



TEST REPORT

Report No.: E5560.01-109-47

Rendered to:

MI WINDOWS AND DOORS, LLC
Gratz, Pennsylvania

PRODUCT TYPE: Polyvinyl Chloride (PVC) Single Hung Window
SERIES/MODEL: 5500

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	
	Test Specimen #1	Test Specimen #2
AAMA/WDMA/CSA 101/I.S.2/A440-08	Class R-PG25 1219 x 2438 (48 x 96)-H	Class R-PG35 914 x 1524* (36 x 60*)-H
Design Pressure	+1200 Pa (+25.06 psf)	+1680 Pa (+35.09 psf)
Negative Design Pressure	-1200 Pa (-25.06 psf)	-2400 Pa (-50.13 psf)
Air Infiltration	0.8 L/s/m ² (0.15 cfm/ft ²)	N/A
Water Penetration Resistance Test Pressure	260 Pa (5.43 psf)	N/A

Test Completion Date: 02/25/15

Reference must be made to Report No. E5560.01-109-47, dated 05/08/15 for complete test specimen description and detailed test results.

1.0 Report Issued To: MI Windows and Doors, LLC
P.O. Box 370
650 West Market Street
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: 5500

3.2.1 This product also labeled under the following names: 550D, 550T, 5500SPSH, 5500MULL, 4000, 4200, and 4050

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(s)	Title	Summary of Results
1	101/I.S.2/A440-08	Class R-PG25 1219 x 2438 (48 x 96)-H
2	101/I.S.2/A440-08	Class R-PG35 914 x 1524* (36 x 60*)-H

3.4 Test Dates: 02/23/15 - 02/25/15

3.5 Test Record Retention End Date: All test records for this report will be retained until February 25, 2019.

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(s) were 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.

3.0 Project Summary: (Continued)

3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Rick Sawdey	MI Windows and Doors, LLC
Richie Williard	MI Windows and Doors, LLC
Jeremy R. Bender	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:

Test Specimen #1:

Overall Area: 3.0 m ² (32.0 ft ²)	Width		Height	
	millimeters	Inches	millimeters	inches
Overall size	1219	48	2438	96
Sash size	1159	45-5/8	916	36-1/16
Screen size	1172	46-1/8	889	35

Test Specimen #2:

Overall Area: 1.4 m ² (15.0 ft ²)	Width		Height	
	millimeters	Inches	millimeters	inches
Overall size	914	36	1524	60
Sash size	857	33-3/4	768	30-1/4
Screen size	867	34-1/8	641	25-1/4

The following descriptions apply to all specimens.

5.2 Frame Construction:

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

5.0 Test Specimen Description: (Continued)

5.2 Frame Construction: (Continued)

	Joinery Type	Detail
All corners	Mitered	Thermally welded
Fixed meeting rail	Coped and butted	The fixed rail was secured with two #6 x 1-1/2" long pan head screws, through the jambs and into the rail.

5.3 Sash Construction:

Sash Member	Material	Description
Rails and stiles	PVC	Extruded

	Joinery Type	Detail
All corners	Mitered	Thermally welded

5.4 Weatherstripping:

Description	Quantity	Location
0.187" backed by 0.200" high polypile with fin	1 Row	Fixed meeting rail and all sash stiles and 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.*

Test Specimen #1:

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
3/4" IG	U-shaped steel	1/8" annealed	1/8" annealed	The glass was set from the exterior onto a bed of silicone and secured with snap-on vinyl glazing beads.

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Sash daylight opening	1	1076 x 829	42-3/8 x 32-5/8	1/2"
Fixed daylight opening	1	1143 x 1454	45 x 57-1/4	1/2"

5.0 Test Specimen Description: (Continued)

5.5 Glazing: (Continued)

Test Specimen #2:

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
3/4" IG	U-shaped steel	3/32" annealed	3/32" annealed	The glass was set from the exterior onto a bed of silicone and secured with snap-on vinyl glazing beads.

Location	Quantity	Daylight Opening		Glass Bite
		Millimeters	inches	
Sash daylight opening	1	772 x 686	30-3/8 x 27	1/2"
Fixed daylight opening	1	838 x 686	33 x 27	1/2"

5.6 Drainage:

Drainage Method	Size	Quantity	Location
Weepslot	1/2" long by 1/8" wide	2	Bottom rail, 2-1/2" from the ends
Weepslot	1" long by 1/8" wide	2	Sill, 2" from the ends, draining into the hollow below
Weepslot	3/8" wide by 1/8" tall	2	Sill screen track, 2" from the ends, draining into the hollow below
Weepslot with cover	1-3/8" wide by 1/4" high	2	Sill face, 3-1/2" from the ends

5.7 Hardware:

Description	Quantity	Location
Metal cam lock with adjacent metal keepers	2	The cam locks were located 8" from each end of the interior meeting rail with keepers on the adjacent fixed rail.
Constant force balances	2	Jamb pockets

5.8 Reinforcement:

Drawing Number	Location	Material
4043	Fixed meeting rail	Aluminum
4041	Lock rail	Aluminum

5.0 Test Specimen Description: (Continued)

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Roll-formed aluminum	Square-cut and secured with corner 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 1/8" 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	Spaced 10" on center, through the mounting fin into the 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
Operating Force, per ASTM E 2068	Initiate motion: 89 N (20 lbf) Maintain motion: 80 N (18 lbf) Locks: 11 N (2.5 lbf)	Report Only 160 N (36 lbf) max. 100 N (22.5 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	0.8 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	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)

