Environmental Product Declaration

of multiple products, based on the average results of the product group.

In accordance with ISO 14025:2006, ISO 14025:2026 and EN 15804:2012+A2:2019/AC:2021 for:

Particleboard, raw

from

Rheinspan GmbH & Co. KG

Programme:	The International EPD System, www.environdec.com
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products from a company
EPD registration number:	EPD-IES-0034062:001
Version date:	2026-11-17
Validity date:	2031-11-17
	An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com



Products included in the EPD:

EcoMaxx 10 – 38 mm, 630 – 710 kg/m³

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:	support@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 2.0.1 and UN CPC code: 31431 – Particle board of wood
PCR review was conducted by: The Technical Committee of the International EPD System. A full list of members is available on www.environdec.com. **Chair of the PCR review:** Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat www.environdec.com/support.
c-PCR, if applicable: c-PCR-006 version 2.0.0 Wood and wood-based products for use in construction (EN 16485:2026)

LCA Accountability
LCA accountability: DEKRA Assurance Services GmbH, Handwerkstraße 15, 70565 Stuttgart, Germany

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006 and ISO 14025:2026, via: ☒ **Individual EPD verification without a pre-verified LCA/EPD tool** Third-party verifier: Manfred Russ (Mail: manfred@russ-lca.com) Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit 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 identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.
For further information about comparability, see EN 15804 and ISO 14025

INFORMATION ABOUT EPD OWNER

Owner of the EPD: Rheinspan GmbH & Co. KG
Address: Konrad-Nolte-Straße 40, 76726 Germersheim, Germany

Contact: Beate Zwick, b.zwick@rheinspan.de

Address and contact information of the LCA practitioner commissioned by the EPD owner: DEKRA Assurance Services GmbH, Handwerkstraße 15, 70565 Stuttgart, Germany

Description of the organisation:
Whether it's kitchen cabinets, warehouse flooring, interior doors, office furniture, or trade show booths—particleboard has become an indispensable, versatile, and flexible material in the furniture industry. In Germersheim, Reinspan developes and manufactures particleboard to meet a wide range of customer needs. With over 65 years of experience in design and manufacturing, they enjoy working closely with long-standing customers in industry and commerce to develop custom-fit particleboard solutions tailored to their individual needs.

The first particleboard was produced as early as 1951 in Rheda-Wiedenbrück; they have been operating at the Germersheim site since 1973. In 2016, Nolte Holzwerkstoff separated from the Nolte SE corporate group and was independently managed by the Nolte family until 2020. In 2020, Rheinspan GmbH & Co. KG was founded.

Product-related or management system-related certifications: Rheinspan is FSC and PEFC Chain of Custody Certified (PEFC ST 2002-2020) and has an environmental management system according to EMAS since 1997.

PRODUCT INFORMATION

Product name: Particleboard, raw

Product identification: The products covered in this EPD are EcoMaxx 10 – 38 mm, 630 – 710 kg/m³. The particleboards are in accordance with DIN EN 312.

UN CPC code: 31431 – Particle board of wood

Product description:
Rheinspan raw particleboard (EcoMaxx) in accordance with DIN EN 312 is a panel-shaped wood-based material manufactured from shredded wood and binder under pressure and heat. It is produced in a multilayer structure, with the outer layers typically consisting of finer particles and the core layer of coarser chips. This gives the panels balanced mechanical properties and a homogeneous structure. Classification according to DIN EN 312 is divided into different types (P1 through P7) based on their mechanical performance and intended use, such as for general applications in dry environments, load-bearing purposes, or environments subject to moisture. Raw particleboard is untreated and thus serves as a versatile base material for further processing and finishing steps. It is primarily used in interior construction, furniture manufacturing, and residential and commercial furnishings.
More information about the technical specifications can be found here: https://www.rheinspan.de

Name and location of production site(s): Germersheim, Germany

Technical characteristics:

Product: **P2 - EcoMaxx E05**
Matarial description: Particleboard acc. DIN EN 312:2010,Typ P2
Application: Indoor use
Rheinspan Maxx-Particleboard, Type P2 nach DIN EN 312:2010:
used for interior decoration (especially furniture) for application in dry areas
Our **DecoMaxx (MFC) is based on this board.**
The board is conform to: *REACH-Verordnung (EG) Nr. 1907/2006. , IKEA-IOS-MAT 0181*
CARB Phase 2 emission standard, U.S. EPA TSCA TitleVI and IKEA IOS-MAT 0003

