

**NFRC 102-2010 THERMAL PERFORMANCE  
TEST REPORT**

**Rendered to:**

**CR LAURENCE CO., INC.**

**SERIES/MODEL: 8200 Horizontal Slider**

**TYPE: Horizontal Slider (Single)**

<b>Summary of Results</b>		
<b>Standardized Thermal Transmittance (U-Factor)</b>		0.47
<b>Unit Size:</b>		59" x 47-1/4" (1499 mm x 1200 mm) (Model Size)
<b>Layer 1:</b>	1/4"	Clear
<b>Gap 1:</b>	0.50"	A1-D: Aluminum Spacer
<b>Layer 2:</b>	1/4"	PPG Solarban 70XL (e=0.018*, #3)

Reference must be made to Report No. E0619.01-116-46, dated 01/16/15 for complete test specimen description and data.

**NFRC 102-2010 THERMAL PERFORMANCE TEST REPORT**

Rendered to:

CR LAURENCE CO., INC.  
2100 East 38th Street  
Vernon, California 90058

Report Number: E0619.01-116-46  
Test Date: 12/18/14  
Report Date: 01/16/15

**Test Sample Identification:**

**Series/Model:** 8200 Horizontal Slider

**Type:** Horizontal Slider (Single)

**Overall Size:** 59" x 47-1/4" (1499 mm x 1200 mm) (Model Size)

**NFRC Standard Size:** 59.1" x 47.2" (1500 mm wide x 1200 mm high)

**Test Sample Submitted by:** Client

**Test Sample Submitted for:** Validation for Initial Certification (Production Line Unit) & Plant Qualification

**Test Procedure:** U-factor tests were performed in a Guarded Hot Box in accordance with NFRC 102-2010, *Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems*.

**Test Results Summary:**

Standardized U-factor (U<sub>st</sub>): 0.47 Btu/hr·ft<sup>2</sup>·F (CTS Method)

**Test Sample Description:****Frame:**

<b>Material:</b>	AT (0.25"): Aluminum with Thermal Breaks - All Members*		
<b>Size:</b>	59" x 47-1/4" (Model Size)		
<b>Daylight Opening:</b>	25-1/2" x 38-3/8"	<b>Glazing Method:</b>	Exterior
<b>Exterior Color:</b>	Clear	<b>Exterior Finish:</b>	Anodized
<b>Interior Color:</b>	Clear	<b>Interior Finish:</b>	Anodized
<b>Corner Joinery:</b>	Coped / Screws / Sealed		

\*Fixed meeting stile was AT (0.25"). Head, sill and jambs were AT (0.31")

**Active Sash:**

<b>Material:</b>	AT (0.25"): Aluminum with Thermal Breaks - All Members		
<b>Size:</b>	30-1/4" x 42-3/4"		
<b>Daylight Opening:</b>	25-1/2" x 38-3/8"	<b>Glazing Method:</b>	Exterior
<b>Exterior Color:</b>	Clear	<b>Exterior Finish:</b>	Anodized
<b>Interior Color:</b>	Clear	<b>Interior Finish:</b>	Anodized
<b>Corner Joinery:</b>	Coped / Screws / Sealed		

**Glazing Information:**

<b>Layer 1:</b>	1/4"	Clear	
<b>Gap 1:</b>	0.50"	A1-D: Aluminum Spacer	100% Air*
<b>Layer 2:</b>	1/4"	PPG Solarban 70XL (e=0.018*, #3)	
<b>Gas Fill Method:</b>	N/A*		

\*Stated per Client/Manufacturer

N/A Non-Applicable

**Test Sample Description: (Continued)****Weatherstripping:**

Description	Quantity	Location
EPDM wedge gasket	1 row	Exterior glazing perimeter
Compression gasket	1 row	Interior glazing perimeter
Polypile with center fin	1 row	Head, sill, active jamb, fixed and active meeting stile
Vinyl glide strip	1 row	Head, sill, active jamb

**Hardware:**

Description	Quantity	Location
Spring-loaded latch	1	Active meeting stile
Metal keeper	1	Fixed meeting stile
Roller assembly	1 set	Bottom corners of active sash
Metal glide track	1	Active sash track sill
Aluminum insert	1	Fixed sash track sill
Aluminum insert	1	Active sash track at fixed jamb
Aluminum insert	1	Fixed sash track at active jamb

