Fisher® EH and EHA Control Valves

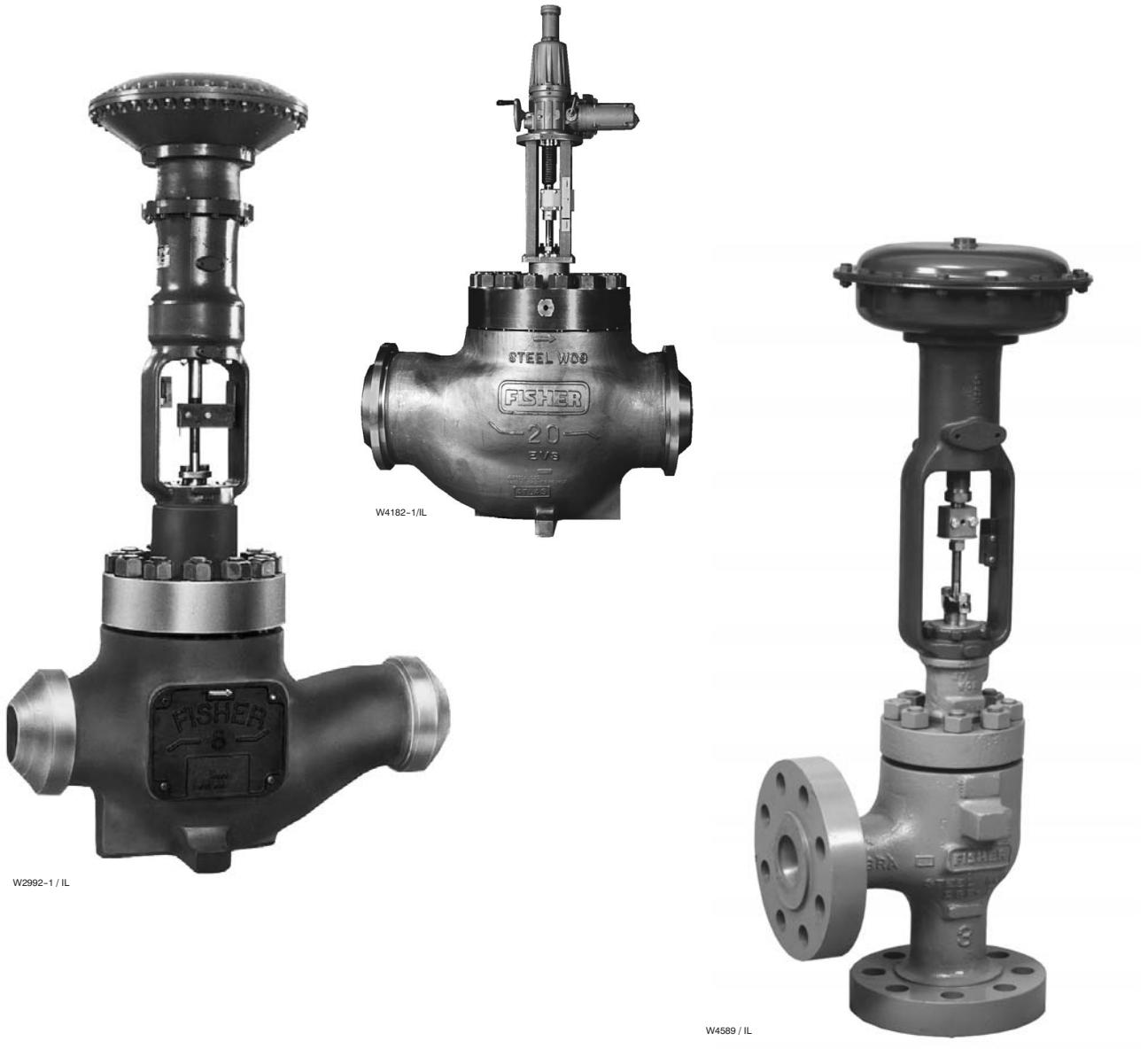


Figure 1. Fisher® EH and EHA Control Valves

Contents

Table 1. Availability Chart

Valve Size, NPS	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	EHAT, EHAD	EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT
4 x 3	- - -	- - -	EHD, EHS, EHT	- - -
4	EHAT, EHAD	EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT
6 x 4	- - -	- - -	EHD, EHS, EHT	- - -
6	EHAT, EHAD	EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT	EHD, EHS, EHT EHAD, EHAS, EHAT
8 x 6	- - -	- - -	EHD, EHS, EHT	- - -
8	EHD, EHT, EHAD, EHAS, EHAT	EHD, EHT EHAD, EHAS, EHAT	EHD, EHT	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 14	- - -	- - -	EHD, EHT	- - -
20	- - -	EHD	- - -	- - -

EH (globe)

■ EHS (NPS 1-1/2 x 1 through 6), ■ EHD (NPS 2 through 20), and ■ EHT (NPS 2 through 14)

EHA (angle)

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

EH Series Valves

These valves (figure 1) 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 Emerson Process Management 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.

- **Optional 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.

- **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 tables 7 and 8 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.

- **Piping Economy—**The availability of expanded end connections on EH valves may eliminate the need for line swages while accommodating oversized piping arrangements.

- **Control of Low Flow Rates/Tight Shut-off—**Micro-Form or Micro-Flute valve plugs (figure 6 or 7) 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.

For EHA valves only, and in low-flow applications where cavitation damage may occur, the Micro-Flat style valve plug can be used. For soot-blower applications, where the valve must provide tight shut-off, a special trim design is available. Please contact your Emerson Process Management sales office for more information.

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 Process Management sales office for more information.

- **High-Temperature, Class V Shutoff—**Use of C-seal trim (see figure 21) permits Class V shutoff up to 593°C (1100°F) for up to 4-3/8 inch port. Bore Seal trim will permit Class V shutoff up 593°C (1100°F) for 5-3/8 inch ports and larger.

- **Excellent 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. This system (figure 2) features graphite packing material and heavy-duty live loading.

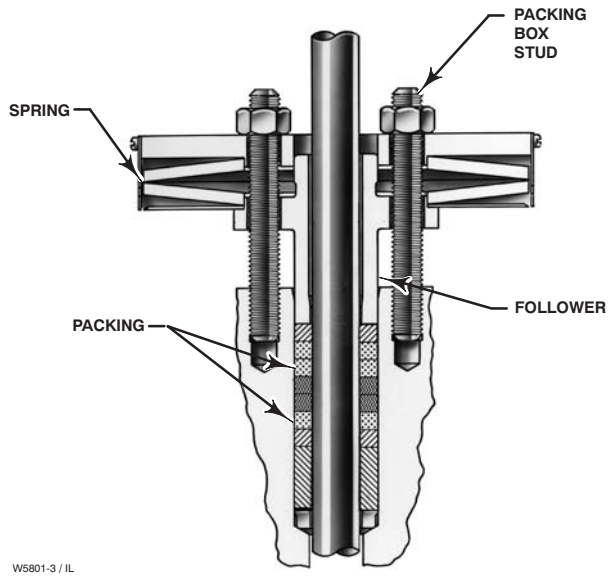


Figure 2. Typical HIGH-SEAL Packing System

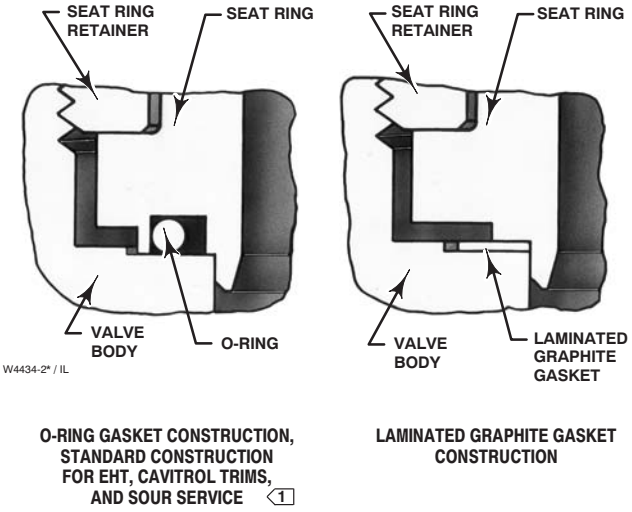


Figure 3. Seat Ring Gasket Constructions

- **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.

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 10	12 and 14
EHD, EHT	CL1500	912	1830
	CL2500	584	1010

1. See the section titled Coefficients in this bulletin for additional sizing data.

- **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, thus reducing actuator thrust requirements and permitting the use of smaller actuators. This, combined with capacities higher than comparably priced globe valves, makes the NPS 8 through 14 EH Series valves very 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 and valve plug 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, accurate 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, helps 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.

Figure 4. NPS 3 Fisher® EH Valve with 657 Actuator

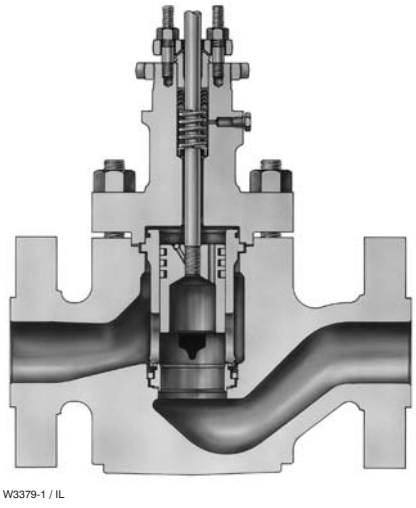


Figure 5. Fisher® EHD Valve Body Assembly

- **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 conditions as well as high flow, low pressure drop conditions. A choice of actuator styles allows wide selection of power and control capabilities.

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

EH Series valves (figure 4) 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 5) uses a balanced valve plug and is well suited for general applications where extremely tight shutoff is not required. The EHS (figures 6 and 7) has an unbalanced valve plug and provides up to Class V shutoff. The EHT (figure 8) has a balanced valve plug and offers up to Class V shutoff with process temperatures below 232°C (450°F).

EHA valves--EHAD (figure 9), EHAT (figure 10), and EHAS--are angle versions of the EH valve. Trim is interchangeable between an EH valve and the next larger EHA. For example, the trim used in an NPS 3 EHD is the same size as (and is interchangeable with) the trim in the NPS 4 EHAD.

EH valves are available in CL2500 ratings. EHA valves are available in CL900 and 1500 only. 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 and NPS 3 through 8 Angle Valves)
See figures 6, 7, 8, 9, 10, and 11.

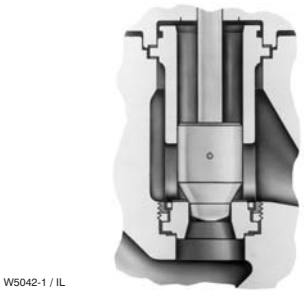


Figure 6. Fisher® EHS Trim with Micro-Form Valve Plug

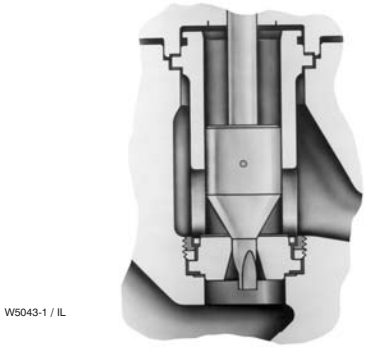


Figure 7. Fisher® EHS Trim with Micro-Flute Valve Plug

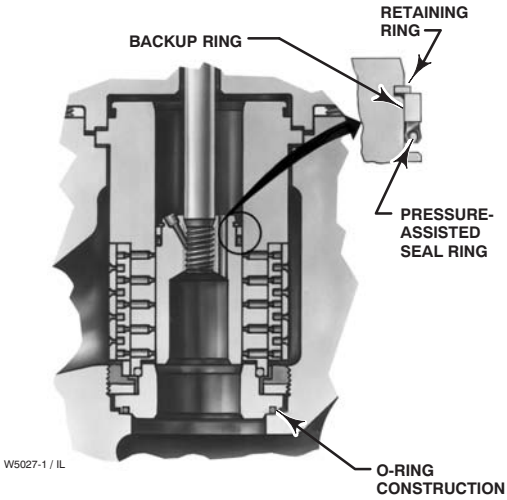


Figure 8. Fisher® EHT Trim w/ Cavitrol® III Three-Stage Cage

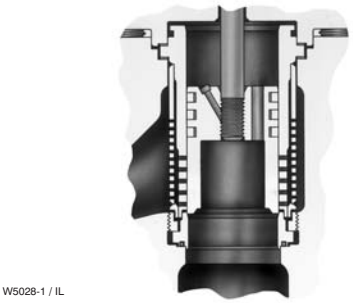


Figure 9. Fisher® EHAD Trim with Whisper Trim® III Level D Cage

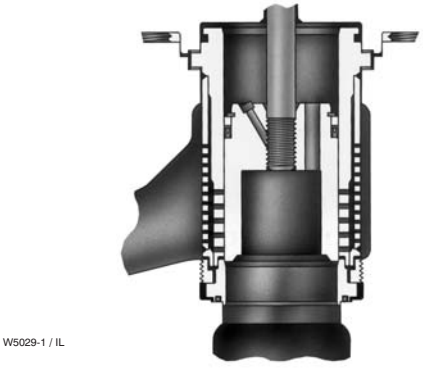


Figure 10. Fisher® EHAT Trim (NPS 3 through 8 Angle Valves)

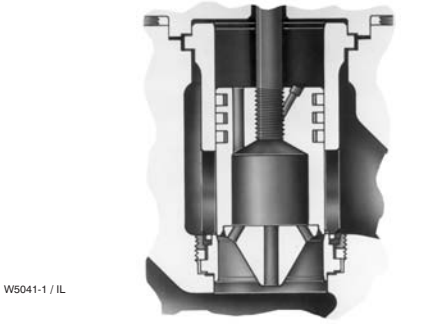


Figure 11. Diverter Cone Plug Used in NPS 6 Fisher® EHD and EHT Valves (Flow Up Only)

