ENVIRONMENTAL-PRODUCT DECLARATION

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

Owner of the Declaration	Fritz EGGER GmbH & Co. OG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-EGG-20200250-IBC2-EN
Issue date	10/05/2021
Valid to	09/05/2026

Medium Density Fibreboards EGGER MDF

EGGER Holzwerkstoffe Brilon GmbH & Co. KG

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

EGGER Holzwerkstoffe Brilon GmbH & Co. KG

Programme holder

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

Declaration number

EPD-EGG-20200250-IBC2-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

10/05/2021

Valid to

09/05/2026

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

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

Medium Density Fibreboards EGGER MDF

Owner of the declaration

Fritz EGGER GmbH & Co. OG
Weiberndorf 20
6380 St. Johann in Tirol
Austria

Declared product / declared unit

1 m³ medium density fibreboard MDF (736 kg/m³) with a moisture content of 6%

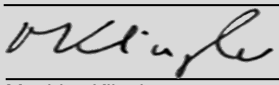
Scope:

This document refers to medium density fibreboards EGGER MDF, produced with an average glue mix at the site in Brilon, Germany.
The production conditions in Brilon are comparable to those of the other plants. They correspond to the technologies and standards used in all locations.
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 bezeichnet*.

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

Raw MDF boards are board-type materials for dry furniture and interior design in accordance with *EN 622-5:2009, Fibreboards. Specifications. Requirements for dry process boards (MDF).* The average glue mix across all board types is considered. The production conditions of the Brilon site are comparable to those of the other plants. They correspond to the technologies and standards used in all locations. Regulation (EU) no. 305/2011 (CPR) applies to bringing the product into circulation in the EU/EFTA (with the exception of Switzerland). The product requires a declaration of performance declaration 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.

Relevant national regulations apply to use.

2.2 Application

Due to their homogeneous structure, MDF boards can be milled three-dimensionally and then painted or faced with a foil in a membrane press. They are predominantly used coated and as furniture boards. They are used, for example, as deep drawer fronts in the kitchen area.

2.3 Technical Data

Egger MDF boards are building products according to the harmonised standard *EN 13986*

Structural engineering data

Technical data for EGGER MDF-ST E1CE:

Name	Value	Unit
Gross density 15-19 mm according to EN 323	670 - 730	kg/m^3
Grammage 18 mm	121 - 131	kg/m^2
Transverse tensile strength according to EN 319	0.54-0.72	N/mm²
Bending strength 12-19 mm according to DIN EN 310	> 25	N/mm²
Bending elastic modulus according to EN 310	2.400-3.000	N/mm²
Swelling 24 h according to EN 317	7-15	%
Surface soundness according to EN 311	1.0	N/mm²
Screw extraction surface	1080	N
Sand content	0.02	%
Surface absorption	210	mm
Material dampness at delivery according to EN 322	4 - 8	%
Formaldehyde emissions according to EN 717-1	E1)*1, E1E05)*2, TSCA)*3, F****)*4	µg/m^3
Thickness tolerance 12-19 mm according to DIN EN 324	±0,2	mm
Thermal conductivity according to EN 13986	1 - 14	W/(mK)
Water vapour diffusion resistance factor according to EN 13986	12 - 30	-
Sound absorption according to EN 13986	0.10-0.20	
Room sound improvement	-	Sone
PCP content according to EN 13986	< 5	ppm
Biological durability according to EN 335-3 (without ground contact; dry 20°C/65% RLF)	Hazard class 1	

*1) E1: According to *EN 13986+A1:2015-04* formaldehyde class E1, a limit value of 8 mg HCHO/100 g absolutely dry board may not be exceeded by the perforator method according to *ISO 12460-5*.

*2) E1E05: According to the *ChemVerbotsV*, coated and uncoated wood-based materials may not be placed on the market in DE if the compensation concentration of formaldehyde caused by the wood-based material in the air of a test room according to *EN 16516* exceeds 0.1 ml/cbm (ppm).

