AMORIM
CORK
INSULATION

EPD Hub

ENVIRONMENTAL PRODUCT DECLARATION

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

Expanded Cork Granules
Amorim Cork Insulation

EPD HUB, EPD number HUB-0280
Publishing 13 February 2023, last updated 20 December 2023, valid until 13 February 2028

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Amorim Cork Insulation
Address	Industrial Unit of Vendas Novas: Estrada de Lavre, km 6 – Apartado 7, 7080-026 Vendas Novas, Portugal / Industrial Unit of Silves: Vale de Lama – Apartado 27, 8300-999 Silves, Portugal
Contact details	info.aci@amorim.com
Website	www.amorimcorkinsulation.com

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 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Sister EPD
Scope of the EPD	Cradle to gate with options A4-A5 and modules C1-C4, D
EPD author	Khadija Benis, Greenlab
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Elma Avdyli, 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	Expanded Cork Granules
Place of production	Vendas Novas (Portugal) and Silves (Portugal)
Period for data	2020
Averaging in EPD	Multiple factories
Variation in GWP-fossil for A1-A3	-8.6 to 12.6 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m3 of Expanded Cork Granules
Declared unit mass	70 kg
GWP-fossil, A1-A3 (kgCO2e)	57.3
GWP-total, A1-A3 (kgCO2e)	-2520.0
Secondary material, inputs (%)	0.712
Secondary material, outputs (%)	0.0
Total energy use, A1-A3 (kWh)	10800.0
Total water use, A1-A3 (m3e)	2.13

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Amorim Cork Insulation is dedicated to the production of insulation agglomerates with excellent technical performance and strictly 100% natural. The company has a strong foothold in the world market, arising from a rigorous commitment to compliance with the quality standards and demands required primarily by the sustainable construction sector.

In order to achieve certification and total quality, Amorim Cork Insulation seeks high levels of quality and productivity, where the protection of the environment and the preservation of natural resources are a constant, clearly demonstrating its position in the community in which it operates.

PRODUCT DESCRIPTION

Expanded Cork Granules os a by-product obtained during the Expanded Insulation Corkboard (ICB) production. It is a solution of lightweight filling with acoustic insulation properties for use in screeds, flooring, and interior cavity walls. It is a 100% recyclable and ecological product.

Size: 1-3; 3-5; 3-10; 3-15 (mm)
Bags: 250/500 L

Average density: 70 kg/m^3
Thermal conductivity: 0.041 W/m.K

Biogenic carbon content in product and packaging (kg C) calculation in accordance with EN 16449:2014 Wood and wood-based products.

Further information can be found at www.amorimcorkinsulation.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	-
Minerals	-	-
Fossil materials	-	-
Bio-based materials	100	Portugal

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	31.22
Biogenic carbon content in packaging, kg C	0.3019

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m3 of Expanded Cork Granules
Mass per declared unit	70 kg

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		
x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	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.

A1. The first stage of the production process consists in extraction of cork from the cork oak. This operation can be performed manually or with electric equipment. Specifically, the raw cork that is used to produce expanded cork granules in the factory consists of recycled wooden by-products obtained from the maintenance (pruning) of cork oak forests in Portugal.

A2. After this procedure, cork is transported to the industrial unit by truck and is stored.

A3. In the factory the cork is ground into granules with the appropriate size and placed in an autoclave. Under the effect of pressure and superheated steam the granules expand and are agglomerated, originating blocks. This process occurs only with the natural resin (suberin) of the raw material, meaning that it does not require any extra use of adhesives. Once formed, the blocks are forwarded to cooling stage, where recycled water is injected at a temperature of approximately 90°C. The stabilization phase, not requiring any use of energy, occurs by placing the blocks in the tunnel and then in a ventilated space. The cork granules can be a result of material losses during the process of shaping the blocks (cutting and sanding to obtain the desired sizes of Expanded Insulation Corkboards, ICB) and can also be produced by milling the blocks into granules of the desired sizes. After this stage, the granules are packed in raffia bags.

TRANSPORT AND INSTALLATION (A4-A5)

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

A4. The transportation distance is defined according to the PCR. Average distance of transportation from production plant to building site is 720 km and the transportation method is lorry (calculation and assumption based on sales data for expanded cork granules). Vehicle capacity utilization volume factor is assumed to be 100 % which means full load. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as product is packaged properly. Also, volume capacity utilisation factor is assumed to be 100 %.

A5. Cork granules are applied in gaps, for example gaps between the ceiling and the floor of the story on top, or to insulate cavity walls. This application does not require the use of any ancillary materials. During installation, a

little waste is generated because of losses and packaging materials. As mentioned in EN 16783:2017, 2% of product is assumed to be landfill waste during installation.

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)

End-of life scenario is based on manufacturer's feedback.

