

RAKO

Environmental Product Declaration according to ISO 14 025 and EN 15 804 Manufacturer: **LASSELSBERGER, s.r.o.**, Adolova 2549/1, Plzeň 320 00, Czech Republic
Registered by: CENIA, Czech Environmental Information Agency No.: 7220006 Date of approval: 30. 11. 2022 Valid until: 29. 11. 2027



Brand of lasselsbergergroup



www.tzus.cz

1. General Information

LASSELSBERGER, s.r.o.

Programme:

"National programme of environmental labelling" –
CR

Service provider:

CENIA, Czech Environmental Information
Agency, executive function of NPEZ Agency
Vršovická 1442/65, 100 10 Prague 10, www.cenia.cz

Declaration ID:

7220006

Rules for product category:

EN 15804:2012+A2:2019+AC:2021 as the basic PCR

Date of approval:

30. 11. 2022

Valid until:

29. 11. 2027

according to EN 15804:2012+A2:2019+AC:2021

**Ceramic tiles
Group Bla and BIII**

Producer's name and address:

LASSELSBERGER, s.r.o., Adelova 2549/1
320 00 Plzeň

Declared unit:

average 1 m² of product – type Bla and BIII

Product:

This Environmental Declaration on the type III product (EPD) represents average values from 4 plants of LASSELSBERGER, s.r.o. The values are related to 1 m² of ceramic tiles.

LASSELSBERGER, s.r.o. is the only manufacturer of ceramic tiles in the Czech Republic. It is one of the largest European manufacturers of RAKO tile materials, which has a 140-year-old tradition. With its valuable know-how, innovative technology, use of latest knowledge in the field and comprehensive offer of tiles, including building chemistry, LASSELSBERGER, s.r.o. belongs among the important European manufacturers of ceramic tiling materials. For many years, the company has been satisfying specific customer needs on both domestic and international markets, specifically in 92 countries across all continents.

By this Environmental Product Declaration type III. (EPD), LASSELSBERGER s.r.o. declares its attitude to environmental protection, certifying that it possesses all the corresponding information on the environmental impacts of its products.

LASSELSBERGER, s.r.o. produces many types of ceramic tiles in dimensions from 5 x 5 cm to 60 x 120 cm.

This Environmental Product Declaration type III. (EPD) represents **the average values for 1 m² of manufactured ceramic tile elements in 4 plants of LASSELSBERGER, s.r.o.**

With regard to the possibility of comparing products as part of the life cycle assessment of constructions based on their EPD, which is carried out by determining their contribution to the environmental properties of the building, it is necessary that EPD of the given building products be processed in 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** and with the use of **PCR CET Product Category Rules for Environmental Product Declarations for Ceramic Tiles (12/2021)**.

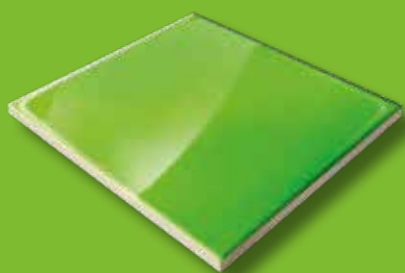
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1.1

Information on the product

1.1.1 Product



Porcelain ceramic tile elements GL,UGL group Bla

Porcelain ceramic tile elements unglazed UGL group Bla

These are ceramic highly sintered **unglazed** frost-resistant tiles with absorbability lower than 0.5%, produced as per **EN 14411 Bla UGL, annex G**.

The products are designed for tiling floors and walls subject to extremely demanding conditions in exteriors and interiors such as climatic influences, high or extremely high mechanical stress, abrasion or dirt. They are thus very suitable for tiling vertical and horizontal surfaces – such as outdoor pools, freezers, external tiling in mountain areas, floors in restaurants, industrial halls, car showrooms, balconies, patios, passages, etc. They are characterised by high firmness, frost and chemical resistance. Polished and satinised non-unglazed tiles are designed for exclusive interiors and façades. These elements are characterised by almost unlimited life, high frost resistance, high resistance against load and high grindability and chemical resistance.

Porcelain ceramic tiles glazed GL group Bla

Ceramic highly sintered **glazed** frost-resistant tiles with absorbability lower than 0.5% produced according to **EN 14411 Bla GL, annex G**. The products have universal application in floor and wall tiling of interiors and exteriors, where they are subjected to climatic influences, high mechanical stress or dirt. They are thus suitable for apartments, apartment blocks and exteriors. For public areas (e.g. restaurants, shops, hotels, offices, car showrooms), highly wear-resistant tiles with declared slip-resistance should be used.

Ceramic tile elements group BIII

Glazed ceramic tiles with absorbability exceeding 10%, produced according to **EN 14411 BIII GL, annex L**. They are solely designed for tiling walls in interiors, which are not subjected to climatic influences, frost, underground water effects, acid fumes or abrasive agents. They are thus used for tiling walls of bathrooms, kitchens, laundries or other interiors.

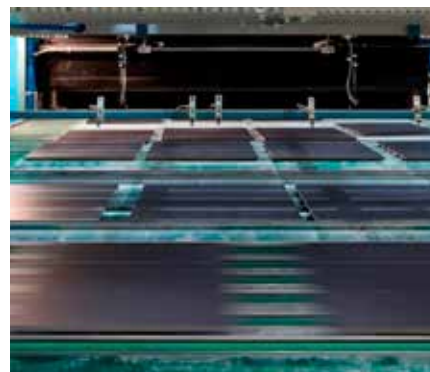
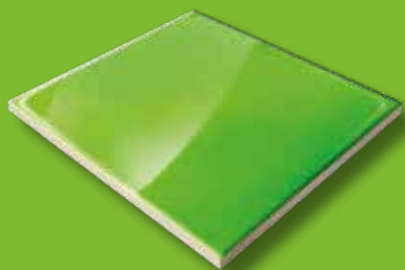
The basic characteristics of the individual product types are shown in the following Table 1:

Table 1: Basic characteristics of individual product types

Technical properties	Standard	Declared values of product groups Bla and BIII	
		Bla	BIII
Declaration of Performance	EU Nr. 305/2011		
Dimensions and surface quality			
Length/width	ISO 10545-2	±0.4%	±0.4%
Thickness		±5%	±5%
Straightness of sides		±0.25%	±0.25%
Rectangularity		±0.3%	±0.3%
Surface flatness		±0.25%	±0.25%
Surface quality		Min 95%	Min 95%
Water absorption	ISO 10545-3	E ≤ 0.3% Individually max. 0.4%	E > 10%
Modulus of rupture	ISO 10545-4	Min. 35 N/mm ² Individually min. 32 N/mm ²	Min. 12 N/mm ² Individually min. 15 N/mm ²
Breaking strength	ISO 10545-4	Min. 1500 N	≥ 7.5 mm min. 600 N < 7.5 mm min. 200 N
Frost resistance	ISO 10545-12	Resistant	Not
Abrasion resistance (glazed)	ISO 10545-7	Declaration in the catalogue	
Deep abrasion (unglazed)	ISO 50545-6	Max. 135 mm ³	
Coefficient of linear thermal expansion	ISO 10545-8	Max. 8 x 10 ⁻⁶ /K	Max. 8 x 10 ⁻⁶ /K
Thermal shock resistance	ISO 10545-9	Resistant	Resistant
Crazing resistance	ISO 10545-11	Resistant	Resistant

Technical properties	Standard	Declared values of product groups	
		Bla	BIII
Declaration of Performance	EU Nr. 305/2011		
Resistance to low concentration of acids and alkalis	ISO 10545-13	A	B
Resistance to high concentration of acids and alkalis	ISO 10545-13	A	B
Resistance to household chemicals	ISO 10545-13	A	A
Resistance to staining	ISO 10545-14	Min. 3	Min. 3
Slipperiness	DIN 51130 DIN 51097 EN 16165:2021	Declaration in the catalogue	Not required
Coefficient of friction	EN 16165:2021	≥0.3	Not required
Surface hardness according to Mohs	ČSN EN 101	Min. 7	Min. 3
Release of dangerous substances	ISO 10545-15	NPD	NPD

The following photos show some examples of the production sites and areas of application of ceramic tiles:





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1.1.2 Product technical information

Detailed characteristics of individual product types are available on the manufacturer's website:

www.rako.cz/cs/pro-odborniky/vlastnosti-keramickych-prvku/typy-keramickych-obkladu, where you can also download the Technical Catalogue.

The products are produced according to European standard **EN 14411:2012** *Ceramic tiles – Definitions, classification, characteristics, evaluation of conformity and marking* and evaluated according to Regulation (EU) No. 305/2011 of the European Parliament and of the Council (system of assessment and verification of performance of products 4). The manufacturer declares the product technical data by the respective CE marking and EU Declaration of Performance (DoP).

The quality of the products is ensured by an efficient Production Management System (PMS) in conformity with the technical regulations and integration of PMS into the Quality Management System pursuant to the ČSN EN ISO 9001:2016 standard. The manufacturer applies the Energy Management System according to ČSN EN ISO 50001:2019 and the Environmental Management System according to ČSN EN ISO 14001:2016.

Product packaging:

Most of the products are packed in cardboard packaging and are placed on pallets and protected with foil for transport.

1.1.3 Instructions for use

Environment and health during use

Under normal conditions of use, the products do not produce any adverse health effects or release volatile organic compounds into indoor air.

Due to the areas of product use, no environmental impacts and no emissions to water, air or soil are expected.

The areas of product application are listed in Article 1.1.1.

Reference service life

The reference life (RSL) of the ceramic tiles is defined as **50 years** in PCR CET. However, practical experience shows a longer lifespan. In some cases, 80 to 150 years of use is common. The reference lifespan according to ISO 15686 is not specified.

1.1.4 Method of delivery

The products shall be supplied in accordance with the standards referred to in Section 1.1.2.

Most of the products are packed in cardboard packaging and are placed on pallets and protected with foil for transport.

1.1.5 Basic raw materials and auxiliary agents

Most materials used for production of ceramic tiles are of a natural origin. This includes clay, kaolin, feldspar, limestone, dolomite and engobes. Ceramic frits and glazing are produced industrially.

Finished product, a ceramic tile, contains no harmful substances listed in the Candidate List of Substances of Special Concern, within the limits subject to authorisation and registration with the European Chemicals Agency.

The representation of the basic material components in the products is shown in Table 2.

