ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804+A2 & ISO 14025

PRECAST CONCRETE PRODUCTS

FROM UAB "BETONO MOZAIKA"

EPD of multiple products, based on the average results of the product group




Programme operator: Rakennustieto Oy
EPD registration number RTS_358_25
Published on 18.2.2025
valid until 18.2.2030

GENERAL INFORMATION

MANUFACTURER

Manufacturer	UAB "Betono mozaika"
Address	Liepų St. 87N, Klaipėda; Raudondvario Rd. 157, Kaunas; Daubos St. 7A, Šiauliai; Žarijų St. 6, Vilnius
Contact details	info@betonomozaika.lt
Website	https://www.betonomozaika.lt/

EPD information

Program operator	Rakennustieto Oy
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards
Product category rules (PCR)	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used
EPD author	Sandra Bagdonaitė and Sigita Židonienė, UAB "Vesta Consulting"
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Daniel Satola, Daniel Satola Consulting

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Precast concrete products
Place of production	Lithuania
Averaging in EPD	EPD of multiple products, based on the average results of the product group
CPC code	37550 – prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.166

Jukka Seppänen
RTS EPD Committee Secretary

Laura Apilo
Managing Director

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

The company was founded in 1997. The mission of the company is to introduce market with high quality concrete products and solutions. The vision of the company is to be the best in its field to improve production processes, to introduce modern technologies and to produce quality products that meet the needs of all interested parties.

PRODUCT DESCRIPTION

Concrete products are made from two concrete layers: top and core. Top layer is made from fine materials like sand, cement, colours, additives, water. Core layer contains materials like, sand, coarse aggregate, cement, colours, additive, water. Cement is the only binder which binds all materials. In average, top stone layer takes around 10 % of product volume, rest is core layer. 99 % of cement used in production is type – CEM II.

PRODUCT APPLICATION

Concrete products are widely used around industrial and commercial buildings, in private areas, logistic centres, warehouses, and other that require to pave the area.

TECHNICAL SPECIFICATIONS AND PRODUCT STANDARDS

Products are available in various sizes, shapes and lengths. Height: 40 mm - 550 mm, width: 50 mm - 1000 mm length: 50-1300 mm.

Concrete products for paved areas comply with European standards which specifies all requirements for factory made products and quality control: EN 1338; EN 1339; EN 1340; EN 13198.

Further information can be found at https://www.betonomozaika.lt/

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Biogenic material, weight-%	Biogenic material, kg C/DU
Sand	571.79	0	0
Stone	249.43	0	0
Cement	148.81	0	0
Water	28.71		
Additives	1.27	0	0
Total	**1000.00**	**0**	**0**
Packaging materials	**Weight, kg**	**Biogenic material, weight-%**	**Weight biogenic carbon, kg C/kg**
Plastic film	0.15	0	
Plastic pellets	0.01	0	
PP bags	0.00	0	
Welding wire	0.00	0	
*Wooden lamps	0.37	100	0.17
Total	**0.53**	**70.6**	**0.17**

* Global Warming Potential biogenic: - 1150.0 kg CO2e / m3

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0	-
Minerals	97.00	EU
Fossil materials	0.13	EU
Water	2.87	EU
Bio-based materials	0	-

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0.1 % (1000 ppm).

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

MANUFACTURING PROCESS

All products are made from concrete. Firstly, semi dry concrete is made. Cement as a binder is used. Special additives are used to improve final product properties. Fresch concrete is distributed to the product shaping press/machine. Stone mould is filled with fresh concrete, compacted, separated from the mould and delivered to curing chamber. During product hardening process in the curing chamber, no artificial heating is used. Hardened products are sorted, packed and delivered to warehouse for sale.

