

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Moland Group A/S
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Issue date	29.08.2023
Valid to	28.08.2028

Moland Super Eg Moland Group A/S

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1. General Information

Moland Group A/S

Programme holder

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

Declaration number

EPD-MOL-20230148-IBA1-EN

This declaration is based on the product category rules:

Solid wood products, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

29.08.2023

Valid to

28.08.2028



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Moland Super Eg

Owner of the declaration

Moland Group A/S
Strandvejen 16
7800 Skive
Denmark

Declared product / declared unit

1 m² of veneered, wood flooring with HDF carrier (10 mm)

Scope:

This Environmental Product Declaration covers an average square meter of pre-lacquered, veneered, wood flooring with HDF carrier (10 mm), produced by Moland Group A/S in Denmark.

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	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally



Dr. Matthew Fishwick,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Moland Super Eg is a multi-layered parquet, consisting of a wood wear layer, pressed onto high-density fibreboard (HDF) with a wooden backing. Moland Super Eg floors are finished with a top layer of authentic wood species, sourced from responsible forestry. The thickness of the veneer top layer is 0.6 mm in order to make the most of the material.

The thin veneer layer of 0.6 mm is pressed on the HDF board according to the DSI (Double-Sided Impregnation) system. During this process, the adhesive is pressed into and absorbed by the wood.

The surface finish, consisting of eight robust layers of specially developed lacquers protects the floor from wear and tear as well as scratches. The wood absorbs the varnish which fuses with the adhesive. This results in a high-strength and scratch-resistant floor and a moist and dirt-resistant surface.

The combination of the thin top layer, the high-density fibreboard and the wooden backing ensures impact resistance and dimensional stability. Moland Super Eg floors are equipped with a click system for easy installation.

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration EN 14342:2013 Wood flooring and parquet - Characteristics, evaluation of conformity and marking as well as the CE-marking. Further specification is according to *EN 14354:2017*, the European standard for wood veneer floor coverings, as referenced by *EN 14342:2013*. For the application and use., the respective national provisions apply.

2.2 Application

Moland Super Eg flooring is covered by harmonised standards, *EN 14342:2013* and *EN 14354:2017*. It's intended as floor covering for internal use in dry conditions. The provided click system is only suitable for floating installations. Flooring without an integrated cork layer should be installed on a suitable underlay. Moland Super Eg flooring can be installed for both private and commercial use. The installation must be carried out in accordance with the installation instructions, the rules of the trade and the state of the art.

2.3 Technical Data

Technical specifications in accordance with the information in the declaration of performance with respect to its essential characteristics following *EN 14342:2013*, Wood flooring and parquet - Characteristics, evaluation of conformity and marking.

Constructional data

Name	Value	Unit
Moisture content acc. to EN 322	5-9	%
Mean density	850	kg/m ³
Thickness	10	mm
Length	593 - 2050	mm
Width	121 - 233	mm
Reaction to fire EN 13501-1	Cfl-s1	Class
Formaldehyde emission EN 717-1	E1	Class
Content PCP EN 14342	< 5	ppm
Slip resistance CEN/TS 15676	≥ 45	USRV
Thermal conductivity EN 12667	0.14	W/mK
Installation method	floating	-

Performance data of the product in accordance with the declaration of performance with respect to its essential characteristics according to *EN 14342:2013*, Wood flooring and parquet - Characteristics, evaluation of conformity and marking. Verification and assessment of constancy of performance are carried out according to system 3.

2.4 Delivery status

All products are delivered in packaging units. The following information is specified on the box:

- Finish
- Wood type
- Box quantity [m²]
- Dimensions [mm]
- Number of parquet planks [pcs]

Dimensions of the declared products as delivered are within following ranges:

- Length: 593 - 2050 mm
- Width: 121 - 233 mm
- Thickness: 10 mm
- Box quantity: 0.79 -2.39 m²

2.5 Base materials/Ancillary materials

The average composition of the finished products is calculated per product group. The components of Moland Super Eg are given below in kg/m² flooring.

