

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 allows the model HCDR-350 to be tailored to the application.

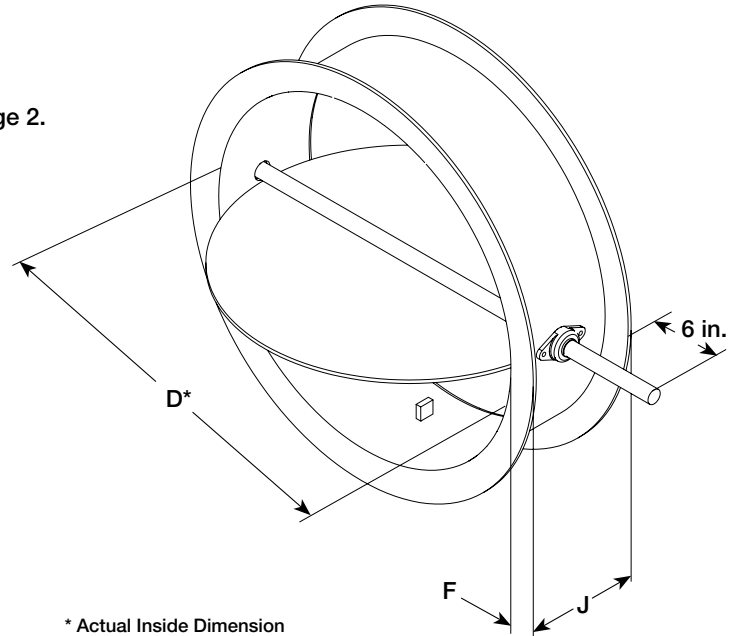
Ratings (See pages 3 and 4 for specific limitations)

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

Velocity: 6400 fpm (32.5 m/s)

Temperature: -60°F to 1000°F (-51°C to 538°C). See page 2.

<i>Diameter</i>	<i>Minimum Size</i>	<i>Maximum Size</i>
Inches	4	72
mm	102	1829



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 (3305)	6 (152)	12 (2.7)	1.25 (32)	0.5 (13)	10 (3.5)
12 (305)	20 (508)	8 (203)	10 (3.5)	1.5 (38)	0.75 (19)	0.188 (4.8)
20 (5080)	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)	3 (76)	2 (51)	0.25 (6)

CONSTRUCTION FEATURES

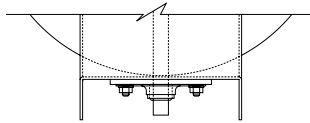
HCDR-350

	Frame Material	Frame Type	Blade Material	Blade Seals	Blade Stops	Blade Type	Axle Bearing	Axle Material	Axle Seals	Paint Finishes
Up to 400°F										
Standard	Painted Steel	Flanged Channel	Painted Steel	None	Pin Stop	Round	External Bronze Sleeve through 48 in. (1219mm); External Relubricable Ball above 48 in. (1219mm) diameter	Plated Steel	None	Permatector™
Optional	304SS		304SS or 316SS	EPDM, Silicone	Rolled Bar		External Relubricable Ball, Outboard External Bronze Sleeve, Outboard Relubricable Ball	304SS or 316SS	O-ring	Epoxy, Hi Pro Polyester, Hi Temperature Aluminum, Hi Temperature Silver, Industrial Epoxy
600°F										
Standard	Carbon Steel	Flanged Channel	Carbon Steel	None	Pin Stop	Round	Outboard Bronze Sleeve	Carbon Steel	Double Gland	None
Optional	304SS, 316SS		304SS, 316SS	Fiberglass, Ceramic	Rolled Bar		Outboard Ball Outboard Carbon	304SS, 316SS	Outboard Double Gland	Hi Temperature Aluminum
800°F										
Standard	Carbon Steel	Flanged Channel	Carbon Steel	None	Pin Stop	Round	Outboard Carbon	Carbon Steel	Double Gland	None
Optional	304SS, 316SS		304SS, 316SS	Fiberglass, Ceramic	Rolled Bar		-	304SS, 316SS	Outboard Double Gland	Hi Temperature Aluminum
1000°F										
Standard	304SS	Flanged Channel	304SS	None	Pin Stop	Round	Outboard Carbon	304SS	Double Gland	None
Optional	316SS		316SS	Fiberglass, Ceramic	Rolled Bar		-	316SS	Outboard Double Gland	-

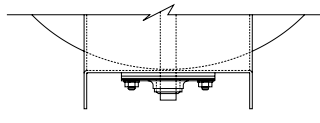
Features

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

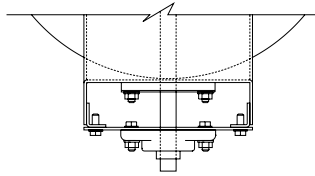
Bearing and Shaft Options



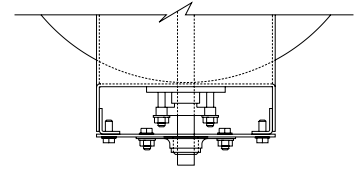
External Mounted
Ball or Sleeve Bearing
(Bronze Sleeve
Standard, Ball Optional)



