

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.

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.



W9156-1

Fisher NPS 24 Valve Assembly with Piston Actuator

- **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, 5, and 6

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, ■ CF8M stainless steel, ■ CD3MN duplex stainless steel, or ■ CD3MWCuN super-duplex 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 505 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 7

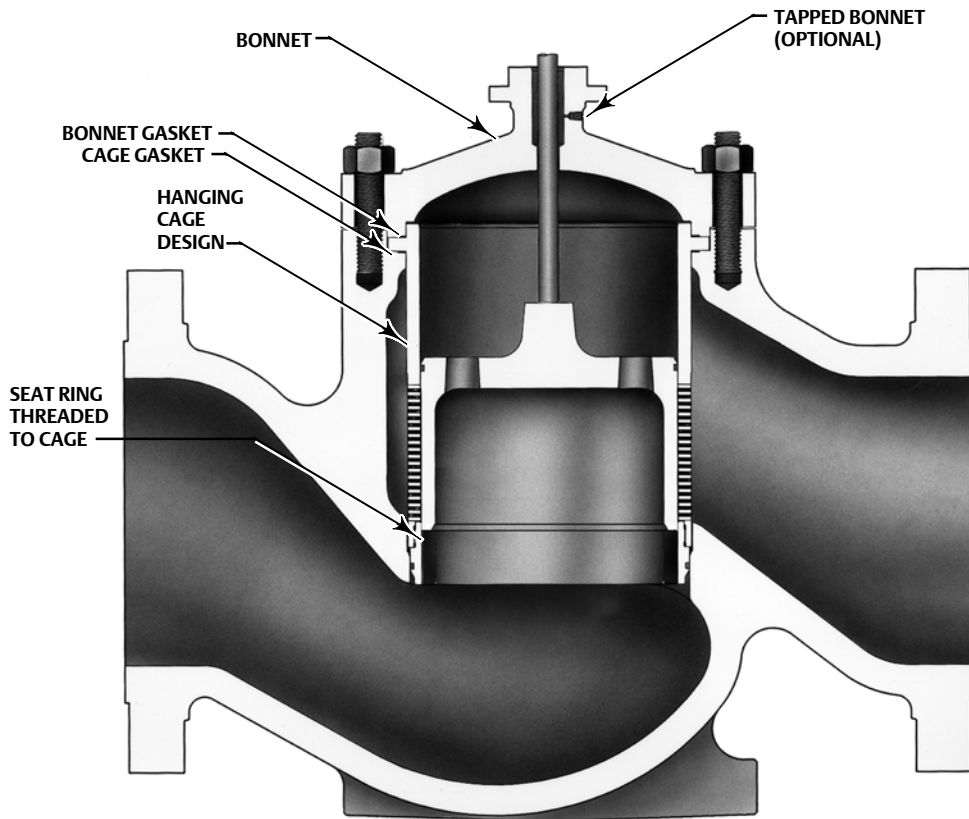
1. The pressure/temperature limits in this bulletin and any applicable standard or code limitation for valve should not be exceeded.

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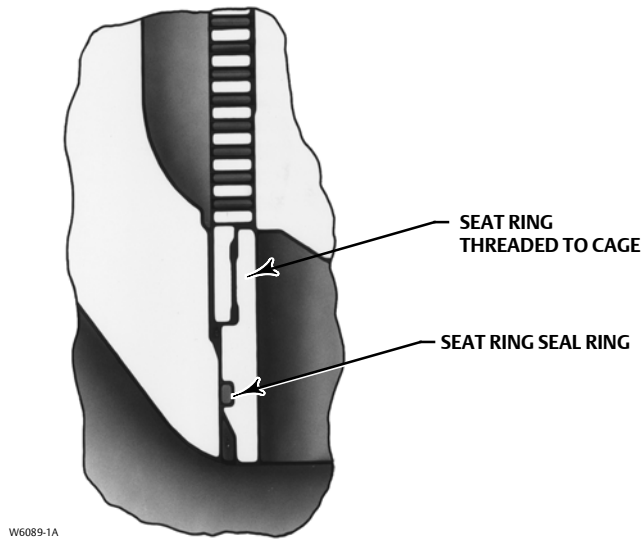
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Figure 1. Typical Fisher Large ET Valve



