ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	**Bauwerk Group AG**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	22.08.2027

2-layer parquet

Bauwerk Group AG

Institut Bauen und Umwelt e.V.

www.ibu-epd.com | https://epd-online.com

ECO PLATFORM EPD VERIFIED

1. General Information

Bauwerk Group AG

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

Declaration number
EPD-BAU-20220151-IBH1-EN

This declaration is based on the product category rules:
Solid wood products, 12.2018
(PCR checked and approved by the SVR)

Issue date
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Valid to
22.08.2027

Dipl. Ing. Hans Peters
(chairman of Institut Bauen und Umwelt e.V.)

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.))

2-layer parquet

Owner of the declaration
Bauwerk Group AG
Neudorfstrasse 49
CH-9430 St. Margrethen
Switzerland

Declared product / declared unit
1 m² 2-layer parquet floor

Scope:
This EPD declares an average m² 2-layer parquet floor from the Bauwerk Group.

Bauwerk Group produces its 2-layer parquet floor or parts thereof at various, production sites, which are all owned by the group of companies. The vertical depth of the production processes varies and ranges from the sawmill to the packaging of the finished product.

As of August 2021, Bauwerk Group produces the 2-layer parquet products or parts thereof in its plants in Switzerland, Lithuania and Croatia.

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.

The EPD was created according to the specifications of *EN 15804+A2*. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard *EN 15804* serves as the core PCR
Independent verification of the declaration and data according to *ISO 14025:2011*
☐ internally ☒ externally

Prof. Dr. Birgit Grahl
(Independent verifier)

2. Product

2.1 Product description/Product definition

2-layer parquet floors are wooden floors constructed in two layers with a top layer thickness of at least 2.5 mm. Depending on the product group, the top layer can consist of a single lamella made from one piece or of several assembled single lamellas (ship's deck look). These top layers are glued to an underlay, which acts as a carrier material for the top layer.

The dimensional ranges of the products can be found under 2.3 Technical data, in the table "Construction data".

The surface coating is done in a multi-stage process in which layers of lacquer or oil are applied step by step. After the surface coating, the products are profiled. In the case of 2-layer parquet products, this is usually a tongue-and-groove profiling, which is used to connect the individual parquet strips/planks lengthwise and crosswise.

The products generally comply with the requirements of the product standards specified under 2.2.

Regulation (EU) No. 305/2011 (Construction Products Regulation) applies to the placing on the market in the European Union/EFTA; the *Construction Products Act (BauPG) 933.0* applies to Switzerland. The products require a declaration of performance taking into account the harmonised *DIN EN 14342:2013-09, Wood flooring and parquet - Characteristics, evaluation of conformity and marking* as well as the CE marking. *EN 13489 is* relevant as a further product-specific standard. The respective national regulations apply to the use of the products.

2.2 Application

2-layer parquet floors are floor coverings according to *EN 14342* and subsequently *EN 13489, which are* intended for private and commercial use indoors. They

are laid either on screed or on existing other subfloors such as wood panel materials. 2-layer parquet products are always glued to the subfloor unless a click connection is provided for a floating installation. Installation must be carried out in accordance with the installation instructions, the rules of the trade and the state of the art. The respective national regulations apply to the use.

2.3 Technical Data

Construction data

Name	Value	Unit
Wood moisture according to EN 13489	5 - 9	%
Brinell hardness oak according to EN 1534	~ 38	N/mm2
Length (min. - max.)	380 - 2800	mm
Width (min. - max.)	70 - 260	mm
Thickness (min. - max.)	9.5 - 12.5	mm
Weight per unit area (min. - max.)	5.0 - 8.5	kg/m2
Thermal conductivity according to EN 12664*	106 - 188	W/(mK)
Thermal resistance (min. - max.)	0.055 - 0.103	(m2*K)/W
Formaldehyde according to EN 14342 (Chapter 4.3.1 und Annex A)	E1	-

*Thermal conductivity determined after air conditioning in a normal climate at 20 °C / 65 % relative humidity.