		Unit	Thickness classes					
			>6-13mm	>13-20mm	>20-25mm	>25-32mm	>32-40mm	>40mm
Building material class	DIN 4102-1		B2					
	DIN EN 13501-1		D-s2,d0					
Formaldehyde-Emission	EN 12460-3		Reach /CARBII/ U.S. EPA/ IOS-MAT0003			Reach /CARBII/ U.S. EPA/ IOS-MAT0003		
Density		kg/m³	675-700	640-660	620-640	620-630	595-620	580 -590
Tolerance in density		kg/m³	± 20					
		%	± 10					
Tolerance length/width	EN 324-1	mm/m	± 5					
Tolerance thickness	EN 324-1	mm	± 0,3					
Squareness	EN 324-2	mm/m	2					
Straightness	EN 324-2	mm/m	1,5					
Curvature		mm/m	≤ 2					
Moisture	EN 322	%	9 (± 4)					
Bending strength	EN 310	N/mm²	11	11	10,5	9,5	8,5	7,0
E-Modulus	EN 310	N/mm²	1800	1600	1500	1350	1200	1050
Internal bond	EN 319	N/mm²	0,40	0,35	0,30	0,25	0,20	0,20
Surface soundness	EN 311	N/mm²	0,8	0,8	0,8	0,8	0,8	0,8

CONTENT DECLARATION

Description of the main components and/or materials:
The product consists mostly of wood and wood chips and multiple additives (hardener, emulsion, glue, liquid urea).

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Wood (mixed)	512	58	78	259
Glue	52	0	0	0
Emulsion	32	0	0	0
Hardening agent	33	0	0	0
Urea liquid	32	0	0	0
TOTAL	660	58	78	259

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Wood	4.12	0.62%	1.800
Plastic band	0.07	0.01%	0
Plastic foil	2.91E-05	0.000004%	0
Cardboard	0.02	0.002717%	0.008
TOTAL	4.21	0.64%	1.808

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO_2.

Information on the environmental and hazardous/toxic properties of substances contained in the product:
None of the substances used during production are classified as persistent, bioaccumulative and toxic (PBT) or substances of very high concern (SVHC) according to Regulation No. 1907/2006 Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Hazardous substances from the candidate list of SVHC	EC No.	CAS No.	Mass-% per product or declared unit
N/A	N/A	N/A	N/A

LCA INFORMATION

Compliance with standards
The LCA and EPD have been created to comply with:

- ISO 14040:2006 and ISO 14044:2006+A1:2018 which describe the principles, framework, requirements and provides guidelines for life cycle assessment (LCA) (ISO 14040:2006-07, 2006) (ISO 14044:2006-07, 2006)
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures, which establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations (ISO 14025:2006-07, 2006)
- ISO 14025:2026 Environmental statements and programmes for products – Environmental product declarations (EPDs) (ISO 14025:2026-06, 2026)
- ISO 14020:2022 Environmental labels and declarations – General principles, which describes the guiding principles for the development and use of environmental labels and declarations (ISO 14020:2022-12, 2022)
- EN 15804+A2:2019/AC:2021: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products (DIN EN 15804:2022-03, 2022)
- EN 15941: Sustainability of construction works – Data quality for environmental assessment of products and construction works (DIN EN 15941:2024-10, 2024)

- PCR 2019:14, v2.0.1 – Construction products (Environdec, 2025a)
- c-PCR-006 version 2.0.0 Wood and wood-based products for use in construction (EN 16485:2026)
- GPI for the International EPD System v5.0.1 – containing instructions regarding methodology and the content that must be included in EPDs registered under the International EPD System (Environdec, 2025b)

Declared unit: The declared unit for this EPD is 1 m^3 of raw particleboard with an average density of 660 kg/m^3.

The environmental impacts are determined for an average product. The EPD does depict multiple products of the same product group which are available in different thicknesses and have a different density per m^3. For the calculation of the average the production volumes of the included products are considered.

Reference service life: N/A

Time representativeness: The reference year of the study is the calendar year 2025, covering 12 months of data.