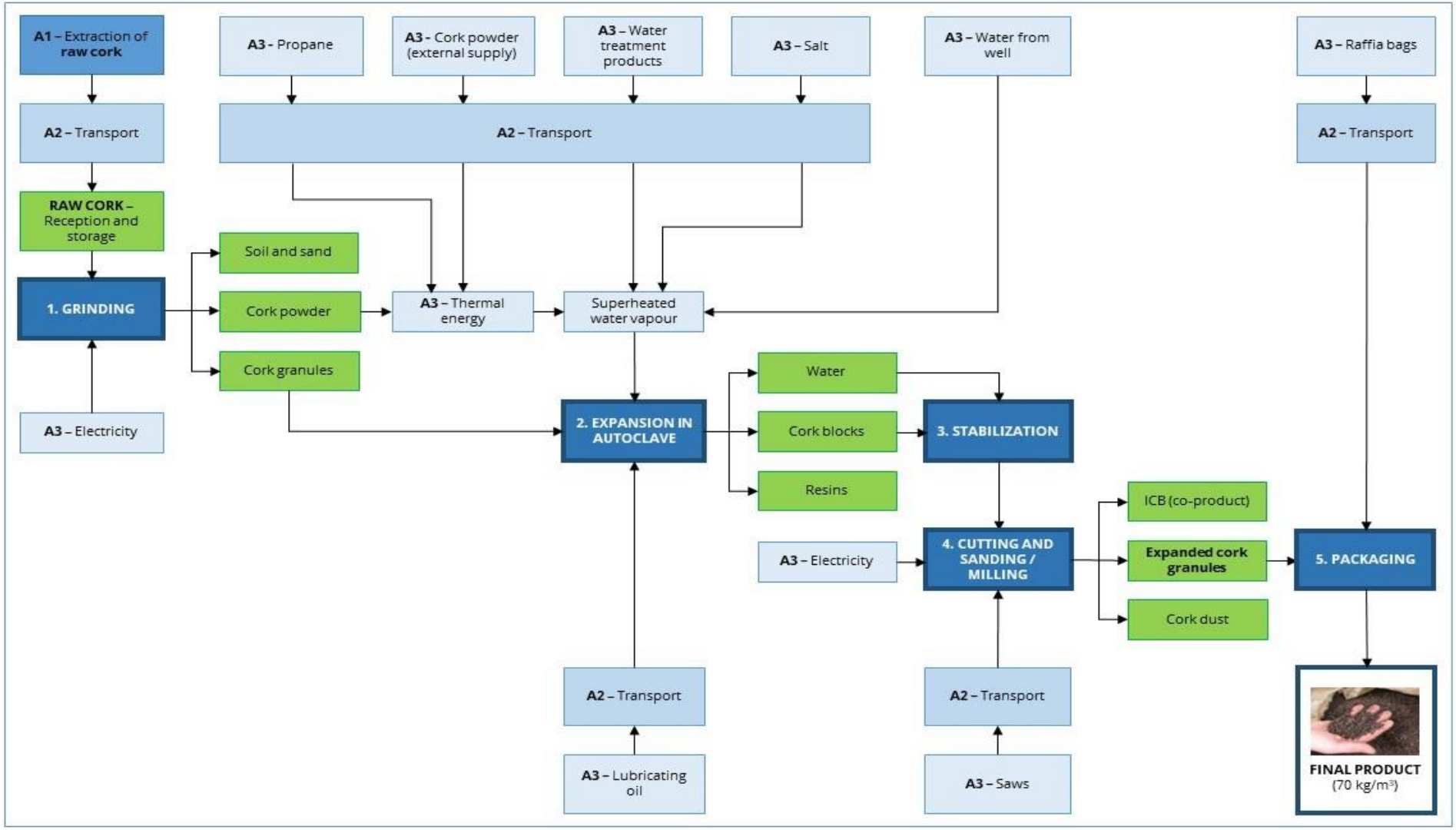
C1. Consumption of energy in demolition process is assumed to be 0.01 kWh/kg.

C2. The waste is collected and transported by lorry to the waste treatment centre (50 km average distance).

C3. There is no procedure related to recycling, reuse or repurpose for lifetime completed products.

C4. The entire product is deposited in landfill.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

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. 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	Allocated by mass or volume
Packaging materials	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	Multiple factories
Averaging method	Averaged by shares of total volume
Variation in GWP-fossil for A1-A3	-8.6 to 12.6 %

This EPD indicates the weighted average of the values of two plants, Vendas Novas (Portugal) and Silves (Portugal), by shares of total production volumes.

