

# ARMORCORE BY WACO COMPOSITES TEST REPORT

## SCOPE OF WORK

ASTM C518 - 2021; STEADY-STATE THERMAL TRANSMISSION PROPERTIES BY MEANS OF THE HEAT FLOW METER APPARATUS ON UL752 LEVEL 3 BULLET RESISTANT FIBERGLASS

## REPORT NUMBER

105710306MID-001REV1

## TEST DATE(S)

02/05/24 - 02/07/24

## ISSUE DATE [REVISED DATE]

02/09/24 02/14/24

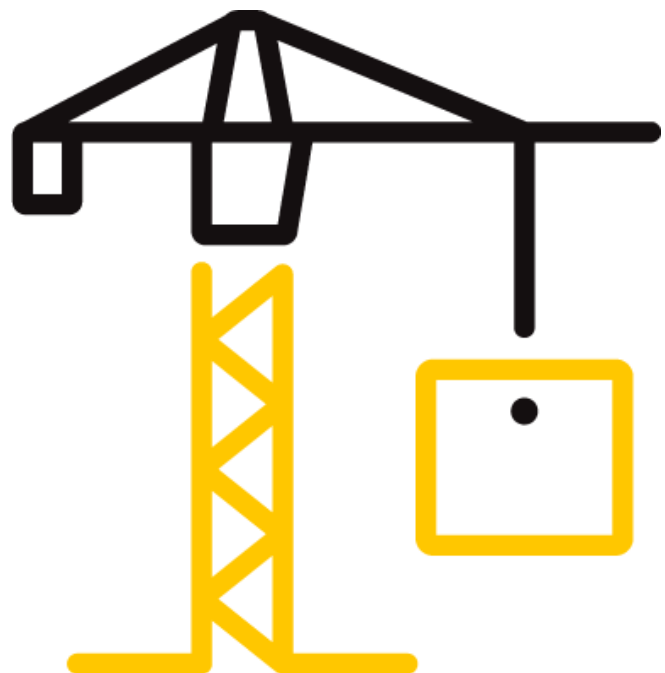
## PAGES

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## DOCUMENT CONTROL NUMBER

GFT-OP-10c (09/29/20)

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## TEST REPORT FOR ARMORCORE BY WACO COMPOSITES

Report No.: 105710306MID-001REV1

Date: 02/09/24

### REPORT ISSUED TO

#### ARMORCORE BY WACO COMPOSITES

PO Box 20008

Waco, TX 76702-0008

### SECTION 1

#### SCOPE

Intertek Testing Services NA, Inc. dba Intertek Building & Construction (B&C) was contracted by Armorcore by Waco Composites to perform testing in accordance with ASTM C518 - 2021; *Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*, on their UL752 Level 3 Bullet Resistant Fiberglass. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at Intertek test facility in Middleton, WI.

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Intertek B&C will service this report for the entire test record retention period. The test record retention period ends four years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens (where required by Certification or Accreditation bodies), or other pertinent project documentation, will be retained for the entire test record retention period.

### SECTION 2

#### SUMMARY OF TEST RESULTS

The standard has no specified performance requirements. The Thermal Resistance per inch is 3.71 Hr-ft<sup>2</sup>-°F/Btu/in (25.69 m<sup>2</sup>-K/W/m).

For INTERTEK B&C:

<b>COMPLETED BY:</b>	Sandy Osborne	<b>REVIEWED BY:</b>	Bryan Bowman
<b>TITLE:</b>	Lab Technician I	<b>TITLE:</b>	Associate Engineer
<b>SIGNATURE:</b>		<b>SIGNATURE:</b>	
<b>DATE:</b>	02/09/24	<b>DATE:</b>	02/09/24

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### SECTION 3

#### TEST METHOD(S)

The specimens were evaluated in accordance with the following:

**ASTM C518 - 2021; Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus Test Method-Year**

**ASTM D1622 – 2020; Standard Test Method for Apparent Density of Rigid Cellular Plastics**

### SECTION 4

#### MATERIAL SOURCE/INSTALLATION

Test samples were provided by the client. The results outlined in this report apply to the sample as received. Samples were received at the Middleton Evaluation Center on January 26, 2024 in good condition verified by Sample ID# MID2401261024-001.

