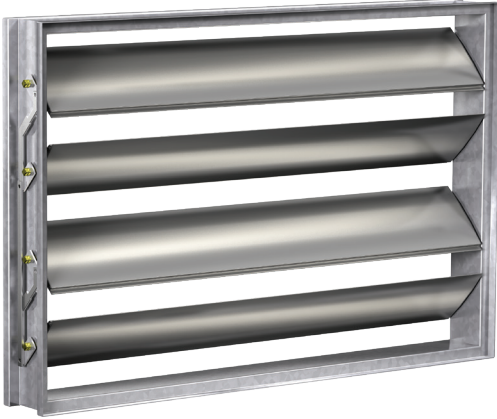


### Application and Design

The VCD-42 is a low leakage damper with extruded aluminum airfoil blades and galvanized steel frame. Smooth profile extruded aluminum airfoil blades insure the lowest resistance to airflow in HVAC systems. The VCD-42 is intended for application in medium to high pressure and velocity systems.

VCD-42 is IECC (International Energy Conservation Code) compliant with a leakage rating of 3 cfm/ft<sup>2</sup> at 1 in. wg (55 cmh/m<sup>2</sup> at .25 kPa) or less.



\*W&H dimension furnished approximately 1/4 in. (6mm) undersize.

Construction	Standard	Optional
<b>Frame Material</b>	Galvanized Steel	304SS
<b>Frame Material Thickness</b>	16 ga. (1.5mm)	12 ga. (2.7mm)*
<b>Frame Type</b>	5 in. x 1 in. (127mm x 25mm) hat channel	Single Flange, Reverse Flange or Double Flange
<b>Blade Material</b>	Extruded Aluminum	-
<b>Blade Type</b>	Airfoil	-
<b>Blade Action</b>	Opposed	Parallel
<b>Linkage</b>	Plated steel out of airstream, 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	-
<b>Finish</b>	Mill finish	Baked Enamel, Hi Pro Polyester, Industrial Epoxy,

\*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.

### Damper Ratings

**Pressure:** Up to 6 in. wg (1.5 kPa) pressure differential

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

**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 .25 kPa)

**Temperature:** -40°F to 250°F (-40°C to 121°C)

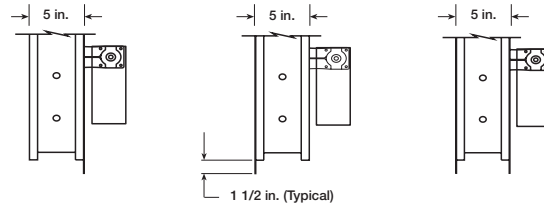
### Features:

- Frames are constructed with reinforced corners. Low profile head and sill are used on sizes less than 17 in. high (432mm).
- Blade seals - pressure activated to produce tighter sealing.
- Horizontal or vertical mount, blades must be horizontal. See VCD-42V if you need blades to be vertical.
- 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.

### Sizes Available

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

### Flange Options



Single Flange

Reversed Flange

Double Flange

Shown with optional internally mounted actuator.

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 0.075 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 Test Figures

**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 5.2** 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 5.5** 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.

