

Severe Duty Louvered Products

Miami-Dade County Qualified, Florida Product Approved,
Wind-Driven Rain, FEMA 361 and Sand Louver



BUILDING VALUE IN AIR.



April
2015

Model Name Max. Wind-load	AMCA Certifications	AMCA Listed	Miami-Dade County, FL NOA No.	Florida Product Approved No.	Protocols	Minimum Opening	Maximum Section	Maximum Opening	
						Dimensions – inches (mm)			
Miami-Dade County Qualified Louvers and Penthouses									
AFJ-601D 150 PSF	Water, Sound and Air	AMCA 540 Enhanced Level E	14-0902.07 EXP. 11/20/19	FL16786.1	TAS 201, TAS 202, TAS 203	12 W x 12 H (305 W x 305 H)	60 W x 120 H (1524 W x 3048 H)	Unlimited W x 120 H (Unlimited W x 3048 H)	
ESS-502D 110 PSF	Water, Air		14-0624.16 EXP. 8/5/19	FL12941.1		8 W x 7 H (203 W x 178 H)	144 W x 144 H, Limited to 72 ft ² (3658 W x 3658 H, Limited to 6.7m ²)	Unlimited W x 144 H (Unlimited W x 3658 H)	
ESD-635D* 150 PSF		AMCA 540 Basic Level D, AMCA 540 Enhanced Level E (with 0.125 blade/ frame)	12-0830.07 EXP. 12/6/17	FL10088.3		12 W x 12 H (305 W x 305 H)	72.563 W x 144.813 H (1843 W x 3678 H)	Unlimited W x 144.813 H (Unlimited W x 3678 H)	
ESD-635D/VCD-40 150 PSF				FL10088.4		12 W x 15.25 H (305 W x 387 H)	36.563 W x 144.813 H (928 W x 3678 H)	Unlimited W x 144.813 H (Unlimited W x 3678 H)	
EACA-601D 110 PSF		Water, Air and Wind Driven Rain	AMCA 540 Basic Level D	13-0919.05 EXP. 12/5/18		FL16781.1	12 W x 13 H (305 W x 330 H)	60 W x 120 H (1524 W x 3048 H)	Unlimited W x 120 H (Unlimited W x 3048 H)
EHH-601D* 150 PSF	AMCA 540 Enhanced Level E		12-0830.08 EXP. 11/1/17	FL10088.1		12 W x 7 H (305 W x 178 H)	72.563 W x 144.813 H (1843 W x 3678 H)	Unlimited W x 144.813 H (Unlimited W x 3678 H)	
EHH-601D/VCD-40 150 PSF				FL10088.2		TAS 201, TAS 202, TAS 203, TAS 100A	12 W x 13.25 H (305 W x 337 H)	36.563 W x 144.813 H (928 W x 3678 H)	Unlimited W x 144.813 H (Unlimited W x 3678 H)
EVH-602D 150 PSF	Water, Air and Wind Driven Rain	AMCA 550, AMCA 540 Enhanced Level E	11-1103.01 EXP. 12/7/16	FL8042.1		TAS 201, TAS 202, TAS 203	12 W x 16 H (305 W x 406 H)	48.25 W x 96.25 H (1226 W x 2445 H)	Unlimited W x 96.25 H (Unlimited W x 2445 H)
EVH-602D/VCD-40 150 PSF				FL8042.2		TAS 201, TAS 202, TAS 203, TAS 100A			
EVH-660D 150 PSF				14-0224.10 EXP. 10/4/17		FL16785.1 FL16086.1			
EHH-601PD 115 PSF	Not Applicable	Not Applicable	13-0510.06 EXP. 6/19/18	FL11350.1	TAS 201, TAS 202, TAS 203	Minimum Throat W x L x Max. H 12 x 12 x 12 (305 x 305 x 305)	Maximum Throat W x L x Max. H 84 x 108 x 84 (2134 x 2743 x 2134)	Maximum Throat W x L x Max. H 84 x 108 x 84 (2134 x 2743 x 2134)	
ESD-635PD 115 PSF			13-0510.05 EXP. 6/19/18	FL11350.2		Minimum Throat W x L x Max. H 12 x 12 x 12 (305 x 305 x 305)	Maximum Throat W x L x Max. H 84 x 108 x 84 (2134 x 2743 x 2134)	Maximum Throat W x L x Max. H 84 x 108 x 84 (2134 x 2743 x 2134)	
Florida Product Approved Louvers									
AFJ-601X Max. 200 PSF [^]	Water, Sound and Air	AMCA 540 Enhanced Level E	Not Applicable	FL6876.1, FL15718.1	Standard: TAS 202 Welded: TAS 201, TAS 202, TAS 203	12 W x 15 H (305 W x 381 H)	60 W x 96 H (1524 W x 2438 H)	Unlimited W x 96 H (Unlimited W x 2438 H)	
ESD-435X* Max. 200 PSF [^]	Water, Air	AMCA 540 Basic Level D		FL6876.3, FL15718.3		12 W x 9 H (305 W x 229 H)	120 W x 144 H Limited to 70 ft ² (3048 W x 3658 H Limited to 6.5m ²)	Unlimited W x 144 H or 120 W x Unlimited H (Unlimited W x 3658 H or 3048 W x Unlimited H)	
ESD-635X* Max. 200 PSF [^]		AMCA 540 Basic Level D, AMCA 540 Enhanced Level E (with 0.125 blade/ frame)		FL6876.4, FL15718.4		12 W x 12 H (305 W x 305 H)			
EHH-501X* Max. 200 PSF [^]	Water, Air and Wind Driven Rain	AMCA 540 Enhanced Level E		FL6876.2, FL15718.2		12 W x 7 H (305 W x 178 H)			
EVH-602X Max. 200 PSF [^]		AMCA 550, AMCA 540 Enhanced Level E		FL7494.1, FL15719.1		12 W x 16 H (305 W x 406 H)	60 W x 96 H (1524 W x 2438 H)	Unlimited W x 96 H (Unlimited W x 2438 H)	
FEMA 361 Tornado Grille									
FSG-801 Max. 248 PSF	Not Applicable (UL Listed)			ICC 500	12 W x 12 H (305 W x 305 H)	57 ft ² (configuration dependent)	Unlimited W x Unlimited H (Limited to 1 section W or H)		
AFL-501 Max. 300 PSF	Water, Air	Not Applicable (UL Listed)			ICC500	12 W x 12 H (305 W x 305 H)	120 W x 120 H Limited to 72 ft ² (3048 W x 3048 H)	Configuration Dependant	

