



Test Report

THERMAL CONDUCTIVITY OF POLYESTER FIBRE

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FOR

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For the attention of Shaun Grimes.

IDENTIFICATION

Authorised NPL quotation 2010110149 signed and dated by Alex Forrest on 10 November 2010, and customer's purchase order 48969. NPL specimen number LA557 was assigned to the specimen.

BASIS OF TEST

NPL thermal conductivity measurement procedure QPDQM/B/421, conforming to EN 12667:2001 and EN 12939:2000.

UNCERTAINTY

The overall measurement uncertainty is estimated to be within $\pm 2.5\%$, based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

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Date of issue: 24 November 2010

Signed:

(Authorised Signatory)

Checked by: CS

Name: Jeremy Wormington

on behalf of NPLML

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OBJECTIVE

To measure the thermal conductivity of a loose fill polyester fibre specimen at a nominal thickness of 50 mm and at a mean specimen temperature of $10\text{ }^{\circ}\text{C} \pm 0.3\text{ }^{\circ}\text{C}$. The specimen to be prepared by NPL from material supplied by the customer.

SPECIMEN PREPARATION

The specimen was prepared by NPL and consisted of loose fill material contained within a expanded polystyrene frame with approximate internal dimensions of 560 mm \times 560 mm \times 50 mm and external lateral dimensions of 610 mm \times 610mm.

The specimen was stored in an environment of 23 $^{\circ}\text{C}$ and 50 % RH prior to the testing.

MEASUREMENTS

The thermal conductivity was measured using a precision single-sided 610 mm heat flow meter apparatus (NPL 610HFM – LaserComp FOX 600). In this apparatus the specimen is mounted horizontally with heat flow upwards, with lateral heat flow from the metering area minimised by additional edge guard heating. All the temperature, dimensional and heat flow measurements have traceability to national standards.

DATE OF LAST HEAT FLOW METER CALIBRATION CHECK

The heat flow meter calibration was checked on 13 October 2010 using mineral wool reference material LA56 and found to be within specification.

For measurements made with specimen thickness below 100 mm, calibrations are used that are based on NPL specimens LA55 and LA56, which are both 34.5 mm thick glass fibre board (IRMM-440 reference material) with thermal resistances at 20 $^{\circ}\text{C}$ of 0.912 $\text{m}^2\cdot\text{K}/\text{W}$ and 0.914 $\text{m}^2\cdot\text{K}/\text{W}$ respectively. LA55 and LA56 were last calibrated in the NPL 610 mm guarded hot plate during June 2006 and are due to be recalibrated in June 2016.

For measurements made with specimen thickness between 100 mm and 200 mm, a calibration is used that is based on NPL specimen LA3, which is 150 mm thick expanded polystyrene with thermal resistance at 20 $^{\circ}\text{C}$ of 3.92 $\text{m}^2\cdot\text{K}/\text{W}$. LA3 was last calibrated in the NPL 610 mm guarded hot plate during June 2006 and is due to be recalibrated in June 2016.

RESULTS

The results, including the specimen details, are shown on the following page.

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Sample description: Loose fill polyester fibre
 Specimen reference: Hollow fibre
 Nominal thickness: 50 mm
 Nominal density: 25 kg/m³

Information regarding the specimen and measurement is given below.

Specimen and Test Details	
NPL specimen number	LA557
Mean length × width /mm	561 × 557
Mean thickness during test /mm	49.89
Mass before test /kg	0.390
Mass after test /kg	0.390
Density during test /(kg/m ³)	25.0
Mean temperature difference /K	20.0
Mean density of heat flow rate /(W/m ²)	15.62
Laboratory temperature /°C	23
Laboratory relative humidity /%RH	43 to 50
Name of operator	A. J. Simpkin

Thermal Conductivity Result for LA557	
Date of measurement	19/11/10
Mean test temperature /°C	10.0
Thermal conductivity /(W/m·K)	0.0389

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