

Design ED, EAD, and EDR Sliding-Stem Control Valves

Design ED, EAD, and EDR single-port control valves shown in figures 1, 2, 3, and 4 have balanced valve plugs, cage guiding, and metal-to-metal seating for all general applications over a wide range of process pressure drops and temperatures. These general purpose, sliding-stem valves are used for either throttling or on-off control of a wide variety of liquids and gases.

The easy-e® Valve Family

Design ED, EAD, and EDR valves are part of the versatile easy-e family of industrial control valves from Fisher. easy-e valves share the following characteristics:

- Multiple trim material choices
- Trim temperature capability with standard metal seats to 427°C (800°F)
 - FGM gaskets
 - Interchangeable, restricted-capacity trims and full-size trims match variable process flow demands
 - Different cage/plug styles provide particular flow characteristics for highly-specialized applications. The standard cage comes in three different flow characteristics:
 - quick-opening
 - linear
 - equal percentage
 - Noise in gaseous service may be attenuated by using Whisper Trim® I, Whisper Trim III (figure 10), and WhisperFlo® cages (figure 12)
 - Optional constructions provide material compatibility with NACE MR0175
 - 316 stainless steel packing box parts are standard (including packing flange, studs, and nuts)



W1916-3/IL

Figure 1. Design ED Control Valve with Type 667 Actuator



ED Valve

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Features

- **Compliance with the Clean Air Act**—Optional ENVIRO-SEAL packing systems (figure 7) provide a superior stem seal to prevent the loss of process fluid. The ENVIRO-SEAL packing systems feature PTFE, graphite ULF, or duplex packing with live-loading for reduced packing maintenance.

- **Stable Control at High Pressure Drops**—Rugged cage guiding stabilizes the valve plug at all points during travel. Cage guiding reduces vibration and mechanical noise.

- **More Flow Capacity for Initial Investment**—Streamlined flow passages provide greater capacities. When compared to globe valves of the same line size by other manufacturers, the Design ED, EAD, and EDR provide more flow.

- **Balanced Valve Plug Construction**—Balanced valve plug construction permits use of smaller, lower-cost actuators from Fisher. Also, trim inventory costs are cut because dimensional standardization permits use of most standard easy-e trim parts.

- **High-Temperature Capability with Class IV or Class V Shutoff**—Use of multiple graphite piston rings (figure 2) permit Class IV shutoff up to 593°C (1100°F). Use of C-seal trim (see figure 6) permits Class V shutoff up to 593°C (1100°F).

- **Compliance with European Standards**—Valves are available with dimensions specified by EN/DIN standards. See figure 14.

- **Sour Gas Service Capability**—Materials are available for applications handling sour fluids and gases. These materials comply with the requirements of NACE MR0175.

- **Operating Economy**—Increased wear resistance provided by standard hardened stainless steel trim means longer service life.

- **Maintenance Economy**—The valve body can stay in the pipeline during removal of trim parts. The Design EDR valve also features easy valve access without removing the actuator.

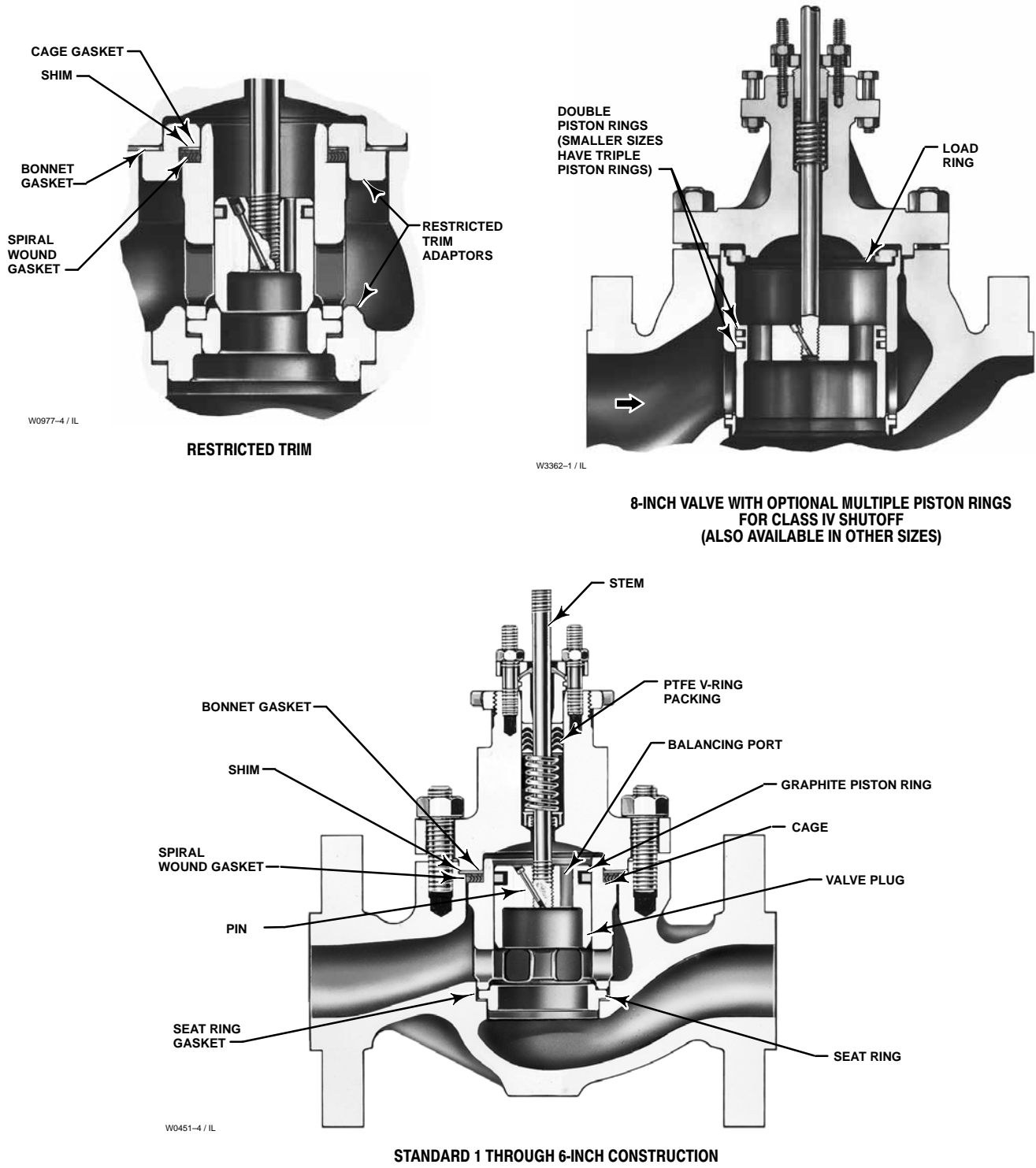


Figure 2. Design ED Sectional

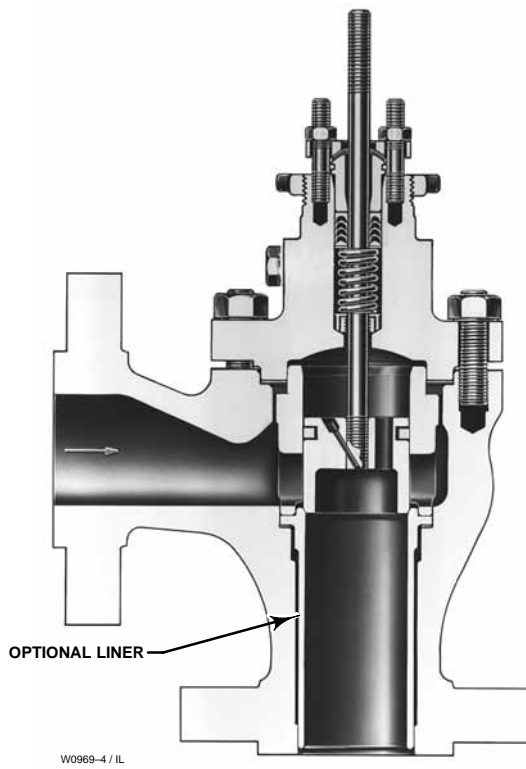


Figure 3. Design EAD Sectional

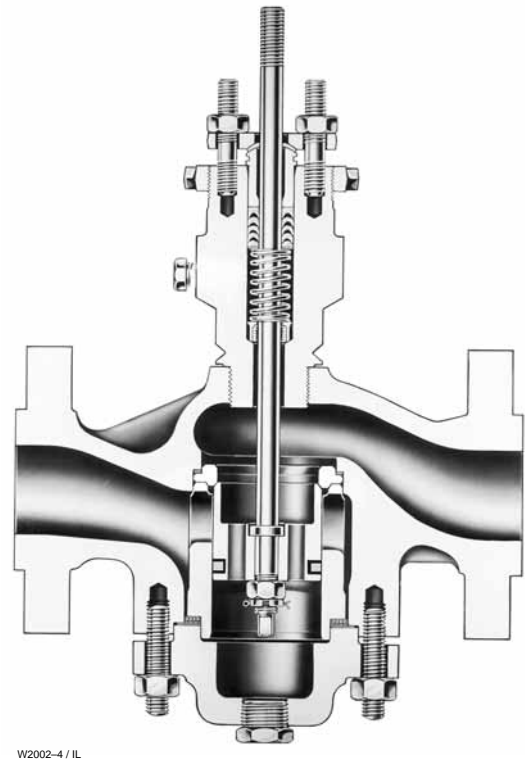


Figure 4. Design EDR Sectional

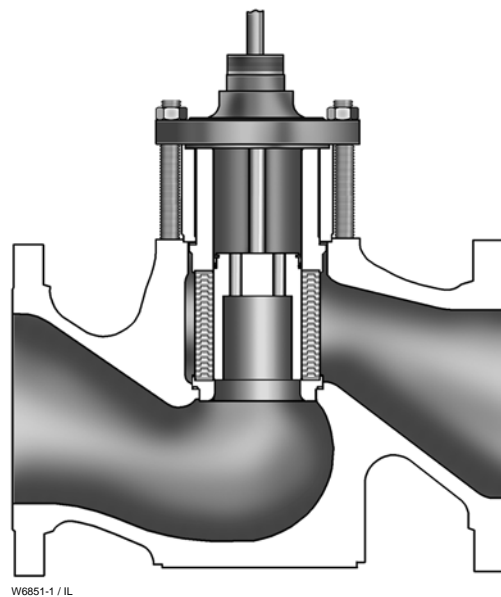


Figure 5. Typical Valve with WhisperFlo Aerodynamic Trim

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ED Valve

Table 1. C-seal Shutoff Classification

VALVE DESIGN (CLASS)	VALVE SIZE		PORT DIAMETER		CAGE STYLE	ANSI LEAKAGE CLASS
	Inches	mm	Inches	mm		
Design ED (Class 150-600)	2.5	73	2.875		Eq. %, Linear, Whisper I, Cav III, 1 stage	V to 593°C (1100°F) [for port diameters from 73 through 203.2 mm (2.875 through 8-inch) with optional C-seal trim]
	3	87.3	3.4375			
	3	73	2.875		Cav III, 2 stage	
	4	73	2.875			
	4	73 111.1	2.875 4.375		Eq. %, Linear, Whisper I, Cav III, 1 stage	
	6	136.5	5.375			
					Eq. %, Linear, Whisper I, Cav III, 1 stage	
	8	177.8	7		Cav III, 2 stage	
	8	203.2	8		Eq. %, Linear, Whisper I, Cav III, 1 stage	

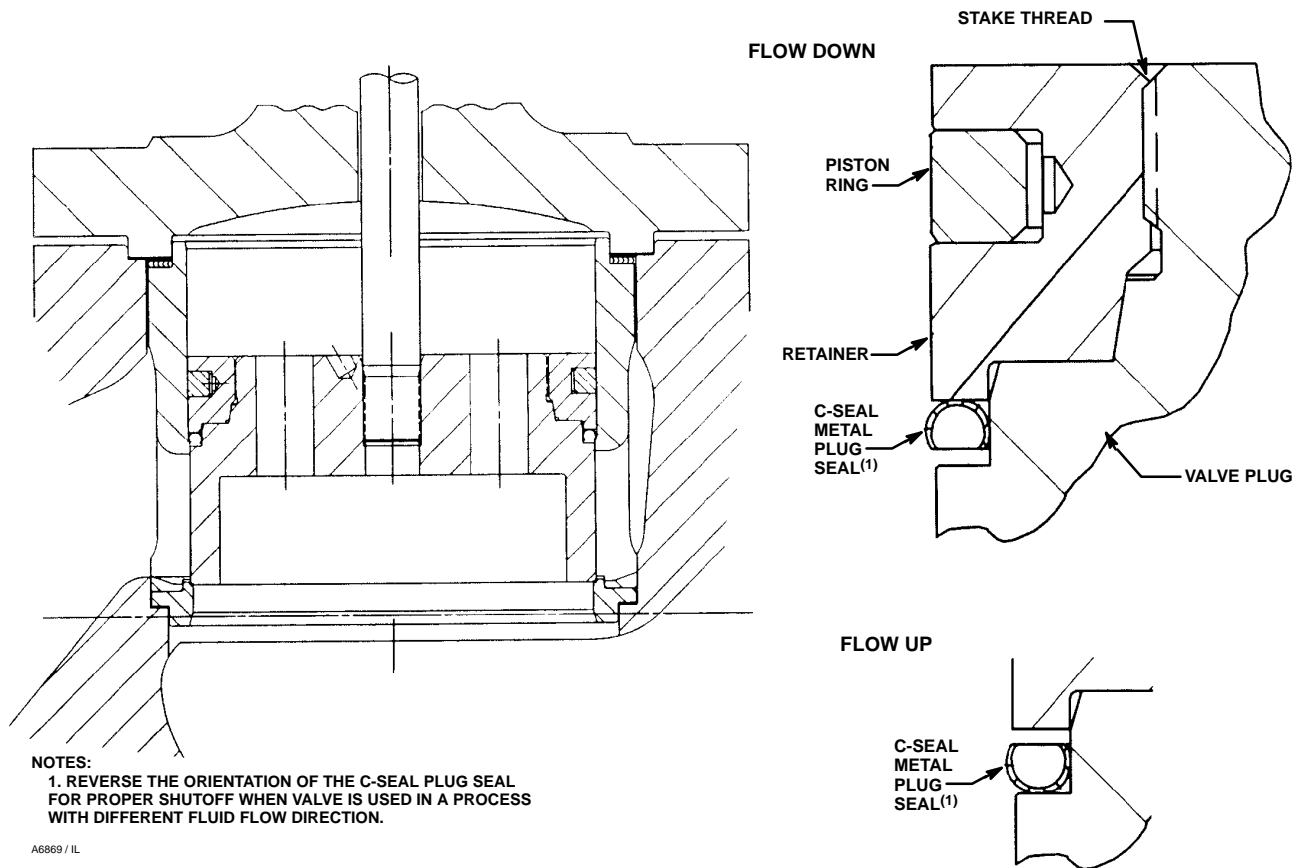


Figure 6. C-seal Trim

Table 2. Available Constructions

DESIGN	VALVE SIZE, INCH	VALVE BODY MATERIAL AND END CONNECTION STYLE ⁽¹⁾								
		Carbon Steel, Alloy Steel, or Stainless Steel Valve Body						Cast Iron Valve Body		
		Screwed	RF or RTJ Flanged			Butt-welding	Socket Weld	Screwed	Class 125 FF Flanged	Class 250 RF Flanged
Class 150	Class 300		Class 600							
ED	1, 1.5, or 2	X	X	X	X	X	X	X	X	X
	1.25	X	---	---	---	---	---	X	---	---
	2.5, 3, 4, 6, or 8	---	X	X	X	X	---	---	X	X
EAD	1 or 2	---	X	X	X	X	---	---	---	---
	3, 4, or 6	---	X	X	X	X	---	---	---	---
EDR	1, 1.5, or 2	X	X	X	X	X	X	X	X	X
	1.25	X	---	---	---	---	---	X	---	---
	2.5, 3, or 4	---	X	X	X	X	---	---	X	X

X = Available Construction.
1. End connection style abbreviations: FF - Flat Faced, RF - Raised Face, RTJ - Ring Type Joint.

