

### Application and Design

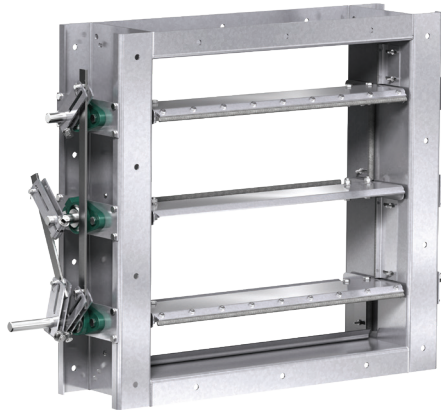
Model HCD-324 is a heavy duty industrial control damper with a flanged frame for high temperature applications. It is designed to control airflow and provide shut off in HVAC or industrial process control systems. A variety of optional features makes model HCD-324 extremely versatile, allowing its capabilities to be tailored to the application.

### Ratings (see page 2 and 3 for specific limitations)

**Pressure:** Up to 25 in. wg (6.2 kPa) - differential pressure

**Velocity:** Up to 5000 fpm (25.4 m/s)

**Temperature:** -40 to 1000°F (-40 to 538°C). Consult factory for other temperatures.



The W dimension is ALWAYS parallel with the damper blade length.

Damper linkage and axles may extend beyond the damper flange based on the configuration of selectable options. Consult factory for dimensions.

### Standard Construction

	Standard	Optional
<b>Frame Depth (C)</b>	8 in. (203mm)	10 in. (254mm) 12 in. (305mm)
<b>Frame Material</b>	Painted	304SS 316SS
<b>Frame Type</b>	Flanged Channel	
<b>Frame Thickness</b>	10 ga. (3.5mm)	7 ga. (4.8mm)
<b>Flange Width (D)</b>	2 in. (51mm)	2½ in. (64mm) 3 in. (76mm)
<b>Blade Action</b>	Opposed	
<b>Blade Material</b>	Painted	304SS 316SS
<b>Blade Seals</b>	None	Fiberglass Ceramic
<b>Blade Thickness</b>	10 ga. (3.5mm)	
<b>Blade Type</b>	High Temp Airfoil	
<b>Linkage</b>	Plated Steel	304SS 316SS
<b>Jamb Seals</b>	None	Fiberglass Ceramic
<b>Axle Diameter</b>	¾ in. (19mm)	
<b>Axle Bearing</b>	Outboard Ball	Outboard Carbon
<b>Axle Material</b>	Plated Steel	303SS 316SS
<b>Axle Seals</b>	Double Gland	Outboard Double Gland
<b>Paint Finishes</b>	Hi Temperature Flame Control	None
<b>Mounting Holes</b>	None	Standard Standard with corner holes

### Size Limitations

W x H	Minimum Size	Maximum Size
		Single Section
<b>Inches</b>	6½ x 6	48 x 60
<b>mm</b>	165 x 152	1219 x 1524

### Features:

- Wide range of actuators available

### Options:

- Vertical Blade Orientation

## Pressure Limitations

The chart at the right shows conservative pressure limitations based on a maximum blade deflection of  $w/360$ .

## Temperature Limitations

**Blade seals:** Fiberglass -60° to 800°F (-51° to 427°C)

Ceramic -60° to 1000°F (-51° to 538°C)

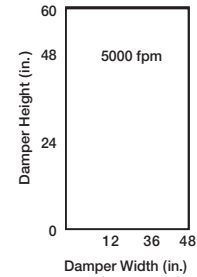
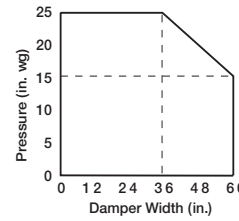
**Jamb seals:** Fiberglass -60° to 800°F (-51° to 427°C)

Ceramic -60° to 1000°F (-51° to 538°C)

For higher temperatures, consult factory.

## Velocity Limitations

The chart at far right shows velocity limitations based on damper size.



