

# 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.



**Fisher FBT Valve with 585C Long Stroke Actuator**

- **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).

## 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 above 232°C (450°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 table 1

### End Connection Styles<sup>(3)</sup>

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

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

### Maximum Inlet Pressures and Temperatures<sup>(1)</sup>

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<sup>(1)</sup>

Valve bodies and trims capable of full rated pressure drop

### Temperature Capability

Piston Rings, Plug Seals, Gaskets, and Packing: See table 3

Trim: See table 4

### 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 3

### Construction Materials

Valve, Bonnet, Stem and Other Metal Parts: See table 2

Piston Rings and Plug Seals, Gaskets, and Packing: See table 3

Trim: See table 4

### Flow Characteristic

Whisper Trim III Levels A, B, C and D: Linear  
WhisperFlo Levels X, Y, and Z: Linear

### Flow Direction

Flow up

### Flow Coefficients and Valve Plug Travel

See Catalog 12

### Port Diameters

See table 1

### Valve Plug Stem and Yoke Boss Diameters

See table 1

### Typical Actuators

Pneumatic Piston: ■ 585C, ■ 585CLS, and ■ 685  
Diaphragm: ■ 657, ■ 667, and ■ 3025

### Valve Dimensions and Approximate Weights

See figure 2 and tables 6, 7, 8, 9, and 10

### Options

■ Special constructions with the inlet designed for higher pressure or valve class rating than the outlet are also available, ■ ENVIRO-SEAL and HIGH-SEAL packing system: See Fisher Bulletin 59.1:061 ([D101633X012](#)) for more information (retrofit kits are available for valve in service), ■ 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. Level A3 is not available in NPS 30 and 36 outlet sizes.

3. Series A and B flanges are available on sizes over NPS 24. Please specify Series A or B when ordering.

Table 1. Fisher FBD or 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			WhisperFlo Trim			STEM DIAMETER		YOKE BOSS DIAMETER	
	Port Diameter		Unbalanced Area	Port Diameter		Unbalanced Area	Port Diameter		Unbalanced Area				
	mm	Inch	Inch <sup>2</sup>	mm	Inch	Inch <sup>2</sup>	mm	Inch	Inch <sup>2</sup>	mm	Inch	mm	Inch
8 x 12 10 x 12	171	6.75	0.24	132	5.1875	0.19	178	7	0.24	25.4	1		
10 x 16 12 x 16 16 x 16	197	7.75	0.28	171	6.75	0.24	178	7	0.24				
12 x 18 16 x 18	252	9.9375	0.35	197	7.75	0.28	178	7	0.24				
10 x 20 12 x 20 16 x 20 20 x 20	275	10.8125	0.38	224	8.8125	0.31	279	11	0.38	31.8	1-1/4	127	5 & 5H
12 x 24 16 x 24 18 x 24 20 x 24 24 x 24	352	13.875	0.49	275	10.8125	0.38	375	14.75	0.51				
16 x 30 20 x 30 24 x 30 30 x 30	430	16.9375	0.59	378	14.875	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	19.9375	0.69	430	16.9375	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 3 and 4 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.

## Contents

Features .....	1
Specifications .....	2
Bore Seal Description .....	3
Tables	
Valve Body Sizes and Trim Information .....	3
Valve Body and Bonnet Construction Materials ...	4
Construction Materials for Piston Ring, Plug Seal, Packing, and Gaskets .....	5

Whisper Trim III Trim Materials and Temperatures .....	5
WhisperFlo Metal Trim Materials and Valve Body/Trim Temperature Capabilities .....	6
Approximate Weights .....	6
Dimensions .....	8

