

**TEST REPORT**

**Report No.:** B0319.01-109-47

**Rendered to:**

MI WINDOWS AND DOORS, INC.  
Gratz, Pennsylvania

**PRODUCT TYPE:** PVC Single Hung (Fin)  
**SERIES/MODEL:** 3540

**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 LC-PG25 1324 x 2134 (52 x 84)-H	Class LC-PG40 1118 x 1600* (44 x 63*)-H
Design Pressure	±1200 Pa (±25.06 psf)	+1920 Pa (+40.10 psf)
Negative Design Pressure	N/A	-2260 Pa (-47.20 psf)
Air Infiltration	0.4 L/s/m <sup>2</sup> (0.09 cfm/ft <sup>2</sup> )	N/A
Water Penetration Resistance Test Pressure	290 Pa (6.06 psf)	N/A

**Test Completion Date:** 05/26/2011

Reference must be made to Report No. B0319.01-109-47, dated 06/20/11 for complete test specimen description and detailed 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 Single Hung (Fin)

**3.2 Series/Model:** 3540

**3.2.1** This product also labeled under the following name: 3240

**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 LC-PG25 1324 x 2134 (52 x 84)-H**; Test Specimen #2: **Class LC-PG40 1118 x 1600\* (44 x 63\*)-H**.

***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:** 05/23/2011 - 05/26/2011

**3.5 Test Location:** MI Windows and Doors, 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".

**3.6 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 test completion date.

**3.7 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)

#### 3.8 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: 2.8 m <sup>2</sup> (30.4 ft <sup>2</sup> )	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1324	52-1/8	2134	84
Interior sash	1273	50-1/8	892	35-1/8
Screen	1249	49-3/16	868	34-3/16

##### Test Specimen #2:

Overall Area: 1.8 m <sup>2</sup> (19.3 ft <sup>2</sup> )	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1118	44	1600	63
Interior sash	1072	42-3/16	786	30-15/16
Screen	1048	41-1/4	762	30

*The following descriptions apply to all specimens.*

##### 5.2 Frame Construction:

Frame Member	Material	Description
Head, sill, jambs, and fixed meeting rail	PVC	Extruded, the sill utilized a snap-in extruded PVC sill adaptor, sealed with adhesive foam tape and silicone

## 5.0 Test Specimen Description:

### 5.2 Frame Construction: (Continued)

	Joinery Type	Detail
Head, sill, and jambs	Mitered	Thermoplastic weld
Fixed meeting rail	Coped and butted	Secured at each end with PVC end caps. The end caps were secured to the fixed meeting rail with three #6 x 1-1/8" long Phillips flat head screws and secured to the jambs at each end using three #6 x 5/8" long screws.

### 5.3 Sash Construction:

Sash Member	Material	Description
Rails and stiles	PVC	Extruded

	Joinery Type	Detail
All corners	Mitered	Thermoplastic weld

### 5.4 Weatherstripping:

Description	Quantity	Location
0.187" backed by 1/8" diameter offset foam-filled vinyl bulb	1 Row	Fixed meeting rail
0.187" backed by 0.240" high polypile with center fin	1 Row	Sash stiles, interior meeting rail, and sill adaptor
0.187" backed by 0.310" high polypile with center fin	1 Row	Sash stiles
0.187" backed by 5/16" diameter offset foam-filled vinyl bulb	1 Row	Sash bottom rail

## 5.0 Test Specimen Description: (Continued)

### 5.5 Glazing:

#### Test Specimen #1:

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
3/4" IG	Butyl reinforced intercept	1/8" clear annealed	1/8" clear annealed	Interior glazed against a bed of silicone and secured using snap-in PVC glazing beads

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Sash daylight opening	1	1199 x 819	47-3/16 x 32-1/4	1/2"
Fixed daylight opening	1	1219 x 1130	48 x 44-1/2	1/2"

#### Test Specimen #2:

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
3/4" IG	Butyl reinforced intercept	3/32" clear annealed	3/32" clear annealed	Interior glazed against a bed of silicone and secured using snap-in PVC glazing beads