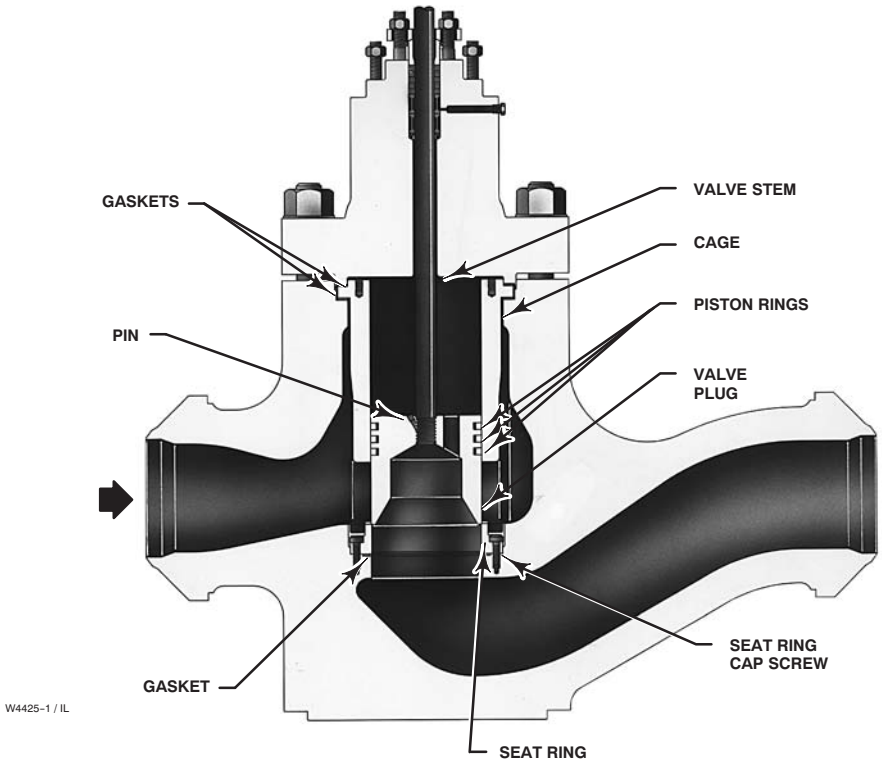


Figure 12. Fisher® EHD Valve Assembly (NPS 8 through 14 Globe Valves)

Figure 13. NPS 8 Fisher® EH Valve with 667 Actuator

NPS 8 through 14 Globe Valves

EH Series control valves (figure 13) 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 12) is well-suited to general applications where extremely tight shutoff is not required, and the EHT valve (figure 14) 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 12 and 14, are balanced valve designs. When the valves are opening or closing, pressure registers on top of the valve plug through the registration 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.

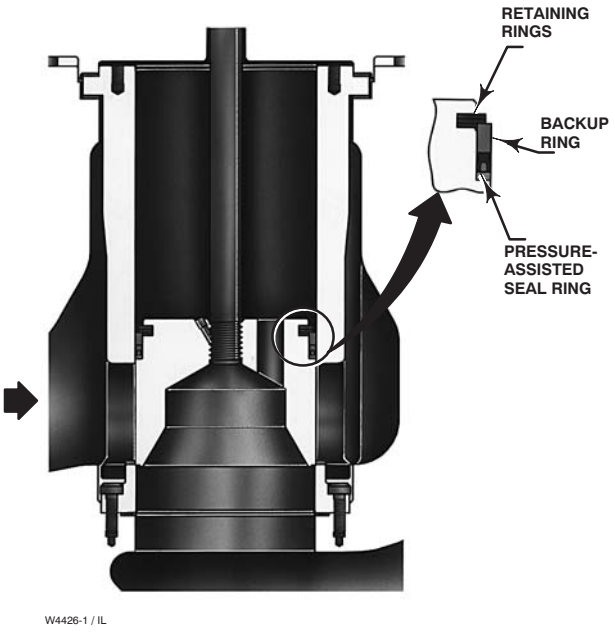


Figure 14. Fisher® EHT Trim (NPS 8 through 14 Globe Valves)

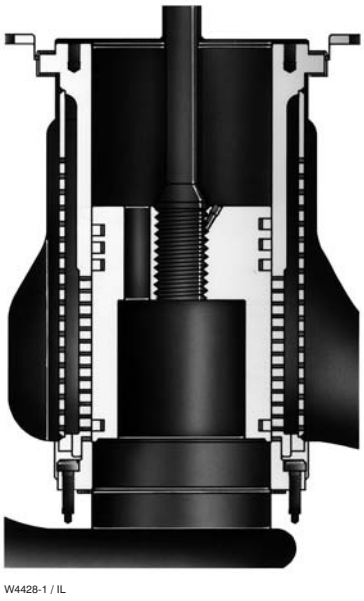


Figure 15. Fisher® EHD Trim with Whisper Trim® III Level D Cage (NPS 8 through 14 Globe Valves)

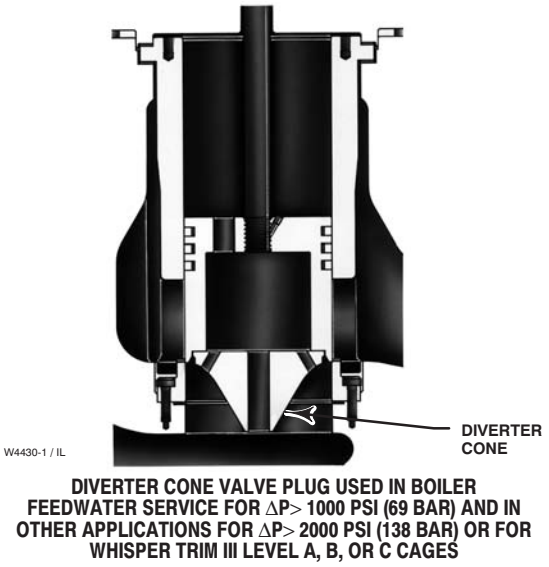


Figure 16. Diverter Cone Valve Plug Used in Fisher® EHD and EHT Valves (NPS 8 through 14 Globe Valves, Flow Up Only)

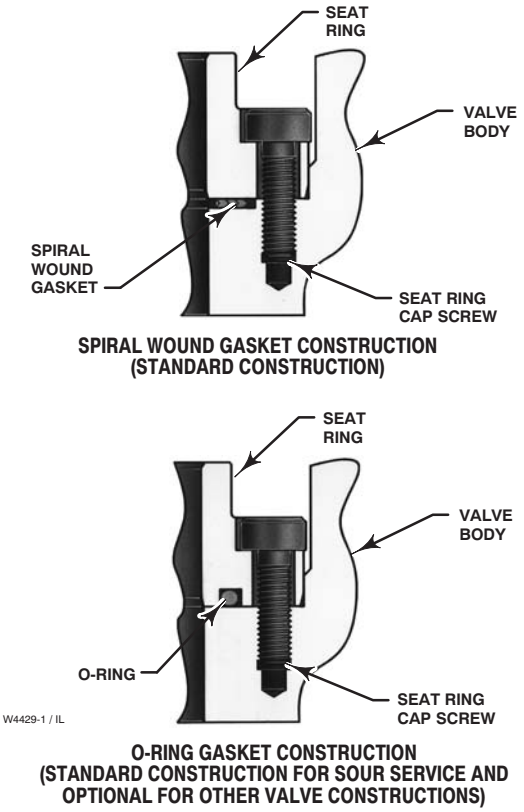


Figure 17. Seat Ring Gasket Constructions (NPS 8 through 14 Globe Valves)

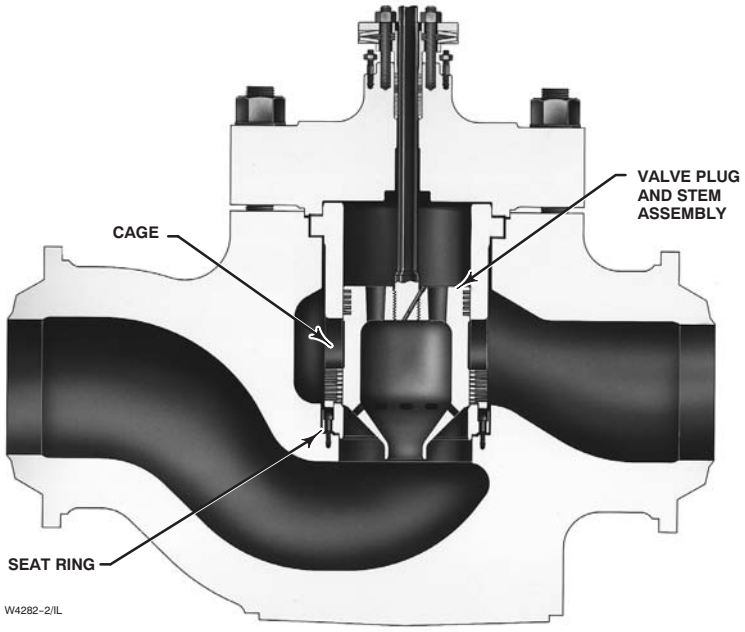


Figure 18. Sectional of NPS 20 Fisher® EHD Control Valve Assembly

NPS 20 Globe Valves

The NPS 20 EHD control valve (figure 19) 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 18 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 18.

Figure 19. NPS 20 Fisher® EHD Valve with Electromechanical Actuator

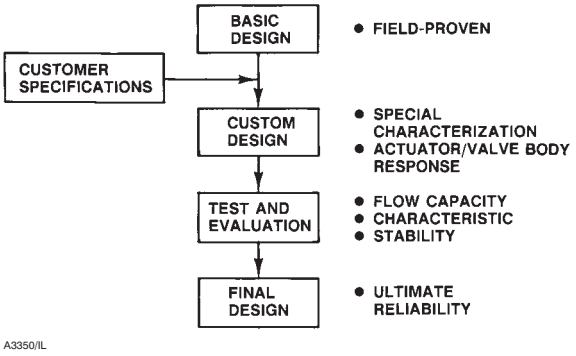


Figure 20. Custom Design Sequence (NPS 20 Globe Valves)

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 20, 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 Process Management R.A. Engel Technical Center Flow Laboratory, the largest facility of its kind in North America.

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.

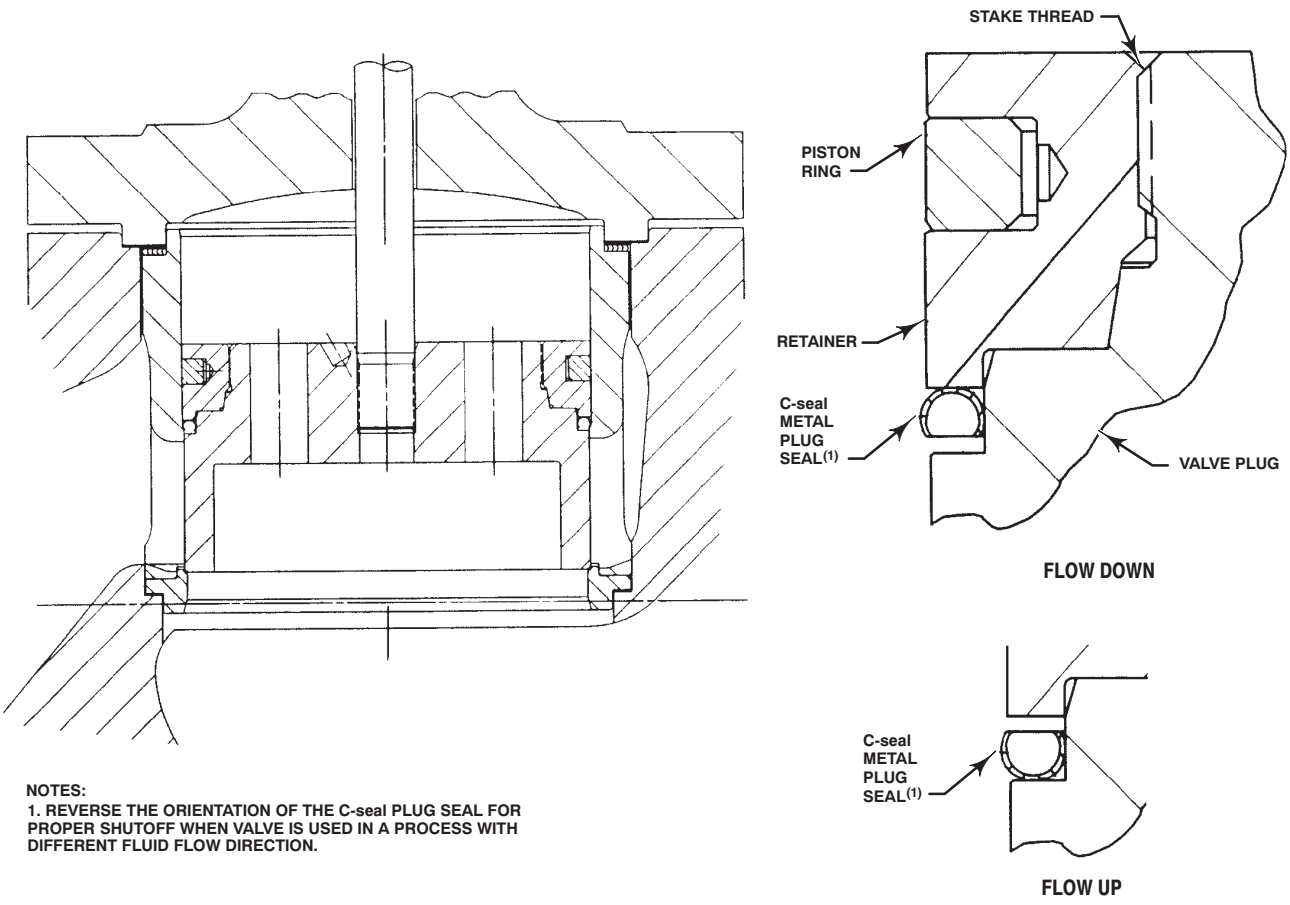


Figure 21. C-seal™ Trim

C-seal™ Trim Description

C-seal trim (figure 21) is available for valves with port diameters from 2.875 inches through 4-3/8 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).

Bore Seal Trim Description

The Bore Seal design (figure 22) employs a variation of the proven C-seal trim with enhancements for use with the larger port EH hung cage. In the Bore Seal trim, the primary plug-to-seat interface is a metal-to-metal line contact while the secondary metallic seal engages a controlled bore region in the cage when the plug is seated (see figure 22). During modulation, the secondary seal does not contact the upper cage wall and the controlled bore region remains protected, which extends the shutoff life of the valve.

