

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Parador GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-PAR-20230067-IBC1-EN
Issue date	04.05.2023
Valid to	03.05.2028

Multi-layered engineered wood flooring Parador GmbH

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1. General Information

Parador GmbH	Multi-layered engineered wood flooring								
Programme holder IBU – Institut Bauen und Umwelt e.V. Hegelplatz 1 10117 Berlin Germany	Owner of the declaration Parador GmbH Millenkamp 7-8 48653 Coesfeld Germany								
Declaration number EPD-PAR-20230067-IBC1-EN	Declared product / declared unit The declared unit is one square meter (1 m²) of multi-layered engineered wood flooring.								
This declaration is based on the product category rules: Solid wood products, 01.08.2021 (PCR checked and approved by the SVR)	Scope: This EPD relates to the manufacture, transport, installation, and disposal of an average square metre of Parador multi-layered engineered wood flooring. The technical characteristics are described in chapter 2.3. The product is manufactured in Güssing, Austria. It is shipped from Coesfeld in Germany. The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.								
Issue date 04.05.2023	Verification <table><tr><td colspan="2">The standard EN 15804 serves as the core PCR</td></tr><tr><td colspan="2">Independent verification of the declaration and data according to ISO 14025:2011</td></tr><tr><td>☐</td><td>internally</td></tr><tr><td>☒</td><td>externally</td></tr></table>	The standard EN 15804 serves as the core PCR		Independent verification of the declaration and data according to ISO 14025:2011		☐	internally	☒	externally
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☐	internally								
☒	externally								
Valid to 03.05.2028	The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as <i>EN 15804</i>.								
 Dipl.-Ing. Hans Peters (Chairman of Institut Bauen und Umwelt e.V.)									
 Dipl.-Ing. Hans Peters (Managing Director Institut Bauen und Umwelt e.V.)	 Prof. Dr. Birgit Grahl, (Independent verifier)								

2. Product

2.1 Product description/Product definition

Parador multi-layered engineered wood floors are wooden floors with a high-grade timber top layer. The materials required for the production of these floors, such as sawn timber, planed timber, friezes, veneers or ready-made top layers, are initially manufactured separately. For the most part, native wood species are used. Tropical woods are not used for environmental reasons. Depending on the version of the product, the top layer consists of either a single lamella or several lamellae. The individual materials are glued together. After a period of acclimatisation, the blanks undergo a surface treatment and are given a longitudinal and transverse profile according to the product format in question and are then packaged.

When these products are introduced onto the market for the first time, they are subject to the provisions of *Regulation (EU) No. 995/2010 (European Timber Regulation)*. Furthermore, when brought onto the market in the EU/EFTA (with the exception of Switzerland), they are also subject to the provisions of *Regulation (EU) No. 305/2011 (CPR)*. The products have a Declaration of Performance and are CE marked taking into consideration the harmonised standard *DIN EN 14342:2013-09, Wood flooring and engineered wood flooring - characteristics, evaluation of conformity and marking*.

2.2 Application

Multi-layered engineered wood floors are floor coverings in accordance with *EN 13489* for private and commercial use in interior areas, which are either laid "floating" on screed or on other existing floors such as wood or tiles, in connection with suitable underlay materials, or are glued to the screed across the whole floor area. Laying is to be done in accordance with the laying instructions in the packaging or the "Guide Engineered Wood Flooring", the rules of the trade and using the latest methods in terms of technology.

The respective national regulations apply to the use of the product.

2.3 Technical Data

Key features and performance in accordance with the Declaration of Performance and the underlying harmonised product standard *EN 14342*.

Structural data

Name	Value	Unit
Product thickness	10.5 - 19	mm
Wear layer thickness	≥ 2,5	mm
Surface weight	4500 - 9300	g/m ²
Length of top layer, approx.	570 - 2380	mm
Width of top layer, approx.	95 - 233	mm
Thermal transfer resistance	0.07-0.140	m ² K/W
Thermal conductivity	0.135 - 0.150	W/m.K
Formaldehyde	E1	
Pentachlorophenol (PCP)	≤ 5	ppm
Reaction to fire (in accordance with EN 13501-1)	≥ Dfl – s1	
Biological durability	Class1	
Slip resistance natural oil (CEN/TS 15676)	46	SRT (wet)
Slip resistance natural oil (rough-sawn) (CEN/TS 15676)	57	SRT (wet)
Slip resistance lacquer (CEN/TS 15676)	29	SRT (wet)
Slip resistance UV oil (CEN/TS 15676)	29	SRT (wet)
Slip resistance natural oil plus (CEN/TS 15676)	99	USRV
Slip resistance natural oil (CEN/TS 15676)	103	SRT (dry)
Slip resistance natural oil (rough-sawn) (CEN/TS 15676)	99	SRT (dry)
Slip resistance lacquer (CEN/TS 15676)	51	SRT (dry)
Slip resistance lacquer (rough-sawn) (CEN/TS 15676)	91	USRV
Slip resistance UV oil (CEN/TS 15676)	38	SRT (dry)
Breaking strength	NPD*	

*NPD = no performance determined

Further technical data can be found on the company website: <https://parador.de/services/downloads/parkett>

Certificates can be found on: <https://parador.de/services/downloads/parkett> under the heading "Certificates".