## Pressure Drop Data

This pressure drop data 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> (1.2 kg/m<sup>3</sup>).

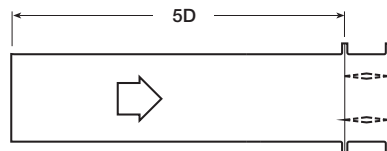
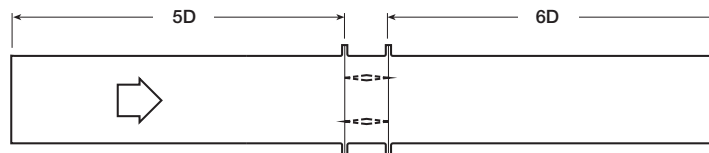
Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

## AMCA Test Figures

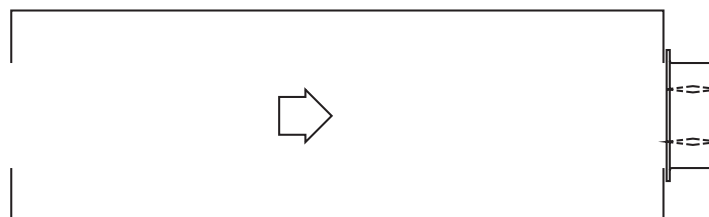
**Figure 5.3** illustrates a fully ducted damper. This configuration has the lowest pressure drop of the three test configurations because the entrance and exit losses are minimized by straight duct runs upstream and downstream of the damper.

**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 the 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 the high entrance and exit losses due to the sudden changes of area in the system.

