



Application and Design

ESD-603D/HCD-240 is an extruded aluminum louver with high performance drainable blades, incorporating a factory mounted heavy duty control damper, designed specifically for applications having extremely high structural design loading and sensitivity to the penetration of wind driven rain. The design characteristics of model ESD-603D/HCD-240 allow this product to meet the performance requirements established by the Florida Building Code and Miami-Dade County. Model ESD-603D/HCD-240 has been tested in accordance with and passes the following (Miami-Dade County test protocols: **TAS 201** (Large Missile Impact Test), **TAS 202** (Uniform Static Air Pressure Test), **TAS 203** (Cyclic Wind Loading Test), and **TAS 100(A)** (Wind Driven Rain Test). Model ESD-603D/HCD-240 allows zero water carry over even with a simulated 110 mph wind and rainfall rate of 8.8 inches/hour. Model ESD-603D/HCD-240 is qualified to meet the above-mentioned Miami-Dade County tests based on an individual rough opening size of 60 1/2 in. W x 120 in. H with a maximum design load of 138 lbs/sq ft for elevations less than 33 ft. The unique anchorage system designed and supplied by Greenheck allows for a swift and inexpensive installation of an individual louver section within an opening. This anchorage system, required only at the head (top) and sill (bottom), also allows for a simple installation of multiple louver panels within an opening greater than 60 1/2 in. in width without the need for additional vertical reinforcing members.

Standard Construction

Louwer

Frame: Heavy gauge 6063T5 extruded aluminum, 6 in. x .125 in. nominal dimensions.

Blades: Drainable design, 6063T5 extruded aluminum, .125 in. nominal wall thickness mechanically fastened and welded to jambs positioned at 37° and 45° angles on approximately 6 in. centers.

Anchorage

Plates: Heavy gauge steel.

Sleeve: 1/8 in. thick aluminum.

Birdscreen: 3/4 in. x .051 in. flattened expanded aluminum in removable frame. Screen is mounted on inside (rear).

Structural: Formed steel channels fastened to the rear of the louver, sized as a function of height.

Finish: Louver - Mill.
Structural support and anchorage plates - Perma-Tector™.

Damper

Frame: 9 in. deep galvanized steel.

Blades: .081 thick 6063-T5 extruded aluminum airfoil, vertical axis.

Axles: 3/4 in. dia. plated steel.

Bearings: Stainless steel sleeve with Viton o-ring axle seals at perimeter.

Linkage: External heavy duty with galvanized steel components. Blade action is parallel.

Seals: Silicone rubber at blade edge; stainless steel at jambs.

Actuator: Internally mounted manual quadrant.

Finish: Damper Blades - Mill.
Damper Frame - Galvanized steel.

Minimum

*R.O.

Size: 12 in. W x 15 in. H

Maximum

*R.O.

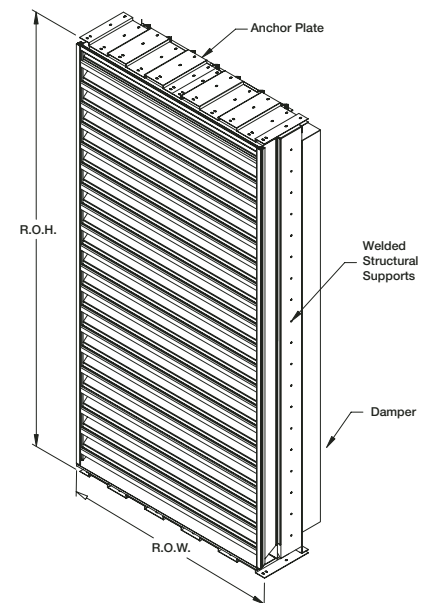
Size: 60 1/2 in. W x 120 in. H

* Represents "Rough Opening"

Note: Actual louver panel size is determined by Greenheck based on provided R.O. dimensions.

