

Fisher™ FB Control Valve

Fisher FB angle valves are used with compressible fluids on special applications requiring maximum noise attenuation capability and high capacity.

Typical applications include main steam reducing valves and compressor bypass valves. FB valves are also commonly used for sour gas applications in petrochemical and gas processing plants.

Contact your [Emerson sales office](#) for more information.

Features

- **Noise Attenuation** — Whisper Trim™ III or WhisperFlo™ cages used in FBD or FBT valves can reduce noise produced by high flow rates and large pressure drops.
- **Minimal Noise Regeneration** — Regeneration of valve noise is significantly reduced by reducing the outlet flow velocity with an expanded-outlet design.
- **Hung Cage Design** — The design eliminates gasketing problems caused by thermal expansion and contraction of long parts such as the cage assembly.
- **Excellent Sealing Capability** — The ENVIRO-SEAL™ or HIGH-SEAL packing system options are available. These packing systems provide excellent sealing, guiding, and loading force transmission.
- **Tight Shutoff** — A spring-loaded seal ring with PEEK anti-extrusion rings is available on FBT valves for class V shutoff up to 316°C (600°F). Bore seal is available on FBD valves for class V shutoff above 316°C (600°F).



X1843

**Fisher FBT Valve with
ODV High Performance Actuation Package**

Specifications

Available Configurations

Characteristics for FBD & FBT: Single-port, angle-style valve body with cage guiding, balanced valve plug, and push-down-to-close valve plug action

FBD: High-temperature valve with graphite piston rings, hung cage, and seat ring welded to the valve body. Used on applications with temperatures up to 593°C (1100°F)

FBT: Standard and low temperature design with integral cage/seat ring assembly and spring-loaded seal ring on the seat ring and valve plug. Used on applications with temperatures up to 232°C (450°F) and temperatures up to 316°C (600°F) with PEEK anti-extrusion rings

Valve Sizes

See tables 1 and 2

End Connection Styles⁽²⁾

All Outlet Sizes: CL150, 300, and 600 ■ Raised-face, ■ RTJ, and ■ BWE

Outlet Sizes NPS 30, 36, 42, and 48 : ■ Series A or B flanges available

Maximum Inlet Pressures and Temperatures⁽¹⁾

Consistent with applicable ■ CL150, ■ CL300, or ■ CL600 pressure-temperature ratings per ASME B16.34

Cage Performance Levels

Whisper Trim III Cage:

0.999 $\Delta P/P_1$ maximum for levels A1 through D3

WhisperFlo Cage:

0.999 $\Delta P/P_1$ maximum for levels X, Y, and Z

Maximum Pressure Drops⁽¹⁾

Valve bodies and trims capable of full rated pressure drop

Temperature Capability

Piston Rings, Plug Seals, Gaskets, and Packing: See table 4

Trim: See tables 5 and 6

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

FBD: ■ Standard Class II, ■ Optional--Class IV, with multiple piston rings, and ■ Optional--Class V with Bore Seal trim (contact your [Emerson sales office](#) for additional information)

FBT: ■ Standard--Class IV ■ Optional--Class V

Also see table 4

Construction Materials

Valve, Bonnet, Stem and Other Metal Parts: See table 3

Piston Rings and Plug Seals, Gaskets, and Packing: See table 4

Trim: See tables 5 and 6

Flow Characteristic

Whisper Trim III Levels A, B, C and D: Linear

WhisperFlo Levels X, Y, and Z: Linear

Flow Direction

Flow up

Port Diameters

See table 2

Valve Plug Stem and Yoke Boss Diameters

See tables 1 and 2

Typical Actuators

Pneumatic Piston: ■ 585C, ■ 785C, and ■ 685

Diaphragm: ■ 657, ■ 667, and ■ 3025

Valve Dimensions and Approximate Weights

See figure 2 and tables 8, 9, 10, 11, and 12

Options

■ Special constructions with the inlet designed for higher pressure or valve class rating than the outlet are also available, ■ ENVIRO-SEAL, HIGH-SEAL, and ISO-Seal packing system, ■ Packing box leak-off connection, ■ Packing lubricator or ■ lubricator/isolating valve, and ■ Special end connections available upon request

1. None of the pressure/temperature limits in this bulletin nor any ASME standard limitations should be exceeded.
2. Series A and B flanges are available on sizes over NPS 24. Please specify Series A or B when ordering.

