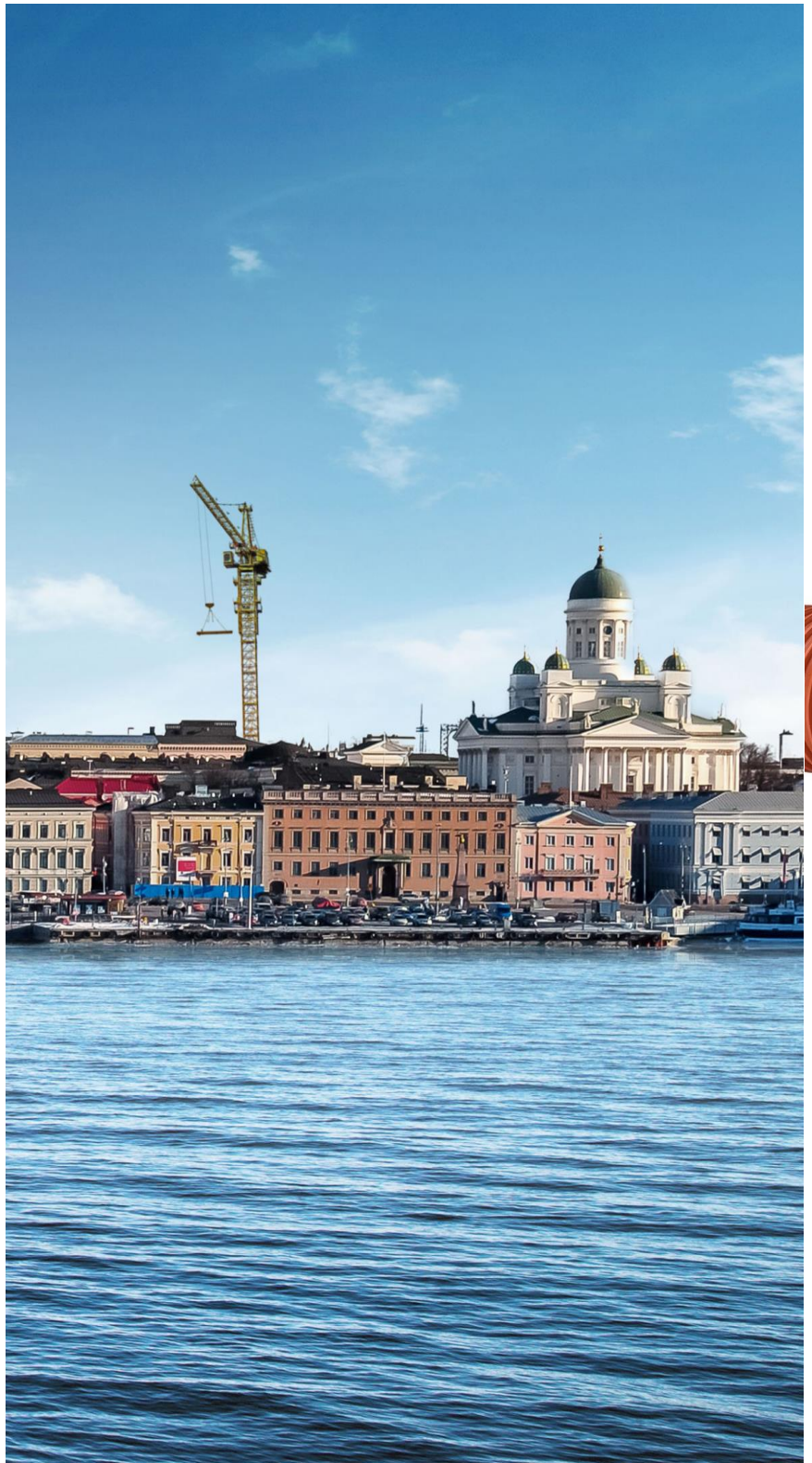


ENVIRONMENTAL PRODUCT DECLARATION

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

Ultra Rib 2 Blue
Uponor Corporation

EPD HUB, HUB-0040
Publishing date 23 May 2022, last updated date 23 May 2022, valid until 23 May 2027

