ENVIRONMENTAL PRODUCT DECLARATION

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

UPONOR UNI PIPE PLUS

DIAMETER RANGE 16-32 MM

UPONOR CORPORATION

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Uponor Corporation
Address	Äyritie 20, 01510 Vantaa, Finland
Contact details	info@uponor.com
Website	www.uponor.com

PRODUCT IDENTIFICATION

Product name	Uponor Uni Pipe Plus
Product number /reference	1059576, 1059577, 1059579, 1059581, 1059583
Place(s) of production	Industriestraße 18, 98544 Zella-Mehlis, Germany

Jukka Seppänen
RTS EPD Committee Secretary

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EPD INFORMATION

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.

EPD program operator	Rakennustietosäätiö RTS Building Information Foundation RTS Malminkatu 16 A 00100 Helsinki http://cer.rts.fi
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (Finnish version, 26.8.2020) is used.
EPD author	Dr. Qian Wang, Uponor Corporation
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	17.01.2022
EPD verifier	Silvia Vilčeková, Silcert, s.r.o
EPD number	RTS_164_22
Publishing date	January 20, 2022
EPD valid until	January 20, 2027

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Uponor Uni Pipe Plus is the world's first multilayer composite pipe with a seamless, extruded aluminium layer, enhanced performance and safety.

PRODUCT APPLICATION

The Uni Pipe Plus range are used for safe and reliable tap water, heating and cooling installations.

TECHNICAL SPECIFICATIONS

The product consists of the following materials: PE-RT (Polyethylene of Raised temperatures), Adhesive and Aluminium. Features the best surface finish for preventing the build-up of deposits and is absolutely oxygen tight and corrosion resistant. Uponor Uni Pipe Plus is the unique composite pipe with no weld seam, which increases fixing distances and reduces the bending radii by up to 40 % compared to conventional composite pipes, meaning fewer pipe fixing points are required during installation and many changes in direction can be achieved with pipe bends. That reduces the number of fittings and pipe clamps required and also saves assembly time.

PRODUCT STANDARDS

DIN EN ISO 21003; Multilayer piping systems for hot and cold water installations inside buildings

Tap water approvals: DVGW/ÖVGW/QB (CSTB)/AENOR/WRAS

PHYSICAL PROPERTIES OF THE PRODUCT

Pipe dimension (mm)	16x2.0	20x2.25	25x2.5	32x3.0
Coefficient of expansion a [m/mK]	25 x 10-6	25 x 10-6	25 x 10-6	25 x 10-6
Thermal conductivity λ [W/mK]	0.40	0.40	0.40	0.40
Pipe roughness k [mm]	0.0004	0.0004	0.0004	0.0004
Water volume [l/m]	0.113	0.189	0.314	0.531
Coil length [m]	100/200	100	50	50
Bar length [m]	3/5	3/5	3/5	3/5
Weight of coil/bar with water at 10 °C [g/m]	224/232	350/360	547/560	895/926

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.uponor.com

PRODUCT RAW MATERIAL COMPOSITION

Material	Amount %	Usability			Origin
		Renewable	Non-renewable	Recycled	
PE-RT	52,4	-	X	-	EU
Aluminium	42,5	-	X	-	EU
Adhesive	4,1	-	X	-	EU
Other	1	-	X	-	EU
Total	100%				

Material	Amount %	Origin
Metals	42,5	EU
Stone-based materials (minerals)	-	-
Fossil materials	57,5	EU
Bio-based materials	-	-

SUBSTANCES, REACH - VERY HIGH CONCERN

Products do not contain any REACH SVHC substances in amounts greater than 0, 1% (1000 ppm). *Declaration of Conformity, According to the REACH regulation* https://www.uponor.com/legal-information/reach

No hazardous substances as per GHS; Regulation 1907/2006

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

In a first step an aluminium tube is produced. Further, a PE-layer and an adhesive layer are co-extruded into the aluminium tube and applied on the aluminium inner surface. Subsequently another PE-layer is co-extruded together with an adhesive layer and applied on the outer surface of the aluminium tube. In a further step the complete pipe runs through a long water bath in order to cool down the pipe materials. An ink-jet printer marks the pipe with necessary information. There are several checking and test procedures along the production line and off-line in order to ensure the expected high quality. As a last step the pipe is cut and packaged.

