# ENVIRONMENTAL PRODUCT DECLARATION

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

| | |
|---|---|
| Owner of the Declaration | Fundermax GmbH |
| Publisher | Institut Bauen und Umwelt e.V. (IBU) |
| Programme holder | Institut Bauen und Umwelt e.V. (IBU) |
| Declaration number | EPD-FMX-20240365-IBA1-EN |
| Issue date | 19.11.2024 |
| Valid to | 18.11.2029 |

## Fundermax MAX HPL high pressure laminate

## Fundermax GmbH

Institut Bauen und Umwelt e.V.

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# 1. General Information

## Fundermax GmbH

**Programme holder**

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

**Declaration number**

EPD-FMX-20240365-IBA1-EN

**This declaration is based on the product category rules:**

Laminates, 01.08.2021
(PCR checked and approved by the SVR)

**Issue date**

19.11.2024

**Valid to**

18.11.2029

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

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

## Fundermax MAX HPL high pressure laminate

**Owner of the declaration**

Fundermax GmbH
Klagenfurter Straße 87-89
9300 St. Veit/Glan
Austria

**Declared product / declared unit**

1 m² Fundermax MAX HPL decorative laminate with a thickness of 1 mm (1.5 kg/m²)

**Scope:**

This EPD is based on a declared unit of 1 $m^2$ MAX HPL decorative laminate (1.5 kg/$m^2$) manufactured at the Wiener Neudorf (Austria) production plant with the brand name MAX HPL decorative laminate.

A separate EPD annex contains further information on the environmental impact of MAX HPL decorative laminate with a thickness of 0.8 mm.

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 |

Matthias Klingler,
(Independent verifier)

## 2. Product

### 2.1 Product description/Product definition

MAX HPL high pressure laminates are decorative high-pressure laminates (HPL) in accordance with *EN 438 Part 3*. Decorative high-pressure laminates are characterised by their decorative surfaces, mechanical resistance, durability and functionality. They are available in a large number of decors and patterns in various surfaces. They are abrasion-resistant, impact-resistant, scratch-resistant, resistant to heat, moisture and light as well as dirt-resistant and hygienic. HPL is easy to clean and requires no maintenance. MAX HPL panels are not self-supporting and are therefore glued to carrier panels, usually wood-based panels.
Regulation (EU) No. 305/2011 (CPR) applies to the placing on the market of the product as an HPL multilayer composite panel in the EU/EFTA (with the exception of Switzerland). The product requires a declaration of performance in accordance with *EN 438-7:2005, High-pressure decorative laminates (HPL) – Sheets based on thermosetting resins (Usually called Laminates) – Part 7: Compact laminate and HPL composite panels for internal and external wall and ceiling finishes* and CE marking.
The use of the product is subject to the respective national regulations at the place of use, in Germany for example the building regulations of the federal states, and the technical provisions based on these regulations.

### 2.2 Application

HPL can be used in both private and public areas. They are particularly suitable for residential areas, hospitals, public buildings, railway stations and airports, public transport, hotels, schools, business premises, sports facilities and industrial applications. The special properties of HPL allow it to be used indoors as wall panelling, balustrade panels, furniture, tables, column cladding, laboratory equipment, cubicles, ceilings, window sills, worktops, shop desks, washbasins, etc.

### 2.3 Technical Data

**Structural data**

| Name | Value | Unit |
|---|---|---|
| Resistance to surface wear EN 438.2-10 | IP >= 150 | Revolutions |
| Resistance to impact by small-diameter ball EN 438.2-20 | ≥ 20 | N |
| Resistance to scratching EN 438.2-25 | ≥ 2 | Degree Gloss texture |
| Resistance to scratching EN 438.2-25 | ≥ 3 | Degree Other textures |
| Resistance to dry heat (180 °C) EN 438.2-16 | ≥ 3 | Degree Gloss texture |
| Resistance to dry heat (180 °C) EN 438.2-16 | ≥ 4 | Degree Other textures |
| Surface resistance to wet heat; (100 °C) EN 12721 | ≥ 3 | Degree Gloss texture |
| Surface resistance to wet heat; (100 °C) EN 12721 | ≥ 4 | Degree Other textures |
| Resistance to water vapour EN 438.2-14 | ≥ 3 | Degree Gloss texture |
| Resistance to water vapou EN 438.2-14 | ≥ 4 | Degree Other textures |
| Light fastness (Xenon arc) EN 438.2-27 | ≥ 4 | Grey scale |
| Density ISO 1183-1 | ≥ 1350 | kg/m³ |

Performance values of the product in relation to its characteristics according to the relevant technical regulation (no CE marking).

