

## Application

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.

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/m<sup>2</sup> at .25 kPa) or less.

## Ratings

### Pressure

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

### Velocity

Up to 6000 fpm (30.5 m/s)

### Temperature

Up to 250°F (121°C)

### Leakage

6 cfm/ft<sup>2</sup> at 4 in. wg (110 cmh/m<sup>2</sup> at 1 kPa)  
3 cfm/ft<sup>2</sup> at 1 in. wg (55 cmh/m<sup>2</sup> at 0.25 kPa)

## Construction

|                                 | Standard  | Optional     |
|---------------------------------|---|--------------|
| <b>Frame Material</b>           | Aluminum  | -            |
| <b>Frame Material Thickness</b> | 0.125 in. (3.2mm)                                   | -            |
| <b>Frame Type</b>               | 5 in. x 1 in.<br>(127mm x 25mm)<br>hat channel      | -            |
| <b>Blade Material</b>           | Extruded Aluminum                                   | -            |
| <b>Blade Type</b>               | Airfoil   | -            |
| <b>Blade Action</b>             | Opposed   | Parallel     |
| <b>Bypass Location</b>          | Right of Face                                       | Left of Face |
| <b>Linkage</b>                  | Plated steel out of airstream,<br>concealed in jamb | 316SS        |
| <b>Axle Bearings</b>            | Synthetic (acetal) sleeve                           | 316SS        |
| <b>Axle Material</b>            | Plated steel  | 316SS        |
| <b>Blade Seals</b>              | TPE   | Silicone     |
| <b>Jamb Seals</b>               | Stainless Steel                                     | -            |



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

## Size Limitations

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

\* varies by actuator configuration

## Features & Options

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- 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.

## Document Links

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[Installation Instructions](#)



[HVAC Control and Balancing Damper Catalog](#)



[Damper Product Selection Guide](#)



[Specifications](#)



[Damper Warranty](#)



[How to Select an Actuator](#)

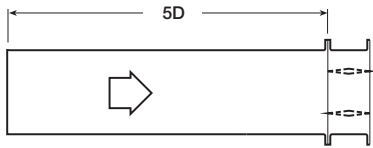


# Pressure Drop Data

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/ft<sup>3</sup>(1.201 kg/m<sup>3</sup>).

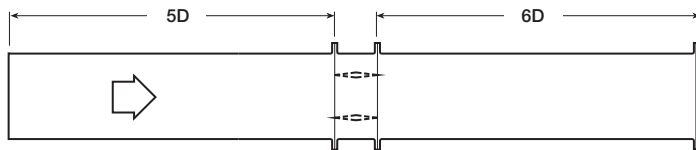
Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

## AMCA 5.2



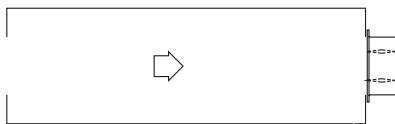
| 12 in. x 12 in. (305mm x 305mm) |                        | 24 in. x 24 in. (610mm x 610mm) |                        | 36 in. x 36 in. (914mm x 914mm) |                        | 12 in. x 48 in. (305mm x 1219mm) |                        | 48 in. x 12 in. (1219mm x 305mm) |                        |
|---------------------------------|------------------------|---------------------------------|------------------------|---------------------------------|------------------------|----------------------------------|------------------------|----------------------------------|------------------------|
| Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                   | Pressure Drop (in. wg) | Velocity (fpm)                   | Pressure Drop (in. wg) |
| 500                             | 0.01                   | 500                             | 0.01                   | 500                             | 0.01                   | 500                              | 0.01                   | 500                              | 0.01                   |
| 1000                            | 0.06                   | 1000                            | 0.04                   | 1000                            | 0.03                   | 1000                             | 0.04                   | 1000                             | 0.03                   |
| 1500                            | 0.13                   | 1500                            | 0.10                   | 1500                            | 0.06                   | 1500                             | 0.10                   | 1500                             | 0.06                   |
| 2000                            | 0.23                   | 2000                            | 0.18                   | 2000                            | 0.12                   | 2000                             | 0.17                   | 2000                             | 0.10                   |
| 2500                            | 0.35                   | 2500                            | 0.28                   | 2500                            | 0.18                   | 2500                             | 0.26                   | 2500                             | 0.16                   |
| 3000                            | 0.50                   | 3000                            | 0.40                   | 3000                            | 0.26                   | 3000                             | 0.38                   | 3000                             | 0.23                   |
| 3500                            | 0.68                   | 3500                            | 0.54                   | 3500                            | 0.35                   | 3500                             | 0.52                   | 3500                             | 0.30                   |
| 4000                            | 0.88                   | 4000                            | 0.70                   | 4000                            | 0.46                   | 4000                             | 0.68                   | 4000                             | 0.39                   |