- Lacquer < 1.5 %
- Veneer (top layer & backing) 9 %
- Adhesive (UF-glue) < 1 %
- High-density fibreboard 89 %

This product/article/at least one partial article contains substances listed in the *candidate list* (17.01.2023) exceeding 0.1 percentage by mass: No

This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *candidate list*, exceeding 0.1 percentage by mass: No

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) *Ordinance on Biocide Products No. 528/2012*): No

2.6 Manufacture

Moland Group A/S produces Moland Super Eg flooring at its production site in Denmark. The production process mainly involves assembly of the above, purchased components (HDF, veneer, adhesive, lacquer). Prior to the assembly process, an

extended part of the production is dedicated to the sorting, preparing and jointing of the veneer.

Veneer is produced by slicing a log into thin layers. This process makes optimal use of the logs because, in contrast with solid wood, there is no sawing loss. The purchased bundles of veneer are sorted and evaluated on various aspects:

- Wood species
- Slicing technique
- Dimensions
- Quality

After the assignment of a certain quality level, the bundles are cut in length and width. By using advanced technology, the sliced wood can be joined into veneer sheets, which are again graded, based on their quality.

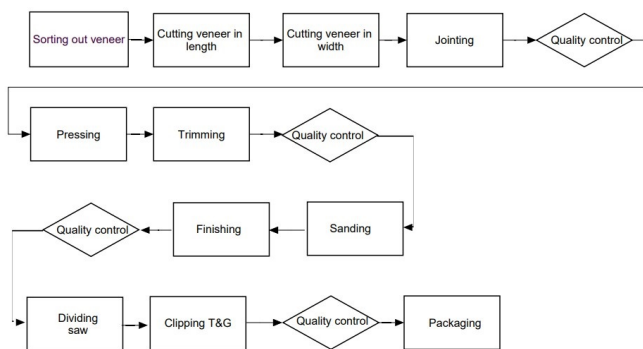
The next step in the production process is pressing. Adhesive is applied to both sides of the HDF carrier, which is subsequently placed onto the wooden backing. The wooden wear layer is placed on top. By placing this combination of materials in the press at a predefined time, temperature and pressure level, the adhesive is pressed into and absorbed by the wood. After pressing, the veneered board is trimmed to the desired dimensions and subjected to quality control.

Finishing of the wooden wear layer is done by applying eight layers of specially developed lacquers. Prior to this process, the wooden wear layer is sanded and optionally brushed. The eight layers of lacquer are cured by means of UV light. This extremely strong and matt lacquer is nearly invisible. The quality of the finishing process is extensively inspected.

After approval of the finishing quality, the lacquered veneered boards are divided into parquet planks. Dimensions of the planks depend on the collection. Each plank is provided with a click system, which is carefully milled to the sides.

The wooden flooring is packed in cardboard boxes and wrapped with plastic foil.

At the end of the manufacturing process, a full quality inspection check is performed and documented according to the internal Factory Production Control (FPC) system.



2.7 Environment and health during manufacturing

Health protection measures

Applicable legislation is strictly and fully applied. Working conditions comply with all requirements and in particular, with regard to health and safety.

Possible hazards, related to chemicals used in production, are covered by a yearly due diligence exercise where material safety data sheets are collected and conformity with the REACH-regulation (incl. SVHC's) is evaluated.

The health and safety manager keeps track of safe use guidelines and provides appropriate personal protection equipment when needed. Since air extraction systems filter ambient air in production, personal protection equipment mainly involves:

- Protective clothing
- Safety shoes
- Hearing protection
- Gloves

All employees are provided with the above mentioned, suitable protection measures.

A committee for prevention and protection at work is in place. Training for personnel is carried out at regular intervals, including: at the start of employment, annual recap or when deemed necessary.

All of this is captured in safety procedures, prevention and protection reports and put into practice by means of e.g. fire exercises, first aid training organized by the HR- and HSE-manager.

Chemical residues are sorted and collected separately. These containers are picked up by our waste processor and processed according to applicable disposal regulations.