C-seal Trim Description

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

With C-seal trim, a balanced valve can achieve high-temperature, Class V shutoff. Because the C-seal plug seal is formed from metal (N07718 nickel alloy, Inconel 718) rather than an elastomer, a valve equipped with the C-seal trim can be applied in processes with a fluid temperature of up to 593°C (1100°F).

ENVIRO-SEAL and HIGH-SEAL Packing Systems

ENVIRO-SEAL and HIGH-SEAL packing systems offer exceptional sealing capabilities. They easily install in your existing valves or can be purchased with new valves. These systems may help prevent the loss of process fluid. The longer operational life and reliability of these systems also reduces your maintenance costs and downtime.

For applications requiring compliance with environmental protection regulations, Fisher offers the unique ENVIRO-SEAL packing system (figure 7) and a unique ENVIRO-SEAL bellows seal system (figure 8). The patented emission control packing

system keeps emission concentrations below the EPA 500 ppm requirement.

For a superior stem seal in applications that are not environmentally-sensitive, Fisher offers the HIGH-SEAL graphite ULF packing system (figure 7). The HIGH-SEAL packing system provides superior sealing at pressure/temperature ratings beyond ENVIRO-SEAL limits. ENVIRO-SEAL systems may also be applied for superior stem sealing in higher pressure/temperature applications not requiring EPA compliance.

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

Note

Fisher does not assume responsibility for the selection, use, or maintenance of any product. Responsibility for proper selection, use, and maintenance of any Fisher product remains solely with the purchaser and end-user.

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Table 3. Typical Combinations of Metal Trim Parts⁽¹⁾ for all Valves Except Those for NACE Specification, Whisper Trim III, and WhisperFlo Cages

Trim Designation	Valve Plug	Cage	Seat Ring	Liner (Design EAD Valve Only)
1 (standard for Design ED, EAD, and EDR in all valve body materials except CF8M)	S41600 hardened to 38 HRC	CB7Cu-1 hardened to 40 HRC	S41600 or CA15 ⁽²⁾ (410 stainless steel), both hardened to 38 HRC	S41600 hardened to 38 HRC
3 and 3H ⁽³⁾	S31600 with seat and guide hard faced with CoCr-A hardfacing alloy	R30006 (alloy 6)	R30006 (alloy 6)	---
4	S31600	CB7Cu-1 hardened to 40 HRC	S31600	S31600
27	S31600 with seat and guide hard faced with CoCr-A hardfacing alloy	CF8M with electroless nickel coating (ENC)	R30006 (alloy 6)	---
28	S31600 with seat hard faced with CoCr-A hardfacing alloy			
29 (standard for CF8M bodies in all designs)	S31600	CF8M with electroless nickel coating (ENC)	S31600	S31600
37 and 37H ⁽³⁾	S31600 with seat and guide hard faced with CoCr-A hardfacing alloy	CB7Cu-1 hardened to 40 HRC	R30006 (alloy 6)	

1. Nonferrous-alloy combinations are also available. Consult your Fisher sales office for details.
2. CA15 is used for 6- and 8-inch full-size and restricted-trim valves.
3. Trims 3H and 37H have clearances for high-temperature service.

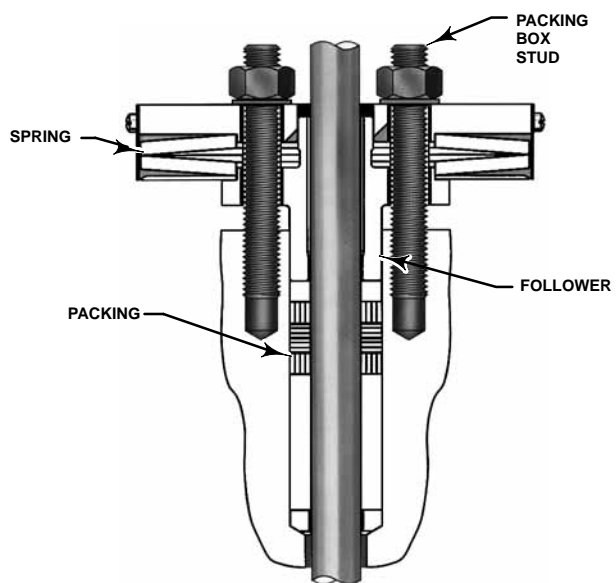
Table 4. Whisper Trim III Metal Trim Part Materials and Body/Trim Temperature Capabilities (6-inch Design ED only)

TRIM DESIGNATION	VALVE PLUG	CAGE	CAGE RETAINER	BAFFLE (FOR LEVEL D3 CAGE ONLY)	SEAT RING	BODY, BONNET & BONNET SPACER	MATERIAL TEMPERATURE CAPABILITY			
							°C		°F	
							Min	Max	Min	Max
301 (standard for all body materials except S31600)	S17400 hardened to 40 HRC	S41600 hardened to 38 HRC	Carbon steel NACE with electroless nickel coating (ENC)	Steel	410 SST hardened to 38 HRC	WCC carbon steel or WC9 chrome moly steel	-29	343	-20	650
						CF8M (316 SST)	-29	163	-20	325
301A	S17400 hardened to 40 HRC	S41600	WCC Ion Nitrided	Steel	S41600	WCC carbon steel or WC9 chrome moly steel	232	427	450	800
304	S31600 with seat and guide hard faced with CoCr-A hardfacing alloy	S41600 hardened to 38 HRC	Carbon steel NACE with electroless nickel coating (ENC)	Steel	S31600 with seat hard faced with CoCr-A hardfacing alloy	WCC carbon steel, WC9 chrome moly steel	-29	343	-20	650
						CF8M (316 SST)	-29	177	-20	350
313 (NACE compatible) ⁽¹⁾	S31600 with seat and guide hard faced with CoCr-A hardfacing alloy	S31600 with electroless nickel coating (ENC)	Carbon steel NACE with electroless nickel coating (ENC)	Steel	S31600 with seat hard faced with CoCr-A hardfacing alloy	WCC carbon steel, WC9 chrome moly steel, or CF8M (316 SST)	-29	343	-20	650
315	S31600 with seat and guide hard faced with CoCr-A hardfacing alloy	Electrolized 316 SST	Electrolized 316 SST	S31600	S31600 with seat hard faced with CoCr-A hardfacing alloy	WCC carbon steel or WC9 chrome moly steel	-29	260	-20	500
						CF8M (316 SST)	-198	537 ⁽²⁾	-325	1000 ⁽²⁾
318	S31600 with seat and guide hard-faced with CoCr-A	WC9/Ion Nitrided	WC9 Ion Nitrided	WC9	S31600 with seat hard-faced with CoCr-A	WCC carbon steel	-29	427	-20	800
						WC9 chrome moly steel	-29	566	-20	1050

1. Level D3 cage cannot be certified to NACE. Use 316/ENC cage retainer instead.
2. May be used up to 593°C (1100°F) if manufacturing process controls carbon content to 0.04% minimum or 0.08% maximum.

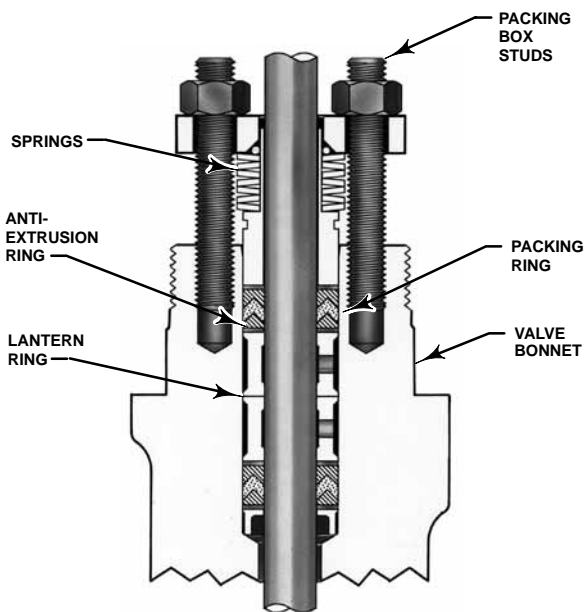
Table 5. WhisperFlo Metal Trim Part Materials and Valve Body/Trim Temperature Capabilities (4- and 6-inch Design ED only)

TRIM DESIGNATION	VALVE BODY	VALVE PLUG	CAGE	CAGE RETAINER	SEAT	MATERIAL TEMPERATURE CAPABILITY			
						°C		°F	
						Min	Max	Min	Max
901	WCC	S41600	S41000	WCC ENC	S41600	-29	343	-20	650
902	WCC	S31600/CoCrA Seat and Guide	S41000	WCC ENC	S31600/CoCrA	-29	343	-20	650
915	WCC	S31600/CoCrA Seat and Guide	S41000/Nitride	WCC/Nitride	S31600/CoCrA	343	427	650	800
916	WC9	S31600/CoCrA Seat and Guide	S41000/Nitride	WC9/Nitride	S31600/CoCrA	343	538	650	1000
926	WCC	S31600/CoCrA Seat and Guide	S41000 NACE	WCC/NACE/ENC	S31600/CoCrA	-29	343	-20	650
936	316 CF8M	S31600/CoCrA Seat and Guide	S31603/CRCT	S31600/ENC	S31600/CoCrA	-198	343	-325	650
946	316 CF8M	S31600/CoCrA Seat and Guide	S31603/CRCT	S31600/Nitride	S31600/CoCrA	343	538	650	1000



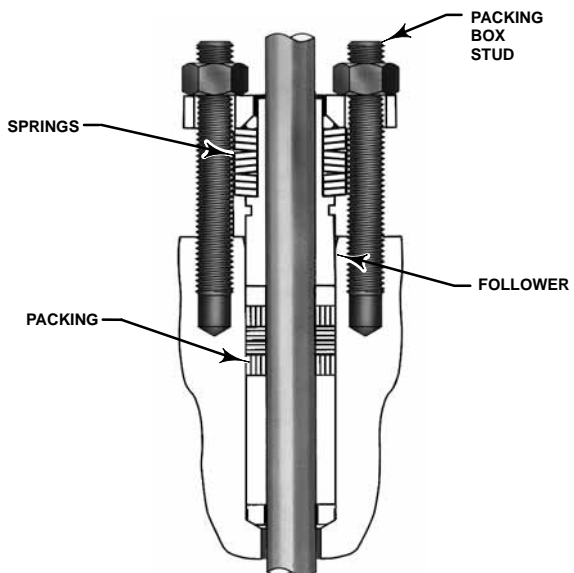
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**TYPICAL HIGH-SEAL PACKING SYSTEM
WITH GRAPHITE ULF PACKING**



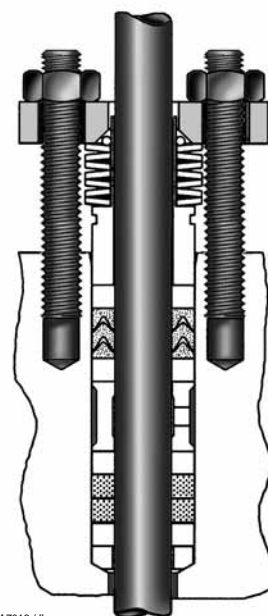
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**TYPICAL ENVIRO-SEAL PACKING SYSTEM
WITH PTFE PACKING**



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



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

Figure 7. ENVIRO-SEAL and HIGH-SEAL Packing Systems



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Figure 8. Cutaway of ENVIRO-SEAL Bellows Seal Bonnet and Internal Shroud, Showing Bellows

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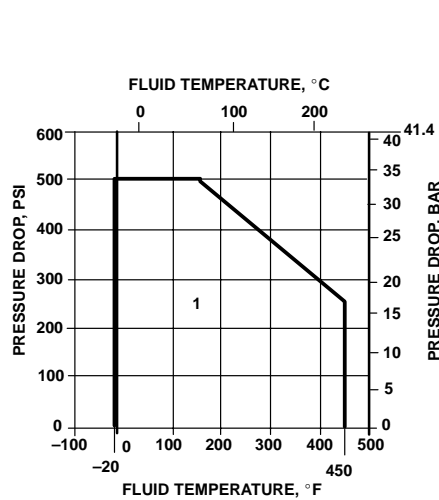
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ED Valve

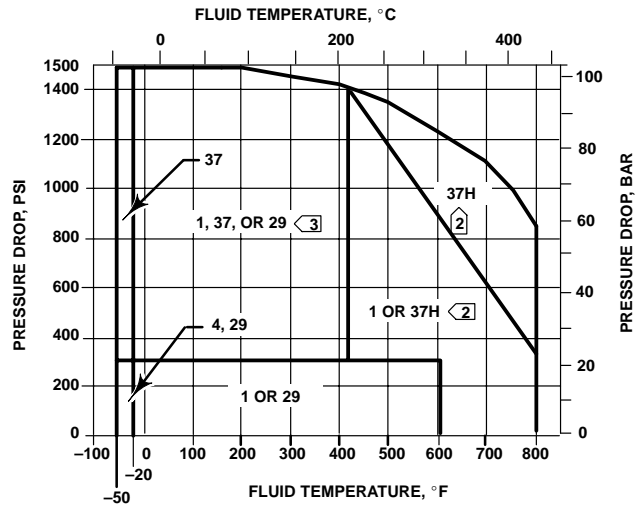
Table 6. Materials and Temperature Limits for All Other Parts

PART			MATERIAL		MATERIAL TEMPERATURE CAPABILITY			
					°C		°F	
					Min	Max	Min	Max
Body-to-bonnet bolting. See table 12 for NACE bolting materials and temperature limits	Cast iron valve body	Cap screws	Steel SAE Grade 5	-29	232	-20	450	
	WCC, or WC9 valve body	Studs	Steel SA-193-B7	-29	427 ⁽¹⁾	-20	800 ⁽¹⁾	
		Nuts	Steel SA-194-2H					
	LCC/HT valve body	Studs	Steel SA-193-B7	-46	343 ⁽¹⁾	-50	650 ⁽¹⁾	
		Nuts	Steel SA-194-2H					
	WC9 valve body	Studs	Steel SA-193-B16	-29	566 ⁽¹⁾	-20	1050 ⁽¹⁾	
		Nuts	Steel SA-194-7					
	CF8M (316 SST) valve body	Studs	Steel SA-193-B7 (NACE [non-exposed bolting])	-48	427 ⁽¹⁾	-55	800 ⁽¹⁾	
		Nuts	Steel SA-194-2H (NACE [non-exposed bolting])					
		Studs	304 stainless steel SA-320-B8	These materials not limiting factors	-198	These materials not limiting factors	-325	
Nuts		304 stainless steel SA-194-8						
Studs		316 stainless steel SA-193-B8M (strain hardened)						
Nuts	316 stainless steel SA-194-8M	-198 ⁽²⁾	427 ⁽¹⁾	-325 ⁽²⁾	800 ⁽¹⁾			
Piston ring		Graphite (FMS 17F27)	Oxidizing service	-46 ⁽³⁾	427	-50 ⁽³⁾	800	
			Non-oxidizing service	-46 ⁽³⁾	482	-50 ⁽³⁾	900	
		Graphite (FMS17F39)	Oxidizing service	-46 ⁽³⁾	560	-50 ⁽³⁾	1000	
			Non-oxidizing service	-46 ⁽³⁾	593	-50 ⁽³⁾	1100	
Valve plug stem		S31600 (S20910, NACE Std.)	-198 ⁽²⁾	593	-325 ⁽²⁾	1100		
Pin (Design ED or EAD valve only)		S31600						
Castle nut and cotter pin (Design EDR valve only)		18-8 stainless steel						
Load ring (8 inch Design ED valve only)		S17400	-101	316	-150	600		
		Inconel	-254	593	-425	1100		
		N05500 (K-Monel)	-204	260	-400	500		
Restricted trim adaptors		Cast iron	-73	232	-100	450		
		WCC steel	-29	427	-20	800		
		S31600	-198 ⁽²⁾	593	-325 ⁽²⁾	1100		
Seat ring, bonnet and cage gaskets		FGM (standard)	-198	593 ⁽⁴⁾	-325	1100 ⁽⁴⁾		
		PTFE-coated Monel	-73	149	-100	300		
Spiral wound gaskets		Inconel 600/graphite (FGM-standard)	-198	593 ⁽⁴⁾	-325	1100 ⁽⁴⁾		
		N04400 (Monel)/composition	-73	232	-100	450		
Shim		S31600	These materials not limiting factors					
		N04400 (Monel)						
Packing (temperatures shown are material temperature capabilities). See table 8 for proper bonnet selection.		PTFE V-ring	-40	232	-40	450		
		PTFE/composition	-73	232	-100	450		
		Graphite ribbon/filament	-198	538 ⁽⁶⁾	-325	1000 ⁽⁶⁾		
		Graphite ribbon for high-temperature oxidizing service	371	649	700	1200		
Packing flange, studs and nuts when used with standard bonnet		S31600	-198 ⁽²⁾	593 ⁽¹⁾	-325 ⁽²⁾	1100 ⁽¹⁾		
Packing follower, and packing spring ⁽⁵⁾ or lantern ring		S31600	-198 ⁽²⁾	593	-325 ⁽²⁾	1100		
Packing box ring		S31600						
Extension bonnet bushing	Trims 1 & 4	S41600	-29	427	-20	800		
	Other trims	S31600	-198 ⁽²⁾	427	-325 ⁽²⁾	800		