### SECTION 5

#### EQUIPMENT

The measure of uncertainty cannot be determined due to the thinness of the material. The samples were tested horizontally in a testing chamber sealed from ambient on all sides. The heat flow direction is vertically downward with 4" by 4" heat flux transducers on both the hot and cold surfaces of the sample.

EQUIPMENT			
DESCRIPTION - ASSET #:	6" Caliper - 1542	CALIBRATION DUE:	1/10/2025
DESCRIPTION - ASSET #:	24" Caliper-1394	CALIBRATION DUE:	4/5/2024
DESCRIPTION - ASSET #:	Ohaus Scale - 62074	CALIBRATION DUE:	10/5/2024
DESCRIPTION - ASSET #:	Temp/Humidity Sensor - 1456	CALIBRATION DUE:	3/7/2024
DESCRIPTION - ASSET #:	Temp/Humidity Sensor - Samp Rm 1451	CALIBRATION DUE:	3/7/2024

EQUIPMENT			
DESCRIPTION - ASSET #:	Thermal Chamber -Netzch HMF436 - 1266	VBU:	2/5/2024
DESCRIPTION - ASSET #:	Temp/Humidity Recorder- 1455	CALIBRATION DUE:	3/7/2024
DESCRIPTION - ASSET #:	Temp/Humidity Recorder- Samp Rm-1451	CALIBRATION DUE:	3/7/2024
DESCRIPTION - ASSET #:	Reference Standard - 1450d #274-3		

### SECTION 6

#### TEST PROCEDURE

Testing was conducted in accordance with Section 7-Procedure of the standard. There were no deviations from the standard.

### SECTION 7

#### TEST CRITERIA

The standard has no specified performance requirements regarding pass/fail criteria.

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### SECTION 8

#### TEST SPECIMEN DESCRIPTION

A single panel approximately 12" x 12" x 0.5" of fiberglass composite material off-white in color was provided. Specimens were conditioned a minimum of 24 hours at 23 ± 2°C and 50 ± 10% Relative Humidity prior to testing.

### SECTION 9

#### TEST RESULTS

SPECIMEN MEASUREMENTS							
Specimen	Length (mm)	Width (mm)	Depth (mm)	Depth	Weight	Density	
	Avg.	Avg.	Avg.	Avg. (in)	(kg)	(kg/m <sup>3</sup> )	(lbs/ft <sup>3</sup> )
1	304.04	304.21	11.81	0.4650	2.26790	2075.91	129.60

Test Information	Thermal Conductivity (K Value)		Thermal Resistance (R Value)		Thermal Resistance (R/in)	Thermal Resistance (R/m)	Thermal Conductance (U)	Heat Flux (q)
	Btu-in/hr-ft <sup>2</sup> -°F	W/m-K	Hr-ft <sup>2</sup> -°F/Btu	m <sup>2</sup> -K/W	Hr-ft <sup>2</sup> -°F/Btu/in	m <sup>2</sup> -K/W/m	W/m <sup>2</sup> -K	W/m <sup>2</sup>
Run 1	0.276756	0.03992	1.68343	0.2965	3.61	25.05	3.37	72.60
Run 2	0.272464	0.03930	1.70812	0.3008	3.67	25.45	3.32	71.58
Run 3	0.260845	0.03762	1.78612	0.3146	3.83	26.58	3.18	68.53
Average	0.270022	0.03894	1.72589	0.3039	3.71	25.69	3.29	70.90

Test Information	Duration of the Measurement	Measured Thickness		Delta Temperature		Mean Temperature		Temperature Gradient	
	min	in	m	°F	°C	°F	°C	°F/in	°K/m
Run 1	0:56:21	0.466	0.011834	38.74	21.52	76.26	24.59	84.79	44.12
Run 2	0:57:22	0.465	0.011821	38.76	21.53	75.99	24.44	83.90	43.84
Run 3	0:58:08	0.466	0.011834	38.80	21.56	76.18	24.54	84.18	43.93
Average	0:57:17	0.466	0.011830	38.77	21.54	76.14	24.52	84.29	43.96

### SECTION 10

#### CONCLUSION

The standard has no specified performance requirements.

### SECTION 11

#### REVISION LOG

REVISION #	DATE	SECTION	REVISION
0	02/09/24	N/A	Original Report Issue
1	2/13/24	Cover, 1	Per client changed company name from Specialty Composites Group, LLC to Armorcore by Waco Composites