Performance values of the product in accordance with the Declaration of Performance (DoP) in regard to its key features in accordance with *DIN EN 14342:2013- 09, Wood flooring and engineered wood flooring - characteristics, evaluation of conformity and marking*.

The Declarations of Performance can be found on: <https://parador.de/services/downloads/parkett> under the heading "Declarations of Performance".

2.4 Delivery status

All products are delivered in packaging units. The accompanying delivery paperwork contains the following information, at the least:

- Quantity in m²

- Dimensions in mm (length, width, height (thickness) of the elements)
- Type of wood
- Grade

The product-specific and manufacturer-specific dimensions/quantities of the declared products in as-delivered condition are within the following ranges:

- Length: 570-2,380 mm
- Width: 95-233 mm
- Thickness: 10.5-19 mm
- m²/packaging unit: 1.083-4.07

Other formats are possible – on this point and for details of packaging units, please see the current list of types and technical data sheets for the product in question.

The technical data sheets can be found on:

<https://parador.de/services/downloads/parkett> under the heading "Technical Data Sheets".

2.5 Base materials/Ancillary materials

The following percentages of component materials were averaged for this EPD (the details are given in % by mass per m² of three-layered engineered wood flooring in as-delivered condition):

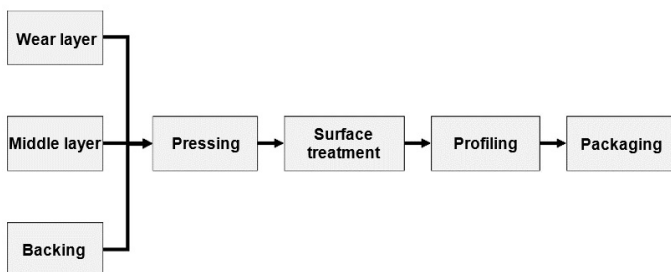
- 58 % middle layer (spruce)
- 30 % top layer (various high-grade woods, of which > 95 % are oak)
- 9 % backing (spruce veneer)
- 3 % glues and surface (lacquers and oils)

The product/at least a part of the product contains substances that are on the *ECHA Candidate List* (Date 17.01.2022) more than 0.1 % by mass: no

The product/at least a part of the product contains further CMR substances in Category 1A or 1B, which are not on the Candidate List, more than 0.1 % by mass in at least of a part of the product: no

Biocide products have been added to this construction product or has it been treated with biocide products (it is therefore a treated product within the meaning of the Biocide Products Regulation (EU) No. 528/2012): no.

2.6 Manufacture



The wear layer, middle layer and backing are pressed together with glue in a press in one operation. After pressing, the individual raw planks undergo a surface treatment (apart from untreated end products) and are given a longitudinal and transverse profile. After quality control of the individual multi-layered engineered wood flooring elements, they are packed into half-shell cardboard boxes and shrink-wrapped in polyethylene (PE) film. These individual packaging units are stacked on pallets according to the different formats and made available in the warehouse for subsequent delivery.

All processes are continually inspected and documented as part of the in-house Factory Production Control (FPC) system.

Parador's quality management system is certified according to *ISO 9001* and ensures that all processes are documented and, where necessary, amended.

2.7 Environment and health during manufacturing

All wood waste from the Güssing site is delivered to a biomass cogeneration plant, from which Parador sources the heat needed for their processes.

The Coesfeld and Güssing sites are certified according to the European Eco-Management and Audit System *EMAS* which audits both the environmental and the energy-related aspects of the sites and requires them to undergo continual improvement.

2.8 Product processing/Installation

For the installation of engineered wood flooring, Parador recommends the use of the following tools: measuring tape, cutter, adhesive tape, pencil, hammer, and jigsaw or circular/mitre saw (ensure the finest possible teeth and suitability for wood processing). Spacer wedges, drawbars, protective block, and a MultiTool are also useful.

The usual safety precautions (e.g. safety goggles and dust mask when sawing) must be observed. The resulting shavings and sawdust should be extracted. If the products are used for commercial purposes, the provisions of the employers' liability insurance association shall apply.

The residual material and packaging must be disposed of separately according to waste category. Further information can be found in the installation instructions enclosed with the product or in the "Guide Engineered Wood Flooring".