Table 1. Fisher Cast FBT Valve Body Sizes and Trim Information

VALVE SIZE, INLET AND OUTLET, NPS	Whisper Trim III Level A, B, and C Cages			Whisper Trim III Level D Cage			STEM DIAMETER		YOKE BOSS DIAMETER	
	Port Diameter		Unbalanced Area	Port Diameter		Unbalanced Area				
	mm	Inch	Inch ²	mm	Inch	Inch ²	mm	Inch	mm	Inch
8x12	171	6.75	(1)	132	5.18	(1)	25.4	1	127	5
10x16 12x16	197	7.75	(1)	171	6.75	(1)	31.8	1-1/4	127	5H
12x18	252	9.93	(1)	197	7.75	(1)				
12x20	275	10.81	(1)	224	8.81	(1)				
16x24	352	13.87	0.49	275	10.81	0.38				
20x30	430	16.93	0.74	378	14.87	0.62	50.8	2	178	7
24x36 30x36	506	19.93	0.94	430	16.93	0.74				
36x42	660	26.0	1.52	559	22.0	1.19				
42x48	813	32.0	2.08	660	26.0	1.52				
1. Please contact your Emerson sales office for additional information.										

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Table 2. Fisher Fabricated FB Valve Body Sizes and Trim Information

VALVE SIZE, INLET AND OUTLET, NPS	Whisper Trim III Level A, B, and C Cages			Whisper Trim III Level D Cage			WhisperFlo Trim			STEM DIAMETER		YOKE BOSS DIAMETER	
	Port Diameter		Unbalanced Area	Port Diameter		Unbalanced Area	Port Diameter		Unbalanced Area				
	mm	Inch	Inch²	mm	Inch	Inch²	mm	Inch	Inch²	mm	Inch	mm	Inch
8 x 12 10 x 12	171	6.75	0.24	132	5.18	0.19	178	7	0.24	25.4	1	127	5 & 5H
10 x 16 12 x 16 16 x 16	197	7.75	0.28	171	6.75	0.24	178	7	0.24	31.8	1-1/4		
12 x 18 16 x 18	252	9.93	0.35	197	7.75	0.28	178	7	0.24				
10 x 20 12 x 20 16 x 20 20 x 20	275	10.81	0.38	224	8.81	0.31	279	11	0.38				
12 x 24 16 x 24 18 x 24 20 x 24 24 x 24	352	13.87	0.49	275	10.81	0.38	375	14.75	0.51				
16 x 30 20 x 30 24 x 30 30 x 30	430	16.93	0.59	378	14.87	0.52	464	18.25	0.63	50.8	2	178	7
20 x 36 24 x 36 30 x 36 36 x 36	506	19.93	0.69	430	16.93	0.59	464	18.25	0.63				

Bore Seal Description

The Bore Seal is available for the FBD 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 FBT should be used when Class V shutoff is required. This trim can only be used with trim 234, see table 4 and 6 for temperature limits.

The Bore Seal employs a metal C-shaped seal ring that

is secured to the outside diameter of the valve plug.

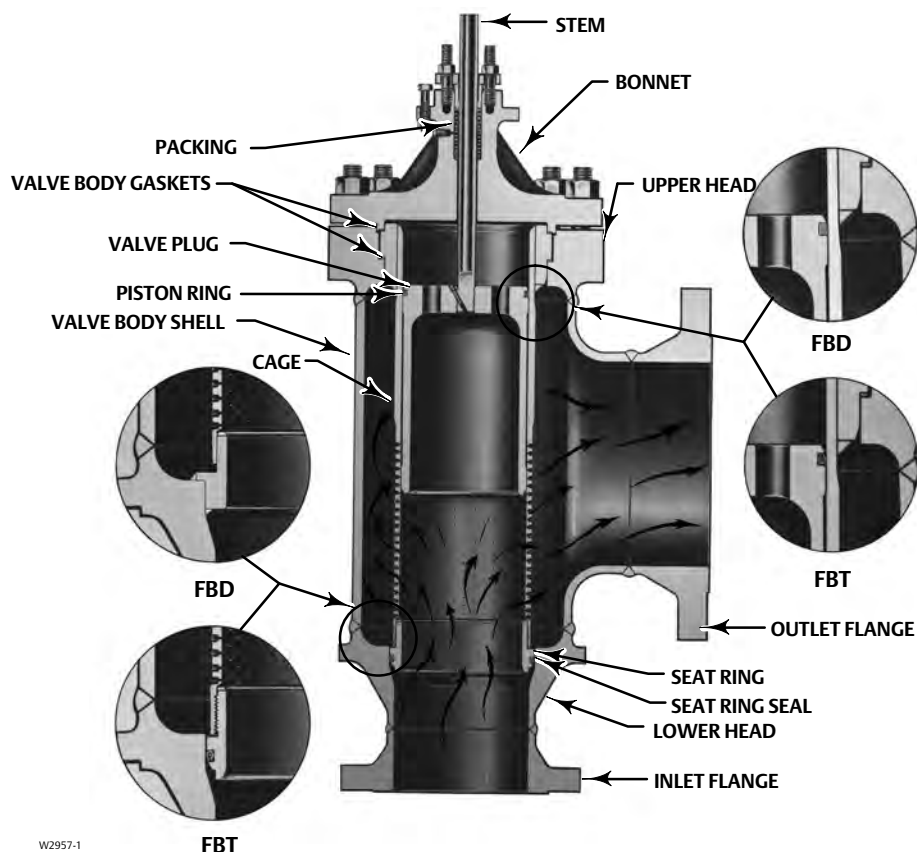
When the valve plug comes into contact with the seat ring, to close the valve, the Bore Seal is compressed against the cage wall blocking a secondary leakage path that exists between the plug and cage wall.