*Also available in architectural shapes. [^]Size/section dependent.

Building Code Descriptions

International Building Code 2006/2009

Section 1609.2 Definitions.

HURRICANE PRONE REGIONS. Areas vulnerable to hurricanes defined as:

1. The U.S. Atlantic Ocean and Gulf of Mexico coasts where the basic wind speed is greater than 90 mph (40 m/s) and
2. Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa

WIND-BORNE DEBRIS REGION. Portions of hurricane-prone regions that are within 1 mile (1.61 km) of the coastal mean high water line where the basic wind speed is 110 mph (49 m/s) or greater; or portions of hurricane-prone regions where the basic wind speed is 120 mph (54 m/s) or greater; or Hawaii.

Section 1609.1.2.1 Louvers. Louvers protecting intake and exhaust ventilation ducts not assumed to be open that are located within 30 feet (9144 mm) of grade shall meet requirements of an approved impact-resisting standard or the large missile test of ASTM E 1996.

International Building Code 2012

Section 202 Definitions

HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes defined as:

1. The U.S. Atlantic Ocean and Gulf of Mexico coasts where the ultimate design wind speed for Risk Category II buildings is greater than 115 mph (51 m/s); and
2. Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa.

WIND-BORNE DEBRIS REGION. Areas within hurricane-prone regions located:

1. Within 1 mile (1.61 km) of the coastal mean high water line where the ultimate design wind speed is 130 mph (58 m/s) or greater; or
2. In areas where the ultimate design wind speed is 140 mph (63 m/s) or greater; or Hawaii.

For Risk Category II buildings and structures and Risk Category III buildings and structures, except health care facilities, the wind-borne debris region shall be based on Figure 1609A. For Risk Category IV buildings and structures and Risk Category III health care facilities, the wind-borne debris region shall be based on figure 1609B.

Section 1609.1.2.1. Louvers. Louvers protecting intake and exhaust ventilation ducts not assumed to be open that are located within 30 feet (9144 mm) of grade shall meet the requirements of AMCA 540.

International Mechanical Code 2012

Section 401.5. Louvers that protect air intake openings in structures located in hurricane-prone regions, as defined in the International Building Code, shall comply with **AMCA 550**.

Florida Building Code 2010

Section 1609.2 Definitions.

HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes defined as:

1. The U.S. Atlantic Ocean and Gulf of Mexico coasts where the ultimate design wind speed for Risk Category II buildings is greater than 115 mph (40 m/s) and
2. Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa.

WIND-BORNE DEBRIS REGION. Areas within hurricane-prone regions located:

1. Within 1 mile (1.61 km) of the coastal mean high water line where the ultimate design wind speed is 130 mph (58 m/s) or greater; or
2. In areas where the ultimate design wind speed is 140 mph (63 m/s) or greater.

For Risk Category II buildings and structures and Risk Category III buildings and structures, except health care facilities, the wind-borne debris region shall be based on Figure 1609A. For Risk Category IV buildings and structures and Risk Category III health care facilities, the wind-borne debris region shall be based on Figure 1609B.

Section 1609.1.2.1 Louvers. Louvers protecting intake and exhaust ventilation ducts not assumed to be open that are located within 30 feet (9144 mm) of grade shall meet requirements of AMCA 540 or shall be protected by an impact resistant cover complying with an approved impact-resistance standard or the large missile test of ASTM E 1996.

Florida Mechanical Code 2010

401.5 Intake opening protection. Louvers that protect air intake openings in structures located in hurricane-prone regions, as defined in the Florida Building Code, Building shall comply with AMCA 550. Outdoor air intake openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the Florida Building Code, Building.

501.2.2 Exhaust opening protection. Louvers that protect exhaust openings in structures located in hurricane-prone regions as defined in the Florida Building Code, Building shall comply with AMCA 550. Outdoor openings located in exterior walls shall meet the provisions for exterior wall opening protectives in accordance with the Florida Building Code, Building.

FEMA P-361, Second Edition, August 2008

Greenheck recommends any design professional or construction professional obtain publication FEMA P-361, FEMA P-320 or ICC-500 for reference to specific construction/design criteria required for Tornado Community Safe Rooms and/or Hurricane Community Safe Rooms.



Test Descriptions

Florida TAS 201: Large Missile Impact

To date, Florida Building Code (FBC) TAS 201 remains the Large Missile Impact recognized by the Miami-Dade County Department of Regulatory and Economic Resources (RER) for Miami-Dade Notice of Acceptance (NOA) for louvers and louvered penthouse assemblies. TAS 201 was/is considered by many to be an “approved impact-resisting” standard as described within International Building Codes (IBC) 2006 and 2009 and FBC 2004 and 2007. TAS 201 measures a product’s resistance to wind-borne debris. TAS 201 simulates a 9 pound 2 x 4 traveling at 50 feet per second (34 miles per hour). Manufacturers must test their largest specimen size to several impacts for certification.



