

ENVIRONMENTAL PRODUCT DECLARATION

according to *ISO 14025* and *EN 15804+A2*

Declaration holder	Pfleiderer Deutschland GmbH
Issuer	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PFI-20250683-IBI1-DE
Issue date	30 March 2026
Valid until	29 March 2031

Particleboard (melamine-coated) Pfleiderer Deutschland GmbH

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1. General information

Pfleiderer Deutschland GmbH

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin, Germany

Declaration number

EPD-PFI-20250683-IBI1-DE

This declaration is based on the product category rules:


Wood-based materials, 1 August 2021
(PCR verified and approved by the independent Expert Council (SVR))

Issue date

30 March 2026

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29 March 2031



Hans Peters
(Chairman of the Board of the Institut Bauen und Umwelt e.V.)



Florian Pronold
(Managing Director of the Institut Bauen und Umwelt e.V.)

Particleboard (melamine-coated)

Declaration holder

Pfleiderer Deutschland GmbH
Ingolstädter Str. 51
92318 Neumarkt i.d.OPf.
Germany

Declared product/unit: 1 m³

particleboard, melamine-coated

Scope:

The contents of this declaration are based on the manufacturing specifications for **melamine-coated particleboards** from the following manufacturer: **Pfleiderer Deutschland GmbH** (Gütersloh, Neumarkt, Leutkirch)

The life cycle assessment of this declaration covers 100% of the production of melamine-coated particleboards at the named factories in 2023. It relates to an average product derived from data from the respective sites. This declaration can be used for **melamine-coated particleboards** manufactured by the above-named manufacturer. The holder of the declaration is liable for the underlying information and evidence; any liability of the IBU in relation to manufacturer information, life cycle assessment data and evidence is ruled out.

The EPD was prepared in accordance with the requirements of EN 15804+A2. In the following, the standard is referred to in the simplified form *EN 15804*.

Verification

The European standard EN 15804 is used as the core PCR		
Independent verification of the declaration and information in accordance with ISO 14025:2011		
<input type="checkbox"/>	internal	<input checked="" type="checkbox"/> external



Dr Martina Bender, (independent verifier)

2. Product

2.1 Product description/product definition

The resource-saving, low-emission, raw particleboards manufactured by **Pfleiderer Deutschland GmbH** are wood-based panels.

These mainly consist of crushed wood particles (chip- to dust-like quality) and are pressed with thermosetting binders and additives.

The product qualities are based on *EN 13986*, *EN 312* and *EN 14322*. The finished end product is coated with a layer consisting of melamine resin and impregnated decor paper within the scope of this declaration.

Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC applies to the placing of products on the market in the EU/EFTA (with the exception of Switzerland).

The required declarations of performance and the CE marking have been drawn up according to the requirements of the harmonised standard *EN 13986:2004+A1:2015*, Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking.

2.2 Use

Pfleiderer particleboards (melamine-coated) can be used (according to their type classification) for the following applications:

- Furniture & interior fitout
- Fire protection
- Door construction
- Formwork construction
- Storage and shelving technology

2.3 Technical data

The following table shows examples of the range of technical data for the following product classes: P2–P7. Specific information can be found in the respective declarations of performance and technical data sheets for the products (<https://www.pfleiderer.com/dach--de/service/downloads>).

Structural data

Name/description	Value	Unit
Density EN 323	620–760	kg/m ³
Bending strength (longitudinal) EN 310	11–23	N/mm ²
Modulus of elasticity (longitudinal) EN 310	1600–3100	N/mm ²
Perpendicular tensile strength EN 319	0.35–0.7	N/mm ²
Surface soundness EN 311	0.4–0.8	N/mm ²
Material moisture content on delivery EN 322	5–13	%
Dimensional change in the plane of the board EN 14323	± 5	mm
Formaldehyde emissions according to EN 717-1 or EN 16516	E1E05 (TSCA, F****)	µg/m ³
Reaction to fire	E (d < 9 mm); D-s2,d0	
Emission (content), pentachlorophenol (PCP)	< 3	mg/kg
Swelling in thickness, 24 h EN 317	4–5	%

Note: specific technical data can be found in the technical data sheets for the respective products.

(Product information (pfleiderer.com))

Performance values of the product correspond to the declaration of performance in relation to its main characteristics according to *EN 13986:2015-06*, Wood-based panels for use in construction. Voluntary information for the product: none (not part of the CE marking)

2.4 As-delivered condition

The various Pfleiderer melamine-coated particleboards are available in the following sizes and thickness ranges:

- Width: 615–2100 mm
- Length: 2655–5600 mm
- Thickness: 8–50 mm

Special sizes with regard to length, width and thickness are available on request. Classification requirements in accordance with *EN 312* tables 2 to 10, special qualities available on request.

2.5 Base materials/auxiliary materials

Pfleiderer melamine-coated particleboards consist of crushed, processed wood particles (chips and dust), adhesives and other additives. These are clearly shown in the table below. The wood mix used is made up of the following components:

- Fresh wood/thinnings: 14%
- Industrial waste wood (sawmill waste): 35%
- Recycled material in accordance with **AltHolzV (German Waste Wood Ordinance)**: approx. 56%
- Bark: approx. 1%

Urea–formaldehyde (UF), melamine–urea–formaldehyde (MUF) and polymeric diphenylmethane diisocyanate (PMDI) are used as adhesives for the raw cores. Paraffin, ammonium phosphate, urea and ammonium nitrate are added as product-specific additives.

Name/description	Value	Unit
Wood (absolutely dry fraction) fresh wood & recycled wood	> 85	%
Water	approx. 5	%
Adhesive I MUF (> 20% melamine)	0–10	%
Adhesive II UF	0–11	%
Hydrophobising paraffin	< 1	%
Fire-retardant, ammonium phosphate	0–14	%
Hardener, ammonium nitrate	< 1	%
Adhesives additive urea	< 1	%
Impregnating resin I MF	approx. 1.25	%
Impregnating resin II UF	< 1	%
Decor paper:	approx. 1	%

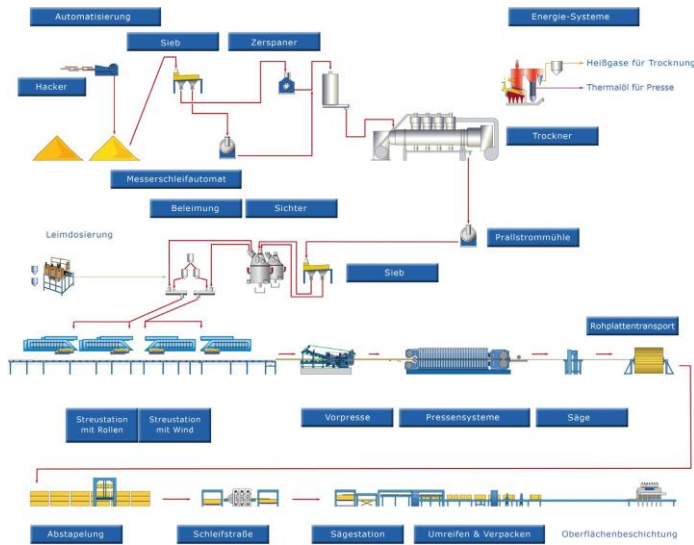
The product has an average density of approx. 650 kg/m³. The functional chemical groups of the fire retardants include phosphate- and nitrogen compounds.

