

# 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-20200248-IBC3-EN
Issue date	29.07.2021
Valid to	09.05.2027

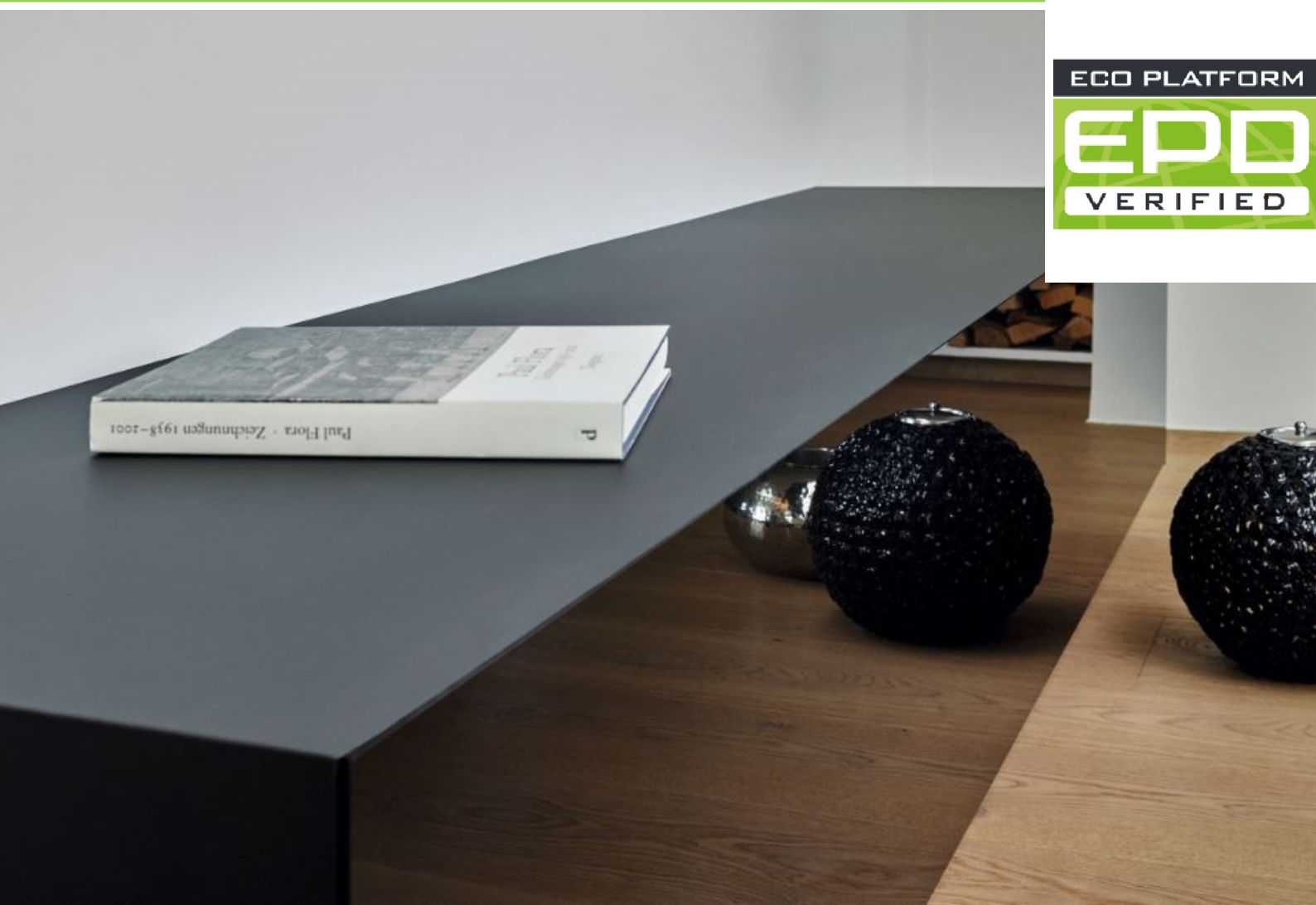
## PerfectSense Lacquered Boards Fritz EGGER GmbH & Co. OG

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ECO PLATFORM

**EPD**  
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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-20200248-IBC3-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

29.07.2021

#### Valid to

09.05.2027



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



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

### PerfectSense Lacquered Boards

#### Owner of the declaration

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

#### Declared product / declared unit

1  
m<sup>2</sup> EGGER PerfectSense Lacquered Board (13.2 kg/m<sup>2</sup>).

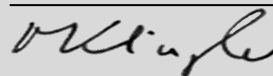
#### Scope:

This document refers to EGGER PerfectSense Gloss and Matt Lacquered Boards, produced in Brilon, Germany. 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	
<input type="checkbox"/>	internally
<input checked="" type="checkbox"/>	externally



Matthias Klingler,  
(Independent verifier)

## 2. Product

### 2.1 Product description/Product definition

PerfectSense

Lacquered Boards are panel-shaped materials according to

*EN*

*622-5, Fibreboards — Specifications — Part 5: Requirements for dry process boards (MDF).*

which

are classified for general purposes in dry conditions.

