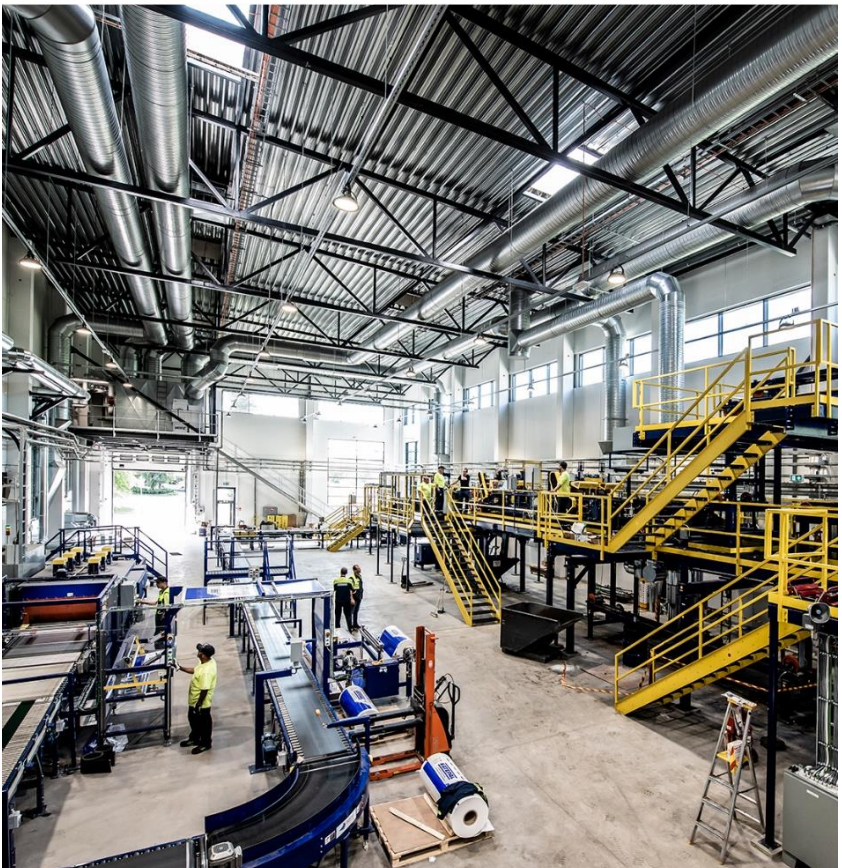


ENVIRONMENTAL PRODUCT DECLARATION

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

KATEPAL TUPLA

Katepal Oy

EPD HUB, HUB-0215

Publishing date 23 December 2022, last updated date 23 December 2022, valid until 23 December 2027

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Katepal Oy
Address	Katepalintie 15, 37500 Lempäälä
Contact details	myynti@katepal.fi
Website	https://katepal.fi/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 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	
EPD author	Miia Kuhlman, Katepal Oy
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	E.A 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	Katepal TUPLA
Additional labels	Katepal DUBBEL
Product reference	-
Place of production	Lempäälä, Finland
Period for data	2020
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	- %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m^2 of installed Katepal TUPLA roof
Declared unit mass	5.94 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	4.33
GWP-total, A1-A3 ($kgCO_2e$)	4.15
Secondary material, inputs (%)	0.394
Secondary material, outputs (%)	100.0
Total energy use, A1-A3 (kWh)	39.9
Total water use, A1-A3 (m3e)	0.0243

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Katepal Oy is a Finnish family-owned company with a history dating back to year 1949. Main product categories are bitumen membranes, bitumen shingles and liquid applied bitumen products. Additional information available at www.katepal.fi/en/

PRODUCT DESCRIPTION

Katepal TUPLA is a bitumen membrane for roof waterproofing. It is used as a top sheet for one-layer applications for all kinds or roofs and buildings. The product is installed by fully torching with 10 cm overlapping of the product. Katepal TUPLA is made of SBS- modified bitumen and reinforced with a polyester nonwoven. Upper surface of the product is covered with mineral granules or slate excluding the torch on edge. Bottom surface is covered with torch-on bitumen and thermofusible film.

Bitumen waterproofing membranes provide a good and durable protection against water penetration. Technical service life of a single layer waterproofing system is 40 years. Technical service life is based on the studies and lifetime evaluations for SBS-modified bitumen membranes conducted by Finnish Roofing Association. The evaluations are based on visual inspection on the roofs, discussions with the owners of the buildings and also laboratory tests made for specimens taken from the roofs. These evaluations have been implemented as group studies among different materials from different manufacturers. Katepal products have been investigated in these group studies performed in Finland for a long time, the first studies performed in 1988. The Finnish Roofing Association consists of roof material manufacturers and roof contractors operating in Finland.

