

Environmental Product Declaration

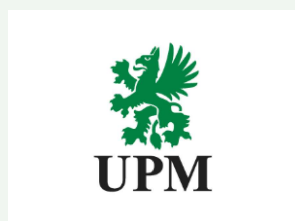


In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

WISA[®] Birch plywood, uncoated

from

UPM Plywood Oy



Programme:	The International EPD [®] System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-10542
Publication date:	2023-10-25
Revision date:	2024-05-17
Valid until:	2028-10-25


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



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Product Category Rules (PCR)	
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)	
Product Category Rules (PCR): PCR 2019:14 Construction products, version 1.2.5; c-PCR-006 (to PCR 2019:14) Wood and wood-based products for use in construction (EN 16485:2014) UN CPC 031, 311, 312, 313, 314, 315, 316, 319, version 2019-12-20.	
PCR review was conducted by: The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com . The review panel may be contacted via info@environdec.com .	
Life Cycle Assessment (LCA)	
Etteplan Finland Oy Laserkatu 6, 53850 Lappeenranta, Finland www.etteplan.com LCA by: Kaisa Kuusela	
Third-party verification	
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: Hannu Karppi, Ramboll Finland Oy 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:

UPM Plywood Oy

Contact:

Sanna Kontinen,
Manager, Environmental Affairs
e-mail: sanna.kontinen@upm.com

More information: www.wisaplywood.com

Description of the organisation:

UPM Plywood offers high quality WISA® plywood and veneer products for construction, vehicle flooring, LNG shipbuilding, parquet manufacturing and other industrial applications. In 2022 UPM Plywood sales was EUR 539 million and it had 1,982 employees. UPM has five plywood mills and one veneer mill in Finland and one plywood mill in Estonia.

Product-related or management system-related certifications:

- ✓ FSC and PEFC CoC
- ✓ ISO 9001, ISO 14001 & ISO 45001
- ✓ CE marking according to EN 13986:2004+A1:2015 with AVCP 2+ & 4 (depending on the product)
- ✓ M1 emission classification (depending on the product)

Names and locations of production sites:

- ✓ UPM Joensuu Plywood mill
Sirkkalantie 17
80100 Joensuu
- ✓ UPM Savonlinna Plywood mill
Schaumanintie 1
57200 Savonlinna
- ✓ UPM Otepää Plywood mill
Tehase 2
67404 Otepää

Product information

Product name:

WISA® uncoated birch plywood. This is a name for a range of different plywood products, see Table 1. This EPD represents the average composition and production of multiple plywood products manufactured at three mills in Finland and Estonia. The results presented in this EPD for 1 m³ of average uncoated birch plywood are weighted according to the production volumes at each mill.

Table 1. Products included in the results of this average EPD.

Product group	Product	Features
WISA® uncoated birch plywood	WISA®-Birch WISA®-Birch Premium WISA®-Birch Special WISA®-Parquet Birch WISA®-Birch PQ	Basic uncoated birch plywood board.
	WISA®-Duo	Uncoated plywood panel from birch and spruce veneers.
	WISA®-LNG Mark III	LNG Mark III approved uncoated birch panel.
	WISA®-LNG NO96	LNG NO96 approved uncoated birch panel.

Up-to-date information on products is available at www.wisaplywood.com

Product identification:

WISA-Plywood products are marked with CE-marking containing unambiguous code of Declaration of Performance, i.e. UPM007CPR.

Product description:

WISA® Plywood products are sustainable material for permanent constructions and infrastructure. Panels are strong, stiff and lightweight and hence suitable for multiple different uses in building and construction applications, such as roofing, flooring and wall sheeting.

As permanent component of building or infrastructure, plywood boards are primarily used in dry indoor or moderately humid conditions (reference in-use conditions), such as in roofing, flooring and wall sheeting. According to research results and experience, glued timber products, such as plywood, will have around the same service life expectations than solid wood in dry and moderately humid conditions. If installed properly and moisture exposure is low or moderate, the service life of the plywood board is 100 years at minimum.