The product/article/at least one partial article contains substances listed in the *ECHA candidate list* (5 November 2025), exceeding 0.1% by mass: no

The product/article/at least one partial article contains other CMR- substances in categories 1A or 1B which are not listed in the *ECHA candidate list*, exceeding 0.1% by mass: no

Biocidal products have been added to this construction product or it has been treated with biocidal products (it is thus a treated article as defined in the *Biocidal Products Regulation (EU) No. 528/2012*): no

2.6 Manufacture



2.7 Environment and health during manufacturing

All products manufactured by Pfleiderer Deutschland GmbH are manufactured in accordance with the applicable legal requirements regarding occupational health and safety.

The existing hazards and danger zones are marked accordingly.

Employees are provided with the necessary protective equipment for working in these areas (high-visibility vests, dust-/respiratory masks, safety clothing, etc.).

The specified occupational exposure limit values for emissions of all kinds are complied with (e.g. installation of ventilation systems, enclosure of noise sources).

All wastewater and service water is treated in accordance with the applicable guidelines/directives or is sent to the appropriate treatment companies. The production-related exhaust air is treated in accordance with the legal requirements.

The combined heat and power -plants (CHP) at the sites (Neumarkt and Gütersloh) are the key components of Pfleiderer Deutschland GmbH's energy resilience. They enable the sites to be self-sufficient and, if necessary, feed surplus energy into the public grids.

All sites (scope: Germany) have received the following certifications:

- ISO 9001
- ISO 14001
- ISO 45001
- ISO 50001

2.8 Product processing/installation

Melamine-coated particleboard from Pfleiderer Deutschland GmbH can be processed using standard woodworking machinery (sawing, planing, sanding, milling, drilling).

Detailed machining and processing instructions can be found in the relevant product brochures.-

When machining and processing in a commercial environment, the occupational safety guidelines/-requirements of the relevant

Berufsgenossenschaft (German statutory accident insurance institution) (e.g. BG-Bau) apply.

In general, we recommended maintaining adequate extraction during processing. If this is not possible, dust masks must be worn.

2.9 Packaging

Square timber and protective panels made from particleboard offcuts (in-house production), cardboard (for covering the boards), and plastic or steel strapping are used for the packaging and storage of the finished Pfleiderer melamine-coated particleboards.

2.10 Condition of use

The composition of the melamine-coated particleboards corresponds to the base materials listed in section 2.5 (base materials). The binders cure by thermosetting.

2.11 Environment and health during use

To ensure that Pfleiderer melamine-coated particleboards can be used safely, the legal requirements for emissions are complied with and are tested by accredited institutes.

2.12 Reference service life

The durability in use depends on the application classes and the correct application (see EN 312).

The German BBSR (Federal Ministry of Housing, Urban Development and Construction) specifies a service life of at least 50 years for the correct use of particleboard/wood-based panels (according to Table: Service lives of components for life cycle assessment according to BNB (sustainable building assessment system))

This specification differs from the reference service life (RSL) as defined in ISO 15686.

2.13 Extraordinary effects

Fire

Pfleiderer melamine-coated particleboards have different reactions to fire (EN 13501-1, EN 13986):

- without flame retardants: D--s2,d0 (thickness: ≥ 9 mm/density: ≥ 600 kg/m³)
- with flame retardant: B-s1,d0 (DecoBoard Pyroex)

Fire protection

Name/description	Value
Building material class	B-D
Burning droplets	d0
Smoke gas development	s1

Water

No constituents that could be hazardous to water are washed out/leached.

Pfleiderer melamine-coated particleboards are not resistant to prolonged exposure to water.

Mechanical destruction

The product exhibits fracture behaviour under destructive mechanical stress.

This can result in sharp edges, which may cause injury.

2.14 Post-use phase

Reuse:

In case of conversion or at the end of the in-use phase of a building, or of other products in the event of selective dismantling, Pfleiderer melamine-coated particleboards can be collected separately and reused for the same use or for different use that is different to the original application (cascade principle). Products that are badly damaged should be sent for recycling.

Recovery/recycling:

Pfleiderer melamine-coated particleboards can be sorted, processed and returned to the wood-based panels manufacturing process via certified waste wood recycling companies.

2.15 Disposal

The circular economy is one of the fundamental principles of

Pfleiderer Deutschland GmbH, which is why any product residues (where appropriate) are recovered/recycled and used for further production of wood-based panels. At the end of its in-use phase, the product should be separated as far as possible from any other components (e.g. screws) and sent to a suitable waste disposal facility (for possible recycling – see above).

Disposing of waste wood in landfill sites is not permitted according to §9 *AltholzV* (German Waste Wood Ordinance). Waste code according to AVV (German Waste Register Regulation): 17 02 01 / 03 01 05

2.16 Further information

Further information can be found on the following website: <https://www.pfleiderer.com/dach-de/>

3. LCA: calculation rules

3.1 Declared unit

The reference for this declaration is **1 m³** of melamine-coated particleboard with an average mass of **651 kg/m³ (average thickness: 18 mm; surface weight: 11.72 kg/m²).**

Declared unit and mass reference

Name/description	Value	Unit
Declared unit	1	m ³
Density	651.3	kg/m ³

The declared unit of the ecological assessment is the provision of 1 m³ melamine-coated particleboard with a mass of 651.3 kg/m³ and a water fraction of 5.7% and an adhesive and additive fraction of 12.5%. The composition corresponds to the average weighted by production volume.

3.2 System boundary

The declaration type corresponds to an EPD 'from cradle to gate with options, modules C1–C4 and module D (A1–A3 + C + D and additional module A5)'. The contents are the production stage, i.e. from the provision of raw materials to the production factory gate (cradle-to-gate, modules A1 to A3), as well as module A5 and parts of the end of the life cycle (modules C1 to C4). Furthermore, the potential benefits and loads are considered beyond the product's life cycle (module D). Specifically, module A1 assesses the supply of wood raw materials and the supply of adhesives- and additives. Waste wood used as a material goes into the system without loads. The transport of the raw materials used, including waste wood, to the factory is taken into consideration in module A2. Module A3 includes the supply of the fuels, operating resources, product packaging and electricity as well as the manufacturing processes on site. These essentially include the preparation, drying (incl. emissions), sorting and pressing of the raw materials. Module A5 solely maps out the disposal of the product packaging, which includes the output of the biogenic carbon it contains and its primary energy (PERM and PENRM). The GWP-fossil value for the electricity mix used in modules A1–A3 is 0.263 kg CO₂-eq/kWh. The electricity mix also includes green electricity generated from our own biomass (GoO).

For module C1, manual dismantling without any

loads is assumed. Module C2 takes into account transport to the disposal company and module C3 the processing and sorting of the waste wood. In addition, in module C3, in accordance with *EN 16485*, the CO₂-equivalents of the wood-inherent carbon contained in the product and the renewable and non-renewable primary energy (PERM and PENRM) contained in the product are recorded as outputs. Module C4 was calculated according to normative requirements and does not contain any waste for disposal at a landfill site. This is because, at the end of its life, the product system becomes waste wood which, according to *AltholzV (2020)* (the German Waste Wood Ordinance), must not be placed in landfill but must be recycled thermally or for material use. Module D assesses the thermal recycling of the product at the end of its life and the resulting potential benefits and loads in the form of a system extension.

