

Low Leakage Insulated Airfoil Control Damper

Application and Design

The VCD-34 Series is a low leakage control damper with thermally insulated blades. The blades are double skin with ½ in. (13mm) fiberglass insulation for improved thermal insulation. The VCD-34 is intended for application in medium pressure and velocity systems.

This model is also IECC (International Energy Conservation Code) compliant with a leakage rating of 3 cfm/ft² at 1 in. wg (55 cmh/m² at .25 kPa) or less.



*W&H dimension furnished approximately ¼ in. (6mm) undersize.

| | Standard Construction | Optional Construction |
|------------------------|--|---|
| Frame Material | Galvanized steel | 304SS |
| Frame Thickness | 16 ga. (1.5mm) | 12 ga. (2.7mm)* |
| Frame Type | 5 in. x 1 in. (127mm x 25mm) hat channel | Single Flange, Reversed Flange, Double Flange |
| Blade Action | Opposed | Parallel |
| Blade Material | Galvanized steel | 304SS |
| Blade Thickness | 2 skins of 20 ga. (1mm) | - |
| Blade Type | Insulated Airfoil | - |
| Linkage | Plated steel out of airstream | 316SS |
| Axle Bearings | Synthetic (acetal) | 316SS |
| Axle Material | Plated steel | 316SS |
| Blade Seals | TPE | Silicone |
| Jamb Seals | Stainless Steel | - |

*When 12 ga. frame is selected and the damper height is less than 17 inches, low profile top and bottom frame members are utilized. These low profile frame members will be made from 16 ga. material.

Notes:

- Frames are constructed with reinforced corners. Low profile head and sill are used on sizes less than 17 in. (432mm) high.
- Electric actuators and manual operators available. Factory supplied actuators are sized for 1500 fpm (7 m/s) and fully-closed differential pressure of 2 in. wg (.5 kPa). Contact factory for actuator sizing on applications exceeding those limits.
- Horizontal or vertical mount, blades must be horizontal. See VCD-34V if you need blades to be vertical.

Damper Ratings (See page 3 for specific limitations)

Pressure: Up to 8 in. wg (2 kPa) - pressure differential

For pressures greater than 8 in wg, consult factory.

Velocity: Up to 4000 fpm (20.3 m/s)

Leakage: Class 1A at 1 in. wg (.25 kPa)

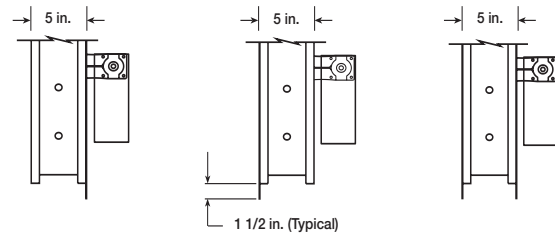
Class 1 at 4 in. - 8 in. wg (1 kPa - 2 kPa)

Temperature: -40°F to 250°F (-40°C to 121°C). Consult factory for higher temperatures.

Size Limitations

| W x H | Minimum Size | Maximum Size | |
|--------|--------------|----------------|------------------|
| | | Single Section | Multiple Section |
| Inches | 10 x 6 | 60 x 74 | Unlimited |
| mm | 254 x 152 | 1524 x 1880 | Unlimited |

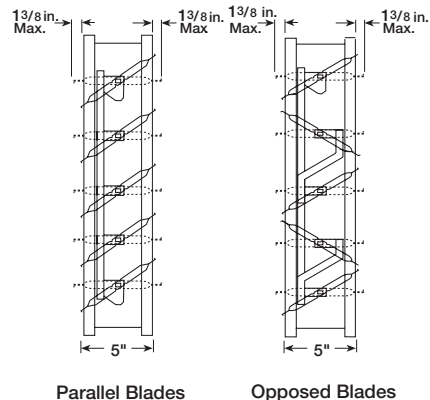
Flange Options



Single Flange Reversed Flange Double Flange

Shown with optional internally mounted actuator.

Blade Operation



Parallel Blades

Opposed Blades

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.

