



Environmental Product Declaration Type III (EPD) ITB number 527/2023

Aerogel insulation mat EVERGEL



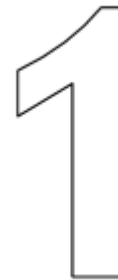
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Basic Information



This declaration is a Type III Environmental Product Declaration (EPD) based on the EN 15804 standard and verified according to ISO 14025 by an independent auditor.

It contains information about the environmental impact of the declared construction materials. These aspects have been verified by an independent body in accordance with ISO 14025. In principle, a comparison or evaluation of EPD data is only possible if all data to be compared have been created in accordance with EN 15804+A2 (see section 5.3 of the standard).

LCA analysis: A1 - A3, A4, C1 - C4 i D according to EN 15804 (cradle to grave with options)

Year of EPD development: 2023

Declared service life: 60 years

PCR: document ITB-PCR A (based on PN-EN 15804)

Declared unit: 1 m² of an aerogel insulation mat of 11 mm thickness

Reason for implementation: B2B

Representativeness: Europe, 2022

Manufacturer

Evertec manufactures insulating aerogel mats and pre-insulated pipes for solar and hot water systems. It creates innovative solutions to improve the quality of life, taking care of harmonious human and environmental development.

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The company's comprehensive product range consists of aerogel mats, pre-insulated pipes for solar installations and pre-insulated hot water pipes with aerogel mats with particularly low heat losses.

Evertec's mission is to contribute to a more energy sustainable world. The company's products save energy, make better use of natural energy sources and reduce CO2 emissions. All technological processes are designed with special attention to the environment.

Production is implemented using Evertec's proprietary, patented solutions. Products covered in this study are manufactured in a factory located in China.



Description of products and application

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Evergel aerogel mat is an excellent insulating material that performs its primary function - thermal insulation - very well, and also provides many additional benefits thanks to its unique characteristics. It is a ductile material that is easy to form and cut into the right shapes, so it is very suitable for insulating thermal bridges, hard-to-reach surfaces and buildings where the use of thicker insulation is limited for architectural reasons.

The Evergel aerogel mat offered by Evertec has very good thermal insulation properties with a thermal conductivity coefficient of 0.0175 W/mK. It is also resistant to high temperatures and has European flammability class A2-s1,d0, which means that it is a non-flammable material, does not produce dangerous smoke or spread fire, and is also a fire insulation. It is an extremely durable material that retains its properties for many years. It is completely hydrophobic, resistant to external agents and chemical and biological corrosion, and at the same time breathable and vapour-permeable. It ensures that moisture dries out of the masonry and prevents corrosion. The mat does not deteriorate under pressure. Thanks to its porous and open structure, Evergel mat is an excellent acoustic insulation. The material adheres tightly to the building structure, eliminating any gaps through which noise can pass. Evergel matting is also space-saving - the low thickness of the insulation and high packing density reduces transport and storage costs compared to rigid, moulded materials.

Aerogel matting can be used in many industries such as:

- industry - mainly in the heating sector. It is excellent for high-temperature insulation of pipelines, furnaces, fireplaces and wherever traditional insulation cannot be used due to its thickness. It is also used in the fuel industry - for insulating fuel tanks, pipelines, road tankers and other equipment exposed to high temperatures.
- transport - for insulating ships, rolling stock, tankers, caravans, yachts. They ensure minimal heat loss, space saving and acoustic comfort.
- construction - they are used due to their low thickness and low thermal conductivity coefficient. They insulate thermal bridges very well and are also worth using to insulate window sills, balconies, window and door frames.
- manufacture of tourist equipment and clothing - tents, sleeping bags, thermoses, thermal bags. They can also be used for winter footwear and clothing, especially thermal and military clothing. They provide resistance to extreme temperature conditions and moisture.

This study covers Evergel aerogel mats produced in the form of rolls and strips with a thickness of 11 mm and a density of 173 kg/m³. Standard mats are supplied to customers in the form of rolls with the following dimensions:

- width: 150 cm,
- length: 24-26 m,
- diameter: 62 cm,
- weight: 80 kg,
- m² per roll: 36-39.

Overview of Evergel aerogel mat properties

Property	Value	Research method
Declared thermal conductivity coefficient λ at a temperature of 10°C, W/mK	0.0175	PN-EN 12667:2002
Water vapour diffusion resistance factor μ	4.8	PN-EN 12086:2013
Dimensional stability under the defined temperature and humidity conditions (+70°C and 90%)	± 10%	PN-EN 1604:2013
Tensile strength perpendicular to surface, kPa	6.1 ± 2,0	EN 1607:2013
Tensile strength parallel to the surface, kPa	in the longitudinal direction: 409 ± 28 in the transverse direction: 1 291 ± 125	EN 1608:2013
Maximum application temperature	675°C	PN-EN 14706:2013
Emission of volatile organic compounds (VOCs)	Emisja poniżej dopuszczalnych stężeń szkodliwych dla zdrowia	UA GW VIII.21/2011
Class of reaction to fire	A2-s1, d0	PN-EN 13501-1+A1:2019



Life cycle assessment (LCA) - general principles



Declared unit

The declared unit of product is 1 m² of an Evergel aerogel insulation mat of 11 mm thickness and density of 173 kg/m³.

Allocation

The allocation in this study was made in accordance with the ITB PCR A guidelines. The production and storage of the products covered in this declaration take place at the production plant in China. Input data were collected for the entire plant. Allocation to a single, representative product was made on the basis of product weight. All impacts from raw material extraction are allocated in module A1. The production is based on raw and recycled materials. 65% of the glass fibre is recycled, the remaining 35% is raw glass. Module A2 includes the transport of raw materials to the production facility. Energy, fuel, waste and direct emissions for the entire production process were inventoried and included in module A3.

System boundaries

The life cycle analysis of the declared products includes A1 - A3, A4, C1-C4+D ("from cradle to grave with options") according to EN 15804 and ITB PCR A.

System limits

100% of input materials and 100% of energy, gas, fuel and waters consumption were inventoried at the production plant in China. All relevant parameters from the collected production data are included in the assessment, i.e. all materials used in production, electricity, gas and fuel consumption. direct production waste and emissions from production processes.

Modules A1 and A2 Extraction and transport of raw materials

Raw materials for production, such as glass fibres, chemicals and packaging materials such as foil and cardboard are transported by truck from locations between 15 and 900 km from the production site. Module A1 shows the impact of the production of the raw materials further used in the production of aerogel insulation. Raw material transport data is recorded by the plant. Global fuel averages were used for the calculation of module A2.

Module A3 Production

The production process is illustrated in the diagrams on page 8. The main process is the forming and curing of the mat, which consists of glass fibres and a binder. The mat is then processed to give it the form of rolls or strips. The processes consume electricity, gas, water and diesel.

Module A4 Transport

Transport to the place of installation takes place from the plant in China. The finished products are wrapped in foil and placed in cartons or cardboard tubes. The company uses road and water transport, adapted to the size of the order. The fuel used is diesel. Based on 2022 data for the largest customers, products are transported an average of 280 km by road and 17 132 km by sea.

Module C1 Deconstruction and demolition

It is assumed that deconstruction of the mats is possible in parallel with the demolition of the structure, and during such a process the impacts from deconstruction of the mats are negligibly small. No information is available for Evergel

mats regarding the impact of deconstruction in the construction sector or any other sector. Therefore, no contribution to the impact categories of this modulus is reported and the modulus is equal to 0.

Module C2 Transport

It is assumed that the end-of-life product will be transported by truck to the nearest waste treatment facility (truck, diesel) within 100 km.

Module C3 Waste treatment

Accelerated aging tests prove that for a period of 60 years, the properties of the product do not change, so after taking into account losses due to deconstruction, it was assumed that 50% of the mat is reused.

Module C4 Disposal

At the end of its life, 50% of the product goes to landfill.

Module D External impacts beyond system boundaries

Module D presents the burdens and benefits of recycling. Benefits are assessed at the point of functional equivalence, i.e. where there is a substitution of virgin raw material. It is expected that 50% of the mats will be reused.

Data collection period

The input data for the calculation of declared products concern the period from January to December 2022. The life cycle assessment has been prepared for Europe as a reference area.

