

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-20240363-IBA1-EN |
| Issue date | 19.11.2024 |
| Valid to | 18.11.2029 |

Fundermax MAX Compact Exterior Fundermax GmbH

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ECO PLATFORM

EPD
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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-20240363-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.)



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

Fundermax MAX Compact Exterior

Owner of the declaration

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

Declared product / declared unit

1 m² of Fundermax MAX Compact Exterior high-pressure laminate with a thickness of 6 mm (8.7 kg/m²)

Scope:

This EPD is based on a declared unit of 1 m² MAX Compact Exterior high-pressure laminate with a thickness of 6 mm (8.7 kg/m²) manufactured at the Wiener Neudorf (Austria) production plant with the brand name MAX Compact Exterior.

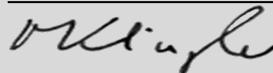
A separate EPD annex contains further information on the environmental impact of MAX Compact Exterior with thicknesses: 8, 10 and 16 mm.

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



Matthias Klingler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

MAX Compact Exterior are decorative high-pressure laminates (HPL) in accordance with *EN 438 Part 6 (MAX Compact Exterior)* for use as wall and ceiling panelling and as furniture panels in exterior applications. Decorative high-pressure laminates are manufactured from cellulose fibre sheets and hardenable resins. They can be produced in different colours and patterns in various surface structures. MAX Compact Exterior can be glued, screwed or riveted to metal and timber substructures. In addition, a variety of other fastening and joining methods can be used.

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

MAX Compact Exterior 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 MAX Compact Exterior allow it to be used outdoors as façade cladding (ventilated façade), soffits, balustrade infills, furniture, tables, column cladding, playground equipment, etc.

2.3 Technical Data

The data in the declaration of performance apply to the performance values of the product

Structural data

| Name | Value | Unit |
|---|------------|-------------------|
| Reaction to fire EN 13501-1 | B - s2, d0 | - |
| Resistance to fixings EN 438-7 Abs 4.5 | ≥ 2000 | N |
| Flexural strength ISO 178 | ≥ 80 | MPa |
| E-Modulus ISO 178 | ≥ 9000 | MPa |
| Formaldehyde emission EN 717-1 | ≤ 0.13 | mg/m ³ |
| Resistance to climatic shock EN 438-2.19 | pass | - |
| Durability Resistance to immersion in boiling water EN 438-2.12 | pass | |
| Durability Resistance to wet conditions EN 438-2.15 | pass | |
| Density ISO 1183-1 | ≥ 1350 | kg/m ³ |

Performance values of the product according to the declaration of performance in relation to its essential characteristics 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*.

2.4 Delivery status

MAX Compact Exterior is available as full panels or cut to size with a maximum length of 4100 mm and a maximum width of

1850 mm. MAX Compact Exterior is available in thicknesses of 2-20 mm.

2.5 Base materials/Ancillary materials

Compact panels with a thickness of 6 mm and an average density of 1450 kg/m³ consist of (data in mass % per 1 m² of production):

- Decor paper 0.55 - 5.55 %
- Kraft paper 58 - 65 %
- Melamine resin 0.55 - 5.55 %
- Phenolic resin 30 - 35 %

Flame-retardant versions also contain up to 4 % phosphorus-based flame retardants.

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 (date 14.07.2021) 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

Compact laminates are produced by pressing cellulose fibre webs impregnated with curable resins while applying heat (temperature ≥ 120 °C) and high pressure (≥ 5 MPa), resulting in a homogeneous, non-porous material with 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 displayed by FunderMax Compact panels are similar to those when processing hardwood. Tools with carbide tips are essential. Compact panels can be used on substrates or can even be self-supporting if they are of the corresponding thickness. For this, they are fixed using screws or rivets, or glued to substructures. Standard safety guidelines concerning dust precipitation, dust extraction, fire prevention etc. must be observed during processing.

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 Compact panels remain permanently stable even when used outdoors. No substances are leached. The mechanical properties remain constant.