*3) TSCA: According to the US Toxic Substances Control Act (*TSCA Title VI*), MDF boards may not exceed 0.11 ppm and thin MDF may not exceed 0.13 ppm according to test chamber method *ASTM E 1333*.

*4) F****: According to Japanese standard *JIS A 5905*, the uncoated MDF board complies with the limit (mean) of ≤ 0.3 mg HCHO/L according to desiccator method *JIS A 1460*.

Performance values of the product according to the declaration of performance in relation to its essential characteristics according to *EN 622-5:2009*, *Fibreboards - Requirements - Part 5: Requirements for dry process boards (MDF).*

2.4 Delivery status

Standard size [mm]: 2,800 × 2,070 & 4,110 x 2,070
thicknesses range [mm]: 8-38

2.5 Base materials/Ancillary materials

MDF boards with a thickness between 2.4 and 40 mm and an average density of 736 kg/m³ consisting of (information in weight % per 1 m³ of production):

- Wood
  chips, wood type mainly spruce and pine, approximately 81 %
- Water
  approx. 5-7 %
- UMF glue
  (melamine-urea-formaldehyde resin) approx. 12%
- Ammonium
  phosphate (fire retardant, only in Flammex product variant)
- Paraffin
  wax emulsion <1 %

The product contains substances on the *ECHA List* of substances of very high concern (16.01.2020) above 0.1% by weight: no.

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

Biocidal products have been added to this building product or it has been treated with biocidal products (this refers to treated goods within the meaning of the Biocidal Products Regulation (EU) No. 528/2012): no.

2.6 Manufacture

1. Peeling logs2. Chipping the wood to produce chips
3. Cooking the chips
4. Defibration in the refiner
5. Drying the fibres to approximately 2 – 3 % residual moisture
6. Application of resin to the fibres
7. Spreading the glue-coated fibres onto a forming belt
8. Compression of the fibre mat in a continuously operating hot press
9. Cutting and trimming the fibre strand into rawboard formats
10. Cooling the rawboards in star coolers
11. Piling into large stacks
12. Sanding the upper and lower sides after the acclimatisation phase

All plants where EGGER MDF boards are produced are certified with a quality management system in accordance with *ISO 9001*.

2.7 Environment and health during manufacturing

Employee training on environmental and health aspects takes place on a regular basis. Emissions are kept well below the thresholds prescribed by law by means of the latest exhaust air treatment facilities. There is no impact on water or soil. Waste water from production and waste water from the exhaust air treatment process is treated internally and returned to production. Noise protection measurements show that all readings from inside and outside the production plant fall below German limit levels. Noise-intensive parts of the plant such as debarking and chipping are structurally enclosed. All waste streams are collected separately as far as possible and fed to a downstream use or recycling facility.

2.8 Product processing/Installation

EGGER MDF boards can be sawed and drilled with regular (electrical) machines. Hard metal tipped tools are recommended, particularly in the case of circular saws. Wear a respiratory mask if using hand tools without a dust extraction device. In the course of processing and installing MDF boards, compliance with the safety regulations commonly applicable to processing is required (safety goggles, face mask in case of dust development). Observe all liability insurance association regulations for commercial processing operations.

2.9 Packaging

Raw MDF boards are delivered in composite systems for further processing. The stacked pallets are wrapped with cardboard and fixed in place with packaging straps.

2.10 Condition of use

The component materials comply in terms of their proportions to those of the basic material composition described in section 2.6. In the course of pressing, the aminoplast resin (UMF) is cross-linked in three dimensions by a polycondensation reaction under the addition of heat. The bonding agents are chemically stable and mechanically bonded to the wood under normal conditions.

2.11 Environment and health during use

Environmental protection: When the described products are used properly in accordance with the area of application, there is no risk of water, air or ground contamination according to the current state of knowledge.

Health aspects: There are no known health hazards or effects to be expected from normal use, i.e. in accordance with the intended uses of MDF boards. Natural wood constituents may be released in small quantities. With the exception of minor amounts of formaldehyde in quantities that are harmless to health, no emissions of hazardous substances can be detected (evidence see section 7.1).

