Architectural Testing

AAMA/NWWDA 101/I.S.2-97
TEST REPORT

Rendered to:

MANNIX

SERIES/MODEL: 1600
TYPE: Aluminum Double Hung

	Summary of Results	
Title	**Test Specimen #1**	**Test Specimen #2**
AAMA Rating	H-AW40 60 x 96	H-AW45 60 x 96
Operating Force	25 lb max.	N/A
Air Infiltration	0.19 cfm/ft^2	N/A
Water Resistance Test Pressure	9.0 psf	N/A
Uniform Load Deflection Test Pressure	±40.0 psf	±45.0 psf
Uniform Structural Load Test Pressure	±60.0 psf	±67.5 psf
Deglazing	Passed	N/A
Forced Entry Resistance	Grade 10	N/A

Reference should be made to ATI Report No. 01-42054.06 for complete test specimen description and data.

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Architectural Testing

AAMA/NWWDA 101/I.S.2-97 TEST REPORT

Rendered to:

MANNIX
345 Crooked Hill Road
Brentwood, New York 11717

Report No: 01-42054.06
Test Date: 06/25/02
Through: 07/01/02
And: 09/26/02
Report Date: 10/31/02
Expiration Date: 07/01/06

Project Summary: Architectural Testing, Inc. (ATI) was contracted by Mannix to perform tests on two Series/Model 1600, aluminum double hung windows. The samples tested successfully met the performance requirements for the following ratings: Test Specimen #1: H-AW40 60 x 96; Test Specimen #2: H-AW45 60 x 96.

Test Specification: The test specimen was evaluated in accordance with AAMA/NWWDA 101/I.S.2-97, *Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.*

Test Specimen Description:

Series/Model: 1600

Type: Aluminum Double Hung

Test Specimen #1: H-AW40 60 x 96 (two locks)

Overall Size: 5' 0" wide by 8' 0" high

Top Sash Size: 4' 8-9/16" wide by 3' 11-1/4" high

Bottom Sash Size: 4' 9-1/2" wide by 3' 11-5/8" high

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Test Specimen Description: (Continued)

Test Specimen #2: H-AW45 60 x 96 (three locks)

Overall Size: 5' 0" wide by 8' 0" high

Top Sash Size: 4' 8-9/16" wide by 3' 11-1/4" high

Bottom Sash Size: 4' 9-1/2" wide by 3' 11-5/8" high

Finish: All aluminum was painted.

Glazing Details: The sash were constructed utilizing 1" thick insulating glass comprised of two sheets of 1/8" thick clear annealed glass and a metal spacer system. The insulating glass was channel glazed using a flexible PVC gasket.

Weatherstripping:

Description	Quantity	Location
0.270" back by 0.190" high polypile with fin	1 Row	Sill, head, interior meeting rail, top rail
0.270" back by 0.750" diameter flexible PVC bulb	1 Row	Sill
0.270" back by 0.230" high polypile with fin	2 Rows	All stiles
0.270" back by 0.230" high polypile with fin	1 Row	Interior meeting rail

Frame Construction: All frame members were constructed of thermally broken extruded aluminum. All corners were coped, butted, sealed and fastened with two #8 x 1-1/4" screws per corner.

Sash Construction: All sash members were constructed of thermally broken extruded aluminum. All corners were coped, butted, sealed and fastened with one #8 x 1-1/4" screw per corner. Deflection limiters with adjacent keepers were used at the midspan of all sash stiles.

Test Specimen Description: (Continued)

Hardware:

Description	Quantity	Location
Spring loaded latch	1	Mid-point of top rail
Cam lock with adjacent keeper		
Specimen #1	2 Sets	15" from ends of meeting rail
Specimen #2	3 Sets	15" from ends of meeting rail and midspan
Spiral balance system	4	Two each jamb
Metal tilt latch	4	One each end of top rail and Interior meeting rail
Deflection limiters	2 2	Midspan of top sash stiles Midspan of bottom sash stiles
Rubber limit stops	2	One each exterior sash stile
Vinyl limit stops	2	One each jamb at the sill end

Drainage: Sloped sill

Description	Quantity	Location
1/4" diameter weephole	2	One each end of exterior meeting rail 1-1/4" from ends

Reinforcement: No reinforcement was utilized.

Installation: The window was installed in a Spruce-Pine-Fir wood test buck. The window was attached using interior aluminum clips 8" from each end and 12" on center at the head and sill, and 6" from each end and 12" on center each jamb. Each clip was secured to the frame using one #8 x 3/4" screw and to the wood test buck using one #14 x 1-1/4" screw. The exterior perimeter was sealed with silicone.

Test Results:

The results are tabulated as follows:

Paragraph	Title of Test - Test Method	Results	Allowed
Test Specimen #1: H-AW40 60 x 96 (two locks)			
2.2.2.5.1	Operating Force	25 lbs max.	45 lbs max.
2.1.2	Air Infiltration (ASTM E 283-91) @ 6.24 psf (50 mph)	0.12 cfm/ft^2	0.30 cfm/ft^2 max.

