AMORIM
CORK
INSULATION

EPD Hub

ENVIRONMENTAL PRODUCT DECLARATION

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

Expanded Insulation Corkboard (ICB)
Amorim Cork Insulation

EPD HUB, EPD number HUB-0281
Publishing 13 February 2023, last updated 20 December 2023, valid until 13 February 2028

One Click LCA 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	Third party verified 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 Insulation Corkboard (ICB)
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	-11.6 to 12.3 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m^3 of insulation corkboard (ICB)
Declared unit mass	115 kg
GWP-fossil, A1-A3 (kgCO2e)	82.8
GWP-total, A1-A3 (kgCO2e)	-2040.0
Secondary material, inputs (%)	0.0483
Secondary material, outputs (%)	60.0
Total energy use, A1-A3 (kWh)	12300.0
Total water use, A1-A3 (m3e)	2.85

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

The Expanded Insulation Corkboard (ICB) is a natural and fully recyclable solution, consisting only of cork (suberin, lignin and cellulose), with a high thermal, acoustic and anti-vibration performance, especially suitable for use in external and internal walls, slabs and floors, roofs, and ceilings.

Satisfies European Standards EN13170 and EN13172.
Indoor VOC emissions according to ISO 16000: Class A+.

Board dimensions: 1000 x 500 mm.
Thickness: up to 300 mm.
Average density: 115 kg/m^3.

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

Density (kg/m^3)	Thermal conductivity λ (W/m.ºC)
Up to 115	0.040
140-160	0.043
170-190	0.044
190-210	0.045

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	51.29
Biogenic carbon content in packaging, kg C	0.01379

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m^3 of insulation corkboard (ICB)
Mass per declared unit	115 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	x	x	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 ICB 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 any 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. After the stabilization period, the blocks are cut according to the desired thickness and then packed. Expanded insulation cork board (ICB) is a natural product since the cork granules are aggregated solely by the action of the natural resins contained in cork.

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 3300 km and the transportation method is lorry (calculation and assumption based on exportation data for ICB). 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. Corkboard insulation is installed using shiplap joints to avoid gaps. Shiplap joints are formed by cutting identical rabbets into opposite faces of adjoining boards and then overlapping the rabbets. Installation of panels starts from the base of the wall to its top. The boards can be

screwed to the sheathing or framing. 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. The damaged wooden pallets used during transportation are incinerated for energy recovery (considered damaged after an average of 100 uses).

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.