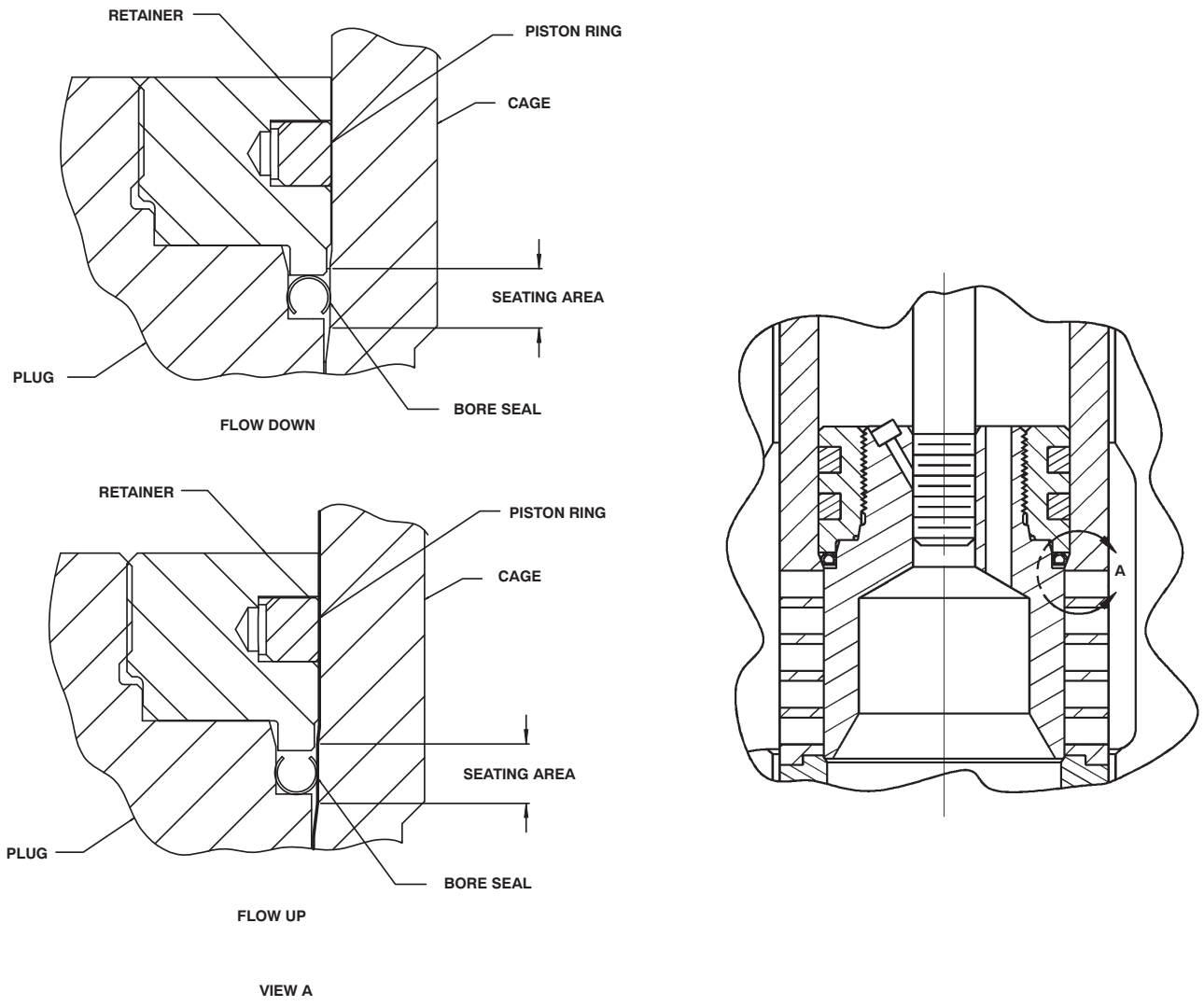


Figure 22. Bore Seal Trim

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 23 and tables 9 and 10. For additional information contact your Emerson Process Management sales office.

Table 3. 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**	**3 x 2**	**3, 4 x 3**	**4, 6 x 4**	**6, 8 x 6**
			CL2500	**CL2500**	**CL2500**	**CL2500**	**CL2500**
EHS	Micro-Form	Quick-Opening[2]	X	X	- - -	- - -	- - -
	Standard	Standard[3]	- - -	X	X	X	X
		Whisper Trim III	- - -	X	X	X	X
		Cavitrol III: 2-stage 3-stage	 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 4. Available Angle Valve Configurations and Valve Sizes (NPS 3 through 8 Angle Valves)

AVAILABLE CONFIGURATIONS			VALVE SIZES (NPS) AND PRESSURE RATING			
Valve Design	**Valve Plug Style**	**Cage Style**	**3**	**4**	**6**	**8**
			CL1500	**CL1500**	**CL1500**	**CL1500**
EHAS	Micro-Form	Quick-Opening[1]	X	- - -	- - -	- - -
	Micro-Flute	Quick-Opening	- - -	- - -	- - -	- - -
	Standard	Standard[2]	X	X	X	X
		Whisper Trim III	X	X	X	X
		Cavitrol III: 2-stage 3-stage	- - - - - -	- - - - - -	- - - - - -	- - - - - -
EHAT	Standard	Standard[2]	X	X	X	X
		Whisper Trim III	X	X	X	X
		Cavitrol III: 2-stage 3-stage	X X	X X	X X	X X
EHAD	Standard	Standard[2]	X	X	X	X
		Whisper Trim III	X	X	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.

Table 5. 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 2 x 1	X X	- - - - - -	X X	X X	X X	X X
3 x 2 3 4 x 3 4	X X X X	- - - - - - - - - - - -	X X X X	- - - - - - - - - - - -	X X X X	X X X X
6 x 4 6 8 x 6	X X X	- - - - - - X	X X - - -	- - - - - - - - -	X X X	X X X

X—Indicates available construction.
1. EN (or other) ratings and end connections can usually be supplied; consult your Emerson Process Management 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.

Table 6. Angle Valve Sizes and End Connection Styles(1) (NPS 3 through 8 Angle Valves)

VALVE SIZE, NPS	CL900		CL1500					
	RF	RTJ	BWE			SWE	RTJ	RF
			SCH 80	SCH 160	SCH XXS			
3	X	X	X	X	- - -	- - -	X	X
4	X	X	X	X	- - -	- - -	X	X
6	X	X	X	X	- - -	- - -	X	X
8	X	X	X	- - -	X	- - -	X	X

X—Indicates available construction.
1. EN (or other) ratings and end connections can usually be supplied; consult your Emerson Process Management sales office.

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
10	1566	2522
12	1650	2940
14 x 12	1650	2753

1. See bulletin 59.1:026 for additional information.
2. Intermediate rating of 4080 is available with special bolting materials in most valve body materials. Contact your Emerson Process Management sales office.

Table 8. Increased Pressure/Temperature Ratings for Steel Angle Valves with Buttwelding End Connections (NPS 3 through 8 Angle Valves)

VALVE SIZE, NPS	CL1500
	Intermediate Rating (ASME B16.34)
3	1508
4	1569
6	1804
8	1860

Table 9. 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 10. Shutoff Classifications per ANSI/FCI 70-2 and IEC 60534-4

Valve Design		Port Diameter, mm (Inches)		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
EHD (CL1500)	**Valve Size, NPS**	**Port Diameter, mm (Inches)**	**Cage Style**	**ANSI/FCI Leakage Class**
	8 10	177.8 (7)	Eq. %, Mod. Eq. % Linear (std. cage) Linear (Whisper III, A1, B3, C3)	V to 593°C (1100°F) (for port diameters from 136.5 through 177.8 mm [5.375 through 7-inches] with optional C-seal trim)
EHD (CL2500)	4 6 x 4	73 (2.875)	Eq. %, Mod. Eq. %, Linear (std. cage), Linear (Whisper III, A1, B3, C3)	V (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 10	136.5 (5.375)	Eq. %, Mod. Eq. %, Linear (std. cage), Linear (Whisper III, A1, B3, C3, D3)	V to 593°C (1100°F) (for port diameters from 136.5 through 177.8 mm [5.375 through 7-inches] with optional Bore seal trim)
	12 14	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 9	See table 9	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 mm (1- inch) to 254 mm (10- inch)	All	V to 316°C (600°F)

1. PEEK (PolyEtherEtherKetone)

Trim Selection Guidelines for NPS 1-1/2 x 1 through 6 Globe and NPS 3 through 8 Angle Valves

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

- **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 54 should not be used in boiler feedwater due to amine corrosion problems associated with CoCr-A.

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

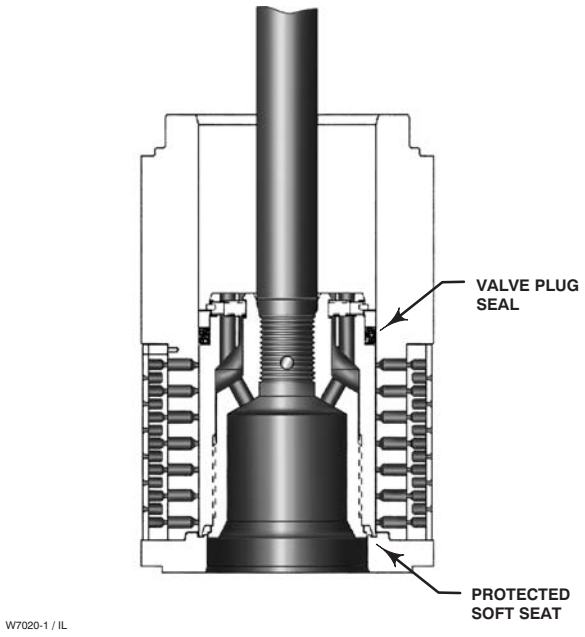


Figure 23. Typical Balanced TSO (Tight Shutoff) Trim

- **Trim 57—**Trim 57 should 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).

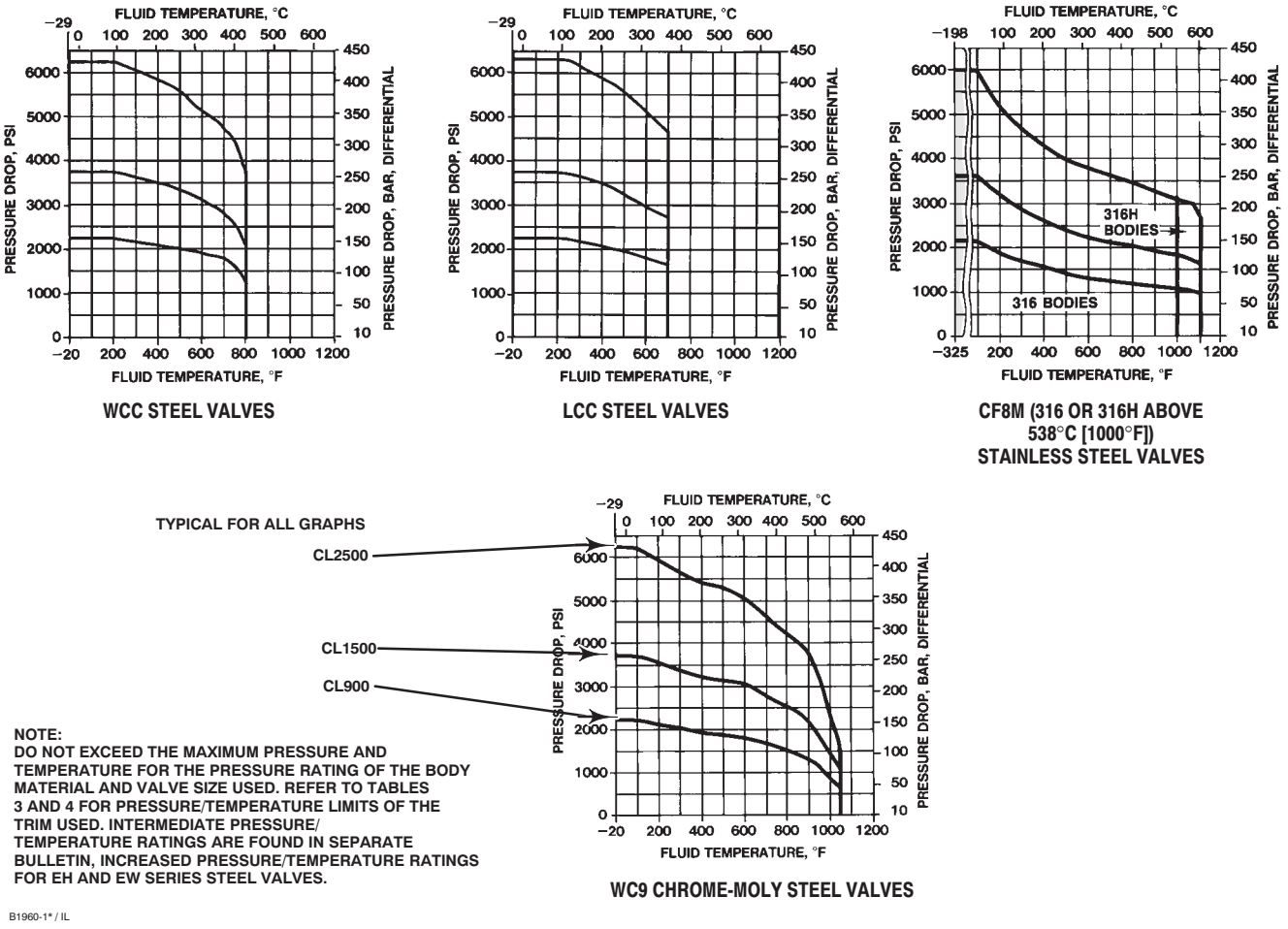


Figure 24. Pressure/Temperature Limits for CL2500 Valves (NPS 1-1/2 x 1 through 6 Globe) and CL900, 1500, and 2500 Valves (NPS 3 through 8 Angle)

Material Selection Guidelines

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

1. 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.

2. Select the desired valve style from the Available Configurations specification and from the shutoff classifications listed in table 10.