***Note #1**: The tested specimen meets the performance levels specified in AAMA/NWWDA 101/I.S. 2-97 for air infiltration.*

2.1.3	Water Resistance (ASTM E 331-00 and ASTM E 547-00) WTP = 9.0 psf	No leakage	No leakage

Life Cycle Testing per AAMA 910-93

2.1.4	Vent Cycle Testing (first half) (1250 times each)	
	Exterior sash	Meets as stated
	Interior sash	Meets as stated

***Observations**: Showed signs of some wear to jambs.*

2.1.5	Locking Hardware Cycle Testing (first half) (1250 times each)	
	Left side lock	Meets as stated
	Right side lock	Meets as stated

***Observations**: No signs of wear.*

2.1.7	Misuse Testing (Full test)	
2.5.3.1	Sash Corner Block Test	Meets as stated
2.5.3.2	Sash Removal Test	Meets as stated

***Observations**: No obvious damage was noticed.*

Test Results: (Continued)

Paragraph	Title of Test - Test Method	Results	Allowed
2.1.8	Vent Cycle Test (second half) (1250 times each)		
	Exterior sash	Meets as stated	
	Interior sash	Meets as stated	

Observations: *Shows wear to roller track.*

2.1.9	Locking Hardware Cycle Test (second half) (1250 times each)		
	Left side lock	Meets as stated	
	Right side lock	Meets as stated	

Observations: *No signs of wear.*

Life Cycle Testing per AAMA 910-93

2.1.10	Operating Force	25 lbs max.	45 lbs max.
2.1.11	Air Infiltration (ASTM E 283-91) @ 6.24 psf (50 mph)	0.19 cfm/ft^2	0.30 cfm/ft^2
2.1.12	Water Resistance (ASTM E 331-00 and ASTM E 547-00) WTP = 9.0 psf	No leakage	No leakage
2.1.4.1	Uniform Load Deflection (ASTM E 330-97) (Measurements reported were taken on the exterior meeting rail) (Loads were held for 29 seconds)		
	@ 40.0 psf (positive)	0.31"	0.31" max.
	@ 40.0 psf (negative)	0.31"	0.31" max.
2.1.4.2	Uniform Load Structural (ASTM E 330-97) (Measurements reported were taken on the exterior meeting rail) (Loads were held for 10 seconds)		
	@ 60.0 psf (positive)	0.02"	0.11" max.
	@ 60.0 psf (negative)	<0.01"	0.11" max.

Test Results: (Continued)

Paragraph	Title of Test - Test Method	Results	Allowed
2.2.2.5.2	Deglazing Test (ASTM E 987-88) In operating direction at 70 lbs		
	Exterior sash top rail	0.22"/44%	0.50"/100%
	Exterior sash meeting rail	0.19"/38%	0.50"/100%
	Interior sash meeting rail	0.21"/42%	0.50"/100%
	Interior sash bottom rail	0.29"/58%	0.50"/100%
	In remaining direction at 50 lbs		
	Exterior sash left stile	0.13"/26%	0.50"/100%
	Exterior sash right stile	0.12"/24%	0.50"/100%
	Interior sash right stile	0.13"/26%	0.50"/100%
	Interior sash left stile	0.14"/28%	0.50"/100%
2.1.8	Forced Entry Resistance (ASTM F 588-97)		
	Type: A Grade: 10		
	Lock Manipulation Test	No entry	No entry
	Test A1 thru A7	No entry	No entry
	Lock Manipulation Test	No entry	No entry
Optional Performance			
4.3	Water Resistance (ASTM E 330-00 and ASTM E 547-00) WTP = 9.0 psf	No leakage	No leakage

Test Specimen #2: H-AW45 60 x 96 (three locks)

4.4.1	Uniform Load Deflection (ASTM E 330-97) (Measurements reported were taken on the exterior meeting rail) (Loads were held for 27 seconds)		
	@ 45.0 psf (positive)	0.29"	0.31" max.
	@ 45.0 psf (negative)	0.31"	0.31" max.
4.4.2	Uniform Load Structural (ASTM E 330-97) (Measurements reported were taken on the exterior meeting rail) (Loads were held for 10 seconds)		
	@ 67.5 psf (positive)	0.03"	0.11" max.
	@ 67.5 psf (negative)	0.01"	0.11" max.

Detailed drawings, representative samples of the test specimen, and a copy of this report will be retained by ATI for a period of four years. The above results were secured by using the designated test methods and they indicate compliance with the performance requirements of the above referenced specification. This report does not constitute certification of this product, which may only be granted by the certification program administrator. This report may not be reproduced except in full without the approval of Architectural Testing.

For ARCHITECTURAL TESTING, INC:

Digitally Signed by: Scott Gill

Scott Gill
Technician

Digitally Signed for: David A. Kranz by Vicki L. McElwain

David A. Kranz
Director - Product/Physical Testing

SG:baw
01-42054.06

Architectural Testing

DOCUMENT CONTROL ADDENDUM #01-42054.00

Current Issue Date: 10/31/02

Report No.: 01-42054.01

Requested by: Paul Greenstein, Mannix
Purpose: AAMA/NWWDA 101/I.S.2-97 testing on a Series/Model 1600, aluminum double hung window to AW performance requirements
Issued Date: 07/18/02
Comments: Certification copy to John Smith at Associated Laboratories, Inc.

Report No.: 01-42054.02

Requested by: Bob Ris, Mannix
Purpose: Revision to Report No. 01-42054.01.
Issued Date: 08/15/02
Comments: Corrected the fastener size on page 2.

Report No.: 01-42054.03

Requested by: Bob Ris, Mannix
Purpose: Added optional performance window using additional lock set.
Issued Date: 10/09/02
Comments: Certification copy to John Smith at Associated Laboratories, Inc.

Report No.: 01-42054.04

Requested by: Bob Ris, Mannix
Purpose: Issue: Heavy Commercial (HC) test report.
Issued Date: 10/17/02
Comments: Certification copy to John Smith at Associated Laboratories, Inc.

Report No.: 01-42054.05

Requested by: Bob Ris, Mannix
Purpose: Performance test on two Series/Model 1600, aluminum double hung windows.
Issued Date: 10/17/02
Comments:

Architectural Testing

DOCUMENT CONTROL ADDENDUM #01-42054.00

(Continued)

Report No.: 01-42054.06

Requested by: Bob Ris, Mannix
Purpose: Reporting Optional AW results.
Issued Date: 10/31/02
Comments: