

Issued by:

Thermal Measurement Laboratory

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University of
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MANCHESTER

Your Order No.: Chris Hardy 12/12/16

Date of Issue: 22 May 2017

Approved:


Mr. I G Rattigan

Test Engineer

Signed:


Dr. A Simpson

Head of Laboratory

Thermal Conductivity of Double Door Panel

Client Latham's Security Doorsets Ltd, 35/37 Hainge Road, Tividale, West Midlands, UK, B69 2NY

- Sample*** Sample D. The sample identified as a panel from the centre of "Double Door (personnel door / fire exit door), Door leaf – 50mm thick / 2mm steel / honeycomb card core frame – 2mm steel / hollow" was supplied by the client. The specimen was pre-conditioned before testing at 23°C and 50% RH for 35 days to constant mass.
Product Standard: N/A.
- Method** LaserComp FOX 603 Instrument, single specimen heat flow meter apparatus
Heat flow meter method to ISO 8301:1991 / BS EN 12664:2001
Serial Number: 12051473-F603
Heat flux direction: Vertically upwards
Edge heat losses minimised by additional edge temperature controls.
All temperature, dimensional and heat flow measurements are traceable to national standards.
- Thermal Resistance**

Mean Temperature	Thermal Resistance	Mean Measured Thickness	Bulk Density
[°C]	[m ² K/W]	[mm]	[kg/m ³]
10.1	0.276 ± 4%	49.08	332

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

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

4. Test Details

Measured specimen thickness:	0.04908	m
Relative thickness change during test:	0.00	%
Dimensions:	0.596 × 0.594	m
Relative volume change during test:	0.00	%
Mass before test:	5763.8	g
Mass after test:	5765.3	g
Relative mass change during test:	0.03	%
Relative mass change during drying:	N/A	%
Relative mass change during conditioning:	-0.04	%
Density of conditioned material as tested:	332	kg/m ³
Mean temperature of test:	10.1	°C
Average temperature drop across specimens:	12.06	°C
Density of heat flow rate:	43.73	W/m ²
Test started:	27 April 2017 at 14.30	
Test finished:	28 April 2017 at 15.09	
Duration of test:	24.6	hours
Ambient temperature surrounding the apparatus during the test:	23.7	°C
Type and pressure of gas surrounding specimens:	Air at atmospheric pressure	
Interface medium:	None	
Water-tight envelope:	None	

5. Date of Last Heat Flow Meter Calibration Check

The heat flow meter calibration was checked on 28 April 2017 using 3) and found to be within specification.

Calibrations are used that are based on:

- 1) 25mm EPS material (EPS#1108112, traceable to IRMM-440) with thermal resistance at 10°C of 0.78m²K/W. EPS#1108112 was last calibrated at LaserComp Inc. in July 2012 and is due to be recalibrated in July 2017.
- 2) Stable 20 year aged 100mm EPS with thermal resistance at 10°C of 2.82m²K/W, which was last calibrated in the University of Salford UKAS accredited guarded hotplate during September 2012 and is due to be recalibrated in September 2017.
- 3) 34mm IRM-440 Resin Bonded Glass Fibre Board, ID No: S312 with thermal resistance at 10°C of 1.13m²/K/W. Last calibrated at IRMM. Valid from July 2014 and is due to be recalibrated in July 2024

6. Thickness Measurement

The mean measured thickness was determined by the FOX 603 Instrument by measuring the hot and cold plate separation at each corner. The separation was checked with calibrated electronic calipers.

7. Specimen preparation and method of conditioning

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8. Errors in measured property

The maximum expected error in the measured Thermal Conductivity is within 4%. This includes errors arising from non-compliances.

9. Non-compliances

The test conformed to the requirements of Standard Test Method ISO 8301:1991 / BS EN 12664 with the exception of:-

- 1) An additional uncertainty has been applied to allow for the error due to imperfect contact (0.1mm deviation from flatness) was 0.41% greater than the maximum 0.5% specified.
- 2) An additional uncertainty has been applied to allow for the thermal resistance being less than 0.3 m²K/W.

10. Name of Test Operator/s

A.Simpson

11. Management system requirements of ISO/IEC 17025:2005

The laboratory operates a management system which meets both the technical competence requirements and management system requirements of ISO/IEC 17025:2005 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.**