

Application and Design

VCD-42V is a low leakage damper with vertical blade orientation designed to meet the highest standards established for commercial control dampers. The VCD-42V is intended for application in medium to high pressure and velocity systems.

This model is 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.

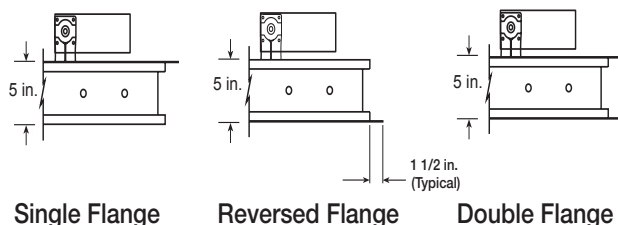


* W & H dimension furnished approximately 1/4 in. (6mm) undersize.

Construction	Standard	Optional
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, Reverse flange, Double flange
Blade Material	Extruded Aluminum	-
Blade Type	Airfoil	-
Linkage	Plated steel out of airstream, concealed in jamb	316SS
Axle Bearings	Synthetic with thrush washers	316SS with thrush washers
Axle Material	Plated steel	316SS
Blade Seals	TPE	Silicone
Jamb Seals	Stainless Steel	-
Paint Finishes	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 side members are utilized. These low profile frame members will be made from 16 ga. material.

Flange Options



Damper Ratings

Pressure: Up to 6.0 in. wg (.5 kPa - 1.5 kPa) pressure differential

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

Leakage: 6 cfm/ft² at 4 in. wg (110cmh/m² at 1 kPa)
3 cfm/ft² at 1 in. wg (55cmh/m² at .25 kPa)

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

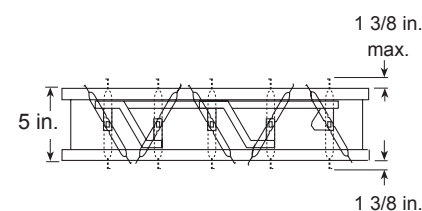
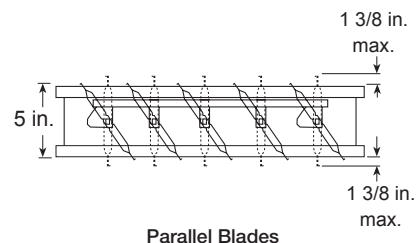
Features and Options:

- Blade seals - pressure activated to produce tighter sealing
- Electric actuator and manual quadrant available. Factory supplied actuators are sized for 1500 fpm (7m/s) and fully closed differential pressure of 2 in. wg (.5 kPa). contact factory for actuator sizing on applications exceeding those limits. Actuators (when supplied) are mounted on the top or bottom

Size Limitations

W x H	Minimum Size	Maximum Size	
		Single Section	Multi-Section
Inches	6 x 6	74 x 60	148 x 120
mm	152 x 152	1880 x 1524	3759 x 3048

Blade Operation



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^3 (1.201 kg/m^3).

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.

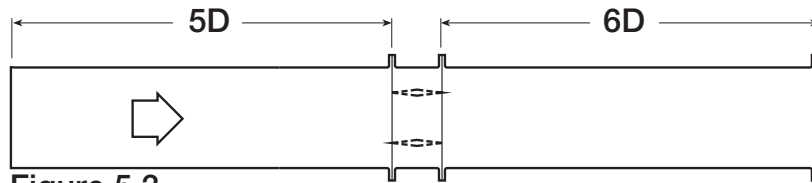


Figure 5.3

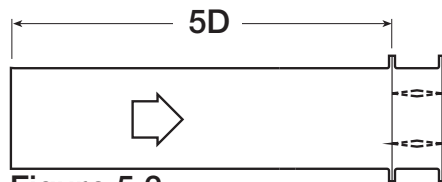


Figure 5.2

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.

