NATIONAL CERTIFIED TESTING LABORATORIES

Report Number  NCTL-110-15582-2
Report Date     11/20/2012
Report To       VTEC Laboratories, Inc.
                 212 Manida Street
                 Bronx, NY 10474
Test Start Date 09/23/2002
Test End Date   09/24/2002
Specification   ASTM C1363-97 “Standard Method of Test for the Thermal Performance of
                 Building Assemblies by Means of a Hot Box Apparatus”

Description of Sample Tested
Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

Model/Type:     3” Fiberglass Core with 10 mil. Super Therm on the Interior Side
Configuration   Panel
Frame Size      609.6 mm x 1219.2 mm (24” x 48”)
Core            Fiberglass
Coating         10 mil. Super Therm on Interior

SPECIMEN PREPARATION PRIOR TO TEST

The test specimen was pre-conditioned at ambient laboratory conditions prior to the test. The surround
panel-to-specimen interfaces were sealed with a non-reflective tape. The specimen was sealed with a non-
reflective tape on the room side resulting in a measured net air leakage of 0.000 CFM per square foot.

TEST PARAMETERS

Tests to determine the thermal transmittance (U) of the specimen were performed in the guarded hot box
apparatus located at the York, PA facility. The most recent calibration of the hot box apparatus was in May,
2002. The thermal performance evaluations were completed in accordance with ASTM C1363 using a dynamic
wind perpendicular to the specimen on the weather side and simulated natural convection on the room side. A
zero static pressure differential was maintained across the specimen during the test by pressurizing the
metering box on the room side. Data was collected over successive 4 hour periods for a minimum duration of 8
hours after steady state conditions were achieved. Steady state conditions were considered established when,
over a 4 hour period; a) the 1-hour averages of the surface thermocouples did not vary more than 0.1°F or
change unidirectionally; and b) the 1-hour averages of the power input to the metering box did not vary more
than ± 1% or change unidirectionally.
Measured Areas

Test Specimen Projected Area: 8.00 ft²
Test Specimen Interior Wetted Surface Area: 8.00 ft²
Test Specimen Exterior Wetted Surface Area: 8.00 ft²
Metering Box Opening Area: 46.44 ft²
Exposed Area of Mods to Surround Panel Opening: 22.29 ft²
Surround Panel Interior Exposed Area: 24.11 ft²

THERMAL TRANSMITTANCE & CONDUCTANCE

The test chamber environmental systems were initiated at 1542 on 09/23/02. The test conditions were considered stable for a four hour period from 0203 to 0403 and 0403 to 0603 on 09/24/02. The thermal performance test results were derived from averaging the results of the successive test periods.

Test Conditions

Average Room Side Air Temperature $t_h$ 70.4 °F
Average Weather Side Air Temperature, $t_c$ 0.0 °F
Average Guard Box Air Temperature 73.1 °F
Metering Box Average Relative Humidity 11 %
Measured Weather Side Wind Velocity 14.3 mph
Measured Room Side Air Convection Velocity 00.0 fpm
Static Pressure Difference Across Specimen -0.01 "H₂O

Heat Flows

Heat Input Rate to Metering Box 296.5 BTU/HR
Surround Panel Heat Flow 70.6 BTU/HR
Heat Flow through Mods to Surround Panel Opening (k = 0.308) 86.7 BTU/HR
Sensible Heat from Pressure Balance Air Flow -48.9 BTU/HR
Metering Box Heat Flow -24.9 BTU/HR
Flanking Loss Heat Flow 56.5 BTU/HR
Net Test Specimen Heat Flow 156.5 BTU/HR
Surface Temperature Data

Specimen Area-Weighted Room Side Surface Temperature, \( t_1 \) 63.4 ºF
Specimen Area-Weighted Weather Side Surface Temperature, \( t_2 \) 0.4 ºF

Test Results & Calculated Test Data

Room Side Surface Conductance, \( h_h \) 2.80 BTU/HR/FT²/ºF
Weather Side Surface Conductance, \( h_c \) 52.87 BTU/HR/FT²/ºF
Test Specimen Thermal Conductance, \( C \) 0.31 BTU/HR/FT²/ºF
Test Specimen Thermal Resistance, \( R \) (without surface films) 3.23 HR*FT²/ºF /BTU
Room Side Surface Resistance, \( r_h \) 0.36 HR*FT²/ºF /BTU
Weather Side Surface Resistance, \( r_c \) 0.02 HR*FT²/ºF /BTU
Test Specimen Thermal Transmittance, \( U \) 0.27 BTU/HR/FT²/ºF
Overall Test Specimen Thermal Resistance, \( R_u \) (including surface films) 3.70 HR*FT²/ºF /BTU

Based on the listed test results, the thermal transmittance (C) of the test specimen (excluding surface films) was determined to be 0.31 BTU/HR/FT²/ºF at the described test conditions. The test specimen’s thermal resistance (excluding surface films) was determined to be 3.23 HR*FT²/ºF /BTU at the described test conditions.

Attachments to this report list the measured surface temperature data as well as the area information used to calculate the area-weighted surface temperatures. Attachment 2 to this report is a drawings showing surface thermocouple measurement locations corresponding to the data on Attachment 1.

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 may be expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that may occur due to the specific design and construction of the fenestration system opening. The latter can only be determined by in-site measurements. Therefore, it should be recognized 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.
A copy of this report along with representative sections of the test specimen will be retained by NCTL for a period of four (4) years. The results obtained apply only to the specimen tested. This report may not be reproduced, except in full, without the written approval of National Certified Testing Laboratories. Testing described in this report was conducted in full compliance with the requirements of the referenced test method. This report does not constitute endorsement, approval, or certification of the tested product. Per C1363, the primary units used in for this test method are SI; however, if noted, inch-pound may be used in lieu of SI.

National Certified Testing Laboratories

STEVEN H. COBLE
Simulator In Responsible Charge

RAYMOND W. LAMB, P.E.
Senior Project Engineer
Person-in-Responsible Charge

SHC/ shc
<table>
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<th>Thermocouple Location #</th>
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<th>Assigned 3-D Areas per Thermocouple Location (ft²)</th>
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ATTACHMENT 2
SURFACE TEMPERATURE LOCATIONS

VTEC Laboratories, Inc.  NCTL-110-15582-2  0403-0603  09/24/02

INTERIOR SIDE

1  2  3  4
5  6  7  8
9 10 11 12
13 14 15 16
17 18 19 20
21 22 23 24

EXTERIOR SIDE

4  3  2  1
8  7  6  5
12 11 10  9
16 15 14 13
20 19 18 17
24 23 22 21
Section 1:

Component Drawings, with Applicable Part Numbers, Manufacturing and Modeling Details, were Reviewed (as submitted) for Product Verification (Reference: NCTL-110-15582-2)

See Attached Documentation; any deviations noted.

Note: The above referenced component drawings 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:

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