



FBH-43

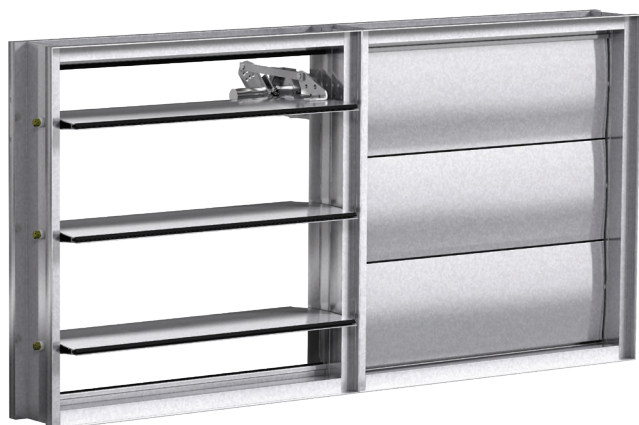
Horizontal Face & Bypass Control Damper Ultra Low Leakage Aluminum Frame Construction

Application and Design

The FBH-43 is a horizontal style face and bypass low leakage damper. This model is intended for application in medium to high pressure and velocity systems. Smooth profile extruded aluminum airfoil blades insure the lowest resistance to airflow in HVAC systems.

The FBH-43 is IECC (International Energy Conservation Code) compliant with a leakage rating of 3 cfm per sq. ft. at 1 in. wg (55 cmh/m² at .25 kPa) or less.

Horizontal style face and bypass control dampers are used in applications where face and bypass dampers are needed along side each other. The units are connected causing one damper to open and the other damper to close.



* Width and Height is based on outside dimension. Actual sizing only.

Construction	Standard	Optional
Frame Material	Aluminum	-
Frame Material Thickness	0.125 in. (3.2mm)	-
Frame Type	5 in. x 1 in. (127mm x 25mm) hat channel	-
Blade Material	Extruded Aluminum	-
Blade Type	Airfoil	-
Blade Action	Opposed	Parallel
Bypass Location	Right of Face	Left of Face
Linkage	Plated steel out of airstream, concealed in jamb	316SS
Axle Bearings	Synthetic (acetal) sleeve	316SS
Axle Material	Plated steel	316SS
Blade Seals	TPE	Silicone
Jamb Seals	Stainless Steel	-
Finish	None	Anodize, Baked Enamel, Hi Pro Polyester, Industrial Epoxy

Damper Ratings

Pressure: Up to 8.0 in. wg (2 kPa) pressure differential
For pressures greater than 8 in wg, consult factory.

Velocity: Up to 6000 fpm (30.5 m/s)

Leakage: 6 cfm/ft² at 4 in. wg (110 cmh/m² at 1 kPa)
3 cfm/ft² at 1 in. wg (55 cmh/m² at 0.25 kPa)

Temperature: Up to 250°F (82°C - 121°C)

Features & Options:

- Low profile head and sill are used on sizes less than 17 in. high (432mm).
- Airfoil (streamlined) blade shape for reduced turbulence and lower pressure drop at velocities to 6000 fpm (30.5 m/s).
- Electric actuators and manual operators available. Factory supplied actuators are sized for 1500 fpm (7 m/s) and a fully-closed differential pressure of 2 in. wg (.5kPa). Contact factory for actuator sizing and applications exceeding those levels.
- Clean wrap available.

Size Limitations

W x H in. (mm)		Damper	
		Face	Bypass
Minimum Sizes*		8 x 6 (203 x 178)	8 x 6 (203 x 178)
Maximum Sizes*	Single Section	60 x 74 (1524 x 1880)	60 x 74 (1524 x 1880)
	Multiple Section	96 x 74 (2438 x 1880)	-

* varies by actuator configuration

This pressure drop testing was conducted in accordance with AMCA Standard 500-D using the three configurations shown. All data has been corrected to represent standard air at a density of .075 lb/ft³(1.2 kg/m³).

Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

AMCA Test Figures

Figure 5.2 Illustrates a ducted damper exhausting air into an open area. This configuration has a lower pressure drop than Figure 5.5 because entrance losses are minimized by a straight duct run upstream of the damper.

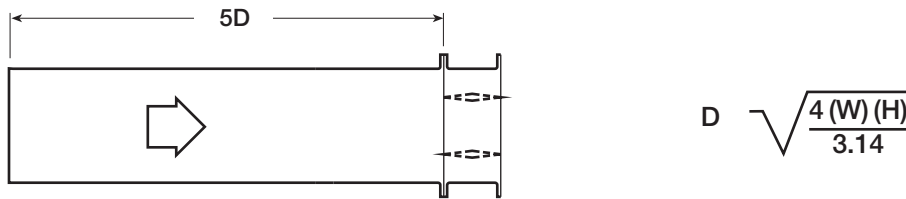


Figure 5.3 Illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

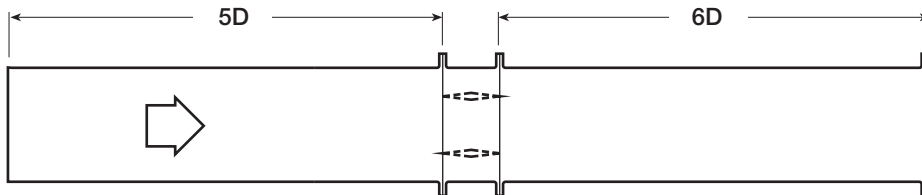
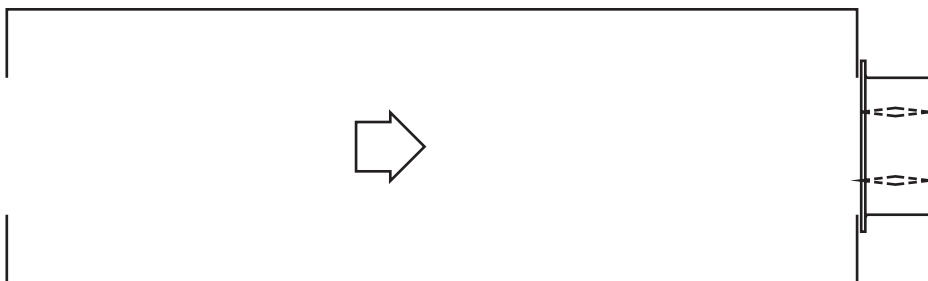
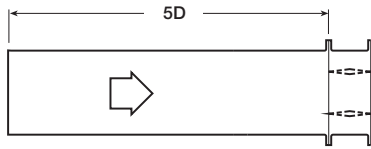


Figure 5.5 Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.



AMCA 5.2



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.06
1500	0.13
2000	0.23
2500	0.35
3000	0.50
3500	0.68
4000	0.88

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.10
2000	0.18
2500	0.28
3000	0.40
3500	0.54
4000	0.70

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.03
1500	0.06
2000	0.12
2500	0.18
3000	0.26
3500	0.35
4000	0.46

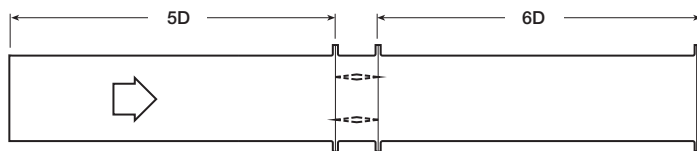
12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.04
1500	0.10
2000	0.17
2500	0.26
3000	0.38
3500	0.52
4000	0.68

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.03
1500	0.06
2000	0.10
2500	0.16
3000	0.23
3500	0.30
4000	0.39

AMCA 5.3



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.03
1500	0.07
2000	0.14
2500	0.21
3000	0.29
3500	0.39
4000	0.51

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.02
1500	0.04
2000	0.08
2500	0.13
3000	0.19
3500	0.26
4000	0.34