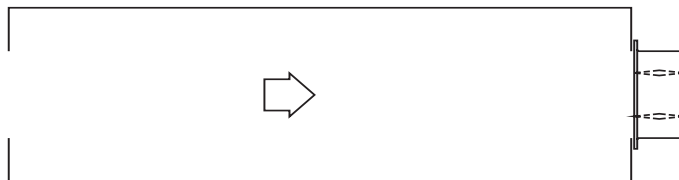


Figure 5.5

Pressure Drop Data

VCD-42V

AMCA 5.2

12 in. x12 in. (305mm x 305mm)		24x24 (610 mm x 610mm)		36x36 (914mm x 914mm)		12x48 (305mm x 1219mm)		48x12 (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	.05	500	.01	500	.01	500	.03	500	.01
1000	.18	1000	.05	1000	.04	1000	.11	1000	.01
1500	.43	1500	.12	1500	.09	1500	.25	1500	.14
2000	.76	2000	.22	2000	.17	2000	.44	2000	.25
2500	1.19	2500	.34	2500	.26	2500	.69	2500	.39
3000	1.71	3000	.49	3000	.38	3000	1.00	3000	.57
3500	2.33	3500	.66	3500	.51	3500	1.36	3500	.77
4000	3.04	4000	.87	4000	.67	4000	1.78	4000	1.04

AMCA 5.3

12 in. x12 in. (305mm x 305mm)		24x24 (610 mm x 610mm)		36x36 (914mm x 914mm)		12x48 (305mm x 1219mm)		48x12 (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	.03	500	.01	500	.01	500	.02	500	.01
1000	.12	1000	.03	1000	.02	1000	.06	1000	.04
1500	.28	1500	.06	1500	.05	1500	.14	1500	.09
2000	.49	2000	.11	2000	.08	2000	.25	2000	.16
2500	.77	2500	.17	2500	.13	2500	.39	2500	.25
3000	1.11	3000	.24	3000	.19	3000	.57	3000	.36
3500	1.51	3500	.33	3500	.26	3500	.77	3500	.49
4000	1.98	4000	.43	4000	.34	4000	1.01	4000	.64