Created with One Click LCA

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 and D
EPD author	Dr. Qian Wang, Uponor Corporation
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	N.C, 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	Ultra Rib 2 Blue
Product reference	1120027, 1120028, 1120029, 1120030, 1120031, 1120032, 1120033, 1120034, 1120035, 1120036
Place of production	Uponor Infra AB, Industrivägen 11, 513 32 Fristad, Sweden
Period for data	2020
Averaging in EPD	No averaging

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg of pipe
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	2,21
GWP-total, A1-A3 (kgCO2e)	8,26E-1
Secondary material, inputs (%)	56,9
Secondary material, outputs (%)	5,00
Total energy use, A1-A3 (kWh)	9,90
Total water use, A1-A3 (m3e)	6,15E-2

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

Uponor Ultra Rib 2 Blue® is a gravity sewer system partially based on renewable plastic raw material. The pipes are used as sewer and storm water pipes in various kinds of applications like municipal, transport, commercial and residential.

Ultra Rib 2 Blue® is a ribbed and massive non-pressure pipe with injection moulded in-line socket. The material is polypropylene. Pipes are available from outer diameter 200mm up to diameter 560mm. Outer layer of the pipe is red brown and inner layer is white for easier inspection. The pipe has an injection moulded in-line socket, which is a solid part of the pipe and is produced on extrusion production line. The in-line socket reduces the number of joints needed by 50%.

Ultra Rib 2 Blue® pipes uses renewable PP 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 [Munter D. et al. 2021].

Ultra Rib 2 Blue® pipes are extremely tight, safe and strong. Socket has perfect shape and tolerances. Pipe cavity can be filled well-graded soil with up to 60mm particle size.
EN 13476-3 Plastics piping systems for non-pressure underground drainage and sewerage. Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE). Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B INSTA SBC EN 13467.

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

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Fossil materials	45	EU
Bio-based materials	55	EU

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	1.78
Biogenic carbon content in packaging, kg C	0.0003

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg of pipe
Mass per declared unit	1 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

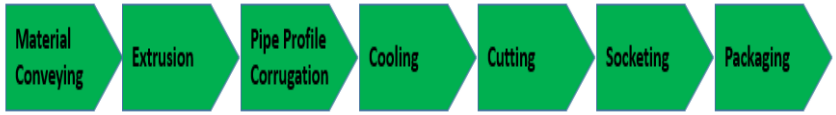
Modules not declared = MND. Modules not relevant = MNR.

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.

The production method is a pipe extrusion with in-line injection moulded socketing. The different steps of manufacturing are:
-Material conveying
-Extrusion (melting and processing of material)
-Pipe profile corrugation
-Cooling
-Cutting

-Socketing
-Packaging



The packaging of the finished product consists of a wooden U-frame with a wooden lath on top of it. The amount of pipes on a frame differs depending on the pipe diameter. The wooden frame has a nail plate on the edge to strengthen the structure as well as a plastic band around to tighten the package.

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 installation scenarios in Uponor's infrastructure product EPDs are based on TEPPFA's (The European Plastic Pipe and Fittings Association) industry average EPDs. These documents and their background reports include industry consensus estimates of the resource use, emissions and affluents of typical European installations, including the size of installation trenches, machinery used for digging/excavation, volume of backfilling sand required for the installation, etc. These parameters have been used as input for the Uponor EPD modelling.
Ref: https://www.teppfa.eu/sustainability/environmental-footprint/epd/

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

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). After ca 100 years of service life 5% of the end-of-life product is assumed to be sent to the closest treatment facilities (C2). The collected 5% from the demolition site is sent to recycling (C3), whereas the remaining 95% is left inert under the ground (C4). Due to the recycling of PP, the end-of-life product is converted into recycled PP (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.

The scope of the EPD is Cradle to gate with options, A4-A5, and modules C1-C4 and D. The modules A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport). A5 (Installation) as well as C1 (Deconstruction/ demolition), C2 (Transport at end-of-life), C3 (Waste processing), C4 (Disposal) and D (benefits and loads beyond the system boundary) are included in the study.