3.3 Estimates and assumptions

All material and energy flows of the processes required for production are determined on the basis of questionnaires. The emissions that occur on site from the incineration of wood are estimated based on background data from 2019 taken from the *Sphera MLC CUP 2024.2* database. Emissions from wood drying and the curing of the adhesives are based on information from the literature and are documented in detail in *Rüter, Diederichs (2012)*. All other data are based on average values.

3.4 Cut-off criteria

A decision regarding the flows to be considered is based on existing studies on the life cycle assessment of wood products. At least the material and energy flows that account for 1% of the use of renewable or non-renewable primary energy or mass were evaluated, whereby the total sum of flows not considered is not greater than 5%. In addition, it was ensured that no material and energy flows with particular potential to have a significant impact on the environmental indicators were ignored. The expenditure on the provision of the infrastructure (machines, buildings, etc.) of the whole foreground system was not considered. This is based on the assumption that the expenditure on the erection and maintenance of the overall infrastructure does not exceed the 1% of the total expenditure described above. On the other hand, the energy expenditure in the form of heat and power (electricity) necessary to operate the infrastructure was taken into account. Individual subordinate process steps in

upstream supply chains for consumables and operating materials were not explicitly modelled, provided that they fall below the defined cut-off thresholds. This applies, for example, to individual process steps in the manufacture of adhesive components or packaging materials whose environmental impacts are already included in aggregated background datasets within the database used, or whose contribution falls below the specified cut-off criteria.

Detailed information on the cut-off criteria is documented in *Rüter, Diederichs 2012*.

3.5 Background data

All background data have been taken from the *Sphera MLC CUP 2024.2* database and the final report, 'Ökobilanz-Basisdaten für Bauprodukte aus Holz' (Life cycle assessment - Basic data for construction products made of wood) *Rüter, Diederichs 2012*. The latter provides the basis for a regularly updated internal database, from which the modelling of the upstream forestry chain and the processes for mapping the assumptions listed in section 3.3 were taken.

3.6 Data quality of foreground data (manufacturer data):

The production volume taken into account in this EPD covers 100% of Pfleiderer's total production of melamine-coated particleboards in the reference year 2023 and is assessed as very good.

The foreground data were provided by the manufacturer via a standardised questionnaire and relate to the reference period of 2023. They cover the main material and energy flows associated with production at the Gütersloh, Neumarkt and Leutkirch sites. The data were checked for plausibility and validated using mass balances and internal consistency checks. The timeliness and completeness of the operating data collected are rated as very good.

Background data (database data):

Temporal representativeness

The data taken from the literature for wood raw materials used for material and energy purposes, with the exception of forest wood, are from the years 2008 to 2012. The provision of forest wood was taken from a publication from 2008, which is mainly based on data from the years 1994 to 1997, the quality of which is reviewed periodically. The data on wood raw materials are based on the German National Forest Inventory, which is regularly updated and published by the *Thünen Institute in 2012 and 2019*. All other background data were taken from the *Sphera 2023b* database and are no more than five years old.

Geographic representativeness

All the production assessed here takes place in Germany, although a small proportion of intermediate products are imported (from within the EU). The background data account for this through region-specific processes. Following the recommendations of the PEF quality assurance system, an average of 1.8 can be assumed for most datasets, which is interpreted by the system as a 'very good overall quality'.

Technical representativeness

All the background data used for the modelling, derived from

the literature, originate from science and are described in detail in *Rüter, Diederichs (2012)*. The quality of these data, first described in 2012, remains very good in terms of technical representativeness.

Overall assessment of data quality

By combining up-to-date company-specific primary data from the three production sites under consideration in the foreground system with established background datasets, the overall data quality of this life cycle assessment can be rated as at least good (see *EN 15804, Annex E, Table E.2*).

The primary data were collected on a site-by-site basis via manufacturer questionnaires and include information on raw material usage, energy consumption, process parameters, packaging materials and residual materials generated. For the modelling, an average of the three sites weighted by production volume was calculated from these datasets, with the result that the dataset reflects the actual production structure of the particleboard production under consideration. The material composition of the product and the basic manufacturing processes are comparable across all sites, enabling a consistent aggregation of production data. The differences between the sites mainly relate to site-specific energy supply, transport distances and operational constraints, all of which were taken into account in the modelling process. Given the up-to-date nature of the primary data used, as well as the use of current background datasets from the *Sphera* database and scientific literature, the overall data quality can be assessed as at least good.

3.7 Period under review

The foreground data were collected by the manufacturer for three plants for twelve consecutive months each in the period from 01/2023 to 12/2023. The manufacturer has confirmed that these data continue to be current and valid.

3.8 Geographic representativeness

Country or region in which the declared product system is manufactured and, where applicable, used and treated at the end of its life: Germany

3.9 Allocation

The allocations made meet the requirements of *EN 15804+A2* and *EN 16485* and are explained in detail in *Rüter, Diederichs (2012)*.

Essentially, the following system extensions and allocations were undertaken.

General

Flows of the inherent material properties (biogenic carbon and primary energy contained) were assigned according to physical causalities. All other allocations for related coproductions were made on an economic basis. An exception is the allocation of the heat required in combined heat and power, which was allocated on the basis of the exergy of the products electricity and process heat.

Module A1

- Forest: all expenditure of the upstream forestry chain was allocated to logs and industrial wood via economic allocation factors on the basis of their prices.
- The provision of waste wood does not allow for any expenditure from the preceding life cycle.

Module A3

- Wood processing industry: in the case of associated coproductions, expenditure was allocated economically to the main products and residual materials based on their prices.
- Non-wood-based production waste from module A3 (e.g. packaging waste or other operational waste that cannot be recycled) is sent for external thermal waste treatment. The expenditure and emissions associated with waste treatment are taken into account in module A3. The energy recovered from external waste treatment is not accounted for within the product system. Potential energy benefits from the incineration of waste lie outside the system boundary and are therefore not included in module A3 in accordance with

EN 15804.

Wood-based production residues are treated separately and are accounted for in the system according to their actual use.

- In the case of combined generation of heat and power, all furnace expenditure was allocated according to the exergy of these two products.
- The supply of recovered/waste wood as fuel does not take into account any expenditure from the preceding life cycle (similar to Module A1).

Module D

- The extension of the system boundary undertaken in module D corresponds to an energy use scenario for waste wood. This is based on the total product mass, including the proportion of binders.

3.10 Comparability

A comparison or assessment of EPD data is only possible if all the datasets to be compared were produced in accordance with EN 15804 and the product-specific performance characteristics are taken into account. The life cycle assessment modelling was carried out using the *Sphera LCA for Experts* software, version 10.9.0.31. All the background data were taken from the *Sphera MLC CUP 2024.2* database or come from the literature.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on the description of the biogenic carbon content at the factory gate

Name/description	Value	Unit
Biogenic carbon in the product	268.73	kg C
Biogenic carbon in the associated packaging	8.09	kg C

At the factory gate and during use, the product contains 268.73 kg of biogenic carbon per cubic metre, which corresponds to a CO₂-equivalent of 985.33 kg.

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg CO₂.