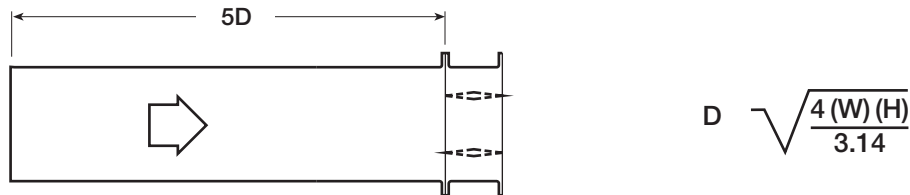


Figure 5.3 Illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

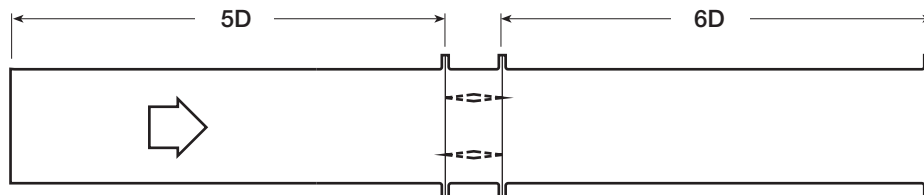
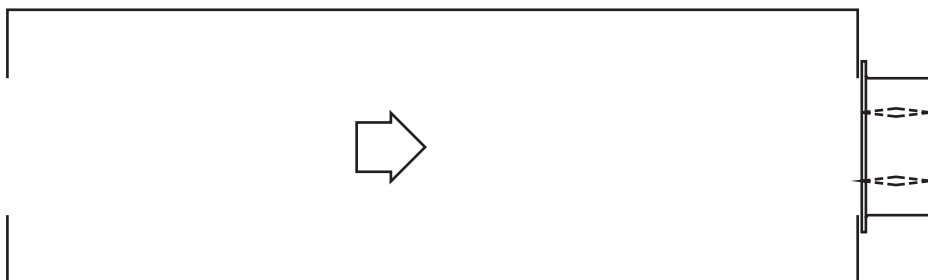
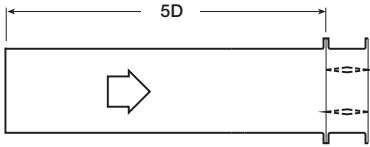


Figure 5.5 Illustrates a plenum mounted damper. This configuration has the highest pressure drop because of extremely high entrance and exit losses due to the sudden changes of area in the system.



AMCA 5.2



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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.01 |
| 1000 | 0.03 |
| 1500 | 0.07 |
| 2000 | 0.13 |
| 2500 | 0.19 |
| 3000 | 0.26 |
| 3500 | 0.35 |
| 4000 | 0.45 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.01 |
| 1000 | 0.03 |
| 1500 | 0.06 |
| 2000 | 0.10 |
| 2500 | 0.15 |
| 3000 | 0.21 |
| 3500 | 0.28 |
| 4000 | 0.36 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.01 |
| 1000 | 0.02 |
| 1500 | 0.04 |
| 2000 | 0.07 |
| 2500 | 0.11 |
| 3000 | 0.15 |
| 3500 | 0.20 |
| 4000 | 0.26 |

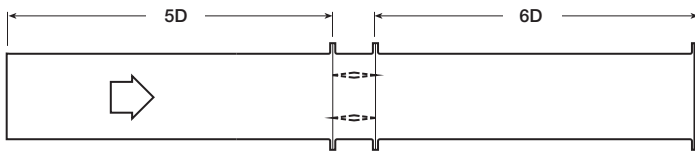
12 in. x 48 in. (305mm x 1219mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.01 |
| 1000 | 0.03 |
| 1500 | 0.07 |
| 2000 | 0.11 |
| 2500 | 0.17 |
| 3000 | 0.23 |
| 3500 | 0.31 |
| 4000 | 0.39 |

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 | 0.16 |
| 3500 | 0.21 |
| 4000 | 0.27 |

AMCA 5.3



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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.01 |
| 1000 | 0.02 |
| 1500 | 0.05 |
| 2000 | 0.08 |
| 2500 | 0.12 |
| 3000 | 0.17 |
| 3500 | 0.23 |
| 4000 | 0.30 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.01 |
| 1000 | 0.01 |
| 1500 | 0.03 |
| 2000 | 0.05 |
| 2500 | 0.09 |
| 3000 | 0.13 |
| 3500 | 0.17 |
| 4000 | 0.22 |

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 | 0.08 |
| 3500 | 0.12 |
| 4000 | 0.15 |

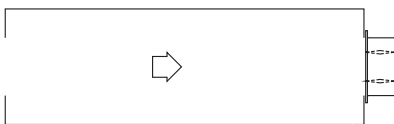
12 in. x 48 in. (305mm x 1219mm)