UN CPC code: 31410

Geographical scope:

WISA® uncoated birch plywood products are manufactured in Finland and Estonia and modules A1–A3 mostly represent these locations. Plywood products are used across Europe and therefore modules A4–A5, B, C (end-of-life stage) and D (avoided burdens) represent specific destination countries in Europe.

LCA information

Declared unit:

1 m³ of WISA® uncoated birch plywood board from cradle to grave. Plywood density is 680 kg/m³, which acts as a conversion factor for declared indicator results.

Reference service life:

100 years. As permanent component of building or infrastructure, plywood boards are primarily used in dry indoor or moderately humid conditions (reference in-use conditions), such as in roofing, flooring and wall sheeting. According to research results and experience, glued timber products, such as plywood, will have around the same service life expectations than solid wood in dry and moderately humid conditions. If installed properly and moisture exposure is low or moderate, the service life of the plywood board is 100 years at minimum.

Time representativeness:

Manufacturer-specific data (module A3) represents year 2021. Time representativeness of secondary data used was mainly very good, and good overall.

Database(s) and LCA software used:

LCA for Experts software version 10.8 is used for modeling and calculation of results. Used databases include Sphera Professional Core 2024 and Ecoinvent 3.10 (cut-off system model).

Description of system boundaries:

The system boundaries of this EPD are cradle to grave and module D (A + B + C + D). Therefore, all life cycle stages are included. See Table 2 and Figure 1 below for information on declared modules and descriptions further below.

Table 2. Modules declared, geographical scope, share of specific data and data variation (in GWP-GHG results):

	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	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	FI, EE, EU			FI, EE, EU														FI, EE, EU
Specific data used	22 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	1 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	12 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

EE = Estonia; EU = Europe; FI = Finland.

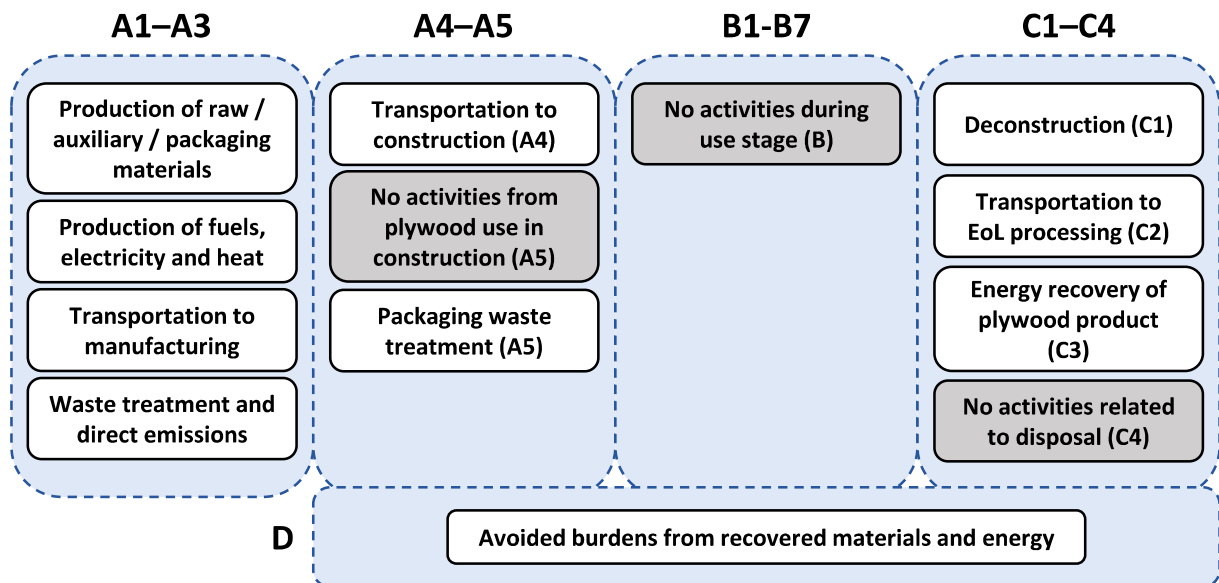


Figure 1. System diagram.