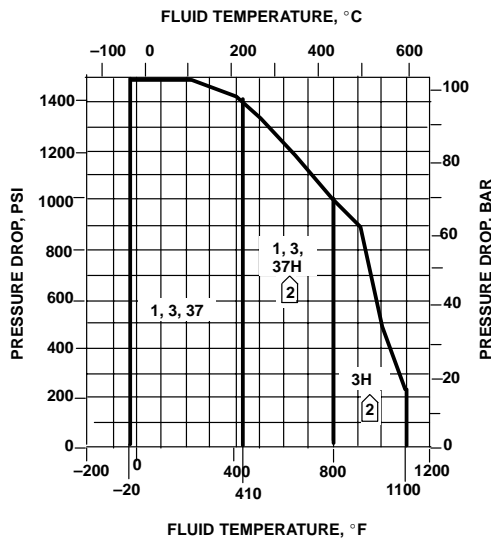
- Lubricated nuts are standard.
- May be used down to -254°C (-425°F) if manufacturing process includes Charpy impact test.
- This minimum is due to thermal expansion differential between piston ring and cage at low temperatures.
- Except 427°C (800°F) on oxidizing service.
- Spring is used only with single PTFE V-ring packing; lantern ring replaces spring in other packings.
- Except 371°C (700°F) on oxidizing service.



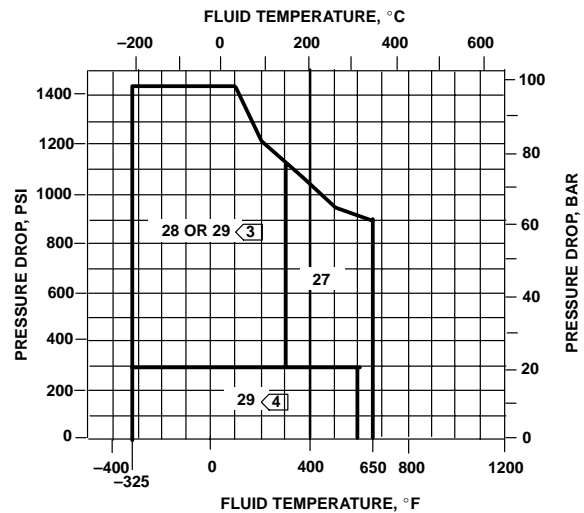
WITH CLASS 250B 1 CAST IRON VALVE BODY



WITH CLASS 600 1
WCC OR LCC/HT STEEL VALVE BODY



WITH CLASS 600 1
WC9 CHROME MOLY STEEL VALVE BODY



WITH CLASS 600 1
316 STAINLESS STEEL (CF8M) VALVE BODY

NOTES:

- 1 DO NOT EXCEED THE MAXIMUM PRESSURE AND TEMPERATURE FOR THE CLASS RATING OF THE VALVE MATERIAL USED, EVEN THOUGH THE TRIMS SHOWN MAY HAVE HIGHER CAPABILITIES.
- 2 BE ESPECIALLY CAREFUL TO SPECIFY SERVICE TEMPERATURE IF TRIM 3 OR 37 IS SELECTED AS DIFFERENT THERMAL EXPANSION RATES REQUIRE SPECIAL PLUG CLEARANCES. SPECIFY TRIM 37H FOR TEMPERATURES ABOVE 210°C (410°F). SPECIFY TRIM 3H FOR TEMPERATURES ABOVE 427°C (800°F).
- 3 TRIM 29 MAY BE USED UP TO 103 BAR (1500 PSI) WITH CLEAN, DRY GAS.
- 4 USE TRIM 27 INSTEAD OF TRIM 29 FOR NONLUBRICATING FLUIDS SUCH AS SUPERHEATED STEAM OR DRY GASES BETWEEN 149 AND 316°C (300 AND 600°F).

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Figure 9. Typical Trim Used for All Valves Except 4- and 6-Inch Design ED with Whisper Trim III Cage and WhisperFlo Cage

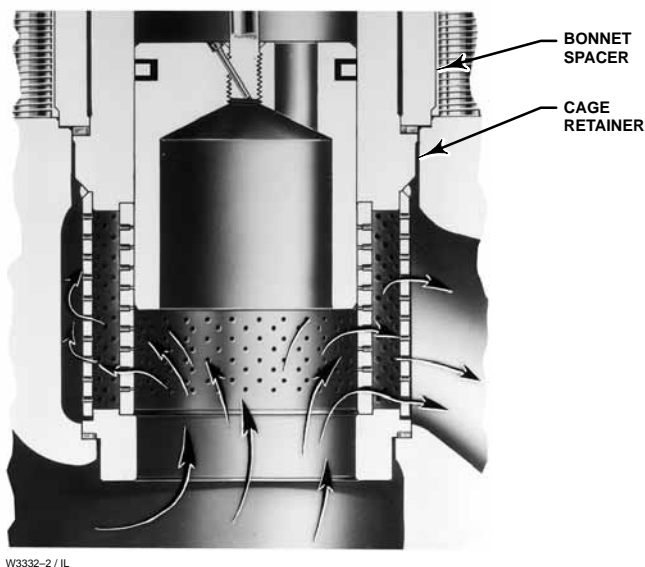
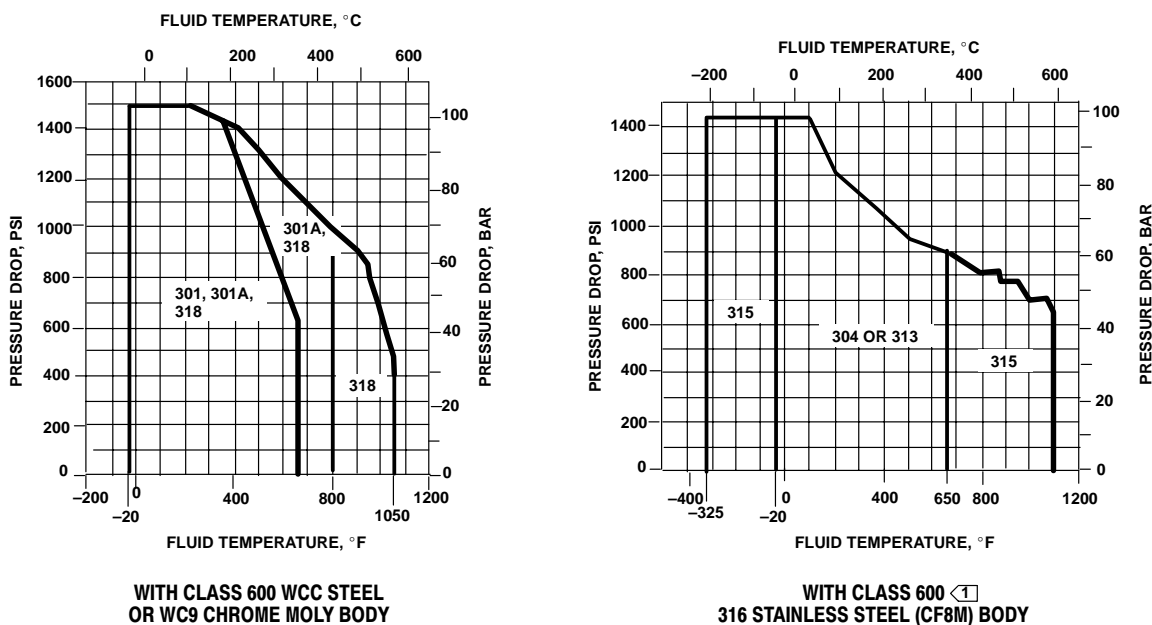


Figure 10. Whisper Trim III Cage in 6-Inch Design ED Valve



NOTES:
 1) DO NOT EXCEED THE MAXIMUM PRESSURE AND TEMPERATURE FOR THE CLASS RATING OF THE BODY MATERIAL USED, EVEN THOUGH THE TRIM SHOWN MAY HAVE HIGHER CAPABILITIES.

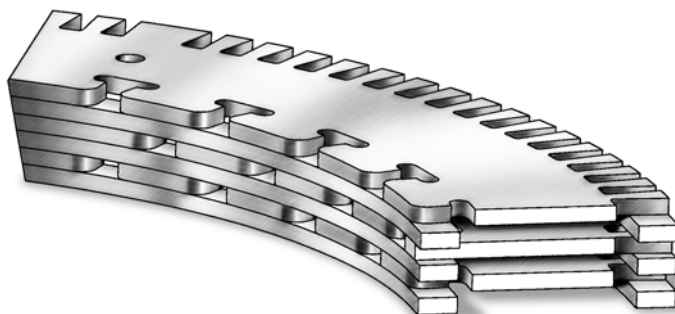
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Figure 11. Typical Trim Used for 6-Inch Design ED Valves with Whisper Trim III Cages

Table 7. Valve Body/Trim Temperature Capabilities⁽¹⁾ For All Valves Except 6-Inch Design ED with Whisper Trim III Cage and 4- and 6-Inch Design ED with WhisperFlo Cage

VALVE BODY/BONNET ⁽²⁾ MATERIAL	TRIM DESIGNATION	VALVE SIZE AND DESIGN	MATERIAL TEMPERATURE CAPABILITY			
			°C		°F	
			Min	Max	Min	Max
Cast iron	1, 3, 27, or 29	All	-29	232	-20	450
	37	All	-29	210	-20	410
	37H	All	210	232	410	450
WCC steel	1	All	-29	427	-20	800
	29	All	-29	316	-20	600
	37	All	-29	210	-20	410
	37H	All	210	427	410	800
WC9 chrome moly steel	1 or 3	All	-29	427	-20	800
	27	All	-29	343	-20	650
	29	All	-29	238	-20	460
	37	All	-29	210	-20	410
	37H	All	427	566	800	1050
LCC/HT steel	1	2 inch in all designs	-29	316	-20	600
		All sizes except 2 inch in all designs	-29	343	-20	650
	4	All	-46	210	-50	410
	29	All	-46	316	-50	600
	37	All	-46	210	-50	410
	37H	All	210	343	410	650
CF8M (316 stainless steel)	27	All	-198 ⁽³⁾	343	-325 ⁽³⁾	650
	28	All	-198 ⁽³⁾	149	-325 ⁽³⁾	300
	29	All	-198 ⁽³⁾	316	-325 ⁽³⁾	600

1. For metal trim parts only. Restricted trim and full-sized limits are the same.
 2. Same material also used for bottom flange, if required.
 3. May be used down to -254° C (-425° F) if manufacturing process includes Charpy impact test.



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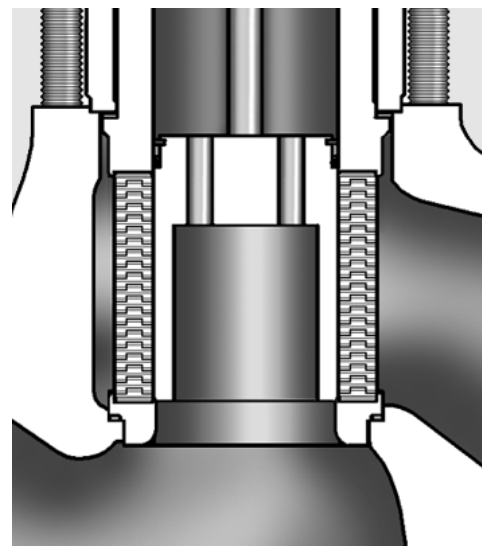


Figure 12. WhisperFlo Cage in 4- and 6-Inch Design ED Valve

Table 8. Bonnet Selection Guidelines

BONNET STYLE	PACKING MATERIAL	IN-BODY PROCESS TEMPERATURE LIMITS ⁽¹⁾	
		°C	°F
Plain: ■ Standard for all valves through 6-inch valve body size with 2.8125 yoke boss diameter ■ Standard for 6-inch and 8-inch valves in cast iron and WCC steel bonnet material with 3.5625 yoke boss diameter	PTFE V-ring	-18 to 232	0 to 450
	PTFE/Composition	-18 to 232	0 to 450
	Graphite ribbon/filament	0 to maximum shown in table 6	0 to maximum shown in table 6
Style 1 Cast Extension: ■ Standard for 8-inch valves in S31600 bonnet material with 3.5625 yoke boss diameter	PTFE V-ring	-46 to 232	-50 to 450
	PTFE/Composition		
	Graphite ribbon/filament	-46 to -18 and above 232	-50 to 0 and above 450
Style 2 Cast Extension: ■ Optional for 2-inch through 4-inch valve sizes with 2.8125 inch yoke boss diameter ■ Optional for 6-inch and 8-inch valves with 3.5625 yoke boss diameter. Not available for 8-inch valve in S31600 bonnet material	PTFE V-ring	-18 to 232	0 to 450
	PTFE/Composition		
	Graphite ribbon/filament	-101 to -18 and above 232	-150 to 0 and above 450
ENVIRO-SEAL bellows seal bonnet	PTFE	For exceptional stem sealing capabilities. See Bulletin 59.1:070, ENVIRO-SEAL Bellows Seal Bonnets, for pressure/temperature ratings.	
	Graphite		

1. These in-body process temperatures assume an outside, ambient temperature of 21°C (70°F). When using any packing at low process temperatures, a cast extension bonnet may have to be used to prevent packing damage which could result from the formation of valve stem frost.

Table 9. Maximum Flow Coefficients for Full-Sized Trim with Equal Percentage Cage and Normal Flow Direction

Valve Design	Valve Size, Inch	C _v at Max. Valve Plug Travel	
ED	1, 1.25	17.2	
	1.5	35.8	
	2	59.7	
	2.5	99.4	
	3	136	
	4	224	
	6	394	
	8 ⁽¹⁾ 8 ⁽²⁾	567 819	
EAD	with liner	1	18.5
		2	48.1
		3	149
		4	152
		6	336
	without liner	1	19.0
		2	47.2
		3	148
		4	156
		6	328
EDR	1, 1.25	17.2	
	1.5	35.8	
	2	59.7	
	2.5	99.4	
	3	136	
	4	224	

1. With 51 mm (2 inch) travel.
2. With 76 mm (3 inch) travel.

Table 10. Metal Trim Part Materials for Compatibility with NACE MR0175 (Sour Service) Specifications, Environmental Restrictions Apply, Refer to Standard

Trim Designation	Valve Plug	Cage	Seat Ring for Standard Metal Seat Construction	Optional Liner for Metal Seat (EAD only)	Valve Stem, Packing Follower, Lantern Ring, Packing Box Ring, and Pin	Load Ring ⁽¹⁾
85	S31600	S31600 with electroless nickel coating (ENC)	S31600	S31600	S20910 (Valve Stem) S31600 (All Other Parts)	N05500 (K-Monel)
86	S31600 with seat hard faced with CoCr-A hardfacing alloy	S31600 with electroless nickel coating (ENC)	R30006 (alloy 6)	---		
87	S31600 with seat and guide hard faced with CoCr-A hardfacing alloy	S31600 with electroless nickel coating (ENC)	R30006 (alloy 6)	---		

1. 8-inch valve only.

