Architectural Testing

TEST REPORT

Report No.: C8847.01-109-47

Rendered to:

MI WINDOWS AND DOORS, LLC
Gratz, Pennsylvania

PRODUCT TYPE: Double Hung Window
SERIES/MODEL: 1650

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

Test Dates: 05/29/13
Through: 11/21/13
Revision 1: 05/13/14
Report Date: 12/05/13

Architectural Testing

Summary of Results

	Summary of Results
Title	**Test Specimen #1**
Primary Product Designator	Class R-PG25 1321 x 1524 (52 x 60)-H
Design Pressure	±1200 Pa (±25.06 psf)
Air Infiltration	0.9 L/s/m^2 (0.17 cfm/ft^2)
Water Penetration Resistance Test Pressure	260 Pa (5.43 psf)

	Summary of Results	
Title	**Test Specimen #2**	**Test Specimen #3**
Primary Product Designator	Class R-PG30 1219 x 1524* (48 x 60*)-H	Class R-PG30 1118 x 1829* (44 x 72*)-H
Design Pressure	±1440 Pa (±30.08 psf)	+1440 Pa (+30.08 psf)
Negative Design Pressure	N/A	-1680 Pa (-35.09 psf)
Air Infiltration	N/A	1.3 L/s/m^2 (0.25 cfm/ft^2*
Water Penetration Resistance Test Pressure	N/A	260 Pa (5.43 psf)*

Test Completion Date: 11/21/2013

Reference must be made to Report No. C8847.01-109-47, dated 05/13/14 for complete test specimen description and detailed test results. *Reference must be made to Report No. C8846.01-109-47 for Gateway results.

1.0 Report Issued To: MI Windows and Doors, LLC
P. O. Box 370
650 West Market Street
Gratz, Pennsylvania 17030-0370

2.0 Test Laboratory: Architectural Testing, Inc.
130 Derry Court
York, Pennsylvania 17406-8405
(717) 764-7700

3.0 Project Summary:

3.1 Product Type: Double Hung Window

3.2 Series/Model: 1650

3.2.1 This product also labeled under the following names: 1555 BMDH3 and NCDH3

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test method(s). The specimens tested successfully met the performance requirements for the following ratings: Test Specimen #1: **Class R-PG25 1321 x 1524 (52 x 60)-H**; Test Specimen #2: **Class R-PG30 1219 x 1524* (48 x 60*)-H;** Test Specimen #3: **Class R-PG30 1118 x 1829* (44 x 72*)-H**.

***General Note**: An asterisk (*) next to the size designation indicates that the size tested for optional performance was smaller than the Gateway test size for the product type and class.*

3.4 Test Dates: 05/29/2013 – 11/21/2013

3.5 Test Record Retention End Date: All test records for this report will be retained until November 21, 2017.

3.6 Test Location: MI Windows and Doors, LLC test facility in Gratz, Pennsylvania. Calibration of test equipment was performed by Architectural Testing in accordance with AAMA 205-01 "In-Plant Testing Guidelines for Manufacturers and Independent Laboratories".

3.7 Test Sample Source: The test specimens were provided by the client. Representative samples of the test specimen(s) will be retained by Architectural Testing for a minimum of four years from the test completion date.

3.8 Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Architectural Testing per the drawings on file with Architectural Testing. Any deviations are documented herein or on the drawings.

3.0 Project Summary: (Continued)

3.9 List of Official Observers:

Name	Company
Rick Sawdey	MI Windows and Doors, LLC
Jeremy R. Bender	Architectural Testing, Inc.
Aaron M. Shultz	Architectural Testing, Inc.

