EPSCOT
TEST REPORT

SCOPE OF WORK
NFRC 201-2017 TESTING ON THERMAL BARRIER COATING > METAL SHEET WITH COATING

REPORT NUMBER
K9848.02-301-41 R2

TEST DATE(S)
05/20/20

ISSUE DATE **REVISED DATE**
06/02/20 08/07/20

RECORD RETENTION END DATE
05/20/25

PAGES
11

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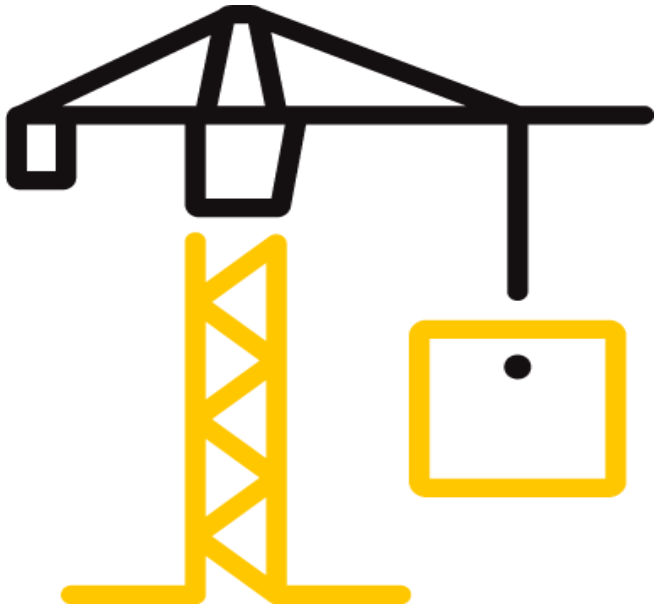

2524 East Jensen Avenue
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www.intertek.com/building

TEST REPORT FOR EPSCOT
Report No.: K9848.02-301-41 R2
Date: 08/07/20

REPORT ISSUED TO

EPSCOT
21011 Hegar Road
Hockley, TX 77447

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by EPSCOT to perform testing in accordance with NFRC 201-2017 on their Thermal Barrier Coating > Metal Sheet with Coating, Metal Sheet. Results obtained are tested values and were secured by using the designated test method. Testing was conducted in full compliance to NFRC standards at the Intertek B&C test facility in Fresno, California.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

SECTION 2

SUMMARY OF TEST RESULTS

Type:	**Metal Sheet**
Series/Model:	**Thermal Barrier Coating > Metal Sheet with Coating**
Unit Size:	**48"x48 (1219.2 mm x 1219.2 mm) (Non-Standard Size)**
Net Specimen Heat Flow (Qs) - Base Metal Sheet w/o Coating	**89.453 Watt/m²**
Net Specimen Heat Flow (Qs) - Metal Sheet with Coating	**5.819 Watt/m²**
Percent Reduction of Specimen Heat Flow (Qs)	**93%**

For INTERTEK B&C:

COMPLETED BY	Jerry Bontilao, BSME	**REVIEWED BY**	Tyler Westerling, P.E.
TITLE	Project Lead	**TITLE**	Operations Manager, IIRC
SIGNATURE	Digitally Signed by: Jerry Bontilao	**SIGNATURE**	Digitally Signed for: Tyler Westerling by Shannon Stein
DATE	08/07/20	**DATE**	08/07/20

JB:ss

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SECTION 3
TEST SPECIMEN SUMMARY

SERIES/MODEL	Thermal Barrier Coating > Metal Sheet with Coating
TYPE	Metal Sheet
OVERALL SIZE	48"x48 (1219.2 mm x 1219.2 mm)
NFRC STANDARD SIZE	N/A
GROUPING:	N/A
TEST SAMPLE SUBMITTED FOR	N/A

SECTION 4
TEST METHOD(S)

The specimens were evaluated in accordance with the following:

> **NFRC 201-2017**, *Interim Standard Test Method for Measuring the Solar Heat Gain Coefficient of Fenestration Systems Using Calorimetry Hot Box*

SECTION 5
MATERIAL SOURCE/INSTALLATION

Test samples were provided by EPSCOT. Detailed drawings (if any), representative samples of the test specimen, and a copy of this report will be retained by Intertek B&C for a minimum of four years from the test completion date.

The specimen was installed into an extruded polystyrene foam panel with an R-value of 18 using silicone caulking.

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SECTION 6
EQUIPMENT

Testing was performed in the 48 inch Solar Calorimeter, ICN# 62060, located at 2524 East Jensen in Fresno, California, near the northeast corner of the lot and elevated approximately 15 feet from ground level.

Calibration Information for the 48 inch Calorimeter, ICN 62060:

ICN/ASSET #	DESCRIPTION	CALIBRATION DUE DATE
4064	Moving Pyranometer	12/11/20
004065	Flowmeter	08/20/20

SECTION 7
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Jerry Bontilao	Intertek B&C

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SECTION 8
TEST PROCEDURE

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 foreground is desert, the background is industrial buildings. Output was determined with flat characterization plate in place.

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 E283. 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.

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SECTION 9
TEST SPECIMEN DESCRIPTION

MANUFACTURER	EPSCOT
PRODUCT TYPE	Metal Sheet
SERIES/MODEL	Thermal Barrier Coating > Metal Sheet with Coating
UNIT SIZE	48" x 48" (1219.2 mm x 1219.2 mm)
DAYLIGHT OPENING	47" x 47" (1193.8 mm x 1193.8 mm)

FRAME SIZE	No Frame Members
INTERIOR LAYER SIZE	N/A
EXTERIOR LAYER SIZE	N/A

CONSTRUCTION:

The specimen consisted of one single-layer 24 Ga. Metal Sheet Thermal Barrier Coating - With 0.012" thick Coating.

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SECTION 10
TEST RESULTS

Test Start Date: 05/20/20
Test Completion Date: 05/20/20
Time of Test: 11:30 AM

Test Duration

The test parameters were considered stable for five consecutive time constants (minimum of 10 minutes each) from 11:30 to 12:20.

Estimated Uncertainty: 4.40%

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

HEAT FLOWS	MEASUREMENT
1. Heat Extracted From System (Q fluid)	97.0 Btu/hr
2. Surround Panel Heat Flow (Qsp)	3.8 Btu/hr
3. Surround Panel Conductance	0.056 Btu/hr·ft^2·I
4. Heat Across Walls (Q walls)	8.5 Btu/hr
5. Flanking Loss Heat Flow (Qfl)	2.970 Btu/hr
6. Auxiliary energy (Q aux)	23.0 Btu/hr
7. Maximum thermal transmittance (Q u-factor)	30.5 Btu/hr
8. Net Specimen Heat Flow (Qs)	28.3 Btu/hr
9. Net Specimen Heat Flow (Qs) per Unit Area	5.8 Watts/m^2

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SECTION 10 (Continued)

TEST RESULTS

TEST CONDITIONS	MEASUREMENT
1. Average Interior Air Temperature	72.8 °F
2. Average Exterior Air Temperature	74.1 °F
3. Surround panel inside temperature (tsp1)	77.2 °F
4. Surround panel outside temperature (tsp2)	96.8 °F
5. Maximum Solar Irradiation Es	338.1 Btu/hr·ft²
6. Minimum Solar Irradiation Es	97.8 Btu/hr·ft²
7. Average Solar Irradiation Es	316.6 Btu/hr·ft²
8. Inlet Fluid Temperature	72.0 °F
9. Outlet Fluid Temperature	75.2 °F
10. Standardized Thermal Transmittance (Ust)*	1.50 Btu/hr·ft²·
11. Maximum Exterior Surface Coefficient (Hh-sun)	7.1 Btu/hr·ft²·
12. Minimum Exterior Surface Coefficient (Hh-sun)	1.7 Btu/hr·ft²·
13. Average Exterior Surface Coefficient (Hh-sun)	5.3 Btu/hr·ft²·
14. Standardized Weather Conductance (hstII)	5.1 Btu/hr·ft²·
15. Maximum Wind Velocity	1.1 MPH
16. Minimum Wind Velocity	0.6 MPH
17. Average Wind Velocity	0.9 MPH
18. Average Wind Direction (North equals 360 degrees)	252 Degrees
19. Starting Azimuth	123 Degrees
20. Ending Azimuth	147 Degrees
21. Minimum Altitude	66 Degrees
22. Maximum Altitude	69 Degrees
23. Water Flow Rate	2.29 gpm

* Estimated.