3. Select desired materials from tables 11, 12, 13, and 14 and figures 24, 25, 26, and 27. The temperature capabilities determined from figures 24, 25, 26, and 27 may be further limited by the temperature capabilities of materials selected from tables 11, 12, 13, and 14. Refer to figures 24, 25, 26, and 27 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 Process Management 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 11. Trim Material Combinations (NPS 1-1/2 x 1 through 6 Globe and NPS 3 through 8 Angle Valves)

DESIGNATION	VALVE PLUG	CAGE	SEAT RING	SEAT RING RETAINER	OPERATING TEMPERATURE RANGE		SOUR SERVICE (NACE)
					Degrees Celsius	Degrees Fahrenheit	
WITH STANDARD CAGE							
50[1]	S41600 (416 SST) heat-treated[2] S44004 (440C SST) heat-treated for Micro-Flute valve plugs	S17400 (17-4PH SST) H1075 heat-treated	S41600 heat-treated	S17400 H1150 heat-treated chrome coat	−29 to 427	−20 to 800	No
53[3] (EHD/ EHAD and EHS/ EHAS valves only)	S31600 (316 SST) with CoCr-A (Alloy 6) seat and guide	CA28MWV (422 SST) nitrided	CoCr-A	N07718 heat-treated chrome coat	427 to 566	800 to 1050	No
54	S31600 with CoCr-A seat and guide	CF8M (316 SST) chrome coat	CoCr-A	N07718 heat-treated chrome coat	−38 to 593	−100 to 1100	No
56	S31600 with CoCr-A seat and guide	CF8M ENC	CoCr-A[4]	S17400 H1150 heat-treated chrome coat	−40 to 149	−40 to 300	Yes
57 (O-ring seat ring only)	S44004 heat-treated	S17400 H1075 heat-treated	S44004 heat-treated	S17400 H1150 heat-treated chrome coat	0 to 232	32 to 450	No
WITH CAVITROL III TRIM CAGE							
58[1]	S44004 heat-treated	CB7CU-1 H1075 heat-treated	S44004[4]	S17400 H1150 heat-treated chrome coat	0 to 232	32 to 450	No
59	S31600 with CoCr-A seat and guide	CB7CU-1 H1150 heat-treated	CoCr-A[4]	S17400 H1150 heat-treated chrome coat	−40 to 232	−40 to 450	Yes
WITH WHISPER TRIM III CAGE							
60	S41600 heat-treated S17400 (17-4H900 SST) heat-treated for NPS 6 EH and NPS 8 EHA valves	CB7CU-1 H1075 heat-treated	S41600 heat-treated	S17400 H1150 heat-treated chrome coat	−29 to 427	−20 to 800	No
61	S31600 with CoCr-A seat and guide	CA28MWV nitrided WC9 nitrided for NPS 6 EH and NPS 8 EHA valves	CoCr-A	N00718 heat-treated chrome coat	−29 to 566	−20 to 1050	No
62	S31600 with CoCr-A seat and guide	CB7CU-1 H1150 heat-treated	CoCr-A[4]	S17400 H1150 heat-treated chrome coat	−40 to 232	−40 to 450	Yes

1. Recommended for boiler feedwater service due to amine problems when using Alloy 6.
2. 17-4H900 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.
3. This trim designation not available with the O-ring seat ring gasket construction due to temperature limitations.
4. This trim designation uses the O-ring seat ring gasket construction. See table 13 for O-ring temperature limits.

Table 12. 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	OPERATING TEMPERATURE RANGE	
						°C	°F
EHD and EHT Valve with Standard Cage							
75	S42000 (420 SST)	S31600 (316 SST)	CA6NM	S17400 (17-4PH SST) H1075 heat-treated	S17400	−29 to 427	−20 to 800
77	S31600 with CoCr-A (alloy 6) seat and guide	S20910 SST(1)	S31600 chrome coat	S31600 with CoCr-A seat	S66286 (660 SST)	−198 to 593	−325 to 1100
78	S31600 with CoCr-A seat and guide	S20910 chrome coat(1)	S31600 chrome coat	S31600 with CoCr-A seat	S66286	427 to 593	800 to 1100
79	S31600 with CoCr-A seat and guide	S20910	CA6NM chrome coat	N06600 with CoCr-A seat	N07718	−101 to 566	−150 to 1050
80	S31600 with CoCr-A seat and guide	S20910 chrome coat(1)	CA6NM chrome coat	N06600 with CoCr-A seat	N07718	427 to 566	800 to 1050
EHD and EHT Valve with Standard Cage for Sour Service							
82(2)	S31600 with CoCr-A seat and guide	S20910	S31600 ENC	N06600 with CoCr-A seat	N07718	−29 to 149	−20 to 300
All Valves with Whisper Trim III Cages							
95	F22 with CoCr-A seat and guide	S41000 (410 SST) heat treated	WC9/ nitrided	F22 with CoCr-A seat	N07718	−29 to 566	−20 to 1050
96	S17400 with CoCr-A seat and guide	S17400	CB7CU-1 H1075	S17400 with CoCr-A seat	S17400	−62 to 427	−80 to 800
All Valves with Whisper Trim III Cages for Sour Service							
97	S17400 with CoCr-A seat and guide	S17400	S17400 H1150 ENC	S17400 with CoCr-A seat	S17400	−157 to 343	−250 to 650

1. Available with 50.8 mm (2-inch) valve stem connector only.
2. This trim designation is available with O-ring seat ring gasket construction only.

Table 13. Construction Materials and Temperature Capabilities for Parts Other than Body and Trim (NPS 1-1/2 x 1 through 6 Globe and NPS 3 through 8 Angle 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)	−254 to 427 (to 482 for nonoxidizing service)	−425 to 800 (to 900 for nonoxidizing service)
		Graphite (FMS 17F39)	−254 to 537 (to 593 for nonoxidizing service)	−425 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 11	See table 11
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	PTFE with N10276 Spring	−73 to 232(7)	−100 to 450(7)
	Anti-extrusion ring	PEEK (PolyEtherEtherKetone)	- - -(8)	- - -(8)
Cage gasket		Silver-plated N04400	−254 to 593	−425 to 1100
		Tin-plated N04400(1)	−29 to 149	−20 to 300
Seat ring gasket	O-ring seat ring gasket(1)	Nitrile(5)	−29 to 107	−20 to 225
		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	Graphite/stainless steel laminate	−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 537	−20 to 1000
	Studs Nuts	Steel SA193-B16 (WC9 body mat'ls) Steel SA194-7 (WC9 body mat'ls)	−29 to 593	−20 to 1100
	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 38	−325 to 100
	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 537	−325 to 1000
	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 593	−325 to 1100
	Studs Nuts	SST SA453-660 Class A (CF8M [316, 316H body mat'ls]) Steel SA194-7 (CF8M [316, 316H body mat'ls])	−29 to 537	−20 to 1000
	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, for further information)	See bulletin 59.1:061	See bulletin 59.1:061
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.
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. These materials are not limiting factors.

Table 14. 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
	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
	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)
EHT seal ring		R30003 (with glass and moly-filled PTFE)	−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	PTFE with N10276 Spring	−73 to 232(3)	−100 to 450(3)
	Anti-extrusion rings	PEEK (PolyEtherEtherKetone)	- - -(4)	- - -(4)
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 538 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 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 14. 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 537	−20 to 1000
	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 38	−325 to 100
	Nuts	316 stainless steel SA194-8			
	Studs	316 stainless steel SA193-B8M(2)	CF8M and CF8M (316H) body materials	−198 to 537	−325 to 1000
	Nuts	316 stainless steel SA194-8M			
	Studs	316 stainless steel SA194-B8M	CF8M body materials	−198 to 427	−325 to 800
	Nuts	316 stainless steel SA194-B8			
	Studs	316 stainless steel SA194-B8M chrome coat(2)	CF8M body materials	427 to 649	801 to 1200
	Nuts	316 stainless steel SA194-B8			
	Studs	Steel SA 193-B7M	For sour service CF8M body material	−48 to 232 (SST bodies)	−55 to 450 (SST bodies)
	Nuts	Steel SA 194-2HM			
	Studs	Stainless Steel SA453-660 Class A	CF8M body materials	−29 to 537	−20 to 1000
	Nuts	Steel SA 194-7			

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. These materials are not limiting factors.

Table 15. Valve Plug Travel(1) (NPS 8 through 14 Valves)

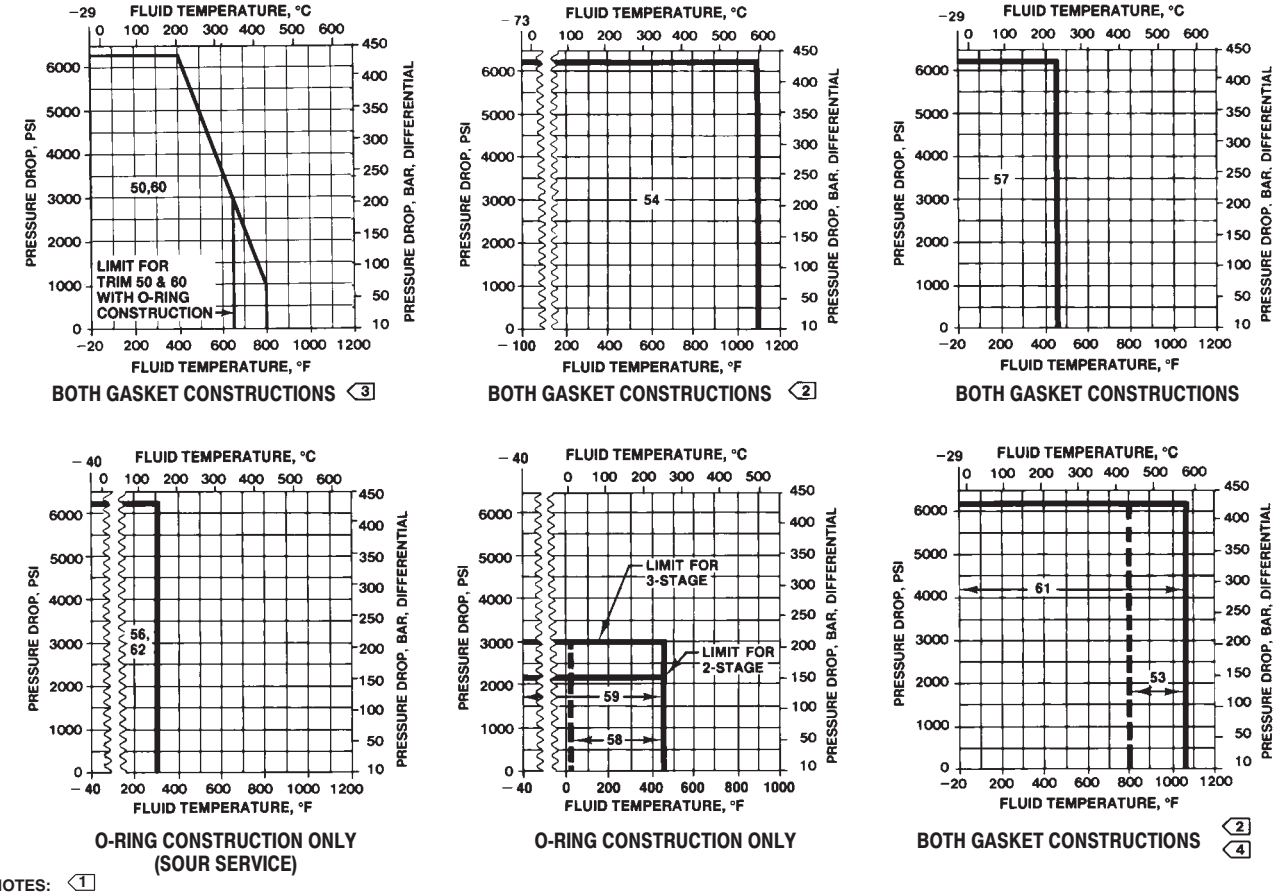
CAGE STYLE	PRESSURE RATING	EHD, EHT			
		Valve Size, NPS			
		8, 10		12, 14	
		mm	Inches	mm	Inches
Linear	CL1500	76	3	102	4
	CL2500	64	2.5	76	3
Equal Percentage(1)	CL1500	76	3	102	4
	CL2500	64	2.5	76	3
Modified Equal Percentage(1)	CL1500	89	3.5	114	4.5
	CL2500	76	3	89	3.5
Whisper Trim III Cage	CL1500	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 16. Flowing Pressure Drop Limits for NPS 6 CL2500 Fisher® EHD/EHT and NPS 8 CL1500 or 2500 EHAD/EHAT Valves (w/o Cavitrol® III or Whisper Trim® III)

VALVE PRESSURE RATING	FLOW MEDIA	STEM SIZE, mm (INCHES)	MAXIMUM FLOWING PRESSURE DROP			
			PSI		Bar	
			Flowing Down	Flowing up with Diverter Cone	Flowing Down	Flowing up with Diverter Cone
CL1500	All except boiler feedwater	19.1 mm (3/4 inch)	1000	- - -	69	- - -
		50.8 mm (1-inch)	1000	- - -	69	- - -
		31.7 mm (1-1/4 inch)	2000	- - -	138	- - -
		50.8 x 31.7 mm(1) (2 x 1-1/4 inch(1))	3000	3750	207	259
	Boiler feedwater	31.7 mm (1-1/4 inch)	1000	- - -	69	- - -
		50.8 x 31.7 mm(1) (2 x 1-1/4 inch(1))	2000	3750	138	259
CL2500	All except boiler feedwater	19.1 mm (3/4 inch)	1000	- - -	69	- - -
		50.8 mm (1-inch)	1000	- - -	69	- - -
		31.7 mm (1-1/4 inch)	2000	6250	138	431
	Boiler feedwater	31.7 mm (1-1/4 inch)	1000	6250	69	431

1. 31.7 mm (1-1/4 inch) S20910 stem with 50.8 mm (2-inch) plug to stem connection.