2.9 Packaging

The engineered wood flooring elements are packed in half-shell cardboard boxes which are shrink-wrapped in polyethylene (PE) film for better protection against moisture. Exchangeable Euro-pallets and polyethylene terephthalate (PET) strapping are also used for transport. Packaging materials are to be collected and separated into different materials and taken for recycling in line with local regulations. If Euro-pallets are used, these can be reused several times or recycled as used wood prior to thermal recovery.

2.10 Condition of use

Wood is a hygroscopic material, i.e. it can absorb and release moisture. For use it is therefore important to ensure a balanced room climate in order to avoid possible dimensional changes. The room climate should be at a temperature of approx. 20°C and a relative humidity of between 30 and 65 % all year round.

2.11 Environment and health during use

As the engineered wood flooring is made of wood, the product does not cause any adverse effects with regard to the environment or health. If the product is used as intended, there will not be any risk to our water, air or soil. Emissions of pollutants are well below the legal limits. Products with smoked top layers may contain negligible quantities of residual ammonia. With regard to the emissions produced, Parador multi-layered engineered wood flooring (with the exception of the smoked version) fulfils the fundamental principles for the awarding of DE-UZ176 (*Blue Angel*) "Contract 27261" and of the *eco-INSTITUT label* "ID 1016-12656-002".

2.12 Reference service life

The useful life of multi-layered engineered wood flooring is 40 years in accordance with Code No. 352.812, Useful life of building components for lifecycle analyses according to the evaluation system for sustainable building (BNB), as of Nov 2011. Inadequate maintenance and incorrect cleaning may have an adverse effect on the expected useful life of the products.

According to the manufacturer, the useful life of the product is 50 years. This is under the assumption that the multi-layered engineered wood flooring is sanded down twice.

2.13 Extraordinary effects

Fire

Details of the building material class in accordance with EN 13501-1 and in accordance with Table 1 of EN 14342.

Fire protection

The hardener used contains ammonium chloride, which can form dioxins in the case of fire.

Name	Value
Building material class	Dfl
Smoke gas development	s1

Water

Among the water-related effects, it is possible that the material could swell up, in the worst case leading to deformation and making it necessary to replace the engineered wood flooring. If there is long-term exposure to moisture the possibility cannot

be excluded that the wood will rot and mould will start to form. However, if the wood is properly dried, there should be no adverse effects for the environment or for human health.

Mechanical destruction

Mechanical destruction is not expected to have any negative consequences for the environment.

2.14 Re-use phase

In case of selective dismantling, the product can easily be reused even after the end of the useful life. If the product can no longer be re-used as a floor covering, the wood itself can still be used in other ways, e.g. as a raw material for the manufacture of wooden boards, where there are in turn many options for the cascading use of wood. If the product cannot be re-used or recycled, its high calorific value of approx. 16.1 MJ/kg means that it can be sent for thermal recovery to generate process heat and electricity.

2.15 Disposal

Residues and wastes from multi-layered engineered wood flooring should be recycled in accordance with AVV 17 02 01 and AVV 03 01 05. According to AltholzV and AVV 17 02 01, sending used wood to landfill is not allowed in Germany and it is also unnecessary (see 2.14 Re-use phase).

2.16 Further information

Additional information about the company and other products as well as information brochures – including the EMAS Environmental Statement – are available to download on the company website: www.parador.de

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 m² of average multi-layered engineered wood flooring, including packaging material. The average was weighted according to the production volume of the products involved. The total inputs, outputs and m² produced for the period under consideration were taken as a basis.

The variations included on average differ in regard to the type of wood and the treatment of the wear layer and in terms of dimensions.

Details of the declared unit

Name	Value	Unit
Declared unit	1	m ²
Grammage	7.01	kg/m ²
Packaging materials	0.500	kg/m ²
Total	7.510	kg/m ²
Layer thickness	0.013	m
Gross density	539	kg/m ³

3.2 System boundary

Type of EPD: Cradle to factory gate with options.

Modules A1 to A3 and A5

In Modules A1 to A3, the production of the required raw materials and energy (including all relevant upstream chains and procurement transport) is taken into account. Furthermore, the entire manufacturing phase is considered, including treatment of production waste until end-of-waste status (EoW) is reached.

In Module A5, the recovery of the packaging material is accounted for.

Modules B2 and B5

In Module B2, the cleaning and oiling of the engineered wood flooring is considered, including the auxiliary materials needed for this and the treatment of the waste and waste water that is produced, in the referenced useful life.

In Module B5, the renovation of the engineered wood flooring is declared, including the treatment of the waste that arises.

Modules C1 to C4 and D

Module C1 describes the dismantling of the product. As it is assumed that dismantling will be done manually, no negative or positive effect is accounted for in this module.

In Module C2, transportation to the various sites for disposal processes is taken into account.

Module C2 comprises the necessary processes for waste management at the end of the product lifecycle. For this purpose, two scenarios are considered: thermal recovery (scenario 1) and recycling of materials (scenario 2).

The negative effects for waste management are mapped out here up until the point when the material loses its waste status. Potentials that arise and negative effects that are avoided outside of the system boundaries are assigned to Module D. No materials are sent to landfill so no negative or positive effects are accounted for in Module C4.

3.3 Estimates and assumptions

The data set for oak has been used for any types of wood for which there is no suitable data set. The percentage of such types of wood is so small that we do not expect this to have any significant effect on the overall life cycle assessment.

3.4 Cut-off criteria

It can be assumed that the total of neglected processes does not exceed 5 % of the impact categories taken into consideration.

3.5 Background data

As a general rule, the background database *GaBi* has been used in content version 2021.1. In cases where no suitable data set was available in the *GaBi* background database, the data sets of the *ecoinvent* 3.6 database were used.

3.6 Data quality

The foreground data was provided by Parador and has been tested for plausibility. The quality of the foreground data and the extent to which the data is representative can therefore be considered to be high.

The data quality of the background data has been rated as good in regard to the extent to which it is representative in temporal, technical and geographical terms.

With regard to the robustness of the life cycle assessment values, it can be stated that the potential impacts on the environment that have been taken into account result for the

most part from the background data.

3.7 Period under review

Foreground data was recorded for the period from July 2019 to June 2020.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Europe

3.9 Allocation

There was no need for allocation of by-products as their contribution to the company's operating income is very small.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. The *GaBi* background database in content version 2021.1 has been used

4. LCA: Scenarios and additional technical information

Characteristic product properties biogenic carbon

Information describing the biogenic carbon content at the factory gate

Name	Value	Unit
Biogenic carbon content in product	3.15	kg C
Biogenic carbon content in accompanying packaging	0.16	kg C

Installation in the building (A5)

Name	Value	Unit
Output substances following waste treatment on site	0.5	kg

Maintenance (B2)

Name	Value	Unit
Information on maintenance	-	-
Maintenance cycle (vacuum cleaning, twice a week)	5200	Number/RSL
Water consumption (wet cleaning)	0.24	m ³
Electricity consumption (vacuum cleaning)	15.6	kWh
Maintenance interval (wet cleaning)	1200	No./RSL
Cleaning product (wet cleaning)	0.48	litre
Maintenance interval (oils, every 5 years)	7	No./RSL
Water consumption (oils)	0.0007	m ³
Cleaning product (oils)	0.0014	litre
Pads (oils)	0.12	piece
Oil	0.11	kg

Replacement (B4)/rebuilding/renewal (B5)

Name	Value	Unit
Replacement cycle	2	Number/RSL
Electricity consumption	1.32	kWh
Decrease for each instance of renovation	0.7	mm
Sanding material	0.2	piece
Oil (50 % of floors)	0.05	kg
Lacquer (50 % of floors)	0.225	kg

Reference useful life

Name	Value	Unit
Life Span (according to BBSR)	40	a
Life Span according to the manufacturer	50	a

End of the product lifecycle (C2 to C3)

Name	Value	Unit
Collected separately (old wood)	-	kg
Energy recovery (scenario 1)	6.267	kg
Recycling (scenario 2)	6.267	kg
Landfilling	-	kg

Potential for reuse, recovery and recycling (D), relevant scenario data

Name	Value	Unit
Old wood	6.267	kg

5. LCA: Results

The results of the life cycle assessment for the B Modules (utilisation phase) refer to a useful life of 50 years. Details of the parameters that form the basis for this can be found in Chapter 4.

Two scenarios were considered for the end of the product lifecycle:

- Scenario 1: Thermal recovery
- Scenario 2: Recycling of materials

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-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	X	MNR	MNR	X	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² multi-layered engineered wood flooring

Parameter	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
GWP-total	kg CO ₂ eq	-6.8E+00	9.38E-01	7.04E+00	1.46E+00	0	7.34E-02	1.15E+01	1.14E+01	0	-4.61E+00	-1.97E-01
GWP-fossil	kg CO ₂ eq	5.31E+00	3.58E-01	7.03E+00	1.24E+00	0	7.28E-02	1.68E-01	5.48E-02	0	-4.61E+00	-1.96E-01
GWP-biogenic	kg CO ₂ eq	-1.21E+01	5.8E-01	0	2.24E-01	0	0	1.13E+01	1.13E+01	0	0	0
GWP-luluc	kg CO ₂ eq	2.27E-02	2.67E-05	9.02E-03	1.12E-03	0	5.96E-04	1.08E-04	1.23E-04	0	-3.2E-03	-1.09E-03
ODP	kg CFC11 eq	1.1E-07	3.33E-17	1.51E-13	1.56E-14	0	1.44E-17	1.49E-15	4.59E-09	0	-5.29E-14	-1.65E-08
AP	mol H ⁺ eq	2.82E-02	4.55E-05	1.43E-02	2.55E-03	0	8.49E-05	1.61E-03	3.03E-04	0	-6.04E-03	-1.09E-03
EP-freshwater	kg P eq	1.65E-04	1.32E-08	1.7E-04	2.76E-06	0	2.17E-07	2.04E-07	5.27E-05	0	-6.05E-06	-8.21E-05
EP-marine	kg N eq	1.06E-02	1.08E-05	3.98E-03	6.51E-04	0	2.85E-05	5.3E-04	5.24E-05	0	-1.71E-03	-2.79E-04
EP-terrestrial	mol N eq	1.2E-01	2.11E-04	3.6E-02	7.25E-03	0	3.36E-04	7.69E-03	4.96E-04	0	-1.84E-02	-2.91E-03
POCP	kg NMVOC eq	4.14E-02	3.11E-05	9.88E-03	2.03E-03	0	7.47E-05	1.44E-03	1.3E-04	0	-4.81E-03	-9.16E-04
ADPE	kg Sb eq	1.68E-05	7.58E-10	1.9E-06	2.35E-07	0	6.46E-09	2.27E-08	2.11E-07	0	-7.69E-07	-1.94E-06
ADPF	MJ	9.14E+01	9.31E-02	1.28E+02	2.64E+01	0	9.71E-01	2.47E+00	1.26E+00	0	-8E+01	-3.01E+00
WDP	m ³ world eq deprived	1.81E+00	3.75E-02	1.13E+00	4.1E-01	0	6.77E-04	1.17E+00	3.98E-02	0	-3.55E-01	-5E-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; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² multi-layered engineered wood flooring

Parameter	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
PERE	MJ	1.65E+02	1.28E-02	5.18E+01	5.59E+00	0	5.59E-02	1.11E+02	1.86E-01	0	-1.82E+01	-2.81E+01
PERM	MJ	1.17E+02	0	0	0	0	0	-1.1E+02	0	0	0	0
PERT	MJ	2.82E+02	1.28E-02	5.18E+01	5.59E+00	0	5.59E-02	4.78E-01	1.86E-01	0	-1.82E+01	-2.81E+01
PENRE	MJ	8.07E+01	9.33E-02	1.28E+02	2.64E+01	0	9.75E-01	8.49E+00	1.26E+00	0	-8E+01	-3.01E+00
PENRM	MJ	1.09E+01	0	0	0	0	0	-6.02E+00	0	0	0	0
PENRT	MJ	9.15E+01	9.33E-02	1.28E+02	2.64E+01	0	9.75E-01	2.47E+00	1.26E+00	0	-8E+01	-3.01E+00
SM	kg	0	0	0	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0	0	1.1E+02	0
NRSF	MJ	0	0	0	0	0	0	0	0	0	0	0
FW	m ³	7.48E-02	8.81E-04	5.32E-02	1.28E-02	0	6.4E-05	2.76E-02	9.28E-04	0	-1.77E-02	-1.16E-03

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

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2:

1 m² multi-layered engineered wood flooring

Parameter	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
HWD	kg	5.55E-07	1.17E-11	3.06E-08	5.3E-09	0	5.14E-11	4.45E-10	0	0	-1.8E-08	0
NHWD	kg	1E-01	1.75E-03	3.4E-01	3.74E-02	0	1.53E-04	8.14E-02	0	0	-3.76E-02	0
RWD	kg	2.25E-03	3.1E-06	1.67E-02	1.69E-03	0	1.77E-06	1.37E-04	0	0	-5.84E-03	0
CRU	kg	0	0	0	0	0	0	0	0	0	0	0
MFR	kg	0	1.17E-01	0	0	0	0	0	0	0	0	0
MER	kg	1.74E-01	1.39E-01	1.23E-01	9.68E-01	0	0	6.27E+00	0	0	0	0
EEE	MJ	0	8.23E-01	0	2.71E+00	0	0	1.64E+01	0	0	0	0
EET	MJ	6.6E-01	1.47E+00	0	4.87E+00	0	0	2.95E+01	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:

1 m² multi-layered engineered wood flooring

Parameter	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
PM	Disease incidence	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IR	kBq U235 eq	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	SQP	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