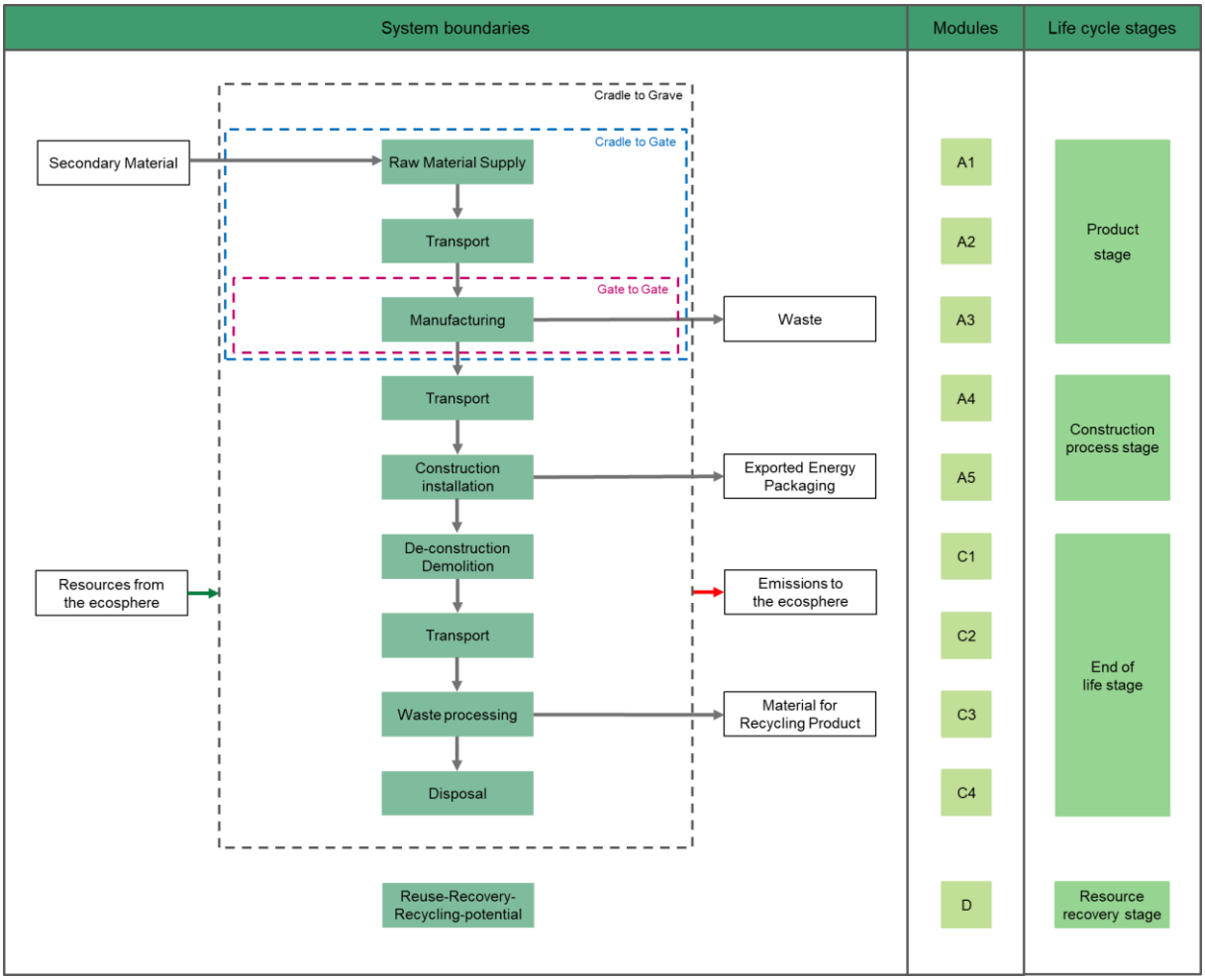
Geographical scope: The geographical scope is Europe.

Database(s) and LCA software used: The database used is ecoinvent v3.12 (Wernet et al. 2016 and ecoinvent 2025) with the EN15804 reference package based on Environmental Footprint (EF) 3.1. The LCA software used is Umberto, version 11.19.1.