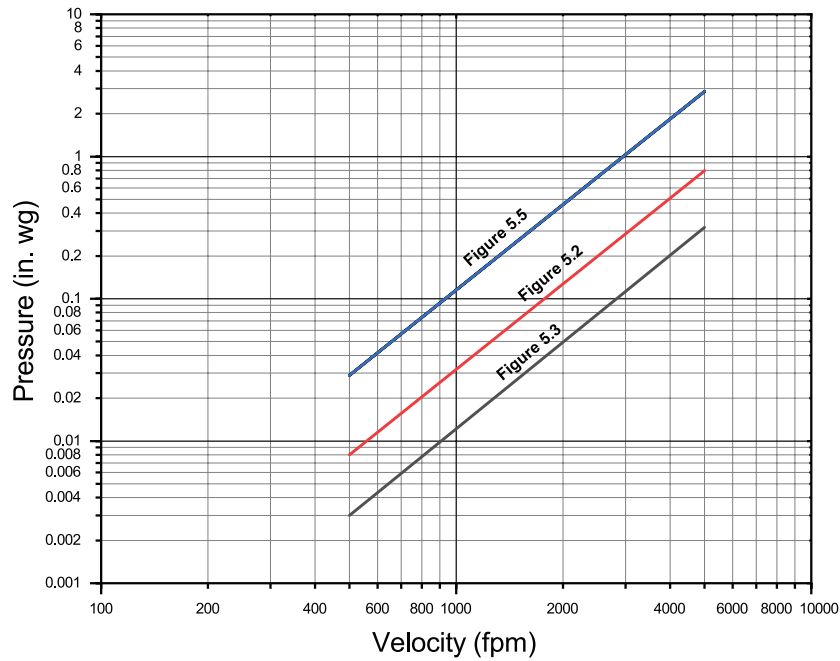


$$D = \sqrt{\frac{4(W)(H)}{3.14}}$$



## Estimated Pressure Drop

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

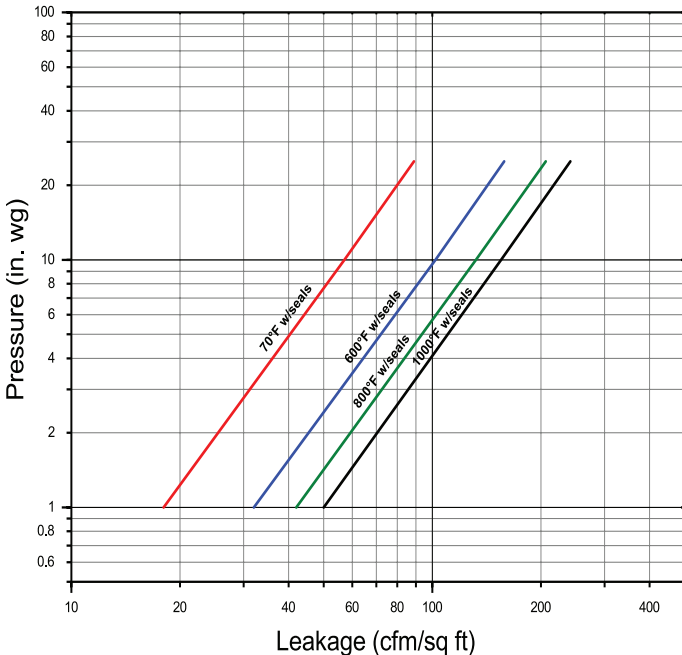


## Leakage Data

Damper leakage (with blades fully closed) varies based on the type of low leakage seals applied. Model HCD-324 is available with no jamb and blade seals (standard) or with optional fiberglass or ceramic jamb and blade seals. Leakage testing was conducted in accordance with AMCA Standard 500-D and is expressed as CFM per sq. ft. of damper face area. All data has been corrected to represent standard air at a density of .075 lb/ft<sup>3</sup> (1.2 kg/m<sup>3</sup>).

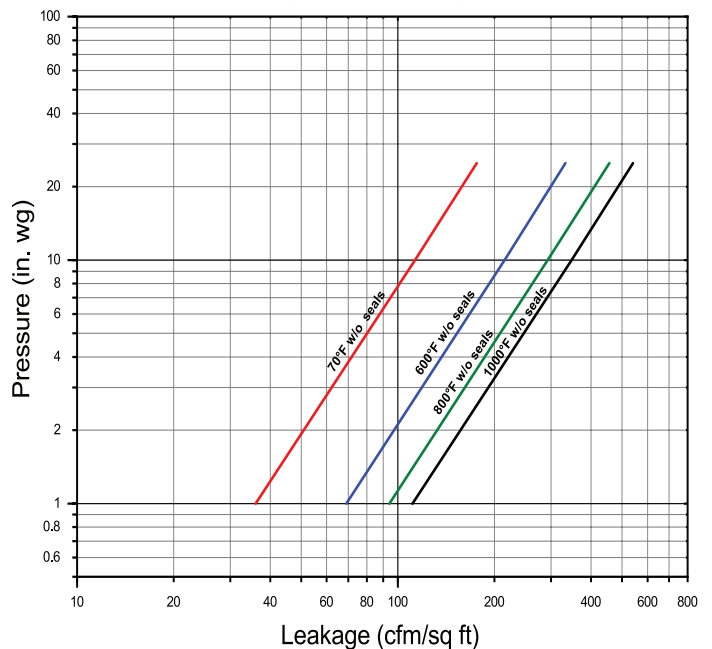
### Estimated Leakage (with seals)

