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-20240368-IBA1-EN
Issue date	19.11.2024
Valid to	18.11.2029

Fundermax Biofiber

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-20240368-IBA1-EN

This declaration is based on the product category rules:

Wood-based panels, 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 Biofiber

Owner of the declaration

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

Declared product / declared unit

1 m^3 of Fundermax Biofiber with an average density of 1000 kg/m^3

Scope:

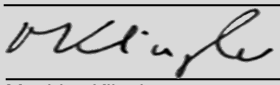
This EPD is based on a declared unit of 1 m^3 of average Fundermax Biofiber (1000 kg/m^3) manufactured at the St. Veit/Glan (Austria) production plant with the brand name Biofiber.

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

Biofiber boards are board-shaped materials according to *EN 622-2*. These boards are used as stiffening, room-side panelling in timber frame construction or as carrier and composite material, e.g. in the door industry.
Regulation (EU) No. 305/2011 (CPR) applies to the placing of the product on the market in the EU/EFTA (with the exception of Switzerland). The product requires a declaration of performance taking into account *EN 13986:2004+A1:2015, Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking* and the 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 states, and the technical provisions based on these regulations.

2.2 Application

Use in the door industry, automotive industry, packaging industry, furniture industry, shoe industry, construction industry and in trade.

2.3 Technical Data

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

Structural values

Name	Value	Unit
Bulk density ISO 1183-1	≥ 900	kg/m³
Transverse tensile strength EN 13986	≥ 0.50	N/mm²
Transverse tensile strength after boiling test EN 13986	≥ 0.35	N/mm²
E-Modulus EN 12369	≥ 4100	MPa
Bending strength EN 13986	≥ 25	MPa
Formaldehyde emission EN 717-1	≤ 0.13	mg/m3

Performance values of the product according to the declaration of performance in relation to its essential characteristics in accordance with *EN 13986:2004+A1:2015, Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking.*

Product standard:
EN 622-2:2004-07, Fibreboards - Specifications - Part 2: Requirements for hardboards
EN 14322:2022, Wood-based panels. Melamine faced boards for interior uses. Definition, requirements and classification

2.4 Delivery status

Raw fiber (Thickness 2.0 – 8.0 mm):
Full format: 5640 x 2150 mm
Half format: 2820 x 2150 mm
Cut to size: according to customer requirements

2.5 Base materials/Ancillary materials

Fiberboard between 2.0 and 8.0 mm thick with an average density of 1000 kg/m³ consists of (in mass%):

- Wood fibers, predominantly spruce, fir, pine and beech 88.5 - 96 %
- Water, approx. 4-8 %
- Paraffin wax dispersion ≤ 2.5 %
- Phenolic resin ≤ 1 % (fully cured)

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

The 100 % usable raw material wood is shredded, the wood chips are transported to the dewatering machine via a flushing channel and cleaned in the process.

From the wood chip silo, the cleaned wood chips are sent to the fibre processing unit, where they are thermomechanically defibrated using a pressure defibrator. By adding water, an approx. 2 % fiber suspension is obtained. The pulp is now formed and then dewatered using newly developed double screen dewatering technology with targeted orientation of the wood fibers.
The resulting fiber mat is then fed into the hot press with simultaneous closing device, where it is pressed into a biofiber board under precisely controlled pressure and temperature conditions.
After pressing, the board is air-conditioned in the climate chamber to approx. 4-8 % board moisture. Finally, the boards are further processed according to customer specifications.

2.7 Environment and health during manufacturing

Employees do not come into contact with any substances that are harmful to health during panel production. The product is manufactured using a wet process, so there is no dust formation. The minor additives are added via automatic dosing systems. No solvents are added.

The process water is not released into the environment. Part of it is returned to the production process. The rest of the process water is purified in an evaporation plant. The concentrate is utilised in the company's own fluidised bed furnace. The purified vapour is released into the environment via the chimney.
The dust generated during post-processing (sanding line, cut-to-size saw) is extracted via a central extraction system with an integrated fabric dust filter. The legal limits are adhered to and monitored.
The process heat required for production is generated by the company's own fluidised bed boiler, which is predominantly heated with biogenic fuels. The biogenic waste produced during the finishing process, such as sanding dust, panel residues and sawdust, is utilised in the company's own energy production.