Dimensional tolerances *according to EN 13489*

- Top layer thickness: ≥ 2.5 mm
- Length: +/- 0.1 %
- Width: +/- 0.2 mm
- Lipping *(between the elements)*: ≤ 0.2 mm
- Permitted deviation of squareness: ≤ 0.2 % over the width
- Cup *(across the element)*: ≤ 0.2 % over the width
- Spring *(across the element)*: ≤ 0.1 % over the length

Performance values of the product according to the declaration of performance in relation to its essential characteristics according to *DIN EN 14342:2013-09, Wood flooring and parquet - Characteristics, evaluation of conformity and marking.*

2.4 Delivery status

All products are delivered in packaging units. The accompanying delivery papers shall specify at least:

- Quantity in m²
- Dimensions (length, width, thickness of the elements) in mm
- Wood type
- Sorting

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

- Length: 380-2800 mm
- Width: 70-260 mm
- Thickness: 9.5-12.5 mm
- m^2/VPE: 1.0-4.0

2.5 Base materials/Ancillary materials

The following proportions of ingredients were averaged for this environmental product declaration. The information is given in mass % per m^2 2-layer parquet flooring as delivered.

The basic structure of 2-layer parquet floors is shown below:

Top layer consisting of untreated hardwoods such as oak, ash, cherry, walnut and Canadian maple. The top layers are manufactured in thicknesses of more than 2.5 mm. For special orders, a top layer thickness of up to 6 mm is possible.

The carrier material of the top layer (underlay) can be either spruce/fir solid wood slats or board materials, mostly HDF (High Density Fibreboard).

The gluing of the underlay to the top layer of the 2-layer parquet is done using polyvinyl acetate (PVAc) glue.

- Hardwood: 48 %
- Coniferous wood, mainly spruce: 12.9 %
- High density fibreboard (HDF): 30.5 %
- Natural oil and varnishes: 0.6 %
- PVAc glue: 1 %
- Water: 7 %

The product/at least one of the partial products contains substances on the *ECHA Candidate List* (date 08.07.2021) above 0.1% by mass: no.

The product/at least one sub-product contains other CMR substances of category 1A or 1B not on the candidate list above 0.1% by mass in at least one sub-product: no.

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

2.6 Manufacture

Bauwerk Group produces its 2-layer parquet flooring or parts thereof at various, production sites, which are all owned by the group. The vertical depth of the production processes varies and ranges from the sawmill to the packaging of the finished product.

As of August 2021, Bauwerk Group produces the 2-layer parquet products or parts thereof in its plants in Switzerland, Lithuania and Croatia.

At the production site in Switzerland, the top layers of the products are pressed together with underlays in a press using a glue. The semi-finished products are then subjected to surface coating before being profiled, finally inspected and packaged after several quality checks.

The vertical depth of the production site in Croatia extends to the processing of round timber in the factory's own sawmill. The raw wood planks are then technically dried for top layer production before they are further processed into top layers at corresponding plants. The same drying and top layer production process is carried out for purchased raw wood planks. The finished top layers for the 2-layer parquet production are distributed from Croatia to the Bauwerk Group plants in Lithuania and Switzerland.

Like the Croatian site, the Lithuanian site has a sawmill that cuts roundwood into raw wood planks and, with subsequent technical drying, makes the raw wood planks available for top layer production. From this production step onwards, the other process steps are similar to those at the Swiss site.

The Swiss site of the Bauwerk Group is Cradle to Cradle® certified and manufactures, among other things, "Cradle to Cradle Gold certified" products.

The processes in all plants are constantly controlled and documented within the framework of the plant's own production control. All data refer to the status as of August 2021.

2.7 Environment and health during manufacturing

Environment and sustainability
The production sites in Switzerland, Lithuania and Croatia are certified according to *ISO 14001.* The environmental management system is subject to the principle of continuous improvement.

The Bauwerk Group maintains a sustainability management system based on the GRI standard and publishes a sustainability report in accordance with the "GRI Core Option".

Water/soil
There is no impact on the soil or water.

Air
Technical equipment such as chip extraction systems are installed at all production sites. Chips, wood dust and wood residues are directly extracted in a closed system and made available in a chip silo for heat generation or briquette production at the respective site.

Occupational safety and health protection
As a basis, the production sites work according to and comply with the respective national occupational health and safety legislation.
In addition, the Bauwerk Group operates an internal occupational health and safety management system that functions beyond the scope of the legislation.

2.8 Product processing/Installation

Bauwerk Group 2-layer parquet can be sawn, milled, planed and drilled with the usual stationary machines as well as (electric) hand machines.

Carbide-tipped tools are to be preferred. For a good cutting result, care should be taken that the teeth are suitable for solid wood processing.

In addition, it must be ensured that the required tools are used as intended, according to the manufacturer's operating instructions, and in compliance with the usual safety precautions (protective goggles, dust mask in case of dust formation, ear protection depending on the machine, etc.).

Disposal of residual material must be carried out in accordance with the regulations of the local waste disposal authorities.

For the 2-layer parquet products of the Bauwerk Group, full-surface gluing is generally intended. Make sure that an adhesive approved by the adhesive manufacturer and an appropriate notched trowel are used.

2.9 Packaging

Cardboard, paper, wood, metals, plastic straps and polyethylene films are used for packaging the 2-layer parquet products. Reusable pallets, among other things, are used to transport the finished products.

2.10 Condition of use

Wood is a hygroscopic material that adapts to the surrounding climate. It can absorb and release moisture. With regard to the use of parquet, it is therefore important to ensure a balanced room climate in order to avoid/reduce possible dimensional changes due to the absorption and release of moisture by the wood and the associated "working" of the wood. The optimal room climate is at a temperature of approx. 20-22 °C and a humidity of approx. 40-50 %. We are happy to provide details on an individual basis.

2.11 Environment and health during use

Bauwerk Group parquet products are regularly tested for national legislation and supplementary certificates relating to residential health and other aspects by independent and accredited institutes. These include tests on the emission behaviour of the products. (see evidence in chapter 7).

When parquet products from the Bauwerk Group are used as intended, no hazards to water, air or soil can arise.

Small amounts of emissions can be released into the indoor air, which are well below the legal limits. The emissions are generally harmless to humans and the environment. The parquet products of the Bauwerk Group are regularly tested for healthy living emissions. We are happy to provide details on an individual basis. If you have any questions, please contact product management at productmanagement@bauwerk.com. (see evidence in chapter 7).

2.12 Reference service life

The useful life of multilayer parquet is 40 years according to Code No. 352.812, Useful life of building components for life cycle analyses according to the Sustainable Building Assessment System *(BNB),* as of 02/2017.

Experience has shown, however, that depending on the thickness of the top layer, the type of wood of the top layer and the product group, the service life in the private sector can be over 50 years. The fully glued 2-layer parquet products can be sanded down without any problems.

Negative effects on the service life of the products can be achieved by insufficient care and excessively damp cleaning or by excessive introduction of moisture of any kind.

2.13 Extraordinary effects

Fire
Bauwerk Group parquet products are classified either according to Table 1 - "Classes for the reaction to fire of wood flooring" in *EN 14342* or by testing the reaction to fire according to *ISO 9239-1* as well as the flammability according to *ISO 11925-2 and* subsequently classified according to *EN 13501-1.*

Fire protection

Name	Value
Fire behaviour with HDF underlay*	Cfl
Smoke development with HDF underlay	s1
Fire behaviour with spruce/fir underlay*	Dfl
Smoke development with spruce/fir underlay*	s1

*Individual parquet products may also have a different fire behaviour. We are happy to provide details on an individual basis. If you have any questions, please contact the product management at productmanagement@bauwerk.com.

The individual requirements of the subfloor, the type of fastening and the type of adhesive must be taken into account in order to apply the corresponding reaction to fire class. We will be happy to provide details on an individual basis. If you have any questions, please contact product management at productmanagement@bauwerk.com.

Cfl-s1
- Substrate: non-combustible substrates (Euroclasses A1fl or A2fl) with a bulk density of at least 1350 kg/m³.
- Type of fastening: glued
- Adhesive: Silane-modified adhesives (according to *ISO 17178* hard, hard-elastic, elastic).

Dfl-s1
- Substrate: Installed according to *ISO 9239-1* on a substrate with at least class D-s2, d0 and a minimum density of 400 kg/m3 or with an air gap on the underside.
- An intermediate layer may be used with at least class Efl and with a maximum thickness of 3 mm and a minimum density of 280 kg/m³.

Water
If the parquet is exposed to heavy water, irreversible damage can occur due to the hygroscopic properties in combination with the "working" of the wood. The formation of rot or mold cannot be ruled out. If the damage is repaired professionally, there will be no negative consequences for people or the environment.

Mechanical destruction
In case of mechanical destruction of the parquet product, no negative consequences for humans and the environment are to be expected.

2.14 Re-use phase
Selected Bauwerk Group products are "Cradle to Cradle® Gold" certified and can be non-destructively removed, reprocessed and reused. We are happy to provide details on an individual basis. If you have any questions, please contact product management at productmanagement@bauwerk.com. See chapter 7. Other parquet products can be recycled or used for energy recovery after removal. The respective national legislation must be observed (see 2.15 Disposal).

