

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

Rendered to:

REHAU CONSTRUCTION LLC

**SERIES/MODEL: 2171
PRODUCT TYPE: Sliding Patio Door (XO)**

Title	Summary of Results
Primary Product Designator	Class R-PG35 1829 x 2134 (72 x 84)-SD
Design Pressure	± 1680 Pa (± 35.11 psf)
Operating Force (in motion)	49 N (11 lbf)
Air Infiltration	1.1 L/s/m ² (0.21 cfm/ft ²)
Canadian Air Infiltration/Exfiltration Level	A2
Water Penetration Resistance Test Pressure	260 Pa (5.43 psf)
Uniform Load Structural Test Pressure	± 2520 Pa (± 52.66 psf)
Forced Entry Resistance	Grade 30

Test Completion Date: 05/14/09

Reference must be made to Report No. 91668.02-109-47, dated 06/02/09 for complete test specimen description and data.

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

Rendered to:

REHAU CONSTRUCTION LLC
1501 Edwards Ferry Road. N.E.
Leesburg, Virginia 20176

Report No.: 91668.02-109-47

Test Dates: 05/12/09

Through: 05/14/09

Report Date: 06/02/09

Test Record Retention Date: 05/14/13

Project Summary: Architectural Testing, Inc. was contracted by REHAU Construction LLC to witness and validate testing on a Series/Model 2171, sliding patio door (XO) REHAU Construction LLC test facility in Leesburg, Virginia. The sample tested successfully met the performance requirements for a Class R-PG35 1829 x 2134 (72 x 84)-SD rating. Test specimen description and results are reported herein. The sample was provided by the client.

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:

Series/Model: 2171

Product Type: Sliding Patio Door (XO)

Overall Size: 1829 mm (72") wide by 2134 mm (84") high

Panel Size: 914 mm (36") wide by 2067 mm (81-3/8") high

Fixed Daylight Opening Size: 772 mm (30-3/8") wide by 1938 mm (76-1/4") high

Screen Size: 914 mm (36") wide by 2083 mm (82") high

Overall Area: 3.9 m² (42 ft²)

Test Specimen Description: (Continued)

Finish: All vinyl was white.

Frame Construction: The frame was constructed of extruded PVC with mitered and welded corners. The sill utilized an extruded snap-in PVC roller track for the screen (reference Drawing #RDL/QCL1845-3) and for the operable panel (reference Drawing #RDL/QCL 1800-2). An extruded PVC snap-in threshold was located in the exterior sill track in front of the operable panel and was sealed in place with silicone.

Panel Construction: The fixed and operable panels were constructed from extruded PVC with mitered and welded corners. The fixed panel was snap-fit into the frame and secured with #10 x 1-1/2" long Phillips pan head screws, located 6" from each end and one midspan. The exterior perimeter of the fixed panel was sealed to the frame with silicone. The fixed meeting stile and the operable meeting stile utilized an extruded snap-in PVC interlock, secured using two #8 x 5/8" long Phillips pan head screws, located 1" from each end.

Weatherstripping:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
0.187" backed by 0.310" high polypile with center fin	1 Row	Operable panel interlock
0.187" backed by 0.270" high polypile with center fin	2 Rows	Head, sill, and jambs at the interior panel track
0.187" backed, 1/4" diameter foam-filled vinyl bulb	1 Row	Fixed interlock

Glazing Details: The unit was glazed with 1" thick sealed insulating glass, constructed from two sheets of 1/8" thick clear tempered glass with a desiccant-filled aluminum box spacer system. The fixed panel was glazed from the exterior and the operable panel was glazed from the interior. All glass was set against a bead of silicone and secured with extruded PVC snap-in glazing beads with a co-extruded vinyl fin.

Drainage:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
1" long by 1/4" wide weepslot	3	Each end and midspan of the interior panel track, draining into the interior sill hollow

Test Specimen Description: (Continued)

Drainage: (Continued)

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
1" long by 1/4" wide weepslot	3	4" from each end and midspan of the interior sill hollow, draining to the intermediate sill hollow
1" long by 1/4" wide weepslot	3	4" from each end and midspan of the intermediate sill hollow, draining to the exterior sill hollow
1" long by 1/8" wide weepslot	3	4" from each end and midspan of the sill, draining the unit
1/8" diameter weephole	2	Each end of the screen track

Hardware:

<u>Description</u>	<u>Quantity</u>	<u>Location</u>
Pull handle with two point lock	1	Lock stile, 40" from bottom rail
Metal lock keeper	1	Lock jamb, 40" from sill
Dual wheel roller assembly	2	One at each end of operable panel bottom rail

Reinforcement: The operable panel lock stile and meeting stile were reinforced with "U" shaped, roll-formed aluminum, (reference Drawing #RDL1826). The fixed meeting stile utilized "U" shaped steel reinforcement, (reference Drawing #RDL1968).

Screen Construction: The screen was constructed of roll-formed steel members. Corners were mitered and secured with steel corner keys and one #5 x 2-1/2" long Phillips head screw. The screen mesh was secured with a flexible vinyl spline. A roller assembly was utilized at each end of the bottom rail.

