



NATIONAL CERTIFIED TESTING LABORATORIES

FIVE LEIGH DRIVE • YORK, PENNSYLVANIA 17406 • TELEPHONE (717) 846-1200
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AAMA/WDMA/CSA 101/I.S.2/A440-11
AAMA/WDMA/CSA 101/I.S.2/A440-08
CSA A440S1-09

TEST REPORT SUMMARY

Rendered to:

REHAU CONSTRUCTION, LLC.
1501 Edwards Ferry Road, NE
Leesburg, VA 20176

PRODUCT TYPE: Fixed Window

SERIES/ MODEL: "190"

Title	Summary of Results
Primary Product Designator AAMA/WDMA/CSA 101/I.S.2/A440-11 AAMA/WDMA/CSA 101/I.S.2/A440-08	Class LC-PG45: Size tested 1829 x 1829 mm (~72 x 72 in) - Type FW Class LC-PG45: Size tested 1829 x 1829 mm (72 x 72 in) - Type FW
Positive Design Pressure	+2160 Pa (+45.11 psf)
Negative Design Pressure	-2160 Pa (-45.11 psf)
Air Infiltration	0.1 L/s/m ² (<0.01 cfm/ft ²)
Canadian Air Infiltration/Exfiltration	Fixed Level
Water Penetration Resistance Test Pressure	440 Pa (9.19 psf)
Uniform Load Structural Test Pressure	±3240 Pa (67.67 psf)
Forced Entry Resistance	ASTM F588-07 - Grade 10 Pass

Test Completed: 10/10/14

Revision Date: 10/22/14

Reference must be made to Report No. NCTL-110-17468-1 dated 10/20/14 for complete test specimen description and data.

For National Certified Testing Laboratories


DIGITAL SIGNATURE

Jay Leader
Technician



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**AAMA/WDMA/CSA 101/I.S.2/A440-11
AAMA/WDMA/CSA 101/I.S.2/A440-08
CSA A440S1-09**

STRUCTURAL TEST REPORT

NCTL-110-17468-1

REPORT TO:
REHAU CONSTRUCTION, LLC.
1501 EDWARDS FERRY ROAD, NE
LEESBURG, VA 20176

REPORT NUMBER: NCTL-110-17468-1
REPORT DATE: 10/20/14
REVISION DATE: 10/22/14

PRODUCT:
"190"
FIXED WINDOW



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Report Number	NCTL-110-17468-1
Report Date	10/20/14
Revision Date	10/22/14
Report To	Rehau Construction, LLC. 1501 Edwards Ferry Road, NE Leesburg, VA 20176
Test Date	10/10/14
Specification	AAMA/WDMA/CSA 101/I.S.2/A440-11 NAFS 2011 - North American Fenestration Standard/Specification for windows, doors, and skylights AAMA/WDMA/CSA 101/I.S.2/A440-08 NAFS North American Fenestration Standard/Specification for windows, doors, and skylights CSA A440S1-09 Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard/Specification for windows, doors, and skylights
Performance Results	<u>AAMA/WDMA/CSA 101/I.S.2/A440-11</u> Class LC-PG45: Size tested 1829 x 1829 mm (~72 x 72 in)-Type FW <u>AAMA/WDMA/CSA 101/I.S.2/A440-08</u> Class LC-PG45: Size tested 1829 x1829 mm (72 x 72 in)-Type FW
<u>Description of Specimen Tested</u>	
Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.	
Model/ Series	"190"
Configuration	Fixed Lite
Frame Size	<u>Overall</u> 1829 mm x 1829 mm (72" x 72")
Fixed Lite Viewing Area	1759 mm x 1759 mm (69.25" x 69.25")
Frame Type	Extruded vinyl
Joint Construction	<u>Frame</u> Mitered, welded
Glazing Components	
Overall	19.05 mm (0.750") nominal
Glass Thickness	(2) Lites of 5 mm (0.185") nominal tempered glass
Spacer Type/Size	9.65 mm (0.380") Dessicant-filled aluminum spacer (Type A1-D)
Glazing System	Exterior glazed with a foam tape back-bedding and a snap-in rigid vinyl glazing bead

