Architectural Testing

MIAMI-DADE COUNTY
PERFORMANCE TEST REPORT

Rendered to:

EAGLE WINDOW & DOOR, INC.

SERIES/MODEL: 3060 Series 02 Axiom Clad Casement Outswing Vent with Harbormaster Monolithic Glazing
PRODUCT TYPE: Aluminum Clad Casement Window with Impact Glazing

This report contains in its entirety:

Cover Page:	**1 page**
Report Body:	**13 pages**
Sketches:	**2 pages**
Drawings:	**19 pages**

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JOSEPH A. REED LICENSE No. 58920 STATE OF FLORIDA PROFESSIONAL ENGINEER

Joseph A. Reed

Digitally Signed by: Joseph A. Reed

Date: 2009.05.15 16:26:12 -04'00'

Report No.:	**90241.04-201-44**
Test Dates:	**04/27/09**
Through:	**04/29/09**
Report Date:	**05/15/09**
Expiration Date:	**04/29/13**
Miami-Dade County Notification No.:	**ATIMN 09009**

849 Western Avenue North
St. Paul, MN 55117
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EAGLE WINDOW & DOOR, INC.
2045 Kerper Blvd., P.O. Box 1072
Dubuque, Iowa 52004-1072

Report No.:	90241.04-201-44
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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/Model 3060 Series 02 Axiom Clad Casement Outswing Vent with Harbormaster Monolithic Glazing, aluminum clad casement windows with impact glazing. The samples tested met the performance requirements set forth in the protocols for a +65.0/-75.0 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: 3060 Series 02 Axiom Clad Casement Outswing Vent with Harbormaster Monolithic Glazing

Product Type: Aluminum Clad Casement Outswing Window with Impact Glazing

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Test Specimen Description: (Continued)

Overall Size: 36" wide by 72" high

Sash Size: 34-1/2" wide by 70-1/2" high

Daylight Opening Size: 29-3/4" wide by 65-3/4" high

Overall Area: 18.0 ft^2

Finish: Interior wood was natural and the exterior aluminum cladding was white.

Frame Construction: The wood frame was of laminated veneer lumber (LVL) with corners rabbet jointed, butted, sealed with silicone and secured with two 7/16" x 1-1/2" long 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 #8 x 7/16" screws. The head stop was secured with 3/16" x 1-1/8" long staples spaced approximately 6" on center. The side stops were secured with glue and a vinyl spline. The sill operator cover was secured with three #8 x 2-1/8" screws.

Sash Construction: The sash members were of molded pine. The corners utilized mortise and tenon construction and were 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, silicone sealed and secured with a nylon corner key and one #5 x 1-1/2" screw per corner.

Weatherstripping:

Description	Quantity	Location
0.267" diameter hollow bulb	1 Row	Sash stiles and top rail
0.320" diameter foam filled bulb	1 Row	Interior frame perimeter
Vinyl spline	1 Row	Between frame jambs and stop

Glazing Details: The window utilized a nominal 10.1 mm thick laminated glass fabricated from two sheets of nominal 3.9 mm (5/32") annealed glass separated by a 0.090" thick SentryGlas® Plus interlayer by DuPont. The glass was set from the interior against Instant Glaze II silicone and backfilled with Instant Glaze II silicone. Wood glazing stops with single-sided adhesive foam tape were utilized on the interior and secured with 1-1/4" brads spaced 1" from each corner and 6" to 8" on center. Glass bite was 0.500".

Drainage: No drainage was utilized.

Test Specimen Description: (Continued)

Hardware:

Description	Quantity	Location
Roto operator	1	Frame sill/bottom rail
3-point lock system with single actuator	1	Locking jamb/stile with keepers located 64 mm (12-1/2") from head and sill, and midspan
Sash limiter	1	Sill
Full length stainless steel piano hinge	1	Frame jamb to sash stile

Installation: The window was installed within a Spruce-Pine-Fir test buck. Masonry clips were utilized 152 mm (6") from each end of jamb and spaced 610 mm (24") on center. The masonry clips were secured to the window frame with four #8 x 5/8" screws and to the wood buck with two #8 x 1-1/2" screws on each face of the buck.

Test Results: The following results have been recorded:

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

Test Unit #1
Design Pressure: +65.0/-75.0 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 (+48.75 psf)					
Maximum Deflection	0.04	0.08	0.10	0.11	0.10
Permanent Set	0.01	0.03	0.01	0.02	0.02
Design Pressure (+65.0 psf)					
Maximum Deflection	0.04	0.09	0.11	0.14	0.11
Permanent Set	0.01	0.04	0.02	0.03	0.03
50% of Test Pressure (-56.25 psf)					
Maximum Deflection	0.07	0.18	0.16	0.15	0.18
Permanent Set	0.02	0.01	0.01	0.01	0.01
Design Pressure (-75.0 psf)					
Maximum Deflection	0.11	0.28	0.25	0.22	0.24
Permanent Set	0.01	0.05	0.04	0.05	0.04
Water Infiltration					
15% Positive Design Pressure (+10.5 psf)	No Penetration				
Test Pressure (+97.5 psf)					
Maximum Deflection	0.03	0.10	0.05	0.06	0.12
Permanent Set	0.01	0.02	0.02	0.02	0.02
Test Pressure (-112.5 psf)					
Maximum Deflection	0.19	0.35	0.04	0.04	0.37
Permanent Set	0.05	0.05	0.01	0.02	0.07
Forced Entry - ASTM F 588-97	Pass				

Note: *See Architectural Testing Sketch #2 for indicator locations.*

Test Results: (Continued)

Protocol TAS 201-94, *Impact Test Procedures*

Conditioning Temperature: 70°F
Missile Weight: 9.0 lbs
Missile Length: 96"
Muzzle Distance from Test Specimen: 16 ft.