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.01
1500	0.02
2000	0.04
2500	0.06
3000	0.09
3500	0.13
4000	0.17

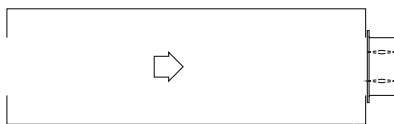
12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.03
1500	0.06
2000	0.11
2500	0.17
3000	0.25
3500	0.34
4000	0.45

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.01
1000	0.02
1500	0.04
2000	0.08
2500	0.12
3000	0.18
3500	0.24
4000	0.31

AMCA 5.5



12 in. x 12 in. (305mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.04
1000	0.14
1500	0.31
2000	0.55
2500	0.86
3000	1.23
3500	1.67
4000	2.19

24 in. x 24 in. (610mm x 610mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.12
1500	0.27
2000	0.48
2500	0.75
3000	1.07
3500	1.47
4000	1.91

36 in. x 36 in. (914mm x 914mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.10
1500	0.22
2000	0.39
2500	0.61
3000	0.87
3500	1.19
4000	1.56

12 in. x 48 in. (305mm x 1219mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.11
1500	0.25
2000	0.46
2500	0.72
3000	1.05
3500	1.43
4000	1.87

48 in. x 12 in. (1219mm x 305mm)

Velocity (fpm)	Pressure Drop (in. wg)
500	0.03
1000	0.11
1500	0.26
2000	0.46
2500	0.72
3000	1.02
3500	1.40
4000	1.83

* These values are for one damper (face or bypass), not the combined dampers.

Leakage

Selection Criteria

Air leakage is based on operation between 32°F (0°C) and 120°F (49°C).

Tested for leakage in accordance with ANSI/AMCA Standard 500-D, Figure 5.5.

Tested for air performance in accordance with ANSI/AMCA Standard 500-D, Figures 5.2, 5.3 and 5.5.

Torque

Data are based on a torque of 5.0 in.lb./ft² (0.56 N·m) applied to close and seat the damper during the test.

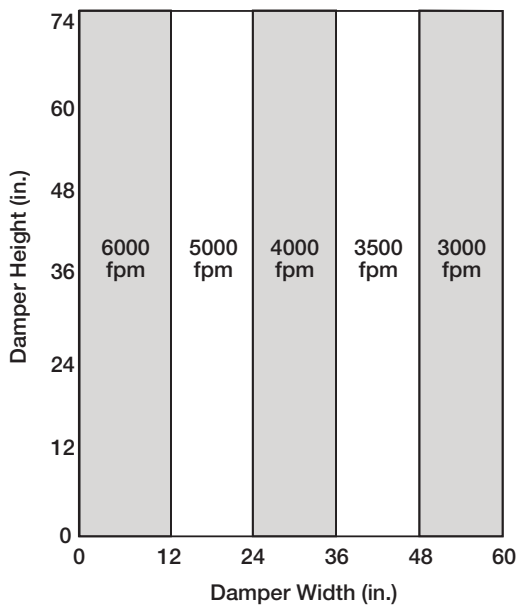
FBH-43	Leakage Class*		
Maximum Damper Width	1 in. wg (0.25 kPa)	4 in. wg (1 kPa)	8 in. wg (2 kPa)
60 in. (1524mm)	1A	1	1
* applies to opposed blades only			

*Leakage Class Definitions

The maximum allowable leakage is defined as the following:

- Leakage Class 1A - 3 cfm/ft² at 1 in. wg (class 1A is only defined at 1 in. wg).
- Leakage Class 1
 - 4 cfm/ft² at 1 in. wg
 - 8 cfm/ft² at 4 in. wg
 - 11 cfm/ft² at 8 in. wg
 - 12.6 cfm/ft² at 10 in. wg