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



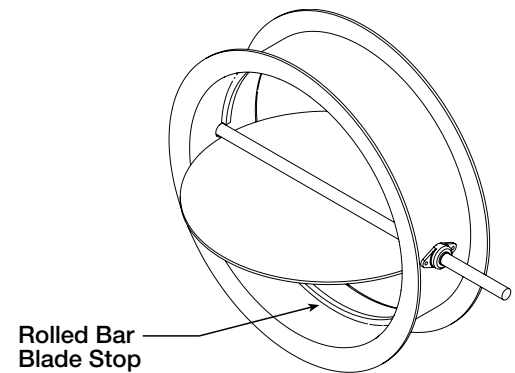
O-Ring Shaft Seal with
Outboard Mounted
Bearing
(Optional)



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.)



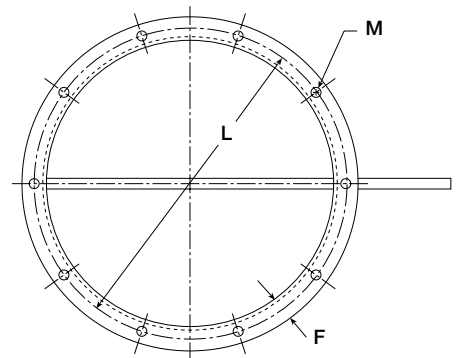
Frame Construction Options

Bolt Holes:

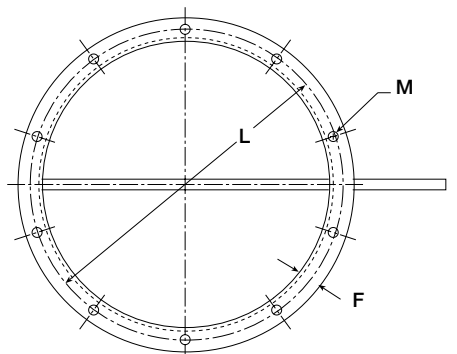
- Standard - Does not include bolt holes
- Optional - Bolt holes in both flanges.

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)

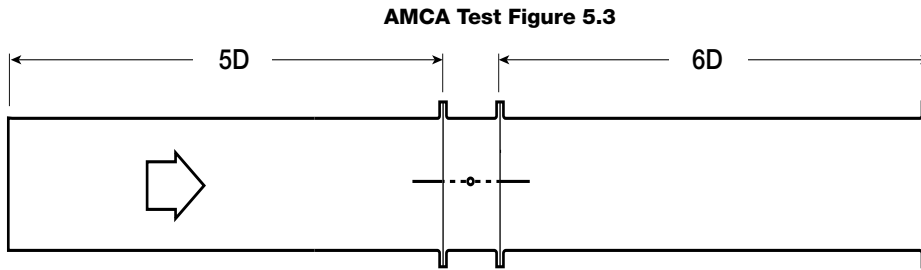


Greenheck Recommended Bolt Hole Pattern (Bolt Holes Parallel to Axle Centerline)					
Diameter Inches (mm)		Number of Holes	Mounting Hole Diameter in. (mm) M	Bolt Circle Diameter L	Degrees Between Holes
Above	Through				
4 (102)	5 (127)	4	3/8 (9.5)	*	90
5 (127)	8 (203)	6	3/8 (9.5)	*	60
8 (203)	11 (279)	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)

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/ft³ (1.2 kg/m³).

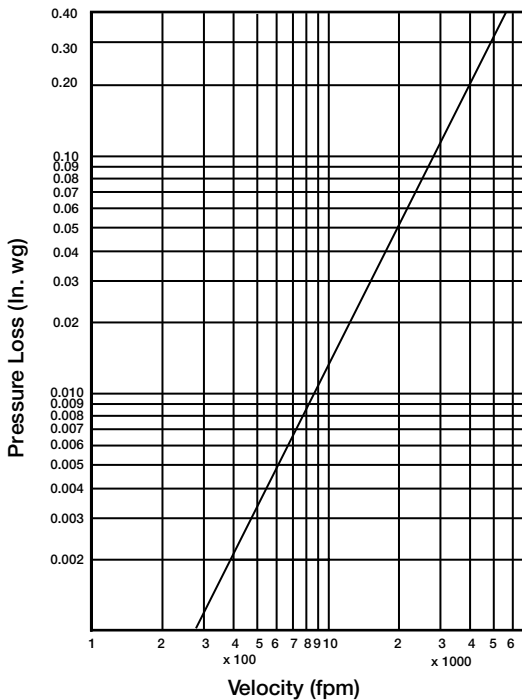
Actual pressure drop found in any HVAC system is a combination of many factors. This pressure drop information along with an analysis of other system influences should be used to estimate actual pressure losses for a damper installed in a given HVAC system.