2.12 Reference service life

The service life of MDF fibreboards depends on the area of use in the specific project, taking into account the use class according to *EN 1995-1-1*, *DIN 68800-2* and appropriate maintenance.

For general fixtures/furnishing systems, the *BBSR Table* "Useful lives of components for life cycle analyses according to the BNB" gives a range of 10 to 40 years (KG 371-378). These useful lives are based on empirical values and are used to develop forecast scenarios for further LCAs. No binding statements (warranties, construction contracts, expert opinions, etc.) can be derived from the data. The type of chemical or structural wood protection, temperature, humidity, UV radiation, frequency and extent of room climate changes as well as the presence of standing water have a significant influence on the ageing of the product.

2.13 Extraordinary effects

Fire

From a thickness of 9 mm and a bulk density of > 600 kg/m3, EGGER MDF complies with fire classification D as per *EN 13501-1* and falls into the categories s2 (normally smoky) and d0 (non-dripping). EGGER MDF boards do not melt when exposed to heat; burning droplets are not possible. For increased fire protection requirements there is EGGER MDF Flammex (B-s1, d0).

Fire protection EGGER MDF / MDF Flammex

Name	Value
Building material class	D / B
Burning droplets	s2 / s1
Smoke gas development	d0 / d0

Water

No water-polluting substances are washed out. EGGER MDF boards are not resistant to the long-term effects of water

(change to the mechanical properties from swelling of the fibres), yet damaged
areas can easily be replaced at a local level.

Mechanical destruction
The fracture pattern of an MDF board shows relatively brittle behaviour, with the possibility of sharp edges where the boards break (risk of injury).

2.14 Re-use phase
If selectively removed after renovation or end of use in a building, MDF boards can be simply collected separately and reused for the same purpose. MDF boards can also be used for purposes other than the original application. Exceptions to this are boards that have been bonded over their surface.

2.15 Disposal
Residual material, trimmings and packaging materials produced on the construction site must be sorted by waste classes and collected. They should be taken first and foremost for material recycling. If this is not possible, due to the high calorific value of 18.5 MJ/kg (absolute dry), energy recovery at a landfill site is to be favoured. When disposing of the material, the provisions of the local waste disposal authorities are to be taken into account. Waste code according to European Waste Catalogue *EWC*: 17 02 01 / 03 01 05. If not mixed with other materials, EGGER MDF boards can be processed and returned to the manufacturing of wood-based materials.

2.16 Further information
Further information, documents and certificates at www.egger.com.

3. LCA: Calculation rules

3.1 Declared Unit
This environmental product declaration is based on a declared unit of 1 m³ medium density fibreboard EGGER MDF uncoated with an average density of 736 kg/m³ and a delivery moisture of approximately 6 %.

Specification of the declared unit

Name	Value	Unit
Declared unit	1	m^3
Raw density	736	kg/m³
Wood moisture at delivery	6	%
Conversion factor to 1 kg (kg/m³)	736	-

Medium density fibreboard EGGER MDF uncoated is manufactured at the Brilon (DE) site. The calculation of the declared density of the MDF was carried out on a volume-weighted basis. The glue mix of the products was also included in the calculation as a weighted average.

3.2 System boundary
The LCA of the EGGER MDF uncoated includes a cradle-to-gate consideration of the occurring environmental impact with the modules C1-C4 and module D (A1-A3, +C, +D). The following life cycle phases are taken into account in the analysis:

Module A1– A3 | Production stage
The production stage includes the expenses of the raw material supply (logs, scrap wood, sawdust, glue system, auxiliary materials, etc.) as well as the associated transports to the production site in Brilon. Within the plant boundaries, the log yard, wet chip preparation, drying, gluing, spreading, pressing, the sanding line up to the warehouse and shipping are taken into account. Thermal and electrical energy, compressed air and water are provided by central suppliers at the Brilon site. The majority of the electrical energy used is obtained from the German power grid. Both internal wood waste and scrap wood sourced externally are used in the in-house biomass power plant. The system boundary for the scrap wood used in the production is set after sorting and chopping. It is assumed that the end of the waste status has been reached. The system boundary for secondary raw materials according to *EN 15804* applies.