### 2.4 Delivery status

Full panels or cut to size
Maximum length: 4100 mm
Maximum width: 1300 mm
Thickness: 0.8 to 2 mm

### 2.5 Base materials/Ancillary materials

Laminate panels with a thickness of 1 mm and an average density of 1480 kg/m³ consist of (in % by mass per 1 m² of production):

- Decor paper 1.80 - 6.80 %
- Kraft paper 60 - 67 %
- Melamine resin 1.80 - 6.80 %
- Phenolic resin 26 - 30 %

All boards and laminates of FunderMax are articles according to REACH Article 3 (3).

1) The product/article/at least one sub-article contains substances from the ECHA list of substances of very high concern (SVHC) that are eligible for authorization (date14.07.2021) above 0.1% by mass: no.

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

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

### 2.6 Manufacture

Decorative high-pressure laminates (HPL) are produced by pressing cellulose fibre sheets impregnated with curable resins while applying heat (temperature ≥ 120 °C) and high pressure (≥ 5 MPa), producing a homogeneous, non-porous material with an increased density (≥ 1.35 g/cm³) and the required surface quality.

### 2.7 Environment and health during manufacturing

Waste heat is recovered via heat exchangers.

### 2.8 Product processing/Installation

The processing properties of MAX HPL panels are similar to those of hardwood. Tools with hard metal cutting edges are essential. MAX HPL panels are glued or bonded to carrier boards such as chipboard, MDF, etc. The resulting composite elements are attached to appropriate substructures with screws, rivets or glued or fixed using suitable fittings. The usual safety regulations regarding dust separation, dust extraction, fire prevention, etc. must be observed during processing and finishing.

### 2.9 Packaging

The laminate panels are placed on wooden pallets with base and cover panels (chipboard or polypropylene multiwall sheet), wrapped in polyethylene film if required, and strapped with plastic straps. The plastic straps are made of PET (polyethylene terephthalate).

### 2.10 Condition of use
The resins and therefore the MAX HPL panels are permanently stable even when used in damp areas. No substances are washed out. The mechanical properties remain constant.

### 2.11 Environment and health during use
MAX HPL panels are a cured, thermosetting material. Emissions of formaldehyde or VOCs are extremely low and fall well below the legal requirements. In everyday use, they are approved for contact with food. Due to their extremely low permeability, they are well suited as a barrier against emissions (e.g. formaldehyde) from the substrate. The decorative surfaces are largely resistant to all common household solvents and chemicals; the material has therefore been used for many years in areas of application where cleanliness and hygiene are essential. The closed surface can be easily disinfected using hot water, steam or all disinfectants used in hospitals and commercial applications.

### 2.12 Reference service life
Due to the wide range of possible applications, no standardised service life can be specified. However, even in highly stressed areas such as façades, the service life can extend to over 50 years *Life cycle costs of façades*.

### 2.13 Extraordinary effects
**Fire**
Fire protection (tests according to *EN 13823* and *ISO 11925-2* in accordance with *EN 13501-1*). MAX HPL panels are difficult to set on fire and have the property of delaying the spread of flames, thus extending the escape time. In the event of incomplete combustion, toxic substances may also be present in the smoke, as with any other organic material. For fires involving MAX HPL, the same firefighting techniques can be used as for other wood-containing building materials.

**Fire protection**
MAX laminate panels glued on both sides to a 19 mm raw chipboard panel of fire class B - s2, d0

| Name | Value |
|---|---|
| Building material class EN 13501-1 | B |
| Smoke gas development EN 13501-1 | s2 |
| Burning droplets EN 13501-1 | d0 |

**Water**
MAX HPL panels are water-resistant. Stagnant moisture must be avoided. No ingredients that are harmful to health are washed out.

**Mechanical destruction**
MAX HPL panels are characterised by very high mechanical resistance. However, if they break due to force, sharp-edged fragments can occur.

### 2.14 Re-use phase
MAX HPL panels can be reused for the same or a different purpose after disassembly and removal of the fasteners. Material recycling is generally not possible. Energy recovery in industrial furnaces is recommended due to the high calorific value.

### 2.15 Disposal
Energy recovery.
Waste code according to ÖNORM S 2100:18702.
Waste code according to EWC: 17 02 01/03.

### 2.16 Further information
Further information on the properties, processing and treatment of MAX HPL panels can be found at www.fundermax.at

## 3. LCA: Calculation rules

### 3.1 Declared Unit
This EPD refers to a declared unit of 1 m² MAX HPL decorative laminate with a thickness of 1 mm and a surface weight of 1.5 kg/m². Packaging is considered in the LCA.