Data quality

The data for the LCA calculation of modules A1-A4 came from verified LCI inventory data from the plant. In accordance with Annex E of EN 15804 + A2, a data quality assessment was carried out. For technical representativeness, processes with a quality level of 'very good' represent 99% of the values for the climate change indicators. For geographical and temporal representativeness, a process evaluation level of "very good" was obtained.

Assumptions and estimates

The impacts of the representative products were aggregated using a weighted average. The results obtained for the representative products can be applied proportionally to all aerogel products

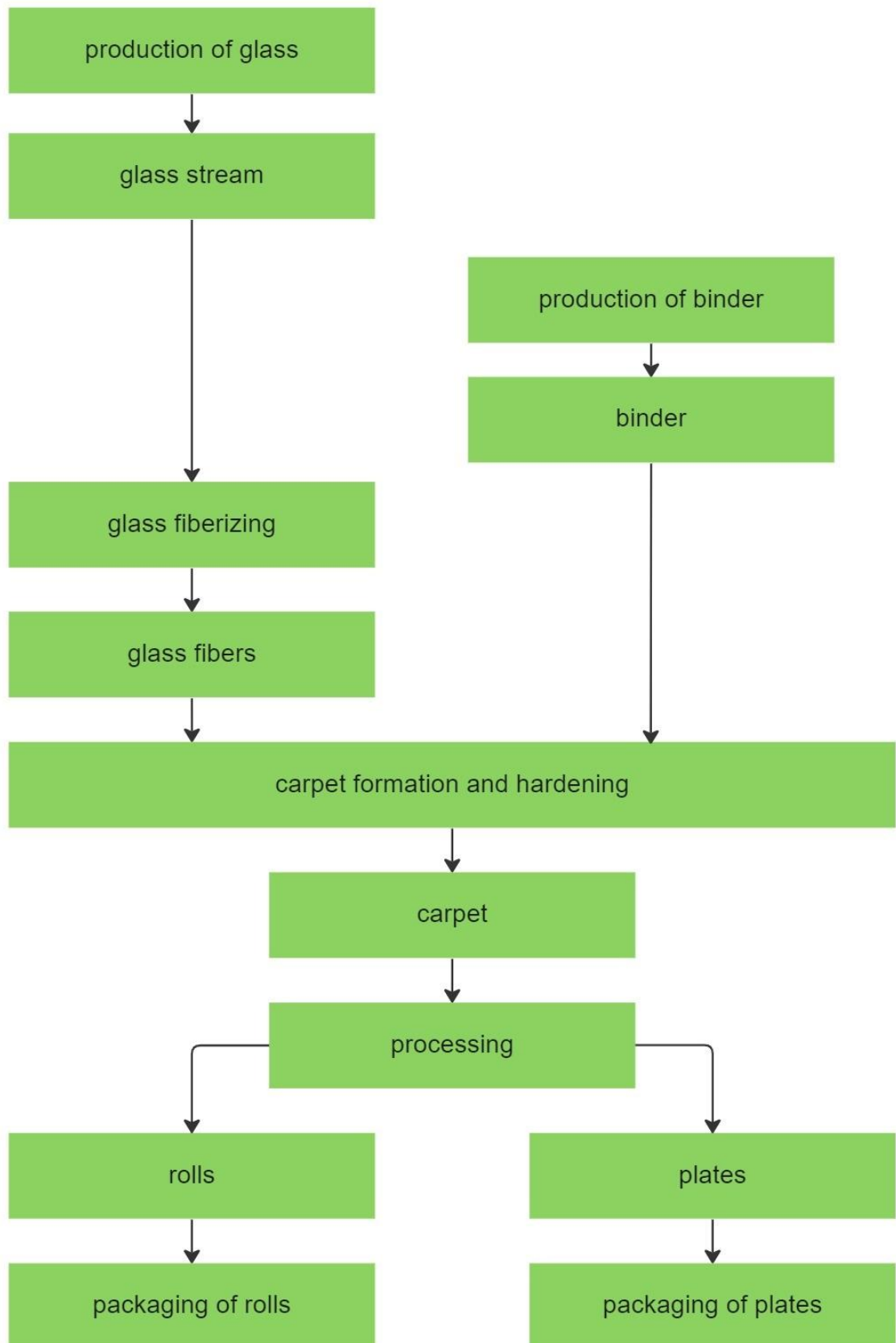
Calculation principles

LCA was made in accordance with PN-EN 15804+A2 standard and ITB PCR A (v1.6, 2023) document.

Databases

The data for the calculations came from Ecoinvent v. 3.6, Ecoinvent v. 3.8 and from databases available in Bionova OneClickLCA software. The characterisation factors are CML ver. 4.2 based on EN 15804+A2. Calculations for emissions from natural gas and oil combustion were made on the basis of emission factors from the KOBIZE database.

Production scheme of Evergel aerogel insulation mats:



Life cycle assessment (LCA) - results

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Declared unit

The declared unit is 1 m² of an Evergel aerogel mat with a thickness of 11 mm and a density of 173 kg/m³. The following indicates which LCA assessment modules were included in the assessment:

Information on system boundaries (MA = module assessed, MNA = module not assessed)																
Product stage			Construction stage		Use stage							End of life				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction and installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport	Waste processing	Disposal	Potential for reuse, recovery or recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MA	MA	MA	MA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MA	MA	MA	MA	MA

As the raw materials at the production stage provide the main contribution to the environmental balance results, there is a linear relationship between the weight of the raw materials and the environmental impact. The range includes mats of different thicknesses. For further results for other Evergel mat thicknesses, please use the following formula:

$$P(x) = [P(x1)/11]*x$$

P(x): indicator for different product thickness,

P(x1): indicator obtained for the product representing the product type, (e.g. global warming potential (GWP))

x: new mat thickness [mm].

Results for an Evergel aerogel mat

Environmental impacts

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential- total	kg CO2 eq.	7.39E+00	2.26E-01	3.57E+00	1.12E+01	3.98E-01	0.00E+00	1.73E-02	5.30E-01	6.20E-01	-1.03E+01
Global warming potential- fossil	kg CO2 eq.	7.35E+00	2.26E-01	3.57E+00	1.12E+01	3.98E-01	0.00E+00	1.73E-02	5.30E-01	6.20E-01	-1.03E+01
Global warming potential- biogenic	kg CO2 eq.	3.11E-02	1.25E-04	6.70E-05	3.13E-02	0.00E+00	0.00E+00	1.26E-05	4.36E-05	4.11E-05	-2.62E-02
Global warming potential- LULAC	kg CO2 eq.	8.32E-03	7.89E-05	4.97E-04	8.90E-03	2.44E-04	0.00E+00	5.20E-06	8.87E-05	9.79E-05	-2.30E-03
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	1.06E-06	5.15E-08	9.48E-08	1.21E-06	8.13E-08	0.00E+00	4.07E-09	6.63E-09	7.58E-09	-1.32E-05
Acidification potential	mol H+ eq.	3.76E-02	9.25E-04	3.13E-02	6.98E-02	1.03E-02	0.00E+00	7.26E-05	4.41E-03	5.17E-03	-1.80E-02
Eutrophication aquatic freshwater	kg Pe	7.47E-04	1.89E-06	1.84E-04	9.34E-04	2.28E-06	0.00E+00	1.41E-07	5.40E-07	4.72E-07	-1.07E-04
Eutrophication aquatic marine	kg N eq.	6.52E-03	2.75E-04	4.05E-03	1.08E-02	2.51E-03	0.00E+00	2.19E-05	2.57E-03	3.02E-03	-2.93E-03
Eutrophication terrestrial	kg N eq.	7.27E-02	3.04E-03	4.63E-02	1.22E-01	2.79E-02	0.00E+00	2.42E-04	2.49E-02	2.92E-02	-3.20E-02
Formation potential of tropospheric ozone	kg NMVOC eq.	2.58E-02	9.36E-04	1.23E-02	3.91E-02	7.29E-03	0.00E+00	7.77E-05	6.17E-03	7.24E-03	-1.46E-02
Abiotic depletion potential for non-fossil resources	kg Sb eq.	7.22E-05	5.87E-06	6.56E-06	8.47E-05	4.71E-06	0.00E+00	2.95E-07	1.26E-07	1.33E-07	-1.51E-05
Abiotic depletion potential for fossil resources	MJ	1.32E+02	3.42E+00	4.23E+01	1.77E+02	5.26E+00	0.00E+00	2.69E-01	5.40E-01	5.88E-01	-8.68E+01
Water use	m ³	2.68E+01	1.12E-02	1.67E+00	2.84E+01	1.35E-02	0.00E+00	1.00E-03	1.25E-02	1.38E-02	-3.17E+00

Environmental aspects related to resource use

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy as an energy carrier	MJ	1.13E+01	4.77E-02	5.95E+00	1.73E+01	4.16E-02	0.00E+00	3.39E-03	1.36E-02	1.08E-02	-1.80E+00
Renewable primary energy for material use	MJ	9.23E-3	0.00E+00	1.06E+00	1.07E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Completely renewable primary energy	MJ	1.13E+01	4.77E-02	7.01E+00	1.84E+01	4.16E-02	0.00E+00	3.39E-03	1.36E-02	1.08E-02	-1.80E+00
Non-renewable primary energy as an energy source	MJ	9.79E+01	3.42E+00	3.44E+01	1.36E+02	5.26E+00	0.00E+00	2.69E-01	5.41E-01	5.88E-01	-5.00E+01
Non-renewable primary energy for material use	MJ	3.38E+01	0.00E+00	7.85E+00	4.17E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.68E+01
Completely non-renewable primary energy	MJ	1.32E+02	3.42E+00	4.23E+01	1.77E+02	5.26E+00	0.00E+00	2.69E-01	5.41E-01	5.88E-01	-8.68E+01
Use of secondary raw materials	kg	3.95E-01	0.00E+00	8.73E+01	3.96E-01	0.00E+00	0.00E+00	0.00E+00	2.36E-04	2.66E-04	-8.38E-03
Renewable secondary fuels	MJ	2.90E-04	0.00E+00	5.99E-04	8.89E-04	0.00E+00	0.00E+00	0.00E+00	3.10E-06	3.61E-06	-1.25E-04
Non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of fresh water resources	m ³	6.24E-01	5.99E-04	1.74E-02	6.42E-01	6.03E-04	0.00E+00	5.60E-05	4.63E-04	5.21E-04	-7.48E-02

Other environmental information describing the waste categories

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste destined for landfill	kg	5.55E-01	3.46E-03	1.80E-01	7.39E-01	6.35E-03	0.00E+00	2.61E-04	0.00E+00	4.77E-03	-1.38E-01
Non-hazardous waste destined for disposal	kg	1.46E+01	2.53E-01	7.68E+00	2.25E+01	1.57E-01	0.00E+00	2.89E-02	0.00E+00	1.10E-01	-2.16E+00
Radioactive waste for disposal	kg	2.94E-04	2.34E-05	7.68E-05	3.94E-04	3.64E-05	0.00E+00	1.85E-06	0.00E+00	3.14E-06	-5.25E-05
Components to be reused	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.52E-01	0.00E+00	0.00E+00
Materials to be recycled	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials destined for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Electricity exported	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Verification

The verification process for this EPD is in accordance with ISO 14025 and ISO 21930. Once verified, this EPD is valid for a period of 5 years. There is no need to recalculate after 5 years if the inputs have not changed significantly.

EN 15804 serves as the basis for ITB PCR-A Independent verification according to ISO 14025 (subsection 8.1.3.) [] internal [X] external
External verification of EPDs: Michał Piasecki, Professor ITB, m.piasecki@itb.pl Input data verification, LCI audit, LCA: Agnieszka ,Pikus JW+A, a.pikus@jw-a.pl LCA verification: Michał Piasecki, ITB professor, m.piasecki@itb.pl

Note 1: The declaration owner has the sole ownership, liability, and responsibility for the information provided and contained in EPD. Declarations of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform - Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines
- EN 15804 +A2 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products



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CERTIFICATE № 527/2023

of TYPE III ENVIRONMENTAL DECLARATION

Products:

Aerogel insulation mat EVERGEL

Manufacturer:

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confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

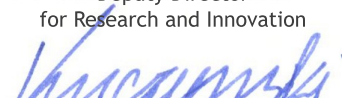
This certificate, issued on 4th October 2023 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kuczyński, PhD

Warsaw, October 2023