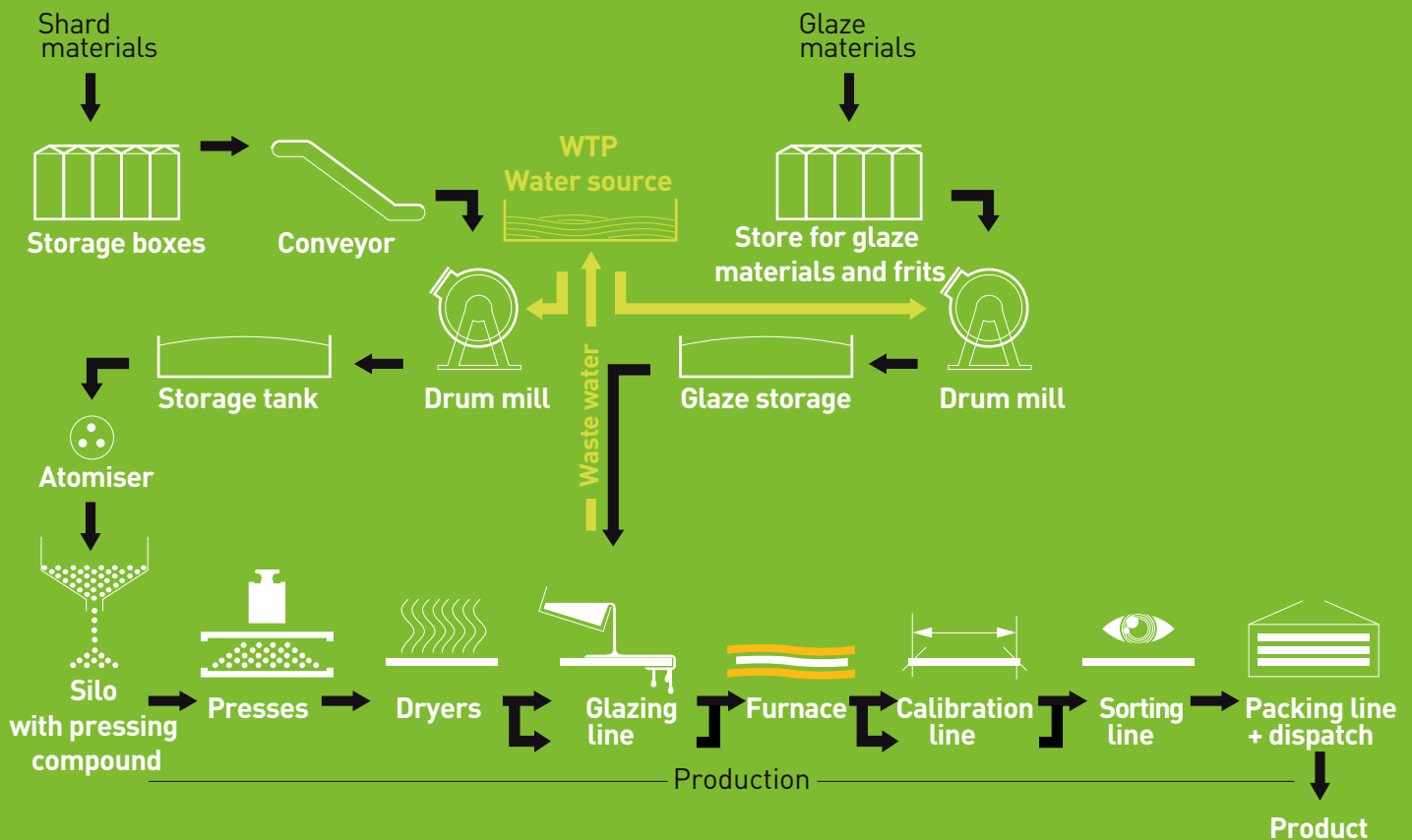
Table 2

Material input	Bla	BIII
	Content in %	Content in %
clays, kaolins	30-34	80-85
sand, feldspar	60-62	0
dolomite, limestone	2-4	7-9
frits, glazes, sprinkle	1-2	7-9
silica, zircon silicates	0.5-0.9	0.4-0.6
dyes	0.3-0.4	0.01-0.02

1.1.6 Production

The production process is shown in the diagram in Figure 1:

Figure 1: Diagram of production processes



1.1.7 Waste management

Waste generated during the production process is collected and reported according to the regulations.

Possibility to recycle used products (at the end of their useful lifespan)

At the end of the building lifespan, some of the ceramic tile elements can be recycled into backfill material. Details are given in the scenarios for modules C1-C4.

Unused material can be landfilled – waste type 0 (waste code 170107)

1.2

LCA: Calculation rules

1.2.1 Declared unit

Declared unit considered for the LCA and EPD study is an average **1 m²** of ceramic tile elements of a given type to cover walls and floors for **50 years**.

All inputs and outputs of this report have been considered as total consumption (inputs) based on the **production of 1 m²** of the product type in each production plant. To be able to determine the conversion factors for an average 1 m² of product, the **average volumetric weight** of both product types is considered – see Table 2.

Table 2: Declared unit and conversion factors

Symbol	Unit	Value
Declared unit	m²	1
Average volumetric weight – type BIa	kg/m ²	20.37
Average volumetric weight – type BIll	kg/m ²	13.76
Conversion factor from m ² to kg – type BIa	kg	20.37
Conversion factor from m ² to kg – type BIll	kg	13.76

2. Product system and system boundary

This EPD contains a **full life cycle** assessment of the product, i.e., the “**cradle to grave**” type according to EN 15804+A2 with declaration of modules **A1-A3, A4, A5, B2, C2, C3, C4** and **D**. Modules B1, B3, B4, B5, B6, B7 and C1 are assessed in the PCR as ‘*not relevant*’ for ceramic tile elements – see Table 3. The assessment was carried out in accordance with EN 15804+A2, taking into account CET PCR Ceramic Tiles, 2021, and the LCA calculation method was applied in accordance with EN 15804+A2, taking into account PCR CET, EN ISO 14040 and EN ISO 14044.

The reference lifespan (**RSL**) of the ceramic tiles is defined as **50 let** in PCR.

The information on the limits of the product system are illustrated in Table 3.

Table 3: Information on product system limits – information modules

Information on product system limits – information modules (X = included, MNR = module is not relevant)																
Production phase			Building phase		Usage phase							End of the life cycle phase				Additional information beyond the life cycle
Delivery of mineral materials	Transport	Production	Transport to the building site	Process of building/installation	Usage	Maintenance	Repair	Replacement	Reconstruction	Operational energy consumption	Operating water consumption	Demolition/deconstruction	Transport	Waste processing	Removal	Yields and costs beyond the system boundary. Potential re-usage, utilisation, recycling
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MNR	X	MNR	MNR	MNR	MNR	MNR	X	X	X	X	X

The production phase includes these modules:

- **A1** – extraction and processing of raw materials
- **A2** – transport of input raw materials from the supplier to the producer, waste removal
- **A3** – production of products, production of auxiliary materials and semi-finished products, energy consumption, including waste processing until reaching a state where it ceases to be waste or after removal of the last material residues during the production phase

Construction phase: Transport to the building site and installation in the building work. Includes modules **A4** and **A5**:

- **A4 – transport to the construction site**

For the calculation, the manufacturer provided a table of individual shipments with the distances and quantities transported (sold). This was used to calculate the relative quantities of DJ product transported with respect to the type of destination. Type of transport and average distances were taken from the PCR CET scenario.

Basic parameters for construction phase – transport to site are given in Table 5

Table 5

Destination	Type of transport	Average distance (km)
Domestic	Truck with a capacity of 27 tonnes, utilisation 100% outward and 20% inward	300
Europe	Truck with a capacity of 27 tonnes, utilisation 100% outward and inward	1390
Internationally (outside Europe)	Transoceanic freight ship, utilisation 100% outward and inward	6,520

Calculation is in "tkm". The weight is calculated according to the average weight **for the product group BIa and BII and the share for the respective destination.**

- **A5 – installation in a building**

For this scenario, according to the manufacturer's data, option 3 (cement adhesive) according to PCR CET is used.