2.15 Disposal
Finished parquet products from the Bauwerk Group are considered to be waste wood. According to the German Waste Wood Ordinance (*AltholzV*), which regulates the material and energy recycling and disposal of waste wood, Bauwerk Group's parquet products are assigned to waste wood class "AII" (glued, painted, coated, lacquered or otherwise treated waste wood without halogen organic compounds in the coating and without wood preservatives).

This class of waste wood makes both material and energy recovery possible. National legislation must be observed. Multilayer parquet is to be assigned to *AVV* 17 02 01.

2.16 Further information
Further information (e.g. product data sheets) on Bauwerk Group parquet products can be found on the respective Bauwerk and Boen websites.

www.bauwerk-parkett.com
www.boen.com

3. LCA: Calculation rules

3.1 Declared Unit
The declared unit is 1 m² average 2-layer parquet. The average was weighted according to the production volume of the products included. The total inputs, outputs and produced m² for the period under consideration were taken as a basis.

Indication of the declared unit

Name	Value	Unit
Declared unit	1	m²
Grammage	7.71	kg/m²
Gross density	720	kg/m³
Wood moisture on delivery	5 - 9	%
Thickness (average)	10.7	mm

3.2 System boundary
Type of EPD: Cradle to factory gate with options.

Modules A1-A3 and A5
Modules A1-A3 take into account the production of the necessary raw materials and energies, including all corresponding upstream chains and procurement transport.
In addition, the entire manufacturing phase, including the treatment of production waste until the end-of-waste (EoW) status is reached, is considered.
Module A5 accounts for the recycling of packaging materials.

Modules B2 and B5

Module B2 considers the cleaning and oiling of the parquet, including the auxiliary materials required for this and the treatment of the waste and waste water produced in the process.
Module B5 declares the renovation of the parquet, including the treatment of the resulting waste.

Modules C1-C4 and D
Module C1 describes the deconstruction.
In module C2, the transports to the disposal processes are considered.
Module C3 contains the necessary processes for waste treatment at the end of the product life cycle. The loads for waste treatment are mapped here until the end of the waste property is reached. Potentials arising in the process and avoided loads outside the system boundary are assigned to module D.
Module C4 describes the landfilling of non-recycled components of the product at the end of its life.

3.3 Estimates and assumptions
For wood species for which no suitable data set is available, the data set for oak wood was used. The proportion of these wood species is so small that no significant influence on the results of the LCA is to be expected.

3.4 Cut-off criteria
The reusable pallets were not considered, as it is assumed that they have a negligible share in the impact categories considered due to multiple use.
In addition, auxiliary materials for which no suitable data sets were available were cut-off. The sum of the neglected processes is < 1 % of the material inputs. It can therefore be assumed that the sum of the neglected processes does not exceed 5 % of the considered impact categories

3.5 Background data
Basically, the background database *GaBi-10.5* in content version 2021.1 was used. If no suitable data sets were available in the GaBi background database, data sets from the *ecoinvent 3.6* database were used.

3.6 Data quality
The foreground data was provided by the Bauwerk Group and checked for plausibility. The quality and representativeness of the foreground data can therefore be considered high.
The data quality of the background data was rated as good in terms of temporal, technical and geographical representativeness.

With regard to the robustness of the LCA values, it can be stated that the balanced potential environmental impacts largely result from the background data.

3.7 Period under review
The foreground data was collected for the year 2020.

3.8 Allocation

Module A1-A3
Wood residues that are thermally utilised internally were considered in the closed loop.
An economic allocation of the by-products was dispensed with, as the product value exceeds that of the by-products many times over and no significant influence on the LCA results is to be expected.

3.9 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* 10.5 background database Content Version 2021.1 was used.

4. LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic carbon

Information describing the biogenic carbon content at the factory gate

Name	Value	Unit
Biogenic Carbon Content in product	3.44	kg C
Biogenic Carbon Content in accompanying packaging	0.04	kg C

The following technical information was used for the modelling. A service life of 50 years was assumed.

Installation in the building (A5)

Name	Value	Unit
Output substances following waste treatment on site	0.134	kg

Maintenance (B2)

Name	Value	Unit
Information on maintenance Cleaning (vacuuming, damp cleaning, oiling)	-	-
Maintenance cycle (vacuum cleaning, 2x a week)	5200	Number/RSL
Electricity consumption Vacuum cleaning	156	kWh
Maintenance cycle (damp cleaning, 2x monthly)	1200	Number/RSL
Water consumption (damp cleaning)	24	m^3
Detergent (damp cleaning)	0.48	Liter
Maintenance cycle (oiling, every 5 year)	7	Number/RSL
Water consumption (oiling)	0.0007	m3
Cleaning agent (oiling)	0.0014	Liter
Pads (oiling)	0.12	Pieces
Oil	0.11	kg