TRANSPORT AND INSTALLATION (A4-A5)

This EPD does not cover the Installation phase. However, module A5 is declared for “balancing-out reporting” since part of the packaging of products contains more than 5% biogenic carbon. The uptake of this biogenic carbon, as biogenic CO_2, in module A1 shall be balanced out by an equal amount of emission of biogenic CO_2 in module A5

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

C1: Demolition of paving stones and slabs, which meet the weight requirements for occupational safety, are dismantled manually. Products like curb stones are removed using machinery (10 kWh/t), 100% of the waste is collected and treated. For this EPD, it was conservatively estimated that machinery is required for the removal.

C2: It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. All the end-of-life products are assumed to be sent to the closest facilities such as recycling and landfill. Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is assumed as lorry which is the most common option.

C3: Concrete waste reaches the end-of-waste state when it has been adequately processed (e.g., crushed, sorted, and cleaned) to meet quality criteria for use in new concrete production or other construction purposes,

without posing environmental risks. According to the European commission Waste Framework Directive by 2020, the preparation for re-use, recycling and other material recovery of non-hazardous construction and demolition waste shall be increased to a minimum of 70 % by weight, hence it is assumed that 70% of the concrete waste is recycled.

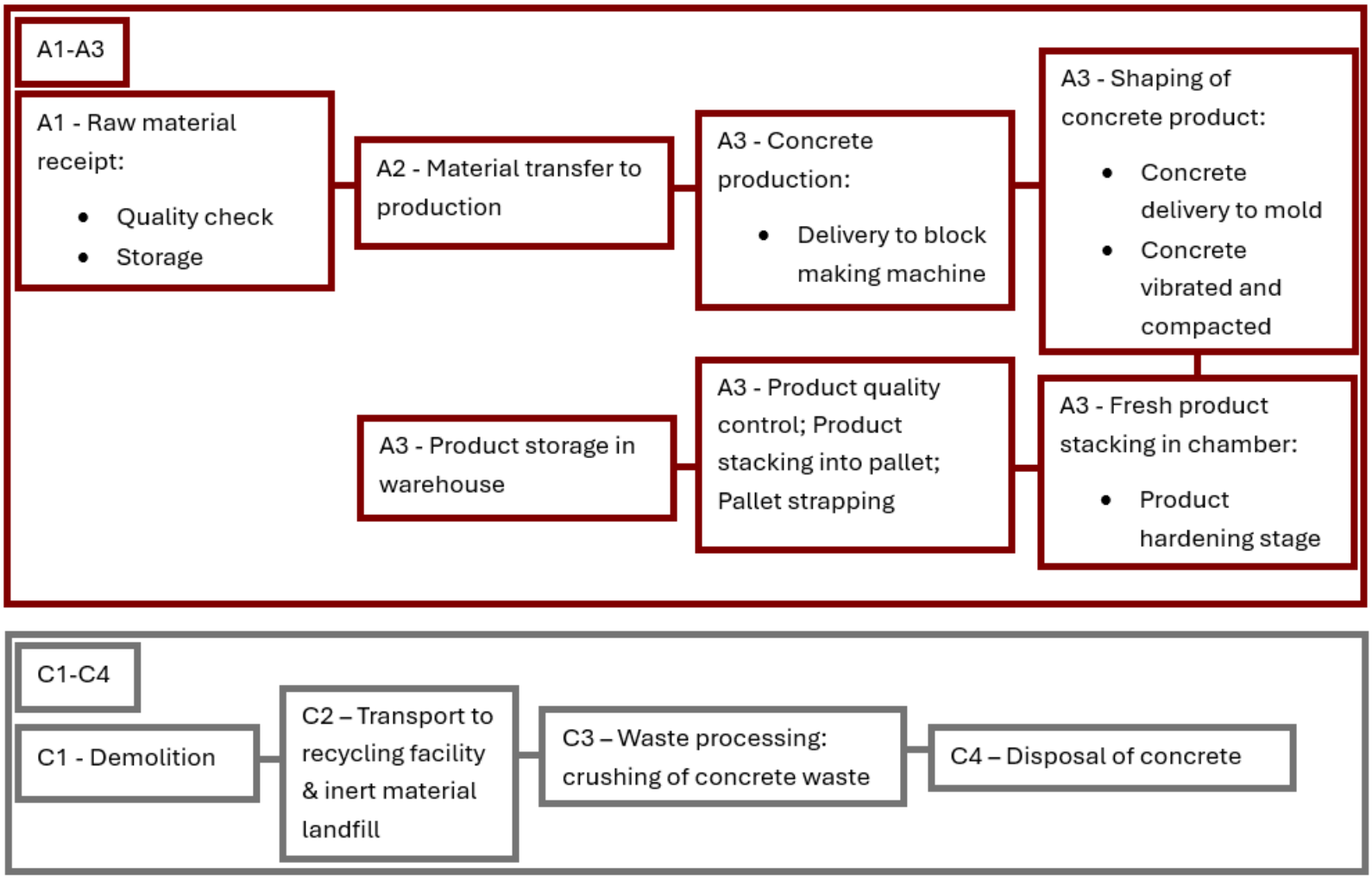
C4: According to the European commission Waste Framework Directive it is assumed that 30 % of concrete is collected with construction waste and is sent to landfills.