4.0 Test Specification(s):

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

5.0 Test Specimen Description:

5.1 Product Sizes:

Test Specimen #1:

Overall Area: 2.0 m^2 (21.7 ft^2)	**Width**		**Height**	
	millimeters	**inches**	**millimeters**	**inches**
Overall size	1321	52	1524	60
Exterior sash	1216	47-7/8	727	28-5/8
Interior sash	1235	48-5/8	743	29-1/4
Screen	1219	48	756	29-3/4

Test Specimen #2:

Overall Area: 1.9 m^2 (20.0 ft^2)	**Width**		**Height**	
	millimeters	**inches**	**millimeters**	**inches**
Overall size	1219	48	1524	60
Exterior sash	1114	43-7/8	727	28-5/8
Interior sash	1133	44-5/8	746	29-3/8
Screen	1118	44	759	29-7/8

5.0 Test Specimen Description: (Continued)

5.1 Product Sizes: (Continued)

Test Specimen #3:

Overall Area: 2.0 m^2 (22.0 ft^2)	**Width**		**Height**	
	millimeters	**inches**	**millimeters**	**inches**
Overall size	1118	44	1829	72
Exterior sash	1013	39-7/8	879	34-5/8
Interior sash	1032	40-5/8	899	35-3/8
Screen	1016	40	908	35-3/4

The following descriptions apply to all specimens.

5.2 Frame Construction:

Frame Member	**Material**	**Description**
Head, sill, and jambs	Vinyl	Extruded

	Joinery Type	**Detail**
All corners	Mitered	Thermally welded

5.3 Sash Construction:

Sash Member	**Material**	**Description**
Rails, stiles	Vinyl	Extruded

	Joinery Type	**Detail**
All corners	Mitered	Thermally welded

5.0 Test Specimen Description: (Continued)

5.4 Weatherstripping:

Description	Quantity	Location
0.187" backed by 0.240" high polypile with center fin	1 Row	Vertical sill leg, head, exterior sash top rail, interior meeting rail
0.187" backed by 0.240" high polypile with center fin	2 Rows	All sash stiles
0.187" backed by 0.160" high polypile with center fin	1 Row	Exterior meeting rail
7/8" by 1/2" by 0.400" high polypile pad	2	Each end of interior meeting rail
0.187" backed custom dual-leaf vinyl bulb seal	2 Rows	Interior sash bottom rail

5.5 Glazing: *No conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made.*

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
3/4" IG	Metal reinforced butyl spacer	3/32" annealed	3/32" annealed	The glass was set from the exterior against a bead of silicone and secured with vinyl snap-in glazing beads

Test Specimen #1:

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash daylight opening	1	1146 x 654	45-1/8 x 25-3/4	1/2"
Interior sash daylight opening	1	1146 x 654	45-1/8 x 25-3/4	1/2"

Test Specimen #2:

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash daylight opening	1	1041 x 654	41 x 25-3/4	1/2"
Interior sash daylight opening	1	1045 x 654	41-1/8 x 25-3/4	1/2"

5.0 Test Specimen Description: (Continued)

5.5 Glazing: (Continued)

Test Specimen #3:

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
3/4" IG	Metal reinforced butyl spacer	1/8" annealed	1/8" annealed	The glass was set from the exterior against a bead of silicone and secured with vinyl snap-in glazing beads

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash daylight opening	1	943 x 806	37-1/8 x 31-3/4	1/2"
Interior sash daylight opening	1	943 x 806	37-1/8 x 31-3/4	1/2"

5.6 Drainage:

Drainage Method	Size	Quantity	Location
Weepslot	1/2" long by 3/32" wide	4	2-1/2" from edge of each sash
Weepslot	1/2" long by 1/16" wide	2	2-1/2" from edge of interior sash bottom rail

5.7 Hardware:

Description	Quantity	Location
Plastic tilt latches (recessed)	4	Ends of top rail and interior meeting rail
Constant force balance	4	Two per jamb
Metal tilt pins	4	Ends of bottom rail and exterior meeting rail
Metal locks with adjacent keepers	2	7" from ends of interior meeting rail
Plastic night latches	2	Exterior sash stiles, 5" above the meeting rail

5.0 Test Specimen Description: (Continued)

5.8 Reinforcement:

Drawing Number	Location	Material
M-1911	Exterior meeting rail	Aluminum
RF-104S	Interior meeting rail	Roll-formed steel
GVL-450	Bottom rail of interior sash	Roll-formed steel

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Extruded aluminum	Mitered and keyed with a plastic key	Fiberglass	Flexible vinyl spline

6.0 Installation:

The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/4" shim space. The exterior perimeter of the window was sealed with sealant.