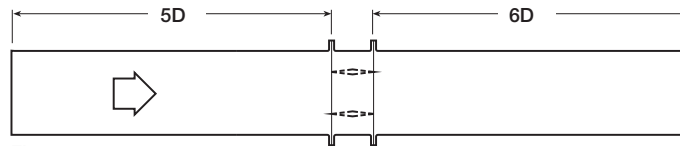


Figure 5.3

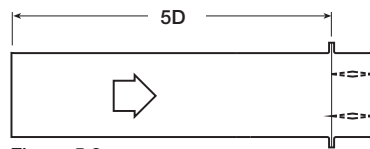


Figure 5.2

$$D = \sqrt{\frac{4 (W) (H)}{3.14}}$$

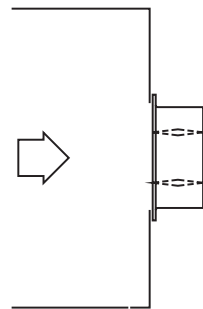


Figure 5.5

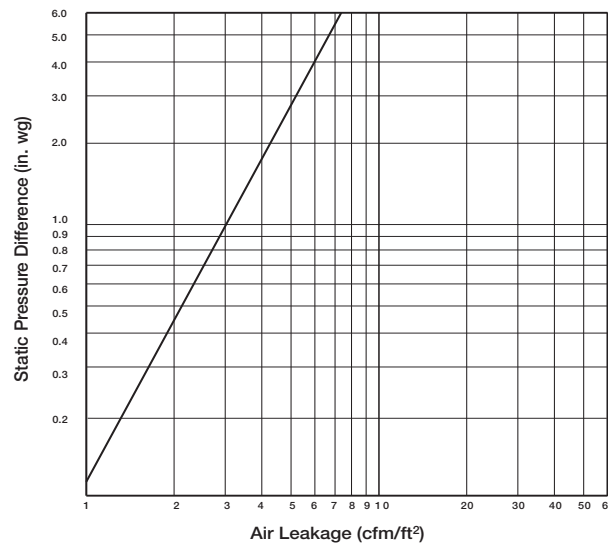
Dimension inches	12x12			24x24			36x36			12x48			48x12		
AMCA figure	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5	5.2	5.3	5.5
Velocity (ft/min)	Pressure Drop in. wg														
500	.05	.03	.07	.01	.01	.04	.01	.01	.02	.01	.01	.03	.03	.02	.05
1000	.18	.12	.28	.05	.03	.17	.04	.02	.12	.01	.04	.18	.11	.06	.19
1500	.43	.28	.62	.12	.06	.37	.09	.05	.28	.14	.09	.40	.25	.14	.44
2000	.76	.49	1.11	.22	.11	.66	.17	.08	.50	.25	.16	.72	.44	.25	.78
2500	1.19	.77	1.73	.34	.17	1.04	.26	.13	.78	.39	.25	1.12	.69	.39	1.21
3000	1.71	1.11	2.50	.49	.24	1.50	.38	.19	1.13	.57	.36	1.62	1.0	.57	1.75
3500	2.33	1.51	3.41	.66	.33	2.04	.51	.26	1.53	.77	.49	2.21	1.36	.77	2.38
4000	3.04	1.98	4.45	.87	.43	2.66	.67	.34	2.01	1.01	.64	2.88	1.78	1.01	3.11

# Leakage Data

# Selection Criteria

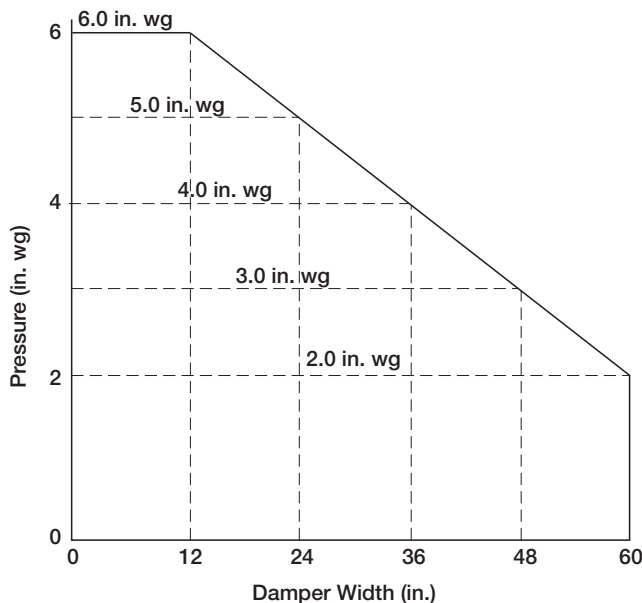
## Leakage Data

Damper leakage (with blades fully closed) varies based on the type of low leakage seals applied. Model VCD-42 is available with silicone blade seals and stainless steel jamb seals. Leakage testing was conducted in accordance with AMCA Standard 500-D and is expressed as cfm/ft<sup>2</sup> of damper face area. All data has been corrected to represent standard air at a density of 0.075 lb/ft<sup>3</sup> (1.201 kg/m<sup>3</sup>).

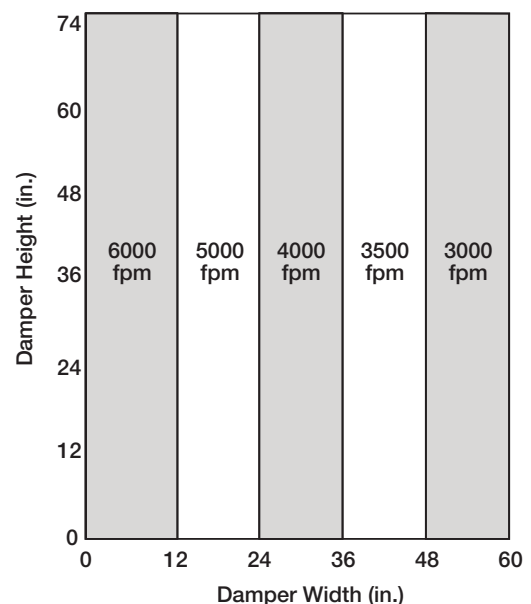


## Selection Criteria

### Pressure Limitations



### Velocity Limitations

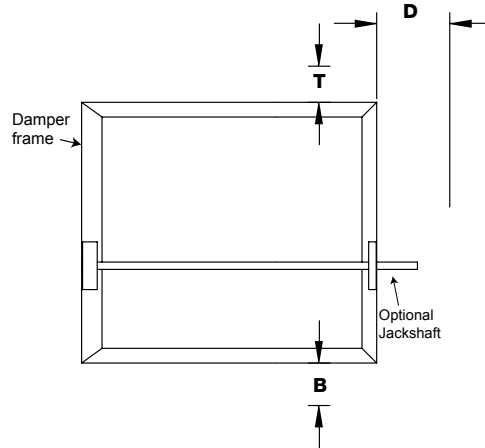


### Temperature Limitations

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)

**NOTE:** VCD-42 will withstand higher pressures and velocities. Displayed ratings are conservative to prevent misapplication. Consult factory if you have an application outside these limitations.