D: The recycled concrete has been modelled to avoid gravel production. The impact of concrete crushing for use as gravel is also considered.

Calculation rules for averaging data

This EPD of multiple products, based on the average results of the product group. Average product calculations were chosen because the products in the group, despite their varying shapes and height, share common characteristics in their manufacturing process and material composition. Using an average product value allows for streamlined analysis and decision-making while maintaining a fair representation of the group as a whole. The A1-A3 GWP total value for the worst-case scenario is 1,32E+02 kg CO_2e, while the A1-A3 GWP total value for the best-case scenario is 1,20E+02 kg CO_2e. Therefore, the difference between the worst-case and best-case scenarios is approximately 9.09%. The average product group results are evaluated, as A1-A3 GWP value differs less than 10%.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2023
EPD type	EPD of multiple products, based on the average results of the product group

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 tonne
Mass per declared unit	1000 kg

SYSTEM BOUNDARY

This EPD covers the cradle to gate with options scope with following modules: A1 (Raw material supply), A2 (Transport), and A3 (Manufacturing),C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5*	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
×	×	×	MND	MND	MND	MND	MND	MND	MND	MND	MND	×	×	×	×	×		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR

**A5 only packaging GWP balancing*

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per EN 15804, allocation is conducted in the following order:

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

The allocations in the Ecoinvent 3.10.1 datasets used in this study follow the Ecoinvent system model 'Allocation, cut-off, EN15804. Scenarios included in the LCA are based on realistic scenarios which are currently in use and are representative for one of the most likely scenario alternatives.

In this study no allocation was made.

The EN 15804 reference package used is based on EF 3.1.