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.01 |
| 1000 | 0.02 |
| 1500 | 0.04 |
| 2000 | 0.08 |
| 2500 | 0.12 |
| 3000 | 0.17 |
| 3500 | 0.22 |
| 4000 | 0.29 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.01 |
| 1000 | 0.02 |
| 1500 | 0.04 |
| 2000 | 0.07 |
| 2500 | 0.11 |
| 3000 | 0.15 |
| 3500 | 0.20 |
| 4000 | 0.25 |

AMCA 5.5



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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.03 |
| 1000 | 0.12 |
| 1500 | 0.27 |
| 2000 | 0.48 |
| 2500 | 0.74 |
| 3000 | 1.07 |
| 3500 | 1.46 |
| 4000 | 1.91 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.03 |
| 1000 | 0.11 |
| 1500 | 0.26 |
| 2000 | 0.45 |
| 2500 | 0.71 |
| 3000 | 1.02 |
| 3500 | 1.40 |
| 4000 | 1.89 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.02 |
| 1000 | 0.09 |
| 1500 | 0.21 |
| 2000 | 0.38 |
| 2500 | 0.58 |
| 3000 | 0.85 |
| 3500 | 1.15 |
| 4000 | 1.52 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.03 |
| 1000 | 0.11 |
| 1500 | 0.24 |
| 2000 | 0.43 |
| 2500 | 0.67 |
| 3000 | 0.96 |
| 3500 | 1.31 |
| 4000 | 1.71 |

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

| Velocity (fpm) | Pressure Drop (in. wg) |
|----------------|------------------------|
| 500 | 0.03 |
| 1000 | 0.11 |
| 1500 | 0.24 |
| 2000 | 0.44 |
| 2500 | 0.68 |
| 3000 | 0.97 |
| 3500 | 1.32 |
| 4000 | 1.73 |

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 7.0 in.lb./ft² (0.79 N·m) applied to close and seat the damper during the test.

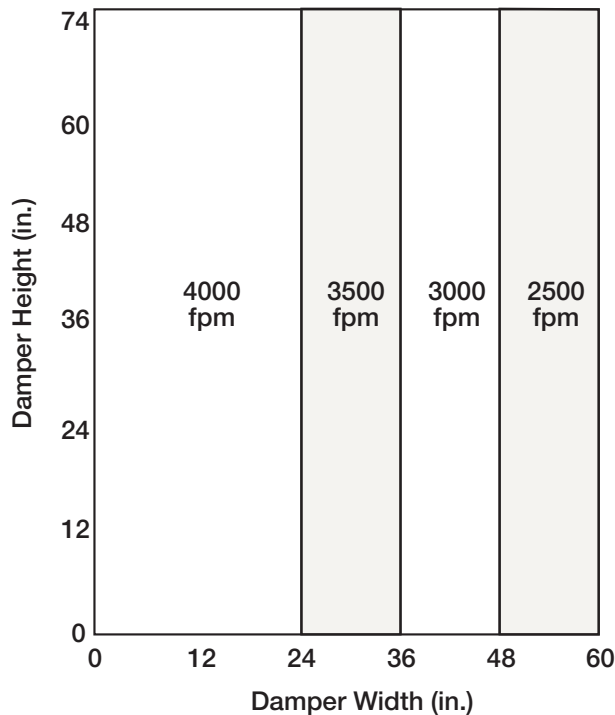
| VCD-34 | Leakage Class | | |
|----------------------|------------------------|---------------------|---------------------|
| Maximum Damper Width | 1 in. wg (0.25 kPa) | 4 in. wg (1 kPa) | 8 in. wg (2 kPa) |
| 60 in. (1524mm) | 1A | 1 | 1 |

*Leakage Class Definitions

The maximum allowable leakage is defined by AMCA 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