Module C1 | Dismantling / Demolition
Manual dismantling was assumed for the MDF boards. The associated efforts are negligible, which means that no environmental impact from the dismantling of the products is declared.

Module C2 | Transport to waste treatment
Module C2 includes transport to waste treatment. For this purpose, transport by lorry over a distance of 50 km is used as a representative scenario.

Module C3 | Waste processing
Chopping after product disassembly is considered in module C3. The wood products and with them the material-inherent properties leave the product system as secondary fuel in module C3.

Module C4 | Disposal
The scenario used declares the energy recovery of the wood products, which means that no environmental impact from the waste treatment of the products in C4 are to be expected.

Module D | Credits and charges beyond the limits of the product system
The energy utilisation of the product at the end of its life cycle is described in Module D, including energetic substitution potentials as a European average scenario.

3.3 Estimates and assumptions
Assumptions and estimates are used in the absence of a representative background data set to represent the environmental impact of certain raw materials. All assumptions are supported with detailed documentation and correspond to the best possible representation of reality given the available data. A generic data set from the *GaBi* Database for spruce roundwood was used as background data set for roundwood. A large part of the wood processed by EGGER represents coniferous fibrewood. For other wood types used, the data set for spruce roundwood should be considered as an approximation.

In the case of missing measurement data for emissions from the presses, these values were estimated based on the publication by *Rüter & Diederichs 2012*.

3.4 Cut-off criteria
All inputs and outputs for which data are available and from which a significant contribution can be expected are included in the LCA model. Missing data are populated when a data basis is available using conservative assumptions for average data or generic data and are documented accordingly. Only data with a contribution of less than 1% were removed.
Neglecting these data can be justified by the limited effect to be expected. Thus, no processes, materials or emissions were neglected that are expected to make a significant contribution

to the environmental impact of the products under consideration. It can be assumed that the data were recorded in full and that the total sum of the neglected input flows does not exceed 5 % of the energy and mass input. Expenses for machinery and infrastructure were not taken into account.

3.5 Background data

Secondary data are included to represent the background system in the LCA model. These are taken, on the one hand, from the *GaBi* database 2020, SP40 and, on the other hand, from recognised literature sources, such as *Rüter & Diederichs 2012*.

3.6 Data quality

The data was collected via spreadsheets specifically created by EGGER. Questions were answered through an iterative process in writing via e-mail, phone, or in person. Given the intense discussion concerning a representation of material and energy flows in the company that is as close as possible to reality, led by EGGER and Daxner & Merl, the high quality of collected foreground data can be assumed. A consistent and uniform calculating procedure was applied in line with *ISO 14044*. When selecting the background data, the technological, geographical, and time-related representativeness of the data basis was taken into consideration. When specific data was missing, generic data sets or a representative average were used. The *GaBi* background data sets are not older than ten years.

3.7 Period under review

As part of the collection of the foreground data, the life cycle was recorded for the production year 2018. The data are based on the annual volumes used and produced.

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: Germany

3.9 Allocation

The carbon dioxide content and primary energy content of the products have been balanced on the basis of their inherent material characteristics in line with underlying physical relationships. Allocation within the forestry chain is based on the publication of *Hasch 2002* and its update by *Rüter & Albrecht 2007*.

For board production, sawing by-products were also used in addition to roundwood. A price allocation according to *Rüter & Diederichs 2012* and according to the primary data for the sawmill in Brilon was used to calculate the environmental impact of these by-products from the sawing system. The thermal and electrical energy generated in the cogeneration plants is allocated according to exergy.

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. Zur Berechnung der Ökobilanz wurde die *GaBi* Hintergrunddatenbank (DB 2020, SP 40) in der *GaBi*-Software-Version 9 verwendet

4. LCA: Scenarios and additional technical information

Characteristic product properties
Information on biogenic carbon

The biogenic carbon content quantifies the amount of biogenic carbon in the declared building product.