2.11 Environment and health during use

MAX Compact laminates 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, it is not possible to specify a standardised service life. However, the service life can extend to over 50 years, even in highly stressed areas such as public spaces or in damp room applications *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 Compact Exterior 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. On customer request, MAX Compact Exterior are available in F-quality as standard and contain halogen-free flame retardants. In the event of fires involving MAX Compact Exterior, the same fire-fighting techniques can be used as for other wood-containing building materials.

Fire protection

MAX Compact Exterior F-Quality

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

Water

MAX Compact laminates are water-resistant. Stagnant moisture must be avoided. No ingredients that are harmful to health are washed out.

Mechanical destruction

MAX Compact laminates 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 Compact laminates 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 Compact Exterior 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 Compact Exterior high-pressure laminate with a thickness of 6 mm and a surface weight of 8.7 kg/m². Packaging is considered in the LCA.

Declared Unit

| Name | Value | Unit |
|-----------------|-------|-------------------|
| Declared unit | 1 | m ² |
| Grammage | 8.7 | kg/m ² |
| Layer thickness | 0.006 | m |

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

High-pressure laminates with the brand name MAX Compact Exterior are manufactured at the Wiener Neudorf (Austria) site of Fundermax.

Max Compact Exterior high-pressure laminates are available in different thicknesses. Therefore, a separate EPD annex contains further information on the environmental impact of MAX Compact Exterior with thicknesses: 8, 10 and 16 mm.

3.2 System boundary

The life cycle assessment of MAX Compact Exterior high-pressure 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 transport 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 by 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 which a 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 cut off. 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.

It is possible to clearly allocate the main raw materials to the declared product lines. A constant decor weight is used for all product thicknesses in a product line, which means that the proportion of decor by mass decreases as the boards thickness increases. The mass proportion of the core increases proportionally with the thickness of the board. The raw materials required for the various components (core / decor) were therefore allocated based on the respective mass proportion of these.

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 CO₂

Information on describing the biogenic carbon content at factory gate

| Name | Value | Unit |
|---|-------|------|
| Biogenic carbon content in product | 2.44 | kg C |
| Biogenic carbon content in accompanying packaging | 0.001 | kg C |

Installation into the building (A5)

The end of life of the product packaging is not declared in module A5.

| Name | Value | Unit |
|---------------------|----------|-------------------|
| Packaging (Paper) | 0.002 | kg/m ² |
| Packaging (Plastic) | 0.012 | kg/m ² |
| Packaging (Wood) | 0.000003 | kg/m ² |

End of life (C1–C4)

| Name | Value | Unit |
|-----------------|-------|------|
| Energy recovery | 8.7 | 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 Compact Exterior high-pressure laminates with a surface weight of 8.7 kg/m² and a thickness of 6 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 Compact Exterior high-pressure laminate (8.7 kg/m²)

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|----------------------------------|-----------|----|----------|----------|----|-----------|
| Global Warming Potential total (GWP-total) | kg CO ₂ eq | 1.52E+01 | 0 | 3.13E-02 | 1.38E+01 | 0 | -4.1E+00 |
| Global Warming Potential fossil fuels (GWP-fossil) | kg CO ₂ eq | 2.4E+01 | 0 | 3.09E-02 | 4.87E+00 | 0 | -4.08E+00 |
| Global Warming Potential biogenic (GWP-biogenic) | kg CO ₂ eq | -8.85E+00 | 0 | 8.4E-05 | 8.95E+00 | 0 | -1.84E-02 |
| Global Warming Potential luluc (GWP-luluc) | kg CO ₂ eq | 1.46E-02 | 0 | 2.9E-04 | 1.18E-04 | 0 | -2.66E-04 |
| Depletion potential of the stratospheric ozone layer (ODP) | kg CFC11 eq | 1.04E-10 | 0 | 4.07E-15 | 1.8E-12 | 0 | -3.21E-11 |
| Acidification potential of land and water (AP) | mol H ⁺ eq | 5.38E-02 | 0 | 6.28E-05 | 2.55E-03 | 0 | -5.11E-03 |
| Eutrophication potential aquatic freshwater (EP-freshwater) | kg P eq | 1.33E-04 | 0 | 1.14E-07 | 5.21E-07 | 0 | -6.63E-06 |
| Eutrophication potential aquatic marine (EP-marine) | kg N eq | 2.1E-02 | 0 | 2.59E-05 | 8.76E-04 | 0 | -1.49E-03 |
| Eutrophication potential terrestrial (EP-terrestrial) | mol N eq | 1.76E-01 | 0 | 2.95E-04 | 1.16E-02 | 0 | -1.6E-02 |
| Formation potential of tropospheric ozone photochemical oxidants (POCP) | kg NMVOC eq | 5.5E-02 | 0 | 5.62E-05 | 2.35E-03 | 0 | -4.16E-03 |
| Abiotic depletion potential for non fossil resources (ADPE) | kg Sb eq | 5.31E-05 | 0 | 2.07E-09 | 1.61E-08 | 0 | -2.94E-07 |
| Abiotic depletion potential for fossil resources (ADPF) | MJ | 5.19E+02 | 0 | 4.26E-01 | 4.35E+00 | 0 | -7.54E+01 |
| Water use (WDP) | m ³ world eq deprived | 1.65E+00 | 0 | 3.78E-04 | 1.33E+00 | 0 | -3.89E-01 |

