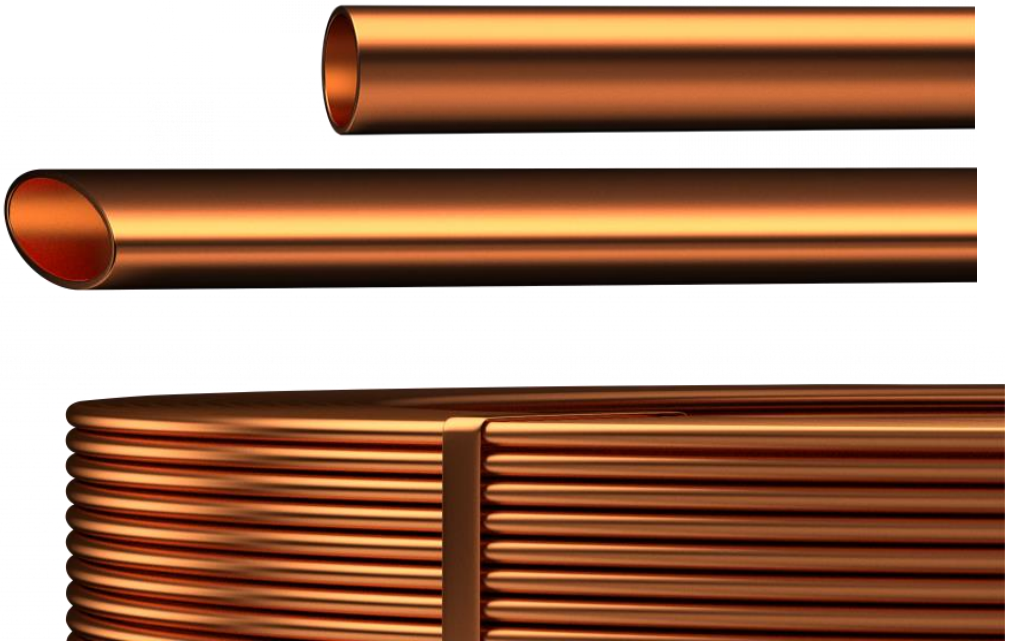
ENVIRONMENTAL PRODUCT DECLARATION

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

Cupori copper tubes
(CUPORI 410, CUPORI 420, CUPORI 430, CUPORI 440 IG, CUPORI 460, CUPORI 470)
Cupori Oy



EPD HUB, HUB-1580
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Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Cupori Oy
Address	Kuparitie, PL 60 28101, Pori, Finland
Contact details	https://www.cupori.com
Website	teemu.pihl@cupori.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	Riikka Anttonen, Laura Sariola, Afry Finland Oy
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Haiha Nguyen, 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	Cupori copper tubes
Additional labels	CUPORI 410, CUPORI 420, CUPORI 430, CUPORI 440 IG, CUPORI 460, CUPORI 470
Product reference	see product description
Place of production	Finland
Period for data	2022
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	<20 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	5,15E-01
GWP-total, A1-A3 (kgCO2e)	4,45E-01
Secondary material, inputs (%)	100
Secondary material, outputs (%)	90
Total energy use, A1-A3 (kWh)	7.95
Total water use, A1-A3 (m3e)	0.01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

The roots of Cupori's expertise are founded in the Outokumpu copper mine. Cupori Oy was founded in 2008 when the company's management bought out Outokumpu Oyj's copper tube business. In 2014, the company was transferred to private Austrian ownership and in 2022 Lazarus Industriförvaltning Ab acquired the full ownership. Today, Cupori is known as a sustainably growing company that is developing its operations in a responsible manner. Cupori's production and headquarters are at Pori, but our products serve customers all over the world.

PRODUCT DESCRIPTION

Cupori copper tubes are manufactured from phosphorus de-oxidized copper (Cu-DHP) according to customer specifications. Application areas include various types of industrial applications and building technology solutions. This EPD includes the following products:

- Cupori 410 CU-DHP:
- Cupori 420 Cu-DHP:
- Cupori 430 LWC Cu-DHP:
- Cupori 440 IG Cu-DHP:
- Cupori 460 Solar Cu-DHP:
- Cupori 470 Oval Cu-DHP:

Cupori 410, 420 is a general industrial copper tube typically manufactured according to EN12449 standard.

- Delivery form in straight lengths up to 12 meters (also non-standard lengths) as 410, and spirally wounded (SWC) coils as 420 ("punch" coils also available).
- Temper: hard (R290), half-hard (R250), annealed (R200) or skin-hard (R220) as 410 and annealed (R200) or hard (R290), as 420.
- If required, tubes can be delivered with sealed ends.

Cupori 430 and 440 LWC copper tubes are mainly used in further industrial processing for various purposes with bigger volume industrial manufacturers.

- 430 is smooth seamless copper tube.
- 440 IG is inner-grooved tube, that is manufactured according to customer specifications. The depth and number of grooves can be agreed.
- Manufactured normally from phosphorus-deoxidized copper (Cu-DHP) typically according to standard EN 12735-2 as well as to customer specifications (other copper grades possible also)
- Delivery form in level wound coils
- Temper: hard (R290) or light-annealed (R220)
- Average grain size for annealed (R220) tube is 0.015–0.035 mm
- Delivered On-Reel or Off-Reel
- Possibility to de-coiling from center, directly from pallet
- Support of solutions for coil lifting and de-coiling equipment are available

Cupori 460 Solar is a copper tube with ultra-clean outer surface for solar collectors. Especially for applications where good bending and welding properties are required (eg. ultrasonic and laser welding) Can be welded to copper and aluminium.

- Applicable standard EN 12449 for straight lengths and coils, EN 12735-2 for level wound coils
- Max. coil size 360 kg
- Temper: Cupori 460 Solar Cu-DHP: hard (R360 and R290), in level wound coils, hard (R360 and R290), half-hard (R250) or annealed (R220) in straight lengths

Cupori 470 Oval is an oval copper tube manufactured according to customer specifications.

- Delivery form in straight lengths
- Temper: Half-hard (R250) or annealed.
- delivery forms: straight lengths up to 6 meters, also cut to non-standard lengths
- Shape of the cross cutting (w x h) can be agreed with customer

Further information can be found at https://www.cupori.com/

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	100	Finland
Minerals	0	-
Fossil materials	0	-
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	0.02

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	kg
Mass per declared unit	1 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
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.

Cupori Oy produces seamless drawn copper tubes to various market areas. Production is divided into three major production lines, and product groups; sanitary, level wound and industrial tubes. Products are mainly manufactured according to applicable manufacturing standards, from which usually customers choose specific standard against further use and purpose. Standards determine shape, condition and cleanliness properties. Each product batches are tested against standard requirements, in own in-house laboratory.

The product is made of recycled phosphorus de-oxidized copper with limited residual phosphorus content. The raw material is 100% upcycled copper scrap. Raw material for production is purchased as copper billets, from which tube shell is extruded in hot extrusion plant. Billets are cut into specific lengths and after annealing, extruded to tube shell and further to cooling reservoir. After this hot molding tubes are further cold reducted with pilger milling and with specialized copper drawing machinery to required dimension and shape. Production processes cause intermediate waste which is again melted and 100% re-used as circulated raw material in production process. Cupori utilizes intermediate waste from other local copper producers, and therefore there is no need for virgin material (cathodes)

In finalizing product phases copper tubes are produced further to delivery form, which are straight length, spirally wounded coils or level wounded coils. Tubes can be also equipped with internal grooving, oval forming or plastic coating. Tubes can be delivered in different conditions (MPa), hard drawn (R290), annealed (R220) or half hard (R250) depending on further needs. Hard tubes are usually assembled as they are when annealed tubes are usually used for industrial processing. Half-hard tubes are used in both purposes. Annealed and half-hard tubes are more suitable for further bending, reduction or expansion by equipment or part manufacturers, who purchase majority of the exported copper tubes from Cupori.