Installation: The unit was installed into a Spruce-Pine-Fir wood buck. The unit was secured through the jambs with #10 x 2" long Phillips pan head screws, located 4" from each end and spaced 18" on center. The head was secured to the buck using #10 x 2" long Phillips pan head screws, located 17" from each end and one midspan. Two 0.035" thick steel straps were utilized at the lock keeper on the jamb. The straps were secured to the buck using two #10 x 2" long Phillips pan head screws each and were secured to the jamb through the lock keeper using five #10 x 2" long Phillips pan head screws each. The exterior and interior perimeters were sealed with silicone.

Test Results: The temperature during testing was 18°C (65°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		
	Initiate motion	62 N (14 lbf)	135 N (30 lbf)
	Maintain motion	49 N (11 lbf)	90 N (20 lbf)
	Locks	13 N (3 lbf)	100 N (22.5 lbf)
5.3.2.1	Air Leakage Resistance per ASTM E 283		
	<u>Infiltration</u>		
	75 Pa (1.6 psf)	1.1 L/s/m ² (0.21 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²) max.
	<u>Exfiltration</u>		
	75 Pa (1.6 psf)	0.2 L/s/m ² (0.04 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²) max.
5.3.2.2	Canadian Air Infiltration/Exfiltration Level = A2		
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 (with and without insect screen)		
	140 Pa (2.93 psf)	No leakage	No leakage
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 842		
	Type: A	Grade: 30	
	Disassembly Test	No entry	No entry
	Tests A1 through A6	No entry	No entry
	Sash/Panel Manipulation Test	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 (70 lbf)		
	Lock stile	1.0 mm (0.04")	14.2 mm (0.56")
	Meeting stile	1.0 mm (0.04")	14.2 mm (0.56")
	In remaining direction - 230 N (50 lbf)		
	Top rail	0.5 mm (0.02")	14.2 mm (0.56")
	Bottom rail	0.5 mm (0.02")	14.2 mm (0.56")

Optional Performance

4.3.2.1	Water Penetration Resistance per ASTM E 547 (with and without insect screen) 260 Pa (5.43 psf)	No leakage	No leakage
4.3.2.1	Uniform Load Deflection per ASTM E 330 (Deflections were taken on the meeting stile) (Loads were held for 10 seconds)		
	1680 Pa (35.11 psf) (positive)	11.7 mm (0.46")	See Note #3
	1680 Pa (35.11 psf) (negative)	33.5 mm (1.32")	See Note #3

Note #3: *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.*

4.3.2.1	Uniform Load Structural per ASTM E 330 (Permanent sets were taken on the meeting stile) (Loads were held for 10 seconds)		
	2520 Pa (52.66 psf) (positive)	0.5 mm (0.02")	8.4 mm (0.33") max.
	2520 Pa (52.66 psf) (negative)	0.5 mm (0.02")	8.4 mm (0.33") 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>
Jim Reed Emily C. Riley	REHAU Construction LLC 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 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.

Emily C. Riley
Technician

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

ECR:vlm

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

Appendix-A: Alteration Addendum (1)

Appendix-B: Test Equipment (1)

Appendix-C: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	06/02/09	N/A	Original report issue

Appendix A

Alteration Addendum

- Alteration #1:** Date-05/13/09
Cause for alteration - failed water test at 4.60 psf
Remedial action taken - added sill adapter
- Alteration #2:** Date-05/14/09
Cause for alteration - failed Grade 30 Forced Entry Resistance
Remedial action taken - added three #10 x 3" screws through lock keeper
into buck

Appendix B

Test Equipment

Instrument	Manufacturer	Asset #
Upright Control Panel (Blower)	Architectural Testing, Inc.	REHAU-1
Spray Racks (2)	Architectural Testing, Inc.	REHAU-A/B
4" Digital Indicator	CDI Chicago	031563273
4" Digital Indicator	CDI Chicago	983424920
4" Digital Indicator	CDI Chicago	031563272
Architectural Testing, Inc. Lab Pack (blower)	Architectural Testing, Inc.	005102
Force Gauge	Ashcroft	9816
Force Gauge	Chatillon	160
Spring Scale	Hanson	70418-29
Deglazing tool	Allenair	57