Florida Building Code Approval Number: 4826.2

Miami-Dade Notice of Acceptance Number: 02-0415.09



Louwer Options

- A variety of bird and insect screens
- A variety of architectural finishes including:
 - Clear anodize
 - Integral color anodize
 - Baked enamel
 - Kynar
- Sill Extensions

Damper Options

- Stainless steel axles and linkage
- Internally mounted actuators
- Stainless steel frame
- Rear flange mounting holes

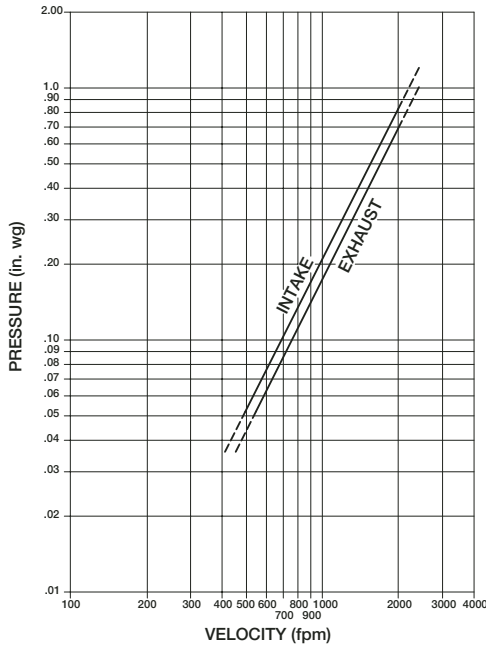
Damper and Louwer Features

- Approved for use in structures requiring no water penetration through 70 mph (31.3 m/s), and .05% for wind velocities of 90 and 110 mph.
- No site welding or additional structural supports required. Louwer/damper sections may be installed side-by-side without additional framing.
- Louwer/damper is qualified for installation into concrete, masonry block, and structural steel framed openings.
- Unique anchorage system designed and supplied by Greenheck allows for a simple installation.

PERFORMANCE DATA

ESD-603D/HCD-240

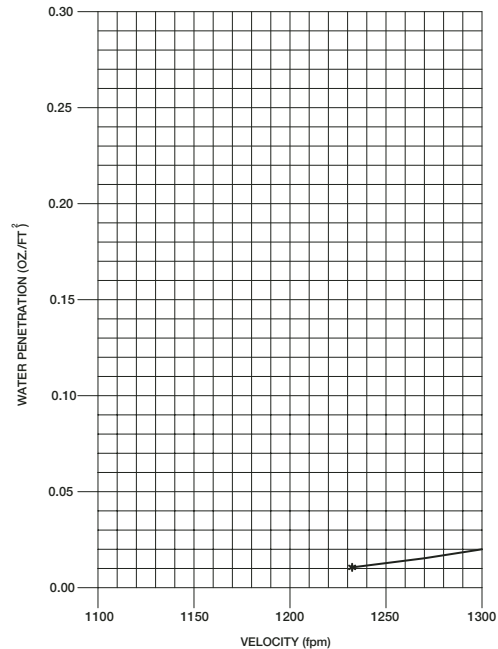
Airflow Resistance (Standard Air - .075 lb/ft³)



Greenheck certifies that the model ESD-603D shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance ratings and water penetration ratings. (AMCA certified ratings program is applicable for the louver only.)

Model ESD-603D/HCD-240 resistance to airflow varies depending on louver application (air intake or air exhaust). Free area velocities (shown) are higher than average velocity through the overall louver size. See louver selection information.

Water Penetration (Standard Air - .075 lb/ft³) (Test Size 48" x 48" - 15 minute test period)



* (- BEGINNING POINT OF WATER PENETRATION IS 1232 FPM)

The Water Penetration Test provides a method for comparing various louver models and designs as to their efficiency in resisting the penetration of rainfall under specific laboratory test conditions. The beginning point of water penetration is defined as that velocity where the water penetration curve projects through .01 oz. of water (penetration) per sq. ft. of louver free area. ***The beginning point of water penetration for Model ESD-603D/HCD-240 is 1232 fpm free area velocity with damper full open.** These performance ratings do not guarantee a louver to be weatherproof or stormproof and should be used in combination with other factors including good engineering judgement in selecting louvers.