2.8 Product processing/Installation

Raw, coated and lacquered biofiber boards can be sawn and drilled using standard (electric) machines. Carbide-tipped tools, especially circular saws, are preferable. Respiratory protection and goggles should be worn when using hand tools without extraction.

2.9 Packaging
Disposable or reusable wooden or raw chipboard pallets and wooden stacks are used. Fiberboard or raw chipboard is used to cover packages. The wood materials can be utilised for energy recovery at any time.

2.10 Condition of use
The proportions of the ingredients of biofiber boards correspond to those of the basic material composition in section 2.5 "Basic materials". During pressing, the phenolic resin (PF) is cross-linked three-dimensionally by an irreversible polycondensation reaction when heat is applied. The binding agents are chemically stable and firmly bonded to the wood. Only small quantities of formaldehyde are emitted, see Chapter 7 (Evidence).

2.11 Environment and health during use
No special hazard information for humans (after inhalation, after skin contact, after eye contact, after ingestion, chronic effects, etc.). No special hazard information for the environment. No other hazard statements.

2.12 Reference service life
Due to the wide range of possible applications, no standardised service life can be specified. If used correctly in the construction sector, the service life can be over 50 years.

2.13 Extraordinary effects
Fire
Fire protection (tests according to *EN 13823* and *ISO 11925-2* in accordance with *EN 13501-1*). In the event of incomplete combustion, toxic substances may also be present in the smoke, as with any other organic material. For fires involving biofiber boards, the same firefighting techniques can be used as for other wood-containing building materials.

Fire protection

Name	Value
Building material class EN 13501-1	D
Smoke gas development EN 13501-1	s1
Burning droplets EN 13501-1	d0

Water
No substances that could be hazardous to water are washed out. Biofiber boards are not resistant to permanent exposure to water.

Mechanical destruction
Biofiber boards break when subjected to excessive force, but do not splinter. There are no sharp-edged fragments.

2.14 Re-use phase
Material recycling is possible as part of the cascading utilisation of wood.

2.15 Disposal
The product to be disposed of is a non-hazardous waste and can be disposed of under code number 170201.

2.16 Further information
Further information on the properties and processing of Fundermax biofiber can be found at www.fundermax.at

3. LCA: Calculation rules

3.1 Declared Unit
This EPD refers to a declared unit of 1 m³ of Fundermax Biofiber with an average density of 1000 kg/m³. Packaging is considered in the LCA.

Declared Unit

Name	Value	Unit
Declared unit	1	m³
Gross density	1000	kg/m^3

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

Panels with the brand name Biofiber are manufactured at the St. Veit/Glan (Austria) site of Fundermax.

This is a declaration of an average product from a manufacturer's plant. The products are manufactured in different thicknesses, but have a homogeneous structure. As the biofiber is produced in a wet fiber process, it does not have a layered structure. Wood fibers, small amounts of paraffin wax dispersion and phenolic resin are pressed into a homogeneous mass. The variance of the average product is considered to be low.

Coated and painted panels are not included in the declared average.

3.2 System boundary
The life cycle assessment of Biofiber 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 (wood fiber, phenolic resin, paraffin wax, etc.) and their transports to the manufacturing plant in St. Veit/Glan. Within the plant boundaries the production process as well as the packaging of the Biofiber panels are considered. The manufacturing process is considered based on the primary data of the site. Electrical energy is provided at the St. Veit/Glan site via its own biomass cogeneration plant. In addition, electricity is purchased from the Austrian grid and natural gas is purchased externally.

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 environmental 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 for material recycling
In scenario 0, module C3 includes the impacts of chipping the products as a basis for recycling.
Module C3 includes the impacts from waste management. The wooden products, and with them the material-inherent properties, leave the product system as secondary material in module C3. The expected effect of chipping the wood is also considered.

Module C3/1 | Waste treatment for energy recovery
In scenario 1, module C3 includes the impacts for chipping the

products as a basis for recycling.
Module C3/1 includes the impacts from waste management. The wooden products and with them the material-inherent properties, leave the product system as secondary fuel in module C3/1. The expected effect of chipping the wood is also considered.

