



TEST REPORT

Report No.: E9328.01-109-47

Rendered to:

MI WINDOWS AND DOORS, LLC
Gratz, Pennsylvania

PRODUCT TYPE: Polyvinyl Chloride (PVC) Double Hung Window
SERIES/MODEL: 1650

SPECIFICATION(S): 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
AAMA/WDMA/CSA 101/I.S.2/A440-08	Class R-PG25 965 x 1956* (38 x 77)*-H	Class R-PG25 965 x 1956* (38 x 77)*-H
Design Pressure	+1200 Pa (+25.06 psf)	+1200 Pa (+25.06 psf)
Negative Design Pressure	-1440 Pa (-30.08 psf)	-1440 Pa (-30.08 psf)
Air Infiltration	1.1 L/s/m ² (0.21 cfm/ft ²)	N/A
Water Penetration Resistance Test Pressure	260 Pa (5.43 psf)	N/A

Test Completion Date: 07/28/15

Reference must be made to Report No. E9328.01-109-47, dated 08/26/15 for complete test specimen description and detailed test results. Reference Intertek-ATI Report No. C8846.01-109-47, dated 12/05/13 for complete *Gateway* test specimen description and test 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.,
an Intertek company ("Intertek-ATI")
130 Derry Court
York, Pennsylvania 17406-8405
717-764-7700

3.0 Project Summary:

3.1 Product Type: Polyvinyl Chloride (PVC) Double Hung Window

3.2 Series/Model: 1650

3.2.1 This product also labeled under the following names: 1555, 1655, 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(s)	Title	Summary of Results
1	101/I.S.2/A440-08	Class R-PG25 965 x 1956* (38 x 77)*-H
2	101/I.S.2/A440-08	Class R-PG25 965 x 1956* (38 x 77)*-H

Reference Intertek-ATI Report No. C8846.01-109-47, dated 12/05/13 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: 07/27/15 - 07/28/15

3.5 Test Record Retention End Date: All test records for this report will be retained until July 28, 2019.

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

3.7 Test Specimen Source: The test specimen(s) were provided by the client. Representative samples of the test specimen(s) will be retained by Intertek-ATI for a minimum of four years from the test completion date.

3.0 Project Summary: (Continued)

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

3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Rick Sawdey	MI Windows and Doors, LLC
Jeremy R. Bender	Intertek-ATI

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 Specimens #1 and #2:

Overall Area: 1.9 m ² (20.3 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	965	38	1956	77
Exterior sash	860	33-7/8	943	37-1/8
Interior sash	876	34-1/2	957	37-11/16
Screen	865	34-1/16	972	38-1/4

The following descriptions apply to all specimens.

5.2 Frame Construction:

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

	Joinery Type	Detail
All corners	Mitered	Thermally welded

5.0 Test Specimen Description: (Continued)

5.3 Sash Construction:

Sash Member	Material	Description
Rails 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, and 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 against silicone sealant and secured with snap-in PVC glazing beads.

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash daylight opening	1	787 x 868	31 x 34-3/16	1/2"
Interior sash daylight opening	1	764 x 868	30-1/16 x 34-3/16	1/2"

5.0 Test Specimen Description: (Continued)

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 the edge of each sash
Weepslot	1/2" long by 1/16" wide	2	2-1/2" from the edge of the interior sash bottom rail

5.7 Hardware:

Description	Quantity	Location
Plastic tilt latches (recessed)	4	Ends of the top rail and interior meeting rail
Constant force balance	4	Two per jamb
Metal tilt pins	4	Ends of the bottom rail and exterior meeting rail
Metal lock with adjacent keeper	2	7" from the ends of the interior meeting rail

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 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 1/8" shim space. The exterior perimeter of the window was sealed with sealant.

Test Specimen #1:

Location	Anchor Description	Anchor Location
Head, sill, and jambs	#6 x 1-5/8" screws	2" from the corners and spaced 8" to 10" on center, through the mounting fin into the wood buck

Test Specimen #2:

Location	Anchor Description	Anchor Location
Jambs	#8 x 2" long pan head screws	3" from each corner and one at midspan, through the frame 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: 58 N (13 lbf) Maintain motion: 98 N (22 lbf) Locks: 58 N (13 lbf)	Report only 155 N (35 lbf) max. 100 N (22.5 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	1.1 L/s/m ² (0.21 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	7
Thermoplastic Corner Weld	Pass	Meets as stated	7
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	7 7

7.0 Test Results: (Continued)

Test Specimen #1: (Continued)

Title of Test	Results	Allowed	Note
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 Deflections taken at meeting rail +1200 Pa (+25.06 psf) -1440 Pa (-30.08 psf)	6.1 mm (0.24") 7.4 mm (0.29")	Report only	4, 5, 6
Uniform Load Structural, per ASTM E 330 Permanent sets taken at meeting rail +1800 Pa (+37.59 psf) -2160 Pa (-45.11 psf)	0.3 mm (0.01") 0.5 mm (0.02")	3.0 mm (0.12") max. 3.0 mm (0.12") max.	5, 6

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 Deflections taken at meeting rail +1200 Pa (+25.06 psf) -1440 Pa (-30.08 psf)	4.3 mm (0.17") 6.4 mm (0.25")	Report only	4, 5, 6
Uniform Load Structural, per ASTM E 330 Permanent sets taken at meeting rail +1800 Pa (+37.59 psf) -2160 Pa (-45.11 psf)	<0.3 mm (<0.01") 0.5 mm (0.02")	3.0 mm (0.12") max. 3.0 mm (0.12") max.	5, 6

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 Intertek-ATI Report No. C8846.01-109-47, dated 12/05/13 for complete Gateway test specimen description and test results.