Environmental protection measures:

Moland Group A/S is Program for the Enforcement of Forest Certification (PEFC) certified. This organisation is committed to responsible forest management and includes social aspects in their policy. Wood or wood-based materials are responsibly sourced with one of the above-mentioned certifications. Internal wood waste is incinerated with energy recovery which is re-used in the manufacturing process. Air extraction systems filter ambient air in production. A committee for prevention and protection at work is in place.

2.8 Product processing/Installation

Before starting the installation, it is essential to read the installation instructions carefully. Moland Super Eg flooring is intended for floating installation and can easily be installed, with its click tongue-and-groove system. Following installation tools are recommended:

- Installation kit
- Pencil
- Meter
- Hammer
- Handsaw
- Cutter

Besides the above-mentioned installation tools, Moland Super Eg flooring can be processed with all tools, suitable for solid wood. These tools must be operated in accordance with the manufacturer's operating instructions. Make sure that the necessary safety precautions and protection measures (e.g. hearing protection, respiratory mask, protective gloves, safety glasses...) are applied. Provide adequate ventilation if the processing operations generate wood dust.

Dispose of the product and packaging in accordance with applicable, local, or national disposal regulations.

2.9 Packaging

Moland Super Eg flooring is packed in a cardboard box and wrapped with PE-foil in order to protect the product during transport and storage.

Packaging material must be collected separately and disposed of in accordance with applicable legislation.

2.10 Condition of use

Before installation, Moland Super Eg flooring should be stored in a dry and protected room with an air humidity of 40 – 60 % and a temperature between 16-21°C. Wood has, as a hygroscopic material, the ability to absorb and release moisture from the surrounding environment. Changes in moisture content can result in dimensional changes over time. This needs to be accommodated during installation by foreseeing expansion gaps of 1 mm per running meter, as outlined in the installation instructions.

2.11 Environment and health during use

The use phase of Moland Super Eg flooring is not in the scope of the Life Cycle Assessment (LCA) and resulting EPD.

However, measurements of VOC emissions to indoor air are measured and available.

Moland Super Eg flooring complies with following regulations and test protocols:

- Indoor Air Comfort GOLD®
- CDPH
- M1

Additional and more detailed information can be provided on request. Moland Super Eg flooring does not imply any hazards to water, air or soil when used as intended.

2.12 Reference service life

The service life in accordance with the Bundesinstitut für Stadt- und Raumforschung (BBSR), table "Service lives of components for life cycle assessment according to Bewertungssystem Nachhaltiges Bauen (BNB)", is

- 40 years for wooden, multilayer parquet.
- 15 years for wood lacquers

The service life is specified on an informative basis and is based on the warranty period Moland Group A/S specifies for the products:

Material	Residential use	Low commercial use
Group 1	15	5
Group 2	Limited lifetime warranty	10
Group 3	Limited lifetime warranty	10

The following information, related to maintenance and repair is informative, given that module B is not declared. The product must be installed and maintained according to the installation and maintenance instructions.

Misuse or poor maintenance will adversely affect the service life. This also applies for unusually low or high humidity, excessive water use, dragging heavy furniture, etc.

2.13 Extraordinary effects

Fire

Moland Super Eg, wood veneered floor covering, with surface coating and with or without cork bottom layer is classified as Cfl-s1. Test conditions: in accordance with EN 13501-1:2019. Installation method: loose-laid on end-use substrates of wood and of classes A1 and A2-s1,d0.

Fire protection

Name	Value
Building material class	Cfl
Smoke gas development	s1

Water

Moland Super Eg flooring has a water-resistant surface but is not able to withstand prolonged exposure to water. Besides damage to the product, no adverse consequences to the environment will occur.

Mechanical destruction

No negative impacts on the environment are identified when mechanically destroying the product. Suitable personal protection equipment is recommended to prevent injury or health risks, caused by sharp edges, wood chips or wood dust.

2.14 Re-use phase

Limited mechanical damage like scratches can be repaired using the Repair Pens and Repair Wax. Colour and lacquer pens are available to repair the floor and to protect it from dirt and moisture.

