Architectural Testing

MIAMI-DADE COUNTY
PERFORMANCE TEST REPORT

Rendered to:

EAGLE WINDOW & DOOR, INC.

SERIES/MODEL: Series 02 Clad Axiom Awning with Harbor Master Mono
PRODUCT TYPE: Aluminum Clad Wood Awning Window with Impact Glass

This report contains in its entirety:

Cover Page:	**1 page**
Report Body:	**12 pages**
Sketches:	**2 pages**
Drawings:	**17 pages**

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Joseph A. Reed
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Date: 2010.01.13 17:24:35 -05'00'

Report No.:	**95126.01-201-18**
Test Dates:	**10/23/09**
Through:	**10/28/09**
Report Date:	**01/13/10**
Expiration Date:	**10/28/19**
Miami-Dade County Notification No.:	**ATIMN 09035**

849 Western Avenue North
St. Paul, MN 55117
phone: 651-636-3835
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EAGLE WINDOW & DOOR, INC.
2045 Kerper Boulevard
Dubuque, Iowa 52004-1072

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Project Summary: Architectural Testing, Inc. was contracted by Eagle Window & Door, Inc. to perform testing per Florida Building Code, Test Protocols for High Velocity Hurricane Zone, Protocols TAS 201-94, TAS 202-94 and TAS 203-94 on three Series 02 Clad Axiom Awning with Harbor Master Mono, aluminum clad wood awning windows with impact glass. The samples tested met the performance requirements set forth in the protocols for a +70.0/-80.0 psf *Design Pressure* rating. Test specimen description and results are reported herein. The samples were provided by the client.

Test Procedures: The test specimens were evaluated in accordance with the following:

TAS 201-94, *Impact Test Procedures*.

TAS 202-94, *Criteria for Testing Impact and Non Impact Resistant Building Envelope Components Using Uniform Static Air Pressure Loading*.

TAS 203-94, *Criteria for Testing Products Subject to Cyclic Wind Pressure Loading*.

Drawing Reference: The test specimen drawings have been reviewed and verified by Architectural Testing and are representative of the samples tested.

Test Specimen Description:

Series/Model: Series 02 Clad Axiom Awning with Harbor Master Mono

Product Type: Aluminum Clad Wood Awning Window with Impact Glass

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Test Specimen Description: (Continued)

Overall Size: 48" wide by 36" high

Sash Size: 46-1/2" wide by 34-1/2" high

Daylight Opening Size: 42" wide by 30" high

Finish: Exterior aluminum cladding was painted white, interior wood was natural.

Glazing Details: The window utilized a nominal 8.6 mm Harbor Master monolithic laminated glass. The glass was comprised of two nominal 1/8" annealed sheets separated by a 0.090" thick DuPont SentryGlas® Plus interlayer. The glass was set from the interior against Instant Glaze II silicone sealant and back-filled with silicone. Wood glazing stops with single-sided adhesive foam tape were utilized on the interior and secured with 1-1/4" brad nails 1" from each corner and spaced 6" to 8" on center. Glass bite was 1/2".

Weatherstripping:

Description	Quantity	Location
Hollow vinyl bulb	1 Row	Sash stiles and top rail
Foam filled bulb	1 Row	Frame perimeter

Frame Construction: The wood frame was comprised of laminated veneer lumber with corners square-cut, butted, sealed with silicone and secured with two 7/16" x 1-1/2" staples per corner. Extruded aluminum cladding was slip-fit over the wood frame members with the corners miter-cut, sealed with silicone and secured with a nylon corner key and two #6 x 7/16" screws per corner.

Sash Construction: Sash corners utilized mortise and tenon construction secured with glue and one #7 x 1-1/4" screw per corner. Extruded aluminum cladding was slip-fit over the wood sash members with the corners miter-cut, sealed with silicone, secured with a nylon corner key and one #5 x 1-1/2" screw per corner.

Test Specimen Description: (Continued)

Hardware:

Description	Quantity	Location
Awning hinges	2	Side jambs
Locks with keepers	2	Jambs; 11-3/4" up from bottom of sash
Roto-operator	1	Midspan of sill
Snubber	3	Head jamb 102 mm (4") from each corner and midspan

Drainage: No drainage was utilized.

Reinforcement: No reinforcement was utilized.