**Drainage:**

Drainage Method	Size	Quantity	Location
Weepslot with cover	1.50" x 0.25"	2	Sill face

## Thermal Transmittance (U-factor)

### Measured Test Data

#### Heat Flows

1. Total Measured Input into Metering Box ( $Q_{\text{total}}$ )	805.48 Btu/hr
2. Surround Panel Heat Flow ( $Q_{\text{sp}}$ )	100.71 Btu/hr
3. Surround Panel Thickness	4.00 inches
4. Surround Panel Conductance	0.0461 Btu/hr·ft <sup>2</sup> ·F
5. Metering Box Wall Heat Flow ( $Q_{\text{mb}}$ )	40.38 Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0373*EMF + 0.300
7. Flanking Loss Heat Flow ( $Q_{\text{fl}}$ )	13.42 Btu/hr
8. Net Specimen Heat Loss ( $Q_s$ )	650.97 Btu/hr

#### Areas

1. Test Specimen Projected Area ( $A_s$ )	19.36 ft <sup>2</sup>
2. Test Specimen Interior Total (3-D) Surface Area ( $A_h$ )	22.23 ft <sup>2</sup>
3. Test Specimen Exterior Total (3-D) Surface Area ( $A_c$ )	23.01 ft <sup>2</sup>
4. Metering Box Opening Area ( $A_{\text{mb}}$ )	52.94 ft <sup>2</sup>
5. Metering Box Baffle Area ( $A_{\text{bl}}$ )	46.97 ft <sup>2</sup>
6. Surround Panel Interior Exposed Area ( $A_{\text{sp}}$ )	33.58 ft <sup>2</sup>

#### Test Conditions

1. Average Metering Room Air Temperature ( $t_h$ )	69.80 F
2. Average Cold Side Air Temperature ( $t_c$ )	-0.41 F
3. Average Guard/Environmental Air Temperature	71.25 F
4. Metering Room Average Relative Humidity	6.42 %
5. Metering Room Maximum Relative Humidity	6.91 %
6. Metering Room Minimum Relative Humidity	5.91 %
7. Measured Cold Side Wind Velocity (Perpendicular Flow)	12.66 mph
8. Measured Warm Side Wind Velocity (Parallel Flow)	NA mph
9. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04" H <sub>2</sub> O

#### Average Surface Temperatures

1. Metering Room Surround Panel	65.54 F
2. Cold Side Surround Panel	0.52 F

#### Results

1. Thermal Transmittance of Test Specimen ( $U_s$ )	0.48 Btu/hr·ft <sup>2</sup> ·F
2. Standardized Thermal Transmittance of Test Specimen ( $U_{\text{st}}$ )	0.47 Btu/hr·ft <sup>2</sup> ·F

## Thermal Transmittance (U-factor)

### Calculated Test Data

#### CTS Method

1. Warm Side Emittance of Glass ( $e_1$ )	0.84
2. Cold Side Emittance of Glass	0.84
3. Warm Side Frame Emittance*	0.80
4. Cold Side Frame Emittance*	0.80
5. Warm Side Sash/Panel/Vent Emittance*	0.80
6. Cold Side Sash/Panel/Vent Emittance*	0.80
7. Warm Side Baffle Emittance ( $e_{b1}$ )	0.92
8. Cold Side Baffle Emittance ( $e_{b2}$ )	N/A
9. Equivalent Warm Side Surface Temperature	44.75 F
10. Equivalent Cold Side Surface Temperature	6.15 F
11. Warm Side Baffle Surface Temperature	69.49 F
12. Cold Side Baffle Surface Temperature	N/A F
13. Measured Warm Side Surface Conductance ( $h_h$ )	1.34 Btu/hr·ft <sup>2</sup> ·F
14. Measured Cold Side Surface Conductance ( $h_c$ )	5.13 Btu/hr·ft <sup>2</sup> ·F
15. Test Specimen Thermal Conductance ( $C_s$ )	0.87 Btu/hr·ft <sup>2</sup> ·F
16. Convection Coefficient ( $K_c$ )	0.28 Btu/(hr·ft <sup>2</sup> ·F <sup>1.25</sup> )
17. Radiative Test Specimen Heat Flow ( $Q_{r1}$ )	354.55 Btu/hr
18. Conductive Test Specimen Heat Flow ( $Q_{c1}$ )	296.42 Btu/hr
19. Radiative Heat Flux of Test Specimen ( $q_{r1}$ )	18.31 Btu/hr·ft <sup>2</sup> ·F
20. Convective Heat Flux of Test Specimen ( $q_{c1}$ )	15.31 Btu/hr·ft <sup>2</sup> ·F
21. Standardized Warm Side Surface Conductance ( $h_{sth}$ )	1.27 Btu/hr·ft <sup>2</sup> ·F
22. Standardized Cold Side Surface Conductance ( $h_{stc}$ )	5.28 Btu/hr·ft <sup>2</sup> ·F
23. Standardized Thermal Transmittance ( $U_{st}$ )	0.47 Btu/hr·ft <sup>2</sup> ·F