Installation in the building (A5)

The scenarios on which the life cycle assessment is based are described in greater detail below.

Installation in the building (A5)

Module A5 is declared; however, it only contains information on the disposal of the product packaging and no information whatsoever on the actual installation of the product in the building.

The quantity of packaging material produced as waste material for thermal recycling in module A5 for each m³ of product and the resulting exported energy are given in the following table as technical scenario information.

Name/description	Value	Unit
Plastic packaging for thermal waste treatment	0.2918	kg
Overall efficiency of the thermal waste recycling (plastics)	38	%
Wooden packaging for thermal waste treatment	15.89	kg
Overall efficiency of the thermal waste recycling (wood)	44	%
Paper and cardboard packaging for thermal waste treatment	0.2918	kg
Overall efficiency of the thermal waste recycling (paper and cardboard)	38	%
Total exported electrical energy	38.4	MJ
Total exported thermal energy	100.0	MJ

A transport distance of 50 km is assumed for the disposal of the product packaging. The overall efficiency of waste incineration and the percentages of electricity- and heat generation from combined heat- and power- correspond to the assigned waste incineration process in the *Sphera 2024.2* database.

End-of-life stage (C1–C4)

A scenario for the end of life in Germany is assumed. The German electricity mix is therefore used to calculate the energy required for processing the material.

Name/description	Value	Unit
Product fraction for use as secondary fuel	651.3	kg
Redistribution transport distance of the waste wood (module C2)	50	km

A collection rate of 100% without losses caused by the crushing of the material is assumed for the thermal recycling scenario.

Reuse, recovery and recycling potential (D), relevant scenario information

Name/description	Value	Unit
Waste wood (absolutely dry, per net flow of the declared unit)	323.53	kg
Adhesive (per net flow of the declared unit)	81.58	kg
Generated electrical power (per net flow of the declared unit)	566.36	kWh
Waste heat used (per net flow of the declared unit)	4129.55	MJ

The product is recovered with the same composition as the described declared unit at the end of the life cycle. Energy recovery in a biomass power plant with a total efficiency

of 55 % and an electrical efficiency of 18.19% is assumed. Around 909 kWh electricity and 6630 MJ usable heat are generated by the incineration of 1 t wood (air dry, approx. 6.16% wood moisture content, 18 MJ/kg) . As secondary fuel is used in the manufacturing phase (A1–A3), the net flow entering module D corresponds to the product composition at the factory gate minus the waste wood fraction. Taking into account the adhesives fraction, each unit declared in module D potentially produces 566.36 kWh of electricity and 4129.55 MJ of thermal energy.

The exported energy substitutes fuels from fossil sources, whereby in this scenario, for recovery in Germany, it is assumed that thermal energy is produced from natural gas and the substituted electricity corresponds to the German electricity mix of 2021.

5. LCA: results

DESCRIPTION OF SYSTEM BOUNDARIES (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction		Use stage							End-of-life stage				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacture	Transport from the manufacturer to	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/de molition	Transport	Waste treatment	Disposal	Reuse, recovery or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	X	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LIFE CYCLE ASSESSMENT – ENVIRONMENTAL IMPACTS in accordance with EN 15804+A2: 1 m³ particleboard, melamine-coated

Indicator	Unit	A1	A2	A3	A5	C1	C2	C3	C4	D
GWP _{total}	kg CO ₂ -eq.	-9.13E+02	1.24E+01	3.99E+01	3.12E+01	0	1.01E+00	9.95E+02	0	-7.42E+01
GWP _{fossil}	kg CO ₂ -eq.	7.21E+01	1.24E+01	6.92E+01	1.62E+00	0	1E+00	9.33E+00	0	-7.38E+01
GWP _{biogenic}	kg CO ₂ -eq.	-9.85E+02	3.49E-02	-2.93E+01	2.96E+01	0	2.82E-03	9.85E+02	0	-3.89E-01
GWP _{luluc}	kg CO ₂ -eq.	ND	ND	ND	ND	ND	ND	ND	ND	ND
ODP	kg CFC11-eq.	2.76E-10	1.31E-12	8.78E-10	5.42E-12	0	1.02E-13	2.91E-10	0	2.3E-10
AP	mol H ⁺ -eq.	1.14E-01	7.44E-02	2.32E+01	8.38E-03	0	6.02E-03	1.47E-02	0	6.02E-02
EP _{freshwater}	kg P-eq.	1.55E-02	2.18E-04	6.48E-02	6.32E-04	0	1.7E-05	1.25E-02	0	9.69E-03
EP _{marine}	kg N-eq.	1.31E-01	3.64E-02	8.34E+00	2.5E-03	0	2.95E-03	4.73E-03	0	-1.45E-02
EP _{terrestrial}	mol N-eq.	5.15E-01	4.04E-01	9.14E+01	3.56E-02	0	3.27E-02	4.72E-02	0	2.36E-01
POCP	kg NMVOC-eq.	1.36E-01	6.99E-02	2.24E+01	6.76E-03	0	5.65E-03	1.1E-02	0	-5.96E-02
ADPE	kg Sb-eq.	5.94E-06	1.06E-06	6.39E-06	6.12E-08	0	8.6E-08	1.95E-06	0	-4.74E-06
ADPF	MJ	1.96E+03	1.63E+02	8.68E+02	1.24E+01	0	1.32E+01	1.3E+02	0	-4.38E+03
WDP	m ³ world-eq. withdrawn	4.48E+00	1.87E-01	1.63E+00	5.34E+00	0	1.5E-02	-2.52E+00	0	1.25E+02

GWP = global warming potential; ODP = depletion potential of the stratospheric ozone layer; AP = acidification potential of land and water; EP = eutrophication potential; POCP = formation potential of tropospheric ozone photochemical oxidants; ADPE = abiotic depletion potential for non-fossil resources (ADP materials); ADPF = abiotic depletion potential for fossil resources (ADP fossil energy sources); WDP = water (user) deprivation potential

RESULTS OF THE LIFE CYCLE ASSESSMENT – INDICATORS FOR DESCRIBING RESOURCE USE in accordance with EN 15804+A2: 1 m³ particleboard, melamine-coated

Indicator	Unit	A1	A2	A3	A5	C1	C2	C3	C4	D
PERE	MJ	3.76E+03	1.38E+01	4.02E+03	2.93E+02	0	1.11E+00	1.39E+02	0	-4.31E+03
PERM	MJ	4.12E+03	0	2.9E+02	-2.9E+02	0	0	-4.12E+03	0	0
PERT	MJ	7.89E+03	1.38E+01	4.31E+03	3.41E+00	0	1.11E+00	-3.98E+03	0	-4.31E+03
PENRE	MJ	1.96E+03	1.63E+02	7.36E+02	1.59E+01	0	1.32E+01	1.3E+02	0	-5.55E+03
PENRM	MJ	1.17E+03	0	3.49E+00	-3.49E+00	0	0	-1.17E+03	0	0
PENRT	MJ	3.12E+03	1.63E+02	7.39E+02	1.24E+01	0	1.32E+01	-1.04E+03	0	-5.55E+03
SM	kg	3.24E+02	0	0	0	0	0	0	0	0
RSF	MJ	3.41E+03	0	2.02E+03	0	0	0	0	0	4.12E+03
NRSF	MJ	0	0	0	0	0	0	0	0	1.17E+03
FW	m ³	4.89E-01	1.55E-02	-2.35E-01	-1.26E-01	0	1.25E-03	-2.18E-02	0	2.95E+00

