

## Industrial Control Damper

### Application and Design

Model HCDR-350 is a heavy duty round industrial control damper with a flanged style frame. It is designed to control airflow and provide shut off in HVAC or industrial process control systems. A variety of optional features makes model HCDR-350 extremely versatile, allowing its capabilities to be tailored to the application.

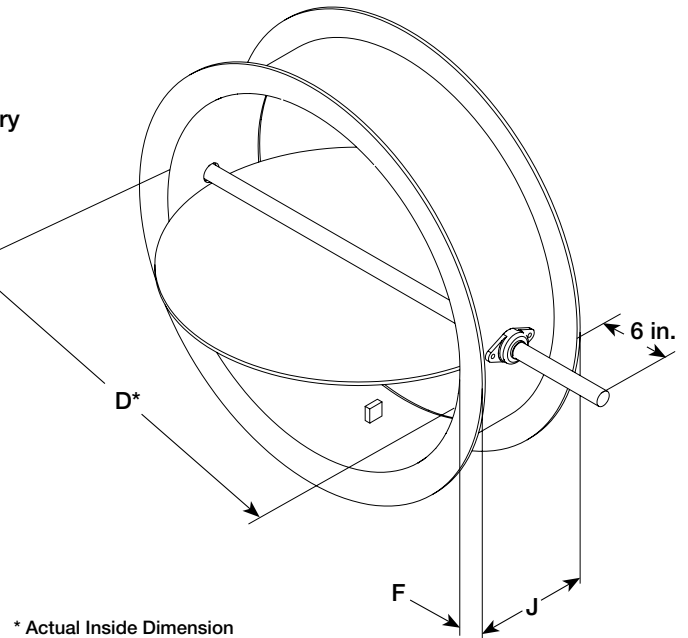
### Ratings (See pages 2 and 3 for specific limitations)

**Pressure:** 20 in. wg (5 kPa) - differential pressure

**Velocity:** 6400 fpm (32.5 m/s)

**Temperature:** -60°F to 600°F (-51°C to 315°C). Consult factory for other temperatures.

	Standard	Optional
<b>Frame Material</b>	Painted Steel	304SS
<b>Frame Type</b>	Flanged Channel	
<b>Blade Material</b>	Painted Steel	304SS
<b>Blade Seals</b>	None	EPDM, Silicone
<b>Blade Type</b>	Round	
<b>Axle Bearing</b>	External Bronze Sleeve through 48 in. (1219mm); External Relubricable Ball above 48 in. (1219mm) diameter	External Relubricable Ball, Outboard External Sleeve, Outboard Relubricable Ball
<b>Axle Material</b>	Plated Steel	304SS
<b>Axle Seals</b>	None	O-ring, Double Gland Stuffing Box
<b>Paint Finishes</b>	Permatector™	Baked Enamel, Epoxy, Hi Pro Polyester, Hi Temperature Aluminum, Hi Temperature Silver, Industrial Epoxy



Diameter	Minimum Size	Maximum Size
Inches	4	72
mm	102	1829

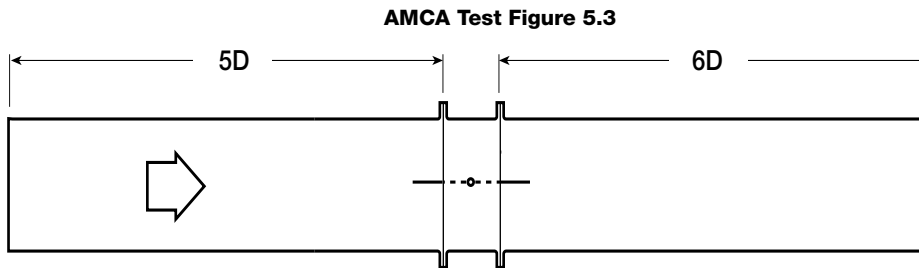
### Features

- Wide mounting flanges can be ordered with bolt holes, customized to match your requirements.
- Rolled bar stops are required when blade seal is selected.