For

the preliminary product, the MDF coreboard is provided according to the

*EN*

*14322 Wood-based panels - Melamine faced boards for interior uses - Definition, requirements and classification*

with

a melamine resin coating.

The

PerfectSense Lacquered Boards are provided with a one-sided UV coating as standard\*. Due to the homogeneity of the coreboard, a high-gloss surface with a mirror finish effect can be created (PerfectSense Gloss), or a particularly matt surface with a velvety feel and anti-fingerprint properties (PerfectSense Matt).

To

protect the lacquered surface, the PerfectSense Lacquered Board is provided with a protective film, which is peeled off the surface after final processing.

\*The

optionally available double-sided lacquer finish is excluded from the validity

of this EPD. PerfectSense Lacquered Boards with matt and high-gloss surfaces are used in the upmarket furniture segment. PerfectSense

Lacquered Boards are popular in interior design for kitchen fronts and sliding

door elements as well as for bathroom and living room furniture.

### 2.2 Application

PerfectSense Lackplatten mit matter und hochglänzender Oberfläche werden im gehobenen Möbelsegment eingesetzt. Gerne werden PerfectSense Lackplatten in der Inneneinrichtung für Küchenfronten und Schiebetürelemente sowie für Bad- und Wohnmöbel verwendet.

### 2.3 Technical Data

The PerfectSense Lacquered Board has a melamine resin-coated board as coreboard. The definition, requirement and classification of melamine faced boards for interior use and dimensional tolerances are provided by the *EN 14323* standard.

The surface properties of the lacquered

board are regulated by a number of other standards, e.g. the behaviour under

scratching stress according to *EN 15186* or surface defects according to

AMK leaflet *AMK-MB-009*.

For detailed information, please refer

to the technical data sheets available at [www.egger.com](http://www.egger.com).

### Structural engineering data

The following data are based on the EGGER MDF ST E1 TSCA board type according to *EN 622-5* and therefore refer to the

uncoated coreboard of the PerfectSense Lacquered Board.

Name	Value	Unit
Gross density 15-19 mm, EN 323	670 - 730	kg/m <sup>3</sup>
Grammage 18 mm	121 - 131	kg/m <sup>2</sup>
Bending strength (longitudinal) 12-19 mm, EN 310	25	N/mm <sup>2</sup>
E-module (longitudinal) 12-19 mm, EN 310	2700	N/mm <sup>2</sup>
Material dampness at delivery EN 322	4 - 8	%
Thermal conductivity EN 13986	1 - 14	W/(mK)
Water vapour diffusion resistance factor EN 12524 in $\mu$ -dry	20 - 30	-
Sound absorption EN 13986 Tab. 10 250 Hz to 500 Hz	1	%
Formaldehyde emissions according to EN 717-1 (rawboard) *1)*2)	<124	$\mu$ g/m <sup>3</sup>
Surface soundness EN 311	1,0	N/mm <sup>2</sup>
Thickness tolerance 12-19 mm, EN 324	+ - 0.2	mm

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

\*2) TSCA: According to the US Toxic Substances Control Act (*TSCA Title VI*), MDF boards may not exceed 0.11 ppm according to test chamber method *ASTM E 1333*.

Performance values of the product as stated in the declaration of performance in relation to its essential characteristics according to *EN 13986+A1:2015-04, Wood-based panels for use in construction – Characteristics, evaluation of conformity and marking* (not part of the CE marking).

#### 2.4 Delivery status

Standard size [mm]: 2,800 × 2,070

Thickness range [mm]: 10-25

#### 2.5 Base materials/Ancillary materials

##### Preliminary products:

MDF boards between 10 and 25 mm thick with an

average density between 670-730 kg/m<sup>3</sup> consisting of (information in weight % per 1 m<sup>3</sup> of production):

- **approx. 81 % wood weight:** predominantly the wood species spruce and pine

- **approx. 5-7 % water**

- **approx. 12 % UMF glue** (urea-melamine-formaldehyde resin): consisting of urea-formaldehyde resin. Through polycondensation, the aminoplastic adhesive hardens completely in the pressing process.

- **approx. <1 % paraffin wax emulsion:** A paraffin wax emulsion is added to the recipe during application as a water repellent (improves moisture resistance).

- **Ammonium phosphate:** It is added as a fire retardant to the average MDF coreboard (only for Flammex product variants, PerfectSense not available as Flammex).

#### For the coating:

- **Decorative papers:** with a grammage of 60 -120 g/m<sup>2</sup>

- **Melamine formaldehyde resin:** amino-plastic resin for the impregnation of decorative paper for lamination; the resin hardens inside the press into a hard and wear-resistant surface.

#### For lacquering with UV-curing acrylic paint:

- 94.5-97.5% acrylic preparation

- 2.5-5.5% photo-initiators for UV curing.

The paint polymerises completely under UV radiation to a hard surface.