When your floor is severely damaged, the Bulldog allows you to remove and replace the damaged plank(s). More information and instructions for use are available on www.moland.dk.

At end-of-life, the product can be incinerated with energy recovery.

2.15 Disposal

Moland Super Eg flooring is classified as wood waste with EWC-code 17 02 01, according to EUROSTAT Guidance.

The product must be disposed of in accordance with applicable, local or national disposal regulations.

2.16 Further information

Additional information, contact details, installation and maintenance instructions are available on www.moland.dk

3. LCA: Calculation rules

3.1 Declared Unit

The declared unit is 1 m² of pre-lacquered, veneered wood flooring with HDF carrier of 10 mm. The total inputs, outputs and produced m² for the period under consideration are taken as a basis.

The products in this EPD represent an average in a product group. The most important variable which leads to differences in the environmental profiles within the group is the amount of HDF in the product. For Moland Super Eg, the difference is 5.88 %.

Declared unit

Name	Value	Unit
Declared unit	1	m ²
Gross density	850	kg/m ³
Grammage	9.49	kg/m ²
Wood moisture at delivery	5 - 9	%
Layer thickness (Weighted averaged thickness)	0.01	m

Moland Group A/S collected data for a full production year: 2021. More specifically:

- Raw material use and transport to the production location
- Relevant suppliers were contacted for primary data
- Energy use
- Emissions
- Production

3.2 System boundary

This EPD is a cradle-to-gate with options (C1-C4, D)

Product stage A1-A3

Parquet consists of a high-density fibreboard to which a wooden veneer layer is applied (glued) on both sides. All the raw materials are supplied by truck. The application of veneer onto the baseboard is called the pressing process. This pressing is achieved by means of pressure, temperature and time. The panels are then sawn, sanded and varnished. After varnishing, the boards are divided in planks and are provided with a click system so that they can be clipped into one another.

The heat used in the production process is obtained from the incineration of part of the wood production waste.

The proportion of the electricity demand covered by green electricity in the total electricity demand is 100 %.

Transport to construction (A4)

This module is not in the scope of this EPD.

Construction process (A5)

This module is not in the scope of this EPD.

Use phase (B)

This module is not in the scope of this EPD. However, the emissions to indoor air will be mentioned informatively in this EPD.

Demolition C1

Parquet can be removed from the building in a manual process. It is anticipated that the environmental impact of this process is neglectable.

Recovery D

This module includes the benefit of the recovery of electricity and heat that often occurs in waste incineration plants. For the electrical and thermal efficiency of the waste-to-energy plant we calculated with 18 % and 31 % respectively. For the heat of combustion of parquet (wood) the lower heating value was used: Wood: 13.99 MJ/kg.

3.3 Estimates and assumptions

Transport to waste treatment C2

After the parquet is removed from the application is transported to a waste treatment facility. In the waste treatment scenario in this LCA, a transport distance of 50 km is assumed.

Waste processing C3

The waste treatment scenario in this study assumes that at the waste treatment facility the parquet is chipped into wood chips.

Final waste treatment C4

The waste treatment scenario in this study assumes that that the wood chips are used for incineration with energy recovery.

3.4 Cut-off criteria

Emissions for the combustion of wood are not measured at the plant and are therefore included via the ecoinvent used. There is a process-specific emission to be expected from formaldehyde. The exact emission is not measured and therefore included based on the ecoinvent process "Glued laminated timber, for indoor use {RER} production | Cut-off". The emission included in the calculation is 0.0114 kg/m³ product. The avoided production of electricity from primary sources is based on: "Electricity, high voltage {NL}|heat and power co-generation, natural gas, combined cycle power plant, 400MWelectrical | Cut-off". The avoided production of heat from primary sources is based on: "Heat, district or industrial, natural gas {Europe without Switzerland}| heat production, natural gas,

at industrial furnace >100 kW |Cut-off".

Since the LCA is based on production information from a full production year it is expected that mass and energy balance is (in) close (proximity) to complete as no materials or processes have been excluded. The cut-off criteria are well below 1 %.