Initial replacement (B4)/Conversion/Renovation (B5)

Name	Value	Unit
Replacement cycle	2	Number/RSL
Electricity consumption (loops)	132	kWh
Acceptance per renovation process	0.7	mm

Abrasives	0.2	Piece
Oil (50 % of the floors)	0.05	kg
Lacquer (50 % of the floors)	0.225	kg

Reference service life

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

End of life (C1–C4)

Name	Value	Unit
Collected separately	6.964	kg
Recycling (Scenario 2)	6.964	kg
Energy recovery (Scenario 1)	6.964	kg

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

Name	Value	Unit
Waste wood	6.964	kg

5. LCA: Results

The LCA results for the B modules (use phase) refer to a useful life of 50 years. The parameters used as a basis can be found in Chapter 4.

Two scenarios were considered for the end of life:

- Scenario 1: Thermal treatment
- Scenario 2: Material recycling

Important notice:

EP-freshwater: this indicator was developed in accordance with the characterization model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml) calculated as "kg P-eq."

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	ND	X	ND	X	MNR	MNR	X	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² 2-layer parquet

Core Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
GWP-total	[kg CO_2-Eq.]	-6.56E+0	2.41E-1	7.04E+0	1.46E+0	0.00E+0	8.16E-2	1.26E+1	1.25E+1	0.00E+0	-4.91E+0	-2.19E-1
GWP-fossil	[kg CO_2-Eq.]	6.21E+0	7.65E-2	7.03E+0	1.24E+0	0.00E+0	8.09E-2	1.86E-1	6.09E-2	0.00E+0	-4.90E+0	-2.18E-1
GWP-biogenic	[kg CO_2-Eq.]	-1.28E+1	1.65E-1	0.00E+0	2.24E-1	0.00E+0	0.00E+0	1.24E+1	1.24E+1	0.00E+0	0.00E+0	0.00E+0
GWP-luluc	[kg CO_2-Eq.]	1.82E-2	1.03E-5	9.02E-3	1.12E-3	0.00E+0	6.62E-4	1.20E-4	1.37E-4	0.00E+0	-3.40E-3	-1.21E-3
ODP	[kg CFC11-Eq.]	5.38E-9	1.51E-17	1.51E-13	1.56E-14	0.00E+0	1.60E-17	1.65E-15	5.10E-9	0.00E+0	-5.62E-14	-1.83E-8
AP	[mol H^+-Eq.]	2.65E-2	1.88E-5	1.43E-2	2.55E-3	0.00E+0	9.43E-5	1.79E-3	3.36E-4	0.00E+0	-6.42E-3	-1.21E-3
EP-freshwater	[kg P-Eq.]	3.77E-5	5.37E-9	1.70E-4	2.76E-6	0.00E+0	2.41E-7	2.26E-7	5.85E-5	0.00E+0	-6.43E-6	-9.13E-5
EP-marine	[kg N-Eq.]	1.01E-2	5.32E-6	3.98E-3	6.51E-4	0.00E+0	3.16E-5	5.89E-4	5.82E-5	0.00E+0	-1.82E-3	-3.10E-4
EP-terrestrial	[mol N-Eq.]	9.95E-2	8.82E-5	3.60E-2	7.25E-3	0.00E+0	3.73E-4	8.54E-3	5.52E-4	0.00E+0	-1.95E-2	-3.23E-3
POCP	[kg NMVOC-Eq.]	4.36E-2	1.48E-5	9.88E-3	2.03E-3	0.00E+0	8.30E-5	1.60E-3	1.44E-4	0.00E+0	-5.12E-3	-1.02E-3
ADPE	[kg Sb-Eq.]	3.79E-6	3.26E-10	1.90E-6	2.35E-7	0.00E+0	7.18E-9	2.52E-8	2.35E-7	0.00E+0	-8.17E-7	-2.16E-6
ADPF	[MJ]	1.18E+2	3.95E-2	1.28E+2	2.64E+1	0.00E+0	1.08E+0	2.74E+0	1.41E+0	0.00E+0	-8.51E+1	-3.35E+0
WDP	[m^3 world-Eq deprived]	5.67E-1	1.42E-2	1.13E+0	4.10E-1	0.00E+0	7.52E-4	1.30E+0	4.43E-2	0.00E+0	-3.77E-1	-5.56E-2

