(cage style: Whisper Trim III Level A1)	EHAS, EHAD, EHAT	58.7	2.3125	38	1.5	12.7, 19.1, 25.4	1/2, 3/4, 1
6	CL2500	Modified Equal Percent	EHAD	92.1	3.625	51	2	31.8	1-1/4
		Linear(Cavitrol III, 3-stage)	EHAD	73	2.875	102	4	31.8	1-1/4

1. Available only with EHAS valve body.

Table 19. Globe Valve Yoke Boss and Valve Stem Diameter Combinations(1) (NPS 1-1/2 x 1 through 6 Globe Valves)

VALVE SIZE, NPS	STANDARD DIAMETERS				OPTIONAL DIAMETERS			
	mm		Inches		mm		Inches	
	Stem	Yoke Boss	Stem	Yoke Boss	Stem	Yoke Boss	Stem	Yoke Boss
1-1/2 x 1, 2 x 1	12.7	71	1/2	2-13/16	19.1	90	3/4	3-9/16
2, 3 x 2	12.7 19.1	71 90	1/2 3/4	2-13/16 3-9/16	25.4	127	1	5
3, 4 x 3	19.1	90	3/4	3-9/16	12.7 25.4	71 127	1/2 1	2-13/16 5
4, 6 x 4	19.1	90	3/4	3-9/16	25.4	127	1	5
6, 8 x 6	25.4 31.8	127 127	1 1-1/4	5 5H	19.1	90	3/4	3-9/16

1. See table 17 for valve stem diameters available for specific construction.

Table 20. Approximate Weights (Valve and Bonnet Assemblies)
(NPS 1-1/2 x 1 through 6 Globe and NPS 1 through 6 Angle Valves)

VALVE SIZE, NPS	GLOBE VALVES				ANGLE VALVES			
	CL2500				CL2500			
	Kilograms		Pounds		Kilograms		Pounds	
	Flg	SWE and BWE	Flg	SWE and BWE	Flg	SWE and BWE	Flg	SWE and BWE
1	---	---	---	---	73.1	53.5	161	118
1-1/2 x 1	---	46	---	101	---	---	---	---
2	---	---	---	---	98	66.2	216	146
2 x 1	78	47	173	104	---	---	---	---
3 x 2	161	94	355	207	---	---	---	---
3	223	163	492	359	181	99.3	399	219
4 x 3	265	162	585	357	---	---	---	---
4	338	243	745	536	---	203.2	---	448
6 x 4	526	257	1160	567	---	---	---	---
6	785	544	1731	1199	---	496.2	---	1094
8 x 6	955	558	2106	1231	---	---	---	---
8	---	---	---	---	---	---	---	---

Table 21. Approximate Weights (Valve Assembly and Bonnet) (NPS 8 through 14 Valves)

VALVE SIZE, NPS	WEIGHTS							
	CL1500				CL2500			
	BWE		FLG		BWE		FLG	
	Kilograms	Pounds	Kilograms	Pounds	Kilograms	Pounds	Kilograms	Pounds
8	1400	3100	1700	3700	1900	4100	2200	4700
10	1500	3300	1900	4100	2000	4400	---	---
12	3400	7300	3900	8600	3400	7600	---	---
14	3400	7300	---	---	3400	7600	---	---