Diameter <i>D</i> Inches (mm)		Frame Depth <i>J</i> Inches (mm)	Frame & Flange Gauge (mm)	Flange Width <i>F</i> Inches (mm)	Axle Diameter Inches (mm)	Blade Thickness Gauge (mm)
Above	Through					
3.99 (101)	12.24 (311)	6 (152)	12 (2.7)	1.25 (32)	0.5 (13)	10 (3.5)
12.24 (311)	20 (508)	8 (203)	10 (3.5)	1.5 (38)	0.75 (19)	0.188 (4.8)
20 (508)	24 (610)	8 (203)	10 (3.5)	1.5 (38)	0.75 (19)	0.25 (6)
24 (610)	36 (914)	8 (203)	0.188 (4.8)	2.0 (51)	1 (25)	0.25 (6)
36 (914)	48 (1219)	8 (203)	0.188 (4.8)	2.0 (51)	1.25 (32)	0.25 (6)
48 (1219)	54 (1372)	8 (203)	0.188 (4.8)	2.5 (64)	1.50 (38)	0.25 (6)
54 (1372)	60 (1524)	8 (203)	0.25 (6)	2.5 (64)	1.50 (38)	0.25 (6)
60 (1524)	72 (1829)	8 (203)	0.25 (6)	2.5 (64)	2 (51)	0.25 (6)

## AMCA Test Figure 5.3

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



## Pressure Drop Data

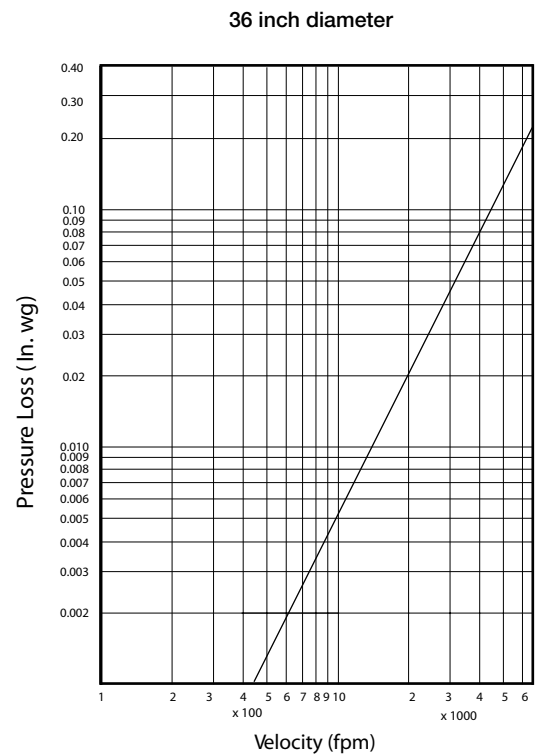
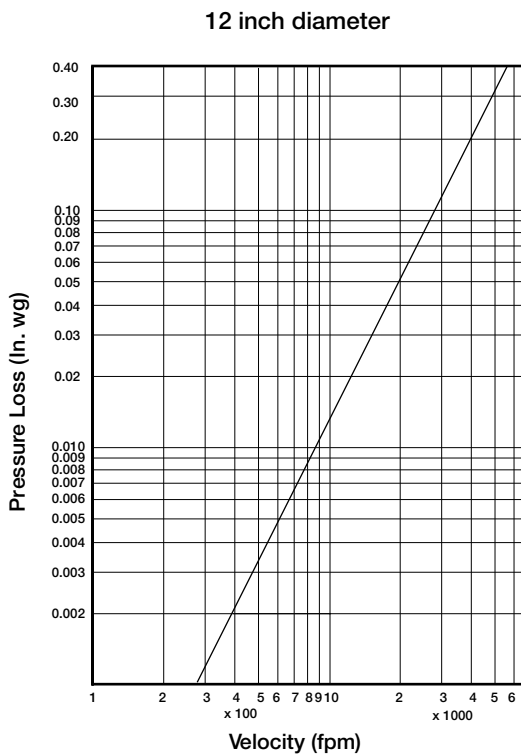
This pressure drop data was conducted in accordance with AMCA Standard 500-D using Test Figure 5.3. All data has been corrected to represent standard air at a density of 0.075 lb/ft<sup>3</sup> (1.2 kg/m<sup>3</sup>).

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.