PERE = primary energy renewable - used as energy carrier; PERM = primary energy-renewable - used as raw material; PERT = primary energy renewable - total; PENRE = primary energy non-renewable - used as energy carrier; PENRM = primary energy non-renewable - used as raw material; PENRT = primary energy non-renewable - total; SM = use of secondary materials; RSF = use of renewable secondary fuels; NRSF = use of non-renewable secondary fuels; FW = use of net fresh water

RESULTS OF THE LIFE CYCLE ASSESSMENT – WASTE CATEGORIES AND OUTPUT FLOWS in accordance with EN 15804+A2: 1 m³ particleboard, melamine-coated

Indicator	Unit	A1	A2	A3	A5	C1	C2	C3	C4	D
HWD	kg	1.55E-02	2.18E-04	6.48E-02	6.32E-04	0	1.7E-05	1.25E-02	0	9.7E-03
NHWD	kg	8.15E-01	2.54E-02	1.86E+00	9.45E-01	0	2.05E-03	1.9E-01	0	2.63E+01
RWD	kg	7.24E-06	5.34E-09	6.66E-07	7.01E-09	0	-4.26E-10	3.21E-07	0	1.85E-07
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0	0
MER	kg	0	0	7.13E-02	1.65E+01	0	0	6.57E+02	0	0

EEE	MJ	0	0	0	3.84E+01	0	0	0	0	0
EET	MJ	0	0	0	1E+02	0	0	0	0	0

HWD = hazardous waste disposed; NHWD = non-hazardous waste disposed; RWD = radioactive waste disposed; CRU = components for reuse; MFR = materials for recycling; MER = materials for energy recovery; EEE = export energy – electrical; EET = export energy – thermal

RESULTS OF THE LIFE CYCLE ASSESSMENT – additional impact categories according to EN 15804+A2-optional: 1 m³ particleboard, melamine-coated

Indicator	Unit	A1	A2	A3	A5	C1	C2	C3	C4	D
PM	Cases of illness	-1.35E-06	4.75E-07	8.56E-05	5.58E-08	0	3.85E-08	1.15E-07	0	5.04E-07
IR	kBq U235–eq.	1.75E+00	3.06E-02	5.37E+00	9.99E-02	0	2.38E-03	1.33E+00	0	1.01E+00
ETP-fw	CTUe	4.75E+02	1.2E+02	3.42E+02	5.53E+00	0	9.7E+00	4.96E+01	0	6.97E+01
HTP-c	CTUh	4.95E-08	2.41E-09	1.02E-06	5.17E-10	0	1.95E-10	2.82E-09	0	-1.04E-08
HTP-nc	CTUh	7.22E-07	1.07E-07	3.57E-07	2.7E-08	0	8.67E-09	3.9E-08	0	-1.75E-06
SQP	SQP	9.37E+02	8.07E+01	6.92E+03	4.06E+00	0	6.52E+00	9.09E+01	0	1.03E+02

PM = potential incidence of diseases due to particulate matter emissions; IR = potential human exposure efficiency relative to U235; ETP-fw = potential comparative toxic unit for ecosystems; HTP--c = potential comparative toxic unit for humans (carcinogenic effect); HTP-nc = potential comparative toxic unit for humans (non-carcinogenic effect); SQP = potential soil quality index

Note on limitations 1 – applies to the indicator ‘potential human exposure efficiency relative to U235’: this impact category primarily deals with the potential impact of low-dose ionising radiation on human health within the nuclear fuel cycle. It takes into account neither the effects attributable to potential nuclear accidents and occupational exposure, nor the disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionising radiation emitted by the ground, radon and certain building materials.

Note on limitations 2 – applies to the indicators: ‘abiotic depletion potential for non-fossil resources’, ‘abiotic depletion potential for fossil resources’, ‘water (user) deprivation potential’, ‘potential comparative toxic unit for ecosystems’, ‘potential comparative toxic unit for humans (carcinogenic effect)’, ‘potential comparative toxic unit for humans (non-carcinogenic effect)’, ‘potential soil quality index’: the results of these environmental impact indicators must be applied with caution because there is a high degree of uncertainty surrounding these results or because there is only limited experience with the indicators.

The indicator **GWP-luluc** was not declared because, including all exclusions, it accounts for less than 5% of the total GWP across the declared modules A–C. On the one hand, detailed information on the origin of raw materials was requested as part of the primary data collection. According to this, in the case of this product, approximately 15% of the industrial timber used (in the form of bark) comes from Germany (from the federal states of Baden–Württemberg, Bavaria, Hesse, Lower Saxony, North Rhine-Westphalia, Rhineland–Palatinate and Thuringia). A very small proportion comes from the Czech Republic and Switzerland. Industrial waste wood mainly comes from Germany, but also from France, Italy, the Netherlands, Austria, Switzerland and the Czech Republic (approx. 3–8%). Waste wood is purchased in Germany, France, Italy, the Netherlands, Austria, Switzerland and the Czech Republic. The average waste wood percentage is 56% of the wood content of the particleboard. Waste wood contains various assortments of former solid wood products and wood-based materials, and it is not currently possible to trace the wood back to its original harvest locations from a technological point of view. Therefore, we can only comment on the primary system, and we find that the secondary use of the raw material does not result in deforestation, as it originates from an earlier product life cycle. On the other hand, as part of the international greenhouse gas reporting under the Framework Convention on Climate Change (UNFCCC) and EU Regulation (EU) 2018/841, the annual amount of deadwood removed from existing forests in Germany is estimated, including the percentage of wood originating from the land-use change ‘deforestation’ (German Federal Environment Agency 2023). For the reference year 2023, the percentage of wood removals associated with deforestation was 1.86% nationwide. At the same time, it can be assumed that wood assortments associated with a change in land use are unlikely to be used by wood-processing companies due to irregular supply (in terms of space and time, and can therefore not be planned logistically), as they rely on a continuous supply of specific raw wood assortments of consistent quality and dimensions (in this case: industrial wood for wood-based panel production).

The primary energy used as raw materials (PERM and PENRM) is construed as an inherent material property in accordance with EN 16485. Consequently, it always leaves the product system with the material and is entered as a negative value from the corresponding indicator. RSF and NRSF are to be understood as part of PERE and PENRE and are included therein.

6. LCA: interpretation

The interpretation of the results focuses on the production phase (modules A1 to A3), as this is based on specific information received from the company. Modules A5 and C1 to C3 are also presented. The interpretation is carried out by means of a dominance analysis of the environmental impacts (GWP, ODP, AP, EP, POCP, ADPE, ADPF, WDP) and the uses of renewable/non-renewable primary energy (PERE, PENRE) as well as the additional resource indicators freshwater use and hazardous waste (FW, HWD). The specified indicators are shown on a modular basis in Fig. 2 and Fig. 3 as relative contributors to environmental impacts and resource indicators.

