EUROLAB®
Laboratory Services

TEST/ INSPECTION REPORT

EUROLAB LABORATORY SERVICES

TÜRCERT TEKNİK KONTROL VE BELGELENDİRME A.Ş.

UNITED ACCREDITATION FOUNDATION UAF

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Overall Rating: PASSED

Report No : 2020121501
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Sample ID: COTTON PLASTER

	TEST	METHOD	RESULT
*	**Thermal Insulation - Determination of Steady Heat Resistance and Related Properties - Enclosed Hot Plate Device**	**ISO 8302**	**0.058 W/(m.K)**

Seal

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Environment

The requirements and standards apply to equipment intended for use in

X	Residential (domestic) environment
X	Commercial and light-industrial environment
X	Industrial environment
X	Medical environment

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Thermal Insulation - Determination of Steady Thermal Resistance and Related Properties

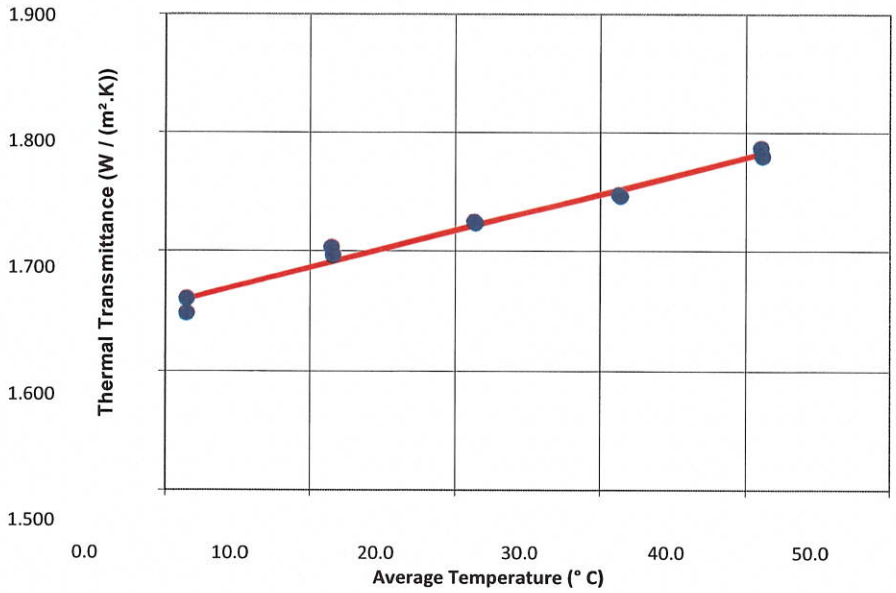
Method

The thermal resistance of the samples was measured with a heat flow meter for 30x30 cm samples as described in ISO 8302 (Figure 1). The device consists of a central hot plate with a cold plate above and below. Circular heat flow meters with a diameter of 10 cm are located centrally on the bottom of the top plate, on both sides of the central plate and on the top of the bottom plate. These heat flow counters are embedded in a neoprene sheet that is the same thickness as the counters and is as large as the area of the plates. In the middle of each plate side, extremely thin Cu / Co thermocouples are glued against the heat flow counters. Samples are then mounted between the top plate and the center plate and between the bottom plate and the center plate. All of them are finally packed in a thermally insulated box to create close to adiabatic conditions around the installation. Before the measurements start, heat flow meters are recalibrated using reference samples of the EU's BCR.

The temperature difference between the thermostatic bath that keeps the upper and lower cold plate at temperature and the thermostatic bath that keeps the central hot plate at temperature is set to 10 ° C. The temperatures and heat fluxes on both surfaces of the samples are not fixed, all data are recorded in 10 time intervals and stored on the hard disk. All calculations are done in Excel. Values are converted in averages lasting three hours and the resistance is calculated using the equation below.

$$R = \frac{2\Delta\theta}{C_1 E_1 + C_2 E_2}.$$

C_1, C_2	Calibration constants of heat flow meters W / (m².mV))
E_1, E_2	Electric voltage difference measured on heat flow meters at mV
$\Delta\theta$	Temperature difference on samples in K (measured with Cu / Co thermocouples)



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Results of the measurement

Sample	Thickness m	Vol. humidity rate $\%m^3/m^3$	Average temperature °C	Temperature difference °C	Thermal Resistance $m^2.K/W$ (1)
1	0.02	0	1.5	9.0	0.50^2
			11.5	9.2	0.58^7
			21.4	9.2	0.58^0
			31.3	9.3	0.57^2
			41.2	9.2	0.56^0
2	0.02	0	1.6	8.9	0.60^7
			11.6	9.1	0.59^0
			21.5	9.2	0.58^0
			31.4	9.2	0.57^2
			41.3	9.2	0.56^2
3	0.02	0	1.6	9.2	0.60^5
			11.6	8.7	0.59^2
			21.4	9.3	0.58^1
			31.4	9.4	0.58^2
			41.3	9.2	0.57^2

(1) The last number in the superscript is not precise (not sure)

Sample	$\frac{\partial q}{q}$ %	$\frac{\partial \theta}{\theta}$ %	$\frac{qR_n}{\Delta\theta}$ %	Maximum Uncertainty %	Most Possible Uncertainty %
1	1.5	0.55	1	3.1	1.9
2	1.5	0.55	1	3.1	1.9
3	1.5	0.55	1	3.1	1.9

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Thermal conductivity at different average temperatures

These are given in the table below:

Average temperature °C	Thermal Conductivity W/(m.K)
-10	0.049
0	0.050
10	0.055
20	0.057
30	0.063
50	0.066
100	0.071
200	0.083
300	0.094
400	0.106
500	0.117

The average thermal conductivity in COTTON PLASTER then reaches 0.058 W / (m.K).

In the test environment, the relative humidity in the environment is 50%.
In the test environment, the air temperature is about 21 degrees Celsius.

***** End of Report *****

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