Basic parameters for construction – on-site installation phase are given in Table 6

Table 6

Parameter – option 3 used according to PCR with specification according to the manufacturer's data	Parameter unit expressed in the declared unit (1 m ²)
Cement adhesive – small tile format (15 x 15 cm)	2.5 kg
Cement adhesive – medium tile format (20 x 20 cm, 33 x 33 cm)	3.5 kg
Cement adhesive – large tile format	5.0 kg

Adhesive consumption data for each format is specified by the manufacturer according to its installation instructions.

For adhesion preparation, an average water consumption of **0.28 litres per 1 kg of adhesive** and adhesive paper packaging waste of **0.08 kg** per one piece of **packaging** is assumed (according to the manufacturer's data).

Any packaging materials such as cardboard (code 15 00 01), polyethylene film and tape (code 15 00 02 for both) are collected separately and returned to the economic cycle as recycling products or used for energy production. European average scenarios according to PCR CET are used for treatment of the waste packaging.

Usage phase: Corresponding to the use of ceramic tiles, maintenance, repair, replacement and refurbishment, including transport (modules **B1, B2, B3, B4** and **B5** according to EN 15804+A2), as well as operational energy and water use during product use (modules **B6** and **B7** according to EN 15804+A2).

- **B1 – use or application of installed product**

Ceramic tile elements are inert by nature and therefore do not have environmental impacts during use that need to be addressed in Module B1.

- **B2 – maintenance**

The maintenance of ceramic tiles consists solely of cleaning; no other maintenance tasks are required. Only water and generally some cleaning agent is used for cleaning activities. No energy consumption is required for cleaning activities.

Water required for maintenance cleaning must be included in module B2, not in modules B6 and B7.

During the reference lifespan, the ceramic tiles are cleaned according to the following scenario according to PCR CET:

Maintenance scenario for the ceramic **floor** tile elements (BIa type considered):

→ Residential use: **0.134 ml of detergent and 0.1 l of water** to wash 1 m² of ceramic floor tiles once a week.

Maintenance scenario for the ceramic **wall** tile elements (BII type considered):

→ Residential use: **0.134 ml of detergent and 0.1 l of water** to wash 1 m² of ceramic wall tiles once every three months.

- **B3 – repair**

Ceramic tile elements are a long-life product and are not expected to be repairable, therefore the impacts can be neglected.

- **B4 – replacement**

Ceramic tile elements rarely require replacement during the use phase; these effects are negligible in any case; therefore, no effects should be declared in Module B4.

- **B5 – renovation**

Ceramic tile elements do not require any renovation during the use phase; therefore, no effects should be declared in module B5.

2.1 Assumptions and measures taken

- **B6 – operational energy consumption**

When ceramic tile elements are integrated into a building, no energy consumption is expected for their normal operation; therefore, no impacts should be declared in Module B6.

- **B7 – operational water consumption**

When ceramic tile elements are integrated into a building, no water consumption is expected for their normal operation; therefore, no impacts should be declared in Module B7.

The end-of-life phase includes the following modules:

- **C1**, deconstruction, demolition; of a product from the building including its dismantling or demolition, including the initial sorting of materials on site. In this case, it is assumed that the environmental impact is very small compared to the joint demolition of other structures and can be neglected.
- **C2**, transport to the waste treatment site; transport of the discarded product within the waste treatment process, e.g., to a recycling site; and transport of the waste, e.g., to a final disposal site. The ceramic tile demolition waste is transported from the construction site to a container or treatment plant by truck (3.5-7.5 t); the assumed average distance is 20 km. The assumed average distance from the container or treatment plant to final destination is 30 km. The inward journey is included in the system at 20% of the outward journey. The average transport distances are in line with PCR CET.
- **C3**, treatment of waste for reuse, recovery and/or recycling, e.g., collection of waste fractions from deconstruction, and treatment of waste from material flows for reuse, recycling and energy recovery. For recycling of the demolished material, about **70%** of the total amount of waste (crushed backfill material) is calculated according to PCR CET.
After the demolition/deconstruction stage, ceramic tiles can be crushed and then used in a range of different applications:
 - road construction in the embankment subsoil;
 - recycled ceramic aggregates (concrete, backfill, landfill, etc.)
- **C4**, waste disposal including pre-treatment and management of the disposal site. About **30%** of the total amount of waste is considered to be landfilled in accordance with PCR CET.

Potential reuse, utilisation, recycling (D)

In Module D, **the replacement of natural materials with recycled demolition waste** is considered. In the Module D scenario, a 70% saving of primary raw material inputs (without considering transport and energy) in a different product system is considered.

This module also considers **exported energy** (benefits beyond the system boundary) from the incineration of paper and plastic from packaging.

All information modules according to EN 15804+A2 are included in the LCA and EPD study in accordance with PCR CET. These boundaries include information modules in accordance with PCR: A1-A3, A4, A5, B2, C2, C3, C4 and D. The B1, B3, B4, B5, B6, B7 and C1 Modules are evaluated in PCR as modules, which “are irrelevant” for the ceramic tile elements – see Table 3.

The reference lifespan (RSL) of the ceramic tiles is defined as **50 years** in PCR. All data from operational data collection is taken into account, i.e., all raw materials used according to the recipe, thermal and electrical energy used. This means that material and energy flows with a share of less than 1 per cent are also taken into account.

Material flows that significantly contribute to the environmental impact of the product are not neglected.

Packaging for sub-raw materials is not considered as inputs in A1. If they are not returnable, they are stored separately according to the type of material and reported in waste.

Data on energy inputs were based on data valid for the Czech Republic – electricity production – national mix CZ, year 2021, Ecoinvent database 3.8. Breakdown by energy source was made according to OTE data.

2.2. Rules for separation

Processes necessary for installation of the production equipment and construction of the infrastructure were not included in the analysis. Administrative processes were not included either – the inputs and outputs are balanced in the production phase.