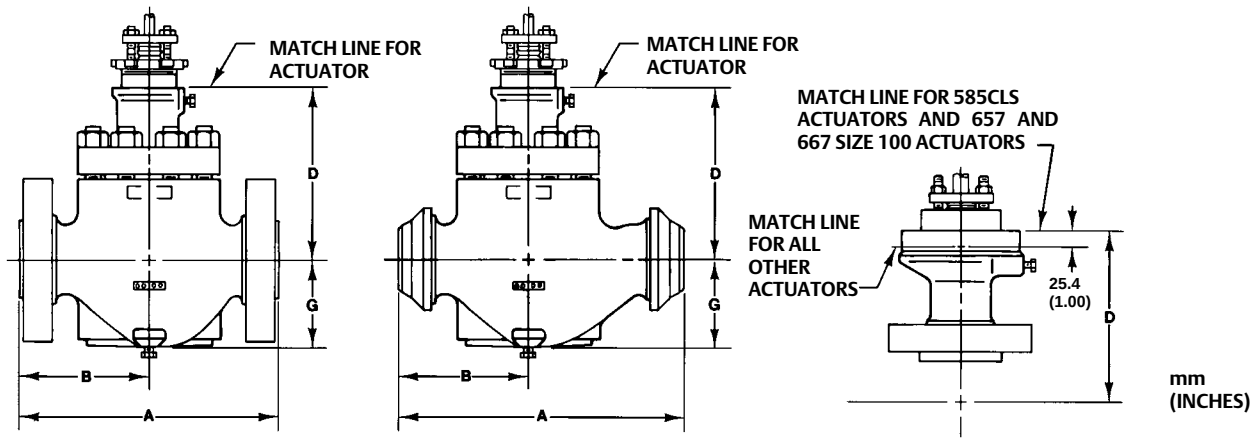
Installation

The valve must be installed so flow through the valve matches the flow direction arrow on the valve body. Consideration should be given to installing an upstream strainer, especially if the valve uses a multi-orifice Whisper Trim III or Cavitrol III cage.

For NPS 8 and larger valves, the recommended installation position is with the valve in a horizontal pipeline and the actuator vertical above the valve. Other orientations may result in shortened trim life and difficulty with field maintenance.

Overall dimensions are shown in figures 23, 24, 25, 26, and 27. Face-to-face dimensions are in compliance with ANSI/ISA-S75 for valves smaller than NPS 8. For NPS 8 and larger valves, face-to-face dimensions are longer than industry standards for valves of this size and rating. Actual end connection dimensions conform to ASME B16.25 for buttwelding ends and to ASME B16.5 for flanged ends.

Figure 23. NPS 1-1/2 x 1 through 6 Globe Valve Dimensions with Standard Bonnet (also see tables 22, 23, and 24)



FLANGED VALVE WITH 71 OR 90 mm (2-13/16 OR 3-9/16 INCH) DIAMETER YOKE BOSS

BUTTWELDING END VALVE WITH 71 OR 90 mm (2-13/16 OR 3-9/16 INCH) DIAMETER YOKE BOSS

127 mm (5-INCH) DIAMETER YOKE BOSS FOR USE WITH FLANGED OR BUTTWELDING VALVE

A2719-4 / IL

Note:
For dimensions of valves with DIN (or other) end connections, consult your Emerson Automation Solutions sales office.

Table 22. NPS 1-1/2 x 1 through 6 Globe Valve Dimensions with Standard Bonnet

VALVE SIZE NPS	A(1)			
	CL2500			
	BWE	SWE	RF	RTJ
mm				
1-1/2 x 1	318	318	337	340
2 x 1	318	318	349	353
2(2)	400	---	---	---
3 x 2	400	---	435	442
3	498	---	498	505
4 x 3	498	---	518	527
4	575	---	575	584
6 x 4	575	---	660	673
6	819	---	819	832
8 x 6	819	---	857	873
Inches				
1-1/2 x 1	12.50	12.50	13.25	13.38
2 x 1	12.50	12.50	13.75	13.88
2(2)	15.75	---	---	---
3 x 2	15.75	---	17.12	17.38
3	19.62	---	19.62	19.88
4 x 3	19.62	---	20.38	20.75
4	22.62	---	22.62	23.00
6 x 4	22.62	---	26.00	26.50
6	32.25	---	32.25	32.75
8 x 6	32.25	---	33.75	34.38

1. RF—raised-face flanges; RTJ—ring-type joint flanges; BWE—buttwelding ends; SWE—socketweld ends.
2. Intermediate CL3273 only.

Table 23. NPS 1-1/2 x 1 through 6 Globe Valve Dimensions with Standard Bonnet

VALVE SIZE NPS	B(1)			
	CL2500			
	BWE	SWE	RF	RTJ
mm				
1-1/2 x 1	159	159	168	170
2 x 1	159	159	175	176
2(2)	200	---	---	---
3 x 2	200	---	217	221
3	249	---	249	253
4 x 3	249	---	259	264
4	273	---	273	278
6 x 4	273	---	325	331
6	397	---	397	403
8 x 6	397	---	416	424
Inches				
1-1/2 x 1	6.25	6.25	6.62	6.69
2 x 1	6.25	6.25	6.88	6.94
2(2)	7.88	---	---	---
3 x 2	7.88	---	8.56	8.69
3	9.81	---	9.81	9.94
4 x 3	9.81	---	10.19	10.38
4	10.75	---	10.75	10.94
6 x 4	10.75	---	12.81	13.06
6	15.62	---	15.62	15.88
8 x 6	15.62	---	16.38	16.69

1. RF—raised-face flanges; RTJ—ring-type joint flanges; BWE—buttwelding ends; SWE—socketweld ends.
2. Intermediate CL3273 only.