Information describing the biogenic carbon content at the plant gate

Name	Value	Unit
Biogenic carbon content (in the product)	299	kg C/m³
Stored carbon dioxide (in the product)	1096	kg CO2-Äq./m³

Since the end-of-life of the product packaging is not declared in module A5, its carbon uptake is not included in modules A1-A3.

The following technical information represents the basis for the declared module or can be used for the development of specific scenarios in the context of a building evaluation if modules are not
declared (MND).

Biogenic carbon in the product

The biogenic carbon content quantifies the amount of biogenic carbon in the declared building product.

Name	Value	Unit
Biogenic carbon content (in the product)	299	kg/m³
Stored carbon dioxide (in the product)	1096	kg/m³

Since the end-of-life of the product packaging is not declared in module A5, its carbon uptake is not included in modules A1-A3.

Integration into building (A5)

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

Name	Value	Unit
Packaging (PET)	0.0216	kg/dekl. Einheit
Packaging (PE)	0.0158	kg/dekl. Einheit
Packaging (wood)	9.85	kg/dekl. Einheit

Reference utilisation duration

The product is tested according to the normative product requirements. When used according to the rules and the state of the art, the reference service life corresponds to 10-40 years. These periods are to be used for further calculations and do not constitute manufacturer's guarantees.

Name	Value	Unit
Reference service life	10 - 40	a
Life Span (according to BBSR)	10 - 40	a
Life Span (according to BBSR)	10 - 40	a
Declared product properties (at the gate) and finishes	according to EN 622-5	-
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	Service life depending on intended use	-
An assumed quality of work, when installed in accordance with the manufacturer's instructions	according to the processing instructions Eurodekor, available on www.egger.com	-
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	not relevant, given use in interiors	-
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	dry furniture and interior design	-
Usage conditions, e.g. frequency of use, mechanical exposure	according to EN 622-5	-
Maintenance e.g. required frequency, type and quality and replacement of components	regular visual inspection and replacement in case of damage	-

End of life cycle (C1-C4)

Name	Value	Unit
Zur Energierückgewinnung [Ausgleichsfeuchte 12 %]	778	kg/m³

Reuse, recovery and recycling potential (D), relevant scenarios

Name	Value	Unit
Net flow in module D [[balance moisture 12%]]	736	kg/m³
Moisture during thermal reuse	12	%
Processing rate	100	%
Efficiency of the system	61	%

The product reaches the end of the waste status after it is removed from the building, transported for preparation, and the chopping of the product. Energetic utilisation as secondary fuel is assumed for the end of life of the medium density fibreboard EGGER MDF. Energetic utilisation takes place in a biomass power plant. System-specific figures correspond to a European average scenario (EU28), given that the sales market of EGGER MDF is focussed on Europe. The scenario foresees a processing rate of the EGGER MDF after removal from the building of 100%. This assumption must be adapted accordingly after using the results in the context of the building. A balance moisture of 12% must be assumed at the product's end of life. This value may fluctuate significantly depending on the storage of the product prior to energetic utilisation.

5. LCA: Results

The following table contains the LCA results for a declared unit of 1 m³ medium density fibreboard EGGER MDF uncoated with a thickness of 736 kg/m³ (approximately 6 % moisture).

Important remark:
EP-freshwater: This indicator has been calculated as "kg P eq" as required in the characterization model (EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe; http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml).

