Fraunhofer Institute for Building Physics IBP
Body recognized by the building authorities
for testing, monitoring and certification
Director
Prof. Dr. Philip Leistner

Statement P1-270e/2025

Determination of the declared core thermal resistance and its thermal resistance when installed between 2 non-ventilated air gaps in horizontal heat flow of the composite thermal insulation mat “Aluphonic”

Client:
ALUTHERMO SA
Steinkelt, Galhausen 23
4780 ST. VITH
BELGIUM

Stuttgart, October 9, 2025

Deutsche Akkreditierungsstelle D-PL-11140-11-00

Testing laboratory
accredited by DAkkS GmbH according to
DIN EN ISO/IEC 17025:2018

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1 Task

The Fraunhofer Institute for Building Physics IBP was ordered by ALUTHERMO SA to determine the nominal value of the thermal resistance of Composite Thermal Insulation Mat "Aluphonic" according to DIN EN ISO 22097 [1] by means of the statistical method according to DIN EN ISO 10456, Annex C [2] and to calculate the thermal resistance according to DIN EN ISO 6946 [3]. This determination was based on measured values of the thermal resistance by means of the guarded hot plate apparatus of ALUTHERMO SA and of the Fraunhofer Institute for Building Physics IBP.

2 Description of the Method

The standard DIN EN ISO 10456 [2] describes a method to determine the nominal values of the thermal insulation of building materials and products. The wanted nominal value of the thermal resistance $R_{90/90}$ can be calculated from the mean value of the measured thermal resistances $\overline{R}$, the standard deviations of these measured values s, and a coefficient k_2 specified for a unilateral 90 % tolerance interval with a 90 % level of confidence and presented in dependence of the number of measurements in Table C.1 in [2]. The method can be applied for thermal insulation material for building construction according to DIN 4108-4. Thus the nominal value is also valid as design value of the thermal resistance.

With this value, the thermal resistance R is calculated according to DIN EN ISO 6946 [3] using a two-dimensional, steady-state finite difference program described in [4] and taking into account the heat transfer coefficients R_{si} = 0.13 (m²·K)/W inside and R_{se} = 0.04 (m²·K)/W outside, as well as adjacent air layers with a thickness of 20 mm. The emission coefficient of the insulation mat is ε = 0.06 according to [5], and for the adjacent material, an emission coefficient of ε = 0.8 has been assumed based on the client's information.

3 Result

The Fraunhofer Institute for Building Physics IBP investigated the following products: Composite Thermal Insulation Mat "Aluphonic" Batch 13/02/25, Batch 22/02/24, Batch 26/06/25 and Batch 18/07/23, delivered to Fraunhofer IBP on July 7, 2025 manufactured by ALUTHERMO SA. The measured values were determined by measurements of Fraunhofer IBP according to DIN EN 12667 and are documented in the test reports listed in Table 1. Another 9 measurements carried out by ALUTHERMO SA were also used to determine the nominal value. All measurement values are presented in Table 1.

The mean value of thermal resistance is R_{mean} = 0.2736 (m²·K)/W, the standard deviation is s = 0.002603 W/(m·K) and the coefficient k for 13 measured values according to [2] is k = 1.93. Therefore, the nominal value and the design value of the thermal resistance of the test specimens determined on the basis of these input data is:

R = 0.26 (m²·K)/W *

Thus, according to [3], the thermal resistance with two adjacent air layers of a thickness of 20 mm is calculated to:

R = 1.52 (m²·K)/W *

* value for 1 sheet of the insulation mat

4 References

[1] EN ISO 22097: Wärmedämmstoffe für Gebäude – Reflektierende Dämmprodukte – Bestimmung der wärmetechnischen Eigenschaften (ISO 22097:2023); Deutsche Fassung EN ISO 22097:2023, Beuth-Verlag, Berlin.

[2] DIN EN ISO 10456:2010-05: Baustoffe und Bauprodukte, Wärme- und feuchteschutztechnische Eigenschaften – Tabellierte Bemessungswerte und Verfahren zur Bestimmung der wärmeschutztechnischen Nenn- und Bemessungswerte (ISO 10456:2007 + Cor. 1:2009); Deutsche Fassung EN 10456:2007 + AC:2009, Beuth-Verlag, Berlin.

[3] DIN EN ISO 6946:2018-03: Bauteile - Wärmedurchlasswiderstand und Wärmedurchgangskoeffizient - Berechnungsverfahren (ISO 6946:2017); Deutsche Fassung EN ISO 6946:2017. Beuth-Verlag. Berlin.

with

DIN EN ISO 6946 Berichtigung 1:2023-04: Bauteile - Wärmedurchlasswiderstand und Wärmedurchgangskoeffizient - Berechnungsverfahren (ISO 6946:2017, korrigierte Fassung 2021-12); Deutsche Fassung EN ISO 6946:2017; Berichtigung 1. Beuth-Verlag, Berlin.

[4] BISCO. Computer program to calculate two-dimensional steady state heat transfer in free-form objects. Version 13.0w. Manual BISCO v13.0 2024, Physibel, Maldegem, Belgium (2024).

[5] Test Report P15-054e.1/2014: Determination of the Hemispheric Emissivity, Product Aluthermo Optima, from October 30, 2014. Fraunhofer-Institut für Bauphysik.

Note: This statement exclusively refers to the tested materials and the tested calculation scheme.

The test laboratory is recognized by the Deutsches Institut für Bautechnik (DIBt) as a testing facility under applicable building regulations LBO as "PÜZ-Stelle" No. BWU-10 and as a Notified Body No. 1004 to the terms of the Regulation of Construction Products (EU-BauPVO). It has been granted flexible accreditation under DIN EN ISO/IEC 17025 by the Deutsche Akkreditierungsstelle GmbH (DAkkS) under accreditation No. D-PL-11140-11-00.

This statement comprises 4 pages with 1 table.

Stuttgart, October 9, 2025/JL

Head of the Test Laboratory

Andreas Zegowitz

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Table 1: Measurement results of the thermal resistance of test specimens made of Composite Thermal Insulation Mat "Aluphonic" of the Fraunhofer Institute for Building Physics IBP and ALUTHERMO SA.

Measurement	Measuring institution	Batch / Production code	Test report	Thermal resistance *
				(m²·K)/W
1	IBP	13/02/25	P1-183e/2025	0.2736
2		22/02/25	P1-184e/2025	0.2722
3		26/06/25	P1-185e/2025	0.2743
4		18/07/23	P1-186e/2025	0.2770
5	ALUTHERMO SA	26648	M_723_20250708_1631	0.2767
6		26656	M_723_20250709_1157	0.2767
7		26665	M_723_20250711_1255	0.2767
8		26875	M_723_20250829_1349	0.2700
9		26878	M_723_20250829_1615	0.2733
10		26945	M_723_20250909_0846	0.2733
11		26946	M_723_20250909_0939	0.2700
12		26947	M_723_20250909_1118	0.2733
13		26948	M_723_20250909_1205	0.2700
Mean value				0.2736

* value for 1 sheet of the insulation mat