Module A1 includes the production of raw materials and energy used in the manufacturing of the plywood products. Birch logs are sourced from Finland and Estonia according to mill locations. Plywood mills have onsite energy plants that use wood residues from plywood manufacturing as fuel. Residual electricity used in manufacturing is produced mostly with natural gas, nuclear power and coal and its emission factor is 0.311 kg CO₂ eq./kWh (GWP-GHG).

Module A2 comprises of transportation processes up to the plywood mill gates. Most of the materials are shipped to the mills by road and few materials are also shipped by sea.

Module A3 includes the direct emissions of the manufacturing processes at the plywood mills, production of auxiliary and packaging materials, treatment of solid wastes and pre-treatment of wastewater. Plywood manufacturing process is depicted in Figure 2 below (note: coating line processes are not related to uncoated plywood products).

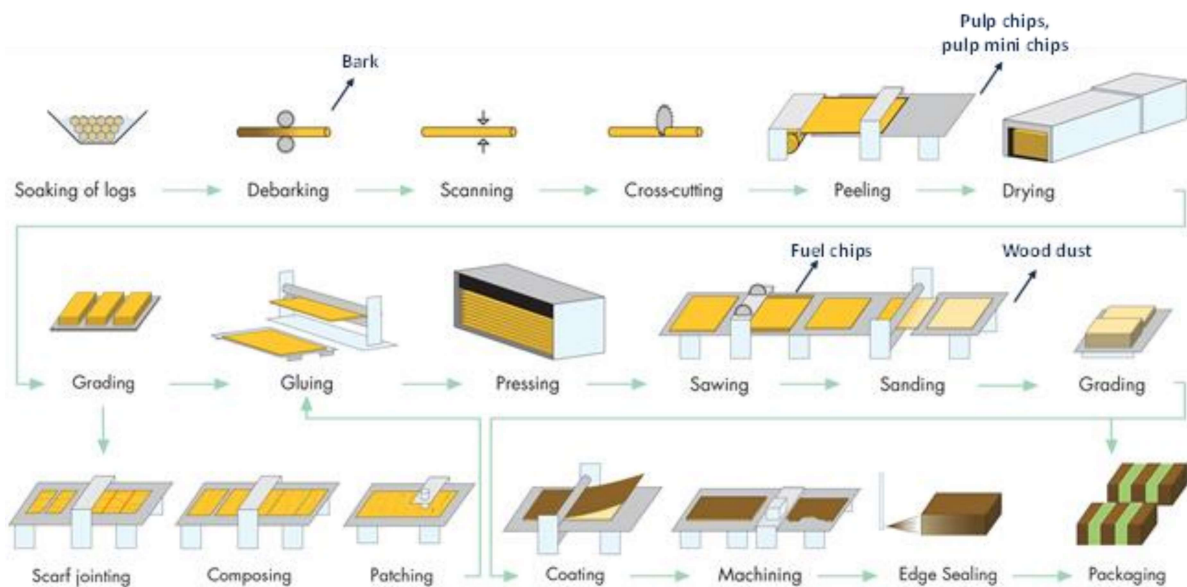


Figure 2. Manufacturing process flow diagram. Coating line is not included for uncoated plywood products.

Module A4 describes the transportation of plywood products to end users in multiple European countries. In module A5 the plywood products are installed/used in construction (no significant inputs are identified to be used in construction). Plywood wastage and product packaging are directed to waste treatment in module A5.

Modules B1–B7 describe the use stage of plywood board installed in a building; the plywood does not require maintenance or create additional material or energy consumption, and therefore the environmental impacts in module B are estimated to be insignificant and presented as zero. Modules C1–C4 describe the deconstruction of the plywood (C1), transportation to waste processing (C2), waste processing (C3) and disposal (C4). Plywood is assumed to be recovered as energy, of which burdens belong to module C3, and no activities are included in module C4. Module D describes the material and energy resource recovery across the life cycle.

