

**AAMA/WDMA/CSA 101/LS.2/A440-05
TEST REPORT**

Rendered to:

INTERNATIONAL WINDOW CORPORATION

SERIES/MODEL: 5321

PRODUCT TYPE: Polyvinyl Chloride (PVC) Single Hung Window

Title	Summary of Results
Primary Product Designator	H-R20 1220 x 2130 (48 x 84)
Design Pressure	±960 Pa (20.05 psf)
Operating Force (in motion)	117 N (26.3 lbf)
Air Infiltration	1.4 L/s/m ² (0.28 cfm/ft ²)
Water Penetration Resistance Test Pressure	150 Pa (3.13 psf)
Uniform Load Structural Test Pressure	±1440 Pa (±30.08 psf)
Forced Entry Resistance	ASTM F 588 – Grade 10 CAWM 301

Test Completion Date: 01/07/09

Reference must be made to Report No. 78338.01-301-44, dated 02/10/09 for complete test specimen description and data.

AAMA/WDMA/CSA 101/I.S.2/A440-05 TEST REPORT

Rendered to:

INTERNATIONAL WINDOW CORPORATION
5625 East Firestone Boulevard
South Gate, California 90280

Report No.: 78338.01-301-44
Test Dates: 07/22/08
Through: 01/07/09
Report Date: 02/10/09
Expiration Date: 01/07/13

Project Summary: Architectural Testing, Inc. was contracted by International Window Corporation to perform testing on a Series/Model 5321, Polyvinyl Chloride (PVC) Single Hung Window. The sample tested successfully met the performance requirements for an H-R20 1220 x 2130 (48 x 84) rating. Test specimen description and results are reported herein. The sample was provided by the client.

Test Specifications: The test specimen was evaluated in accordance with the following:

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

CAWM 301, *Forced Entry Resistance Tests for Windows.*

Test Specimen Description:

Series/Model: 5321

Product Type: Polyvinyl Chloride (PVC) Single Hung Window

Overall Size: 1220 mm (48-1/16") wide by 2130 mm (83-7/8") high

Active Sash Size: 1170 mm (46-1/16") wide by 1059 mm (41-11/16") high

Fixed Lite Daylight Opening Size: 1155 mm (45-1/2") wide by 995 mm (39-3/16") high

Screen Size: 1183 mm (46-9/16") wide by 1035 mm (40-3/4") high

Overall Area: 2.6 m² (27.97 ft²)

Test Specimen Description: (Continued)

Finish: All PVC was white.

Frame Construction: All members were constructed of extruded PVC. The corners were mitered and fully welded. The exterior meeting rail was fastened to the jambs with two #8 x 2-1/2" Phillips flat head screws and sealed with silicone, the screw heads were sealed with silicone.

Sash Construction: All members were constructed of extruded PVC. The corners were mitered and fully welded. Each end of the interlock was held-back 1-1/4" from each end and was notched 3-5/8" at the lock.

Weatherstripping:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
0.210" high x 0.187" backed polypile with center fin	1 Row	All members of the active sash.

Glazing Details: The window utilized 3/4" thick overall sealed insulating glass. The insulating glass was comprised of two 3/32" thick clear annealed sheets a U-shaped coated steel (CU) spacer system. The fixed lite was glazed to the frame onto 3/8" wide x 1/16" thick glazing tape. The active sash was glazed onto a Perma Bed 2000 Bedding. All Glass was exterior glazed and was secured with a PVC glazing bead.

Drainage:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
1-3/4" x 3/8" weephole with cover (1-1/4" x 1/8" effective drain)	2	1-1/2" from each end of the sill face.
1-3/4" x 3/8" weephole	2	1-1/2" from each end of the second layer of internal sill webbing.
1/2" round weephole	2	3-3/16" from each end of the interior sill track.
1/4" round weephole	2	2-1/8" from each end of the screen sill track.
1/4" x 1/8" weephole	2	1-1/8" from each end of the active sash bottom rail.

Test Specimen Description: (Continued)

Hardware:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
Metal auto lock (part SP3305)	1	Midspan of the active sash meeting rail attached with three #6 x 3/4" Phillips flat head self-drill screws fastened into the reinforcement.
Metal keeper (part SP3305)	1	Opposite the lock on the exterior meeting rail attached with two #6 x 3/4" Phillips flat head self-drilling screws fastened into the PVC.