Further information can be found at https://katepal.fi/en/

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	
Minerals	40-55	EU
Fossil materials	40-55	EU
Bio-based materials	-	

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	0.094

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m^2 of installed Katepal TUPLA roof
Mass per declared unit	5.94 kg
Functional unit	N/A
Reference service life	N/A

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

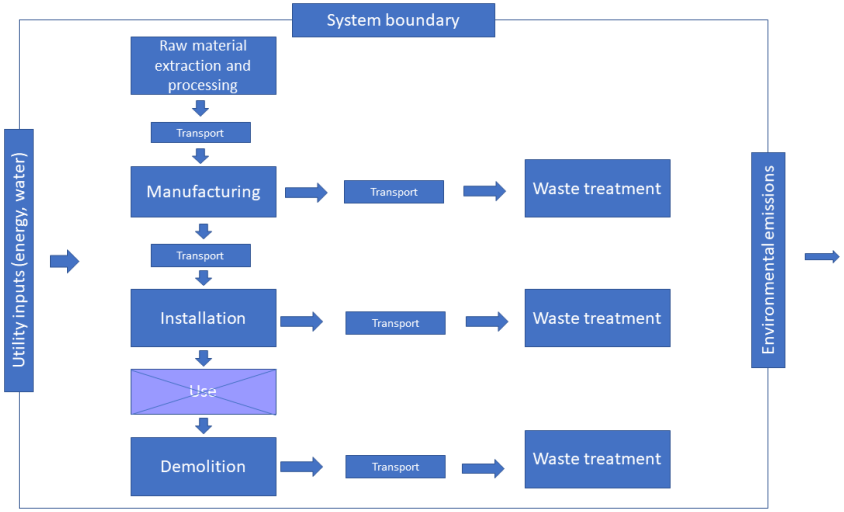
PRODUCT LIFE-CYCLE

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.

The bitumen is generally delivered as hot from the petroleum refinery to the manufacturing site, where it's heated further for the processing. The manufacturing is done by heating the raw materials (bitumen and copolymers) to a specific temperature and mixing them. The polyester nonwoven acting as a reinforcing structure is impregnated and coated with this bitumen mix. The resulting sheet is then faced with mineral granules and protective film. After cooling the product is cut to the right length, rolled and placed on a wooden pallet. The pallet is wrapped with PE shrink hood for storage and transportation.

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.

Freight mode and distances for transportation from production site to the construction site has been approached by most probable scenario based on the annual sales volume of the product. The most probable scenario for transportation distance is 1100 km and for transportation method lorry and ferry. Vehicle capacity utilization volume factor is assumed to be 100 % which means 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 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 are packaged properly. Also, volume capacity utilization factor is assumed to be 100% for the nested packaged products.

Installation of the product is done by torching and possibly with mechanical fasteners. The amount and type of mechanical fasteners vary a lot depending on the installation understructure and wind load calculations for the construction site, so mechanical fasteners are excluded from the calculation. The use of propane torching gas is included in the calculation. Assumptions have been made for the amount of propane gas needed for the torching and for the waste generation during installation; the installation loss is assumed to be low, 0,5%.

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.

