ENVIRONMENTAL PRODUCT DECLARATION

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

Owner of the Declaration	**MeisterWerke Schulte GmbH**
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-MWS-20220200-ICC1-EN
Issue date	16.09.2022
Valid to	15.09.2027

Lindura® wood flooring

MeisterWerke Schulte GmbH

Institut Bauen und Umwelt e.V.

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ECO PLATFORM

EPD

VERIFIED

1. General Information

MeisterWerke Schulte GmbH

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

Declaration number
EPD-MWS-20220200-ICC1-EN

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

Issue date
16.09.2022

Valid to
15.09.2027

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

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

Lindura® wood flooring

Owner of the declaration
MeisterWerke Schulte GmbH
Johannes-Schulte-Allee 5
59602 Rüthen-Meiste

Declared product / declared unit
1 m² Lindura wood flooring (10 kg/m²)

Scope:
This EPD applies for one square metre of Lindura wood flooring in the plank (1-strip) variant, manufactured in 59602 Rüthen-Meiste, 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.

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

The product consists of multi-layer wooden flooring with high-density fibreboard (HDF) as a middle layer, a real wood covering layer made of oak and real wood veneer backing. There is a special wood powder layer between the HDF middle layer and the real wood covering layer, which is made of wood fibres, mineral components and natural additives. The products feature an oiled or varnished surface ready for residential use and can be joined together as elements without glue using a special tongue-and-groove geometry. The surface is produced using only approximately one eighth of the wood needed for conventional multi-layered parquet flooring. This innovative production process means that so-called wood powder technology makes the resource-efficient, real wood covering layer extremely resistant to dents. MEISTERWERKE markets the wood flooring under the MEISTER brand as Lindura wood flooring (http://meister.com).

(EU) Directive No. 305/2011 (CPR) applies for placing the product on the market in the European Union / EFTA (with the exception of Switzerland). The products have a Declaration of Performance (DoP) and must bear a CE marking taking consideration of the harmonised *DIN EN 14342:2013-09, Wood flooring and parquet - Characteristics, evaluation of conformity and marking*.

The respective national regulations apply for usage.

The *EN 14354* is of relevance as another product-specific standard.

2.2 Application

MEISTER Lindura wood flooring are wood flooring products in accordance with *EN 14354*, which are suitable for private and commercial use, depending on the respective variant. The floor coverings are laid on screeds, tiles or wooden substructures in conjunction with suitable laying underlays (insulation underlays) as a floating installation or glued to the screed/subfloor over the entire surface. In all cases, the corresponding MEISTERWERKE installation conditions and subfloor requirements must be observed (http://www.meister.com).

2.3 Technical Data

Constructional data

Name	Value	Unit
Formaldehyde emissions in accordance with EN 717-1	≤ 26	µg/m^3
Total thickness	11 (+/- 0,5)	mm
Length (min. - max.)	700 - 2600	mm
Width (min. - max.)	140 - 320	mm
Basis weight	approx. 10 (+/- 0,5)	kg/m²
Covering layer timber moisture	7	%

Product according to Construction Products Regulation (CPR) with harmonised standards hEN: Performance values of the product according to the Declaration of Performance (DoP) 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 supplied in packaging units. The dimensions/quantities of the declared products as delivered are within the following ranges:

- Length: 700–2600 mm
- Width: 140–320 mm
- Thickness: 11 mm
- m²/pack: 0.98–2.50 m²

2.5 Base materials/Ancillary materials

The averaged proportions of ingredients per m² as a mass percentage for the EPD are as follows:

- 86.7% middle layer (HDF, high-density fibreboard)
- 5.8% wood powder
- 3.7% covering layer (oak)
- 3.1% backing (veneer)
- 0.7% surface treatment (varnishes and oils)

The product/at least part of the product contains substances on the *ECHA List of Candidates* (dated 17.01.2022) above 0.1% by mass: no

The product/at least one sub-product contains other 1A or 1B category CMR substances not on the list of candidates which are 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

To produce MEISTER Lindura wood flooring, finished top layers are sorted according to growth characteristics. A finished high-density fibreboard (HDF) is used for the middle layer and a veneer is used as a backing. The wood powder material is mixed and manufactured from recycled wood fibres, mineral fillers and natural additives. The HDF middle layer is sprinkled with the wood powder from both sides and pressed together with the real wood top layer and the backing veneer and then cut into individual formats. The surface is then lacquered or oiled. For glue-free installation, the individual planks are equipped and packaged with a special tongue-and-groove geometry.

