Type III Environmental Product Declaration No. 929/2026

Issuance date: 11.03.2026
Validation: 12.03.2026
Validity date: 11.03.2031

Ceramic bricks

Owner of the EPD:

Leier Baustoffe SK s.r.o.
Address: Pribylinská 3
831 04 Bratislava, Slovakia
Tel.: +421 940 603 736
Website: www.leier.sk
Contact: Lubomir.roth@leier.sk

EPD Program Operator:

Instytut Techniki Budowlanej (ITB)
Address: Filtrowa 1,
00-611 Warsaw, Poland
Website: www.itb.pl
Contact: energia@itb.pl

ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A3, A4-A5, C1-C4 and D modules in accordance with EN 15804+A2 (Cradle-to-Gate with options)

The year of preparing the EPD: 2026

Product standard: EN 771-1:2011+A1:2015

Service Life: 100 years

PCR: ITB-PCR A

Declared unit: 1 ton

Reasons for performing LCA: B2B

Representativeness: Slovakia, Europe, 2024

MANUFACTURER

Leier started its business in 1965 in Horitschon, Austria. As of today, the Leier Group has more than 40 production plants and employs over 3,000 people in 7 European countries: Austria, Hungary, Poland, Slovakia, Romania, Croatia and Ukraine. Its core focus is the production of construction materials.

Figure 1 The view of Leier Baustoffe SK s.r.o. manufacturing plant

Leier Baustoffe SK s.r.o. is the Slovak subsidiary of the Leier Group. Founded in 2004, today it employs more than 100 people in two production plants. Wood chip concrete under the registered trademark Durisol is produced in Bratislava, western Slovakia, and ceramic bricks under the registered trademarks Leiertherm and Leierplan are produced in Petrovany, eastern Slovakia.

PRODUCTS DESCRIPTION

LEIER BAUSTOFFE s.r.o. offers its customers Leiertherm and LeierPLAN ceramic wall blocks covered by this EPD. These are vertically hollow products designed for use in reinforced walls (P elements), for erecting load-bearing and non-load-bearing walls, made of porous ceramics fired at a temperature above 900°C. They are characterized by thermal insulation, good acoustic insulation, frost resistance, and fire resistance.

The full range of products can be divided into two groups:

1. Leiertherm hollow bricks are designed for bricklaying with ordinary or heat-insulating mortar, with a horizontal joint thickness of approximately 12 mm, while vertical joints, depending on the range, are made:

- for tongue-and-groove joints without the use of adhesive,

- products marked N+F.

2. LeierPLAN hollow bricks are designed for bricklaying with thin-layer mortar using modern ground elements. Walls can be constructed in two ways: using thin-layer mortar of at least class M10, in accordance with EN 998-2, or using polyurethane foam adhesive for bricklaying. The mortar or foam adhesive is applied to horizontal joints. Vertical joints (tongue and groove) are not filled with mortar.

The variety of products in the Leiertherm + LeierPLAN system allows the functional properties of the products to be tailored to the intended application and customer requirements. The technical parameters of the hollow bricks are given in the Table 1.

Table 1 Technical characteristics of Thermopor and Thermopor Plan ceramic blocks according to EN 771-1:2011+A1:2015

Performance		Unit	Value	
			From	To
Dimensions	Length	mm	250	500
	Width		100	450
	Height		238	249
Dimensional deviations	Category of dimensional deviations	-	T1,T1+,T2, T2+	
	Category of dimensional range		R1,R1+,R2, R2+	
	Flatness of the laying surface	mm	NPD/≤ 0,3	

	Parallelism of the laying surface		NPD/≤ 0,6	
Construction group		-	G2, G3	
Compressive strength	Category	-	Category I elements	
	Standardised compressive strength	N/mm^2	10	15
	Load direction	-	Perpendicular to the laying surface	
Expansion under the influence of moisture		-	NPD	
Joint strength, fixed value		N/mm^2	0.15	
Active soluble salt content		-	S0	
Reaction to fire		-	A1	
Water absorption		%	NPD	
Tabular water vapour diffusion coefficient		-	5/10	
Gross density in dry condition		kg/m^3	645	910
Density deviation category		-	Dm ± 8%	
Thermal conductivity coefficient $\lambda_{10,dry,unit}$		W/mK	0.156	0.285
Resistance to freezing and thawing, category		-	F0	
Hazardous substances		-	NPD	

All additional technical information about the product is available on the www.leier.sk and catalogues.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Unit

Declared unit is 1 ton of Ceramic brick products. The reference period is the year 2024.