Manufacturing flowchart

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.

-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 (A4)

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

INSTALLATION (A5)

Environmental impacts from installation into the building (A5) include the product installation losses, emissions of energy use in installation and generation of waste at the construction site. The packaging waste is included as well.

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 50 years of service life the collected product is assumed to be sent to the closest treatment facilities (C2). 100% of the end-of-life product is assumed to be sent to recycling facilities (C3) and nothing is sent to landfill (C4). Due to the recycling of PE and Aluminium, the end-of-life product is converted into recycled PE and Aluminium (D).

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2020

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 kg of pipe
Mass per declared unit	1 kg

BIOGENIC CARBON CONTENT

Product's biogenic carbon content per declared unit

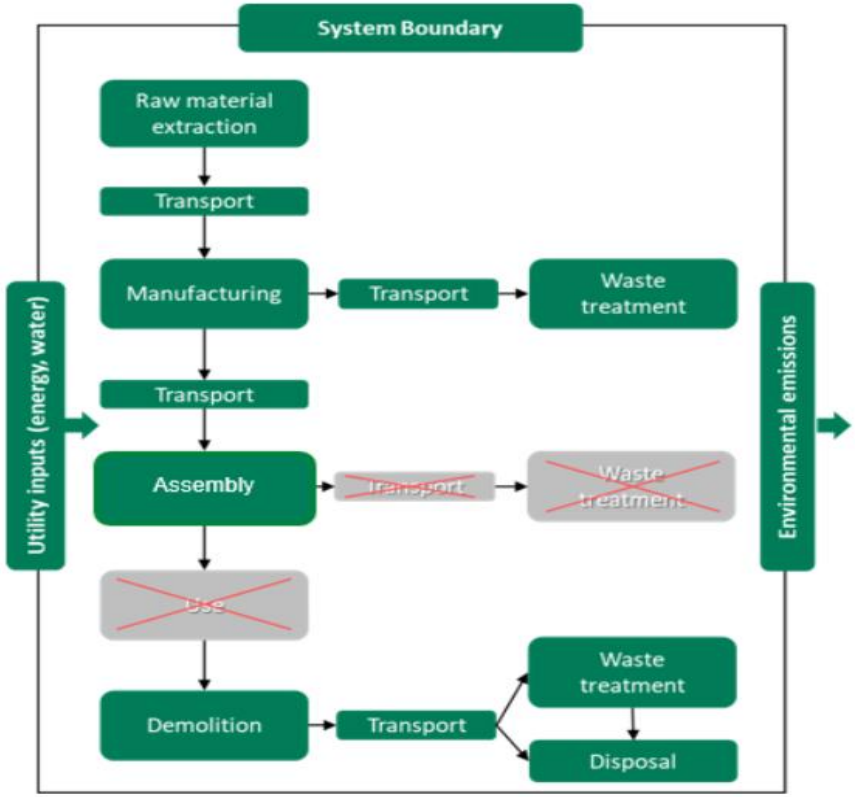
Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	0.00252

SYSTEM BOUNDARY

The scope of the EPD is "cradle to gate with options, module A4, module A5, modules C1-C4 and module 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.

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	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	MNR	MNR	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.



CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and RTS PCR. Excluded modules are Use stage modules (B1-B7), which are not mandatory according to the RTS 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 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.

Uponor Uni Pipe Plus

ALLOCATION, ESTIMATES AND ASSUMPTIONS

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 energy consumption, water and 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 RTS PCR. As installation places are located in different countries across Europe, an average transportation distance from the production plant is assumed to be 1100 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: Due to a big variety of installation sites across Europe, industry average values for energy and material consumption as well as generated waste during assembly are used in the study (TEPPFA, 2019). TEPPFA is a well-established standard that can be found publicaly.