# Product Bulletin

51.1:FB  
July 2019

**FB Valve**  
D100195X012

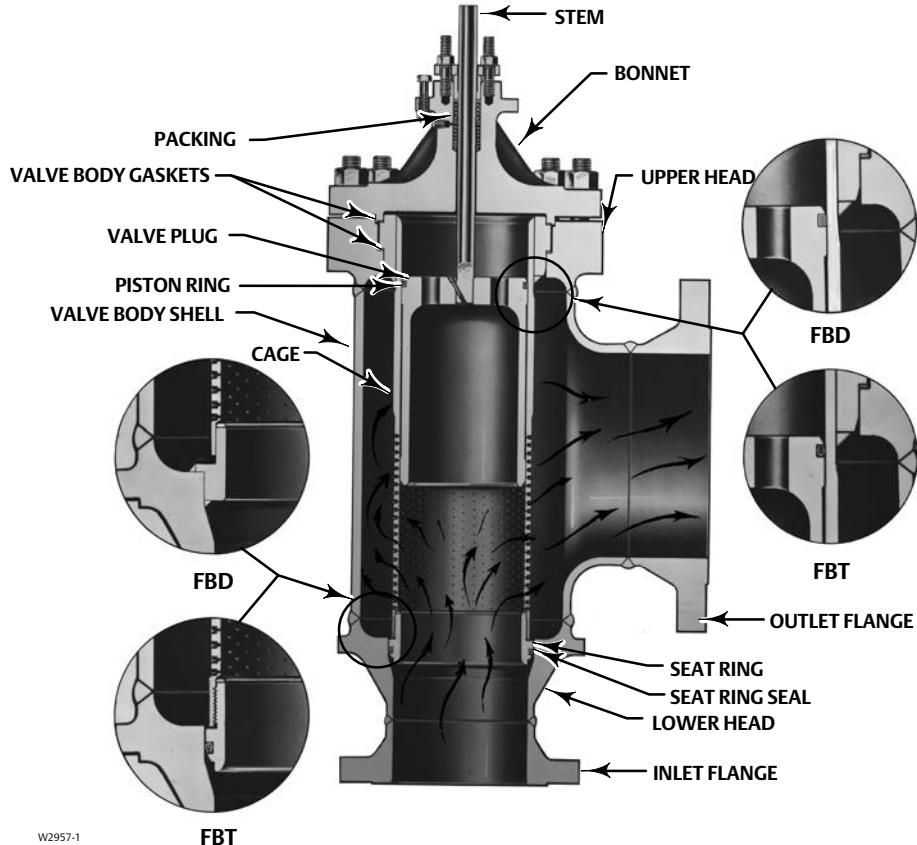
**Table 2. Valve Body and Bonnet Construction Materials (see tables 3 and 4 for other parts)**  
(See figure 1 for parts identification)

PART	STANDARD			OPTIONAL				
	Valve Body	Bonnet	Flanges & Head	Valve Body	Bonnet	Flanges & Head		
Valve Body, Bonnet, Flanges and Head	WPC	WCC	(SA105) <sup>(1)</sup>	WP22	WC9	F22		
				WPL6	LCC	LF2		
				304L	CF3	304L		
				316L	CF3M	316L		
				316	CF8M	316		
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 <sup>(2)</sup> , Washer, and Lantern Ring <sup>(2)</sup>	316 stainless steel			---				
Piston and Seal Rings	See table 3			See table 3				
Gaskets and Packing	See table 3			See table 3				
Trim	See table 4			See table 4				

1. For pressure-temperature ratings, reference the pressure-temperature ratings for SA-105.

2. The spring is used with single PTFE V-ring packing only. The lantern ring replaces the spring for other packing.

**Figure 1. Fisher FBT Valve Body Showing Internal Construction**



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**Table 3. Construction Materials for Piston Ring, Plug Seal, Packing, and Gaskets**

<b>PART</b>		<b>STANDARD</b>		<b>OPTIONAL</b>	
		<b>Material</b>	<b>Temperature</b>	<b>Material</b>	<b>Temperature</b>
FBD Piston Ring	Material	Graphite	-46 to 593°C (-50 to 1100°F)	Bore Seal <sup>(3)</sup> N07718	316 to 593°C (600 to 1100°F)
	Shutoff Class	II is standard; IV <sup>(1)</sup> 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	-40 to 232°C (-40 to 450°F)	PTFE/Composition	-73 to 232°C (-100 to 450°F)
				Graphite Ribbon/Filament	-198 to 593°C <sup>(2)</sup> (-325 to 1100°F) <sup>(2)</sup>
				ENIRO-SEAL or HIGH-SEAL Packing System	See the separate ENIRO-SEAL and HIGH-SEAL Product Bulletin
Gaskets		N04400, or silver-plated N04400	-254 to 593°C (-425 to 1100°F)	Tin-plated N04400 for sour gas service	-29 to 149°C (-20 to 300°F)

