SAD_95no54

Control Valve Specification Sheet

FISHER

Customer:			
Fax:		Phone:	
Contact:		Contact:	
Item:	3 Qty: 1	PO Number:	
Tags:	PCV-627	Project:	DALAN
Description:	14 Inch 667 Large ET-DVC6200	P&ID Number:	
Service Description:	CONTROL OF UNIT-600 OUTLET GAS PRESSURE	Line Number:	

1 Fluid: Gas — Crit. Pressure PC: 46.60000 bar(g)

	Service Conditions	Units	Minimum	Normal	Maximum
2	Volumetric Flow Rate Gas (Qg)	MMscfd	212.00000000	671.00000000	883.00000000
3	Inlet Pressure (P1)	bar(g)	74.00000	70.00000	70.00000
4	Outlet Pressure (P2)	bar(g)	53.00000	53.00000	53.00000
5	Inlet Temperature (T1)	deg C	37.0000	37.0000	37.0000
6	Molecular Weight (M)	M	17.800	17.800	17.800
7	Ratio of Specific Heats (gamma)		1.500	1.500	1.500
8					
9	Sizing Coefficient (Cv)		241.779	867.860	1144.926
10		% Open	46	82	92
11	(Allowed) / (Calculated w/ Insulation Credit)	dB(A)	85/88	85/95	85/97
12					

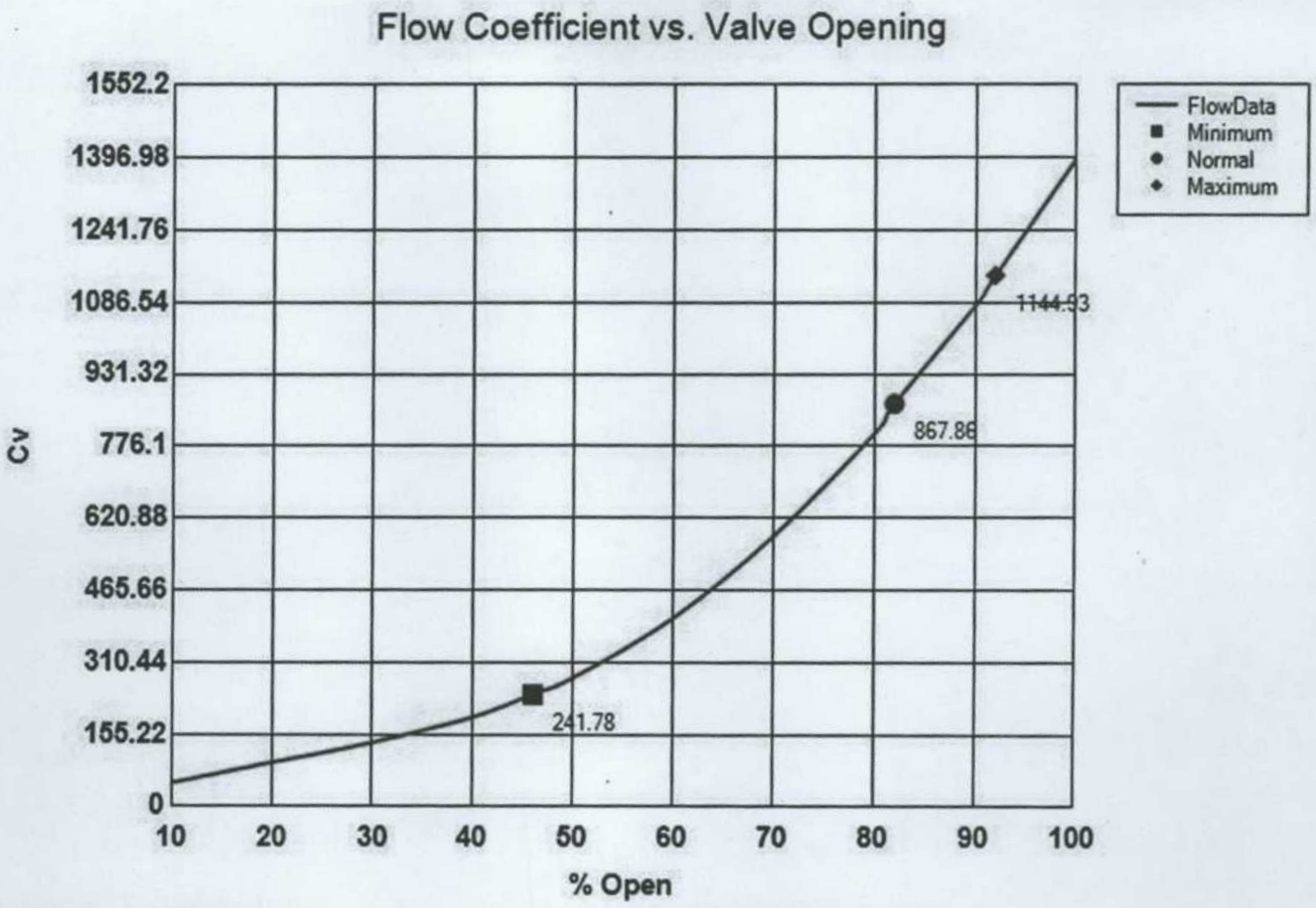
	PIPE LINE				
13	Size, Schedule In:	**20 Inches,**			
14	Size, Schedule Out:	**20 Inches,**			
15	Insulation:	**None,,**			
16	Valve Body/Bonnet:	Type:	**Globe**		
17	Size: **NPS 14**	ANSI:	**CL600**		
18	Max Press/Temp:	**83.6bar(g)/90deg C**			
19	Mfg/Model:	**Fisher/Large ET**			
20	Body/Bonnet Matl:	**WCB STEEL**			
21	Liner Matl/ID:				
22	End Connection In:	**14 Inch CL600 RF Flg**			
23	End Connection Out:	**14 Inch CL600 RF Flg**			
24	Flg Face Finish:				
25	End Ext/Matl:				
26	Flow Direction:	**Down**			
27	Bonnet Type:	**STD**			
28	Lub-ISO Valve:				
29	Packing Material:	**PTFE V-RING**			
30	Packing Type:	**GRAPHITE**			
31					
32	TRIM Type:				
33	Size: **5 1/2 Inch**	Travel:	**Short Neck**		
34	Characteristic:	**Equal Percent**			
35	Balanced/Unbalanced:	**Balanced**			
36	Rated Cv: **1397**	Fl: **0.88**	Xt: **0.894**		
37	Material:	**316SS**			
38	Seat Material:	**316LSS**			
39	Cage Material:	**316LSS**			
40	Stem Material:	**316SS**			
41					
42					
	SPECIAL ACCESS:				
43	NEC Class: **1**	Group: **D**	Div: **2**		
44	**Hazardous Area:CSA, Division 2**				
45					
46					
47					
48					
49					
50					
51					
52					