AMCA 540: Test Method for Louvers Impacted by Wind Borne Debris

The FBC 2010 and IBC 2012 recognize AMCA 540 for Large Missile Impact requirements for louvers where applicable within the defined Wind-Borne Debris Region. AMCA 540 measures a louver’s resistance to wind-borne debris. AMCA 540 simulates two different missile criteria. Missile Level D simulates a 9 pound 2 x 4 traveling at 50 feet per second (34 miles per hour). Missile Level E simulates a 9 pound 2 x 4 traveling at 80 feet per second (55 miles per hour). Missile Level D is required for Basic Protection while Missile Level E is required for Enhanced Protection for all Essential Facilities. Manufacturers must test their specimen’s smallest shortest blade span for single section assemblies along with multiple section configurations, to qualify applicable mulled panels.

ICC-500: Debris Impact

ICC-500 is recognized by the Federal Emergency Management Agency (FEMA) as a requirement for FEMA P-361 and/or FEMA P-320 Tornado or Hurricane Community Safe Rooms. ICC-500 defines several missile criteria, however, the most widely specified and applied is a simulate 15 pound 2 x 4 traveling at 100 miles per hour. This is also regarded as the most stringent. Pass or failure is based on penetration and perforation of “witness paper” located behind the specimen. A missile may penetrate a door, wall sections, etc, and remain lodged within the component, but the component does not allow any missile or specimen fragments to perforate the “witness paper” located inches directly behind the specimen.

Florida TAS 202: Uniform Static Air Pressure Test

Florida TAS 202 is recognized by both the FBC for Florida Product Approval and the Miami-Dade County RER for Miami-Dade NOA. TAS 202 simulates a product’s resistance to both negative and positive static wind pressure loading. Manufacturers must submit to 30 second positive and negative pressure cycles ranging from one-half design load to 1.5 times design load. Pass or failure is based on the subject product’s deflection and integrity retention. Manufacturers must test their largest specimen size along with multiple section configurations for applicable mulled panels.



Florida TAS 203: Cyclic Wind Pressure Loading

Florida TAS 203 is recognized by both the FBC for Florida Product Approval and the Miami-Dade County RER for Miami-Dade NOA. TAS 203 is required if the subject product is also Large Missile Impact qualified (AMCA 540 or TAS 201). TAS 203 simulates a product’s resistance to both negative and positive cyclic wind pressure loading. Manufacturers must submit to a total of 671 five second maximum cycles ranging from one-half design load to 1.3 times design load (600 cycles at one-half design load, 70 cycles at 0.6 design load and one cycle at 1.3 times design load). Pass or failure is based on the subject product’s deflection and integrity retention. Manufacturers must test their largest specimen size along with multiple section configurations for applicable mulled panels.

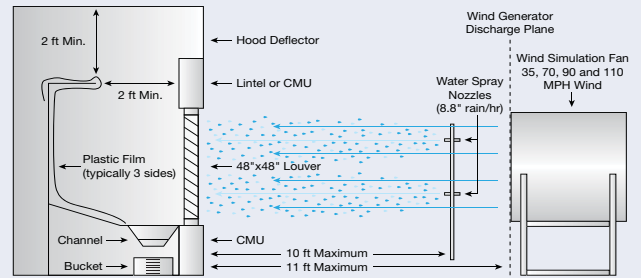
AMCA 500-L: Airflow Resistance

The AMCA 500-L Airflow Resistance test procedure measures a louver’s resistance to airflow under both intake and exhaust conditions. Pressure drop across the louver free area is measured and displayed as airflow resistance in units of inches water gauge at specific intake or exhaust velocity points. Manufacturers must test a 48 inch x 48 inch specimen size.

Test Descriptions

Florida TAS 100A: Wind-Driven Rain

To date, Florida TAS 100A is recognized by the Miami-Dade County RER for Miami-Dade NOA. TAS 100A simulates a louver or louver/damper assembly's resistance to wind-driven rain. TAS 100A is required for louvers applied within 33 feet of grade where the room behind the louver is NOT designed to drain water penetrating into the room or the room will house non-water resistant or water proof equipment, components or supplies. TAS 100A simulates an external 35, 70, 90 and 110 miles per hour wind speed with a simulated external horizontal rainfall rate of 8.8 inches per hour. During the 35 and 70 miles per hour wind simulations no water penetration is allowable. During the 90 and 110 miles per hour wind simulations an amount of water not greater than 0.05% of the overall sprayed water volume is allowed beyond the louver and damper assembly. Manufacturers must test a 48 inch x 48 inch specimen size.



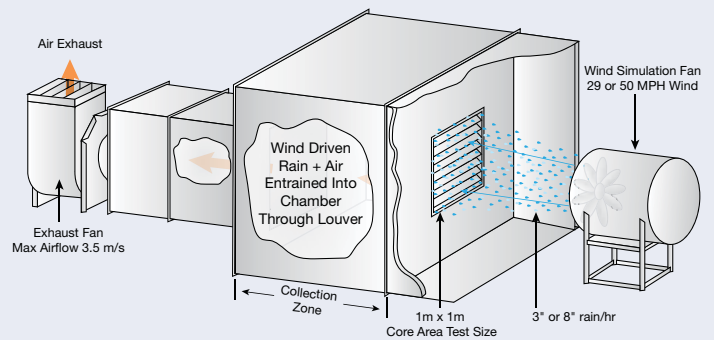
AMCA 550: Test Method for High Velocity Rain Resistant Louvers

Florida Mechanical Code (FMC) 2010 recognizes compliance with AMCA 550 for all intake and exhaust louvers that are located within the Hurricane Prone Regions as defined by the FBC 2010. International Mechanical Code (IMC) recognizes compliance with AMCA 550 for all intake louvers that are located within the Hurricane Prone Regions as defined by IBC 2012. The AMCA 550 test specification is identical to that of Florida TAS 100A, with the exception being the pass or failure criteria. The AMCA 550 High Velocity Wind-Driven Rain standard measures failure where greater than 1% of the overall sprayed water volume passes beyond the louver or louver and damper assembly during the entire test duration. Manufacturers must test a 48 inch x 48 inch specimen size. In addition to testing to the AMCA 550 standard the louver and damper assembly must first have undergone testing to the AMCA 500-L Wind Driven Rain procedure (50 mile per hour wind, 8 inches rain per hour).