Velocity Limitations

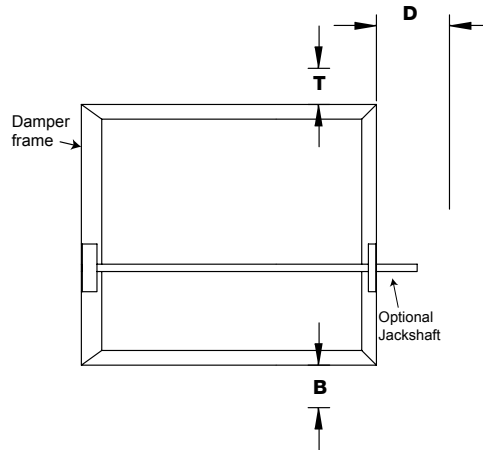


Temperature Limitations

Blade Seal	Temperature Range
TPE	-10°F to 180°F (-23°C to 82°C)
Silicone	-40°F to 250°F (-40°C to 121°C)
No Seal	-40°F to 250°F (-40°C to 121°C)

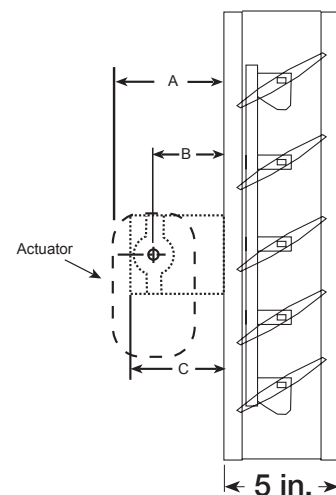
NOTE: FBH-43 will withstand higher pressures and velocities based on face or bypass damper. Displayed ratings are conservative to prevent misapplication. Consult factory if you have an application outside these limitations. Temperatures in excess of 180°F (82°C) require special consideration.

On dampers less than 18 in. (457mm) high, actuators may also require clearances above and/or below the damper frame. **“B” and “T” dimensions are worst case clearance requirements for some dampers less than 18 in. (457mm) high.** All damper sizes under 18 in. (457mm) high do not require these worst case clearances. If space availability above or below the damper is limited, each damper size should be individually evaluated.



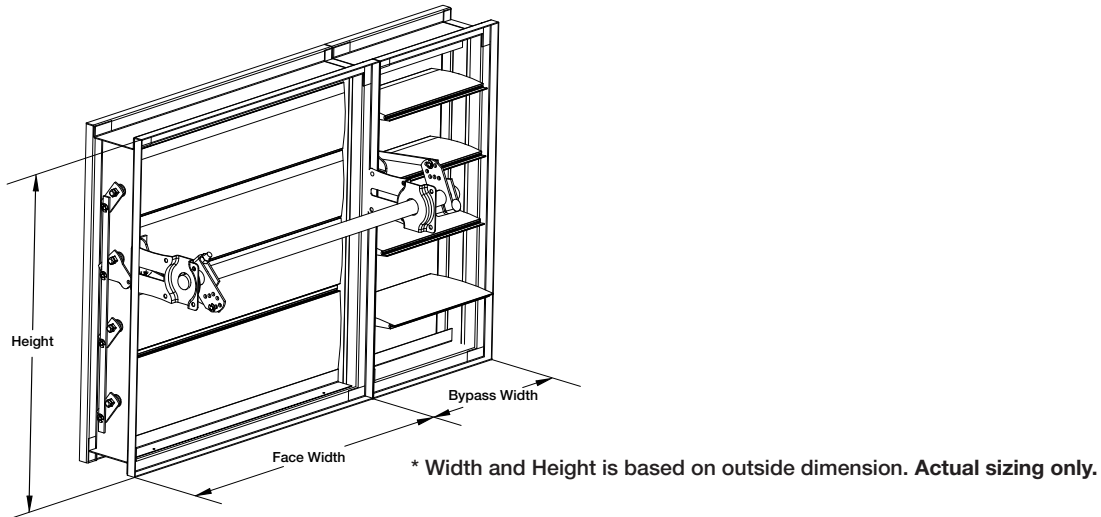
Actuator Type/Model	Height	T	B	D
	Inches (mm)			
AFBUP (-S) and FSNF Series, Belimo MSxx20 Series, Honeywell	≥6 to <10	0	12¼	6
	≥10 to <18	0	2	6
	≥18	0	0	10
FSLF, LF and TFB Series, Belimo	≥6 to <10	0	3½	6
	≥10	0	0	6
MSxx04 & MSxx09 Series, Honeywell	≥6 to <9	0	4¾	6
	≥9	0	0	6
MS75xx Series, Honeywell	≥6 to <10	0	12¼	6
	≥10 to <18	0	7	6
	≥18	0	0	6

