

TEST REPORT

Report No.: B8448.01-301-47

Rendered to:

MI WINDOWS AND DOORS, INC.
Prescott Valley, Arizona

PRODUCT TYPE: Polyvinyl Chloride (PVC) Tilt Double Hung
SERIES/MODEL: EC 180 / 180EC

SPECIFICATION: AAMA/WDMA/CSA 101/I.S.2/A440-05, *Standard/Specification for Windows, Doors, and Unit Skylights.*

CAWM 301, Forced Entry Resistance Test for Windows.

Title	Summary of Results
Primary Product Designator	H-LC50 1218 x 1572 (48 x 62)*
Design Pressure	±2400 Pa (±50.13 psf)
Air Infiltration	0.76 L/s/m ² (0.15 cfm/ft ²)
Water Penetration Resistance Test Pressure	400 Pa (8.35 psf)

Test Completion Date: 04/05/2012

Reference must be made to Report No. B8448.01-301-47 dated 05/31/12 for complete test specimen description and detailed test results. Reference Architectural Testing, Inc. Report No. 97836.05-901-44, dated 04/12/11 for complete *Gateway* test specimen description and test results.

1.0 Report Issued To: MI Windows and Doors, Inc.
7555 East State Route 69
Prescott Valley, Arizona 86314

2.0 Test Laboratory: Architectural Testing, Inc.
2524 East Jensen Avenue
Fresno, California 93706
(559) 233 - 8705

3.0 Project Summary:

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

3.2 Series/Model: EC 180/180EC

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test methods. The specimen tested successfully met the performance requirements for a **H-LC50 1218 x 1572 (48 x 62)*** rating.

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: 04/03/2012 – 04/05/2012

3.5 Test Record Retention End Date: All test records for this report will be retained until April 05, 2016.

3.6 Test Location: MI Windows and Doors, Inc. test facility in Prescott Valley, Arizona. 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 Sample Source: The test specimen was provided by the client. Representative samples of the test specimen will be retained by Architectural Testing for a minimum of four years from the test completion date.

3.8 Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix B. Any deviations are documented herein or on the drawings.

3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Russ Wilkerson	MI Windows and Doors, Inc.
Mike Maystadt	MI Windows and Doors, Inc.
Jeffrey T. Osugi	Architectural Testing, Inc.

4.0 Test Specifications:

AAMA/WDMA/CSA 101/I.S.2/A440-05, *Standard/Specification for Windows, Doors, and Unit Skylights.*

CAWM 301, *Forced Entry Resistance Test for Windows.*

5.0 Test Specimen Description:

5.1 Product Sizes:

Overall Area: 1.91 m ² (20.61 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1218	47-15/16	1572	61-7/8
Exterior sash	1105	43-1/2	762	30
Interior sash	1129	44-7/16	762	30
Screen	1106	43-9/16	1482	58-3/8

5.2 Frame Construction:

Frame Member	Material	Description
Head, sill and jambs	PVC	Two internal hollows were filled with Aircell foam.
Sill filler	PVC	Employed at sill.
Head extension	PVC	Snap fit to head.
Panel stop	PVC	Employed at each jamb at the head of the interior sash and the sill of the exterior sash.
Tilt latch guide	PVC	Each jamb at interior sash.

	Joinery Type	Detail
Head, sill and jambs	Mitered / coped	Fully welded. The interior sill leg was sealed to the jambs.

5.0 Test Specimen Description: (Continued)

5.3 Sash Construction:

Sash Member	Material	Description
Top rail, bottom rail and each stile	PVC	The interlocks were held back 1" from each end and notched 2" for the locks. One hollow of the stiles and top rail of the exterior panel were filled with Aircell foam. One hollow of the stiles and bottom rail of the interior panel were filled with Aircell foam.

	Joinery Type	Detail
Top rail, bottom rail and each stile	Mitered	Fully welded.

5.4 Weatherstripping:

Description	Quantity	Location
0.450" high polypile with center fin	1 Row	Interior meeting rail.
0.270" high polypile with triple center fin	3 Rows	Each stile, bottom rail of interior sash and top rail of exterior sash.
Wrapped foam gasket	1 Row	Interior and exterior meeting rails.

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	Polycarbonate - butyl composite	1/8" Annealed	1/8" Annealed	Exterior glazed onto a bed of silicone glazing sealant and secured with a snap in PVC glazing bead.