2.7 Environment and health during manufacturing

As the holder of *PEFC* certification, MEISTERWERKE are committed to implementing the PEFC.

Due to the manufacturing conditions, no environmental and health protection measures beyond the regulations of valid EU regulations as well as national legal and other regulations are required. This also includes compliance with or falling below the occupational exposure limit values (OELs) in the manufacturing process.

2.8 Product processing/Installation

MEISTER Lindura wood flooring can be sawn, milled, planed and drilled with standard stationary machines as well as (electric) hand machines. The use of carbide saw blades or diamond-tipped saw blades is recommended. Respiratory protection should be worn when using hand tools without suction. Required tools and machines may only be used as intended and in accordance with the operating instructions of the respective manufacturer.
The usual safety precautions (e.g., hearing protection depending on the machine, protective goggles and dust mask when sawing) must be considered. The resulting sawdust should be extracted. The products must be stored in a dry place. MEISTER Lindura wood flooring can be glued down or, in conjunction with suitable installation underlays, laid as a floating floor. In all cases, the corresponding MEISTERWERKE installation conditions and subfloor requirements must be observed (http://www.meister.com).
During processing/installation, the usual safety regulations for processing (protective goggles, dust mask in case of dust formation, ear protection depending on the machine, etc.) must be observed. For commercial processing, the regulations of the employers' liability insurance associations must be observed.
Residual material (cuttings and packaging) generated on the construction site must be collected separately according to waste fractions. For disposal, the regulations of the local disposal authorities as well as the instructions given under 2.15 "Disposal" must be observed.

2.9 Packaging

Paper and cardboard, wood, polyethylene and other plastics are used.
Packaging materials must be collected separately and recycled in accordance with local legal requirements. Disposable pallets can be partially reused or recycled as waste wood before thermal recovery.

2.10 Condition of use

The composition for the period of use corresponds to the basic material composition according to 2.5. “Base materials”. Wood is a hygroscopic material which means it responds to changes in room climate. In the course of use, it is therefore important to ensure a balanced indoor climate to avoid possible dimensional changes. Appropriate measures to maintain the value must be observed in accordance with the installation/maintenance instructions (http://www.meister.com).

2.11 Environment and health during use

When used as intended,
no impacts to health or impairments are to be expected.
Hazards to water, air/atmosphere and soil cannot arise when wood flooring is used as directed. Lindura wood flooring is a natural CO2 reservoir.
The varnished and oiled surfaces can be reworked. Depending on the surface, they can be primed or sanded and then resurfaced. Multiple use in other rooms is also possible.
In addition, Lindura wood flooring can be recycled.
Lindura wood flooring meets the requirements of the *Blue Angel* eco-label according to RAL UZ 176 and eco-INSTITUT according to *EN 16516*.

2.12 Reference service life

The service life depends on the area of use (e.g., private area, public area) in which the wooden floor is installed. Since more than 90% of wooden floors are installed in the private sector, the service life of 40 years refers to this sector.

2.13 Extraordinary effects

Fire

Indication of building material class in accordance with *EN 13501-1*.
Building material class B corresponds to “hardly flammable”.

Fire protection

Name	Value
Building material class	B
Smoke gas development	s1

Water

When exposed to water, no ingredients are washed out that could be hazardous to water. The floor covering is not resistant to permanent exposure to water.

Mechanical destruction

Mechanical damage can be repaired locally. The fracture pattern of a multi-layer wooden floor depends on the type of wood. Splinters and splinter formation may occur at the fracture edges (risk of injury). If the damage is too great, individual planks in the area can also be replaced.

2.14 Re-use phase

The product can be easily reused or re-purposed in case of selective deconstruction after the end-of-use phase.
If repeated use as flooring is no longer possible, the wood can continue to be used materially, e.g., as a raw material for the production of wood-based panels, again with several cascades of use possible. If the product cannot be recycled, it is sent for thermal utilisation to generate process heat and electricity due to its high calorific value of approx. 18 MJ/kg.