EPD/LCA Tool used: N/A

Description of system boundaries:
The study is a cradle to gate study with options with modules A4, A5, C1-C4 and module D. This EPD includes the modules raw material supply, transport, manufacturing (A1-A3; product stage), construction process stage (A4-A5), end of life (EOL; C) and benefits and loads beyond the system boundary (D). The study omits the use stage (B1-B7). The use stage (modules B) is not included because it is highly dependent on the particular application. In addition, the environmental impact of the use phase is considered negligible because it is a passive product that is not removed over an extended period.

Process flow diagram:



Product stage

Manufacturing of the particleboard, raw takes place at the construction facility in Germersheim. The manufacturing process includes the following steps:

- Raw material supply
- Primary wood processing
- Processing of recycled wood
- Chip drying
- Sifting and screening
- Binder application
- Dispersion
- Pressing and Cutting to large-format dimensions
- Cooling and conditioning
- Grinding
- Unstacking, packaging, or storing for further processing

The modules A1-A3 include the production of raw and auxiliary materials entering the production:

A1: Raw material supply

- Module A1 includes the extraction and processing of raw materials (wood, glue, emulsion, hardening agent, urea liquid) that serve as input for the manufacturing process taking place at the production facility in Germersheim.

A2: Transport to manufacturer

- Module A2 includes the transportation of the raw materials via truck to Germersheim. Rheinspan provided the distances for the different raw material suppliers.

A3: Manufacturing

- Module A3 includes all the process steps, material, and energy inputs to produce the particleboard, raw.
- The product is packaged prior to delivery using wood, plastic bands, plastic foil and cardboard, in order to ensure protection during transportation and handling.
- The packaging materials of pre-products are not included in the life cycle assessment.
- During the production no co-product is generated, and no allocation needs to be considered.
- Scrap, that is generated during manufacturing, is internally recycled.

Construction process stage

A4: Transport

- Module A4 covers the distribution of the product by truck and ship to customers. The average transport distance by truck was 79 km and the average transport distance by ship 356,6 km.

A5 Construction

- Module A5 covers the manual installation of the product, with no material losses taken into account. The disposal of packaging and installation materials is assumed to occur via thermal waste treatment.

End of life stage

C1: Demolition

- This module covers the dismantling of the product. It is assumed, that 100 % of the product can be recovered during dismantling.

C2: Transport

- Module C2 covers the transport to the waste processing facility. The distance is estimated to be 30 km and the transport is assumed to be done via truck.

C3: Waste processing

- Waste processing contains the waste treatment to the end of waste state. Module C3 considers the loading of bulky waste at the sorting facility and the mechanical sorting. The product leaves the products system as Material for Recycling.

C4: Disposal

- No disposal is necessary, since the product is fully recycled.

Resource recovery stage

D: Reuse-Recovery-Recycling potential

- In Module D credits were given for the avoidance of the primary production of wood chips and loads for the production process. Energy recovery from packaging was also considered.

Estimation and assumptions:
The biggest estimation made is the modelling of raw materials mostly based on secondary data from ecoinvent datasets. In addition, for some materials, for example the packaging, the amounts were given in volumes or meters, so assumptions for thickness and densities were made to calculate the packaging weight.

Calculation of Primary Energy Indicators:
The energy used as material enters the system in module A1 (raw material) and A3 (packaging material) and exits the system in A5 (packaging waste) and C3 (product waste), in line with option A in the PCR 2019:14 v2.0.1.

Cut-off rules:
The selection of the cut-off criteria is in line with the standard EN 15804:2012+A2:2019/AC:2021 and the PCR 2019:14 v2.0.1 and includes a minimum of 95% of the total inflows and 100% completeness.

The packaging of the pre-products was neglected, since there was no exact data available and the impact can be considered neglectable. The cleaning agent used in the production was excluded due to the very small amount per declared unit.

Infrastructure/ capital goods were not available as primary data in the core processes. However, they are implicitly accounted for through generic datasets from the LCI database used to model upstream and downstream processes. These datasets include infrastructure and capital goods within their system boundaries, and disaggregating or removing this data is not feasible without disproportionate effort. The results of the environmental performance indicators were issued with a disclaimer.

Personnel-related processes, such as business travel and commuting to and from work, were excluded from the system boundaries in accordance with the PCR.

Allocation:
In module A1, recycled wood enters the system burden free. Any environmental burden until the end-of-waste state of this input material is assigned to the previous product life cycle. The biogenic carbon and primary energy content entering the product system with the recycled material is considered.