1. Class IV with multiple piston rings only.

2. To 371°C (700°F) with oxidizing service.

3. Available for use with trim 234 only.

**Table 4. Whisper Trim III Trim Materials and Temperatures**

TRIM DESIGN- NATION	TRIM MATERIAL				VALVE BODY MATERIAL							
	Plug	Cage	Seat Ring	Baffle	WPC (SA234-WPC)		316L SST (SA403-WP316L)	316 SST (SA403-WP316)	WPL6 (SA420-WPL6)	WP22 (SA243-WP22)		
							304L SST (SA403-WP304L)	Trim Temperature, °C (°F)	Min	Max	Min	Max
					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 <sup>(2)</sup>	CF8M w/ CoCr-A seat and guide	CF8M/ ENC <sup>(1)</sup>	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 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.

# Product Bulletin

51.1:FB

July 2019

FB Valve

D100195X012

Table 5. 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 <sup>(1)</sup>	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.

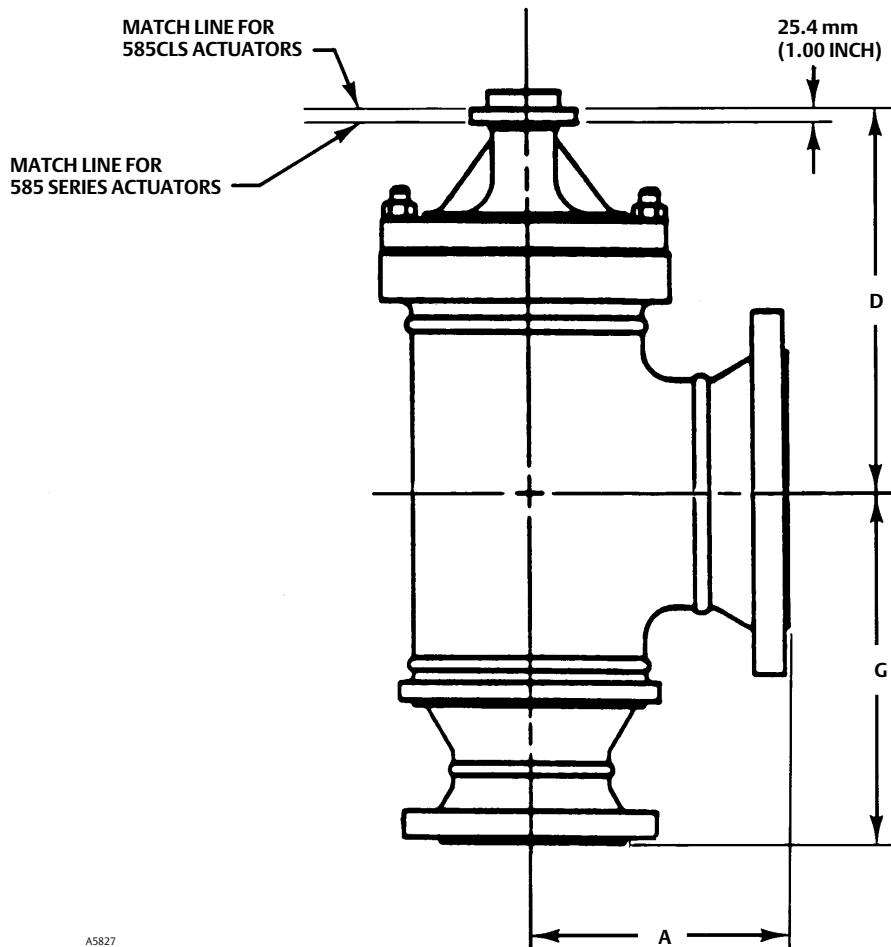
2. 316L maximum temperature is 454°C (850°F), 316 maximum temperature is 538°C (1000°F), 304L maximum temperature is 427°C (800°F).

