GREENHECK

HTD-640

Extruded Aluminum Airfoil Blades

Tunnel Transit Damper

Application and Design

Model HTD-640 is a heavy duty flanged frame style industrial control damper qualified for use in tunnel and transit systems. The aluminum airfoil blades, silicone blade seals and stainless steel jamb seals meet he demanding requirements for strength, leakage, and operability to standards such as NFPA-130, 502, and UL555S leakage.

	Standard Construction	Optional Construction
Frame Depth	12 in. (305mm)	10 in. (254mm)
		8 in. (203mm)
Flange Width	2 in. (51mm)	1½ in. - 4 in. (38mm - 101mm)
Frame Material	Galvanized (ASTM A653)	304SS
		316SS
Frame Material Thickness	12 ga. (2.7mm)	14 ga. (2mm), 10 ga. (3.4mm), or .25 in. (6.4mm)
Blade Type	Extruded Airfoil	-
Blade Material	Aluminum (ASTM B221 6063-T5)	-
Blade Skin Thickness	.081 in. (2mm)	-
Blade Action	Parallel	Opposed
Blade Seal	Mechanically Fastened Silicone	None
Axle Type	Stub	-
Axle Diameter	0.75 in. (19mm)	-
Axle Material	304SS	316SS
Axle Seal	None	O-ring
Bearing	Oil impregnated 316SS sleeve press fit into frame	External Oil impregnated bronze
		External Relubricable ball
Linkage	External industrial type, stainless steel	-
Jamb Seal	Compression type, stainless steel	None
Blade Deflection	L/180	L/360

Options

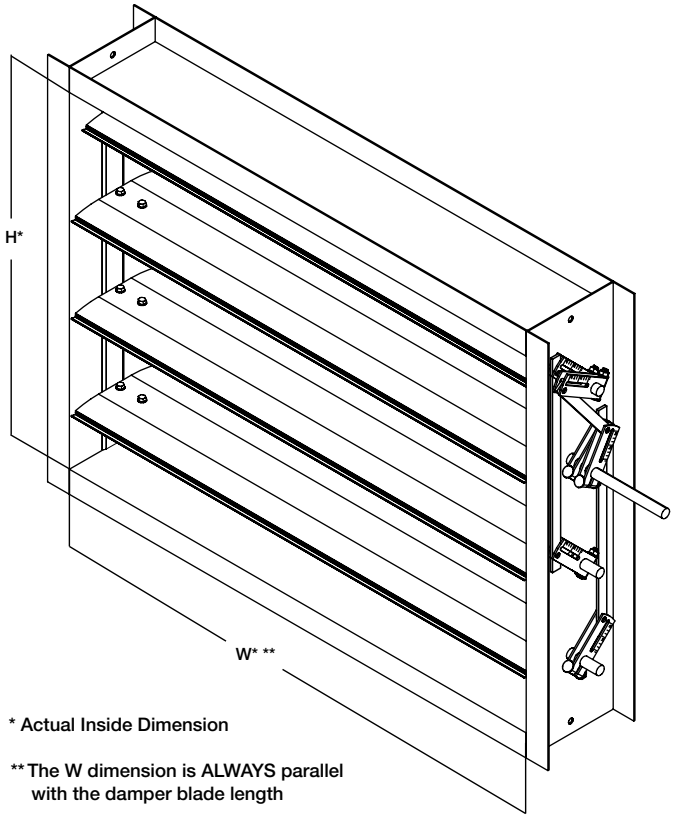
- Wide range of electric and pneumatic actuators available
- Limit Switches
- Multiple panel assemblies
- Mounting holes in both flanges
- Vertical blade for vertical mounting
- Corrosion resistant powder paint on galvanneal frame

Ratings

Pressure: 24 in. wg (6 kPa) structural integrity
12 in. wg (3 kPa) leakage and operability

Velocity: 4000 (20.3 m/s)

Temperature: 250° F (121°C) continuous, not including actuator;
482°F (250°C) for 1 hour (NFPA 130)



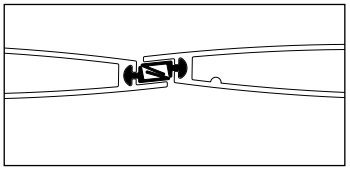
* Actual Inside Dimension

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

Size Limitations	
The following table provides minimum and maximum single section size. Multiplie sections can be linked together to create larger damper assemblies.	
Single Section Size	
Minimum	12 in. W x 12 in. H (305mm x 305mm)
Maximum	48 in. W x 96 in. H (1219mm x 2438mm)

Blade Overlap

Blades overlap to provide added resistance to leakage. When pressure increases, the blade seals are forced together creating a tighter seal.