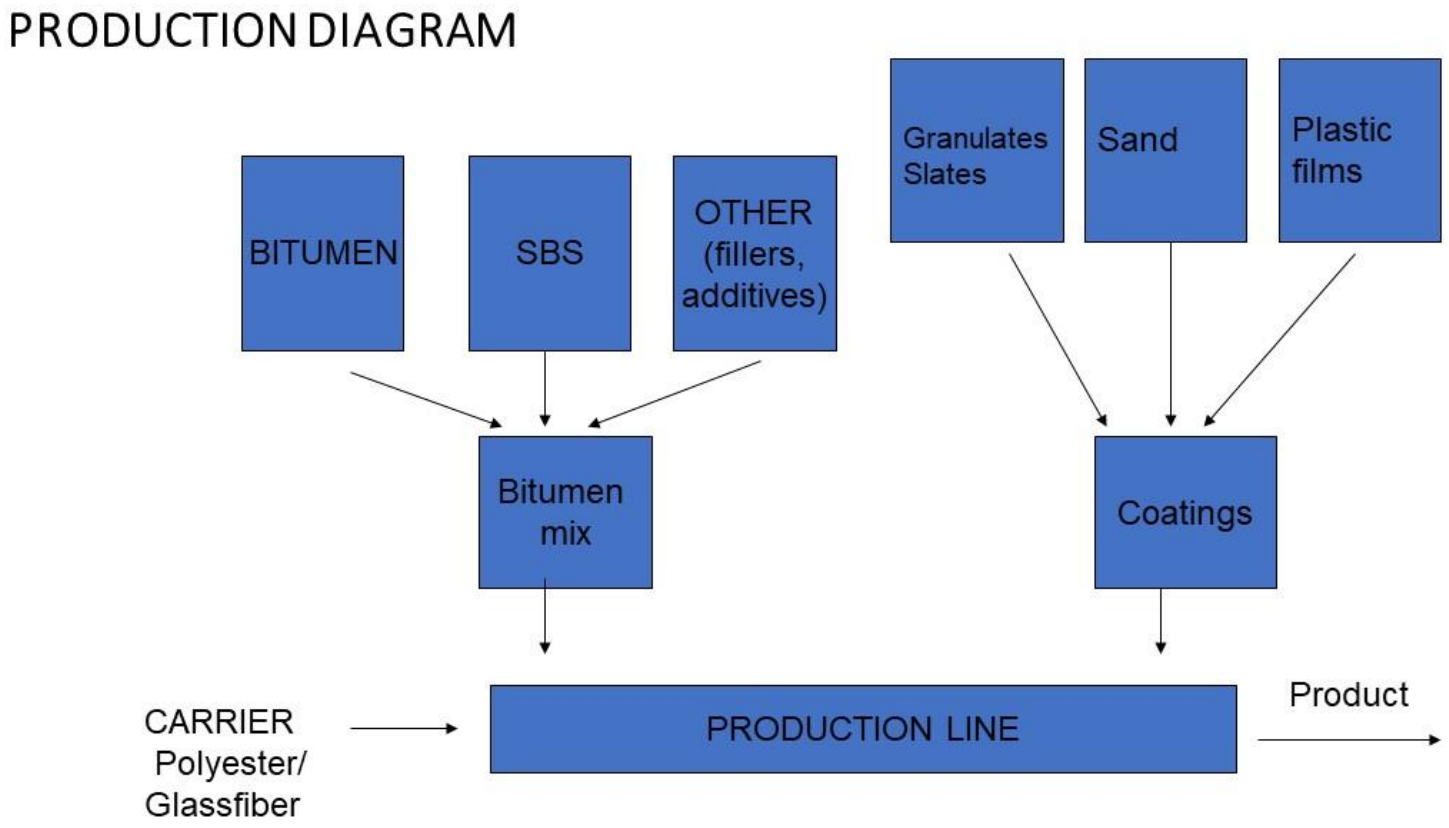
PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life, in the demolition phase 100% of the waste is assumed to be collected as separate construction waste. The consumption of energy and natural resources is negligible for disassembling of the end-of-life product, as demolition of bitumen membrane roofing is assumed to be done either manually or with a powered cutter. So the impacts of demolition are assumed zero (C1).

The bitumen roofing is delivered to the nearest construction waste treatment plant. 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 of the end-of-life product is assumed to be sent to the closest facility for waste treatment. Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is lorry which is the most common (C2). At the waste treatment plant, waste that can be reused, recycled or recovered for energy is separated and diverted for further use.

The end-of-life scenario for bitumen membrane in this study is assumed to be 100% recycling. This assumption is made base on the fact that 100% of the Katepal TUPLA bitumen membrane can be recycled and used as secondary raw material in road construction. Before reusing as asphalt raw material the bitumen membrane is crushed. Recycling of bitumen roofing avoids the use of virgin raw material.

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	No allocation
Packaging materials	No allocation
Ancillary materials	Not applicable
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	- %

This EPD is product and factory specific and does not contain average calculations.

