

**AAMA/WDMA/CSA 101/I.S.2/A440-08  
TEST REPORT**

**Rendered to:**

**MI WINDOWS AND DOORS, INC.**

**SERIES/MODEL: EC180**

**PRODUCT TYPE: Polyvinyl Chloride (PVC) Tilt Double Hung**

Title	Summary of Results	
	Test Specimen #1	Test Specimen #2
Primary Product Designator	Class LC-PG40 1220 x 1905 (48 x 75)-H	Class LC-PG50 1118 x 1600* (44 x 63)-H
Design Pressure	± 1920 Pa (± 40.13 psf)	± 2400 Pa (± 50.16 psf)
Operating Force (in motion)	142 N (32 lbf)	-----
Air Infiltration	0.47 L/s/m <sup>2</sup> (0.09 cfm/ft <sup>2</sup> )	-----
Water Penetration Resistance Test Pressure	470 Pa (9.82 psf)	-----
Uniform Load Structural Test Pressure	± 2880 Pa (±60.19 psf)	± 3600 Pa (±75.24 psf)
Forced Entry Resistance	Passed	-----

**Test Completion Date:** 02/18/10

Reference must be made to Report No. 97836.05-901-44, dated 04/12/11, for complete test specimen description and data.

**A.L.I**

(Validator / Operations Administrator)

**AAMA  
CERTIFICATION PROGRAM****AUTHORIZATION FOR PRODUCT CERTIFICATION****MI Windows & Doors, LLC  
P.O. Box 370  
Gratz, PA 17030-0370****Attn: Rick Sawdey**

The product described below is hereby approved for listing in the next issue of the AAMA Certified Products Directory. The approval is based on successful completion of tests, and the reporting to the Administrator of the results of tests, accompanied by related drawings, by an AAMA Accredited Laboratory.

1. The listing below will be added to the next published AAMA Certified Products Directory.

SPECIFICATION	RECORD OF PRODUCT TESTED			
<b>AAMA/WDMA/CSA 101/I.S.2/A440-08 LC-PG40-1219x1905 (48x75)-H</b>				
COMPANY AND CODE	CPD NO.	SERIES MODEL & PRODUCT DESCRIPTION	MAXIMUM SIZE TESTED	
<b>MI Windows &amp; Doors, LLC Code: MTL</b>	<b>6420</b>	<b>EC180 DH (FINLESS) (PVC)(X/X)(OG)(INS GL)(REINF) (TILT)(ASTM)(CMBSO)</b>	<b>FRAME 1219 mm x 1905 mm (4'0" x 6'3")</b>	<b>SASH 1132 mm x 927 mm (3'9" x 3'1")</b>

2. This Certification will expire **February 18, 2016** (extended from **February 18, 2014** per **AAMA 106-13**) and requires validation until then by continued listing in the current AAMA Certified Products Directory.

3. Product Tested and Reported by: **Architectural Testing, Inc.**

Report No.: **97836.05-901-44**Date of Report: **April 12, 2011****Validated for Certification**  
Associated Laboratories, Inc.Date: **January 9, 2014****Authorized for Certification**Cc: AAMA  
JGS  
ACP-04 (Rev. 1/11)  
American Architectural Manufacturers Association

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1. The listing below will be added to the next published AAMA Certified Products Directory.

SPECIFICATION	RECORD OF PRODUCT TESTED			
	CPD NO.	SERIES MODEL & PRODUCT DESCRIPTION	MAXIMUM SIZE TESTED	
AAMA/WDMA/CSA 101/I.S.2/A440-08 LC-PG50*-1118x1600 (44x63)-H				
COMPANY AND CODE	CPD NO.	SERIES MODEL & PRODUCT DESCRIPTION	MAXIMUM SIZE TESTED	
MI Windows & Doors, LLC Code: MTL	6419	EC180 DH (FINLESS) (PVC)(X/X)(OG)(INS GL)(REINF) (TILT)(ASTM)(CMBSO)	<b>FRAME</b> 1118 mm x 1600 mm (3'8" x 5'3")	<b>SASH</b> 1029 mm x 775 mm (3'5" x 2'7")

2. This Certification will expire **February 18, 2016** (extended from February 18, 2014 per AAMA 106-13) and requires validation until then by continued listing in the current AAMA Certified Products Directory.

3. Product Tested and Reported by: **Architectural Testing, Inc.**

Report No.: **97836.05-901-44**Date of Report: **April 12, 2011**

Validated for Certification

  
Associated Laboratories, Inc.