Installation instructions on www.greenheck.com.

Pressure Drop Data

This pressure drop testing 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^3(1.2 kg/m^3).

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

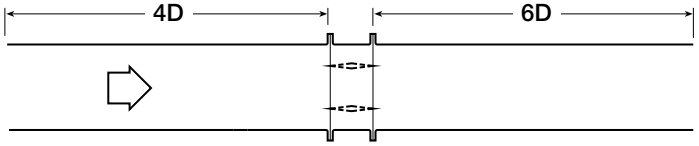


Fig. 5.3

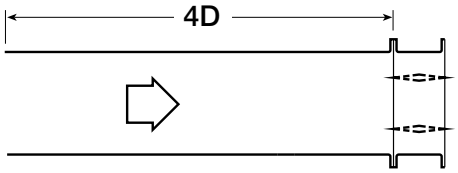


Fig. 5.2

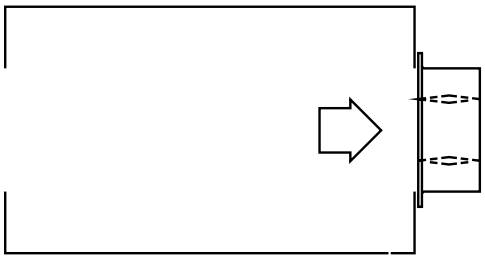


Fig. 5.5

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

VELOCITY VS. PRESSURE DROP

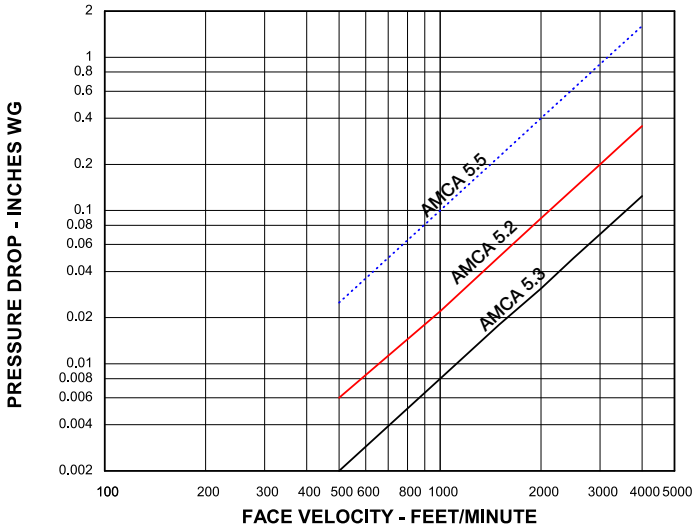


Figure 5.2: Log (P) = 2 * Log (V) - 7.653213
Figure 5.3: Log (P) = 2 * Log (V) - 8.109144
Figure 5.5: Log (P) = 2 * Log (V) - 7.0

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

VELOCITY VS. PRESSURE DROP

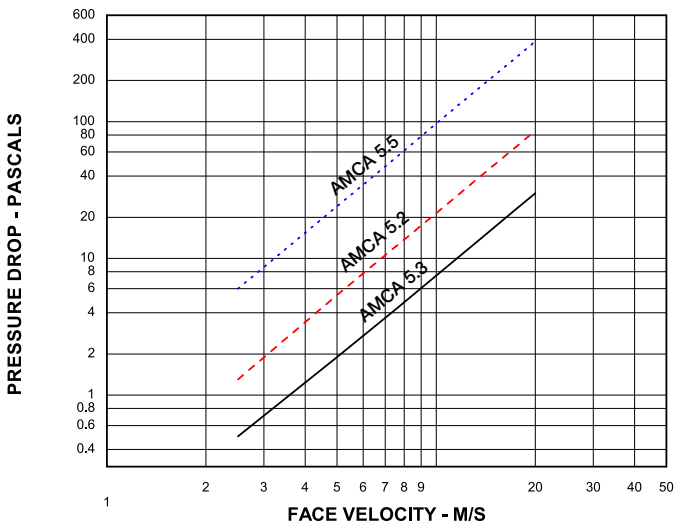
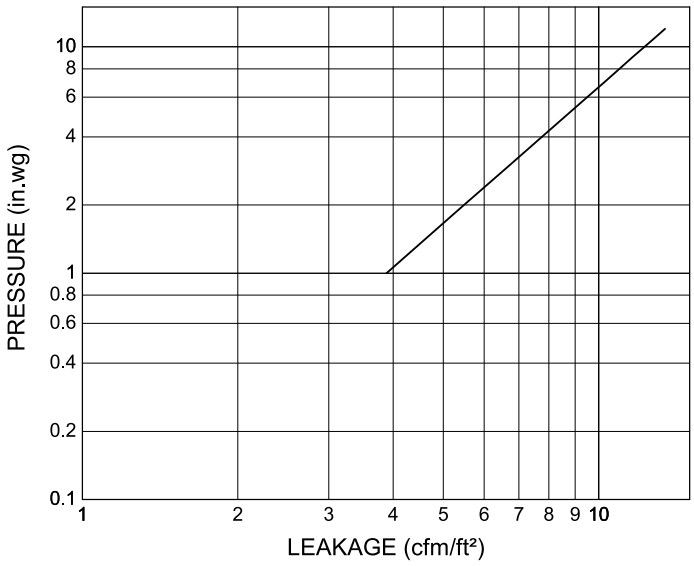