Interpretation of individual indicators

The results show that in most environmental categories, the heat and electricity supply (A3) and the use of adhesives (A1) are the most significant influencing variables. Whilst the adhesive in the upstream phase (A1) often accounts for the largest share of environmental impacts such as fossil greenhouse gas potential (GWP-f) and primary energy consumption (ADPF, PENRE), the manufacturing phase (A3) plays a similarly significant or even greater role overall, particularly in terms of electricity generation and heat supply. Key drivers during the production phase

include electricity generation and thermal processes (drying, heating, primary shaping), as well as packaging, which is particularly relevant to waste (HWD).

Overall interpretation

In summary, as can be seen in Fig. 2 and Fig. 3, the most significant elementary flows with a major impact are fossil fuels (electricity and heat), adhesives as a raw material, and packaging materials.

In particular, electricity consumption and heat supply are major drivers of several environmental indicators, such as ozone depletion, acidification and eutrophication. The adhesive also has a significant impact on fossil resources, primary energy and freshwater consumption.

As this EPD represents an average of three production sites weighted by production volume, site-specific differences in the input data may lead to variations in environmental impacts. Differences between sites arise in particular from the respective energy supply (e.g. the proportion of electricity from biomass CHP or the residual electricity mix), from site-specific transport distances for raw materials, and from operational constraints on production.

However, the dominance analysis shows that the key influencing factors – in particular the use of adhesives and the supply of electricity and heat during the production phase – make a comparable contribution to environmental impacts at all sites. The LCIA results presented should therefore be understood as a representative average of the production sites under consideration.

The declared average product comprises particleboards with thicknesses ranging from 8 mm to 50 mm. As the panel thickness increases, the relative proportion of coating per unit volume changes in particular, which may result in slight differences in the specific environmental impacts per m³. Thinner sheets tend to show higher contributions from coating-related materials and processes because of the higher relative proportion of coating.

However, the dominance analysis shows that the key factors influencing environmental impacts – in particular the use of adhesives and the supply of electricity and heat during the production phase – account for the majority of the impact, regardless of the panel thickness. The results presented can therefore be regarded as representative and robust for the declared average product across the range of thicknesses under consideration.

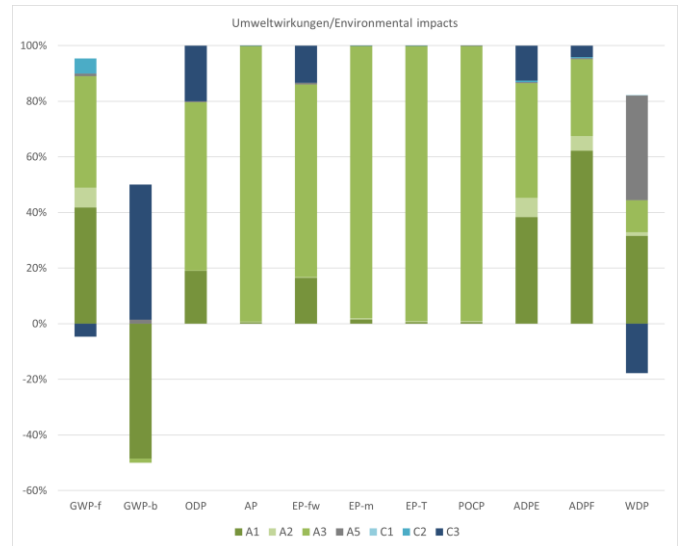


Fig. 2: Relative contributions of the modules under consideration to the individual environmental impacts

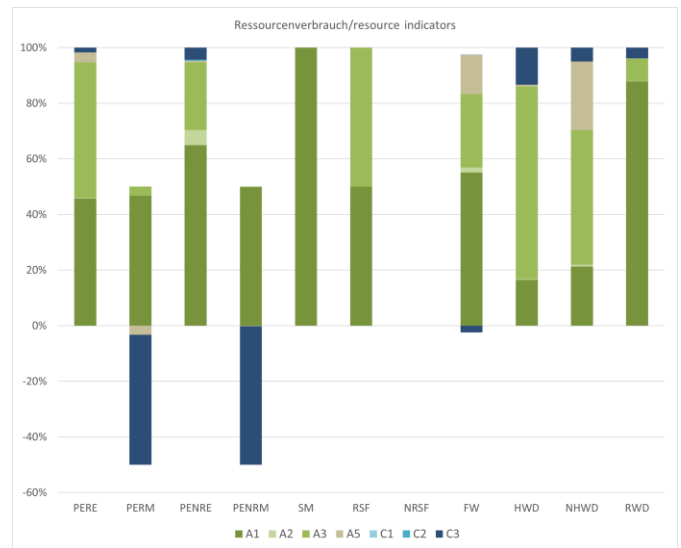


Fig. 3: Relative contributions of the modules under consideration to the individual resource indicators. Biogenic carbon

When wood is used in the form of wood chips, round timber or waste wood, the carbon sequestered in the wood enters the system space in the raw material provision module (A1), which means a negative CO₂- value from an atmospheric perspective. In information module C3, the carbon contained in the wood fractions of the product leaves the system space again in the form of recyclable waste wood. In module A3, the carbon sequestered in the (wood-) packaging is transferred from the atmosphere to the product system and leaves it again when it is disposed of in module A5. The biogenic carbon- or CO₂ flows directly attributable to the wood fractions in the product and packaging are not calculated using background datasets from the *Sphera 2024b* database. The conversion of wood mass into CO₂ is based on the quantity of carbon contained in the wood and the ratio of the molar mass of carbon dioxide to carbon (44/12). The carbon content in wood is assumed to be 50% of the absolutely dry wood mass for all species of wood (IPCC, 2006). Thus, 1 kg of absolutely dry wood mass equals approximately 1.833 kg of CO₂.

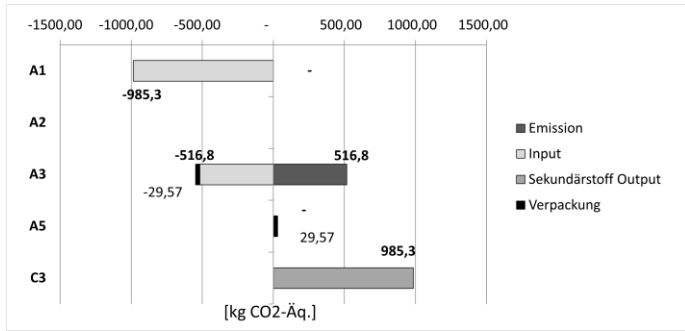


Figure 4: CO2 inherent in wood - product system inputs and outputs. The inverse sign convention used for the inputs and outputs takes into account the CO2 flow analysis in the life cycle assessment from the perspective of the atmosphere.

The growth of the wood required for production results in 985.3 kg of CO2 being sequestered in module A1; see Fig. 4. The growth of the wood used for energy in production also sequesters a further 516.8 kg CO2, which go into module A3 and are also emitted again in this module due to the incineration at the site. The 29.57 kg of biogenic CO2 contained in wood- and paper packaging also go into module A3. This leaves the system when the packaging is disposed of in module A5. The remaining 985.3 kg of CO2 leave the product system in module C3 in the form of recyclable waste wood.

Other indicators

Global warming potential fossil (GWP-f) [kg CO₂-eq.]: 31.9% - UF adhesive (A1); 10.7% - electricity, primary shaping (A3); 8.2% - electricity, coating (A3); 5.7% - packaging (A3); 5.4% - muf adhesive (A1); 4.6% - transport of waste wood for use as a material (A2); remainder 33.3%.

Ozone depletion potential (ODP) [kg CFC11-eq.]: 21% - electricity, primary shaping (A3); 16.7% - UF adhesive (A1); 16.1% - electricity, coating (A3); 8.7% - electricity, finishing (A3); 8.5% - electricity, drying (A3); 7.2% - electricity, waste wood processing (A3); remainder 21.8%.

Acidification potential (AP) [mol H⁺-eq.]: 47% - heat, drying (A3); 32.2% - heat, heating (A3); 19.6% - heat, primary shaping (A3); 0.2% - UF adhesive (A1); 0.2% - transport of waste wood for use as a material (A2); 0.1% - packaging (A3); remainder 0.7%.

Eutrophication (EP-fw) [kg P-Äqv.]: 21.8% -- electricity, primary shaping (A3); 16.8% -- electricity, coating (A3); 12.3% -- UF adhesive (A1); 9.1% -- electricity, finishing (A3); 8.9% -- electricity, drying (A3); 7.5% -- electricity, waste wood processing (A1); remainder 23.7%

Photochemical ozone formation (POCP) [kg NMVOC-eq.]: 45.4% - heat, drying (A3); 33.1% - heat, heating (A3); 19.3% - heat, primary shaping (A3); 0.6% - dryer emissions on site (A3); 0.3% - adhesive curing (A3); 0.3% - UF adhesive (A1); remainder 1.1%.

Potential for abiotic degradation of non-fossil resources (ADPE) [kg Sb-eq.]: 20.6% - UF adhesive (A1); 12% - electricity, primary shaping (A3); 9.3% - electricity, coating (A3); 8.2% - coating_A1 (A1); 6.6% - packaging (A3); 5% - electricity, finishing (A3); remainder 38.4%.

Potential for the abiotic degradation of fossil fuels (ADPF) [MJ]: 48.1% - UF adhesive (A1); 7.1% - muf adhesive (A1); 6.8% - electricity, primary shaping (A3); 5.2% - electricity, coating (A3); 4.3% - packaging (A3); 3.9% - formaldehyde scavenger (A1); remainder 24.6%.

Water use (WDP) [m³ world-eq. withdrawn]: 43.1% - operating resources (A1); 13.7% - UF adhesive (A1); 5.2% - packaging (A3); 5.3% - coating_A1 (A1); 4.2% - electricity, primary shaping (A3); 3% - electricity, coating (A3); remainder 25.5% .

Primary energy renewable - used as energy carrier (PERE) [MJ]: 21.9% - heat, drying (A3); 20.9% - packaging (A3); 19.2% - heat, heating (A3); 9.9% - heat, primary shaping (A3); 5.4% - coating_A1 (A1); 4.2% - electricity, primary shaping (A3); remainder 18.6%.

Primary energy non-renewable - used as energy carrier (PENRE) [MJ]: 48.1% - UF adhesive (A1); 7.1% - muf adhesive (A1); 6.8% - electricity, primary shaping (A3); 5.2% - electricity, coating (A3); 4.3% - packaging (A3); 3.9% - formaldehyde scavenger (A1); remainder 24.6%.

Use of freshwater resources (FW) [m³]: 30.5% - UF adhesive (A1); 15.8% - coating_A3 (A1); 9.3% - operating resources (A1); 8.2% - electricity, primary shaping (A3); 6.3% - electricity, coating (A3); 4.4% - packaging (A3); remainder 25.6%

Hazardous waste disposed (HWD) [kg]: 43.9% - heat, drying (A3); 28.6% - heat, heating (A3); 17.9% - heat, primary shaping (A3); 6.8% - packaging (A3); 0.6% - UF adhesive (A1); 0.3% - primary wood for use as a material (A1); remainder 1.9%.

Hazardous waste

Figure 5 shows the relative amounts of hazardous, non-hazardous and radioactive waste produced per declared unit of the product on a modular basis. For example, hazardous waste disposed (HWD) [kg]: 43.9% - heat, drying (A3); 28.6% - heat, heating (A3); 17.9% - heat, primary shaping (A3); 6.8% - packaging (A3); 0.6% - UF adhesive (A1); 0.3% - primary wood for use as a material (A1); remainder 1.9%.

The radioactive waste content is 7.91E-06 kg/m³. The hazardous waste amounts to approximately 8.05E-02 kg/m³. The majority of waste materials consist of non-hazardous waste, at approximately 2.70E+00 kg/m³.

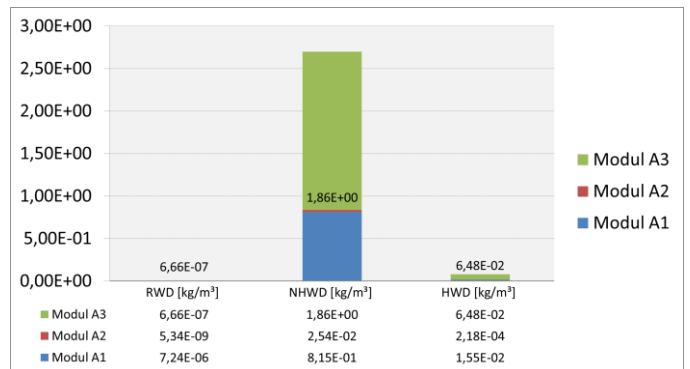


Fig. 5: Waste produced per declared unit at a module level. HWD = hazardous waste disposed; NHWD = non-hazardous waste disposed; RWD = radioactive waste disposed.

7. Requisite evidence

/AltholzV (German Waste Wood Ordinance)

7.1. Formaldehyde

Monitoring: **WKI Fraunhofer-Institute Braunschweig (Qualitätsgemeinschaft Holzwerkstoffe e.V.)**

Test body: **WKI Fraunhofer Institute Braunschweig**

Test standard: **EN 717-1 Determination of formaldehyde release EN 16516 Assessment of release of dangerous substances - Determination of emissions into indoor air**

The tested material meets the requirements of the German Banned Chemicals Ordinance (Chemikalien-Verbotsverordnung) as follows:

Formaldehyd	≤ 0,1 ppm nach EN 717-1 (x-Faktor 2,0 gem. Chemikalienverordnung, sog. Standard E 05)
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Source: Qualitätsgemeinschaft Holzwerkstoffe e.V.

Monitoring takes place every six months and complies with the requirements of the 'Ordinance on the prohibition and restriction of the placing on the market and release of certain substances, mixtures and articles according to the Chemicals Act' (*ChemVerbotsV* – German Banned Chemicals Ordinance), Annex 1 (to §3) 'Prohibitions on placing on the market', 'Entry 1: Formaldehyde', Column 2 'Prohibitions' (1) and complies with the limit values applicable in Germany since 1 January 2020 regarding the release of formaldehyde.

Certificate: E[D2020](R)-1351-4/2024 (TSCA; F****) E[D2020](R)-659-4/2024 (TSCA; F****) E[D2020](R)-1349-3/2024 (TSCA) E[D2020](R)-1436-4/2024 (TSCA) E[D2020](R)-1435-4/2024 (TSCA) E[D2020]@-1398-4/2024

7.2. Testing for pretreatment of the input materials

Monitoring: **MPA Eberswalde (Qualitätsgemeinschaft Holzwerkstoffe e.V.)**

Test bodies: **MPA Eberswalde & SGS Institut Fresenius GmbH**

Purpose of the test: to examine panel material for its PCP, tetrachlorophenol and lindane content.