ESD-603D/HCD-240 Specifications

Louvers meeting the following specifications shall be furnished and installed where shown on the plans and/or as described in schedules. Louvers shall be stationary type with horizontal drainable blades within a 6 in. deep louver frame. Louvers must conform to South Florida Building Code (Miami-Dade County) Protocols: TAS 201, TAS 202, TAS 203, and TAS 100(A) based on a maximum design load of 138 lbs/sq ft when mounted within a concrete, masonry block, or structural steel framed opening at a maximum elevation of 33 feet. Louver blade and frame materials to be 0.125 in. thick 6063T5 extruded aluminum. Louver blade to frame and louver frame to frame connections shall be both mechanically fastened with 300 series stainless steel threaded fasteners and welded. Louver blades shall be positioned at 37 and 45 degree angles on approximately 6 in. centers. Factory mounted behind the louver must be a heavy-duty volume control damper. Damper frame material to be heavy gauge galvanized steel. Damper blades to be heavy gauge 6063T5 extruded aluminum airfoil. Damper blades shall be positioned vertically. Damper shall be provided with an internally mounted manual quadrant actuator. Louvers shall have a maximum factory assembled section limitation for a rough opening no less than 60 1/2 in. W x 120 in. H. Louver frames shall be reinforced with rear mounted heavy gauge perimeter steel channel. Louver sections for rough openings greater than 36 in. in width shall be provided with steel blade reinforcing angles concealed from view. Louvers shall be provided with steel installation anchor plates, which are required at the head (top) and sill (bottom) only. Ship loose or site installed additional structural supports shall not be accepted for either single section assemblies or multiple louver sections within an opening wider than 60 1/2 inches. Louver performance data shall be licensed under the AMCA Certified Ratings Program and shall bear the AMCA Certified Ratings Seal. This certified performance data shall include airflow pressure loss and water penetration, and shall demonstrate performance equal to or better than the Greenheck model specified (AMCA certified ratings program is applicable for the louver only).

SELECTION AND APPLICATION

ESD-603D/HCD-240

Application of any louver involves selecting an airflow velocity through the louver free area (free area velocity in fpm) that produces an acceptable pressure drop and for intake applications minimizes carry through of normally encountered rain water. No louver manufacturer warrants their louver to prevent water penetration under all possible combinations of wind and rain. Water penetration through Model ESD-603D/HCD-240 begins at 1232 fpm free area velocity. Intake air louver selection using free area velocity below 1232 fpm is recommended. Louver selection involves the following two steps, and depending on given conditions, either step may come first.

Select Free Area Velocity:

Using the **Airflow Resistance Chart**, select a free area velocity that produces an acceptable pressure drop with minimal water penetration. (Water penetration need not be considered when selecting exhaust louvers.)

Determine Louver Free Area:

Using the free area velocity from previous step and total cfm, determine Louver Free Area required. Using **Louver Free Area Chart**, select a louver with the required free area. If louver size is given, determine free area from chart and work backwards to determine maximum airflow. See examples below.

