



University of  
**Salford**  
MANCHESTER

# THERMAL MEASUREMENT LABORATORY



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## Traceable Test Report

### Thermal Conductivity of Enhanced Grain Board

The Millboard Company Ltd

**Project:** 00346

**Test No.:** 3248

Your Order No.: 45642

Date of Issue: 1 August 2024

Signed:

*A. Simpson*

Approved:

*[Signature]*

Dr. A Simpson  
Technical Manager  
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Quality Manager  
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#### 1. Test Results

Test standard: ISO 8301:1991 / BS EN 12664:2001  
Product Standard: Not Applicable  
Measured Sample Thickness: 31.67 mm  
Conditioned Sample Density: 532.4 kg/m<sup>3</sup>

Mean Temperature [°C]	Apparent Thermal Conductivity [W/mK]	Thermal Resistance [m <sup>2</sup> K/W]
10.0	0.102	0.311

The results only apply to the sample tested as described in this report.

**THIS IS NOT A UKAS ACCREDITED TEST REPORT**

## 2. Client

The Millboard Company Ltd, Unit A Castle Court, Bodmin Road, Coventry, CV2 5DB / UK.

## 3. Sample Details, Preparation and Conditioning

Miscellaneous Product supplied and identified by the client as "Enhanced Grain, Enhanced Grain board, Batch: MC430102023183820, Production Date: 30.10.2023" was received by the Thermal Measurement Laboratory on the 1 May 2024. This was machined flat and parallel then conditioned at 23°C and 50% RH for 1 day to constant mass before testing.

Measured specimen thickness:	0.03167	m
Relative thickness change during test:	0.00	%
Dimensions:	0.304 × 0.308	m
Relative volume change during test:	0.00	%
Mass before test:	1578.8	g
Mass after test:	1578.7	g
Relative mass change during test:	-0.01	%
Relative mass change during drying:	N/A	%
Relative mass change during conditioning:	0.00	%
Density of conditioned material as tested:	532.4	kg/m <sup>3</sup>

## 4. Methodology

LaserComp FOX 304 Instrument single specimen heat flow meter apparatus located in the Thermal Measurement Laboratory, Serial No. 1311644-F304.

Heat flow meter method to ISO 8301:1991 / BS EN 12664:2001 / BS EN 12667: 2001.

Modified FOX304 Method following documented in-house method "FOX304 Modified EN12664".

Heat flux direction: Vertically upwards

Calibrated thermocouples were attached to the faces of the sample to measure temperature difference. 2.5mm thick foamed silicone rubber interface sheets were used. The clamping pressure of this apparatus has been measured to be 7kPa which has been shown by measurements using a Guarded Hot Plate to achieve the required surface contact between apparatus surface, thermocouples, thermal contact sheets and specimens.

All temperature, dimensional and heat flow measurements are traceable to national standards.

## 5. Thickness Measurement

The mean measured thickness was determined by the FOX 304 Instrument by measuring the hot and cold plate separation at each corner. The separation was checked with calibrated electronic calipers.

## 6. General Test Details

Start date and time of test:	04 June 2024 at 10:39
Finish date and time of test:	04 June 2024 at 15:56
Ambient laboratory temperature during the test:	22 °C
Type and pressure of gas surrounding specimens:	Air at atmospheric pressure
Interface medium between specimen and plates:	2.5mm silicone
Water-tight envelope surrounding the specimen:	None

## 7. Setpoint Details

To measure the thermal conductivity of the specimen at the required temperatures, a single setpoint was programmed into the test apparatus software with the results being as follows:

Mean Temperature [°C]	Temperature difference [°C]	Density of heat flow rate [W/m <sup>2</sup> ]	Setpoint duration [hh:mm]
10.0	10.6	33.99	05:17

## 8. Date of Last Heat Flow Meter Calibration Check

The heat flow meter calibration was checked on 3 June 2024 using Item 1) and found to be within specification.

Calibrations are used that are based on:

- 1) Stable, aged greater than 25 years; 50mm EPS with thermal resistance at 10°C of 1.41m<sup>2</sup>K/W, which was last calibrated in the University of Salford UKAS accredited guarded hotplate in 2019.
- 2) 34mm IRM-440 Resin Bonded Glass Fibre Board, ID No: S312 with thermal resistance at 10°C of 1.13m<sup>2</sup>/K/W. Last calibrated at IRMM. Valid from July 2014 and is due to be recalibrated in July 2032

## 9. Errors in measured property

The maximum expected error in the measured Thermal Conductivity is within 2.8%. This includes errors arising from non-compliances.

## 10. Non-compliances

The test conformed to the requirements of Standard Test Method ISO 8301:1991 / BS EN 12667:2001, with the exception of the following additional uncertainties:

- 0.44% has been added to account for the spread in sample face temperature.
- The error associated with imperfect contact (0.2mm deviation from flatness) and the use of contact sheets is estimated to be 0.70% (A3.6.3 of BS EN 12664:2001).
- The error associated with definition of temperature is estimated to be 0.75% (A3.6.3 of BS EN 12664:2001).

## 11. Name of Test Operator/s

Dr. A Simpson, Technical Manager

## 12. Management system requirements of ISO/IEC 17025:2017

The laboratory operates a management system which meets both the technical competence requirements and management system requirements of ISO/IEC 17025:2017 that are necessary for the laboratory to constantly deliver technically valid test results within its accredited scope.

**\* Sample Retention Period - Unless advised otherwise by the client, samples will be retained for up to 1month from the test completion date. After this time the samples will be destroyed.**

**END OF REPORT**