



TEST REPORT

Report No.: G1516.03-109-47

Rendered to:

MI WINDOWS AND DOORS LLC
Gratz, Pennsylvania

PRODUCT TYPE: Polyvinyl Chloride (PVC) Single Hung Window
SERIES/MODEL: 1620

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 LC-PG50 1324 x 1905 (52 x 75)-H	Class LC-PG50 1207 x 2121 (48 x 84)-H
Design Pressure	±2400 Pa (±50.13 psf)	±2400 Pa (±50.13 psf)
Air Infiltration	0.5 L/s/m ² (0.09 cfm/ft ²)	0.4 L/s/m ² (0.08 cfm/ft ²)
Water Penetration Resistance Test Pressure	360 Pa (7.52 psf)	360 Pa (7.52 psf)

Test Completion Date: 10/14/16

Reference must be made to Report No. G1516.03-109-47, dated 10/27/16 for complete test specimen description and detailed test results.

1.0 Report Issued To: MI Windows and Doors, LLC
 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) Single Hung Window

3.2 Series/Model: 1620

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 LC-PG50 1324 x 1905 (52 x 75)-H
2	101/I.S.2/A440-08	Class LC-PG50 1207 x 2121 (48 x 84)-H

3.4 Test Dates: 10/11/16 - 10/14/16

3.5 Test Record Retention End Date: All test records for this report will be retained until October 14, 2020.

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 205-15 "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 two years from the test completion date.

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>
Richie Williard	MI Windows and Doors, LLC
Andrew P. Mehalick	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 Specimen #1:

Overall Area: 2.5 m ² (27.2 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1324	52-1/8	1905	75
Interior sash	1257	49-1/2	946	37-1/4
Screen	1235	48-5/8	921	36-1/4

Test Specimen #2:

Overall Area: 2.6 m ² (27.5 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1207	47-1/2	2121	83-1/2
Interior sash	1137	44-3/4	1056	41-9/16
Screen	1118	44	1029	40-1/2

The following descriptions apply to all specimens.

5.2 Frame Construction:

Frame Member	Material	Description
Head and sill	PVC	Extruded
Jambs	PVC	Extruded, the sash opening utilized two pieces of aluminum screen retainer (M-2341) with polypile on the sash pocket
Meeting rail	PVC	Extruded with aluminum reinforcement

	Joinery Type	Detail
Head, sill, and jambs	Mitered	Thermally welded
Meeting rail	Coped and butted	The ends of the meeting rail were secured to the jambs utilizing two #8 x 2-1/2" pan head screws through each jamb into the meeting rail.

5.0 Test Specimen Description: (Continued)

5.3 Sash Construction:

Sash Member	Material	Description
Bottom rail and stiles	PVC	Extruded
Top rail	PVC	Extruded with aluminum reinforcement

	Joinery Type	Detail
All corners	Mitered	Thermally welded

5.4 Weatherstripping:

Description	Quantity	Location
0.187" backed by 0.230" polypile with fin	1 row	Exterior face of sash pocket at the sill
0.187" backed by 0.270" polypile with fin	1 row	Interior face of the jamb reinforcement, the stiles of the sash, and the interlock at the top rail
0.200" backed by 0.190" polypile with fin	1 row	Interior face of the meeting rail and behind the interlock
0.187" backed by 0.250" polypile	1 row	Exterior face of the stiles
0.187" backed by 0.350" diameter bulb seal	1 row	Bottom sash lift rail, interior slot
0.187" backed by 0.450" diameter bulb seal	1 row	Bottom sash lift rail, exterior slot

5.0 Test Specimen Description: (Continued)

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	1/8" annealed glass	1/8" annealed glass	The unit was glazed from the exterior to the interior using silicone placed on the exterior face of glazing pocket. Glazing beads were used to secure the glass on the exterior of the unit.