Free Area Chart ESD-603D/HCD-240 Rough Opening Dimensions

R.O. Height Inches	Rough Opening Width in Inches																		R.O. Height Inches
	12.5	15.5	18.5	21.5	24.5	27.5	30.5	33.5	36.5	39.5	42.5	45.5	48.5	51.5	54.5	57.5	60.5		
Nominal Louver Width in Inches (1/2 in. less than rough opening size)																			
	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60		
15	0.27	0.36	0.45	0.54	0.63	0.72	0.80	0.89	0.98	1.03	1.11	1.20	1.29	1.38	1.47	1.59	1.65	15	
18	0.44	0.59	0.73	0.88	1.02	1.16	1.31	1.45	1.60	1.67	1.81	1.96	2.10	2.24	2.39	2.53	2.68	18	
24	0.70	0.93	1.15	1.38	1.61	1.84	2.06	2.29	2.52	2.63	2.86	3.08	3.31	3.54	3.77	3.99	4.22	24	
30	0.96	1.27	1.59	1.89	2.20	2.51	2.82	3.13	3.44	3.59	3.90	4.21	4.52	4.83	5.14	5.45	5.76	30	
36	4.21	1.60	2.00	2.39	2.78	3.17	3.57	3.96	4.35	4.55	4.94	5.33	5.73	6.12	6.51	6.90	7.30	36	
42	1.37	1.81	2.25	2.70	3.14	3.59	4.03	4.47	4.92	5.14	5.58	6.03	6.47	6.91	7.36	7.80	8.24	42	
48	1.62	2.15	2.67	3.20	3.73	4.25	4.78	5.30	5.83	6.09	6.62	7.15	7.67	8.20	8.72	9.25	9.78	48	
54	1.87	2.48	3.09	3.69	4.30	4.91	5.52	6.12	6.73	7.03	7.64	8.25	8.86	9.46	10.07	10.68	11.28	54	
60	2.12	2.81	3.50	4.19	4.88	5.56	6.25	6.94	7.63	7.97	8.66	9.35	10.04	10.73	11.42	12.10	12.79	60	
66	2.38	3.15	3.92	4.69	5.46	6.23	7.00	7.77	8.54	8.93	9.70	10.47	11.24	12.01	12.78	13.55	14.32	66	
72	2.63	3.48	4.34	5.19	6.01	6.90	7.75	8.60	9.46	9.88	10.74	11.59	12.44	13.30	14.15	15.00	15.85	72	
78	2.89	3.82	4.76	5.69	6.63	7.70	8.50	9.44	10.37	10.84	11.78	12.71	13.65	14.59	15.52	16.46	17.39	78	
84	3.14	4.16	5.18	6.20	7.22	8.24	9.26	10.27	11.29	11.80	12.82	13.84	14.86	15.88	16.90	17.92	18.94	84	
90	3.40	4.50	5.60	6.70	7.81	8.91	10.01	11.11	12.21	12.77	13.87	14.97	16.07	17.17	18.28	19.38	20.48	90	
96	3.65	4.84	6.02	7.21	8.40	9.58	10.77	11.95	13.14	13.73	14.91	16.10	17.28	18.49	19.65	20.84	22.02	96	
102	3.91	5.18	6.44	7.71	8.98	10.25	11.51	12.78	14.05	14.68	15.95	17.22	18.49	19.75	21.02	22.29	23.56	102	
108	4.07	5.38	6.70	8.02	9.34	10.66	11.98	13.30	14.61	15.27	16.59	17.91	19.23	20.55	21.87	23.18	24.50	108	
114	4.32	5.72	7.12	8.52	9.92	11.33	12.73	14.13	15.53	16.23	17.63	19.03	20.43	21.83	23.23	24.63	26.04	114	
120	4.57	6.05	7.53	9.02	10.50	11.98	13.46	14.95	16.43	17.17	18.65	20.13	21.62	23.10	24.58	26.06	27.54	120	
Louver Free Area in Square Feet																			

ESD-603D/HCD-240 Selection and Examples

Example 1:

Airflow given as 10,000 cfm – select louver size.

- A. Determine louver free area by dividing airflow by free area velocity (do not exceed 1232 fpm on intake louver application).

$$\frac{10,000 \text{ cfm}}{\text{Airflow}} \div \frac{1232 \text{ fpm}}{\text{Free Area Velocity}} = \frac{8.12 \text{ ft.}^2}{\text{Required Louver Free Area}}$$

- B. Select a louver with at least the required louver free area from **Free Area Chart** above. Rough opening=

$$\frac{60.5 \text{ in.}}{8.24 \text{ ft.}^2} \text{ W} \times \frac{42 \text{ in.}}{8.24 \text{ ft.}^2} \text{ H}$$

$$\frac{1214 \text{ fpm}}{8.24 \text{ ft.}^2} \text{ free area velocity (10,000 cfm} \div \text{8.18 ft.}^2 \text{ F.A.)}$$

(Other selections available – See **Free Area Chart** above.)