NOTES: 1

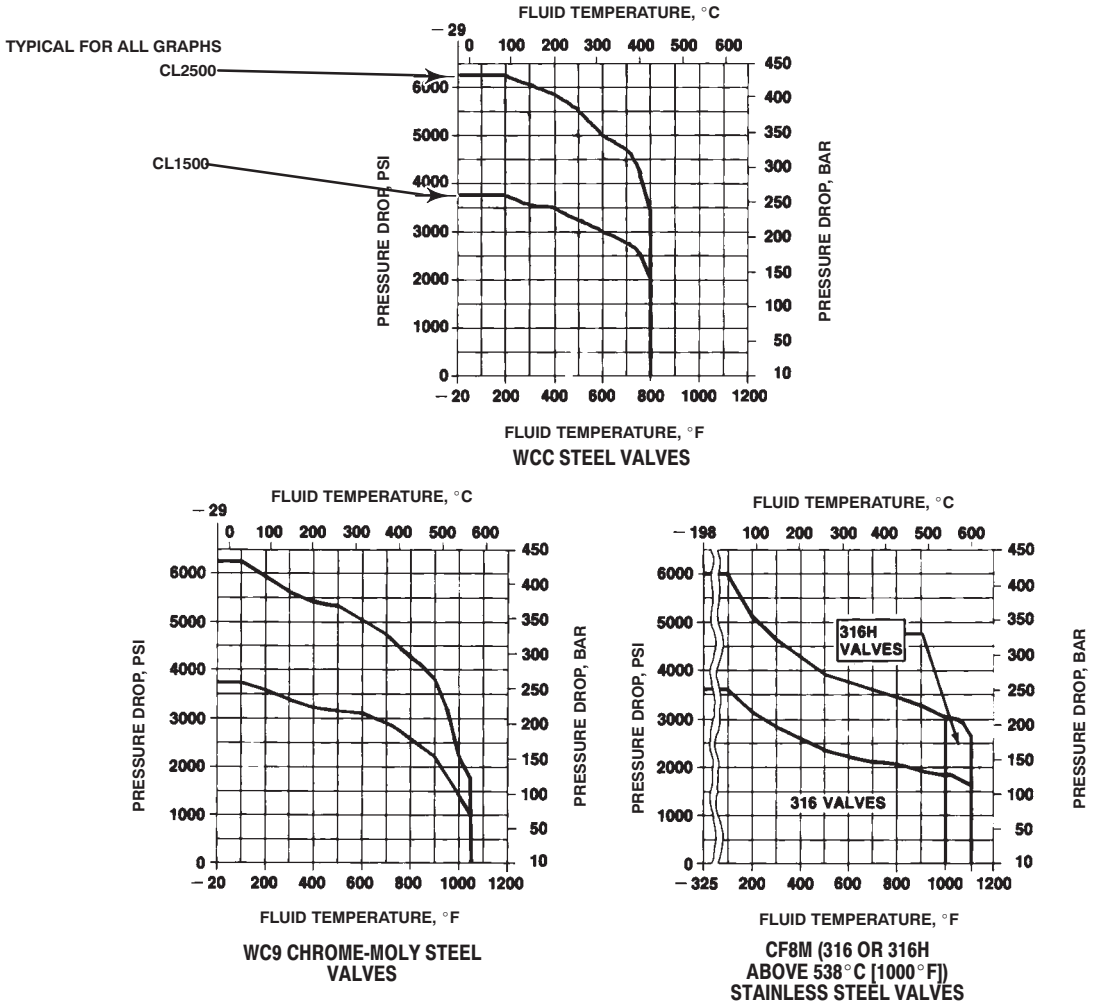
1 FOR RECOMMENDED SERVICE APPLICATIONS, SEE TABLE SHOWN.

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).

Figure 25. Pressure/Temperature Limits for Trim Material Combinations (NPS 1-1/2 x 1 through 6 Globe and NPS 3 through 8 Angle Valves) (also see table 16)



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.

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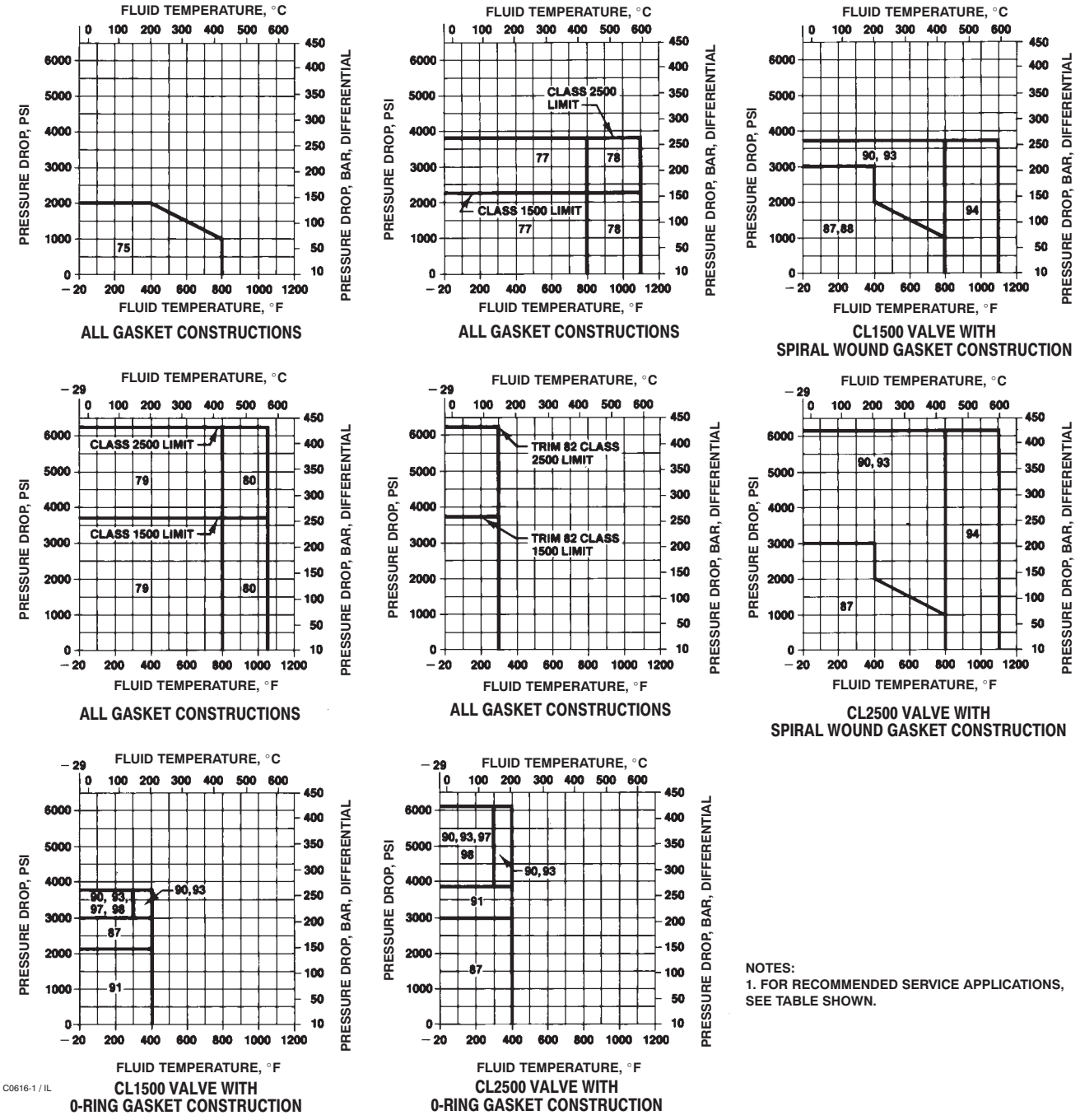
Figure 26. Pressure/Temperature Limits for CL1500 and 2500 Valves (NPS 8 through 14 Valves)

Table 17. 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(1) 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)

1. Do not exceed figure 27 material combination pressure drop limits.



NOTES:
1. FOR RECOMMENDED SERVICE APPLICATIONS, SEE TABLE SHOWN.

Figure 27. Pressure/Temperature Limits for Trim Material Combinations on CL1500 and 2500 Valves (NPS 8 to 14 Valves) (also see table 17)

Table 18. 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
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	0.75, 1, 1.25
		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.

Table 19. Additional Angle Valve Specifications (NPS 3 through 8 Angle Valves)

VALVE SIZE, NPS	PRESSURE RATING	FLOW CHARACTERISTIC	VALVE DESIGN AND PLUG STYLE	PORT DIAMETER		VALVE PLUG TRAVEL		VALVE STEM DIAMETER	
				mm	Inches	mm	Inches	mm	Inches
3	CL1500	Equal percentage	EHAS w/Micro-Form	31.8 38.1	1.25 1.5	19 29	0.75 1.125	12.7, 19.1, 25.4 12.7, 19.1, 25.4	1/2, 3/4, 1 1/2, 3/4, 1
			EHAS, EHAD, EHAT	47.6	1.875	29	1.125	12.7, 19.1, 25.4(1)	1/2, 3/4, 1(1)
		Modified equal percentage	EHAS w/Micro-Form	31.8 38.1	1.25 1.5	25 38	1 1.5	12.7, 19.1, 25.4 12.7, 19.1, 25.4	1/2, 3/4, 1 1/2, 3/4, 1
			EHAS, EHAD, EHAT	47.6	1.875	38	1.5	12.7, 19.1, 25.4(1)	1/2, 3/4, 1(1)
		Linear (cage style: Whisper Trim III, level A1)	EHAS, EHAD, EHAT	47.6	1.875	38	1.5	12.7, 19.1, 25.4(1)	1/2, 3/4, 1(1)
		Linear (cage style: Cavitrol III, 2-stage)	EHAT	44.5	1.75	51	2	12.7, 19.1	1/2, 3/4
		Linear (cage style: Cavitrol III, 3-stage)	EHAT	25.4	1	51	2	12.7, 19.1	1/2, 3/4
4	CL1500	Equal percentage	EHAS, EHAD, EHAT	73	2.875	38	1.5	12.7, 19.1, 25.4	1/2, 3/4, 1
		Modified equal percentage	EHAS, EHAD, EHAT	73	2.875	51	2	12.7, 19.1, 25.4	1/2, 3/4, 1
		Linear (cage style: Whisper Trim III, level A1, B1)							
		Linear (cage style: 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: Cavitrol III, 2-stage)	EHAT	64	2.5	64	2.5	12.7, 19.1, 25.4	1/2, 3/4, 1
6	CL1500	Equal percentage	EHAS, EHAD, EHAT	92.1	3.625	38	1.5	19.1, 25.4	3/4, 1
		Modified equal percentage	EHAS, EHAD, EHAT	92.1	3.625	51	2	19.1, 25.4	3/4, 1
		Linear (cage style: Whisper Trim III, level A1, B3, C3)							
		Linear (cage style: Whisper Trim III, level D3)	EHAS, EHAD, EHAT	73	2.875	51	2	19.1, 25.4	3/4, 1
		Linear (cage style: Cavitrol III, 3-stage)	EHAT	73	2.875	76	3	19.1, 25.4	3/4, 1
		Linear (cage style: Cavitrol III, 2-stage)	EHAT	87.3	3.4375	76	3	19.1, 25.4	3/4, 1
8	CL1500	Equal percentage	EHAS, EHAD, EHAT	136.5	5.375	64	2.5	19.1, 25.4, 31.8	3/4, 1, 1-1/4
		Modified equal percentage	EHAS, EHAD, EHAT	136.5	5.375	76	3	19.1, 25.4, 31.8	3/4, 1, 1-1/4
		Linear (cage style: Whisper Trim III, level A1, B3, C3)	EHAS, EHAD, EHAT	136.5	5.375	76	3	25.4, 31.8	1, 1-1/4
		Linear (cage style: Whisper Trim III, level D3)	EHAS, EHAD, EHAT	111.1	4.375	76	3	19.1, 25.4, 31.8	3/4, 1, 1-1/4
		Linear (cage style: Cavitrol III, 3-stage)	EHAT	115.9	4.5625	102	4	19.1, 25.4, 31.8	3/4, 1, 1-1/4
		Linear (cage style: Cavitrol III, 2-stage)	EHAT	133.4	5.25	102	4	19.1, 25.4, 31.8	3/4, 1, 1-1/4

1. Available only with EHAS valve body.

Table 20. 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
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 18 for valve stem diameters available for specific construction.

Table 21. Angle Valve Yoke Boss and Valve Stem Diameter Combinations[1] (NPS 3 through 8 Angle Valves)

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

1. See table 19 for valve stem diameters available for specific construction.

Table 22. Approximate Weights (Valve and Bonnet Assemblies) (NPS 1-1/2 x 1 through 6 Globe and NPS 3 through 8 Angle Valves)

VALVE SIZE, NPS	GLOBE VALVES				ANGLE VALVES			
	CL2500				CL1500			
	Kilograms		Pounds		Kilograms		Pounds	
	Flg	SWE and BWE	Flg	SWE and BWE	Flg	SWE and BWE	Flg	SWE and BWE
1-1/2 x 1	- - -	46	- - -	101	- - -	- - -	- - -	- - -
2 x 1	78	47	173	104	- - -	- - -	- - -	- - -
3 x 2	161	94	355	207	- - -	- - -	- - -	- - -
3	223	163	492	359	123	78	272	173
4 x 3	265	162	585	357	- - -	- - -	- - -	- - -
4	338	243	745	536	181	117	399	258
6 x 4	526	257	1160	567	- - -	- - -	- - -	- - -
6	785	544	1731	1199	357	202	788	445
8 x 6	955	558	2106	1231	- - -	- - -	- - -	- - -
8	- - -	- - -	- - -	- - -	648	405	1428	893

Table 23. 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	- - -	- - -

Table 24. 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
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
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.

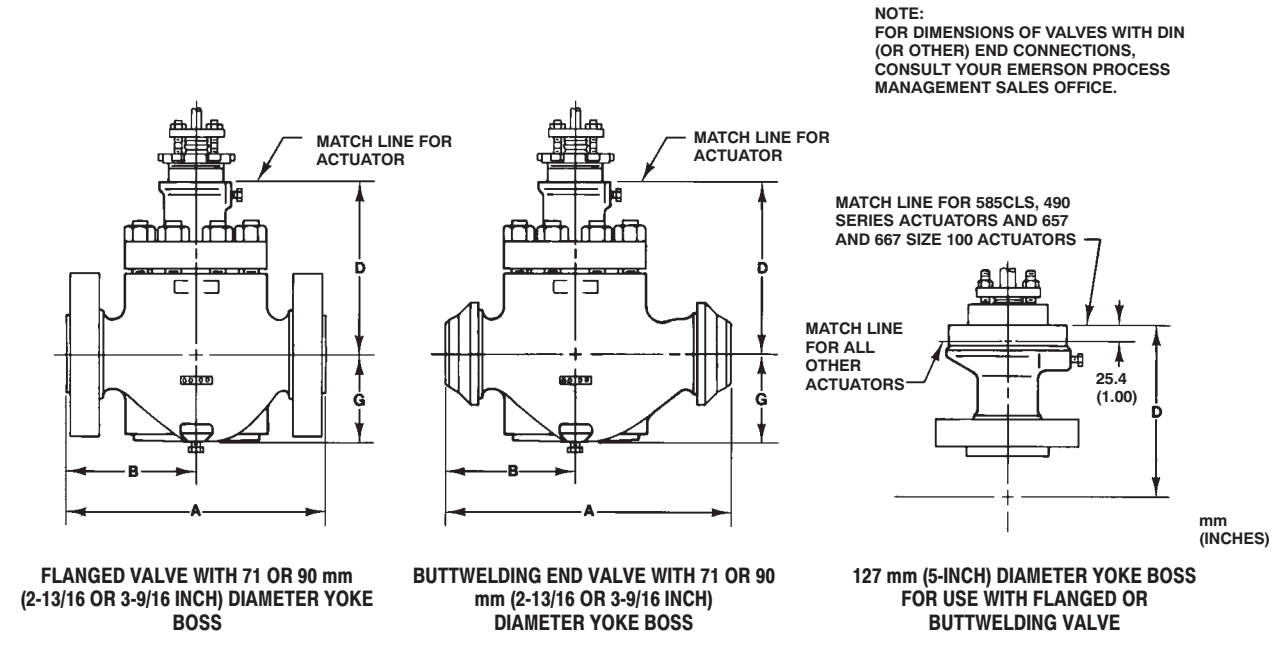


Figure 28. NPS 1-1/2 x 1 through 6 Globe Valve Dimensions with Standard Bonnet (also see tables 24, 25, and 26)

Table 25. 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
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
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.