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. Ecoinvent and One Click LCA databases were used 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	-4,19E3	4,98E0	1,67E3	-2,52E3	8,23E0	-4,88E1	MND	MND	MND	MND	MND	MND	MND	2,31E-1	3,18E-1	0E0	7,8E0	-1,72E-2
GWP – fossil	kg CO_2e	5,89E0	4,97E0	4,65E1	5,73E1	8,31E0	2,14E0	MND	MND	MND	MND	MND	MND	MND	2,31E-1	3,18E-1	0E0	7,56E-1	-1,72E-2
GWP – biogenic	kg CO_2e	-4,2E3	2,67E-3	1,63E3	-2,57E3	4,47E-3	-5,09E1	MND	MND	MND	MND	MND	MND	MND	6,42E-5	2,31E-4	0E0	7,05E0	5,63E-5
GWP – LULUC	kg CO_2e	6,49E-1	1,8E-3	5,16E-1	1,17E0	3E-3	2,36E-2	MND	MND	MND	MND	MND	MND	MND	1,95E-5	9,57E-5	0E0	3,94E-4	-3,37E-6
Ozone depletion pot.	kg $CFC_{-11}e$	1,23E-6	1,13E-6	4,17E-6	6,54E-6	1,89E-6	2,86E-7	MND	MND	MND	MND	MND	MND	MND	4,98E-8	7,48E-8	0E0	2,29E-7	-5,55E-10
Acidification potential	mol H^+e	4,46E-2	1,43E-2	8,91E-1	9,5E-1	2,38E-2	2,41E-2	MND	MND	MND	MND	MND	MND	MND	2,41E-3	1,34E-3	0E0	6,43E-3	-8,47E-5
EP-freshwater[2)]	kg Pe	3,99E-3	4,23E-5	2,14E-2	2,55E-2	7,06E-5	5,17E-4	MND	MND	MND	MND	MND	MND	MND	9,33E-7	2,59E-6	0E0	1,61E-5	-1,03E-6
EP-marine	kg Ne	2,11E-2	2,84E-3	3,89E-1	4,13E-1	4,74E-3	1,02E-2	MND	MND	MND	MND	MND	MND	MND	1,07E-3	4,03E-4	0E0	4,21E-3	-1,64E-5
EP-terrestrial	mol Ne	1,97E-1	3,16E-2	3,98E0	4,21E0	5,28E-2	1,05E-1	MND	MND	MND	MND	MND	MND	MND	1,17E-2	4,45E-3	0E0	2,38E-2	-1,87E-4
POCP ("smog")[3)]	kg NMVOCe	2,07E-1	1,21E-2	9,77E-1	1,2E0	2,02E-2	2,95E-2	MND	MND	MND	MND	MND	MND	MND	3,21E-3	1,43E-3	0E0	8,5E-3	-8,91E-5
ADP-minerals & metals[4)]	kg Sbe	3,11E-5	1,37E-4	3,65E-4	5,34E-4	2,29E-4	1,97E-5	MND	MND	MND	MND	MND	MND	MND	3,52E-7	5,43E-6	0E0	7,98E-6	-3,1E-7
ADP-fossil resources	MJ	7,84E1	7,52E1	5,32E2	6,85E2	1,26E2	2,53E1	MND	MND	MND	MND	MND	MND	MND	3,18E0	4,95E0	0E0	1,75E1	-1,41E-1
Water use[5)]	m^3e depr.	1,83E0	2,46E-1	4E1	4,21E1	4,11E-1	1,25E0	MND	MND	MND	MND	MND	MND	MND	5,92E-3	1,84E-2	0E0	7,8E-1	-8,05E-3

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	9,85E-7	3,17E-7	3,72E-5	3,85E-5	5,29E-7	8,44E-7	MND	MND	MND	MND	MND	MND	MND	6,4E-8	2,88E-8	0E0	1,22E-7	-1,33E-9
Ionizing radiation[6)]	kBq U235e	3,35E-1	3,29E-1	1,62E0	2,29E0	5,49E-1	8,96E-2	MND	MND	MND	MND	MND	MND	MND	1,36E-2	2,16E-2	0E0	6,87E-2	3,36E-5
Ecotoxicity (freshwater)	CTUe	9,18E1	5,84E1	4,03E3	4,18E3	9,75E1	9,23E1	MND	MND	MND	MND	MND	MND	MND	1,86E0	3,78E0	0E0	1,73E1	-9,81E-1
Human toxicity, cancer	CTUh	1,74E-8	1,68E-9	8,6E-8	1,05E-7	2,8E-9	2,4E-9	MND	MND	MND	MND	MND	MND	MND	6,67E-11	9,67E-11	0E0	4,83E-10	-9,31E-11
Human tox. non-cancer	CTUh	4,24E-7	6,38E-8	2,35E-6	2,84E-6	1,07E-7	6,42E-8	MND	MND	MND	MND	MND	MND	MND	1,64E-9	4,48E-9	0E0	1,9E-8	2,06E-9
SQP[7)]	-	3,34E1	6,37E1	1,18E3	1,28E3	1,06E2	5,7E1	MND	MND	MND	MND	MND	MND	MND	8,15E-2	7,47E0	0E0	6,2E1	-4,22E-2