2.3 Environmental data sources

The basic source of the necessary data in the area of production, purchasing, maintenance, etc., was the information system, or operational records from maintenance activities. The annual waste production report from the ISPOP system and the operational records for the production plant were used to determine the waste production.

The time range of the specific data requested, provided by the organisation, was 2021.

Software used for data processing and evaluation:

SimaPro – version 9.3, SimaPro Analyst, Ecoinvent database 3.8

2.4 Data quality

The data used for calculation of EPD correspond to the following principles:

Time period: Manufacturer data for 2021 is used for the specific data. Data from the Ecoinvent database version 3.8 are used for generic data. Based on the evaluation according to EN 15804+A2, **Annex E, Table E.1** the generic data used meet the quality level of very good.

Technological aspect: Data corresponding to the actual production of each type of sub-products of the plant and corresponding to the current state of the new technologies used are used.

Based on the evaluation according to EN 15804+A2, Annex E, Table E.1 the generic data used meet the quality level of very good.

Completeness aspect: Most of the input data is based on consumption balances that are accurately recorded in the information system. As part of the completeness check, LASSELSBERGER, s.r.o. was visited and it was verified that all used inputs/outputs are present in the records. The reliability of the source of specific data is due to the uniformity of the collection methodology of the information system.

Geographical aspect: The generic data from the Ecoinvent database are used with validity for the Czech Republic (e.g. energy inputs) and if the data is not available for the Czech Republic, data valid for the EU or location of the supplier are used. Based on the evaluation according to EN 15804+A2, Annex E, Table E.1 the generic data used meets the quality level of medium.

Consistency aspect: Uniform aspects (allocation rules, data age, technological validity, temporal validity, geographical validity) are used throughout the report.

Credibility aspect: All relevant data was checked for compliance with cross-comparison of mass balances.

2.5 Evaluated period

The time range of the required specific data provided by LASSELSBERGER, s.r.o. for the preparation of EPD was set to 2021.

2.6 Allocation

An allocation of inputs and outputs was made within the report. A uniform method based on weight shares was used for allocation. Data converted to a declared unit of an average 1 m² of finished product of type BIa and BIll were taken into account in the inventory and evaluation.

2.7 Comparability

Environmental declarations on the product from the different programmes need not be comparable. Comparison or assessment of data given in EPD is only possible if all of the compared data given in accordance with EN 15804+A2 has been detected according to the same rules.

2.8. Product variability

The resulting data is always given for 1 m² average product of a given type – Bla and BIII. The differences between production plants are small.

2.9. LCA: Results

The information on environmental impact is given in the following Tables 7-18. The tables describe basic and additional environmental impacts, parameters describing resource consumption, waste categories, description of output flows and information describing biogenic carbon content at the gate of the production plant. The average Bla product data is displayed in Tables 7-12. The average BIII product data is displayed in Tables 13-18.

Table 7: Baseline environmental impacts – type Bla

LCA result – Parameters describing basic environmental impacts (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential (GWP-total)	kg CO ₂ eq.	1.09E+01	3.26E+00	1.19E+00	NR	8.36E-01	0	0	0	NR	NR	0	6.65E-01	4.71E-02	3.23E-02	6.01E-02
Global warming potential (GWP-fossil)	kg CO ₂ eq.	1.11E+01	3.25E+00	8.11E-01	NR	8.29E-01	0	0	0	NR	NR	0	6.65E-01	4.71E-02	3.22E-02	-6.90E-02
Global warming potential (GWP-biogenic)	kg CO ₂ eq.	-2.42E-01	2.71E-03	3.79E-01	NR	6.49E-03	0	0	0	NR	NR	0	3.29E-04	1.66E-05	3.19E-05	-1.29E-01
Global warming potential from land use and land use change(GWP-luluc)	kg CO ₂ eq.	1.20E-02	1.30E-03	2.13E-03	NR	5.75E-04	0	0	0	NR	NR	0	4.10E-04	4.70E-06	3.04E-05	9.48E-06
Ozone layer depletion potential (ODP)	kg CFC 11 eq.	1.33E-06	7.51E-07	3.03E-08	NR	8.02E-08	0	0	0	NR	NR	0	1.35E-07	1.01E-08	1.30E-08	-1.30E-08
Acidification potential, Cumulative exceedance (AP)	mol H+ eq.	4.45E+00	1.49E-02	2.58E-03	NR	5.83E-03	0	0	0	NR	NR	0	2.66E-03	4.89E-04	3.03E-04	-9.85E-04
Eutrophication potential, proportion of nutrients entering fresh water (Fresh water EP)	kg P eq.	8.21E-04	2.08E-04	1.13E-04	NR	2.49E-04	0	0	0	NR	NR	0	6.69E-05	1.46E-06	2.95E-06	3.99E-06
Eutrophication potential, proportion of nutrients entering sea water (sea water EP)	kg N eq.	7.15E-03	4.38E-03	7.21E-04	NR	8.42E-04	0	0	0	NR	NR	0	7.11E-04	2.17E-04	1.05E-04	-1.12E-04
Eutrophication potential, Cumulative exceedance (soil EP)	mol N eq.	6.99E-02	4.80E-02	7.72E-03	NR	8.94E-03	0	0	0	NR	NR	0	7.75E-03	2.37E-03	1.15E-03	-1.19E-03
Photochemical Ozone Creation Potential (POCP)	kg NMVOC eq.	2.21E-02	1.44E-02	2.09E-03	NR	4.72E-03	0	0	0	NR	NR	0	2.40E-03	6.53E-04	3.35E-04	-3.44E-04
Raw material depletion potential for non-fossil resources (ADP-minerals and metals)	kg Sb eq.	7.87E-05	1.12E-05	1.22E-06	NR	1.25E-05	0	0	0	NR	NR	0	3.94E-06	2.42E-08	7.34E-08	-1.73E-06
Raw material depletion potential for fossil resources (ADP-fossil fuels)	MU, calorific value	1.73E+02	4.90E+01	4.44E+00	NR	2.24E+01	0	0	0	NR	NR	0	9.49E+00	6.46E-01	8.99E-01	-2.08E+00
Water deprivation potential (for users), water consumption weighted by water deprivation (WDP)	m ³ world eq. derivation	5.30E+00	1.46E-01	8.79E-02	NR	1.16E+01	0	0	0	NR	NR	0	4.15E-02	1.01E-03	4.05E-02	-2.89E-01