Table 6. Fisher FBT and FBD Approximate Weights

VALVE SIZE (NPS) INLET X OUTLET	VALVE AND BONNET ASSEMBLY					
	Pressure Rating <sup>(1)</sup>					
	CL150		CL300		CL600	
	Approximate Weight	kg	Approximate Weight	lb	Approximate Weight	kg
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. Pressure rating for all sizes through NPS 24 outlet. NPS 30 and 36 outlets conform to MSS SP-44. Dimensions and weights and or buttwelding-end valves are available on request.

Figure 2. Fisher FBD and FBT Flanged Valve Body Dimensions (also see tables 7, 8, 9, and 10)



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# Product Bulletin

51.1:FB  
July 2019

**FB Valve**  
D100195X012

Table 7. Fisher FBT CL150 Face-to-Face Dimensions (also see figure 2)<sup>(2)</sup>

Valve Size, NPS Inlet x Outlet	CL150 FLANGED													
	Dimensions													
	G		A		D									
	Inches	mm	Inches	mm	Whisper Trim III		WhisperFlo Trim							
					Inches	mm	Inches	mm						
8X12	(1)		14.50	368	(1)									
10X12	(1)				(1)									
10X16	(1)		17.00	432	(1)									
12X16	(1)				(1)									
16X16	(1)				(1)									
12X18	(1)		19.00	483	(1)									
16X18	(1)				(1)									
10X20	(1)		20.68	525	30.41	772	30.41	772						
12X20	27.5	699												
16X20	25.81	656												
20X20	(1)													
12X24	30.5	775			33.46	850	32.44	824						
16X24	30.63	778	23	584										
18X24	29.76	756												
20X24	28.68	728	27.38	695										
24X24	29	737												
16X30 (A)	(1)						(1)							
20X30 (A)	38.44	976	38.47	977	(1)		(1)							
24X30 (A)	(1)				(1)		(1)							
30X30 (A)	(1)				(1)		(1)							
16X30 (B)	(1)		25.94	659	(1)		(1)							
20X30 (B)	37.44	951												
24X30 (B)	(1)						(1)							
30X30 (B)	(1)						(1)							
20X36 (A)	(1)							(1)						
24X36 (A)	(1)							(1)						
30X36 (A)	(1)							(1)						
36X36 (A)	(1)							(1)						
20X36 (B)	(1)		31.12	790	43.22	1098	43.22	1098						
24X36 (B)	44	1118												
30X36 (B)	(1)													
36X36 (B)	(1)													

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

2. For FBD face-to-face dimensions, please contact your Emerson sales office for additional information.

(A) DENOTES ASME B16.47 SERIES A FLANGE(S)

(B) DENOTES ASME B16.47 SERIES B FLANGE(S)

Table 8. Fisher FBT CL300 Face-to-Face Dimensions (also see figure 2)<sup>(2)</sup>

Valve Size, NPS Inlet x Outlet	CL300 FLANGED														
	Dimensions														
	G		A		D										
	Inches	mm	Inches	mm	Whisper Trim III		WhisperFlo Trim								
					Inches	mm	Inches	mm							
8X12	20.76	527	(1)		20.87	530	(1)	(1)							
10X12	(1)														
10X16	(1)		17.75	451	(1)										
12X16	(1)				(1)										
16X16	(1)				(1)										
12X18	(1)		19.75	502	(1)										
16X18	(1)				(1)										
10X20	27.62	702			30.58	777	(1)								
12X20	28.12	714	21.38	543			(1)								
16X20	(1)						(1)								
20X20	(1)						(1)								
12X24	31.92	811	23.63	600	33.46	850	32.44	824							
16X24	31.38	797													
18X24	30.5	775													
20X24	29.38	746													
24X24	29.63	753													
16X30 (A)	(1)						38.97	990							
20X30 (A)	(1)														
24X30 (A)	(1)														
30X30 (A)	(1)														
16X30 (B)	(1)		28.22	717	39.97	1015	38.97	990							
20X30 (B)	(1)														
24X30 (B)	(1)														
30X30 (B)	(1)														
20X36 (A)	(1)		36	914	43.97	1117	43.97	1117							
24X36 (A)	44.63	1134													
30X36 (A)	(1)														
36X36 (A)	(1)														
20X36 (B)	(1)		33.62	854	43.97	1117	43.97	1117							
24X36 (B)	44.75	1137													
30X36 (B)	(1)														
36X36 (B)	(1)														

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

2. For FBD face-to-face dimension, please contact your Emerson Automation Solutions sales office for additional information.