Analysis method: quantitative gas chromatography with mass-selective detection (GC-MS)

Extraction: Soxhlet extraction for several hours with methanol or n-hexane; PCP/tetrachlorophenol-analysis after derivatisation with acetic anhydride under alkaline conditions according to *CEN/TR 14823:2003/ or Annex IV*

Pentachlorphenol	≤ 3,0 mg/kg
Lindan	≤ 1,0 mg/kg

Source: Qualitätsgemeinschaft Holzwerkstoffe e.V.

Test report:

No. UAU-23-0082451/01-1

No. 7680014

7.4. VOC emissions

Monitoring: **RAL GmbH**

Test body: **WKI Fraunhofer Institute Braunschweig**

Purpose of the test: to determine VOC emissions in accordance with

AgBB Schema/MVVTB

Method of measurement: *EN 16516*

Result: the raw particleboards tested in accordance with *EN 16516* meet the requirements laid down in the 2018 *AgBB Schema/MVVTB* for VOC after 3 days and after 28 days.

Pfleiderer DecoBoard (No. 2100) and OrganicBoard (No. 40337) melamine-coated particleboards bear, among other things, the RAL quality seal (UZ-76) **Blauer Engel** (Blue Angel label).

AgBB results overview (28 day [µg/m³])

Name/description	Value	Unit
TVOC (C6–C16)	116	µg/m ³
Total SVOC (C16–C22)	< 5	µg/m ³
R (dimensionless)	0.34	-
VOC without LCI	42	µg/m ³
Carcinogenic	< 1	µg/m ³
Formaldehyde	22	µg/m ³

AgBB results overview (3 day [µg/m³])

Name/description	Value	Unit
TVOC (C6–C16)	420	µg/m ³
SVOC sum (C16–C22)	< 5	µg/m ³
R (dimensionless)	0.34	-
VOC without LCI	52	µg/m ³
Carcinogenic	< 1	µg/m ³
Formaldehyde	26	µg/m ³

The Pfleiderer product **DecoBoard P2** was used as the reference.

Precise measurements for all products can be provided on request.

8. References

EN 310:1993-08

-Wood-based panels - Determination of modulus of elasticity in bending and of bending strength; EN 310:1993

EN 311:2002-08

Wood-based materials - Surface soundness. Test method; EN 311:2002

EN 312:2010-12

-Particleboards - Specifications; EN 312:2010

EN 317:1993-08

Particleboards and fibreboards - Determination of swelling in thickness after immersion in water; EN 317:1993

EN 319:1993-08

Particleboards and fibreboards - Determination of tensile strength perpendicular to the plane of the board; EN 319:1993

EN 322:1993-08

Wood-based panels - Determination of moisture content; EN 322:1993

EN 323:1993-08

Wood-based panels - Determination of density; EN 323:1993

EN 324-1:1993-08

Wood-based panels - Determination of dimensions of boards - Part 1: Determination of thickness, width and length; EN 324-1:1993

EN 324-2:1993-08

Wood-based panels - Determination of dimensions of boards - Part 2: Determination of squareness and edge straightness; EN 324-2:1993

EN 717-1:2005-01

Wood-based panels - Determination of formaldehyde release -- Part 1: Formaldehyde emission by the chamber method; EN 717-1:2004

EN 1087-1:1995-04

Particleboards - Determination of moisture resistance - Part 1: Boil test; EN 1087-1:1995

ISO 9001:2015-09

Quality management systems -- Requirements

EN 13501-1:2019-05

Fire classification of construction products and building elements -- Part 1: Classification using data from reaction to fire tests; EN 13501-1:2018

EN 13986:2015-06

-Wood-based panels for use in construction - Characteristics, evaluation of conformity and marking; EN 13986:2004+A1:2015

ISO 14001:2015-09

Environmental management systems - Requirements with guidance for use

ISO 14025:2006-07

-Environmental labels and declarations - -Type III environmental declarations -- Principles and procedures

EN 15804+A2:2022-11

Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products

ISO 16000-3:2023-12

Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds in indoor and test chamber air - Active sampling method (ISO 16000-3:2022)

ISO 16000-6:2022-03

Indoor air -- Part 6: Determination of organic compounds (VVOC, VOC, SVOC) in indoor- and test chamber air by active sampling on sorbent tubes, thermal desorption and gas chromatography using MS or MS -FID (ISO 16000-6:2021)

EN ISO 16000-9:2008-04

Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method (ISO 16000-9:2006); EN ISO 16000-9:2006

EN 16516:2020-10

Construction products: assessment of release of dangerous substances - Determination of emissions into indoor air; EN 16516:2017+A1:2020

ISO 45001:2018-03

-Occupational health and safety management systems - Requirements with guidance for use

ISO 50001:2018-08

-Energy management systems - Requirements with guidance for use

Further references**PCR Part B**

Product category rules for building-related products and services. Part B: Requirements on the EPD for wood-based products. Version 1.7. Berlin: Institut Bauen und Umwelt e.V. (publisher), 1 August 2021.

PCR Part A

Product category-- rules for building-related products and services. Part A: Calculation rules for the life cycle assessment and requirements on the project report. Version 1.4. Berlin: Institut Bauen und Umwelt e.V. (publisher), 30 April 2024.

AgBB Schema

Emissionen von flüchtigen organischen Verbindungen (VVOC, VOC und SVOC) aus Bauprodukten; Ausschuss zur gesundheitlichen Bewertung von Bauprodukten (German Committee for Health Assessment of Construction Products - Procedure for health assessment of VOC emissions). 2021 version.

AltholzV

Verordnung über Anforderungen an die Verwertung und Beseitigung von Altholz -'Altholzverordnung' (AltholzV) (German Waste Wood Ordinance)

BBSR-Tabelle

BBSR- Tabelle zu Nutzungsdauern von Bauteilen für Lebenszyklusanalysen nach Bewertungssystem Nachhaltiges Bauen (BNB), Federal Ministry of the Interior, Building and Community, dated: 24 February 2017 (Service life of building elements)

CARB

CARB - Final Regulation Order § 93120--931120.12, title17, California Code of Regulations: 'Airborne toxic control measurement to reduce formaldehyde emissions from composite wood products'.

CPR

CPR – Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products (EU CPR).

ChemVerbotsV

Chemikalien -Verbotsverordnung (ChemVerbotsV): Verordnung über Verbote und Beschränkungen des Inverkehrbringens und über die Abgabe bestimmter Stoffe, Gemische und Erzeugnisse nach dem Chemikaliengesetz (German Banned Chemicals Ordinance).

ECHA candidate list

List of substances of very high concern eligible for authorisation (as of 27 June 2018) in accordance with Article 59(10) of the *REACH* Regulation. European Chemicals Agency.

REACH Regulation

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

Rüter and Diederichs

Rüter und Diederichs (2012) Ökobilanz Basisdaten für Bauprodukte aus Holz, Hamburg: Johann Heinrich von Thünen Institute, Institute of Wood Technology and Wood Biology, final report.

Regulation (EU) No. 305/2011

Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

Sphera (2024)

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**Publisher**

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produced by**

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Germany

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