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² MAX Compact Exterior high-pressure laminate (8.7 kg/m²)

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|---|----------------|----------|----|----------|-----------|----|-----------|
| Renewable primary energy as energy carrier (PERE) | MJ | 6.76E+01 | 0 | 3.1E-02 | 8.42E+01 | 0 | -2.19E+01 |
| Renewable primary energy resources as material utilization (PERM) | MJ | 8.32E+01 | 0 | 0 | -8.32E+01 | 0 | 0 |
| Total use of renewable primary energy resources (PERT) | MJ | 1.51E+02 | 0 | 3.1E-02 | 1.05E+00 | 0 | -2.19E+01 |
| Non renewable primary energy as energy carrier (PENRE) | MJ | 4.57E+02 | 0 | 4.28E-01 | 6.89E+01 | 0 | -7.54E+01 |
| Non renewable primary energy as material utilization (PENRM) | MJ | 6.45E+01 | 0 | 0 | -6.45E+01 | 0 | 0 |
| Total use of non renewable primary energy resources (PENRT) | MJ | 5.21E+02 | 0 | 4.28E-01 | 4.36E+00 | 0 | -7.54E+01 |
| Use of secondary material (SM) | kg | 3.94E-03 | 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 | 2.7E-01 | 0 | 3.4E-05 | 3.15E-02 | 0 | -1.78E-02 |

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² MAX Compact Exterior high-pressure laminate (8.7 kg/m²)

| Parameter | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-------------------------------------|------|----------|----|----------|----------|----|-----------|
| Hazardous waste disposed (HWD) | kg | 7.32E-08 | 0 | 1.32E-12 | 8.79E-11 | 0 | -4.01E-09 |
| Non hazardous waste disposed (NHWD) | kg | 2.63E+00 | 0 | 6.52E-05 | 6.52E-01 | 0 | -3.72E-02 |
| Radioactive waste disposed (RWD) | kg | 1.9E-02 | 0 | 8.01E-07 | 1.95E-04 | 0 | -5.82E-03 |
| 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 | 9.71E-01 | 0 | 0 | 0 | 0 | 0 |
| Exported electrical energy (EEE) | MJ | 0 | 0 | 0 | 1.94E+01 | 0 | 0 |
| Exported thermal energy (EET) | MJ | 0 | 0 | 0 | 3.49E+01 | 0 | 0 |

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² MAX Compact Exterior high-pressure laminate (8.7 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.

