

ENVIRONMENTAL PRODUCT DECLARATION

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

Klett Comfort Pipe PLUS Blue
Uponor Corporation



EPD HUB, HUB-0562

Publishing date 7 July 2023, last updated on 7 July 2023, valid until 7 July 2028

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Uponor Corporation
Address	Äyritie 20, 01510 Vantaa, Finland
Contact details	info@uponor.com
Website	www.uponor.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	Dr. Qian Wang, Uponor Corporation
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> 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	Klett Comfort Pipe PLUS Blue
Additional labels	-
Product reference	1137641
Place of production	Nordanövägen 2, 73061, Virsbo, Sweden
Period for data	2021
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	-%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	2,3E0
GWP-total, A1-A3 (kgCO ₂ e)	2E-1
Secondary material, inputs (%)	96.8
Secondary material, outputs (%)	99.0
Total energy use, A1-A3 (kWh)	13.3
Total water use, A1-A3 (m ³ e)	1,12E-1

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Uponor is rethinking water for future generations. Our offering, including safe drinking water delivery, energy-efficient radiant heating and cooling and reliable infrastructure, enables a more sustainable living environment. We help our customers in residential and commercial construction, municipalities and utilities, as well as different industries to work faster and smarter. We employ about 3,800 professionals in 26 countries in Europe and North America. Over 100 years of expertise and trust form the basis of any successful partnership. This is the basis, on which they can build, in a literal and metaphorical sense. We create trust together with our partners: Customers, prospective customers and suppliers. We establish this with shared knowledge, quality and sustainable results.

PRODUCT DESCRIPTION

As one of the leading suppliers of plastic pipe systems, Uponor attaches great importance to product development. The new Klett Comfort Pipe PLUS Blue is a pipe with an oxygen diffusion barrier. This barrier consists of a layer of ethyl vinyl alcohol (EVOH) extruded on the outside of the PEX pipe. The outermost layer is polyethylene (PE). This layer is very flexible and does not affect the flexibility and pliability of the basic pipe. Renewable PE raw material for the pipe is based on the Bornewables™ product range supplied by Borealis. These raw materials are made using sustainably sourced renewable feedstocks derived solely from waste and residue vegetable oils, such as used cooking oil and residues from vegetable oil processing. The residue from vegetable oil processing consists of rancid fat that has to be removed to produce food-grade oil. The used cooking oil, entirely waste and residues in origin, is a waste stream collected from restaurants and the food industry. The waste and residue raw materials that are used to produce our feedstock are no longer fit for human consumption, and as such, do not impact food security.

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

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Fossil materials	3	EU
Bio-based materials	97	Sweden

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0.83
Biogenic carbon content in packaging, kg C	0.017

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 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. Manufacturing waste and loss are handled according to end of life scenario.

Uponor Klett Comfort Pipe PLUS Blue is a pipe, manufactured by polyethylene (PE), crosslinking additive and stabilizers. The materials are mixed after which the mix is fed into an extruder where the material melts and is crosslinked. The crosslinked pipe is calibrated to correct dimension, cooled, coiled and packaged. The finished product is packed with plastic films and papers. The finished product is packed with plastic films and

papers. Ready and packed products are supplied to construction site on pallets.

The packaging of the product varies as a function of the pipe diameter and coil length. There are four primary packaging approaches. In this LCA the data that an average packaging is taken into account.

-Stretch wrap film around each individual coil, then multiple coils are placed in a corrugated cardboard box which rests on a wood pallet. Each coil has a label and each box has several additional labels.

-Stretch wrap film around each individual coil, then a shrink film bag around each individual coil, multiple coils are then placed on a wood pallet, and finally a plastic film or "hood" that encapsulates and attaches the stack of coils to the wood pallet. Each coil has a label and each hooded stack of coils has several additional labels.

-Stretch wrap film around each individual coil, each coil is then placed in a corrugated cardboard box, then multiple boxed coils are stacked on a wood pallet, then plastic bands wrap around the stack of boxes and the pallet to join the boxes together and to the pallet, and finally the stack of boxes are wrapped with film to further stabilize and protects the palletized stack of boxed coils. Each box has a label and the entire stack receives several additional labels. Manufacturing waste including mix plastic is sent 25 km away to a treatment facility, where 36% is incinerated and 63% is recycled

-Bundles of 20 foot lengths of straight pipe placed in a poly bag and then multiple poly bags of pipe placed in a woven transport bag.



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.

The transportation distance is defined. Average distance of transportation from production plant to building site is based on the actual sales average figures of the company in of the local markets and the transportation method is assumed to be lorry. 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 utilisation factor is assumed to be <1 for the nested packaged products. Each wooden pallet is assumed to be re-used for 120 times based on the actual re-use scenarios.

Environmental impacts from installation into the building include a 0,16% product installation loss, waste packaging materials (A5) and release of biogenic carbon dioxide from wood pallets. The impacts of material production, its processing and its disposal as installation waste are also included.

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)

Since the consumption of energy and natural resources is negligible for disassembling of the end-of-life product, the impacts of demolition are assumed zero (C1). The end-of-life product is assumed to be sent to the closest facilities by lorry and is assumed to be 50 km away (C2). 100% of the end-of-life product is collected separately from the demolition site while 63% sent to recycling and 36% to incineration facilities (C3). Only 1% of the end-of-life product goes to landfill (C4). Due to the recycling and incineration potential of Polyethylene, the end-of-life product is converted into the recycled PE while energy and heat is produced from its incineration (D). The benefits and loads of waste packaging materials in A5 are also considered in module D.



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.

For easier modelling and because of lack of accuracy in available modelling resources some constituents under 0,1% of product mass are excluded. These include some additives which are all present in the product only in very small amounts and have no serious impact on the emissions of the product. These raw materials include additives and polymer vortex tapes. Their sum is below the cut-off criteria.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per the reference standard, allocation is conducted in the following order;

1. Allocation should be avoided.

2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

In this study allocation could not be avoided for raw materials, packaging, ancillary material, energy consumption and waste production as the information was only measured on factory or production process level. The inputs were allocated to studied product based on annual production volume (mass). The values for 1 kg of pipe are calculated by considering the total product weight per annual production. In the factory, several kinds of plastic pipes are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total raw materials, energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 1kg and the corresponding amount of product is used in the calculations.

Distribution distance was calculated as a sales volume-based weighted average according to the percentage ratios for each destination point. This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs.

All estimations and assumptions regarding the cut off criteria and the allocation are declared in the part "Cut-off Criteria" except the estimations/assumptions below:

- Module A2, A4 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. It may vary but as the role of transportation emission in total results is small, the variety in load is assumed to be negligible. Empty returns are not considered as it is assumed that return trip is used by transportation companies to serve the needs of other

clients.

- Module A4: Transportation does not cause losses as products are packaged properly. Also, volume capacity utilisation factor is assumed to be <1 for the nested packaged products. Additionally, transportation distances are based on average sales across Europe.
- Module A5 - 0,16% of the product is assumed to be lost as installation waste and is incinerated without energy recovery.
- Module C2: Transportation distance to waste handling facility is estimated as 50 km and the transportation method is assumed as lorry.
- Module C3, C4, D: The product undergoes separate collection and 63% is assumed to be recycled, 36% incinerated and 1% landfilled. Ash from incineration processes is assumed negligible. The recycled end-of-life materials are assumed to serve as secondary raw materials in manufacturing while the materials incinerated displace electricity and heat production.

Allocation used in environmental data sources is aligned with the above.

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 ₂ e	-5,34E-2	5,72E-2	1,96E-1	2E-1	2,83E-1	3,7E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,62E-3	4,32E0	3,15E-2	-1,74E0
GWP – fossil	kg CO ₂ e	2,05E0	5,72E-2	1,97E-1	2,3E0	2,85E-1	3,01E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,62E-3	1,32E0	1,48E-3	-1,78E0
GWP – biogenic	kg CO ₂ e	-3,04E0	3,84E-5	-1,05E-3	-3,04E0	1,75E-4	6,84E-3	MND	MND	MND	MND	MND	MND	MND	0E0	3E-6	3E0	3E-2	5,01E-2
GWP – LULUC	kg CO ₂ e	9,38E-1	1,86E-5	1,45E-4	9,38E-1	1,01E-4	1,37E-5	MND	MND	MND	MND	MND	MND	MND	0E0	2,44E-6	1,37E-4	5,67E-8	-1,57E-3
Ozone depletion pot.	kg CFC ₁₁ e	8,93E-8	1,33E-8	5,43E-9	1,08E-7	6,54E-8	1,57E-9	MND	MND	MND	MND	MND	MND	MND	0E0	1,45E-9	1,79E-8	3,28E-11	-5,17E-8
Acidification potential	mol H ⁺ e	1,13E-2	2,51E-4	5,66E-4	1,21E-2	1,18E-3	9,57E-5	MND	MND	MND	MND	MND	MND	MND	0E0	2,77E-5	8,09E-4	9,24E-7	-9,95E-3
EP-freshwater ²⁾	kg Pe	2,26E-4	4,75E-7	5,66E-6	2,33E-4	2,47E-6	9,46E-7	MND	MND	MND	MND	MND	MND	MND	0E0	6,61E-8	3,97E-6	1,99E-9	-5,19E-5
EP-marine	kg Ne	1,21E-2	7,4E-5	1,35E-4	1,23E-2	3,48E-4	2,05E-5	MND	MND	MND	MND	MND	MND	MND	0E0	8,04E-6	2,52E-4	5,65E-7	-1,23E-3
EP-terrestrial	mol Ne	4,38E-2	8,18E-4	1,65E-3	4,63E-2	3,85E-3	2,2E-4	MND	MND	MND	MND	MND	MND	MND	0E0	8,89E-5	2,74E-3	3,4E-6	-1,48E-2
POCP (“smog”) ³⁾	kg NMVOCe	6,63E-3	2,59E-4	4,93E-4	7,38E-3	1,21E-3	8,52E-5	MND	MND	MND	MND	MND	MND	MND	0E0	2,78E-5	8,28E-4	1,3E-6	-5,77E-3
ADP-minerals & metals ⁴⁾	kg Sbe	1,2E-5	1,15E-6	4,05E-6	1,72E-5	7,12E-6	3,32E-7	MND	MND	MND	MND	MND	MND	MND	0E0	1,61E-7	3,02E-6	1,14E-9	-9,41E-6
ADP-fossil resources	MJ	1,91E1	8,81E-1	1,46E0	2,15E1	4,36E0	3,43E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	2,38E0	2,51E-3	-5,03E1
Water use ⁵⁾	m ³ e depr.	1,02E0	3,21E-3	4,14E-2	1,06E0	1,55E-2	1,45E-2	MND	MND	MND	MND	MND	MND	MND	0E0	4,09E-4	5,1E-2	1,11E-4	-5,97E-1

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	6,64E-8	4,85E-9	2,62E-8	9,75E-8	2,2E-8	1,23E-9	MND	MND	MND	MND	MND	MND	MND	0E0	5,04E-10	1,21E-8	1,74E-11	-6,85E-8
Ionizing radiation ⁶⁾	kBq U235e	2,38E-1	3,85E-3	3,71E-3	2,45E-1	1,9E-2	9,79E-4	MND	MND	MND	MND	MND	MND	MND	0E0	4,12E-4	7,03E-3	9,82E-6	-1,2E-1
Ecotoxicity (freshwater)	CTUe	1,12E1	6,78E-1	3,76E0	1,56E1	3,4E0	4,7E-1	MND	MND	MND	MND	MND	MND	MND	0E0	8,45E-2	2,65E0	2,61E-3	-2,6E1
Human toxicity, cancer	CTUh	2,87E-10	1,83E-11	1,96E-10	5,02E-10	9,63E-11	5,7E-11	MND	MND	MND	MND	MND	MND	MND	0E0	2,2E-12	2,82E-10	6,98E-14	-1,49E-10
Human tox. non-cancer	CTUh	9,99E-9	7,92E-10	3,94E-9	1,47E-8	3,9E-9	5,77E-10	MND	MND	MND	MND	MND	MND	MND	0E0	8,94E-11	4,92E-9	1,74E-12	-1,08E-8
SQP ⁷⁾	-	4,27E1	1,19E0	5,83E-1	4,44E1	4,85E0	5,89E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,09E-1	1,42E0	8,85E-3	3,45E-1

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	1,76E1	1,16E-2	8,38E0	2,6E1	6,18E-2	3,29E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,13E-3	1,15E-1	4,44E-5	-3,86E0
Renew. PER as material	MJ	4,47E1	0E0	4,92E-2	4,47E1	0E0	-4,99E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-4,42E1	-4,5E-1	0E0
Total use of renew. PER	MJ	6,23E1	1,16E-2	8,43E0	7,07E1	6,18E-2	-1,7E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,13E-3	-4,41E1	-4,5E-1	-3,86E0
Non-re. PER as energy	MJ	2,01E1	8,81E-1	1,02E0	2,2E1	4,36E0	2,64E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	2,38E0	2,51E-3	-2,08E1
Non-re. PER as material	MJ	3,6E0	0E0	-1,46E0	2,14E0	0E0	-4,37E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-1,7E0	-1,7E-2	-2,95E1
Total use of non-re. PER	MJ	2,37E1	8,81E-1	-4,43E-1	2,41E1	4,36E0	-1,74E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	6,83E-1	-1,45E-2	-5,03E1
Secondary materials	kg	9,67E-1	0E0	1,2E-4	9,68E-1	0E0	1,3E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	6,3E-1
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	1,11E-1	1,76E-4	6,28E-4	1,12E-1	8,25E-4	6,14E-4	MND	MND	MND	MND	MND	MND	MND	0E0	1,89E-5	9,43E-4	2,81E-6	-3,65E-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	5,02E-3	8,82E-4	9,06E-3	1,5E-2	4,53E-3	2,4E-3	MND	MND	MND	MND	MND	MND	MND	0E0	1,3E-4	0E0	4,58E-6	-8,57E-2
Non-hazardous waste	kg	1,77E-1	8,71E-2	2,47E-1	5,12E-1	3,77E-1	4,31E-2	MND	MND	MND	MND	MND	MND	MND	0E0	8,81E-3	0E0	1E-2	-1,72E0
Radioactive waste	kg	4,67E-6	6,04E-6	3,27E-6	1,4E-5	2,98E-5	9,4E-7	MND	MND	MND	MND	MND	MND	MND	0E0	6,54E-7	0E0	1,5E-8	-6,1E-5

END OF LIFE – OUTPUT FLOWS

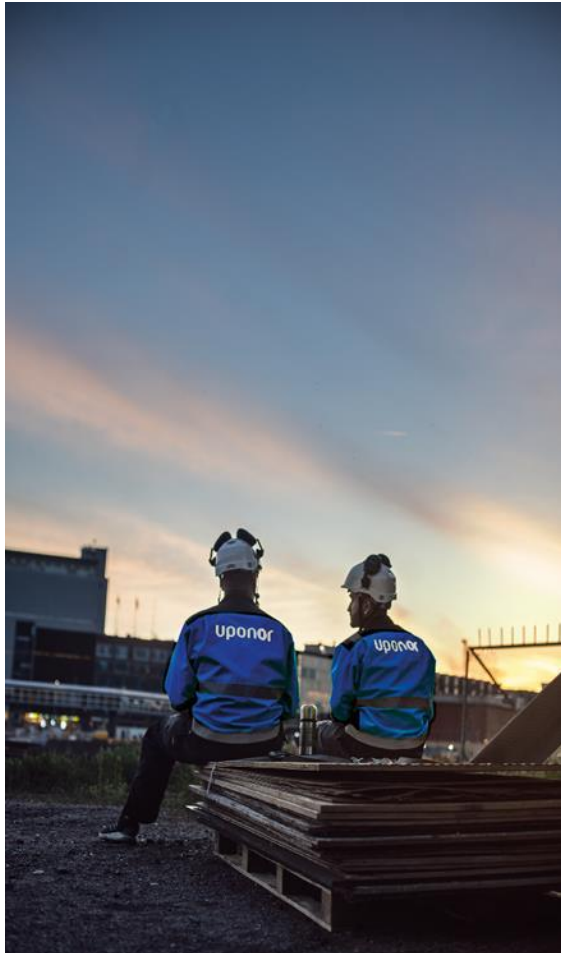
Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	1,53E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	6,3E-1	0E0	0E0
Materials for energy rec	kg	0E0	0E0	4E-2	4E-2	0E0	1,9E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	3,6E-1	0E0	0E0
Exported energy	MJ	0E0	0E0	1,05E-1	1,05E-1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1,26E1	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 ₂ e	-2,86E-1	5,67E-2	1,95E-1	-3,47E-2	2,83E-1	2,95E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,55E-3	1,32E0	1,05E-3	-1,65E0
Ozone depletion Pot.	kg CFC ₁₁ e	4,22E-6	1,06E-8	5,01E-9	4,23E-6	5,21E-8	1,42E-9	MND	MND	MND	MND	MND	MND	MND	0E0	1,15E-9	1,49E-8	2,61E-11	-5,45E-8
Acidification	kg SO ₂ e	8,3E-3	1,27E-4	4,24E-4	8,85E-3	5,82E-4	7,39E-5	MND	MND	MND	MND	MND	MND	MND	0E0	2,01E-5	5,18E-4	9,99E-7	-8,76E-3
Eutrophication	kg PO ₄ ³ e	6,91E-3	2,48E-5	1,99E-4	7,13E-3	1,21E-4	4,23E-5	MND	MND	MND	MND	MND	MND	MND	0E0	4,61E-6	5,68E-4	5,22E-5	-6,81E-4
POCP ("smog")	kg C ₂ H ₄ e	5,69E-4	7,7E-6	2,75E-5	6,04E-4	3,76E-5	8,51E-6	MND	MND	MND	MND	MND	MND	MND	0E0	8,7E-7	4,12E-5	2,18E-7	-5,41E-4
ADP-elements	kg Sbe	1,2E-5	1,15E-6	4,05E-6	1,72E-5	7,12E-6	3,32E-7	MND	MND	MND	MND	MND	MND	MND	0E0	1,61E-7	3,02E-6	1,14E-9	-9,41E-6
ADP-fossil	MJ	1,91E1	8,81E-1	1,46E0	2,15E1	4,36E0	3,43E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	2,38E0	2,51E-3	-5,03E1

ENVIRONMENTAL IMPACTS – TRACI 2.1. / 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 ₂ e	1,6E-1	5,66E-2	1,95E-1	4,12E-1	2,82E-1	2,93E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,54E-3	1,32E0	1,11E-3	-1,67E0
Ozone Depletion	kg CFC ₁₁ e	8,22E-9	1,41E-8	6,39E-9	2,87E-8	6,93E-8	1,86E-9	MND	MND	MND	MND	MND	MND	MND	0E0	1,54E-9	1,95E-8	3,49E-11	-6,68E-8
Acidification	kg SO ₂ e	5,42E-4	2,18E-4	4,72E-4	1,23E-3	1,02E-3	8,06E-5	MND	MND	MND	MND	MND	MND	MND	0E0	2,42E-5	7,22E-4	8,25E-7	-8,34E-3
Eutrophication	kg Ne	8,47E-5	2,95E-5	6,27E-5	1,77E-4	1,44E-4	1,29E-5	MND	MND	MND	MND	MND	MND	MND	0E0	3,36E-6	1,25E-4	4,55E-7	-5,04E-4
POCP ("smog")	kg O ₃ e	7E-3	4,69E-3	7,83E-3	1,95E-2	2,21E-2	1,17E-3	MND	MND	MND	MND	MND	MND	MND	0E0	5,1E-4	1,56E-2	1,96E-5	-8,25E-2
ADP-fossil	MJ	7,71E-1	1,26E-1	1,6E-1	1,06E0	6,21E-1	3,35E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,39E-2	2,96E-1	3,44E-4	-6,32E0



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
07.07.2023

