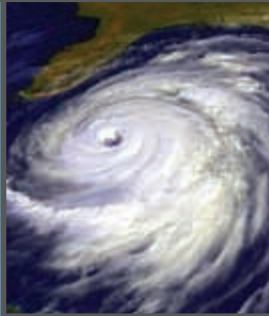


Severe Duty Louvered Products

Miami-Dade Qualified, Florida Product Approved and Wind-Driven Rain



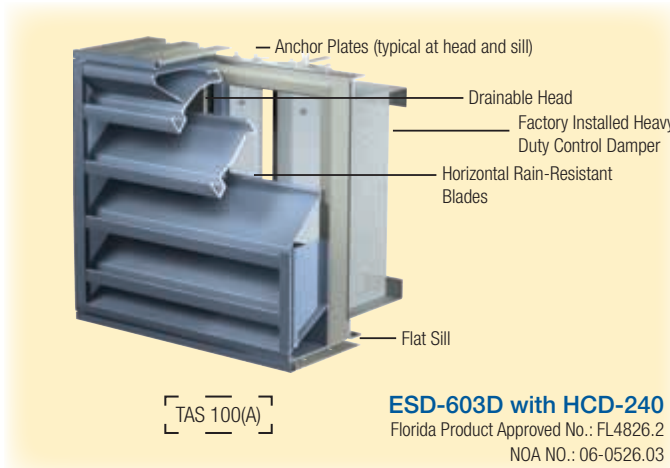
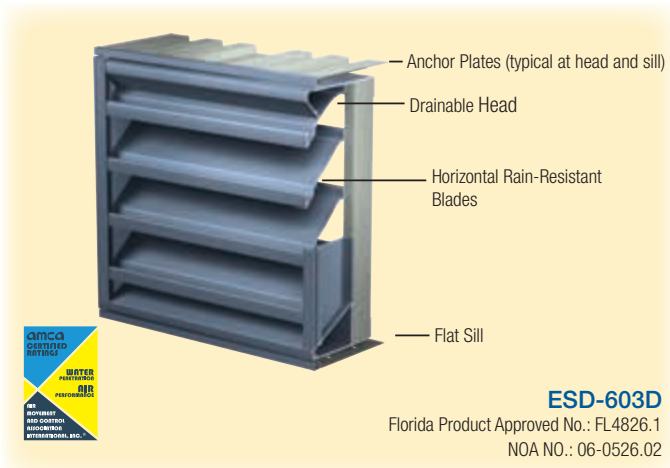
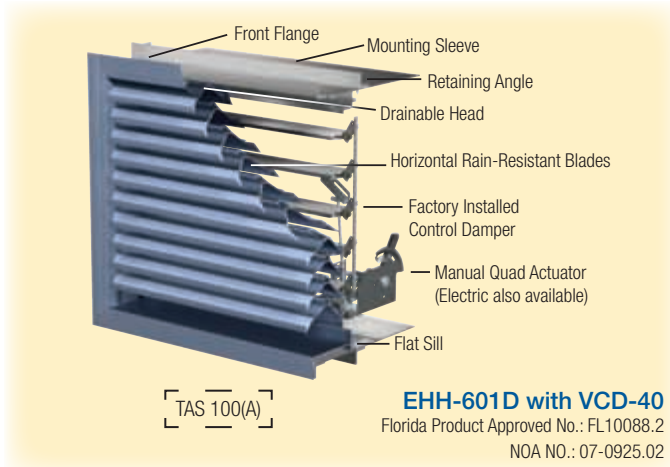
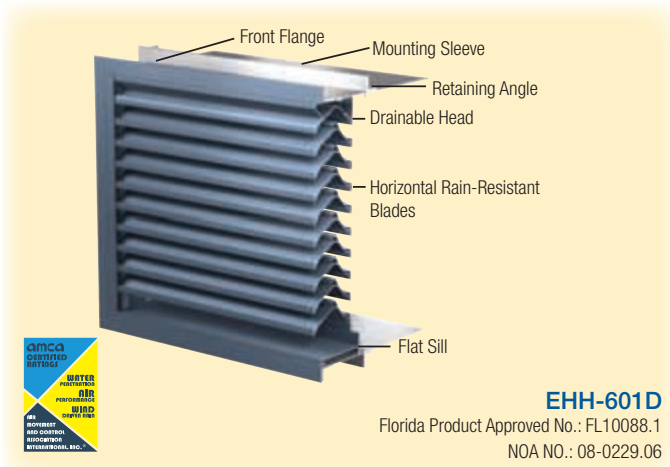
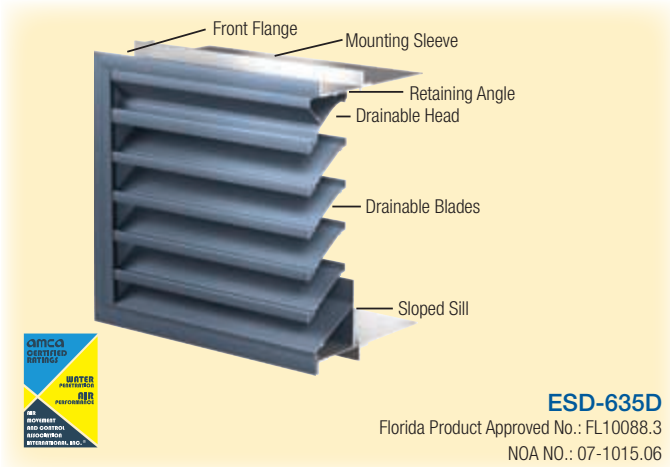
BUILDING VALUE IN AIR.