Table 3. Modeling data pertaining to modules A4–C4.

Module	Module information
A4	977 km by road (Euro 5 truck, 24.7 ton payload capacity; 61 % utilization rate) 1198 km by sea (Container ship, 14 000 dead weight tonnage; 70 % utilization rate)
A5	5 % plywood material loss
B1–B7	No activities (estimated to be insignificant and presented as 0).
C1	Deconstruction (Excavator, 100 kW, construction)
C2	100 km assumed (Euro 6 truck, 9.3 ton payload capacity; 51 % utilization rate)
C3	100 % energy recovery assumed.
C4	No activities (presented as 0).
D	Quality ratios of recovered materials are accounted for. Default efficiency of energy recovery are 25–27 % for heat, 13–15 % for electricity (Sphera). Heat from natural gas (A5/C3) and country-specific electricity grid mix (A5/C3) are assumed to be avoided.

Cut-off criteria:

The sum of excluded flows do not exceed 1% of the total inputs or outputs (by mass or by energy). The flows knowingly excluded are as follows:

- Capital equipment, infrastructure, and employee commute.
- A1: Production of few minor auxiliary/raw materials (<0.05 % of material input mass to mills).
- A3: Few minor solid waste flows (<0.07 % of plywood production mass).
- A5: Production of screws and use of screwdriver in construction stage.
- B1: Emissions to air during use stage are very minor and assumed to be zero.

Allocation:

Volumetric allocation is used to allocate annual flows between main products from the mills, coated and coated birch plywood. Economic allocation is then applied to allocate flows between plywood product and wooden co-products of the mill. Economic allocation is applied only to raw material (wood) and energy inputs relating to the formation of co-products. Plywood products carry at least 94 % of burdens from manufacturing.

Data quality:

Primary data of UPM Plywood represents year 2021 and annual production inventory data is used as the basis of calculation. Modeling data is obtained from Sphera Professional Core 2024 and Ecoinvent 3.10 databases. Time-related, geographical and technological representativeness are assessed before using secondary data and overall, the data quality is good.

Content information

Compositions of average WISA® uncoated birch plywood and accompanying packaging are presented in Table 4 below. It should be noted that the plywood composition represents a calculated average of all included plywood products and not any specific product.

Table 4. WISA® uncoated birch plywood composition and packaging (average for multiple products).

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Wood, birch	561.4	0 %	100%, 0.49
Wood, spruce	0.8	0 %	100%, 0.49
Moisture	56.3	0 %	0 %
Adhesive resin	50.9	0 %	0 %
Hardeners and fillers	10.4	0 %	0 %
Others (i.e. composing adhesives, fillers)	0.2	0 %	0 %
TOTAL	680.0	0 %	82.7%, 0.41
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Bed timber	12.3	1.8 %	0.40
Plywood	10.6	1.6 %	0.45
Cardboard	0.8	0.1 %	0.43
Polyester band	0.2	0.0 %	0
Plastic wrap (LDPE)	1.4	0.2 %	0
TOTAL	25.3	3.7 %	0.39

* Only WISA® -Duo contains spruce veneers.

There are no SVHC substances in the product.

Results of the environmental performance indicators

The declared indicators in this section represent average WISA® uncoated birch plywood. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Mandatory impact category indicators (EN 15804+A2)