Authorized for Certification

  
American Architectural Manufacturers AssociationDate: **January 9, 2014**Cc: AAMA  
JGS  
ACP-04 (Rev. 1/11)



**AAMA/WDMA/CSA 101/I.S.2/A440-08 TEST REPORT**

Rendered to:

MI WINDOWS AND DOORS, INC.  
7555 E. State Rt. 69  
Prescott Valley, AZ 86314

Report No.: 97836.05-901-44  
Test Dates: 02/13/10  
Through: 02/18/10  
Report Date: 04/12/11  
Test Record Retention Date: 02/18/14

**Project Summary:** Architectural Testing, Inc. was contracted by Mikron Industries, Inc. to perform and validate testing on two Series/Model 10200 PVC Tilt Double Hung Windows at the test facility of Architectural Testing, Inc. in Kent, Washington. The samples tested successfully met the performance requirements for the following ratings: Test Specimen #1: Class LC-PG40 1220 x 1905 (48 x 75)-H; and Test Specimen #2: Class LC-PG50 1118 x 1600\* (44 x 63)-H. This report is a reissue of the original Report No. 97836.01-901-44. This report is reissued in the name of MI Windows and Doors, Inc. through written authorization of Mikron Industries, Inc. Test specimen description and results are reported herein. The sample was provided by the client.

**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.*

**Test Specification:** The test specimen was evaluated in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-08, *NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights.*

**Test Specimen Description:**

Unless otherwise specified, the following description applies to both specimens:

**Series/Model:** EC180

**Product Type:** PVC Tilt Double Hung Window

**Finish:** All PVC members were white.

**Test Specimen Description:** (Continued)

**Test Specimen #1:** LC-PG40 1220 x 1905 (48 x 75)-H

**Overall Size:** 1220 mm (48") wide by 1905 mm (75") high

**Upper Sash Size:** 1106 mm (43-1/2") wide by 927 mm (36-1/2") high

**Lower Sash Size:** 1132 mm (44-1/2") wide by 927 mm (36-1/2") high

**Screen Size:** 1108 mm (43-5/8") wide by 1816 mm (71-1/2") high

**Overall Area:** 2.32 m<sup>2</sup> (24.97 ft<sup>2</sup>)

**Test Specimen #2:** LC-PG50 1118 x 1600\* (44 x 63)-H

**Overall Size:** 1118 mm (44") wide by 1600 mm (63") high

**Upper Sash Size:** 1003 mm (39-1/2") wide by 775 mm (30-1/2") high

**Lower sash Size:** 1029 mm (40-1/2") wide by 775 mm (30-1/2") high

**Overall Area:** 1.79 m<sup>2</sup> (19.27 ft<sup>2</sup>)

**Frame Construction:** The frame members were miter cut with thermally-welded corner construction.

The frame, interior sash pocket, at the head, contained an 1135 mm (44-11/16") long PVC head insert.

The frame, interior sash pocket, at the sill, contained an 1135 mm (44-11/16") long PVC pocket filler.

The frame, interior sash pocket, at the jambs, contained 94 mm (3-3/4") long PVC balance covers.

**Sash Construction:** The sash members were miter cut with thermally-welded corner construction.

**Weatherstripping:**

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
6.6 mm (0.26") (triple fin)	1 row	Frame, interior sash pocket, at the sill

**Test Specimen Description:**

**Weatherstripping:** (Continued)

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
6.6 mm (0.26") (triple fin)	1 row	Upper sash, exterior face, full perimeter
6.6 mm (0.26") (triple fin)	2 rows	Upper sash, exterior perimeter, stiles, and top rail
9.5 mm (0.37") (hollow foam bulb)	1 row	Upper sash, interior face, bottom rail
6.6 mm (0.26") (triple fin)	1 row	Lower sash, exterior face, stiles, and bottom rail
6.6 mm (0.26") (triple fin)	2 rows	Lower sash, exterior perimeter, stiles, and bottom rail
9.5 mm (0.37") (hollow foam bulb)	1 row	Lower sash, exterior face, top rail
6.6 mm (0.26") (triple fin)	1 row	Head insert, exterior face

**Glazing Details:** All sash were exterior-glazed against double-sided foam tape with PVC glazing beads. The nominal 28.5 mm (1-1/8") thick insulating glass units were fabricated with two sheets of nominal 3 mm (1/8") thick annealed glass and an aluminum spacer system.