System boundary

The life cycle analysis of the declared products covers “Product Stage with options” A1-A3, A4-A5, C1-C4+D modules in accordance with EN 15804 and ITB PCR A (cradle to gate with options). Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculation. It can be assumed that the total sum of omitted processes does not exceed 2% of all impact categories. In accordance with EN 15804+A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Allocation

The allocation rules used for this EPD are based on general ITB PCR A. Production of ceramic bricks is a line process executed by of Leier Baustoffe SK s.r.o. in plant located in Petrovany (Slovakia). Allocation was done on product volumes basis. All impacts from raw materials extraction and processing are allocated in module A1 of the LCA . Impacts from the global line production of Leier Baustoffe SK s.r.o. Water and energy consumption, associated emissions and generated wastes are allocated to module A3. Packaging materials were taken into consideration.

System limits

100% materials and 100% energy consumption were inventoried in a factory and were included in calculation. In the assessment, all significant parameters from gathered production data are considered, utilized energy, and electric power consumption, direct production waste, and available emission measurements. The total of neglected input flows per module A1-A3 does not exceed the permitted maximum of 1 % of energy usage and product mass. Tires consumption for transport was not taken into account. It is assumed that the total sum of omitted processes does not exceed 2% of all impact categories. In accordance with EN 15804+A2 machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

Modules A1 and A2: *Raw materials supply and transport*

The modules A1 and A2 represent the extraction and processing of raw materials (clay raw material, cellulose slimming mixture, natural sand and sawdust) and transport to the production site. For A2 module (transport) European averages for fuel data are applied. All input material transport's distances from supplier were considered and included into calculation.

Module A3: *Production*

The basic ingredient used in the production of ceramic products is clay, which is stored in technological heaps located in the immediate vicinity of the factory before being used in production. Clay is extracted from open-cast mines located near the factory (Močarmany, Drienov). Production then proceeds as follows: as follows: dosing of moulding compound ingredients, Preliminary processing of moulding compound, Homogenisation of moulding compound in a mixer, Moulding of products on a belt press, Drying of semi-finished products, Firing in a tunnel kiln, Sorting of finished products (grinding) and their palletization. The diagram of the production process is shown in Fig. 2.

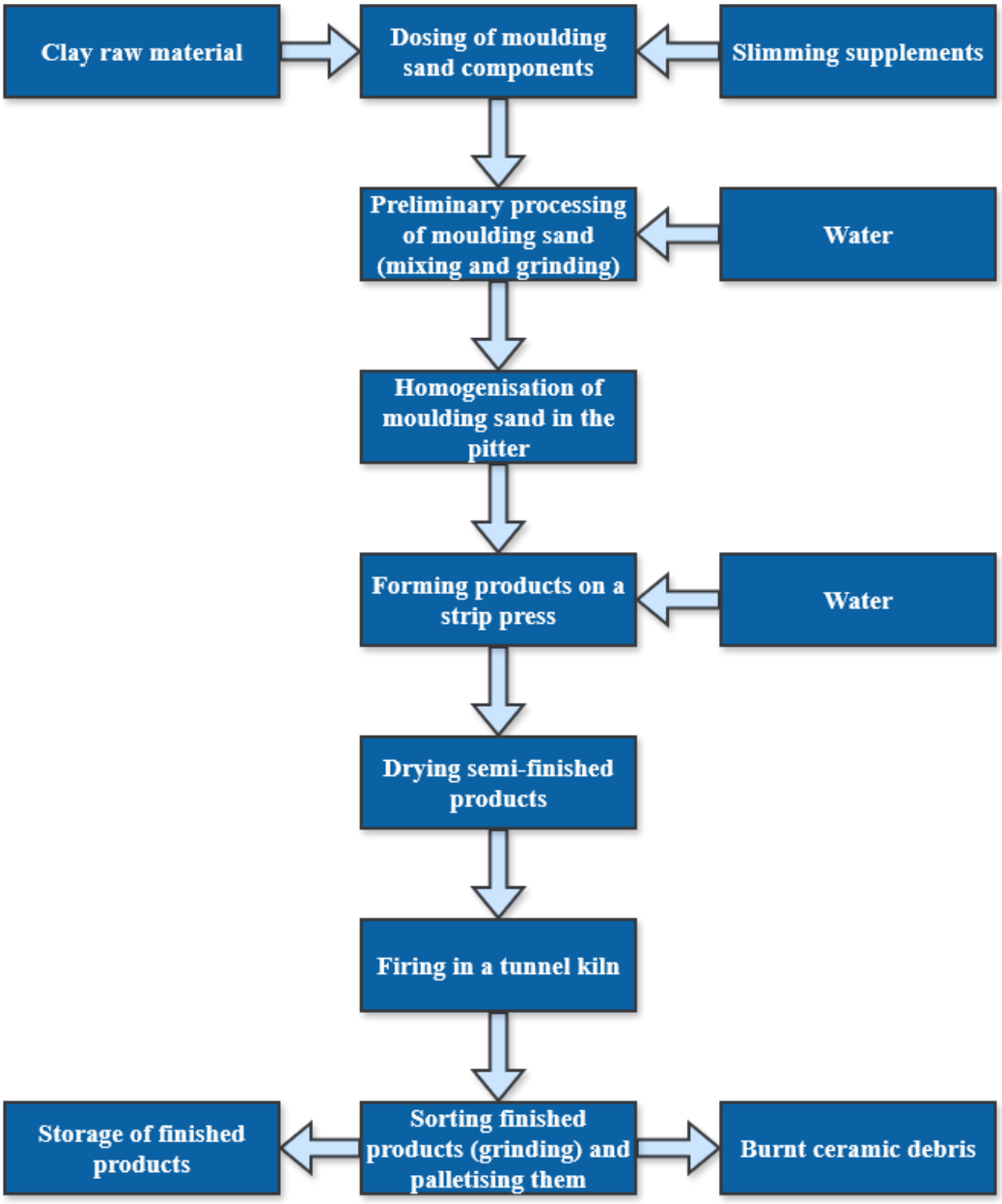

Figure 2 Manufacturing process scheme (A3)

Module A4-A5: transport to consumer and installation

Vehicle transport at distance 100 km is considered (emission standard: Euro 5) with 100% load capacity. Approximately 3 kWh of energy is expected per installation of one tonne of product.

Modules *C and D: End-of-life (EOL)*

In the adapted scenario, dismantling of ceramic bricks and elements (C1) is performed as part of building renovation or demolition processes, where environmental impacts from declared products can be considered as minor (<1%). There are no specific deconstruction methods, applied in Slovakia, in regards with the ceramic bricks and elements so the electric tools impact was assumed. During the demolition process the major amount of the products contribute to the construction and demolition wastes which can be processed on site or in a waste processing plant. It is assumed that 100% of ceramic bricks and elements are recovered at the EoL cycle. Recovered material is transported to either to landfill or construction site distant by 100 km, on 16 32t lorry (EURO 5) with fuel consumption of 35 l per 100 km. In the adapted scenario 90% of the ceramic bricks and elements is recycled and further used as aggregate for road foundation or ballast (credits presented in module D) while remaining 10% is forwarded to landfill in the form of mixed construction and demolition wastes. Environmental burdens declared in module C4 are associated with waste specific emissions to air, soil and groundwater. Regarding the recycling material of metals, the metal parts in the EoL are declared a send of waste status. Electricity at end of life (module D) has been modelled using an average EU27 electricity mix as the location where the product reaches end of life is unknown.

Table 2 End-of-life scenario for the Ceramic bricks

Material	Material recovery	Recycling	Landfilling
ceramic	100%	90%	10%

Electricity at end-of-life (module C) has been modelled using an average Slovak electricity mix as the location where the product reaches end-of-life is unknown.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2024 – 31.12.2024 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by Leier Baustoffe SK s.r.o. and verified during LCI data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.11. Specific (LCI) data quality analysis was a part of the input data verification. Where no background data is available, data gaps were complemented by manufacturer information and literature research.

Assumptions and estimates

The impacts of the representative products were aggregated using weighted average.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2 and EF 3.1. No mass balance approach was used. Biogenic C content per 1 kg of product is 0,057 kg C/kg.

Additional information

Slovak electricity mix (Ecoinvent v 3.11) emission factor used is 0.21 kg CO_2/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 ton of Ceramic bricks following life cycle modules (Table 3) were included in the analysis. The following tables 4-7 show the environmental impacts of the life cycle of selected modules (A1-A5+C1-C4+D).

Table 3 System boundaries for the environmental characteristic of the product.

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)															
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
MD	**MD**	**MD**	**MD**	**MD**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MD**	**MD**	**MD**	**MD**	**MD**

Table 4 Life cycle assessment (LCA) results for specific product – environmental impacts (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	1.19E+02	6.85E+00	7.63E+01	2.02E+02	1.67E+01	4.63E+00	0.00E+00	1.67E+01	2.18E+02	1.06E+00	-9.04E+00
Greenhouse potential - fossil	eq. kg CO_2	3.21E+02	6.85E+00	7.60E+01	4.04E+02	1.66E+01	4.54E+00	0.00E+00	1.66E+01	1.50E+01	1.05E+00	-9.00E+00
Greenhouse potential - biogenic	eq. kg CO_2	-2.03E+02	4.38E-03	1.66E-01	-2.03E+02	5.68E-02	9.31E-02	0.00E+00	5.68E-02	2.03E+02	1.06E-02	-5.40E-04
Global warming potential - land use and land use change	eq. kg CO_2	1.19E+00	2.27E-03	8.46E-02	1.28E+00	6.52E-03	3.05E-03	0.00E+00	6.52E-03	5.87E-03	1.07E-03	-4.13E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	8.52E-06	1.49E-07	5.68E-06	1.44E-05	3.85E-06	1.25E-07	0.00E+00	3.85E-06	3.46E-06	3.20E-07	-1.69E-06
Soil and water acidification potential	eq. mol H+	1.82E+00	2.20E-02	9.56E-02	1.93E+00	6.75E-02	3.62E-02	5.30E-02	6.75E-02	6.07E-02	8.88E-03	-3.78E-01
Eutrophication potential - freshwater	eq. kg P	1.83E-01	4.67E-04	6.54E-03	1.90E-01	1.12E-03	3.11E-03	0.00E+00	1.12E-03	1.01E-03	3.06E-04	-1.37E-02
Eutrophication potential - seawater	eq. kg N	3.44E-01	7.40E-03	2.06E-02	3.72E-01	2.04E-02	1.36E-02	0.00E+00	2.04E-02	1.83E-02	3.06E-03	-3.36E-02
Eutrophication potential - terrestrial	eq. mol N	3.27E+00	8.05E-02	1.91E-01	3.54E+00	2.22E-01	5.88E-02	0.00E+00	2.22E-01	2.00E-01	3.33E-02	-4.51E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	1.11E+00	3.33E-02	1.03E-01	1.25E+00	6.80E-02	2.42E-02	0.00E+00	6.80E-02	6.12E-02	9.64E-03	-1.08E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.44E-03	2.36E-05	7.67E-05	1.54E-03	5.89E-05	1.22E-05	1.77E-07	5.89E-05	5.30E-05	3.56E-06	-2.68E-03
Abiotic depletion potential - fossil fuels	MJ	5.65E+03	9.71E+01	1.91E+03	7.66E+03	2.47E+02	5.12E+01	0.00E+00	2.47E+02	2.22E+02	2.43E+01	-3.16E+02
Water deprivation potential	eq. m^3	4.02E+02	5.09E-01	9.29E+00	4.12E+02	1.14E+00	2.53E+00	0.00E+00	1.14E+00	1.03E+00	1.41E-01	-2.34E+01

Table 5 Life cycle assessment (LCA) results for specific product – additional impacts indicators (DU: 1 ton)

Indicator	Unit	A1-A3	A4-A5	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA

Table 6 Life cycle assessment (LCA) results for specific product - the resource use (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.68E+03	1.58E+00	5.67E+01	2.74E+03	3.54E+00	7.59E+00	0.00E+00	3.54E+00	3.19E+00	0.00E+00	-3.63E+01
Consumption of renewable primary energy resources used as raw materials	MJ	1.65E+03	0.00E+00	0.00E+00	1.65E+03	0.00E+00	6.38E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	4.33E+03	1.58E+00	5.67E+01	4.39E+03	3.54E+00	7.66E+00	1.52E-07	3.54E+00	3.19E+00	4.27E-01	-3.63E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	5.38E+03	9.71E+01	5.22E+02	6.00E+03	2.47E+02	5.26E+01	0.00E+00	2.47E+02	2.22E+02	0.00E+00	-3.16E+02
Consumption of non-renewable primary energy resources used as raw materials	MJ	2.67E+02	0.00E+00	1.39E+03	1.66E+03	0.00E+00	3.37E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	5.65E+03	9.71E+01	1.91E+03	7.66E+03	2.47E+02	5.28E+01	0.00E+00	2.47E+02	2.22E+02	2.63E+01	-3.16E+02
Consumption of secondary materials	kg	2.07E+00	4.34E-02	1.67E-01	2.28E+00	8.27E-02	1.17E-01	0.00E+00	8.27E-02	7.44E-02	0.00E+00	-1.91E-01
Consumption of renew. secondary fuels	MJ	1.11E+01	5.69E-04	6.15E-04	1.11E+01	9.11E-04	1.36E-03	9.00E-13	9.11E-04	8.20E-04	0.00E+00	-1.16E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.24E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	9.36E+00	1.17E-02	2.25E-01	9.59E+00	3.10E-02	4.14E-01	0.00E+00	3.10E-02	2.79E-02	3.79E-03	-5.73E-01

Table 7 Life cycle assessment (LCA) results for specific product – waste categories (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	1.40E+01	1.39E-01	7.27E-01	1.48E+01	2.77E-01	5.50E-01	0.00E+00	2.77E-01	2.49E-01	3.83E-05	-2.21E+00
Non-hazardous waste	kg	9.53E+02	2.98E+00	9.52E+01	1.05E+03	4.92E+00	1.11E+01	0.00E+00	4.92E+00	4.42E+00	1.00E+02	-6.15E+01
Radioactive waste	kg	2.00E-02	2.86E-05	3.74E-03	2.38E-02	1.84E-05	2.15E-05	7.83E-18	1.84E-05	1.66E-05	1.48E-04	-8.34E-04
Components for re-use	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	0.00E+00
Materials for recycling	kg	3.47E-01	1.16E-03	2.90E+01	2.94E+01	7.64E-04	4.20E+00	0.00E+00	7.64E-04	6.87E-04	0.00E+00	-4.28E-03
Materials for energy recovery	kg	1.18E-03	6.16E-06	1.84E-05	1.20E-03	6.18E-06	2.79E-06	0.00E+00	6.18E-06	5.56E-06	0.00E+00	-3.98E-04
Exported Energy	MJ	7.05E+01	4.25E-02	1.04E-01	7.06E+01	0.00E+00	1.42E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.59E-01

Verification

The process of verification of this EPD is in accordance with ISO 14025. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 (sub clause 8.1.3.) [x] external [ ] internal
External verification of EPD: Halina Prejzner, PhD. Eng. LCI audit and verification: Michał Chwedaczuk, M.Sc. Eng. LCA, LCI audit and input data verification: Michał Piasecki, PhD., D.Sc., eng.

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 (see 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 (2025)
- ISO 14025 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
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A2:2019 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- EN 771-2:2011+A1:2015 Requirements for masonry units. Calcium silicate masonry units
- https://ecoinvent.org/

LCA,LCI, input data verification
Michał Piasecki, PhD. D.Sc.

Qualified electronic signature

Head of Thermal Physic, Acoustic and Environment Department
Agnieszka Winkler-Skalna, PhD.

Qualified electronic signature

Instytut Techniki Budowlanej

Instytut Techniki Budowlanej
00-611 Warsaw, Filtrowa 1

Thermal Physics, Acoustics and Environment Department
02-656 Warsaw, Ksawerów 21

CERTIFICATE № 929/2026
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Ceramic bricks

Manufacturer:

Leier Baustoffe SK s.r.o.
Pribylinská 3, 831 04 Bratislava, Slovakia

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 11th March 2026 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

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, March 2026