**NOTE:**

PS refers to damper with standard pin blade stop

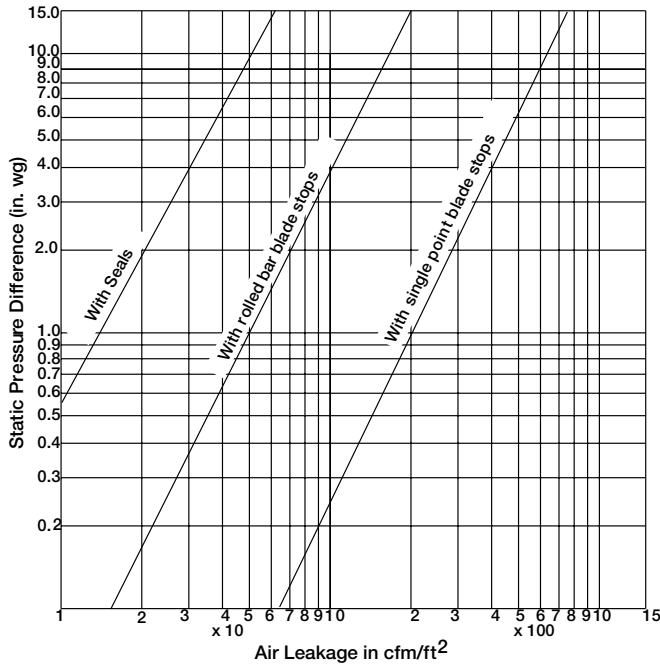
BS refers to damper with rolled bar blade stop



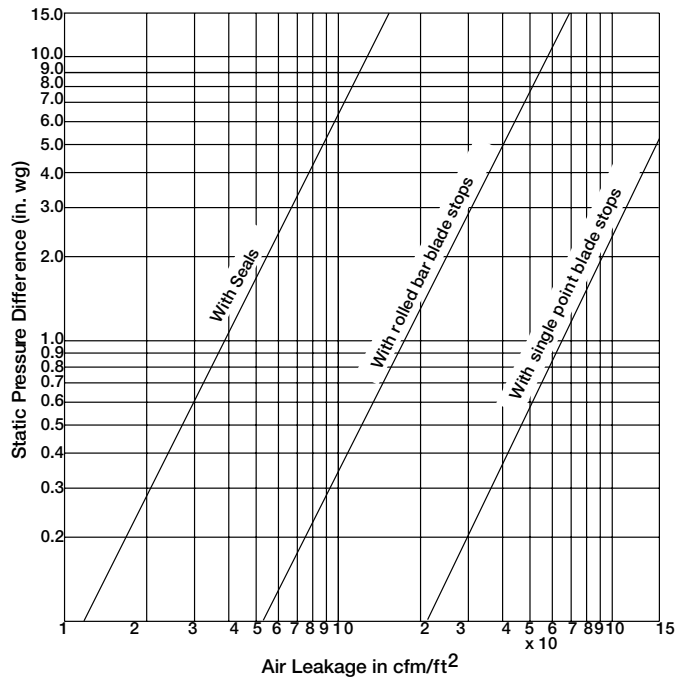
## Leakage Data

Damper leakage (with blades fully closed) varies based on the type of blade stops and low leakage seals applied. Model HCDR-350 is available with no seals (standard) or with EPDM or silicone rubber blade 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> (1.2 kg/m<sup>3</sup>).

**Leakage**  
**12 in. Diameter Damper**



**Leakage**  
**36 in. Diameter Damper**



## Frame Construction Options

### Bolt Holes:

Standard - Does not include bolt holes

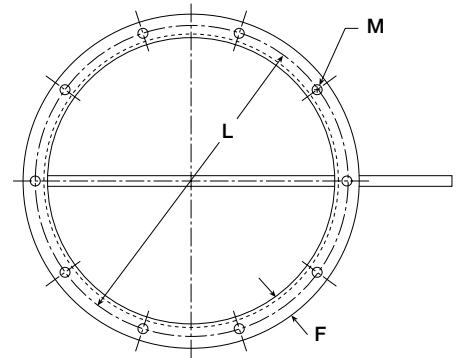
Optional - Bolt holes in both flanges.

Greenheck recommended bolt hole pattern is shown in the table below.

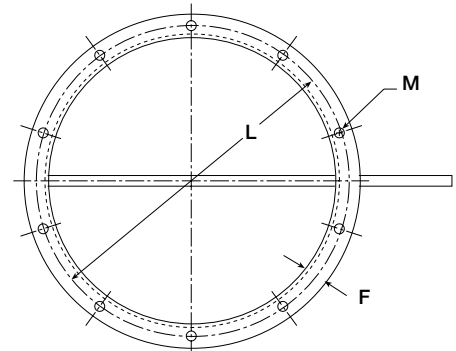
Customer must specify bolt holes that are parallel to the axle centerline (P) or that straddle the axle centerline (S) as shown in the diagrams below.