BIOGENIC CARBON CONTENT

The product does not contain biogenic carbon content.
The packaging contains biogenic carbon content of 0.166 kg C.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A5	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	1,15E+02	7,81E+00	5,93E+00	1,29E+02	4,61E-01	3,61E+00	5,38E+00	3,06E+00	1,87E+00	-7,01E+00
GWP – fossil	kg CO_2e	1,15E+02	7,80E+00	6,39E+00	1,29E+02	0,00E+00	3,60E+00	5,38E+00	3,06E+00	1,87E+00	-7,00E+00
GWP – biogenic	kg CO_2e	1,72E-05	0,00E+00	-4,61E-01	-4,61E-01	4,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	1,60E-01	3,49E-03	2,05E-03	1,66E-01	0,00E+00	3,69E-04	2,41E-03	3,14E-04	1,07E-03	-6,34E-03
Ozone depletion pot.	kg CFC-$_{11}$e	1,21E-04	1,15E-07	1,24E-07	1,21E-04	0,00E+00	5,52E-08	7,95E-08	4,69E-08	5,42E-08	-5,46E-08
Acidification potential	mol H^+e	3,71E-01	2,66E-02	3,44E-02	4,32E-01	0,00E+00	3,25E-02	1,84E-02	2,76E-02	1,33E-02	-4,28E-02
EP-freshwater[2)]	kg Pe	3,47E-03	6,08E-04	8,60E-04	4,94E-03	0,00E+00	1,04E-04	4,19E-04	8,84E-05	1,54E-04	-2,14E-03
EP-marine	kg Ne	7,52E-02	8,74E-03	9,98E-03	9,39E-02	0,00E+00	1,51E-02	6,03E-03	1,28E-02	5,06E-03	-1,01E-02
EP-terrestrial	mol Ne	8,75E-01	9,51E-02	1,07E-01	1,08E+00	0,00E+00	1,65E-01	6,56E-02	1,40E-01	5,53E-02	-1,23E-01
POCP ("smog")[3)]	kg NMVOCe	2,19E-01	3,92E-02	3,77E-02	2,96E-01	0,00E+00	4,93E-02	2,70E-02	4,19E-02	1,98E-02	-3,40E-02
ADP-minerals & metals[4)]	kg Sbe	1,03E-03	2,18E-05	2,18E-05	1,07E-03	0,00E+00	1,29E-06	1,50E-05	1,10E-06	2,98E-06	-3,75E-05
ADP-fossil resources	MJ	5,86E+02	1,13E+02	1,02E+02	8,01E+02	0,00E+00	4,72E+01	7,81E+01	4,01E+01	4,60E+01	-8,40E+01
Water use[5)]	m^3e depr.	7,23E+03	5,59E-01	1,18E+00	7,23E+03	0,00E+00	1,18E-01	3,86E-01	1,00E-01	1,33E-01	-1,05E+01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Particulate matter	Incidence	2,06E-06	7,81E-07	5,95E-07	3,43E-06	9,25E-07	5,39E-07	5,99E-06	3,02E-07	-6,50E-07
Ionizing radiation[6)]	kBq U235e	1,54E+00	9,86E-02	7,23E-01	2,36E+00	2,09E-02	6,80E-02	1,78E-02	2,89E-02	-5,91E-01
Ecotoxicity (freshwater)	CTUe	7,37E+02	1,60E+01	1,06E+01	7,63E+02	2,60E+00	1,10E+01	2,21E+00	3,86E+00	-2,01E+01
Human toxicity, cancer	CTUh	1,16E-08	1,29E-09	2,44E-09	1,53E-08	3,71E-10	8,88E-10	3,15E-10	3,45E-10	-1,87E-09
Human tox. non-cancer	CTUh	1,48E-07	7,33E-08	2,79E-08	2,49E-07	5,87E-09	5,06E-08	4,99E-09	7,93E-09	-5,47E-08
SQP[7)]	-	1,84E+02	1,14E+02	6,68E+01	3,65E+02	3,30E+00	7,87E+01	2,81E+00	9,05E+01	-7,87E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A5	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	1,54E+02	1,55E+00	1,74E+01	1,73E+02	0,00E+00	2,99E-01	1,07E+00	2,54E-01	4,44E-01	-7,65E+00
Renew. PER as material	MJ	1,15E+00	0,00E+00	3,77E+00	4,93E+00	-3,77E+00	0,00E+00	0,00E+00	-7,98E-01	-3,42E-01	0,00E+00
Total use of renew. PER	MJ	1,55E+02	1,55E+00	2,12E+01	1,78E+02	-3,77E+00	2,99E-01	1,07E+00	-5,44E-01	1,02E-01	-7,65E+00
Non-re. PER as energy	MJ	5,93E+02	1,13E+02	9,36E+01	8,00E+02	0,00E+00	4,72E+01	7,81E+01	4,01E+01	4,60E+01	-8,41E+01
Non-re. PER as material	MJ	3,79E+00	0,00E+00	7,36E+00	1,11E+01	-7,36E+00	0,00E+00	0,00E+00	-2,70E+00	-1,16E+00	0,00E+00
Total use of non-re. PER	MJ	5,97E+02	1,13E+02	1,01E+02	8,11E+02	-7,36E+00	4,72E+01	7,81E+01	3,74E+01	4,48E+01	-8,41E+01
Secondary materials	kg	1,78E-01	4,82E-02	2,97E-02	2,55E-01	0,00E+00	1,96E-02	3,32E-02	1,66E-02	1,16E-02	7,00E+02
Renew. secondary fuels	MJ	9,56E+00	6,12E-04	5,36E-03	9,56E+00	0,00E+00	5,12E-05	4,22E-04	4,35E-05	2,39E-04	-6,47E-04
Non-ren. secondary fuels	MJ	8,05E+01	0,00E+00	0,00E+00	8,05E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,45E+00	1,67E-02	5,20E-02	1,52E+00	0,00E+00	3,12E-03	1,15E-02	2,65E-03	4,78E-02	-2,49E-01