Weatherstrip	No weatherseals employed
Operating Hardware	No operating hardware
Auxiliary	No auxiliary items employed
Reinforcement	No reinforcement employed
Weep Description	
Size	25.4 mm (1.0") wide by 6.35 mm (0.25") high with plastic weep cover
Location	88.9 mm (3.5") from each end of the exterior sill face
Size	4.78 mm (0.188") Diameter
Location	130.18 mm (5.125") From each end of the sill glazing track
Interior/ Exterior Surface Finish	White vinyl (PVC)
Sealant	No apparent sealant applied
Insect Screen	No screen employed
Installation Method	The window was installed in a 50.8 mm x 203.2 mm (2" x 8") spruce-pine-fir lumber test buck and secured with (1) #10 x 15.88 mm (0.625") pan head screw located at 101.6 mm (4") from each end and 101.6 mm (4") on center thereafter through the nail fin. The exterior perimeter was sealed with silicone.

Test Results - AAMA/WDMA/CSA 101/I.S.2/A440-2011& 2008

<u>Paragraph</u>	<u>Test</u>
5.3.2.1/ 9.3.2	Air Leakage Resistance ASTM E283-04(12)
	The tested specimen meets or exceeds the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-2011 and 2008 for air infiltration at 75 Pa (1.6 psf).
	Maximum Allowable = 1.5 L/s/m ² (0.3 cfm/ft ²)
	Extraneous Air Leakage = 0.28 L/s (0.60 cfm)
	Total Air Leakage = 0.28 L/s (0.60 cfm)
	Air Infiltration Rate = 0.1 L/s/m ² (<0.01 cfm/ft ²)

<u>Paragraph</u>	<u>Test</u>
5.3.3/ 9.3.3	Water Penetration Resistance ASTM E547-00(09)
	<u>3.4 L/ (min• m²) (5.0 gph/ft²)</u>
	No Leakage after 4 cycles of 5 minutes at 440 Pa (9.19 psf)
	NOTE: Tested without insect screen

Paragraph Test
 5.3.4.2/ 9.3.4.2 Uniform Load Deflection at Design Pressure
 ASTM E330-14

No damage after positive	2160 Pa (45.11 psf) held for 10 seconds
No damage after negative	2160 Pa (45.11 psf) held for 10 seconds
Measured Deflection _{Positive}	= 2.01 mm (0.079 inches)
Measured Deflection _{Negative}	= 5.97 mm (0.235 inches)

Paragraph Test
 5.3.4.3/ 9.3.4.3 Uniform Load Structural Test
 ASTM E330-14

No damage after positive	3240 Pa (67.67 psf) held for 10 seconds
No damage after negative	3240 Pa (67.67 psf) held for 10 seconds
Measured Permanent Set _{Positive}	= 0.38 mm (0.015 inches)
Measured Permanent Set _{Negative}	= 0.97 mm (0.038 inches)
Maximum Allowed (0.4%)	= 7.32 mm (0.288 inches)

NOTE: Deflection and Permanent Set measurements taken on the jamb over a 1829 mm (72") span.

Paragraph Test
 5.3.5/ 9.3.5 Forced Entry Resistance
 ASTM F588-07

Type D Window Assembly/ Grade 10: = Pass

<u>Test</u>	
Disassembly	= No Entry
Sash Manipulation	= No Entry

NOTE: 1. T1 = 5 minutes, L1 = 667 N (150 lbf), L2 = 333 N (75 lbf), L3 = 111 N (25 lbf)
 2. Loads were held for 60 seconds.

