TEST REPORT

Report No.: F4616.01-109-47

Rendered to:

MI WINDOWS AND DOORS, LLC
Gratz, Pennsylvania

PRODUCT TYPE: Polyvinyl Chloride (PVC) Single Hung Window
SERIES/MODEL: HM 150

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

Title	Summary of Results
AAMA/WDMA/CSA 101/I.S.2/A440-08	Class R-PG30 1207 x 2426 (48 x 96)-H
Design Pressure	±1440 Pa (±30.08 psf)
Air Infiltration	0.6 L/s/m^2 (0.12 cfm/ft^2)
Water Penetration Resistance Test Pressure	290 Pa (6.06 psf)

Test Completion Date: 01/14/16

Reference must be made to Report No. F4616.01-109-47, dated 04/15/16 for complete test specimen description and detailed test results.

1.0 Report Issued To: MI Windows and Doors, LLC
650 West Market Street
P.O. Box 370
Gratz, Pennsylvania 17030-0370

2.0 Test Laboratory: Architectural Testing, Inc., an Intertek company ("Intertek-ATI")
130 Derry Court
York, Pennsylvania 17406-8405
717-764-7700

3.0 Project Summary:

3.1 Product Type: Polyvinyl Chloride (PVC) Single Hung Window

3.2 Series/Model: HM 150

3.2.1 This product also labeled under the following names: EC150, EC150SPSH, and HM150SPSH

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test method(s). The specimen tested successfully met the performance requirements for a **Class R-PG30 1207 x 2426 (48 x 96)-H** rating.

3.4 Test Dates: 01/11/16 - 01/14/16

3.5 Test Record Retention End Date: All test records for this report will be retained until January 14, 2020.

3.6 Test Location: MI Windows and Doors, LLC test facility in Gratz, Pennsylvania. Calibration of test equipment was performed by Intertek-ATI in accordance with AAMA 205-01 "In-Plant Testing Guidelines for Manufacturers and Independent Laboratories".

3.7 Test Specimen Source: The test specimen was provided by the client. Representative samples of the test specimen(s) will be retained by Intertek-ATI for a minimum of four years from the test completion date.

3.8 Drawing Reference: The test specimen drawings have been reviewed by Intertek-ATI and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Intertek-ATI per the drawings on file with Intertek-ATI. Any deviations are documented herein or on the drawings.

3.9 List of Official Observers:

Name	Company
Richie Williard	MI Windows and Doors LLC
Joel Chronister	Intertek-ATI

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:

Overall Area: 2.9 m² (31.5 ft²)	**Width**		**Height**	
	millimeters	**inches**	**millimeters**	**inches**
Overall size	1207	47-1/2	2426	95-1/2
Interior sash	1133	44-5/8	1216	47-7/8
Screen	1127	44-3/8	1168	46

5.2 Frame Construction:

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

	Joinery Type	**Detail**
All corners	Mitered	Thermally welded
Fixed meeting rail	Coped and butted	Secured at each end with two #8 x 3" Philips pan head screws

5.3 Sash Construction:

Sash Member	**Material**	**Description**
Bottom rail and stiles	PVC	Extruded, hollows filled with aircell
Top rail	PVC	Extruded

	Joinery Type	**Detail**
All corners	Mitered	Thermally welded

5.0 Test Specimen Description: (Continued)

5.4 Weatherstripping:

Description	Quantity	Location
0.187" backed by 3/8" diameter, foam-filled vinyl bulb gasket	1 Row	Interior meeting rail
0.187" backed by 0.260" high polypile with triple center fin	1 Row	Head, sill, jambs, sash stiles, and bottom rail
0.187" backed by 0.450" high polypile with fin	1 Row	Sash top rail

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	Metal-reinforced butyl	1/8" clear annealed	1/8" clear annealed	Interior glazed against a bead of silicone and secured with a PVC snap-in glazing bead

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Fixed daylight opening	1	1099 x 1130	43-1/4 x 44-1/2	1/2"
Sash daylight opening	1	1048 x 1124	41-1/4 x 44-1/4	1/2"

5.6 Drainage:

Drainage Method	Size	Quantity	Location
Weepslot with cover	2-5/8" long by 1/4" high	2	3-5/8" in from the jambs and 1/2" up from the sill on exterior frame sill
Weepslot	1" long by 3/16" high	2	3-5/8" in from the jambs in the interior sash pocket
Weepslot	1/2" long by 1/16" high	2	3/8" in from the sash stiles on the bottom rail

5.0 Test Specimen Description: (Continued)

5.7 Hardware:

Description	Quantity	Location
Metal lock	1	23-3/4" in from the jambs and 48-1/2" up from the sill

5.8 Reinforcement:

Drawing Number	Location	Material
M9264000	Hollow chamber of the sash lock rail	Extruded aluminum

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Extruded aluminum	Mitered and keyed with corner plastic key	Flexible vinyl spline	Rolled into the frame pocket using a ridged foam bulb

