Architectural Testing

AAMA/WDMA/CSA 101/I.S.2/A440-08 AND
AAMA/WDMA/CSA 101/I.S.2/A440-05

TEST REPORT

Rendered to:

UNITED STATES ALUMINUM CORPORATION - CAROLINA

SERIES/MODEL: 8000
PRODUCT TYPE: Thermally Broken Aluminum Single Hung Window

Title	Summary of Results
AAMA/WDMA/CSA 101/I.S.2/A440-08	Class CW-PG60 1422 x 2313 (56 x 91)-H
AAMA/WDMA/CSA 101/I.S.2/A440-05	H-C60 1422 x 2313 (56 x 91)
Design Pressure	±2880 Pa (±60.15 psf)
Operating Force (in motion)	178 N (40.0 lbf)
Air Infiltration @ 75 Pa (1.57 psf)	0.56 L/s/m^2 (0.11 cfm/ft^2)
Air Infiltration @ 300 Pa (6.27 psf)	1.32 L/s/m^2 (0.26 cfm/ft^2)
Water Penetration Resistance Test Pressure	580 Pa (12.11 psf)
Uniform Load Structural Test Pressure	±4320 Pa (±90.23 psf)
Forced Entry Resistance	ASTM F 588 – Grade 10

Test Completion Date: 04/29/10

Reference must be made to Report No. A0552.01-301-44, dated 05/18/10 for complete test specimen description and data.

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AAMA/WDMA/CSA 101/I.S.2/A440-08 AND AAMA/WDMA/CSA 101/I.S.2/A440-05 TEST REPORT

Rendered to:

UNITED STATES ALUMINUM CORPORATION - CAROLINA
720 Cel-River Road
Rock Hill, South Carolina 29730

Report No.:	A0552.01-301-44
Test Dates:	04/28/10
Through:	04/29/10
Report Date:	05/18/10
Test Record Retention Date:	04/29/14

Project Summary: Architectural Testing, Inc. was contracted by United States Aluminum Corporation – Carolina to perform testing on a Series/Model 8000, thermally broken aluminum single hung window. The sample tested successfully met the performance requirements for an AAMA/WDMA/CSA 101/I.S.2/A440-08, Class CW-PG60 1422 x 2313 (56 x 91)-H and AAMA/WDMA/CSA 101/I.S.2/A440-05, H-C60 1422 x 2313 (56 x 91) rating. Test specimen description and results are reported herein. The sample was provided by the client.

Test Specification: The test specimen was evaluated in accordance with the following:

AAMA/WDMA/CSA 101/I.S.2/A440-08, *NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.*

AAMA/WDMA/CSA 101/I.S.2/A440-05, *Standard/Specification for Windows, Doors, and Unit Skylights.*

Test Specimen Description:

Series/Model: 8000

Product Type: Aluminum Single Hung

Overall Size: 1422 mm (56") wide by 2313 mm (91-1/16") high

Daylite Opening Size: 1307 mm (51-7/16") wide by 1016 mm (40") high

Sash Size: 1385 mm (54-1/2") wide by 1161 mm (45-11/16") high

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Test Specimen Description: (Continued)

Screen Size: 1375 mm (54-1/2") wide by 1120 mm (45-11/16") high

Overall Area: 3.29 m^2 (35.40 ft^2)

Finish: All aluminum was mill finished.

Frame Construction: All members were constructed of extruded aluminum. The corners were coped and secured with two #8 x 1" Phillips pan head screws. The screw heads and corners were sealed with seam sealer. The exterior meeting stile was secured using two #8 x 1-1/4" Phillips hex head screws at each end. The screw heads and exterior meeting stile were sealed with seam sealer. PVC isolators were utilized on each member of the frame. PVC guides were utilized at each jamb and the sill. The corners were sealed with seam sealer. The frame was thermally broken, poured and debridged 0.257" and 0.166" at the exterior meeting stile. The debriding was skipped in a 2-4" section 15-18" on center at the head, sill and jambs.

Sash Construction: All members were constructed of extruded aluminum. The top corners were coped and secured using two #8 x 1" Phillips pan head screws each. The bottom corners were secured with four #8 x 1" Phillips pan head screws through sash clip (part #BL517). The corners were sealed with seam sealer. Each pull hand was capped on each end with a sash pull end cap (part #WH803). The sash was thermally broken, poured and debridged 0.251" at the stiles and bottom rail and 0.300" at the meeting rail. The debriding was skipped in a 2-3" section 18" on center on the stiles and bottom rail.

Weatherstripping:

Description	Quantity	Location
0.270" tall x 0.250" backed tri-fin polypile	1 Row	Jambs, exterior meeting rail, meeting rail PVC isolators.
0.270" tall x 0.250" backed tri-fin polypile	2 Row	Sill.

Glazing Details: The window utilized 1" thick overall sealed insulating glass. The insulating glass was comprised of two 1/4" thick clear tempered sheets with a U-shaped coated steel dual seal (CU-D) spacer system. The glass was exterior glazed onto gasket (part #NP811) and secured with a snap-in extruded aluminum glazing bead with gasket. The corners of the gaskets were sealed with Schnee –Morehead 5504. The corners of the glazing bead were sealed with seam sealer

Test Specimen Description: (Continued)

Drainage:

Description	Quantity	Location
1-3/4" x 1/4" oval weephole (1-3/8 x 3/16" effective)	2	2-11/16" from each end in outter sill leg.
1/4" round weephole	2	3-3/4" from each in bottom rail through thermal break.

