Architectural Testing

TEST REPORT

Report No.: C6951.01-301-41-r1

Rendered to:

AMERILUX INTERNATIONAL, LLC
De Pere, Wisconsin

TYPE: Multi-Cellular Panel
SERIES/MODEL: 40mm Clear Thermoclick filled with Lumira™ Aerogel

Specification: *NFRC 201-2010, "Interim Standard Test Method for Measuring the Solar Heat Gain Coefficient of Fenestration Systems Using Calorimetry Hot Box Methods".*

Summary of Results	
Solar Heat Gain Coefficient (SHGC)	0.42
Unit Size: 37" x 39-3/8" (940 mm x 1000 mm) (Non-Standard Size)	
Testing was performed in the 48" Solar Calorimeter ICN# 62060	

Test Completion Date: 04/02/13

Reference must be made to Report No. C6951.01-301-41-r1, dated 04/25/13 for complete test specimen description and data.

1.0 Report Issued To: Amerilux International, LLC
1212 Enterprise Drive
De Pere, Wisconsin 54115

2.0 Test Laboratory: Architectural Testing, Inc.
2524 E. Jensen Ave
Fresno, California 93706
559-233-8705

3.0 Project Summary:

3.1 Product Type: Multi-Cellular Panel

3.2 Series/Model: 40mm Clear Thermoclick filled with Lumira™ Aerogel

3.3 Test Date: 04/02/13

3.4 Overall Size: 37" x 39-3/8" (940 mm x 1000 mm) (Non-Standard Size)

3.5 Daylight Opening: 35-1/2" x 38" (902 mm x 965 mm)

3.6 Test Sample Submitted by: Manufacturer

3.7 Test Sample Submitted for: Validation for Initial Certification (Prototype Unit)

4.0 Test Specification:

NFRC 201-2010, "Interim Standard Test Method for Measuring the Solar Heat Gain Coefficient of Fenestration Systems Using Calorimetry Hot Box Methods".

Testing was conducted in full compliance to NFRC standards

5.0 Test Specimen Description:

Construction:
Two extruded multi-cellular panel, oriented vertically.

6.0 Test Results:

6.1 Heat Flows:

1.	Heat Extracted From System (Q_{fluid})	1203.3	Btu/hr
2.	Surround Panel Heat Flow (Q_{sp})	8.1	Btu/hr
3.	Surround Panel Conductance	0.056	Btu/hr·ft²·F
4.	Heat Across Walls (Q_{walls})	-48.1	Btu/hr
5.	Flanking Loss Heat Flow (Q_{fl})	2.970	Btu/hr
6.	Auxiliary energy (Q_{aux})	40.9	Btu/hr
7.	Maximum thermal transmittance ($Q_{u\text{-}factor}$)	-12.2	Btu/hr
8.	Net Specimen Heat Flow (Q_s)	1211.6	Btu/hr

6.2 Test Conditions:

1.	Average Interior Air Temperature	74.5	F
2.	Average Exterior Air Temperature	61.5	F
3.	Surround panel inside temperature (t_{sp1})	70.7	F
4.	Surround panel outside temperature (t_{sp2})	86.1	F
5.	Maximum Solar Irradiation Es	321.6	Btu/hr·ft²
6.	Minimum Solar Irradiation Es	301.0	Btu/hr·ft²
7.	Average Solar Irradiation Es	311.6	Btu/hr·ft²
8.	Inlet Fluid Temperature	68.0	F
9.	Outlet Fluid Temperature	69.0	F
10.	Standardized Thermal Transmittance (U_{st})*	0.10	Btu/hr·ft²·F
11.	Maximum Exterior Surface Coefficient ($H_{h\text{-}sun}$)	7.6	Btu/hr·ft²·F
12.	Minimum Exterior Surface Coefficient ($H_{h\text{-}sun}$)	4.9	Btu/hr·ft²·F
13.	Average Exterior Surface Coefficient ($H_{h\text{-}sun}$)	5.9	Btu/hr·ft²·F
14.	Standardized Weather Conductance (h_{stII})	5.1	Btu/hr·ft²·F
15.	Maximum Wind Velocity	3.7	MPH
16.	Minimum Wind Velocity	0.7	MPH
17.	Average Wind Velocity	1.8	MPH
18.	Average Wind Direction (North equals 360 degrees)	301	Degrees
19.	Starting Azimuth	109	Degrees
20.	Ending Azimuth	118	Degrees
21.	Minimum Altitude	32	Degrees
22.	Maximum Altitude	36	Degrees
23.	Water Flow Rate	2.39	gpm

*Determined using ASTM 1199. For details see ATI report C6946.01-301-46-R0.

6.0 Test Results: (Continued)

6.3 Test Duration:

1.	The test parameters were considered stable for five consecutive time constants (minimum of 10 minutes each) from 08:08 to 08:58

6.4 Calibration Information 48 inch Calorimeter ICN 62060:

1.	Moving Pyranometer ICN 004059	05/07/12
2.	Flowmeter ICN 004065	12/13/12
3.	Thermocouple	01/04/12
4.	Surround Panel Conductivity	06/21/13
5.	Power Input	11/16/13
6.	Fluid Temperature	11/16/13
7.	Miscellaneous Power Input Last Calibration	11/16/13
8.	Metering Box Last Calibration	11/16/12
9.	Calibration Transfer Standard	03/08/10

The specimen was installed into an extruded polystyrene foam panel with an R-value of 18 using silicone caulking. Tracking system azimuth and altitude are read every minute and the calorimeter is moved to a position normal to the sun from chart stored in computer. The calorimeter is located at 2524 East Jensen in Fresno, California near the northeast corner of the lot elevated approximately 15 feet from ground level. The foreground is desert, the background is industrial buildings.

The estimated uncertainty of this test is 2.50%
This was determined using ANSI/NCSL Z540-2-1997 type B evaluation as described in section 4.3 of this specification. For assumptions used for this calculation or for a description of the procedure contact the "Individual-In-Responsible-Charge" that signed this report.

"This test method does not include separate procedures to determine the heat flows due to either air movement or nighttime U-factor effects. As a consequence, the SHGC results obtained do not reflect the overall performance which may be found in field installations due to temperature differences, wind, shading, air leakage effects, and the thermal bridge effects specific to the design and construction of the fenestration system opening."

"Since there is a wide variety of fenestration system openings in residential, commercial and industrial buildings, it is not feasible to select a "typical" surround panel construction in which to mount the fenestration test specimen. The selection of a relatively high thermal resistance surround panel places the focus of the test on the solar performance of the system. Therefore, it should be recognized that the solar heat gain coefficient results obtained from this test method, for ideal laboratory conditions in a highly insulating surround panel, should only be used for fenestration product comparisons or as input to performance analyses which also include thermal, air leakage and thermal bridge effects due to the surrounding building structure. To determine air leakage effects for windows and doors, refer to Test Method ASTM E 283. For thermal transmittance refer to Test Method ASTM C 1199."

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.

Detailed drawings, representative samples of the test specimen and a copy of this report will be retained by Architectural Testing for a period of four years. This report is the exclusive property of the client so named herein and relates only to the fenestration product tested. This report may not be reproduced, except in full, without the approval of the laboratory.

For ARCHITECTURAL TESTING, INC.

Test performed by:

Digitally Signed by: Jerry Bontilao

Jerry Bontilao
Technician

Digitally Signed by: Tyler Westerling

Tyler Westerling, P.E.
Senior Project Engineer
Individual-In-Responsible-Charge

TW:JB:ms

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

Appendix-A: Heat Exchanger Thermocouple Location and Temperatures (1)
Appendix-B: Photo (1)
Appendix-C: Drawings (1)

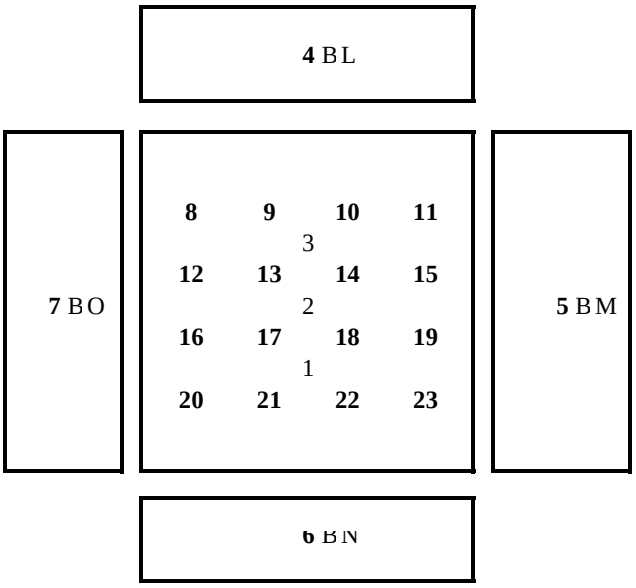
Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	04/12/13	All	Original Report Issue. Work requested by Tim Fikkert of Amerilux International, LLC
1	04/25/13	1, 2	Revised Series/Model name.