**Drainage:**

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
25.4 mm by 6.3 mm (1" by 1/4") (with weep flap)	2	Frame, sill, exterior face, 63.5 mm (2-1/2") from outside corner, through one wall, draining hollow
25.4 mm by 6.3 mm (1" by 1/4")	2	Frame, sill, interior pocket, 50.8 mm (2") from outside corner, through one wall, draining into hollow
25.4 mm by 6.3 mm (1" by 1/4")	2	Frame, sill, internal web, through one wall, draining into hollow

**Test Specimen Description:**

**Drainage: (Continued)**

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
6.3 mm by 2.2 mm (1/4" by 3/32")	2	Lower sash, bead pocket, through one wall, draining into hollow
9.5 mm by 3.1 mm (3/8" by 1/8")	2	Upper sash, bead pocket, through one wall, draining into hollow
12.7 mm by 3.1 mm (1/2" by 1/8")	4	Upper sash, bottom rail, exterior perimeter, 19.0 mm (3/4") from outside corner, through one wall, draining hollow

**Hardware:**

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
Metal locks	2	Lower sash, top rail, 180 mm (7") from outside corner, secured with two 3.4 mm by 25.4 mm (#6 by 1") screws
Metal keepers	2	Upper sash, bottom rail, aligned with locks, secured with two 3.4 mm by 31.7 mm (#6 by 1-1/4") screws
Metal pivot bars	2 (per sash)	Sash, bottom rail, secured with two 15 mm by 14.2 mm (#6 by 9/16") screws
Metal coil balancers (plastic housings)	4 (2 per jamb)	Frame, jambs, interior and exterior pocket
Plastic tilt latches	2 (per sash)	Sash, top rail

**Reinforcement:** The interior and exterior meeting rails were reinforced with full width aluminum extrusions (reference drawing #10099.1).

**Screen Construction:** The steel frame was fabricated with plastic corner keys and a mesh cloth, held in place with a flexible spline.

**Installation:** The specimens were installed into a 2 by 8 wood test buck. The frames were fastened to the bucks with 4.8 mm by 63.5 mm (#10 by 2-1/2") screws spaced approximately 152 mm (6") off each end, jambs and head, and no more than 406 mm (16") apart. The test buck, at the sill, contained an interior and exterior blind stop.

**Test Results:** The temperature during testing was 21°C (70°F). The results are tabulated as follows:

**Test Specimen #1:** LC-PG40 1220 x 1905 (48 x 75)-H

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
5.3.1	Operating Force per ASTM E 2068		
	Initiate motion	111 N (25 lbf)	Report Only
	Maintain motion	142 N (32 lbf)	180 N (40 lbf)
	Locks	9 N (2 lbf)	100 N (22.5 lbf)
5.3.2.1	Air Leakage Resistance per ASTM E 283		
	75 Pa (1.6 psf)	0.47 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.

*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.*

5.3.3.2	Water Penetration Resistance per ASTM E 547		See Note #2
5.3.4.2	Uniform Load Deflection per ASTM E 330		See Note #2
5.3.4.3	Uniform Load Structural per ASTM E 330		See Note #2

*Note #2: The client opted to start at a pressure higher than the minimum required. Those results are listed under "Optional Performance."*

5.3.5	Forced Entry Resistance per ASTM F 588 and CAWM 301-90		
	Type: A	Grade: 20	
	Disassembly Test	No entry	No entry
	Sash/Panel Manipulation Test	No entry	No entry
	Lock Hardware Manipulation Test	No entry	No entry
	Test A1	No entry	No entry
	Test A2	No entry	No entry
	Test A3	No entry	No entry
	Test A4	No entry	No entry
	Test A5	No entry	No entry
	Test A6	No entry	No entry
	Test A7	No entry	No entry
	Sash/Panel Manipulation Test	No entry	No entry
	Lock Hardware Manipulation Test	No entry	No entry



**Test Results:**

**Test Specimen #1: LC-PG40 1220 x 1905 (48 x 75)-H – (Continued)**

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
5.3.6.2	Thermoplastic Corner Weld Test	Meets as stated	Meets as stated
5.3.6.3	Deglazing Test In operating direction - 320 N (70 lbf)		
	Interior Sash		
	Top rail	2.0 mm (0.08")	11.8 mm (0.16")
	Bottom rail	2.0 mm (0.08")	13.8 mm (0.54")
	Exterior sash		
	Top rail	2.0 mm (0.08")	13.8 mm (0.54")
	Bottom rail	2.0 mm (0.08")	11.8 mm (0.16")
	In remaining direction - 230 N (50 lbf)		
	Interior sash		
	Stile	1.0 mm (0.04")	12.5 mm (0.49")
	Stile	1.0 mm (0.04")	10.8 mm (0.42")
	Exterior sash		
	Stile	1.0 mm (0.04")	12.5 mm (0.49")
	Stile	1.0 mm (0.04")	10.8 mm (0.42")

