



TEST REPORT

Report No.: B9043.01-109-47

Rendered to:

MI WINDOWS AND DOORS, INC.
Gratz, Pennsylvania

PRODUCT TYPE: PVC Triple Single Hung Window
SERIES/MODEL: 3500 CHS

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

Title	Summary of Results
Primary Product Designator	Class R-PG25 2737 x 1880* (108 x 74*)-H
Design Pressure	±1200 Pa (±25.06 psf)
Air Infiltration	1.0 L/s/m ² (0.19 cfm/ft ²)
Water Penetration Resistance Test Pressure	220 Pa (4.59 psf)

Test Completion Date: 04/27/2012

Reference must be made to Report No. B9043.01-109-47, dated 05/08/12 for complete test specimen description and detailed test results. Reference Intertek-ATI Report No. B1922.01-109-47, dated 08/17/11 for complete *Gateway* test specimen description and test results.

1.0 Report Issued To: MI Windows and Doors, Inc.
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: PVC Triple Single Hung Window

3.2 Series/Model: 3500 CHS

3.2.1 This product also labeled under the following names: 3540, 3250, 3240, 1255, M-3500, S-3500, W-3500, S-3540, W-3540, 3500SPSH, 3540SPSH, 3250SPSH, 3240SPSH, W-3500SPSH, 3500HPSPSH and 1255HP

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-PG25 2737 x 1880* (108 x 74*)-H** rating. Reference Intertek-ATI Report No. B1922.01-109-47, dated 08/17/11 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: 04/26/2012 - 04/27/2012

3.5 Test Record Retention End Date: All test records for this report will be retained until April 27, 2016.

3.6 Test Location: MI Windows and Doors, Inc. 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 Sample 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.

3.0 Project Summary: (Continued)

3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Rick Sawdey	MI Windows and Doors, Inc.
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:

Overall Area: 5.1 m ² (55.4 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	2737	107-3/4	1880	74
Interior sash	857	33-3/4	924	36-3/8
Screen	840	33-1/16	902	35-1/2

5.2 Frame Construction:

Frame Member	Material	Description
Head, sill, and jambs	PVC	Extruded, the sill utilized a snap-in sill adaptor sealed with adhesive backed foam tape and silicone
Intermediate frame 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	Thermoplastic weld
Intermediate frame jambs	Coped and butted	The frame jamb was sealed with silicone to the head and sill and secured with two #6 x 1-1/2" long pan head screws and two #6 x 2-1/2" long pan head screws at each end
Fixed meeting rail	Coped and butted	The fixed meeting rail was secured at each end with a plastic end clip. Each clip was secured to the fixed meeting rail with three #6 x 1-1/8" flat head screws and to the frame with three #6 x 5/8" long flat head screws.

5.3 Sash Construction:

Sash Member	Material	Description
All sash members	PVC	Extruded

	Joinery Type	Detail
All corners	Mitered	Thermoplastic weld

5.4 Weatherstripping:

Description	Quantity	Location
0.187" backed by 0.250" high polypile with center fin	1 Row	Sill and interior meeting rails
0.187" backed by 0.310" high polypile with center fin	2 Rows	Sash stiles
1/8" diameter, offset foam-filled bulb gasket	1 Row	Fixed meeting rails
3/8" diameter, offset foam-filled bulb gasket	1 Row	Bottom rail

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	Metal reinforced butyl	3/32" clear annealed	3/32" clear annealed	The fixed lites were interior glazed against a 1/4" wide single-sided glazing tape and secured with PVC snap-in glazing beads. The sash were interior glazed against a bed of silicone and secured with PVC snap-in glazing beads.

Location	Quantity	Daylight Opening		Glass Bite
		millimeters	inches	
Fixed daylight opening	3	806 x 845	31-3/4 x 33-1/4	1/2"
Sash daylight opening	3	787 x 851	31 x 33-1/2	1/2"

5.6 Drainage:

Drainage Method	Size	Quantity	Location
Weep notch	3/8" wide by 1/4" high	2	Sill corners
Weep notch	7/8" wide by 1/4" high	2	Screen track corners
Weepslot	1" wide by 1/8" high	2	Sill face, 2-1/2" from corners, draining the exterior hollow
Weepslot	1/2" wide by 3/16" high	2	Sill, 2-1/2" from the jambs, draining the sill to the hollow below
Weepslot	1/2" wide by 1/8" high	4 per sash	Two per bottom corner of each sash, 2-1/2" from corners

5.7 Hardware:

Description	Quantity	Location
Metal cam sweep lock with keeper	2 per sash	Interior meeting rail, 7" from each end
Plastic tilt latches	2 per sash	Each end of interior meeting rail
Metal pivot bar	2 per sash	Each end of bottom rail
Constant force balance	2 per sash	One per jamb

5.0 Test Specimen Description: (Continued)

5.8 Reinforcement:

Drawing Number	Location	Material
RF-104S-020	Fixed meeting rail	Roll-formed steel
GVL-451-020	Interior meeting rail and bottom rail	Roll-formed steel
WD000004	Intermediate frame jamb	1/2" x 1-1/2" wood

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Roll-formed aluminum	Square-cut and keyed	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	2" from corners and spaced 8" on center through the mounting fin into the wood buck.

7.0 Test Results: The temperature during testing was 21°C (69°F). The results are tabulated as follows:

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 49 N (11 lbf) Maintain motion: 76 N (17 lbf) Latches: 9 N (2 lbf) Locks: 9 N (2 lbf)	Report Only 135 N (30 lbf) max. 100 N (22.5 lbf) max. 100 N (22.5 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.57 psf)	1.0 L/s/m ² (0.19 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²) max.	1

7.0 Test Results: (Continued)

Title of Test	Results	Allowed	Note
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	
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 the meeting rail +1200 Pa (+25.06 psf) -1200 Pa (-25.06 psf)	3.6 mm (0.14") 3.8 mm (0.15")	Report Only	4, 5, 6
Uniform Load Deflection, per ASTM E 330 taken at the intermediate frame jamb +1200 Pa (+25.06 psf) -1200 Pa (-25.06 psf)	43.2 mm (1.70") 40.4 mm (1.59")	Report Only	4, 5, 6
Uniform Load Structural, per ASTM E 330 taken at the meeting rail +1800 Pa (+37.59 psf) -1800 Pa (-37.59 psf)	0.3 mm (0.01") 1.3 mm (0.05")	3.3 mm (0.13") max. 3.3 mm (0.13") max.	5, 6

7.0 Test Results: (Continued)

Title of Test	Results	Allowed	Note
Uniform Load Structural, per ASTM E 330 taken at the intermediate frame jamb +1800 Pa (+37.59 psf) -1800 Pa (-37.59 psf)	1.8 mm (0.07") 2.5 mm (0.10")	7.1 mm (0.28") max. 7.1 mm (0.28") 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 that are retained 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
Lead Technician

Timothy J. McGill
Manager-Product Testing

JRB:dem/asm

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 Intertek-ATI.

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
1	01/27/16	Page 4	Corrected glazing from double-sided to single-sided

This report produced from controlled document template ATI 00438, issued 01/31/12.

Appendix A

Alteration Addendum

***Note:** No alterations were required.*

Appendix B

Drawings

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