AMCA 500-L: Wind-Driven Rain

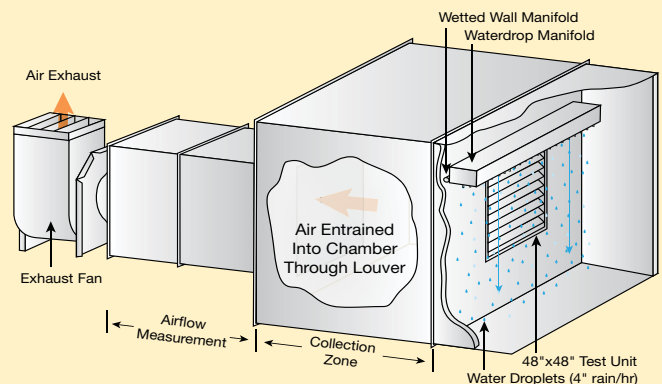
The AMCA 500-L Wind-Driven Rain test procedure measures a louver's resistance to water penetration under more dynamic storm-like conditions than the AMCA 500-L Water Penetration test procedure. A fan in front of the subject test louver simulates external wind speeds of 29 and/or 50 miles per hour. Between the external fan and the louver, spray nozzles simulate external rainfall at a rate(s) of 3 inches and/or 8 inches per hour (3 inches occurs at 29 miles per hour wind, 8 inches occurs at 50 miles per hour wind). Within a fully enclosed pressurized chamber behind the louver, a fan attempts to pull the water droplets through the louver blades. The louver is measured by a grading system of Class A, B, C or D, which defines the water rejection percentage at specific inlet velocity points. Manufacturers must test a louver size, which allows for a 1 meter x 1 meter louver core size. The louver core size is defined as the minimum distance between the louver's opposing frame members at the exterior face of the louver.

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



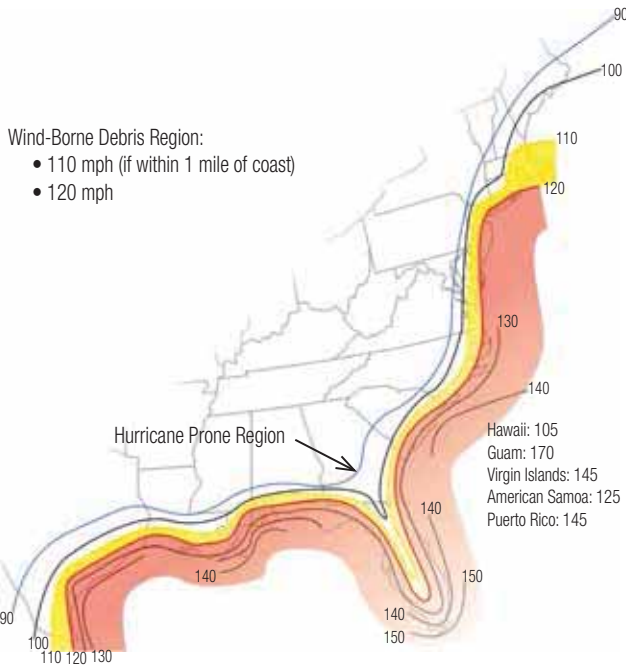
AMCA 500-L: Water Penetration

The AMCA 500-L Water Penetration test procedure measures a louver's resistance to water penetration during normal operating conditions. Rainfall at a rate of 4 inches per hour is simulated by dripping water droplets in front of the test louver. A wetted wall condition is simulated by applying 0.25 gallons of water per minute per linear foot across the wall directly above the test louver. Within a fully enclosed pressurized chamber behind the louver, a fan attempts to pull the water droplets through the louver blades. The louver is measured by the Beginning Point of Water Penetration, which is defined as the free area intake velocity from 0-1250 feet per minute where 0.01 ounces of water per square foot of louver free area is measurable behind the louver. The AMCA 500-L Water Penetration test procedure does NOT simulate external wind forces. Manufacturers must test a 48 inch x 48 inch specimen size.



International Building Code 2006/2009 (ASCE 7-05)

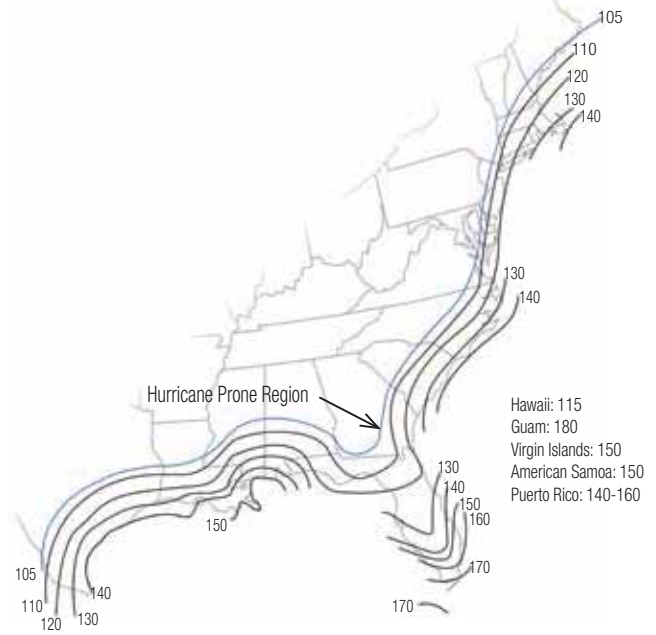
- International Building Code 2006/2009 requires louvers in the hurricane prone region to be impact tested in accordance with the large missile test requirements of ASTM E1996 (Florida TAS 201) if within the wind-borne debris region if located within 30 feet of grade