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Sash daylight opening	1	995 x 711	39-3/16 x 28	1/2"
Fixed daylight opening	1	1016 x 705	40 x 27-3/4	1/2"

### 5.6 Drainage:

Drainage Method	Size	Quantity	Location
Weephole	1/2" long by 3/16" wide	2	Glazing channel, 1" from each end, draining to hollow below
Weephole	1/2" long by 1/16" wide	2	Sash bottom rail, 2-1/2" from each end
Weep notch	1-1/16" long by 1/8" high	2	Exterior sill leg ends
Weephole	1" long by 1/8" high	2	Sill face, 3" from each end
Weephole	5/8" long by 1/4" high	2	Sill sash track ends, draining to central sill hollow

## 5.0 Test Specimen Description: (Continued)

### 5.6 Drainage: (Continued)

Drainage Method	Size	Quantity	Location
Weephole	5/8" long by 1/4" high	2	Sill central hollow ends, draining to exterior sill hollow
Weephole	1/2" long by 5/32" wide	2	Sill adaptor track, 1" from each end, draining to exterior sill hollow
Weephole	1/2" long by 3/16" wide	2	Sill, 2-1/2" from each end, draining to exterior sill hollow

### 5.7 Hardware:

Description	Quantity	Location
Metal cam lock	2	Interior meeting rail, 7" from each end with keepers aligned opposite on fixed meeting rail
PVC surface mount tilt latches	2	Interior meeting rail ends
Metal pivot bars	2	Bottom rail ends
Coil balances	2	One in each jamb

### 5.8 Reinforcement:

Drawing Number	Location	Material
GVL-451-020	Sash rails and stiles	Steel
RF-104S-020	Fixed meeting rail	Steel

### 5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Roll-formed aluminum	Square-cut and secured with plastic keys	Fiberglass	Flexible vinyl spline

## 6.0 Installation:

The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/16" shim space. The exterior perimeter of the window was sealed with sealant.

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

**7.0 Test Results:** The temperature during testing was 23°C (73°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: 62 N (14 lbf) Maintain motion: 71 N (16 lbf) Latches: 4 N (1 lbf) Locks: 9 N (2 lbf)	Report Only  135 N (30 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)	0.4 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 taken at meeting rail +1200 Pa (+25.06 psf) -1200 Pa (-25.06 psf)	21.6 mm (0.85") 21.6 mm (0.85")	Report Only	4, 5, 6
<b>Uniform Load Structural,</b> per ASTM E 330 taken at meeting rail +1800 Pa (+37.59 psf) -1800 Pa (-37.59 psf)	3.6 mm (0.14") 4.3 mm (0.17")	4.8 mm (0.19") max. 4.8 mm (0.19") max.	5, 6
<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	
<b>Optional Performance</b>			
<b>Water Penetration,</b> per ASTM E 547 at 290 Pa (6.06 psf)	Pass	No leakage	2

**7.0 Test Results:** (Continued)

**Test Specimen #2:**

Title of Test	Results	Allowed	Note
<b>Optional Performance</b>			
<b>Uniform Load Deflection,</b> per ASTM E 330 taken at meeting rail +2160 Pa (+45.11 psf) -2260 Pa (-47.20 psf)	17.3 mm (0.68") 17.3 mm (0.68")	Report Only	4, 5, 6
<b>Uniform Load Structural,</b> per ASTM E 330 taken at meeting rail +3240 Pa (+67.67 psf) -3390 Pa (-70.80 psf)	2.5 mm (0.10") 4.1 mm (0.16")	4.1 mm (0.16") max. 4.1 mm (0.16") 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.*



The service life of this report will expire on the stated Test Record Retention End Date, at which time such materials as drawings, data sheets, samples of test specimens, copies of this report, and any other pertinent project documentation, shall be discarded without notice.

If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made. 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  
Technician

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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.



Test Report No.: B0319.01-109-47  
Report Date: 06/20/11  
Test Record Retention End Date: 05/26/15

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

*Note: No alterations were required.*



Test Report No.: B0319.01-109-47  
Report Date: 06/20/11  
Test Record Retention End Date: 05/26/15

## **Appendix B**

### **Drawings**

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