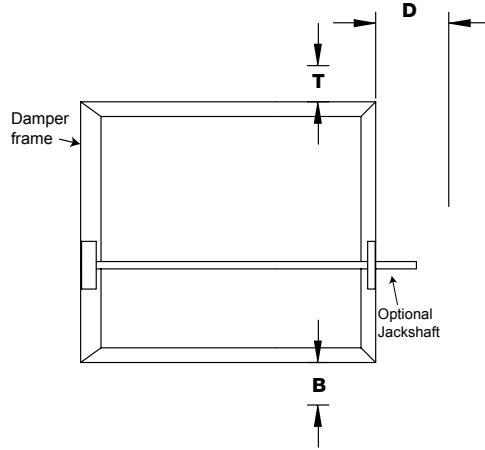
Velocity and Temperature Limitations



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) |

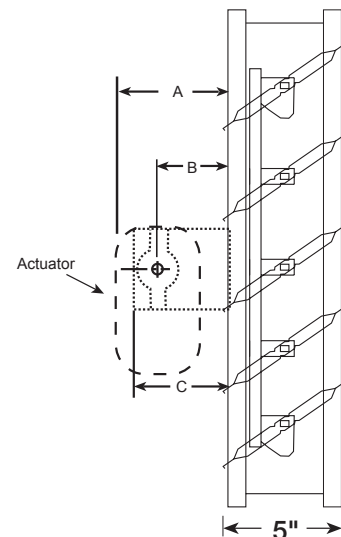
On dampers less than 18 in. (457mm) high, actuators may also require clearances above and/or below the damper frame. “B” and “T” **dimensions are worst case clearance requirements for some dampers less than 18 in. (457mm) high**. All damper sizes under 18 in. (457mm) high do not require these worst case 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) | Inches | | |
| AFBUP (-S) and FSNF Series, Belimo MSxx20 Series, Honeywell | ≥6 to <10 | 0 | 12¾ | 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 | 12¾ | 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.

| Internal mount only Actuator model | A | B | C |
|---------------------------------------|-------------------|------------------|----------------------|
| All except - EFB & EFCX Series | 7¾ in (197 mm) | 3¾ in (95 mm) | 5 ⅜ in (136.5 mm) |
| EFB & EFCX Series | 8½ in (216 mm) | 6 in (152mm) | 8½ in (216 mm) |



Mounting

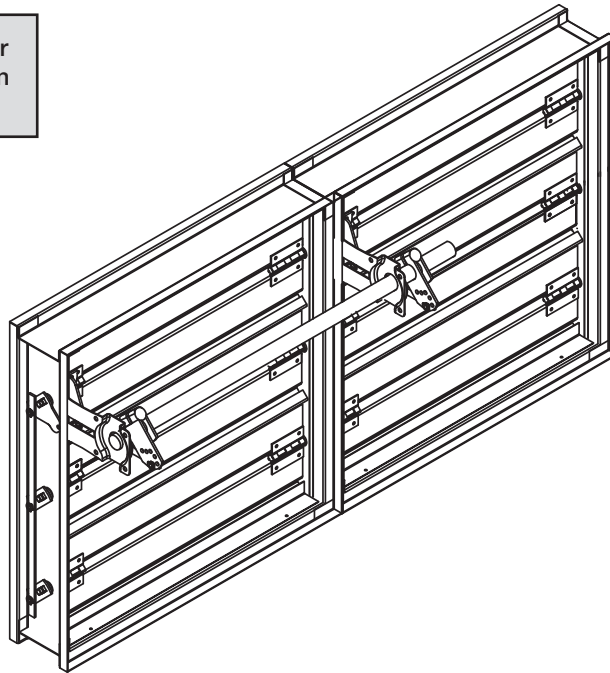
- External - includes extension pin (standoff bracket optional)
- External kit - actuator and all mounting hardware
- Internal - blade lever

Multi-Section Assembly

Dampers larger than the maximum single section size, will be made up of a multiple of equal size sections. Multiple section dampers can be jackshafted together so that all sections operate together as shown below.

NOTE: Dampers larger than 60 in. x 74 in. (1524mm x 1880mm) are not intended to be structurally self supporting. Additional horizontal bracing is recommended to support the weight of the damper and vertical bracing should be installed as required to hold against system pressure.

Refer to IOM document 483509 for structural support requirements on multi-section assemblies.



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: a 16 ga. (1.5mm) galvanized steel channel frame with 5 in. (127mm) depth; airfoil shaped, galvanized steel double skin construction blades (2 skins of 20 ga. [1mm]) filled with ½ in. (13mm) polystyrene; blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow in either direction or pressure on either side of the damper; ½ in. (13mm) dia. plated steel axles turning in synthetic (acetal) sleeve bearings; TPE blade seals for 180°F (82°C) maximum temperature; 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 4000 fpm (20.3m/s) and temperatures to 250°F (121°C).

Damper manufacturer's submittal data shall certify all air leakage and air performance pressure drop data is licensed in accordance with the AMCA Certified Ratings Program for Test figures 5.2, 5.3 and 5.5. Damper air performance data shall be developed in accordance with the latest edition of AMCA Standard 500-D.

Basis of design is model VCD-34.