International Building Code 2012 (ASCE 7-10)

Building Risk Category I

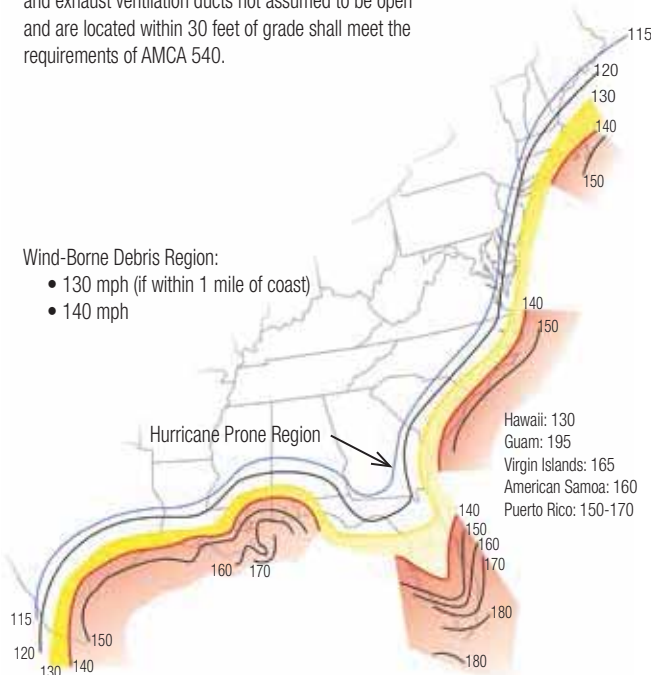
- Low risk to human life in the event of failure
- International Building Code 2012 does not reference building risk category I as requiring large missile impact
- Wind-Borne Debris Region not applicable



International Building Code 2012 (ASCE 7-10)

Building Risk Category II

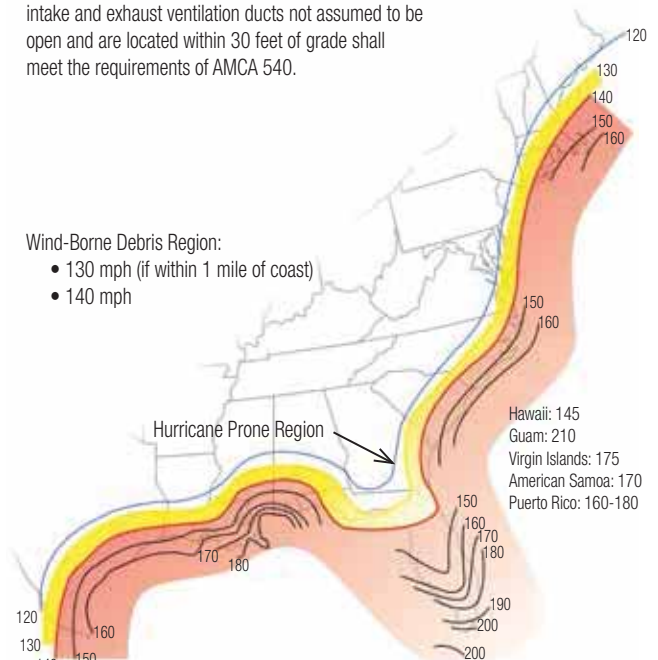
- All other buildings or structures not considered building risk category I, III or IV
- Wind-Borne Debris Requirements: Louvers protecting intake and exhaust ventilation ducts not assumed to be open and are located within 30 feet of grade shall meet the requirements of AMCA 540.



International Building Code 2012 (ASCE 7-10)

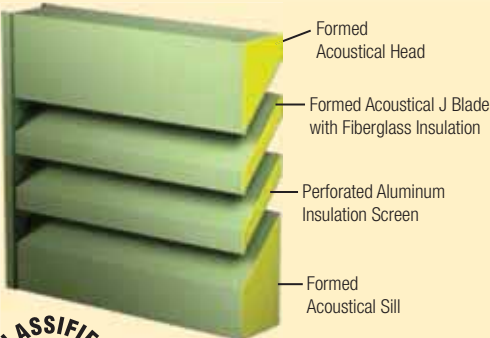
Building Risk Category III & IV

- High economic impact, mass disruption of day-to-day civilian life in event of failure
- Essential Facilities
- Wind-Borne Debris Requirements: Louvers protecting intake and exhaust ventilation ducts not assumed to be open and are located within 30 feet of grade shall meet the requirements of AMCA 540.




Note: All referenced wind speeds are MPH. Maps are Greenheck's representation of the IBC publication.

- All Greenheck Florida Product Approved “X” louvers retain Florida Product Approval (FBC 2012) and are approved for use in Florida’s High Velocity Hurricane Zone.
- All Greenheck Florida Product Approved “X” louvers comply with Florida test protocol TAS 201, TAS 202 and TAS 203 (when selected as impact qualified).
- All Greenheck Florida Product Approved “X” louvers are AMCA 540 Listed (when selected as impact qualified).
- Greenheck model EVH-602X is tested in accordance with AMCA 550 test standards.