Figure 5.2: Log (P) = 2 * Log (V) - .668585
Figure 5.3: Log (P) = 2 * Log (V) - 1.124517
Figure 5.5: Log (P) = 2 * Log (V) - 0.015373

Leakage Data

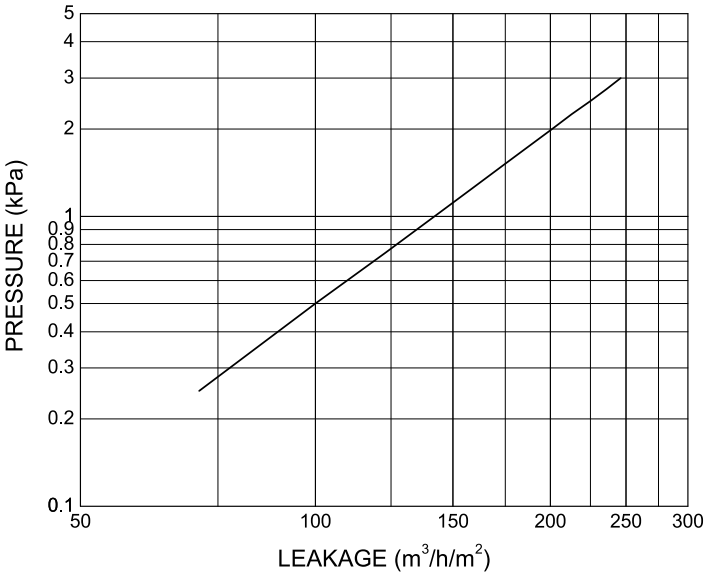
Leakage testing was conducted in accordance with AMCA Standard 500-D and is expressed as CFM per sq. ft. of damper face area. All data has been corrected to represent standard air at a density of .075 lb/ft³ (1.2 kg/m³).

Leakage
This chart shows worst case scenario based on these sizes: 6 in. x 60 in. (152mm x 1524mm), 60 in. x 6¼ in. (1524mm x 159mm), 48 in. x 36 in. (1219mm x 914mm), 60 in. x 60 in. (1524mm x 1524mm).



Log (Leakage) = 0.5 * (Log (Pressure) + 1.177296)

Leakage
This chart shows worst case scenario based on these sizes: 152mm x 1524mm (6 in. x 60 in.), 1524mm x 159mm (60 in. x 6¼ in.), 1219mm x 914mm (48 in. x 36 in.), 1524mm x 1524mm (60 in. x 60 in.).



Log (Leakage) = 0.5 * (Log (Pressure) + 4.305274)

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 12 ga. (2.7mm) galvanized steel channel frame with 8 in. (203mm) minimum depth and 2 in. (51mm) flanges; extruded aluminum airfoil type blades; ¾ in. (19mm) dia. plated steel axles turning in oil impregnated sintered type 316 stainless steel bearings press-fit into frame; and external (out of the airstream) blade-to-blade linkage. Blade seals shall be silicone rubber and jamb seals shall be flexible stainless steel.

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 12 in. wg (3 kPa), velocities to 4000 fpm (20.3 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 Greenheck model HTD-640.

GREENHECK
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