COMPLETE VALVE



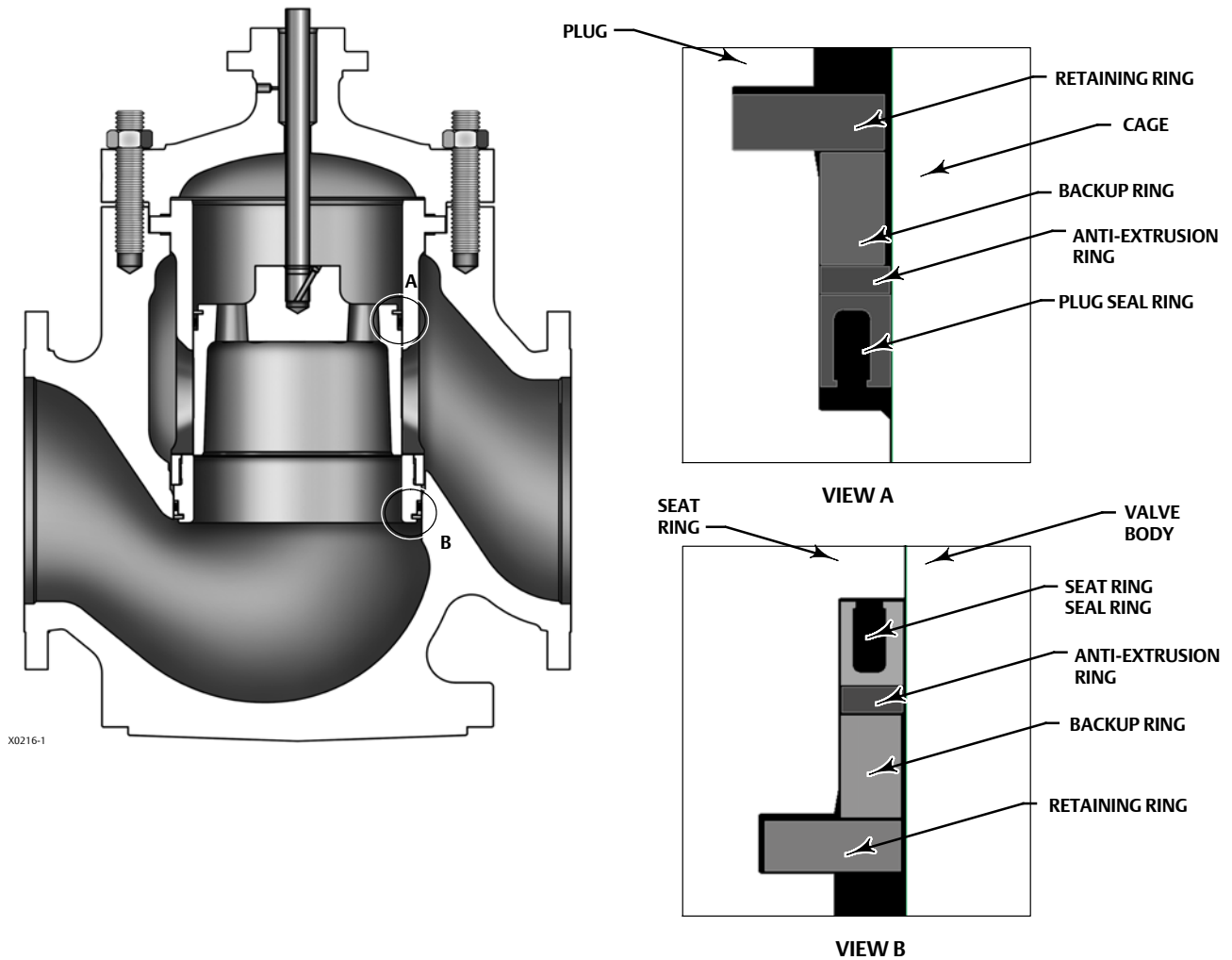
SEAT RING SEAL DETAIL

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 (Flow Down)



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 5 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.

