ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

SEMBLA®

Polycare Research Technology GmbH

EPD HUB, HUB-1980

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Created with One Click LCA

Polycare

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Polycare Research Technology GmbH
Address	Glasmacherstraße 11, 98528 Suhl/OT Gehlberg, Germany
Contact details	bauen@polycare.de
Website	https://polycare.de/en

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023 EN 16757 Product Category Rules for concrete and concrete elements
Sector	Construction product
Category of EPD	Design phase EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Philipp J. Scherer, Maryam Soleymani
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Nemanja Nedic, as an authorized verifier acting for EPD Hub Limited

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	SEMBLA®
Additional labels	-
Product reference	-
Place of production	Glasmacherstraße 11, 98528 Suhl/OT Gehlberg, Germany
Period for data	15. April -31. May 2024
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	- %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m^3
Declared unit mass	960 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	7,42E+01
GWP-total, A1-A3 ($kgCO_2e$)	6,75E+01
Secondary material, inputs (%)	5.42
Secondary material, outputs (%)	96.4
Total energy use, A1-A3 (kWh)	438
Net freshwater use, A1-A3 (m^3)	1.72

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Polycare is a European leader in the use of cement-free concretes in the building industry. Since 2010, Polycare has been developing circular and regenerative building solutions for various markets across the globe. With SEMBLA®, the first geopolymer concrete-based, circular masonry system for high-rise construction has been introduced on the German market. The business model of Polycare involves licensing the technology portfolio.
Further information can be found at: https://polycare.de/en

PRODUCT DESCRIPTION

The circular, geopolymer-based masonry blocks SEMBLA® enable quick and easy construction of load-bearing and non-load-bearing walls, as well as their non-destructive dismantling at the end of a building's life cycle. SEMBLA® blocks can then be reused in new construction projects. The wall system is designed for holistically circular buildings and is therefore particularly suitable for the combination with other deconstructable and reusable building elements. Further information about SEMBLA can be found on the product website: https://sembla.de

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0	
Minerals	99.7	Europe
Fossil materials	0.3	Europe
Bio-based materials	0	

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	1.848

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m^3
Mass per declared unit	960 kg
Functional unit	-
Reference service life	-

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

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

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	×	×	×	×	×		
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

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.

SEMBLA® block production starts by transporting the binders, activators, aggregates, and additives to the dry storage hall at the manufacturing site. From there the dry ingredients are fed into dosing units. Binder and aggregates are mixed dry. Pre-solubilized activator, water and additives are then added to the mixture, followed by wet mixing. The wet mass is filled into a mold of a concrete block paver machine and vibrated to its final shape. The blocks are then transported to a curing rack. From the curing rack, the blocks are adjusted to the right height dimensions with a masonry sawing machine. From there, they go to the packaging line, where they are taken for storage. Eventually, the finished product is packaged with plastic straps, cardboard strips, and sent to the installation site on a wooden EUR-pallet.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from the delivery of final products to the construction site (A4) include fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The transportation distance is defined in accordance with the PCR guidelines. Average distance of transportation from production plant to building site is assumed as 50 km and the transportation method is assumed to be lorry. Vehicle capacity utilization is assumed to be 100 % indicating a full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. Empty return trips are excluded as it is assumed that return trip is used by the transportation company to serve the needs of other clients. Transportation does not result in product losses because the items are properly packaged. Also, volume capacity utilization factor is assumed to be 100 % for the nested packaged products.