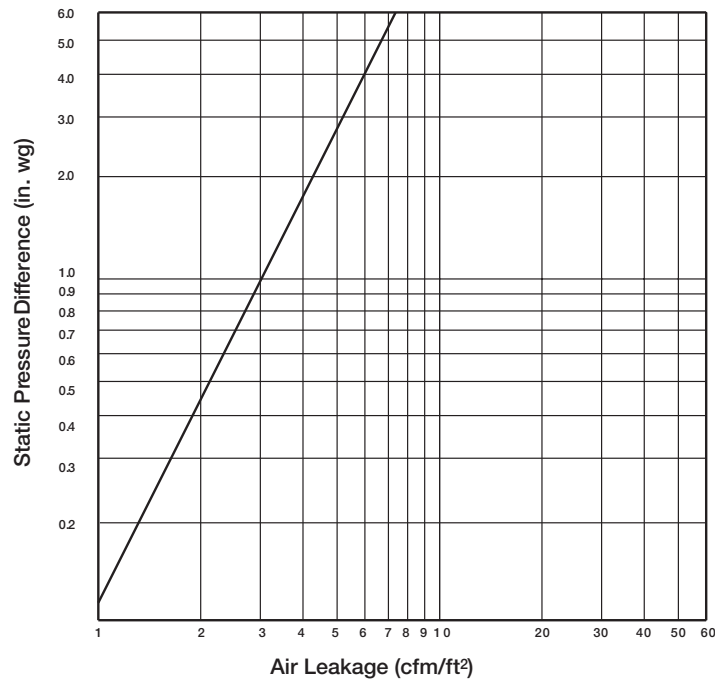
AMCA 5.5

12 in. x12 in. (305mm x 305mm)		24x24 (610 mm x 610mm)		36x36 (914mm x 914mm)		12x48 (305mm x 1219mm)		48x12 (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	.07	500	.04	500	.02	500	.05	500	.03
1000	.28	1000	.17	1000	.12	1000	.19	1000	.18
1500	.62	1500	.37	1500	.28	1500	.44	1500	.40
2000	1.11	2000	.66	2000	.50	2000	.78	2000	.72
2500	1.73	2500	1.04	2500	.78	2500	1.21	2500	1.12
3000	2.50	3000	1.50	3000	1.13	3000	1.75	3000	1.62
3500	3.41	3500	2.04	3500	1.53	3500	2.38	3500	2.21
4000	4.45	4000	2.66	4000	2.01	4000	3.11	4000	2.88

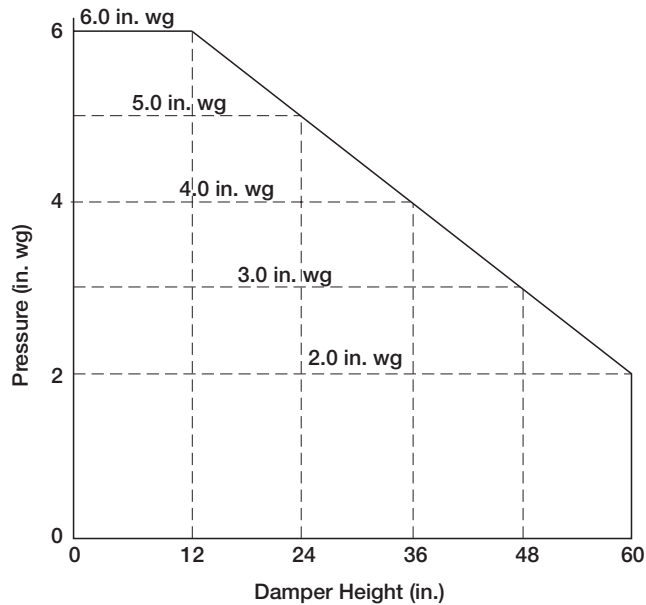
Leakage Data and Limitations

VCD-42V

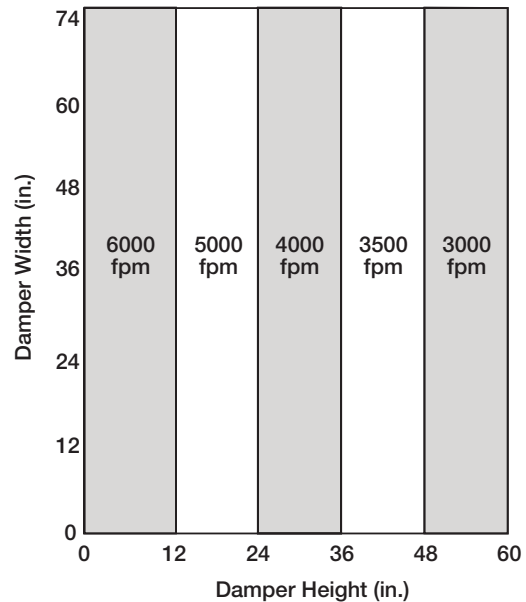
Damper leakage (with blades fully closed) varies based on the type of low leakage seals applied. Model VCD-42V is available with silicone blade seals and stainless steel jamb seals. Leakage testing was conducted in accordance with AMCA Standard 500-D and is expressed as cfm/ft^2 of damper face area.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



Pressure Limitations



Velocity Limitations



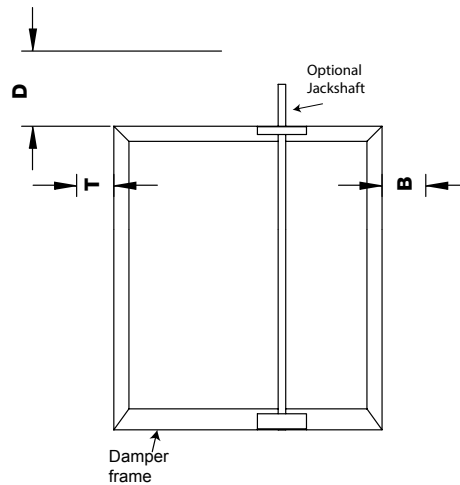
NOTE: VCD-42V will withstand higher pressures and velocities. Displayed ratings are conservative to prevent misapplication. Consult factory if you have an application outside these limitations. Temperatures in excess of 180°F (82°C) require special consideration.