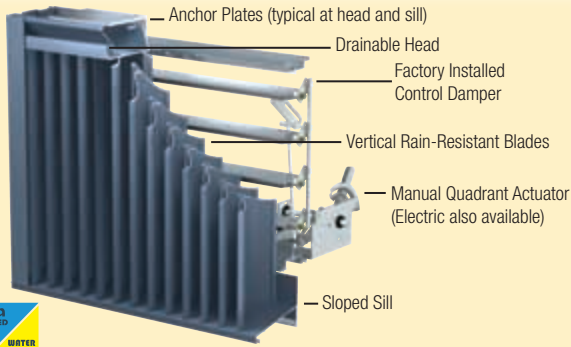


November
2009

Miami-Dade Qualified

- Use Miami-Dade Qualified louvers within Florida's High-Velocity Hurricane Zone when a Miami-Dade Notice of Acceptance is required.
- All models comply with Florida Building Codes' structural test protocols TAS-201, *Large Missile Impact Test* (ASTM E1996); TAS-202, *Uniform Static Pressure Test* (ASTM E330) and TAS-203, *Cyclic Wind Pressure Test*.
- Models **ESD-603D with HCD-240**, **EHH-601D with VCD-40** and **EVD-602D with VCD-40** also comply with Miami-Dade's test protocol TAS 100A, *Wind-Driven Rain Resistance Test*.
- Models **ESD-635D**, **ESD-635D with VCD-40**, **EHH-601D** and **EHH-601D with VCD-40** incorporate a mounting sleeve for swift and efficient installation.





TAS 100(A)

EVH-602D with VCD-40

Florida Product Approved No.: FL8042.2
NOA NO.: 06-0711.11



EVH-602D

Florida Product Approved No.: FL8042.1
NOA NO.: 06-0711.11



ESS-502D

Florida Product Approved No.: FL12941.1
NOA NO.: 09-0519.15



SDLE

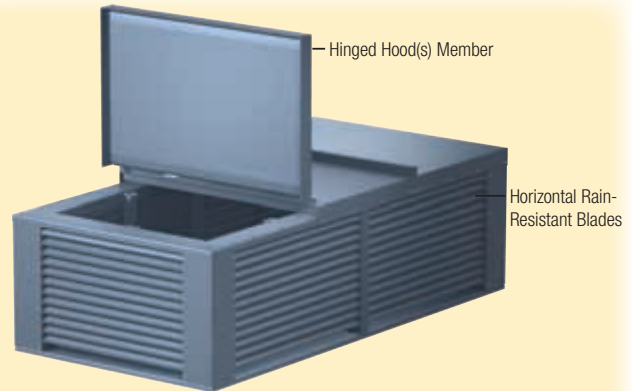
Factory provided roof curb provided.