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 m³ MDF uncoated (736 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	-7.09E+02	0	2.34E+00	1.1E+03	0	-5.43E+02
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	3.79E+02	0	2.33E+00	6.26E+00	0	-5.41E+02
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	-1.09E+03	0	-3.89E-03	1.1E+03	0	-1.61E+00
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	6.67E-01	0	1.87E-02	9.07E-03	0	-5.21E-01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	4.62E-10	0	4.25E-16	1.38E-13	0	-7.81E-12
Acidification potential of land and water (AP)	mol H^+ eq	1.27E+00	0	7.87E-03	1.38E-02	0	4.29E-01
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	1.17E-03	0	7.05E-06	1.67E-05	0	-9.56E-04
Eutrophication potential aquatic marine (EP-marine)	kg N eq	5.35E-01	0	3.55E-03	3.07E-03	0	1.09E-01
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	5.52E+00	0	3.97E-02	3.23E-02	0	1.29E+00
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	1.4E+00	0	6.97E-03	8.42E-03	0	4.59E-01
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	1.47E-04	0	1.87E-07	1.81E-06	0	-1.17E-04
Abiotic depletion potential for fossil resources (ADPF)	MJ	6.85E+03	0	3.09E+01	1.1E+02	0	-1.1E+04
Water use (WDP)	m^3 world eq deprived	1.07E+01	0	2.26E-02	1.36E+00	0	-3.6E+01

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m³ MDF uncoated (736 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	1.3E+03	0	1.79E+00	1.11E+04	0	-2.77E+03
Renewable primary energy resources as material utilization (PERM)	MJ	1.12E+04	0	0	-1.11E+04	0	0
Total use of renewable primary energy resources (PERT)	MJ	1.25E+04	0	1.79E+00	4.88E+01	0	-2.77E+03
Non renewable primary energy as energy carrier (PENRE)	MJ	5.18E+03	0	3.1E+01	1.78E+03	0	-1.1E+04
Non renewable primary energy as material utilization (PENRM)	MJ	1.68E+03	0	0	-1.67E+03	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	6.86E+03	0	3.1E+01	1.1E+02	0	-1.1E+04
Use of secondary material (SM)	kg	0	0	0	0	0	0
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	1.05E+04
Use of non renewable secondary fuels (NRSF)	MJ	6.83E+02	0	0	0	0	1.59E+03
Use of net fresh water (FW)	m^3	1.34E+00	0	2.08E-03	5.64E-02	0	-2.24E+00

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m³ MDF uncoated (736 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	7.57E-05	0	1.43E-06	4.56E-08	0	-3.73E-06
Non hazardous waste disposed (NHWD)	kg	6.12E+00	0	4.92E-03	7.81E-02	0	4.03E-01
Radioactive waste disposed (RWD)	kg	2.15E-01	0	5.72E-05	1.67E-02	0	-9.48E-01
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	0	0	0	0	0	0
Materials for energy recovery (MER)	kg	0	0	0	7.78E+02	0	0
Exported electrical energy (EEE)	MJ	0	0	0	0	0	0
Exported thermal energy (EET)	MJ	0	0	0	0	0	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m³ MDF uncoated (736 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	1.12E-05	0	4.45E-08	1.16E-07	0	-2.32E-06
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	2.1E+01	0	8.43E-03	2.74E+00	0	-1.56E+02
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	1.98E+03	0	2.31E+01	4.71E+01	0	-2.7E+03
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	2.28E-06	0	4.78E-10	1.3E-09	0	-1.07E-08
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	3.47E-06	0	2.75E-08	4.8E-08	0	3.12E-06
Soil quality index (SQP)	SQP	7.53E+04	0	1.08E+01	3.51E+01	0	-2.03E+03