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)

Space Envelopes

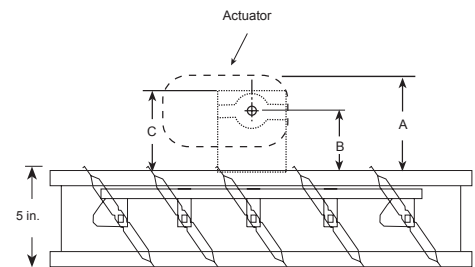
On dampers less than 18 in. (457mm) high, actuators may also require clearances above and/or below the damper frame. **“B” and “T” dimensions are worst case clearance requirements for some dampers less than 18 in. (457mm) high.** All damper sizes under 18 in. (457mm) high do not require these worst case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



Actuator Type/Model	Width	T	B	D
	Inches (mm)	Inches (mm)		
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	7 ¾ in (197 mm)	3 ¾ in (95 mm)	5 ⅜ in (136.5 mm)
EFB & EFCX Series	8 ½ in (216 mm)	6 in (152mm)	8 ½ in (216 mm)



Mounting

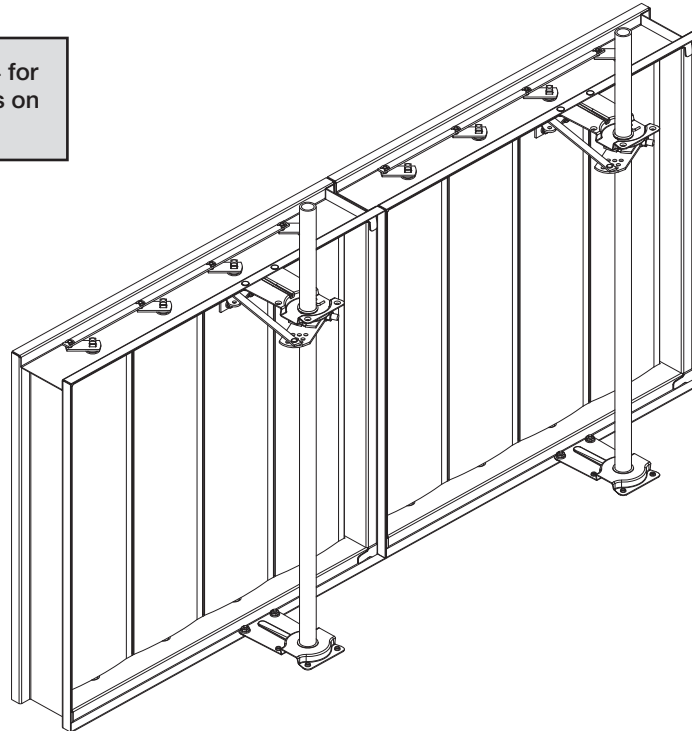
- External - includes extension pin (standoff bracket optional)
- External kit - actuator and all mounting hardware
- Internal - blade lever

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 74 in. x 60 in. (1880mm x 1524mm) 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 463384 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); blades shall be completely symmetrical relative to their axle 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; 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, leakage, and temperature limitations shall be submitted for approval showing damper suitable for pressures to 6 in. wg (1.5 Pa), velocities to 6000 fpm (30.5 m/s) and temperatures to 250°F (121°C).

Damper leakage for approval showing standard air leakage less than 6 cfm/sq.ft. at 4 in. wg (110cmh/m sq. at 1 kPa). Testing and ratings developed in accordance with AMCA Standard 500-D.

Basis of design is model VCD-42V.

