



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

Rendered to:

MASTER ALUMINUM WINDOW AND DOOR

PRODUCT TYPE: Hopper Window

Title	Summary of Results
Primary Product Designator	AP-C75 1219 x 822 (48 x 32)
Design Pressure	±3600 Pa (±75.24 psf)
Operating Force (in motion)	58 N (13 lbf)
Air Infiltration	<0.1 L/s/m ² (<0.01 cfm/ft ²)
Water Penetration Resistance Test Pressure	580 Pa (12.12 psf)
Uniform Load Structural Test Pressure	+5400 Pa (+112.85 psf) -5760 Pa (-120.38 psf)
Forced Entry Resistance	Grade 10

Test Completion Date: 08/20/08

Reference must be made to Report No. 84727.01-109-44, dated 09/26/08 for complete test specimen description and data.

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Architectural Testing

AAMA/WDMA/CSA 101/1.S.2/A440-05 TEST REPORT

Rendered to:

MASTER ALUMINUM WINDOW AND DOOR

199 Starr Street
Brooklyn, New York 11237

Report No.: 84727.01-109-44
Test Dates: 08/18/08
Through: 08/20/08
Report Date: 09/26/08
Expiration Date: 08/20/12

Project Summary: Architectural Testing, Inc. was contracted by Master Aluminum Window and Door to perform testing on a hopper window. The sample tested successfully met the performance requirements for an AP-C75 1219 x 822 (48 x 32) 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 AAMA/WDMA/CSA 101/1.S.2/A440-05, *Standard/Specification for Windows, Doors, and Unit Skylights*.

Test Specimen Description:

Product Type: Hopper Window

Overall Size: 1219 mm (48") wide by 822 mm (32-3/8") high

Vent Size: 1175 mm (46-1/4") wide by 772 mm (30-3/8") high

Overall Area: 1.0 m² (10.79 ft²)

Finish: All aluminum was anodized.

Frame Construction: The frame was constructed of poured and debrided, thermally improved extruded aluminum members. The corners were mitered, keyed and staked, welded, and sealed with butyl.

Test Specimen Description: (Continued)

Vent Construction: The vent was constructed of poured and debridged, thermally improved extruded aluminum members. The corners were mitered, keyed and staked, welded, and sealed with butyl.

Weatherstripping:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
0.187" backed by 3/16" diameter hollow vinyl bulb	1 Row	Jamb, head, sill, and all vent stiles and rails

Glazing Details: The unit was glazed with 1" thick, insulating glass constructed of two sheets of 1/4" thick, annealed glass and an aluminum box spacer system that utilized a desiccant filler. The unit was interior glazed against butyl with an exterior silicone cap bead. The unit was secured with snap-in glazing beads constructed of extruded aluminum with a rubber gasket against the glass and a silicone cap bead.

Drainage: No drainage was utilized.

Hardware:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
Cam handles	2	Bottom rail 6-1/2" from each end
4-bar hinge	2	Each jamb at head

Reinforcement: No reinforcement was utilized.

Installation: The unit was installed into a 2x6 Spruce-Pine-Fir wood buck. The unit was secured with interior and exterior 1" by 1" wood blind stops which were secured to the buck using #8 x 3" long drywall screws, located 2" from each end and spaced 12" on center. The exterior perimeter was sealed with silicone.



Test Results: The temperature during testing was 23°C (74°F). The results are tabulated as follows:

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
5.3.1	Operating Force per ASTM E 2068		
	Initiate motion	36 N (8 lbf)	156 N (35 lbf)
	Maintain motion	58 N (13 lbf)	135 N (30 lbf)
	Locks	36 N (8 lbf)	100 N (22.5 lbf)
5.3.2.1	Air Leakage Resistance per ASTM E 283		
	75 Pa (1.6 psf)	<0.1 L/s/m ² (<0.01 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²) max.
<i>Note #1: The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-05 for air leakage resistance.</i>			
5.3.3.2	Water Penetration Resistance per ASTM E 547	220 Pa (4.60 psf)	No leakage
5.3.4.2	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the top rail between the latches) (Loads were held for 10 seconds)	1440 Pa (30.09 psf) (positive) 1440 Pa (30.09 psf) (negative)	0.3 mm (0.01") <0.3 mm (<0.01") See Note #2 See Note #2
<i>Note #2: 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.</i>			
5.3.4.3	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the top rail between the latches) (Loads were held for 10 seconds)	2160 Pa (45.14 psf) (positive) 2160 Pa (45.14 psf) (negative)	<0.3 mm (<0.01") <0.3 mm (<0.01") 4.3 mm (0.09") max. 4.3 mm (0.09") max.

Test Results: (Continued)

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
5.3.5	Forced Entry Resistance per ASTM F 588		
	Type: B	Grade: 10	
	Disassembly Test	No entry	No entry
	Test B1 through B3	No entry	No entry
	Sash/Panel Manipulation Test	No entry	No entry
	Lock Hardware Manipulation Test	No entry	No entry
5.3.6.6.7	Awning, Hopper, Projected Hardware Load Test 140 N (30 lbf)	2.0 mm (0.08")	34.8 mm (1.37")
<u>Optional Performance</u>			
4.4.2.6	Water Penetration Resistance per ASTM E 547 580 Pa (12.12 psf)	No leakage	No leakage
4.4.2.6	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the top rail between the latches) (Loads were held for 10 seconds)	0.8 mm (0.03") 0.5 mm (0.02")	See Note #2 See Note #2
4.4.2.6	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the top rail between the latches) (Loads were held for 10 seconds)	<0.3 mm (<0.01") 5400 Pa (112.85 psf) (positive) 5760 Pa (120.38 psf) (negative)	2.3 mm (0.09") max. 2.3 mm (0.09") 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

<u>Name</u>	<u>Company</u>
Penn Ku	Master Aluminum Window and Door
Michael D. Stremmel, P.E.	Architectural Testing, Inc.
Emily C. Riley	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. 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 by: Emily C. Riley

Emily C. Riley
Technician

ECR:dem



Digitally Signed by: Michael D. Stremmel

Michael D. Stremmel, P.E.
Senior Project Engineer

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

Appendix-A: Alteration Addendum (1)

Appendix-B: Drawings (6)