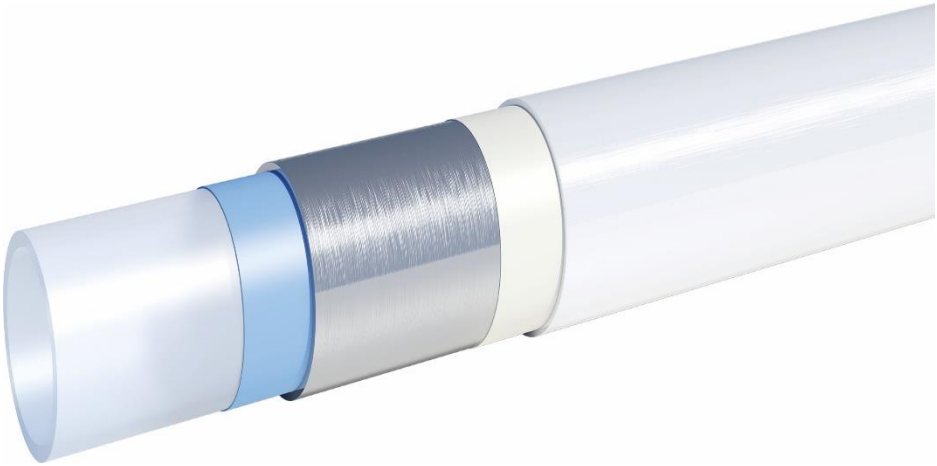
• Module C1: The impacts of demolition stage are assumed zero, since the consumption of energy and natural resources for disassembling of the end-of-life product is negligible.

• 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. After ca 50 years of service life (TEPPFA, 2019) all of end-of-life product 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.

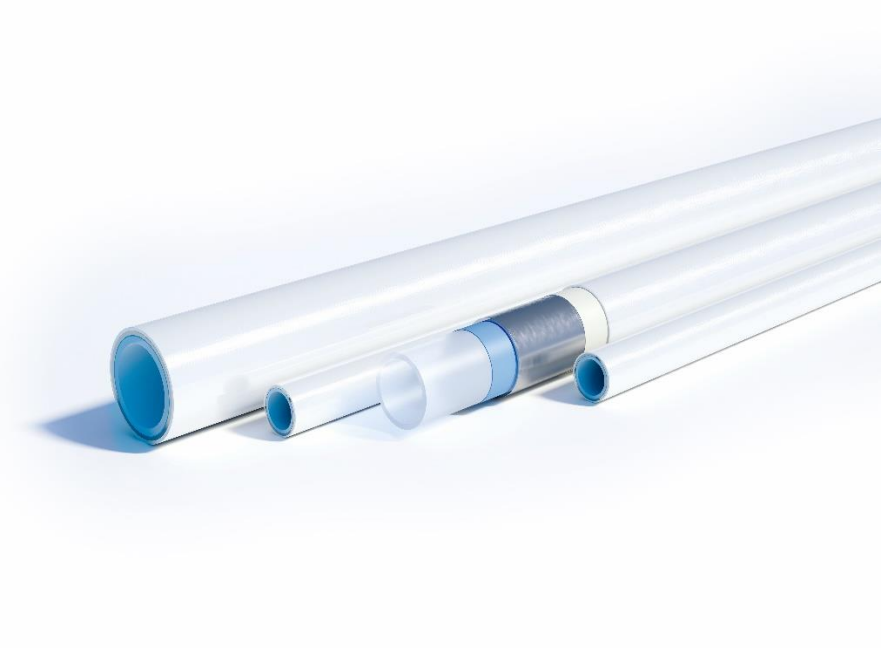
• Module A2, A4 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as the role of transportation emission in total results is small and so the variety in load assumed to be negligible. Empty returns are not taken into account as it is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

• Module C3: It is assumed that 100% of the end-of-life product is recycled. The assumption is based on the availability of mature technologies and well-established infrastructure for separation and

recycling of composite pipes as well as the increasing interest of public authorities to incentivize residual waste sorting from construction sites and the expectation that this will be regulated as a common practice across Europe within the upcoming decades (Swedish Environmental Protection Agency, 2020).



- Module C4: There is no remaining end-of-life product sent to landfill.
- Module D: Due to the recycling processes the end-of-life product is converted into a recycled PE raw material and Aluminium raw material.



