

# Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

## Average sanitaryware product made of Woodio® material

from

**Woodio Oy**

Hankasuontie 8, 00390 Helsinki, Finland

<https://woodio.fi/en/>



Programme:

The International EPD® System, [www.environdec.com](http://www.environdec.com)

Programme operator:

EPD International AB

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S-P-08517

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2023-06-30

Valid until:

2028-06-30



*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)*



## General information

### Programme information

<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
<b>E-mail:</b>	<a href="mailto:info@environdec.com">info@environdec.com</a>

<b>Product Category Rules (PCR)</b>	
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)	
Product Category Rules (PCR): <i>PCR 2019:14 Construction products, version 1.2.5</i>	
PCR review was conducted by: The Technical Committee of the International EPD® System. A full list of members available on <a href="http://www.environdec.com">www.environdec.com</a> . The review panel may be contacted via <a href="mailto:info@environdec.com">info@environdec.com</a> .	
<b>Life Cycle Assessment (LCA)</b>	
<b>Etteplan Finland Oy</b> Laserkatu 6, 53850 Lappeenranta, Finland <a href="http://www.etteplan.com">www.etteplan.com</a> LCA by: Emma Salminen and Kaisa Kuusela	
<b>Third-party verification</b>	
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:	
<input checked="" type="checkbox"/> EPD verification by individual verifier	
Third-party verifier: <i>Hannu Karppi, Ramboll Finland Oy</i>	
Approved by: The International EPD® System	
Procedure for follow-up of data during EPD validity involves third party verifier:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

## Company information

### Owner of the EPD:

Woodio Oy

### Contact:

Petro Lahtinen, CEO & Founder

petro.lahtinen@woodio.fi

### Description of the organisation:

Woodio is a Finnish modern-day interior and design brand that brings together the best of Nordic design traditions and the use of sustainable bio-material innovation in a contemporary way. All our products are made from our signature material called Woodio®. It is the world's first 100% waterproof solid wood composite designed to replace ceramic and stone materials – sustainably.

<https://woodio.fi/en/>

### Product-related or management system-related certifications:

✓ ISO 9001

### Name and location of production site(s):

Woodio Factory

Hankasuontie 8

00390 Helsinki

Finland

## Product information

### Product name:

Average Woodio® sanitaryware product. Two material formulations are included in this EPD: colored Woodio® Northern Elements and uncolored Woodio® Natural. Woodio® Northern Elements is the representative material of which content and results are declared in this EPD.

### Product identification:

The Woodio material is the world's first 100 % waterproof solid wood composite designed to be an ecological alternative to ceramics and stone materials. Woodio material meets the functional requirements according to the BS EN 997:2012, 14688:2006, and 14516:2015 for sanitary appliances. Table 1 lists example products which this EPD represents and their masses for reference to the declared unit (1 kg of Woodio material).

Table 1. Products, identification, dimensions and masses.

Woodio® product	Product identification	Dimensions, L x W x H (mm)	Mass (kg)
S40 table top	S40T	Ø 400 x 188	5.3
S60 table top	S60T	600 x 400 x 173	8.8
C40 table top	C40T	400 x 400 x 184	6.9
C60 table top	C60T	600 x 400 x 169	10.3
Flow bathtub	BT01	1600 x 700 x 630	80
Block wall hung toilet	WC-BL	592 x 393 x 366	29.7

Product description:

The Woodio material is a composite of wood chips and resin, and it can be coated with gelcoat type coating on the surfaces requiring improved resistance against moisture, chemicals, dirt, UV or abrasion. The Woodio material is waterproof and can be placed in environments where temperature and humidity are constantly varying, e.g. in sanitary facilities. In addition, the material can be used in many interior refurbishing applications such as furniture, worktops and kitchen backsplash.

UN CPC code: 36930 Baths, wash-basins, lavatory pans and covers, flushing cisterns and similar sanitary ware, of plastics

Content information:

The material consists of wood, resin, gelcoat and silica based filler. The material composition in maximum moisture content is presented in the table below.