53	Actuator Type:	**Spring & Diaphragm**			
54	Mfg/Model:	**Fisher**			
55	Size:	Eff Area:			
56	On/Off:	Modulating:			
57	Spring Action:	**Close**			
58	Max Allow Press:				
59	Min Reqd Press:				
60	Available Air Supply Pressure				
61	Max: **7bar(g)**	Min:	**bar(g)**		
62	Bench Range:				
63	Act Orientation:	**Vertical**			
64	Handwheel Type:	**Side Mounted**			
65	Air Failure Valve:	Set at:			
66					
67	Input Signal:	**4-20 mA dc**			
68	Positioner Type:	**Digital-HART**			
69	Mfg/Model:	**Fisher/DVC6200**			
70	Incr Signal Output:	**Double**			
71	Gauges: **Yes**	By-Pass:			
72	Cam Characteristic:	**Linear**			
73					
	SWITCHES				
74	Type:	Qty:			
75	Mfg/Model:	**Fisher**			
76	Contacts/Rating:				
77	Actuation Points:				
78					
	AIRSET				
79	Mfg/Model:	**Fisher/**			
80	Set Pressure:				
81	Filter:	Gauges:	**Yes**		
82					
83	TESTS Hydro Press:				
84	ANSI/FCI Leak Class:	**ANSI CL V**			
85	Shutoff Pressure:	**83.600 bar(g)**			
86					

Rev	Date	Revision	Orig	Checked	App

Cv Plot Graph

FISHE



Project Name: dalan
Tag Name: PCV-627
Product: Large ET
Body Style: Globe
Travel: Short Neck

Trim Style: Cavitrol III 1-Stage
Flow: Down
Size: 14 Inch
Port Diameter: 5 1/2 Inch

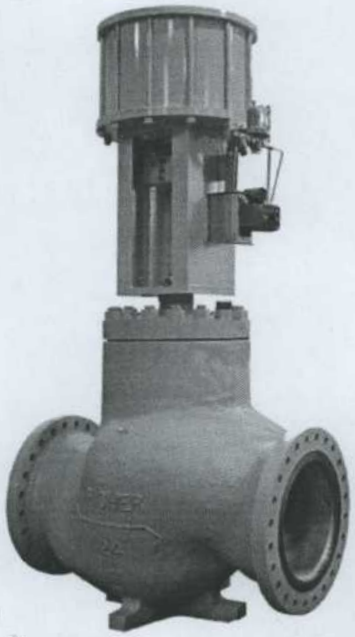
Fisher® Large ET and ED Valves NPS 12 through 16 and NPS 30

Fisher NPS 12 through 16 and NPS 30 CL150 through CL600 ET and ED control valves are used for either throttling or on-off control of a wide variety of liquids and gasses.