3.5 Background data

For background processes, the ecoinvent database v3.6 (allocation cut-off) has been used.

3.6 Data quality

Data quality and validation of economic flows

Moland Group A/S collected data on the production of parquet for a full production year, 2021. More specifically:

- Raw material use and transport to the production location
- Primary data for important products were requested from suppliers
- Energy use
- Emissions
- Production waste

The provided data was checked for plausibility. The quality and representativeness are considered high. The products in this EPD represent an average in a product group. The most important variable which leads to differences in the environmental profiles within the group is the amount of HDF in these products. For Moland Super Eg, this difference is 5,88 %.

For background processes, the ecoinvent database v3.6 (allocation cut-off) has been used.

Data quality and validation of environmental inventories

Since the LCA is based on production information from a full production year it is expected that mass and energy balance is close to complete. For the LCA calculations, the following methods have been used:

- SimaPro's LCA method: "EN 15804+A2" via bepalingsmethode 'set 1', 'set 2' & param (NMD 3.4) (see appendix C)

SGS INSTRON has checked potential uncharacterised substances. This check is part of the validation of environmental inventories.

3.7 Period under review

The production data for this EPD is based on the production of a full production year (2021).

3.8 Geographic Representativeness

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

3.9 Allocation

The energy use for the production processes has been allocated based on the area produced for each of the products. The amount of production waste has been allocated based on the mass of the products and the loss factor for each of the products.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account. For background processes, the ecoinvent database v3.6 (allocation cut-off) has been used.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The amount of biogenic C in the product has been calculated using the amount of veneer, HDF and cork in the product, multiplication by the wood and cardboard content and 0.5. The latter is the amount of C in wood according to *EN 16485:2014*. The wood content in HDF is 77 % according to the suppliers EPD: EPD-UNI-20150013-IBA1-EN. For veneer and cork, a moisture content of 6 % has been used.

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

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	3.67	kg C
Biogenic carbon content in accompanying packaging	0.08	kg C

Use or application of the installed product (B1) see section 2.12 "Use"

This module is not in scope. However, the emissions to indoor air are informatively mentioned in section 2.11.

The following information, related to maintenance and repair is informative, given that module B is not declared.

Maintenance (B2)

The specially developed Wood Floor Cleaner is recommended to maintain the parquet. It removes dirt without harming the lacquer. Maintenance instructions are available on www.moland.dk

Repair (B3)

Limited mechanical damage like scratches can be repaired using the Repair Pens and Repair Wax. Colour and lacquer pens are available to repair the floor and protect it from dirt and moisture.

Replacement (B4) / Refurbishment (B5)

When your floor is severely damaged, the Bulldog allows you to remove and replace the damaged plank(s). More information and instructions for use are available on www.moland.dk.

Reference service life

The service life is declared in accordance with the *BBSR*, table "Service lives of components for life cycle assessment according to *BNB*".

Name	Value	Unit
Life span according to BBSR	15	years
Life span according to the manufacturer	See section 2.12	-

End of life (C1-C4)

Demolition C1

Parquet is typically removed from the building in a manual process. It is anticipated that the environmental impact of this process is neglectable.

Transport to waste treatment C2

After the parquet is removed from the application it's transported to a waste treatment facility. In the waste treatment scenario in this LCA a transport distance of 50 km is assumed (*ecoinvent*: "Transport, freight, lorry, unspecified {GLO}| market group for transport, freight, lorry, unspecified | Cut-off").

Waste processing (C3)

The waste treatment scenario in this study assumes that at the waste treatment facility the parquet is chipped into wood chips. The following *ecoinvent* process is used: "Wood chipping, industrial residual wood, stationary electric chipper {GLO}| market for | Cut-off".

Final waste treatment (C4)

The waste treatment scenario in this study assumes that the wood chips are used for incineration with energy recovery. It is assumed that the energy efficiency of energy recovery is 18 % electric and 31 % thermal. Since this efficiency is <60 %, the incineration process is included in module C4.