Finished products are packed using packaging film and cardboard and loaded onto wooden pallets for dispatch. Products are delivered all over the world, but Scandinavia and central Europe are main market areas. Goods are delivered mainly via road to customers, all over Europe.

Transportation of raw materials, ancillary materials and packaging materials is assessed as road transports with EURO6 trucks with payload > 32 tons and 50% occupancy rate.

Manufacturing requires fuels, electricity and energy for heating of production facilities (A3). Ancillary materials like process chemicals and shielding gases are used. Moulds, machinery and equipment are counted as capital goods and are not taken into consideration in the calculation. Waste generated at the production facility is sorted for recycling or for energy recovery.

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.

Products are mainly delivered to Scandinavia and central Europe. The distance to the customer (weighted average) is estimated as 1054 km by truck and 50 km by sea. Road transport is assumed to be carried out by EURO6 trucks with payload > 32 tons and 50% occupancy rate. For sea transports occupancy rate 100% is assumed. Transportation losses are assessed as insignificant (<1%).

Due to variation in the application, the energy use, share of wastage and the possible need for additional components at installation varies and cannot be determined. Most probably the product will be used inside an electrical device (heat pump etc.) which means the energy and material use at installation is likely to be low. Thus, module A5 comprises of the handling of packaging waste only (plastics and pallets submitted for incineration, cardboard for recycling).

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 for this EPD specifically. Impacts of copper on air, soil, and water have been studied over the years globally and extensively in other contexts. Cupori has participated in the studies, covering manufacturing and use phase of copper. Studies have been used for the European environmental and health risk assessment. Reports available at ECHA: Copper Voluntary Risk Assessment Reports [1]

1) https://echa.europa.eu/da/copper-voluntary-risk-assessment-reports

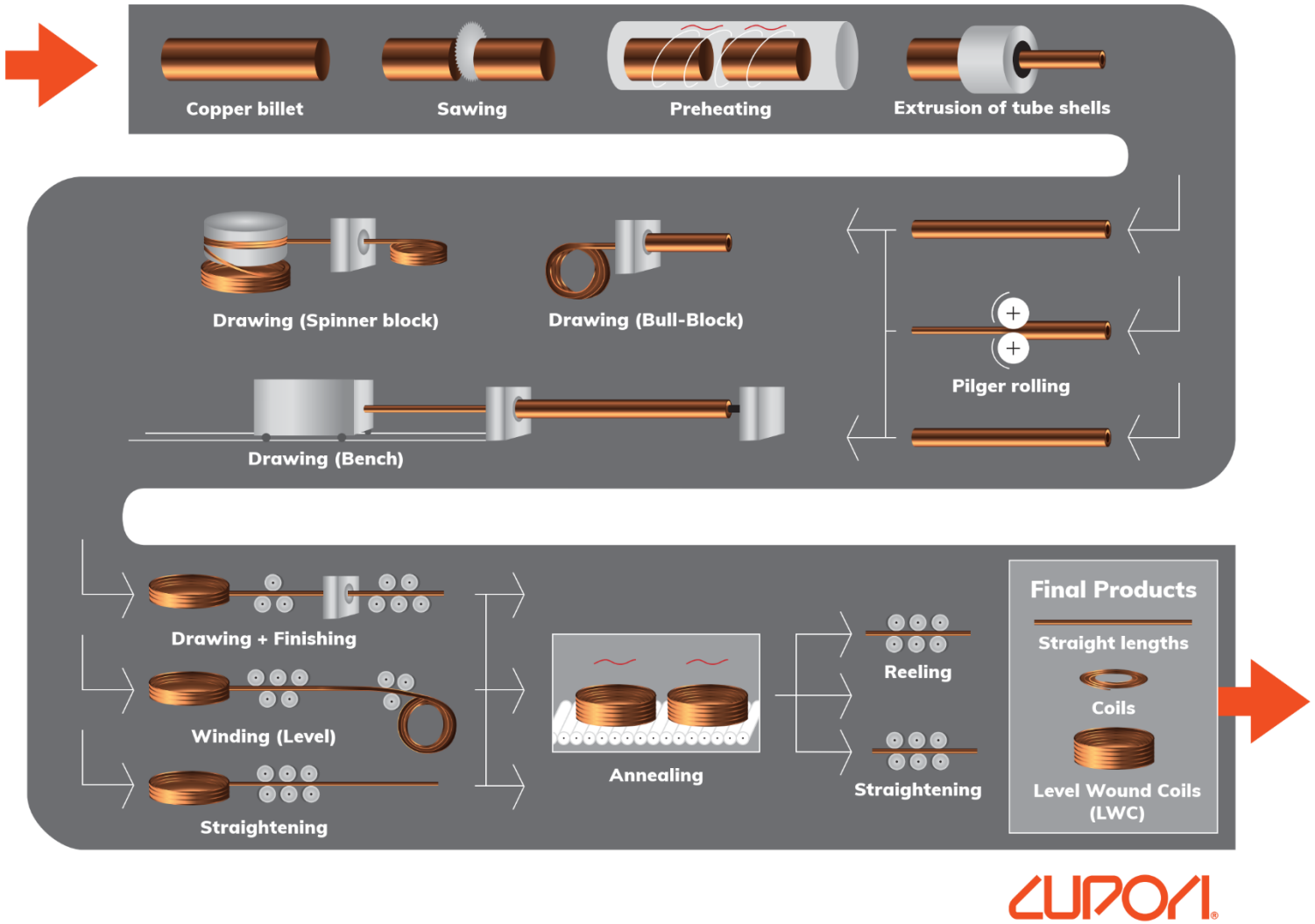
PRODUCT END OF LIFE (C1-C4, D)