## AMCA 5.3



| 12 in. x 12 in. (305mm x 305mm) |                        | 24 in. x 24 in. (610mm x 610mm) |                        | 36 in. x 36 in. (914mm x 914mm) |                        | 12 in. x 48 in. (305mm x 1219mm) |                        | 48 in. x 12 in. (1219mm x 305mm) |                        |
|---------------------------------|------------------------|---------------------------------|------------------------|---------------------------------|------------------------|----------------------------------|------------------------|----------------------------------|------------------------|
| Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                   | Pressure Drop (in. wg) | Velocity (fpm)                   | Pressure Drop (in. wg) |
| 500                             | 0.01                   | 500                             | 0.01                   | 500                             | 0.01                   | 500                              | 0.01                   | 500                              | 0.01                   |
| 1000                            | 0.03                   | 1000                            | 0.02                   | 1000                            | 0.01                   | 1000                             | 0.03                   | 1000                             | 0.02                   |
| 1500                            | 0.07                   | 1500                            | 0.04                   | 1500                            | 0.02                   | 1500                             | 0.06                   | 1500                             | 0.04                   |
| 2000                            | 0.14                   | 2000                            | 0.08                   | 2000                            | 0.04                   | 2000                             | 0.11                   | 2000                             | 0.08                   |
| 2500                            | 0.21                   | 2500                            | 0.13                   | 2500                            | 0.06                   | 2500                             | 0.17                   | 2500                             | 0.12                   |
| 3000                            | 0.29                   | 3000                            | 0.19                   | 3000                            | 0.09                   | 3000                             | 0.25                   | 3000                             | 0.18                   |
| 3500                            | 0.39                   | 3500                            | 0.26                   | 3500                            | 0.13                   | 3500                             | 0.34                   | 3500                             | 0.24                   |
| 4000                            | 0.51                   | 4000                            | 0.34                   | 4000                            | 0.17                   | 4000                             | 0.45                   | 4000                             | 0.31                   |

## AMCA 5.5



| 12 in. x 12 in. (305mm x 305mm) |                        | 24 in. x 24 in. (610mm x 610mm) |                        | 36 in. x 36 in. (914mm x 914mm) |                        | 12 in. x 48 in. (305mm x 1219mm) |                        | 48 in. x 12 in. (1219mm x 305mm) |                        |
|---------------------------------|------------------------|---------------------------------|------------------------|---------------------------------|------------------------|----------------------------------|------------------------|----------------------------------|------------------------|
| Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                  | Pressure Drop (in. wg) | Velocity (fpm)                   | Pressure Drop (in. wg) | Velocity (fpm)                   | Pressure Drop (in. wg) |
| 500                             | 0.04                   | 500                             | 0.03                   | 500                             | 0.03                   | 500                              | 0.03                   | 500                              | 0.03                   |
| 1000                            | 0.14                   | 1000                            | 0.12                   | 1000                            | 0.10                   | 1000                             | 0.11                   | 1000                             | 0.11                   |
| 1500                            | 0.31                   | 1500                            | 0.27                   | 1500                            | 0.22                   | 1500                             | 0.25                   | 1500                             | 0.26                   |
| 2000                            | 0.55                   | 2000                            | 0.48                   | 2000                            | 0.39                   | 2000                             | 0.46                   | 2000                             | 0.46                   |
| 2500                            | 0.86                   | 2500                            | 0.75                   | 2500                            | 0.61                   | 2500                             | 0.72                   | 2500                             | 0.72                   |
| 3000                            | 1.23                   | 3000                            | 1.07                   | 3000                            | 0.87                   | 3000                             | 1.05                   | 3000                             | 1.02                   |
| 3500                            | 1.67                   | 3500                            | 1.47                   | 3500                            | 1.19                   | 3500                             | 1.43                   | 3500                             | 1.40                   |
| 4000                            | 2.19                   | 4000                            | 1.91                   | 4000                            | 1.56                   | 4000                             | 1.87                   | 4000                             | 1.83                   |

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

## Leakage

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./ft<sup>2</sup> (0.56 N·m) applied to close and seat the damper during the test.

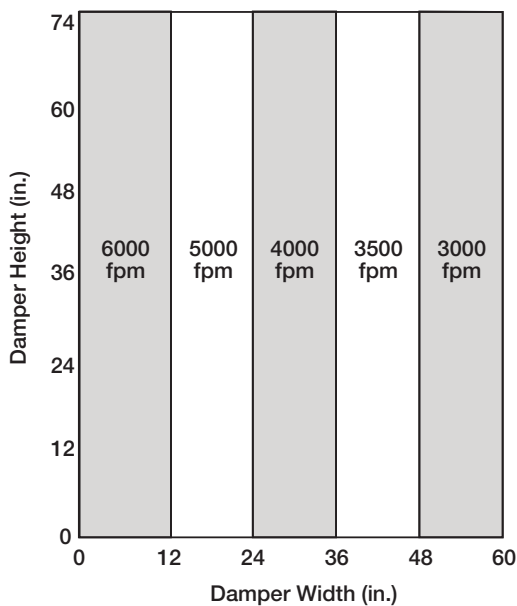
| FBH-43<br>Maximum<br>Damper Width | Leakage Class*         |                     |                     |
|-----------------------------------|------------------------|---------------------|---------------------|
|                                   | 1 in. wg<br>(0.25 kPa) | 4 in. wg<br>(1 kPa) | 8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