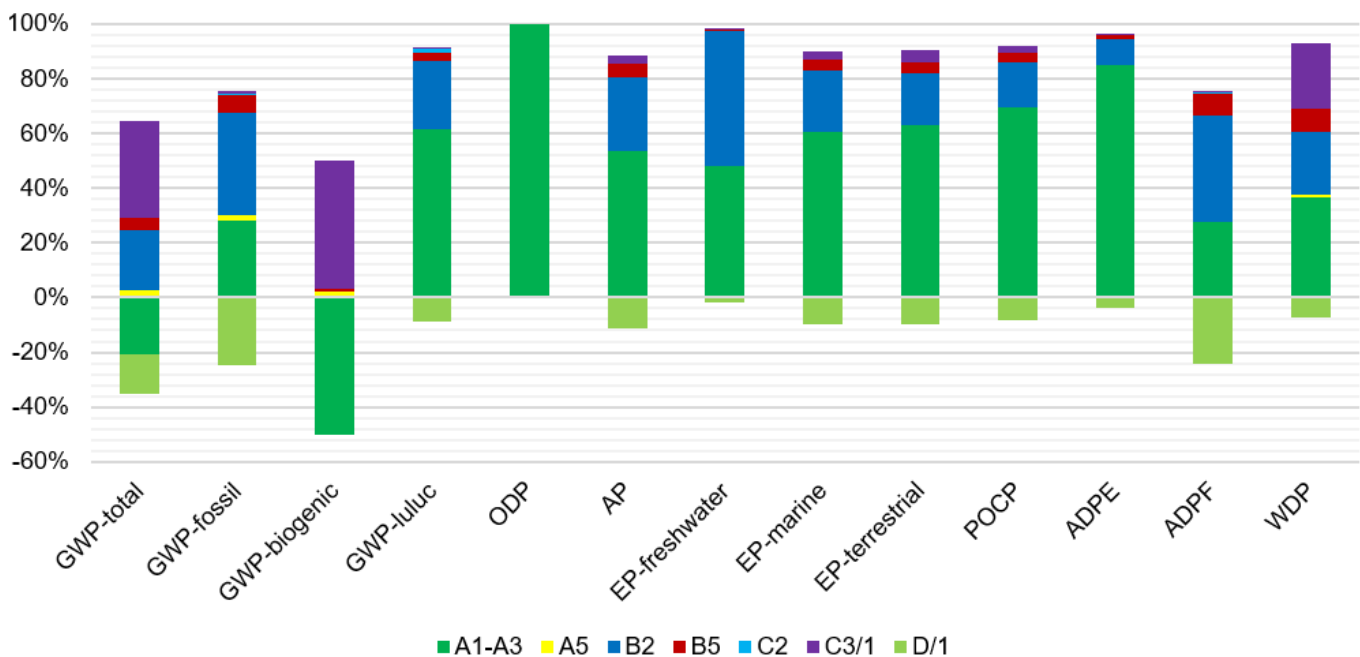
PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

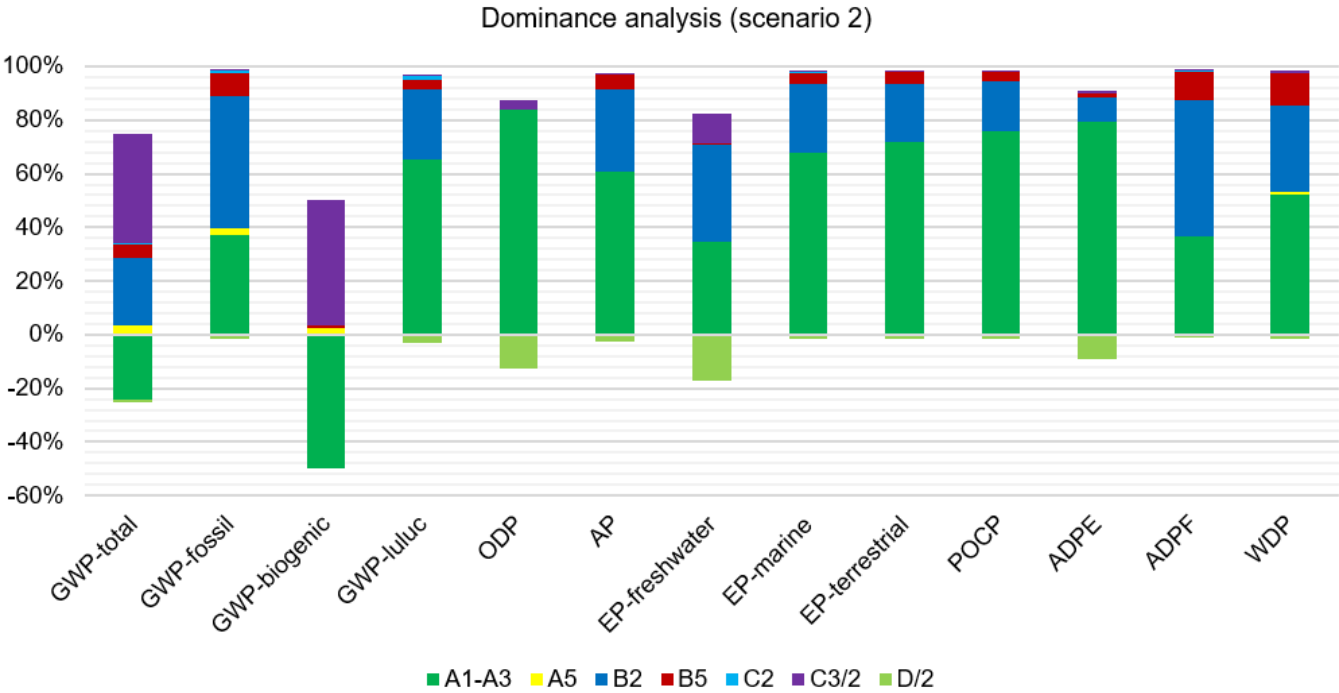
Disclaimer 1 – for the indicator 'Potential Human exposure efficiency relative to U235'. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential, deprivation-weighted water consumption', 'potential comparative toxic unit for ecosystems', 'potential comparative toxic unit for humans – cancerogenic', 'Potential comparative toxic unit for humans - not cancerogenic', 'potential soil quality index'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