When the valve plug is not in contact with the seat ring (i.e. valve open) the Bore Seal is not engaged and the piston rings that are also secured to the outside diameter of the plug assume the role of blocking this secondary leakage path.

Table 3. FB Valve Body and Bonnet Construction Materials

CAST FBT		
Valve Body	Bonnet	Class Rating
WCC	WCC	CL150
		CL300
		CL600
LCC	LCC	CL150
		CL300
		CL600
CF8M	CF8M	CL150
		CL300
		CL600
FABRICATED FB ⁽¹⁾		
Valve Body	Bonnet	Flanges and Head
WPC	WCC	SA105 ⁽²⁾
WP22	WC9	F22
WPL6	LCC	LF2
304L	CF3	304L
316L	CF3M	316L
316 SST	CF8M	316 SST
Part	Standard	
Valve Stem	25.4 and 31.8 mm (1 and 1-1/4 inch) stems: S20910 50.8 mm (2-inch) stems: S20910	
Packing Box Follower, Spring ⁽³⁾ , Washer, and Lantern Ring ⁽³⁾	316 SST	
1. Pressure Class Rating options include CL150, CL300, CL600, and CL900. 2. For pressure-temperature ratings, reference the pressure-temperature ratings for SA-105. 3. The spring is used with single PTFE V-ring packing only. The lantern ring replaces the spring for other packing.		

Figure 1. Fisher FB Valve Body Showing Internal Construction



W2957-1

Table 4. Construction Materials for Piston Ring, Plug Seal, Packing, and Gaskets

PART		STANDARD		OPTIONAL	
		Material	Temperature	Material	Temperature
FBD Piston Ring	Material	Graphite	-46 to 593°C (-50 to 1100°F)	Bore Seal N07718	316 to 593°C (600 to 1100°F)
	Shutoff Class	II is standard; IV ⁽¹⁾ is optional	---	Class V	---
FBT Plug Seal	Material	N10276/Glass and Moly-filled PTFE	-29 to 232°C (-20 to 450°F)	Carbon-Filled PTFE w/ PEEK anti-extrusion rings	232 to 316°C (450 to 600°F)
	Shutoff Class	IV is standard; V is optional	---	Standard Class V	---
Packing		Spring-Loaded PTFE V-Ring	Single PTFE V-Ring -46 to 232°C (-50 to 450°F)	PTFE/Composition	-73 to 232°C (-100 to 450°F)
				Graphite Ribbon/Filament	-198 to 593°C ⁽²⁾ (-325 to 1100°F) ⁽²⁾
				ENVIRO-SEAL or HIGH-SEAL Packing System	See the separate ENVIRO-SEAL and HIGH-SEAL Product Bulletin
Gaskets		N04400/Silver	-254 to 593°C (-425 to 1100°F)	S31600/Graphite	-198 to 593°C (-325 to 1100°F)