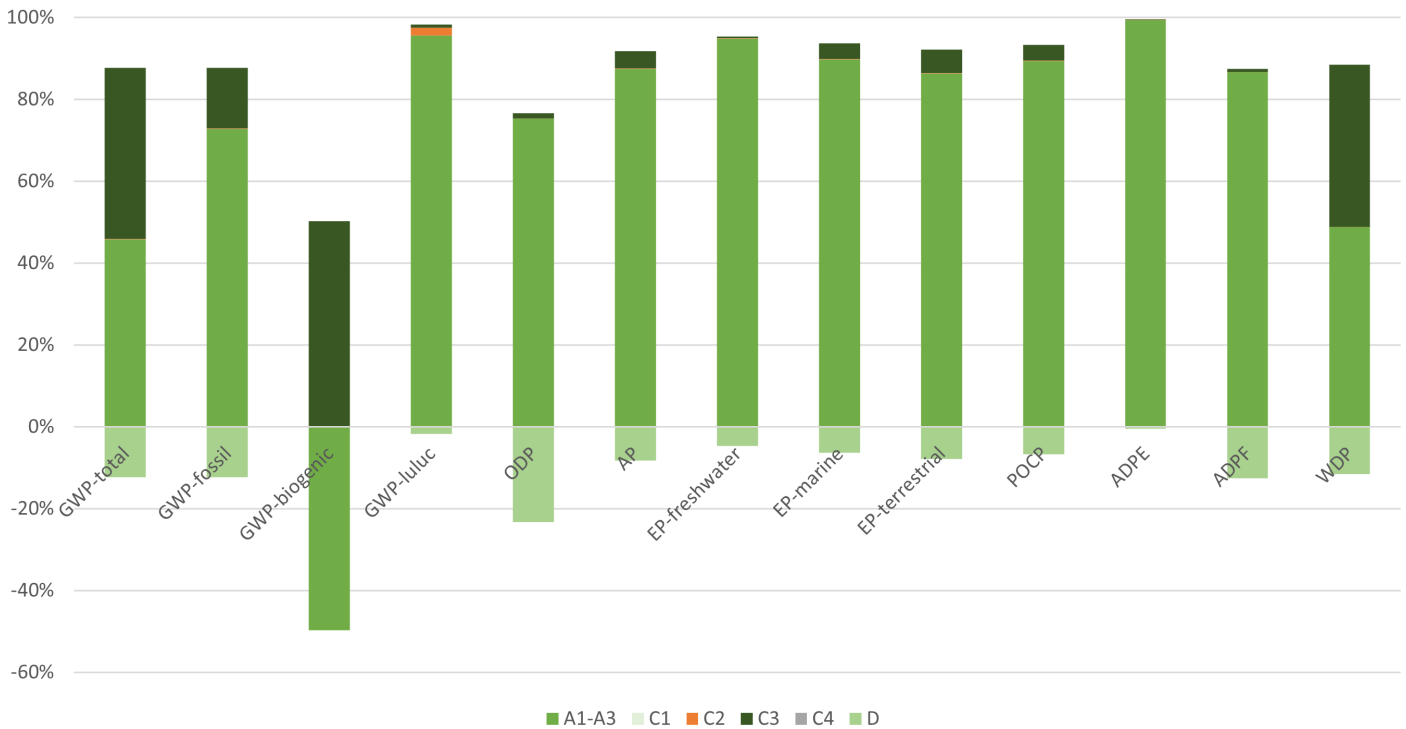
for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential'. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is 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 Compact Exterior high-pressure laminates with a surface weight of 8.7 kg/m² and a thickness of 6 mm.

Since MAX Compact Exterior high-pressure 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 Compact Exterior panels with a thickness of 8, 10 and 16 mm.

Hot-spot analysis of MAX Compact exterior



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.

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: 0.46 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 Eluat analysis

FUNDERMAX Compact laminates 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'.

8. References

Standards

EN 438-2

EN 438-2:2019, High-pressure decorative laminates (HPL) – Sheets based on thermosetting resins (laminates) – Part 2: Determination of properties.

EN 438-4

EN 438-4:2016-06, High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (usually called laminates) — Part 4: Classification and specifications for compact laminates of thickness 2 mm and greater.

EN 438-6

EN 438-6:2016-06, High-pressure decorative laminates (HPL) — Sheets based on thermosetting resins (usually called laminates) — Part 6: Classification and specifications for Exterior-grade compact laminates of thickness 2 mm and greater.

EN 438-7

EN 438-7:2005-04, 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.

EN 717-1

DIN EN 717-1:2005, Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method.

