

**AAMA/WDMA 101/I.S. 2-97
TEST REPORT**

Rendered to:

EAGLE WINDOW & DOOR, INC.

**SERIES/MODEL: Series 93 Clad Auxiliary
TYPE: Aluminum Clad Fixed Wood Window**

Title of Test	Results
AAMA Rating	F-C90 60 x 96
Uniform Load Deflection Test Pressure	± 90.0 psf
Air Infiltration	< 0.01 cfm/ft ²
Water Resistance Test Pressure	15.00 psf
Uniform Load Structural Test Pressure	± 135.0 psf
Forced Entry Resistance	Grade 40

Reference should be made to full report for test specimen description and data.

Report No: 53721.01-201-44
Report Date: 11/01/04
Expiration Date: 10/25/08



Architectural Testing

**ASTM E 1886-02 and ASTM E 1996-02
TEST REPORT**

Rendered to:

EAGLE WINDOW & DOOR, INC.

PRODUCT TYPE: Series 93 Aluminum Clad Auxiliary Fixed Wood Windows

Report No.: 53721.02-201-44

Test Date: 10/25/04

And: 10/26/04

Original Report Date: 11/01/04

Revised Report Date: 11/19/04

Expiration Date: 10/25/08

849 Western Avenue North
St. Paul, MN 55117
phone: 651-636-3835
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www.archtest.com



ASTM E 1886-02 and ASTM E 1996-02 TEST REPORT

Rendered to:

EAGLE WINDOW & DOOR, INC.
2045 Kerper Boulevard.
Dubuque, Iowa 52004-1072

Report No.: 53721.02-201-44
Test Date: 10/25/04
And: 10/26/04
Original Report Date: 11/01/04
Revised Report Date: 11/19/04
Expiration Date: 10/25/08

Project Summary: Architectural Testing, Inc. (ATI) was contracted by Eagle Window & Door to perform testing per ASTM E1886-02 and ASTM E1996-02. Tests were performed on three Eagle Window & Door Series 93 Clad Auxiliary Windows with Impact Glass. The samples tested met the requirements set forth in each of the test methods for *Design Load* ratings of 2634pa (55.0 psf) (positive) and 3112pa (65.0 psf) (negative).

Test Procedure: The test specimens were evaluated in accordance with ASTM E 1886-02 "Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials," and ASTM E 1996-02, "Standard Specification for Performance of Exterior Windows, Glazed Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes," to the Wind Zones 1, 2 and 3, Missile D requirements

Test Specimen Description:

Series/Model: Series 93 Clad Auxiliary

Type: Aluminum Clad Fixed Wood Window

Overall Size: 1524mm wide by 2438mm high (5' 0" by 8' 0")

Area: 12.2m² (40.0 ft²)

Finish: Interior wood was natural, exterior cladding was painted.

Glazing Details: The window utilized a nominal 32mm (1-1/4") thick insulating glass unit fabricated from one nominal 5mm (3/16") sheet of heat-strengthened glass and one laminated sheet of glass separated by a desiccant-filled metal spacer system. The laminated sheet was comprised of two nominal 6mm (1/4") sheets of annealed glass with a 2mm (0.090") SGP interlayer. The glass was set from the interior against butyl rubber mastic and back-filled with silicone. Wood glazing stops with single-sided adhesive foam tape were utilized on the interior and secured with 32mm (1-1/4"), 18-gauge brads spaced 25mm (1") from each corner and 152mm to 203mm (6" to 8") on center.

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Test Specimen Description: (Continued)

Frame Construction: The wood frame was comprised of laminated veneer lumber with corners square cut, butted, sealed with silicone, and secured with two 16 gauge 13mm by 44mm (1/2" by 1-3/4") staples and 38mm by 25mm (1-1/2" by 1") corrugated fastener 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, two #6 by 11mm (7/16") screws and one #10 by 64mm (2-1/2") screw per corner.

Installation: The window was installed within a nominal 51mm by 203mm (2" by 8") southern yellow pine wood test buck. The window was anchored to the buck with #10 by 76mm (3") wood screws spaced 152mm (6") from each corner and 267mm (10-1/2") on center on the jambs and 305mm (12") on center on the head and sill. Silicone sealant was used to seal the window to the test buck.

Test Results: The following results have been recorded:

ASTM E 1886-02, Missile Impact

Conditioning Temperature: 21°C (70°F)
Missile Weight: 4196g (9.25 lbs)
Missile Length: 2.36m (93")
Muzzle Distance from Test Specimen: 4.87m (16 ft.)