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Table 11. Port Diameters, Valve Plug Travel, and Stem and Yoke Boss Diameters

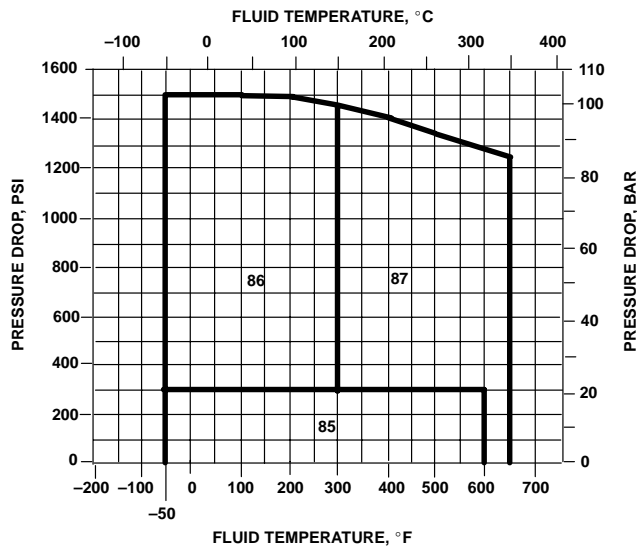
VALVE SIZE, INCH				PORT DIAMETER		MAX VALVE PLUG TRAVEL		STEM AND YOKE BOSS DIAMETERS							
Design EDR		Design EAD		mm	Inch	mm	Inch	Standard				Optional			
Full-Sized Trim	Restricted-Capacity Trim	Full-Sized Trim	Restricted-Capacity Trim					Stem	Yoke Boss		Stem	Yoke Boss			
								mm	Inch	mm	Inch	mm	Inch	mm	Inch
1 or 1.25	1.5	1	2	33.3	1.3125	19	0.75	9.5	0.375	54	2.125	12.7	0.5	71	2.8125
---	2	---	---	33.3	1.3125	19	0.75	12.7	0.5	71	2.8125	---	---	---	---
1.5	---	2	---	47.6	1.875	19	0.75	9.5	0.375	54	2.125	12.7	0.5	71	2.8125
---	2.5	---	3	47.6	1.875	19	0.75	1.7	0.5	71	2.8125	---	---	---	---
2	3	---	4	58.7	2.3125	29	1.125	12.7	0.5	71	2.8125	19.1	0.75	90	3.5625
2.5	4	3	6	73.0	2.875	38	1.5	12.7	0.5	71	2.8125	19.1	0.75	90	3.5625
3	---	4	---	87.3	3.4375	38	1.5	12.7	0.5	71	2.8125	19.1	0.75	90	3.5625
4	---	6	---	87 ⁽³⁾	3.4375 ⁽³⁾	76 ⁽³⁾	3 ⁽³⁾	12.7	0.5	71	2.8125	19.1	0.75	90	3.5625
				111.1	4.375	51	2					25.4	1	127	5
6 ⁽¹⁾	---	---	---	177.8 ⁽²⁾	7 ⁽²⁾	51 ⁽²⁾	2 ⁽²⁾	19.1	0.75	90	3.5625	25.4	1	127	5
				136 ⁽³⁾	5.375 ⁽³⁾	76 ⁽³⁾	3 ⁽³⁾					or	or		
8 ⁽¹⁾	---	---	---	203.2	8	51	2					31.8	1.25		
						76	3								

1. Not available in Design EDR valve.
2. Standard-travel cages.
3. Whisper Trim III (6-inch Design ED) and WhisperFlo cages (4- and 6-inch Design ED).

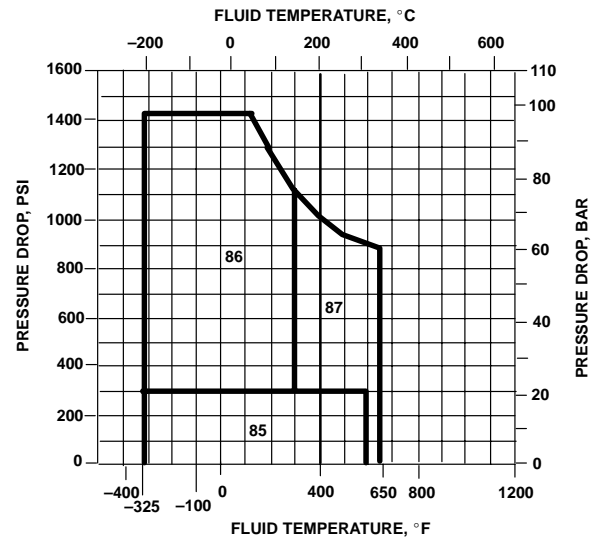
Table 12. Bolting Materials and Temperature Limits for Compatibility with NACE MR0175

VALVE BODY MATERIAL	BOLTING MATERIAL		TEMPERATURE CAPABILITIES			
			°C		°F	
			Min	Max	Min	Max
NACE MR0175 (non-exposed bolting) (Standard)						
WCC and CF8M (316 SST)	Studs	Steel SA-193-B7	-48 ⁽²⁾	427	-55 ⁽²⁾	800
	Nuts	Steel SA-194-2H				
NACE MR0175 (exposed bolting) (Optional) Requires Derating of Valve⁽¹⁾ When These Body-to-Bonnet Bolting Materials are Used						
WCC and CF8M	Studs	Steel SA-193-B7M	-48 ⁽²⁾	427	-55 ⁽²⁾	800
	Nuts	Steel SA-194-2HM				

1. Derating is not required for Class 300 valves. Derating may be required for valves rated at Class 600. Contact your Fisher sales office for assistance in determining the derating of valves when these body-to-bonnet bolting materials are used.
2. -29°C (-20°F) with WCC valve body material.



FOR STANDARD METAL SEATING WITH CLASS 600 \triangleleft WCC OR LCC/HT VALVE BODY



FOR STANDARD METAL SEATING WITH CLASS 600 \triangleleft 316 STAINLESS STEEL (CF8M) VALVE BODY

NOTES:

\triangleleft DO NOT EXCEED THE MAXIMUM PRESSURE AND TEMPERATURE FOR THE CLASS RATING OF THE VALVE MATERIAL USED, EVEN THOUGH THE TRIM SHOWN MAY HAVE HIGHER CAPABILITIES.

C0575-2 / IL

Figure 13. Typical Trim Used for NACE MR0175 (Sour Service)

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Table 13. Design ED and EDR Dimensions

VALVE SIZE, INCH	A									G (MAX)	
	Class, End Connection Style ⁽¹⁾									Design ED	Design EDR
	Scrd or SW	125 FF or 150 RF	150 RTJ	250 RF or 300 RF	300 RTJ	BW or 600 RF	600 RTJ	PN16-40 ⁽²⁾	PN63-100 ⁽²⁾		
mm											
1	210	184	197	197	210	210	210	160	230	60	119
1.25	229	---	---	---	---	---	---	---	---	60	119
1.5	251	222	235	235	248	251	251	200	260	71	116
2	286	254	267	267	282	286	289	230	300	78	133
2.5	---	276	292	292	308	311	314	290	340	90	159
3	---	298	311	317	333	337	340	310	380	97	168
4	---	353	365	368	384	394	397	350	430	129	192
6	---	451	464	473	489	508	511	480	550	162	---
8	---	543	556	568	584	610	613	600	650	191	---
Inch											
1	8.25	7.25	7.75	7.75	8.25	8.25	8.25			2.38	4.69
1.25	9.00	---	---	---	---	---	---			2.38	4.69
1.5	9.88	8.75	9.25	9.25	9.75	9.88	9.88			2.81	4.56
2	11.25	10.00	10.50	10.50	11.12	11.25	11.38	See mm below	See mm below	3.06	5.25
2.5	---	10.88	11.38	11.50	12.12	12.25	12.38			3.56	6.25
3	---	11.75	12.25	12.50	13.12	13.25	13.38			3.81	6.62
4	---	13.88	14.38	14.50	15.12	15.50	15.62			5.06	7.56
6	---	17.75	18.25	18.62	19.25	20.00	20.12			5.50	---
8	---	21.38	21.88	22.38	23.00	24.00	24.12	7.50	---		

1. End connection style abbreviations: BW - Butt welding, FF - Flat Faced, Scrd - Screwed, SW - Socket weld, RF - Raised Face, RTJ - Ring Type Joint.
2. Valves which meet DIN flange standards and have DIN face-to-face dimensions are available only from Europe. Valves which meet DIN flange standards but not DIN face-to-face standards are available in the US. Consult your Fisher sales office.

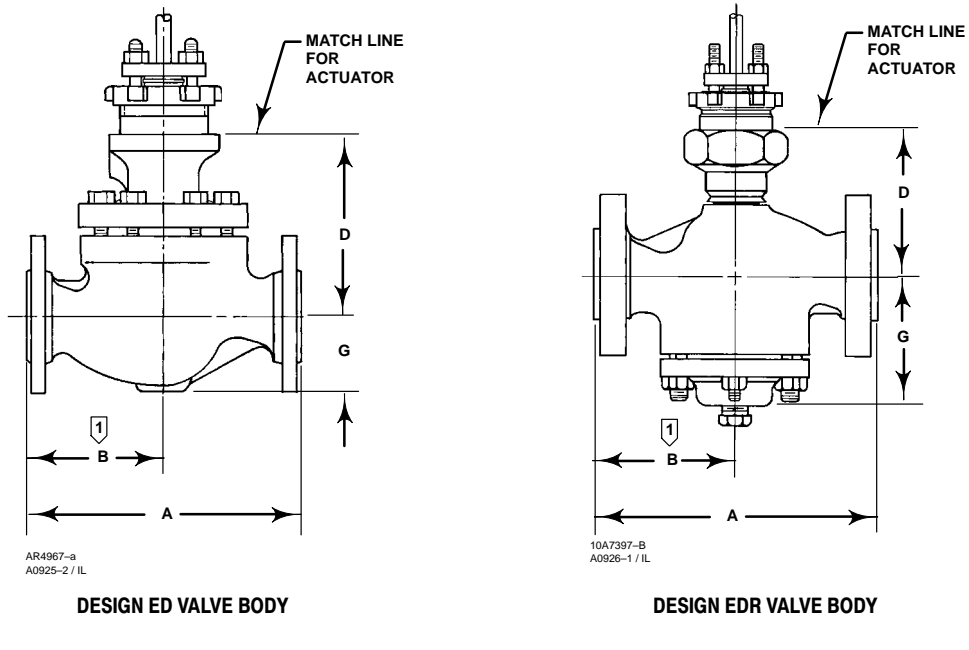


Figure 14. Design ED and EDR Dimensions (also see tables 13, 14, and 15)

Table 14. Design ED and EDR Dimensions

VALVE SIZE, INCH	D FOR PLAIN BONNET						
	Design ED				Design EDR		
	Stem Diameter				Stem Diameter		
	mm						
	9.5	12.7	19.1	25.4 or 31.8	9.5	12.7	19.1
1 or 1.25	127	149	---	---	113	124	---
1.5	124	146	---	---	122	133	---
2	---	165	162	---	---	148	140
2.5	---	187	184	---	---	157	152
3	---	191	187	---	---	167	159
4	---	221	217	238	---	198	191
6 ⁽¹⁾	---	---	251	270	---	---	---
6 ⁽²⁾	---	---	312	330	---	---	---
8	---	---	375 ⁽³⁾	---	---	---	---
	Inch						
	0.375	0.5	0.75	1 or 1.25	0.375	0.5	0.75
	1 or 1.25	5.00	5.88	---	---	4.44	4.88
1.5	4.88	5.75	---	---	4.81	5.25	---
2	---	6.50	6.38	---	---	5.81	5.50
2.5	---	7.38	7.25	---	---	6.31	6.00
3	---	7.50	7.38	---	---	6.56	6.25
4	---	8.69	8.56	9.38	---	7.81	7.50
6 ⁽¹⁾	---	---	9.88	10.62	---	---	---
6 ⁽²⁾	---	---	12.26	13.00	---	---	---
8	---	---	14.75 ⁽³⁾	---	---	---	---

1. All except Whisper Trim III cages.
2. Whisper Trim III cages.
3. Available only in cast iron or WCC steel for the stem diameter with plain bonnet.

Table 15. Design ED and EDR Dimensions

VALVE SIZE, INCH	D FOR EXTENSION AND ENVIRO-SEAL BELLOWS SEAL BONNETS (DESIGN ED ONLY)									
	Style 1 Ext. Bonnet				Style 2 Ext. Bonnet			ENVIRO-SEAL Bellows Seal Bonnet		
	Stem Diameter				Stem Diameter			Stem Diameter		
	mm									
	9.5	12.7	19.1	25.4 or 31.8	9.5	12.7	19.1	9.5	12.7	19.1
1 or 1.25	213	251	---	---	303	319	---	321	---	---
1.5	210	248	---	---	300	316	---	317	---	---
2	---	267	---	---	---	465	---	---	384	---
2.5	---	289	272	---	---	492	---	---	---	---
3	---	292	297	---	---	495	487	---	518	518
4	---	322	327	370	---	526	518	---	541	---
6 ⁽¹⁾	---	---	357	402	---	---	543	---	---	573
6 ⁽²⁾	---	---	418	462	---	---	604	---	---	---
8	---	---	421	450	---	---	621	---	---	---
	Inch									
	0.375	0.5	0.75	1 or 1.25	0.375	0.5	0.75	0.375	0.5	0.75
	1 or 1.25	8.38	9.88	---	---	11.94	12.56	---	12.62	---
1.5	8.25	9.75	---	---	11.81	12.44	---	12.50	---	---
2	---	10.50	---	---	---	18.31	---	---	15.12	---
2.5	---	11.38	10.69	---	---	19.38	---	---	---	---
3	---	11.50	11.69	---	---	19.50	19.19	---	20.38	20.38
4	---	12.69	12.88	14.56	---	20.69	20.38	---	21.31	---
6 ⁽¹⁾	---	---	14.06	15.81	---	---	21.38	---	---	22.56
6 ⁽²⁾	---	---	16.44	18.19	---	---	23.76	---	---	---
8	---	---	16.56	17.75	---	---	24.44	---	---	---

1. Standard-travel cages.
2. Whisper Trim III cages.

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Table 16. Design EAD Dimensions

VALVE SIZE, INCH	AA					
	Class 150		Class 300		Class 600	
	End Connection Style ⁽¹⁾					
	RF	RTJ	RF	RTJ	BW, SW or RF	RTJ
	mm					
1	92	98	98	105	105	105
2	127	133	133	141	143	144
3	149	156	159	167	168	170
4	176	183	184	197	197	198
6	225	232	237	244	254	256
Inch						
1	3.62	3.88	3.88	4.12	4.12	4.12
2	5.00	5.25	5.25	5.56	5.62	5.69
3	5.88	6.12	6.25	6.56	6.62	6.69
4	6.94	7.19	7.25	7.56	7.75	7.81
6	8.88	9.12	9.31	9.62	10.00	10.06

1. End connection style abbreviations: BW - Butt welding, FF - Flat Faced, Scrd - Screwed, SW - Socket weld, RF - Raised Face, RTJ - Ring Type Joint.

NOTE:
FOR DIMENSIONS OF VALVES WITH DIN (OR OTHER) END CONNECTIONS. CONSULT YOUR FISHER SALES OFFICE.

