



**Architectural Testing**

**TEST REPORT**

**Report No.:** E1729.01-109-47

**Rendered to:**

MI WINDOWS AND DOORS, LLC  
Gratz, Pennsylvania

**PRODUCT TYPE:** Aluminum Single Hung Window  
**SERIES/MODEL:** 185

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

**Test Date(s):** 10/07/14  
**Through:** 10/17/14  
**Revision 1:** 01/06/15  
**Report Date:** 10/31/14



Architectural Testing

**Summary of Results**

<b>Summary of Results</b>	
<b>Title</b>	<b>Test Specimen #1</b>
AAMA/WDMA/CSA 101/I.S.2/A440-08	Class R-PG60 914 x 2134* (36 x 84*)-H
Design Pressure	±2880 Pa (±60.15 psf)
Air Infiltration	0.5 L/s/m <sup>2</sup> (0.09 cfm/ft <sup>2</sup> )
Water Penetration Resistance Test Pressure	440 Pa (9.19 psf)

<b>Summary of Results</b>		
<b>Title</b>	<b>Test Specimen #2</b>	<b>Test Specimen #3</b>
AAMA/WDMA/CSA 101/I.S.2/A440-08	Class R-PG60 914 x 2134* (36 x 84*)-H	Class R-PG60 914 x 2134* (36 x 84*)-H
Design Pressure	±2880 Pa (±60.15 psf)	±2880 Pa (±60.15 psf)
Air Infiltration	N/A	N/A
Water Penetration Resistance Test Pressure	N/A	N/A

**Test Completion Date:** 10/17/14

Reference must be made to Report No. E1729.01-109-47, dated 01/06/15 for complete test specimen description and detailed test results. Reference Architectural Testing, Inc. Report No. E1730.01-109-47, dated 10/29/14 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.  
 130 Derry Court  
 York, Pennsylvania 17406-8405  
 717-764-7700

**3.0 Project Summary:**

**3.1 Product Type:** Aluminum Single Hung Window

**3.2 Series/Model:** 185

**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-PG60 914 x 2134* (36 x 84*)-H
2	101/I.S.2/A440-08	Class R-PG60 914 x 2134* (36 x 84*)-H
3	101/I.S.2/A440-08	Class R-PG60 914 x 2134* (36 x 84*)-H

Reference Architectural Testing, Inc. Report No. E1730.01-109-47, dated 10/29/14 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:** 10/07/14 - 10/17/14

**3.5 Test Record Retention End Date:** All test records for this report will be retained until October 17, 2018.

**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 Specimen Source:** The test specimen(s) 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.

### 3.0 Project Summary: (Continued)

**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.

### 3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Rick Sawdey	MI Windows and Doors, LLC
Jeremy R. Bender	Architectural Testing, Inc.

### 4.0 Test Specification(s):

AAMA/WDMA/CSA 101/IS.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 - #3:

Overall Area: 2.0 m <sup>2</sup> (21.0 ft <sup>2</sup> )	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	914	36	2134	84
Screen	873	34-3/8	895	35-1/4
Interior sash	876	34-1/2	914	36

## 5.0 Test Specimen Description: (Continued)

*The following descriptions apply to all specimens.*

### 5.2 Frame Construction:

Frame Member	Material	Description
Head, sill, and jambs	Aluminum	Extruded
Fixed meeting rail	Aluminum	Extruded

	Joinery Type	Detail
Sill/jamb corners	Coped and butted	Sealed with a butyl backed foam pad and secured with two #8 x 1" long pan head screws per corner
Head/jamb corners	Coped and butted	Sealed with silicone and secured with two #8 x 1" long pan head screws per corner
Fixed meeting rail	Coped and butted	Sealed with silicone and secured with two #8 x 1-1/4" long pan head screws, through the jamb into the meeting rail

### 5.3 Sash Construction:

Sash Member	Material	Description
Rails and stiles	Aluminum	Extruded

	Joinery Type	Detail
All corners	Coped and butted	Secured with two #6 x 1" long pan head screws per corner

### 5.4 Weatherstripping:

Description	Quantity	Location
0.187" backed by 0.230" high polypile with center fin	1 Row	Fixed meeting rail and sash stiles
0.187" backed by 5/16" diameter dual fin foam-filled vinyl bulb	1 Row	Bottom rail
7/8" by 5/8" by 0.190" polypile dust plug	2	Each end of interior meeting rail