1. Class IV with multiple piston rings only.
2. To 371°C (700°F) with oxidizing service.

Table 5. Cast FBT Whisper Trim III Trim Materials and Temperatures

TRIM DESIG- NATION	TRIM MATERIAL			VALVE BODY MATERIAL					
	Plug	Cage	Seat Ring	WCC		LCC		CF8M	
				Trim Temperature, °C (°F)					
				Min	Max	Min	Max	Min	Max
229	CA6NM HT	17-4 H1075 (CB7CU-1 H1075)	17-4 H1075 (CB7CU-1 H1075)	-20 (-29)	600 (315)	-50 (-46)	600 (315)	---	---
230	316 SST (CF8M) w/CoCr-A S&G	17-4 H1075 (CB7CU-1 H1075)	316 SST (CF8M) w/CoCr-A	-20 (-29)	200 (93)	-50 (-46)	200 (93)	-80 (-62)	200 (93)
232A ⁽¹⁾	316 SST (CF8M) w/CoCr-A S&G	316 SST (CF8M) Chrome Plate	316 SST (CF8M) w/CoCr-A	-20 (-29)	600 (315)	-50 (-46)	600 (315)	-325 (-198)	600 (315)
236	17-4 H1150 (CB7CU-1 H1150) w/CoCr-A	17-4 H1075 (CB7CU-1 H1075) Chrome Plate	17-4 H1150 (CB7CU-1 H1150) w/CoCr-A	-20 (-29)	600 (315)	-50 (-46)	600 (315)	---	---
1. NACE MR0175-2002, MR0175-2003, MR0175/ISO 15156, and MR0103 approved trim combination.									

1. NACE MR0175-2002, MR0175-2003, MR0175/ISO 15156, and MR0103 approved trim combination.

Table 6. Fabricated FB Whisper Trim III Trim Materials and Temperatures

TRIM DESIG- NATION	TRIM MATERIAL				VALVE BODY MATERIAL							
	Plug	Cage	Seat Ring	Baffle	WPC (SA234-WPC)		316L SST (SA403-WP316L) 316 SST (SA403-WP316) 304L SST (SA403-WP304L)		WPL6 (SA420-WPL6)		WP22 (SA243-WP22)	
					Trim Temperature, °C (°F)							
Min	Max	Min	Max	Min	Max	Min	Max					
230	CF8M w/ CoCr-A seat and guide	S17400 H1075 (CB-7Cu-1 H1075)	CF8M w/ CoCr-A on seat	Carbon steel	-29 (-20)	427 (800)	-62 (-80)	427 (800)	-46 (-50)	343 (650)	-29 (-20)	427 (800)
232(2)	CF8M w/ CoCr-A seat and guide	CF8M/ ENC ⁽¹⁾	CF8M w/ CoCr-A on seat	18-8 stainless steel	-29 (-20)	343 (650)	-198 (-325)	343 (650)	-46 (-50)	343 (650)	-29 (-20)	343 (650)
234	WC9 or F22 steel with CoCr-A seat seat and guide	WC9 steel/ nitrided	F22 with CoCr-A seat	Cr-Mo steel	-29 (-20)	427 (800)	---	---	---	---	-29 (-20)	593 (1100)
1. Electroless nickel coated. 2. Meets the metallurgical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156. Environmental restrictions apply for MR0175/ISO15156.												

1. Electroless nickel coated.

2. Meets the metallurgical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156. Environmental restrictions apply for MR0175/ISO15156.

Table 7. Fabricated FB WhisperFlo Metal Trim Materials and Valve Body/Trim Temperature Capabilities

TRIM DESIG- NATION	TRIM MATERIAL			VALVE BODY MATERIAL							
	Plug	Cage	Seat Ring	WPC (SA234-WPC)		316L SST (SA403-WP316L) 316 SST (SA403-WP316) 304L SST (SA403-WP304L)		WPL6 (SA420-WPL6)		WP22 (SA243-WP22)	
				Trim Temperature, °C (°F)							
				Min	Max	Min	Max	Min	Max	Min	Max
952	CA6NM HT	410 SST	CF8M with CoCr-A on seat	-29 (–20)	427 (800)	-29 (–20)	427 (800)	-29 (–20)	343 (650)	-29 (–20)	427 (800)
953 ⁽¹⁾	CF8M with CoCr-A on Seat and Guide	316 SST / (Chrome coat)	CF8M with CoCr-A on seat	-29 (–20)	427 (800)	-198 (–325)	(2)	-46 (–50)	343 (650)	-29 (–20)	427 (800)
1. Meets the metallurgical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156. Environmental restrictions apply for MR0175/ISO15156. 2. 316L maximum temperature is 454°C (850°F). 316 maximum temperature is 538°C (1000°F). 304L maximum temperature is 427°C (800°F).											

1. Meets the metallurgical requirements of NACE MR0175-2002, NACE MR0103 and NACE MR0175/ISO 15156. Environmental restrictions apply for MR0175/ISO15156.