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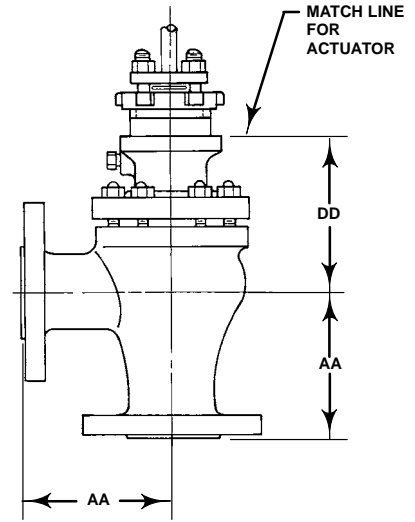


Figure 15. Design EAD Dimensions (also see tables 16 and 17)

Table 17. Design EAD Dimensions

VALVE SIZE, INCH	DD										ENVIRO-SEAL Bellows Seal Bonnet	
	Plain Bonnet				Style 1 Extension Bonnet			Style 2 Extension Bonnet				
	Stem Diameter											
	mm											
	9.5	12.7	19.1	25.4 or 31.8	9.5	12.7	19.1	9.5	12.7	19.1		
1	111	133	---	---	197	235	---	291	305	---	Contact your Fisher sales office.	
2	98	121	---	---	184	223	---	278	291	---		
3	---	149	146	---	---	251	256	---	454	---		
4	---	140	137	---	---	241	246	---	445	437		
6	---	144	141	187	---	246	251	---	449	441		
Inch											ENVIRO-SEAL Bellows Seal Bonnet	
0.375	0.5	0.75	1 or 1.25	0.375	0.5	0.75	0.375	0.5	0.75			
1	4.38	5.25	---	---	7.75	9.25	---	11.44	12.00	---		Contact your Fisher sales office.
2	3.88	4.75	---	---	7.25	8.75	---	10.94	11.44	---		
3	---	5.88	5.75	---	---	9.88	10.06	---	17.88	---		
4	---	5.50	5.38	---	---	9.50	9.69	---	17.50	17.19		
6	---	5.69	5.56	7.38	---	9.69	9.88	---	17.69	17.38		

Coefficients

Table 18. Design EAD, Quick Opening Cage, With Liner

With Liner																Quick Opening Characteristic	
Valve Size, Inches	Port Diameter		Maximum Travel ⁽¹⁾		Flow Coefficient	Coeffs. for 6 mm (0.25 in) Travel ⁽²⁾	Valve Opening—Percent of Total Travel										F _L ⁽³⁾
	mm	Inches	mm	Inches			10	20	30	40	50	60	70	80	90	100	
1	33.3	0.3125	19	0.75	C _v	14.2	5.14	9.24	13.1	16.2	18.8	20.9	22.4	23.4	24.0	24.0	0.90
					K _v	12.3	4.45	7.99	11.3	14.0	16.3	18.1	19.4	20.2	20.8	20.8	---
					X _T	0.800	0.629	0.703	0.761	0.809	0.775	0.713	0.677	0.652	0.630	0.630	---
2	47.6	1.875	19	0.75	C _v	29.4	8.77	17.1	26.2	36.1	45.4	53.4	59.3	63.6	67.3	70.7	0.76
					K _v	25.4	7.59	14.8	22.7	31.2	39.3	46.2	51.3	55.0	58.2	61.2	---
					X _T	0.573	0.480	0.513	0.568	0.570	0.577	0.589	0.628	0.618	0.656	0.656	---
	33.3 (4)	1.3125 (4)	19	0.75	C _v	17.3	5.91	10.1	15.1	21.7	29.4	37.3	43.7	48.5	52.4	55.2	0.60
					K _v	15.0	5.11	8.74	13.1	18.8	25.4	32.3	37.8	42.0	45.3	47.7	---
					X _T	0.543	0.404	0.584	0.570	0.522	0.478	0.431	0.396	0.370	0.344	0.326	---
3	73.0	2.875	38	1.5	C _v	30.6	24.2	47.2	77.8	108	133	148	159	171	181	183	0.76
					K _v	26.5	20.9	40.8	67.3	93.4	115	128	138	148	157	158	---
					X _T	0.540	0.517	0.534	0.504	0.545	0.582	0.636	0.651	0.616	0.575	0.569	---
	47.6 (4)	1.875 (4)	19	0.75	C _v	29.8	7.96	15.5	25.7	37.4	49.0	61.2	72.5	83.1	92.8	102	0.60
					K _v	25.8	6.89	13.4	22.2	32.4	42.4	52.9	62.7	71.9	80.3	88.2	---
					X _T	0.576	0.549	0.624	0.603	0.541	0.525	0.482	0.452	0.422	0.391	0.349	---
4	87.3	3.4375	38	1.5	C _v	37.1	22.3	46.3	77.1	117	155	180	197	212	230	235	0.72
					K _v	32.1	19.3	40.0	66.7	101	134	156	170	183	199	203	---
					X _T	0.580	0.616	0.547	0.537	0.531	0.529	0.575	0.629	0.635	0.609	0.620	---
	58.7 (4)	2.3125 (4)	29	1.125	C _v	31.4	14.4	28.3	46.1	66.7	87.5	107	124	138	149	160	0.61
					K _v	27.2	12.5	24.5	39.9	57.7	75.7	92.6	107	119	129	138	---
					X _T	0.548	0.509	0.533	0.505	0.486	0.482	0.465	0.443	0.416	0.387	0.354	---
6	111.1	4.375	51	2	C _v	50.0	39.8	84.0	150	219	279	332	379	420	435	435	0.71
					K _v	43.3	34.4	72.7	130	189	241	287	328	363	376	376	---
					X _T	0.578	0.597	0.599	0.577	0.581	0.581	0.578	0.565	0.527	0.533	0.533	---
	73.0 (4)	2.875 (4)	38	1.5	C _v	38.7	23.9	47.1	74.9	109	142	174	201	219	244	248	0.59
					K _v	33.5	20.7	40.7	64.8	94.3	123	151	174	189	211	215	---
					X _T	0.353	0.353	0.353	0.353	0.353	0.356	0.352	0.353	0.352	0.353	0.354	---

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

Table 19. Design EAD, Quick Opening Cage, Without Liner

Without Liner																Quick Opening Characteristic	
Valve Size, Inches	Port Diameter		Maximum Travel ⁽¹⁾		Flow Coefficient	Coeffs. for 6 mm (0.25 in) Travel ⁽²⁾	Valve Opening—Percent of Total Travel										F _L ⁽³⁾
	mm	Inches	mm	Inches			10	20	30	40	50	60	70	80	90	100	
1	33.3	0.3125	19	0.75	C _V	14.8	5.07	9.36	13.6	16.8	19.2	20.9	22.2	23.1	23.6	23.7	0.87
					K _V	12.8	4.39	8.10	11.8	14.5	16.6	18.1	19.2	20.0	20.4	20.5	---
					X _T	0.757	0.638	0.753	0.753	0.766	0.736	0.703	0.670	0.650	0.640	0.636	---
2	47.6	1.875	19	0.75	C _V	28.0	8.06	15.7	24.9	34.3	43.1	51.0	57.1	61.4	64.6	67.2	0.87
					K _V	24.2	6.97	13.6	21.5	29.7	37.3	44.1	49.4	53.1	55.9	58.1	---
					X _T	0.629	0.531	0.621	0.623	0.631	0.641	0.638	0.656	0.676	0.686	0.682	---
	33.3 (4)	1.3125 (4)	19	0.75	C _V	17.2	6.02	10.4	15.4	20.9	27.1	33.7	38.5	41.7	44.2	45.6	0.71
					K _V	14.9	5.21	9.00	13.3	18.1	23.4	29.2	33.3	36.1	38.2	39.4	---
					X _T	0.573	0.470	0.541	0.570	0.575	0.563	0.526	0.510	0.492	0.476	0.470	---
3	73.0	2.875	38	1.5	C _V	39.2	23.4	47.9	78.7	108	128	142	153	163	171	171	0.81
					K _V	33.9	20.2	41.4	68.1	93.4	111	123	132	141	148	148	---
					X _T	0.576	0.588	0.573	0.534	0.573	0.635	0.662	0.654	0.626	0.600	0.605	---
	47.6 (4)	1.875 (4)	19	0.75	C _V	29.1	8.27	15.9	25.6	36.0	46.8	56.4	64.6	72.1	79.3	86.1	0.72
					K _V	25.2	7.15	13.8	22.1	31.1	40.5	48.8	55.9	62.4	68.6	74.5	---
					X _T	0.609	0.488	0.603	0.610	0.594	0.575	0.574	0.569	0.561	0.530	0.490	---
4	87.3	3.4375	38	1.5	C _V	39.0	23.9	48.2	80.3	118	151	178	195	209	223	223	0.76
					K _V	33.7	20.7	41.7	69.5	102	131	154	169	181	193	193	---
					X _T	0.562	0.588	0.566	0.554	0.556	0.580	0.610	0.659	0.669	0.644	0.650	---
	58.7 (4)	2.3125 (4)	29	1.125	C _V	30.9	13.6	27.0	43.9	62.5	80.6	96.0	109	120	127	133	0.73
					K _V	26.7	11.8	23.4	38.0	54.1	69.7	83.0	94.3	104	110	115	---
					X _T	0.608	0.593	0.614	0.582	0.578	0.587	0.590	0.576	0.547	0.533	0.513	---
6	111.1	4.375	51	2	C _V	45.8	37.6	79.6	142	207	265	311	351	383	398	398	0.76
					K _V	39.6	32.5	68.9	123	179	229	269	304	331	344	344	---
					X _T	0.652	0.680	0.652	0.639	0.639	0.655	0.686	0.683	0.666	0.657	0.667	---
	73.0 (4)	2.875 (4)	38	1.5	C _V	35.4	21.8	43.1	71.5	103	130	154	173	188	198	206	0.74
					K _V	30.6	18.9	37.3	61.8	89.1	112	133	150	163	171	178	---
					X _T	0.671	0.624	0.650	0.652	0.618	0.659	0.659	0.646	0.620	0.595	0.568	---

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

Table 20. Design EAD, Linear Cage, With Liner

With Liner - Flow Down															Linear Characteristic	
Valve Size, Inches	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F _L ⁽¹⁾
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
1	33.3	1.3125	19	0.75	C _V	2.71	5.17	8.14	10.7	13.0	15.2	17.2	19.1	20.7	22.0	0.90
					K _V	2.34	4.47	7.04	9.26	11.2	13.1	14.9	16.5	17.9	19.0	---
					X _T	0.632	0.692	0.719	0.772	0.786	0.777	0.755	0.722	0.682	0.634	---
2	47.6	1.875	19	0.75	C _V	3.77	6.94	11.3	16.1	21.0	26.7	33.1	40.1	46.8	53.8	0.82
					K _V	3.26	6.00	9.77	13.9	18.2	23.1	28.6	34.7	40.5	46.5	---
					X _T	0.665	0.675	0.663	0.642	0.627	0.616	0.617	0.607	0.633	0.661	---
	33.3 (2)	1.3125 (2)	19	0.75	C _V	2.95	5.49	8.65	12.1	15.7	19.3	23.4	29.7	35.7	41.0	0.66
					K _V	2.55	4.75	7.48	10.5	13.6	16.7	20.2	25.7	30.9	35.5	---
					X _T	0.474	0.592	0.587	0.581	0.579	0.584	0.564	0.487	0.451	0.426	---
3	73.0	2.875	38	1.5	C _V	10.3	24.0	38.8	54.3	69.8	86.5	102	124	141	155	0.80
					K _V	8.91	20.8	33.6	47.0	60.4	74.8	88.2	107	122	134	---
					X _T	0.630	0.623	0.618	0.598	0.599	0.591	0.619	0.603	0.614	0.614	---
	47.6 (2)	1.875 (2)	19	0.75	C _V	3.37	6.45	10.6	15.3	19.8	25.3	32.2	40.1	48.4	58.1	0.74
					K _V	2.92	5.58	9.17	13.2	17.1	21.9	27.9	34.7	41.9	50.3	---
					X _T	0.630	0.682	0.693	0.665	0.663	0.637	0.600	0.588	0.569	0.548	---
4	87.3	3.4375	38	1.5	C _V	12.7	31.6	54.1	77.8	103	128	149	171	191	208	0.78
					K _V	11.0	27.3	46.8	67.3	89.1	111	129	148	165	180	---
					X _T	0.677	0.638	0.596	0.590	0.552	0.548	0.573	0.594	0.613	0.627	---
	58.7 (2)	2.3125 (2)	29	1.125	C _V	6.70	15.3	25.2	37.0	50.2	64.5	79.4	94.6	110	124	0.66
					K _V	5.80	13.2	21.8	32.0	43.4	55.8	68.7	81.8	95.2	107	---
					X _T	0.705	0.590	0.596	0.573	0.536	0.509	0.493	0.490	0.471	0.445	---
6	111.1	4.375	51	2	C _V	25.4	53.6	83.0	113	146	179	218	263	309	350	0.78
					K _V	22.0	46.4	71.8	97.7	126	155	189	227	267	303	---
					X _T	0.670	0.666	0.666	0.659	0.631	0.627	0.623	0.624	0.630	0.617	---
	73.0 (2)	2.875 (2)	38	1.5	C _V	10.6	25.2	41.1	57.7	76.1	94.8	116	139	168	195	0.67
					K _V	9.17	21.8	35.6	49.9	65.8	82.0	100	120	145	169	---
					X _T	0.445	0.443	0.448	0.445	0.445	0.445	0.443	0.448	0.442	0.444	---

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

Table 21. Design EAD, Linear Cage, Without Liner

Without Liner - Flow Down															Linear Characteristic	
Valve Size, Inches	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F _L ⁽¹⁾
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
1	33.3	1.3125	19	0.75	C _V	2.90	5.78	8.85	11.6	13.9	16.0	18.0	19.7	21.2	22.3	0.89
					K _V	2.51	5.00	7.66	10.0	12.0	13.8	15.6	17.0	18.3	19.3	---
					X _T	0.778	0.704	0.699	0.736	0.745	0.747	0.730	0.699	0.664	0.624	---
2	47.6	1.875	19	0.75	C _V	3.68	6.98	11.3	15.9	20.8	26.4	32.7	39.2	45.7	52.5	0.84
					K _V	3.18	6.04	9.77	13.8	18.0	22.8	28.3	33.9	39.5	45.4	---
					X _T	0.676	0.667	0.684	0.666	0.624	0.627	0.632	0.625	0.655	0.679	---
	33.3 (2)	1.3125 (2)	19	0.75	C _V	3.01	5.45	8.95	12.5	15.9	19.1	23.3	28.4	33.2	37.6	0.73
					K _V	2.60	4.71	7.74	10.8	13.8	16.5	20.2	24.6	28.7	32.5	---
					X _T	0.790	0.768	0.661	0.618	0.608	0.611	0.582	0.545	0.535	0.516	---
3	73.0	2.875	38	1.5	C _V	10.9	25.1	41.3	58.4	75.7	93.9	112	128	143	153	0.83
					K _V	9.43	21.7	35.7	50.5	65.5	81.2	96.9	111	124	132	---
					X _T	0.736	0.638	0.591	0.548	0.538	0.532	0.543	0.583	0.619	0.631	---
	47.6 (2)	1.875 (2)	19	0.75	C _V	3.61	6.92	11.1	15.5	20.6	26.4	33.2	41.4	50.1	60.2	0.78
					K _V	3.12	5.99	9.60	13.4	17.8	22.8	28.7	35.8	43.3	52.1	---
					X _T	0.623	0.721	0.694	0.684	0.663	0.630	0.602	0.570	0.568	0.546	---
4	87.3	3.4375	38	1.5	C _V	14.0	33.8	56.3	80.2	104	127	148	169	185	201	0.81
					K _V	12.1	29.2	48.7	69.4	90.0	110	128	146	160	174	---
					X _T	0.640	0.638	0.611	0.588	0.570	0.568	0.593	0.622	0.660	0.664	---
	58.7 (2)	2.3125 (2)	29	1.125	C _V	7.02	15.7	25.7	36.9	48.6	60.9	72.9	84.6	97.2	108	0.76
					K _V	6.07	13.6	22.2	31.9	42.0	52.7	63.1	73.2	84.1	93.4	---
					X _T	0.712	0.626	0.625	0.597	0.587	0.577	0.590	0.604	0.580	0.566	---
6	111.1	4.375	51	2	C _V	24.2	51.2	81.8	109	140	171	208	256	300	341	0.78
					K _V	20.9	44.3	70.8	94.3	121	148	180	221	260	295	---
					X _T	0.643	0.697	0.666	0.693	0.672	0.668	0.684	0.663	0.668	0.662	---
	73.0 (2)	2.875 (2)	38	1.5	C _V	10.2	22.8	36.6	52.1	68.0	84.5	102	124	147	168	0.74
					K _V	8.82	19.7	31.7	45.1	58.8	73.1	88.2	107	127	145	---
					X _T	0.592	0.651	0.661	0.635	0.619	0.619	0.615	0.584	0.568	0.556	---

