

EXAMINATION REPORT

Determination of steady-state thermal resistance
and related properties of magnesite bound
woodwool panels

REPORTNUMBER

KL 3467

AUTHORISATION

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This report may only be copied as a complete set. The examination results relate exclusively to the samples offered.

Determination of steady-state thermal resistance and related properties of magnesite bound woodwool panels

Manufacturer: Tectum Inc.

Place of production: Newark- Ohio (USA)

Reference number: 11.4550

According to standard: NEN-EN 12667

1. **Order**

By order of Kiwa Certification and Inspection, Unit Construction Products in Rijswijk, the samples mentioned below were tested by the Laboratory for Materials Testing on the determination of steady-state thermal resistance and related properties of magnesite bound wood wool panels according to NEN-EN 12667 (NEN-EN 12939 en NEN-EN 12664).

2. **General**

We have received the samples on 18-05-2005 and registered them with number KL 3467.

The test was started on 23-05-2005 and was carried out by Mr. H. Pauw.

3. **Sample description**

Date of sampling : 18-05-2005
Sampled by : material was send by Tectum
Material : 2 magnesite bound woodwool panels
Dimensions : 600 x 600 x 25 mm
Date of production : 09-08-2004
Other : compound - woodwool, magnesium oxide and sodium silicate

4. **Testconditions and methods**

Before testing the sample was first conditioned at a temperature of $23 \pm 2^\circ\text{C}$ and a relative humidity of $50 \pm 5\%$.

The sample was tested including eventual coating.

See Annex 1 for measuring results.

The determination of steady-state thermal resistance was carried out by using the heat flow meter apparatus type FOX 600, see Annex 3 for specifications, according to the standard NEN-EN 12667 (NEN-EN 12939 en NEN-EN 12664) at a mean temperature of 10°C .

The apparatus was oriented horizontally, the hot side of the specimen being at the bottom.

5. Keeping of sample

The sample will be kept for at least 2 months.

6. Result

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Samples	Thickness	Specific weight	Thermal conductivity at 10 °C
	d (mm)	ρ (kg/m ³)	λ [W/(m.K)]
Magnesite bound woodwool panels	51,3	332,9	0,0858

Annex 1: Measuring results

Description material : 2 magnesite bound woodwool panels

Coating : none

Data specimens (inclusive possible coating)	Unit	Result
length	m	0,59800
width	m	0,59700
Thickness	m	0,05127
mass in dry condition	kg	6,09400
specific weight in dry condition	kg/m ³	332,94
mass after testing	kg	6,09500
mass increase during testing	kg	0,00100

Measureings	Unit	Result
mean temperature hot plate	°C	20,02
mean temperature cold plate	°C	0,01
mean temperature	°C	10,01
thermal resistance	m ² .K/W	0,5976
thermal conductivity	W/(m.K)	0,0858

Annex 2: Analytical information

Calibration FOX 600 instrument

1. NIST calibration FOX 600 instrument

The FOX 600 instrument was first calibrated on the 15th of April 2003 by Lasercomp in accordance with ASTM C 1132-1985 using a NIST 1450c SRM specimen measured at the National Institute of Standards and Technology (USA). After the calibration of the FOX 600 instrument the NIST calibration data were filed in the non-fluid memory called "NIST-type". The test produced results within $\pm 0,2\%$ of the NIST measured value.

2. IRMM 440 calibration FOX 600 instrument

The FOX 600 instrument was calibrated on the 15th of June 2003 in accordance with EN 1946-3:1999 using an IRMM 440 [resin bounded glass fibre board with dimensions 600x600mm], measured at the Institute for Reference Materials and Measurements [Joint Research Centre] at Geel Belgium. After the calibration of the FOX 600 instrument the IRMM 440 calibration data were filed in the non-fluid memory called "IRMM 440 User's type". The test produced results within $\pm 0,2\%$ of the IRMM 440 measured value.

The thermal conductivity λ for the IRMM 440 [600x600mm] is given in the table below.

Specimen code	λ -value [W/m.K]	Expiration date
IRMM 440 - reference plate - Code 22 [600x600mm]	0,03051	01.06.2008

Calibration checks will be kept with the certified reference material IRMM 440 at each measurement cyclus.

Annex 3: Maximum probable error and specification FOX 600 instrument

The maximum probable error in percent is obtained from the individual components calculated in table 1. The specification of the FOX 600 equipment is described in table 2.

Table 1: Maximum probable error in accordance with NEN-EN 1946-3

Probable errors	Maximum percentage
Edge heat loss error	0.5%
Error in the temperature difference	1.0%
Error in the specimen thickness	0.5%
Error due to imperfect contact (sheet)	0.5%
Accuracy of the calibration specimen	1.5%
Maximum allowed non-linearity of the calibration	1.0%
Maximum calibration drift	1.0%

Remark: If these errors are summed, the maximum error is 6%.
 If the errors are added in quadrature, the maximum possible error is 2.4%.

Table 2: Specification FOX 600 instrument

Thermal conductivity range	0.005-0.35 W.m ⁻¹ K ⁻¹ (0.035-2.4 Btu h ⁻¹ ft ⁻² in F ⁻¹)
Accuracy	~1%
Repeatability	~0.2%
Reproducebility	~0.5%
Max. Temperature hot plate	85 °C (185°F)
Max. Temperature cold plate	-15°C (5°F)
Stability of the temperature	-0.03°C (-0.06°F)
Accuracy of thickness	± 0.025 mm (± 0.001")
Interface	12 components for input and LCD 4-device
Interaction with software	RS-232 serial interface