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)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-BAU-20220152-IBH1-EN
Issue date	17.10.2022
Valid to	22.08.2027

3-layer parquet

Bauwerk Group AG

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

1. General Information

Bauwerk Group AG	3-layer parquet
Programme holder IBU – Institut Bauen und Umwelt e.V. Hegelplatz 1 10117 Berlin Germany	**Owner of the declaration** Bauwerk Group AG Neudorfstrasse 49 CH-9430 St. Margrethen Switzerland
Declaration number EPD-BAU-20220152-IBH1-EN	**Declared product / declared unit** 1 m² 3-layer parquet floor
This declaration is based on the product category rules: Solid wood products, 12.2018 (PCR checked and approved by the SVR)	**Scope:** This EPD declares an average m² 3-layer parquet floor from the Bauwerk Group. Bauwerk Group produces its 3-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 3-layer parquet products or parts thereof in its plants in Switzerland, Lithuania and Croatia.
Issue date 17.10.2022	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*.
Valid to 22.08.2027	**Verification** The standard *EN 15804* serves as the core PCR Independent verification of the declaration and data according to *ISO 14025:2011* ☐ internally ☒ externally
Dipl. Ing. Hans Peters (chairman of Institut Bauen und Umwelt e.V.)	
Dr. Alexander Röder (Managing Director Institut Bauen und Umwelt e.V.))	Prof. Dr. Birgit Grahl (Independent verifier)

2. Product

2.1 Product description/Product definition

3-layer parquet floors are wooden floors constructed in three 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 pressed together with a middle layer consisting of softwood or a wood-based material and a counter layer of softwood veneer with a thickness of approx. 2 mm to form a product.

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. For 3-layer parquet products, this is either a tongue-and-groove profiling or a click connection, which is used to connect the individual parquet strips/planks lengthwise and crosswise. Tongue-and-groove profiling usually requires the parquet floor to be glued over the entire surface. In individual cases, however, it can also be nailed to upholstered wood. The click connection can be installed both floating and glued.

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

3-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. 3-layer parquet products with tongue and groove joints are always glued to the subfloor. Products with a click connection are intended for a floating installation, but can also be glued down.

The 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 nach EN 13489	5 - 9	%
Brinell hardness oak according to EN 1534	~ 38	N/mm^2
Length (min. - max.)	690 - 4000	mm
Width (min. - max.)	138 - 395	mm
Thickness (min. - max.)	13 - 23	mm
Basis weight	7.0 - 12.5	kg/m2
Thermal conductivity according to EN 12664*	0.11 - 0.15	W/(mK)
Thermal resistance (min. - max.)	0.093 - 0.182	(m2*K)/W
Formaldehyde emissions according to EN 14342 (Chapter 4.3.1 and 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: 690-4000 mm
- Width: 138-395 mm
- Thickness: 13-23 mm
- m^2 /VPE: 0.8-3.5

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 3-layer parquet flooring as delivered.

The basic structure of 3-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 (middle layer) consists of spruce/fir solid wood lamellas or a board material. A softwood veneer with a thickness of approx. 2 mm is used as a backing.

The individual layers of the 3-layer parquet are glued together using formaldehyde-reduced urea-formaldehyde (UF) adhesive.

- Hardwood: 28 %
- Coniferous wood, mainly spruce: 57.4 %
- Veneer plywood: 2%
- High-density fibreboard (HDF): 1.3 %
- Urea Formaldehyde resin Adhesives: 3.4%
- Natural oil and varnishes: 0.9 %
- 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 3-layer parquet floors 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 3-layer parquet products or parts thereof in its plants in Switzerland, Lithuania and Croatia.

At the production site in Switzerland, the 3-layer parquet products are delivered as semi-finished

products from the plants in Croatia and Lithuania. Afterwards, the knotholes in the top layers are fully automatically puttied (if necessary), brushed (if desired) and subsequently 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 3-layer parquet production are pressed into a 3-layer semi-finished product in the Croatian factory. This means that they are pressed together with the middle layer and the counter layer in one operation and with the addition of a UF adhesive. Afterwards, any knotholes are puttied, the surface of the products is coated and profiled, and the products are packed and shipped. Intensive quality tests are carried out between and during the respective production steps, which make the product suitable for the next process step.

Like the Croatian site, the Lithuanian site also has a sawmill that cuts roundwood into raw wood planks and, with subsequent technical drying, makes the raw planks available for the production of top layers. From this production step onwards, the 3-layer parquet production follows analogously to that of the Croatian production plant.

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

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 systems, 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 goes beyond the legal requirements.

2.8 Product processing/Installation

Bauwerk Group 3-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, in accordance with 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 3-layer parquet products of the Bauwerk Group, both floating and full-surface gluing is intended. Make sure that an adhesive approved by the adhesive manufacturer and an appropriate notched trowel are used. For a floating installation, it is recommended to install an impact sound mat between the subfloor and the parquet.

2.9 Packaging

Cardboard, paper, wood, metals, plastic straps and polyethylene films are used for packaging the 3-layer parquet products. Wooden pallets 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. If you have any questions, please contact the product management at productmanagement@bauwerk.com.

2.11 Environment and health during use

Bauwerk Group parquet products are regularly tested for national legislation and supplementary certificates relating to healthy living 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 11/2011.

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 top layers of the 3-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 underneath.
- 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

Floating installed parquet products can be removed and reused after the usage phase.
If the parquet product has been glued down over its entire surface, it must be removed mechanically and disposed of in one of the ways described in chapter 2.15.

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 3-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	8.37	kg/m²
Gross density	541	kg/m³
Wood moisture on delivery	5 - 9	%
Thickness (average)	15.5	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 wastewater 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	3.8	kg C
Biogenic Carbon Content in accompanying packaging	0.07	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	0.221	kg

Maintenance (B2)

Name	Value	Unit
Information on maintenance (vacuuming, damp cleaning, oiling)	-	-
Maintenance cycle (vacuum cleaning, 2x a week)	5200	Number/RSL
Electricity consumption (vacuum cleaning)	15.6	kWh
Maintenance cycle (damp cleaning, 2x monthly)	1200	Number/RSL
Water consumption (damp cleaning)	0.24	m^3
Detergent (damp cleaning)	0.48	Liter
Maintenance cycle (oiling, every 5	7	Number/R

years)		SL
Water consumption (oiling)	0.0007	m3
Cleaning agent (oiling)	0.0014	Liter
Pads (oiling)	0.12	Piece
Oil	0.11	kg

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

Name	Value	Unit
Replacement cycle	2	Number/RSL
Electricity consumption (loops)	1.32	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 (nach BBSR)	40	a
Life Span (according to manufacturer)	50	a

End of life (C1–C4)

Name	Value	Unit
Collected separately	7.624	kg
Recycling (Scenario 2)	7.624	kg
Energy recovery (Scenario 1)	7.624	kg

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

Name	Value	Unit
Waste wood	7.624	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 3-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.]	-6.33E+0	4.22E-1	7.04E+0	1.46E+0	0.00E+0	8.93E-2	1.39E+1	1.38E+1	0.00E+0	-5.36E+0	-2.40E-1
GWP-fossil	[kg CO_2-Eq.]	7.83E+0	1.69E-1	7.03E+0	1.24E+0	0.00E+0	8.86E-2	2.04E-1	6.67E-2	0.00E+0	-5.35E+0	-2.38E-1
GWP-biogenic	[kg CO_2-Eq.]	-1.42E+1	2.53E-1	0.00E+0	2.24E-1	0.00E+0	0.00E+0	1.37E+1	1.37E+1	0.00E+0	0.00E+0	0.00E+0
GWP-luluc	[kg CO_2-Eq.]	2.49E-2	1.79E-5	9.02E-3	1.12E-3	0.00E+0	7.25E-4	1.31E-4	1.50E-4	0.00E+0	-3.71E-3	-1.33E-3
ODP	[kg CFC11-Eq.]	1.52E-7	2.51E-17	1.51E-13	1.56E-14	0.00E+0	1.75E-17	1.81E-15	5.58E-9	0.00E+0	-6.14E-14	-2.01E-8
AP	[mol H^+-Eq.]	3.80E-2	3.21E-5	1.43E-2	2.55E-3	0.00E+0	1.03E-4	1.96E-3	3.68E-4	0.00E+0	-7.01E-3	-1.33E-3
EP-freshwater	[kg P-Eq.]	2.17E-4	9.21E-9	1.70E-4	2.76E-6	0.00E+0	2.64E-7	2.48E-7	6.41E-5	0.00E+0	-7.02E-6	-9.99E-5
EP-marine	[kg N-Eq.]	1.16E-2	8.62E-6	3.98E-3	6.51E-4	0.00E+0	3.46E-5	6.44E-4	6.37E-5	0.00E+0	-1.99E-3	-3.39E-4
EP-terrestrial	[mol N-Eq.]	1.34E-1	1.50E-4	3.60E-2	7.25E-3	0.00E+0	4.09E-4	9.35E-3	6.04E-4	0.00E+0	-2.13E-2	-3.54E-3
POCP	[kg NMVOC-Eq.]	4.41E-2	2.42E-5	9.88E-3	2.03E-3	0.00E+0	9.08E-5	1.75E-3	1.58E-4	0.00E+0	-5.59E-3	-1.12E-3
ADPE	[kg Sb-Eq.]	2.24E-5	5.50E-10	1.90E-6	2.35E-7	0.00E+0	7.86E-9	2.76E-8	2.57E-7	0.00E+0	-8.93E-7	-2.36E-6
ADPF	[MJ]	1.36E+2	6.69E-2	1.28E+2	2.64E+1	0.00E+0	1.18E+0	3.00E+0	1.54E+0	0.00E+0	-9.29E+1	-3.67E+0
WDP	[m^3 world-Eq deprived]	2.37E+0	2.50E-2	1.13E+0	4.10E-1	0.00E+0	8.23E-4	1.43E+0	4.85E-2	0.00E+0	-4.12E-1	-6.08E-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 3-layer parquet

Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
PERE	[MJ]	1.80E+2	9.46E-3	5.18E+1	5.59E+0	0.00E+0	6.80E-2	1.34E+2	2.27E-1	0.00E+0	-2.11E+1	-3.42E+1
PERM	[MJ]	1.37E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.34E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	3.17E+2	9.46E-3	5.18E+1	5.59E+0	0.00E+0	6.80E-2	5.82E-1	2.27E-1	0.00E+0	-2.11E+1	-3.42E+1
PENRE	[MJ]	1.26E+2	6.70E-2	1.28E+2	2.64E+1	0.00E+0	1.19E+0	1.04E+1	1.54E+0	0.00E+0	-9.29E+1	-3.67E+0
PENRM	[MJ]	9.70E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-7.40E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PENRT	[MJ]	1.36E+2	6.70E-2	1.28E+2	2.64E+1	0.00E+0	1.19E+0	3.00E+0	1.54E+0	0.00E+0	-9.29E+1	-3.67E+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	1.34E+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]	8.91E-2	5.87E-4	5.32E-2	1.28E-2	0.00E+0	7.79E-5	3.36E-2	1.13E-3	0.00E+0	-2.06E-2	-1.42E-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 3-layer parquet

Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
HWD	[kg]	4.47E-7	8.68E-12	3.06E-8	5.30E-9	0.00E+0	6.25E-11	5.42E-10	0.00E+0	0.00E+0	-2.09E-8	0.00E+0
NHWD	[kg]	1.18E-1	1.33E-3	3.40E-1	3.74E-2	0.00E+0	1.86E-4	9.91E-2	0.00E+0	0.00E+0	-4.37E-2	0.00E+0
RWD	[kg]	8.60E-3	2.33E-6	1.67E-2	1.69E-3	0.00E+0	2.15E-6	1.66E-4	0.00E+0	0.00E+0	-6.79E-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	6.50E-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]	2.15E+0	1.05E-1	1.23E-1	9.68E-1	0.00E+0	0.00E+0	7.62E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	4.89E-1	0.00E+0	2.71E+0	0.00E+0	0.00E+0	2.00E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	7.68E-2	8.72E-1	0.00E+0	4.87E+0	0.00E+0	0.00E+0	3.58E+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 3-layer parquet

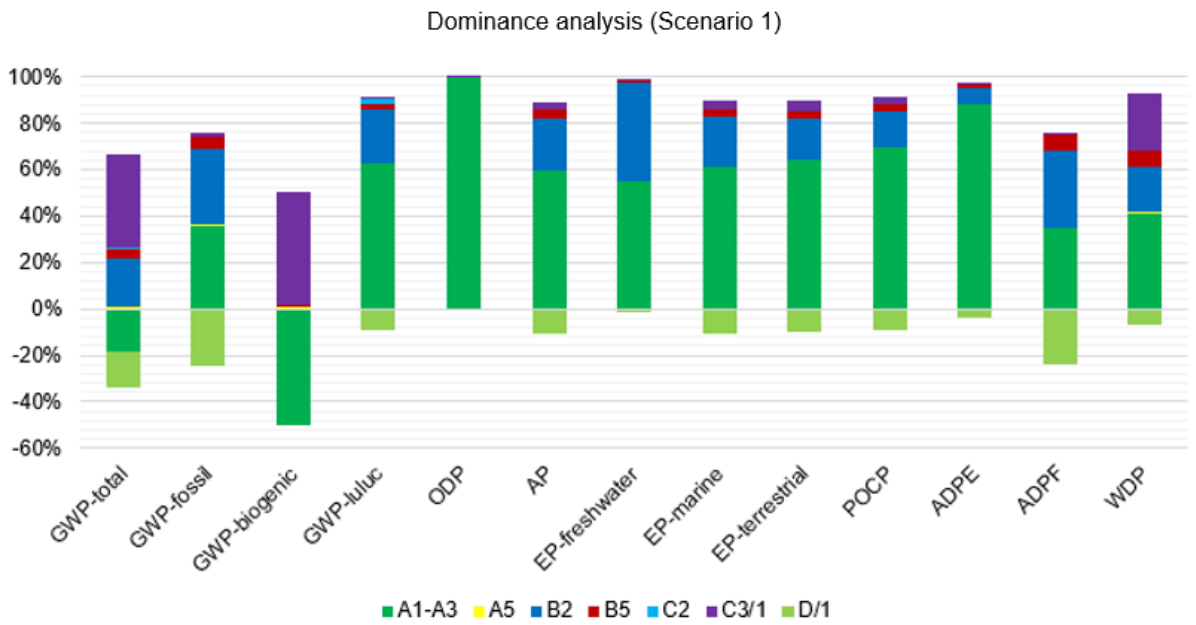
Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND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

