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-20200249-IBC1-EN
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Valid to	09.05.2024

Eurospan Raw Chipboard

Fritz EGGER GmbH & Co. OG

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

Fritz EGGER GmbH & Co. OG

Programme holder

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

Declaration number

EPD-EGG-20200249-IBC1-EN

This declaration is based on the product category rules:

Wood based panels, 08.03.2023
(PCR checked and approved by the SVR)

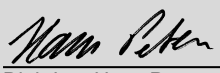
Issue date

10.05.2021

Valid to

09.05.2024

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



Dipl.-Ing. Hans Peters
(Managing Director Institut Bauen und Umwelt e.V.)

Eurospan Raw Chipboard

Owner of the declaration

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

Declared product / declared unit

1 m³ raw chipboard (655 kg/m³) with a moisture content of 6 %

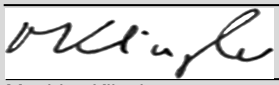
Scope:

This environmental product declaration is based on a declared unit of 1 m³ raw chipboard with an average density of 655 kg/m³ produced with an average glue mix in the plant of 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

Eurospan raw chipboards are board-shaped wood-based materials according to *EN 312*. The board types are primarily differentiated or classified in their application as non-load-bearing and load-bearing elements in dry and humid conditions: P1: General purpose boards for use in dry conditions, P2: Boards for interior furnishings (including furniture) for use in dry conditions, P3: Boards for non-load-bearing purposes for use in humid conditions, P4: Boards for load-bearing purposes for use in dry conditions, P5: Load-bearing boards for use in humid conditions, P6: heavy-duty load-bearing boards for use in dry conditions, P7: heavy-duty load-bearing boards for use in humid conditions (are not produced).

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.

The *EN 312:2010-12, Particleboards - Specifications* also applies.

Relevant national regulations apply to use.

2.2 Application

Raw chipboard is mainly used in decorative interior design and furniture construction. It is used in residential and project furnishings. Raw chipboards Eurospan E1E05 TSCA P2 and Eurospan JP F0.3
F**** MR are used especially for furniture and interior design with increased requirements for formaldehyde emission.

2.3 Technical Data

Structural engineering data

The mechanical properties of Eurospan raw chipboard comply with the standard specifications for board types P1-P6 of *EN 312*. Technical data sheets and the CE declaration of performance are available for further technical details.

Name	Value	Unit
Gross density according to EN 323	655	kg/m^3
Transverse tensile strength according to EN 319	0.20 - 0.40	N/mm²
Grammage Eurodekor with 17.6 mm	116	kg/m^2
Bending strength (longitudinal) according to EN 310	7 - 20	N/mm^2
E-module (longitudinal) according to EN 310	1200 - 3150	N/mm^2
Material dampness at delivery according to EN 322	4 - 13	%
Thermal conductivity according to EN 13986	12 - 18	W/mK
Water vapour diffusion resistance factor	15 - 50	-
Sound absorption coefficient according to EN 13986	1 - 25	%
Airborne sound insulation according to EN 13986	R =13 x lg(mA) + 14 (mA = board surface weight)	kg/m²
Biological durability according to EN 335-3	Hazard class 1 (without ground contact; dry 20°C/65% RLF)	
Formaldehyde emissions according to EN 717-1	E1[1], E1E05[2], TSCA[3], F****4	µg/m^3
PCP content	<5	ppm

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*), chipboard may not exceed 0.09 ppm according to test chamber method *ASTM E 1333*.

4 F****: According to Japanese standard *JIS A 5908*, the uncoated chipboard complies with the limit (mean) of ≤ 0.3 mg HCHO/L according to desiccator method *JIS A 1460*.

Performance values of the product as stated in the declaration of performance in relation to its essential characteristics according to *EN 13986:2004+A1:2015*, *Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking* and *EN 312:2010-12*, *Particleboards - Specifications* (not part of the CE marking).

2.4 Delivery status

Chipboard standard format
Dimensions: 5610 x 2070 & 2800 x 2070 mm
Thickness range: 8 to 40 mm

2.5 Base materials/Ancillary materials

Raw chipboards with a thickness between 2.5 and 40 mm and an average density of 655 kg/m³ consist of (information in

weight % per 1 m³ of production):

- approx. 84-86 % wood weight:
Fresh wood from thinning measures and sawmill residues, mainly spruce and pine, are used for the production of chipboard. Up to 30% of the raw material is covered by recycled wood, which is materially utilised.
- approx. 4-7 % water

- approx. 8-10 % UF glue: consisting of urea-formaldehyde resin. Through polycondensation, the aminoplastic adhesive hardens completely in the pressing process.
< 1 % PMDI glue (polymer diphenylmethane diisocyanate): MDI (diphenylmethane - diisocyanate), a polyurea precursor that is converted into PUR (polyurethane) and polyurea during board production, is used. These serve the purpose of bonding the wood fibres.
- <1 % paraffin wax emulsion: A paraffin wax emulsion is added to the recipe during application as a water repellent (improves moisture resistance).