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	3,91E0	2,93E-1	-5,4E-2	4,15E0	2,05E-1	6,09E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,4E-2	2,19E0	0E0	-1,4E0
GWP – fossil	kg CO_2e	3,79E0	2,93E-1	2,54E-1	4,33E0	2,07E-1	2,45E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,39E-2	2,19E0	0E0	-1,71E0
GWP – biogenic	kg CO_2e	1,21E-1	1,48E-4	-3,09E-1	-1,88E-1	1,1E-4	3,64E-1	MND	MND	MND	MND	MND	MND	MND	0E0	3,16E-5	-9,16E-3	0E0	3,04E-1
GWP – LULUC	kg CO_2e	9,12E-4	1,09E-4	1,96E-3	2,98E-3	7,33E-5	4,91E-5	MND	MND	MND	MND	MND	MND	MND	0E0	2,78E-5	1,27E-3	0E0	-1,78E-4
Ozone depletion pot.	kg $CFC_{-11}e$	1,73E-6	6,65E-8	2,77E-8	1,82E-6	4,7E-8	5,19E-8	MND	MND	MND	MND	MND	MND	MND	0E0	1,41E-8	1,6E-7	0E0	-4,22E-7
Acidification potential	mol H^+e	2,11E-2	2,08E-3	7,12E-4	2,39E-2	8,44E-4	8,08E-4	MND	MND	MND	MND	MND	MND	MND	0E0	2,56E-4	6,29E-3	0E0	-1,34E-2
EP-freshwater[2)]	kg Pe	5,68E-5	2,33E-6	8,28E-6	6,74E-5	1,73E-6	1,79E-6	MND	MND	MND	MND	MND	MND	MND	0E0	6,17E-7	3,65E-5	0E0	-5,73E-5
EP-marine	kg Ne	3,51E-3	5,6E-4	1,76E-4	4,25E-3	2,51E-4	1,99E-4	MND	MND	MND	MND	MND	MND	MND	0E0	7,34E-5	1,74E-3	0E0	-1,77E-3
EP-terrestrial	mol Ne	3,55E-2	6,2E-3	1,9E-3	4,36E-2	2,77E-3	2,13E-3	MND	MND	MND	MND	MND	MND	MND	0E0	8,12E-4	1,9E-2	0E0	-1,98E-2
POCP ("smog")[3)]	kg NMVOCe	1,44E-2	1,8E-3	7,57E-4	1,69E-2	8,48E-4	7,43E-4	MND	MND	MND	MND	MND	MND	MND	0E0	2,49E-4	6,16E-3	0E0	-7,3E-3
ADP-minerals & metals[4)]	kg Sbe	2,38E-4	6,19E-6	2,31E-6	2,46E-4	5,59E-6	1,92E-6	MND	MND	MND	MND	MND	MND	MND	0E0	2,29E-6	2,69E-5	0E0	-2,27E-4
ADP-fossil resources	MJ	1,53E2	4,39E0	3,97E0	1,61E2	3,12E0	3,71E0	MND	MND	MND	MND	MND	MND	MND	0E0	9,51E-1	2,15E1	0E0	-3,67E1
Water use[5)]	m^3e depr.	3,76E0	1,47E-2	4,91E-2	3,82E0	1E-2	2,91E-2	MND	MND	MND	MND	MND	MND	MND	0E0	3,38E-3	4,62E-1	0E0	-3,96E-1

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	1,71E-7	2,14E-8	1,08E-8	2,04E-7	1,44E-8	9,65E-9	MND	MND	MND	MND	MND	MND	MND	0E0	3,89E-9	1,09E-7	0E0	-1,67E-7
Ionizing radiation[6)]	kBq U235e	4,78E-1	1,91E-2	5,71E-3	5,03E-1	1,36E-2	1,45E-2	MND	MND	MND	MND	MND	MND	MND	0E0	4,16E-3	6,49E-2	0E0	-1,19E-1
Ecotoxicity (freshwater)	CTUe	7,96E1	3,34E0	3,66E0	8,66E1	2,41E0	2,33E0	MND	MND	MND	MND	MND	MND	MND	0E0	7,76E-1	2,27E1	0E0	-6,69E1
Human toxicity, cancer	CTUh	1,1E-9	1,03E-10	2,2E-10	1,42E-9	6,99E-11	9,87E-11	MND	MND	MND	MND	MND	MND	MND	0E0	2,49E-11	2,31E-9	0E0	-5,63E-10
Human tox. non-cancer	CTUh	3,55E-8	3,75E-9	2,48E-9	4,17E-8	2,72E-9	2,6E-9	MND	MND	MND	MND	MND	MND	MND	0E0	8,46E-10	3,23E-8	0E0	-1,58E-8
SQP[7)]	-	3E0	4,51E0	5,06E-1	8,01E0	2,6E0	3,07E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,53E-1	1,31E1	0E0	-1,14E1