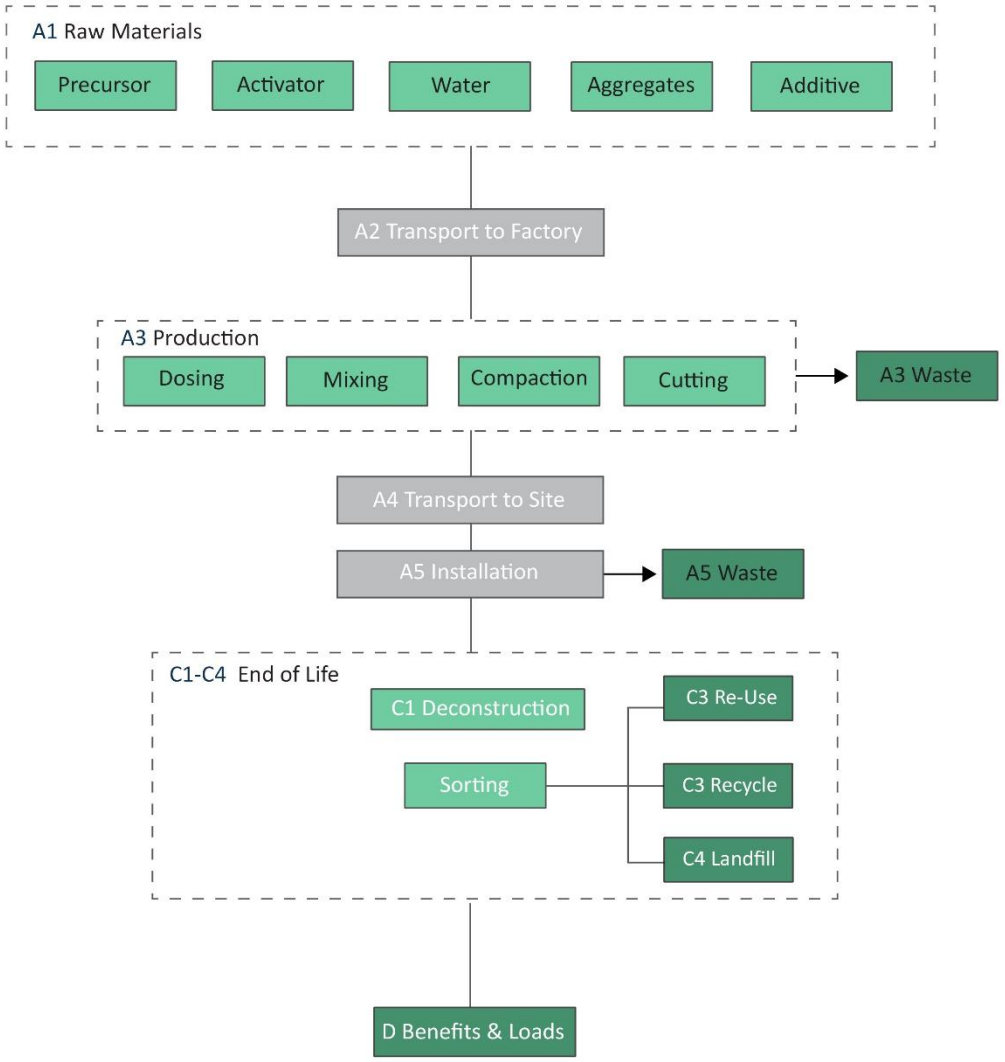
PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. Impacts on air, soil, and water during the use phase have not been analyzed.

PRODUCT END OF LIFE (C1-C4, D)