Table 2. Product composition.

Product components	Weight, kg	Post-consumer recycled material, weight-%	Biogenic material, weight-% and kg C/kg
Wood (dry)	0.20	0	100 wt.%; 0.49 kg C/kg
Moisture	0.01	0	0
Resin and gelcoat	0.77	0	0
Filler	<0.05	100 wt.%	0
Pigment	<0.01	0	0
TOTAL	1	2 wt.%	20 wt.%; 0.10 kgC/kg
Product components	Weight, kg	Post-consumer recycled material, weight-%	Biogenic material, kg C/kg
Cardboard	0.08	0	0.43 kgC/kg

Dangerous substances

Woodio material does not contain dangerous substances from the candidate list of SVHC.

## LCA information

Declared unit:

1 kg of average Woodio® sanitaryware product without fittings, including packaging

The declared unit represents 1 kg of any sanitaryware product made from Woodio® Nothern Elements and Woodio® Natural. To obtain product specific LCA results, multiply the result value by the mass of the product (kg). Declared unit and conversion factor from mass to volume are presented in Table 3.

Table 3. Declared unit and conversion factor.

Indicator	Unit	Amount
Declared unit	kg	1.0
Product density (conversion factor)	dm <sup>3</sup> /kg	1.0

Reference service life:

The type of this EPD is cradle to gate with modules C1–C4 and module D (A1–A3 + C + D) and therefore reference service life is not applicable.

Time representativeness:

Manufacturer-specific data represents year 2022.

Geographical scope:

Woodio® products are manufactured at the site of Woodio Oy located in Helsinki, Finland (module A3). The geographical scope of raw material production and transportation (modules A1 and A2) includes Europe and North America. End of life stage (module C) and resource recovery stage (module D) take place in Finland.

Database(s) and LCA software used:

GaBi Software version 10.6 is used for modeling and calculation of results. Used databases include GaBi Professional database 2022 and Extension database XVII: full US from Sphera and Ecoinvent 3.8 (cut-off) from Ecoinvent.

Description of system boundaries:

System boundary is cradle to gate with modules C1–C4 and module D (A1–A3 + C + D). The life cycle of the studied Woodio® product therefore considers all operations from resource extraction and processing into raw materials for the product (A1), transportation to the production site (A2), manufacturing of the finished product (A3) to end-of-life treatment of the product, including deconstruction by hand (C1), transportation to energy recovery (C2), energy recovery (C3) and disposal (C4) (no activities in this module). Resource recovery stage (D) depicts the recovery potential of materials and energy in the product system. Additional information module A5 is reported for the end-of-life of product packaging. See Figure 1 for a visual description of the studied product system and Table 4 for information on declared modules.

Figure 1. System diagram.