#### Test Duration

1. The environmental systems were started at 17:22 hours, 12/17/14.
2. The test parameters were considered stable for two consecutive four hour test periods from 22:02 hours, 12/17/14 to 06:02 hours, 12/18/14.
3. The thermal performance test results were derived from 02:02 hours, 12/18/14 to 06:02 hours, 12/18/14.

The reported Standardized Thermal Transmittance ( $U_{st}$ ) was determined using CTS Method, per Section 8.2(A) of NFRC 102.

\*Stated per NFRC 101

**Glazing Deflection:**

	<b>Frame</b>	<b>Active Sash</b>
Edge Gap Width	0.50"	0.50"
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.50"	0.50"
Center gap width at laboratory ambient conditions on day of testing	0.50"	0.50"
Center gap width at test conditions	0.41"	0.41"

*Glass collapse determined using a digital glass and air space meter*

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. The sample showed no evidence of condensation/frost at the conclusion of the test.

“This test method does not include procedures to determine the heat flow due to either air movement through the specimen or solar radiation effects. As a consequence, the thermal transmittance results obtained do not reflect performances which are expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that have the potential to occur due to the specific design and construction of the fenestration system opening. The latter can only be determined by in-situ measurements. Therefore, it is important to recognize that the thermal transmittance results obtained from this test method are for ideal laboratory conditions and should only be used for fenestration product comparisons and as input to thermal performance analyses which also include solar, air leakage and thermal bridge effects.”

The test sample was installed in a vertical orientation, the exterior of the specimen was exposed to the cold side. The direction of heat transfer was from the interior (warm side) to the exterior (cold side) of the specimen. The ratings were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy. The data acquisition frequency is 5 minutes.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 2.31%.

Required annual calibrations for the Architectural Testing Inc. 'thermal test chamber' (ICN 000001) in York, Pennsylvania were last conducted in May 2014 in accordance with Architectural Testing Inc. calibration procedure. A CTS Calibration verification was performed May 2014. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed September 2014.

"Ratings included in this report are for submittal to an NFRC licensed IA for certification purposes and are not meant to be used for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) are to be used for labeling purposes."

Architectural Testing, Inc. 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 Architectural Testing, Inc. for the entire test record retention period. The test record retention end date for this report is December 18, 2018.

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 tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

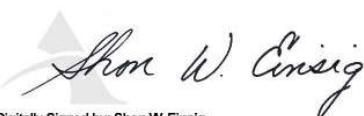
Tested By:



Digitally Signed by: Ryan P. Moser

Ryan P. Moser  
Technician

Reviewed By:



Digitally Signed by: Shon W. Einsig

Shon W. Einsig  
Senior Technician  
Individual-In-Responsible-Charge

RPM:klb  
E0619.01-116-46

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

- Appendix-A: CTS Calibration Data (1)
- Appendix-B: Surround Panel Wiring Diagram (1)
- Appendix-C: Baffle Wiring Diagram (1)
- Appendix-D: Submittal Form and Drawings (20)

 ACCREDITED	Architectural Testing, Inc. is accredited by the International Accreditation Service (IAS) under the specific test methods listed under lab code TL-144, in accordance with the recognized International Standard ISO/IEC 17025:2005. The laboratory's accreditation or test report in no way constitutes or implies product certification, approval, or endorsement by IAS.
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**Revision Log**

<b><u>Rev. #</u></b>	<b><u>Date</u></b>	<b><u>Page(s)</u></b>	<b><u>Revision(s)</u></b>
.01R0	01/16/15	All	Original Report Issue. Work requested by Gyu-Hyeon Kim of CR Laurence Co., Inc.