ET valves with a hanging cage are available for demanding applications in oil and natural gas up to 232°C (450° F). The hanging cage, with the seat ring threaded into the cage, provides the valve with easy-maintenance trim. The seal between the plug and cage and the seal between the seat ring and body are spring-loaded PTFE. The spring-loaded PTFE seal configuration can provide Class V shutoff per ANSI/FCI 70-2 and IEC 60534-4. The temperature range can be extended to 316°C (600°F) for non-oxidizing service and to 260°C (500° F) for oxidizing service by using the High Temperature (HTS1) seal.

ED valves utilize a hanging cage and a seat ring that is bolted into the body. These valves have two graphite piston rings between the cage and plug. They are used for high temperature applications between 316°C (600°F) and 593°C (1100° F) with a Class IV standard shutoff. Shutoff can be improved to Class V by using the Bore seal.

To help reduce aerodynamic noise in gas service, Whisper Trim™ III and WhisperFlo™ cages are available. Cavitrol™ III cages are available to eliminate the effects of liquid cavitation damage and DST, Dirty Service Trim, is available for cavitating liquid with particulates.



W9156-1
Fisher NPS 24 Valve Assembly with Piston Actuator

Features

- **Stable Control at High Pressure Drops**— Rugged cage guiding stabilizes the valve plug at all points in its travel range. This guiding reduces vibration, mechanical noise, and the need for hydraulic snubbers.
- **Economy**— Streamlined flow passages provide greater capacities per initial investment than most globe valves of the same size. Balanced valve plug design can allow use of smaller actuators for high pressure drops.
- **Cost-Effective Operation**— Increased wear resistance of the standard hardened stainless steel trim means long-lasting service.
- **Easy Maintenance**— The valve can stay in the pipeline during removal of trim parts for inspection or maintenance.

Specifications

Valve Sizes

■ NPS 12, ■ 14, ■ 16, and ■ 30

End Connection Styles

Flanged: CL150, 300, and 600 raised-face or ring-type joint flanges per ASME B16.5. NPS 30 valve size has series A flanges as standard, per ASME B16.47
Buttwelding: All ASME B16.25 schedules through schedule 120 that are compatible with the ASME B16.34 valve body rating

For other end connections, contact your Emerson Process Management sales office for details.

Maximum Inlet Pressure(1)

Flanged: Consistent with CL150, 300, and 600 pressure-temperature ratings per ASME B16.34
Buttwelding: Consistent with CL600 per ASME B16.34

Material Temperature and Pressure Drop Capabilities(1)

See tables 3, 4, and 5

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

ET and ET-C with Metal Seats
Standard: Class V
Optional (for all trims except 2-Stage Cavitrol Trim): Class IV
ED with Metal Seats
Standard: Class IV
Optional: Class V

Construction Materials

Valve Body and Bonnet: ■ WCC steel, ■ LCC steel, ■ WC9 alloy steel, ■ C12A alloy steel, or ■ CF8M stainless steel. For other materials, consult your Emerson Process Management sales office
Trim and Other Parts: See table 3

Flow Characteristics

Standard Cages: ■ Linear or ■ equal percentage
Whisper Trim III and WhisperFlo Cages: Linear
Cavitrol III Cages: Linear

For other characteristics, contact your Emerson Process Management sales office for details.

Flow Direction

Standard and Cavitrol III Cages: Down
Whisper Trim III and WhisperFlo Cages: Up

Flow Coefficients

See Fisher Catalog 12

Port Diameters

See table 2

Valve Plug Travel

102 through 432 mm (4 to 19-7/8 inches).

Contact your Emerson Process Management sales office for further details if needed

Yoke Boss and Stem Diameters

■ 127 mm (5H-inch) diameter yoke boss, with 31.8 mm (1.25 inch) diameter valve stem for all valves except NPS 30
■ 179 mm (7-inch) diameter yoke boss, with 50.8 mm (2 inch) diameter valve stem for NPS 30 valve