EN 13501-1

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Annex

For Fundermax MAX Compact Exterior

to the

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

| | |
|--------------------------|--------------------------|
| Owner of the Declaration | Fundermax GmbH |
| Declaration number | EPD-FMX-20240363-IBA1-EN |
| Issue date | See EPD |
| Valid to | See EPD |

www.ibu-epd.com / <https://epd-online.com>



General Information

This annex contains the LCA results for a declared unit of 1 m² MAX Compact Exterior high-pressure laminate with a thickness of

- 8 mm and a surface weight of 11.6 kg/m²
- 10 mm and a surface weight of 14.5 kg/m²
- 16 mm and a surface weight of 23.2 kg/m²

manufactured at the Fundermax site in Wiener Neudorf (Austria) with the brand name MAX Compact Exterior. 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 Compact Exterior with a thickness of 6mm (8.7 kg/m²) is available in the EPD [Declaration number: EPD-FMX-20240363-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 CO₂

Information on describing the biogenic Carbon Content at factory gate

| Name | 8 mm | 10 mm | 16 mm | Unit |
|---|-------|-------|-------|------|
| Biogenic carbon content in product | 3.28 | 4.11 | 6.62 | kg C |
| Biogenic carbon content in accompanying packaging | 0.001 | 0.002 | 0.003 | kg C |

Installation into the building (A5)

The end of life of the product packaging is not declared in module A5.

| Packaging | 8 mm | 10 mm | 16 mm | Unit |
|---------------------|---------|---------|---------|-------------------|
| Packaging (Paper) | 0.003 | 0.004 | 0.006 | kg/m ² |
| Packaging (Plastic) | 0.016 | 0.020 | 0.033 | kg/m ² |
| Packaging (Wood) | 0.00004 | 0.00005 | 0.00008 | kg/m ² |

End of life (C1–C4)

| Name | 8 mm | 10 mm | 16 mm | Unit |
|-----------------|------|-------|-------|------|
| Energy recovery | 11.6 | 14.5 | 23.2 | kg |

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

| Name | 8 mm | 10 mm | 16 mm | Unit |
|---------------------|-------|-------|-------|------|
| Processing rate | 100 | 100 | 100 | % |
| Efficiency of plant | > 0.6 | > 0.6 | > 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 Compact Exterior high-pressure laminate (11.6 kg/m², 8 mm)

| Core Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|----------------|------------------------------------|-----------|----------|----------|----------|----------|-----------|
| GWP-total | [kg CO ₂ -Eq.] | 1.96E+01 | 0.00E+00 | 4.17E-02 | 1.84E+01 | 0.00E+00 | -5.46E+00 |
| GWP-fossil | [kg CO ₂ -Eq.] | 3.15E+01 | 0.00E+00 | 4.12E-02 | 6.42E+00 | 0.00E+00 | -5.43E+00 |
| GWP-biogenic | [kg CO ₂ -Eq.] | -1.19E+01 | 0.00E+00 | 1.12E-04 | 1.20E+01 | 0.00E+00 | -2.45E-02 |
| GWP-luluc | [kg CO ₂ -Eq.] | 1.94E-02 | 0.00E+00 | 3.86E-04 | 1.56E-04 | 0.00E+00 | -3.55E-04 |
| ODP | [kg CFC11-Eq.] | 1.38E-10 | 0.00E+00 | 5.43E-15 | 2.39E-12 | 0.00E+00 | -4.28E-11 |
| AP | [mol H ⁺ -Eq.] | 6.92E-02 | 0.00E+00 | 8.38E-05 | 3.41E-03 | 0.00E+00 | -6.80E-03 |
| EP-freshwater | [kg P-Eq.] | 1.76E-04 | 0.00E+00 | 1.52E-07 | 6.93E-07 | 0.00E+00 | -8.82E-06 |
| EP-marine | [kg N-Eq.] | 2.68E-02 | 0.00E+00 | 3.46E-05 | 1.17E-03 | 0.00E+00 | -1.99E-03 |
| EP-terrestrial | [mol N-Eq.] | 2.28E-01 | 0.00E+00 | 3.94E-04 | 1.56E-02 | 0.00E+00 | -2.13E-02 |
| POCP | [kg NMVOC-Eq.] | 7.15E-02 | 0.00E+00 | 7.49E-05 | 3.15E-03 | 0.00E+00 | -5.54E-03 |
| ADPE | [kg Sb-Eq.] | 6.61E-05 | 0.00E+00 | 2.77E-09 | 2.15E-08 | 0.00E+00 | -3.91E-07 |
| ADPF | [MJ] | 6.85E+02 | 0.00E+00 | 5.68E-01 | 5.79E+00 | 0.00E+00 | -1.00E+02 |
| WDP | [m ³ world-Eq deprived] | 2.29E+00 | 0.00E+00 | 5.04E-04 | 1.78E+00 | 0.00E+00 | -5.18E-01 |