Formed Acoustical Head
 Formed Acoustical J Blades with Fiberglass Insulation
 Perforated Aluminum Insulation Screen
 Formed Acoustical Sill



AFJ-601X
 Florida Product Approved No.: FL6876.1, FL15718.1



Drainable Head
 Rain-Resistant Blades
 Flat Sill
 Formed aluminum sill pan⁺



EHH-501X
 Florida Product Approved No.: FL6876.2, FL15718.2

+ Shipped loose. Formed aluminum sill pan



Drainable Head
 Drainable Blades
 Sloped Sill



ESD-435X
 Florida Product Approved No.: FL6876.3, FL15718.3



Drainable Head
 Drainable Blades
 Sloped Sill



ESD-635X
 Florida Product Approved No.: FL6876.4, FL15718.4



Drainable Head
 Vertical Rain-Resistant Blades
 Sloped Sill



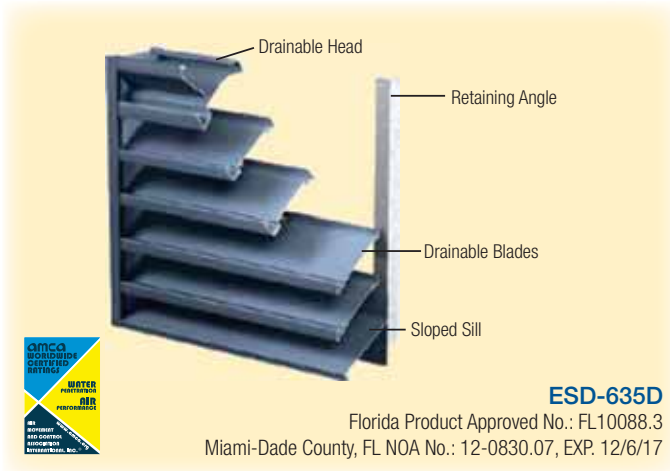
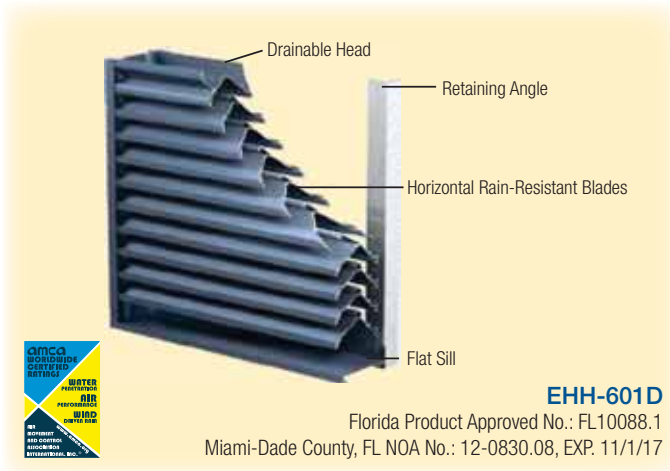
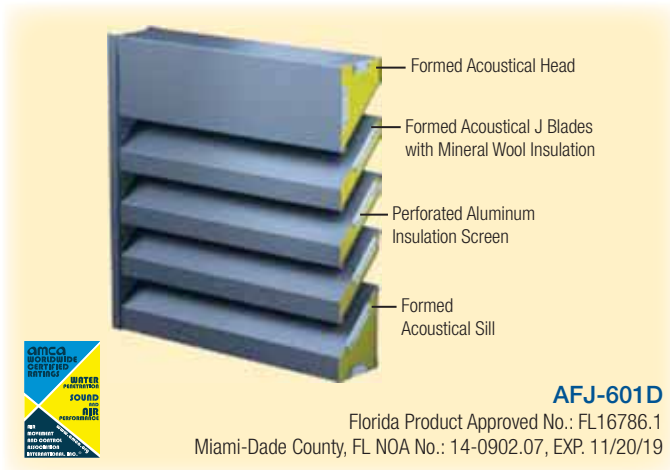
EVH-602X
 Florida Product Approved No.: FL7494.1, FL15719.1

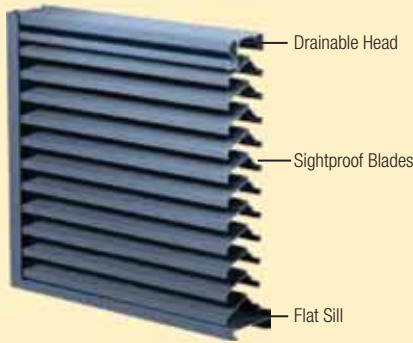
Model	Depth	Blade Style	Blade Thickness (in.)	Frame Thickness (in.)	Free Area (sq. ft)	Free Area (%)	Beginning Point of Water Penetration (ft/min)	Pressure Drop at Beginning Point of Water Penetration (in. wg)	Max. Intake Volume Flow Rate (cfm)	Exhaust Volume Flow Rate @ 0.15 in. wg (cfm)
AFJ-601X	6	J	0.080	0.080	4.89	31	799	0.065	3907	6015
EHH-501X	5	RR	0.081	0.081	6.80	43	above 1250	0.180	8500	5998
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	0.150	10135	9956
EVH-602X	6	RR	0.081	0.081	5.88	37	above 1250	0.161	7350	7832

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

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

- All Greenheck Miami-Dade Qualified louvers retain both Miami-Dade Notice of Acceptance and Florida Product Approval (FBC 2010) and are approved for use in Florida's High Velocity Hurricane Zone.
- All Greenheck Miami-Dade Qualified louvers comply with Florida test protocols TAS-201, TAS-202 and TAS-203.
- All Greenheck Miami-Dade Qualified louvers are AMCA 540 Listed (exceptions: ESD-635PD and EHH-601PD).
- Greenheck models EVH-660D, EHH-601D (with optional VCD-40 damper), EVH-602D (with optional VCD-40 damper) comply with Florida test protocol TAS 100A.
- Greenheck models EACA-601D, EVH-660D and EVH-602D are AMCA 550 Listed.
- Greenheck models ESD-635D and EHH-601D are available as channel frame or flanged/sleeve installation configuration.