Table 26. 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	- - -
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	- - -
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

Table 27. Dimension D for Style 1 Extension Bonnet (A, B, and G Dimensions Listed in Figure 28 Do Not Change When Extension Bonnet is Used

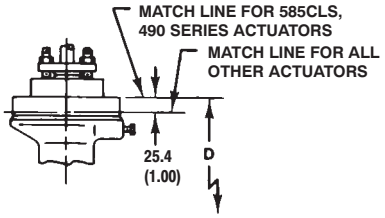
GLOBE VALVE SIZE, NPS	PRESSURE RATING	D		
		Yoke Boss Diameter, mm (Inches)		
		71 (2-13/16)	90 (3-9/16)	127 (5)
mm				
1-1/2 x 1 and 2 x 1	CL2500	391	406	- - -
3 x 2	CL2500	427	443	502
Inches				
1-1/2 x 1 and 2 x 1	CL2500	15.38	16.00	- - -
3 x 2	CL2500	16.81	17.44	19.75

Installation

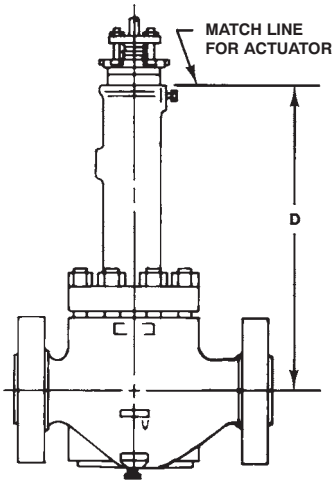
The valve must be installed so flow through the valve matches the flow direction arrow on the valve body. Consideration should be given to installing an upstream strainer, especially if the valve uses a multi-orifice Whisper Trim III or Cavitrol III cage.

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 28, 29, 30, 31, and 32. 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.



127 mm (5-INCH) DIAMETER YOKE BOSS FOR STYLE 1 EXTENSION BONNET



FLANGED VALVE WITH STYLE 1 EXTENSION BONNET HAVING 71 OR 90 mm (2-13/16 OR 3-9/16 INCH) DIAMETER YOKE BOSS

18A5906-C
A3002-2 / IL

Figure 29. Dimension D for Style 1 Extension Bonnet (A, B, and G Dimensions Listed in Figure 28 Do Not Change When Extension Bonnet is Used) (also see table 27)

Table 28. NPS 3 through 8 Angle Valve CL1500 Dimensions with Standard Bonnet and Style 1 Extension Bonnet

VALVE SIZE, NPS	A, mm				D					
					Std. Bonnet			Ext. Bonnet		
					Stem Diameter, mm			Stem Diameter, mm		
	BWE	SWE	RF	RTJ	1/2	3/4	1, 1-1/4	1/2	3/4	1
3	235	- - -	235	237	259	265	329	427	443	502
4	273	- - -	273	275	287	278	338	- - -	- - -	- - -
6	353	- - -	353	356	- - -	302	380	- - -	- - -	- - -
8	416	- - -	416	421	- - -	367	403	- - -	- - -	- - -
Inches										
3	9.25	- - -	9.25	9.31	10.19	10.44	12.94	16.81	17.44	19.75
4	10.75	- - -	10.75	10.81	11.31	10.94	13.31	- - -	- - -	- - -
6	13.88	- - -	13.88	14.00	- - -	11.88	14.56	- - -	- - -	- - -
8	16.38	- - -	16.38	16.56	- - -	14.44	15.88	- - -	- - -	- - -

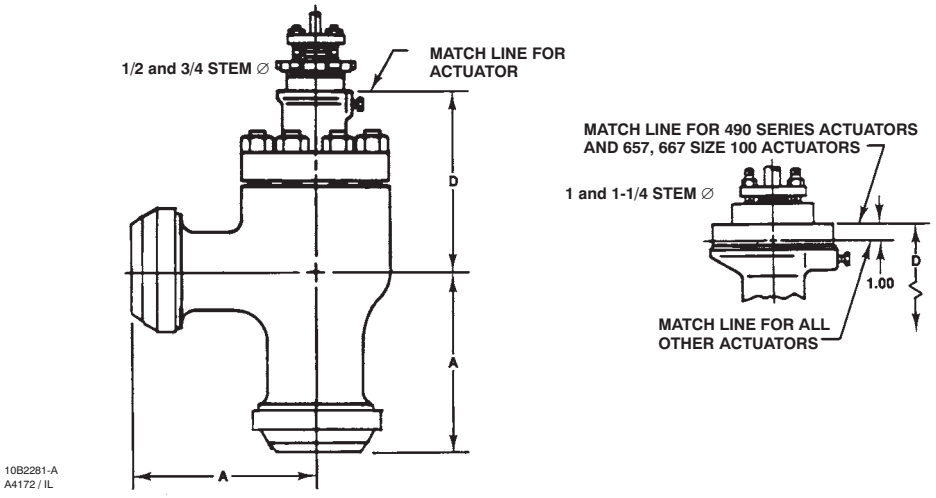


Figure 30. NPS 3 through 8 Angle Valve CL1500 Dimensions with Standard Bonnet and Style 1 Extension Bonnet (also see table 28)

Table 29. 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	- - -	- - -
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.

Table 30. 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

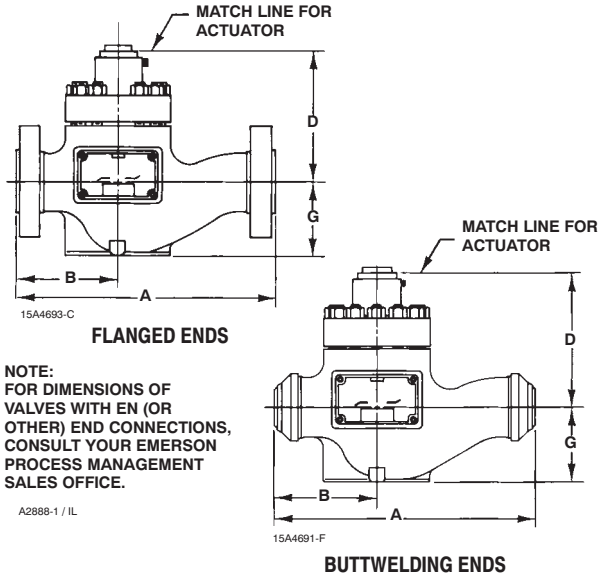


Figure 31. Dimensions (NPS 8 through 14 Fisher® EHD and EHT Valves) (also see tables 29 and 30)

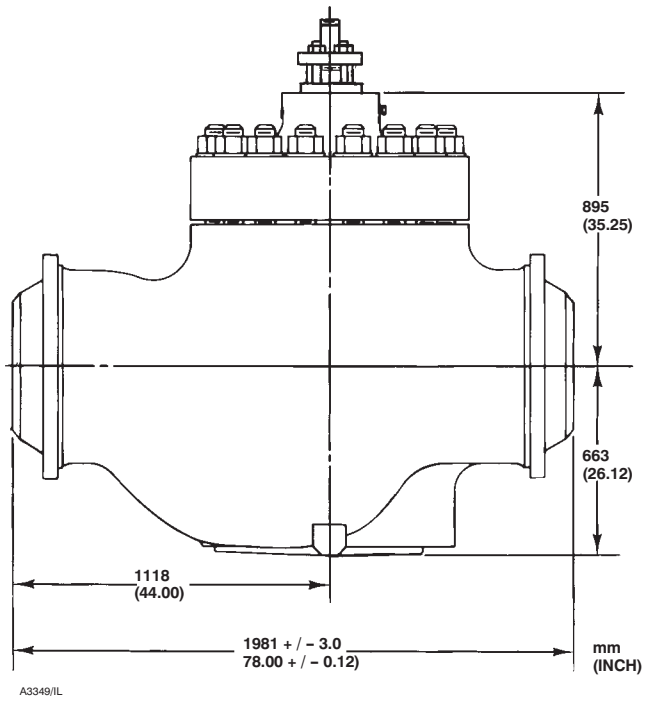


Figure 32. Dimensions (NPS 20 Fisher® EHD Valve)

Coefficients

Table 31. Fisher® EHD, CL900 and 1500, Linear and Equal Percentage Cages

Linear - Flow Down														**Linear Characteristic**
Valve Size, NPS	**Port Diameter**		**Maximum Travel**		**Flow Coefficient**	**Valve Opening—Percent of Total Travel**										F_L[1]
	mm	**Inches**	**mm**	**Inches**		**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	
8 & 10	177.8	7	76	3	C_v	105	212	332	458	578	689	788	878	954	1020	0.82
					K_v	*90.8*	*183*	*287*	*396*	*500*	*596*	*682*	*759*	*825*	*882*	- - -
					X_T	0.591	0.676	0.661	0.653	0.633	0.620	0.624	0.622	0.614	0.592	- - -
12 & 14	254.0	10	102	4	C_v	211	390	593	804	1010	1240	1460	1660	1830	1970	0.80
					K_v	*183*	*337*	*513*	*695*	*874*	*1073*	*1263*	*1436*	*1583*	*1704*	- - -
					X_T	0.443	0.652	0.669	0.664	0.671	.0653	0.662	0.669	0.658	0.629	- - -
Equal Percentage - Flow Down														**Equal Percentage Characteristic**		
8 & 10	177.8	7	76	3	C_v	32.5	59.6	85.3	114	159	229	334	468	619	755	0.85
					K_v	*28.1*	*51.6*	*73.8*	*98.6*	*138*	*198*	*289*	*405*	*535*	*653*	- - -
					X_T	0.969	0.939	0.842	0.944	0.840	0.731	0.641	0.633	0.639	0.639	- - -
12 & 14	254.0	10	102	4	C_v	81.3	143	207	286	382	557	752	1000	1290	1570	0.82
					K_v	*70.3*	*124*	*179*	*247*	*330*	*482*	*650*	*865*	*1116*	*1358*	- - -
					X_T	0.689	0.581	0.579	0.557	0.606	0.582	0.647	0.644	0.616	0.596	- - -

1. At 100% travel.

Notes: The coefficients on this page are also appropriate for the EHT Valve.

Table 32. Fisher® EHD, CL900 and 1500, Equal Percentage Cages

Modified Equal Percentage - Flow Down														**Modified Equal Percentage Characteristic**
Valve Size, NPS	**Port Diameter**		**Maximum Travel**		**Flow Coefficient**	**Valve Opening—Percent of Total Travel**										F_L[1]
	mm	**Inches**	**mm**	**Inches**		**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	
8 & 10	177.8	7	89	3.5	C_v	38.3	70.2	103	145	216	324	495	684	844	912	0.85
					K_v	*33.1*	*60.7*	*89.1*	*125*	*187*	*280*	*428*	*592*	*730*	*789*	- - -
					X_T	0.946	0.891	0.910	0.835	0.744	0.669	0.669	0.664	0.668	0.667	- - -
12 & 14	254.0	10	114	4.5	C_v	95.9	156	229	313	487	710	988	1280	1610	1830	0.83
					K_v	*83.0*	*135*	*198*	*271*	*421*	*614*	*855*	*1107*	*1393*	*1583*	- - -
					X_T	0.579	0.607	0.561	0.618	0.577	0.617	0.576	0.620	0.610	0.611	- - -

1. At 100% travel.

Notes: The coefficients on this page are also appropriate for the EHT Valve.