6.0 Installation:

The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/4" 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" drywall screws	Located 3" from the corners and spaced 8" to 10" on center through the mounting fin

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

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 58 N (13 lbf) Maintain motion: 36 N (8 lbf) Locks: 22 N (5 lbf)	Report only 45 N (10.1 lbf) max. 100 N (22.5 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.6 L/s/m^2 (0.12 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	N/A	N/A	3
Forced Entry Resistance, per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
Thermoplastic Corner Weld	Pass	Meets as stated	
Deglazing, 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)

Title of Test	Results	Allowed	Note
Optional Performance			
Water Penetration, per ASTM E 547 at 290 Pa (6.06 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 Deflections taken meeting rail			
+1440 Pa (+30.08 psf)	8.1 mm (0.32")		
-1440 Pa (-30.08 psf)	7.6 mm (0.30")	Report only	4, 5, 6
Uniform Load Structural, per ASTM E 330 Permanent sets taken at meeting rail			
+2160 Pa (+45.11 psf)	0.3 mm (0.01")	4.6 mm (0.18") max.	
-2160 Pa (-45.11 psf)	0.8 mm (0.03")	4.6 mm (0.18") 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.

Intertek-ATI 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 Intertek-ATI 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 Intertek-ATI.

For ARCHITECTURAL TESTING, INC.

Digitally Signed for: Joel Chronister by Anne Mendoza

Joel Chronister
Technician

Digitally Signed by: Timothy J. McGill

Timothy J. McGill
Manager – Product Testing

JC: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 Intertek-ATI.

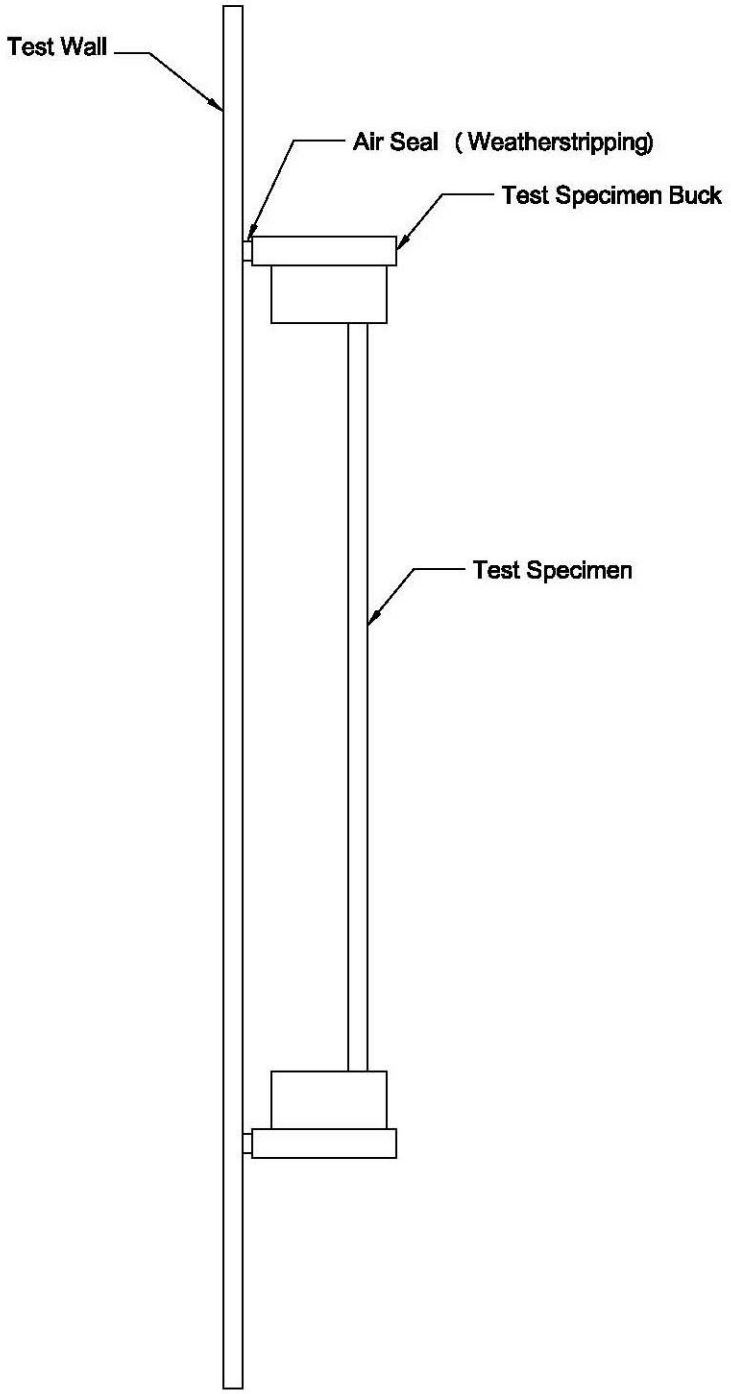
Appendix A

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.



Appendix C

Drawing(s)

***Note**: Complete drawings packet on file with Intertek-ATI.*