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019. Excluded modules use stage modules (B1-B7). 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 which data are available for are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows do also not exceed 5% of energy usage or mass. The life cycle analysis includes all industrial processes from raw material acquisition to production, distribution and end-of-life stages. 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.

As it is impossible to collect all energy consumption data separately for each product produced in the plant, data is allocated. Allocation is based on annual production rate and made with high accuracy and precision.
The values for 1 kg of the product, which is used within this study is calculated by considering the total product weight per annual production. In the factory, several kinds of pipes are produced; since the production processes of these products are similar, the annual production percentage is 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 fuel consumption, consumed water and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 1 kg and the corresponding amount of product is used in the calculations. Besides, since the formulation of the product is certain, raw materials in the product do not need to be allocated considering the total annual production. The amounts of raw materials and packaging materials are given as per the formulations in Uponor's internal Bills of Material and the purchased amounts from the respective suppliers. 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 are given below:

• Module A4: The transportation distance is defined according to the standards. As installation places are located at different places around Sweden and Finland, an average transportation distance from the

production plants is assumed to be 400 km. Transportation method is lorry. According to Uponor transportation doesn't cause losses as products are packaged properly. Also, volume capacity utilisation factor is assumed to be 1 for the nested packaged products.

• Module A5: Environmental impacts from installation include standardized energy and materials need, 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. The modelling of A5 is based on the references of well-established industry standards (TEPPFA industry average EPD) [TEPPFA, 2020], which is installation-wise closest to UR2

• Module C1: The impacts of demolition stage are assumed zero, since the consumption of energy and natural resources for disassembling of the end-of-life product is negligible.

• Module C2: 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. 5% waste is assumed to be collected from the demolition site. Since there is no follow up procedure, transportation distance to the closest disposal area is estimated as 50 km and the transportation method is assumed to be lorry, which is the most common.

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

• Module C3: It is assumed that 5% of the waste is recycled and 95% is left inert under the ground. While making this assumption, TEPFFA's Third Party Report from year 2013 is taken into account.

• Module C4: 95% of the product is left inert under the ground. While making this assumption, TEPFFA's Third Party Report from year 2013 is taken into account

• Module D: Due to the recycling process part of the end-of-life product is converted into a recycled PP raw material.

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

AVERAGES AND VARIABILITY

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 Product Declaration: CROSSLINKED POLYETHYLENE (PEX) PIPE SYSTEM FOR HOT AND COLD WATER IN THE BUILDING, TEPPFA 2020

Munter D. et al (2021), Eco-profile of polyolefins and other hydrocarbons made from biomass-based feedstock (steam cracker). IFEU Institute for Energie-und Umwelforschung, Heidelberg, Germany.

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	kg CO_2e	7,8E-1	1,34E-1	-8,66E-2	8,27E-1	5,5E-2	1,61E0	MND	MND	MND	MND	MND	MND	MND	1,82E-12	3,19E-4	1,54E-2	6,21E-3	1,42E-2
GWP – fossil	kg CO_2e	2,03E0	1,34E-1	4,53E-2	2,21E0	5,54E-2	1,5E0	MND	MND	MND	MND	MND	MND	MND	1,82E-12	3,19E-4	1,17E-2	6,17E-3	-1,05E-1
GWP – biogenic	kg CO_2e	-1,78E0	8,18E-5	-1,32E-1	-1,91E0	3,4E-5	9,8E-2	MND	MND	MND	MND	MND	MND	MND	2,13E-15	1,95E-7	3,67E-3	3,68E-5	1,19E-1
GWP – LULUC	kg CO_2e	5,28E-1	4,72E-5	7,8E-5	5,28E-1	1,96E-5	1,15E-2	MND	MND	MND	MND	MND	MND	MND	1,6E-15	1,12E-7	1,3E-5	3,26E-6	3,8E-5
Ozone depletion pot.	kg CFC_{-11}e	7,6E-8	3,06E-8	2,8E-9	1,09E-7	1,27E-8	2,57E-7	MND	MND	MND	MND	MND	MND	MND	1,49E-19	7,3E-11	1,49E-9	1,6E-9	-2,67E-9
Acidification potential	mol H^+e	9,45E-3	5,54E-4	1,73E-4	1,02E-2	2,28E-4	1,19E-2	MND	MND	MND	MND	MND	MND	MND	1,2E-14	1,31E-6	5,97E-5	4,62E-5	-2,22E-4
EP-freshwater[3)]	kg Pe	1,6E-4	1,15E-6	1,52E-6	1,63E-4	4,79E-7	3,49E-5	MND	MND	MND	MND	MND	MND	MND	9,94E-17	2,75E-9	3,39E-7	9,8E-8	-2,01E-7
EP-marine	kg Ne	7,34E-3	1,65E-4	4,25E-5	7,54E-3	6,76E-5	4,06E-3	MND	MND	MND	MND	MND	MND	MND	2,25E-15	3,89E-7	2E-5	1,61E-5	-2,38E-5
EP-terrestrial	mol Ne	3,09E-2	1,82E-3	4,71E-4	3,31E-2	7,47E-4	4,42E-2	MND	MND	MND	MND	MND	MND	MND	2,38E-14	4,29E-6	1,77E-4	1,77E-4	-3,1E-4
POCP (“smog”)	kg NMVOCe	6,06E-3	5,7E-4	1,9E-4	6,82E-3	2,35E-4	1,25E-2	MND	MND	MND	MND	MND	MND	MND	8,75E-15	1,35E-6	5,8E-5	5,06E-5	-2,24E-4
ADP-minerals & metals	kg Sbe	2,56E-5	3,34E-6	1,18E-6	3,02E-5	1,38E-6	4,21E-5	MND	MND	MND	MND	MND	MND	MND	2,12E-16	7,95E-9	2,41E-7	1,01E-7	-4,54E-7
ADP-fossil resources	MJ	4,13E1	2,04E0	5,33E-1	4,39E1	8,46E-1	2,13E1	MND	MND	MND	MND	MND	MND	MND	2,33E-11	4,86E-3	1,94E-1	1,19E-1	-3,84E0
Water use[2)]	m^3e depr.	8,89E-1	7,24E-3	2,2E-2	9,19E-1	3E-3	4,7E0	MND	MND	MND	MND	MND	MND	MND	8,95E-13	1,73E-5	3,94E-3	3,57E-3	-5,45E-2