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

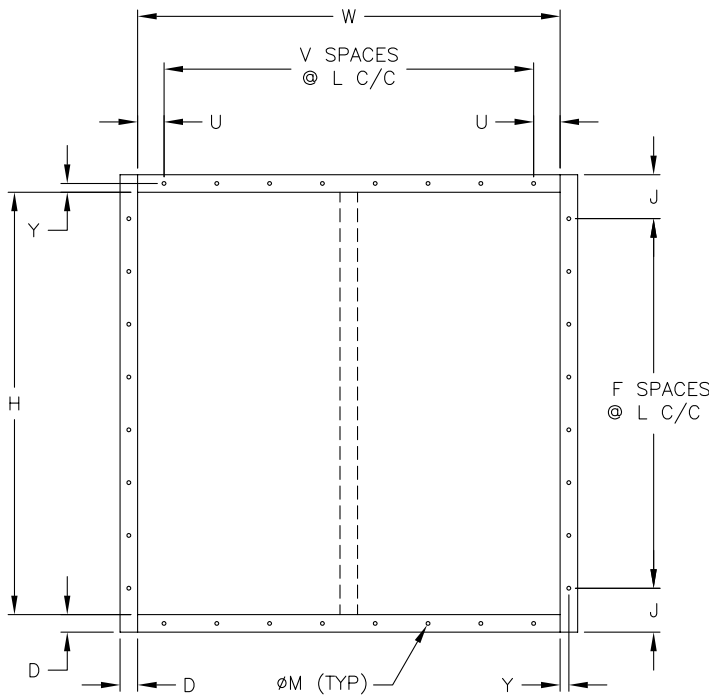


### Estimated Leakage (without seals)

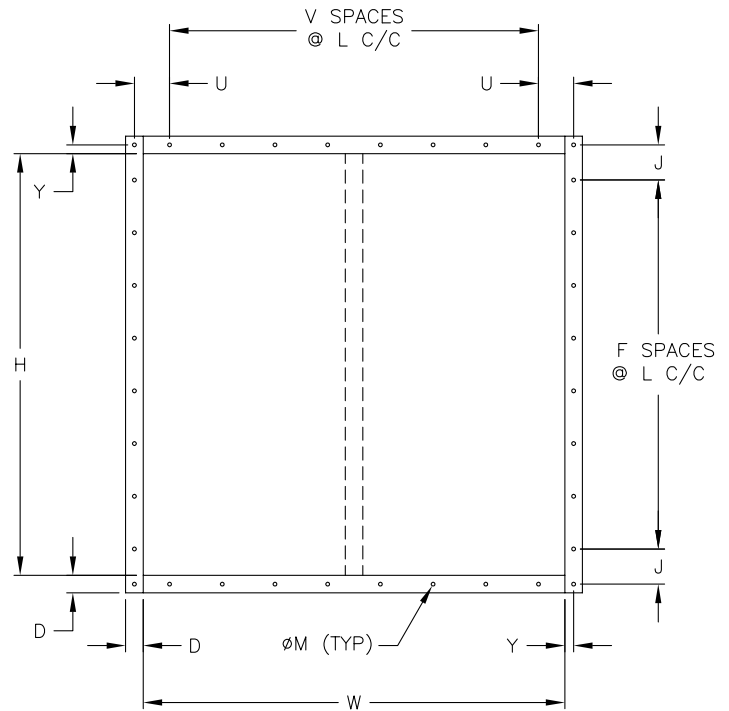
36 in. x 36 in. Damper  
(914mm x 914mm)



Bolt holes are available as an option. The standard pattern is 7/16 in. (11mm) diameter holes (M dimension) spaced 6 in. (152mm) on center (L dimension). Custom bolt hole patterns are available. Contact factory for the limitations.



Standard Mounting Hole Pattern  
Typical for single or double wide panel



Standard Mounting Hole Pattern with Corner Holes  
Typical for single or double wide panel

## Specifications

Industrial grade 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 10 ga. (3.5mm) steel channel frame with 8 in. (203mm) minimum depth and 2 in. (51mm) flanges; high temp airfoil blades fabricated from two layers of 10 ga. (3.5mm) galvanized painted steel; 3/4 in. (9.5mm) dia. plated steel axles turning in outboard ball bearings; and external (out of the airstream) blade-to-blade linkage. To prevent air leakage through the frame, each blade axle shall be equipped with a double gland seal where it penetrates the damper frame.

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 25 in. wg (6.2 kPa), velocities to 5,000 fpm (25.4 m/s) and temperatures to 1000°F (538°C).

Specifier may add the following:

Damper shall be equipped with blade and jamb seals for low leakage performance. Blade and jamb seals shall be fiberglass for 800°F (427°C) or ceramic for 1000°F (538°C) maximum temperature. Testing and ratings shall be per AMCA Standard 500-D.

Basis of design is model HCD-324.