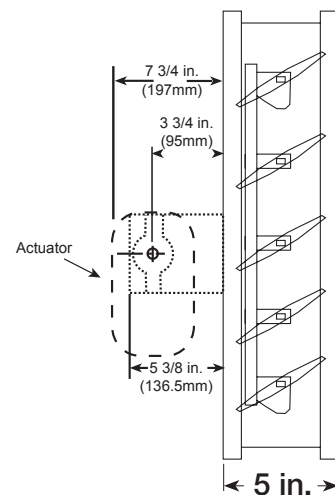
On dampers less than 18 in. (457mm) high, actuators may also require clearances above and/or below the damper frame. **“B” and “T” dimensions are worst case clearance requirements for some dampers less than 18 in. (457mm) high.** All damper sizes under 18 in. (457mm) high do not require these worst case 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 (mm)		
AFBUP (-S) and FSNF Series, Belimo MSxx20 Series, Honeywell	≥6 to <10	0	12 <sup>3</sup> / <sub>4</sub>	6
	≥10 to <18	0	2	6
	≥18	0	0	10
FSLF, LF and TFB Series, Belimo	≥6 to <10	0	3 <sup>1</sup> / <sub>2</sub>	6
	≥10	0	0	6
MSxx04 & MSxx09 Series, Honeywell	≥6 to <9	0	4 <sup>3</sup> / <sub>4</sub>	6
	≥9	0	0	6
MS75xx Series, Honeywell	≥6 to <10	0	12 <sup>3</sup> / <sub>4</sub>	6
	≥10 to <18	0	7	6
	≥18	0	0	6

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

Internal mount only Actuator model	A	B	C
All except - EFB & EFCX Series	7 <sup>3</sup> / <sub>4</sub> in. (197 mm)	3 <sup>3</sup> / <sub>4</sub> in. (95 mm)	5 <sup>5</sup> / <sub>8</sub> in. (136.5 mm)
EFB & EFCX Series	8 <sup>1</sup> / <sub>2</sub> in. (216 mm)	6 in. (152mm)	8 <sup>1</sup> / <sub>2</sub> in. (216 mm)



## Mounting

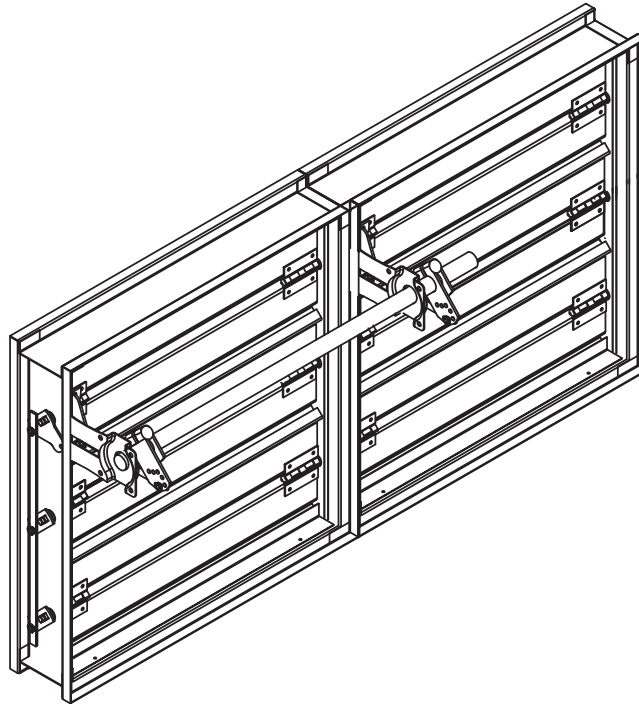
- External - includes extension pin (standoff bracket optional)
- External kit - actuator and all mounting hardware
- Internal - blade lever

## 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, extruded aluminum blades (0.063 in. [1.6mm] thick) with metal blade to blade overlap (seal to seal only contact is not acceptable); 1/2 in. (13mm) dia. plated steel axles turning in acetal 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 6 in. wg (1.5 kPa), velocities to 6000 fpm (30.5 m/s) and temperatures to 250°F (121°C).

Damper manufacturer's printed performance data showing standard air leakage less than 6 cfm/ft<sup>2</sup> at 4 in. wg (110 cmh/m<sup>2</sup> at 1 kPa) shall be submitted for approval.

Testing and ratings to be in accordance with AMCA Standard 500-D.

Basis of design is model VCD-42.