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

The production process of Eurospan raw chipboard is identical at all producing locations and proceeds according to the following steps:

1. Wood preparation - roundwood
chipping - chip preparation - residual wood preparation
2. Drying the chips to approximately 2 – 3 % residual moisture
3. Sorting the chips
4. Applying glue to the chips
5. Spreading the glue-coated chips onto a forming belt
6. Pressing the chip cake in a continuously operating hot press
7. Formatting of the raw boards
8. Cooling the rawboards in star coolers
9. Sanding the upper and lower sides
10. Stacking into large stacks.

All scraps produced during production (trimming, cutting and milling scraps) are processed and fed back into the production process.

All sites maintain a certified quality management system according to *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 plant components, such as the debarker and cjopper, are appropriately encapsulated by structural measures. All waste streams are collected separately as far as possible and fed to a downstream use or recycling facility.

2.8 Product processing/Installation

Eurospan raw chipboard 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. Detailed information and processing recommendations are available at: www.egger.com

2.9 Packaging

Packaging materials are used that can be separated by type and recycled. The following list contains the waste code number according to *EWC :*

· Chipboard (15 01 03)
· and corrugated cardboard (15 01 01) for covering
· and PET strapping (15 01 02)
· or steel strapping as packaging straps (15 01 04)

2.10 Condition of use

The component materials of raw chipboard comply in terms of their proportions to those of the basic material composition described in section 2.6. During compression, the aminoplast resin (UF) is cross-linked three-dimensionally by an irreversible polycondensation reaction under the application of heat. The bonding agents are chemically stable and permanently bonded to the wood.

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: According to the current state of knowledge, no health hazards or adverse effects are to be expected from normal use of chipboard in accordance with its intended purpose. 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 (see section 7).

2.12 Reference service life

The service life of raw chipboard depends on the area of application in the specific project, taking into account the use class according to *EN 1995-1-1*, *DIN 68800-2* and appropriate maintenance. Resistance in use is defined by the use classes (P1 - P7) (see 2.1).

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.

2.13 Extraordinary effects

Fire
Raw chipboard has the following fire behaviour according to *EN 13501-1.* Change of the aggregate state (burning drip off/fall off): Burning dripping is not possible, as chipboard does not become liquid when heated.

Fire protection

Name	Value
Building material class	D (normal flammability)
Burning droplets	d0 (non-dripping)
Smoke gas development	s2 (normal smoke development)

Water
No hazardous water contaminants are washed out. Chipboard is not resistant to continuous water influence, damaged parts, however, can easily be locally replaced.

Mechanical destruction
The fracture pattern of a chipboard shows a relatively brittle behaviour, whereby sharp edges can occur at the fracture edges of the boards (risk of injury). The resistance to mechanical impact corresponds to the respective board types P1-P6.

2.14 Re-use phase
Eurospan raw chipboard can easily be collected separately in the case of selective dismantling when a building is converted or ends its use phase, and can be re-used or recycled for purposes other than its original application. Exceptions to this are boards that have been bonded over their surface.

Reclamation for energy generation (in approved facilities): With the high calorific value of approx. 16.72 MJ/kg, energy recovery for the generation of process energy and electricity (combined heat and power plants) of chipboard residues accumulating on the construction site and chipboard from demolition measures is preferable to landfilling.

2.15 Disposal
Residues of Eurospan raw chipboard accumulating on the construction site as well as those from demolition measures should primarily be recycled. If this is not possible, they must be sent for energy recovery instead of landfilling (waste code according to the European Waste Catalogue *EWC:* 17 02 01 or 03 01 05).

2.16 Further information
Extensive information and recommendations are available under www.egger.com.

3. LCA: Calculation rules

3.1 Declared Unit
This environmental product declaration is based on a declared unit of 1 m³ EGGER raw chipboard with an average raw density of 655 kg/m³ and a delivery moisture of approximately 6 %.

Specification of the declared unit

Name	Value	Unit
Declared unit	1	m^3
Raw density	655	kg/m³
Wood moisture at delivery	6	%
Conversion factor to 1 kg (kg/m³)	655	-

EGGER raw chipboard is made at the Brilon (DE) plant. The calculation of the declared density of the raw chipboard was carried out on a volume-weighted basis. The glue mix of the products was also included (< 1 % PMDI glue) in the calculation as a weighted average.