Typical Bonnet Style

Standard: Style 1 extension
Optional: Style 3 extension

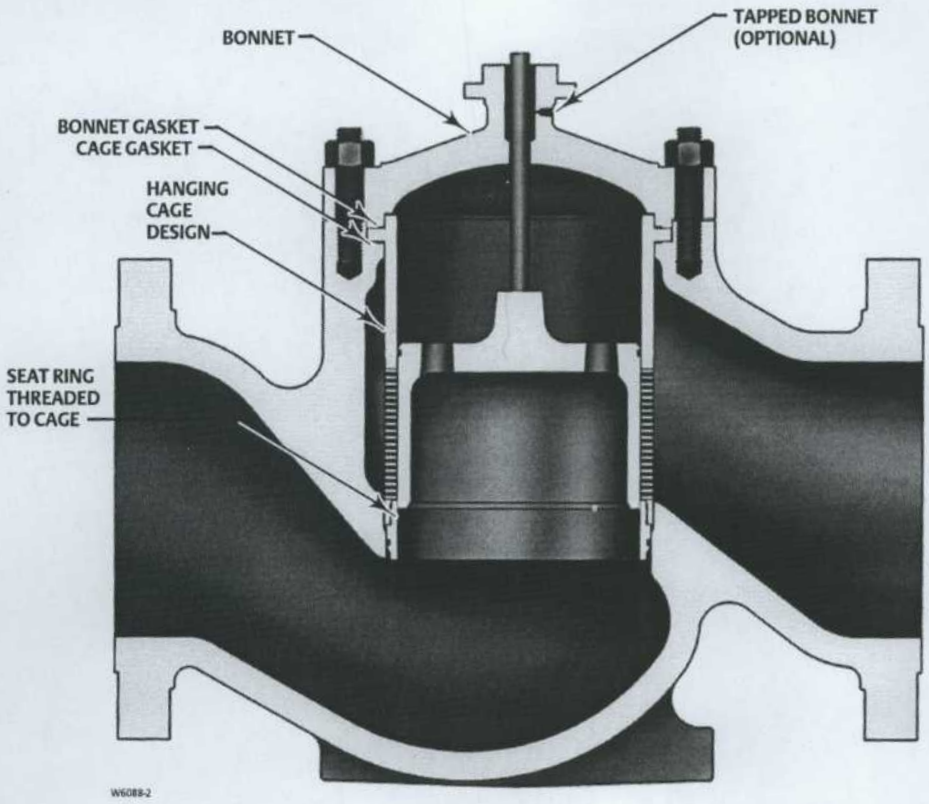
Dimensions and Approximate Weights

See figure 4 and table 6

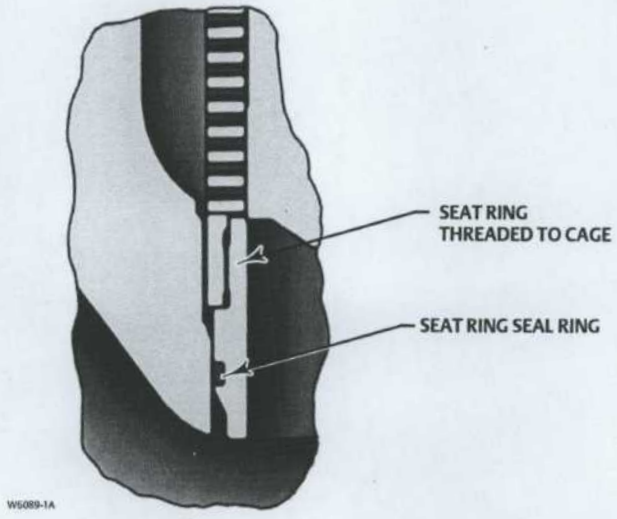
1. The pressure/temperature limits in this bulletin and any applicable standard or code limitation for valve should not be exceeded.