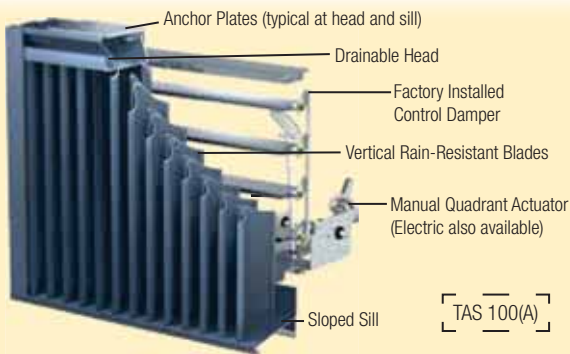
ESS-502D

Florida Product Approved No.: FL12941.1
 Miami-Dade County, FL NOA No.: 14-0624.16, EXP. 8/5/19



EVH-602D

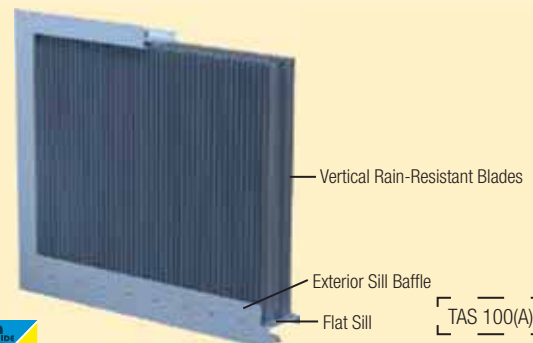
Florida Product Approved No.: FL8042.1
 Miami-Dade County, FL NOA No.: 11-1103.01, EXP. 12/7/16



TAS 100(A)

EVH-602D with VCD-40

Florida Product Approved No.: FL8042.2
 Miami-Dade County, FL NOA No.: 11-1103.01, EXP. 12/7/16



TAS 100(A)

EVH-660D

Florida Product Approved No.: FL16875.1, 16086.1
 Miami-Dade County, FL NOA No.: 14-0224.10, EXP. 10/4/17



Optional factory roof curb available.

EHH-601PD

Florida Product Approved No.: FL11350.1
 Miami-Dade County, FL NOA No.: 13-0510.06, EXP. 6/19/18



Optional factory roof curb available.

ESD-635PD

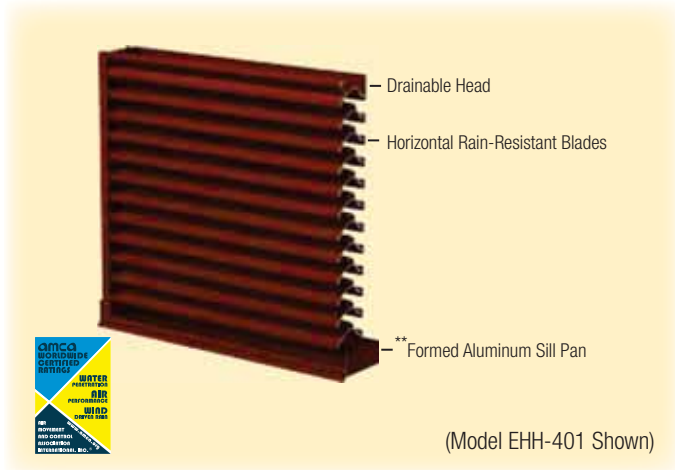
Florida Product Approved No.: FL11350.2
 Miami-Dade County, FL NOA No.: 13-0510.05, EXP. 6/19/18

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 Beginning Point of Water Penetration (in. wg)	Max. Intake Volume Flow Rate (cfm)	Exhaust Volume Flow Rate @ 0.15 in. wg (cfm)
AFJ-601D	6	J	0.080	0.125	4.88	30	827	0.069	4037	6015
EACA-601D	6	DAF	0.081	0.125	7.68	48	1221	0.140	9377	9586
EHH-601D	6	RR	0.081	0.081	7.58	47	above 1250	0.324	9475	5794
ESD-635D	6	D	0.081	0.125	9.41	59	1077	0.173	9800	5794
ESS-502D	5	C	0.081	0.081	8.19	51	1036	0.254	8485	5400
EVH-602D	6	RR	0.081	0.081	5.88	37	above 1250	0.161	7350	7832
EVH-660D	6	RR	0.063	0.095	7.29	46	above 1250	0.250	9112	7160

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

RR = Rain-Resistant C = Chevron D = Drainable DAF = Drainable Airfoil

- 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.