6. LCA: Interpretation

Dominance analysis (scenario 1)





The dominance analysis shows that the manufacturing phase (Modules A1 to A3) and the maintenance phase (Module B2) make a particular contribution to the potential environmental impact in the listed indicators. In Module B2 the requirement for energy for vacuum cleaning has a particular effect on the potential environmental impact. The recovery of the engineered wood flooring at the end of the product lifecycle (Module C3) makes a significant contribution to the indicators Global Warming Potential - total (GWP total), Global Warming Potential - biogenic (GWP biogenic) and Water Depletion Potential (WDP). During the thermal recovery of the engineered wood flooring, the biogenic carbon stored in the product is emitted in the form of biogenic CO₂ emissions.

During the recycling of materials, the biogenic carbon leaves the system boundaries. This is the reason why the sum of the biogenic CO₂ emissions is balanced out over the life cycle of the product.

To follow, we will look at the main impacts during the manufacturing phase (Modules A1 to A3): the indicators Global

Warming Potential - fossil (GWP fossil), Global Warming Potential - Land Use and Land Use Change (GWP luluc), Soil and Water Acidification Potential (AP), Eutrophication Potential - salt water (EP marine), Eutrophication Potential - land (EP terrestrial), Photochemical Ozone Creation Potential (POCP) and Abiotic Resource Depletion Potential - fossil fuels (ADPF) are dominated by the wood inputs. Depletion Potential of the Stratospheric Ozone Layer (ODP), Eutrophication Potential - freshwater (EP freshwater) and Abiotic Resource Depletion Potential - non-fossil resources (ADPE) are dominated by the data sets for the glues used.

Range of the results

The floors considered vary in thickness, weight and composition of materials. As a consequence, the life cycle assessment results for the manufacturing phase (Modules A1 to A3) are dependent on these factors. The indicator results for the disposal phase (C Modules) are dependent on the weight of the individual floors.

7. Requisite evidence

Formaldehyd

Measuring site: *eco-INSTITUT* Germany GmbH, Schanzenstrasse 6-20, Carlswerk Kupferzug 5.2, D-51063 Cologne
Test reports: 57563-A001-A003 / A005-A006 dated 15.09.2022
Testing method: DIN ISO 16000-9 and DIN ISO 16000-3
Result: < 5 mg/m

VOC emissions

Measuring site: *eco-INSTITUT* Germany GmbH, Schanzenstrasse 6-20, Carlswerk Kupferzug 5.2, D-51063 Cologne
Test report: 57563-A007, 15.09.2022
Testing method: AgBB scheme 2021

AgBB overview of results (28 days)

Name	Value	Unit
TVOC (C6 - C16)	130	µg/m³
Sum SVOC (C16 - C22)	< 5	µg/m³
R (dimensionless)	0.59	-
VOC without NIK	10	µg/m³
Carcinogenic Substances	< 1	µg/m³

Certificate DE-UZ176 Blue Angel

On account of the trademark agreement No. 27261 between RAL gGmbH, Siegburger Strasse 39, 53757 Sankt Augustin and the Federal Environment Agency, Parador multi-layered engineered wood flooring (with the exception of the smoked version) is allowed to carry the environmental symbol "The Blue Angel" due to being low in emissions.

Certificate eco-INSTITUT Label

In accordance with the inspection criteria of the eco-INSTITUT Label (as of May 2021) issued by the *eco-INSTITUT* Germany GmbH, Schanzenstrasse 6-20, Carlswerk Kupferzug 5.2, D-51063 Cologne, Parador multi-layered engineered wood flooring (with the exception of the smoked version) is allowed to carry the eco-INSTITUT Label with ID no. 1016-12656-002.

Certificate PEFC
PEFC certification

8. References

Standards

CEN/TS 15676

DIN CEN/TS 15676:2008-02, Wood flooring - Slip resistance - Pendulum test; German version CEN/TS 15676:2007.

