



HTOD-330 & HTOD-331

Heavy Duty Tornado Damper

Application and Design

Models HTOD-330 and HTOD-331 are heavy duty backdraft damper with double flanged channel frame and single thickness fabricated blades. The HTOD damper series are designed to protect against tornadoes and instantaneous pressure changes. External clevis type linkage and external mount 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: Up to 83 in. wg (20.7 kPa) (3 psi) - differential pressure

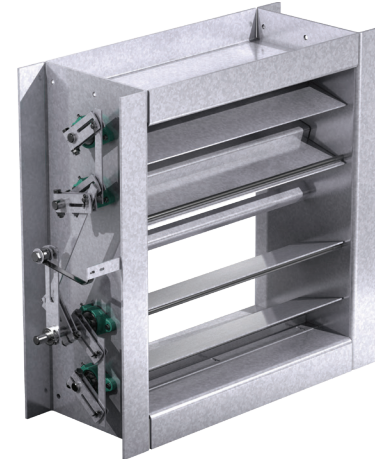
Velocity: Up to 6400 fpm (32.5 m/s)

Temperature: -40°F to 250°F (-40°C to 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	Galvaneal	304SS or 316SS
Blade Type	Single thickness	-
Blade Thickness	10 ga. (3.5mm)	-
Axle Material	Plated steel, full length with reinforcing tube	303SS or 316SS
Axle Size	3/4 in. (19mm)	-
Axle Bearings	External ball	-
Blade Seal	EPDM	Silicone
Jamb Seal	EPDM	Silicone
Linkage Material	Plated steel	304SS or 316SS
Paint Finishes	Hi Pro Polyester on damper frame; Mill galvanized on blades	Industrial Epoxy, Mill (304SS or 316SS)
Air Flow	Horizontal	-
Mounting Holes	None	Standard, Standard w/corner holes

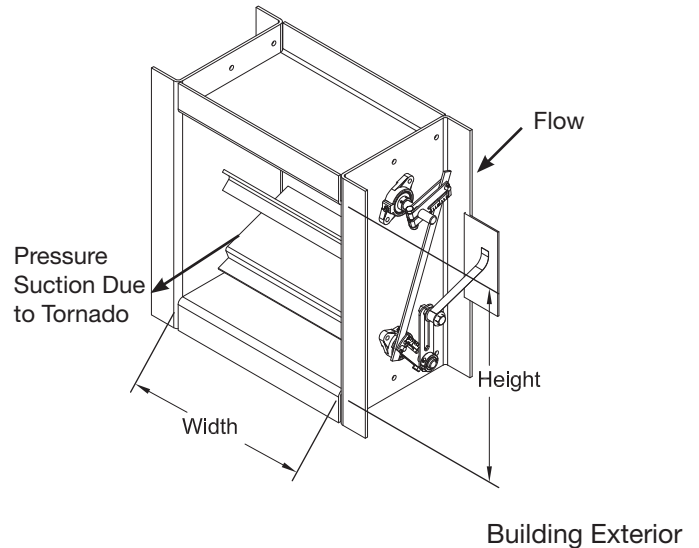
Size Limitations		
W x H	Minimum Size	Maximum Size
		Single Section
Inches	12 x 12	48 x 60
mm	305 x 305	1219 x 1524



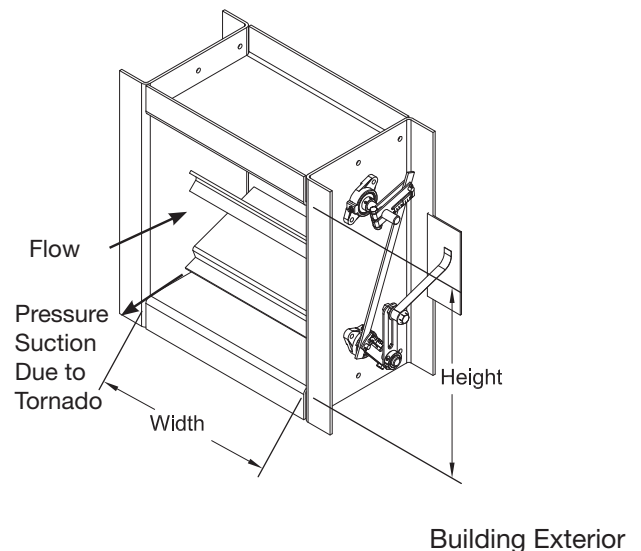
* Actual Inside Dimension.

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

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-D using the three configurations shown. All data has been corrected to represent standard air at a density of .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.

