



## TEST REPORT

**Report No.:** G9386.01-109-47

**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/A440-11, *NAFS 2011 - 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/A440-11	Class LC-PG35 1219 x 2438 (48 x 96)-H	Class LC-PG35 1219 x 2438 (48 x 96)-H
Design Pressure	±2160 Pa (±45.11 psf)	±2160 Pa (±45.11 psf)
Air Infiltration	0.3 L/s/m <sup>2</sup> (0.05 cfm/ft <sup>2</sup> )	0.2 L/s/m <sup>2</sup> (0.04 cfm/ft <sup>2</sup> )
Water Penetration Resistance Test Pressure	260 Pa (5.43 psf)	260 Pa (5.43 psf)

**Test Completion Date:** 03/24/17

Reference must be made to Report No. G9386.01-109-47, dated 05/03/17 for complete test specimen description and detailed test results.

**1.0 Report Issued To:** MI Windows and Doors, LLC  
650 West Market Street  
P.O. Box 370  
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 (Fin)	101/I.S.2/A440-11	Class LC-PG35 1219 x 2438 (48 x 96)-H
2 (Finless)	101/I.S.2/A440-11	Class LC-PG35 1219 x 2438 (48 x 96)-H

**3.4 Test Date(s):** 03/20/17 - 03/24/17

**3.5 Test Record Retention End Date:** All test records for this report will be retained until March 24, 2021.

**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/A440-11, *NAFS 2011 - 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: 3.0 m <sup>2</sup> (32.0 ft <sup>2</sup> )	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1219	48	2438	96
Interior sash	1153	45-3/8	903	35-9/16
Screen	1130	44-1/2	873	34-3/8

*The following descriptions apply to all specimens.*

**5.2 Frame Construction:**

Frame Member	Material	Description
Head, sill, and jambs	PVC	Extruded
Screen retainer	Aluminum	Extruded

	Joinery Type	Detail
All corners	Coped and butted	Thermally welded
Screen retainer	Butted	The screen retainer was pressed onto the jamb.

**5.3 Sash Construction:**

Sash Member	Material	Description
Rails and stiles	PVC	Extruded

	Joinery Type	Detail
All corners	Mitered	Thermally welded

## 5.0 Test Specimen Description: (Continued)

### 5.4 Reinforcement:

Drawing Number	Location	Material
M-2266	Stiles	Aluminum
M-2115	Lock rail	Aluminum
AE-000162	Fixed meeting rail	Aluminum

### 5.5 Weatherstripping:

Description	Quantity	Location
0.187" backed, dual-finned, foam-filled hollow vinyl bulb	1 row	Bottom rail
0.187" backed, foam-filled, hollow vinyl bulb	1 row	Bottom rail
0.187" backed, 0.270" high polypile with fin	1 row	Stiles, top rail behind the interlock, sash pocket of the sill
0.187" backed, 0.210" high polypile with fin	1 row	Meeting rail behind the interlock and the face of the interlock
0.187" backed, 0.180" high polypile with fin	1 row	Screen retainer
5/8" by 7/8" by woolpile pad	2	One per corner of the top rail and stiles on the interior face

**5.6 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" clear annealed glass	1/8" clear annealed glass	Exterior glazed against a bead of silicone and secured in place using snap-in glazing beads on the exterior

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Sash daylight opening	1	1064 x 816	41-7/8 x 32-1/8	1/2"
Fixed daylight opening	1	1102 x 1435	43-3/8 x 56-1/2	1/2"

## 5.0 Test Specimen Description: (Continued)

### 5.7 Drainage:

Drainage Method	Size	Quantity	Location
Sloped sill	1-5/8" wide by 43" long	1	Sill
Weep notch	1-9/16" long	2	Corner of the sill and jambs
Weep notch	7/8" long	2	Corner of the sill and jambs
Weep notch	1-1/8" long	2	Corner of the sill and jambs
Weephole	3/16" diameter	2	3" from the stiles in the bottom rail

### 5.8 Hardware:

Description	Quantity	Location
Recessed metal cam lock	2	7" from the stiles on the interior meeting rail of the sash
Metal pivot bar	2 per sash	Located in the corners of the stiles and the bottom rail
Surface mount metal tilt latch	2 per sash	Located at the corners of the stiles and interior meeting rail
Metal coil balances	4 per jamb	Located within the sash track of the jamb

### 5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Aluminum	Keyed	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 silicone.