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste	kg	1,67E+00	1,92E-01	2,50E-01	2,12E+00	5,25E-02	1,32E-01	4,46E-02	5,08E-02	-6,56E-01
Non-hazardous waste	kg	1,74E+01	3,55E+00	9,36E+00	3,03E+01	7,15E-01	2,45E+00	6,08E-01	1,16E+00	-1,17E+01
Radioactive waste	kg	1,79E-03	2,45E-05	1,54E-04	1,97E-03	5,18E-06	1,69E-05	4,40E-06	7,15E-06	-1,43E-04

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
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
Materials for recycling	kg	5,55E-03	0,00E+00	1,38E+01	1,38E+01	0,00E+00	0,00E+00	7,00E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	1,02E-03	0,00E+00	0,00E+00	1,02E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	5,30E-03	0,00E+00	0,00E+00	5,30E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Key information table (RTS) – key information per kg of product

Impact category	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP – total	kg CO_2e	1,15E-01	7,81E-03	5,93E-03	1,29E-01	3,61E-03	5,39E-03	3,07E-03	1,88E-03	-7,02E-03
ADP-minerals & metals	kg Sbe	1,03E-06	2,18E-08	2,18E-08	1,07E-06	1,29E-09	1,50E-08	1,10E-09	2,98E-09	-3,75E-08
ADP-fossil	MJ	5,86E-01	1,13E-01	1,02E-01	8,01E-01	4,72E-02	7,82E-02	4,01E-02	4,60E-02	-8,41E-02
Water use	m^3e depr.	7,23E+00	5,59E-04	1,18E-03	7,23E+00	1,15E-04	3,76E-04	9,81E-05	1,29E-04	-1,05E-02
Secondary materials	kg	1,78E-04	4,82E-05	2,97E-05	2,55E-04	1,96E-05	3,32E-05	1,66E-05	1,16E-05	7,00E-01
Biog. C in product[7)]	kg C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	N/A	N/A	1,66E-04	N/A	N/A	N/A	N/A	N/A	N/A

9) Biog. C in product = Biogenic carbon content in product.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value	Source
Residual mix (Lithuania)	0.626 kg CO_2e/kWh	Average Lithuanian residual mix of last three last years (2021, 2022 and 2023) has been modelled according to the Association of Issuing Bodies data (https://www.aib-net.org/facts/european-residual-mix). Data sources: Ecoinvent 3.10.1
Diesel, burned in building machine	0.1 kg CO2e / MJ	Data sources: Ecoinvent 3.10.1 Country: World
Electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted (Reference product: electricity, low voltage)	0.0993 kg CO_2e / kWh	Data sources: Ecoinvent 3.10.1 Country: Lithuania

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1000.00 kg
Collection process – kg collected with mixed waste	0
Recovery process – kg for re-use	0
Recovery process – kg for recycling	700.00 kg
Recovery process – kg for energy recovery	0
Disposal (total) – kg for final deposition	300.00 kg
Scenario assumptions e.g. transportation	Transported 50 km with an average lorry.

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