- C. Check the pressure drop of the selected louver at the given airflow (**Airflow Resistance Chart** on Page 2).

$$\Delta P \text{ at } \frac{1214 \text{ fpm}}{\text{Free Area Velocity}} = \frac{0.30 \text{ in. w.g.}}{\text{Pressure Drop}}$$

Example 2:

Louver rough opening size given as 48.5 x 48 – determine maximum intake airflow.

- A. Use **Free Area Chart** to determine Free Area = 7.67 ft.²
- B. Multiply Free Area x Free Area Velocity (Do not exceed 1232 fpm on intake louver applications).

$$\frac{7.67 \text{ ft.}^2}{\text{Free Area}} \times \frac{1232 \text{ fpm}}{\text{Free Area Velocity}} = \frac{9,449 \text{ cfm}}{\text{Maximum Airflow}}$$

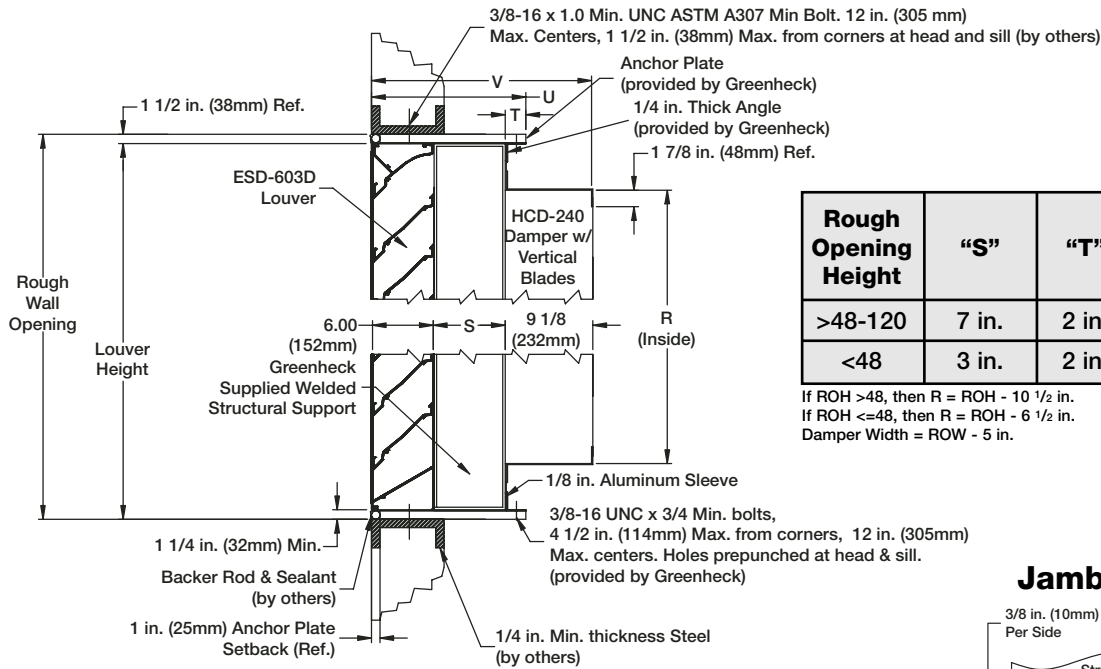
- C. Check the pressure drop of the selected louver at the given airflow (**Airflow Resistance Chart** on Page 2).

$$\Delta P \text{ at } \frac{1232 \text{ fpm}}{\text{Free Area Velocity}} = \frac{0.31 \text{ in. w.g.}}{\text{Pressure Drop}}$$