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.

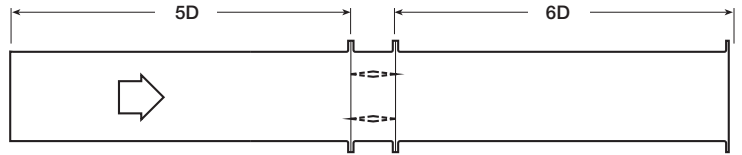


Fig. 5.3

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.

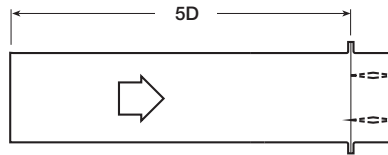


Fig. 5.2

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

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.

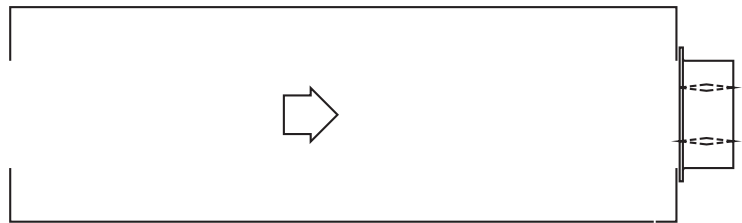
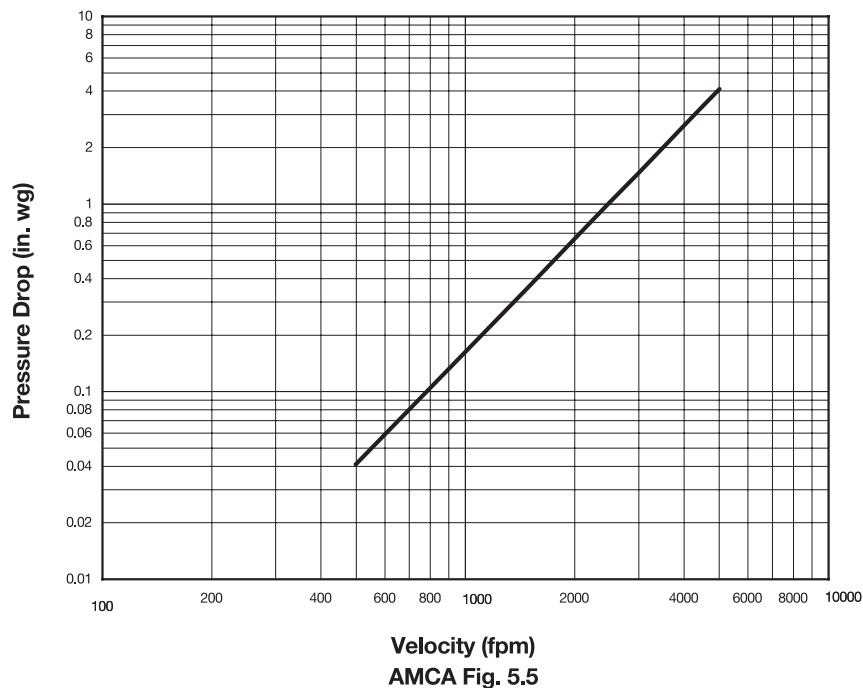


