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

Owner of the Declaration Fritz EGGER GmbH & Co. OG Holzwerkstoffe
Programme holder Institut Bauen und Umwelt e.V. (IBU)
Publisher Institut Bauen und Umwelt e.V. (IBU)
Declaration number EPD-EGG-20200249-IBC1-EN
Issue date 10.05.2021
Valid to 09.05.2022

Eurospan Raw Chipboard
Fritz EGGER GmbH & Co. OG Holzwerkstoffe
1. General Information

<table>
<thead>
<tr>
<th>Fritz EGGER GmbH &amp; Co. OG Holzwerkstoffe</th>
<th>Eurospan raw chipboard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Programme holder</strong></td>
<td><strong>Owner of the declaration</strong></td>
</tr>
<tr>
<td>IBU – Institut Bauen und Umwelt e.V.</td>
<td>Fritz EGGER GmbH &amp; Co. OG Holzwerkstoffe</td>
</tr>
<tr>
<td>Panoramastr. 1</td>
<td>Weiberndorf 20</td>
</tr>
<tr>
<td>10178 Berlin</td>
<td>6380 St. Johann in Tyrol</td>
</tr>
<tr>
<td>Germany</td>
<td>Austria</td>
</tr>
</tbody>
</table>

| **Declarant number**                   | **Declared product / declared unit** |
| EPD-EGG-20200249-IBC1-EN              | 1 m³ raw chipboard (655 kg/m³) with a moisture content of 6 % |

This declaration is based on the product category rules:
Wood based panels, 12.2018
(PCR checked and approved by the SVR)

**Issue date**
10.05.2021

**Valid to**
09.05.2022

**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.

**Verification**
The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2010

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

Dr. Alexander Röder
(Managing Director Institut Bauen und Umwelt e.V.)

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.
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/m³
Transverse tensile strength according to EN 319 | 0.20 - 0.40 | N/mm²
Grammage Eurodecor with 17.6 mm | 116 | kg/m²
Bending strength (longitudinal) according to EN 310 | 7 - 20 | N/mm²
E-module (longitudinal) according to EN 310 | 1200 - 3150 | N/mm²
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, E1E05², TSCA³, F****4 | µg/m³
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:

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 chipper, 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
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

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building material class</td>
<td>D (normal flammability)</td>
</tr>
<tr>
<td>Burning droplets</td>
<td>d0 (non-dripping)</td>
</tr>
<tr>
<td>Smoke gas development</td>
<td>s2 (normal smoke development)</td>
</tr>
</tbody>
</table>

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 m² EGGER raw chipboard with an average raw density of 655 kg/m³ and a delivery moisture of approximately 6%.

<table>
<thead>
<tr>
<th>Specification of the declared unit</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declared unit</td>
<td>1</td>
<td>m²</td>
</tr>
<tr>
<td>Raw density</td>
<td>655</td>
<td>kg/m³</td>
</tr>
<tr>
<td>Wood moisture at delivery</td>
<td>6</td>
<td>%</td>
</tr>
<tr>
<td>Conversion factor to 1 kg (kg/m³)</td>
<td>655</td>
<td>-</td>
</tr>
</tbody>
</table>

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
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 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.

3.9 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.

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.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogenic carbon content (in the product)</td>
<td>278</td>
<td>kg/m³</td>
</tr>
<tr>
<td>Stored carbon dioxide (in the product)</td>
<td>1019</td>
<td>kg CO₂-Äq./m³</td>
</tr>
</tbody>
</table>

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.

<table>
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<tr>
<th>Name</th>
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<th>Unit</th>
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<td>1019</td>
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</tr>
</tbody>
</table>

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.
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.