**Appendix A: CTS Calibration Data**

1. CTS Test Date	12/03/13
2. CTS Size	19.38 ft <sup>2</sup>
3. CTS Glass/Core Conductance	0.42 Btu/hr·ft <sup>2</sup> ·F
4. Warm Side Air Temperature	69.80 F
5. Cold Side Air Temperature	-0.40 F
6. Warm Side Average Surface Temperature	53.63 F
7. Cold Side Average Surface Temperature	3.69 F
8. Convection Coefficient (K <sub>c</sub> )	0.28 Btu/(hr·ft <sup>2</sup> ·F <sup>1.25</sup> )
9. Measured Cold Side Surface Conductance (h <sub>c</sub> )	5.13 Btu/hr·ft <sup>2</sup> ·F
10. Measured Thermal Transmittance	0.30 Btu/hr·ft <sup>2</sup> ·F

**Appendix B: Surround Panel Wiring Diagram**

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+2

+3

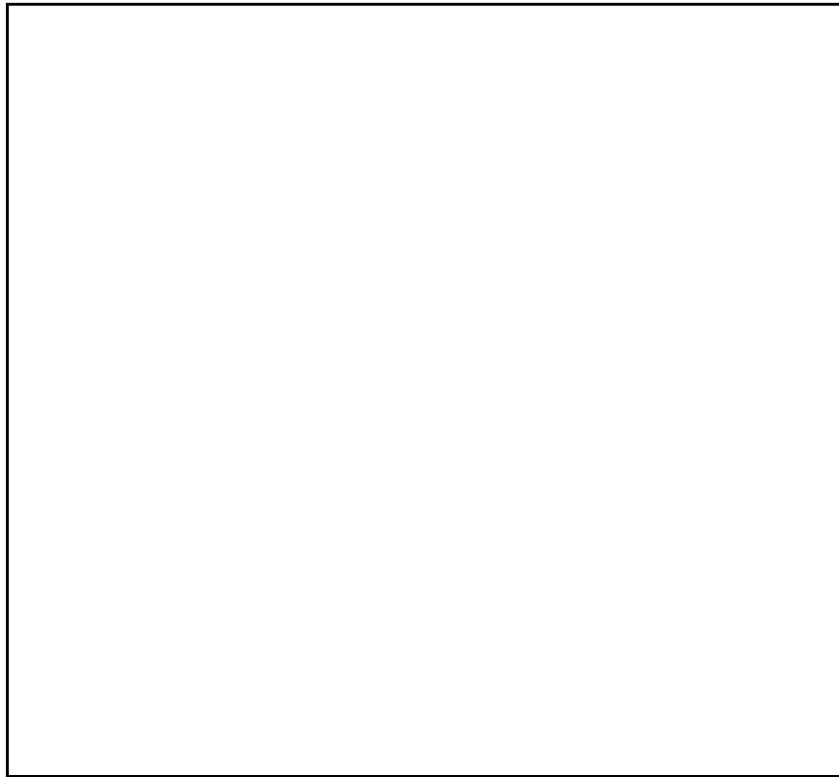
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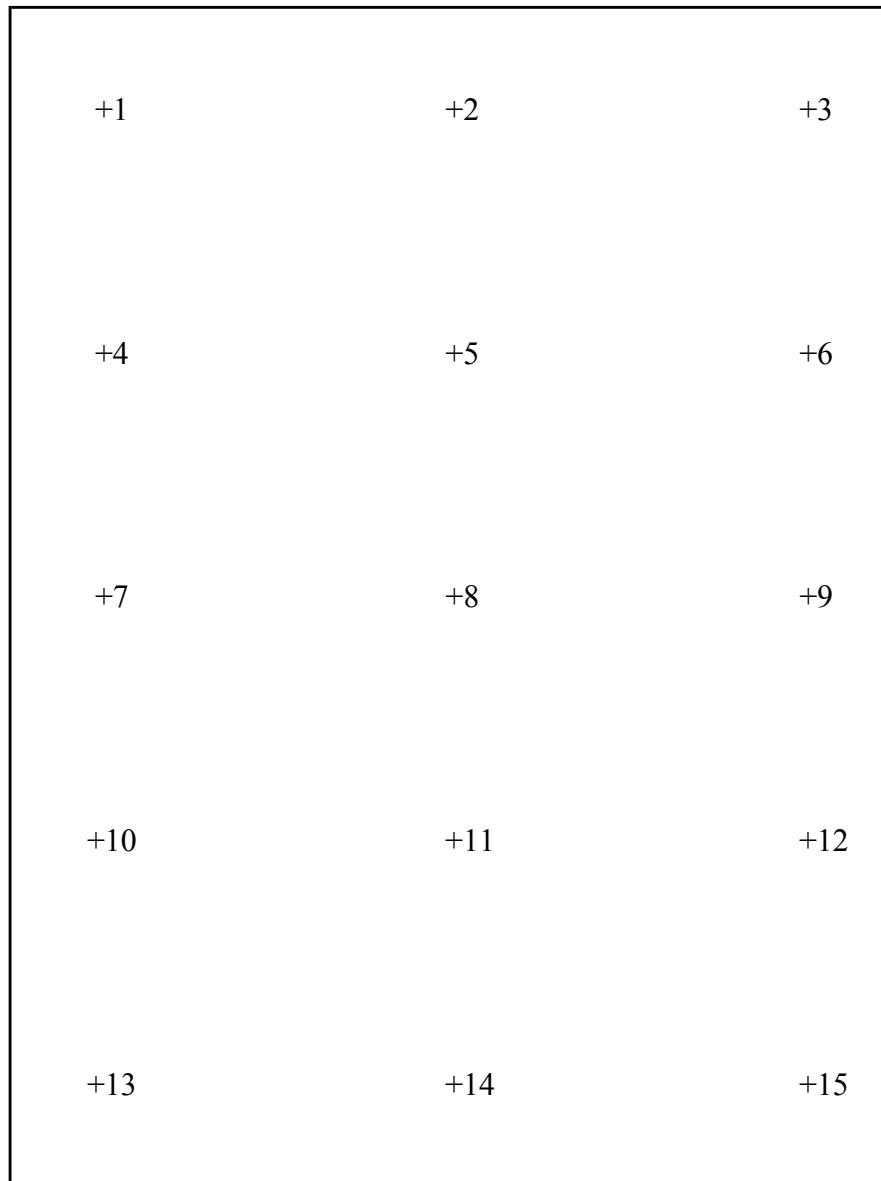
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**Appendix C: Baffle Wiring Diagram**