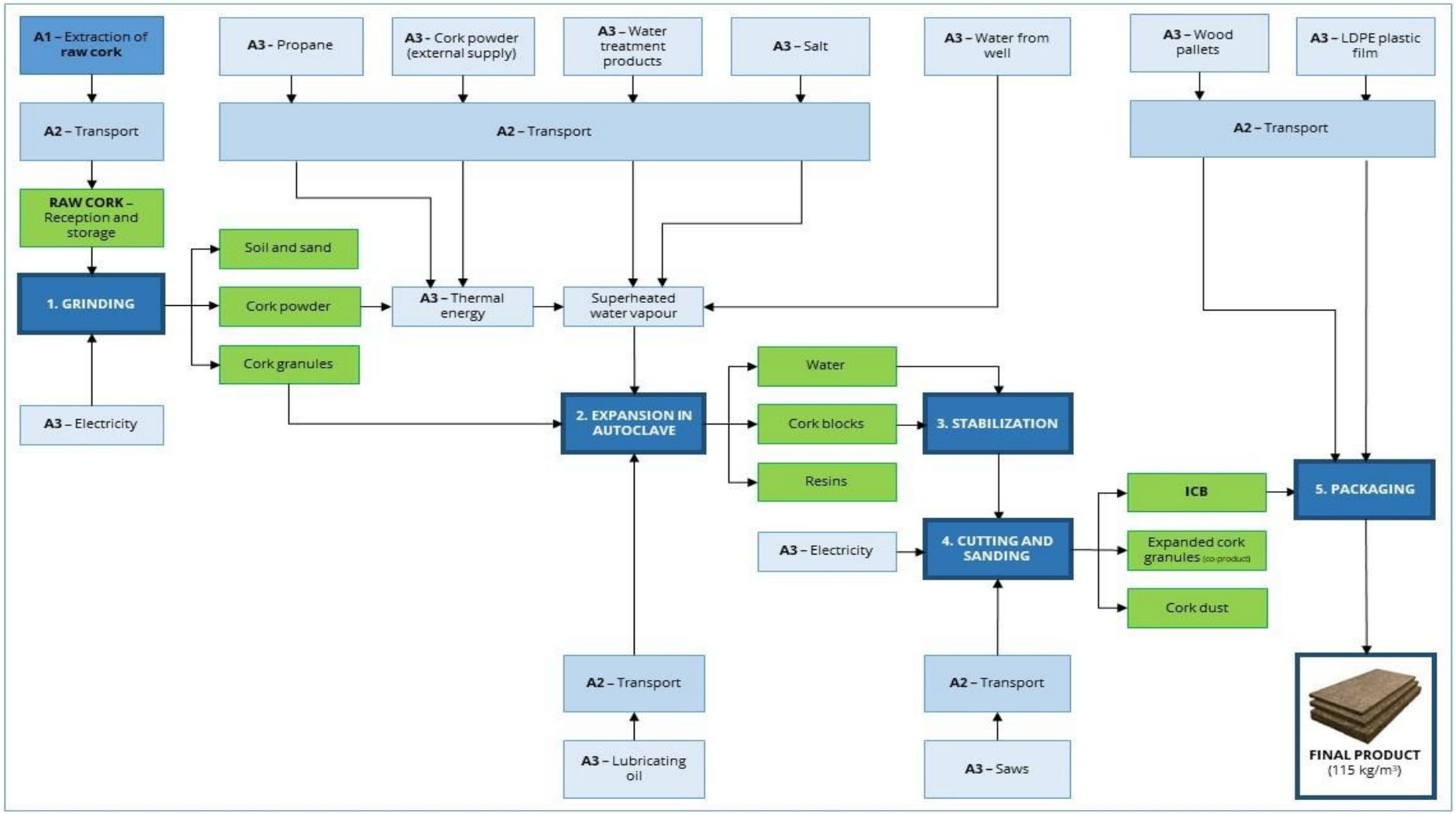
C2. It is assumed that the ICB waste is collected and returned in lorry to Amorim industrial units in Portugal (2000 km in average).

C3. 60% is recycled (grinded) into Expanded Cork Granules, that are sold in the market.

C4. The remaining 40% is deposited in landfill.

D. Correspondingly, 60% is included in Module D for benefits. The benefits and loads of recycling plastic packaging waste are included in Module D.