3.2 System boundary
The LCA of the average EGGER raw chipboard 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 raw chipboard. 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 combined heat and power systems 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)	278	kg C/m³
Stored carbon dioxide (in the product)	1019	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)	278	kg/m³
Stored carbon dioxide (in the product)	1019	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)	0.054	kg/dekl. Einheit
Packaging (PE)	0.154	kg/dekl. Einheit
Packaging (wood)	11	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	Conforms to EN 312	-
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 EGGER Eurodekor/ Eurodekor Plus, 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	Conforms to EN 312	-
Maintenance e.g. required frequency, type and quality and replacement of components	regular visual inspection and	-

End of life cycle (C1-C4)

Name	Value	Unit
For energy recovery [balance moisture 12%]	692	kg/m³

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

Name	Value	Unit
Net flow in module D [balance moisture 12 %]	659	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. For the end of life of EGGER raw chipboard, energy recovery as secondary fuel is assumed. 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 raw chipboard is focussed on Europe. The scenario foresees a processing rate of the raw chipboard 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 EGGER raw chipboard with a thickness of 655 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).

Disclaimer:
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 raw chipboard (655 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO_2 eq	-8.68E+02	0	2.09E+00	1.03E+03	0	-5.13E+02
Global Warming Potential fossil fuels (GWP-fossil)	kg CO_2 eq	1.47E+02	0	2.07E+00	5.57E+00	0	-5.11E+02
Global Warming Potential biogenic (GWP-biogenic)	kg CO_2 eq	-1.01E+03	0	-3.46E-03	1.02E+03	0	-1.44E+00
Global Warming Potential luluc (GWP-luluc)	kg CO_2 eq	2.47E-01	0	1.67E-02	8.08E-03	0	-4.66E-01
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	3.11E-10	0	3.78E-16	1.23E-13	0	-6.99E-12
Acidification potential of land and water (AP)	mol H^+ eq	4.25E-01	0	7E-03	1.23E-02	0	3.84E-01
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	4.07E-04	0	6.28E-06	1.49E-05	0	-8.56E-04
Eutrophication potential aquatic marine (EP-marine)	kg N eq	1.35E-01	0	3.16E-03	2.73E-03	0	9.73E-02
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	1.54E+00	0	3.53E-02	2.87E-02	0	1.16E+00
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	3.11E-01	0	6.21E-03	7.49E-03	0	4.11E-01
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	9.38E-05	0	1.67E-07	1.61E-06	0	-1.05E-04
Abiotic depletion potential for fossil resources (ADPF)	MJ	3.22E+03	0	2.75E+01	9.8E+01	0	-9.85E+03
Water use (WDP)	m^3 world eq deprived	5.19E+00	0	2.01E-02	1.21E+00	0	-3.22E+01

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m³ raw chipboard (655 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	5.32E+03	0	1.59E+00	1.03E+04	0	-2.48E+03
Renewable primary energy resources as material utilization (PERM)	MJ	1.04E+04	0	0	-1.03E+04	0	0
Total use of renewable primary energy resources (PERT)	MJ	1.57E+04	0	1.59E+00	4.34E+01	0	-2.48E+03
Non renewable primary energy as energy carrier (PENRE)	MJ	2.12E+03	0	2.76E+01	1.19E+03	0	-9.85E+03
Non renewable primary energy as material utilization (PENRM)	MJ	1.1E+03	0	0	-1.09E+03	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	3.22E+03	0	2.76E+01	9.8E+01	0	-9.85E+03
Use of secondary material (SM)	kg	2.71E+02	0	0	0	0	0
Use of renewable secondary fuels (RSF)	MJ	5.51E+02	0	0	0	0	9.81E+03
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	1.04E+03
Use of net fresh water (FW)	m^3	4.96E-01	0	1.85E-03	5.02E-02	0	-2.01E+00

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m³ raw chipboard (655 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	1.38E-04	0	1.28E-06	4.06E-08	0	-3.33E-06
Non hazardous waste disposed (NHWD)	kg	3.7E+00	0	4.37E-03	6.95E-02	0	3.6E-01
Radioactive waste disposed (RWD)	kg	6.62E-02	0	5.09E-05	1.49E-02	0	-8.48E-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	6.92E+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 raw chipboard (655 kg/m³)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	4.45E-06	0	3.96E-08	1.03E-07	0	-2.08E-06
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	6.83E+00	0	7.5E-03	2.44E+00	0	-1.39E+02
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	7.55E+02	0	2.06E+01	4.2E+01	0	-2.41E+03
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	1.38E-07	0	4.25E-10	1.16E-09	0	-9.54E-09
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	1.45E-06	0	2.45E-08	4.27E-08	0	2.79E-06
Soil quality index (SQP)	SQP	2.49E+04	0	9.65E+00	3.12E+01	0	-1.81E+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 raw chipboard.