(A) DENOTES ASME B16.47 SERIES A FLANGE(S)

(B) DENOTES ASME B16.47 SERIES B FLANGE(S)

# Product Bulletin

51.1:FB  
July 2019

**FB Valve**  
D100195X012

Table 9. Fisher FBT CL600 with Whisper Trim III, Face-to-Face Dimensions (also see figure 2)<sup>(2)</sup>

CL600 FLANGED WITH Whisper Trim III						
Valve Size, NPS	Dimensions					
	G		A		D	
Inlet x Outlet	Inches	mm	Inches	mm	Inches	mm
8X12		(1)				(1)
10X12		(1)	16.37	416		(1)
10X16	25.10	638		(1)		
12X16	24.37	619		(1)		
16X16		(1)			23.5	597
12X18	30.99	787				(1)
16X18		(1)	21.00	533		(1)
10X20		(1)				
12X20	32.56	827				
16X20	28.13	715	22.75	578	30.17	766
20X20		(1)				
12X24	33.87	860				
16X24	33.25	845				
18X24	33.5	851	25.25	641	33.34	847
20X24	31.75	806				
24X24	32.76	832				
16X30 (A)		(1)				
20X30 (A)		(1)				
24X30 (A)	40.00	1016	32.00	813	38.53	979
30X30 (A)		(1)				
16X30 (B)		(1)				(1)
20X30 (B)	39.5	1003				(1)
24X30 (B)		(1)				(1)
30X30 (B)		(1)				(1)
20X36 (A)				(1)		
24X36 (A)	46.25	1175			(1)	
30X36 (A)				(1)		
36X36 (A)				(1)		
20X36 (B)		(1)				(1)
24X36 (B)	46.25	1175				(1)
30X36 (B)		(1)				(1)
36X36 (B)		(1)				(1)

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

2. For FBD face-to-face dimension, please contact your Emerson sales office for additional information.

(A) DENOTES ASME B16.47 SERIES A FLANGE(S)

(B) DENOTES ASME B16.47 SERIES B FLANGE(S)

Table 10. Fisher FBT CL600 with WhisperFlo Trim, Face-to-Face Dimensions (also see figure 2)<sup>(2)</sup>

CL600 FLANGED WITH WhisperFlo TRIM						
Valve Size, NPS	Dimensions					
	G		A		D	
Inlet x Outlet	Inches	mm	Inches	mm	Inches	mm
8X12				(1)		
10X12				(1)		
10X16	25.10	638	19.25	489		(1)
12X16		(1)				(1)
16X16		(1)				(1)
12X18	30.99	787	21.00	533		(1)
16X18		(1)				(1)
10X20		(1)	22.75	578		
12X20	32.56	827			30.17	766
16X20		(1)				
20X20		(1)				
12X24	36.37	924	27.25	692		
16X24	35.75	908				
18X24	36	914				
20X24	34.25	870				
24X24	35.26	896				
16X30 (A)		(1)	32.00	813		
20X30 (A)		(1)				
24X30 (A)	40.00	1016			38.53	979
30X30 (A)		(1)				
16X30 (B)				(1)		
20X30 (B)				(1)		
24X30 (B)				(1)		
30X30 (B)				(1)		
20X36 (A)				(1)		
24X36 (A)	46.25	1175			(1)	
30X36 (A)				(1)		
36X36 (A)				(1)		
20X36 (B)				(1)		
24X36 (B)				(1)		
30X36 (B)				(1)		
36X36 (B)				(1)		

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

2. For FBD face-to-face dimension, please contact your Emerson sales office for additional information.

(A) DENOTES ASME B16.47 SERIES A FLANGE(S)

(B) DENOTES ASME B16.47 SERIES B FLANGE(S)

## Product Bulletin

51.1:FB

July 2019

FB Valve

D100195X012

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