Table 8: Complementary environmental impacts – type Bla

LCA result – Parameters describing complementary environmental impacts (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Potential incidence of disease due to particulate matter emission (PM)	Disease occurrence	5.07E-07	2.77E-07	3.17E-08	NR	4.84E-08	0	0	0	NR	NR	0	4.24E-08	1.19E-07	6.10E-09	-1.21E-08
Potential effect of human exposure to the isotope U235 (IRP)	kBq U235 eq.	8.00E-01	2.52E-01	5.93E-02	NR	8.01E-02	0	0	0	NR	NR	0	4.33E-02	2.91E-03	3.99E-03	-1.86E-02
Ecosystem toxicity potential benchmark (ETP-fw)	CTUe	7.13E+01	3.81E+01	9.00E+00	NR	1.32E+01	0	0	0	NR	NR	0	9.54E+00	3.78E-01	5.68E-01	-7.05E-02
Potential human toxicity benchmark (HTP-c)	CTUh	9.95E-08	3.98E-08	6.24E-09	NR	1.49E-08	0	0	0	NR	NR	0	8.48E-09	2.74E-10	3.73E-10	9.73E-11
Potential human toxicity benchmark (HTP-nc)	CTUh	1.01E-08	1.26E-09	1.76E-10	NR	8.08E-10	0	0	0	NR	NR	0	3.52E-10	1.46E-11	1.44E-11	-4.01E-12
Soil Quality Potential Index (SQPI)	dimensionless	5.31E+01	3.33E+01	1.03E+01	NR	2.54E+00	0	0	0	NR	NR	0	4.60E+00	8.22E-02	1.89E+00	1.29E-02

Table 9: Parameters describing resource consumption – type Bla

LCA result – Parameters describing resource consumption (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Consumption of renewable primary energy except sources of energy used as raw material (PERE)	MJ	9.83E+00	6.86E-01	1.28E+00	NR	8.50E-01	0	0	0	NR	NR	0	1.55E-01	3.63E-03	7.67E-03	-8.09E-02
Consumption of renewable sources of primary energy used as a raw material (PERM)	MJ	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy sources (primary energy and primary energy sources used as raw material) (PERT)	MJ	9.83E+00	6.86E-01	1.28E+00	NR	8.50E-01	0	0	0	NR	NR	0	1.55E-01	3.63E-03	7.67E-03	-8.09E-02
Consumption of non-renewable primary energy except sources of energy used as raw material (PENRE)	MJ	1.89E+02	5.21E+01	4.69E+00	NR	2.41E+01	0	0	0	NR	NR	0	1.01E+01	6.86E-01	9.55E-01	-2.20E+00
Consumption of non-renewable primary energy sources used as raw material (PENRM)	MJ	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy sources (primary energy and primary energy sources used as raw material) (PENRT)	MJ	1.89E+02	5.21E+01	4.69E+00	NR	2.41E+01	0	0	0	NR	NR	0	1.01E+01	6.86E-01	9.55E-01	-2.20E+00
Consumption of secondary raw materials (SM)	kg	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Consumption of renewable secondary fuels (RSF)	MJ	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Consumption of non-renewable secondary fuels (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net potable water consumption (FW)	m ³	1.29E-02	0.00E+00	1.11E-03	NR	2.60E-01	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 10 Other environmental information – description of waste category – type Bla

LCA result – Parameters describing waste categories (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposal (HWD)	kg	0	0	0	NR	0	0	0	0	NR	NR	0	0	0	0	0
Non-hazardous waste disposal (NHWD)	kg	1.41E-01	0	1.08E-01	NR	0	0	0	0	NR	NR	0	0	0	6.11E+00	0
Radioactive waste disposal (RWD)	kg	0	0	0	NR	0	0	0	0	NR	NR	0	0	0	0	0

Table 11: Other environmental information – description of output flows – type Bla

LCA result – Parameters describing output flows (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Construction elements for reuse (MFR)	kg	0	0	0	NR	0	0	0	0	NR	NR	0	0	0	0	0
Materials for recycling (MER)	kg	0	0	9.47E-01	NR	0	0	0	0	NR	NR	0	0	1.43E+01	0	0
Materials for energy utilisation (EEE)	kg	0	0	2.12E-01	NR	0	0	0	0	NR	NR	0	0	0	0	0
Exported energy (EET)	Unit per energy provider	0	0	0	NR	0	0	0	0	NR	NR	0	0	0	0	1.59E+01

Table 12: Information describing biogenic carbon content at the production plant gate – type Bla

LCA result – Information describing the biogenic carbon content at the production plant gate (DJ = 1 m ² of product)		
Parameter	Unit	At the production plant gate
Biogenic carbon content in the product	kg C	0
Biogenic carbon content in the relevant packaging	kg C	4.08E-01

Packaging – pallets for DJ (weight 25 kg, calculation according to EN 16449).