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	1,23E0	5,57E-2	2,28E0	3,57E0	4,4E-2	4,89E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,62E-2	1,06E0	0E0	-2E0
Renew. PER as material	MJ	1,78E-1	0E0	3,29E0	3,47E0	0E0	1,73E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-3,19E-1
Total use of renew. PER	MJ	1,4E0	5,57E-2	5,57E0	7,03E0	4,4E-2	6,62E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,62E-2	1,06E0	0E0	-2,32E0
Non-re. PER as energy	MJ	1,32E2	4,39E0	3,63E0	1,4E2	3,12E0	3,61E0	MND	MND	MND	MND	MND	MND	MND	0E0	9,51E-1	2,15E1	0E0	-3,63E1
Non-re. PER as material	MJ	2,04E1	0E0	3,35E-1	2,07E1	0E0	1,04E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-3,18E-1
Total use of non-re. PER	MJ	1,53E2	4,39E0	3,97E0	1,61E2	3,12E0	3,71E0	MND	MND	MND	MND	MND	MND	MND	0E0	9,51E-1	2,15E1	0E0	-3,67E1
Secondary materials	kg	2,31E-2	0E0	2,93E-4	2,34E-2	0E0	1,17E-4	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	3,71E-2
Renew. secondary fuels	MJ	1,3E-3	0E0	0E0	1,3E-3	0E0	6,48E-6	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	4,65E-3	0E0	0E0	4,65E-3	0E0	2,33E-5	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	2,25E-2	7,86E-4	9,56E-4	2,43E-2	5,33E-4	4,56E-4	MND	MND	MND	MND	MND	MND	MND	0E0	1,65E-4	6,46E-3	0E0	-2,26E-2

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	3,88E-1	4,53E-3	9,39E-3	4,02E-1	3,16E-3	6,33E-3	MND	MND	MND	MND	MND	MND	MND	0E0	1,12E-3	0E0	0E0	-8,17E-2
Non-hazardous waste	kg	1,76E0	3,51E-1	2,36E-1	2,35E0	2,17E-1	9,27E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,21E-2	0E0	0E0	-2,09E0
Radioactive waste	kg	7,72E-4	3,01E-5	6,44E-6	8,09E-4	2,14E-5	2,31E-5	MND	MND	MND	MND	MND	MND	MND	0E0	6,45E-6	0E0	0E0	-1,84E-4

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	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	1,19E-2	0E0	9,99E-2	1,12E-1	0E0	1,59E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	5,94E0	0E0	0E0
Materials for energy rec	kg	1,79E-4	0E0	3,7E-3	3,88E-3	0E0	3,04E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	9,3E0	0E0	0E0	9,3E0	0E0	4,65E-2	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	3,65E0	2,91E-1	2,5E-1	4,19E0	2,05E-1	2,52E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,34E-2	2,14E0	0E0	-1,66E0
Ozone depletion Pot.	kg $CFC_{-11}e$	1,38E-6	5,28E-8	2,19E-8	1,45E-6	3,74E-8	4,12E-8	MND	MND	MND	MND	MND	MND	MND	0E0	1,12E-8	1,33E-7	0E0	-3,35E-7
Acidification	kg SO_2e	1,75E-2	1,35E-3	5,5E-4	1,94E-2	4,15E-4	6,27E-4	MND	MND	MND	MND	MND	MND	MND	0E0	1,32E-4	3,96E-3	0E0	-1,15E-2
Eutrophication	kg PO_4^3e	3E-3	1,99E-4	2,17E-4	3,42E-3	8,52E-5	1,82E-4	MND	MND	MND	MND	MND	MND	MND	0E0	2,9E-5	4,56E-3	0E0	-2,2E-3
POCP (“smog”)	kg C_2H_4e	9,82E-4	5,53E-5	5,2E-5	1,09E-3	2,73E-5	6,43E-5	MND	MND	MND	MND	MND	MND	MND	0E0	8,62E-6	3,74E-4	0E0	-5,06E-4
ADP-elements	kg Sbe	2,38E-4	6,19E-6	2,31E-6	2,46E-4	5,59E-6	1,92E-6	MND	MND	MND	MND	MND	MND	MND	0E0	2,29E-6	2,69E-5	0E0	-2,27E-4
ADP-fossil	MJ	1,53E2	4,39E0	3,97E0	1,61E2	3,12E0	3,71E0	MND	MND	MND	MND	MND	MND	MND	0E0	9,51E-1	2,15E1	0E0	-3,67E1

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
23.12.2022

VERIFIED ISO 14025