For the global warming potential (GWP) during the production phase (Module A1-A3) of the EGGER raw chipboard, 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 energy utilisation of scrap wood was modelled CO2 neutral.
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 use of glue and the provision of electricity from the German grid represent the most significant influencing factors in the production of the raw chipboard (modules A1-A3) in almost all of the impact indicators considered. In addition, the upstream forestry processes and the production of the paraffin emulsion used also contribute to the indicators considered. In production, up to 40 % of the wood is covered by recycled wood. The waste wood for material use is included in the calculation unencumbered, whereby the material-inherent properties of wood were taken into account accordingly.

The use of renewable primary energy (PERT) is mainly ue 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, the paraffin emulsion and the provision of energy from the German electricity mix.

The results of the previous EPD for EGGER raw chipboard (EPD-EGG-20140003-IBD1-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
Eurospan E1 P2 CE
Measurement centre: Institut technologique FCBA Forêt, Cellulose, Bois - Construction, Ameublement, Champs-sur-Marne, FR
Test report: no 403/20/071/1-fe of 12.03.2020
Test basis: raw chipboard E1, perforator method according to *ISO 12460-5* standard
Result: Perforator value converted to 7.5 % board moisture 4.6 mg HCHO/100g absolute dry board. All mean values fall below the limit of 8.0 mg HCHO/100g absolute dry board.

Eurospan E1E05 TSCA P2 CE
Measurement centre: Fraunhofer Institut für Holzforschung Wilhelm-Klauditz-Institut WKI
Test report: No. QA-2019-4805 of 12.12.2019
Test basis: *EN 717-1*
Result: Formaldehyde concentration in the test chamber after 267 h: 0.023 mg/m³ or 0.02 ppm. The limit value according to *ChemVerbotsV* is complied with.

7.2 MDI emissions
Measurement centre: Wessling Beratende Ingenieure GmbH,
Test report: IAL-08-0310 of 04.09.2008
Test basis: BIA 7670
Result: The boards to be tested were set with a total area of 1 m² in a 1000-l test chamber with an air exchange of 1 h-1. The edges of the test pieces were sealed with aluminium adhesive tape. Sampling took place 24 h after chamber loading. The obtained sample was analysed for MDI emissions together with the blank value of the emission test chamber. The emission of MDI and other isocyanates in the test chamber were below the detection limit of the analytical method after 2 hours. The test method is identical to the NIOSH P&CAM 142 test required in

the PCR document. Given that the recipe hasn't changed, the said test reports maintain their validity.

7.3 Testing for pre-treatment of input materials
Measurement in accordance with the Waste Wood Ordinance (AltholzVO)
Measurement centre: Eurofins Umwelt West GmbH
Test basis: Continuous testing of the chipboard according to the German AltHolzVO.
Result: statistical mean values of the year 2019 for the Brilon plant, own evaluation of the individual reports

PCP (pentachlorophenol): 0.4 mg/kg dry matter (limit value 3 mg/kg dry matter)
Lead: 5.1 mg/kg dry matter (limit value 30 mg/kg dry matter)
Cadmium: 0.2 mg/kg dry matter (limit value 2 mg/kg dry matter)
Arsenic: all measurements below the limit of determination (limit value 2 mg/kg dry matter)
Mercury: all measurements below the limit of determination (limit value 0.4 mg/kg dry matter)
PCB (polychlorinated biphenyls): all measurements below the limit of determination (limit value 5 mg/kg dry matter total)
Total chlorine compounds: 189 mg/kg dry matter (limit value 600 mg/kg dry matter)
Total fluorine compounds: all measurements below the limit of determination (limit value 100 mg/kg dry matter)

7.4 Toxicity of the fire gases
Measurement centre: 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 chipboard: 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.

AgBB result overview (28 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	-	µg/m^3
Sum SVOC (C16 - C22)	-	µg/m^3
R (dimensionless)	-	-
VOC without NIK	-	µg/m^3
Carcinogenic Substances	-	µg/m^3

AgBB result overview (3 days [µg/m³])

Name	Value	Unit
TVOC (C6 - C16)	-	µg/m^3
Sum SVOC (C16 - C22)	-	µg/m^3
R (dimensionless)	-	-
VOC without NIK	-	µg/m^3
Carcinogenic Substances	-	µg/m^3

8. References

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