#### \*Leakage Class Definitions

The maximum allowable leakage is defined by AMCA as the following:

- Leakage Class 1A - 3 cfm/ft<sup>2</sup> at 1 in. wg (class 1A is only defined at 1 in. wg).
- Leakage Class 1
  - 4 cfm/ft<sup>2</sup> at 1 in. wg
  - 8 cfm/ft<sup>2</sup> at 4 in. wg
  - 11 cfm/ft<sup>2</sup> at 8 in. wg
  - 12.6 cfm/ft<sup>2</sup> at 10 in. wg

## Velocity and Temperature Limitations

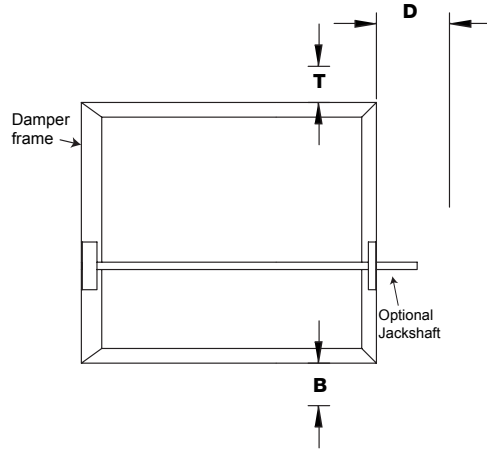


| Blade Seal | Temperature Range               |
|------------|---------------------------------|
| TPE        | -10°F to 180°F (-23°C to 82°C)  |
| Silicone   | -40°F to 250°F (-40°C to 121°C) |
| No Seal    | -40°F to 250°F (-40°C to 121°C) |

**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.

# Space Envelopes

Dampers less than 18 in. (457mm) high may require actuator 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.

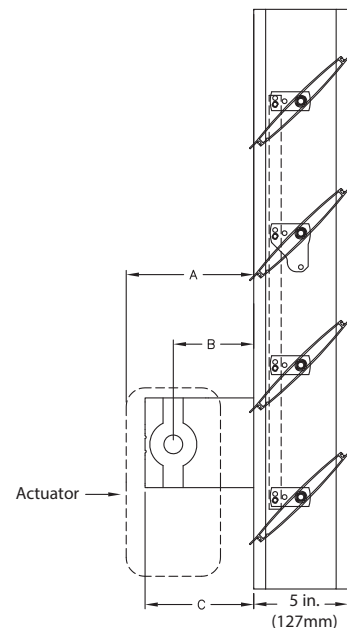


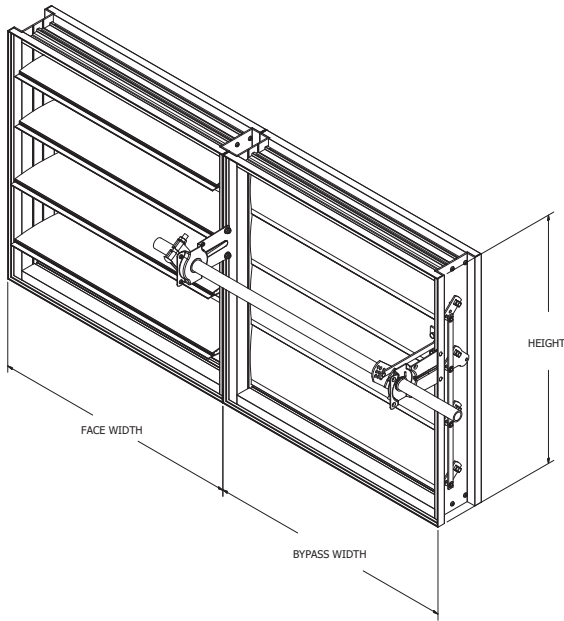
| Actuator Type/Model   | Height      | T           | B   | D  |
|---|-------------|-------------|-----|----|
|   | Inches (mm) | Inches (mm) |     |    |
| AFBUP (-S) and<br>FSNF Series, Belimo<br>MSxx20 Series, Honeywell | ≥6 to <10   | 0           | 12¾ | 6  |
|   | ≥10 to <18  | 0           | 2   | 6  |
|   | ≥18         | 0           | 0   | 10 |
| FSLF, LF and TFB Series,<br>Belimo                                | ≥6 to <10   | 0           | 3½  | 6  |
|   | ≥10         | 0           | 0   | 6  |
| MSxx04 & MSxx09 Series,<br>Honeywell                              | ≥6 to <9    | 0           | 4¾  | 6  |
|   | ≥9          | 0           | 0   | 6  |
| MS75xx Series, Honeywell  | ≥6 to <10   | 0           | 12¾ | 6  |
|   | ≥10 to <18  | 0           | 7   | 6  |
|   | ≥18         | 0           | 0   | 6  |

## Mounting

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

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





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

### 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.