Test Specimen #1

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Fixed daylight opening	1	1207 x 857	47-1/2 x 33-3/4	1/2"
Operable sash	1	1168 x 860	46 x 33-7/8	1/2"

Test Specimen #2

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Fixed daylight opening	1	1086 x 965	42-3/4 x 38	1/2"
Operable sash	1	1048 x 967	41-1/4 x 38-1/16	1/2"

5.6 Drainage:

Drainage Method	Size	Quantity	Location
Weepslot	3/16" wide by 1/2" long	2	1-5/8" from the corner of the bottom rail and stiles in the glazing pocket
Weepslot	1/16" wide by 1/2" long	2	Bottom of the bottom rail 2-1/4" from the corner
Weepslot	3/32" wide by 1/2" long	2	Bottom of the bottom rail 2-1/4" from the corner

5.0 Test Specimen Description: (Continued)

5.7 Hardware:

Description	Quantity	Location
Cam lock	2	Top rail of the sash, 7" from each corner
Tilt latch	2	Top rail of the sash at each corner
Coil balances	2	Sash pocket of the jambs

5.8 Reinforcement:

Drawing Number	Location	Material
M-2266	Stiles of the operable sash	Aluminum
M-2115	Top rail of the operable sash	Aluminum
AE-000162	Meeting rail	Aluminum

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Aluminum	Keyed	Fiberglass	Secured using a flexible vinyl spline

6.0 Installation:

The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for no shim space. The exterior perimeter of the window was sealed with silicone.

Location	Anchor Description	Anchor Location
Head, sill, and jambs	#6 x 1-5/8" flat head screws	Located 3" from each corner and spaced every 8" on center thereafter through the mounting fin, and into the wood buck

7.0 Test Results: The temperature during testing was 21°C (69°F). The results are tabulated as follows:

Test Specimen #1:

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 102 N (23 lbf) Maintain motion: 111 N (25 lbf) Latches: 18 N (4 lbf) Locks: 44 N (10 lbf)	Report only 180 N (40 lbf) max. 100 N (22.5 lbf) max. 100 N (22.5 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.5 L/s/m ² (0.09 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	

7.0 Test Results: (Continued)

Test Specimen #1: (Continued)

Title of Test	Results	Allowed	Note
Optional Performance			
Water Penetration, per ASTM E 547 at 360 Pa (7.52 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 Deflections taken at meeting rail +2400 Pa (+50.13 psf) -2400 Pa (-50.13 psf)	36.6 mm (1.44") 30.0 mm (1.18")	Report only	4, 5
Uniform Load Structural, per ASTM E 330 Permanent sets taken at meeting rail +3600 Pa (+75.19 psf) -3600 Pa (-75.19 psf)	4.3 mm (0.17") 1.8 mm (0.07")	4.8 mm (0.19") max. 4.8 mm (0.19") max.	4, 5

7.0 Test Results: (Continued)

Test Specimen #2:

Title of Test	Results	Allowed	Note
<p>Operating Force, per ASTM E 2068</p>	<p>Initiate motion: 107 N (24 lbf) Maintain motion: 116 N (26 lbf) Latches: 22 N (5 lbf) Locks: 49 N (11 lbf)</p>	<p>Report only 180 N (40 lbf) max. 100 N (22.5 lbf) max. 100 N (22.5 lbf) max.</p>	
<p>Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)</p>	<p>0.4 L/s/m² (0.08 cfm/ft²)</p>	<p>1.5 L/s/m² (0.3 cfm/ft²) max.</p>	<p>1</p>
<p>Water Penetration, per ASTM E 547</p>	<p>N/A</p>	<p>N/A</p>	<p>3</p>
<p>Uniform Load Deflection, per ASTM E 330</p>	<p>N/A</p>	<p>N/A</p>	<p>3</p>
<p>Uniform Load Structural, per ASTM E 330</p>	<p>N/A</p>	<p>N/A</p>	<p>3</p>
<p>Forced Entry Resistance, per ASTM F 588, Type: A - Grade: 10</p>	<p>Pass</p>	<p>No entry</p>	
<p>Thermoplastic Corner Weld</p>	<p>Pass</p>	<p>Meets as stated</p>	
<p>Deglazing, per ASTM E 987 Operating direction, 320 N (70 lbf) Remaining direction, 230 N (50 lbf)</p>	<p>Pass Pass</p>	<p>Meets as stated Meets as stated</p>	

7.0 Test Results: (Continued)**Test Specimen #2:** (Continued)

Title of Test	Results	Allowed	Note
Optional Performance			
Water Penetration, per ASTM E 547 at 360 Pa (7.52 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 Deflections taken at meeting rail +2400 Pa (+50.13 psf) -2400 Pa (-50.13 psf)	25.4 mm (1.00") 21.6 mm (0.85")	Report only	4, 5
Uniform Load Structural, per ASTM E 330 Permanent sets taken at meeting rail +3600 Pa (+75.19 psf) -3600 Pa (-75.19 psf)	2.8 mm (0.11") 1.5 mm (0.06")	4.3 mm (0.17") max. 4.3 mm (0.17") max.	4, 5

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: Loads were held for 10 seconds.