Paragraph Test
 5.3.6.2/ 9.3.6.2 Thermoplastic Corner Weld Test (PVC products only) = Pass

Test Results - CSA A440S1-09

Paragraph Test
 5.3 Canadian Air Infiltration/Exfiltration
 ASTM E283-04(12)

The tested specimen meets or exceeds the performance levels specified in CSA A440S1-09 for air infiltration at 75 Pa (1.57 psf)

Fixed Level Maximum Allowable = 0.2 L/s/m² (0.04 cfm/ft²)

Infiltration

Extraneous Air Leakage _{Tare}	= 0.28 L/s (0.60 cfm)
Total Air Leakage	= 0.28 L/s (0.60 cfm)
Air Infiltration Rate	= 0.1 L/(s•m ²) (<0.01 cfm/ft ²)

Exfiltration

Extraneous Air Leakage _{Tare}	= 0.28 L/s (0.60 cfm)
Total Air Leakage	= 0.28 L/s (0.60 cfm)
Air Exfiltration Rate	= 0.1 L/(s•m ²) (<0.01 cfm/ft ²)

<u>Paragraph</u>	<u>Test</u>
5.4	Water Penetration Resistance ASTM E547-00(09)

No Leakage after 4 cycles of 5 minutes at 440 Pa (9.19 psf)

NOTE: Tested without insect screen

This test report was prepared by National Certified Testing Laboratory (NCTL), for the exclusive use of the above named client and it does not constitute certification of this product. The results are for the particular specimen tested and do not imply the quality of similar or identical products manufactured or installed from specifications identical to the tested product. The test specimen was supplied to NCTL by the above named client. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen are to be drawn from the ASTM E330 test. Forced entry resistance test equipment used is in compliance with Section 7 of the ASTM F588-07 test method. Foam tape is mounted to the perimeter of the test buck prior to clamping to the test wall. NCTL is a testing lab and assumes that all information provided by the client is accurate and does not guarantee or warranty any product tested or installed. The results in this report are actual tested values and are applicable to the specimen tested only, using the components and construction methods described herein.

Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. Component drawings were reviewed for product verification. The bill of materials contains details with any deviations noted. Ambient conditions during the referenced testing are available upon request. A copy of this report along with representative sections of the test specimen will be retained by NCTL. This report does not constitute certification or approval of the product, which may only be granted by a certification program validator or recognized approval entity. All tests were conducted in full compliance with the referenced specifications and/or test methods. This report is the joint property of National Certified Testing Laboratories Inc. and the Client to whom it is issued. Permission to reproduce this report by anyone other than National Certified Testing Laboratories Inc and the Client must be granted in writing by both of the above parties. This report may not be reproduced, except its entirety, without the written consent of NCTL.

National Certified Testing Laboratories



DIGITAL SIGNATURE

Jay Leader
Technician



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Robert H. Zeiders, P.E.
Vice-President Engineering & Quality

NJL/ drn

Attachments

Appendix A – Revision Summary

Appendix B – Drawings

Appendix A

Section 1:

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were Reviewed (as submitted) for Product Verification
(Reference: NCTL-110-17468-1)

See Attached Documentation;
any deviations noted.

Note: The above referenced component drawings (if applicable) along with representative sections of the test specimen will be retained per procedure by NCTL. This testing facility assumes that all information provided by the client is accurate.

Section 2:

<u>Identification</u>	<u>Date</u>	<u>Page & Revision</u>
Original Issue	10/20/14	Not Applicable
Revision 01	10/22/14	Added weep to weep description