Table 24. NPS 1-1/2 x 1 through 6 Globe Valve Dimensions with Standard Bonnet

VALVE SIZE NPS	G	D		
	CL2500	CL2500		
		Yoke Boss Diameters, mm (Inches)		
		71 (2-13/16)	90 (3-9/16)	127 (5)
mm				
1-1/2 x 1	78	249	256	---
2 x 1	78	249	256	---
2(1)	108	303	310	343
3 x 2	108	303	310	343
3	145	335	335	371
4 x 3	145	335	335	371
4	168	---	348	406
6 x 4	168	---	348	406
6	229	---	408	445
8 x 6	229	---	408	445
Inches				
1-1/2 x 1	3.06	9.81	10.06	---
2 x 1	3.06	9.81	10.06	---
2(1)	4.35	11.94	12.19	13.50
3 x 2	4.35	11.94	12.19	13.50
3	5.69	13.19	13.19	14.62
4 x 3	5.69	13.19	13.19	14.62
4	6.62	---	13.69	16.00
6 x 4	6.62	---	13.69	16.00
6	9.00	---	16.06	17.50
8 x 6	9.00	---	16.06	17.50

1. Intermediate CL3273 only.

Figure 24. Dimension D for Style 1 Extension Bonnet
(A, B, and G Dimensions Listed in Figure 23 Do Not Change When Extension Bonnet is Used)
(also see table 25)

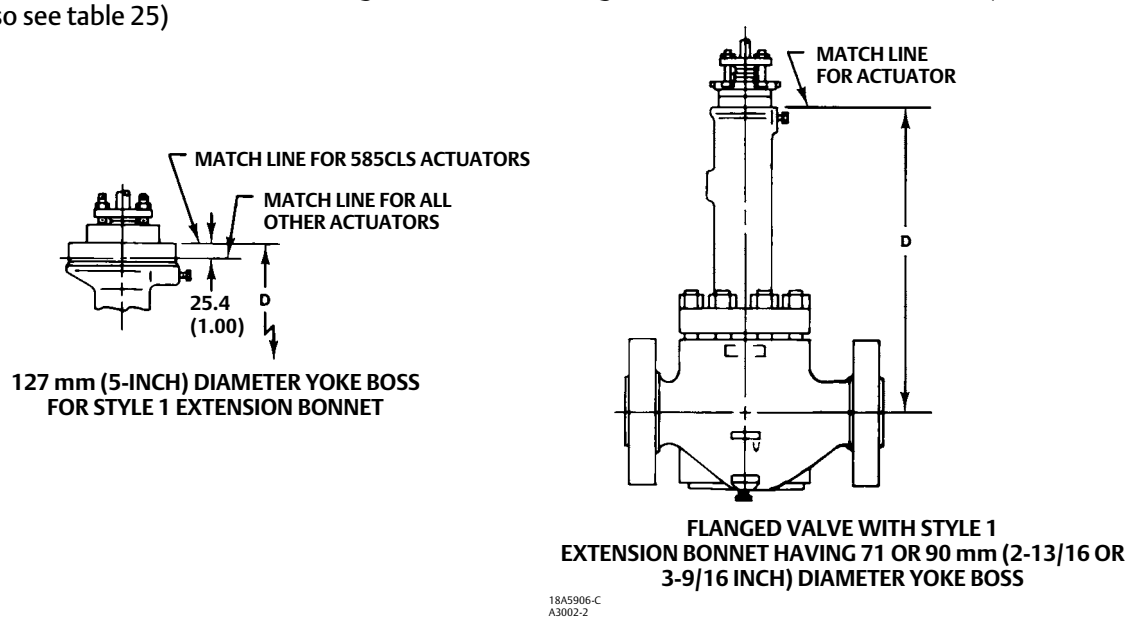


Table 25. Dimension D for Style 1 Extension Bonnet
(A, B, and G Dimensions Listed in Figure 23 Do Not Change When Extension Bonnet is Used)