Florida Product Approved No.: 4825.1
NOA NO.: 08-1107.04



ESD-635PD

Optional factory provided roof curb provided. Florida Product Approved No.: FL11350.2
NOA NO.: 08-0505.05



EHH-601PD

Optional factory provided roof curb provided. Florida Product Approved No.: FL11350.1
NOA NO.: 08-0505.06

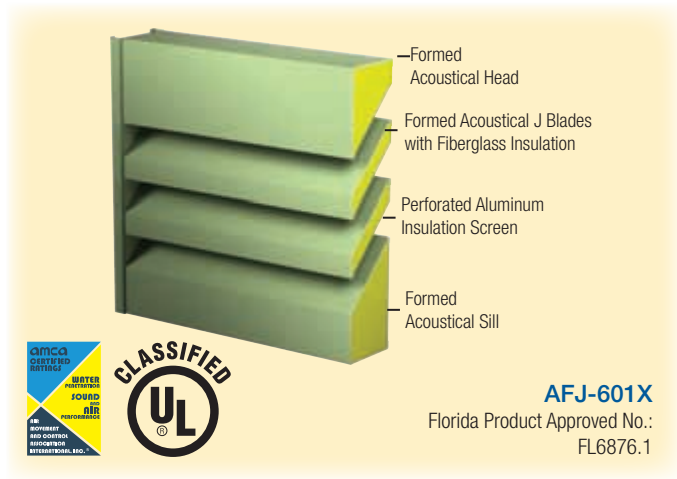
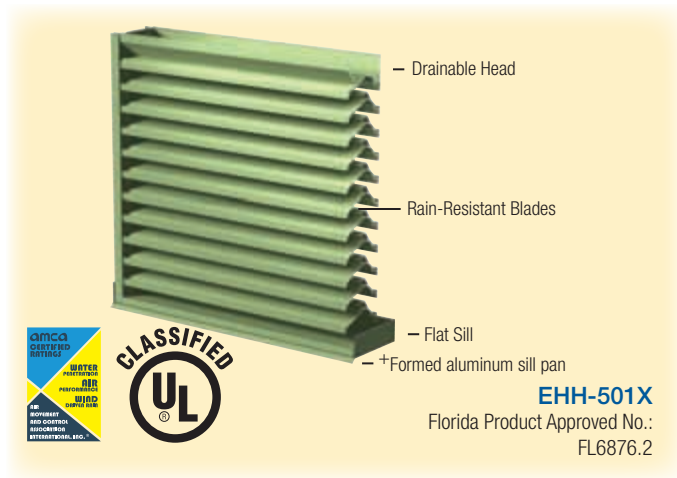
Model	Depth	Blade Style	Blade Thickness (in.)	Frame Thickness (in.)	Free Area (sq. ft)	Free Area (%)	Beginning Point of Water Penetration (ft/min)	Pressure Drop at Max. Intake Velocity (in. wg)	Max. Intake Volume Flow Rate (cfm)	Exhaust Volume Flow Rate @ 0.15 in. wg (cfm)
ESD-635D	6	D	0.125	0.125	9.41	59	1077	0.234	11762	9956
EHH-601D	6	RR	0.081	0.081	7.58	47	1250	0.324	9475	6094
ESD-603D	6	D	0.125	0.125	7.67	48	1027	0.317	9449	7118
ESD-603D/HCD-240	6	D	0.125	0.125	7.67	48	1232	0.317	9449	7118
EVH-602D	6	RR	0.081	0.081	5.88	37	1250	0.161	7350	7832
EVH-602D/VCD-40	6	RR	0.081	0.081	5.88	37	1250	0.161	7350	7832
ESS-502D	5	C	0.081	0.081	8.19	51	1036	0.254	8486	5880

* Test size: 48 x 48 in. unit @ 15 min. duration

RR= Rain-Resistant C= Chevron D= Drainable

Florida Product Approved

- All mechanically fastened models comply with TAS-202, *Uniform Static Pressure Test* (ASTM E330).
- All models comply with TAS-201 *Large Missile Impact Test* (ASTM E1996) and TAS-203 *Cyclic Wind Pressure Load Test*, when optional welded construction is selected.
- Approved for use in Florida's High-Velocity Hurricane Zone if Miami-Dade Notice of Acceptance is not required.