In module A3, the production scraps are internally recycled in a closed loop and no co-product allocation is applied. The energy and auxiliary material inputs associated with the production processes were collected at the plant level. These aggregated inputs were allocated to the product system based on volume.

In module C3, the product leaves the system as “Material for Recycling”. To ensure consistency and avoid double counting, a net scrap calculation is performed which accounts for both the input of recycled wood and the output of recyclable wood.
Module D includes the loads of further processing the recovered material after it has reached the end-of-waste state and left the product system, until it is functionally equivalent to the substituted material.

Electricity mix (A1-A3):
In 2025, 100% electricity was purchased externally for product manufacturing without guarantees of origin, therefore the residual grid mix for Germany was considered. The emission factor for the GWP-GHG indicator is 0.807 kg CO2eq/kWh for the purchased electricity.

Data quality:
The EPD is based on data collected by Rheinspan from one site over one year starting in January 2025. The EPD is representative of the production of raw particleboards at the production site in Germersheim, Germany. The distribution, installation and end-of-life stage of the EPD covers Europe. The thickness and therefore density of the particleboards varies, causing the up to 6.7 % variation from the mean for GWP per m^3 raw particleboard.

The EPD uses background data from the ecoinvent database v3.12, 2025. No EPD data for the specific primary input materials was available. The quality of the relevant data used for the EPD in terms of its time, geography and technology representativeness using EN 15804:2012+A2:2019, Annex E, Table E.2 is mostly very good for foreground data and good for background data. The relevant data assessed included no poor or very poor data.

Table 1 *Additional information on processes contributing more than 10% to the GWP-GHG results of modules A1-A3*

Process	Source Type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Generation of electricity and other energy carriers used in manufacturing of product	EPD Owner, Database	EPD Owner, Ecoinvent v3.12	2025	Primary data, Representative secondary data	27.7%
Direct Emissions during production	EPD Owner	EPD Owner	2025	Primary data	9.7%
Transport of raw materials to manufacturing site	EPD Owner, Database	EPD Owner, Ecoinvent v3.12	2025	Primary data, Representative secondary data	7.9%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Averages and variability
The variation in GWP-GHG was computed in relation to the average product. The variation in the results is mostly related to the density in kg per m^3.

Modules declared, geographical scope, share of primary data (in GWP-GHG results) 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	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	DE	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Primary data used	45.3%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-4.3%/+6.7%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	N/A (single site)			-	-	-	-	-	-	-	-	-	-	-	-	-	-

ENVIRONMENTAL PERFORMANCE

LCA results of the product(s) - main environmental performance results

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.
As module C is included in the EPD, the use of the results of modules A1-A3, and A4-A5 is discouraged without considering the results of module C.

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	-5.50E+02	2.19E+01	6.87E+00	0.00E+00	2.98E+00	9.51E+02	0.00E+00	-8.19E+00
GWP-fossil	kg CO_2 eq.	4.06E+02	2.19E+01	2.40E-01	0.00E+00	2.98E+00	5.94E-01	0.00E+00	-8.11E+00
GWP-biogenic	kg CO_2 eq.	-9.57E+02	5.68E-03	6.63E+00	0.00E+00	6.46E-04	9.51E+02	0.00E+00	-2.23E-02
GWP-luluc	kg CO_2 eq.	4.60E-01	1.43E-02	2.58E-05	0.00E+00	1.01E-03	1.43E-03	0.00E+00	-5.12E-02
ODP	kg CFC 11 eq.	1.60E-05	4.63E-07	1.09E-09	0.00E+00	6.79E-08	1.72E-08	0.00E+00	-1.73E-07
AP	mol H^+ eq.	1.97E+00	1.25E-01	9.87E-04	0.00E+00	1.35E-02	2.80E-03	0.00E+00	-6.54E-02
EP-freshwater	kg P eq.	1.06E-01	1.82E-03	4.15E-05	0.00E+00	2.14E-04	4.85E-04	0.00E+00	-3.42E-03
EP-marine	kg N eq.	5.63E-01	5.33E-02	5.31E-04	0.00E+00	5.41E-03	5.07E-04	0.00E+00	-2.04E-02
EP-terrestrial	mol N eq.	6.07E+00	5.81E-01	5.06E-03	0.00E+00	5.90E-02	4.44E-03	0.00E+00	-2.20E-01
POCP	kg NMVOC eq.	1.89E+00	1.82E-01	1.26E-03	0.00E+00	2.09E-02	2.03E-03	0.00E+00	-7.60E-02
ADP-minerals&metals*	kg Sb eq.	3.38E-03	5.14E-05	1.98E-07	0.00E+00	1.01E-05	1.15E-06	0.00E+00	-2.74E-05
ADP-fossil*	MJ	8.40E+03	2.86E+02	8.37E-01	0.00E+00	4.28E+01	1.61E+01	0.00E+00	-1.48E+02
WDP*	m^3	3.56E+02	1.84E+00	2.03E-01	0.00E+00	2.35E-01	2.87E-01	0.00E+00	-7.01E+00
Acronyms	GWP-total = Total Global Warming Potential; 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.*