SEMBLA® being designed as a circular masonry system, the disassembly and reuse scenarios at the End-of-Life phase are key features of this product. At the end of life, the SEMBLA® wall is dismantled in a non-destructive manner (C1) and sorted. Consumption of energy and natural resources in the dismantling process is assumed to be negligible. 70% of the used SEMBLA® blocks are transported back to the manufacturing site for reuse in the next building project. 30% of the blocks are considered as waste at the end of their life cycle. It is assumed that the waste is collected separately and transported to the nearest waste concrete treatment plant. Transportation distance to treatment is assumed as 50 km and the transportation method is assumed to be lorry (C2). At the waste treatment plant, the blocks are crushed and separated. Based on data from European Environment Agency (2020), it is assumed that 88% of the blocks sent to the treatment plant are recycled. Process losses of the waste treatment plant are assumed to be negligible (C3). The remaining 12% of SEMBLA® sent to the treatment plant is assumed to be landfilled (C4). According to EN 50693:2019, the sequence of treatment operations occurring to the product shall include de-pollution, fractions separation and preparation (dismantling, crushing, shredding, sorting), as well as recycling, other material recovery, energy recovery and disposal. In this study, the default values from table G.4 of EN 50693 are used for treating materials in different waste treatment methods. Due to the material and energy recovery potential of parts in the SEMBLA® system, the end-of-life product is converted into recycled raw materials, while the energy recovered from incineration displaces electricity and heat production (Module D). The wooden pallet and other plastic packaging used during transportation incinerated for energy recovery and/or recycled. The benefits and loads of re-use, incineration and recycling are included in Module D.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes that are mandatory according to the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw materials and energy consumption. All inputs and outputs of the unit processes, for which data is available, are included in the calculation. No unit process is neglected if it accounts for more than 1% of the 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. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	- %

There is no average result considered in this study since this EPD refers to one specific product produced in one production plant.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	5,11E+01	1,35E+01	2,88E+00	6,75E+01	4,49E+00	1,01E+01	MND	MND	MND	MND	MND	MND	MND	9,53E-01	5,47E+00	1,02E+00	1,82E-01	-1,32E+00
GWP – fossil	kg CO_2e	5,10E+01	1,35E+01	9,64E+00	7,42E+01	4,49E+00	3,28E+00	MND	MND	MND	MND	MND	MND	MND	9,53E-01	5,47E+00	1,02E+00	1,82E-01	-4,16E+01
GWP – biogenic	kg CO_2e	0,00E+00	0,00E+00	-6,77E+00	-6,77E+00	0,00E+00	6,77E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,04E+01
GWP – LULUC	kg CO_2e	6,80E-02	5,25E-03	1,81E-02	9,14E-02	1,74E-03	2,36E-03	MND	MND	MND	MND	MND	MND	MND	9,49E-05	2,20E-03	1,01E-04	1,72E-04	-6,83E-02
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	7,97E-06	3,18E-06	8,68E-07	1,20E-05	1,06E-06	3,48E-07	MND	MND	MND	MND	MND	MND	MND	2,04E-07	1,24E-06	2,18E-07	7,36E-08	-5,91E-06
Acidification potential	mol H^+e	4,26E-01	4,40E-02	4,83E-02	5,18E-01	1,46E-02	1,32E-02	MND	MND	MND	MND	MND	MND	MND	9,90E-03	1,71E-02	1,06E-02	1,71E-03	-3,27E-01
EP-freshwater[2)]	kg Pe	3,07E-03	1,15E-04	4,07E-04	3,60E-03	3,80E-05	7,88E-05	MND	MND	MND	MND	MND	MND	MND	3,16E-06	4,64E-05	3,37E-06	1,91E-06	-2,46E-03
EP-marine	kg Ne	6,66E-02	9,67E-03	1,55E-02	9,18E-02	3,21E-03	3,13E-03	MND	MND	MND	MND	MND	MND	MND	4,38E-03	3,60E-03	4,68E-03	5,92E-04	-5,80E-02
EP-terrestrial	mol Ne	9,56E-01	1,07E-01	1,36E-01	1,20E+00	3,57E-02	3,44E-02	MND	MND	MND	MND	MND	MND	MND	4,81E-02	4,00E-02	5,14E-02	6,51E-03	-7,66E-01
POCP ("smog")[3)]	kg NMVOCe	1,81E-01	4,16E-02	4,59E-02	2,69E-01	1,38E-02	8,50E-03	MND	MND	MND	MND	MND	MND	MND	1,32E-02	1,53E-02	1,41E-02	1,90E-03	-1,74E-01
ADP-minerals & metals[4)]	kg Sbe	1,56E-03	3,29E-05	4,45E-05	1,63E-03	1,09E-05	3,46E-05	MND	MND	MND	MND	MND	MND	MND	4,83E-07	1,60E-05	5,17E-07	4,18E-07	-1,20E-03
ADP-fossil resources	MJ	7,36E+02	2,12E+02	1,91E+02	1,14E+03	7,03E+01	3,07E+01	MND	MND	MND	MND	MND	MND	MND	1,28E+01	8,29E+01	1,37E+01	4,99E+00	-6,26E+02
Water use[5)]	m^3e depr.	1,07E+02	9,45E-01	5,24E+00	1,13E+02	3,14E-01	2,43E+00	MND	MND	MND	MND	MND	MND	MND	3,45E-02	3,68E-01	3,68E-02	1,58E-02	-6,90E+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	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	1,47E-05	1,54E-06	2,26E-06	1,85E-05	5,10E-07	4,30E-07	MND	MND	MND	MND	MND	MND	MND	2,65E-07	5,39E-07	2,17E-06	3,45E-08	-9,60E-06
Ionizing radiation[6)]	kBq U235e	4,82E+00	1,01E+00	7,35E-01	6,57E+00	3,37E-01	1,73E-01	MND	MND	MND	MND	MND	MND	MND	5,89E-02	3,93E-01	6,29E-02	2,26E-02	-3,72E+00
Ecotoxicity (freshwater)	CTUe	1,78E+03	1,88E+02	2,14E+02	2,18E+03	6,25E+01	5,30E+01	MND	MND	MND	MND	MND	MND	MND	7,71E+00	7,47E+01	8,23E+00	3,26E+00	-1,29E+03
Human toxicity, cancer	CTUh	3,32E-08	4,61E-09	1,15E-08	4,93E-08	1,53E-09	1,43E-09	MND	MND	MND	MND	MND	MND	MND	2,95E-10	1,95E-09	3,16E-10	8,14E-11	-6,95E-08
Human tox. non-cancer	CTUh	1,05E-06	1,81E-07	1,18E-07	1,35E-06	6,02E-08	4,02E-08	MND	MND	MND	MND	MND	MND	MND	5,57E-09	7,01E-08	5,95E-09	2,13E-09	-8,23E-07
SQP[7)]	-	4,30E+02	2,44E+02	4,93E+02	1,17E+03	8,09E+01	3,52E+01	MND	MND	MND	MND	MND	MND	MND	1,67E+00	7,93E+01	1,78E+00	1,07E+01	-3,44E+03