Table 33. Fisher® EHD, CL2500, Linear and Equal Percentage Cages

Linear - Flow Down

Linear Characteristic

Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F_L[1]
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
2 & 3 x 2	38.1	1.5	29	1.125	C_v	1.44	3.39	9.44	15.2	20.5	25.0	29.0	32.3	34.9	36.1	0.93
					K_v	*1.25*	*2.93*	*8.17*	*13.1*	*17.7*	*21.6*	*25.1*	*27.9*	*30.2*	*31.2*	- - -
					X_T	0.718	0.612	0.566	0.605	0.648	0.697	0.727	0.740	0.740	0.735	- - -
3 & 4 x 3	58.7	2.3125	38	1.5	C_v	2.77	13.2	31.0	47.4	59.7	68.7	75.5	80.6	83.9	85.9	0.95
					K_v	*2.40*	*11.4*	*26.8*	*41.0*	*51.6*	*59.4*	*65.3*	*69.7*	*72.6*	*74.3*	- - -
					X_T	0.685	0.574	0.612	0.668	0.714	0.731	0.735	0.718	0.701	0.706	- - -
4 & 6 x 4	73.0	2.875	51	2	C_v	2.99	17.4	38.1	57.8	78.8	100	119	130	136	139	0.88
					K_v	*2.59*	*15.1*	*33.0*	*50.0*	*68.2*	*86.5*	*103*	*112*	*118*	*120*	- - -
					X_T	0.757	0.624	0.570	0.533	0.559	0.632	0.681	0.706	0.697	0.689	- - -
6 & 8 x 6	111.1	4.375	76	3	C_v	17.5	38.9	86.1	141	195	241	274	293	301	309	0.89
					K_v	*15.1*	*33.6*	*74.5*	*122*	*169*	*208*	*237*	*253*	*260*	*267*	- - -
					X_T	0.187	0.624	0.548	0.559	0.597	0.640	0.681	0.697	0.689	0.681	- - -
8 & 10	136.5	5.375	64	2.5	C_v	75.1	140	212	289	366	435	495	547	590	621	0.82
					K_v	*65.0*	*121*	*183*	*250*	*317*	*376*	*428*	*473*	*510*	*537*	- - -
					X_T	0.772	0.833	0.840	0.779	0.741	0.733	0.729	0.715	0.704	0.688	- - -
12 & 14	177.8	7	76	3	C_v	104	229	369	477	587	691	804	906	981	1030	0.81
					K_v	*90.0*	*198*	*319*	*413*	*508*	*598*	*695*	*784*	*849*	*891*	- - -
					X_T	0.406	0.476	0.478	0.523	0.543	0.561	0.552	0.547	0.558	0.584	- - -

Equal Percentage - Flow Down

Equal Percentage Characteristic

Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F_L[1]
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
2 & 3 x 2	38.1	1.5	22	0.875	C_v	1.25	1.36	2.47	4.14	6.33	9.48	13.8	18.7	23.1	27.0	0.93
					K_v	*1.08*	*1.18*	*2.14*	*3.58*	*5.48*	*8.20*	*11.9*	*16.2*	*20.0*	*23.4*	- - -
					X_T	0.766	0.761	0.608	0.589	0.601	0.601	0.593	0.605	0.660	0.735	- - -
3 & 4 x 3	58.7	2.3125	29	1.125	C_v	1.73	2.77	5.34	9.70	15.6	23.3	33.7	46.2	56.8	65.3	0.92
					K_v	*1.50*	*2.40*	*4.62*	*8.39*	*13.5*	*20.2*	*29.2*	*40.0*	*49.1*	*56.5*	- - -
					X_T	0.870	0.710	0.605	0.581	0.616	0.648	0.640	0.632	0.668	0.748	- - -
4 & 6 x 4	73.0	2.875	38	1.5	C_v	2.57	6.53	10.0	12.5	17.3	25.1	33.8	42.8	59.6	81.1	0.84
					K_v	*2.22*	*5.65*	*8.65*	*10.8*	*15.0*	*21.7*	*29.2*	*37.0*	*51.6*	*70.2*	- - -
					X_T	0.783	0.585	0.589	0.597	0.566	0.533	0.518	0.526	0.526	0.537	- - -
6 & 8 x 6	111.1	4.375	51	2	C_v	3.07	9.29	17.8	24.5	35.6	59.7	98.7	141	188	217	0.85
					K_v	*2.66*	*8.04*	*15.4*	*21.2*	*30.8*	*51.6*	*85.4*	*122*	*163*	*188*	- - -
					X_T	0.922	0.723	0.620	0.660	0.640	0.555	0.529	0.578	0.559	0.640	- - -
8 & 10	136.5	5.375	64	2.5	C_v	19.8	34.4	50.3	69.2	96.8	139	210	307	399	484	0.82
					K_v	*17.1*	*29.8*	*43.5*	*59.9*	*83.7*	*120*	*182*	*266*	*345*	*419*	- - -
					X_T	0.584	0.686	0.697	0.609	0.629	0.745	0.702	0.653	0.663	0.683	- - -
12 & 14	177.8	7	76	3	C_v	38.4	64.8	88.0	119	168	248	360	496	654	800	0.81
					K_v	*33.2*	*56.1*	*76.1*	*103*	*145*	*215*	*311*	*429*	*566*	*692*	- - -
					X_T	0.727	0.701	0.736	0.664	0.709	0.582	0.552	0.556	0.556	0.553	- - -

1. At 100% travel.

Notes: The coefficients on this page are also appropriate for the EHT Valve.

Table 34. Fisher® EHD, CL2500, Equal Percentage Cages

Modified Equal Percentage - Flow Down

Modified Equal Percentage Characteristic

Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coeffi-cient	Valve Opening—Percent of Total Travel										F_L[1]
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
2 & 3 x 2	38.1	1.5	29	1.125	C_v	1.24	1.82	3.91	6.86	11.1	16.9	23.3	28.1	30.4	33.2	0.94
					K_v	*1.07*	*1.57*	*3.38*	*5.93*	*9.60*	*14.6*	*20.2*	*24.3*	*26.3*	*28.7*	- - -
					X_T	0.792	0.681	0.578	0.581	0.605	0.628	0.652	0.693	0.731	0.710	- - -
3 & 4 x 3	58.7	2.3125	38	1.5	C_v	1.94	4.28	9.66	18.1	29.9	45.4	60.5	68.9	74.7	80.9	0.96
					K_v	*1.68*	*3.70*	*8.36*	*15.7*	*25.9*	*39.3*	*52.3*	*59.6*	*64.6*	*70.0*	- - -
					X_T	0.805	0.640	0.593	0.624	0.668	0.672	0.677	0.753	0.779	0.710	- - -
4 & 6 x 4	73.0	2.875	51	2	C_v	2.99	9.01	12.7	19.6	30.3	44.5	65.8	96.3	114	126	0.90
					K_v	*2.59*	*7.79*	*11.0*	*17.0*	*26.2*	*38.5*	*56.9*	*83.3*	*98.6*	*109*	- - -
					X_T	0.681	0.578	0.593	0.559	0.526	0.518	0.544	0.597	0.693	0.693	- - -
6 & 8 x 6	111.1	4.375	76	3	C_v	5.82	16.2	30.6	59.8	115	185	234	254	278	293	0.88
					K_v	*5.03*	*14.0*	*26.5*	*51.7*	*99.5*	*160*	*202*	*220*	*240*	*253*	- - -
					X_T	0.806	0.677	0.624	0.574	0.559	0.597	0.664	0.723	0.706	0.689	- - -
8 & 10	136.5	5.375	76	3	C_v	22.9	41.9	61.9	86.4	140	225	334	451	537	584	0.85
					K_v	*19.8*	*36.2*	*53.5*	*74.7*	*121*	*195*	*289*	*390*	*465*	*505*	- - -
					X_T	0.563	0.698	0.726	0.739	0.734	0.691	0.666	0.682	0.734	0.740	- - -
12 & 14	177.8	7	89	3.5	C_v	42.4	73.7	104	147	223	351	523	717	899	1010	0.80
					K_v	*36.7*	*63.8*	*90.0*	*127*	*193*	*304*	*452*	*620*	*778*	*874*	- - -
					X_T	0.691	0.679	0.652	0.650	0.598	0.549	0.549	0.552	0.551	0.551	- - -

1. At 100% travel.

Notes: The coefficients on this page are also appropriate for the EHT Valve.

Table 35. Fisher® EHS, CL2500, Linear and Equal Percentage Cages

Linear - Flow Up

Linear Characteristic

Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coeffi-cient	Valve Opening—Percent of Total Travel										F_L[1]
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
2 & 3 x 2	38.1	1.5	29	1.125	C_v	1.40	2.77	8.42	14.3	19.3	23.9	28.0	31.4	33.4	35.2	0.90
					K_v	*1.21*	*2.40*	*7.28*	*12.4*	*16.7*	*20.7*	*24.2*	*27.2*	*28.9*	*30.4*	- - -
					X_T	0.718	0.815	0.624	0.628	0.685	0.706	0.701	0.685	0.677	0.656	- - -
3 & 4 x 3	58.7	2.3125	38	1.5	C_v	2.98	11.7	28.3	45.7	58.8	67.9	75.3	82.0	86.4	88.6	0.94
					K_v	*2.58*	*10.1*	*24.5*	*39.5*	*50.9*	*58.7*	*65.1*	*70.9*	*74.7*	*76.6*	- - -
					X_T	0.706	0.664	0.697	0.710	0.731	0.731	0.727	0.710	0.689	0.681	- - -
4 & 6 x 4	73.0	2.875	51	2	C_v	2.92	15.1	30.6	48.6	68.0	86.8	103	116	123	125	0.92
					K_v	*2.53*	*13.1*	*26.5*	*42.0*	*58.8*	*75.1*	*89.1*	*100*	*106*	*108*	- - -
					X_T	0.748	0.819	0.792	0.636	0.624	0.697	0.779	0.797	0.788	0.797	- - -
6 & 8 x 6	111.1	4.375	76	3	C_v	9.11	37.3	78.2	128	180	224	254	269	278	282	0.89
					K_v	*7.88*	*32.3*	*67.6*	*111*	*156*	*194*	*220*	*233*	*240*	*244*	- - -
					X_T	0.620	0.656	0.589	0.574	0.601	0.648	0.689	0.718	0.714	0.714	- - -

Equal Percentage - Flow Up

Equal Percentage Characteristic

2 & 3 x 2	38.1	1.5	22	0.875	C_v	1.06	1.31	2.10	3.73	6.26	9.46	13.1	17.3	22.1	26.3	0.91
					K_v	*0.917*	*1.13*	*1.82*	*3.23*	*5.41*	*8.18*	*11.3*	*15.0*	*19.1*	*22.7*	- - -
					X_T	0.970	0.757	0.731	0.689	0.652	0.624	0.624	0.648	0.693	0.723	- - -
3 & 4 x 3	58.7	2.3125	29	1.125	C_v	1.94	2.86	5.09	9.02	14.9	22.6	32.1	43.0	53.9	64.7	0.94
					K_v	*1.68*	*2.47*	*4.40*	*7.80*	*12.9*	*19.5*	*27.8*	*37.2*	*46.6*	*56.0*	- - -
					X_T	0.810	0.757	0.681	0.677	0.706	0.706	0.668	0.652	0.723	0.761	- - -
4 & 6 x 4	73.0	2.875	38	1.5	C_v	2.35	6.15	9.08	11.3	15.4	22.0	30.3	40.0	53.9	69.6	0.80
					K_v	*2.03*	*5.32*	*7.85*	*9.77*	*13.3*	*19.0*	*26.2*	*34.6*	*46.6*	*60.2*	- - -
					X_T	0.856	0.681	0.620	0.656	0.644	0.597	0.555	0.555	0.578	0.632	- - -
6 & 8 x 6	111.1	4.375	51	2	C_v	4.10	9.98	17.9	24.7	35.3	57.3	93.0	133	174	210	0.79
					K_v	*3.55*	*8.63*	*15.5*	*21.4*	*30.5*	*49.6*	*80.4*	*115*	*151*	*182*	- - -
					X_T	0.697	0.677	0.605	0.578	0.597	0.608	0.574	0.555	0.616	0.605	- - -

Modified Equal Percentage - Flow Up

Modified Equal Percentage Characteristic

2 & 3 x 2	38.1	1.5	29	1.125	C_v	1.10	1.71	3.37	6.56	11.2	16.5	21.6	26.4	30.8	33.1	0.91
					K_v	*0.952*	*1.48*	*2.92*	*5.67*	*9.69*	*14.3*	*18.7*	*22.8*	*26.6*	*28.6*	- - -
					X_T	0.898	0.748	0.689	0.640	0.636	0.656	0.693	0.723	0.727	0.677	- - -
3 & 4 x 3	58.7	2.3125	38	1.5	C_v	2.11	4.16	8.97	16.9	28.4	42.5	55.8	68.2	78.5	84.0	0.
					K_v	*1.83*	*3.60*	*7.76*	*14.6*	*24.6*	*36.8*	*48.3*	*59.0*	*67.9*	*72.7*	- - -
					X_T	0.828	0.710	0.672	0.731	0.723	0.689	0.731	0.766	0.723	0.706	- - -
4 & 6 x 4	73.0	2.875	51	2	C_v	2.75	8.60	11.8	16.6	26.8	42.3	59.8	78.9	106	116	0.88
					K_v	*2.38*	*7.44*	*10.2*	*14.4*	*23.2*	*36.6*	*51.7*	*68.2*	*91.7*	*100.3*	- - -
					X_T	- - -	0.608	0.636	0.640	0.570	0.537	0.578	0.664	0.693	0.779	- - -
6 & 8 x 6	111.1	4.375	76	3	C_v	6.81	16.5	30.5	58.0	109	175	228	256	275	281	0.88
					K_v	*5.89*	*14.3*	*26.4*	*50.2*	*94.3*	*151*	*197*	*221*	*238*	*243*	- - -
					X_T	0.677	0.632	0.593	0.570	0.574	0.601	0.624	0.644	0.693	0.697	- - -

1. At 100% travel.

Table 36. Fisher® EHS, CL2500, Micro-Form Valve Plug

Micro-Form - Flow Up

Equal Percentage Characteristic

Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coeffi-cient	Valve Opening—Percent of Total Travel										F_L[1]
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
1, 1-1/2 x 1, & 2 x 1	6.4	0.25	19	0.75	C_v	0.072	0.106	0.163	0.232	0.324	0.449	0.626	0.871	1.22	1.58	0.91
					K_v	*0.062*	*0.092*	*0.141*	*0.201*	*0.280*	*0.388*	*0.541*	*0.753*	*1.06*	*1.37*	- - -
					X_T	0.778	0.717	0.421	0.474	0.513	0.540	0.558	0.566	0.569	0.644	- - -
	12.7	0.5	19	0.75	C_v	0.220	0.360	0.532	0.746	1.04	1.50	2.15	3.06	4.15	5.37	0.92
					K_v	*0.190*	*0.311*	*0.460*	*0.645*	*0.900*	*1.30*	*1.86*	*2.65*	*3.59*	*4.65*	- - -
					X_T	0.893	0.803	0.748	0.636	0.633	0.637	0.644	0.642	0.661	0.718	- - -
			22[2]	0.875[2]	C_v	0.254	0.445	0.636	0.890	1.40	2.23	3.50	4.77	5.72	6.36	0.93
					K_v	*0.220*	*0.385*	*0.550*	*0.770*	*1.21*	*1.93*	*3.03*	*4.13*	*4.95*	*5.50*	- - -
					X_T	0.632	0.627	0.630	0.632	0.629	0.628	0.629	0.626	0.633	0.630	- - -
	19.1	0.75	19	0.75	C_v	0.441	0.681	1.04	1.59	2.36	3.43	4.81	6.43	7.84	8.91	0.88
					K_v	*0.381*	*0.589*	*0.900*	*1.38*	*2.04*	*2.97*	*4.16*	*5.56*	*6.78*	*7.71*	- - -
					X_T	0.782	0.725	0.652	0.548	0.519	0.506	0.514	0.641	0.651	0.648	- - -
			22[2]	0.875[2]	C_v	0.550	0.721	1.24	1.85	2.78	4.43	6.70	8.45	9.27	10.3	0.84
					K_v	*0.476*	*0.624*	*1.07*	*1.60*	*2.40*	*3.83*	*5.80*	*7.31*	*8.02*	*8.91*	- - -
					X_T	0.516	0.693	0.581	0.587	0.586	0.589	0.585	0.583	0.587	0.585	- - -
2 & 3 x 2	25.4	1	22	0.875	C_v	0.653	1.19	1.89	2.89	4.50	7.08	10.9	15.9	20.0	21.5	0.95
					K_v	*0.565*	*1.03*	*1.63*	*2.50*	*3.89*	*6.12*	*9.43*	*13.8*	*17.3*	*18.6*	- - -
					X_T	0.809	0.812	0.814	0.809	0.810	0.811	0.817	0.806	0.810	0.810	- - -
			29[2]	1.125[2]	C_v	0.884	1.67	2.86	4.96	9.08	15.6	20.9	23.0	23.9	24.2	0.92
					K_v	*0.765*	*1.44*	*2.47*	*4.29*	*7.85*	*13.5*	*18.1*	*19.9*	*20.7*	*20.9*	- - -
					X_T	0.696	0.700	0.698	0.700	0.696	0.700	0.697	0.745	0.714	0.700	- -

1. At 100% travel.
2. Travels identified with this superscript are modified equal percentage characteristic. All other travels are equal percentage.