Table 13: Baseline environmental impacts – type BIII

LCA result – Parameters describing basic environmental impacts (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global warming potential (GWP-total)	kg CO ₂ eq.	8.50E+00	3.26E+00	1.16E+00	NR	6.43E-02	0	0	0	NR	NR	0	4.48E-01	3.18E-02	2.18E-02	6.95E-02
Global warming potential (GWP-fossil)	kg CO ₂ eq.	8.67E+00	3.25E+00	7.88E-01	NR	6.38E-02	0	0	0	NR	NR	0	4.47E-01	3.18E-02	2.17E-02	-5.32E-02
Global warming potential (GWP-biogenic)	kg CO ₂ eq.	-1.84E-01	2.71E-03	3.70E-01	NR	4.99E-04	0	0	0	NR	NR	0	2.21E-04	1.12E-05	2.16E-05	-1.23E-01
Global warming potential from land use and land use change (GWP-luluc)	kg CO ₂ eq.	6.94E-03	1.30E-03	2.10E-03	NR	4.43E-05	0	0	0	NR	NR	0	2.76E-04	3.17E-06	2.05E-05	6.40E-06
Ozone layer depletion potential (ODP)	kg CFC 11 eq.	1.24E-06	7.51E-07	2.96E-08	NR	6.17E-09	0	0	0	NR	NR	0	9.09E-08	6.80E-09	8.80E-09	-1.06E-08
Acidification potential, Cumulative exceedance (AP)	mol H+ eq.	5.05E+00	1.49E-02	2.54E-03	NR	4.49E-04	0	0	0	NR	NR	0	1.79E-03	3.30E-04	2.04E-04	-8.19E-04
Eutrophication potential, proportion of nutrients entering fresh water (fresh water EP)	kg P eq.	1.29E-03	2.08E-04	1.11E-04	NR	1.92E-05	0	0	0	NR	NR	0	4.50E-05	9.85E-07	1.99E-06	2.69E-06
Eutrophication potential, proportion of nutrients entering sea water (sea water EP)	kg N eq.	6.91E-03	4.38E-03	7.04E-04	NR	6.48E-05	0	0	0	NR	NR	0	4.79E-04	1.46E-04	7.11E-05	-8.28E-05
Eutrophication potential, Cumulative exceedance (soil EP)	mol N eq.	6.69E-02	4.80E-02	7.59E-03	NR	6.88E-04	0	0	0	NR	NR	0	5.22E-03	1.60E-03	7.78E-04	-8.71E-04
Photochemical Ozone Creation Potential (POCP)	kg NMVOC eq.	2.10E-02	1.44E-02	2.06E-03	NR	3.63E-04	0	0	0	NR	NR	0	1.61E-03	4.41E-04	2.26E-04	-2.60E-04
Raw material depletion potential for non-fossil resources (ADP-minerals and metals)	kg Sb eq.	1.89E-04	1.12E-05	1.20E-06	NR	9.60E-07	0	0	0	NR	NR	0	2.65E-06	1.64E-08	4.96E-08	-1.65E-06
Raw material depletion potential for fossil resources (ADP-fossil fuels)	MU, calorific value	1.33E+02	4.90E+01	4.37E+00	NR	1.73E+00	0	0	0	NR	NR	0	6.39E+00	4.36E-01	6.07E-01	-1.77E+00
Water deprivation potential (for users), water consumption weighted by water deprivation (WDP)	m ³ of world deprivation equivalent	4.52E+00	1.46E-01	8.66E-02	NR	8.95E-01	0	0	0	NR	NR	0	2.79E-02	6.83E-04	2.73E-02	-1.88E-01

Table 14: Complementary environmental impacts – type BIII

LCA result – Parameters describing complementary environmental impacts (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Potential incidence of disease due to particulate matter emission (PM)	Incidence of disease	3.07E-07	2.77E-07	3.12E-08	NR	3.72E-09	0	0	0	NR	NR	0	2.86E-08	8.05E-08	4.12E-09	-1.00E-08
Potential effect of human exposure to the isotope U235 (IRP)	kBq U235 eq.	6.91E-01	2.52E-01	5.85E-02	NR	6.16E-03	0	0	0	NR	NR	0	2.91E-02	1.97E-03	2.70E-03	-1.54E-02
Ecosystem toxicity potential benchmark (ETP-fw)	CTUe	9.46E+01	3.81E+01	8.84E+00	NR	1.02E+00	0	0	0	NR	NR	0	6.42E+00	2.55E-01	3.84E-01	-2.11E-02
Potential human toxicity benchmark (HTP-c)	CTUh	1.77E-07	3.98E-08	6.13E-09	NR	1.15E-09	0	0	0	NR	NR	0	5.70E-09	1.85E-10	2.52E-10	1.30E-10
Potential human toxicity benchmark (HTP-nc)	CTUh	3.77E-09	1.26E-09	1.71E-10	NR	6.21E-11	0	0	0	NR	NR	0	2.37E-10	9.87E-12	9.73E-12	-3.87E-12
Soil Quality Potential Index (SQP)	dimensionless	6.19E+01	3.33E+01	1.02E+01	NR	1.95E-01	0	0	0	NR	NR	0	3.09E+00	5.56E-02	1.27E+00	8.72E-03

Table 15: Parameters describing resource consumption – type BIII

LCA result – Parameters describing resource consumption (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Consumption of renewable primary energy except sources of energy used as raw material (PERE)	MJ	9.10E+00	6.86E-01	1.26E+00	NR	6.54E-02	0	0	0	NR	NR	0	1.04E-01	2.45E-03	5.18E-03	-7.02E-02
Consumption of renewable sources of primary energy used as a raw material (PERM)	MJ	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy sources (primary energy and primary energy sources used as raw material) (PERT)	MJ	9.10E+00	6.86E-01	1.26E+00	NR	6.54E-02	0	0	0	NR	NR	0	1.04E-01	2.45E-03	5.18E-03	-7.02E-02
Consumption of non-renewable primary energy except sources of energy used as raw material (PENRE)	MJ	1.45E+02	5.21E+01	4.62E+00	NR	1.85E+00	0	0	0	NR	NR	0	6.78E+00	4.63E-01	6.45E-01	-1.87E+00
Consumption of non-renewable primary energy sources used as raw material (PENRM)	MJ	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy sources (primary energy and primary energy sources used as raw material) (PENRT)	MJ	1.45E+02	5.21E+01	4.62E+00	NR	1.85E+00	0	0	0	NR	NR	0	6.78E+00	4.63E-01	6.45E-01	-1.87E+00
Consumption of secondary raw materials (SM)	kg	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Consumption of renewable secondary fuels (RSF)	MJ	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Consumption of non-renewable secondary fuels (NRSF)	MJ	0.00E+00	0.00E+00	0.00E+00	NR	0.00E+00	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net potable water consumption (FW)	m ³	8.82E-03	0.00E+00	1.10E-03	NR	2.00E-02	0	0	0	NR	NR	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 16: Other environmental information – description of waste category – type BIII