As in module A5, also the energy consumption of the disassembly phase (C1) depends on the application of the product and cannot be averaged for the product. Most likely the energy needed for demolition is relatively small (e.g. detaching a heat pump). An end-of-life recycling rate of 90%[2] is assumed. The disassembled material collected for treatment is transported to the closest facility for sorting and recycling (C2-C3). The assumption for an average distance and transport method is estimated to be 150 km by EURO6 trucks with payload 16-32 tons. The remaining 10% is assumed to be landfilled (A4) using transport distance 50 km with 16-32 tons EURO6 trucks.

The benefits of copper recycling (scrap) are included in the raw material phase (A1) and are therefore not considered in the end of life (D). The benefits from the recycling and energy recovery of packaging materials are accounted for in module D.

2) https://copper.org/environment/sustainability/pdfs/copper_life_cycle_assessment_tube_and_sheet.pdf

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 products
Averaging method	Averaged by shares of total volume
Variation in GWP-fossil for A1-A3	<20 %

The product is a weighted average of the products CUPORI 410, 420, 430, 440, 460 and 470. The products differ in relation to the amounts of raw materials and packaging materials, as well as in terms of the consumption of process substances and energy. In addition, there are slight differences in the amounts of production waste and the transport distances of the finished products. The products are all manufactured in the same mill in Pori.

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	2,50E-01	4,97E-03	1,90E-01	4,45E-01	2,00E-01	7,65E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,56E-02	1,45E-02	1,05E-03	-9,48E-03
GWP – fossil	kg CO_2e	2,49E-01	4,97E-03	2,61E-01	5,15E-01	2,00E-01	4,75E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,56E-02	1,45E-02	1,05E-03	-9,34E-03
GWP – biogenic	kg CO_2e	0,00E+00	0,00E+00	-7,18E-02	-7,18E-02	0,00E+00	7,18E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWP – LULUC	kg CO_2e	3,29E-04	8,33E-07	6,03E-04	9,33E-04	7,66E-05	6,46E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,82E-05	1,64E-05	1,07E-06	-1,41E-04
Ozone depletion pot.	kg CFC_{-11}e	2,09E-08	1,33E-09	2,17E-08	4,39E-08	4,95E-08	1,48E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,06E-08	8,23E-10	3,20E-10	-8,74E-10
Acidification potential	mol H^+e	6,64E-04	1,43E-05	1,33E-03	2,01E-03	8,08E-04	9,75E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,30E-04	8,66E-05	8,88E-06	-5,46E-05
EP-freshwater[2)]	kg Pe	3,06E-06	1,64E-08	1,27E-05	1,58E-05	1,40E-06	2,43E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,26E-07	7,00E-07	1,63E-08	-5,34E-07
EP-marine	kg Ne	1,42E-04	2,53E-06	2,51E-04	3,95E-04	1,84E-04	4,02E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,58E-05	2,49E-05	3,03E-06	-1,30E-05
EP-terrestrial	mol Ne	1,60E-03	2,80E-05	2,42E-03	4,05E-03	2,04E-03	4,19E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,87E-04	2,10E-04	3,33E-05	-1,49E-04
POCP ("smog")[3)]	kg NMVOCe	5,05E-04	1,04E-05	8,38E-04	1,35E-03	7,32E-04	1,08E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,10E-04	5,67E-05	9,64E-06	-3,65E-05
ADP-minerals & metals[4)]	kg Sbe	0,00E+00	4,91E-09	1,89E-06	1,89E-06	4,82E-07	9,30E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,65E-07	6,25E-07	3,54E-09	-5,98E-08
ADP-fossil resources	MJ	0,00E+00	8,06E-02	2,44E+01	2,45E+01	3,17E+00	1,42E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,79E-01	1,42E-01	2,43E-02	-2,31E-01
Water use[5)]	m^3e depr.	7,74E-02	1,99E-04	3,75E-01	4,52E-01	1,45E-02	2,86E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,18E-03	4,19E-03	1,42E-04	-6,93E-03

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	8,93E-09	2,42E-10	1,65E-08	2,56E-08	2,27E-08	1,24E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,68E-09	1,25E-09	1,78E-10	-8,96E-10
Ionizing radiation[6)]	kBq U235e	4,85E-02	3,81E-04	1,46E+00	1,51E+00	1,63E-02	8,41E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	3,56E-03	2,36E-03	1,16E-04	-9,03E-03
Ecotoxicity (freshwater)	CTUe	5,62E+00	5,17E-02	7,53E+00	1,32E+01	2,62E+00	3,63E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,66E-01	1,51E+00	1,80E-02	-1,66E-01
Human toxicity, cancer	CTUh	9,01E-11	8,57E-13	1,75E-10	2,66E-10	7,02E-11	3,02E-12	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,74E-11	3,06E-11	7,59E-13	-5,12E-12
Human tox. non-cancer	CTUh	1,63E-09	3,01E-11	3,39E-09	5,05E-09	2,65E-09	1,07E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,55E-10	5,59E-10	1,20E-11	-1,31E-10
SQP[7)]	-	1,19E+00	3,88E-02	6,01E+00	7,25E+00	3,62E+00	7,82E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,82E-01	7,57E-01	5,93E-02	-6,88E-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	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	2,94E-01	4,75E-04	8,93E-01	1,19E+00	4,06E-02	5,94E-04	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,87E-03	2,41E-02	4,22E-04	-1,67E-01
Renew. PER as material	MJ	0,00E+00	0,00E+00	6,26E-01	6,26E-01	0,00E+00	-6,26E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	2,94E-01	4,75E-04	1,52E+00	1,81E+00	4,06E-02	-6,25E-01	MND	MND	MND	MND	MND	MND	MND	0,00E+00	9,87E-03	2,41E-02	4,22E-04	-1,67E-01
Non-re. PER as energy	MJ	3,37E+00	3,78E-02	2,40E+01	2,74E+01	3,17E+00	1,42E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,79E-01	1,42E-01	2,43E-02	-2,29E-01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	8,94E-02	8,94E-02	0,00E+00	-8,94E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	3,37E+00	3,78E-02	2,41E+01	2,75E+01	3,17E+00	-7,52E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,79E-01	1,42E-01	2,43E-02	-2,29E-01
Secondary materials	kg	9,02E-04	1,02E-05	1,97E-02	2,06E-02	9,03E-04	2,36E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,31E-04	2,64E-04	8,75E-06	1,88E-03
Renew. secondary fuels	MJ	1,69E-05	8,61E-08	1,51E-02	1,51E-02	7,78E-06	1,07E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,54E-06	2,17E-05	3,37E-07	2,95E-04
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	7,78E-04	5,14E-06	1,03E-02	1,11E-02	4,15E-04	-1,64E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,65E-05	1,13E-04	2,62E-05	-2,25E-04

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	5,95E-03	4,29E-05	4,75E-02	5,34E-02	3,41E-03	4,92E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	7,72E-04	1,51E-03	0,00E+00	-6,10E-04
Non-hazardous waste	kg	1,49E+00	6,65E-04	6,23E-01	2,11E+00	5,85E-02	4,15E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,37E-02	4,56E-02	1,00E-01	-4,56E-01
Radioactive waste	kg	1,23E-05	5,74E-07	3,30E-04	3,43E-04	2,19E-05	5,20E-08	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,67E-06	8,34E-07	0,00E+00	-2,15E-06

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	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	3,57E-01	3,57E-01	0,00E+00	1,70E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	9,00E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	3,92E-05	0,00E+00	3,42E-02	3,42E-02	0,00E+00	4,05E-02	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	5,20E-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	2,45E-01	4,94E-03	2,59E-01	5,09E-01	1,98E-01	4,85E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,52E-02	2,05E-02	1,03E-03	-9,20E-03
Ozone depletion Pot.	kg CFC_{-11}e	1,73E-08	1,05E-09	1,81E-08	3,64E-08	3,92E-08	1,22E-10	MND	MND	MND	MND	MND	MND	MND	0,00E+00	8,37E-09	6,87E-10	2,54E-10	-7,34E-10
Acidification	kg SO_2e	5,39E-04	1,19E-05	1,10E-03	1,65E-03	6,53E-04	7,11E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,06E-04	6,90E-05	6,73E-06	-3,95E-05
Eutrophication	kg PO_4^3e	1,46E-04	1,78E-06	5,39E-04	6,87E-04	1,23E-04	7,60E-06	MND	MND	MND	MND	MND	MND	MND	0,00E+00	2,29E-05	7,60E-05	2,15E-06	-2,05E-05
POCP (“smog”)	kg C_2H_4e	3,63E-05	4,83E-07	5,26E-05	8,94E-05	2,72E-05	3,66E-07	MND	MND	MND	MND	MND	MND	MND	0,00E+00	5,37E-06	5,10E-06	2,74E-07	-2,33E-06
ADP-elements	kg Sbe	8,21E-07	4,77E-09	1,90E-06	2,73E-06	4,69E-07	8,96E-09	MND	MND	MND	MND	MND	MND	MND	0,00E+00	1,61E-07	6,24E-07	3,42E-09	-4,34E-08
ADP-fossil	MJ	3,33E+00	8,06E-02	2,44E+01	2,78E+01	3,17E+00	1,42E-02	MND	MND	MND	MND	MND	MND	MND	0,00E+00	6,79E-01	1,42E-01	2,43E-02	-2,20E-01

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	2,49E-01	4,97E-03	2,61E-01	5,15E-01	2,00E-01	4,75E-03	MND	MND	MND	MND	MND	MND	MND	0,00E+00	4,56E-02	1,45E-02	1,05E-03	-9,34E-03

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.

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.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
13.06.2024

VERIFIED ISO 14025