2. 316L maximum temperature is 454°C (850°F), 316 maximum temperature is 538°C (1000°F), 304L maximum temperature is 427°C (800°F).

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Table 8. Cast FBT Approximate Weights

VALVE SIZE, NPS INLET x OUTLET	VALVE AND BONNET ASSEMBLY WEIGHT ⁽¹⁾											
	Pressure Rating											
	CL150				CL300				CL600			
	Integral		Free Standing		Integral		Free Standing		Integral		Free Standing	
	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs	kg	lbs
8 x 12	---	---	---	---	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
10 x 16	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 16	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 18	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 20	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
16 x 24	2377	5240	2531	5580	2458	5420	2672	5890	2898	6390	2889	6370
20 x 30	4133	9111	4260	9392	4322	9528	4512	9947	5193	11448	5512	12152
24 x 36	4823	10632	4947	10907	4897	10797	5322	11732	6145	13547	6644	14647
30 x 36	---	---	---	---	5633	12419	5671	12502	---	---	---	---
36 x 42	10106	22279	10974	24193	10081	22224	11014	24281	---	---	---	---
42 x 48	---	---	---	---	12551	27671	14158	31213	---	---	---	---

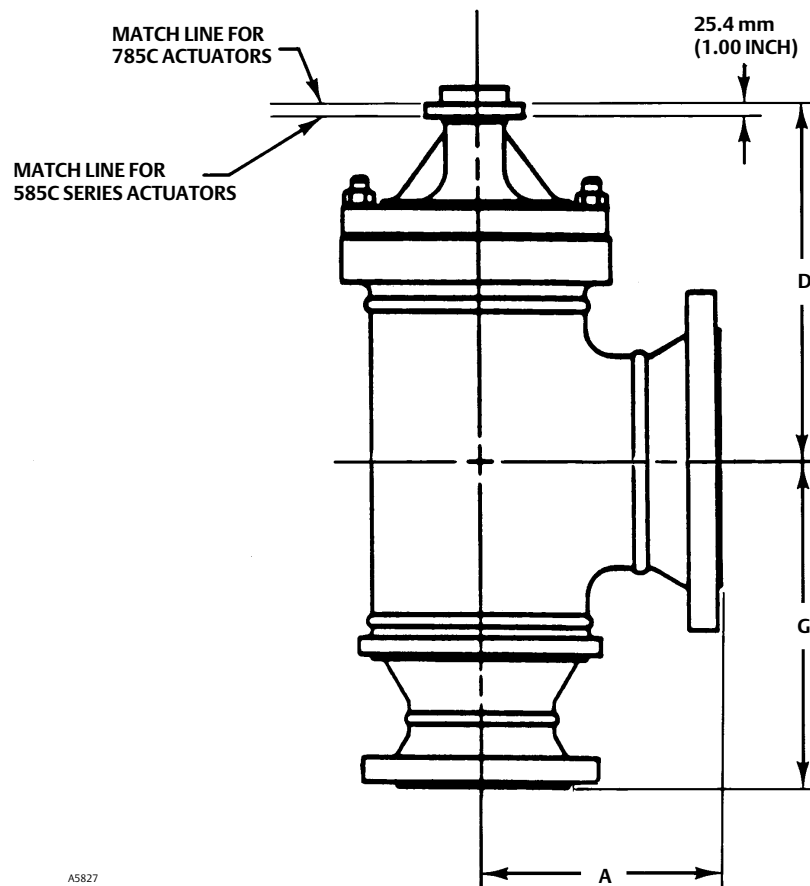
1. With plain bonnet.
2. Please contact your [Emerson sales office](#) for additional information.