**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.*

**Test Specimens #1 and #2:**

Glass Type	Glazing	Glazing Method
Monolithic	1/8" clear annealed 0.090" PVB 1/8" clear annealed	Exterior glazed onto a bead of silicone sealant and secured with snap-in extruded aluminum glazing beads with a rubber gasket against the glass

**Test Specimen #3:**

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
5/8" IG	Metal reinforced butyl spacer	3/32" clear annealed 0.090" PVB 3/32" clear annealed	1/8" clear annealed	Exterior glazed onto a bead of silicone sealant and secured with snap-in extruded aluminum glazing beads with a rubber gasket against the glass

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Sash daylight opening	1	800 x 826	31-1/2 x 32-1/2	1/2"
Fixed daylight opening	1	841 x 1143	33-1/8 x 45	1/2"

**5.6 Drainage:** A sloped sill was utilized.

**5.7 Hardware:**

Description	Quantity	Location
Metal sweep lock	2	8" from each end of the interior meeting rail
Block and tackle balance	2	One per jamb

**5.0 Test Specimen Description:** (Continued)

**5.8 Reinforcement:** No reinforcement was utilized.

**5.9 Screen Construction:**

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Roll-formed aluminum	Square-cut 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.

**Test Specimens #1 and #3:**

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

**Test Specimen #2:**

Location	Anchor Description	Anchor Location
Head and jambs	#8 x 1-1/4" pan head screw	2" from corners and spaced 11" on center, through the 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
<b>Operating Force,</b> per ASTM E 2068	Initiate motion: 80 N (18 lbf) Maintain motion: 71 N (16 lbf) Locks: 9 N (2 lbf)	Report Only  135 N (30 lbf) max.  100 N (22.5 lbf) max.	
<b>Air Leakage,</b> Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.5 L/s/m <sup>2</sup> (0.09 cfm/ft <sup>2</sup> )	1.5 L/s/m <sup>2</sup> (0.3 cfm/ft <sup>2</sup> ) max.	1
<b>Water Penetration,</b> per ASTM E 547	N/A	N/A	3
<b>Uniform Load Deflection,</b> per ASTM E 330	N/A	N/A	3
<b>Uniform Load Structural,</b> per ASTM E 330	N/A	N/A	3
<b>Forced Entry Resistance,</b> per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
<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 440 Pa (9.19 psf)	Pass	No leakage	2
<b>Uniform Load Deflection,</b> per ASTM E 330 Deflections taken at meeting rail +2880 Pa (+60.15 psf) -2880 Pa (-60.15 psf)	3.6 mm (0.14") 3.6 mm (0.14")	Report Only	4, 5, 6
<b>Uniform Load Structural,</b> per ASTM E 330 Permanent sets taken at meeting rail +4320 Pa (+90.23 psf) -4320 Pa (-90.23 psf)	0.5 mm (0.02") 0.5 mm (0.02")	3.6 mm (0.14") max. 3.6 mm (0.14") max.	5, 6

**Test Specimen #2:**

Title of Test	Results	Allowed	Note
<b>Uniform Load Deflection,</b> per ASTM E 330	N/A	N/A	3
<b>Uniform Load Structural,</b> per ASTM E 330	N/A	N/A	3
<b>Optional Performance</b>			
<b>Uniform Load Deflection,</b> per ASTM E 330 Deflections taken at meeting rail +2880 Pa (+60.15 psf) -2880 Pa (-60.15 psf)	3.0 mm (0.12") 2.8 mm (0.11")	Report Only	4, 5, 6
<b>Uniform Load Structural,</b> per ASTM E 330 Permanent sets taken at meeting rail +4320 Pa (+90.23 psf) -4320 Pa (-90.23 psf)	3.0 mm (0.01") 3.0 mm (<0.01")	3.6 mm (0.14") max. 3.6 mm (0.14") max.	5, 6

**7.0 Test Results:** (Continued)

**Test Specimen #3:**

<b>Title of Test</b>	<b>Results</b>	<b>Allowed</b>	<b>Note</b>
<b>Uniform Load Deflection,</b> per ASTM E 330	N/A	N/A	3
<b>Uniform Load Structural,</b> per ASTM E 330	N/A	N/A	3
<b>Optional Performance</b>			
<b>Uniform Load Deflection,</b> per ASTM E 330 Deflections taken at meeting rail +2880 Pa (+60.15 psf) -2880 Pa (-60.15 psf)	3.6 mm (0.14") 3.8 mm (0.15")	Report Only	4, 5, 6
<b>Uniform Load Structural,</b> per ASTM E 330 Permanent sets taken at meeting rail +4320 Pa (+90.23 psf) -4320 Pa (-90.23 psf)	0.5 mm (0.02") <0.3 mm (<0.01")	3.6 mm (0.14") max. 3.6 mm (0.14") 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 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.