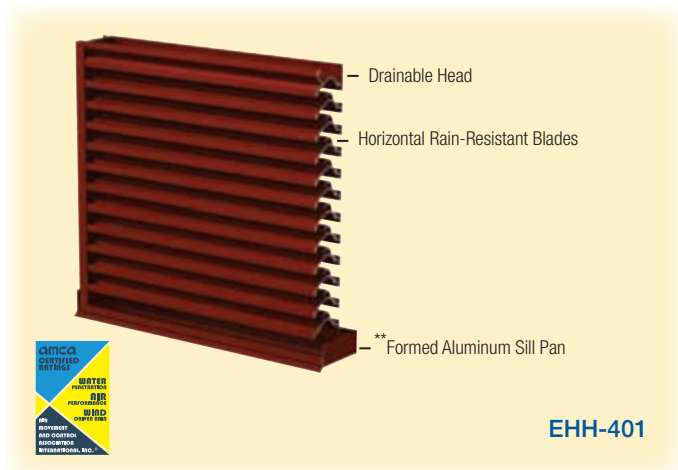


Model	Depth	Blade Style	Blade Thickness (in.)	Frame Thickness (in.)	Free Area (sq. ft)	Free Area (%)	Beginning Point of Water Penetration (ft/min)	Pressure Drop at Max. Intake Velocity (in. wg)	Max. Intake Volume Flow Rate (cfm)	Exhaust Volume Flow Rate @ 0.15 in. wg (cfm)
ESD-435X	4	D	0.081	0.081	8.98	56	1151	0.213	10336	9285
ESD-635X	6	D	0.081	0.081	9.41	59	1077	0.234	11762	9956
EHH-501X	5	RR	0.081	0.081	6.80	43	1250	0.224	8500	5998
EVH-602X	6	RR	0.081	0.081	5.88	37	1250	0.161	7350	7832
AFJ-601X	6	J	0.080	0.080	4.89	31	799	0.065	3907	6015

* Test size: 48 x 48 in. unit @ 15 min. duration

RR= Rain-Resistant J= J Style D= Drainable

- The most effective line of products for minimizing water penetration through openings that are sensitive to rain penetration.
- All models incorporate a drainable head member and either vertical (EVH Series) or horizontal (EHH Series) rain-resistant blades to provide maximum resistance to wind-driven rain as tested by the stringent AMCA 500L Wind-Driven Rain test procedure.



EHH-401



EVH-401

** Shipped loose formed aluminum sill pan required for models EHH-501X, EHH-201, EHH-401, EHH-501, EHH-601, EVH-201, EVH-401.

Wind-Driven Rain Test Results				Wind Velocity - 29 mph Rainfall - 3 in./hr. ³		Wind Velocity - 50 mph Rainfall - 8 in./hr. ³	
	Airflow (cfm)	Free Area Velocity (fpm)	Core Area Velocity (fpm) ¹	Water Penetration Effectiveness	Water Penetration Classification	Water Penetration Effectiveness	Water Penetration Classification
EVH-201	9670	1693	680	100%	A	-	-
	9812	1718	690	-	-	99.9%	A
EVH-401	9489	1487	673	100%	A	-	-
	8037	1260	570	-	-	99.7%	A
EVH-602	9210	1566	693	99.4%	A	-	-
	9050	1539	681	-	-	99.1%	A
EVH-801	9343	1850	703	99.6%	A	-	-
	9197	1821	692	-	-	99.7%	A
EHH-201	2552	412	178	99.9%	A	-	-
	1420	229	99	-	-	99.5%	A
EHH-401	8380	1247	591	99.2%	A	-	-
	1390	207	98	-	-	99.1%	A
EHH-501	9950	1404	689	99.1%	A	-	-
	9950	1404	689	-	-	97.2%	B
EHH-601	9577	1263	689	100%	A	-	-
	4101	541	295	-	-	99.1%	A
EHH-701	9577	1336	689	99.9%	A	-	-
	5477	764	394	-	-	99.1%	A