Table of Contents

Figure 1. Typical Fisher Large ET Valve



COMPLETE VALVE



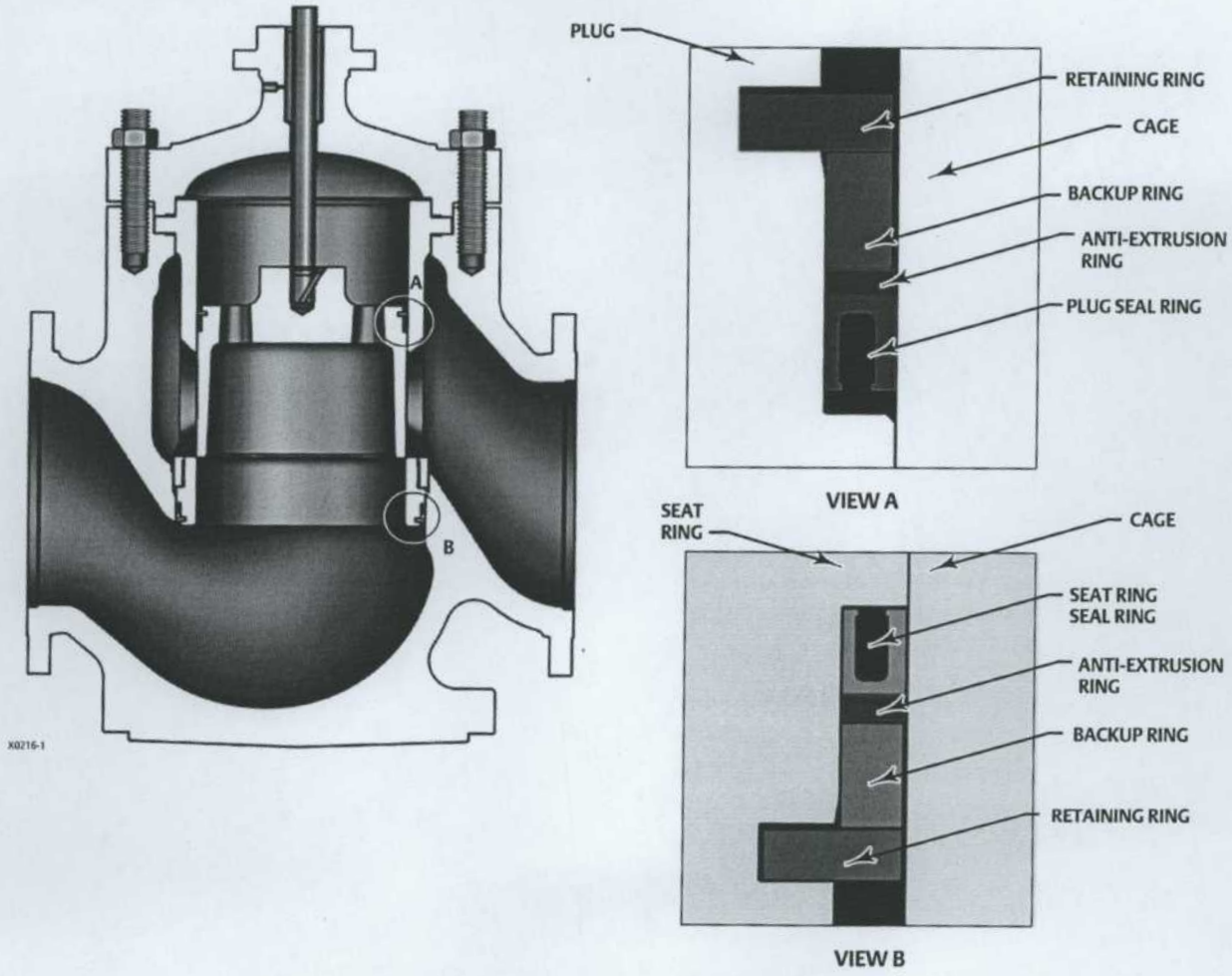
SEAT RING SEAL DETAIL

ET High Temperature Seal (HTS1)

The High Temperature Seal (HTS1) is available for the ET only and is required for applications where the service temperature exceeds 232°C (450°F). This seal is available for all sizes and trims of the ET and allows the valve to be used in temperatures up to 316°C (600°F). See table 3 for temperature limits and figure 2.

The High Temperature Seal is used in place of the standard plug seal ring and seat ring seal ring. This seal employs an identical seal ring as the standard ET, but with the addition of an anti-extrusion ring, backup ring, and retaining ring. At temperatures above 232°C (450°F) the elastomer material the seal ring is constructed from becomes soft and can be damaged due to an extrusion process that could occur when the valve plug is moved inside the cage. The purpose of the anti-extrusion ring and backup ring is to prevent the seal ring from being extruded.

Figure 2. Typical Fisher Large ET Valve with HTS1 Seal



ET-C

The ET-C is designed to provide throttling or on-off control of liquids and gases at cryogenic temperatures as low as -198°C (-325°F). These valves are identical to the standard ET, but with a few differences, which allow the valve to tolerate the very low temperatures. These differences include:

- Style 3 Extension Bonnet
- Bolted-In Seat Ring
- Cryogenic Plug Seal

The style 3 extension bonnet is different from the standard style 1 in that it is designed to locate the temperature sensitive packing parts further away from the valve body, preventing them from being exposed to temperature extremes. The bolted-in seat ring is similar to that used with the ED valve and accommodates the unavoidable material shrinkage that occurs at cryogenic temperatures, which would otherwise loosen the ET's standard threaded-in seat ring. The cryogenic plug seal is used in place of the standard ET plug seal ring. At cryogenic temperatures below -73°C (-100°F) the elastomer material the standard seal ring is constructed from becomes brittle, impacting the ability of the valve to shut off. The maximum valve shutoff that can be attained at these cryogenic temperatures with the cryogenic seal is Class V.

See tables 3 and 4 for temperature limits.

ED Bore Seal

The Bore Seal is available for the ED only and is required for Class V shutoff applications where the service temperature exceeds 316°C (600°F). For service temperatures below 316°C (600°F) the ET should be used when Class V shutoff is required. See table 1 for availability and temperature limits and figure 3.