2.15 Disposal

Residues and waste from wooden flooring are to be recycled according to *AVV 17 02 01* and *AVV 03 01 05*. Landfilling of waste wood is not permitted in Germany according to the Waste Wood Ordinance (*AltholzV*) and *AVV 17 02 01*, nor is it necessary according to 2.14 “Reuse phase”.

2.16 Further information

Further information is available at www.meister.com.

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 m² Lindura wood flooring. The averaging was based on the square metre produced in the period under consideration for the weighting of inputs and outputs.

Declared unit

Name	Value	Unit
Declared unit	1	m^2
Grammage	10.403	kg/m^2
Gross density	946	kg/m^3
Wood moisture covering layer	7	%
Thickness	11	mm

3.2 System boundary

Type of EPD: Cradle to plant 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 as well as procurement transports.
In addition, the entire manufacturing phase is considered, including the treatment of production waste until the end-of-waste (EoW) status is reached.
Module A5 balances the recycling of packaging materials.

Modules B2 and B5
Module B2 considers the cleaning and oiling of the wooden floor, including the ancillary materials required for this, as well as the treatment of the waste and wastewater produced in the process.
Module B5 declares the renovation of the wooden floor, including the treatment of the waste generated in the process.

Modules C1–C4 and D
No expenses are considered for dismantling (Module C1), since manual dismantling is assumed.
In Module C2, transport to the disposal processes is considered.
Module C3 contains the necessary processes for waste treatment at the end of the product life cycle. Two scenarios were considered: Thermal recycling (Scenario 1) and material recycling (Scenario 2). The loads for the waste treatment are represented in this until the end of the waste property is reached.
Resulting potentials and avoided loads outside the system boundary are assigned to Module D.
No materials are landfilled, so no loads/benefits are considered in Module C4.

3.3 Estimates and assumptions

For the disposal transports (Module C2), a distance of 100 km and a utilisation rate of 50% were assumed.

3.4 Cut-off criteria

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 impact categories considered.

3.5 Background data

As a general rule, the *GaBi* background database in content version 2021.1 was used. If no matching records were available in the GaBi background database, records from the *ecoinvent 3.6* database were used.

3.6 Data quality

The foreground data were provided by MeisterWerke Schulte GmbH and checked for plausibility. The quality and representativeness of the primary data can therefore be considered high.
The data quality of the background data was rated as good in terms of temporal, technical, and geographic representativeness.
With regard to the robustness of the LCA values, it can be stated that the balanced potential environmental impact largely result from the background data.

3.7 Period under review

Primary data was collected for the year 2019.

3.8 Allocation

Modules A1–A3
Wood residues that are thermally recycled internally were considered in the closed loop.
An economic allocation of the by-products was not performed, since 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* 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 plant gate

Name	Value	Unit
Biogenic Carbon Content in product	4.49	kg C
Biogenic Carbon Content in accompanying packaging	0.29	kg C

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

Name	Value	Unit
Waste wood	10,339	kg

The following technical information was used for modelling. A service life of 40 years was assumed.

Construction-installation process (A5)

Name	Value	Unit
Output substances following waste treatment on site	0.335	kg

Maintenance (B2)

Name	Value	Unit
Information on maintenance (vacuuming, damp cleaning, oiling)	-	-
Maintenance cycle (vacuuming, twice weekly)	4160	Number/RSL
Electricity consumption (vacuum cleaning)	12.5	kWh
Water consumption	0.19	m^3
Maintenance cycle cycle (damp cleaning, twice monthly)	960	Number / RSL
Cleaning agents (damp cleaning)	0,38	litres
Maintenance cycle (oiling, every 5 years)	6	Number / RSL
Water consumption (oiling)	0,0007	m3
Cleaning agents (oiling)	0,0014	litres
Pads (oiling)	0,13	pieces
Oil	0,11	kg

Replacement (B4) / Conversion/Renovation (B5)

Name	Value	Unit
Replacement cycle	1	Number/RSL
Electricity consumption (grinding)	0.475	kWh
Decrease per renovation process	0,15	mm
Oil (60% of floors)	0,018	kg
Varnish (40% of floors)	0,04	kg

Reference service life

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

End of Life (C1–C4)

Name	Value	Unit
Collected separately (waste wood)	10.339	kg
Recycling (scenario 2)	10.339	kg
Energy recovery (scenario 1)	10.339	kg
Landfilling	0	kg

5. LCA: Results

The LCA results for the B modules (use phase) refer to a service life of 40 years. The parameters used as a basis can be found in section 4.