Fig. 5.5

Pressure Drop

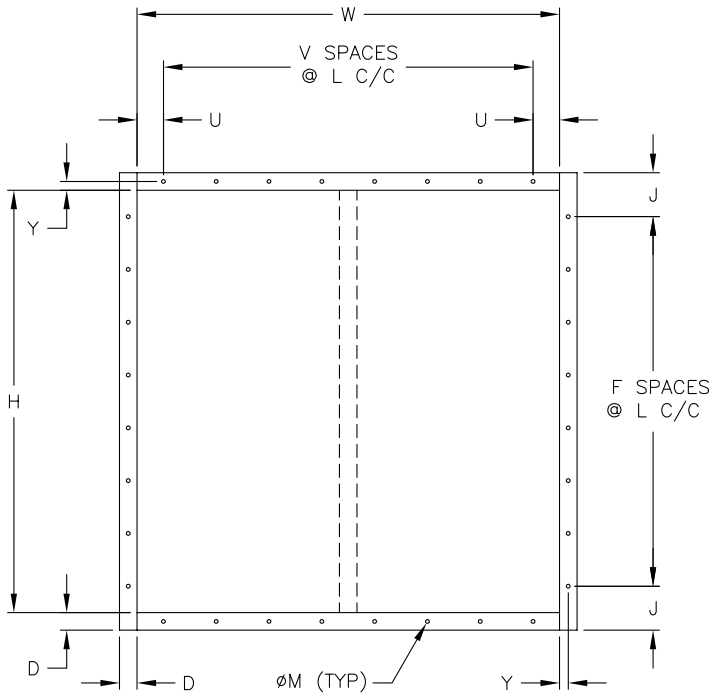
36 in. x 36 in. (914mm x 914mm) Damper



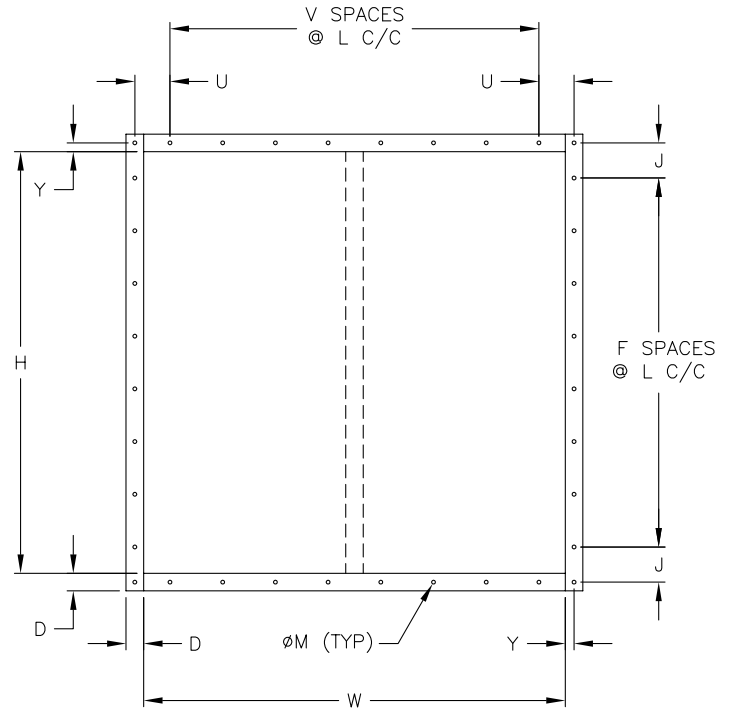
Mounting Holes

HTOD-330 & HTOD-331

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.

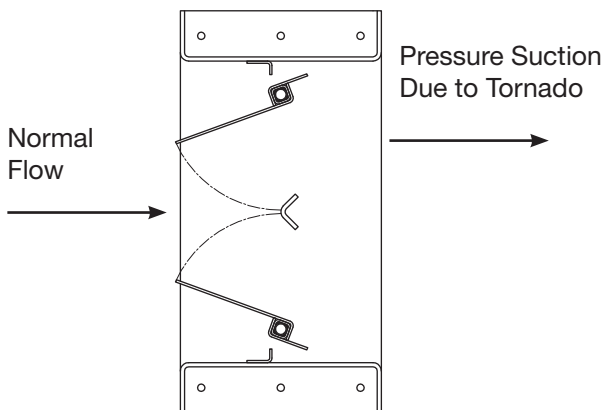


Standard Mounting Hole Pattern
Typical for single or double wide panel



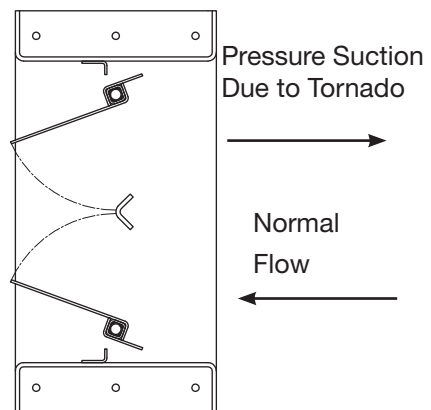
Standard Mounting Hole Pattern with Corner Holes
Typical for single or double wide panel

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 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 ¼ in. (6.3mm) galvanized 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 ball bearings; and external (out of the air-stream) ⅝ in. (9.5mm) clevis pin linkage with adjustable constant force springs to hold blades open under normal 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 6,400 fpm (32.5 m/s) and temperatures to 250°F (121°C). Testing and ratings to be in accordance with AMCA Standard 500-D.

Basis of design is model HTOD-330.

Specifications for HTOD-331

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 ¼ in. (6.3mm) galvanized 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 ball bearings; and external (out of the air-stream) ⅝ in. (9.5mm) clevis pin linkage with adjustable constant force springs to hold blades open under normal conditions.

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Basis of design is model HTOD-331.