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Wood-chip-concrete Durisol®



Owner of the EPD:

Leier Baustoffe SK s.r.o.

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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

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.

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.



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

PRODUCTS DESCRIPTION

Durisol covered by this EPD is an eco-friendly, nature-based building material that protects the environment while maintaining excellent physical properties. Its main raw material is wood, which is refined through a special mineralization process and then combined with cement and water to form building blocks. These blocks are 100% recyclable and can be used for construction of houses as well as noise barriers. The blocks are stacked dry, allowing thermal insulation to be inserted inside or fitted outside of the blocks when needed, and are then filled with concrete. The Durisol building system thus combines the advantages of wood, the effectiveness of thermal insulation, and the strength and durability of concrete. However, Durisol® is also a versatile and highly durable material, which is why it has found use in landscape and garden architecture.

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 Wood-chip-concrete Durisol® 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 PCRA (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 wood-chip-concrete Durisol® is a line process executed by of Leier Baustoffe SK s.r.o. in plant located in Bratislava (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 (cement, wood chips, dolomite and water) 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 production of wood-chip-concrete Durisol® begins with the mixing wood chips to the appropriate size. The wood chips are then mixed with water and cement. After mixing, the blocks are formed. Finally, calibration and packaging are carried out. The diagram of the production process is shown in Fig. 2.

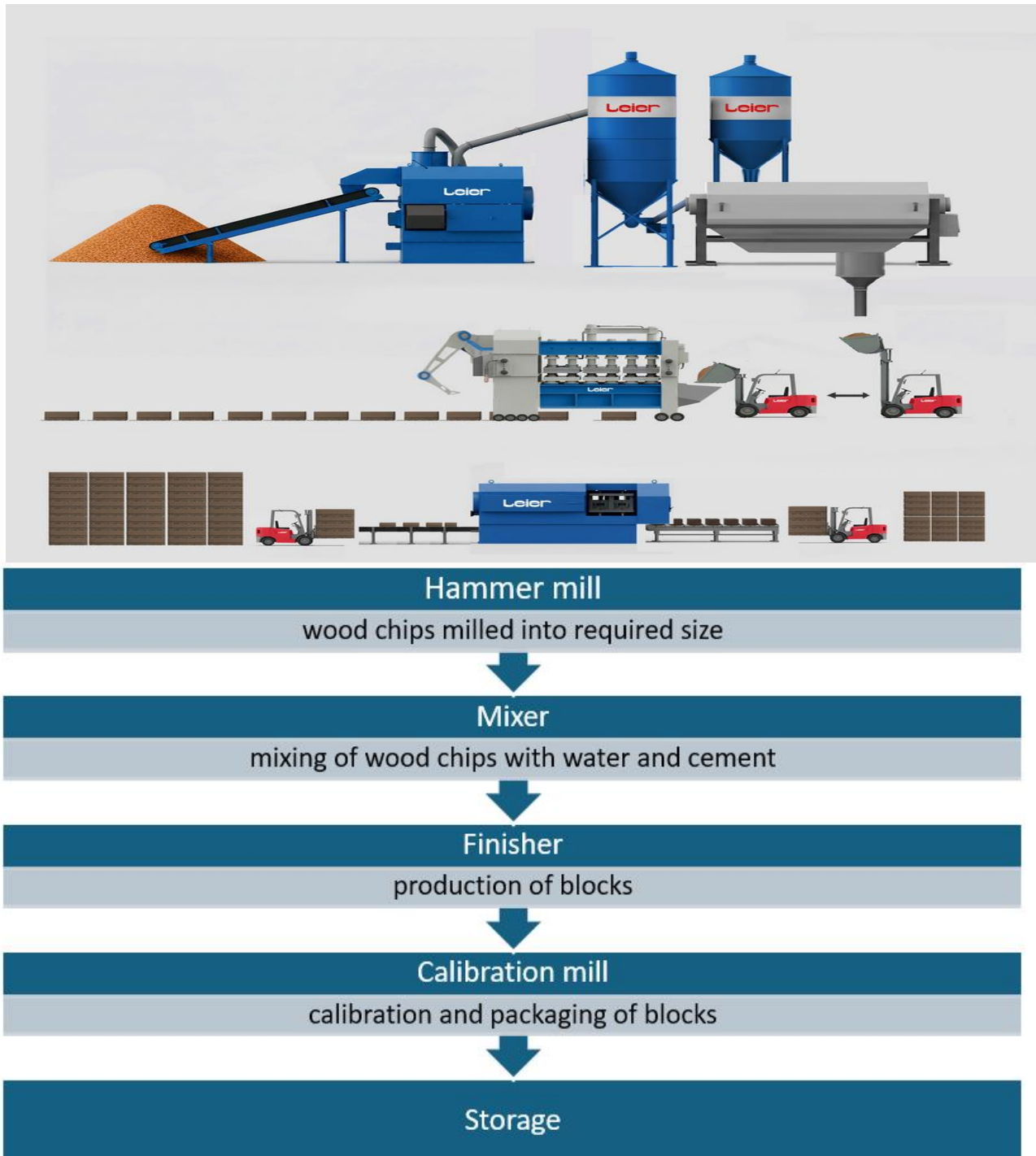


Figure 2 Manufacturing process scheme (A3)

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 ton of product.