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 Compact Exterior high-pressure laminate (11.6 kg/m², 8 mm)

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-----------|-------------------|----------|----------|----------|-----------|----------|-----------|
| PERE | [MJ] | 8.87E+01 | 0.00E+00 | 4.14E-02 | 1.13E+02 | 0.00E+00 | -2.92E+01 |
| PERM | [MJ] | 1.12E+02 | 0.00E+00 | 0.00E+00 | -1.12E+02 | 0.00E+00 | 0.00E+00 |
| PERT | [MJ] | 2.00E+02 | 0.00E+00 | 4.14E-02 | 1.39E+00 | 0.00E+00 | -2.92E+01 |
| PENRE | [MJ] | 6.02E+02 | 0.00E+00 | 5.70E-01 | 9.18E+01 | 0.00E+00 | -1.00E+02 |
| PENRM | [MJ] | 8.61E+01 | 0.00E+00 | 0.00E+00 | -8.60E+01 | 0.00E+00 | 0.00E+00 |
| PENRT | [MJ] | 6.88E+02 | 0.00E+00 | 5.70E-01 | 5.80E+00 | 0.00E+00 | -1.00E+02 |
| SM | [kg] | 5.26E-03 | 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] | 3.62E-01 | 0.00E+00 | 4.53E-05 | 4.20E-02 | 0.00E+00 | -2.37E-02 |

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 Compact Exterior high-pressure laminate (11.6 kg/m², 8 mm)

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-----------|------|----------|----------|----------|----------|----------|-----------|
| HWD | [kg] | 9.42E-08 | 0.00E+00 | 1.77E-12 | 1.18E-10 | 0.00E+00 | -5.34E-09 |
| NHWD | [kg] | 3.09E+00 | 0.00E+00 | 8.69E-05 | 8.65E-01 | 0.00E+00 | -4.96E-02 |
| RWD | [kg] | 2.55E-02 | 0.00E+00 | 1.07E-06 | 2.60E-04 | 0.00E+00 | -7.75E-03 |
| 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] | 1.29E+00 | 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 | 2.58E+01 | 0.00E+00 | 0.00E+00 |
| EET | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.65E+01 | 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 Compact Exterior high-pressure laminate (11.6 kg/m², 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

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 Compact Exterior high-pressure laminate (14.5 kg/m², 10 mm)

| Core-indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|----------------|------------------------------------|-----------|----------|----------|----------|----------|-----------|
| GWP-total | [kg CO ₂ -Eq.] | 2.41E+01 | 0.00E+00 | 5.22E-02 | 2.30E+01 | 0.00E+00 | -6.81E+00 |
| GWP-fossil | [kg CO ₂ -Eq.] | 3.89E+01 | 0.00E+00 | 5.15E-02 | 7.97E+00 | 0.00E+00 | -6.78E+00 |
| GWP-biogenic | [kg CO ₂ -Eq.] | -1.49E+01 | 0.00E+00 | 1.40E-04 | 1.51E+01 | 0.00E+00 | -3.06E-02 |
| GWP-luluc | [kg CO ₂ -Eq.] | 2.43E-02 | 0.00E+00 | 4.83E-04 | 1.94E-04 | 0.00E+00 | -4.43E-04 |
| ODP | [kg CFC11-Eq.] | 1.72E-10 | 0.00E+00 | 6.78E-15 | 2.98E-12 | 0.00E+00 | -5.34E-11 |
| AP | [mol H ⁺ -Eq.] | 8.46E-02 | 0.00E+00 | 1.05E-04 | 4.27E-03 | 0.00E+00 | -8.49E-03 |
| EP-freshwater | [kg P-Eq.] | 2.18E-04 | 0.00E+00 | 1.91E-07 | 8.65E-07 | 0.00E+00 | -1.10E-05 |
| EP-marine | [kg N-Eq.] | 3.25E-02 | 0.00E+00 | 4.32E-05 | 1.47E-03 | 0.00E+00 | -2.48E-03 |
| EP-terrestrial | [mol N-Eq.] | 2.81E-01 | 0.00E+00 | 4.92E-04 | 1.95E-02 | 0.00E+00 | -2.66E-02 |
| POCP | [kg NMVOC-Eq.] | 8.80E-02 | 0.00E+00 | 9.36E-05 | 3.94E-03 | 0.00E+00 | -6.92E-03 |
| ADPE | [kg Sb-Eq.] | 7.91E-05 | 0.00E+00 | 3.46E-09 | 2.68E-08 | 0.00E+00 | -4.88E-07 |
| ADPF | [MJ] | 8.51E+02 | 0.00E+00 | 7.10E-01 | 7.23E+00 | 0.00E+00 | -1.25E+02 |
| WDP | [m ³ world-Eq deprived] | 2.93E+00 | 0.00E+00 | 6.30E-04 | 2.22E+00 | 0.00E+00 | -6.47E-01 |