Location	Anchor Description	Anchor Location
Jambs	#8 x 2" long pan head screws	3-1/2" from each end through the jamb into the wood buck

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

Test Specimen #1:

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 178 N (40 lbf) Maintain motion: 807 N (18 lbf) Locks: 22 N (5 lbf)	Report Only 135 N (30 lbf) 100 N (22.5 lbf)	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.9 L/s/m^2 (0.17 cfm/ft^2)	1.5 L/s/m^2 (0.3 cfm/ft^2) max.	1

7.0 Test Results: (Continued)

Test Specimen #1: (Continued)

Title of Test	Results	Allowed	Note
Water Penetration, per ASTM E 547	N/A	N/A	3
Uniform Load Deflection, per ASTM E 330	N/A	N/A	3
Uniform Load Structural, per ASTM E 330	N/A	N/A	3
Forced Entry Resistance, per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
Thermoplastic Corner Weld	Pass	Meets as stated	
Deglazing, per ASTM E 987 Operating direction, 320 N (70 lbf) Remaining direction, 230 N (50 lbf)	Pass Pass	Meets as stated Meets as stated	
Optional Performance			
Water Penetration, per ASTM E 547 at 260 Pa (5.43 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 taken at meeting rail +1200 Pa (+25.06 psf) -1200 Pa (-25.06 psf)	21.6 mm (0.85") 23.4 mm (0.92")	Report Only	4, 5, 6
Uniform Load Structural, per ASTM E 330 taken at meeting rail +1800 Pa (+37.59 psf) -1800 Pa (-37.59 psf)	3.6 mm (0.14") 4.8 mm (0.19")	4.8 mm (0.19") max. 4.8 mm (0.19") max.	5, 6

7.0 Test Results: (Continued)

Test Specimen #2:

Title of Test	Results	Allowed	Note
Optional Performance			
Uniform Load Deflection, per ASTM E 330 taken at meeting rail +1440 Pa (+30.08 psf) -1440 Pa (-30.08 psf)	 16.5 mm (0.65") 16.8 mm (0.66")	 Report Only	 4, 5, 6
Uniform Load Structural, per ASTM E 330 taken at meeting rail +2160 Pa (+45.11 psf) -2160 Pa (-45.11 psf)	 2.8 mm (0.11") 2.5 mm (0.10")	 4.3 mm (0.17") max. 4.3 mm (0.17") max.	 5, 6

Test Specimen #3:

Title of Test	Results	Allowed	Note
Optional Performance			
Uniform Load Deflection, per ASTM E 330 taken at meeting rail +1440 Pa (+30.08 psf) -1680 Pa (-35.09 psf)	 10.9 mm (0.43") 15.0 mm (0.59")	 Report Only	 4, 5, 6, 7
Uniform Load Structural, per ASTM E 330 taken at meeting rail +2160 Pa (+45.11 psf) -2520 Pa (-52.63 psf)	 0.3 mm (0.01") 2.3 mm (0.09")	 4.1 mm (0.16") max. 4.1 mm (0.16") max.	 5, 6, 7

7.0 Test Results: (Continued)

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.

Note 2: With and without insect screen.

Note 3: The client opted to start at a pressure higher than the minimum required. Test results are reported under Optional Performance.

Note 4: The deflections reported are not limited by AAMA/WDMA/CSA 101/I.S.2/A440 for this product designation. The deflection data is recorded in this report for special code compliance and information only.

Note 5: Loads were held for 10 seconds.

Note 6: 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.

Note 7: Reference Architectural Testing, Inc. test report C8846.01-109-47 dated October 24, 2013 for specimen #3 complete Gateway test specimen description and test results.

Architectural Testing will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period.

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: Jeremy R. Bender

Jeremy R. Bender
Technician

Digitally Signed by: Michael D. Stremmel

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

JRB:asm

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Alteration Addendum (1)
Appendix-B: Complete drawings packet on file with Architectural Testing, Inc.

Revision Log

Rev. #	Date	Page(s)	Revision(s)
1	05/13/14	Summary pages, Page 1	Changed test completion date from 06/11/2013 to 11/21/2013
		Page 1	Changed Test Record Retention End Date from June 11, 2017 to November 21, 2017

Appendix A

Alteration Addendum

***Note**: No alterations were required.*

Appendix B

Drawings

***Note**: Complete drawings packet on file with Architectural Testing, Inc.*