Caption	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 2-layer parquet

Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
PERE	[MJ]	1.31E+2	5.66E-3	5.18E+1	5.59E+0	0.00E+0	6.21E-2	1.29E+2	2.07E-1	0.00E+0	-1.93E+1	-3.12E+1
PERM	[MJ]	1.31E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.29E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	2.62E+2	5.66E-3	5.18E+1	5.59E+0	0.00E+0	6.21E-2	5.31E-1	2.07E-1	0.00E+0	-1.93E+1	-3.12E+1
PENRE	[MJ]	1.14E+2	3.96E-2	1.28E+2	2.64E+1	0.00E+0	1.08E+0	5.77E+0	1.41E+0	0.00E+0	-8.51E+1	-3.35E+0
PENRM	[MJ]	4.06E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-3.03E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	1.18E+2	3.96E-2	1.28E+2	2.64E+1	0.00E+0	1.08E+0	2.74E+0	1.41E+0	0.00E+0	-8.51E+1	-3.35E+0
SM	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	1.29E+2	0.00E+0
NRSF	[MJ]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	[m^3]	4.45E-2	3.35E-4	5.32E-2	1.28E-2	0.00E+0	7.11E-5	3.07E-2	1.03E-3	0.00E+0	-1.89E-2	-1.29E-3

Caption	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 2-layer parquet

Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
HWD	[kg]	6.47E-7	5.21E-12	3.06E-8	5.30E-9	0.00E+0	5.71E-11	4.95E-10	0.00E+0	0.00E+0	-1.91E-8	0.00E+0
NHWD	[kg]	1.41E-1	8.08E-4	3.40E-1	3.74E-2	0.00E+0	1.70E-4	9.05E-2	0.00E+0	0.00E+0	-4.00E-2	0.00E+0
RWD	[kg]	7.39E-3	1.40E-6	1.67E-2	1.69E-3	0.00E+0	1.96E-6	1.52E-4	0.00E+0	0.00E+0	-6.21E-3	0.00E+0
CRU	[kg]	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	[kg]	0.00E+0	3.36E-2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MER	[kg]	1.63E+0	6.31E-2	1.23E-1	9.68E-1	0.00E+0	0.00E+0	6.96E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	2.62E-1	0.00E+0	2.71E+0	0.00E+0	0.00E+0	1.82E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	6.46E-4	4.67E-1	0.00E+0	4.87E+0	0.00E+0	0.00E+0	3.27E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0

Caption	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 2-layer parquet

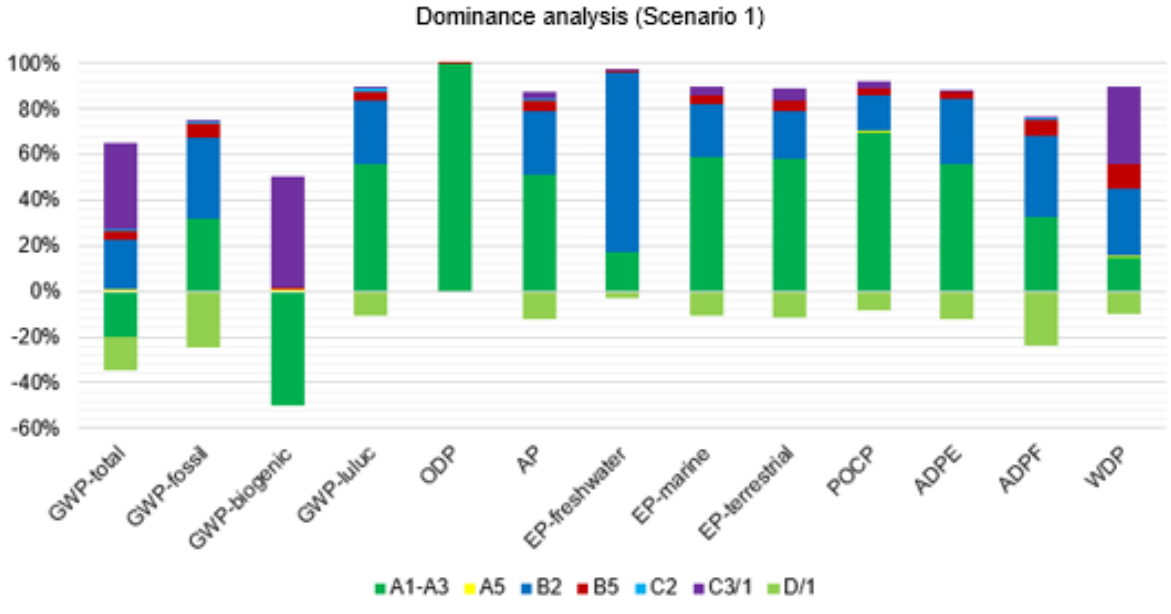
Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