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

Table 1. Bore Seal Availability and Temperature Limits (ED Only)

VALVE (PRESSURE CLASS)	VALVE SIZE, NPS	TRIM DESIGNATION(1)	VALVE BODY MATERIAL	TEMPERATURE LIMIT		ANSI/FCI/IEC SHUTOFF CLASS
				°C	°F	
ED (CL150 to CL600)	12, 14, 16, and 30	40	WCC/WC9	-29 to 371	-20 to 700	V
		41	WCC	-29 to 427	-20 to 800	
			WC9	-29 to 566	-20 to 1050	
			C12A	-29 to 593	-20 to 1100	
		42	C12A	-29 to 621	-20 to 1150	
		954	WCC	-29 to 427	-20 to 800	
			WC9	-29 to 482	-20 to 900	

1. See tables 3, 4, and 5 for materials.

Figure 3. Typical Fisher Large ED with Bore Seal

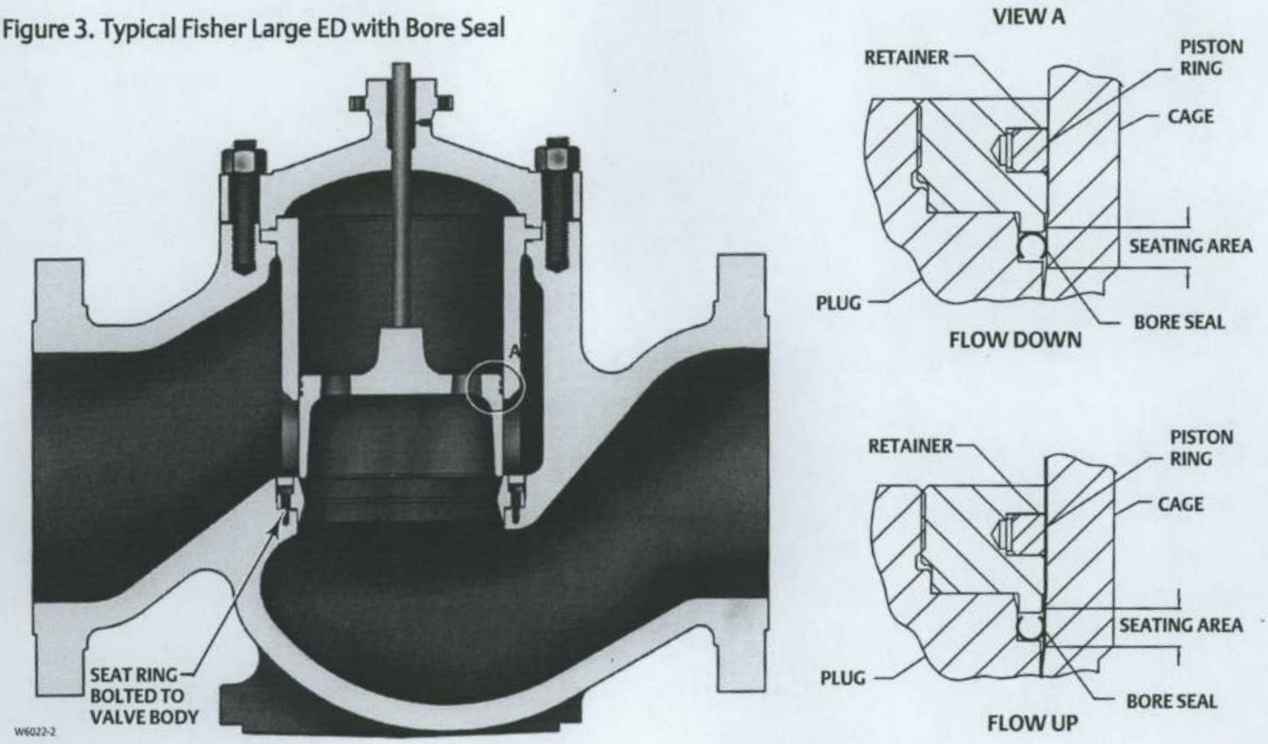


Table 2. Port Diameters and Valve Plug Travels

VALVE SIZE, NPS	VALVE	TRIM (CAGE)	PORT DIAMETER		MAXIMUM VALVE PLUG TRAVEL	
			mm	Inches	mm	Inches
12, 14, and 16	ED and ET	Whisper Trim III Level D	254	10	203	8.00
		Standard; Whisper Trim III Levels A, B, and C; WhisperFlo	279	11	102	4.00
					140	5.50
					203	8.00
30	ED	All	610	24	302	11.88
					505	19.88
	ET	Standard; Whisper Trim III Level D; WhisperFlo	610	24	302	11.88
					505	19.88
		Whisper Trim III Levels A, B, and C	660	26	302	11.88
					505	19.88