Appendix B

Drawings

BILL OF MATERIALS

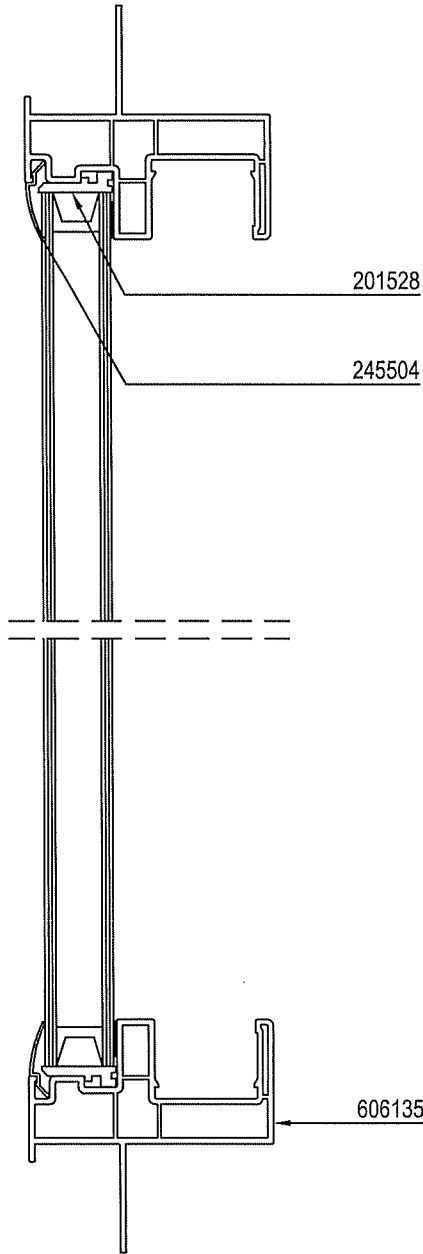


Product: 190 - Fixed Window

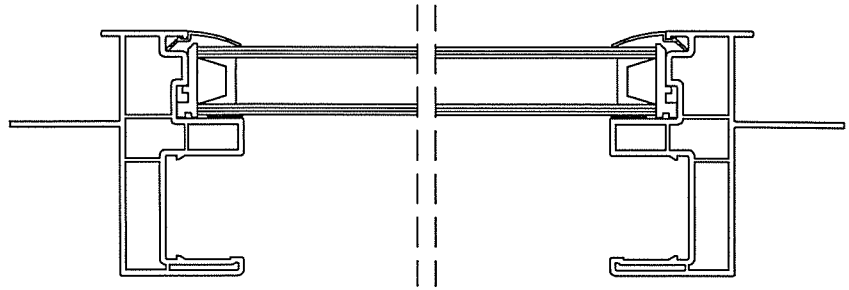
Article / Part No.	Description
606135	Single Hung / Single Slider Frame w/ Stucco Key
245504	Standard Glazing Stop
201528	Fixed Lite Setting Block
Notes: Quantity estimate based on rough estimate	

TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED
REPORT NO. NCTL-110- 17468-1
TEST DATE 10/10/14