GLOBE VALVE SIZE, NPS	PRESSURE RATING	D		
		Yoke Boss Diameter, mm (Inches)		
		71 (2-13/16)	90 (3-9/16)	127 (5)
mm				
1-1/2 x 1 and 2 x 1	CL2500	391	406	---
2	CL3273	427	443	502
3 x 2	CL2500	427	443	502
Inches				
1-1/2 x 1 and 2 x 1	CL2500	15.38	16.00	---
2	CL3273	16.81	17.44	19.75
3 x 2	CL2500	16.81	17.44	19.75

Figure 25. NPS 1 through 6 Angle Valve CL2500 Dimensions with Standard Bonnet and Style 1 Extension Bonnet (also see table 26)

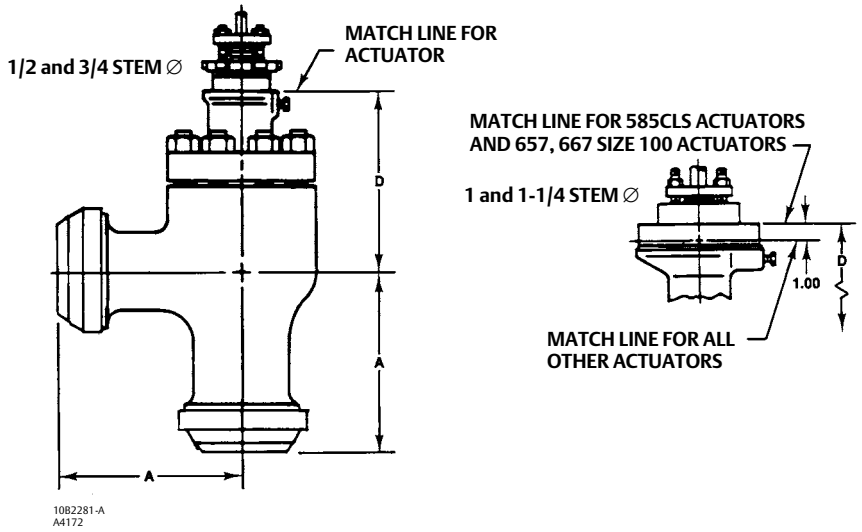
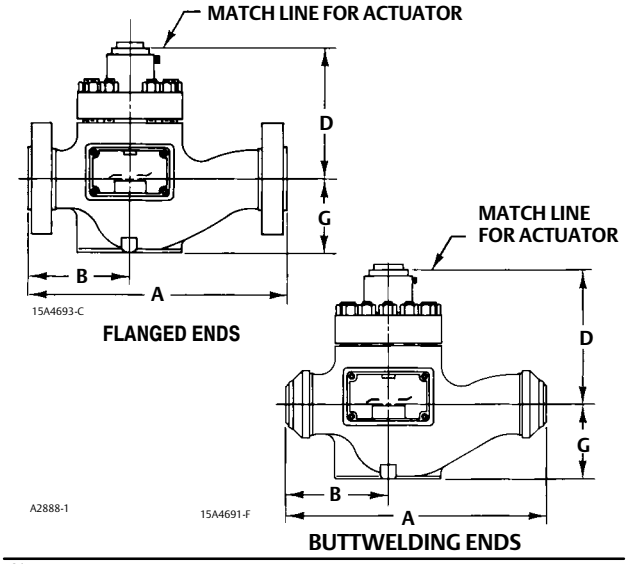


Table 26. NPS 1 through 6 Angle Valve CL2500 Dimensions with Standard Bonnet

VALVE SIZE, NPS	PRESSURE RATING	A, mm				D			
						Std. Bonnet			
		BWE	SWE	RF	RTJ	BWE	SWE	RF	RTJ
1	CL2500	153.9	153.9	153.9	153.9	256.5	392.2	408.1	408.1
2	CL2500	225.6	225.6	225.6	227.1	408.1	408.1	250.0	256.5
3	CL2500	289.1	---	---	292.1	308.9	---	---	308.9
4	CL2500	336.6	---	---	---	334.8	---	---	---
6	CL3230(1)	374.7	---	---	---	451.7	---	---	---
Inches									
1	CL2500	6.06	6.06	6.06	6.06	10.097	15.440	16.065	16.065
2	CL2500	8.88	8.88	8.88	8.94	16.065	16.065	9.844	10.097
3	CL2500	11.38	---	---	11.5	12.162	---	---	12.162
4	CL2500	13.25	---	---	---	13.182	---	---	---
6	CL3230(1)	14.75	---	---	---	17.782	---	---	---

1. NPS 6 is an intermediate CL3230.

Figure 26. Dimensions (NPS 8 through 14 Fisher EHD and EHT Valves) (also see tables 27, 28, and 29)



Note:
For dimensions of valves with EN (or other) end connections, consult your Emerson Automation Solutions sales office.