Table 3. Construction Materials

PART		MATERIAL		TEMPERATURE °C	TEMPERATURE °F
Valve Body and Bonnet		WCC Steel WC9 Alloy Steel(2) CF8M Stainless Steel LCC Steel C12A Alloy Steel		-29 to 427 -29 to 593 -198 to 593 -46 to 343 -29 to 649	-20 to 800(3) -20 to 1100 -325 to 1000(1) -50 to 650 -20 to 1200
Cage, Seat Ring, and Valve Plug		See tables 4 and 5		See table 4 and 5	
Valve Stem		S20910		Not a Limiting Factor	
Valve Body-to-Bonnet Bolting	WCC Valve	SA-193-B7 Studs, SA-194-2H Nuts		-29 to 427	-20 to 800
		SA-193-B7M Studs(4), SA-194-2HM Nuts(4)		-29 to 427	-20 to 800
	LCC Valve	SA-193-B7 Studs, SA-194-2H Nuts		-46 to 343	-50 to 650
		SA-193-B7M Studs(4), SA-194-2HM Nuts(4)		-29 to 316	-20 to 600
	WC9 Valve	SA-193-B7 Studs, SA-194-2H Nuts		-29 to 427	-20 to 800
		SA-193-B16 Studs, SA-194-7 Nuts		-29 to 566	-20 to 1050
		N07718 HT Studs N07718 HT Chrome Coat Nuts		-29 to 427	-20 to 800
	C12A Valve	N07718 HT Studs N07718 HT Chrome Coat Nuts		-29 to 621	-20 to 1150
	CF8M Valve	SA479 S20910 Chrome Coat Studs SA479 S20910 Nuts		-198 to 538	-325 to 1000
		SA-193-B8M Class 2 Studs SA-194-8M Nuts		-198 to 427	-325 to 800
		SA479 S20910 Chrome Coat Studs SA479 S20910 Nuts		-198 to 593	-325 to 1100
Seat Ring Cap Screws		N07718		-198 to 593	-325 to 1100
Bonnet, Seat Ring, and Cage Gaskets		N06600/Graphite	Oxidizing	-198 to 427	-325 to 800
			Non-Oxidizing	-198 to 593	-325 to 1100
ED Piston Ring or Lower Graphite Piston Ring (254 mm [10 inch] port only)		Graphite (Fisher Designation FMS 17F27)	Oxidizing	-198 to 427	-325 to 800
			Non-Oxidizing	-198 to 482	-325 to 900
		Graphite (Fisher Designation FMS 17F39)	Oxidizing	-198 to 538	-325 to 1000
			Non-Oxidizing	-198 to 593	-325 to 1100
ED Bore Seal		N07718		-198 to 593	-325 to 1100
ET Seat Ring Seal Ring and Plug Seal Ring		Glass and Moly-Filled PTFE with N10276 spring		-73 to 232	-100 to 450
ET HTS1 Seal	Anti-extrusion Ring	PEEK (poly ether ether ketone)		Not a Limiting Factor	Not a Limiting Factor
	Backup Ring	S41000			
		S31600			
	Retaining Ring	18-8			
	Seat Ring Seal Ring Plug Seal Ring	PTFE/graphite with R30003 spring		232 to 316	450 to 600
ET Cryogenic Seal Ring		UHMWPE		-198 to 66	-325 to 150
Packing (Temperatures shown are in-body temperatures with Style 1 extension bonnet.)		PTFE V-Ring		-46 to 232	-50 to 450
		PTFE Composition		-46 to 232	-50 to 450
		Graphite Ribbon/Filament	Oxidizing	-198 to 354	-325 to 700
			Non-Oxidizing	-198 to 538	-325 to 1000
Packing Flange, Studs, and Nuts		Steel		-29 to 427	-20 to 800
		S31600		-198 to 593	-325 to 1100
Packing Follower, Spring (PTFE V-Ring Packing), or Lantern Ring		S31600		Not a Limiting Factor	
Packing Box Ring		S31600		-198 to 593	-325 to 1100

1. May be used up to 1100°F if manufacturing controls carbon content to 0.04% minimum or 0.08% maximum.
2. Flanged valve bodies are limited to 427°C (800°F).
3. Limited to 354°C (700°F) in flanged valve bodies.
4. Compliant to NACE MR0175-2002, NACE MR0175/ISO15156, and NACE MR0103.