Test Specimen #1: (Continued)

Title of Test	Results	Allowed	Note
Optional Performance			
Water Penetration, per ASTM E 547 at 260 Pa (5.43 psf)	Pass	No leakage	2
Uniform Load Deflection, per ASTM E 330 Deflections taken at meeting rail +1200 Pa (+25.06 psf) -1200 Pa (-25.06 psf)	14.7 mm (0.58") 14.0 mm (0.55")	Report Only	4, 5, 6
Uniform Load Structural, per ASTM E 330 Permanent sets taken at meeting rail +1800 Pa (+37.59 psf) -1800 Pa (-37.59 psf)	1.3 mm (0.05") <0.3 mm (<0.01")	4.6 mm (0.18") max. 4.6 mm (0.18") max.	5, 6

Test Specimen #2:

Title of Test	Results	Allowed	Note
Uniform Load Deflection, per ASTM E 330	N/A	N/A	3
Uniform Load Structural, per ASTM E 330	N/A	N/A	3
Optional Performance			
Uniform Load Deflection, per ASTM E 330 Deflections taken at meeting rail +2400 Pa (+50.13 psf) -2400 Pa (-50.13 psf)	8.9 mm (0.35") 7.4 mm (0.29")	Report Only	4, 5, 6
Uniform Load Structural, per ASTM E 330 Permanent sets taken at meeting rail +3600 Pa (+75.19 psf) -3600 Pa (-75.19 psf)	0.8 mm (0.03") 1.0 mm (0.04")	3.6 mm (0.14") max. 3.6 mm (0.14") 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.

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.:

Jeremy R. Bender
Senior Technician

Michael D. Stremmel, P.E.
Senior Project Engineer

JRB: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.

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
1	04/03/15	Summary page, Page 1	Removed fin / finless references
2	05/08/15	Page 4	Changed the glass thickness

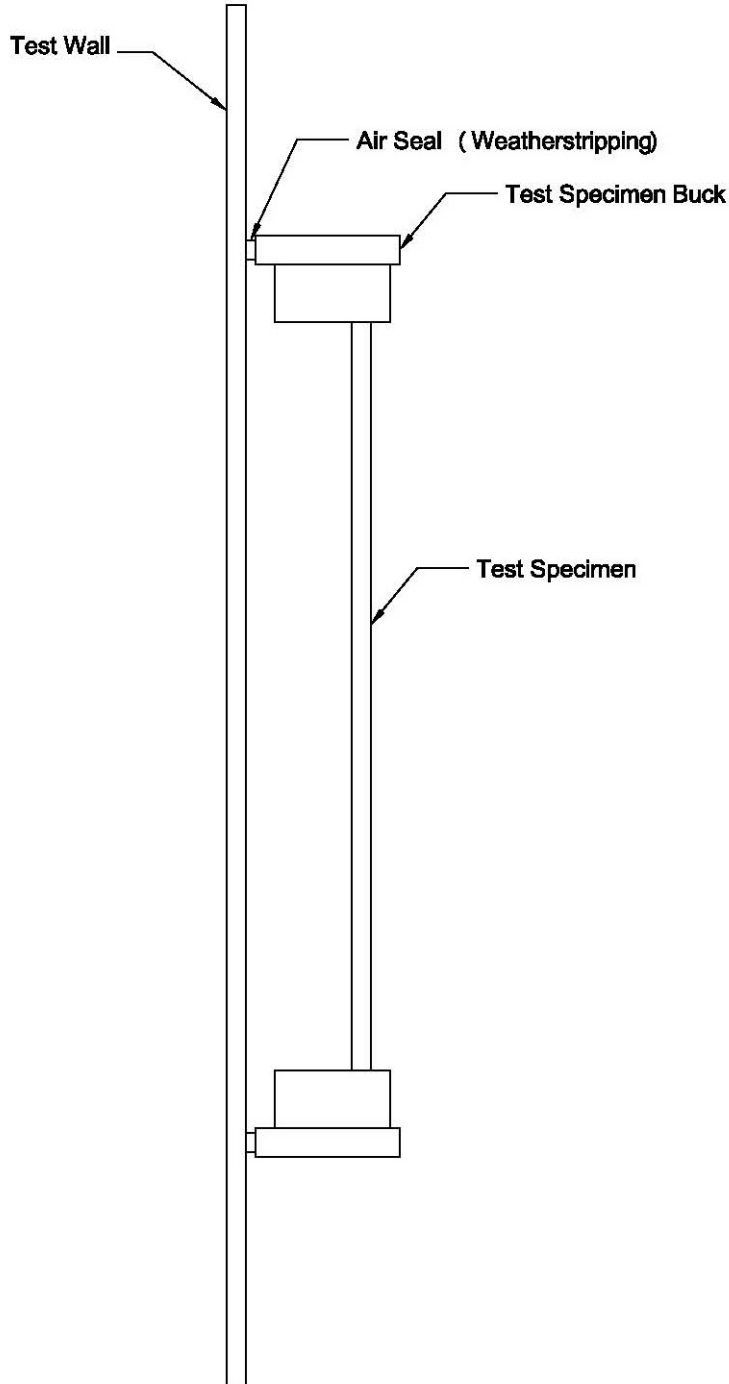
Appendix A

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.*