Test Unit #1

Impact #1: Missile Velocity: 49.2 fps; orientation within ±5° of vertical

Impact Area: Center of glazing
Observations: Missile hit target area, no rips tears or penetrations
Results: Pass

Impact #2: Missile Velocity: 49.4 fps; orientation within ±5° of vertical

Impact Area: Lower right glazing corner
Observations: Missile hit target area, no rips, tears or penetrations
Results: Pass

***Note**: Refer to Architectural Testing Sketch #1 for impact locations.*

Test Results: (Continued)

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

Test Unit #1

Design Pressure: +65.0/-75.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
13.0 to 32.5	3500	1.03	0.45	0.29	0.26	0.21	0.02
0 to 39.0	300	1.51	0.52	0.44	0.43	0.36	0.05
32.5 to 52.0	600	1.14	0.52	0.44	0.43	0.36	0.05
19.5 to 65.0	100	1.93	0.53	0.44	0.43	0.36	0.05
			Permanent Set (inch)				
			0.51	0.43	0.40	0.35	0.02

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
22.5 to 75.0	50	1.44	0.10	0.35	0.19	0.15	0.31
37.5 to 60.0	1050	1.53	0.12	0.32	0.18	0.15	0.27
0 to 45.0	50	1.55	0.10	0.27	0.14	0.12	0.21
15.0 to 37.5	3350	1.31	0.10	0.25	0.17	0.15	0.18
			Permanent Set (inch)				
			0.06	0.09	0.07	0.10	0.02

Result: Pass

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

Test Results: (Continued)

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

Conditioning Temperature: 70°F
Missile Weight: 9.0 lbs
Missile Length: 96"
Muzzle Distance from Test Specimen: 16 ft.

Test Unit #2

Impact #1: Missile Velocity: 49.6 fps; orientation within ±5° of vertical

Impact Area: Center of glazing
Observations: Missile hit target area; no rips, tears or penetrations
Results: Pass

Impact #2: Missile Velocity: 49.3 fps; orientation within ±5° of vertical

Impact Area: Upper left glazing corner
Observations: Missile hit target area; no rips, tears or penetrations
Results: Pass

***Note**: Refer to Architectural Testing Sketch #1 for impact locations.*

Test Results: (Continued)

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

Test Unit #2

Design Pressure: +65.0/-75.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
13.0 to 32.5	3500	1.52	0.05	0.12	0.14	0.12	0.16
0 to 39.0	300	1.31	0.06	0.13	0.16	0.13	0.17
32.5 to 52.0	600	1.30	0.06	0.13	0.15	0.13	0.20
19.5 to 65.0	100	1.82	0.05	0.12	0.14	0.13	0.19
			Permanent Set (inch)				
			0.01	0.01	0.04	0.02	0.04

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
22.5 to 75.0	50	1.42	0.16	0.44	0.26	0.18	0.29
37.5 to 60.0	1050	1.42	0.15	0.37	0.22	0.16	0.24
0 to 45.0	50	1.47	0.10	0.29	0.15	0.12	0.21
15.0 to 37.5	3350	1.07	0.09	0.27	0.14	0.11	0.19
			Permanent Set (inch)				
			0.05	0.08	0.05	0.06	0.07

Result: Pass

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

Test Results: (Continued)

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

Conditioning Temperature: 70°F
Missile Weight: 9.0 lbs
Missile Length: 96"
Muzzle Distance from Test Specimen: 16 ft.

Test Unit #3

Impact #1: Missile Velocity: 49.1 fps; orientation within ±5° of vertical

Impact Area: Center of glazing
Observations: Missile hit target area; no rips, tears or penetrations
Results: Pass

Impact #2: Missile Velocity: 49.9 fps; orientation within ±5° of vertical

Impact Area: Lower left glazing corner
Observations: Missile hit target area; no rips, tears or penetrations
Results: Pass

***Note**: Refer to Architectural Testing Sketch #1 for impact locations.*

Test Results: (Continued)

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

Test Unit #3

Design Pressure: +65.0/-75.0 psf

POSITIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
13.0 to 32.5	3500	1.17	0.04	0.18	0.20	0.19	0.09
0 to 39.0	300	1.23	0.05	0.19	0.21	0.20	0.10
32.5 to 52.0	600	1.35	0.05	0.21	0.22	0.23	0.12
19.5 to 65.0	100	1.52	0.06	0.23	0.22	0.25	0.12
			0.03	0.07	0.06	0.07	0.04

NEGATIVE PRESSURE

Pressure Range (psf)	Number of Cycles	Average Cycle Time (sec.)	Maximum Deflection at Indicator (inch)				
			#1	#2	#3	#4	#5
22.5 to 75.0	50	1.98	0.11	0.41	0.25	0.22	0.33
37.5 to 60.0	1050	1.37	0.09	0.33	0.21	0.20	0.29
0 to 45.0	50	1.44	0.08	0.32	0.20	0.19	0.27
15.0 to 37.5	3350	1.05	0.07	0.22	0.13	0.14	0.20
			0.03	0.05	0.03	0.04	0.07

Result: Pass

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

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.
Jason A. Needham	Architectural Testing, Inc.
Tony D. Gavin	Architectural Testing, Inc.
Joseph A. Reed, P.E.	Architectural Testing, Inc.
Karl A. Lips-Eakins	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 (19)