Installation: The unit was installed within a wood test buck and secured with steel installation straps. The straps were secured to the units with four #8 x 5/8" screws and to the buck, on the interior and exterior, with two #8 x 1-1/2" screws. The steel installation straps were spaced 6" from each corner and midspan on all sides. The unit was sealed to the buck with silicone.

Test Results: The following results have been recorded:

Protocol TAS 202-94, *Static Air Pressure Tests*

Test Unit #1
Design Pressure: +70.0/-80.0 psf

Title of Test	Results				
Air Infiltration					
1.57 psf (25 mph)	<0.01 cfm/ft^2				
6.24 psf (50 mph)	<0.01 cfm/ft^2				
	Indicator Readings (inch)				
Structural Loads	#1	#2	#3	#4	#5
50% of Test Pressure (+52.5 psf)					
Maximum Deflection	0.02	0.04	0.07	<0.01	0.14
Permanent Set	0.01	<0.01	0.01	<0.01	0.01
Design Pressure (+70.0 psf)					
Maximum Deflection	0.02	0.05	0.08	<0.01	0.16
Permanent Set	0.01	0.01	0.01	<0.01	0.01
50% of Test Pressure (-60.0 psf)					
Maximum Deflection	0.02	0.06	0.11	0.01	0.42
Permanent Set	0.01	0.01	0.01	<0.01	0.03
Design Pressure (-80.0 psf)					
Maximum Deflection	0.04	0.10	0.16	0.02	0.58
Permanent Set	0.02	0.02	0.03	<0.01	0.05
Water Infiltration					
15% Positive Design Pressure (+10.5 psf)	No Penetration				
Test Pressure (+105.0 psf)					
Maximum Deflection	0.02	0.03	0.08	0.03	0.17
Permanent Set	0.01	0.01	0.01	0.01	0.02
Test Pressure (-120.0 psf)					
Maximum Deflection	0.09	0.17	0.27	0.05	0.94
Permanent Set	0.06	0.07	0.07	0.03	0.12
Forced Entry - ASTM F 588-97	Pass				

Note: See Architectural Testing Sketch #1 for indicator locations.

Test Results: (Continued)

Protocol TAS 201-94, ***Impact Test Procedures***

Missile Weight: 9.2 lbs
Missile Length: 93"
Muzzle Distance from Test Specimen: 16 ft.

Test Unit #1

Impact #1: Missile Velocity: 50.4 fps

Impact Area: Center of glazing
Observations: No rips, tears or penetrations

Results: Pass

Impact #2: Missile Velocity: 50.5 fps

Impact Area: Lower right corner of glazing
Observations: No rips, tears or penetrations

Results: Pass

Test Unit #2

Impact #1: Missile Velocity: 50.0 fps

Impact Area: Center of glazing
Observations: No rips, tears or penetrations

Results: Pass

Impact #2: Missile Velocity: 49.7 fps

Impact Area: Upper left corner of glazing
Observations: No rips, tears or penetrations

Results: Pass

Test Results: (Continued)

Protocol TAS 201-94, ***Impact Test Procedures***

Test Unit #3

Impact #1: Missile Velocity: 49.3 fps

Impact Area: Center of glazing
Observations: No rips, tears or penetrations

Results: Pass

Impact #2: Missile Velocity: 49.1 fps

Impact Area: Upper right corner of glazing
Observations: No rips, tears or penetrations

Results: Pass

Note: *Refer to Architectural Testing Sketch #2 for impact locations.*

Test Results: (Continued)

Protocol TAS 203-94, ***Cyclic Wind Pressure Loading***

Test Unit #1

Design Pressure: +70.0/-80.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
14.0 to 35.0	3500	1.29	0.05	0.08	0.10	0.01	0.09
0 to 42.0	300	1.43	0.05	0.08	0.10	0.01	0.09
35.0 to 56.0	600	1.25	0.05	0.08	0.11	0.02	0.10
21.0 to 70.0	100	1.91	0.05	0.09	0.13	0.02	0.10
			Permanent Set (inch)				
			0.01	0.01	0.02	0.01	0.02

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
24.0 to 80.0	50	2.35	0.03	0.10	0.17	0.02	0.87
40.0 to 64.0	1050	1.10	0.03	0.10	0.17	0.02	0.76
0 to 48.0	50	2.20	0.03	0.07	0.11	0.01	0.61
16.0 to 40.0	3350	1.39	0.02	0.08	0.12	0.01	0.54
			Permanent Set (inch)				
			<0.01	0.02	0.06	0.01	0.18

Observations*: No additional damage or deglazing was observed.*

Result: Pass

Note: See Architectural Testing Sketch #1 for indicator locations. All test specimens were cycled in a common chamber.