ENVIRONMENTAL IMPACT DATA

NOTE: ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930 AND TRACI 2.1. / ISO 21930 ARE PRESENTED IN ANNEX

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	5,2E0	6,96E-2	2,86E-1	5,56E0	1,76E-1	1,54E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,62E-3	3,37E-1	0E0	-3,71E0
GWP – fossil	kg CO_2e	5,08E0	6,95E-2	3,75E-1	5,53E0	1,78E-1	5,44E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,62E-3	3,38E-1	0E0	-3,7E0
GWP – biogenic	kg CO_2e	3,66E-2	4,26E-5	-9,1E-2	-5,43E-2	1,09E-4	9,93E-2	MND	MND	MND	MND	MND	MND	MND	0E0	3E-6	-9,87E-4	0E0	5,32E-2
GWP – LULUC	kg CO_2e	8,42E-2	2,45E-5	2,15E-3	8,64E-2	6,28E-5	3,13E-5	MND	MND	MND	MND	MND	MND	MND	0E0	2,44E-6	1,89E-4	0E0	-6,93E-2
Ozone depletion pot.	kg CFC_{-11}e	4,97E-7	1,59E-8	2,47E-8	5,38E-7	4,08E-8	4,3E-9	MND	MND	MND	MND	MND	MND	MND	0E0	1,45E-9	2,42E-8	0E0	-3,7E-7
Acidification potential	mol H^+e	2,91E-2	2,86E-4	1,98E-3	3,14E-2	7,33E-4	2,32E-4	MND	MND	MND	MND	MND	MND	MND	0E0	2,77E-5	1,15E-3	0E0	-2,2E-2
EP-freshwater[2)]	kg Pe	2,31E-4	6,01E-7	2,33E-5	2,55E-4	1,54E-6	2,28E-6	MND	MND	MND	MND	MND	MND	MND	0E0	6,61E-8	7,16E-6	0E0	-1,64E-4
EP-marine	kg Ne	3,58E-3	8,48E-5	3,68E-4	4,03E-3	2,17E-4	5,49E-5	MND	MND	MND	MND	MND	MND	MND	0E0	8,04E-6	2,6E-4	0E0	-2,53E-3
EP-terrestrial	mol Ne	3,99E-2	9,37E-4	3,95E-3	4,48E-2	2,4E-3	5,81E-4	MND	MND	MND	MND	MND	MND	MND	0E0	8,89E-5	2,91E-3	0E0	-2,84E-2
POCP (“smog”)	kg NMVOCe	1,59E-2	2,94E-4	1,14E-3	1,73E-2	7,53E-4	2,19E-4	MND	MND	MND	MND	MND	MND	MND	0E0	2,78E-5	8,98E-4	0E0	-1,17E-2
ADP-minerals & metals	kg Sbe	3,05E-5	1,74E-6	4,22E-4	4,54E-4	4,44E-6	9,06E-7	MND	MND	MND	MND	MND	MND	MND	0E0	1,61E-7	4,81E-6	0E0	-1,89E-5
ADP-fossil resources	MJ	1,05E2	1,06E0	4,54E0	1,11E2	2,72E0	5,86E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	3,03E0	0E0	-8,15E1
Water use[1)]	m^3e depr.	1,33E0	3,77E-3	3,15E-1	1,65E0	9,65E-3	3E-2	MND	MND	MND	MND	MND	MND	MND	0E0	4,09E-4	5,67E-2	0E0	-9,96E-1

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) 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 experienced with the indicator. 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO_4e.

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	2,83E-7	5,37E-9	1,86E-8	3,07E-7	1,37E-8	3,51E-9	MND	MND	MND	MND	MND	MND	MND	0E0	5,04E-10	1,72E-8	0E0	-2,13E-7
Ionizing radiation[3)]	kBq U235e	4,23E-1	4,64E-3	1,4E-2	4,41E-1	1,19E-2	2,39E-3	MND	MND	MND	MND	MND	MND	MND	0E0	4,12E-4	1,03E-2	0E0	-3,12E-1
Ecotoxicity (freshwater)	CTUe	7,46E1	8,28E-1	1,33E1	8,88E1	2,12E0	1,8E0	MND	MND	MND	MND	MND	MND	MND	0E0	8,45E-2	5,21E0	0E0	2,08E2

Human toxicity, cancer	CTUh	1,16E-8	2,35E-11	3,67E-10	1,2E-8	6,01E-11	1,47E-10	MND	MND	MND	MND	MND	MND	MND	0E0	2,2E-12	2,96E-10	0E0	-9,29E-9
Human tox. non-cancer	CTUh	1,65E-7	9,5E-10	8,87E-9	1,74E-7	2,43E-9	1,43E-9	MND	MND	MND	MND	MND	MND	MND	0E0	8,94E-11	6,23E-9	0E0	-1,29E-7
SQP	-	3,49E0	1,18E0	1,07E0	5,75E0	3,03E0	1,21E-1	MND	MND	MND	MND	MND	MND	MND	0E0	1,09E-1	1,63E0	0E0	-8,07E-1

4) SQP = Land use related impacts/soil quality.5) 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.

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	2,31E1	1,51E-2	4,03E0	2,72E1	3,86E-2	4,65E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,13E-3	2,06E-1	0E0	-1,87E1
Renew. PER as material	MJ	0E0	0E0	1,29E0	1,29E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-2,68E-1
Total use of renew. PER	MJ	2,31E1	1,51E-2	5,33E0	2,85E1	3,86E-2	4,65E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,13E-3	2,06E-1	0E0	-1,9E1
Non-re. PER as energy	MJ	7,32E1	1,06E0	4,41E0	7,87E1	2,72E0	5,86E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	3,03E0	0E0	-5,36E1
Non-re. PER as material	MJ	3,18E1	0E0	1,3E-1	3,19E1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-2,79E1
Total use of non-re. PER	MJ	1,05E2	1,06E0	4,54E0	1,11E2	2,72E0	5,86E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	3,03E0	0E0	-8,15E1
Secondary materials	kg	1,58E-2	0E0	1,03E-1	1,19E-1	0E0	3,35E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	5,98E-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	2,88E-2	2,01E-4	7,14E-3	3,62E-2	5,15E-4	1,55E-3	MND	MND	MND	MND	MND	MND	MND	0E0	1,89E-5	1,04E-3	0E0	-1,91E-2

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	9,67E-1	1,1E-3	4,51E-2	1,01E0	2,83E-3	5,78E-3	MND	MND	MND	MND	MND	MND	MND	0E0	1,3E-4	0E0	0E0	-7,56E-1
Non-hazardous waste	kg	1,06E1	9,18E-2	8,89E-1	1,16E1	2,35E-1	9,83E-2	MND	MND	MND	MND	MND	MND	MND	0E0	8,81E-3	0E0	0E0	-7,04E0
Radioactive waste	kg	3,58E-4	7,26E-6	1,09E-5	3,76E-4	1,86E-5	2,43E-6	MND	MND	MND	MND	MND	MND	MND	0E0	6,54E-7	0E0	0E0	-2,64E-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	0E0	0E0	1,77E-1	1,77E-1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1E0	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	1,58E-3	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

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

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	5,2E0	6,96E-2	2,86E-1	5,56E0	1,78E-1	1,54E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,62E-3	3,37E-1	0E0	-3,71E0
ADP-minerals & metals	kg Sbe	3,05E-5	1,74E-6	4,22E-4	4,54E-4	4,44E-6	9,06E-7	MND	MND	MND	MND	MND	MND	MND	0E0	1,61E-7	4,81E-6	0E0	-1,89E-5
ADP-fossil	MJ	1,05E2	1,06E0	4,54E0	1,11E2	2,72E0	5,86E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	3,03E0	0E0	-8,15E1
Water use	m^3e depr.	1,33E0	3,77E-3	3,15E-1	1,65E0	9,65E-3	3E-2	MND	MND	MND	MND	MND	MND	MND	0E0	4,09E-4	5,67E-2	0E0	-9,96E-1
Secondary materials	kg	1,58E-2	0E0	1,03E-1	1,19E-1	0E0	3,35E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	5,98E-1
Biog. C in product	kg C	N/A	N/A	0E0	0E0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	N/A	N/A	2,52E-3	2,52E-3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7) Biog. C in product = Biogenic carbon content in product

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source & quality	All electricity consumed is certified green electricity Data Source: Electricity production, wind, 1-3mw turbine, onshore (Reference product: electricity, high voltage), Germany 2019
Electricity CO2e /kWh	0.0175 kg CO2e / kWh
Bottled Gas data source & quality	Data source: Natural gas, burned in gas motor, for storage (Reference product: natural gas, burned in gas motor, for storage), Germany 2019
Bottled Gas CO2e/MJ	0.0598 kg CO2e /MJ
District Heating data source & quality	Data Source: Heat and power co-generation, hard coal (Reference product: heat, district or industrial, other than natural gas), Germany 2019
District Heating CO2e/MJ	0,0571 kg CO2e/MJ