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	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	7,43E+01	2,38E+00	4,44E+02	5,21E+02	7,91E-01	1,06E+01	MND	MND	MND	MND	MND	MND	MND	7,33E-02	9,54E-01	7,83E-02	4,33E-02	-2,84E+02
Renew. PER as material	MJ	4,82E+01	0,00E+00	5,13E+01	9,95E+01	0,00E+00	-5,93E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-3,88E+01	-1,45E+00	-2,09E+00
Total use of renew. PER	MJ	1,23E+02	2,38E+00	4,95E+02	6,20E+02	7,91E-01	-4,87E+01	MND	MND	MND	MND	MND	MND	MND	7,33E-02	9,54E-01	-3,87E+01	-1,40E+00	-2,86E+02
Non-re. PER as energy	MJ	7,16E+02	2,12E+02	1,28E+02	1,06E+03	7,03E+01	2,90E+01	MND	MND	MND	MND	MND	MND	MND	1,28E+01	8,29E+01	1,37E+01	4,99E+00	-5,72E+02
Non-re. PER as material	MJ	2,00E+01	0,00E+00	5,96E+01	7,96E+01	0,00E+00	-6,29E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	-1,60E+01	-5,99E-01	8,53E+00
Total use of non-re. PER	MJ	7,36E+02	2,12E+02	1,88E+02	1,14E+03	7,03E+01	-3,39E+01	MND	MND	MND	MND	MND	MND	MND	1,28E+01	8,29E+01	-2,35E+00	4,39E+00	-5,63E+02
Secondary materials	kg	5,21E+01	5,87E-02	1,39E+00	5,35E+01	1,95E-02	1,07E+00	MND	MND	MND	MND	MND	MND	MND	5,02E-03	2,50E-02	5,36E-03	1,05E-03	-1,19E+00
Renew. secondary fuels	MJ	1,27E-02	5,92E-04	1,62E+00	1,63E+00	1,97E-04	3,27E-02	MND	MND	MND	MND	MND	MND	MND	1,64E-05	2,86E-04	1,75E-05	2,74E-05	-1,18E+01
Non-ren. secondary fuels	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m^3	1,56E+00	2,73E-02	1,30E-01	1,72E+00	9,07E-03	3,87E-02	MND	MND	MND	MND	MND	MND	MND	7,79E-04	1,03E-02	8,32E-04	5,46E-03	-1,06E+00