EN 13489

DIN EN 13489:2017-12, Wood flooring and engineered wood flooring - Multi-layered engineered wood flooring elements.

EN 13501-1

DIN EN 13501-1:2019-05, Classification of construction products and types of construction according to their reaction to fire - Part 1: Classification using the results of tests on the reaction to fire of construction products.

EN 14342

DIN EN 14342:2013-09, Wood flooring and engineered wood flooring - characteristics, evaluation of conformity and marking.

EN 15804

DIN EN 15804:2020-03, Sustainability of buildings - Environmental Product Declarations - Basic rules for the product category construction products.

ISO 9001

DIN EN ISO 9001:2015-11, Quality Management Systems - Requirements (ISO 9001:2015).

ISO 10456

DIN EN ISO 10456:2010-05, Building materials and construction products - Hygrothermal properties - Tabulated rated values and methods for the determination of the nominal and rated thermal insulation values (ISO 10456:2007 + Cor. 1:2009).

ISO 14001

ISO 14001:2015-09, Environmental management systems - Requirements with instructions on use.

ISO 14025

DIN EN ISO 14025:2011-10, Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO 14040

DIN EN ISO 14040:2021-02, Environmental management - Life cycle assessments - Principles and framework conditions.

ISO 14044

DIN EN ISO 14044:2021-02, Environmental management - Life cycle assessments - Requirements and instructions.

Further literature

AltholzV

Regulation on the requirements for recovery and disposal of old

(https://parador.de/pcms/downloads/downloadfile/file_id/670/) provides confirmation that the methods used for the production of the engineered wood flooring made by Parador GmbH meet the requirements of the current PEFC CoC standard.

Certificate EMAS

The company's registration in the EMAS Register under number DE-156-00107, dated 10.11.2015, means that Parador GmbH is entitled to use the EMAS logo.

wood, dated 15 August 2002 (Federal Law Gazette I p. 3302), which was last amended by Article 120 of the Regulation, dated 19 June 2020 (Federal Law Gazette I p. 1328).

AVV

Waste Catalogue Regulation (AVV) of 10 December 2001 (Federal Law Gazette I p. 3379), which was last amended by Article 2 of the Regulation, dated 30 June 2020 (Federal Law Gazette I p. 1533).

Blue Angel

RAL-UZ 176; Regulation on the awarding of environmental labels for low-emission floor coverings, panels and doors made of wood and wood-based products for interiors.

BNB

Federal Institute for Research on Building, Urban Affairs and Spatial Development in the Federal Office for Building and Regional Planning (publisher): Useful life of building components for life cycle analyses according to the evaluation system for sustainable building (BNB), 2011.

ECHA Candidate List

List of Candidate Substances of Very High Concern (ECHA Candidate List), dated 19 January 2021, published in accordance with Article 59 (10) of the REACH Regulation. Helsinki: European Chemicals Agency.

eco-INSTITUT

eco-INSTITUT Germany GmbH, Schanzenstrasse 6-10, Carlswerk 1.19, 51063 Cologne.

ecoinvent 3.6

ecoinvent 3.6 Database on Life Cycle Inventories (Life Cycle Inventory Data), ecoinvent Association, Zurich, 2020.

EMAS

Regulation (EC) No. 1221/2009 of the European Parliament and of the Council on the voluntary participation by organisations in a community system for environmental management and environmental auditing and repealing Regulation (EC) No. 761/2001, as well as the decisions of the Commission 2001/681/EC and 2006/193/EC.
<https://www.emas.de/home/>

GaBi

GaBi 10.5: Software System and Database for Life Cycle Engineering, Sphera Solutions GmbH, Leinfelden Echterdingen, 2021.

IBU 2021

Institut Bauen und Umwelt e.V.: General guide for the EPD programme of the Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021 www.ibu-epd.com

PEFC

Programme for the Endorsement of Forest Certification Schemes.

PCR Part A

Product category rules for building-related products and services. Part A: Calculation rules for the LCA and requirements for the project report according to EN 15804+A2:2019, Version 1.1. Berlin: Institut Bauen und Umwelt e.V.. (publisher), 08 January 2021.

PCR: Solid wood products

Product category rules for building-related products and services. Part B: Requirements of the EPD for solid wood products, Version 0. Berlin: Institut Bauen und Umwelt e.V (publisher), 8 March 2023.

RAL gGmbH

RAL gGmbH, Fränkische Strasse 7, 53229 Bonn.

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. <https://eur-lex.europa.eu/legal-content/DE/TXT/PDF/?uri=CELEX:02011R0305-20210716&from=EN>

Regulation (EU) No. 995/2010

Regulation (EU) No. 995/2010 of the European Parliament and of the Council of 20 October 2010 on the obligations of market participants who bring wood and wooden products onto the market.



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