The results of the impact categories abiotic depletion of minerals and metals, and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	4.07E+02	2.19E+01	2.40E-01	0.00E+00	2.98E+00	5.96E-01	0.00E+00	-8.19E+00

Resource use indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	5.37E+03	6.56E+00	5.31E+01	0.00E+00	7.19E-01	9.56E+03	0.00E+00	-8.22E+02
PERM	MJ	9.61E+03	0.00E+00	-5.30E+01	0.00E+00	0.00E+00	-9.55E+03	0.00E+00	0.00E+00
PERT	MJ	1.50E+04	6.56E+00	2.21E-02	0.00E+00	7.19E-01	2.57E+00	0.00E+00	-8.22E+02
PENRE	MJ	8.40E+03	2.86E+02	2.49E+00	0.00E+00	4.28E+01	2.48E+03	0.00E+00	-1.48E+02
PENRM	MJ	2.47E+03	0.00E+00	-1.65E+00	0.00E+00	0.00E+00	-2.46E+03	0.00E+00	0.00E+00
PENRT	MJ	1.09E+04	2.86E+02	8.37E-01	0.00E+00	4.28E+01	1.61E+01	0.00E+00	-1.48E+02
SM	kg	3.80E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32E+02
RSF	MJ	0.00E+00	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	0.00E+00
FW	m^3	8.18E+00	4.10E-02	1.22E-03	0.00E+00	5.36E-03	6.63E-03	0.00E+00	-1.53E-01
Acronyms	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								

[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 CO_2 is set to zero.

Waste indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.04E+02	1.73E+00	4.87E-02	0.00E+00	2.55E-01	5.96E-02	0.00E+00	-1.07E+00
Non-hazardous waste disposed	kg	9.27E+02	1.88E+01	6.24E+00	0.00E+00	4.06E+00	2.44E+00	0.00E+00	-2.23E+01
Radioactive waste disposed	kg	2.93E-03	1.31E-04	2.27E-07	0.00E+00	1.23E-05	7.29E-05	0.00E+00	-5.26E-04

Output flow indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.60E+02	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	7.42E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	1.49E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Additional LCA results (other environmental performance results) of the product(s)

The following results show the end-of-life for a 100% incineration scenario instead of 100% recycling. After waste processing in modules C1-C4, module D considers the thermal treatment of waste wood in a biomass power plant with an energy efficiency of > 65%.