**Declared Unit**

| Name | Value | Unit |
|---|---|---|
| Declared unit | 1 | $m^2$ |
| Grammage | 1.5 | $kg/m^2$ |
| Layer thickness | 0.001 | m |

Other declared units are allowed if the conversion is shown transparently.

Decorative laminates with the brand name MAX HPL are manufactured at the Wiener Neudorf (Austria) site of Fundermax.

MAX HPL decorative laminates are available in different thicknesses. Therefore, a separate EPD annex contains further information on the environmental impact of MAX HPL with a thickness of 0.8 mm.

### 3.2 System boundary
The life cycle assessment of MAX HPL decorative laminate refers to a cradle-to-gate analysis of the environmental impacts with modules C1–C4 and D (A1–A3, + C, +D). The following life cycle phases are taken into consideration in the analysis:

**Module A1–A3 | Production stage**
The production stage includes the upstream burdens of raw material supply (kraft paper, decor paper, phenolic resin, melamine resin etc.) and their transports to the manufacturing plant in Wiener Neudorf. Impregnation, coating, drying, cutting, pressing, finishing and packaging of the product are taken into account. Material and energy flows for the production process are represented based on primary data of the manufacturing plant. Electrical energy is provided from the Austrian grid. Thermal energy is provided by natural gas and regenerative thermal oxidation (RTO).

**Module C1 | Deconstruction and demolition**
The products are dismantled manually, with little use of machinery. The energy required to dismantle the products can therefore be assumed as a negligible factor. No impacts from the deconstruction of the products are declared.

**Module C2 | Transport to disposal**
Module C2 includes the transport to disposal. For this purpose, transport by truck over a distance of 50 km is assumed as a scenario.

**Module C3 | Waste treatment**
Compact products are assumed to be incinerated with energy recovery in a waste incineration plant at the end of their life. The emissions from incineration are declared in module C3. Based on information from Sphera, the R1 value of the waste incineration plant is assumed to be greater than 0.6.

**Module C4 | Disposal**
The environmental impacts from the energy recovery of the declared products are declared in module C3. Therefore, no

further impacts are to be declared in module C4.

**Module D | Benefits and loads beyond the system boundary**
Module D describes the substitution potential for heat and electricity from the energy recovery of the product in Module C3 in the form of a European average scenario.

### 3.3 Estimates and assumptions
Assumptions and approximations are applied in case of a lack of representative data. All assumptions and approximations are documented precisely and represent a best-guess representation of reality.

Regional applicability of the used background data refers to average data under European or German conditions. German data were used for the Austrian market whenever European or Austrian average data were not available.

### 3.4 Cut-off criteria
The LCA model covers all available input and output flows, which can be represented based on robust data and from whicha significant contribution can be expected. Data gaps are filled with conservative assumptions of average data or generic data if available and are documented accordingly. Only data with a contribution of less than 1 % were cutoff. Thus, no data were neglected, of which a substantial impact is to be expected. All relevant data were collected comprehensively. Cut-off material and energy flows were chosen carefully based on their expected quantitative contribution as well as potential environmental impacts. Thus, it can be assumed that the sum of all neglected input flows does not account for more than 5 % of the total material, water and energy flows. Environmental impacts of machines, plant and infrastructure were not included.

### 3.5 Background data
This study uses generic background data for the evaluation of upstream environmental impacts from the *MLC* database version 2023.2.

### 3.6 Data quality
Data collection is based on industry specific questionnaires. It follows an iterative process clarifying questions via e-mail, telephone calls or in personal and online meetings, respectively. Intensive discussions between Fundermax and Daxner & Merl result in an accurate mapping of product related material and energy flows. This leads to a high quality of foreground data collected. Data collection relies on a consistent process according to *ISO 14044*.

The representation of the kraft paper and formaldehyde used for the production of high-pressure laminates is based on supplier-specific primary data. This results in high data quality.

The technological, geographical, and time-related representativeness of the database was kept in mind when selecting background data. Whenever specific data were missing, either generic datasets or representative average data were used instead. The implemented *MLC*- background datasets refer to the latest versions available and are carefully chosen.

### 3.7 Period under review
Foreground data were collected in the 2022 production year, and the data are based on the volumes produced on an annual basis.

### 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: Austria

### 3.9 Allocation
Many different product lines are manufactured at the Wiener Neudorf site. The allocation of input and output flows for the manufacturing of the laminates were recorded for the plant's total annual production at the plant. The allocation of energy, auxiliary materials and packaging used as well as waste and emissions from the RTO is based on the mass share of the product lines in total production.

For the main raw materials, a distinct allocation to the declared product lines is possible.