Name	Value	Unit
Collected separately waste type waste wood	9.49	kg
Energy recovery	9.49	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information.

The benefit of the recuperation of electricity and heat that often occurs in waste incineration plants was included in module D.

5. LCA: Results

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

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m2 Veneered, wood flooring with HDF carrier (10 mm) (10 mm)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO ₂ eq	-2.35E+00	0	1.32E-01	1.34E-01	1.7E+01	-6.35E-01
Global Warming Potential fossil fuels (GWP-fossil)	kg CO ₂ eq	1.43E+01	0	1.32E-01	1.33E-01	1.42E-01	-5.69E-01
Global Warming Potential biogenic (GWP-biogenic)	kg CO ₂ eq	-1.68E+01	0	6.07E-05	1.04E-03	1.68E+01	-5.88E-02
Global Warming Potential luluc (GWP-luluc)	kg CO ₂ eq	1.9E-01	0	4.82E-05	2.39E-04	2.53E-05	-6.55E-03
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	1.15E-06	0	2.9E-08	6.03E-09	1.14E-08	-1.67E-07
Acidification potential of land and water (AP)	mol H ⁺ eq	9.81E-02	0	7.63E-04	6.75E-04	1.6E-03	-1.85E-02
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	1.9E-03	0	1.33E-06	8.1E-06	1.85E-06	-5.84E-05
Eutrophication potential aquatic marine (EP-marine)	kg N eq	1.86E-02	0	2.69E-04	1.12E-04	7.54E-04	-5.42E-03
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	2.1E-01	0	2.96E-03	1.28E-03	8.03E-03	-8.92E-02
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	6.87E-02	0	8.46E-04	3.44E-04	1.98E-03	-1.56E-02
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	1.39E-04	0	3.33E-06	3.27E-07	1.83E-06	-8.37E-06
Abiotic depletion potential for fossil resources (ADPF)	MJ	2.12E+02	0	1.98E+00	1.82E+00	1.24E+00	-6.84E+00
Water use (WDP)	m ³ world eq deprived	3.57E+00	0	7.1E-03	2.22E-02	-1.1E-01	-6.1E-02

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m2 Veneered, wood flooring with HDF carrier (10 mm) (10 mm)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	2.86E+02	0	2.48E-02	2.23E-01	2.83E-02	-1.48E+02
Renewable primary energy resources as material utilization (PERM)	MJ	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT)	MJ	2.86E+02	0	2.48E-02	2.23E-01	2.83E-02	-1.48E+02
Non renewable primary energy as energy carrier (PENRE)	MJ	2.24E+02	0	2.11E+00	1.92E+00	1.35E+00	-7.27E+00
Non renewable primary energy as material utilization (PENRM)	MJ	0	0	0	0	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	2.24E+02	0	2.11E+00	1.92E+00	1.35E+00	-7.27E+00
Use of secondary material (SM)	kg	0	0	0	0	0	0
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	0
Use of net fresh water (FW)	m ³	1.23E-01	0	2.42E-04	1.08E-03	-2.07E-03	-1.82E-03

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m2 Veneered, wood flooring with HDF carrier (10 mm) (10 mm)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	2.3E-02	0	5.03E-06	7.44E-07	2.88E-06	-2.43E-05
Non hazardous waste disposed (NHWD)	kg	3.52E+00	0	1.26E-01	1.22E-02	1.13E-01	-2.66E-01
Radioactive waste disposed (RWD)	kg	9.65E-04	0	1.3E-05	7.01E-06	2.76E-06	-4.4E-05
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	0	0	0	0	0	0
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	0	0	0	0	2.45E+01	0
Exported thermal energy (EET)	MJ	0	0	0	0	4.23E+01	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m2 Veneered, wood flooring with HDF carrier (10 mm) (10 mm)