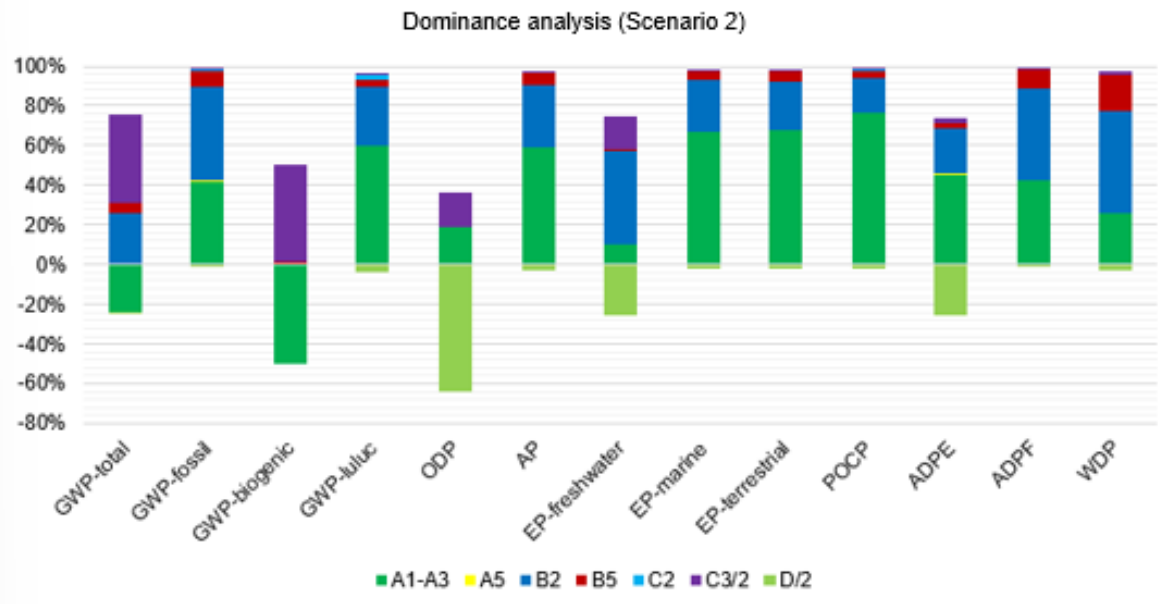
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (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 ionizingradiation on human health of the nuclear fuel cycle. It does not consider effects due to possiblenuclear accidents, occupational exposure nor due to radioactive waste disposal in undergroundfacilities. 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 theuncertainties on these results are high or as there is limited experienced with the indicator.

6. LCA: Interpretation





The dominance analysis shows that especially the manufacturing phase (modules A1-A3) and maintenance (module B2) contribute to the potential environmental impacts in the listed indicators. In module B2, the energy demand for vacuum cleaning in particular has an influence on the potential environmental impacts. The treatment of the parquet floor at the end of the life cycle (Module C3) contributes significantly to the indicators Global Warming Potential - total (GWP-total), Global Warming Potential - biogenic (GWP-biogenic) and Water Removal Potential (WDP). When parquet flooring is thermally recycled, the biogenic carbon stored in the product is emitted as biogenic CO_2 emissions. During material recycling, the biogenic carbon leaves the system boundary. This is the reason why the sum of biogenic CO_2 emissions is balanced over the life cycle of the product.

In the production phase (modules A1-A3), the electrical energy required for production and the materials for the middle layer contribute to the potential environmental impacts. The influence of the middle layer can be explained by the high proportion of mass in the product. For example, the materials for the middle layer contribute 39 % to the indicator Global Warming Potential - fossil (GWP-fossil), the demand for electrical energy 24 %.
The indicators stratospheric ozone depletion potential (ODP), eutrophication potential - freshwater (EP-freshwater) and potential for depletion of abiotic resources - non-fossil (ADPE) are an exception. ODP and EP-freshwater are dominated by the data set used for logs, ADPE by glues.

Range of results
The parquet floors considered vary in thickness, weight and material composition (see chapters 2.3 and 2.5). Consequently, the LCA results in the manufacturing phase (modules A1-A3) are also dependent on these factors. For example, if the indicators GWP-fossil and PENRT are considered, floors with an HDF core board show higher indicator values than floors with a spruce/fir core layer.
The indicator results of the disposal phase (C modules) depend on the weight of the parquet floors.