Architectural Testing

Test Report No.: C6951.01-301-41-r1
Revision 1 Date: 04/25/13
Test Record Retention Date: 04/02/17

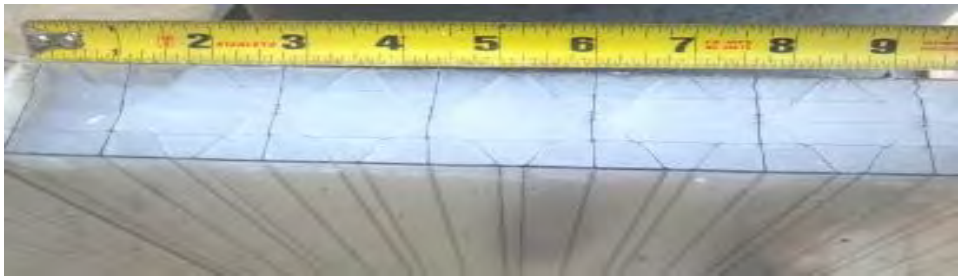
Appendix A
Absorber Plate Thermocouple Layout



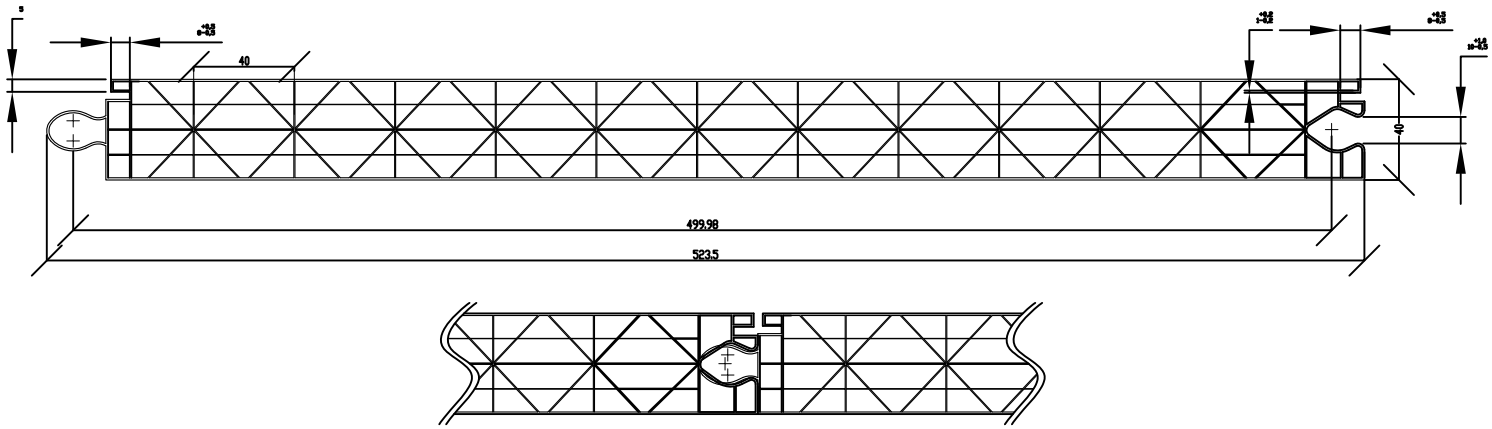
Air Top	1	74.7 F
Air Center	2	75.1 F
Air Bottom	3	73.8 F

Location	4	71.0 F	Location	14	69.8 F
Location	5	70.9 F	Location	15	69.8 F
Location	6	70.4 F	Location	16	70.1 F
Location	7	70.7 F	Location	17	72.2 F
Location	8	70.2 F	Location	18	70.0 F
Location	9	70.2 F	Location	19	71.0 F
Location	10	70.3 F	Location	20	71.1 F
Location	11	70.1 F	Location	21	69.8 F
Location	12	69.7 F	Location	22	70.8 F
Location	13	0.0 F	Location	23	70.0 F

Appendix B
Photo



Appendix C
Drawings



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	NAME	SIGNATURE	DATE		TITLE: LEXAN THERMOCLICK LTC40/4RS3600	
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A						
GE Plastics Specialty Film & Sheet				WEIGHT:	DWG NO.	A3
					SCALE:1:2	SHEET 1 OF 1