SECTION 11

CONCLUSION

Solar Heat Gain Coefficient (SHGC): **0.01**
Net Specimen Heat Flow (Qs) per Unit Area: **5.819 Watt/m²**

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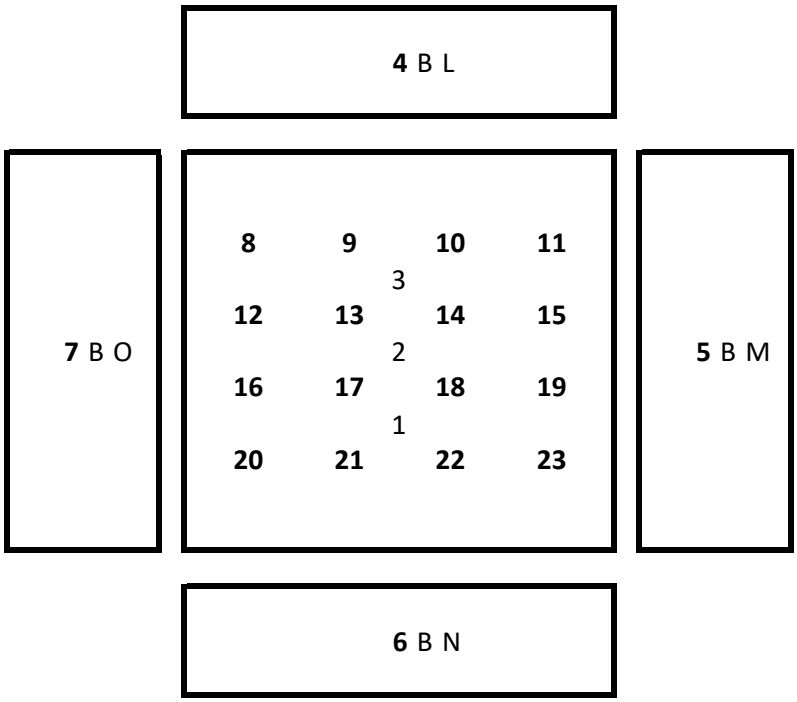
SECTION 12
THERMOCOUPLES

Thermocouple Values
Absorber Plate Thermocouple Layout



Air Top	1	72.8 °F
Air Center	2	72.8 °F
Air Bottom	3	72.8 °F

Location	4	71.0 °F	Location	14	72.1 °F
Location	5	72.1 °F	Location	15	72.1 °F
Location	6	72.1 °F	Location	16	71.9 °F
Location	7	72.2 °F	Location	17	72.0 °F
Location	8	72.0 °F	Location	18	72.3 °F
Location	9	72.0 °F	Location	19	71.0 °F
Location	10	72.0 °F	Location	20	72.0 °F
Location	11	72.0 °F	Location	21	72.0 °F
Location	12	72.1 °F	Location	22	72.3 °F
Location	13	72.0 °F	Location	23	72.0 °F

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SECTION 13
PHOTOS

Single-Layer Thermal Barrier metal sheet > With Coating

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SECTION 14
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0.02R0	06/02/20	N/A	Original Report Issue
0.02R1	06/17/20	N/A	Corrected Test Date, Retention Date, and
0.02R2	08/07/20	N/A	Added "Percent Reduction of Specimen Heat Flow" and Change unit of measure from "Solar Heat Gain Coefficient" to "Net Specimen Heat Flow" in Sec. 2 > Summary of Test Results. Added Item 9 on Sec. 10 > Heat Flow with unit of measure in Watt per Sq. Meter.