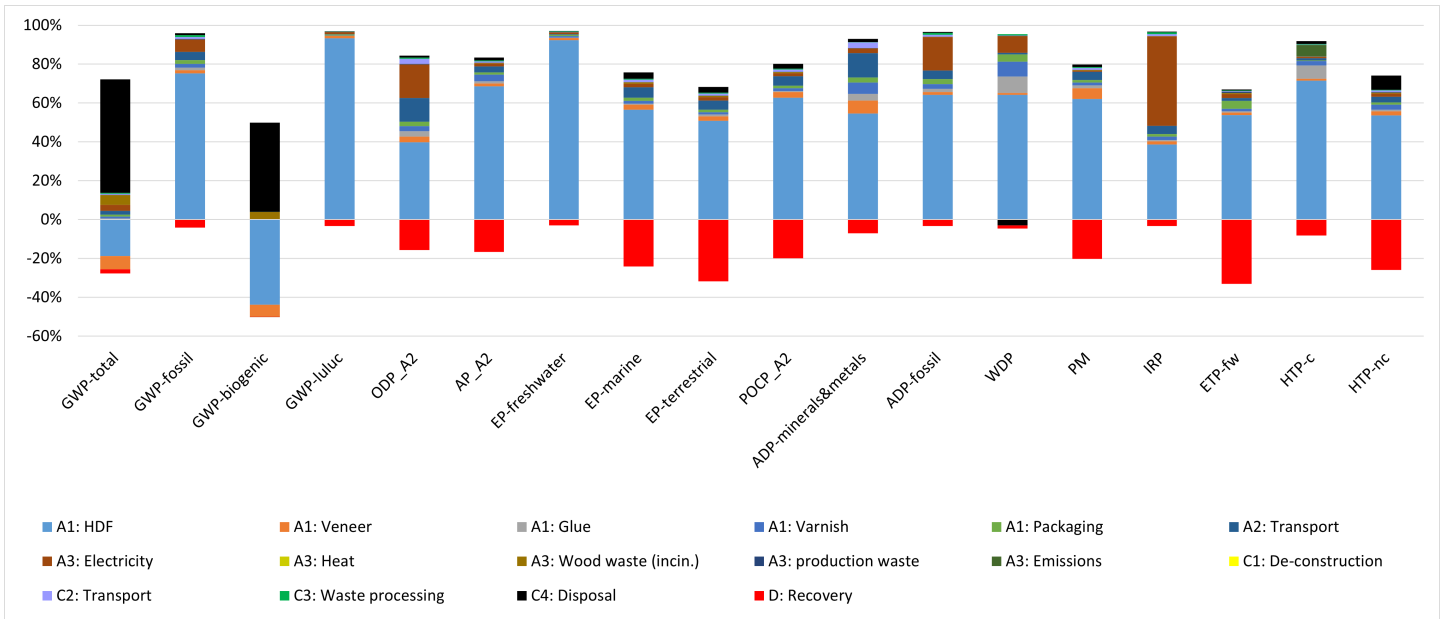
Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	1.08E-06	0	1.18E-08	4.73E-09	1.66E-08	-2.51E-07
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	9.12E-01	0	8.31E-03	9.31E-03	2.04E-03	-2.87E-02

Comparative toxic unit for ecosystems (ETP-fw)	CTUe	3.76E+02	0	1.77E+00	2.37E+00	2.23E+00	-1.8E+02
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	2.34E-08	0	5.74E-11	4.83E-11	3.95E-10	-2.06E-09
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	2.1E-07	0	1.93E-09	1.35E-09	2.1E-08	-7.51E-08
Soil quality index (SQP)	SQP	1.5E+03	0	1.72E+00	3.27E-01	3.89E-01	-7.07E+02

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

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

6. LCA: Interpretation



To visualize which materials and processes give the largest contribution to the environmental indicators, a major contributions analysis has been included. In the graph, the total value of each indicator has been set to 100 %. The colours indicate which part of the environmental effects are caused by the different materials and processes in the life cycle of the

parquet.

The production of HDF gives the largest contribution to most of the environmental indicators. The exceptions are GWP where the incineration of wood (waste) gives the largest contribution.

7. Requisite evidence

Use phase (B) is not in the scope of this LCA, however, the emissions to indoor air will be mentioned informatively. VOC emission test reports by *Eurofins Product Testing A/S*, Smedskovvej 38, 8464 Galten, Denmark are available. The highest measured values of all objects, included in group 3, is given.