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO_2 eq.	-5.50E+02	2.19E+01	6.87E+00	0.00E+00	2.98E+00	9.51E+02	0.00E+00	-1.35E+02
GWP-fossil	kg CO_2 eq.	4.06E+02	2.19E+01	2.40E-01	0.00E+00	2.98E+00	5.94E-01	0.00E+00	-1.34E+02
GWP-biogenic	kg CO_2 eq.	-9.57E+02	5.68E-03	6.63E+00	0.00E+00	6.46E-04	9.51E+02	0.00E+00	-2.38E-02
GWP-luluc	kg CO_2 eq.	4.60E-01	1.43E-02	2.58E-05	0.00E+00	1.01E-03	1.43E-03	0.00E+00	-2.34E-02
ODP	kg CFC 11 eq.	1.60E-05	4.63E-07	1.09E-09	0.00E+00	6.79E-08	1.72E-08	0.00E+00	-9.90E-07
AP	mol H^+ eq.	1.97E+00	1.25E-01	9.87E-04	0.00E+00	1.35E-02	2.80E-03	0.00E+00	-1.01E+00
EP-freshwater	kg P eq.	1.06E-01	1.82E-03	4.15E-05	0.00E+00	2.14E-04	4.85E-04	0.00E+00	-5.37E-02
EP-marine	kg N eq.	5.63E-01	5.33E-02	5.31E-04	0.00E+00	5.41E-03	5.07E-04	0.00E+00	-1.33E-01
EP-terrestrial	mol N eq.	6.07E+00	5.81E-01	5.06E-03	0.00E+00	5.90E-02	4.44E-03	0.00E+00	-1.43E+00
POCP	kg NMVOC eq.	1.89E+00	1.82E-01	1.26E-03	0.00E+00	2.09E-02	2.03E-03	0.00E+00	-4.41E-01
ADP-minerals&metals*	kg Sb eq.	3.38E-03	5.14E-05	1.98E-07	0.00E+00	1.01E-05	1.15E-06	0.00E+00	-3.20E-05
ADP-fossil*	MJ	8.40E+03	2.86E+02	8.37E-01	0.00E+00	4.28E+01	1.61E+01	0.00E+00	-1.31E+03
WDP*	m^3	3.56E+02	1.84E+00	2.03E-01	0.00E+00	2.35E-01	2.87E-01	0.00E+00	-8.23E+00
Acronyms	GWP-total = Total Global Warming Potential; 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.*
The results of the impact categories abiotic depletion of minerals and metals, and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in

currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[2]	kg CO_2 eq.	4.07E+02	2.19E+01	2.40E-01	0.00E+00	2.98E+00	5.96E-01	0.00E+00	-1.35E+02

Resource use indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	5.37E+03	6.56E+00	5.31E+01	0.00E+00	7.19E-01	9.55E+03	0.00E+00	-1.93E+02
PERM	MJ	9.61E+03	0.00E+00	-5.30E+01	0.00E+00	0.00E+00	-9.55E+03	0.00E+00	0.00E+00
PERT	MJ	1.50E+04	6.56E+00	2.21E-02	0.00E+00	7.19E-01	2.21E-02	0.00E+00	-1.93E+02
PENRE	MJ	8.40E+03	2.86E+02	2.49E+00	0.00E+00	4.28E+01	2.46E+03	0.00E+00	-1.31E+03
PENRM	MJ	2.47E+03	0.00E+00	-1.65E+00	0.00E+00	0.00E+00	-2.46E+03	0.00E+00	0.00E+00
PENRT	MJ	1.09E+04	2.86E+02	8.37E-01	0.00E+00	4.28E+01	8.37E-01	0.00E+00	-1.31E+03
SM	kg	3.80E+02	0.00E+00	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	1.85E+03
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	8.18E+00	4.10E-02	1.22E-03	0.00E+00	5.36E-03	6.63E-03	0.00E+00	-1.80E-01
Acronyms	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								

[2] 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_2 is set to zero.

Waste indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1.04E+02	1.73E+00	4.87E-02	0.00E+00	2.55E-01	5.96E-02	0.00E+00	-1.25E+01
Non-hazardous waste disposed	kg	9.27E+02	1.88E+01	6.24E+00	0.00E+00	4.06E+00	2.44E+00	0.00E+00	-2.65E+02
Radioactive waste disposed	kg	2.93E-03	1.31E-04	2.27E-07	0.00E+00	1.23E-05	7.29E-05	0.00E+00	-4.46E-04

Output flow indicators

Results per functional or declared unit									
Indicator	**Unit**	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.60E+02	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	7.42E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	1.49E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ABBREVIATIONS

Abbreviation	Definition
General Abbreviations	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
Environmental Impact Indicators (EN 15804)	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO_2 eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO_2 eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO_2 eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO_2 eq.)
GWP-total	Total Global Warming Potential (kg CO_2 eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO_2 eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H^+ eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m^3)
Resource Use Indicators	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m^3)
Waste Indicators	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
Output Flow Indicators	
CFR	Components for Reuse (kg)

MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
Lifecycle Stages / Modules	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
Other Relevant Terms	
SVHC	Substances of Very High Concern
EC No.	European Community Number
CAS No.	Chemical Abstracts Service Number
MJ	Megajoule
kg	Kilogram
m^3	Cubic Meter
NMVOC	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO_2 eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO_2 eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared
GVW	Gross Vehicle Weight

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VERSION HISTORY

Original Version of the EPD, 2026-11-17

EPD
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