Wind-Driven Rain Penetration Classes	
Class	Effectiveness
A	1 to 0.99
B	0.989 to 0.95
C	0.949 to 0.80
D	Below 0.8

¹Core area is the open area of the louver face (face area less louver frames). Core area velocity is the airflow velocity through the core area of the louver.

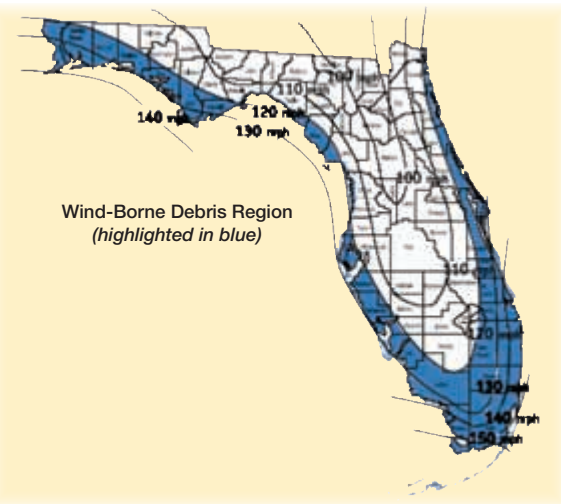
Model	Depth	Blade Style	Blade Thickness (in.)	Frame Thickness (in.)	Free Area (ft ²)	Free Area (%)	Beginning Point of Water Penetration (ft/min)	Pressure Drop at Max. Intake Velocity (in. wg)	Max. Intake Volume Flow Rate (cfm)	Exhaust Volume Flow Rate @ 0.15 in. wg (cfm)
EHH-201	2	RR	0.062	0.062	6.20	39	914	0.198	5667	5185
EHH-401	4	RR	0.081	0.081	6.72	42	1250	0.296	8400	5820
EHH-501	5	RR	0.081	0.081	6.80	43	1250	0.224	8500	5998
EHH-601	6	RR	0.081	0.081	7.58	47	1250	0.324	9475	6094
EHH-701	7	RR	0.081	0.081	7.17	45	1250	0.491	8962	4015
EVH-201	2	RR	0.062	0.062	5.71	36	1250	0.368	7138	5185
EVH-401	4	RR	0.081	0.081	6.38	40	1250	0.370	7975	585
EVH-602	6	RR	0.081	0.081	5.88	37	1250	0.161	7350	7832
EVH-801	8	RR	0.081	0.081	5.05	32	1250	0.100	6313	8625

* Test size: 48 x 48 in. unit @ 15 min. duration

RR= Rain-Resistant

Test Protocols

Applicable For	Description	Required Products	Protocol Required	Approval Body
Wind-Borne Debris Region	Basic wind speed is 120 mph or greater; or, 110 mph and within 1 mile of the coast	Florida Product Approved	TAS 201 TAS 202 TAS 203	Florida Building Code Office
High-Velocity Hurricane Zone	Broward and Dade Counties	Miami-Dade Qualified Products	TAS 100(A) TAS 201 TAS 202 TAS 203	Miami-Dade Building Code Compliance Office
Enhanced Hurricane Protection Areas	Public buildings designed to provide emergency shelter; wind load determined by wind speed map plus 40 mph	Florida Product Approved or Miami-Dade Qualified (in Dade or Broward counties)	TAS 201 TAS 202 TAS 203	Florida Building Code Office or Miami-Dade Building Code Compliance Office
All Other Regions		Florida Product Approved	TAS 202	



Protocol Descriptions

TAS-100(A): Wind-Driven Rain Resistance Test

The Florida Building Code requires that products installed in the High-Velocity Hurricane Zone and utilized for closed building structure envelope protection, or installations where the enclosed space incorporates no provision to accommodate water infiltration (dry rooms) at elevations up to 33 feet above grade, must meet or exceed water infiltration test criteria established under TAS-100(A). This test procedure measures a product's ability to resist water penetration under hurricane-force wind velocities and severe wind-driven rain conditions.