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	-11.6 to 12.3 %

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	-4,71E3	5,93E0	2,67E3	-2,04E3	6,22E1	-3,81E1	MND	MND	MND	MND	MND	MND	MND	3,79E-1	2,09E1	6,23E-1	5,13E0	7,26E2
GWP – fossil	kg CO_2e	6,61E0	5,93E0	7,02E1	8,28E1	6,28E1	4,26E0	MND	MND	MND	MND	MND	MND	MND	3,79E-1	2,09E1	6,04E-1	4,97E-1	-1,32E0
GWP – biogenic	kg CO_2e	-4,72E3	3,19E-3	2,59E3	-2,12E3	3,38E-2	-4,24E1	MND	MND	MND	MND	MND	MND	MND	1,05E-4	1,52E-2	1,81E-2	4,63E0	7,28E2
GWP – LULUC	kg CO_2e	7,29E-1	2,14E-3	4,77E-1	1,21E0	2,27E-2	2,53E-2	MND	MND	MND	MND	MND	MND	MND	3,2E-5	6,29E-3	1,36E-3	2,59E-4	-1,05E-1
Ozone depletion pot.	kg $CFC_{-11}e$	1,39E-6	1,35E-6	6,27E-6	9E-6	1,43E-5	7,36E-7	MND	MND	MND	MND	MND	MND	MND	8,19E-8	4,91E-6	5,05E-8	1,51E-7	-8,45E-8
Acidification potential	mol H^+e	5,01E-2	1,7E-2	1,36E0	1,42E0	1,8E-1	3,93E-2	MND	MND	MND	MND	MND	MND	MND	3,96E-3	8,78E-2	3,33E-3	4,23E-3	-5,43E-3
EP-freshwater[2)]	kg Pe	4,48E-3	5,04E-5	1,21E-2	1,66E-2	5,34E-4	3,64E-4	MND	MND	MND	MND	MND	MND	MND	1,53E-6	1,7E-4	6,3E-5	1,06E-5	-5,93E-4
EP-marine	kg Ne	2,36E-2	3,38E-3	5,82E-1	6,09E-1	3,58E-2	1,52E-2	MND	MND	MND	MND	MND	MND	MND	1,75E-3	2,65E-2	4,48E-4	2,77E-3	-2,56E-3
EP-terrestrial	mol Ne	2,21E-1	3,77E-2	6,01E0	6,27E0	3,99E-1	1,58E-1	MND	MND	MND	MND	MND	MND	MND	1,92E-2	2,92E-1	5,47E-3	1,56E-2	-2,26E-2
POCP ("smog")[3)]	kg NMVOCe	2,32E-1	1,44E-2	1,57E0	1,81E0	1,53E-1	4,69E-2	MND	MND	MND	MND	MND	MND	MND	5,28E-3	9,4E-2	1,42E-3	5,59E-3	-3,6E-2
ADP-minerals & metals[4)]	kg Sbe	3,49E-5	1,64E-4	4,9E-4	6,88E-4	1,73E-3	6,61E-5	MND	MND	MND	MND	MND	MND	MND	5,79E-7	3,57E-4	2,34E-6	5,25E-6	-3,62E-6
ADP-fossil resources	MJ	8,8E1	8,96E1	9,44E2	1,12E3	9,49E2	6,36E1	MND	MND	MND	MND	MND	MND	MND	5,22E0	3,25E2	1,22E1	1,15E1	-8,02E1
Water use[5)]	m^3e depr.	2,06E0	2,93E-1	6,08E1	6,32E1	3,11E0	2,01E0	MND	MND	MND	MND	MND	MND	MND	9,73E-3	1,21E0	1,52E-1	5,12E-1	-1,62E0

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	1,11E-6	3,78E-7	6,04E-5	6,18E-5	4E-6	1,45E-6	MND	MND	MND	MND	MND	MND	MND	1,05E-7	1,89E-6	1,02E-8	8,02E-8	-1,26E-7
Ionizing radiation[6)]	kBq U235e	3,76E-1	3,92E-1	2,62E0	3,39E0	4,15E0	2,35E-1	MND	MND	MND	MND	MND	MND	MND	2,24E-2	1,42E0	1,05E-1	4,51E-2	3,97E-2
Ecotoxicity (freshwater)	CTUe	1,03E2	6,96E1	6,34E3	6,51E3	7,37E2	1,63E2	MND	MND	MND	MND	MND	MND	MND	3,06E0	2,48E2	7,29E0	1,13E1	1,21E1
Human toxicity, cancer	CTUh	1,95E-8	2E-9	1,06E-7	1,28E-7	2,12E-8	3,96E-9	MND	MND	MND	MND	MND	MND	MND	1,1E-10	6,36E-9	2,87E-10	3,17E-10	-2,37E-9
Human tox. non-cancer	CTUh	4,76E-7	7,61E-8	3,92E-6	4,48E-6	8,05E-7	1,24E-7	MND	MND	MND	MND	MND	MND	MND	2,7E-9	2,94E-7	6,83E-9	1,25E-8	-5,45E-8
SQP[7)]	-	3,75E1	7,6E1	2,74E2	3,88E2	8,04E2	7,78E1	MND	MND	MND	MND	MND	MND	MND	1,34E-1	4,91E2	5,31E-1	4,07E1	8,31E-1