Results per 1 m ³ of average WISA® uncoated birch plywood												
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	C4	D	D
GWP-total	kg CO ₂ eq.	-858	61.7	97	0	0.416	9.08	1180	0	0	-341	-341
GWP-fossil	kg CO ₂ eq.	337	60.7	7.22	0	0.408	8.91	68.6	0	0	-340	-340
GWP-biogenic	kg CO ₂ eq.	-1200	0.131	89.8	0	0.00154	0.0212	1110	0	0	-1.02	-1.02
GWP-luluc	kg CO ₂ eq.	1.43	0.86	0.0173	0	0.00677	0.15	0.0101	0	0	-0.0378	-0.0378
ODP	kg CFC 11 eq.	1.66E-05	8.27E-12	1.65E-11	0	5.94E-14	1.31E-12	1.16E-10	0	0	-4.02E-09	-4.02E-09
AP	mol H ⁺ eq.	1.11	0.279	0.0182	0	0.00208	0.0121	0.174	0	0	-0.332	-0.332
EP-freshwater	kg P eq.	0.0992	2.21E-04	1.97E-05	0	1.72E-06	3.80E-05	2.99E-05	0	0	-7.07E-04	-7.07E-04
EP-marine	kg N eq.	0.459	0.101	0.00561	0	9.82E-04	0.00435	0.051	0	0	-0.114	-0.114
EP-terrestrial	mol N eq.	4.87	1.12	0.0759	0	0.0109	0.0521	0.73	0	0	-1.21	-1.21
POCP	kg NMVOC eq.	1.56	0.278	0.0148	0	0.00278	0.012	0.14	0	0	-0.317	-0.317
ADP-minerals&metals*	kg Sb eq.	1.93E-04	4.66E-06	5.83E-07	0	3.51E-08	7.75E-07	1.24E-06	0	0	-3.60E-05	-3.60E-05
ADP-fossil*	MJ	7430	786	45.4	0	5.31	117	256	0	0	-5730	-5730
WDP*	m ³	95.4	0.809	10.3	0	0.00624	0.138	116	0	0	-28.8	-28.8

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 (EN 15804+A2)

Results per 1 m ³ of average WISA® uncoated birch plywood										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	339	61.7	7.25	0	0.416	9.09	68.7	0	-343
PM	Disease incidences	7.67E-06	5.58E-06	1.27E-07	0	2.48E-08	1.24E-07	1.16E-06	0	-2.71E-06
IRP**	kBq U ²³⁵ eq.	72.4	0.196	0.344	0	0.0014	0.031	2.19	0	-34.3
ET-freshwater*	CTUe	1620	583	21.4	0	3.94	87	110	0	-876
HTP-c*	CTUh	2.92E-07	1.16E-08	1.32E-09	0	7.96E-11	1.76E-09	1.11E-08	0	-7.53E-08
HTP-n*	CTUh	4.13E-06	5.01E-07	6.85E-08	0	3.58E-09	7.89E-08	5.85E-07	0	-1.72E-06
SQI*	Pt	142000	332	22	0	2.61	57.7	81.4	0	-1540

* 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.

** Disclaimer: This impact category deals mainly with the eventual impact of low dose ionizing radiation 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.

GWP-GHG = Global Warming Potential greenhouse gases; PM = Particulate Matter; IRP = Ionizing Radiation Potential; ET-freshwater = Ecotoxicity freshwater; HTP-c = Human Toxicity Potential cancer; HTP-n = Human Toxicity Potential non-cancer; SQI = Soil Quality Index

¹ 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 CO₂ is set to zero.

Resource use indicators

Note: energy stored in the product is not balanced out over the life cycle A to C, but instead reported as primary energy used as material, even though it is lost from the product system under study, why this has to be considered in any further assessment or use of the reported result.

Results per 1 m ³ of average WISA® uncoated birch plywood										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	11400	58.6	23.9	0	0.457	10.1	72.5	0	-2480
PERM	MJ	26200	0	0	0	0	0	0	0	0
PERT	MJ	37600	58.6	23.9	0	0.457	10.1	72.5	0	-2480
PENRE	MJ	6770	786	45.4	0	5.31	117	256	0	-5730
PENRM	MJ	1320	0	0	0	0	0	0	0	0
PENRT	MJ	8090	786	45.4	0	5.31	117	256	0	-5730
SM	kg	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0	0
FW	m ³	2.91	0.0654	0.248	0	0.00051	0.0113	2.72	0	-1.25