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference service life</td>
<td>10 - 40</td>
<td>a</td>
</tr>
<tr>
<td>Life Span (according to BBSR)</td>
<td>10 - 40</td>
<td>a</td>
</tr>
<tr>
<td>Life Span (according to BBSR)</td>
<td>10 - 40</td>
<td>a</td>
</tr>
<tr>
<td>Declared product properties (at the gate) and finishes</td>
<td>Conforms to EN 312</td>
<td></td>
</tr>
<tr>
<td>Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes</td>
<td>Service life depending on intended use</td>
<td></td>
</tr>
<tr>
<td>An assumed quality of work, when installed in accordance with the manufacturer's instructions</td>
<td>according to the processing instructions EGGER Eurodekor/ Eurodekor Plus, available on <a href="http://www.egger.com">www.egger.com</a></td>
<td></td>
</tr>
<tr>
<td>Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature</td>
<td>not relevant, given use in interiors</td>
<td></td>
</tr>
<tr>
<td>Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure</td>
<td>dry furniture and interior design</td>
<td></td>
</tr>
<tr>
<td>Usage conditions, e.g. frequency of use, mechanical exposure</td>
<td>Conforms to EN 312</td>
<td></td>
</tr>
<tr>
<td>Maintenance e.g. required frequency, type and quality and replacement of components</td>
<td>regular visual inspection and</td>
<td></td>
</tr>
</tbody>
</table>

End of life cycle (C1-C4)

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>For energy recovery [balance moisture 12%]</td>
<td>692</td>
<td>kg/m³</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net flow in module D [balance moisture 12 %]</td>
<td>659</td>
<td>kg/m³</td>
</tr>
<tr>
<td>Moisture during thermal reuse</td>
<td>12</td>
<td>%</td>
</tr>
<tr>
<td>Processing rate</td>
<td>100</td>
<td>%</td>
</tr>
<tr>
<td>Efficiency of the system</td>
<td>61</td>
<td>%</td>
</tr>
</tbody>
</table>

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.
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).

**5. LCA: Results**

<table>
<thead>
<tr>
<th>DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRODUCT STAGE</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Raw material</td>
</tr>
<tr>
<td>Raw material</td>
</tr>
</tbody>
</table>

**RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m³ raw chipboard (655 kg/m³)**

<table>
<thead>
<tr>
<th>Core Indicator</th>
<th>Unit</th>
<th>A1-A3</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global warming potential - total</td>
<td>[kg CO₂-Eq.]</td>
<td>-8.8E+2</td>
<td>0.00E+0</td>
<td>2.0E+0</td>
<td>1.0E+3</td>
<td>0.00E+0</td>
<td>-5.1E+2</td>
</tr>
<tr>
<td>Global warming potential - fossil fuels</td>
<td>[kg CO₂-Eq.]</td>
<td>1.4E-1</td>
<td>0.00E+0</td>
<td>2.0E+0</td>
<td>5.5E+0</td>
<td>0.00E+0</td>
<td>-6.1E+2</td>
</tr>
<tr>
<td>Global warming potential - biogenic</td>
<td>[kg CO₂-Eq.]</td>
<td>-1.1E+3</td>
<td>0.00E+0</td>
<td>-3.4E+3</td>
<td>1.0E+3</td>
<td>0.00E+0</td>
<td>-1.4E+4</td>
</tr>
<tr>
<td>GWP from land use and land use change</td>
<td>[kg CO₂-Eq.]</td>
<td>2.4E-1</td>
<td>0.00E+0</td>
<td>1.6E-2</td>
<td>8.0E-3</td>
<td>0.00E+0</td>
<td>-4.6E-1</td>
</tr>
<tr>
<td>Depletion potential of the stratospheric ozone layer</td>
<td>[kg CFCl₃-Eq.]</td>
<td>3.1E-10</td>
<td>0.00E+0</td>
<td>3.7E-15</td>
<td>1.2E-13</td>
<td>0.00E+0</td>
<td>-6.9E-12</td>
</tr>
<tr>
<td>Acidification potential, accumulated exceedance</td>
<td>[mol H⁺-Eq.]</td>
<td>4.2E-1</td>
<td>0.00E+0</td>
<td>7.0E-5</td>
<td>1.2E-2</td>
<td>0.00E+0</td>
<td>3.3E-1</td>
</tr>
<tr>
<td>Eutrophication, fraction of nutrients reaching freshwater end compartment</td>
<td>[kg P-Eq.]</td>
<td>4.0E-4</td>
<td>0.00E+0</td>
<td>6.2E-6</td>
<td>1.4E-5</td>
<td>0.00E+0</td>
<td>-5.9E-4</td>
</tr>
<tr>
<td>Eutrophication, fraction of nutrients reaching marine end compartment</td>
<td>[kg N-Eq.]</td>
<td>1.3E-1</td>
<td>0.00E+0</td>
<td>3.1E-3</td>
<td>2.7E-3</td>
<td>0.00E+0</td>
<td>9.7E-2</td>
</tr>
<tr>
<td>Eutrophication, accumulated exceedance</td>
<td>[mol N-Eq.]</td>
<td>1.5E+0</td>
<td>0.00E+0</td>
<td>3.5E-2</td>
<td>2.8E-2</td>
<td>0.00E+0</td>
<td>1.1E+0</td>
</tr>
<tr>
<td>Formation potential of tropospheric ozone photochemical oxidants</td>
<td>[kg NMOC-Eq.]</td>
<td>3.1E-1</td>
<td>0.00E+0</td>
<td>6.2E-3</td>
<td>7.4E-3</td>
<td>0.00E+0</td>
<td>4.1E-1</td>
</tr>
<tr>
<td>Abiotic depletion potential for non-fossil resources</td>
<td>[kg Sb-Eq.]</td>
<td>9.3E-5</td>
<td>0.00E+0</td>
<td>1.6E-7</td>
<td>1.6E-6</td>
<td>0.00E+0</td>
<td>-1.0E-4</td>
</tr>
<tr>
<td>Abiotic depletion potential for fossil resources</td>
<td>[MJ]</td>
<td>3.2E+3</td>
<td>0.00E+0</td>
<td>2.7E+1</td>
<td>9.8E+1</td>
<td>0.00E+0</td>
<td>-9.9E+3</td>
</tr>
<tr>
<td>Water (user) deprivation potential, deprivation-weighted water consumption (WDP)</td>
<td>[m³ world-Eq. deprived]</td>
<td>5.1E+0</td>
<td>0.00E+0</td>
<td>2.0E-2</td>
<td>1.2E+0</td>
<td>0.00E+0</td>
<td>-3.2E+1</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>A1-A3</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renewable primary energy as energy carrier</td>
<td>[MJ]</td>
<td>5.3E+3</td>
<td>0.00E+0</td>
<td>1.5E+3</td>
<td>1.0E+4</td>
<td>0.00E+0</td>
<td>-2.4E+3</td>
</tr>
<tr>
<td>Renewable primary energy resources as material utilization</td>
<td>[MJ]</td>
<td>1.0E+4</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>-1.0E+4</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>Total use of renewable primary energy resources</td>
<td>[MJ]</td>
<td>1.5E+4</td>
<td>0.00E+0</td>
<td>1.5E+4</td>
<td>4.3E+4</td>
<td>0.00E+0</td>
<td>-2.4E+3</td>
</tr>
<tr>
<td>Non-renewable primary energy as energy carrier</td>
<td>[MJ]</td>
<td>2.1E+3</td>
<td>0.00E+0</td>
<td>2.7E+1</td>
<td>1.1E+3</td>
<td>0.00E+0</td>
<td>-9.8E+3</td>
</tr>
<tr>
<td>Non-renewable primary energy as material utilization</td>
<td>[MJ]</td>
<td>1.1E+3</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>-1.0E+3</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>Total use of non-renewable primary energy resources</td>
<td>[MJ]</td>
<td>3.3E+3</td>
<td>0.00E+0</td>
<td>2.7E+1</td>
<td>9.0E+1</td>
<td>0.00E+0</td>
<td>-9.6E-1</td>
</tr>
<tr>
<td>Use of secondary material</td>
<td>[kg]</td>
<td>2.1E+2</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>Use of renewable secondary fuels</td>
<td>[MJ]</td>
<td>5.5E+2</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>9.8E+3</td>
</tr>
<tr>
<td>Use of non-renewable secondary fuels</td>
<td>[MJ]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>1.0E+3</td>
</tr>
<tr>
<td>Use of net fresh water</td>
<td>[m³]</td>
<td>4.9E+1</td>
<td>0.00E+0</td>
<td>1.8E+1</td>
<td>5.0E+2</td>
<td>0.00E+0</td>
<td>-2.0E+0</td>
</tr>
</tbody>
</table>

**RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m³ raw chipboard (655 kg/m³)**
### RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:

1 m³ raw chipboard (655 kg/m³)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Unit</th>
<th>A1-A3</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous waste disposed</td>
<td>[kg]</td>
<td>1.38E-4</td>
<td>0.00E+0</td>
<td>1.28E-6</td>
<td>4.06E-8</td>
<td>0.00E+0</td>
<td>-3.33E-6</td>
</tr>
<tr>
<td>Non-hazardous waste disposed</td>
<td>[kg]</td>
<td>3.70E+0</td>
<td>0.00E+0</td>
<td>4.37E-3</td>
<td>6.95E-2</td>
<td>0.00E+0</td>
<td>3.66E-1</td>
</tr>
<tr>
<td>Radioactive waste disposed</td>
<td>[kg]</td>
<td>6.62E-2</td>
<td>0.00E+0</td>
<td>5.09E-5</td>
<td>1.49E-2</td>
<td>0.00E+0</td>
<td>-8.46E-1</td>
</tr>
<tr>
<td>Components for re-use</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>Materials for recycling</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>Materials for energy recovery</td>
<td>[kg]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>Exported electrical energy</td>
<td>[MJ]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
<tr>
<td>Exported thermal energy</td>
<td>[MJ]</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
<td>0.00E+0</td>
</tr>
</tbody>
</table>

**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 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, 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 basis: EN 717-1

Result: Formaldehyde concentration in the test chamber after 267 h: 0.023 mg/m² 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])

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC (C6 - C16)</td>
<td>-</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Sum SVOC (C16 - C22)</td>
<td>-</td>
<td>µg/m³</td>
</tr>
<tr>
<td>R (dimensionless)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VOC without NIK</td>
<td>-</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Carcinogenic Substances</td>
<td>-</td>
<td>µg/m³</td>
</tr>
</tbody>
</table>

AgBB result overview (3 days [µg/m³])

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVOC (C6 - C16)</td>
<td>-</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Sum SVOC (C16 - C22)</td>
<td>-</td>
<td>µg/m³</td>
</tr>
<tr>
<td>R (dimensionless)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VOC without NIK</td>
<td>-</td>
<td>µg/m³</td>
</tr>
<tr>
<td>Carcinogenic Substances</td>
<td>-</td>
<td>µg/m³</td>
</tr>
</tbody>
</table>

8. References

Standards

**ASTM E1333**

**DIN 4102-1**
DIN 4102-1:1998-05, Fire behaviour of building materials and elements - Part 1: Classification of building materials Requirements and testing

**DIN 68800-2**

**EN 310**

**EN 312**
DIN EN 312:2010-12, Particleboards - Specifications,

**EN 319**
DIN EN 319:1993-08, Particleboards and fibreboards; determination of tensile strength perpendicular to the plane of the board.

**EN 322**
DIN EN 322:1993-08, Wood-based panels - Determination of moisture content.

**EN 323**

**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)

**EN 717-1**
DIN EN 717-1: 2005:-01, Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emissions according to the test chamber method.

**EN 13501-1**

**EN 13986**
DIN EN 13986:2015-06, Wood-based panels for use in
construction - Characteristics, evaluation of conformity and marking.

EN 15804

EN 16516

EN 1995

ISO 9001

ISO 12460-5

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

ISO 14044

ISO 15686
ISO 15686:2011-05; Buildings and constructed assets - Service life planning.

JIS A 1460
JIS A 1460:2015, Determination of the emission of formaldehyde from building boards - Desiccator method.

JIS A 5908

Additional bibliography

AgBB
German committee for health-related evaluation of building products (AgBB): Approach to health assessment of emissions of volatile organic compounds (VOCs and SVOCs) from building products.

BBSR Table

ChemVerbotsv

ECHA List
List of Substances of Very High Concern (SVHC) Candidate for Authorisation (ECHA Candidate List), dated 25.06.2020, published in accordance with Article 59(10) of the REACH Regulation. Helsinki: European Chemicals Agency.

EWC

GaBi


IBU 2016

PCR Part A

PCR: Holzwerkstoffe

Rüter & Diederichs 2012

TSCA Title VI
US EPA 40 CFR Part 770 "Formaldehyde Emission Standards for Composite Wood Products", Title VI to the Toxic Substances Control Act (TSCA) - 'TSCA Title VI', para 40 CFR § 770.10 (b).