Varying allocation keys were used for raw materials that are utilized in different product lines:
Kraft paper is allocated to MAX Compact Interior and HPL via the mass share of the product lines. A constant amount of decor grammage is used for all product thicknesses of a product line, which leads to the mass proportion of decor decreasing as the board thickness increases. The mass proportion of the core increases proportionally with the board thickness. The raw materials required for the various components (core / decor) were therefore allocated based on the respective mass proportion.

### 3.10 Comparability
Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account.
The *MLC* 2023.2 background database in the *LCA FE*-software--version 10 was used to calculate the LCA

## 4. LCA: Scenarios and additional technical information

**Characteristic product properties of biogenic carbon**
During tree growth, the wood assimilates carbon dioxide and stores biogenic carbon. The carbon stored in the product is declared in the following table.
Note: 1 kg biogenic carbon is equivalent to 44/12 kg $CO_2$.

**Information on describing the biogenic carbon content at factory gate**

| Name | Value | Unit |
|---|---|---|
| Biogenic carbon content in product | 0.41 | kg C |
| Biogenic carbon content in accompanying packaging | 0.0002 | kg C |

**Installation into the building (A5)**
The end of life of the product packaging is not declared in the module A5.

| Name | Value | Unit |
|---|---|---|
| Packaging (Wood) | 0.00001 | kg/m² |
| Packaging (Plastic) | 0.002 | kg/m² |
| Packaging (Paper) | 0.0004 | kg/m² |

**End of life (C1–C4)**

| Name | Value | Unit |
|---|---|---|
| Energy recovery | 1.5 | kg |

**Re-Use, recovery and recycling potential (D), relevant scenario information**

| Name | Value | Unit |
|---|---|---|
| Processing rate | 100 | % |
| Efficiency of plant | > 0.6 | |

## 5. LCA: Results

The following table contains the life cycle assessment results for a declared unit of 1 m² Fundermax MAX HPL decorative laminate with a surface weight of 1.5 kg/m² and a thickness of 1 mm.

**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 MAX HPL high-pressure laminate (1.5 kg/m²)**

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|
| Global Warming Potential total (GWP-total) | kg $CO_2$ eq | 1.95E+00 | 0 | 5.33E-03 | 2.37E+00 | 0 | -7.02E-01 |
| Global Warming Potential fossil fuels (GWP-fossil) | kg $CO_2$ eq | 3.45E+00 | 0 | 5.27E-03 | 8.64E-01 | 0 | -6.98E-01 |
| Global Warming Potential biogenic (GWP-biogenic) | kg $CO_2$ eq | -1.5E+00 | 0 | 1.43E-05 | 1.51E+00 | 0 | -3.15E-03 |
| Global Warming Potential luluc (GWP-luluc) | kg $CO_2$ eq | 1.88E-03 | 0 | 4.93E-05 | 2.05E-05 | 0 | -4.56E-05 |
| Depletion potential of the stratospheric ozone layer (ODP) | kg CFC11 eq | 1.26E-11 | 0 | 6.93E-16 | 3.09E-13 | 0 | -5.5E-12 |
| Acidification potential of land and water (AP) | mol $H^+$ eq | 6.76E-03 | 0 | 1.07E-05 | 4.31E-04 | 0 | -8.75E-04 |
| Eutrophication potential aquatic freshwater (EP-freshwater) | kg P eq | 6.82E-06 | 0 | 1.95E-08 | 8.93E-08 | 0 | -1.13E-06 |
| Eutrophication potential aquatic marine (EP-marine) | kg N eq | 2.62E-03 | 0 | 4.42E-06 | 1.47E-04 | 0 | -2.56E-04 |
| Eutrophication potential terrestrial (EP-terrestrial) | mol N eq | 2.07E-02 | 0 | 5.03E-05 | 1.96E-03 | 0 | -2.74E-03 |
| Formation potential of tropospheric ozone photochemical oxidants (POCP) | kg NMVOC eq | 6.07E-03 | 0 | 9.57E-06 | 3.96E-04 | 0 | -7.12E-04 |
| Abiotic depletion potential for non fossil resources (ADPE) | kg Sb eq | 4.86E-06 | 0 | 3.53E-10 | 2.78E-09 | 0 | -5.03E-08 |
| Abiotic depletion potential for fossil resources (ADPF) | MJ | 7.56E+01 | 0 | 7.26E-02 | 7.48E-01 | 0 | -1.29E+01 |
| Water use (WDP) | $m^3$ world eq deprived | 9.7E-02 | 0 | 6.44E-05 | 2.26E-01 | 0 | -6.67E-02 |

**RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² MAX HPL high-pressure laminate (1.5 kg/m²)**

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|
| Renewable primary energy as energy carrier (PERE) | MJ | -6.88E+00 | 0 | 5.28E-03 | 1.42E+01 | 0 | -3.76E+00 |
| Renewable primary energy resources as material utilization (PERM) | MJ | 1.4E+01 | 0 | 0 | -1.4E+01 | 0 | 0 |
| Total use of renewable primary energy resources (PERT) | MJ | 7.13E+00 | 0 | 5.28E-03 | 1.8E-01 | 0 | -3.76E+00 |
| Non renewable primary energy as energy carrier (PENRE) | MJ | 6.39E+01 | 0 | 7.28E-02 | 1.26E+01 | 0 | -1.29E+01 |
| Non renewable primary energy as material utilization (PENRM) | MJ | 1.18E+01 | 0 | 0 | -1.18E+01 | 0 | 0 |
| Total use of non renewable primary energy resources (PENRT) | MJ | 7.57E+01 | 0 | 7.28E-02 | 7.48E-01 | 0 | -1.29E+01 |
| Use of secondary material (SM) | kg | 8.61E-01 | 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) | $m^3$ | 2.02E-02 | 0 | 5.78E-06 | 5.35E-03 | 0 | -3.04E-03 |

**RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² MAX HPL high-pressure laminate (1.5 kg/m²)**

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|
| Hazardous waste disposed (HWD) | kg | 2.69E-05 | 0 | 2.26E-13 | 1.48E-11 | 0 | -6.86E-10 |
| Non hazardous waste disposed (NHWD) | kg | 4.42E-01 | 0 | 1.11E-05 | 1.13E-01 | 0 | -6.37E-03 |
| Radioactive waste disposed (RWD) | kg | 1.67E-03 | 0 | 1.36E-07 | 3.32E-05 | 0 | -9.97E-04 |
| 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 | 1.48E-01 | 0 | 0 | 0 | 0 | 0 |
| Exported electrical energy (EEE) | MJ | 0 | 0 | 0 | 3.32E+00 | 0 | 0 |
| Exported thermal energy (EET) | MJ | 0 | 0 | 0 | 5.98E+00 | 0 | 0 |

**RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² MAX HPL high-pressure laminate (1.5 kg/m²)**

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Incidence of disease due to PM emissions (PM) | Disease incidence | ND | ND | ND | ND | ND | ND |
| Human exposure efficiency relative to U235 (IR) | kBq U235 eq | ND | ND | ND | ND | ND | ND |
| Comparative toxic unit for ecosystems (ETP-fw) | CTUe | ND | ND | ND | ND | ND | ND |
| Comparative toxic unit for humans (carcinogenic) (HTP-c) | CTUh | ND | ND | ND | ND | ND | ND |
| Comparative toxic unit for humans (noncarcinogenic) (HTP-nc) | CTUh | ND | ND | ND | ND | ND | ND |
| Soil quality index (SQP) | SQP | ND | ND | ND | ND | ND | ND |