Greenheck can also provide bolt hole sizes and patterns other than those shown.

**Bolt Holes**  
**Parallel to Axle Centerline (P)**



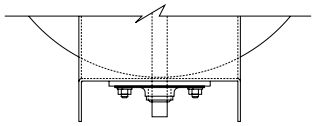
**Bolt Holes**  
**Straddle Axle Centerline (S)**



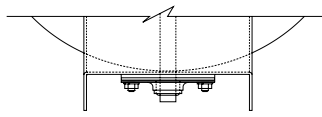
Greenheck Recommended Bolt Hole Pattern (Bolt Holes Parallel to Axle Centerline)					
Diameter Inches (mm)		Number of Holes	Mounting Hole Diameter in. (mm) M	Bolt Circle Diameter L	Degrees Between Holes
Above	Through				
4 (102)	5 (127)	4	3/8 (9.5)	*	90
5 (127)	8 (203)	6	3/8 (9.5)	*	60
8 (203)	11 (279)	6	7/16 (11)	*	60
11 (279)	18 (457)	8	7/16 (11)	*	45
18 (457)	24 (610)	12	7/16 (11)	*	30
24 (610)	36 (914)	16	7/16 (11)	*	22 1/2
36 (914)	58 (1473)	24	7/16 (11)	*	15
58 (1473)	72 (1829)	32	9/16 (14)	*	11 1/4

\* Bolt Circle Diameter = Damper Diameter + Flange Height + 1/4 in. (6mm)

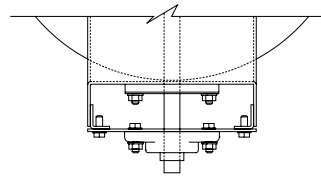
## Bearing and Shaft Options



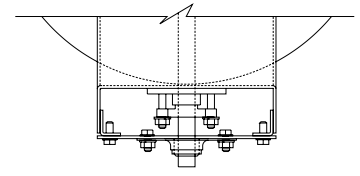
External Mounted  
Ball or Sleeve Bearing  
(Bronze Sleeve  
Standard, Ball Optional)



External Mounted  
Bronze Sleeve  
Bearing with O-Ring  
(Optional)



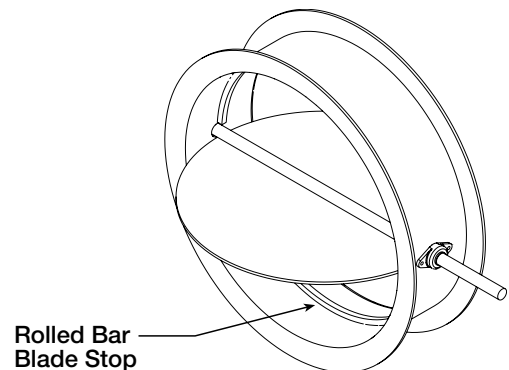
O-Ring Shaft Seal with  
Outboard Mounted  
Bearing  
(Optional)



Double Gland  
Stuffing Box with  
Outboard Mounted  
Bearing (Optional)

## Blade Seal Options (Rolled Bar Blade Stops Required)

- Standard** - Does not include Blade Seals
- Optional** - EPDM Blade Seals (250°F [121°C]max.)
- Optional** - Silicone Rubber Blade Seals (400°F [204°C] max.)



## 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 round channel frame, single axle, and single circular blade fabricated from steel with baked polyester urethane enamel finish. Damper axle shall be continuous pivoting in externally mounted bronze sleeve bearings bolted to each side of 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 20 in. wg (5 kPa), velocities to 6400 fpm (32.5 m/s), and temperatures to 600°F (315°C). Testing and ratings to be in accordance with AMCA Standard 500-D.

Specifier may add the following:

Dampers shall be equipped with blade seals for low leakage performance. Blade seals shall be: select one of the following EPDM synthetic rubber for 250°F (121°C) maximum temperature, or Silicone Rubber for 400°F (204°C) maximum temperature. Axles may also be equipped with Viton o-rings for clean air or double gland stuffing boxes. Frame and blade gauges and axle diameters shall be at a minimum equal to those of the model which is the basis of design. Testing and ratings shall be per AMCA Standard 500-D.

Basis of design is Greenheck model HCDR-350.