Test Louver Size: 4 foot (1.2 m) x 4 foot (1.2 m).

Simulated Wind: The specimen is subjected to wind speeds of 35 mph (15.7 m/s), 70 mph (31.4 m/s), 90 mph (40.4 m/s) and 110 mph (49.3 m/s).

Simulated Rain: Spray nozzle jets apply water horizontally to the face of the test specimen at a rate of 8.8 inches per hour.

Procedure: Water penetration is measured at 4 data points between 35 mph (15.7 m/s) and 110 mph (49.3 m/s). No water penetration is permitted at test points up to 70 mph (31.4 m/s) and no more than 0.05% of the total water volume applied during the test may pass through the louver when tested at 90 mph (40.4 m/s) and 110 mph (49.3 m/s) wind velocities.

Duration: 15 minute test intervals.

Finish: No restrictions.

TAS-201: Large Missile Impact Test (ASTM E1996)

The Florida Building Code requires that products installed in the Wind-Borne Debris Zone or High-Velocity Hurricane Zone must meet or exceed impact test criteria established under TAS-201. Products may be exempt if utilized in "open" structures or installed more than 30 feet above grade. This test procedure measures a product's capacity to withstand impact from wind-borne debris under hurricane-force wind velocities.

Test Louver Size: Maximum size selected by manufacturer for certification.

Test Missile: 7 foot (2.1 m) to 9 foot (2.75 m) long Southern pine 2 x 4; 9.0 to 9.5 pounds.

Distance from Front of Canon to Face of Louver: 9 feet (2.75 m).

Impact Velocity: 50 feet per second (15.25 m/s).

Procedure: Three specimens are tested. One impact is delivered at the center of each specimen and one impact is delivered at one corner of each specimen.

Pass/Fail: Failure occurs if a change in the condition of the specimen results... such as "cracking, fastener loosening, local yielding" or if penetration of the projectile occurs beyond the inside plane of the louver.

TAS-202: Uniform Static Air Pressure Test (ASTM E330)

The Florida Building Code requires that all products utilized in structures located throughout the state meet or exceed the structural test criteria established under TAS-202. This test procedure measures a product's ability to withstand maximum static pressure differentials typical to hurricane events.

Test Louver Size: Maximum size to be certified by manufacturer.

Design Pressure (Design Wind Load): Maximum positive or negative wind load to be certified by manufacturer.

Test Load: 1.5 x the selected Design Pressure.

Procedure: Specimen is subjected to a series of positive and negative pressures increasing from 1/2 test load to full test load.

Duration: 30 seconds maximum.

Recovery Period: 1 to 5 minutes.

Pass/Fail: Failure occurs if a change in the condition of the specimen results... such as "cracking, fastener loosening, local yielding," or, if permanent deformation results greater than 80% of maximum allowable deflection.

TAS-203: Cyclic Wind Pressure Load Test

The Florida Building Code requires this test to be conducted after completion of TAS-201: Large Missile Impact Test, to identify possible weaknesses resulting from the missile impact test. This test procedure assesses a product's capacity to withstand wind vibration imparted under hurricane-force wind velocities.

Test Louver Size: Maximum size to be certified by manufacturer.

Design Pressure (Wind Load): Maximum positive or negative wind load to be certified by manufacturer.

Load Sequence: Application of positive load test followed by application of negative load test.

Duration: 5 seconds maximum.