Hardware:

Description	Quantity	Location
Sash cap (part #WH804)	2	Each end on top rail of meeting rail secured with one #8 x 1/2" Phillips pan head screw each.
Sash balance retainer (part #WH806)	2	Each end on bottom rail secured with two #8 x 3/4" Phillips pan head screws.
Balance clip (part #BL517)	2	Bottom of each stile secured with four #8 x 1" Phillips pan head screws.
Spiral balance (part #K46115W)	2	Each jamb secured with one #8 x 1-1/4" Phillips hex head screw. The screw was sealed at the exterior with seam sealer.
Latch (part #SH857 / SH858 / WH829)	2	12" from each end on bottom rail secured with two 8-32 x 1/4" Phillips flat head screws. The heads of the screws were sealed with seam sealer.

Reinforcement: No reinforcement was utilized.

Screen Construction: All members were constructed of extruded aluminum. The corners were mitered and attached with metal corner keys crimped in place. The fiberglass mesh cloth was held-in-place using a hollow vinyl spline. Two pull tabs and two spring retainers were employed.

Test Specimen Description: (Continued)

Installation: The window was installed into a 2 x 10 test buck constructed of Douglas Fir No. 2 lumber. The nailing fin was set against the test buck and secured using #6 x 1-5/8" drywall screws located 3" from each corner and 6" on center. The rough opening was 13/16" wider and taller than the window. The nailing fin was sealed to the test buck with silicone.

Test Results: The temperature during testing was 21°C (70°F). The results are tabulated as follows:

Paragraph	Title of Test - Test Method	Results	Allowed
5.3.1	Operating Force per ASTM E 2068		
	Open		
	Initiate motion	93 N (21.0 lbf)	Report Only
	Maintain motion	86 N (19.3 lbf)	200 N (45.0 lbf)
	Right Lock	13 N (3.0 lbf)	100 N (22.5 lbf)
	Left Lock	13 N (3.0 lbf)	100 N (22.5 lbf)
	Close		
	Initiate motion	81 N (18.3 lbf)	Report Only
	Maintain motion	178 N (40.0 lbf)	200 N (45.0 lbf)
	Right Lock	N/A	100 N (22.5 lbf)
	Left Lock	N/A	100 N (22.5 lbf)
5.3.2.1	Air Leakage Resistance per ASTM E 283		
	75 Pa (1.57 psf)	0.56 L/s/m^2 (0.11 cfm/ft^2)	1.5 L/s/m^2 (0.3 cfm/ft^2) max.
	300 Pa (6.27 psf)	1.32 L/s/m^2 (0.26 cfm/ft^2)	N/A

***Note #1**: The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440 for air leakage resistance.*

5.3.3.2	Water Penetration Resistance per ASTM E 547 and E 331	See Note #2

***Note #2**: The client opted to start at a pressure higher than the minimum required. Those results are listed under "Optional Performance".*

5.3.4.2	Uniform Load Deflection per ASTM E 330	See Note #2
5.3.4.3	Uniform Load Structural per ASTM E 330	See Note #2

Test Results: (Continued)

Paragraph	Title of Test - Test Method	Results	Allowed
5.3.5	Forced Entry Resistance per ASTM F 588 Type: A	Grade: 10	
	Disassembly Test	No entry	No entry
	Test A1	No entry	No entry
	Test A2	No entry	No entry
	Test A3	No entry	No entry
	Test A4	No entry	No entry
	Test A5	No entry	No entry
	Test A7	No entry	No entry
	Sash Manipulation Test	No entry	No entry
	Lock Hardware Manipulation Test	No entry	No entry
5.3.6.3	Deglazing Test In operating direction - 320 N (71.94 lbf)		
	Top Rail	1.8 mm (0.07")	22.9 mm (0.90")
	Bottom Rail	2.0 mm (0.08")	22.9 mm (0.90")
	In remaining direction - 230 N (51.71 lbf)		
	Left Stile	2.3 mm (0.09")	22.9 mm (0.90")
	Right Stile	2.3 mm (0.09")	22.9 mm (0.90")
Optional Performance			
4.3.2.1	Water Penetration Resistance per ASTM E 547 and E 331 (with and without insect screen) 580 Pa (12.11 psf)	No leakage	No leakage
4.3.2.1	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the exterior meeting stile.) (Loads were held for 10 seconds)		
	2880 Pa (60.15 psf) (positive)	4.0 mm (0.16")	7.9 mm (0.31") See Note #3
	2880 Pa (60.15 psf) (negative)	4.3 mm (0.17")	7.9 mm (0.31") See Note #3

***Note #3**: The deflections reported are not limited by AAMA/WDMA/CSA 101/I.S.2/A440-05 for this product designation. The deflection data is recorded in this report for special code compliance and information only.*

Test Results: (Continued)

Paragraph	Title of Test - Test Method	Results	Allowed
	Optional Performance: (Continued)		
4.3.2.1	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the exterior meeting stile.) (Loads were held for 10 seconds)		
	4320 Pa (90.23 psf) (positive)	0.0 mm (0.00")	4.1 mm (0.16") max.
	4320 Pa (90.23 psf) (negative)	0.3 mm (0.01")	4.1 mm (0.16") max.

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.

Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen reported herein.

List of Official Observers:

Name	Company
Terry Hopgood	United States Aluminum Corporation-Carolina
John Frey	United States Aluminum Corporation-Carolina
Dennis Janzen	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 four 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. If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen can be made. 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 specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Digitally Signed for: Dennis Janzen by Marisela Saavedra

Dennis Janzen
Technician

Digitally Signed for: Kenny C. White by Marisela Saavedra

Kenny C. White
Laboratory Manager

JO:he

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Alteration Addendum (1)
- Appendix-B: Test Equipment (1)
- Appendix-C: Drawings (19)