Transport scenario documentation

Scenario parameter	Value
A4 specific transport CO2e emissions, kg CO2e / tkm	0.13
A4 average transport distance, km	1100
Transport capacity utilization, %	100
Bulk density of transported products, kg/m^3	-
Volume capacity utilisation factor for nested packaged products	1

End of life scenario documentation

Scenario parameter	Value
Collection process – kg collected separately	1
Collection process – kg collected with mixed waste	-
Recovery process – kg for re-use	-
Recovery process – kg for recycling	1
Disposal (total) – kg for final deposition	-
Scenario assumptions e.g. transportation	End-of-life product is transported 50km with an average lorry

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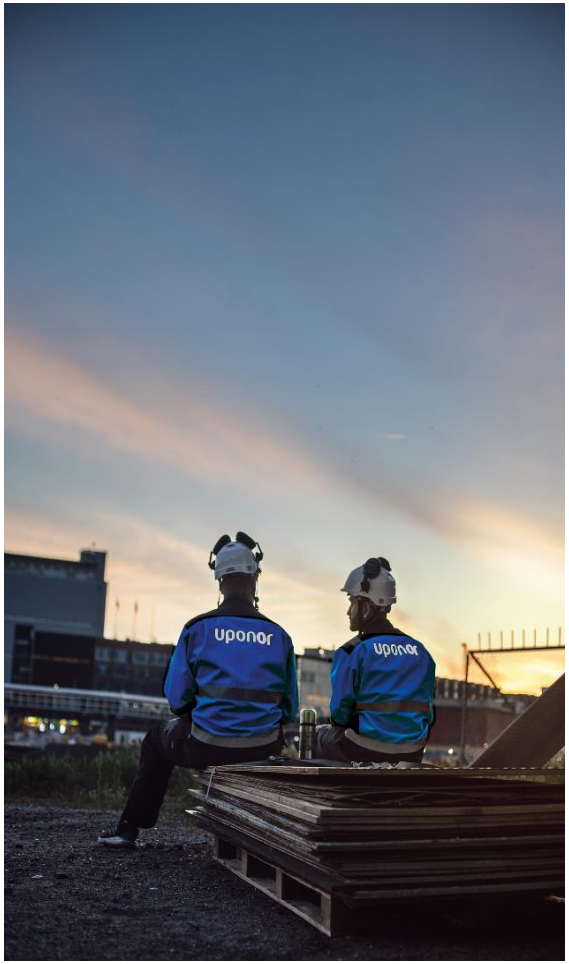

ABOUT THE MANUFACTURER

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.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Uponor Corporation
EPD author	Dr. Qian Wang, Uponor Corporation, www.uponor.com
EPD verifier	Silvia Vilčeková, Silcert, s.r.o
EPD program operator	Rakennustietosäätiö RTS Building Information Foundation RTS Malminkatu 16 A 00100 Helsinki http://cer.rts.fi
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Plumbing Products, Components, Equipment and Systems

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 EN 15804, 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 background report (project report) for this EPD

Why does verification transparency matter? Read more online.

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Silvia Vilčeková, Silcert, s.r.o
EPD verification started on	14.12.2021
EPD verification completed on	17.01.2022
Approver of the EPD verifier	The Building Information Foundation RTS sr

Author & tool verification	Answer
EPD author	Dr. Qian Wang
EPD author training completion	15.09.2020

EPD Generator module	One Click LCA Pre-Verified EPD Generator for Plumbing Products, Components, Equipment and Systems
Independent software verifier	Anni Ovir, Rangi Maja OÛ
Software verification date	20.06.2020

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 EN 15804:2012+A2:2019.

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.

Silvia Vilčeková, Silcert, s.r.o

ANNEX 1

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	4,99E0	6,89E-2	3,68E-1	5,42E0	1,76E-1	5,57E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,55E-3	3,33E-1	0E0	-3,62E0
Ozone depletion Pot.	kg CFC_{-11}e	4,96E-7	1,27E-8	2,33E-8	5,32E-7	3,25E-8	3,81E-9	MND	MND	MND	MND	MND	MND	MND	0E0	1,15E-9	2,02E-8	0E0	-3,71E-7
Acidification	kg SO_2e	2,48E-2	1,42E-4	1,77E-3	2,67E-2	3,63E-4	1,81E-4	MND	MND	MND	MND	MND	MND	MND	0E0	2,01E-5	8,29E-4	0E0	-1,89E-2
Eutrophication	kg PO_4^3e	9,09E-3	2,95E-5	7,61E-4	9,88E-3	7,55E-5	1,2E-4	MND	MND	MND	MND	MND	MND	MND	0E0	4,61E-6	6,17E-4	0E0	-6,24E-3
POCP (“smog”)	kg C_2H_4e	2,47E-3	9,16E-6	8,45E-5	2,56E-3	2,35E-5	2,09E-5	MND	MND	MND	MND	MND	MND	MND	0E0	8,7E-7	5,52E-5	0E0	-1,96E-3
ADP-elements	kg Sbe	3,05E-5	1,74E-6	4,22E-4	4,54E-4	4,44E-6	9,06E-7	MND	MND	MND	MND	MND	MND	MND	0E0	1,61E-7	4,81E-6	0E0	-1,89E-5
ADP-fossil	MJ	1,05E2	1,06E0	4,54E0	1,11E2	2,72E0	5,86E-1	MND	MND	MND	MND	MND	MND	MND	0E0	9,88E-2	3,03E0	0E0	-8,15E1

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	4,96E0	6,88E-2	3,69E-1	5,4E0	1,76E-1	5,55E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,54E-3	3,33E-1	0E0	-3,59E0
Ozone Depletion	kg CFC_{-11}e	5,9E-7	1,69E-8	2,85E-8	6,35E-7	4,32E-8	5,01E-9	MND	MND	MND	MND	MND	MND	MND	0E0	1,54E-9	2,66E-8	0E0	-4,37E-7
Acidification	kg SO_2e	2,42E-2	2,49E-4	1,68E-3	2,61E-2	6,38E-4	1,98E-4	MND	MND	MND	MND	MND	MND	MND	0E0	2,42E-5	9,9E-4	0E0	-1,82E-2
Eutrophication	kg Ne	2,48E-3	3,52E-5	2,41E-4	2,76E-3	9E-5	3,32E-5	MND	MND	MND	MND	MND	MND	MND	0E0	3,36E-6	1,21E-4	0E0	-1,75E-3
POCP (“smog”)	kg O_3e	2,24E-1	5,37E-3	2,18E-2	2,51E-1	1,38E-2	3,09E-3	MND	MND	MND	MND	MND	MND	MND	0E0	5,1E-4	1,62E-2	0E0	-1,6E-1
ADP-fossil	MJ	1,13E1	1,51E-1	3,97E-1	1,18E1	3,87E-1	4,37E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1,39E-2	3,6E-1	0E0	-9,06E0

ANNEX 2: GWP TOTAL FOR A1-A3 STAGES PER AVAILABLE DIMENSION (CML / ISO 21930)

Product Number	Product Description	Weight of coil/bar (kg/m)	Outer diameter (mm)	Pipe length (m)	Global Warming Potential total for A1-A3 stages (kg CO2e)
1059576	UPONOR UNI PIPE PLUS WHITE 16X2,0 100M	0,111/0,119	16	100	5,7781E+01/6,194E+01
1059577	UPONOR UNI PIPE PLUS WHITE 16X2,0 200M	0,111/0,119	16	200	1,156E+02/1,239E+02
1059579	UPONOR UNI PIPE PLUS WHITE 20X2,25 100M	0,161/0,171	20	100	8,38E+01/8,901E+01
1059581	UPONOR UNI PIPE PLUS WHITE 25X2,5 50M	0,233/0,247	25	50	6,064E+01/6,428E+01
1059583	UPONOR UNI PIPE PLUS WHITE 32X3,0 50M	0,364/0,394	32	50	9,473E+01/1,025E+02

Stages A1-A3 include *Raw material extraction and processing*; *Transport to the manufacturer*; *Manufacturing*

For additional indicators, please refer to the previous tables in the document that represent 1kg of pipe. Multiply the results with weight/meter value and the respective pipe length to receive the impact per product number.