Test Results: (Continued)

Protocol TAS 203-94, ***Cyclic Wind Pressure Loading***

Test Unit #2

Design Pressure: +70.0/-80.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
14.0 to 35.0	3500	1.29	0.03	0.08	0.12	0.01	0.14
0 to 42.0	300	1.43	0.04	0.08	0.12	0.01	0.14
35.0 to 56.0	600	1.25	0.04	0.10	0.14	0.02	0.16
21.0 to 70.0	100	1.91	0.04	0.10	0.14	0.02	0.17
			Permanent Set (inch)				
			0.01	0.03	0.04	<0.01	0.04

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
24.0 to 80.0	50	2.35	0.04	0.10	0.17	0.02	0.58
40.0 to 64.0	1050	1.10	0.04	0.11	0.17	0.02	0.53
0 to 48.0	50	2.20	0.02	0.08	0.13	0.01	0.43
16.0 to 40.0	3350	1.39	0.02	0.08	0.13	0.01	0.38
			Permanent Set (inch)				
			0.01	0.03	0.05	<0.01	0.10

Observations*: No additional damage or deglazing was observed.*

Result: Pass

Note*: See Architectural Testing Sketch #1 for indicator locations. All test specimens were cycled in a common chamber.*

Test Results: (Continued)

Protocol TAS 203-94, ***Cyclic Wind Pressure Loading***

Test Unit #3

Design Pressure: +70.0/-80.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
14.0 to 35.0	3500	1.29	0.02	0.05	0.10	0.01	0.18
0 to 42.0	300	1.43	0.02	0.05	0.10	0.01	0.18
35.0 to 56.0	600	1.25	0.02	0.07	0.11	0.02	0.19
21.0 to 70.0	100	1.91	0.02	0.07	0.12	0.02	0.20
			Permanent Set (inch)				
			<0.01	0.01	0.03	<0.01	0.07

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
24.0 to 80.0	50	2.35	0.04	0.10	0.16	0.02	0.82
40.0 to 64.0	1050	1.10	0.04	0.09	0.15	0.02	0.75
0 to 48.0	50	2.20	0.03	0.07	0.12	0.01	0.61
16.0 to 40.0	3350	1.39	0.03	0.06	0.11	0.01	0.55
			Permanent Set (inch)				
			0.01	0.02	0.04	0.01	0.19

Observations*: No additional damage or deglazing was observed.*

Result: Pass

Note*: See Architectural Testing Sketch #1 for indicator locations. All test specimens were cycled in a common chamber.*

Test Equipment:

Cannon: Steel pipe barrel utilizing compressed air to propel the missile

Missile: 2x4 Southern Pine

Timing Device: Electronic Beam Type

Cycling Mechanism: Computer controlled centrifugal blower with electronic pressure measuring device

Deflection Measuring Device: Linear transducers

Laboratory Compliance Statements: The following are provided as required by the protocols for the testing reported herein.

Upon completion of testing, specimens tested for TAS 201-94 met the requirements of Section 1626 of the Florida Building Code.

Upon completion of testing, specimens tested for TAS 202-94 met the requirements of Section 1620 of the Florida Building Code.

Upon completion of testing, specimens tested for TAS 203-94 met the requirements of Section 1626 of the Florida Building Code.

Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.

Testing was conducted at the Architectural Testing, Inc. laboratory located in St. Paul, Minnesota.

List of Official Observers:

Name	Company
Chad Cornell	Eagle Window & Door, Inc.
Jim Welter	Eagle Window & Door, Inc.
Mark D. Lewke	Architectural Testing, Inc.
Jon P. Kasuboski	Architectural Testing, Inc.
Dax R. Stoehr	Architectural Testing, Inc.
Karl A. Lips-Eakins	Architectural Testing, Inc.
Joseph A. Reed, P.E.	Architectural Testing, Inc.
Eric J. Schoenthaler	Architectural Testing, Inc.

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of ten years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Digitally Signed by: Eric Schoenthaler

Eric J. Schoenthaler
Project Manager

Digitally Signed by: Joseph A. Reed

Joseph A. Reed, P.E.
Director - Engineering and Product Testing

EJS:es/cmd

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Sketches (2)
Appendix-B: Drawings (17)