7. Requisite evidence

7.1 Formaldeyhyde

Testing institute: eco-INSTITUT Germany GmbH Schanzenstraße 6 - 20, Carlswerk 1.19, D-51063 Cologne, Germany

Formaldehyde emissions according to test method *EN 16516:*

Name	Value	Unit
Formaldehyde after 28 days	7	µg/m³

(The highest measured value of all test objects is always given. Further details can be requested from the manufacturer).
Classification of Bauwerk parquet products with regard to formaldehyde according to *EN 14342* (chapter 4.3.1 and appendix A) in class E1

7.2 Pentachlorophenol (PCP)

Testing institute: eco-INSTITUT Germany GmbH Schanzenstraße 6 - 20, Carlswerk 1.19, D-51063 Cologne, Germany

Emissions of pentachlorophenol (PCP) according to *CEN/TR 14823* are **not detectable** (limit of determination 0.01 mg/kg).

7.3 VOC emissions

Testing institute: eco-INSTITUT Germany GmbH Schanzenstraße 6 - 20, Carlswerk 1.19, D-51063 Cologne, Germany

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

Name	Value	Unit
TVOC (C6 - C16)	190	µg/m³
Sum SVOC (C16 - C22)	< 5	µg/m³
R (dimensionless)	0,76	-
VOC without NIK	< 23	µg/m³
Carcinogenic Substances	< 1	µg/m³

AgBB result overview (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	1700	µg/m³
Carcinogenic Substances	< 1	µg/m³

(The highest measured value of all test objects is always given. Further details can be requested from the manufacturer).

7.4 Forest Stewardship Council (FSC)
Selected Bauwerk Group products carry FSC certification. We are happy to provide details on an individual basis. If you have any questions, please contact product management at productmanagement@bauwerk.com. Certificate number: SGSCH-COC-001535

7.5 Cradle to Cradle
Selected Bauwerk Group products carry a "Cradle to Cradle Gold" and others a "Cradle to Cradle Bronze" certification. We are happy to provide details on an individual basis. If you have any questions, please contact the product management at productmanagement@bauwerk.com.

7.6 Eco-Institut Label
Selected Bauwerk Group products are Eco-Institut-Label certified. The basis for certification is the Eco-Institut-Label criteria catalogue, as of 09/2018. We will be happy to provide details on an individual basis. If you have any questions, please contact the product management at productmanagement@bauwerk.com.

7.7 Blue Angel
Selected Bauwerk Group products are certified according to the Blue Angel. The basis for certification is the *RAL-UZ 176* standard. We are happy to provide details on an individual basis. If you have any questions, please contact product management at productmanagement@bauwerk.com.

7.8 Real Wood
In accordance with the European Federation of the Parquet Industry (FEP), all Bauwerk Group parquet products correspond to real wood floors that are allowed to carry the **REAL WOOD** label.

7.9 French VOC+CMR Regulation
Bauwerk Group parquet products are regularly tested according to the French VOC and CMR regulations and classified accordingly. We are happy to provide details on an individual basis. If you have any questions, please contact product management at productmanagement@bauwerk.com.

7.10 Belgian VOC Regulation
Bauwerk Group parquet products are regularly tested according to the Belgian VOC regulation. We are happy to provide details on an individual basis. If you have any questions, please contact the product management at productmanagement@bauwerk.com.

7.11 Sentinel House Institute
Selected Bauwerk Group products are rated according to the Sentinel Haus criteria. We are happy to provide details on an individual basis. If you have any questions, please contact product management at productmanagement@bauwerk.com.

7.12 eco-bau
Selected parquet products from the Bauwerk Group are assessed according to eco-building criteria and, depending on the assessment result, are given the classification: eco 1, eco 2 or basis. We are happy to provide details on an individual basis. If you have any questions, please contact product management at productmanagement@bauwerk.com.

8. References

Standards

EN 1534
DIN EN 1534:2020-03, Wood flooring and parquet - Determination of resistance to indentation – Test method.

ISO 9239-1
DIN EN ISO 9239-1:2010-11, Reaction to fire tests for floorings – Part 1: Determination of the burning behaviour using a radiant heat source

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EN 12664
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EN 13489
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EN 13501-1
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ISO 14001
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ISO 14025
DIN EN ISO 14025:2011-10, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

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EN 15804
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ISO 17178
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Further literature

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GRI Standard
Global Reporting Initiative Sustainability Report, Amsterdam: Global Reporting Initiative, 2022.

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