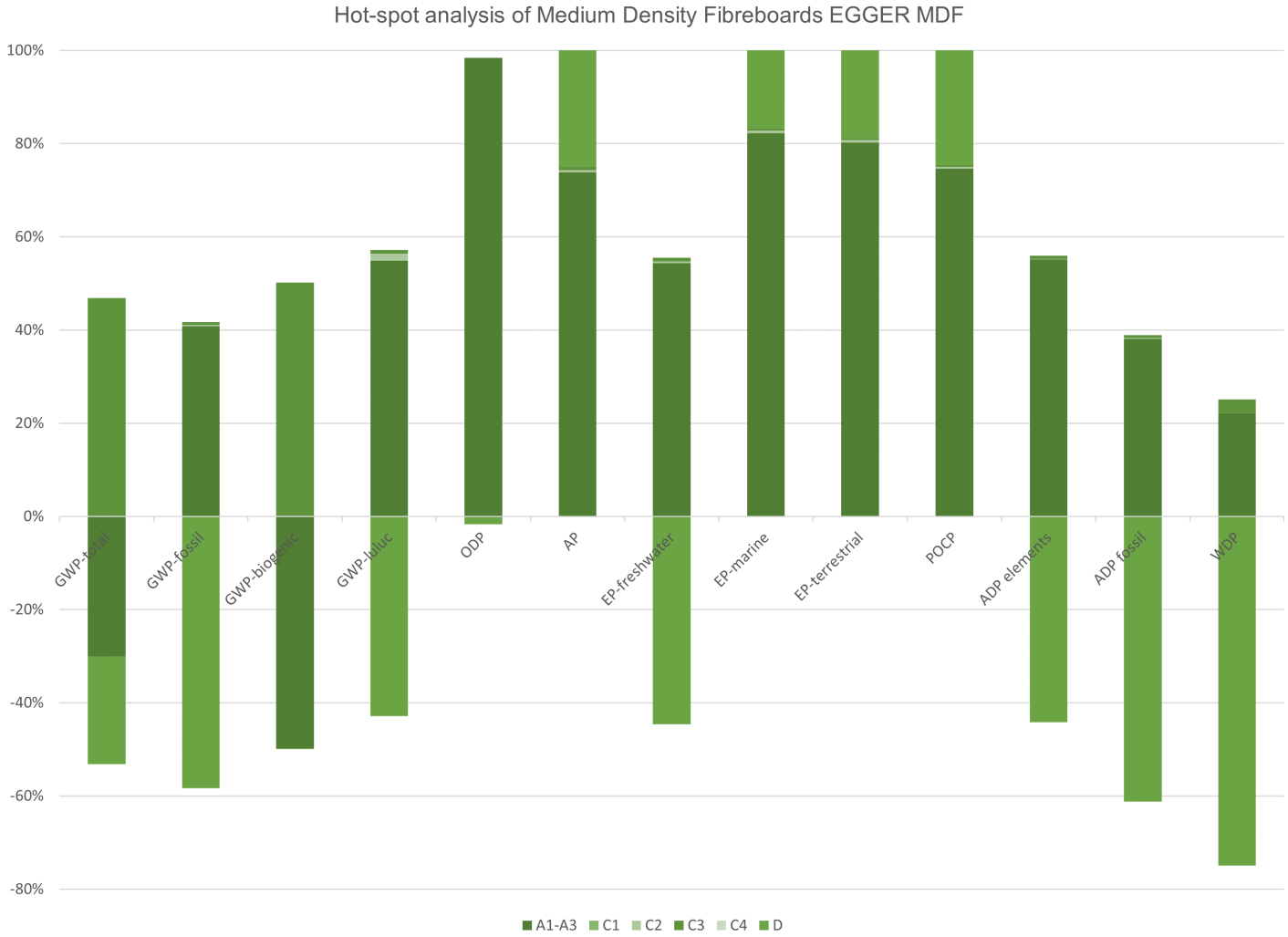
Limitation note 1 - applies to the indicator Potential effect from human exposure to U235:
This impact category mainly addresses the possible effect of low dose ionising radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents and occupational exposure, nor does it consider the disposal of radioactive waste in underground facilities. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.

Limitation note 2 - applies to the indicators Potential for Abiotic Resource Depletion - Non-Fossil Resources, Potential for Abiotic Resource Depletion - Fossil Fuels, Water Depletion Potential (User), Potential Ecosystem Toxicity Comparison Unit, Potential Human Toxicity Comparison Unit - Carcinogenic Effect, Potential Human Toxicity Comparison Unit - Non-Carcinogenic Effect, Potential Soil Quality Index:
The results of this environmental impact indicator need to be used with caution as the uncertainties in these results are high or as there is limited experience with the indicator.

6. LCA: Interpretation

The following interpretation includes a summary of the LCA results relative to a declared unit of 1 m³ average EGGER MDF uncoated board.