Reinforcement: Galvanized steel reinforcement (part# NS-1123) was employed at the exterior meeting rail. Galvanized steel reinforcement (part# NS-1122) was employed at the active sash meeting rail.

Screen Construction: All members were constructed of roll formed aluminum. The corners were square cut and attached with Nylon corner keys. The mesh cloth was held-in-place with a vinyl spline. Two pull tabs and two retainer clips were employed.

Installation: The window was installed into a 2 x 8 test buck constructed of Douglas Fir No. 2 lumber. The nailing fin was set against the test buck and secured using #6 x 1-5/8" screws drywall screws located 4" from each corner and 10" on center. The rough opening of the test buck was 5/8" wider and taller than the test sample. The nailing fin was sealed to the test buck with silicone.

Test Results: The temperature during testing was 27°C (82°F). The results are tabulated as follows:

<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		
	Open		
	Initiate motion	113 N (25.3 lbf)	Report only
	Maintain motion	117 N (26.3 lbf)	135 N (30.3 lbf)
	Autolock	28 N (6.3 lbf)	100 N (22.5 lbf)
	Close		
	Initiate motion	30 N (6.7 lbf)	Report only
	Maintain motion	83 N (18.7 lbf)	135 N (30.3 lbf)
	Autolock	N/A	100 N (22.5 lbf)

Test Results: (Continued)

<u>Paragraph</u>	<u>Title of Test - Test Method</u>	<u>Results</u>	<u>Allowed</u>
5.3.2.1	Air Leakage Resistance per ASTM E 283 75 Pa (1.57 psf)	1.42 L/s/m ² (0.28 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²) max.

Note #1: The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-05 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 Type: A	Grade: 10	
	Disassembly 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 A7	No entry	No entry
	Sash Manipulation Test	No entry	No entry
	Lock Hardware Manipulation Test	No entry	No entry

Forced Entry Resistance per CAWM 301
Type: I

	Disassembly Test	No entry	No entry
	Test A	No entry	No entry
	Test B	No entry	No entry
	Test C	No entry	No entry
	Test E	No entry	No entry
	Test D	No entry	No entry
	Test E	No entry	No entry
	Lock Hardware Manipulation Test	No entry	No entry

Test Results: (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 (71.9 lbf)		
	Meeting Rail	6.5 mm (0.26")	11.4 mm (0.45")
	Bottom Rail	6.0 mm (0.24")	11.4 mm (0.45")
	In remaining direction - 230 N (51.7 lbf)		
	Left Stile	2.0 mm (0.08")	11.4 mm (0.45")
	Right Stile	2.0 mm (0.08")	11.4 mm (0.45")

Optional Performance

4.4.2.6	Water Penetration Resistance per ASTM E 547 (With and without insect screen) 150 Pa (3.13 psf)	No leakage	No leakage
4.4.2.6	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the exterior meeting rail) (Loads were held for 10 seconds)		
	960 Pa (20.05 psf) (positive)	10.8 mm (0.42")	See Note #3
	960 Pa (20.05 psf) (negative)	9.8 mm (0.38")	See Note #3

Note #3: *The deflections reported are not limited by AAMA/WDMA/CSA 101/I.S.2/A440-05 for this product designation. The deflection data is recorded in this report for special code compliance and information only.*

4.4.2.6	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the exterior meeting rail) (Loads were held for 10 seconds)		
	1440 Pa (30.08 psf) (positive)	0.5 mm (0.02")	4.8 mm (0.19") max.
	1440 Pa (30.08 psf) (negative)	0.5 mm (0.02")	4.8 mm (0.19") 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 and are representative of the test specimen reported herein.

List of Official Observers:

<u>Name</u>	<u>Company</u>
Mason Kelly	Architectural Testing, Inc
David Douglass	Architectural Testing, Inc
Derek Spencer	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. 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.

Derek Spencer
Technician

Kenny C. White
Laboratory Manager

DS:ms/ss

Attachments (pages): This report is complete only when all attachments listed are included.

Appendix-A: Alteration Addendum (1)

Appendix-B: Drawings (10) 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	02/10/09	N/A	Original report issue

Appendix A

Alteration Addendum

Alteration #1: Date – 08/07/08
Cause for alteration – Failure during water penetration testing
Remedial action taken – Sealed meeting rail to jambs from interior

Appendix B

Drawings

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