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

For ARCHITECTURAL TESTING, Inc.

Jeremy R. Bender
Senior Technician

Timothy J. McGill
Manager - Product Testing

JRB:asm

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

Appendix-A: Alteration Addendum (1)

Appendix-B: Location of Air Seal (1)

Appendix-C: Complete drawings packet on file with Intertek-ATI.

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
1	12/16/15	Cover page, page 1, page 8	Corrected Gateway report reference

This report produced from controlled document template ATI 00438, revised 06/27/14.

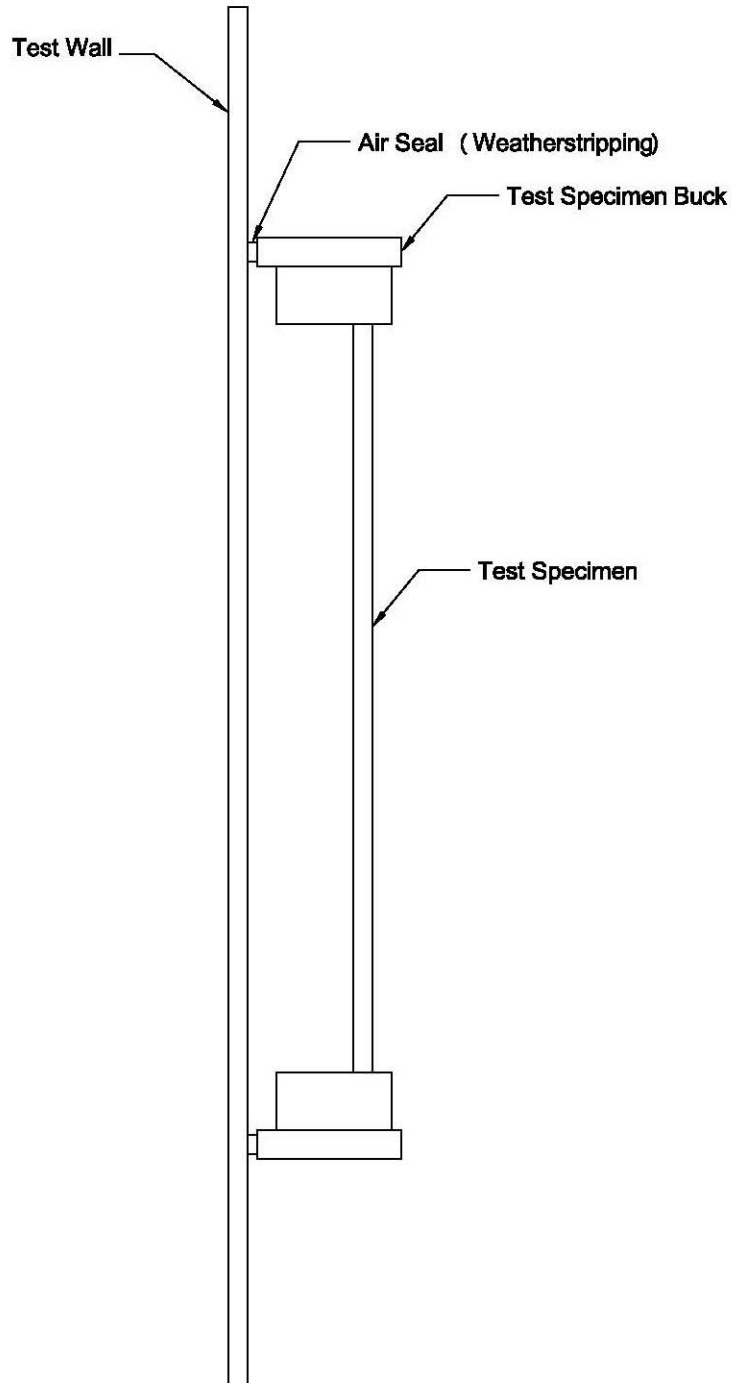
Appendix A

Alteration Addendum

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

Appendix B

Location of Air Seal: The air seal between the test specimen and the test wall is detailed below. The seal is made of foam weatherstripping and is attached to the edge of the test specimen buck. The test specimen buck is placed against the test wall and clamped in place, compressing the weatherstripping and creating a seal.



Appendix C

Drawing(s)

***Note:** Complete drawings packet on file with Intertek-ATI.*