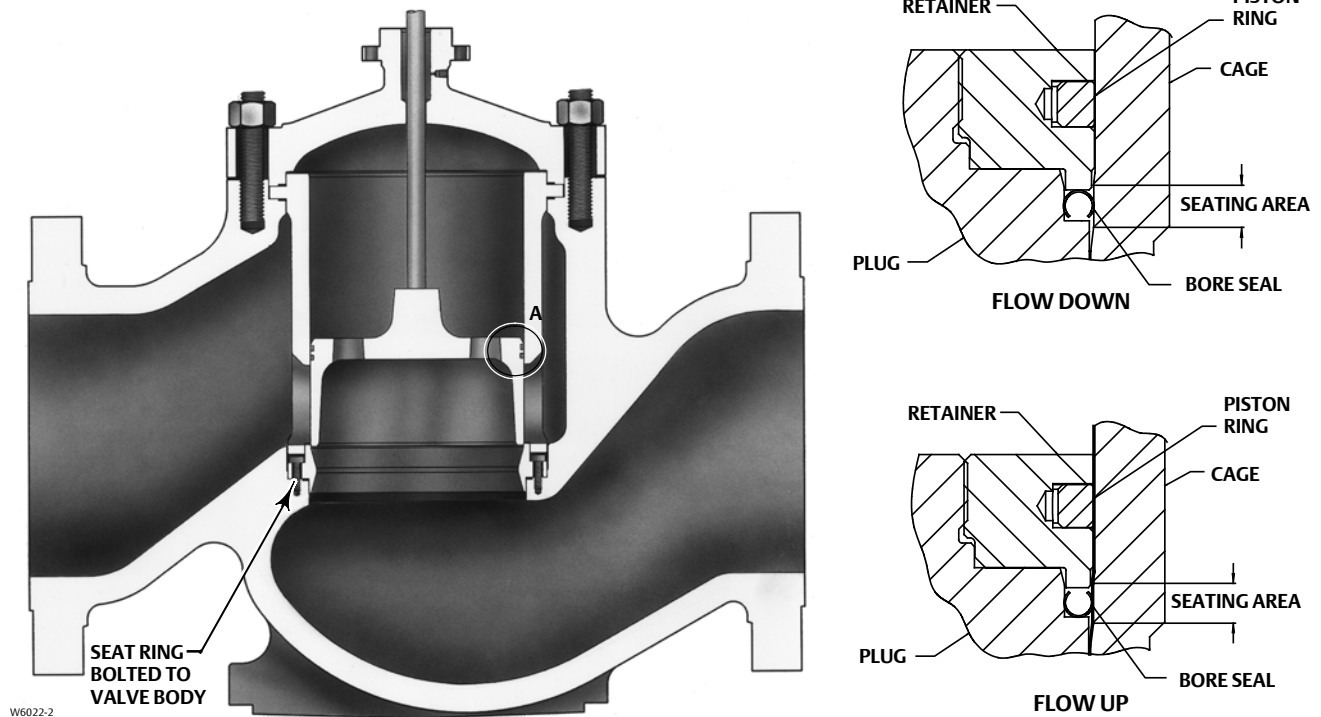
The Bore Seal employs a metal C-shaped seal ring that is secured to the outside diameter of the valve plug. When the valve plug comes into contact with the seat ring, to close the valve, the Bore Seal is compressed against the cage wall thereby blocking a secondary leakage path that exists between the 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, 5, and 6 for materials.

Figure 3. Typical Fisher Large ED with Bore Seal



W6022-2

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
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 (WCC, WC9, CF8M, LCC, and C12A Valves)

PART		MATERIAL	TEMPERATURE		
			°C	°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 5 and 6	See table 5 and 6		
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	
	C12A Valve	N07718 HT Studs N07718 HT Chrome Coat Nuts	-29 to 427	-20 to 800	
		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	-46 to 427	-50 to 800
			Non-Oxidizing	-46 to 482	-50 to 900
		Graphite (Fisher Designation FMS 17F39)	Oxidizing	-46 to 538	-50 to 1000
			Non-Oxidizing	-46 to 593	-50 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. Construction Materials (CD3MN and CD3MWCuN Valves)