NOTE:

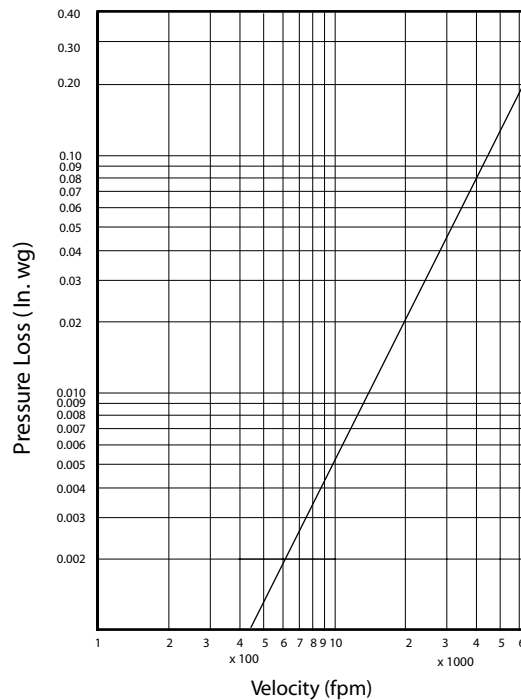
PS refers to damper with standard pin blade stop

BS refers to damper with rolled bar blade stop

12 inch diameter



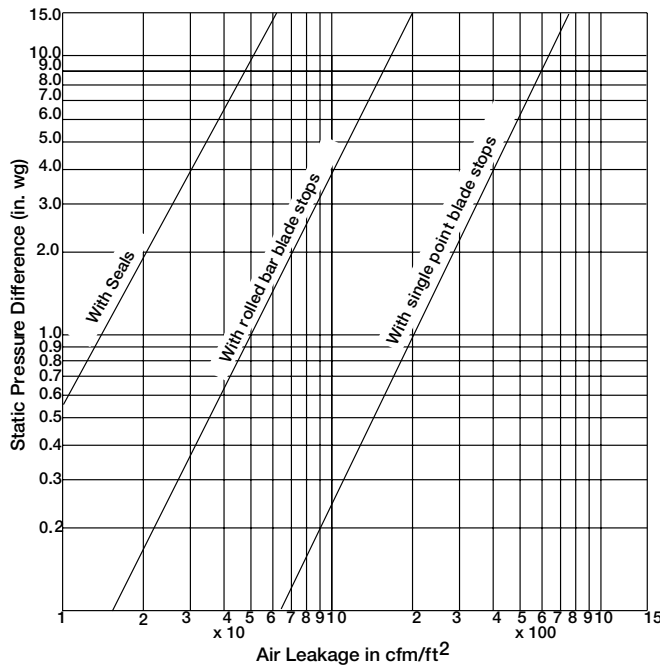
36 inch diameter



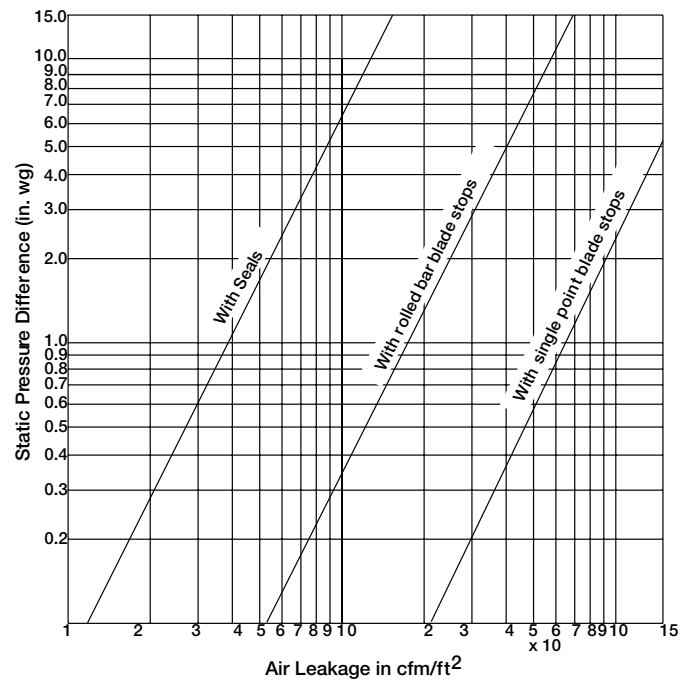
Leakage Data

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/ft² of damper face area. All data has been corrected to represent standard air at a density of 0.075 lb/ft³ (1.2 kg/m³).

**Leakage
12 in. Diameter Damper**



**Leakage
36 in. Diameter Damper**



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 Permator™ 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, Silicone Rubber for 400°F (204°C) maximum temperature, fiberglass or ceramic for 1000°F (538°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.