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash	1	1017 x 673	40-1/16 x 26-1/2	1/2"
Interior sash	1	1042 x 673	41 x 26-1/2	1/2"

5.0 Test Specimen Description: (Continued)

5.6 Drainage:

Drainage Method	Size	Quantity	Location
Weephole with cover	1 x 1/4" (13/16 x 1/8")	2	2-5/8" from each end through exterior sill face.
Weephole	7/8" x 1/4"	2	Each end through first layer of internal webbing.
Weephole	1" x 1/4"	2	1-3/8" from each end through center sill leg.
Weephole	1/2" x 1/8"	10	5/16" from each end on bottom rail of interior sash. 2-5/8" from each end of bottom rail through snap in glazing bead track. 1/4" from each end at interior and exterior of exterior meeting rail. 2-1/2" from each end on bottom rail of exterior sash.

5.7 Hardware:

Description	Quantity	Location
Coil balances	4	Each jamb secured with one #8 x 1/2" Phillips pan head screws.
Tilt bar	4	Each end of exterior meeting rail and bottom rail of interior sash secured with two #8 x 3/4" Phillips truss head self-drilling screws.
Tilt latch	2	Each end on top rail of exterior sash.
Cam latch with integrated tilt latch	2	5" from each end on interior meeting rail secured with two #6 x 1" Phillips flat head screws into reinforcement.
Keeper	2	Opposite lock secured with two #6 x 1" Phillips flat head self-drilling screws into reinforcement.

5.0 Test Specimen Description: (Continued)

5.8 Reinforcement:

Drawing Number	Location	Material
M-9258	Exterior meeting rail	Extruded aluminum
M-9564	Interior meeting rail	Extruded aluminum

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Extruded aluminum	Mitered with corner key	Fiberglass	Hollow spline

6.0 Installation:

The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/4 - 3/8" shim space. The exterior perimeter of the window was sealed with silicone.

Location	Anchor Description	Anchor Location
Head and jambs	#10 x 2" Phillips pan head screws	4 - 5" from each corner and 8 - 10" on center through the frame.

7.0 Test Results: The temperature during testing was 15 - 19°C (60 - 67°F). The results are tabulated as follows:

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 108 N (24.3 lbf) Maintain motion: 116 N (26.0 lbf) Locks: 22 N (5.0 lbf)	Report Only 155 N (34.8 lbf) max. 100 N (22.5 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.76 L/s/m ² (0.15 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 taken at exterior meeting rail	N/A	N/A	3
Forced Entry Resistance, per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
Forced Entry Resistance, per CAWM 301, Type: I	Pass	No entry	
Thermoplastic Corner Weld	Pass	Meets as stated	
Deglazing, per ASTM E 987 Operating direction, 320 N (71.9 lbf)	Pass	Meets as stated	
Remaining direction, 230 N (51.7 lbf)	Pass	Meets as stated	

7.0 Test Results: (Continued)

Title of Test	Results	Allowed	Note
Optional Performance			
Water Penetration, per ASTM E 547 at 400 Pa (8.35 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 taken at exterior meeting rail +2400 Pa (+50.13 psf) -2400 Pa (-50.13 psf)	8.3 mm (0.33") 8.3 mm (0.33")	Report Only	4,5,6
Uniform Load Deflection, per ASTM E 330 taken at exterior meeting rail +2400 Pa (+50.13 psf) -2400 Pa (-50.13 psf)	7.8 mm (0.31") 1.5 mm (0.06")	Report Only	4,5,6
Uniform Load Structural, per ASTM E 330 taken at exterior meeting rail +3600 Pa (+75.19 psf) -3600 Pa (-75.19 psf)	0.3 mm (0.01") 0.3 mm (0.01")	4.3 mm (0.17") max.	5,6
Uniform Load Structural, per ASTM E 330 taken at exterior meeting rail +3600 Pa (+75.19 psf) -3600 Pa (-75.19 psf)	0.3 mm (0.01") 0.3 mm (0.01")	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.

Architectural Testing will service this report for the entire test record retention period. Test records that are retained 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.

Jeffrey Osugi
Technician

Leaton Kirk
Director – Regional Operations

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

Appendix-A: Alteration Addendum (1)

Appendix-B: Drawings (20) Complete drawings packet on file with Architectural Testing, Inc.

Appendix A

Alteration Addendum

Alteration #1: Date – 04/03/12
Cause for alteration – Failed water penetration test.
Remedial action taken – Sealed interior sill leg to jamb of frame.



Test Report No.: B8448.01-301-44
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Record Retention End Date: 04/05/16

Appendix B

Drawings

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