Appendix C

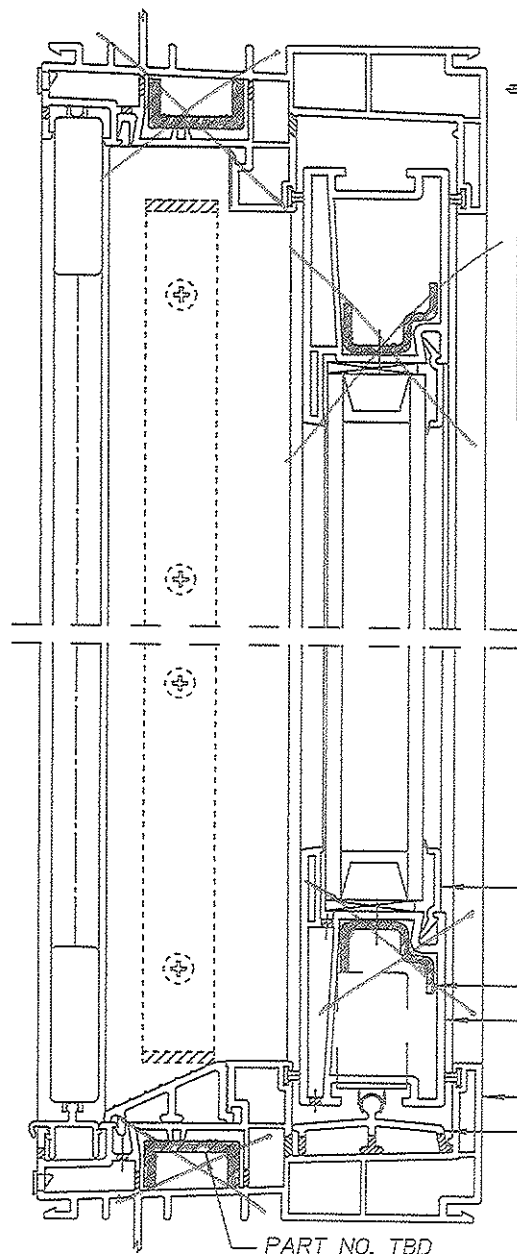
Drawings

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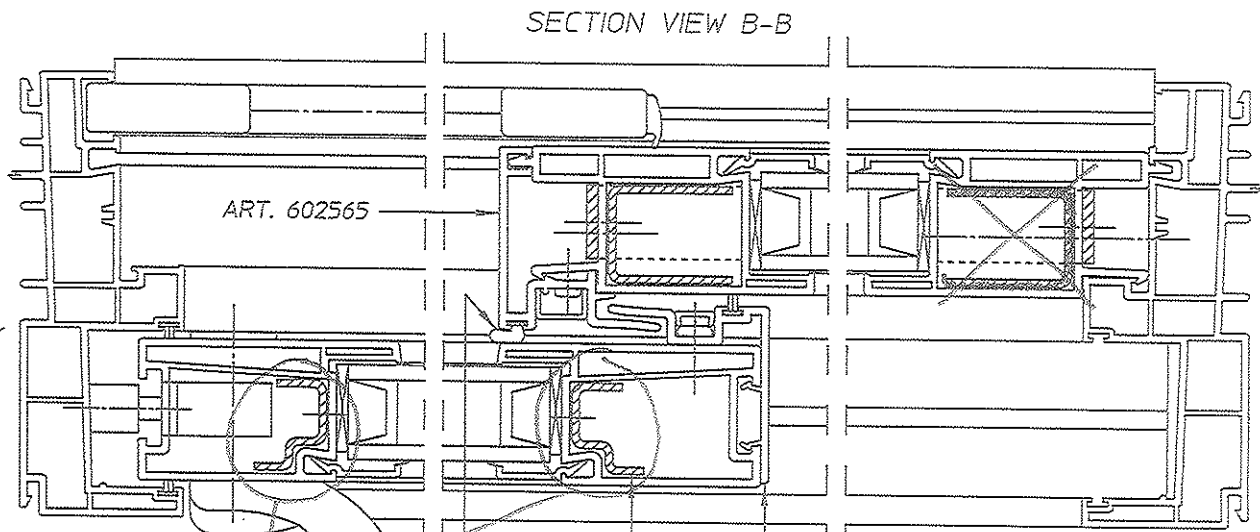
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REHAU

Series: 2170 PATIO DOOR
Title: FIXED SASH PANEL PATIO DOOR (DP-45)
Date: 10/03 Scale: 1/2 CAD File No.: DS2170-03



SECTION VIEW A-A



ART. 602565

Incorrect
Reinforcement
Reference Drawing # 601956

ART. 602575

ART. 600616

ART. 601896 Architectural Testing

Test sample complies with these details.
Deviations are noted.

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ART. 601906

ART. 600606

ART. 601846

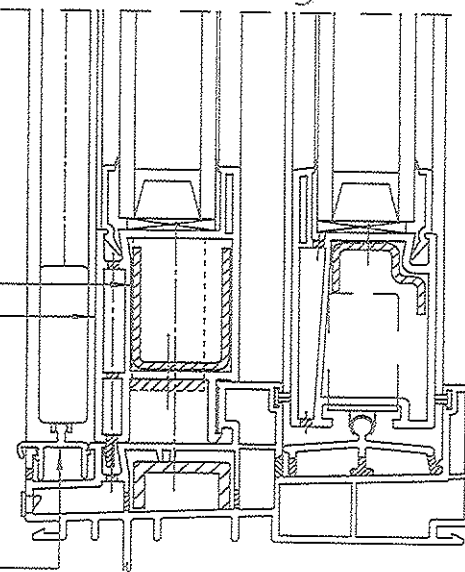
ART. 600616

ART. 601886

ART. 601866

ART. 601876

ART. 601986
OR ART. 602545



SECTION VIEW C-C