INSTALLATION INFORMATION

SPECIFICATIONS

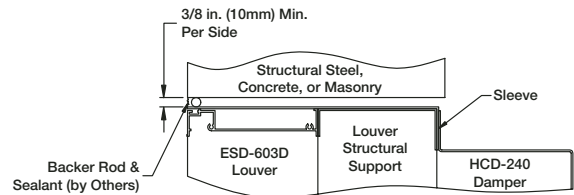
Steel Framed Installation



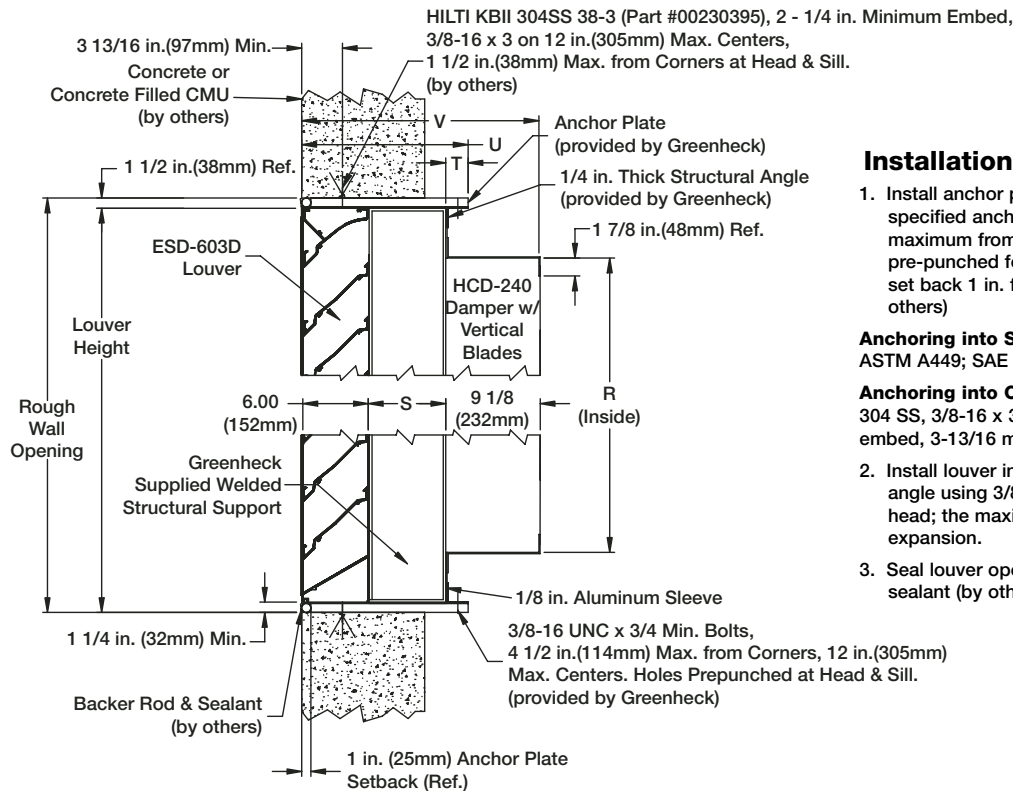
Rough Opening Height	"S"	"T"	"U"	"V"
>48-120	7 in.	2 in.	15.125 in.	22.125 in.
<48	3 in.	2 in.	11.125 in.	18.125 in.

If ROH >48, then R = ROH - 10 1/2 in.
If ROH <=48, then R = ROH - 6 1/2 in.
Damper Width = ROW - 5 in.

Jamb Detail



Concrete or Masonry Opening Installation



Installation Instructions

1. Install anchor plates at opening head and sill using specified anchors on maximum 12 in. center, 1 1/2 in. maximum from opening corners. Anchor plates are pre-punched for hole locations. Front edge of plate is set back 1 in. from front edge of louver. (Fasteners by others)

Anchoring into Steel: Use 3/8-16 x 1.0 minimum length ASTM A449; SAE Grade 5 bolt, minimum.

Anchoring into Concrete or Masonry: Use Hilti KBII type 304 SS, 3/8-16 x 3 in. (part #00230395), 2-1/4 in. minimum embed, 3-13/16 minimum edge distance.

2. Install louver into opening. Fasten anchor plates to rear angle using 3/8-16 bolts provided. Do not shim at head; the maximum 1/4 in. clearance is for thermal expansion.

3. Seal louver opening to perimeter using backer rod and sealant (by others).



Submittal-ESD-603D/HCD-240 Metro-Dade FS
Rev. 2 January 2006

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