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	3,82E4	1,08E0	1,68E2	3,83E4	1,8E0	7,67E2	MND	MND	MND	MND	MND	MND	MND	1,72E-2	6,23E-2	0E0	3,09E-1	-1,41E-2
Renew. PER as material	MJ	7,32E3	0E0	-1,07E4	-3,39E3	0E0	-2,14E2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	-1,32E3	0E0
Total use of renew. PER	MJ	4,55E4	1,08E0	-1,05E4	3,49E4	1,8E0	5,53E2	MND	MND	MND	MND	MND	MND	MND	1,72E-2	6,23E-2	0E0	-1,32E3	-1,41E-2
Non-re. PER as energy	MJ	7,84E1	7,52E1	5,32E2	6,85E2	1,26E2	2,53E1	MND	MND	MND	MND	MND	MND	MND	3,18E0	4,95E0	0E0	1,75E1	-1,41E-1
Non-re. PER as material	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	7,84E1	7,52E1	5,32E2	6,85E2	1,26E2	2,53E1	MND	MND	MND	MND	MND	MND	MND	3,18E0	4,95E0	0E0	1,75E1	-1,41E-1
Secondary materials	kg	0E0	0E0	4,99E-1	4,99E-1	0E0	9,97E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	6,88E-3
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	1,07E-1	1,3E-2	2,01E0	2.13	2,17E-2	5,32E-2	MND	MND	MND	MND	MND	MND	MND	2,81E-4	1,03E-3	0E0	1,97E-2	-1,19E-4

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	1,44E-1	7,74E-2	7,29E0	7,51E0	1,29E-1	1,87E-1	MND	MND	MND	MND	MND	MND	MND	3,42E-3	4,81E-3	0E0	3,18E-2	-6,67E-3
Non-hazardous waste	kg	2,09E0	5,33E0	2,49E2	2,57E2	8,9E0	3,88E1	MND	MND	MND	MND	MND	MND	MND	3,65E-2	5,32E-1	0E0	7E1	-5,61E-2
Radioactive waste	kg	5,41E-4	5,15E-4	1,58E-3	2,64E-3	8,6E-4	1,2E-4	MND	MND	MND	MND	MND	MND	MND	2,22E-5	3,4E-5	0E0	1,05E-4	-2,63E-8

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	0E0	0E0	1,26E3	1,26E3	0E0	2,51E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for energy rec	kg	0E0	0E0	1,73E2	1,73E2	0E0	3,45E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

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	6,35E0	4,93E0	5,11E1	6,24E1	8,23E0	2,23E0	MND	MND	MND	MND	MND	MND	MND	2,29E-1	3,15E-1	0E0	3,98E0	-1,64E-2
Ozone depletion Pot.	kg $CFC_{-11}e$	1E-6	9E-7	4,4E-6	6,31E-6	1,5E-6	2,52E-7	MND	MND	MND	MND	MND	MND	MND	3,94E-8	5,94E-8	0E0	1,83E-7	-4,84E-10
Acidification	kg SO_2e	1,26E-2	1E-2	6,33E-1	6,55E-1	1,68E-2	3,82E-2	MND	MND	MND	MND	MND	MND	MND	3,41E-4	6,47E-4	0E0	4,06E-3	-6,97E-5
Eutrophication	kg PO_4^3e	2,03E-2	2,07E-3	6,83E-1	7,05E-1	3,46E-3	1,52E-2	MND	MND	MND	MND	MND	MND	MND	6E-5	1,31E-4	0E0	1,82E-1	-4,76E-5
POCP (“smog”)	kg C_2H_4e	2,94E-2	6E-4	1,62E-2	4,62E-2	1E-3	1,05E-3	MND	MND	MND	MND	MND	MND	MND	3,51E-5	4,1E-5	0E0	1,17E-3	-1,13E-5
ADP-elements	kg Sbe	3,11E-5	1,37E-4	3,65E-4	5,34E-4	2,29E-4	1,97E-5	MND	MND	MND	MND	MND	MND	MND	3,52E-7	5,43E-6	0E0	7,98E-6	-3,1E-7
ADP-fossil	MJ	7,84E1	7,52E1	5,32E2	6,85E2	1,26E2	2,53E1	MND	MND	MND	MND	MND	MND	MND	3,18E0	4,95E0	0E0	1,75E1	-1,41E-1

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:

- This 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.

Elma Avdyli, as an authorized verifier acting for EPD Hub Limited
Updated 20.12.2023

VERIFIED ISO 14025