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

Table 22. Design EAD, Equal Percentage Cage, With Liner

With Liner - Flow Down																Equal Percentage Characteristic
Valve Size, Inches	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F _L ⁽¹⁾
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
1	33.3	1.3125	19	0.75	C _V	1.02	1.49	2.07	2.70	3.92	5.68	8.18	11.7	15.5	18.5	0.93
					K _V	0.882	1.29	1.79	2.34	3.39	4.91	7.08	10.1	13.4	16.0	---
					X _T	0.902	0.902	0.820	0.740	0.741	0.737	0.738	0.734	0.742	0.739	---
2	47.6	1.875	19	0.75	C _V	1.44	2.38	3.54	5.10	7.60	11.6	18.1	26.9	37.8	48.1	0.83
					K _V	1.25	2.06	3.06	4.41	6.57	10.0	15.7	23.3	32.7	41.6	---
					X _T	0.619	0.649	0.671	0.678	0.666	0.639	0.574	0.578	0.578	0.576	---
	33.3 (2)	1.3125 (2)	19	0.75	C _V	0.792	1.28	1.84	2.56	3.78	5.66	8.64	13.3	19.9	27.6	0.75
					K _V	0.685	1.11	1.59	2.21	3.27	4.90	7.47	11.5	17.2	23.9	---
					X _T	0.648	0.654	0.682	0.659	0.683	0.661	0.592	0.534	0.479	0.468	---
3	73.0	2.875	38	1.5	C _V	4.38	7.99	12.1	16.5	24.2	36.5	56.6	85.9	116	151	0.78
					K _V	3.79	6.91	10.5	14.3	20.9	31.6	49.0	74.3	100	131	---
					X _T	0.783	0.746	0.680	0.652	0.620	0.588	0.551	0.525	0.553	0.550	---
	47.6 (2)	1.875 (2)	19	0.75	C _V	1.31	2.28	3.48	5.05	7.58	11.9	18.2	26.7	38.4	50.5	0.78
					K _V	1.13	1.97	3.01	4.37	6.56	10.3	15.7	23.1	33.2	43.7	---
					X _T	0.804	0.758	0.719	0.725	0.696	0.634	0.637	0.611	0.561	0.530	---
4	87.3	3.4375	38	1.5	C _V	2.31	0.470	7.45	11.3	17.8	28.7	47.9	77.5	112	152	0.81
					K _V	2.00	0.41	6.44	9.77	15.4	24.8	41.4	67.0	96.9	131	---
					X _T	0.780	0.780	0.791	0.726	0.652	0.630	0.565	0.546	0.549	0.545	---
	58.7 (2)	2.3125 (2)	29	1.125	C _V	2.24	3.67	5.44	7.81	11.7	17.9	27.6	41.9	62.6	86.3	0.73
					K _V	1.94	3.17	4.71	6.76	10.1	15.5	23.9	36.2	54.1	74.6	---
					X _T	0.630	0.668	0.662	0.672	0.659	0.610	0.593	0.574	0.500	0.456	---
6	111.1	4.375	51	2	C _V	5.54	11.0	18.1	30.9	51.7	84.3	136	205	276	336	0.74
					K _V	4.79	9.52	15.7	26.7	44.7	72.9	118	177	239	291	---
					X _T	0.727	0.684	0.657	0.624	0.599	0.585	0.590	0.587	0.573	0.576	---
	73.0 (2)	2.875 (2)	38	1.5	C _V	1.32	3.73	7.20	11.1	17.5	27.6	43.4	67.8	102	147	0.74
					K _V	1.14	3.23	6.23	9.60	15.1	23.9	37.5	58.6	88.2	127	---
					X _T	0.455	0.458	0.454	0.457	0.453	0.454	0.454	0.455	0.454	0.454	---

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

Table 23. Design EAD, Equal Percentage Cage, Without Liner

Without Liner - Flow Down															Equal Percentage Characteristic	
Valve Size, Inches	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F _L ⁽¹⁾
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
1	33.3	1.3125	19	0.75	C _V	1.08	1.62	2.20	2.96	4.18	6.04	8.74	12.5	16.5	19.0	0.91
					K _V	0.934	1.40	1.90	2.56	3.62	5.22	7.56	10.8	14.3	16.4	---
					X _T	0.912	0.860	0.808	0.771	0.742	0.706	0.693	0.699	0.697	0.694	---
2	47.6	1.875	19	0.75	C _V	1.67	2.60	3.82	5.43	7.79	12.2	18.9	27.4	37.8	47.2	0.85
					K _V	1.44	2.25	3.30	4.70	6.74	10.6	16.3	23.7	32.7	40.8	---
					X _T	0.680	0.690	0.702	0.725	0.707	0.619	0.622	0.621	0.619	0.623	---
	33.3 (2)	1.3125 (2)	19	0.75	C _V	1.11	1.55	2.05	2.87	4.07	5.95	8.84	13.4	19.6	26.8	0.79
					K _V	0.960	1.34	1.77	2.48	3.52	5.15	7.65	11.6	17.0	23.2	---
					X _T	0.938	0.899	0.848	0.789	0.761	0.692	0.636	0.568	0.519	0.507	---
3	73.0	2.875	38	1.5	C _V	4.59	8.29	12.0	16.9	25.0	37.7	57.3	85.1	121	148	0.80
					K _V	3.97	7.17	10.4	14.6	21.6	32.6	49.6	73.6	105	128	---
					X _T	0.779	0.744	0.715	0.684	0.630	0.582	0.583	0.579	0.578	0.580	---
	47.6 (2)	1.875 (2)	19	0.75	C _V	1.56	2.51	3.68	5.40	7.65	11.7	18.2	27.0	37.3	47.8	0.84
					K _V	1.35	2.17	3.18	4.67	6.62	10.1	15.7	23.4	32.3	41.3	---
					X _T	0.834	0.807	0.768	0.718	0.756	0.723	0.679	0.627	0.615	0.615	---
4	87.3	3.4375	38	1.5	C _V	2.51	5.10	8.03	12.0	18.7	30.7	47.4	80.3	116	156	0.81
					K _V	2.17	4.41	6.95	10.4	16.2	26.6	41.0	69.5	100	135	---
					X _T	0.890	0.770	0.744	0.701	0.696	0.637	0.668	0.572	0.566	0.565	---
	58.7 (2)	2.3125 (2)	29	1.125	C _V	2.33	3.56	5.64	8.18	11.9	18.0	28.2	42.6	62.2	81.8	0.79
					K _V	2.02	3.08	4.88	7.08	10.3	15.6	24.4	36.8	53.8	70.8	---
					X _T	0.753	0.846	0.702	0.666	0.682	0.656	0.619	0.609	0.559	0.530	---
6	111.1	4.375	51	2	C _V	5.51	10.9	17.9	30.2	50.5	82.0	133	200	269	328	0.78
					K _V	4.77	9.43	15.5	26.1	43.7	70.9	115	173	233	284	---
					X _T	0.705	0.701	0.663	0.646	0.612	0.604	0.606	0.605	0.596	0.604	---
	73.0 (2)	2.875 (2)	38	1.5	C _V	4.00	7.63	11.1	15.0	23.3	35.0	53.3	79.6	112	144	0.78
					K _V	3.46	6.60	9.60	13.0	20.2	30.3	46.1	68.9	96.9	125	---
					X _T	0.670	0.698	0.725	0.731	0.637	0.629	0.599	0.597	0.573	0.571	---

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

Table 24. Design EAD, Whisper Trim I Cage

Whisper Trim I - Flow Up														Linear Characteristic	
Valve Size, Inches	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel									
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100
1	33.3	1.3125	19	0.75	C _v	2.17	5.30	8.44	11.8	14.7	16.6	19.5	21.5	23.1	24.1
					K _v	1.88	4.58	7.30	10.2	12.7	14.4	16.9	18.6	20.0	20.8
					X _T	0.390	0.406	0.424	0.454	0.456	0.490	0.490	0.506	0.526	0.536
2	47.6	1.875	19	0.75	C _v	4.98	11.0	19.7	27.9	34.5	40.6	45.7	50.1	53.7	55.9
					K _v	4.31	9.52	17.0	24.1	29.8	35.1	39.5	43.3	46.5	48.4
					X _T	0.670	0.633	0.403	0.330	0.322	0.327	0.343	0.359	0.372	0.386
3	73.0	2.875	38	1.5	C _v	12.4	30.4	48.3	67.6	84.2	95.2	112	123	132	138
					K _v	10.7	26.3	41.8	58.5	72.8	82.3	96.9	106	114	119
					X _T	0.307	0.303	0.330	0.329	0.332	0.331	0.361	0.360	0.360	0.375
4	87.3	3.4375	38	1.5	C _v	16.7	42.9	67.5	91.2	113	133	152	168	182	194
					K _v	14.4	37.1	58.4	78.9	97.7	115	131	145	157	168
					X _T	0.738	0.411	0.378	0.331	0.323	0.342	0.354	0.370	0.391	0.400
6	111.1	4.375	51	2	C _v	28.8	70.4	112	157	195	220	260	285	310	320
					K _v	24.9	60.9	96.9	136	169	190	225	247	268	277
					X _T	0.303	0.331	0.361	0.330	0.330	0.360	0.360	0.390	0.391	0.403

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ED Valve

Table 25. Design ED, Class 125-600, Quick Opening Cage

Quick Opening															Quick Opening Characteristic		
Valve Size, Inches	Port Diameter		Maximum Travel ⁽¹⁾		Flow Coefficient	Coeffs for 6 mm (0.25 Inch) Travel ⁽²⁾	Valve Opening—Percent of Total Travel										F _L ⁽³⁾
	mm	Inches	mm	Inches			10	20	30	40	50	60	70	80	90	100	
1 and 1.25	33.3	1.3125	19	0.75	C _V	14.7	4.86	9.39	13.4	16.9	18.9	20.3	21.1	21.8	21.9	22.1	0.81
					K _V	12.7	4.20	8.12	11.6	14.6	16.3	17.6	18.3	18.9	19.1	---	
					X _T	0.703	0.556	0.744	0.724	0.666	0.626	0.584	0.566	0.549	0.554	0.556	---
1.5	47.6	1.875	19	0.75	C _V	22.6	7.79	14.4	20.5	26.8	32.0	36.6	39.4	41.3	42.7	44.0	0.79
					K _V	19.5	6.74	12.5	17.7	23.2	27.7	31.7	34.1	35.7	36.9	38.1	---
					X _T	0.679	0.494	0.641	0.682	0.680	0.686	0.661	0.649	0.638	0.616	0.597	---
	F _d	---	0.22	0.28	0.32	0.34	0.35	0.36	0.36	0.36	0.36	0.36	0.36	---			
	33.3 ⁽⁴⁾	1.3125 ⁽⁴⁾	19	0.75	C _V	16.2	5.05	9.99	14.7	20.0	24.0	25.7	26.2	27.4	28.6	29.9	0.88
					K _V	14.0	4.37	8.64	12.7	17.3	20.8	22.2	22.7	23.7	24.7	25.9	---
X _T					0.942	0.803	0.904	0.946	0.872	0.838	0.849	0.874	0.832	0.795	0.756	---	
2	58.7	2.3125	29	1.125	C _V	29.7	13.4	26.8	39.9	51.3	62.9	70.6	73.7	75.6	76.8	77.6	0.77
					K _V	25.7	11.6	23.2	34.5	44.4	54.4	61.1	63.8	65.4	66.4	67.1	---
					X _T	0.773	0.605	0.695	0.737	0.761	0.703	0.658	0.641	0.635	0.626	0.623	---
	F _d	---	0.24	0.30	0.33	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.36	---			
	33.3 ⁽⁴⁾	1.3125 ⁽⁴⁾	19	0.75	C _V	16.7	4.80	9.58	14.9	20.2	25.7	29.3	31.2	31.2	31.2	31.2	0.87
					K _V	14.4	4.15	8.29	12.9	17.5	22.2	25.3	27.0	27.0	27.0	27.0	---
X _T					0.705	0.578	0.733	0.695	0.698	0.666	0.689	0.735	0.791	0.805	0.805	---	
2.5	73.0	2.875	38	1.5	C _V	33.4	20.9	39.6	58.8	74.2	84.9	97.0	103	106	108	109	0.81
					K _V	28.9	18.1	34.3	50.9	64.2	73.4	83.9	89.1	91.7	93.4	94.3	---
					X _T	0.635	0.601	0.684	0.738	0.767	0.744	0.689	0.669	0.658	0.660	0.652	---
	F _d	---	0.25	0.31	0.34	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.35	---			
	47.6 ⁽⁴⁾	1.875 ⁽⁴⁾	19	0.75	C _V	25.3	7.83	15.2	22.8	31.0	40.0	48.3	54.9	60.3	66.4	71.2	0.86
					K _V	21.9	6.77	13.1	19.7	26.8	34.6	41.8	47.5	52.2	57.4	61.6	---
X _T					0.642	0.498	0.618	0.627	0.636	0.640	0.669	0.725	0.758	0.737	0.710	---	
3	87.3	3.4375	38	1.5	C _V	43.6	27.2	52.2	77.9	99.5	124	140	149	154	158	161	0.77
					K _V	37.7	23.5	45.2	67.4	86.1	107	121	129	133	137	139	---
					X _T	0.635	0.626	0.671	0.745	0.796	0.703	0.657	0.619	0.602	0.591	0.577	---
	F _d	---	0.22	0.29	0.32	0.34	0.35	0.36	0.36	0.36	0.36	0.36	0.36	---			
	58.7 ⁽⁴⁾	2.3125 ⁽⁴⁾	29	1.125	C _V	35.2	15.9	31.7	47.2	60.7	74.4	83.6	87.3	89.5	91.0	91.9	0.86
					K _V	30.4	13.8	27.4	40.8	52.5	64.4	72.3	75.5	77.4	78.7	79.5	---
X _T					0.852	0.718	0.837	0.889	0.905	0.842	0.784	0.763	0.760	0.744	0.744	---	

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

Notes: The coefficients shown on this page are also appropriate for Design EDR.