Table 37. Fisher® EHS and EHT(1), CL2500, Cavitrol® III Cage

EHS and EHT, Cavitrol - Flow Down

Linear Characteristic

Trim Stage	Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coefficient	Min. Throttling C_v(2)	Valve Opening—Percent of Total Travel										F_L(3)
		mm	Inches	mm	Inches			10	20	30	40	50	60	70	80	90	100	
Two Stage	1, 1-1/2 x 1, & 2 x 1(1)	15.9	0.625	32	1.25	C_v	0.210	0.170	0.480	1.00	1.60	2.20	2.70	3.20	3.70	4.10	4.30	0.98
						K_v	*0.182*	*0.147*	*0.415*	*0.865*	*1.38*	*1.90*	*2.34*	*2.77*	*3.20*	*3.55*	*3.72*	- - -
	2 & 3 x 2	31.8	1.25	51	2	C_v	0.410	0.460	1.60	2.90	4.10	5.30	6.50	7.70	8.80	9.70	10.1	0.98
						K_v	*0.355*	*0.398*	*1.38*	*2.51*	*3.55*	*4.58*	*5.62*	*6.66*	*7.61*	*8.39*	*8.74*	- - -
	3 & 4 x 3	47.6	1.875	64	2.5	C_v	0.610	0.990	3.80	6.60	9.40	12.1	14.9	17.6	20.1	22.7	24.1	0.98
						K_v	*0.528*	*0.856*	*3.29*	*5.71*	*8.13*	*10.5*	*12.9*	*15.2*	*17.4*	*19.6*	*20.8*	- - -
	4 & 6 x 4	73.0	2.875	70	2.75	C_v	0.910	2.10	7.10	12.2	17.2	22.3	27.2	32.2	37.3	42.1	43.9	0.98
						K_v	*0.787*	*1.82*	*6.14*	*10.6*	*14.9*	*19.3*	*23.5*	*27.9*	*32.3*	*36.4*	*38.0*	- - -
	6 & 8 x 6	111.1	4.375	95	3.75	C_v	1.50	4.60	12.8	20.8	29.0	37.0	44.9	52.9	60.9	69.3	75.8	0.98
						K_v	*1.30*	*3.98*	*11.1*	*18.0*	*25.1*	*32.0*	*38.8*	*45.8*	*52.7*	*59.9*	*65.6*	- - -
Three Stage	1, 1-1/2 x 1, & 2 x 1	- - -	- - -	- - -	- - -	C_v	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
						K_v	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
	2 & 3 x 2	15.9	0.625	51	2	C_v	0.420	0.280	0.740	1.20	1.60	2.00	2.50	2.90	3.30	3.60	3.70	0.99
						K_v	*0.363*	*0.242*	*0.640*	*1.04*	*1.38*	*1.73*	*2.16*	*2.51*	*2.85*	*3.11*	*3.20*	- - -
	3 & 4 x 3	33.3	1.3125	64	2.5	C_v	0.730	1.44	2.67	4.06	5.37	6.67	7.93	9.26	10.5	11.8	13.1	0.99
						K_v	*0.631*	*1.25*	*2.31*	*3.51*	*4.65*	*5.77*	*6.86*	*8.01*	*9.08*	*10.2*	*11.3*	- - -
	4 & 6 x 4	58.7	2.3125	70	2.75	C_v	1.00	1.00	3.90	6.50	8.90	11.7	14.4	16.9	19.0	20.3	20.8	0.99
						K_v	*0.865*	*0.865*	*3.37*	*5.62*	*7.70*	*10.1*	*12.5*	*14.6*	*16.4*	*17.6*	*18.0*	- - -
	6 & 8 x 6	111.1	4.375	95	3.75	C_v	2.80	4.4	11.2	16.3	21.5	28.3	35	38.5	45.2	51.9	55.2	0.99
						K_v	*2.42*	*3.8*	*9.7*	*14.1*	*18.6*	*24.5*	*30.3*	*33.3*	*39.1*	*44.9*	*47.7*	- - -

1. Cavitrol III trim in the CL2500, NPS 1, two-stage and in the CL2500, NPS 2, three-stage body sizes uses unbalanced valve plugs. These sizes and constructions are EHS valves; all other valves in this table are EHT valves.
2. Valves should not be required to throttle at a C_v less than the specified minimum of C_v for an extended period. Erosion damage to the valve seats might result.
3. At 100 percent travel.

Table 38. Fisher® EHT, CL2500, Cavitrol® III, Protected Inside Seat Design

EHT, CL2500, Cavitrol III, Protected Inside Seat Design, Flow Down

Linear Characteristic

Trim Stage	Valve Size, NPS	Port Diameter		Maximum Travel		Flow Coefficient	Minimum Throttling C_v	Valve Opening – Percent of Total Travel									
		mm	Inch	mm	Inch			10	20	30	40	50	60	70	80	90	100
Two Stage	3, 4 X 3	32.6	1.284	64	2.5	Cv	0.61	0.3	3.1	5.7	8.3	10.7	12.9	14.9	16.6	18.2	19.5
						Kv	0.528	0.26	2.7	4.9	7.2	9.3	11.2	12.1	14.4	15.7	16.8
	4, 6 X 4	58	2.284	70	2.75	Cv	0.91	1.1	6.2	11.2	16.1	20.9	25.5	30	34.2	38.3	41.1
						Kv	0.787	0.95	5.4	9.7	13.9	18.1	22.1	25.9	29.6	33.1	35.6
	6, 8 X 6	96.1	3.784	95	3.75	Cv	1.5	4.3	13.8	23	31.7	39.6	46.9	53.3	59	64	68.1
						Kv	1.3	3.7	11.9	19.9	27.4	34.3	40.6	46.1	51	55.4	58.9
Three Stage	3, 4 X 3	18.3	0.722	64	2.5	Cv	0.73	1	2.1	3	3.9	5.3	5.9	6.3	6.8	7.4	7.4
						Kv	0.631	0.865	1.8	2.6	3.4	4.6	5.1	5.4	5.9	6.4	6.4
	4, 6 X 4	43.7	1.722	70	2.75	Cv	1.0	2.0	4.0	5.8	7.7	11	12.8	14.5	16.3	18.2	19.2
						Kv	0.865	0.78	1.72	5	6.6	9.5	11.1	12.5	14.1	15.7	16.6
	6, 8 X 6	96.1	3.784	95	3.75	Cv	2.8	4.3	11.1	16.2	21.4	28.2	34.8	38.3	44.9	51.7	54.7
						Kv	2.42	3.7	9.6	14	18.5	24.4	30.1	33.1	38.8	44.7	47.3

Notes:

All other EHT flow coefficients are identical to EHD coefficients. Refer to EHD information using all flange ratings and cage styles.
In applications where pressure drop decreases with travel, consider using characterized Cavitrol III cages. Contact your Emerson Process Management sales office for assistance.

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 3 and 4.
EHS/EHAS: Uses an unbalanced valve plug. For low-flow applications, smaller valve sizes are available with specialized valve plug designs. See tables 3(1) and 4.
EHT/EHAT: Uses a balanced valve plug(1) with a pressure-assisted PTFE valve plug seal ring; also, see tables 3 and 4.

NPS 20 Valve Rating

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

Valve Sizes

■ **Globe Valves:** Tables 3 and 5.
■ **Angle Valves:** Tables 4 and 6

End Connection Styles(2)

Buttwelding Ends (BWE): See tables 5 and 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 tables 5 and 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) or CL900 or 1500 (for EHA valves) according to ASME B16.34 unless limited by individual temperature limits shown in the Material Temperature Capabilities specification(7) or in figures 24 and 25.

In addition, both steel EH and EHA valves with BWE connections have increased pressure/temperature ratings as shown in tables 7 and 8.

Maximum Pressure Drops(3)

Valve With Standard Cage: See figures 24, 25, 26 and 27.
Valve With Cavitrol III Cage: 149 bar (2160 psi) for two-stage cage and 207 bar (3000 psi) for three-stage cage. Consult Bulletin 80.2:018, Cavitrol III Two- and Three-Stage Trims, for more information
Valve With Whisper Trim III Cage:
■ 0.6 $\Delta P/P_1$ maximum for Level A1,
■ 0.75 $\Delta P/P_1$ maximum for Levels B1 and B3,
■ 0.85 $\Delta P/P_1$ maximum for Level C3, and
■ 0.99 $\Delta P/P_1$ maximum for Level D3

Construction Materials

All Except NPS 20 Valve.
Body and Bonnet: ■ WCC steel, ■ LCC steel, ■ WC9 chrome-moly steel, or ■ CF8M (316 SST or 316H SST for service above 538°C [1000°F])
Trim: Trim materials are listed in table 11 and 12. Special materials for trim and valve body are available. Please consult your Emerson Process Management sales office
Other Parts: See tables 13 and 14.
Yoke Temperature Limit (NPS 8 to 20 Valves): Standard bonnet with cast iron yoke is limited to 538°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: Steel
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)
Springs: ■ G61500 (6150 steel), ■ S17700 (17-7 stainless steel) or ■ N07718

- continued -

Specifications (continued)

Shutoff Classifications

See table 10.

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 11 and 12 and figures 24, 25, 26, and 27), Cavitrol III and Whisper Trim III trim materials (table 11), or other parts (table 13).
EHT/EHAT: Up to 232°C (450°F) unless limited by selection of standard trim materials (tables 11 and 12 and figures 24, 25, 26, and 27), Cavitrol III and Whisper Trim III trim materials (table 11), or other parts (tables 13 and 14)

Flow Characteristic

Standard Cage: ■ Equal percentage, ■ modified equal percentage(4), or ■ linear
Standard Cage with Micro-Form Valve Plug: ■ Equal percentage or ■ modified equal percentage(4).
Standard Cage with Micro-Flute Valve Plug: ■ Equal percentage or ■ modified equal percentage(4).
Standard Cage with Micro-Flat Valve Plug (EHAS only): ■ Linear
Cavitrol III or Whisper Trim III Cage: ■ Linear
Special cages: Special characterized flow characteristic cages are available. Please consult your local Emerson Process Management 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

Flow Direction

For All Except NPS 20 Valves: ■ Flow up through seat ring and out cage openings (for cages with standard cage windows or drilled Whisper Trim holes) or ■ flow down through cage openings and out seat ring (only for cages with drilled Cavitrol holes)

For NPS 20 Valves: ■ Flow up through seat ring and out cage openings (for cages with standard cage windows or drilled Whisper Trim holes) or ■ flow down through cage openings and out seat ring (only for cages with drilled Cavitrol holes)

Noise Levels

See table 2 and Fisher Catalog 12, section 3 for noise predictions methods

NPS 20 Valve Maximum Flow Coefficient

Approximately 92,000 C_g or 2600 C_v

Port Diameters

See tables 18 and 19.

NPS 8 and 10 Valves.
CL1500: 178 mm (7 inch) port diameter
CL2500: 137 mm (5.375 inch) port diameter
NPS 12 and 14 Valves.
CL1500: 254 mm (10 inch) port diameter
CL2500: 178 mm (7 inch) port diameter
NPS 14 Valves.
CL2500 Valve: 356 mm (14 inches) port diameter (consult your Emerson Process Management sales office for further information)
NPS 20 Valves: 355.6 mm (14 inches)

Valve Plug Travel and Stem Diameters(9)

See tables 15, 18, and 19.

5 Inch H(10) **Boss Diameter:** 31.8 mm (1.25 inches)
7 Inch Boss Diameter: 50.8 mm (2 inches)
NPS 20 Valves: *Valve Plug Travel:* 85.7 mm (9.125 inches) plus or minus 1.6 mm (0.0625 inch)
Valve Stem Diameter: 50.4 mm (2 inches)

Bonnet Style

■ Standard bonnet (figures 4 and 5) 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 29

- continued -

Specifications (continued)

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

Yoke Boss Diameters for Actuator Mounting

See tables 20 and 21.

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: 177.8 mm (7 inches)

Approximate Weight

See tables 22 and 23

Options

■ O-ring seat ring gasket constructions(6), ■ driver for removing and installing of seat ring retainer, ■ Class V shutoff for EHT above 232°C (450°F) using PEEK anti-extrusion rings, ■ Class V shutoff for EHD 4-3/8 inch port and smaller for up to 593°C (1100°F) using C-seal trim and EHD 5-3/8 inch port and larger for up to 593°C (1100°F) using Bore Seal trim, ■ 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 to 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 figure 11, 16, and 27. Diverter cone valve plug construction is also used for NPS 6 EHD and EHT and NPS 8 EHAD and EHAT applications requiring Whisper Trim III Level A, B, or C cages. Again, for flow up applications only.
2. EN (or other) ratings and end connections can usually be supplied; please consult your Emerson Process Management 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 Emerson Process Management 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 13 and figure 25.
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 Emerson Process Management 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.

Note

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