LCA result – Parameters describing waste categories (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposal (HWD)	kg	0	0	0	NR	0	0	0	0	NR	NR	0	0	0	0	0
Non-hazardous waste disposal (NHWD)	kg	2.15E-03	0	1.03E-01	NR	0	0	0	0	NR	NR	0	0	0	4.13E+00	0
Radioactive waste disposal (RWD)	kg	0	0	0	NR	0	0	0	0	NR	NR	0	0	0	0	0

Table 17: Other environmental information – description of output flows – type BIII

LCA result – Parameters describing output flows (DJ = 1 m ² of product; NR = not relevant)																
Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Construction elements for reuse (MFR)	kg	0	0	0	NR	0	0	0	0	NR	NR	0	0	0	0	0
Materials for recycling (MER)	kg	0	0	9.19E-01	NR	0	0	0	0	NR	NR	0	0	9.53E+00	0	0
Materials for energy utilisation (EEE)	kg	0	0	2.02E-01	NR	0	0	0	0	NR	NR	0	0	0	0	0
Exported energy (EET)	Unit per energy provider	0	0	0	NR	0	0	0	0	NR	NR	0	0	0	0	1.72E+01

Table 18: Information describing biogenic carbon content at the production plant gate – type BIII

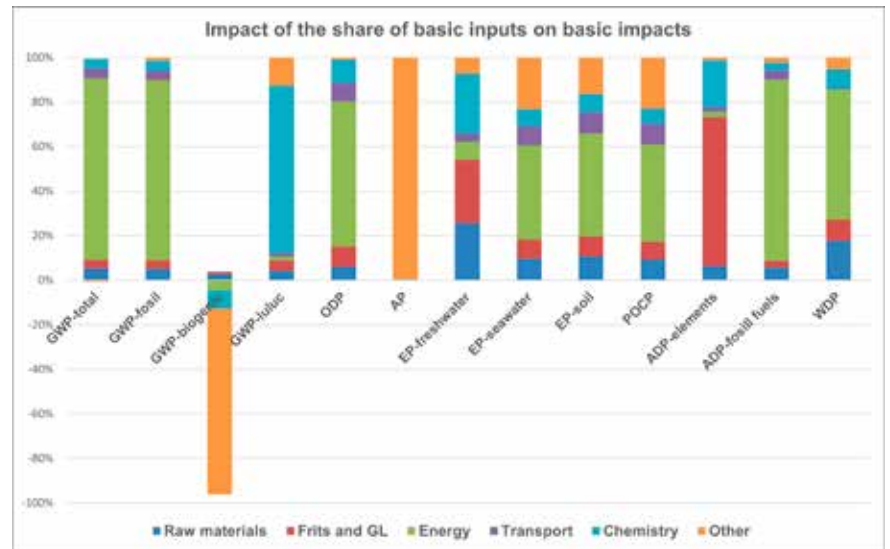
LCA result – Information describing the biogenic carbon content at the production plant gate (DJ = 1 m ² of product)		
Parameter	Unit	At the production plant gate
Biogenic carbon content in the product	kg C	0
Biogenic carbon content in the relevant packaging	kg C	2.93E-01

Packaging – pallets for DJ (weight 25 kg, calculation according to EN 1644).

2.9.1 LCA: Interpretation

Influence of the basic input groups on the baseline environmental impacts is shown in Figure 3:

Figure 3: Influence of share of basic inputs on basic impacts



The figure shows that energy consumption particularly has a very significant impact on environmental impacts.

3. LCA: Scenarios and other technical information

4. LCA: Supplementary information

5. Used sources

This EPD contains a full life cycle assessment of the product, i.e., the "cradle to grave" type according to EN 15804+A2 with declaration of modules A1–A3, A4, A5, B2, C2, C3, C4 and D.

EPD does not include additional documentation related to the declaration of additional information.

ČSN ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations – Principles and procedures

ČSN EN 15804-A1 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products

ČSN EN ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework

ČSN EN ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines

ČSN ISO 14063:2007 Environmental management – Environmental communication – Guidelines and examples

ČSN EN 15643-1:2011 Sustainability of buildings – Sustainability assessment of buildings – Part 1: General framework (Sustainability of construction works – Sustainability assessment of buildings – Part 1: General framework)

ČSN EN 15643-2:2011 Sustainability of buildings – Sustainability assessment of buildings – Part 2: Framework for assessing the environmental properties (Sustainability of construction works – Assessment of buildings – Part 2: Framework for the assessment of environmental properties)

ČSN EN 15942:2013 Sustainability of buildings – Environmental declaration on the product – Format of communication between companies

TNI CEN/TR 15941:2012 Sustainability of buildings – Environmental declaration on the product – Methodology for selection and application of generic data

ILCD handbook – JRC EU, 2011

Act No. 541/2020 Coll., as amended (Act on aste)

Regulation No. 8/2021 Coll. Waste catalogue – Waste catalogue

EU Decree No. 1907/2006 on registration, evaluation, authorisation and restriction of chemicals and on establishment of the European Chemicals Agency – REACH (registration, evaluation and authorisation of chemicals)

Regulation (EC) of the European Parliament and of the Council No. 1272/2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC and amending Regulation (EC) No. 1907/2006 (CLP regulation)

SimaPro LCA Package, Pré Consultants, the Netherlands, www.pre-sustainability.com

Ecoinvent Centre, www.Ecoinvent.org

The explanatory documents can be obtained from the quality manager of LASSELSBERGER, s.r.o.

6. EPD verification

Independent verification of declaration in accordance with ČSN ISO 14025:2010

The ČSN EN 15804+A2 standard produced by CEN serves as the basic PCRa

internal

external

Third-party verifier:

Certification body for EPD: Elektrotechnický zkušební ústav, s.p.

Street: Pod Lisem 129

City: Praha 8 – Troja

Certification body for EPD, accredited by CIA, Czech Accreditation Institute under No. 3018

a Product category rules

b Optional for business-to-business communication, mandatory for business-to-consumer communication (see ISO 14025:2010, clause 9.4).

This document is a translation of the EPD issued in Czech. In case of doubt use the Czech version of this EPD as a reference.



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