### Test Specimen #1:

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

### Test Specimen #2:

Location	Anchor Description	Anchor Location
Jambs	#8 x 2" pan head screws	Located 4" from the corners of the head and sill and spaced 18" on center through the jambs and into the wood buck.

**7.0 Test Results:** The temperature during testing was 19°C (67°F). The results are tabulated as follows:

**Test Specimen #1:**

Title of Test	Results	Allowed	Note
<b>Operating Force,</b> per ASTM E 2068	Initiate motion: 80 N (18 lbf) Maintain motion: 44 N (10 lbf) Latches: 9 N (2 lbf) Locks: 98 N (22 lbf)	Report only  180 N (40.47 lbf) max.  100 N (22.5 lbf) max.  100 N (22.5 lbf) max.	
<b>Air Leakage,</b> Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.3 L/s/m <sup>2</sup> (0.05 cfm/ft <sup>2</sup> )	1.5 L/s/m <sup>2</sup> (0.3 cfm/ft <sup>2</sup> ) max.	1, 2
<b>Water Penetration,</b> per ASTM E 547	N/A	N/A	5
<b>Uniform Load Deflection,</b> per ASTM E 330	N/A	N/A	5
<b>Uniform Load Structural,</b> per ASTM E 330	N/A	N/A	5
<b>Forced Entry Resistance,</b> per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
<b>Thermoplastic Corner Weld</b>	Pass	Meets as stated	
<b>Deglazing,</b> 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
<b>Optional Performance</b>			
<b>Water Penetration,</b> per ASTM E 547 at 260 Pa (5.43 psf)	Pass	No leakage	4
<b>Uniform Load Deflection,</b> per ASTM E 330 Deflections taken at meeting rail +2160 Pa (+45.11 psf) -2160 Pa (-45.11 psf)	24.9 mm (0.98") 23.4 mm (0.92")	Report only	6, 7, 8
<b>Uniform Load Structural,</b> per ASTM E 330 Permanent sets taken at meeting rail +3240 Pa (+67.67 psf) -3240 Pa (-67.67 psf)	2.8 mm (0.11") 1.8 mm (0.07")	4.3 mm (0.17") max. 4.3 mm (0.17") max.	7, 8



## 7.0 Test Results: (Continued)

### Test Specimen #2:

Title of Test	Results	Allowed	Note
<b>Operating Force,</b> per ASTM E 2068	Initiate motion: 98 N (22 lbf) Maintain motion: 53 N (12 lbf) Latches: 9 N (2 lbf) Locks: 93 N (21 lbf)	Report only  180 N (40.47 lbf) max.  100 N (22.5 lbf) max.  100 N (22.5 lbf) max.	
<b>Air Leakage,</b> Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.2 L/s/m <sup>2</sup> (0.04 cfm/ft <sup>2</sup> )	1.5 L/s/m <sup>2</sup> (0.3 cfm/ft <sup>2</sup> ) max.	1, 3
<b>Water Penetration,</b> per ASTM E 547	N/A	N/A	5
<b>Uniform Load Deflection,</b> per ASTM E 330	N/A	N/A	5
<b>Uniform Load Structural,</b> per ASTM E 330	N/A	N/A	5
<b>Forced Entry Resistance,</b> per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
<b>Thermoplastic Corner Weld</b>	Pass	Meets as stated	
<b>Deglazing,</b> 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 #2:** (Continued)

Title of Test	Results	Allowed	Note
<b>Optional Performance</b>			
<b>Water Penetration,</b> per ASTM E 547 at 260 Pa (5.43 psf)	Pass	No leakage	4
<b>Uniform Load Deflection,</b> per ASTM E 330 Deflections taken at meeting rail +2160 Pa (+45.11 psf) -2160 Pa (-45.11 psf)	23.6 mm (0.93") 22.6 mm (0.89")	Report only	6, 7, 8
<b>Uniform Load Structural,</b> per ASTM E 330 Permanent sets taken at meeting rail +3240 Pa (+67.67 psf) -3240 Pa (-67.67 psf)	0.8 mm (0.03") 1.8 mm (0.07")	4.3 mm (0.17") max. 4.3 mm (0.17") max.	7, 8

*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: Test Date 03/20/17 / Time: 1:15 PM*

*Note 3: Test Date 03/21/17 / Time: 7:30 AM*

*Note 4: With and without insect screen.*

*Note 5: The client opted to start at a pressure higher than the minimum required. Test results are reported under Optional Performance.*

*Note 6: 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 7: Loads were held for 10 seconds.*

*Note 8: 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.