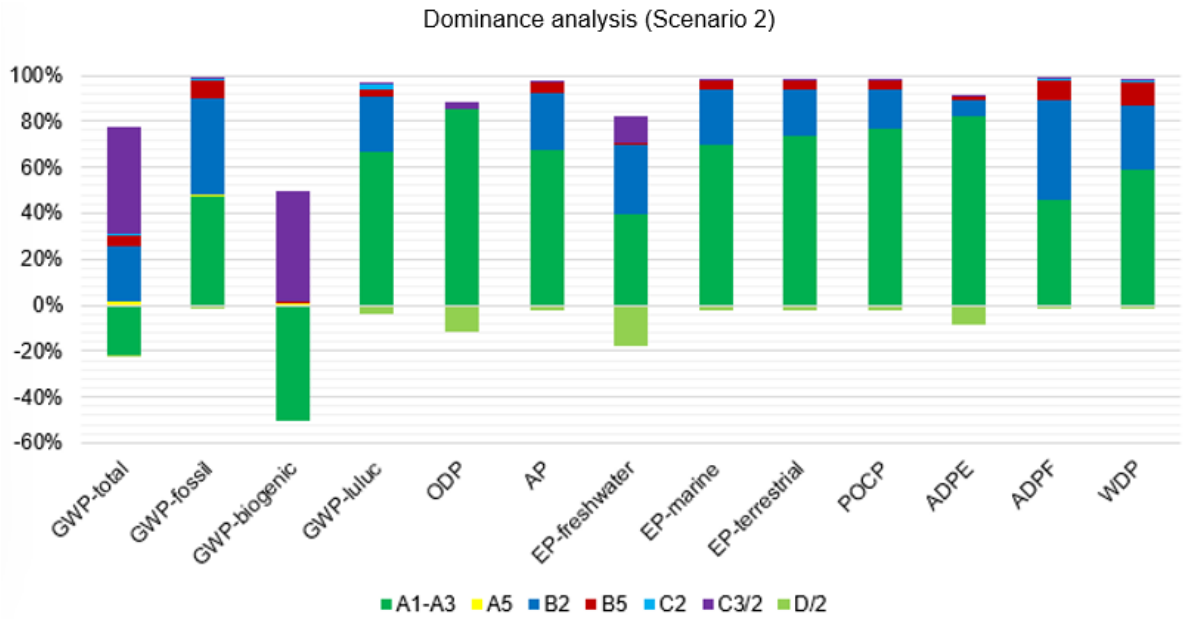
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (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 19% to the indicator Global Warming Potential - fossil (GWP-fossil), the demand for electrical energy 24%. In addition, glue also has a significant contribution of 11 % to GWP-fossil.
The indicators depletion potential of the stratospheric ozone layer (ODP), eutrophication potential - freshwater (EP-freshwater) and potential for depletion of abiotic resources - non-fossil (ADPE) are an exception. These indicators are dominated by the dataset used for the glue.

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

Emissions of formaldehyde according to test method *EN 16516:*

Name	Value	Unit
Formaldehyde after 28 days	5	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 Pentachlrophenol (PCP)
Testing institute: eco-INSTITUT Germany GmbH Schanzenstraße 6 - 20, Carlswerk 1.19, D-51063 Cologne

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

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

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

Name	Value	Unit
TVOC (C6 - C16)	480	µg/m³
Sum SVOC (C16 - C22)	< 5	µg/m³
R (dimensionless)	87	-
VOC without NIK	69	µg/m³
Carcinogenic Substances	< 1	µg/m³

AgBB result overview (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	810	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 the product management at productmanagement@bauwerk.com. Certificate number: SGSCH-COC-001535

7.5 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.

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

7.7 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.

7.8 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.

7.9 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 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
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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 13489
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ISO 14001
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ISO 14025
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EN 15804
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Sustainability Report according to the GRI Core Option 2021, St. Margrethen: Bauwerk Group, 31.05.2022.

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Publisher
Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Tel +49 (0)30 3087748- 0
Fax +49 (0)30 3087748- 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

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

Tel +49 (0)30 - 3087748- 0
Fax +49 (0)30 – 3087748 - 29
Mail info@ibu-epd.com
Web **www.ibu-epd.com**

Author of the Life Cycle Assessment
brands & values GmbH
Altenwall 14
28195 Bremen
Germany

Tel +49 421 70 90 84 33
Fax +49 421 70 90 84 35
Mail info@brandsandvalues.com
Web **www.brandsandvalues.com**

Owner of the Declaration
Bauwerk Group
Neudorfstrasse 49
9430 St. Margrethen
Switzerland

Tel +41 71 747 74 74
Fax +41 71 747 74 74
Mail christian.steiner@bauwerk-group.com
Web **https://bauwerk-group.com/**