Table 27. Dimensions (NPS 8 through 14 Fisher EHD and EHT Valves)

VALVE SIZE, NPS	D		G	
	CL900 and 1500	CL2500	CL900 and 1500	CL2500
mm				
8, 10	684	665	363	370
12, 14	702	724	452	437
Inches				
8, 10	26.94	26.19	14.31	14.56
12, 14	27.62	28.50	17.81	17.19

Table 28. Dimensions (NPS 8 through 14 Fisher EHD and EHT Valves)

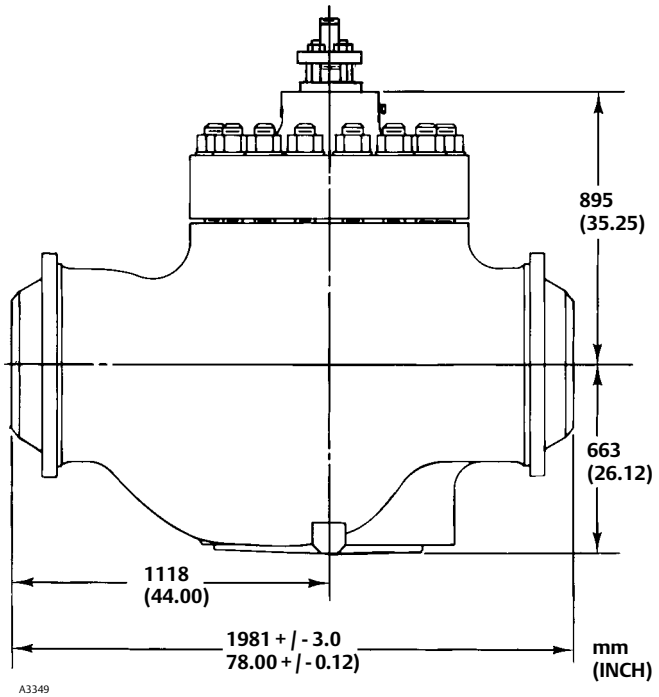
VALVE SIZE, NPS	A(1,2)							
	CL900		CL1500			CL2500		
	RF	RTJ	BWE	RF	RTJ	BWE	RF	RTJ
mm								
8	1137	1140	1194	1194	1203	1295	1295	1311
10	1168	1172	1245	1245	1254	1346	---	---
12	1715	1718	1803	1803	1819	1778	---	---
14	1727	1739	1829	---	---	1803	---	---
Inches								
8	44.75	44.88	47.00	47.00	47.38	51.00	51.00	51.62
10	46.00	46.13	49.00	49.00	49.38	53.00	---	---
12	67.50	67.62	71.00	71.00	71.62	70.00	---	---
14	68.00	68.38	72.00	---	---	71.00	---	---

Table 29. Dimensions (NPS 8 through 14 Fisher EHD and EHT Valves)

VALVE SIZE, NPS	B(1,2)							
	CL900		CL1500			CL2500		
			BWE	RF	RTJ	BWE	RF	RTJ
mm								
8	429	430	457	457	462	508	508	516
10	445	446	483	483	487	533	---	---
12	794	795	838	838	846	838	---	---
14	800	805	851	---	---	851	---	---
Inches								
8	16.88	16.94	18.00	18.00	18.19	20.00	20.00	20.31
10	17.50	17.56	19.00	19.00	19.19	21.00	---	---
12	31.25	31.31	33.00	33.00	33.31	33.00	---	---
14	31.50	31.69	33.50	---	---	33.50	---	---

1. Face-to-face dimensions for these valves are not standard dimensions due to the lack of industry standards for valves of this size and rating.
2. BWE—buttwelding ends; RF—raised-face flanges; RTJ—ring-type joint flanges.

Figure 27. Dimensions (NPS 20 Fisher EHD Valve)



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