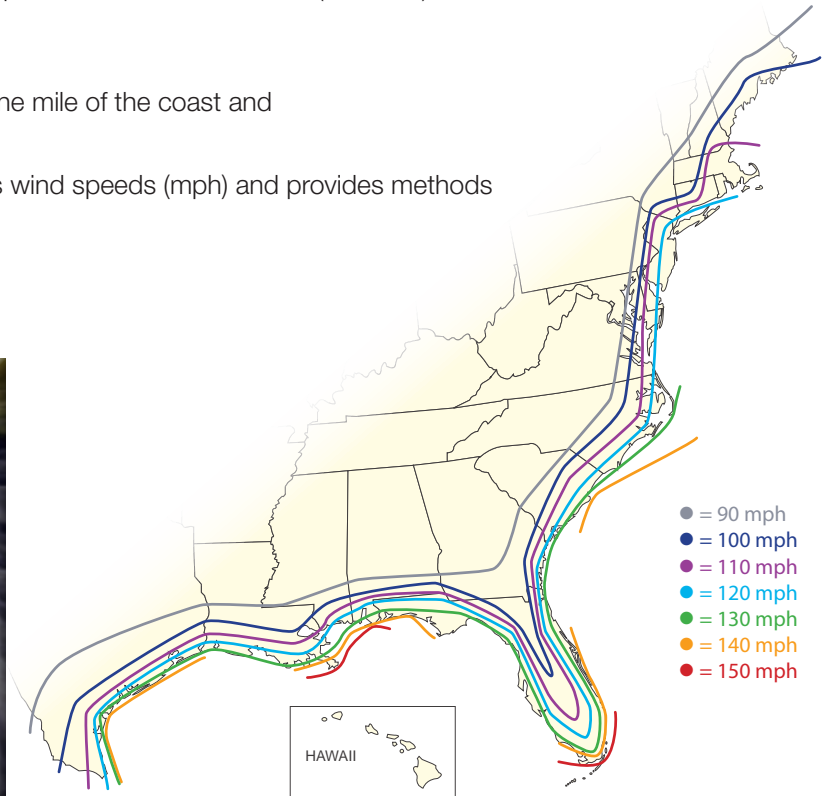
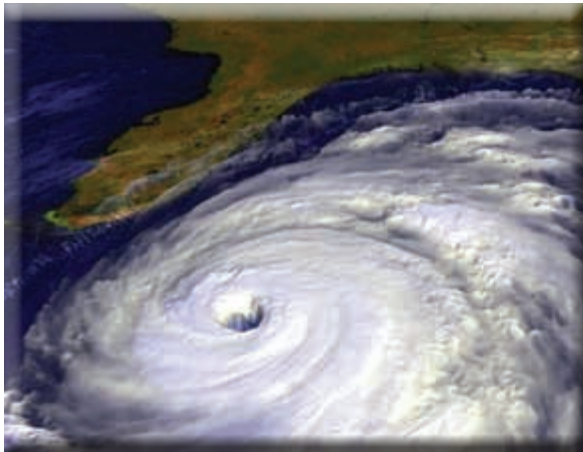
Procedure: 600 cycles at 1/2 x design pressure; 70 cycles at 0.6 x design pressure and 1 cycle at 1.3 x design pressure.

Pass/Fail: Failure occurs if a change in the condition of the specimen results... such as "cracking, fastener loosening, local yielding" or if permanent deformation results greater than 80% of maximum allowable deflection.

The 2006 International Building Code requires louvers in the Hurricane-Prone Region to be Impact Tested in accordance with the large missile test requirements of ASTM E1996 (TAS 201) if within the Wind-Borne Debris Region, which is defined as:

- 120 mph basic wind speed or
- 110 mph basic wind speed and within one mile of the coast and
- All of Hawaii

The ASCE-7, which is adopted by the IBC, defines wind speeds (mph) and provides methods for determining wind loads (psf).