For the global warming potential (GWP) during the production phase (Module A1-A3) of the uncoated EGGER MDF board, the total is a negative value. This is due to the material use of wood in the products.
While the tree is growing, the wood stores carbon dioxide as biogenic carbon (negative greenhouse potential) and does therefore not have a greenhouse effect as long as it is stored in the product. Only upon the energy utilisation at the end of the product life cycle (Module C3) does the stored carbon leave the product system as a material-specific characteristic of the secondary fuel.
The negative values in Module D can be explained through the fact that the energy generated by the energetic utilisation of the product is able to replace the combustion of fossil fuels. In this way, more emissions of (mainly fossil) fuels are avoided than those emitted through the use of the energy stored in the wood. Environmental impacts (acidification potential (AP), eutrophication potential (EP), formation potential for tropospheric ozone (POCP)) in module D arise primarily from emissions from the combustion of biomass.



The potential environmental impacts from the provision of electricity and steam as well as the upstream expenses for the production of the UMF gluing system represent the most significant influencing factors in the production of the raw MDF board (module A1-A3) in almost all impact indicators considered.

The use of renewable primary energy (PERT) is due to the material use of biomass in the product. If we look at the use of non-renewable primary energy (PENRT),this is mainly used for the production of the gluing system and the provision of energy from the German electricity mix.

The results of the previous EPD for Medium Density Fibreboard EGGER MDF (EPD-EGG-20150046-IBA1-DE) are not directly comparable with the present, updated version due to the update of the underlying methodology according to *EN 15804+A2.*

7. Requisite evidence

7.1 Formaldehyde emissions

Measurement centre: TC Lab Unterradlberg Test**report:** CTR_BRI_E1E05_503_504_mm_20191001_3 719650 of 25 August 2019
Test basis: Formaldehyde release according to chamber test EN 717-1, raw MDF E1E05 TSCA ST CE
19.0 mm thickness
Result: Formaldehyde concentration in the test chamber: 0.056 mg/m³ or 0.045 ppm. The limit value according to ChemVerbotsV is complied with.

7.2 MDI emissions

No MDI is used in the gluing system of EGGER MDF, no evidence is necessary.

7.3 Testing for pre-treatment of input materials Measurement in accordance with the Waste Wood Ordinance (AltholzVO)

As EGGER MDF does not contain any post-consumer recycling wood, this evidence is not necessary.

7.4 Toxicity of the fire gases

Measuring point: epa Aachen, Division of Flue Gas Toxicology, D
Test report: No. 15/2014 of 25.06.2014
Testing method: Testing the toxic fire gases according to *DIN 4102-1* Category A at 400 °C
Result raw MDF board: The results show that after 30 minutes 25,000 ppm of carbon monoxide were measured in the inhalation room. After 60 minutes, the concentrations in the inhalation room were as follows: Carbon monoxide 40,000 ppm (calculated from this > 50% COHb), carbon dioxide 18,000 ppm and hydrogen cyanide 45 ppm. Sulphur dioxide and hydrogen chloride were not detectable. The relative weight reduction at a test temperature of 400° C was 68.6 %. There was dense white smoke in the inhalation room at the end of the test. The gaseous emissions released under the selected experimental

conditions correspond largely to the emissions released by wood under the same test conditions. Given that the recipe hasn't changed, the said test reports maintain their validity.

7.5 VOC emissions
Unspecified as optional with shortened validity of EPD.

8. References

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EN 310
DIN EN 310:1993, Wood-based panels - Determination of modulus of elasticity in bending and of bending strength.

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DIN EN 311:2002, Wood-based panels - Surface soundness - Test method.

EN 317
DIN EN 317:1993, Particle boards and fibreboards - Determination of swelling in thickness after immersion in water.

EN 319
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EN 322
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EN 323
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EN 324
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EN 335-3
DIN EN 335-3:1995-09, Durability of wood and wood-based products - Definition of hazard classes of biological attack - Part 3: Application to wood-based panels (withdrawn)

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EN 717-1
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ISO 9001
DIN EN ISO 9001:2008-11, Quality Management Systems – Requirements.

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

ISO 14044
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EWC
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