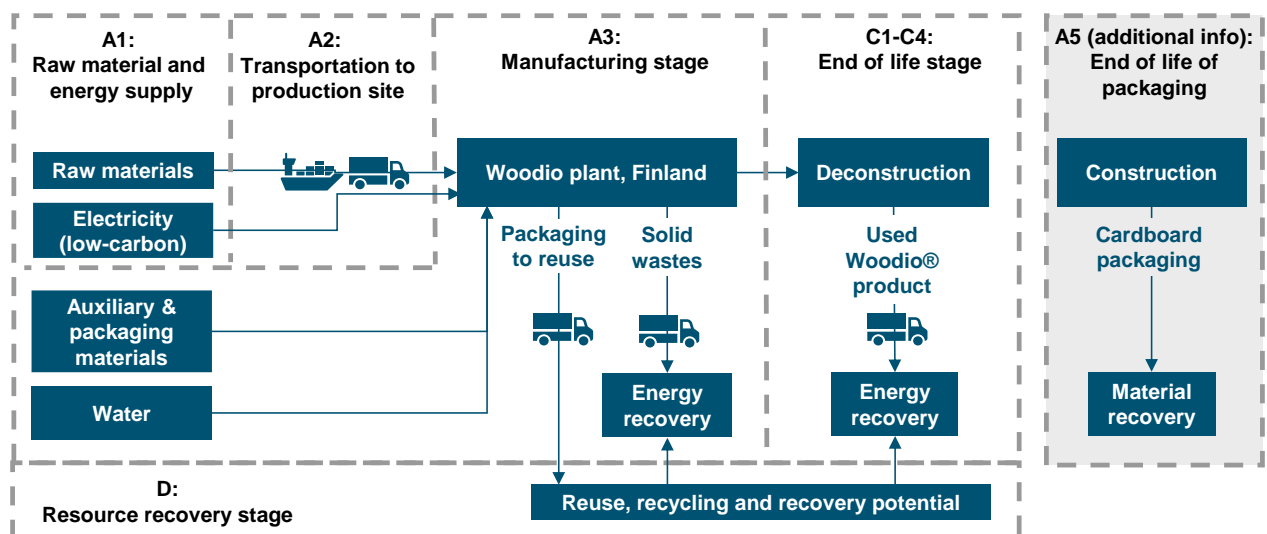


Table 4. Modules declared, geographical scope and (in GWP-GHG results) share of specific data and data variation.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5(*)	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	US, EU	US, EU	FI	-	-	-	-	-	-	-	-	-	FI	FI	FI	FI	FI
Specific data used	2.2%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0.2%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	Single site, no variation			-	-	-	-	-	-	-	-	-	-	-	-	-	-

ND = not declared; US = United States; EU = Europe; FI = Finland. (\*) Note: A5 is reported as additional information module (treatment of product packaging).

Raw materials are sourced from several countries and shipped to the production site in Finland by road and sea. Solid wastes from production, including material loss, are directed to energy recovery – recovered energy is assumed to substitute for local district heat mix and average Finnish electricity grid mix. Reusable packaging is transported back to raw material supplier.

The manufacturing process is similar for all products. Production of a colored product begins with impregnation of wood chips with coloring agent and drying the chips to wanted moisture level. Product mold is cleaned and coated with gelcoat, which gives the finished Woodio® product its final surface quality properties. The mold is filled with wood chips and resin. After curing the product is removed from the mold and post-cured. Woodio® product is finished by drilling holes for fittings and by sanding the edges.

End-of-life stage is based on assumptions about the most likely scenario in Finland. It is assumed that the sanitaryware product is dismantled by hand and transported 100 km to waste processing, where the composite product is crushed prior energy recovery. Recovered energy is assumed to substitute for average Finnish district heat mix and electricity grid mix. Assumptions pertaining to modules beyond A3 are summarized in Table 5. Module A5 is reported as additional information since product packaging contains biogenic carbon, balanced out in module A5.

Table 5. Assumptions pertaining to modules beyond module A3.

Module	Assumptions and modeling
A5*	Cardboard packaging is assumed to be collected separately and recycled into testliner. (* Additional information module.)

C1	Woodio® product is deconstructed by hand and loaded into a waste container. (No material or energy inputs or outputs related to this activity.)
C2	100 km transportation by truck (Euro 5, 7.5 t - 12t gross weight / 5t payload capacity), 51 % utilization rate; Diesel mix at filling station, 6.91 % biogenic carbon content.
C3	Crushing (0.007 kWh/kg Finnish grid mix electricity used) and energy recovery of Woodio® product.
C4	(No material or energy inputs or outputs related to this module.)
D	Substitution of local district heat mix and Finnish grid mix from energy recovery of energy waste (A3), material reject (A3) and product at end-of-life (C3).

#### Cut-off criteria:

Flows accounting less than 1% of the overall input mass or energy flows are excluded from the study if appropriate LCI data or even proxy data is not available. The sum of excluded flows should not exceed 5% of the total inflows (by mass or by energy).