This drawing depicts the worse case clearance requirements for an actuator with a jackshaft.



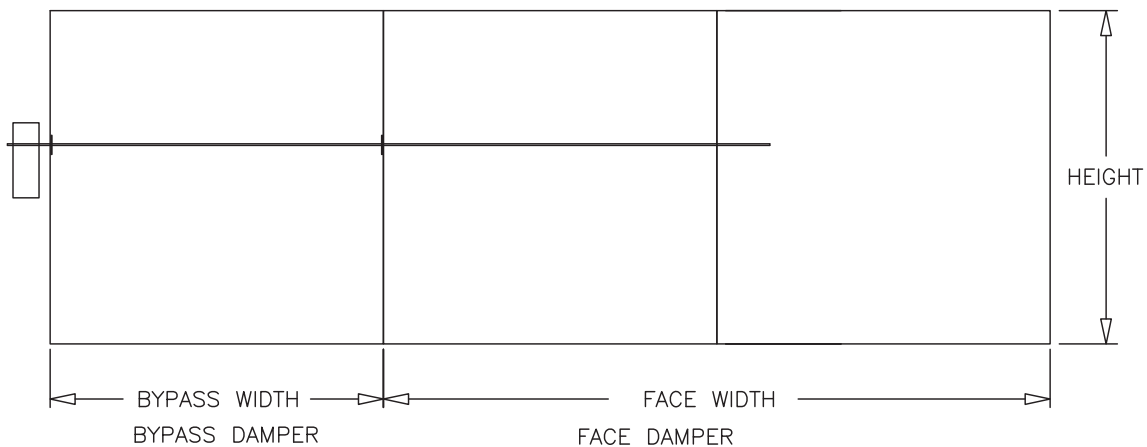
Mounting

- External - includes extension pin (standoff bracket optional)
- External kit - actuator and all mounting hardware
- Internal - blade lever



Multi-Section Assembly

Dampers larger than the maximum single section size, will be made up of a multiple of equal size sections. The bypass damper can be mounted to the right or left of the face damper. This example depicts the face damper is two sections wide and the bypass damper is mounted to the left of the face, which is one section wide.



Specifications

Control dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described in schedules.

Dampers shall consist of: heavy gauge aluminum frame (0.125 in. [3.2mm] thick) with 5 in. (127mm) depth formed into a structural hat channel shape; airfoil shaped, extruded aluminum blades (0.063 in. [1.6mm] thick) with metal blade to blade overlap (seal to seal only contact is not acceptable); blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow and operation in either direction through the damper (blades that are non-symmetrical relative to their axle pivot point or utilize blade stops larger than ½ in. (13mm) are unacceptable); ½ in. (13mm) dia. plated steel axles turning in synthetic (acetal) sleeve bearings; TPE blade seals; flexible stainless steel jamb

seals; and external (out of the airstream) blade-to-blade linkage.

Damper manufacturer's printed application and performance data including pressure, velocity and temperature limitations shall be submitted for approval showing damper suitable for pressures to 8 in. wg (2 kPa), velocities to 6000 fpm (30.5m/s) and temperatures to 250°F (121°C).

Damper manufacturer's printed performance data showing standard air leakage less than 6 cfm/ft² at 4 in. (.003 m³/s at 1 kPa) wg in either direction through the damper shall be submitted for approval.

Testing and ratings shall be developed in accordance with the latest edition of AMCA Standard 500-D.

Basis of design is FBH-43.