Module C4 and C4/1 | Disposal
In scenario 0, material recycling is declared.
Scenario 1, declares the energetic recovery of the products, therefore no environmental impacts are to be expected from the waste processing of the products in C4 and C4/1.

Module D | Benefits and loads beyond the system boundary for material recycling
In module D, a recycling scenario is declared, taking the substitution potential of low-quality sawmill by-products into account.

Module D/1 | Benefits and loads beyond the system boundary for energy recovery
In module D/1 the substitution potential for heat and electricity from the energy recovery of the product in module C3/1 is declared 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 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
Input and output flows during panel production are available on a product-specific basis for the entire annual production in the plant, therefore, no allocation is necessary.

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	460	kg C
Biogenic carbon content in accompanying packaging	3.5	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 (Wood)	8.42	kg/m³

End of life (C1–C4)
A recycling scenario (scenario 0) is assumed to be a likely scenario for the end of the products' life. In addition, the energy recovery of the biofiber panels is also considered as scenario 1.

Name	Value	Unit
Collected separately waste type (Waste wood)	1000	kg
Recycling (C3)	1000	kg
Energy recovery (C3/1)	1000	kg

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

Name	Value	Unit
Net flow (D)	1000	kg/m³
Net flow (D/1)	521	kg/m³

The product reaches the end-of-waste status after removal from the building, transport to processing and chipping of the product.

End of life scenario 0 – material recycling
This scenario contains a recycling rate of 100 %. The most relevant material use for waste wood is currently the production of chipboard. It is assumed that the recycled waste wood can be used as a substitute for low-quality sawmill by-products. According to *Rüter & Diederichs, 2012*, the price difference between waste wood and industrial residual wood suggests a technical and economic difference between the two fractions. Therefore, a value correction factor, that reduces the substitution potential by 45 %, is applied.
The declared products do not contain any hazardous substances that could limit recyclability. The end of life scenario must be adjusted in the respective application if necessary.
The potential arising from the recycling of the products is taken into account in Module D.

End of life scenario 1 – energy recovery
In end of life scenario 1, 100 % energy recovery as a secondary fuel in a biomass power plant is assumed. Plant-specific parameters correspond to a European average scenario (RER), as the sales market for the products is concentrated in Europe.

Both scenarios assume a reprocessing rate of 100 % for the products after removal from the building. This assumption has to be adjusted accordingly when applying the results in the building context.

5. LCA: Results

The following table contains the life cycle assessment results for a declared unit of 1 m³ Fundermax Biofiber with an average density of 1000 kg/m³.

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 m³ Biofiber (1000 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C3/1	C4	C4/1	D	D/1
GWP-total	kg CO_2 eq	-1.31E+03	0	3.6E+00	1.69E+03	1.69E+03	0	0	-1.69E+03	-3.7E+02
GWP-fossil	kg CO_2 eq	3.78E+02	0	3.56E+00	6.45E+00	6.45E+00	0	0	-5.7E+00	-3.68E+02
GWP-biogenic	kg CO_2 eq	-1.69E+03	0	9.67E-03	1.69E+03	1.69E+03	0	0	-1.69E+03	-2.12E+00
GWP-luluc	kg CO_2 eq	5.24E-01	0	3.33E-02	7.01E-04	7.01E-04	0	0	-4.11E-02	-2.92E-02
ODP	kg CFC11 eq	3.28E-10	0	4.68E-13	1.19E-10	1.19E-10	0	0	-1.95E-11	-3.88E-09
AP	mol H^+ eq	1.61E+00	0	7.23E-03	1.38E-02	1.38E-02	0	0	-4.42E-02	4.07E-01
EP-freshwater	kg P eq	2.82E-03	0	1.32E-05	2.41E-05	2.41E-05	0	0	-2.95E-05	-7.95E-04
EP-marine	kg N eq	6.67E-01	0	2.98E-03	3.3E-03	3.3E-03	0	0	-2.13E-02	8.06E-02
EP-terrestrial	mol N eq	7.31E+00	0	3.4E-02	3.45E-02	3.45E-02	0	0	-2.33E-01	9.55E-01
POCP	kg NMVOC eq	1.71E+00	0	6.46E-03	8.8E-03	8.8E-03	0	0	-5.77E-02	3.41E-01
ADPE	kg Sb eq	8.13E-06	0	2.39E-07	9.98E-07	9.98E-07	0	0	-7.15E-07	-3.45E-05
ADPF	MJ	2.67E+03	0	4.9E+01	1.36E+02	1.36E+02	0	0	-8.73E+01	-7.77E+03
WDP	m^3 world eq deprived	1.19E+01	0	4.35E-02	1.44E+00	1.44E+00	0	0	-2.9E-01	-1.94E+01

