



**VILNIAUS GEDIMINO TECHNIKOS UNIVERSITETAS
TERMOIZOLIACIJOS MOKSLO INSTITUTAS**

**(VILNIUS GEDIMINAS TECHNICAL UNIVERSITY
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LIETUVOS
NACIONALINIS
AKREDITACIJOS
BIURAS

BANDYMAI
ISO/IEC 17025

Nr. LA. 01.004

TEST REPORT

No 1434

27 March 2014

Valid for the tested testing object

1 (1)

- CUSTOMER: SIA "HEMP ECO SYSTEMS LATVIA", Vakari, Tīnūžu pagasts, Ikšķiles novads, LV-5015, Latvia.
- MANUFACTURER: Sia "HEMP ECO SYSTEMS LATVIA"
- PRODUCT: Lime-hemp chaff composite "HES-mix".
- RECEIVING DATE: 10th of March 2014
- TESTING DATA: From 14th to 26th of March, 2014
- TEST LOCATION: Laboratory
- SAMPLES SELECTED BY: The samples were selected by customer.
- TESTS WERE CARRIED OUT IN ACCORDANCE WITH:
EN 826:2013. Thermal insulating products for building applications - Determination of compression behaviour.
EN 1602:2013. Thermal insulating products for building applications - Determination of the apparent density.
EN 1604:2013. Thermal insulating products for building applications - Determination of dimensional stability under specified temperature and humidity conditions.
EN 12086:2013. Thermal insulating products for building applications - Determination of water vapour transmission properties.
EN 12667:2001. Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance.
- TEST RESULTS:

Characteristics	Tests methods	Test results of "HES-mix"
Dry density of specimens, kg/m ³	EN 1602	319
Dimensional stability of specimens after keeping for 48 h in (-20±2) °C temperature, %, by: length: width: thickness:	EN 1604	+0,3 +0,2 ±0,1
Water vapour diffusion resistance factor, μ	EN 12086	5,48
Compressive strength, kPa	EN 826	109 (116, 84,6, 83,3, 135, 126)
Thermal conductivity (dry specimen) at 10°C, W/(m·K) ^{*)}	EN 12667	0,0633
Thermal conductivity (before testing specimen stored in an atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity until stabilisation) 10°C, W/(m·K) ^{*)}		0,0981

^{*)} Tests of thermal conductivity were carried out by heat flow meter apparatus FOX 304 with a single-specimen symmetrical configuration and with the linear gradient guard for sample edges. The size of specimens was of (300x300) mm. The temperature difference through the specimen was 20°C and the mean temperature during the test was 10°C. Apparatus FOX 304 was calibrated using reference material IRMM-440, No. 21. Certified reference of expanded polystyrene, No. 12120890 is related to reference IRMM-440, No. 21. Apparatus FOX 304 was calibrated using reference of expanded polystyrene, No. 12120890 on 13th of February, 2014. FOX 304 is additionally calibrated according to IRMM-440, No. 21 parameters, which are set in an internal memory of the apparatus, before each measurement of thermal conductivity. Test objects were dried at the temperature of (70±2)°C. Ambient temperature of environment surrounding the apparatus during the test is 23,5 °C. Uneven surface of specimen was mechanically cut off. The main surfaces of specimens were grinded using grinding wheel before testing in accordance with EN 12667:6.3.2. Test was carried out by engineer Giedrius Balčiūnas.

- OTHER INFORMATION: Test results of water vapour transmission are presented in Annex A – 1 page.

Head of Laboratory of Thermal Insulating Materials

Dr. S. Vėjelis

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Annex A
TEST REPORT

No 1434
27 March 2014

The results are valid for the tested testing object only

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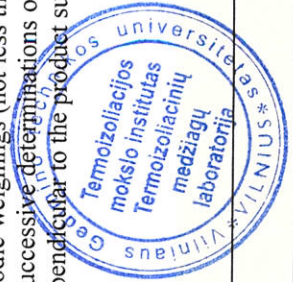
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Table A. Water vapour transmission test results of lime-hemp chaff composite "HES-mix"

Specimen No.	Thickness** of specimen, mm	Water vapour transmission rate g, mg/m ² ·h	Water vapour permeance W, mg/(m ² ·h·Pa)	Water vapour transmission*			Water vapour diffusion equivalent air layer thickness S, m
				Water vapour resistance Z, m ² ·h·Pa/mg	Water vapour diffusion resistance factor, μ	Water vapour permeability δ, mg/(m·h·Pa)	
1	61,6	2305	1,90	0,525	6,04	0,117	0,372
2	64,0	2514	2,08	0,481	5,33	0,133	0,341
3	61,8	2533	2,09	0,478	5,48	0,129	0,338
4	58,5	2699	2,23	0,448	5,43	0,131	0,318
5	63,3	2641	2,18	0,458	5,13	0,138	0,325
Mean value	61,8	2538	2,10	0,478	5,48	0,130	0,339

*) Dimensions of specimens were (100x100) mm. Before the test specimens were conditioned at (23±2)°C temperature. The climatic conditions of the test – 23-50/95, the average test temperature during the test – 22,8°C, the average air pressure during the test – 753 mmHg, water vapour pressure difference between the surfaces of specimens – 1210 Pa, water vapour permeability of air δ_{air}=0,709. The test specimen is sealed to the open side of test dish containing a saturated salt solution. Periodic weighings (not less than 24 h) of the assembly are made to determine the rate of water vapour transmission when the steady state is reached. Weighings continues until five successive determinations of change in mass per unit time for each test specimen are constant within ±5% of the mean value for the test specimen. Water vapour flow direction is perpendicular to the product surface.



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