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 Compact Exterior high-pressure laminate (14.5 kg/m², 10 mm)

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-----------|-------------------|----------|----------|----------|-----------|----------|-----------|
| PERE | [MJ] | 1.10E+02 | 0.00E+00 | 5.17E-02 | 1.42E+02 | 0.00E+00 | -3.65E+01 |
| PERM | [MJ] | 1.40E+02 | 0.00E+00 | 0.00E+00 | -1.40E+02 | 0.00E+00 | 0.00E+00 |
| PERT | [MJ] | 2.50E+02 | 0.00E+00 | 5.17E-02 | 1.74E+00 | 0.00E+00 | -3.65E+01 |
| PENRE | [MJ] | 7.47E+02 | 0.00E+00 | 7.13E-01 | 1.15E+02 | 0.00E+00 | -1.25E+02 |
| PENRM | [MJ] | 1.08E+02 | 0.00E+00 | 0.00E+00 | -1.08E+02 | 0.00E+00 | 0.00E+00 |
| PENRT | [MJ] | 8.54E+02 | 0.00E+00 | 7.13E-01 | 7.24E+00 | 0.00E+00 | -1.25E+02 |
| SM | [kg] | 6.57E-03 | 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] | 4.54E-01 | 0.00E+00 | 5.66E-05 | 5.25E-02 | 0.00E+00 | -2.96E-02 |

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 Compact Exterior high-pressure laminate (14.5 kg/m², 10 mm)

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-----------|------|----------|----------|----------|----------|----------|-----------|
| HWD | [kg] | 1.15E-07 | 0.00E+00 | 2.21E-12 | 1.47E-10 | 0.00E+00 | -6.67E-09 |
| NHWD | [kg] | 3.55E+00 | 0.00E+00 | 1.09E-04 | 1.08E+00 | 0.00E+00 | -6.19E-02 |
| RWD | [kg] | 3.20E-02 | 0.00E+00 | 1.33E-06 | 3.24E-04 | 0.00E+00 | -9.68E-03 |
| 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] | 1.62E+00 | 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 | 3.22E+01 | 0.00E+00 | 0.00E+00 |
| EET | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.81E+01 | 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 Compact Exterior high-pressure laminate (14.5 kg/m², 10 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

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 Compact Exterior high-pressure laminate (23.2 kg/m², 16 mm)