The flows knowingly excluded are as follows:

- Capital equipment, infrastructure, and employee commute as well as use of electrical hand tools and sanitary water at the production plant are excluded.
- The production of wood stain is excluded. This exclusion is deemed of minor importance due to small content in the product (0.23 weight-%).

#### Data quality:

Primary data of Woodio Oy represents year 2022 and annual production inventory data is used as the basis of calculation. Modeling data is obtained from GaBi Professional database 2022 and Extension database XVII: full US and Ecoinvent 3.8 database. Inventory data from literature and supplier specific patent are used to model the production of filler. Time-related, geographical and technological representativeness are assessed before using secondary data and overall, the data quality is good.

#### Allocation:

The recommended allocation procedure described in ISO 14044 section 4.3.4 and in PCR is followed. Co-product allocation is not carried out since no co-products are generated during production. "Polluter pays" principle is applied in the allocation in the reuse and recovery processes of waste flows in modules A and C: all environmental burdens related to waste treatment are allocated to Woodio® products of which production leads to the generation of waste. System expansion and substitution approach are applied to waste streams generated in modules A and C by including the substituted processes inside the system boundary (in module D).

#### Assumptions and limitations:

Transportation to user (A4), installation of the product (A5) or the use stage of the product (B) are not assessed in the results (module A5 is reported as additional information and contains only the end of life of product packaging). End-of-life stage (C1-C4) is modeled according to the currently plausible scenario, but for a newly installed product that would reach its end of life years into the future, the scenario may not be representative if e.g. the reuse or recycling rate of Woodio composite material became more common.

## Results of the environmental performance indicators

This EPD represents two material formulations: Woodio Northern Elements and Woodio Natural. Results of the representative product, Woodio Northern Elements, are declared. Module A5 is reported as additional information (recycling of biogenic product packaging).

### Mandatory impact category indicators according to EN 15804

Results per 1 kg of average Woodio® sanitaryware product								
Indicator	Unit	A1-A3	A5 (add.)	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq.	2.00E+00	4.27E-02	0.00E+00	2.27E-02	2.12E+00	0.00E+00	-4.06E-01
GWP-biogenic	kg CO <sub>2</sub> eq.	-4.60E-01	1.27E-01	0.00E+00	6.72E-05	3.65E-01	0.00E+00	-2.22E-02
GWP-luluc	kg CO <sub>2</sub> eq.	4.37E-04	1.35E-04	0.00E+00	2.11E-04	3.76E-06	0.00E+00	-6.84E-05
GWP-total	kg CO <sub>2</sub> eq.	1.54E+00	1.70E-01	0.00E+00	2.30E-02	2.48E+00	0.00E+00	-4.29E-01
ODP	kg CFC 11 eq.	3.38E-09	8.06E-14	0.00E+00	2.96E-15	4.64E-11	0.00E+00	-4.33E-13
AP	mol H <sup>+</sup> eq.	3.48E-03	7.34E-05	0.00E+00	8.57E-05	2.34E-04	0.00E+00	-1.64E-03
EP-freshwater	kg P eq.	1.01E-05	1.25E-06	0.00E+00	8.32E-08	3.88E-08	0.00E+00	-3.50E-07
EP-marine	kg N eq.	1.10E-03	3.39E-05	0.00E+00	3.94E-05	6.70E-05	0.00E+00	-4.07E-04
EP-terrestrial	mol N eq.	1.19E-02	3.09E-04	0.00E+00	4.44E-04	1.08E-03	0.00E+00	-4.45E-03
POCP	kg NMVOC eq.	1.53E-02	6.74E-05	0.00E+00	7.70E-05	1.86E-04	0.00E+00	-1.22E-03
ADP-minerals & metals*	kg Sb eq.	4.50E-07	1.91E-08	0.00E+00	1.50E-09	1.49E-09	0.00E+00	-1.80E-08
ADP-fossil*	MJ	7.04E+01	5.94E-01	0.00E+00	3.10E-01	4.23E-01	0.00E+00	-7.42E+00
WDP*	m <sup>3</sup>	3.38E-01	1.14E-03	0.00E+00	2.75E-04	1.97E-01	0.00E+00	-2.42E-02

*GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption*

*\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

### Additional mandatory and voluntary impact category indicators

Results per 1 kg of average Woodio® sanitaryware product								
Indicator	Unit	A1-A3	A5 (add.)	C1	C2	C3	C4	D
GWP-GHG <sup>1</sup>	kg CO <sub>2</sub> eq.	2.01E+00	3.37E-01	4.31E-02	0.00E+00	2.30E-02	0.00E+00	2.12E+00

<sup>1</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.



## Use of resources

Results per 1 kg of average Woodio® sanitaryware product								
Indicator	Unit	A1-A3	A5 (add.)	C1	C2	C3	C4	D
PERE	MJ	1.06E+01	1.36E+00	0.00E+00	2.26E-02	1.17E-01	0.00E+00	-6.25E+00
PERM	MJ	5.45E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.60E+01	1.36E+00	0.00E+00	2.26E-02	1.17E-01	0.00E+00	-6.25E+00
PENRE	MJ	5.13E+01	5.95E-01	0.00E+00	3.11E-01	4.23E-01	0.00E+00	-7.43E+00
PENRM	MJ	2.01E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	7.13E+01	5.95E-01	0.00E+00	3.11E-01	4.23E-01	0.00E+00	-7.43E+00
SM	kg	2.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	2.67E-02	6.46E-04	0.00E+00	2.47E-05	4.65E-03	0.00E+00	-3.78E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

## Waste indicators

Results per 1 kg of average Woodio® sanitaryware product								
Indicator	Unit	A1-A3	A5 (add.)	C1	C2	C3	C4	D
HWD	kg	1.86E-08	2.18E-08	0.00E+00	9.63E-13	4.74E-12	0.00E+00	4.32E-10
NHWD	kg	2.98E-02	1.94E-03	0.00E+00	4.74E-05	2.15E-02	0.00E+00	-1.25E-02
RWD	kg	6.33E-03	1.38E-05	0.00E+00	5.82E-07	3.22E-05	0.00E+00	-1.25E-03

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

## Output flow indicators

Results per 1 kg of average Woodio® sanitaryware product								
Indicator	Unit	A1-A3	A5 (add.)	C1	C2	C3	C4	D
CRU	kg	5.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	8.90E-02	0.00E+00	0.00E+00	0.00E+00	9.79E-01	0.00E+00	0.00E+00
EEE	MJ	2.66E-01	0.00E+00	0.00E+00	0.00E+00	2.99E+00	0.00E+00	0.00E+00
EET	MJ	4.87E-01	0.00E+00	0.00E+00	0.00E+00	5.38E+00	0.00E+00	0.00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy, electricity; EET = Exported energy, thermal

## Additional environmental information

The wood used in Woodio material acts as a carbon stock for the whole service life of the product. When the product reach the end of life, it can be disposed of as energy waste, which reduces amount of construction waste at landfills.

Product meets M1 indoor air quality requirements.

The production of Woodio material is based on sustainable choices throughout the life cycle of the products – from the choice of materials to manufacturing, long-term use and disposal. The energy-efficient process technology does not require large amounts of water or high temperatures, leading to reduced material footprint.

## References

- General Programme Instructions of the International EPD<sup>®</sup> System. Version 4.0.
- PCR 2019:14 Construction products. Version 1.2.5
- BS EN 997. 2012. WC pans and WC suites with integral trap.
- BS EN 14688. 2006. Sanitary appliances - Wash basins - Functional requirements and test methods.
- BS EN 14516. 2015. Baths for domestic purposes.
- Ecoinvent. 2021. Ecoinvent 3.8 database (cut-off).
- Kuusela & Salminen. 2023. LCA of an average sanitaryware products made of Woodio<sup>®</sup> material.
- Sphera. 2023. GaBi Professional database 2023 + Extension database XVII: full US.