Table 4. Standard, Whisper Trim III, and Cavitrol III Trim Descriptions

VALVE	TRIM DESIGNATION	BODY MATERIAL	VALVE PLUG	SEAT RING	CAGE	CAP SCREWS	TEMPERATURE LIMIT	
							°C	°F
ED	40	WCC/WC9	CA6NM (modified 410 SST)	CB7CU-1 H1075	CB7CU-1 H1075	N07718	-29 to 427	-20 to 800
		LCC					-46 to 343	-50 to 650
	41	WCC	WC9 Steel with CoCr-A	WC9 Steel with CoCr-A	WC9 - Nitrided	N07718	-29 to 427	-20 to 800
		LCC					-46 to 343	-50 to 650
		WC9	WC9 Steel with CoCr-A	WC9 Steel with CoCr-A	WC9 - Nitrided	N07718	-29 to 566	-20 to 1050
		C12A					-29 to 593	-20 to 1100
	42	C12A	F91 with CoCr-A	F91 with CoCr-A	F91 - Nitrided	N07718	-29 to 621	-20 to 1150
	43(1)	WCC/WC9	CF8M with CoCr-A on seat & guide	CF8M with CoCr-A seat	CF8M Chrome Plate	N07718	-29 to 343	-20 to 650
		LCC					-46 to 343	-50 to 650
		CF8M					-73 to 343	-100 to 650
	44(1)	CF8M	CF8M with CoCr-A on seat & guide	CF8M with CoCr-A seat	CF8M Chrome-Coated	N07718	-73 to 538(2)	-100 to 1000(2)
ET	45	WCC/WC9	CA6NM HT	CB7CU-1 H1075	CB7CU-1 H1075	---	-29 to 316	-20 to 600
		LCC					-46 to 316	-50 to 600
		CF8M					-46 to 316	-50 to 600
	46	WCC/WC9	CF8M with CoCr-A on seat & guide	CF8M with CoCr-A seat	CF8M Chrome Plate	---	-29 to 316	-20 to 600
		LCC					-46 to 316	-50 to 600
		CF8M					-73 to 316	-100 to 600
	47(3)	WCC/WC9	CF8M with CoCr-A on seat & guide	CF8M with CoCr-A seat	CB7CU-1 DBL H1150	---	-29 to 93	-20 to 200
		LCC					-46 to 93	-50 to 200
	48(1)	CF8M	CF8M with CoCr-A on seat & guide	CF8M	CF8M Chrome-Coated	---	-198 to 66	-325 to 150

1. NACE MR0175-2002, MR0175, ISO 15156, and MR0103 approved trim combinations. Environmental restrictions apply to MR0175/ISO15156.
2. May be used up to 593°C (1100°F) if 316H valve body material is used. Contact your Emerson Process Management sales office for additional information.
3. NACE MR0175-2002 approved trim combination.

Table 5. WhisperFlo Trim Descriptions

VALVE	TRIM DESIGNATION	BODY MATERIAL	VALVE PLUG	SEAT RING	CAGE	CAP SCREWS	TEMPERATURE LIMIT	
							°C	°F
ED	954	WCC	CA6NM	WC9 with CoCr-A seat	S41000/ ENC/Ult	N07718	-29 to 427	-20 to 800
		WC9					-29 to 482	-20 to 900
	951(1)	WCC	CF8M with CoCr-A on seat & guide	CF8M with CoCr-A seat	S31600/ ENC/Ult	N07718	-29 to 427	-20 to 800
		WC9					-29 to 566	-20 to 1050
		CF8M(2)					-29 to 593	-20 to 1100
ET	955	WCC/WC9	CA6NM	S17400 H1075	S41000/ ENC/Ult	---	-29 to 316	-20 to 600
ET	953(1)	WCC/WC9	CF8M with CoCr-A on seat & guide	CF8M with CoCr-A seat	S31600/ ENC/Ult	---	-29 to 316	-20 to 600
		CF8M					-29 to 316	-20 to 600

1. NACE approved trim combinations. Environmental restrictions apply to MR0175/ISO15156.
2. May be used up to 593°C (1100°F) if 316H valve body material is used. Contact your Emerson Process Management sales office for additional information.

Table 6. Dimensions and Approximate Weights

END CONNECTION		APPROXIMATE WEIGHT (LONG-NECK VALVE)(2)		DIMENSION															
				A						G		Standard Style 1 Extension Bonnet							
				CL150		CL300		CL600				Short-Neck Valve				Long-Neck Valve			
												D		Max. Travel		D		Max. Travel	
Size, NPS	Type(1)	Kg	Lb	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch
12	RF	1410	3100	737	29.00	775	30.50	819	32.25	338	13.31	592	23.32	140	5.5	745	29.32	203	8
	RTJ			746	29.38	790	31.12	822	32.38										
	BW	1220	2700	---	---	---	---	819	32.25										
14	RF	1565	3450	889	35	927	36.5	972	38.25	379	14.92	561	22.07	140	5.5	713	28.06	203	8
	RTJ			---	---	---	---	---	---										
	BW	1340	2950	---	---	---	---	972	38.25										
16	RF	1720	3800	1016	40.00	1057	41.62	1108	43.62	389	15.31	561	22.07	140	5.5	713	28.06	203	8
	RTJ			1026	40.38	1073	42.25	1111	43.75										
	BW	1450	3200	---	---	---	---	1108	43.62										
30	CL300 RF	6690	14750	2134	84.00	2134	84.00	---	---	673	26.5	1134	44.64	372	14.63	1401	55.14	504	19.84
	CL600 RF	13600	30000	---	---	---	---	2210	87.00	699	27.5	1134	44.64	372	14.63	1401	55.14	504	19.84

1. RF–raised face; RTJ–ring-type joint; BW–buttwelding.

Figure 4. Dimensions and Approximate Weights (also see table 6)