Test Unit # 1

Impact #1: Missile Velocity: 15.0 m/s (49.5 fps)
Impact Area: Center of glazing
Observations: No rips, tears or penetrations
Results: Pass

Test Unit #2

Impact #1: Missile Velocity: 15.0 m/s (49.5 fps)
Impact Area: Top right exterior glazing corner
Observations: No rips, tears or penetrations
Results: Pass

Test Unit # 3

Impact #1: Missile Velocity: 15.0 m/s (49.5 fps)
Impact Area: Bottom left exterior glazing corner
Observations: No rips, tears or penetrations
Results: Pass

Test Results: (Continued)

ASTM E 1886-02, Air Pressure Cycling

Test Unit # 1 **Design Pressure:** + 2634, -3112 Pa (+55.0, -65.0 psf)

Table 1 "*Cyclic Pressure Differential Loading*", Section 11, Paragraph 11.4.2

POSITIVE PRESSURE

Design Pressure +2634 Pa (55.0 psf)

<u>Pressure Range (psf)</u>	<u>Number of Cycles</u>	<u>Average Cycle Time (seconds)</u>
0.2P – 0.5P	3500	2.64
0.0P – 0.6P	300	2.92
0.5P – 0.8P	600	2.54
0.3P – 1.0P	100	2.87

NEGATIVE ACTING

Design Pressure -3112Pa (-65.0 psf)

<u>Pressure Range (psf)</u>	<u>Number of Cycles</u>	<u>Average Cycle Time (seconds)</u>
0.3P – 1.0P	50	2.97
0.5P – 0.8P	1050	2.58
0.0P – 0.6P	50	2.93
0.2P – 0.5P	3350	2.53

Observations: No rips, tears or penetrations

Result: Pass

Test Results: (Continued)

ASTM E 1886-02, Air Pressure Cycling

Test Unit # 2 **Design Pressure:** + 2634, -3112 Pa (+55.0, -65.0 psf)

Table 1 "*Cyclic Pressure Differential Loading*", Section 11, Paragraph 11.4.2

POSITIVE PRESSURE

Design Pressure +2634 Pa (55.0 psf)

<u>Pressure Range (psf)</u>	<u>Number of Cycles</u>	<u>Average Cycle Time (seconds)</u>
0.2P – 0.5P	3500	2.64
0.0P – 0.6P	300	2.92
0.5P – 0.8P	600	2.54
0.3P – 1.0P	100	2.87

NEGATIVE ACTING

Design Pressure -3112Pa (-65.0 psf)

<u>Pressure Range (psf)</u>	<u>Number of Cycles</u>	<u>Average Cycle Time (seconds)</u>
0.3P – 1.0P	50	2.97
0.5P – 0.8P	1050	2.58
0.0P – 0.6P	50	2.93
0.2P – 0.5P	3350	2.53

Observations: No rips, tears or penetrations

Result: Pass

Test Results: (Continued)

ASTM E 1886-02, Air Pressure Cycling

Test Unit # 3 **Design Pressure:** + 2634, -3112 Pa (+55.0, -65.0 psf)

Table 1 "*Cyclic Pressure Differential Loading*", Section 11, Paragraph 11.4.2

POSITIVE PRESSURE

Design Pressure +2634 Pa (55.0 psf)

<u>Pressure Range (psf)</u>	<u>Number of Cycles</u>	<u>Average Cycle Time (seconds)</u>
0.2P – 0.5P	3500	2.12
0.0P – 0.6P	300	2.48
0.5P – 0.8P	600	2.25
0.3P – 1.0P	100	2.80

NEGATIVE ACTING

Design Pressure -3112Pa (-65.0 psf)

<u>Pressure Range (psf)</u>	<u>Number of Cycles</u>	<u>Average Cycle Time (seconds)</u>
0.3P – 1.0P	50	2.06
0.5P – 0.8P	1050	2.33
0.0P – 0.6P	50	2.87
0.2P – 0.5P	3350	2.04

Observations: No rips, tears or penetrations

Result: Pass

General Note: Upon completion of testing, the specimens met the requirements of Section 7 of ASTM E 1996.

Test Equipment:

Cannon: Constructed from steel piping utilizing compressed air to propel the missile(s)

Missile(s): 2 by 4 Southern Pine

Timing Device: Electronic Beam Type

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

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.

List of Official Observers:

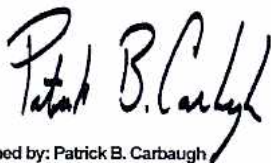
Name	Company
Edward Popp	Architectural Testing Inc.
Patrick Carbaugh	Architectural Testing Inc.
Eric Schoenthaler	Architectural Testing Inc.
Daniel Johnson	Architectural Testing Inc.

Drawing Reference: The following drawings have been checked by ATI, and are representative of the samples tested:

Representative samples of the test specimen and a copy of this report will be retained by ATI for a period of four years from the original test date. This report is the exclusive property of the client so named herein and is applicable to the sample tested. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory. This report may not be reproduced, except in full, without the approval of Architectural Testing.

It has been established that testing performed to ASTM E 1996-02 satisfies all requirements of ASTM E 1996-99 for wall mounted windows and shutters provided operable specimens are tested as described in Sections 5.3.2.2 and 5.3.2.3 of ASTM E 1996-99. The testing documented in this report provides sufficient information to conclude that the tested product also satisfies the requirements of ASTM E 1996-99. The equivalent ASTM E 1996-99 performance level would be Wind Zones 1, 2 and 3 and Missile Level C.

For ARCHITECTURAL TESTING, INC.



Digitally Signed by: Patrick B. Carbaugh

Patrick B. Carbaugh
Technician



Digitally Signed by: Daniel A. Johnson

Daniel A. Johnson
Regional Manager

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	11/01/04	All	Original report issue
1	11/19/04	1, 2 and 6	Correction of ASTM Publication year, identifying wind zones tested for and additional description of missile used Report and drawing to forwarded to AMS for Hallmark Certification