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Andrew P. Mehalick  
Technician

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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.

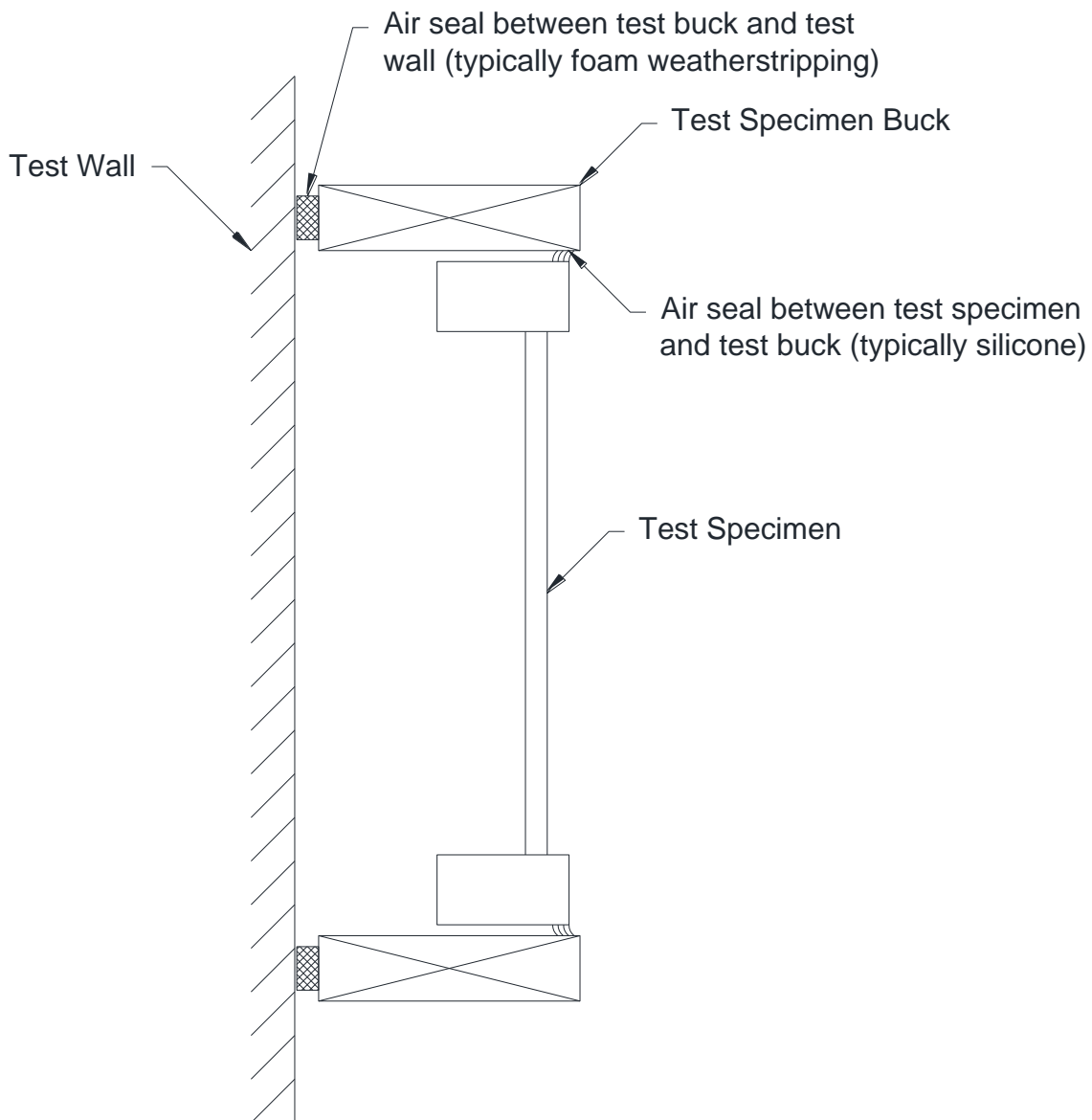
## **Appendix A**

### **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.*