Note 5: 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.

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.

Andrew P. Mehalick
Technician

Timothy J. McGill
Manager – Product Testing

APM: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: Drawing(s) (0) Complete drawings packet on file with Intertek-ATI.

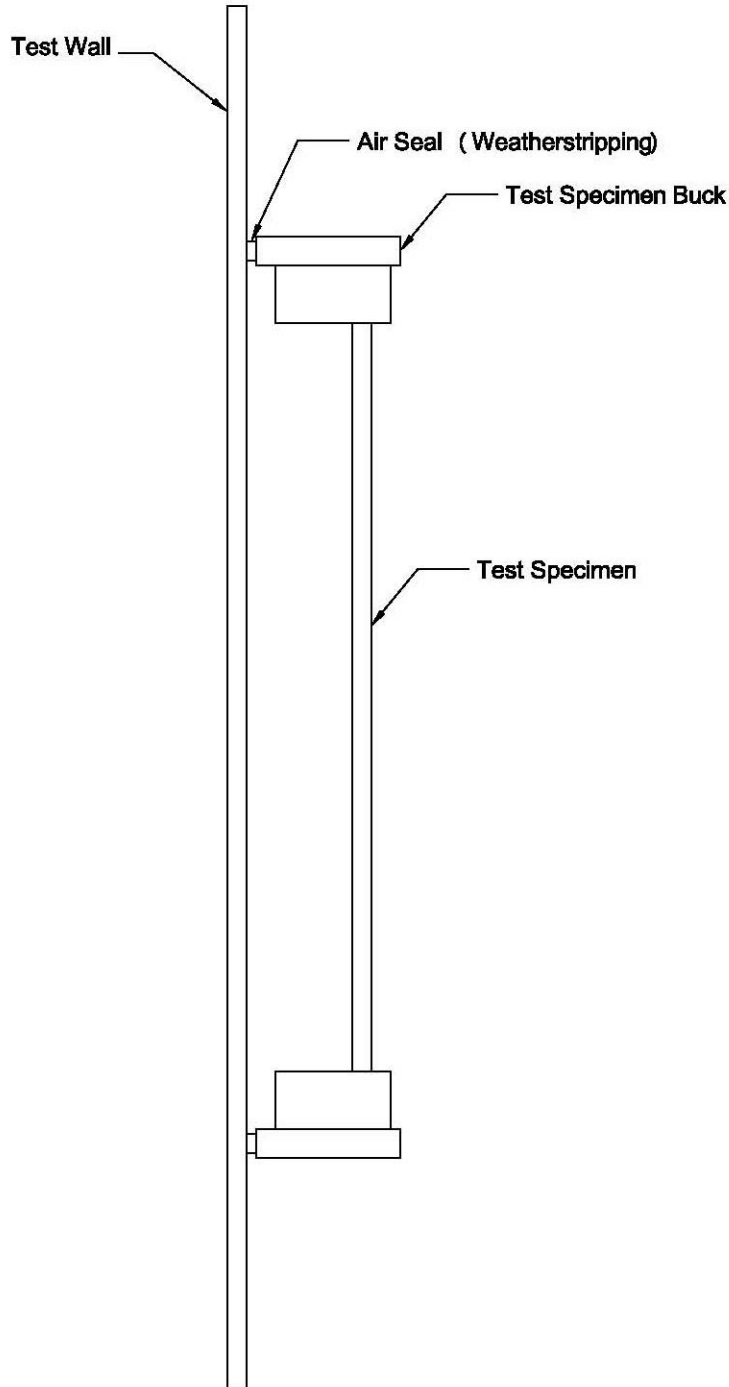
Appendix A

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.*