**Optional Performance**

4.3.2.1	Water Penetration Resistance per ASTM E 547 (with and without insect screen) 470 Pa (9.82 psf)	No leakage	No leakage
4.3.2.1	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the meeting rails) (Loads were held for 10 seconds) 1920 Pa (40.13 psf) (positive) 1920 Pa (40.13 psf) (negative)	6.0 mm (0.23") 6.0 mm (0.23")	See Note #3
4.3.2.1	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the sash stile) (Loads were held for 10 seconds) 1920 Pa (40.13 psf) (positive) 1920 Pa (40.13 psf) (negative)	8.8 mm (0.34") 6.3 mm (0.24")	See Note #3

**Test Results:**

**Test Specimen #1:** LC-PG40 1220 x 1905 (48 x 75)-H

Optional Performance – (Continued)

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
4.3.2.1	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the meeting rails) (Loads were held for 10 seconds)		
	2880 Pa (60.19 psf) (positive)	2.3 mm (0.11")	4.3 mm (0.16") max.
	2880 Pa (60.19 psf) (negative)	0.6 mm (0.02")	4.3 mm (0.16") max.
4.3.2.1	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the stile) (Loads were held for 10 seconds)		
	2880 Pa (60.19 psf) (positive)	2.0 mm (0.08")	3.5 mm (0.13") max.
	2880 Pa (60.19 psf) (negative)	<0.2 mm (<0.01")	3.5 mm (0.13") max.

**Test Specimen #2:** LC-PG50 1118 x 1600\* (44 x 63)-H

Optional Performance

4.3.2.1	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the meeting rails) (Loads were held for 10 seconds)		
	2400 Pa (50.16 psf) (positive)	6.0 mm (0.23")	See Note #3
	2400 Pa (50.16 psf) (negative)	5.3 mm (0.21")	
4.3.2.1	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the sash stile) (Loads were held for 10 seconds)		
	2400 Pa (50.16 psf) (positive)	6.3 mm (0.25")	See Note #3
	2400 Pa (50.16 psf) (negative)	1.0 mm (0.04")	
4.3.2.1	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the meeting rails) (Loads were held for 10 seconds)		
	3600 Pa (75.24 psf) (positive)	0.8 mm (0.03")	4.3 mm (0.16") max.
	3600 Pa (75.24 psf) (negative)	0.8 mm (0.03")	4.3 mm (0.16") max.
4.3.2.1	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the stile) (Loads were held for 10 seconds)		
	3600 Pa (75.24 psf) (positive)	0.3 mm (0.01")	3.5 mm (0.13") max.
	3600 Pa (75.24 psf) (negative)	<0.2 mm (<0.01")	3.5 mm (0.13") max.

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.

**Drawing Reference:** The test specimen drawings have been reviewed by Architectural Testing, Inc. and are representative of the test specimen reported herein.

This report is reissued in the name of MI Windows and Doors, Inc. through written authorization of Mikron Industries, Inc., to whom the original report was rendered. The original Report No. is 97836.01-901-44.

**List of Official Observers:**

<u>Name</u>	<u>Company</u>
Rob Schrader	Mikron Industries, Inc.
Mike Fannan	Mikron Industries, Inc.
Steve Powers	Architectural Testing, Inc.

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice; and the service life of this report will expire.

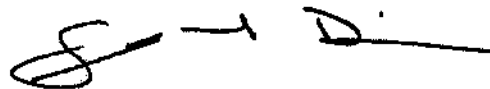
Results obtained are tested values and were secured by using the designated test methods. If the test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen can be made. This report does not constitute certification of this product 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.



Digitally Signed for: Jamie Dunning by Patricia A. Cain

Jamie N. Dunning  
Senior Technician



Digitally Signed by: Jeffrey L. Dideon

Jeffrey L. Dideon  
Director – Regional Operations

JLD:pac

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.

### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	04/12/11	N/A	Original report issue – Reissue of Report No. 97836.01-901-44 in the name of MI Windows and Doors, Inc.

## **Appendix A**

### **Alteration Addendum**

**Alteration #1:**    Date - 02/15/10  
Cause for alteration - Achieve higher structural performance  
Remedial action taken - Replaced plastic tilt latches with different set of plastic tilt latches

**Appendix B**

**Drawings**

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