PART		MATERIAL	TEMPERATURE	
			°C	°F
Valve Body and Bonnet		CD3MN Duplex Stainless Steel CD3MWCuN Super-Duplex Stainless Steel	-51 to 316 -51 to 316	-60 to 600 -60 to 600
Valve Stem		S32760	Not a Limiting Factor	
Valve Body-to-Bonnet Bolting		SA-193-B7 Studs, SA-194-2H Nuts	-46 to 427	-50 to 800
		S32760 Studs and Nuts	Not a Limiting Factor	
		SA-193-B7/Zinc HDG Studs, SA-194-2H/Zinc HDG Nuts	-46 to 200	-50 to 400
Seat Ring Cap Screws		N07718	Not a Limiting Factor	
Bonnet, Seat Ring, and Cage Gaskets		N06600/Graphite	Oxidizing	Not a Limiting Factor
			Non-Oxidizing	
ED Piston Ring or Lower Graphite Piston Ring (254 mm [10 inch] port only)		Graphite (Fisher Designation FMS 17F27)	Oxidizing	Not a Limiting Factor
			Non-Oxidizing	
		Graphite (Fisher Designation FMS 17F39)	Oxidizing	Not a Limiting Factor
			Non-Oxidizing	
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
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	Not a Limiting Factor
Non-Oxidizing				
Packing Flange, Studs, and Nuts		S31600	Not a Limiting Factor	
Packing Follower, Lantern Ring, and Box Ring	CD3MN Valve	S31803	Not a Limiting Factor	
	CD3MWCuN Valve	S32760	Not a Limiting Factor	

Table 5. 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⁾	
49(4)	CD3MN	S31803 with R31233 on seat & guide	S31803 with CoCr-A seat	S31803 Chrome Plate	N07718	-51 to 316	-60 to 600	
50 ⁽⁵⁾	CD3MWCuN	S32760 with R31233 on seat & guide	S32760 with CoCr-A seat	S32760 Chrome Plate	N07718	-51 to 316	-60 to 600	
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
	49(4)	CD3MN	S31803 with R31233 on seat & guide	S31803 with CoCr-A seat	S31803 Chrome Plate	---	-51 to 316	-60 to 600
50 ⁽⁵⁾	CD3MWCuN	S32760 with R31233 on seat & guide	S32760 with CoCr-A seat	S32760 Chrome Plate	---	-51 to 316	-60 to 600	
<p>1. NACE MR0175-2002, MR0175, ISO15156, 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. 4. NACE MR0175/ISO15156 approved trim combinations. Environmental restrictions apply to MR0175/ISO15156. 5. NACE MR0175-2002 and MR0175/ISO15156 approved trim combinations. Environmental restrictions apply to MR0175/ISO15156.</p>								

Table 6. 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

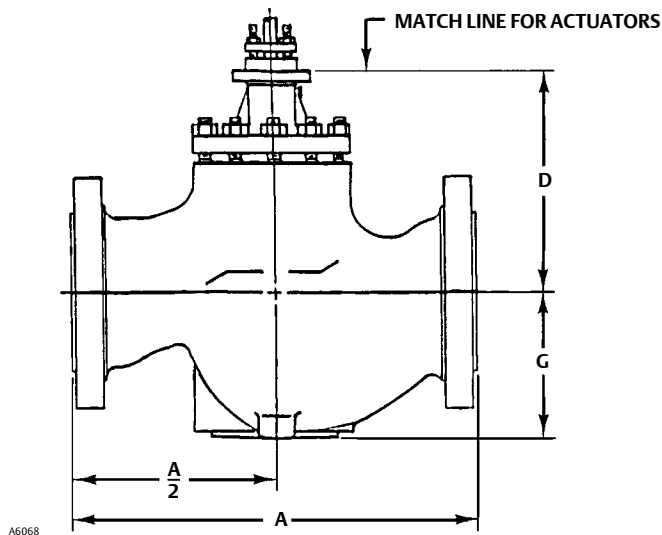
1. NACE approved trim combinations. Environmental restrictions apply to MR0175/ISO15156.
2. May be used up to 593°C (1100°F) if 316H valve body material is used. Contact your Emerson Process Management sales office for additional information.

Table 7. 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			
				mm	Inch	mm	Inch	mm	Inch			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	---	---	---	---										
	CL600 RF	13600	30000	---	---	---	---	2210	87.00										

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

Figure 4. Dimensions and Approximate Weights (also see table 7)



Product Bulletin

51.1:ET/ED (Large)
March 2015

Large ET and ED Valves
D103554X012

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