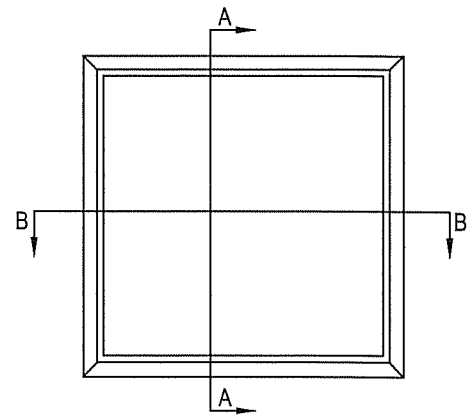
A - A



B - B



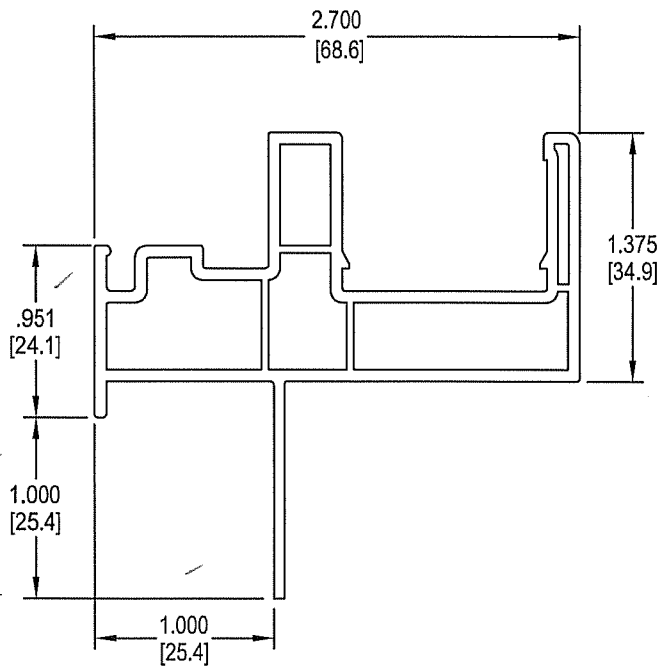
TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED
REPORT NO. NCTL-110- 17468-1
TEST DATE 10/10/14



		 REHAU Construction LLC 1501 Edwards Ferry Road, NE Leesburg, Virginia 20176 Tel: (703) 777-5255	System: 190		
			Title: Fixed Window		
			Date: 10/20/2014	Scale: 1:2	Drawn by: JWB
				Drawing No.: 2412-14-146	Rev.:
Rev #	Revision Description & Date		© 2014 REHAU. Do not disclose without written permission		

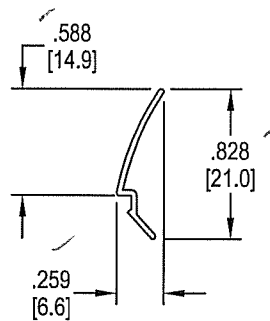
TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED
REPORT NO. NCTL-110- 17468-1
TEST DATE 10/10/14

Art. 606135
Single Hung / Single Slider Frame w/ Stucco Key



			System: 190		
			Title: Single Hung / Single Slider Frame w/ Stucco Key (Art. 606135)		
			Date: 10/20/2014	Scale: 1:1	Drawn by: JWB
			Drawing No.: TDS_606135		Rev.:
			© 2014 REHAU. Do not disclose without written permission		
Rev #	Revision Description & Date	REHAU Construction LLC 1501 Edwards Ferry Road, NE Leesburg, Virginia 20176 Tel: (703) 777-5255			

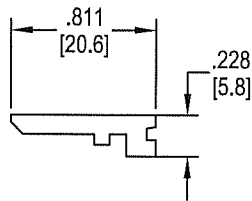
Art. 245504
Standard Glazing Stop



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ANY DEVIATION IS NOTED
REPORT NO. NCTL-110- 17468-1
TEST DATE 10/10/14

			System: 190		
			Title: Standard Glazing Stop (Art. 245504)		
			Date: 02/07/2014	Scale: 1:1	Drawn by: JWB
			Drawing No.: TDS_245504		Rev.:
			© 2013 REHAU. Do not disclose without written permission		
Rev #	Revision Description & Date	REHAU Construction LLC 1501 Edwards Ferry Road, NE Leesburg, Virginia 20176 Tel: (703) 777-5255			

Art. 201528
Fixed Lite Setting Block



TEST SPECIMEN COMPLIES
WITH THESE DETAILS.
ANY DEVIATION IS NOTED
REPORT NO. NCTL-110- 17468-1
TEST DATE 10/10/14

			System: 190		
			Title: Fixed Lite Setting Block (Art. 201528)		
			Date: 02/07/2014	Scale: 1:1	Drawn by: JWB
			Drawing No.: TDS_201528		Rev.:
Rev #	Revision Description & Date	REHAU Construction LLC 1501 Edwards Ferry Road, NE Leesburg, Virginia 20176 Tel: (703) 777-5255	© 2013 REHAU. Do not disclose without written permission		