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	2,95E+00	2,79E-01	5,42E-01	3,77E+00	9,26E-02	9,38E-02	MND	MND	MND	MND	MND	MND	MND	1,72E-02	1,14E-01	1,83E-02	0,00E+00	-2,45E+00
Non-hazardous waste	kg	9,24E+01	4,58E+00	1,06E+01	1,08E+02	1,52E+00	2,51E+01	MND	MND	MND	MND	MND	MND	MND	1,21E-01	1,84E+00	1,29E-01	3,46E+01	-7,67E+01
Radioactive waste	kg	4,97E-03	1,43E-03	4,32E-04	6,83E-03	4,74E-04	1,64E-04	MND	MND	MND	MND	MND	MND	MND	9,03E-05	5,55E-04	9,64E-05	0,00E+00	-3,46E-03

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	6,72E+02	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	1,92E+02	1,92E+02	0,00E+00	6,40E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	2,53E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,14E+01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	4,46E+01	1,34E+01	9,45E+00	6,74E+01	4,44E+00	3,34E+00	MND	MND	MND	MND	MND	MND	MND	9,43E-01	5,42E+00	1,01E+00	1,78E-01	-3,77E+01
Ozone depletion Pot.	kg CFC_{-11}e	7,27E-06	2,52E-06	7,12E-07	1,05E-05	8,36E-07	2,96E-07	MND	MND	MND	MND	MND	MND	MND	1,61E-07	9,82E-07	1,72E-07	5,83E-08	-5,28E-06
Acidification	kg SO_2e	3,16E-01	3,57E-02	3,79E-02	3,90E-01	1,19E-02	9,98E-03	MND	MND	MND	MND	MND	MND	MND	7,06E-03	1,39E-02	7,54E-03	1,29E-03	-2,44E-01
Eutrophication	kg PO_4^3e	8,69E-02	7,81E-03	1,69E-02	1,12E-01	2,59E-03	1,04E-02	MND	MND	MND	MND	MND	MND	MND	1,64E-03	3,05E-03	1,75E-03	2,79E-04	-7,71E-02
POCP (“smog”)	kg C_2H_4e	1,19E-02	1,65E-03	3,45E-03	1,70E-02	5,46E-04	4,83E-04	MND	MND	MND	MND	MND	MND	MND	1,54E-04	6,61E-04	1,65E-04	5,42E-05	-1,24E-02
ADP-elements	kg Sbe	1,27E-03	3,20E-05	4,26E-05	1,34E-03	1,06E-05	2,87E-05	MND	MND	MND	MND	MND	MND	MND	4,76E-07	1,56E-05	5,08E-07	4,12E-07	-1,03E-03
ADP-fossil	MJ	6,37E+02	2,12E+02	1,91E+02	1,04E+03	7,03E+01	2,87E+01	MND	MND	MND	MND	MND	MND	MND	1,28E+01	8,29E+01	1,37E+01	4,99E+00	-5,68E+02

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- The Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Nemanja Nedic, as an authorized verifier acting for EPD Hub Limited
15.12.2024