** Shipped loose formed aluminum sill pan required for models 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 (ft/min)	Core Area Velocity (ft/min) ¹	Water Penetration Effectiveness	Water Penetration Classification	Water Penetration Effectiveness	Water Penetration Classification
EHH-201	1372	298	127	99.6	A	-	-
	0	0	0	-	-	99.1	A
EHH-401	9306	1807	864	99.9	A	-	-
	4212	818	391	-	-	99.0	A
EHH-501	8353	1564	776	99.1	A	-	-
	7353	1377	683	-	-	99.2	A
EHH-601	8211	1418	763	99.8	A	-	-
	7276	1257	676	-	-	99.2	A
EHH-701	8430	1522	783	100.0	A	-	-
	7222	1304	671	-	-	99.5	A
EVH-201	9301	2178	864	99.8	A	-	-
	9278	2173	862	-	-	99.6	A
EVH-401	7248	1604	673	100.0	A	-	-
	6135	1357	570	-	-	99.7	A
EVH-602	10564	2224	981	99.9	A	-	-
	10427	2195	968	-	-	100.0	A
EVH-801	8337	1654	774	99.0	A	-	-
	9299	1845	864	-	-	99.2	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 Beginning Point of Water Penetration (in. wg)	Max. Intake Volume Flow Rate (cfm)	Exhaust Volume Flow Rate @ 0.15 in. wg (cfm)
EHH-201	2	RR	0.063	0.063	6.20	39	914	0.198	5667	5487
EHH-401	4	RR	0.081	0.081	6.72	42	above 1250	0.296	8400	5820
EHH-501	5	RR	0.081	0.081	6.80	43	above 1250	0.180	8500	5998
EHH-601	6	RR	0.081	0.081	7.58	47	above 1250	0.324	9475	6094
EHH-701	7	RR	0.081	0.081	6.99	44	above 1250	0.430	8736	4522
EVH-201	2	RR	0.063	0.063	5.71	36	above 1250	0.368	7138	5185
EVH-401	4	RR	0.081	0.081	6.38	40	above 1250	0.370	7975	5897
EVH-602	6	RR	0.081	0.081	5.88	37	above 1250	0.170	7525	8146
EVH-801	8	RR	0.081	0.081	5.05	32	above 1250	0.100	6313	8625

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

RR = Rain-Resistant

FEMA 361

FEMA 361 louver products are used to protect exterior building openings from flying debris caused by extreme weather events, such as tornadoes or hurricanes. FEMA 361 louver products must also be capable of withstanding extremely high wind loads. FEMA 361 louver products should be applied on any FEMA funded community safe room.

- Model AFL-501 is construction of aluminum materials for maximum weatherability
- Model FSG-801 is constructed of steel materials
- Models AFL-501 and FSG-801 are UL Classified Windstorm Rated assemblies
- Model AFL-501 is AMCA Licensed for Air Performance and Water Penetration
- Models AFL-501 and FSG-801 are tested in accordance with and pass the ICC-500 debris impact criteria as indicated within FEMA 361 (15 lb 2x4 at 100 mph)



AFL-501



FSG-801



Sand Louver

Greenheck's sand louver is designed to protect air intake and exhaust openings in building exterior walls from wind-driven sand. Design incorporates vertical sightproof blades to separate sand from the airstream which is then channeled out at the sloped sill.

Model FSL-401 was tested per ASHRAE Standard Method 52.1-1992 (previously ASHRAE standard 52-76), by an independent third-party test lab using crushed quartz of (150-300 μ m) dust medium. Standard construction material is galvanized steel and optional formed aluminum is available. Frame depth: 4 in.

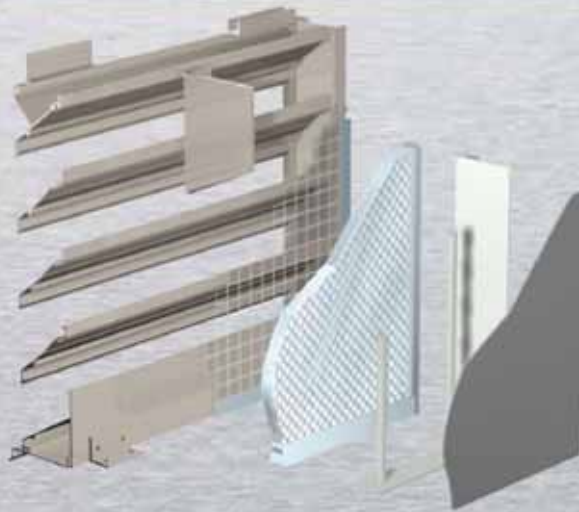


FSL-401



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; EVH-602X; and EVH-660D 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 AFL-501; EACA-601D; 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-601D and 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.



Greenheck Fan Corporation certifies that Model FSL-401 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.



HIGH VELOCITY RAIN RESISTANT AND IMPACT RESISTANT LOUVER
Basic Protection

See www.AMCA.org for all certified or listed products

This label does not signify AMCA airflow performance certification.



IMPACT RESISTANT LOUVER
Basic Protection

See www.AMCA.org for all certified or listed products

This label does not signify AMCA airflow performance certification.

The Greenheck Fan Corporation certifies that Louver Type ESD-435X, ESD-635X, ESD-635D, AFJ-601X, EHH-501X, EVH-602X, AFJ-601D, EACA-601D, ESS-502D, EHH-601D, EVH-602D and EVH-660D shown herein are approved to bear the AMCA Listing Label. The ratings shown are based on tests and procedures performed in accordance with AMCA Publications and comply with the requirements of the AMCA Listing Label Program.



IMPACT RESISTANT LOUVER
Enhanced Protection

See www.AMCA.org for all certified or listed products

This label does not signify AMCA airflow performance certification.



HIGH VELOCITY RAIN RESISTANT LOUVER

See www.AMCA.org for all certified or listed products

This label does not signify AMCA airflow performance certification.



HIGH VELOCITY RAIN RESISTANT AND IMPACT RESISTANT LOUVER
Enhanced Protection

See www.AMCA.org for all certified or listed products

This label does not signify AMCA airflow performance certification.

Our Commitment

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

Specific Greenheck product warranties are located on greenheck.com within the product area tabs and in the Library under Warranties.



Prepared to Support Green Building Efforts