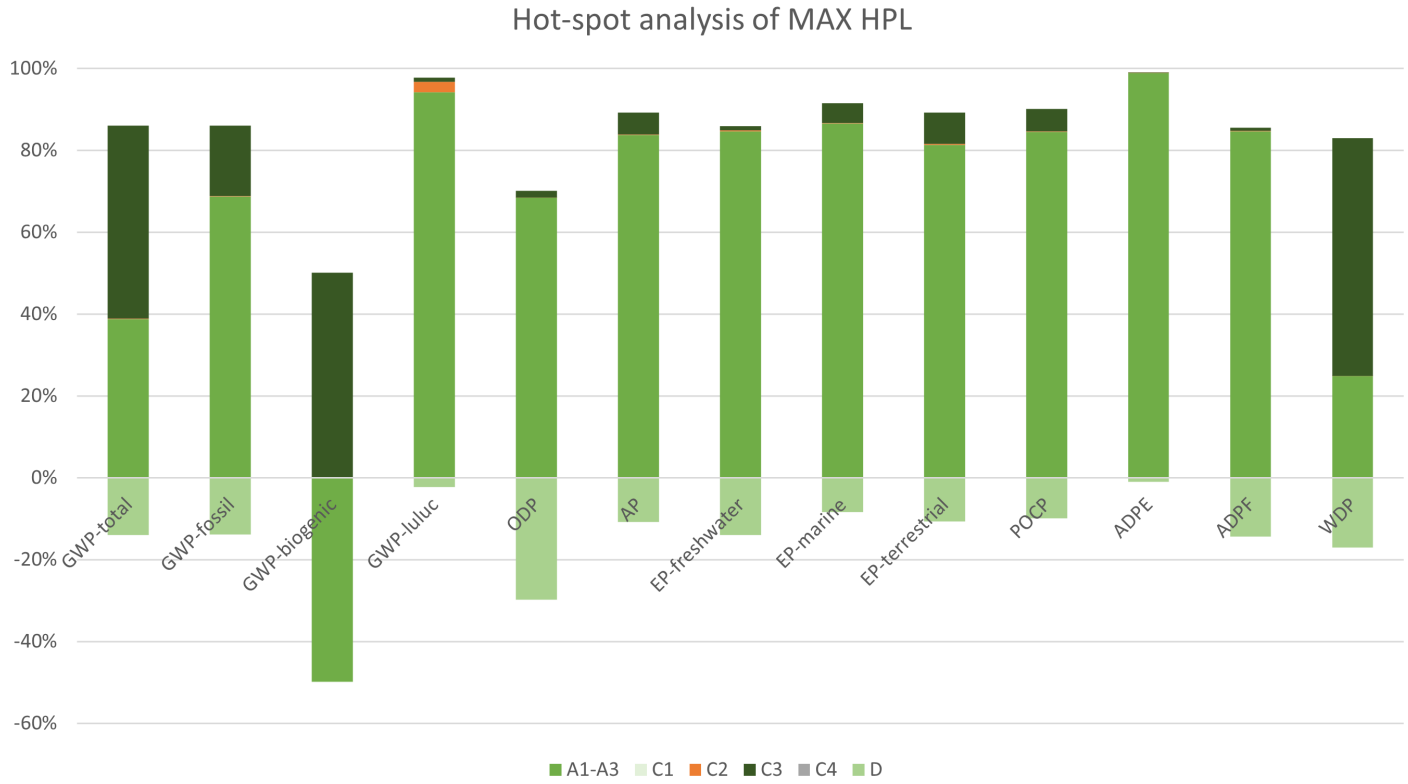
The additional and optional impact categories according to *EN 15804*+A2 are not declared, as the uncertainty of these indicators is classified as high.

for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

## 6. LCA: Interpretation

The following interpretation contains a summary of the LCA results related to a declared unit of 1 m² Fundermax MAX HPL decorative laminate with a surface weight of 1.5 kg/m² and a thickness of 1 mm.

Since MAX HPL decorative laminates with different thicknesses show similar tendencies with regard to the dominance of individual life cycle phases, the following conclusions are also applicable to MAX HPL panels with a thickness of 0.8 mm.




The comparison of the product's life cycle phases shows a clear dominance of the production phase (modules A1–A3) in all environmental impact categories. The environmental impacts of the production phase are mainly dominated by the supply chain of raw materials for the core of the high-pressure laminates. The impact of the decor layer increases with decreasing panel thickness (constant grammage).

Looking closer at the contribution of the biogenic global warming potential (GWP-biogenic), the carbon storage effect of the paper content in the product in module A1–A3 is visible as a negative value.
In accordance with the requirements of *EN 15804*+A2, module C3 declares that the carbon stored in the laminates is released into the atmosphere as biogenic carbon dioxide emissions. This is recognizable as a contribution to the greenhouse effect from biogenic emissions.

Due to the update of the underlying methodology in accordance with *EN 15804*+A2, the results of the previous EPD (EPD-FMX-20190036-IBA2-EN) are not directly comparable with the present, updated version.

## 7. Requisite evidence

**7.1 Formaldehyde**
Test laboratory ISEGA- Forschungs- und Untersuchungs-Gesellschaft mbH. 63704 Aschaffenburg
Test report: 22.03.2018
Result for overall migration: 0.066 mg/dm²

**7.2. Melamine**
Test laboratory ISEGA- Forschungs- und Untersuchungs-Gesellschaft mbH. 63704 Aschaffenburg
Test report: 22.03.2018
Result for overall migration: < 0.01 mg/dm²

### 7.3. Phenol
Test laboratory ISEGA- Forschungs- und Untersuchungs-Gesellschaft mbH. 63704 Aschaffenburg
Test report: 22.03.2018
Result for overall migration: < 0.001 mg/dm²

### 7.4 Eluate analysis
FUNDERMAX HPL panels belong to eluate class IIIa according to *ÖNORM S2072* and have the waste code 57101 phenolic and melamine resin according to *ÖNORM S2100*. They are categorised as 'similar to household waste'.

