

TEST REPORT

Report No.: B7962.01-109-47

Rendered to:

MI WINDOWS AND DOORS, INC.
Gratz, Pennsylvania

PRODUCT TYPE: PVC 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*

Title	Summary of Results	
	Test Specimen #1	Test Specimen #2
Primary Product Designator	Class R-PG40 914 x 1880* (36 x 74*)-H	Class R-PG40 914 x 1524* (36 x 60*)-H
Design Pressure	+1920 Pa (+40.10 psf)	+2400 Pa (+50.13 psf)
Negative Design Pressure	-2400 Pa (-50.13 psf)	-2640 Pa (-55.14 psf)
Air Infiltration	1.0 L/s/m ² (0.19 cfm/ft ²)	N/A
Water Penetration Resistance Test Pressure	290 Pa (6.06 psf)	N/A

Test Completion Date: 03/26/2012

Reference must be made to Report No. B7962.01-109-47, dated 04/26/12 for complete test specimen description and detailed test results. Reference Architectural Testing, Inc. Report No. A4773.01-109-47 dated 01/06/11 for complete *Gateway* test specimen description and test results.



1.0 Report Issued To: MI Windows and Doors, Inc.
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: PVC 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-PG40 914 x 1880* (36 x 74*)-H**; Test Specimen #2: **Class R-PG40 914 x 1524* (36 x 60*)-H**. Reference Architectural Testing, Inc. Report No. A4773.01-109-47, dated 01/06/11 for complete *Gateway* test specimen description and test results.

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: 03/21/2012 - 03/26/2012

3.5 Test Record Retention End Date: All test records for this report will be retained until April 26, 2016.

3.6 Test Location: MI Windows and Door, Inc. 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 report 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:

<u>Name</u>	<u>Company</u>
Rick Sawdey	MI Windows and Doors, Inc.
Jeremy R. Bender	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: 1.7 m ² (18.5 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	914	36	1880	74
Exterior sash	811	31-15/16	903	35-9/16
Interior sash	827	32-9/16	919	36-3/16
Screen	814	32-1/16	902	35-1/2

Test Specimen #2:

Overall Area: 1.4 m ² (15.0 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	914	36	1524	60
Exterior sash	813	32	727	28-5/8
Interior sash	829	32-5/8	741	29-3/16

The following descriptions apply to all specimens.

5.2 Frame Construction:

Frame Member	Material	Description
Head, sill, and jambs	PVC	Extruded

**5.0 Test Specimen Description:** (Continued)**5.2 Frame Construction:** (Continued)

	Joinery Type	Detail
All corners	Mitered	Thermally welded

5.3 Sash Construction:

Sash Member	Material	Other
Top rail, bottom rail, and stiles	PVC	Extruded

	Joinery Type	Detail
All corners	Mitered	Thermally welded

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 0.160" high polypile with center fin	1 Row	Exterior meeting rail
0.187" backed by 0.240" high polypile with center fin	2 Rows	All sash stiles
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	3/32" clear annealed	3/32" clear annealed	The glass was exterior glazed onto double-sided adhesive tape and secured with snap-in PVC glazing beads

**5.0 Test Specimen Description:** (Continued)**5.5 Glazing:** (Continued)**Test Specimen #1:**

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash daylight opening	1	740 x 832	29-1/8 x 32-3/4	1/2"
Interior sash daylight opening	1	737 x 826	29 x 32-1/2	1/2"

Test Specimen #2:

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash daylight opening	1	740 x 654	29-1/8 x 25-3/4	1/2"
Interior sash daylight opening	1	737 x 648	29 x 25-1/2	1/2"

5.6 Drainage: A sloped sill was utilized.

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 lock with adjacent keeper	2	7" from ends of meeting rail



5.0 Test Specimen Description: (Continued)

5.8 Reinforcement:

Drawing Number	Location	Material
M-1911	Exterior meeting rail	Aluminum
RF-104S-020	Interior meeting rail	Roll-formed steel
GVL-450	Bottom rail	Roll-formed steel

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Extruded aluminum	Mitered and keyed with 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 1/8" shim space. The exterior perimeter of the window was sealed with sealant.

Location	Anchor Description	Anchor Location
Jambs	#8 x 2" long pan head screw	4" from corners and one midspan through the finless frame 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: 67 N (15 lbf)	Report Only	
	Maintain motion: 53 N (12 lbf)		
	Latches: 4 N (1 lbf)	135 N (30 lbf) max.	
	Locks: 9 N (2 lbf)	100 N (22.5 lbf) max.	



7.0 Test Results: (Continued)

Test Specimen #1: (Continued)

Title of Test	Results	Allowed	Note
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	1.0 L/s/m ² (0.19 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²) max.	1
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 290 Pa (6.06 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 taken at the meeting rail +1920 Pa (+40.10 psf) -2400 Pa (-50.13 psf)	6.6 mm (0.26") 10.7 mm (0.42")	Report Only	4, 5, 6
Uniform Load Structural, per ASTM E 330 taken at the meeting rail +2880 Pa (+60.15 psf) -3800 Pa (-75.19 psf)	1.3 mm (0.05") 1.5 mm (0.06")	3.3 mm (0.13") max. 3.3 mm (0.13") max.	5, 6



7.0 Test Results: (Continued)

Test Specimen #2:

Title of Test	Results	Allowed	Note
Uniform Load Deflection, per ASTM E 330	N/A	N/A	3
Uniform Load Structural, per ASTM E 330	N/A	N/A	3
Optional Performance			
Uniform Load Deflection, per ASTM E 330 taken at the meeting rail +2400 Pa (+50.13 psf) -2640 Pa (-55.14 psf)	8.9 mm (0.35") 8.6 mm (0.34")	Report Only	4, 5, 6
Uniform Load Structural, per ASTM E 330 taken at the meeting rail +3600 Pa (+75.19 psf) -3960 Pa (-82.71 psf)	3.3 mm (0.13") 0.5 mm (0.02")	3.3 mm (0.13") max. 3.3 mm (0.13") max.	5, 6

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.



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.

Jeremy R. Bender
Technician

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

JRB:dem

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.



Architectural Testing

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Appendix A

Alteration Addendum

Note: No alterations were required.



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Appendix B

Drawings

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