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 m ³ of average WISA® coated birch plywood										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	kg	1.3	2.93E-08	2.84E-07	0	2.03E-10	4.49E-09	1.51E-07	0.00E+00	-5.64E-06
NHWD	kg	10.2	0.121	1.99	0	8.67E-04	0.0191	20.7	0	-3.5
RWD	kg	0.726	0.00136	0.00214	0	9.67E-06	2.14E-04	0.0138	0	-0.339

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

Output flow indicators

Results per 1 m ³ of average WISA® uncoated birch plywood										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	9.32	0	2.14	0	0	0	0	0	0
MER	kg	149	0	46.5	0	0	0	646	0	0
EEE	MJ	582	0	129	0	0	0	1460	0	0
EET	MJ	1700	0	233	0	0	0	2630	0	0

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

Other impact category indicators

Impact category indicators calculated according to EN 15804+A1.

Results per 1 m ³ of average WISA® uncoated birch plywood										
Indicator	Unit	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP	kg CO ₂ eq.	-887	51.3	98.4	0	0.404	8.82	1150	0	-337
ODP	kg R11 eq.	1.65E-05	9.73E-12	1.95E-11	0	6.99E-14	1.54E-12	1.37E-10	0	-4.74E-09
AP	kg SO ₂ eq.	0.809	0.207	0.0126	0	0.00144	0.00859	0.12	0	-0.25
EP	kg Phosphate eq.	0.514	0.0365	0.00253	0	3.49E-04	0.00197	0.0221	0	-0.049
POCP	kg Ethene eq.	0.221	0.00969	9.05E-04	0	1.59E-04	1.45E-04	0.00973	0	-0.0351
ADPE*	kg Sb eq.	1.98E-04	4.65E-06	5.97E-07	0	3.50E-08	7.72E-07	1.33E-06	0	-3.85E-05
ADPF*	MJ	5200	772	38.5	0	5.21	115	213	0	-4590

GWP = Global Warming Potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential; Accumulated Exceedance; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion for fossil resources potential

* 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.

Potential ecotoxicity impacts to humans, aquatic and terrestrial ecosystems, calculated according to Dutch requirements (add-ons to EN 15804).

Results per 1 m ³ of average WISA® uncoated birch plywood										
Indicator	Unit	A1+A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HTP*	kg DCB eq.	330	1.41	0.121	0	0.0106	0.176	0.973	0	-7.74
FAETP*	kg DCB eq.	29.8	0.318	0.0127	0	0.0022	0.0484	0.0402	0	-0.332
MAETP*	kg DCB eq.	92800	973	188	0	6.59	145	1340	0	-26500
TETP*	kg DCB eq.	1.66	0.131	0.0145	0	9.75E-04	0.0215	0.114	0	-0.332

HTP = Human Toxicity Potential; FAETP = Freshwater Aquatic Ecotoxicity Potential; MAETP = Marine Aquatic Ecotoxicity Potential; TETP = Terrestrial Ecotoxicity Potential

* 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 environmental information

There are no harmful substances released to air, water or ground during the use of the product. Regarding indoor air quality the plywood boards have (depending on the product) M1 emission classification granted by the Building Information Foundation RTS sr (Rakennustietosäätiö RTS sr). M1 stands for low emissions.

Differences between previously published version

This EPD is a revised version of previously published version. The following items have changed versus the previous version of this EPD:

- List of products included in the average EPD,
- Database versions used in modelling,
- Information pertaining to module A4,
- Composition of average product and packaging materials, and
- Results of the environmental performance indicators.

References

General Programme Instructions of the International EPD® System. Version 4.0.

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EN 13986:2004+A1:2015. Wood-based panels for use in construction.

Ecoinvent. 2024. Ecoinvent 3.10 database (cut-off).

Kuusela & Kempfi. 2024. LCA for WISA® uncoated and coated birch plywood.

Sphera. 2024. Sphera Professional Core 2024.