**Appendix D: Submittal Form and Drawings**

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## NFRC PRODUCT CERTIFICATION PROGRAM

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### Submittal Form for Test Samples

For use by manufacturers, lineal suppliers and fabricators



1. Information on Production of the Test Sample (complete ALL fields):

Manufacturer: CRL - US Aluminum Date of sample manufacture: 11/7/2014

Plant Address where manufactured: 2100 E 38th St

City: Los Angeles State: CA Zip Code: 90085-1617

Name of IA: Associated Laboratories, Inc Phone: (214)565-0593 Fax: (214)565-1094

2. Product Information (complete ALL fields):

Product Line ID (CPD) No.: 5559 Product/Operator Type  
(Table 4-3 of NFRC 100): Horizontal Slider

Series/Model: 8200 Horizontal Slider

3. Test sample is being submitted for (select ONE):

- a.  Validation for Initial Certification (prototype only) no plant qualification
- b.  Validation for Initial Certification (production line unit) & plant qualification
- c.  Validation for Recertification (production line unit) & plant qualification
- d.  Plant Qualification Only (production line unit)

I, Gyu Hyeon Kim, as the designated agent for CRL - US Aluminum

do hereby attest that the foregoing information is true to the best of my information, knowledge, and belief. Further, if the unit is identified in Section 3 as a production line unit, I hereby authorize the NFRC-accredited testing laboratory to send a copy of the test report to the IA identified above for plant qualification purposes pursuant to the NFRC Product Certification Program..

Signature: Gyu Hyeon Kim Digitally signed by Gyu Hyeon Kim  
Date: 2015.01.15 14:39:58 -08'00' Date: 1/15/2015

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#### FOR LABORATORY USE ONLY

1. Laboratory Architectural testing  
2. Date Sample Received: 11/11/14 File number ID: E0619  
3. Date Sample Tested: 12/18/14 By: RPM  
4. Modifications made: \_\_\_\_\_

5. Reason for non-testing of sample unit: \_\_\_\_\_

[*Note:* If the sample submitted can not be tested due to damage prior to testing, a new sample and new form shall be submitted to the testing laboratory. Both forms shall be submitted to the IA when the testing is completed.]