Table 26. Design ED, Class 125-600, Quick Opening Cage

Valve Size, Inches	Port Diameter		Maximum Travel ⁽¹⁾		Flow Coefficient	Coeffs for 6 mm (0.25 Inch) Travel ⁽²⁾	Valve Opening—Percent of Total Travel										F _L ⁽³⁾	
	mm	Inches	mm	Inches			10	20	30	40	50	60	70	80	90	100		
4	111.1	4.375	51	2	C _v	45.9	37.7	75.0	125	163	193	220	238	247	251	251	0.79	
					K _v	39.7	32.6	64.9	108	141	167	190	206	214	217	217	---	
					X _T	0.607	0.623	0.689	0.733	0.764	0.762	0.723	0.689	0.669	0.683	0.694	---	
					F _d	---	0.22	0.27	0.29	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.30	---
	73.0 (4)	2.875 (4)	38	1.5	C _v	39.8	25.0	47.2	70.1	88.5	101	116	123	127	129	130	0.89	
					K _v	34.4	21.6	40.8	60.6	76.6	87.4	100	106	110	112	112	---	
6	177.8	7	51	2	C _v	92.0	73.6	150	232	306	353	389	416	441	451	460	0.82	
					K _v	79.6	63.7	130	201	265	305	336	360	381	390	398	---	
					X _T	0.660	0.664	0.651	0.667	0.694	0.722	0.742	0.728	0.723	0.719	0.710	---	
					F _d	---	0.17	0.22	0.25	0.26	0.27	0.28	0.28	0.28	0.28	0.28	0.28	---
	111.1 (4)	4.375 (4)	51	2	C _v	64.9	52.3	101	150	199	247	284	310	329	345	358	0.87	
					K _v	56.1	45.2	87.4	130	172	214	246	268	285	298	310	---	
8	203.2	8	51	2	C _v	108	80.3	188	290	389	480	554	615	658	705	744	0.87	
					K _v	93.4	69.5	163	251	336	415	479	532	569	610	644	---	
					X _T	0.653	0.670	0.628	0.679	0.731	0.766	0.806	0.829	0.859	0.863	0.866	---	
					F _d	---	0.19	0.24	0.26	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.27	---
	203.2	8	76	3	C _v	108	135	291	434	551	639	706	759	807	841	863	0.85	
					K _v	93.4	117	252	375	477	553	611	657	698	727	746	---	
8	203.2	8	76	3	X _T	0.653	0.643	0.699	0.757	0.807	0.838	0.861	0.857	0.841	0.838	0.827	---	
					F _d	---	0.19	0.24	0.26	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.27	---
					C _v	108	135	291	434	551	639	706	759	807	841	863	0.85	
					K _v	93.4	117	252	375	477	553	611	657	698	727	746	---	
	X _T	0.653	0.643	0.699	0.757	0.807	0.838	0.861	0.857	0.841	0.838	0.827	---					
	F _d	---	0.19	0.24	0.26	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.27	---				

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

Notes: The coefficients shown on this page are also appropriate for Design EDR.

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Table 27. Design ED, Class 125-600, Linear Cage

Linear															Linear Characteristic	
Valve Size, Inches	Port Diameter		Maximum Travel ⁽²⁾		Flow Coefficient	Valve Opening—Percent of Total Travel										F _L ⁽¹⁾
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
1 & 1.25	33.3	1.3125	19	0.75	C _v	3.21	5.50	8.18	10.9	13.2	15.0	16.9	18.6	19.9	20.6	0.84
					K _v	2.78	4.76	7.08	9.43	11.4	13.0	14.6	16.1	17.2	17.8	---
					X _T	0.340	0.644	0.494	0.509	0.532	0.580	0.610	0.629	0.628	0.636	---
1.5	47.6	1.875	19	0.75	C _v	4.23	7.84	11.8	15.8	20.4	25.3	30.3	34.7	37.2	39.2	0.82
					K _v	3.66	6.78	10.2	13.7	17.6	21.9	26.2	30.0	32.2	33.9	---
					X _T	0.656	0.709	0.758	0.799	0.738	0.729	0.708	0.686	0.683	0.656	---
	F _d	0.30	0.37	0.41	0.44	0.44	0.41	0.38	0.35	0.34	0.34	---				
	33.3 (3)	1.3125 (3)	19	0.75	C _v	2.92	5.70	9.05	12.5	15.6	18.5	21.1	23.9	26.8	29.2	0.91
					K _v	2.53	4.93	7.83	10.8	13.5	16.0	18.3	20.7	23.2	25.3	---
X _T					0.690	0.651	0.633	0.634	0.650	0.666	0.708	0.718	0.737	0.733	---	
2	58.7	2.3125	29	1.125	C _v	7.87	16.0	24.9	33.4	42.1	51.8	62.0	68.1	70.6	72.9	0.77
					K _v	6.81	13.8	21.5	28.9	36.4	44.8	53.6	58.9	61.1	63.1	---
					X _T	0.641	0.720	0.728	0.767	0.793	0.754	0.683	0.658	0.652	0.638	---
	F _d	0.30	0.35	0.36	0.37	0.37	0.36	0.35	0.35	0.34	0.33	---				
	33.3 (3)	1.3125 (3)	19	0.75	C _v	3.53	6.36	9.92	13.3	16.5	19.7	22.7	25.6	29.3	33.3	0.87
					K _v	3.05	5.50	8.58	11.5	14.3	17.0	19.6	22.1	25.3	28.8	---
X _T					0.456	0.529	0.549	0.582	0.611	0.633	0.671	0.723	0.727	0.694	---	
2.5	73.0	2.875	38	1.5	C _v	9.34	21.6	35.5	49.5	62.7	74.1	83.6	93.5	102	108	0.81
					K _v	8.08	18.7	30.7	42.8	54.2	64.1	72.3	80.9	88.2	93.4	---
					X _T	0.680	0.660	0.644	0.669	0.674	0.706	0.716	0.687	0.658	0.641	---
	F _d	0.27	0.33	0.35	0.36	0.35	0.34	0.32	0.29	0.27	0.27	---				
	47.6 (3)	1.875 (3)	19	0.75	C _v	4.10	8.09	12.3	16.7	21.1	26.8	33.7	41.3	49.2	57.0	0.84
					K _v	3.55	7.00	10.6	14.4	18.3	23.2	29.2	35.7	42.6	49.3	---
X _T					0.668	0.646	0.684	0.688	0.698	0.694	0.678	0.668	0.669	0.666	---	
3	87.3	3.4375	38	1.5	C _v	14.5	32.9	52.1	70.4	88.5	105	118	133	142	148	0.82
					K _v	12.5	28.5	45.1	60.9	76.6	90.8	102	115	123	128	---
					X _T	0.671	0.699	0.697	0.720	0.733	0.718	0.707	0.650	0.630	0.620	---
	F _d	0.26	0.32	0.35	0.36	0.36	0.36	0.36	0.28	0.29	0.30	---				
	58.7 (3)	2.3125 (3)	29	1.125	C _v	8.06	16.9	26.7	37.5	49.0	61.4	73.8	85.3	94.7	102	0.85
					K _v	6.97	14.6	23.1	32.4	42.4	53.1	63.8	73.8	81.9	88.2	---
X _T					0.592	0.614	0.662	0.672	0.674	0.676	0.694	0.722	0.736	0.732	---	
4	111.1	4.375	51	2	C _v	23.3	50.3	78.1	105	127	152	181	203	223	236	0.82
					K _v	20.2	43.5	67.6	90.8	110	131	157	176	193	204	---
					X _T	0.691	0.714	0.720	0.731	0.764	0.757	0.748	0.762	0.732	0.688	---
	F _d	0.31	0.36	0.38	0.38	0.37	0.35	0.32	0.30	0.27	0.28	---				
	73.0 (3)	2.875 (3)	38	1.5	C _v	9.77	22.6	37.2	51.8	65.7	77.5	87.5	97.9	107	113	0.84
					K _v	8.45	19.5	32.2	44.8	56.8	67.0	75.7	84.7	92.6	97.7	---
X _T					0.926	0.899	0.873	0.904	0.919	0.962	0.972	0.937	0.891	0.872	---	

1. At 100% travel.
 2. If coefficients listed above for the 8-inch linear cage with 51 mm (2-inch) travel are not sufficient for your application, consider using the quick opening cage. The 8-inch quick opening cage with 51 mm (2-inch) travel has approximately a linear characteristic.
 3. Restricted trim.

Notes: The coefficients shown on this page are also appropriate for Design EDR.

Table 28. Design ED, Class 125-600, Linear Cage

Valve Size, Inches	Port Diameter		Maximum Travel ⁽²⁾		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	
6	177.8	7	51	2	C _v	46.3	107	171	228	279	327	367	402	420	433	0.84
					K _v	40.0	92.6	148	197	241	283	317	348	363	375	---
					X _T	0.656	0.727	0.744	0.781	0.803	0.800	0.784	0.758	0.755	0.740	---
					F _d	0.21	0.26	0.29	0.30	0.31	0.31	0.31	0.28	0.28	0.28	---
	111.1 (3)	4.375 (3)	51	2	C _v	16.7	38.6	65.4	93.7	123	156	194	244	290	322	0.88
					K _v	14.4	33.4	56.6	81.1	106	135	168	211	251	279	---
					X _T	0.762	0.698	0.675	0.684	0.681	0.660	0.676	0.657	0.685	0.703	---
8 ⁽²⁾	203.2	8	51	2	C _v	60.2	129	206	285	363	444	526	581	640	688	0.87
					K _v	52.1	112	178	247	314	384	455	503	554	595	---
					X _T	0.704	0.721	0.657	0.651	0.683	0.713	0.740	0.801	0.821	0.839	---
8	203.2	8	76	3	C _v	91.4	207	325	440	550	639	711	760	795	846	0.87
					K _v	79.1	179	281	381	476	553	615	657	688	732	---
					X _T	0.651	0.624	0.677	0.746	0.786	0.803	0.823	0.836	0.843	0.807	---
					F _d	0.23	0.28	0.30	0.31	0.31	0.31	0.31	0.31	0.31	0.31	---

1. At 100% travel.
 2. If coefficients listed above for the 8-inch linear cage with 51 mm (2-inch) travel are not sufficient for your application, consider using the quick opening cage. The 8-inch quick opening cage with 51 mm (2-inch) travel has approximately a linear characteristic.
 3. Restricted trim.

Notes: The coefficients shown on this page are also appropriate for Design EDR.

Table 29. Design ED, Class 125-600, Equal Percentage Cage, Flow Down

Equal Percentage															Equal Percentage Characteristic	
Valve Size, Inches	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F _L ⁽¹⁾
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
1 & 1.25	33.3	1.3125	19	0.75	C _V	0.783	1.54	2.20	2.89	4.21	5.76	7.83	10.9	14.1	17.2	0.88
					K _V	0.677	1.33	1.90	2.50	3.64	4.98	6.77	9.43	12.2	14.9	---
					X _T	0.766	0.614	0.587	0.667	0.672	0.687	0.743	0.760	0.733	0.667	---
1.5	47.6	1.875	19	0.75	C _V	1.52	2.63	3.87	5.41	7.45	11.2	17.4	24.5	30.8	35.8	0.84
					K _V	1.31	2.27	3.35	4.68	6.44	9.69	15.1	21.2	26.6	31.0	---
					X _T	0.780	0.735	0.716	0.715	0.738	0.727	0.690	0.685	0.685	0.679	---
	F _d	0.64	0.63	0.63	0.64	0.46	0.45	0.30	0.31	0.35	0.38	---				
	33.3 (2)	1.3125 (2)	19	0.75	C _V	1.12	1.56	2.22	3.10	4.27	6.17	9.01	13.1	18.2	23.1	0.91
					K _V	0.969	1.35	1.92	2.68	3.69	5.34	7.79	11.3	15.7	20.0	---
X _T					0.821	0.864	0.820	0.703	0.721	0.679	0.665	0.639	0.650	0.700	---	
2	58.7	2.3125	29	1.125	C _V	1.66	2.93	4.66	6.98	10.8	16.5	25.4	37.3	50.7	59.7	0.85
					K _V	1.44	2.53	4.03	6.04	9.34	14.3	22.0	32.3	43.9	51.6	---
					X _T	0.827	0.834	0.774	0.727	0.687	0.684	0.702	0.736	0.686	0.687	---
	F _d	0.41	0.50	0.53	0.58	0.37	0.32	0.27	0.26	0.29	0.31	---				
	33.3 (2)	1.3125 (2)	19	0.75	C _V	0.923	1.42	2.09	2.84	4.11	5.83	8.58	12.8	18.5	24.3	0.88
					K _V	0.798	1.23	1.81	2.46	3.56	5.04	7.42	11.1	16.0	21.0	---
X _T					0.775	0.744	0.742	0.707	0.715	0.714	0.714	0.641	0.621	0.649	---	
2.5	73.0	2.875	38	1.5	C _V	3.43	7.13	10.8	15.1	22.4	33.7	49.2	71.1	89.5	99.4	0.84
					K _V	2.97	6.17	9.34	13.1	19.4	29.2	42.6	61.5	77.4	86.0	---
					X _T	0.778	0.702	0.678	0.677	0.658	0.654	0.661	0.665	0.661	0.660	---
	F _d	0.45	0.49	0.49	0.47	0.35	0.32	0.30	0.24	0.25	0.27	---				
	47.6 (2)	1.875 (2)	19	0.75	C _V	1.57	2.57	3.82	5.44	7.64	11.5	18.2	26.7	35.1	43.9	0.89
					K _V	1.36	2.22	3.30	4.71	6.61	9.95	15.7	23.1	30.4	38.0	---
X _T					0.801	0.756	0.713	0.677	0.648	0.672	0.628	0.635	0.706	0.710	---	
3	87.3	3.4375	38	1.5	C _V	4.32	7.53	10.9	17.1	27.2	43.5	66.0	97.0	120	136	0.82
					K _V	3.74	6.51	9.43	14.8	23.5	37.6	57.1	83.9	104	118	---
					X _T	0.774	0.706	0.682	0.635	0.616	0.602	0.663	0.693	0.670	0.675	---
	F _d	0.52	0.63	0.68	0.39	0.36	0.29	0.26	0.28	0.30	0.32	---				
	58.7 (2)	2.3125 (2)	29	1.125	C _V	1.75	3.11	4.77	7.07	10.7	17.0	27.9	41.5	58.0	70.7	0.87
					K _V	1.51	2.69	4.13	6.12	9.26	14.7	24.1	35.9	50.2	61.2	---
X _T					0.944	0.840	0.803	0.757	0.735	0.642	0.531	0.613	0.629	0.702	---	
4	111.1	4.375	51	2	C _V	5.85	11.6	18.3	30.2	49.7	79.7	125	171	205	224	0.82
					K _V	5.06	10.0	15.8	26.1	43.0	68.9	108	148	177	194	---
					X _T	0.731	0.650	0.643	0.645	0.632	0.625	0.672	0.742	0.737	0.716	---
	F _d	0.45	0.42	0.40	0.33	0.30	0.28	0.23	0.24	0.26	0.28	---				
	73.0 (2)	2.875 (2)	38	1.5	C _V	3.82	7.65	11.4	16.9	25.5	38.2	60.5	85.7	105	112	0.89
					K _V	3.30	6.62	9.86	14.6	22.1	33.0	52.3	74.1	90.8	96.9	---
X _T					0.746	0.700	0.694	0.669	0.640	0.627	0.591	0.644	0.735	0.813	---	

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

Notes: The coefficients shown on this page are also appropriate for Design EDR.

Table 30. Design ED, Class 125-600, Equal Percentage Cage, Flow Down

Valve Size, Inches	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										F _L ⁽¹⁾
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100	
6	177.8	7	51	2	C _v	12.9	25.8	43.3	67.4	104	162	239	316	368	394	0.85
					K _v	11.2	22.3	37.5	58.3	90.0	140	207	273	318	341	---
					X _T	0.688	0.680	0.682	0.709	0.700	0.720	0.736	0.744	0.780	0.778	---
					F _d	0.39	0.44	0.47	0.33	0.29	0.22	0.22	0.24	0.25	0.26	---
	111.1 (2)	4.375 (2)	51	2	C _v	5.40	10.1	15.8	26.7	45.2	71.2	111	169	232	274	0.88
					K _v	4.67	8.74	13.7	23.1	39.1	61.6	96.0	146	201	237	---
					X _T	0.834	0.834	0.735	0.654	0.626	0.613	0.614	0.610	0.629	0.695	---
8	203.2	8	51	2	C _v	18.5	38.0	58.4	86.7	130	189	268	371	476	567	0.85
					K _v	16.0	32.9	50.5	75.0	112	163	232	321	412	490	---
					X _T	0.727	0.623	0.600	0.588	0.580	0.587	0.599	0.611	0.671	0.724	---
8	203.2	8	76	3	C _v	27.0	58.1	105	188	307	478	605	695	761	818	0.86
					K _v	23.4	50.3	90.8	163	266	413	523	601	658	708	---
					X _T	0.644	0.654	0.636	0.611	0.643	0.615	0.725	0.809	0.804	0.807	---
					F _d	0.28	0.26	0.23	0.20	0.17	0.22	0.24	0.25	0.25	0.26	---

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

Notes: The coefficients shown on this page are also appropriate for Design EDR.