### 7.5 Formaldehyde
Test laboratory: Entwicklungs- und Prüflabor Holztechnologie GmbH, Zellescher Weg 24 01217 Dresden, Germany
Test report: 24.01.2022
Result: The formaldehyde content was tested according to the AgBB scheme for the individual detection of formaldehyde. The product tested fulfils the requirements of the AgBB scheme.

| Name | Value | Unit |
|---|---|---|
| Formaldehyd after 7 days | 0.008 | ppm |

### 7.6. VOC Emission
Test laboratory: Entwicklungs- und Prüflabor Holztechnologie GmbH, Zellescher Weg 24 01217 Dresden, Germany
Test report: 24.01.2022
Result: The formaldehyde content was tested in accordance with *ISO 16000* and the AgBB scheme. The product tested fulfils the requirements of the AgBB scheme.

| Name | Value | Unit |
|---|---|---|
| TVOC | 0 | µg/m³ |
| SVOC | 0 | µg/m³ |
| R | 0.1 | - |
| VOC without NIK | 0 | µg/m³ |
| Carcinogens | 0 | µg/m³ |

## 8. References

**Standards**

**EN 438-2**
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**Further literature**

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**FunderMax Migration Test report, 2018**
Entwicklungs- und Prüflabor Holztechnologie GmbH Zellescher Weg 24 01217 Dresden- Germany.

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# Annex
# For Fundermax MAX HPL high-pressure laminate

**to the**

**ENVIRONMENTAL PRODUCT DECLARATION**
as per *ISO 14025* and *EN 15804+A2*

| | |
|---|---|
| **Owner of the Declaration** | Fundermax GmbH |
| **Declaration number** | EPD-FMX-20240365-IBA1-EN |
| **Issue date** | See EPD |
| **Valid to** | See EPD |

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

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## General Information

This annex contains the LCA results for a declared unit of 1 m² MAX HPL high-pressure laminate with a thickness of 0.8 mm and a surface weight of 1.2 kg/m² manufactured at the Fundermax site in Wiener Neudorf (Austria) with the brand name MAX HPL.
Packaging is considered in the LCA. All scenarios correspond to the descriptions in the EPD.

## General Information on use stages

Product specific information for Fundermax MAX HPL with a thickness of 1mm (1.5 kg/m²) is available in the EPD. [Declaration number: EPD-FMX-20240365-IBA1-EN].

## 2. LCA: Scenarios and additional technical information

**Characteristic product properties of biogenic carbon**
During tree growth. the wood assimilates carbon dioxide and stores biogenic carbon. The carbon stored in the product is declared in the following table.
Note: 1 kg biogenic carbon is equivalent to 44/12 kg $CO_2$

**Information on describing the biogenic Carbon Content at factory gate**

| Name | 0.8 mm | Unit |
|---|---|---|
| Biogenic carbon content in product | 0.32 | kg C |
| Biogenic carbon content in accompanying packaging | 0.0001 | kg C |

**Installation into the building (A5)**
The end of life of the product packaging is not declared in module A5.

| Packaging | 0.8 mm | Unit |
|---|---|---|
| Packaging (Paper) | 0.0003 | kg/m² |
| Packaging (Plastic) | 0.002 | kg/m² |
| Packaging (Wood) | 0.000004 | kg/m² |

**End of life (C1–C4)**

| Name | 0.8 mm | Unit |
|---|---|---|
| Energy recovery | 1.2 | kg |

**Re-Use. recovery and recycling potential (D). relevant scenario information**

| Name | 0.8 mm | Unit |
|---|---|---|
| Processing rate | 100 | % |
| Efficiency of plant | > 0.6 | |

## 3. LCA: Results

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

| PRODUCT STAGE | | | CONSTRUCTION PROCESS STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport from the gate to the site | Assembly | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| **A1** | **A2** | **A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| X | X | X | MND | 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 MAX HPL high-pressure laminate (1.2 kg/m², 0.8 mm)**