7.1. Formaldehyde

Test method: EN 16516

Name	Value	Unit
EN 717-1	8.5	µg/m ³

7.2. VOC emissions

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

Name	Value	Unit
TVOC (C6 - C16)	6.1	µg/m ³
Sum SVOC (C16 - C22)	< 5	µg/m ³
R (dimensionless)	0.092	-
VOC without NIK	< 5	µg/m ³
Carcinogenic Substances	< 1	µg/m ³

AgBB overview of results (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	12	µg/m ³
Sum SVOC (C16 - C22)	< 5	µg/m ³
R (dimensionless)	0.077	-
VOC without NIK	< 5	µg/m ³
Carcinogenic Substances	< 1	µg/m ³

Comparison with limit values of
 - French VOC Regulation
 - French CMR Components
 - Belgian Regulation

Name	Value	Unit
French VOC regulation	A(+)	-
French CMR components	Pass	-
Belgian Regulation	Pass	-

8. References

Standards

EN 322

EN 322:1994, Wood-based panels - Determination of moisture content

EN 717-1

EN 717-1:5802004, Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method

EN 12667

EN 12667:2001, Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance

EN 13501-1

EN 13501-1:2019, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

ISO 14025

ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures, 2006.

ISO 14040

ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework, 2006.

ISO 14044

ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines, 2006.

EN 14342

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

EN 14354

EN 14354: 2017, Wood veneer floor coverings

CEN/TS 15676

CEN/TS 15676:2007, Wood flooring, slip resistance

EN 15804

EN 15804:2012+A2:2019, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products, 2019.

EN 16485

EN 16485:2014; Round and sawn timber - Environmental Product Declarations - Product category rules for wood and wood-based products for use in construction, 2014.

EN 16516

EN 16516:2017+A1:2020, Construction products: Assessment of release of dangerous substances - Determination of emissions into indoor air.

ISO 21930

ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services, 2017.

Further references

AgBB/ABG

Anforderungen an bauliche Anlagen bezüglich des Gesundheitsschutzes (ABG)

AltholzV

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

Belgian Regulation

Royal decree of May 2015

BBSR

Bundesinstitut für Bau-, Stadt- und Raumforschung

BNB

BNB Code No. 352.812 Useful lives of building components for life cycle analyses according to the Sustainable Building Assessment System, 2017: Wood multilayer parquet. Berlin: Federal Ministry of the Interior, for Construction and Home Affairs.

CDPH

Californian Department of Public Health Standard Method for VOC Emissions

ECHA Candidate List

List of Substances of Very High Concern (SVHC) Candidate for Authorisation (ECHA Candidate List), dated 17.01.2023, published in accordance with Article 59(10) of the REACH Regulation. Helsinki: European Chemicals Agency.

EUROSTAT

European waste classification for statistics

EWC-code

EWC-code 17 02 01: Non-hazardous wood waste

French VOC Regulation

Regulation of March and May 2011 (DEVL1101903D and DEVL1104875A)

French CMR Components

Regulation of April and May 2009

FSC®

Forest Stewardship Council License number: FSC-C095327

IBU 2021

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

Indoor Air Comfort Gold®

Eurofins product certification

M1

Finnish classification test for building materials

PEFC

Programme for the Endorsement of Forest Certification Schemes.

License number: PEFC/07-31-60

PCR Part A

'Product Category Rules for Building-Related Products and Services Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019 Version 1.3,'

PCR Part B

'Product Category Rules for Building-Related Products and Services Part B: Requirements on the EPD for Solid wood products.'

Institut Bauen und Umwelt e.V., 2021.

Regulation (EU) No 305/2011

of the European Parliament and of the Council of 9 March 2011 laying down harmonised conditions for the marketing of construction products

Regulation (EU) No 528/2012

of the European Parliament and the Council of 12 May 2012 concerning the making available on the market and use of biocidal products.

Software/database

Ecoinvent database v3.6



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