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Jeremy R. Bender  
Senior Technician

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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: Location of Air Seal (1)

Appendix-C: Complete drawings packet on file with Architectural Testing, Inc.

### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
1	01/06/15	Page 4	5.5 Glazing: Corrected daylight opening sizes



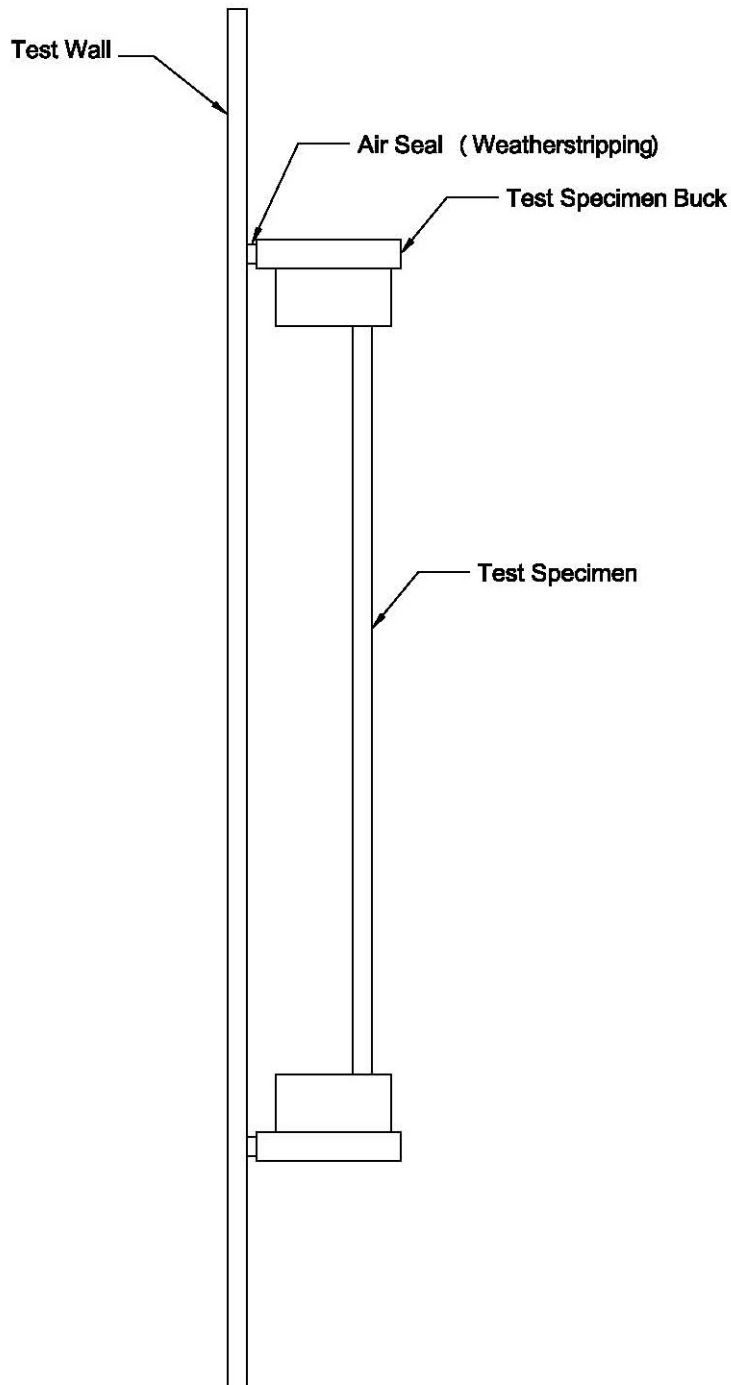
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**Appendix A**  
**Alteration Addendum**

*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.





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## **Appendix C**

### **Drawing(s)**

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