| Core-Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|----------------|------------------------------------|-----------|----------|----------|----------|----------|-----------|
| GWP-total | [kg CO ₂ -Eq.] | 3.74E+01 | 0.00E+00 | 8.35E-02 | 3.69E+01 | 0.00E+00 | -1.09E+01 |
| GWP-fossil | [kg CO ₂ -Eq.] | 6.14E+01 | 0.00E+00 | 8.25E-02 | 1.26E+01 | 0.00E+00 | -1.08E+01 |
| GWP-biogenic | [kg CO ₂ -Eq.] | -2.40E+01 | 0.00E+00 | 2.24E-04 | 2.43E+01 | 0.00E+00 | -4.89E-02 |
| GWP-luluc | [kg CO ₂ -Eq.] | 3.89E-02 | 0.00E+00 | 7.73E-04 | 3.09E-04 | 0.00E+00 | -7.07E-04 |
| ODP | [kg CFC11-Eq.] | 2.75E-10 | 0.00E+00 | 1.09E-14 | 4.76E-12 | 0.00E+00 | -8.54E-11 |
| AP | [mol H ⁺ -Eq.] | 1.31E-01 | 0.00E+00 | 1.68E-04 | 6.85E-03 | 0.00E+00 | -1.36E-02 |
| EP-freshwater | [kg P-Eq.] | 3.45E-04 | 0.00E+00 | 3.05E-07 | 1.38E-06 | 0.00E+00 | -1.76E-05 |
| EP-marine | [kg N-Eq.] | 4.98E-02 | 0.00E+00 | 6.91E-05 | 2.36E-03 | 0.00E+00 | -3.97E-03 |
| EP-terrestrial | [mol N-Eq.] | 4.38E-01 | 0.00E+00 | 7.88E-04 | 3.12E-02 | 0.00E+00 | -4.25E-02 |
| POCP | [kg NMVOC-Eq.] | 1.38E-01 | 0.00E+00 | 1.50E-04 | 6.33E-03 | 0.00E+00 | -1.11E-02 |
| ADPE | [kg Sb-Eq.] | 1.18E-04 | 0.00E+00 | 5.53E-09 | 4.27E-08 | 0.00E+00 | -7.80E-07 |
| ADPF | [MJ] | 1.35E+03 | 0.00E+00 | 1.14E+00 | 1.15E+01 | 0.00E+00 | -2.00E+02 |
| WDP | [m ³ world-Eq deprived] | 4.86E+00 | 0.00E+00 | 1.01E-03 | 3.56E+00 | 0.00E+00 | -1.03E+00 |

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 Compact Exterior high-pressure laminate (23.2 kg/m², 16 mm)

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-----------|-------------------|----------|----------|----------|-----------|----------|-----------|
| PERE | [MJ] | 1.73E+02 | 0.00E+00 | 8.27E-02 | 2.28E+02 | 0.00E+00 | -5.83E+01 |
| PERM | [MJ] | 2.26E+02 | 0.00E+00 | 0.00E+00 | -2.26E+02 | 0.00E+00 | 0.00E+00 |
| PERT | [MJ] | 3.99E+02 | 0.00E+00 | 8.27E-02 | 2.78E+00 | 0.00E+00 | -5.83E+01 |
| PENRE | [MJ] | 1.18E+03 | 0.00E+00 | 1.14E+00 | 1.84E+02 | 0.00E+00 | -2.00E+02 |
| PENRM | [MJ] | 1.72E+02 | 0.00E+00 | 0.00E+00 | -1.72E+02 | 0.00E+00 | 0.00E+00 |
| PENRT | [MJ] | 1.35E+03 | 0.00E+00 | 1.14E+00 | 1.16E+01 | 0.00E+00 | -2.00E+02 |
| SM | [kg] | 1.05E-02 | 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] | 7.29E-01 | 0.00E+00 | 9.06E-05 | 8.40E-02 | 0.00E+00 | -4.72E-02 |

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 Compact Exterior high-pressure laminate (23.2 kg/m², 16 mm)

| Indicator | Unit | A1-A3 | C1 | C2 | C3 | C4 | D |
|-----------|------|----------|----------|----------|----------|----------|-----------|
| HWD | [kg] | 1.78E-07 | 0.00E+00 | 3.53E-12 | 2.36E-10 | 0.00E+00 | -1.07E-08 |
| NHWD | [kg] | 4.93E+00 | 0.00E+00 | 1.74E-04 | 1.71E+00 | 0.00E+00 | -9.89E-02 |
| RWD | [kg] | 5.14E-02 | 0.00E+00 | 2.13E-06 | 5.19E-04 | 0.00E+00 | -1.55E-02 |
| 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] | 2.59E+00 | 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 | 5.15E+01 | 0.00E+00 | 0.00E+00 |
| EET | [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.28E+01 | 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 Compact Exterior high-pressure laminate (23.2 kg/m², 16 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