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	6,43E-8	1,03E-8	3,41E-9	7,81E-8	4,28E-9	1,87E-7	MND	MND	MND	MND	MND	MND	MND	1,45E-19	2,46E-11	8,91E-10	7,89E-10	-2,05E-10
Ionizing radiation[5)]	kBq U235e	9,84E-2	8,92E-3	1,22E-3	1,08E-1	3,7E-3	8,41E-2	MND	MND	MND	MND	MND	MND	MND	6,39E-14	2,12E-5	5,01E-4	4,76E-4	-9,36E-4
Ecotoxicity (freshwater)	CTUe	1,02E1	1,59E0	8,08E-1	1,26E1	6,61E-1	2,36E1	MND	MND	MND	MND	MND	MND	MND	7,84E-11	3,8E-3	2,69E-1	9,97E-2	1,95E-1
Human toxicity, cancer	CTUh	3,25E-10	4,54E-11	9,28E-11	4,63E-10	1,87E-11	9,39E-10	MND	MND	MND	MND	MND	MND	MND	8,62E-21	1,08E-13	1,7E-11	3,54E-12	1,65E-11
Human tox. non-cancer	CTUh	1,09E-8	1,83E-9	9,55E-10	1,37E-8	7,58E-10	2,25E-8	MND	MND	MND	MND	MND	MND	MND	1,22E-19	4,35E-12	2,62E-10	8,61E-11	6,77E-11
SQP	-	2,41E1	2,27E0	1,97E-1	2,66E1	9,43E-1	1,16E2	MND	MND	MND	MND	MND	MND	MND	2,93E-11	5,42E-3	1,29E-1	3,12E-1	1,16E-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	MJ	8,61E0	2,9E-2	2,29E0	1,09E1	1,2E-2	7,19E-1	MND	MND	MND	MND	MND	MND	MND	3,89E-10	6,9E-5	8,29E-3	2,05E-3	-1,33E-2
Renew. PER as material	MJ	2,63E1	0E0	1,27E0	2,76E1	0E0	1,29E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-1,3E0	0E0	0E0
Total use of renew. PER	MJ	3,49E1	2,9E-2	3,56E0	3,85E1	1,2E-2	2,01E0	MND	MND	MND	MND	MND	MND	MND	3,89E-10	6,9E-5	-1,29E0	2,05E-3	-1,33E-2
Non-re. PER as energy	MJ	2,22E1	2,04E0	5,26E-1	2,47E1	8,46E-1	2,09E1	MND	MND	MND	MND	MND	MND	MND	2,33E-11	4,86E-3	1,94E-1	1,19E-1	-1,44E0
Non-re. PER as material	MJ	2,11E1	0E0	1,74E-2	2,11E1	0E0	-2,53E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-1,05E0	0E0	-2,4E0
Total use of non-re. PER	MJ	4,33E1	2,04E0	5,43E-1	4,58E1	8,46E-1	2,09E1	MND	MND	MND	MND	MND	MND	MND	2,33E-11	4,86E-3	-8,56E-1	1,19E-1	-3,84E0
Secondary materials	kg	5,69E-1	0E0	1,61E-6	5,69E-1	0E0	1,14E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	4,98E-2
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	6,02E-2	3,86E-4	8,89E-4	6,15E-2	1,6E-4	3,41E-1	MND	MND	MND	MND	MND	MND	MND	1,92E-14	9,21E-7	4,67E-5	9,37E-5	-2,19E-4

6) 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	1,99E-2	2,12E-3	2,98E-3	2,5E-2	8,8E-4	6,23E-2	MND	MND	MND	MND	MND	MND	MND	3,84E-13	5,06E-6	0E0	2,16E-4	1,14E-3
Non-hazardous waste	kg	6,13E-1	1,76E-1	7,11E-2	8,6E-1	7,32E-2	2,28E0	MND	MND	MND	MND	MND	MND	MND	7,43E-12	4,2E-4	0E0	3,08E-1	8,02E-2
Radioactive waste	kg	1,66E-5	1,39E-5	1,51E-6	3,21E-5	5,79E-6	1,19E-4	MND	MND	MND	MND	MND	MND	MND	6,68E-17	3,32E-8	0E0	7,27E-7	-4,7E-7

END OF LIFE – OUTPUT FLOWS

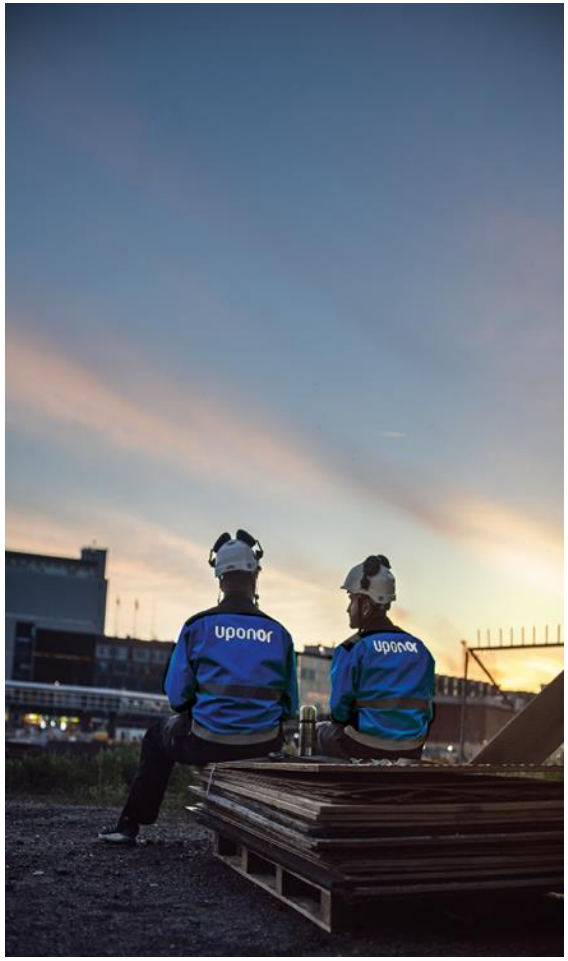
Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	2,04E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	5E-2	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	5,79E-2	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	5,58E-1	1,32E-1	5,09E-2	7,41E-1	5,5E-2	1,45E0	MND	MND	MND	MND	MND	MND	MND	1,75E-12	3,16E-4	1,31E-2	6,09E-3	-9,53E-2
Ozone depletion Pot.	kg CFC_{-11}e	2,39E-6	2,44E-8	3,11E-9	2,42E-6	1,01E-8	2,53E-7	MND	MND	MND	MND	MND	MND	MND	1,34E-19	5,81E-11	1,21E-9	1,27E-9	-2,33E-9
Acidification	kg SO_2e	7,31E-3	2,72E-4	1,58E-4	7,74E-3	1,13E-4	5,71E-3	MND	MND	MND	MND	MND	MND	MND	9,54E-15	6,49E-7	4,44E-5	2,29E-4	-1,87E-4
Eutrophication	kg PO_4^3e	4,47E-3	5,67E-5	7,95E-5	4,61E-3	2,35E-5	1,56E-3	MND	MND	MND	MND	MND	MND	MND	4,6E-15	1,35E-7	4,51E-5	7,98E-6	7,31E-5
POCP (“smog”)	kg C_2H_4e	4,84E-4	1,76E-5	1,86E-5	5,2E-4	7,3E-6	3,54E-4	MND	MND	MND	MND	MND	MND	MND	7,23E-16	4,2E-8	3,77E-6	1,29E-6	-1,52E-5
ADP-elements	kg Sbe	2,56E-5	3,34E-6	1,18E-6	3,02E-5	1,38E-6	4,21E-5	MND	MND	MND	MND	MND	MND	MND	2,12E-16	7,95E-9	2,41E-7	1,01E-7	-4,54E-7
ADP-fossil	MJ	4,13E1	2,04E0	5,33E-1	4,39E1	8,46E-1	2,13E1	MND	MND	MND	MND	MND	MND	MND	2,33E-11	4,86E-3	1,94E-1	1,19E-1	-3,84E0

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_2e	8,41E-1	1,32E-1	5,09E-2	1,02E0	5,49E-2	1,45E0	MND	MND	MND	MND	MND	MND	MND	1,74E-12	3,15E-4	1,33E-2	6,07E-3	-9,62E-2
Ozone Depletion	kg CFC_{-11}e	2,66E-8	3,25E-8	3,98E-9	6,3E-8	1,35E-8	2,74E-7	MND	MND	MND	MND	MND	MND	MND	1,69E-19	7,74E-11	1,61E-9	1,7E-9	-2,93E-9
Acidification	kg SO_2e	2,65E-3	4,82E-4	1,79E-4	3,31E-3	1,99E-4	1,05E-2	MND	MND	MND	MND	MND	MND	MND	1E-14	1,14E-6	5,22E-5	4,12E-5	-1,72E-4
Eutrophication	kg Ne	1,92E-4	6,78E-5	4,46E-5	3,04E-4	2,8E-5	1,03E-3	MND	MND	MND	MND	MND	MND	MND	1,41E-15	1,61E-7	1,09E-5	4,69E-6	4,36E-6
POCP (“smog”)	kg O_3e	3,35E-2	1,04E-2	3,09E-3	4,7E-2	4,28E-3	2,49E-1	MND	MND	MND	MND	MND	MND	MND	1,28E-13	2,46E-5	1,01E-3	1,02E-3	-1,81E-3
ADP-fossil	MJ	4,72E0	2,91E-1	1,22E-1	5,13E0	1,21E-1	2,62E0	MND	MND	MND	MND	MND	MND	MND	2,06E-12	6,93E-4	2,42E-2	1,62E-2	-5,97E-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.

Neena Chandramathy, as an authorized verifier acting for EPD Hub Limited
23.05.2022