Table 31. Design ED, Class 125-600, Whisper Trim I Cage, Flow Up

Whisper Trim I														Linear Characteristic	
Valve Size, Inches ⁽¹⁾	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel									
	mm	Inches	mm	Inches		10	20	30	40	50	60	70	80	90	100
1 & 1.25	33.3	1.3125	19	0.75	C _v	3.28	7.39	12.0	14.2	14.9	15.3	15.7	16.0	16.4	16.8
					K _v	2.84	6.39	10.4	12.3	12.9	13.2	13.6	13.8	14.2	14.5
					X _T	0.581	0.605	0.617	0.644	0.764	0.790	0.809	0.813	0.795	0.768
1.5	47.6	1.875	19	0.75	C _v	2.62	7.42	13.9	20.8	23.2	24.2	24.9	25.4	26.1	26.7
					K _v	2.27	6.42	12.0	18.0	20.1	20.9	21.5	22.0	22.6	23.1
					X _T	0.892	0.766	0.632	0.498	0.614	0.771	0.876	0.919	0.901	0.894
	33.3 (2)	1.3125 (2)	19	0.75	C _v	3.12	7.36	13.0	18.5	20.7	21.4	21.8	23.1	23.9	25.2
					K _v	2.70	6.37	11.2	16.0	17.9	18.5	18.9	20.0	20.7	21.8
					X _T	0.559	0.605	0.460	0.383	0.472	0.622	0.768	0.823	0.874	0.857
2	58.7	2.3125	29	1.125	C _v	7.30	19.2	34.6	42.2	45.5	47.0	47.1	47.2	47.2	48.0
					K _v	6.31	16.6	29.9	36.5	39.4	40.7	40.7	40.8	40.8	41.5
					X _T	0.604	0.467	0.318	0.387	0.526	0.689	0.843	0.899	0.940	0.938
	33.3 (2)	1.3125 (2)	19	0.75	C _v	2.86	6.79	11.7	18.4	23.6	27.9	30.9	33.5	35.3	36.7
					K _v	2.47	5.87	10.1	15.9	20.4	24.1	26.7	29.0	30.5	31.7
					X _T	0.672	0.755	0.547	0.386	0.358	0.377	0.398	0.431	0.470	0.483
2.5	73.0	2.875	38	1.5	C _v	12.2	32.6	49.7	54.4	55.9	59.8	64.0	67.7	71.4	74.0
					K _v	10.6	28.2	43.0	47.1	48.4	51.7	55.4	58.6	61.8	64.0
					X _T	0.748	0.428	0.414	0.589	0.792	0.877	0.857	0.792	0.712	0.719
	47.6 (2)	1.875 (2)	19	0.75	C _v	3.11	8.31	14.9	22.4	29.9	36.0	41.6	46.4	50.5	53.6
					K _v	2.69	7.19	12.9	19.4	25.9	31.1	36.0	40.1	43.7	46.4
					X _T	0.603	0.761	0.596	0.467	0.397	0.395	0.398	0.411	0.427	0.439
3	87.3	3.4375	38	1.5	C _v	16.5	40.3	70.8	88.0	92.1	90.7	90.3	92.6	95.6	99.1
					K _v	14.3	34.9	61.2	76.1	79.7	78.5	78.1	80.1	82.7	85.7
					X _T	0.685	0.471	0.331	0.378	0.532	0.753	0.929	0.983	0.968	0.923
	58.7 (2)	2.3125 (2)	29	1.125	C _v	8.15	19.1	33.2	47.6	60.8	72.1	81.8	90.1	97.4	103
					K _v	7.05	16.5	28.7	41.2	52.6	62.4	70.8	77.9	84.3	89.1
					X _T	0.720	0.660	0.500	0.439	0.406	0.412	0.437	0.472	0.504	0.510
4	111.1	4.375	51	2	C _v	33.9	76.6	117	135	137	137	141	149	157	169
					K _v	29.3	66.3	101	117	119	119	122	129	136	146
					X _T	0.607	0.385	0.352	0.467	0.682	0.887	0.977	0.958	0.921	0.811
	73.0 (2)	2.875 (2)	38	1.5	C _v	13.6	32.5	54.3	75.5	94.6	112	127	141	153	160
					K _v	11.8	28.1	47.0	65.3	81.8	96.9	110	122	132	138
					X _T	0.674	0.481	0.374	0.344	0.345	0.354	0.370	0.385	0.407	0.428
6	177.8	7	51	2	C _v	55.8	125	196	245	270	286	297	308	323	338
					K _v	48.3	108	170	212	234	247	257	266	279	292
					X _T	0.294	0.323	0.286	0.322	0.406	0.494	0.579	0.644	0.673	0.662
8	203.2	8	76 (3,4)	3 (3,4)	C _v	100	226	337	436	502	581	641	655	659	681
					K _v	86.5	195	292	377	434	503	554	567	570	589
					X _T	0.456	0.490	0.470	0.427	0.452	0.468	0.521	0.624	0.703	0.701
			29 (5)	4 (5)	C _v	142	303	428	542	611	652	669	689	700	726
					K _v	123	262	370	469	529	564	579	596	606	628
					X _T	0.549	0.450	0.436	0.441	0.513	0.624	0.707	0.709	0.729	0.718

1. 6-inch E-body with restricted Whisper Trim not available. Use EW body where this trim is desired.
 2. Restricted trim.
 3. Travel limited to 70 mm (2.75 inches) with Class IV ED valve plug.
 4. Travel limited to 64 mm (2.5 inches) with anti-extrusion ring or ET-C valve plug.
 5. Travel limited to 95 mm (3.75 inches) with anti-extrusion ring or ET-C valve plug.

Notes: The coefficients shown on this page are also appropriate for Design EDR.

Table 32. Design ED, Class 125-600, Whisper Trim III Cage, Flow Up

Whisper Trim III															Linear Characteristic⁽²⁾	
Valve Size, Inches	Port Diameter		Maximum Travel		Flow Coefficient	Valve Opening—Percent of Total Travel										$X_T^{(1)}$
	mm	Inches	mm	Inches		Minimum ⁽³⁾	20	30	40	50	60	70	80	90	100	
A3 $\Delta P/P_1 \leq 0.6$																
6	136.5	5.375	76	3	C_v	4.67	68.2	92.0	129	163	196	228	257	279	295	0.714
					K_v	4.04	59.0	79.6	112	141	170	197	222	241	255	---
B3 $\Delta P/P_1 \leq 0.75$																
6	136.5	5.375	76	3	C_v	4.67	38.2	66.9	94.5	120	144	167	190	211	228	0.473
					K_v	4.04	33.0	57.9	81.7	104	125	144	164	183	197	---
C3 $\Delta P/P_1 \leq 0.85$																
6	136.5	5.375	76	3	C_v	4.67	28.0	41.3	55.3	69.3	83.0	97.0	110	124	138	0.563
					K_v	4.04	24.2	35.7	47.8	59.9	71.8	83.9	95.2	107	119	---
D3 $\Delta P/P_1 \leq 0.99$																
6	136.5	5.375	76	3	C_v	4.67	6.67	9.50	19.9	31.4	46.0	61.0	75.7	89.7	104	0.563
					K_v	4.04	5.77	8.22	17.2	27.2	39.8	52.8	65.5	77.6	90.0	---

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

Notes: The coefficients shown on this page are also appropriate for Design EDR.

Specifications

Available Configurations

Design ED: Single-port, globe-style control valve with cage guiding, balanced valve plug, and push-down-to-close valve plug action (figures 1 and 2)

Design EAD: Angle version of Design ED control valve, used to facilitate piping or in applications where a self-draining valve is desired (figure 3)

Design EDR: Same as Design ED control valve except with push-down-to-open valve plug action (figure 4)

Valve Sizes

See table 2

End Connection Styles⁽¹⁾⁽²⁾

Cast Iron Valves.

Flanged: Design ED, 1- through 8-inch, Class ■ 125 flat-face or ■ 250 raised-face flanges per ASME B16.1

Screwed: Design ED, 1- through 2-inch, consistent with ASME B16.4

Steel and Stainless Steel Valves.

Flanged: Class ■ 150, 300, or 600 raised-face (RF) or ring-type joint (RTJ) flanges per ASME B16.5

Screwed or Socket Welding: 1- through 2-inch, consistent with ASME B16.11

Buttwelding: 1- through 8-inch . Schedules 40 or 80 consistent with ASME B16.25

Socket weld end connection style is not available for Design EAD.

Also, see table 2 and figures 14 and 15

Maximum Inlet Pressures and Temperatures⁽¹⁾⁽²⁾

As listed below, unless limited by maximum pressure drop or material temperature capabilities

Cast Iron Valves.

Flanged: Consistent with Class 125B or 250B per ASME B16.1

Screwed: Consistent with Class 250 per ASME B16.4

Steel and Stainless Steel Valves.

Flanged: Consistent with Class 150, 300, and 600⁽³⁾ per ASME B16.34

Screwed or Welding: Consistent with Class 600⁽³⁾ per ASME B16.34

Maximum Pressure Drop⁽²⁾

Same as maximum inlet pressure for specific construction defined above, except where further limited as follows:

All Valves Except Those with Whisper Trim III and WhisperFlo Cages: See figure 9.

Valves with Whisper Trim III Cages (6-inch Design ED): See figure 11 except where further limited by the following max Δ -P/P₁ ratio⁽⁴⁾—0.60 for level A3 cage, 0.75 for level B3 cage, 0.85 for level C3 cage, or 0.99 for level D3 cage

Valves for NACE MR0175: See figure 13

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

Class II: Standard

Class III: For valves with single graphite piston ring and 87 mm (3.4375 inch) or larger port diameter

Class IV: For valves with multiple graphite piston rings and 111 mm (4.375 inch) or larger port diameter

Class V High-Temperature: For valves with port diameters from 73 through 203.2 mm (2.875 through 8-inch) with optional C-seal trim. See table 1

Construction Materials

Valve Body, Bonnet, and Bonnet Spacer or Bottom Flange, if used: ■ Cast iron, ■ WCC carbon steel, ■ 316 stainless steel, ■ LCC/HT carbon steel, ■ WC9 chrome moly steel, or ■ other materials upon request

Valve Plug, Cage, and Metal Seating Parts.

All Valves Except Those with Whisper Trim III and WhisperFlo Cages: See table 3.

Valves with Whisper Trim III and WhisperFlo Cages (4- and 6-inch Design ED): See tables 4 and 5.

Valves for NACE Specification: See table 10.

Bellows Seal Assembly: ■ 316L stainless steel or ■ Monel

All Other Parts: See table 6

Specifications (continued)**Material Temperature Capabilities⁽²⁾****Valve Body/Trim Combinations.**

All Valves Except Those with Whisper Trim III and WhisperFlo Cages: See table 7.

Valves with Whisper Trim III Cages (6-inch Design ED): See table 4.

Valves with WhisperFlo Cages (4- and 6-inch Design ED): See table 5.

All Other Parts: See table 6

Flow Characteristics

Standard Cages: ■ Quick-opening, ■ linear, or ■ equal percentage

Whisper Trim and WhisperFlo Cages: Linear

Flow Directions

Design ED or EAD: ■ Standard Cage—Normally down, ■ Whisper Trim and WhisperFlo Cages—Always up

Design EDR: ■ Standard Cage—Normally up, ■ Whisper Trim Cage—Always down

Flow Coefficients and Noise Level Prediction

See table 9, the section titled Coefficients in this bulletin, and Catalog 12

Port Diameters and Valve Plug Travels

See table 11

Yoke Boss and Stem Diameters

See table 11

Typical Bonnet Styles

■ Plain or ■ extension. See figures 14 and 15 for standard dimensions. See table 8 for selection guidelines.

■ ENVIRO-SEAL bellows seal bonnet. See figure 14 for standard dimensions.

See figure 8 for view of ENVIRO-SEAL bellows seal bonnet. Also, see Bulletin 59.1:070, ENVIRO-SEAL Bellows Seal Bonnets, for further information

Packing Arrangements

■ Single PTFE V-ring (standard), ■ double arrangements, ■ leak-off arrangements, ■ ENVIRO-SEAL packing system. See figure 7 for ENVIRO-SEAL configuration.

ENVIRO-SEAL Packing Systems in vacuum service: Standard ENVIRO-SEAL packing systems can be used in vacuum service with packing rings in standard orientation. Do not reverse the ENVIRO-SEAL PTFE packing rings. See Bulletin 59.1:061, ENVIRO-SEAL Packing Systems for Sliding-Stem Valves, for further information.

Approximate Weights

1 and 1.25 Inch Sizes: 14 kg (30 lb)

1.5 Inch Size: 20 kg (45 lb)

2 Inch Size: 39 kg (85 lb)

2.5 Inch Size: 45 kg (100 lb)

3 Inch Size: 57 kg (125 lb)

4 Inch Size: 77 kg (170 lb)

6 Inch Size: 159 kg (350 lb)

8 Inch Size: 408 kg (900 lb)

Additional Options

■ Seal welding of Design EDR valve body/bonnet joint for temperatures above 232°C (450°F), ■ lubricator, ■ lubricator/isolating valve, ■ drilled and tapped connection in extension bonnet for leak-off service, ■ valve body drain plug, ■ style 3 fabricated extension bonnet made on order to a specific length for cryogenic service, ■ style NS bonnet for seismic service requirements, ■ packings suitable for nuclear service, ■ C-seal trim for Class V high-temperature shutoff

1. DIN (or other) ratings and end connections can usually be supplied; consult your Fisher sales office.

2. The pressure/temperature limits in this bulletin and in any applicable standard limitations should not be exceeded.

3. 316 stainless steel (CF8M) valves with SA-193-B7 bonnet bolting are capable of the full Class 600 rating through 427°C (800°F). For higher temperatures or for other bolting materials, the valve may have to be derated. Contact your Fisher sales office for further information. Also note that the ANSI standard does not allow the use of intermediate ratings for flanged valves.

4. Limitation based on excessive noise increases if max $\Delta P/P_1$ ratio for a given cage level is exceeded.

ENVIRO-SEAL Packing System Specifications

Applicable Stem Diameters

■ 9.5 mm (0.375 inches), ■ 12.7 (0.5), ■ 19.1 (0.75), ■ 25.4 (1), and ■ 31.8 (1.25) diameter valve stems

Maximum Pressure/Temperature Limits⁽¹⁾

To Meet the EPA Fugitive Emission Standard of 500 PPM⁽²⁾

For ENVIRO-SEAL PTFE and ENVIRO-SEAL Duplex packing systems: full ANSI Class 300 up to 232°C (450°F)

For ENVIRO-SEAL Graphite ULF packing system: 104 bar (1500 psig) at 316°C (600°F)

Construction Materials

PTFE Packing Systems.

Packing Ring and Lower Wiper: PTFE V-ring⁽³⁾

Male and Female Adaptor Rings: Carbon-filled PTFE V-ring

Anti-Extrusion Washer: Filled PTFE

Lantern Ring: S31600 (316 stainless steel)

Spring: ■ 17-7PH stainless steel or ■ Inconel

Packing Box Flange: S31600

Packing Follower: S31600 lined with carbon-filled PTFE

Packing Box Studs: Strain-hardened 316 stainless steel

Packing Box Nuts: 316 stainless steel SA194 Grade 8M

Graphite Packing Systems.

Packing Ring: Graphite rings

Spring: ■ 17-7PH stainless steel or ■ Inconel

Packing Box Flange: S31600

Packing Follower: S31600 lined with carbon-filled PTFE

Packing Box Studs: Strain-hardened 316 stainless steel

Packing Box Nuts: 316 stainless steel SA194 Grade 8M

1. Refer to the valve specifications in this bulletin for pressure/temperature limits of valve parts. Do not exceed the pressure/temperature rating of the valve. Do not exceed any applicable code or standard limitation.
2. The Environmental Protection Agency (EPA) has set a limit of 500 parts per million (ppm) for fugitive emissions from a valve in selected VOC (Volatile Organic Compound) services.
3. In vacuum service, reversing the ENVIRO-SEAL PTFE packing rings is not necessary.

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