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	4,28E4	1,28E0	2,45E2	4,31E4	1,36E1	8,62E2	MND	MND	MND	MND	MND	MND	MND	2,82E-2	4,09E0	2,05E0	2,03E-1	-6,75E3
Renew. PER as material	MJ	8,22E3	0E0	-5,26E3	2,96E3	0E0	-1,2E2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-1,3E3	-8,65E2	-1,12E3
Total use of renew. PER	MJ	5,11E4	1,28E0	-5,01E3	4,6E4	1,36E1	7,43E2	MND	MND	MND	MND	MND	MND	MND	2,82E-2	4,09E0	-1,3E3	-8,65E2	-7,87E3
Non-re. PER as energy	MJ	8,8E1	8,96E1	8,75E2	1,05E3	9,49E2	6,22E1	MND	MND	MND	MND	MND	MND	MND	5,22E0	3,25E2	1,22E1	1,15E1	-1,26E1
Non-re. PER as material	MJ	0E0	0E0	6,91E1	6,91E1	0E0	-6,77E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-6,76E1
Total use of non-re. PER	MJ	8,8E1	8,96E1	9,44E2	1,12E3	9,49E2	-5,52E0	MND	MND	MND	MND	MND	MND	MND	5,22E0	3,25E2	1,22E1	1,15E1	-8,02E1
Secondary materials	kg	0E0	0E0	5,56E-2	5,56E-2	0E0	1,11E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	1,42E0
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	1,21E-1	1,55E-2	2,72E0	2,85E0	1,64E-1	7,69E-2	MND	MND	MND	MND	MND	MND	MND	4,61E-4	6,77E-2	3,82E-3	1,29E-2	-7,85E-3

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	1,61E-1	9,23E-2	9,08E0	9,33E0	9,77E-1	2,61E-1	MND	MND	MND	MND	MND	MND	MND	5,61E-3	3,16E-1	0E0	2,09E-2	7,65E-2
Non-hazardous waste	kg	2,35E0	6,35E0	3E2	3,09E2	6,73E1	5,91E1	MND	MND	MND	MND	MND	MND	MND	6E-2	3,5E1	0E0	4,6E1	3,06E0
Radioactive waste	kg	6,07E-4	6,14E-4	2,44E-3	3,66E-3	6,5E-3	3,28E-4	MND	MND	MND	MND	MND	MND	MND	3,65E-5	2,23E-3	0E0	6,88E-5	-7,47E-6

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	2,08E3	2,08E3	0E0	4,17E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	1,48E-2	1,48E-2	0E0	1,46E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	6,9E1	0E0	0E0
Materials for energy rec	kg	0E0	0E0	1,73E2	1,73E2	0E0	3,46E0	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	7,13E0	5,88E0	7,4E1	8,7E1	6,22E1	4,31E0	MND	MND	MND	MND	MND	MND	MND	3,76E-1	2,07E1	5,94E-1	2,61E0	-1,22E0
Ozone depletion Pot.	kg CFC_{-11}e	1,13E-6	1,07E-6	6,74E-6	8,94E-6	1,14E-5	6,23E-7	MND	MND	MND	MND	MND	MND	MND	6,48E-8	3,91E-6	5,94E-8	1,2E-7	-6,18E-8
Acidification	kg SO_2e	1,42E-2	1,2E-2	9,82E-1	1,01E0	1,27E-1	6,03E-2	MND	MND	MND	MND	MND	MND	MND	5,6E-4	4,25E-2	2,86E-3	2,67E-3	-1,3E-3
Eutrophication	kg PO_4^3e	2,28E-2	2,47E-3	7,46E-1	7,71E-1	2,62E-2	1,79E-2	MND	MND	MND	MND	MND	MND	MND	9,86E-5	8,59E-3	1,99E-3	1,2E-1	-3,41E-4
POCP (“smog”)	kg C_2H_4e	3,3E-2	7,16E-4	2,42E-2	5,79E-2	7,58E-3	1,57E-3	MND	MND	MND	MND	MND	MND	MND	5,76E-5	2,69E-3	1,17E-4	7,66E-4	-5,38E-3
ADP-elements	kg Sbe	3,49E-5	1,64E-4	4,9E-4	6,88E-4	1,73E-3	6,61E-5	MND	MND	MND	MND	MND	MND	MND	5,79E-7	3,57E-4	2,34E-6	5,25E-6	-3,62E-6
ADP-fossil	MJ	8,8E1	8,96E1	9,44E2	1,12E3	9,49E2	6,36E1	MND	MND	MND	MND	MND	MND	MND	5,22E0	3,25E2	1,22E1	1,15E1	-8,02E1

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