| Core Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|
| GWP-total | [kg $CO_2$-Eq.] | 1.68E+00 | 0.00E+00 | 4.25E-03 | 1.89E+00 | 0.00E+00 | -5.61E-01 |
| GWP-fossil | [kg $CO_2$-Eq.] | 2.86E+00 | 0.00E+00 | 4.20E-03 | 7.04E-01 | 0.00E+00 | -5.58E-01 |
| GWP-biogenic | [kg $CO_2$-Eq.] | -1.18E+00 | 0.00E+00 | 1.14E-05 | 1.19E+00 | 0.00E+00 | -2.52E-03 |
| GWP-luluc | [kg $CO_2$-Eq.] | 1.51E-03 | 0.00E+00 | 3.93E-05 | 1.65E-05 | 0.00E+00 | -3.65E-05 |
| ODP | [kg CFC11-Eq.] | 1.02E-11 | 0.00E+00 | 5.53E-16 | 2.48E-13 | 0.00E+00 | -4.40E-12 |
| AP | [mol $H^+$-Eq.] | 5.95E-03 | 0.00E+00 | 8.53E-06 | 3.42E-04 | 0.00E+00 | -7.00E-04 |
| EP-freshwater | [kg P-Eq.] | 6.21E-06 | 0.00E+00 | 1.55E-08 | 7.15E-08 | 0.00E+00 | -9.07E-07 |
| EP-marine | [kg N-Eq.] | 2.36E-03 | 0.00E+00 | 3.52E-06 | 1.17E-04 | 0.00E+00 | -2.04E-04 |
| EP-terrestrial | [mol N-Eq.] | 1.80E-02 | 0.00E+00 | 4.01E-05 | 1.56E-03 | 0.00E+00 | -2.19E-03 |
| POCP | [kg NMVOC-Eq.] | 5.25E-03 | 0.00E+00 | 7.63E-06 | 3.14E-04 | 0.00E+00 | -5.70E-04 |
| ADPE | [kg Sb-Eq.] | 4.82E-06 | 0.00E+00 | 2.82E-10 | 2.22E-09 | 0.00E+00 | -4.02E-08 |
| ADPF | [MJ] | 6.20E+01 | 0.00E+00 | 5.79E-02 | 5.99E-01 | 0.00E+00 | -1.03E+01 |
| WDP | [$m^3$ world-Eq deprived] | 5.98E-02 | 0.00E+00 | 5.13E-05 | 1.80E-01 | 0.00E+00 | -5.33E-02 |

| 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 MAX HPL high-pressure laminate (1.2 kg/m², 0.8 mm)**

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|
| PERE | [MJ] | -4.79E+00 | 0.00E+00 | 4.21E-03 | 1.12E+01 | 0.00E+00 | -3.00E+00 |
| PERM | [MJ] | 1.10E+01 | 0.00E+00 | 0.00E+00 | -1.10E+01 | 0.00E+00 | 0.00E+00 |
| PERT | [MJ] | 6.26E+00 | 0.00E+00 | 4.21E-03 | 1.44E-01 | 0.00E+00 | -3.00E+00 |
| PENRE | [MJ] | 5.23E+01 | 0.00E+00 | 5.81E-02 | 1.03E+01 | 0.00E+00 | -1.03E+01 |
| PENRM | [MJ] | 9.68E+00 | 0.00E+00 | 0.00E+00 | -9.68E+00 | 0.00E+00 | 0.00E+00 |
| PENRT | [MJ] | 6.20E+01 | 0.00E+00 | 5.81E-02 | 5.99E-01 | 0.00E+00 | -1.03E+01 |
| SM | [kg] | 6.66E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW | [$m^3$] | 1.63E-02 | 0.00E+00 | 4.61E-06 | 4.26E-03 | 0.00E+00 | -2.43E-03 |

| 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 MAX HPL high-pressure laminate (1.2 kg/m², 0.8 mm)**

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|
| HWD | [kg] | 2.08E-05 | 0.00E+00 | 1.80E-13 | 1.17E-11 | 0.00E+00 | -5.49E-10 |
| NHWD | [kg] | 4.36E-01 | 0.00E+00 | 8.85E-06 | 9.13E-02 | 0.00E+00 | -5.10E-03 |
| RWD | [kg] | 1.34E-03 | 0.00E+00 | 1.09E-07 | 2.65E-05 | 0.00E+00 | -7.97E-04 |
| CRU | [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR | [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MER | [kg] | 1.18E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EEE | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.65E+00 | 0.00E+00 | 0.00E+00 |
| EET | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.78E+00 | 0.00E+00 | 0.00E+00 |

| 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 MAX HPL high-pressure laminate (1.2 kg/m², 0.8 mm) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Indicator** | **Unit** | **A1-A3** | **C1** | **C2** | **C3** | **C4** | **D** |
| PM | [Disease Incidence] | ND | ND | ND | ND | ND | ND |
| IRP | [kBq U235-Eq.] | ND | ND | ND | ND | ND | ND |
| ETP-fw | [CTUe] | ND | ND | ND | ND | ND | ND |
| HTP-c | [CTUh] | ND | ND | ND | ND | ND | ND |
| HTP-nc | [CTUh] | ND | ND | ND | ND | ND | ND |
| SQP | [-] | 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 | | | | | | |

The additional and optional impact categories according to *EN 15804+A2* are not declared. as the uncertainty of these indicators is classified as high.

Disclaimer – for the indicators: “Abiotic depletion potential for fossil resources (ADPF)”. “Abiotic depletion potential for non fossil resources (ADPE)”. “water (user) deprivation potential”.
The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator