

Application and Design

Models HTOD-330 and HTOD-331 are heavy duty double flanged channel frame style backdraft dampers with single thickness fabricated blades. They are designed to protect against tornadoes and instantaneous pressure changes. External clevis type linkage and external mount relubricable ball bearings are standard. Model HTOD-330 will close in the same direction as normal flow and HTOD-331 will close in the opposite direction as normal flow.

Ratings

Pressure: 83 in. wg (20.7 kPa) (3 psi) - differential pressure

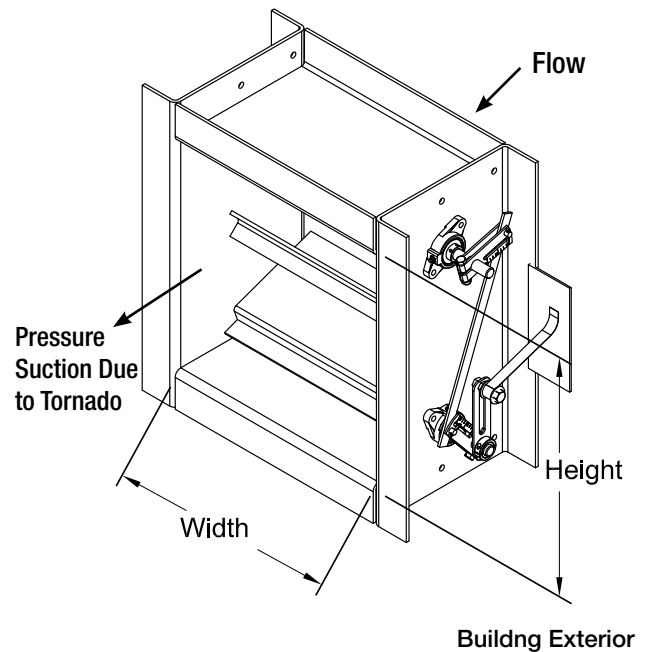
Velocity: 6400 fpm (32.5 m/s)

Temperature: Minimum: -40°F (-40°C)

Maximum: 250°F (121°C)

Pressure Rise or Decrease: 3 psi

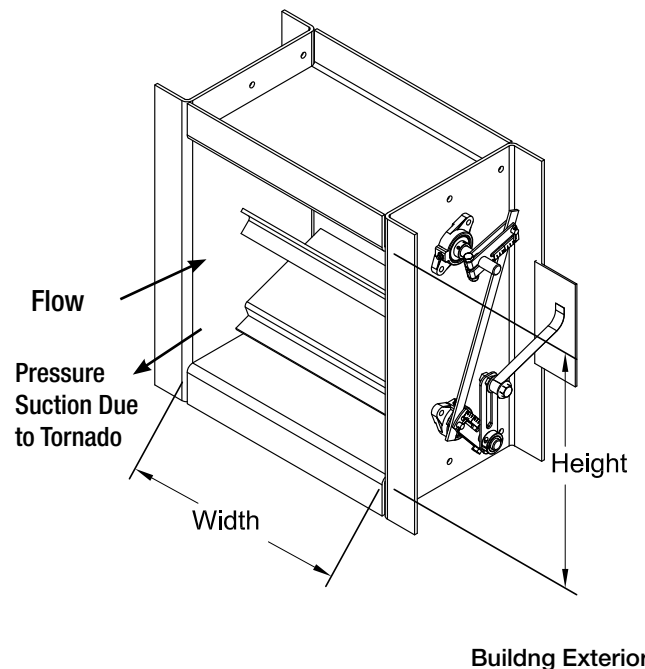
Construction	Standard	Optional
Frame Material	Painted Steel	304SS or 316SS
Frame Material Thickness	1/4 in. (6.3mm)	-
Frame Type	12 in. x 3 in. (305mm x 76mm) flanged channel	-
Blade Material	Galvanized steel	Painted, 304SS or 316SS
Blade Type	Single thickness	-
Blade Thickness	10 ga. (3.5mm)	-
Axle Material	Plated steel, full length with reinforcing tube	304SS or 316SS
Axle Size	Varies with damper width	
Bearings	Externally mounted relubricable ball	-
Blade Seal	EPDM	Silicone
Jamb Seal	EPDM	Silicone
Linkage Material	Galvanized steel	304SS or 316SS
Finish	Permatector on damper frame; Mill galvanized on blades	Hi Pro Polyester, Epoxy, Industrial Epoxy Mill (304SS or 316SS)
Normal Airflow	Horizontal	-



* Actual Inside Dimension.

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

HTOD-331



Size Limitations

W x H	Minimum Size	Maximum Size
		Single Section
Inches	12 x 12	48 x 60
mm	305 x 305	1219 x 1524

Options Available:

- Bolt holes in flanges

PERFORMANCE DATA

HTOD-330 & HTOD-331

Pressure Drop Data - (not valid for counter flow operation)

This pressure drop data was conducted in accordance with AMCA Standard 500 using the three configurations shown. All data has been corrected to represent standard air at a density of 0.075 lb/ft³ (1.201 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.

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 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.

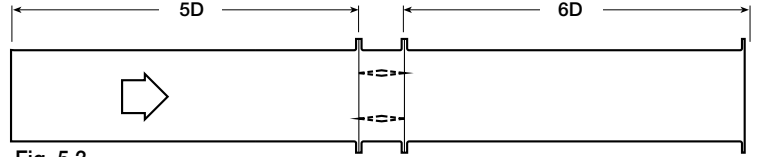


Fig. 5.3

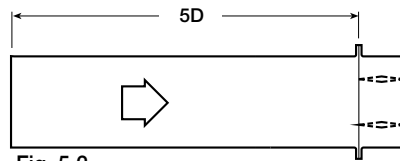


Fig. 5.2

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

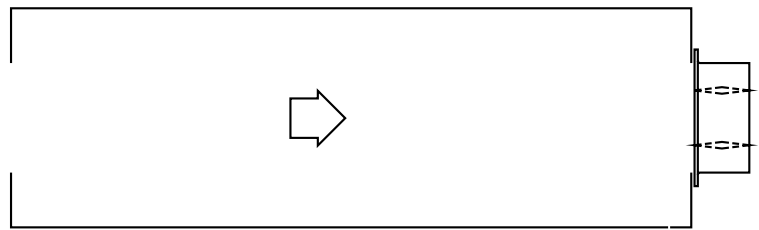
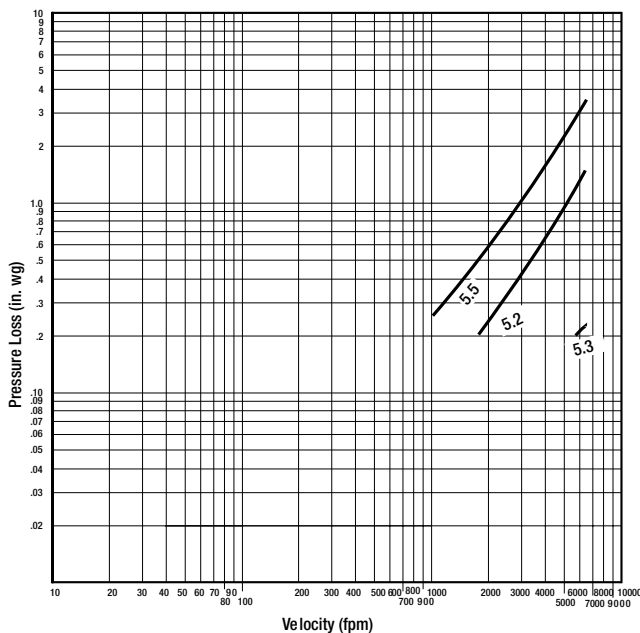


Fig. 5.5

AMCA Test Figures

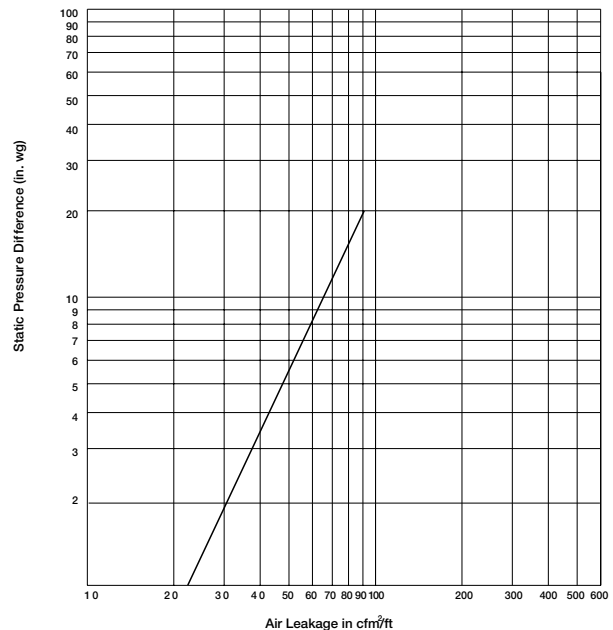
HTOD-331

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



HTOD-331

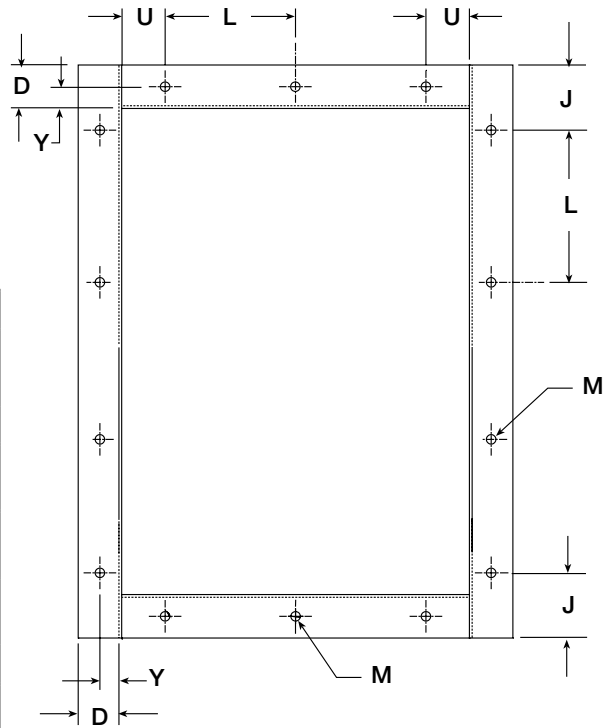
Leakage
36 in. x 36 in. Damper
(914mm x 914mm)



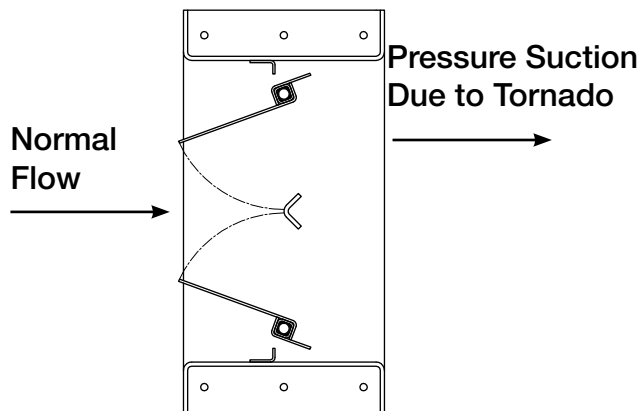
Bolt Hole Limitations

Bolt holes are available as an option. Greenheck's standard pattern is 7/16 in. (11mm) diameter holes (M dimension) spaced 6 in. (152mm) on center (L dimension). Also available is custom bolt hole pattern within the limitations of the chart below.

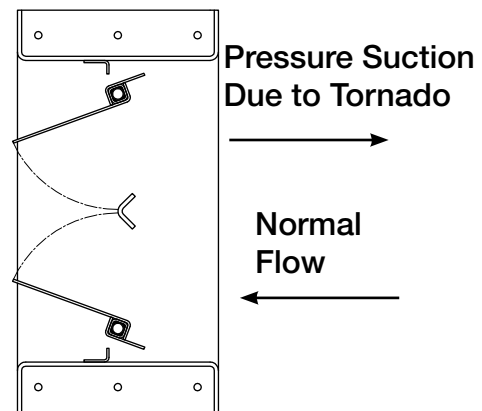
Dimension	Standard	Min./Max.	Description
J		Minimum D/2 Maximum (L+D)/2	First/Last Space in Jamb
F		1 min.	No. of Holes in Jamb
L	6 in. (152mm)	6 - 12 in. (152mm - 305mm)	Hole Spacing
M	7/16 in. (11mm)	1/4 - 11/16 in. (6mm - 17mm)	Mounting Hole Diameter
U		3/4 in. min. (19mm)	First/Last Space in Head/Sill
V		1 min.	No. of Holes in Head/Sill
Y	D/2 + 1/4 in.	Minimum 7/8 in. Maximum D - 5/8 in.	Centerline of bolt hole from inside edge of frame



Model HTOD-330 and HTOD-331 Difference



Model HTOD-330
This model closes in the same direction as normal flow.



Model HTOD-331
This model closes in the opposite direction as normal flow.

Specifications for HTOD-330

Industrial grade tornado 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 1/4 in. (6.3mm) steel channel frame with 12 in. (305mm) minimum depth and 3 in. (76mm) flanges; 10 ga. (3.4mm) galvanized steel single thickness blades; plated steel axles turning in externally mounted relubricable sealed ball bearings; and external (out of the airstream) $\frac{3}{8}$ in. (9.5mm) clevis pin linkage with adjustable constant force springs to hold blades open under normal flow conditions.

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 83 in. wg (20.7 kPa), velocities to 6400 fpm (32.5 m/s) and temperatures to 250°F (121°C). Testing and ratings to be in accordance with AMCA Standard 500.

Basis of design is Greenheck model HTOD-330.

Specifications for HTOD-331

Industrial grade tornado 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 1/4 in. (6.3mm) steel channel frame with 12 in. (305mm) minimum depth and 3 in. (76mm) flanges; 10 ga. (3.4mm) galvanized steel double skin construction blades; plated steel axles turning in externally mounted relubricable sealed ball bearings; and external (out of the airstream) precision $\frac{3}{8}$ in. (9.5mm) clevis pin linkage with counterbalance weights.

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 83 in. wg (20.7 kPa), velocities to 6400 fpm (32.5 m/s) and temperatures to 250°F (121°C). Testing and ratings to be in accordance with AMCA Standard 500.

Basis of design is Greenheck model HTOD-331.