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 m³ Biofiber (1000 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PERE	MJ	1.84E+04	0	3.57E+00	8.59E+03	8.59E+03	0	0	-9.58E+03	-2.65E+03
PERM	MJ	8.65E+03	0	0	-8.51E+03	-8.51E+03	0	0	0	0
PERT	MJ	2.71E+04	0	3.57E+00	8.12E+01	8.12E+01	0	0	-9.58E+03	-2.65E+03
PENRE	MJ	2.04E+03	0	4.92E+01	7.78E+02	7.78E+02	0	0	-8.75E+01	-7.77E+03
PENRM	MJ	6.42E+02	0	0	-6.42E+02	-6.42E+02	0	0	0	0
PENRT	MJ	2.68E+03	0	4.92E+01	1.36E+02	1.36E+02	0	0	-8.75E+01	-7.77E+03
SM	kg	0	0	0	0	0	0	0	1E+03	0
RSF	MJ	8.84E+03	0	0	0	0	0	0	0	4.69E+02
NRSF	MJ	0	0	0	0	0	0	0	0	9.58E+00
FW	m^3	6.76E+00	0	3.91E-03	6.55E-02	6.55E-02	0	0	-5.05E-02	-1.5E+00

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 m³ Biofiber (1000 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C3/1	C4	C4/1	D	D/1
HWD	kg	1.66E-07	0	1.52E-10	1.01E-08	1.01E-08	0	0	1.15E-08	-2.46E-07
NHWD	kg	8.12E+01	0	7.5E-03	9.95E-02	9.95E-02	0	0	-7.03E-02	1.28E-01
RWD	kg	3.88E-02	0	9.21E-05	2.16E-02	2.16E-02	0	0	-5.99E-03	-7.04E-01
CRU	kg	0	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	1E+03	0	0	0	0	0
MER	kg	0	0	0	0	1E+03	0	0	0	0

EEE	MJ	0	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0	0

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 m³ Biofiber (1000 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C3/1	C4	C4/1	D	D/1
PM	Disease incidence	ND	ND	ND	ND	ND	ND	ND	ND	ND
IR	kBq U235 eq	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND	ND	ND	ND
SQP	SQP	ND	ND	ND	ND	ND	ND	ND	ND	ND

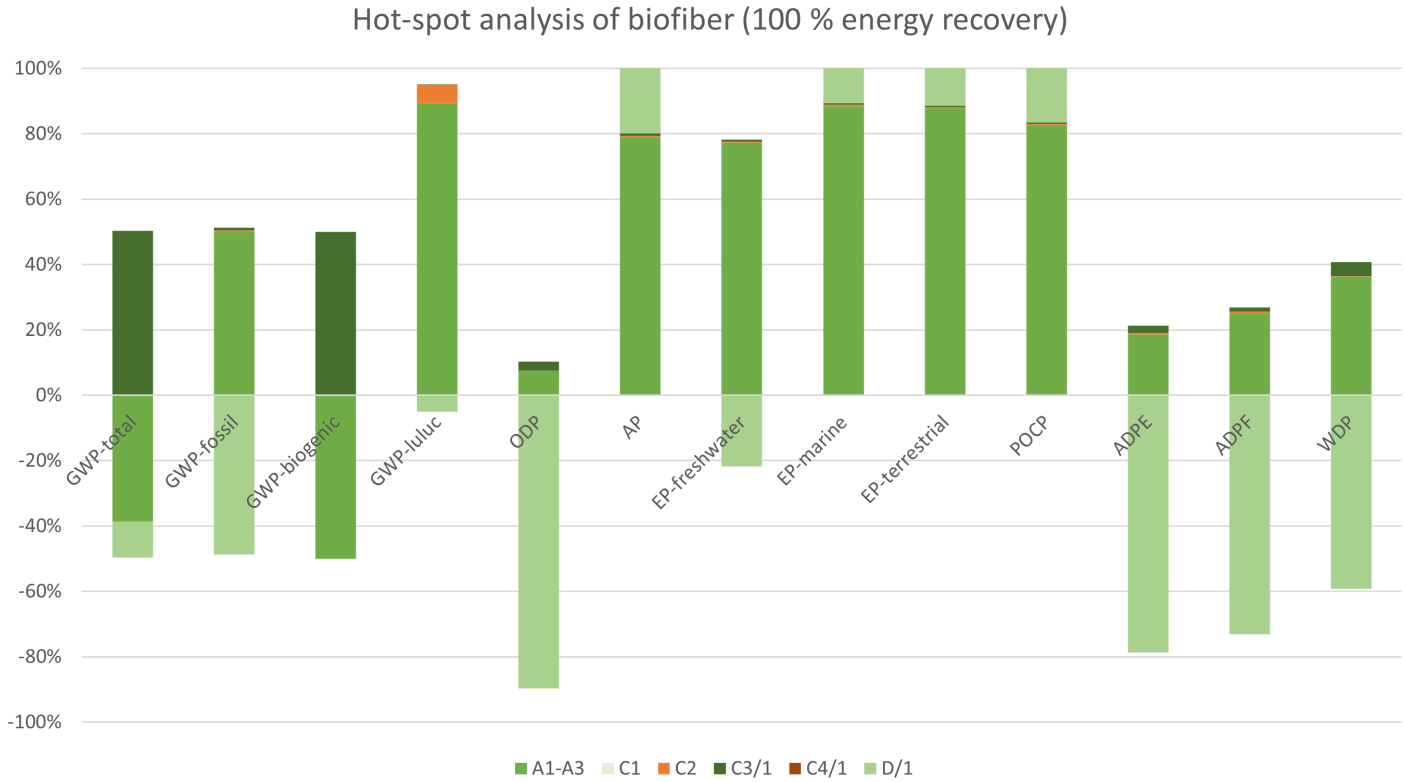
PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); 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 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 referenced to a declared unit of 1 m³ Fundermax Biofiber with an average density of 1000 kg/m³.



Two end of life scenarios are considered: Scenario 0 declares material recycling, scenario 1 declares energy recovery.

A comparison of the individual phases shows a clear dominance of the production phase for most indicators (modules A1–A3). The environmental impacts of the production phase are mainly dominated by the supply of energy for the production of the biofiber panels.

Looking closer at the contribution of the biogenic global warming potential (GWP-biogenic) and of the total global warming potential (GWP-total), the carbon storage effect of wood 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 panels is released into the atmosphere as biogenic carbon dioxide emissions. This is recognizable as a contribution to the greenhouse effect from biogenic emissions.

In scenario 0, the material recycling scenario, due to the recyclability of the products at the end of life, the production of

low-quality sawmill by-products can be avoided. The prerequisite for this is that the product can be dismantled homogeneously and that secondary material meets the quality requirements in the downstream product system. Module D shows the recycling potential of the biofiber boards at the end of the product's life. The substitution of low-quality sawmill by-products results in corresponding environmental benefits. The environmental impacts from the transport to recycling (module C2) and the chipping of the biofiber boards as starting material for the subsequent material recycling (C3) contribute a small proportion to the environmental impact of the product.

Scenario D/1, shows the substitution potential from energy recovery. The use of the energy stored in the biofiber panels can avoid emissions from the use of (primarily) fossil fuels. Transport to energy recovery (module C2) contributes to a small proportion to the environmental impact of the product.

The conversion of the LCA results of the biofiber boards to product thicknesses other than the reference thickness declared, is done linearly via the surface weight. It can be assumed that the results are highly representative.

Due to the update of the underlying methodology in accordance with *EN 15804*+A2, the results of the previous EPD (EPD-FMX-2012221-DE) are not directly comparable with the present, updated version.

7. Requisite evidence

7.1 Formaldehyde
Test laboratory: Entwicklungs- und Prüflabor Holztechnologie GmbH, Zellescher Weg 24, 01217 Dresden, Germany
Test report acc. to *EN 717-1* 02.12.2021
Formaldehyde Emission 0.02 ppm

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7.2 VOC Emission
Test laboratory Holzforschung Austria
Test report 08.07.2010
The analysed product fulfils the requirements of the AgBB-scheme:

Name	Value	Unit
TVOC	47	µg/m³
SVOC	0	µg/m³
R	0.065	-
VOC without NIK	5.2	µg/m³
Carcinogens	0	µg/m³

8. References

Standards

EN 622-2
EN 622-2:2004-07, Fibreboards. Specifications - Part 2. Requirements for hardboards.

EN 717-1
DIN EN 717-1:2021-05, Wood-based panels. Determination of formaldehyde release - Part 1. Formaldehyde emission by the chamber method.

EN 12369
DIN EN 12369:2001-04, Wood-based panels. Characteristic values for structural design.

EN 13501-1
EN 13501-1:2019-05, Fire classification of construction products and building elements - Part 1. Classification using data from reaction to fire tests.

EN 13823
DIN EN 13823:2023-04, Reaction to fire tests for building products - Building products excluding floorings exposed to the thermal attack by a single burning item.

EN 13986
EN 13986:2004+A1:2015, Wood-based panels for use in construction. Characteristics, evaluation of conformity and marking.

EN 14322
EN 14322:2022, Wood-based panels. Melae faced boards for interior uses. Definition, requirements and classification.

EN 15804
DIN EN 15804:2012-04+ A2:2019+AC:2021, Sustainability of construction works - Environmental Product Declarations - Core rules for the product category of construction products.

ISO 1183-1
ISO 1183-1:2019-09, Plastics. Methods for determining the density of non-cellular plastics -Part 1. Immersion method, liquid pycnometer method and titration method.

ISO 11925-2
ISO 11925-2:2020-07, Reaction to fire tests. Ignitability of products subjected to direct impingement of flame - Part 2. Single-flame source test.

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

ISO 14044
DIN EN ISO 14044:2006-10, Environmental management. Life cycle assessment. Requirements and guidelines.

Further literature

Formaldehyd Emission 2021
Test laboratory: Entwicklungs- und Prüflabor Holztechnologie GmbH, Zellescher Weg 24, 01217 Dresden, Germany.

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

Candidate list
List of substances of very high concern for authorisation (14.06.2023), published in accordance with Article 59(10) of the REACH Regulation. European Chemicals Agency.

LCA FE
LCA FE 10, LCA for Experts Software System and Database for Life Cycle Engineering. Version 10.7.1.28. Sphera, 1992-2023.

MLC
MLC 2023.2, Database for Life Cycle Engineering implemented in LCA for Experts software system. DB v10.7 2023.2. Sphera, 1992-2023. Available at: https://lcadatabase.sphera.com/.

PCR Part A
Product category rules for building-related products and services. Part A: Calculation rules for the life cycle assessment and requirements for the project report in accordance with EN 15804+A2:2019. Version 1.3. Berlin: Institut Bauen und Umwelt e.V. (eds.), 2022.

PCR Wood-based panels
Product category rules for building-related products and services. Part B: EPD requirements for wood-based panels, Version 10, Berlin: Institut Bauen und Umwelt e.V., 30 April 2024.

REACH Regulation
Reach Regulation N° 1907:2006, Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006.

Rüter & Diederichs, 2012
Rüter, S.; Diederichs, S.: Basic life cycle assessment data for construction products made of wood. Working report from the Institut for Holztechnologie und Holzbiologie No. 2012/1. Hamburg: Johann Heinrich von Thünen Institut.

VOC Emission 2010
Test laboratory: Holzforschung Austria.

Publisher

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