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

In the adapted scenario, dismantling of wood-chip-concrete 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

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Slovakia, in regards with the wood-chip-concrete 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 wood-chip-concrete 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 wood-chip-concrete 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 1 End-of-life scenario for the wood-chip-concrete Durisol®

Material	Material recovery	Recycling	Landfilling
wood-chip-concrete	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.

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 0,202 kg C/kg.

Additional information

Slovak electricity mix (Ecoinvent v 3.11) emission factor used is 0.21 kg CO₂/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary.

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LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 ton of Wood-chip-concrete Durisol® 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 2 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

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Table 3 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	-3.02E+02	1.55E+01	1.24E+01	-2.74E+02	1.67E+01	4.63E+00	0.00E+00	1.67E+01	7.58E+02	1.06E+00	-9.04E+00
Greenhouse potential - fossil	eq. kg CO ₂	4.40E+02	1.54E+01	1.21E+01	4.68E+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	-7.43E+02	9.87E-03	1.85E-01	-7.43E+02	5.68E-02	9.31E-02	0.00E+00	5.68E-02	7.43E+02	1.06E-02	-5.40E-04
Global warming potential - land use and land use change	eq. kg CO ₂	9.76E-01	5.12E-03	9.08E-02	1.07E+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	4.06E-06	3.37E-07	5.41E-07	4.94E-06	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+	1.46E+00	4.96E-02	6.09E-02	1.58E+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	1.13E-01	1.05E-03	6.14E-03	1.20E-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	4.14E-01	1.67E-02	8.61E-03	4.39E-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	4.32E+00	1.82E-01	7.29E-02	4.58E+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	1.30E+00	7.52E-02	3.49E-02	1.41E+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	1.57E-03	5.32E-05	9.25E-06	1.63E-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	3.31E+03	2.19E+02	5.31E+02	4.06E+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	2.39E+02	1.15E+00	8.21E+00	2.48E+02	1.14E+00	2.53E+00	0.00E+00	1.14E+00	1.03E+00	1.41E-01	-2.34E+01

Table 4 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

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Table 5 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	4.57E+02	3.56E+00	3.72E+01	4.97E+02	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	3.83E+03	0.00E+00	0.00E+00	3.83E+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	4.29E+03	3.56E+00	3.72E+01	4.33E+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	3.04E+03	2.19E+02	4.40E+02	3.70E+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	2.70E+02	0.00E+00	9.19E+01	3.61E+02	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	3.31E+03	2.19E+02	5.31E+02	4.06E+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	3.30E+02	9.78E-02	3.07E-02	3.30E+02	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	2.04E+00	1.28E-03	7.76E-05	2.04E+00	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	5.52E+00	2.65E-02	5.44E-01	6.10E+00	3.10E-02	4.14E-01	0.00E+00	3.10E-02	2.79E-02	3.79E-03	-5.73E-01

Table 6 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	1.13E+01	3.14E-01	3.37E-01	1.20E+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	5.66E+02	6.73E+00	9.82E+01	6.71E+02	4.92E+00	1.11E+01	0.00E+00	4.92E+00	4.42E+00	1.00E+02	-6.15E+01
Radioactive waste	kg	6.80E-03	6.44E-05	4.18E-03	1.10E-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	1.58E-01	2.62E-03	2.90E+01	2.92E+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	1.19E-03	1.39E-05	3.58E-06	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	1.07E+01	9.58E-02	3.33E-02	1.08E+01	0.00E+00	1.42E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.59E-01

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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.) <input checked="" type="checkbox"/> external <input type="checkbox"/> 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, V1.6 General Product Category Rules for Construction Products (2023)
- 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/>

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CERTIFICATE № 928/2026
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Wood-chip-concrete Durisol®

Manufacturer:

Leier Baustoffe SK s.r.o.

Přibylinská 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



Deputy Director
for Research and Innovation


Krzysztof Kulczyński, PhD

Warsaw, March 2026