Table 9. Fabricated FB Approximate Weights

VALVE SIZE (NPS) INLET X OUTLET	FABRICATED VALVE AND BONNET ASSEMBLY ⁽¹⁾					
	Pressure Rating ⁽²⁾					
	CL150		CL300		CL600	
	Approximate Weight		Approximate Weight		Approximate Weight	
	kg	lb	kg	lb	kg	lb
8 X 12	416	925	509	1130	509	1130
10 X 12	421	935	526	1170	545	1210
10 X 16	612	1360	801	1780	1125	2500
12 X 16	619	1375	810	1800	1148	2550
16 X 16	666	1480	761	1690	1260	2800
12 X 18	810	1800	1071	2380	1496	3325
16 X 18	833	1850	1112	2470	1609	3575
10 X 20	1060	2355	1418	3150	1980	4400
12 X 20	1013	2250	1373	3050	1901	4225
16 X 20	1037	2305	1395	3100	2009	4465
20 X 20	1062	2360	1418	3150	2104	4675
12 X 24	1575	3500	2070	4600	2894	6430
16 X 24	1564	3475	2106	4680	3011	6690
18 X 24	1575	3500	2115	4700	3060	6800
20 X 24	1589	3530	2129	4730	3105	6900
24 X 24	1620	3600	2160	4800	3231	7180
16 X 30	2610	5800	3330	7400	---	---
20 X 30	2651	5890	3357	7460	---	---
24 X 30	2684	5965	3420	7600	---	---
30 X 30	2745	6100	3555	7900	---	---
20 X 36	3848	8500	4928	10950	---	---
24 X 36	3897	8660	4995	11100	---	---
30 X 36	4019	8860	5130	11400	---	---
36 X 36	4100	9110	5400	12000	---	---

1. Free standing.
2. Pressure rating for all sizes through NPS 24 outlet. NPS 30 and 36 outlets conform to MSS SP-44. Dimensions and weights and or butt welding-end valves are available on request.

Figure 2. Fisher Cast FBT Flanged Valve Body Dimensions (also see tables 10, 11, and 12)



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Figure 3. FB Body Design Options



Integral



Free Standing

NOTE: Please specify Integral or Free Standing flanges when ordering.

Table 10. Fisher Cast FBT CL150 Face-to-Face Dimensions (also see figure 2)⁽¹⁾

CL150 RF FLANGED												
Valve Size, NPS Inlet x Outlet	Dimensions											
	Free Standing						Integral Flange					
	G		A		D		D		A		D	
	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches
8 x 12	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
16 x 24	620	24.4	597	23.5	1023	40.29	476	18.74	597	23.5	1023	40.29
20 x 30 ⁽²⁾	997	39.25	717	28.22	990	38.98	761	29.97	717	28.22	990	38.98
24 x 36 ⁽²⁾	959	37.75	794	31.25	977	38.47	749	29.5	794	31.25	977	38.47
36 x 42 ⁽²⁾	932	36.7	1011	39.82	1428	56.22	747	29.4	1011	39.82	1428	56.22

1. For FBD face-to-face dimensions, please contact your [Emerson sales office](#) for additional information.
2. Option for ASME B16.47 series A or series B flange(s).

Table 11. Fisher Cast FBT CL300 Face-to-Face Dimensions (also see figure 2)⁽¹⁾

CL300 RF FLANGED												
Valve Size, NPS Inlet x Outlet	Dimensions											
	Free Standing						Integral Flange					
	G		A		D		D		A		D	
	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches
8 x 12	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
10 x 16	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 16	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 18	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 20	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
16x24	620	24.4	597	23.5	1023	40.29	476	18.74	597	23.5	1023	40.29
20 x 30 ⁽²⁾	997	39.25	717	28.22	990	38.98	761	29.97	717	28.22	990	38.98
24 x 36 ⁽²⁾	917	36.12	803	31.62	977	38.47	756	29.75	803	31.62	977	38.47
30 x 36 ⁽²⁾	943	37.12	803	31.62	977	38.47	857	33.75	803	31.62	977	38.47
36 x 42 ⁽²⁾	932	36.7	1011	39.82	1428	56.22	747	29.4	1011	39.82	1428	56.22
42 x 48 ⁽²⁾	1041	41	1067	42	1479	58.21	768	30.25	1067	42	1479	58.21

1. For FBD face-to-face dimensions, please contact your Emerson sales office for additional information.
2. Option for ASME B16.47 series A or series B flange(s).

Table 12. Fisher Cast FBT CL600 Face-to-Face Dimensions (also see figure 2)⁽¹⁾

CL600 RF FLANGED												
Valve Size, NPS Inlet x Outlet	Dimensions											
	Free Standing						Integral Flange					
	G		A		D		D		A		D	
	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches
8 x 12	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
10 x 16	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 16	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 18	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
12 x 20	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
16 x 24	787	31	641	25.25	848	33.39	660	26	641	25.25	848	33.39
20 x 30 ⁽²⁾	997	39.25	762	30	990	38.98	761	29.97	762	30	990	38.98
24 x 36 ⁽²⁾	965	38	883	34.75	977	38.47	756	29.75	883	34.75	977	38.47

1. For FBD face-to-face dimensions, please contact your [Emerson sales office](#) for additional information.
2. Option for ASME B16.47 series A or series B flange(s).

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