Two scenarios were considered for the end-of-life journey:

- Scenario 1: Thermal utilisation
- Scenario 2: Material utilisation

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 Lindura wood flooring

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.]	-8.74E+0	1.16E+0	5.75E+0	-1.15E+0	0.00E+0	1.21E-1	1.77E+1	1.63E+1	0.00E+0	-6.58E+0	-5.68E-2
GWP-fossil	[kg CO_2-Eq.]	8.74E+0	1.12E-1	5.78E+0	1.87E-1	0.00E+0	1.20E-1	2.76E-1	9.05E-2	0.00E+0	-6.58E+0	-3.23E-1
GWP-biogenic	[kg CO_2-Eq.]	-1.75E+1	1.05E+0	0.00E+0	-1.33E+0	0.00E+0	0.00E+0	1.74E+1	1.62E+1	0.00E+0	0.00E+0	0.00E+0
GWP-luluc	[kg CO_2-Eq.]	1.82E-2	3.66E-5	7.25E-3	1.35E-4	0.00E+0	9.83E-4	1.77E-4	2.04E-4	0.00E+0	-4.56E-3	-1.80E-3
ODP	[kg CFC11-Eq.]	1.16E-7	7.38E-17	1.21E-13	1.79E-15	0.00E+0	2.38E-17	2.45E-15	7.57E-9	0.00E+0	-7.54E-14	-2.72E-8
AP	[mol H^+-Eq.]	3.33E-2	8.55E-5	1.16E-2	3.82E-4	0.00E+0	1.40E-4	2.66E-3	5.00E-4	0.00E+0	-8.61E-3	-1.80E-3
EP-freshwater	[kg P-Eq.]	1.82E-4	2.14E-8	1.36E-4	4.04E-7	0.00E+0	3.57E-7	3.36E-7	8.69E-5	0.00E+0	-8.63E-6	-1.36E-4
EP-marine	[kg N-Eq.]	1.30E-2	2.69E-5	3.24E-3	9.43E-5	0.00E+0	4.70E-5	8.74E-4	8.64E-5	0.00E+0	-2.45E-3	-4.60E-4
EP-terrestrial	[mol N-Eq.]	1.21E-1	4.03E-4	2.94E-2	1.04E-3	0.00E+0	5.54E-4	1.27E-2	8.19E-4	0.00E+0	-2.62E-2	-4.80E-3
POCP	[kg NMVOC-Eq.]	2.85E-2	7.36E-5	8.20E-3	3.13E-4	0.00E+0	1.23E-4	2.37E-3	2.14E-4	0.00E+0	-6.87E-3	-1.51E-3
ADPE	[kg Sb-Eq.]	1.87E-5	1.45E-9	1.53E-6	3.07E-8	0.00E+0	1.07E-8	3.74E-8	3.49E-7	0.00E+0	-1.10E-6	-3.20E-6
ADPF	[MJ]	1.66E+2	1.72E-1	1.06E+2	4.40E+0	0.00E+0	1.60E+0	4.07E+0	2.09E+0	0.00E+0	-1.14E+2	-4.97E+0
WDP	[m^3 world-Eq deprived]	2.17E+0	6.10E-2	9.23E-1	5.37E-2	0.00E+0	1.12E-3	1.94E+0	6.57E-2	0.00E+0	-5.06E-1	-8.25E-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 Lindura wood flooring

Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
PERE	[MJ]	5.89E+1	2.64E-2	4.16E+1	6.60E-1	0.00E+0	9.22E-2	1.90E+2	3.08E-1	0.00E+0	-2.59E+1	-4.64E+1
PERM	[MJ]	1.94E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0	-1.89E+2	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	[MJ]	2.53E+2	2.64E-2	4.16E+1	6.60E-1	0.00E+0	9.22E-2	7.89E-1	3.08E-1	0.00E+0	-2.59E+1	-4.64E+1
PENRE	[MJ]	1.64E+2	1.72E-1	1.06E+2	4.40E+0	0.00E+0	1.61E+0	4.07E+0	2.09E+0	0.00E+0	-1.14E+2	-4.97E+0
PENRM	[MJ]	1.39E+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
PENRT	[MJ]	1.66E+2	1.72E-1	1.06E+2	4.40E+0	0.00E+0	1.61E+0	4.07E+0	2.09E+0	0.00E+0	-1.14E+2	-4.97E+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	1.89E+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]	7.47E-2	1.44E-3	4.31E-2	1.66E-3	0.00E+0	1.06E-4	4.55E-2	1.53E-3	0.00E+0	-2.53E-2	-1.92E-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 Lindura wood flooring

Indicator	Unit	A1-A3	A5	B2	B5	C1	C2	C3/1	C3/2	C4	D/1	D/2
HWD	[kg]	5.50E-5	2.45E-11	2.47E-8	7.54E-10	0.00E+0	8.47E-11	7.34E-10	0.00E+0	0.00E+0	-2.57E-8	0.00E+0
NHWD	[kg]	1.73E-1	3.99E-3	2.79E-1	5.30E-3	0.00E+0	2.52E-4	1.34E-1	0.00E+0	0.00E+0	-5.37E-2	0.00E+0
RWD	[kg]	6.46E-3	6.82E-6	1.34E-2	1.92E-4	0.00E+0	2.92E-6	2.26E-4	0.00E+0	0.00E+0	-8.34E-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	2.18E-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]	8.91E-1	3.08E-1	1.27E-1	1.04E-1	0.00E+0	0.00E+0	1.03E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EEE	[MJ]	0.00E+0	9.37E-1	0.00E+0	4.49E-1	0.00E+0	0.00E+0	2.71E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	[MJ]	5.22E-1	1.68E+0	0.00E+0	8.21E-1	0.00E+0	0.00E+0	4.86E+1	0.00E+0	0.00E+0	0.00E+0	0.00E+0

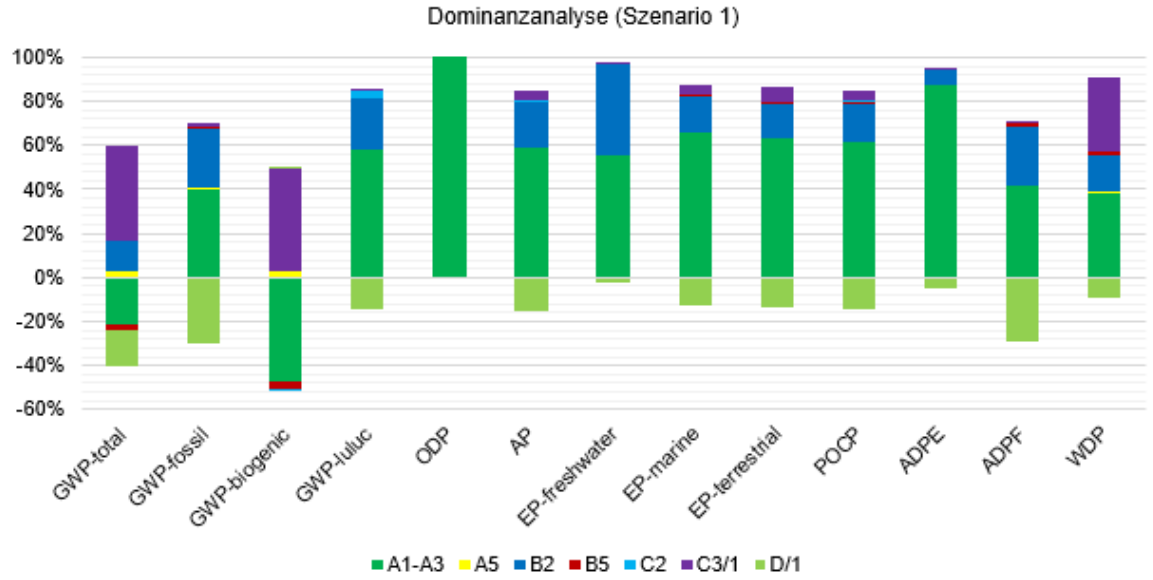
Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

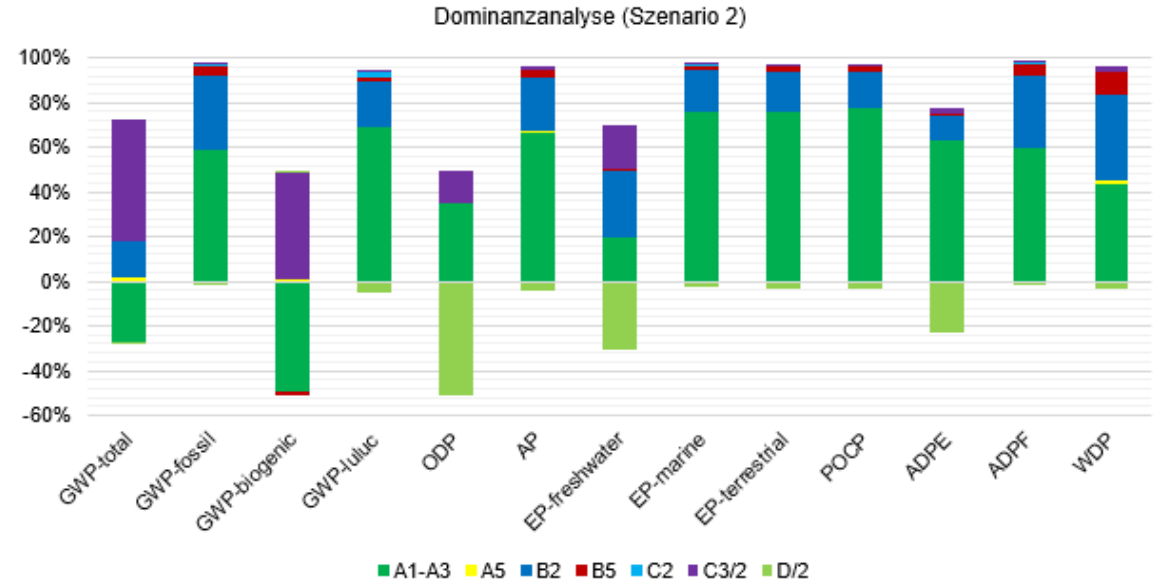
RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² Lindura wood flooring

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

6. LCA: Interpretation





The dominance analysis shows that especially the manufacturing phase (Modules A1-A3) as well as maintenance (Module B2) contribute to the potential environmental impact in the listed indicators. In Module B2, the energy requirement for vacuuming in particular has an influence on the potential environmental impacts. End-of-life wood recovery (Module C3) contributes significantly to the Global Warming Potential – total (GWP total), Global Warming Potential – biogenic (GWP biogenic), and Water Removal Potential (WDP) indicators. When the wood floor is thermally recycled, the biogenic carbon stored in the product is emitted as biogenic CO2 emissions. During material recycling, biogenic carbon leaves the system boundary. This is the rationale for balancing the sum of biogenic CO2 emissions over the life cycle of the product.

In the manufacturing phase (Modules A1-A3), the electrical energy required for production and the materials for the middle layer in particular 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, mid-range materials contribute 54% to the Global Warming Potential – Fossil (GWP fossil) indicator, and electrical energy demand contributes 23%.
The indicators stratospheric ozone depletion potential (ODP), eutrophication potential – fresh water (EP fresh water), and potential for depletion of abiotic resources – non-fossil resources (ADPE) are exceptions. These indicators are dominated by the components of the wood powder.

Range of results
Due to the low variance of the products in terms of thickness and weight per m² (see section 2.3), a significant range of results cannot be assumed.

7. Requisite evidence

VOC emissions

The products were tested at *eco-INSTITUT* on 30.08.2021 (test report 56536-001-003 / -002-004) according to AgBB scheme with the following values.

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

Name	Value	Unit
TVOC (C6 - C16)	110	µg/m³
Sum SVOC (C16 - C22)	<5	µg/m³
R (dimensionless)	0.37	-
VOC without NIK	12	µg/m³
Carcinogenic Substances	<1	µg/m³

AgBB result overview (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	160	µg/m³
Sum SVOC (C16 - C22)	<5	µg/m³
R (dimensionless)	0,62	-
VOC without NIK	30	µg/m³
Carcinogenic Substances	<1	µg/m³

The values given are to be understood as maximum values and may be lower depending on the surface treatment. The real values can be requested from MEISTERWERKE.

The products meet the requirements of the *Blue Angel* eco-label according to RAL UZ 176 (label usage contract no. 28807).

The products meet the requirements of *eco-INSTITUT* according to *EN 16516* (certification number ID 0717-12339-005).

Formaldehyde

The products were tested at *EPH*, D-01217 Dresden on 20.08.2021 (test report 2721282) with the maximum value given in section 2.3.

8. References

Standards

EN 717-1
DIN EN 717-1:2005-01, Wood-based panels - Determination of formaldehyde emission - Part 1: Formaldehyde release according to the test chamber method

EN 13501-1
DIN EN 13501-1:2019-05, Fire classification of construction products and types of construction - Part 1: Classification with the results from the tests on the fire behavior of building products

EN 14342
DIN EN 14342:2013-09, Wood flooring and parquet - Characteristics, evaluation of conformity and marking

EN 14354
DIN EN 14354:2017-11, Wood-based panels - Veneered floor coverings

EN 15804
DIN EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works - Environmental product declarations - Basic rules for the product category construction products

EN 16516
DIN EN 16516:2020-10, Construction products: Hazardous substance release assessment - Determination of emissions to indoor air

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

Other literature

AgBB scheme
AgBB scheme, August 2018 Indoor air quality requirements for buildings. Committee for the health evaluation of emissions of volatile organic compounds (VVOCs, VOCs and SVOCs) from building products.

AltholzV
Ordinance on Requirements for the Recovery and Disposal of Waste Wood (AltholzV) of 15 August 2002 (BGBl. I p. 3302), as last amended by Article 120 of the Ordinance of 19 June 2020 (BGBl. I p. 1328)

AVV
Waste Catalogue Ordinance (AVV) of 10 December 2001 (BGBl. I p. 3379), last amended by Article 2 of the Ordinance of 30 June 2020 (BGBl. I p. 1533).

Blue Angel
Blue Angel eco-label in accordance with RAL UZ 176, eco-label for low-emission floor coverings, panels and doors made of wood and wood-based materials for interiors; label utilisation contract no. 28807

ECHA List of Candidates
List of Substances of Very High Concern (SVHC) Candidates for Authorisation (ECHA List of Candidates), dated 19.01.2021, published in accordance with Article 59(10) of the REACH Regulation Helsinki: European Chemicals Agency

eco-INSTITUT
eco-INSTITUT Germany GmbH, D-51063 Cologne; Test report 56536-001-003 / -002-004, 30.08.2021; Certification number ID 0717-12339-005

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

EPH
Entwicklungs- und Prüflabor Holztechnologie GmbH, D-01217 Dresden; Test report 2721282, 20.08.2021

GaBi
GaBi 10.5: Software system and database for life cycle engineering, Sphera Solutions GmbH, Leinfelden-Echterdingen, 2021

PCR, Part A
Product category rules for building-related products and services Part A: Calculation rules for LCA and requirements for the project report according to EN 15804+A2:2019, version 1.1. Berlin: Institut Bauen und Umwelt e.V. (Pub.), 08.01.2021

PCR: Solid wood products
Product category rules for building-related products and services Part B: Requirements on the EPD for solid wood products, version 1.1. Berlin: Institut Bauen und Umwelt e.V. (Pub.), 10.12.2018

PEFC
Programme for the Endorsement of Forest Certification Schemes

Regulation (EU) No. 305/2011
Regulation (EU) No. 305/2011 of the European Parliament and of the Council of 9 March 2011 laying down harmonized 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

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