

TEST REPORT

Report No.: C6948.01-301-44

Rendered to:

MI WINDOWS AND DOORS, LLC.
Prescott Valley, Arizona

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

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

CAWM 301-90, *Forced Entry Resistance Test for Windows.*

Title	Summary of Results
Primary Product Designator	H-LC 30 1371 x 1836 (54 x 72)*
Design Pressure	±1440 Pa (±30.08 psf)
Air Infiltration	1.22 L/s/m ² (0.24 cfm/ft ²)
Water Penetration Resistance Test Pressure	220 Pa (4.59 psf)

Test Completion Date: 04/04/13

Reference must be made to Report No. C6948.01-301-44 dated 05/21/13 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, LLC.
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) Double Hung

3.2 Series/Model: EC 180

This product also labeled under the following names: BB-180 and HM180

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-LC 30 1371 x 1836 (54 x 72)*** rating. Reference Architectural Testing, Inc. Report No. 97836.05-901-44, dated 04/12/11 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: 03/11/2013 – 04/04/13

3.5 Test Record Retention End Date: All test records for this report will be retained until May 13, 2017.

3.6 Test Location: MI Windows and Doors, LLC. 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.

3.0 Project Summary: (Continued)

3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Jim Liapple	MI Windows and Doors, LLC.
Mike Maystadt	MI Windows and Doors, LLC.
David Douglass	Architectural Testing, Inc.
Jeffrey 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 301-90, *Forced Entry Resistance Test for Windows.*

5.0 Test Specimen Description:

5.1 Product Sizes:

Overall Area: 2.52 m ² (27.09 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1371	54	1836	72-1/4
Exterior sash	1257	49-1/2	889	35
Interior sash	1282	50-1/2	890	35-1/16
Screen	1257	49-1/2	1746	68-3/4

5.2 Frame Construction:

Frame Member	Material	Description
Head and jambs	PVC	Three internal hollows were filled with Aircell foam.
Sill	PVC	One internal hollow was filled with Aircell foam.
Stucco clip	PVC	Snap fit to all members of frame.

	Joinery Type	Detail
Head, sill and jambs	Mitered and coped	Welded and coped.

5.0 Test Specimen Description: (Continued)

5.3 Sash Construction:

Sash Member	Material	Description
Top rail of exterior panel, each stile and bottom rail of interior pane.	PVC	One internal hollow was filled with Aircell foam.
Each meeting stile	PVC	The exterior sash interlock was held back 7/8" from each end. The interior sash interlock was held back 1-1/8" from each end. The interior sash interlock was notched 2" for the lock and a 0.070" lip was employed at the lock.

	Joinery Type	Detail
All corners	Mitered	Fully welded.

5.4 Weatherstripping:

Description	Quantity	Location
0.270" high polypile with triple center fin	1 Row	Sill.
0.270" high polypile with triple center fin	3 Rows	Each stile. Top rail of exterior panel. Bottom rail of interior panel.
0.400" high polypile	1 Row	Interior meeting stile.
Hollow bulb gasket	1 Row	Each meeting stile.

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	Polycarbonate - butyl composite	1/8" Annealed	1/8" Annealed	Exterior glazed onto 3/8" wide x 1/16" high glazing tape and secured with a snap in PVC glazing bead. The corners of the glazing tape were sealed with silicone.

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Exterior sash	1	1169 x 801	46 x 31-9/16	1/2"
Interior sash	1	1194 x 801	47 x 31-9/16	1/2"

5.6 Drainage:

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

5.0 Test Specimen Description: (Continued)

5.7 Hardware:

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

5.8 Reinforcement:

Drawing Number	Location	Material
M-9258	Exterior meeting rail	Extruded aluminum
M-9264	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 1/8" shim space. The exterior perimeter of the window was sealed with silicone.

Location	Anchor Description	Anchor Location
Head, sill and jambs	1-5/8" drywall screws	2" from each corner and 10" on center through the mounting fin

7.0 Test Results: The temperature during testing was 10 - 18°C (50 - 65°F). The results are tabulated as follows:

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 93 N (21.0 lbf) Maintain motion: 153 N (34.3 lbf) Locks: 29 N (6.5 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)	1.22 L/s/m ² (0.24 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²) max.	1
Water Penetration, per ASTM E 547 at 180 Pa (3.76 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 taken at left stile of exterior sash +1200 Pa (+25.06 psf) -1200 Pa (-25.06 psf)	7.0 mm (0.28") 2.0 mm (0.08")	Report Only	3, 4, 5
Uniform Load Deflection, per ASTM E 330 taken at exterior meeting rail +1200 Pa (+25.06 psf) -1200 Pa (-25.06 psf)	8.5 mm (0.34") 7.8 mm (0.31")	Report Only	3, 4, 5
Uniform Load Structural, per ASTM E 330 taken at left stile of exterior sash +1800 Pa (+37.59 psf) -1800 Pa (-37.59 psf)	0.5 mm (0.02") 0.0 mm (0.00")	3.5 mm (0.14") max.	4, 5
Uniform Load Structural, per ASTM E 330 taken at exterior meeting rail +1800 Pa (+37.59 psf) -1800 Pa (-37.59 psf)	0.0 mm (0.00") 0.0 mm (0.00")	5.0 mm (0.20") max.	4, 5
Forced Entry Resistance, per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
Forced Entry Resistance, per CAWM, Type: I	Pass	No entry	

7.0 Test Results: (Continued)

Title of Test	Results	Allowed	Note
Thermoplastic Corner Weld	Pass	Meets as stated	
Deglazing, per ASTM E 987 Operating direction, 320 N (71.9 lbf) Remaining direction, 230 N (51.7 lbf)	Pass Pass	Meets as stated Meets as stated	
Optional Performance			
Water Penetration, per ASTM E 547 at 220 Pa (4.59 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 taken at left stile of exterior sash +1440 Pa (+30.08 psf) -1440 Pa (-30.08 psf)	7.5 mm (0.30") 2.0 mm (0.08")	Report Only	3, 4, 5
Uniform Load Deflection, per ASTM E 330 taken at exterior meeting rail +1440 Pa (+30.08 psf) -1440 Pa (-30.08 psf)	9.8 mm (0.38") 8.5 mm (0.34")	Report Only	3, 4, 5
Uniform Load Structural, per ASTM E 330 taken at left stile of exterior sash +2160 Pa (+45.11 psf) -2160 Pa (-45.11 psf)	0.8 mm (0.03") 0.5 mm (0.02")	3.5 mm (0.14") max.	4, 5
Uniform Load Structural, per ASTM E 330 taken at exterior meeting rail +2160 Pa (+45.11 psf) -2160 Pa (-45.11 psf)	0.3 mm (0.01") 0.5 mm (0.02")	5.0 mm (0.20") max.	4, 5

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 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 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.

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.

David Douglass
Project Manager

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 18) Complete drawings packet on file with Architectural Testing, Inc.



Test Report No.: C6948.01-301-44
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Revision 1 Date: 05/21/13
Record Retention End Date: 05/13/17

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
1	05/21/13	Cover, 1, 2	Revise Series/Model Name & Company Name.



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Appendix A
Alteration Addendum

Note: No alterations were required.



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Appendix B

Drawings

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