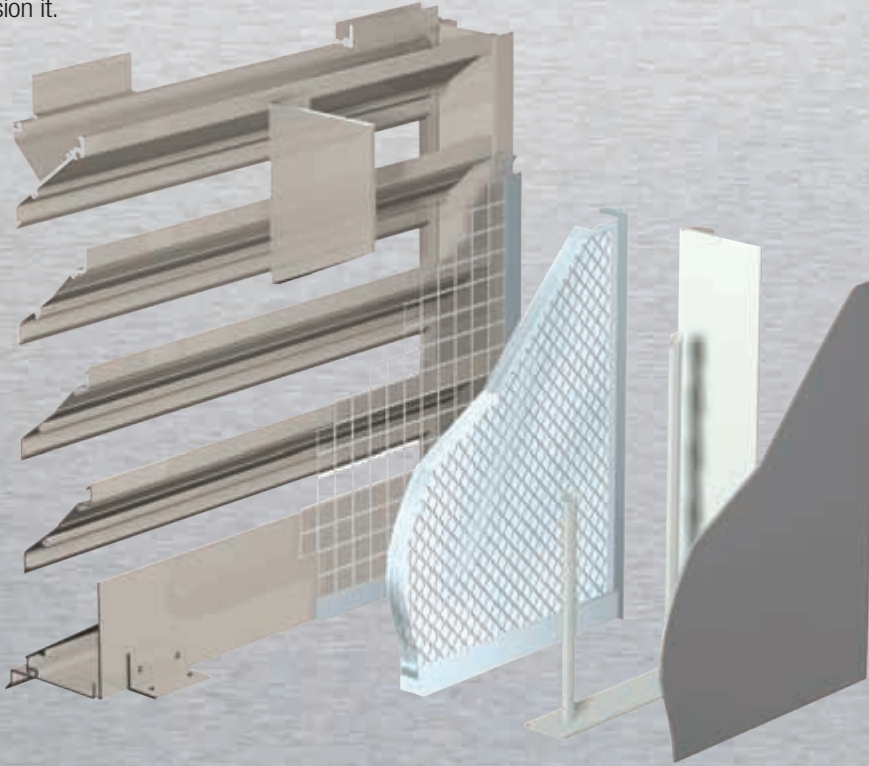


Comparison of Water Penetration Test Procedures

	AMCA Standard 500-L	AMCA Standard 500-L	TAS-100(A) Wind-Driven Rain Resistance Test
Test Procedure Name	"Static" Water Penetration Test	Wind-Driven Rain Water Penetration Test	Wind-Driven Rain Resistance Test
Louver Test Unit Size	4 feet x 4 feet	1 meter x 1 meter	4 feet x 4 feet
Exterior Wind Velocity	Zero mph	29 mph or 50 mph	35, 70, 90 and 110 mph
Simulated Rainfall Rate	4 Inches / Hour	3 Inches / Hour or 8 Inches / Hour	8.8 inches / Hour
Performance Rating Protocol	Beginning Point of Water Penetration is the intake velocity at which 0.01 ounces of water/square feet free area are measured to be carried through the louver by the intake air volume during the 15 minute test procedure.	Effectiveness Ratio, or the percentage of water volume that fails to pass through the louver during the 30 minute test procedure.	Pass or Fail: No water penetration permitted at 35 and 70 mph wind velocities; and, up to 11 ounces of water penetration permitted at 90 and 110 mph wind velocities.
Distance from Face of Test Louver to Spray Nozzle Jets		2 Meters	3 Meters
Louver Finish	Natural Mill	Natural Mill	No Restrictions
Tested with Bird or Insect Screen	No	No	No Restrictions
Certified by an Independent Third-Party Agency	Yes	Yes	Yes

Everything You Need

We have a full line of accessories, so whether your project necessitates security bars or filter racks, we have what you need. An extensive line of standard finishes, including Kynar® paint, baked enamel paint, industrial coatings or anodize finishes are also available. In addition to our complete line of standard colors, our custom color matching capabilities are endless. These accessories and options allow Greenheck to complete your project just as you envision it.



The Greenheck Fan Corporation certifies that Louver Type EHH-201, 401, 501, 601, 701; EVH-201, 401, 602, 801; EHH-601D; EVH-602D; EHH-501X; and EVH-602X 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 Water Penetration, Air Performance and Wind-Driven Rain.



The Greenheck Fan Corporation certifies that Louver Type ESD-603D; ESS-502D; ESD-635D; ESD-435X; and ESD-635X 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 only to Air Performance and Water Penetration ratings.



Greenheck Fan Corporation certifies that Model AFJ-601X 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 Water Penetration, Air Performance and Sound ratings.

Our Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.

As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.



Prepared to Support
Green Building Efforts