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 base material of a PerfectSense Lacquered Board is a melamine-resin-coated MDF board (EGGER Eurodekor MDF).

### Production of the rawboards (EGGER MDF):

#### 1. Wood preparation

- Roundwood chipping

- Chip preparation

- Residual wood preparation

#### 2. Cooking the chips

#### 3. Defibration in the refiner

#### 4. Drying the fibres to approximately 2-3 % residual moisture

#### 5. Application of resin to the fibres

#### 6. Spreading the glue-coated fibres onto a forming belt

#### 7. Compression of the fibre mat in a continuously operating hot press

#### 8. Cutting and trimming the fibre strand into rawboard formats

#### 9. Cooling the rawboards in star coolers

#### 10. Piling into large stacks

#### 11. Sanding the upper and lower sides after the climatisation phase

### Production of impregnates for coating:

#### 1. Processing the base paper

#### 2. Addition of impregnation resins (MUF) in the plant

#### 3. Drying the impregnated paper in heated dryers

#### 4. Formatting the endless paper by

5. Stacking the formatted sheets on pallets

#### **Coating the MDF rawboard (EGGER Eurodekor):**

1. Laying the impregnated papers onto the upper and lower sides of the rawboard
2. Pressing the board in the hot press with variously structured pressing sheets
3. Sorting by quality and stacking
4. Acclimatisation phase of up to 14 days

#### **Lacquering the laminated MDF board:**

1. Lacquering with adhesive primer, curing by means of UV rays
2. Lacquering with sanding primer, curing by means of UV rays
3. Lacquer intermediate sanding
4. Lacquering with top coat as final surface, curing by means of UV rays
5. Application of protective film
6. Sorting by quality and stacking

A quality management system in accordance with *ISO 9001* requirements is implemented and certified at the production site.

#### **2.7 Environment and health during manufacturing**

Environmental management at EGGER starts with state-of-the-art technologies: The plants are equipped with state-of-the-art wastewater, noise protection and air purification systems.

The EGGER environmental management system runs through the entire company, enabling efficient implementation of environmental objectives and the integration of environmental aspects into work processes. The objective is to ensure compliance with legislation, to avoid or reduce negative operational environmental impact, and to continuously improve environmental performance.

The production plant is certified with an energy management system according to *ISO 50001* and an environmental management system according to *ISO 14001*.

#### **2.8 Product processing/Installation**

EGGER PerfectSense Lacquered 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. Detailed information and processing recommendations are available at: [www.egger.com](http://www.egger.com)

#### **2.9 Packaging**

Wooden chipboard and corrugated cardboard are used for covering, as well as PET packaging straps.

The lacquered surface of the board is also provided with a protective film. This is laminated onto the board immediately after lacquering to protect the surface during further processing.

#### **2.10 Condition of use**

The component materials of laminated MDF board comply in terms of their proportions to those of the basic material composition described in section 2.6 Basic materials.

During compression, the aminoplast resin (UF) is cross-linked three-dimensionally by an irreversible polycondensation reaction under the application of heat.

The bonding agents as well as the paint used 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 PerfectSense Lacquered Boards in accordance with their 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.

**2.12 Reference service life**

The service life of PerfectSense Lacquered Boards 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.

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 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. Einfluss auf die Alterung des Produktes nehmen maßgeblich die Temperatur, Feuchtigkeit, UV-Strahlung, Häufigkeit und Ausmaß von Raumklimaänderungen sowie das Vorhandensein von stehendem Wasser.

**2.13 Extraordinary effects**

**Fire**

The PerfectSense Lacquered Board complies with fire class D according to *EN 13501-1* and falls into categories s2 (normal smoke development) and d0 (non-dripping). PerfectSense Lacquered Boards do not become liquid when heated. Burning dripping is not possible.

The PerfectSense Lacquered Board meets the material properties and end-use conditions according to *EN 13986* and is classified without the need for retesting (CWFT).

**Fire protection**

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

**Water**

No water-polluting substances are washed out. 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 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**

**Re-use / Recycling:** EGGER PerfectSense 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.

**Energy generation (in approved**

**facilities):** With the high average calorific value of approximately 18.5 MJ/kg an energy utilisation for the generation of process energy and electricity (combined heat and energy power plants) from residues from the construction site as well as from demolition measures are to be preferred over dumping.

### 2.15 Disposal

Construction site waste of EGGER PerfectSense, and waste from demolition projects, should primarily be used in materials. If this is not possible, they must be sent for energy

recovery instead of landfilling (waste code according to the European Waste Catalogue EWC: 170201/030105).

The transport packaging materials, chipboard as well as PET packaging straps and the protective film can be recycled as long as they are collected separately. In some cases, external disposal can be arranged with the manufacturer.

### 2.16 Further information

Detailed information and recommendations are available at [www.egger.com](http://www.egger.com).

## 3. LCA: Calculation rules

### 3.1 Declared Unit

This environmental product declaration refers to a declared unit of one square meter of EGGER PerfectSense Gloss and Matt Lacquered Boards produced with an average grammage of 13.2 kg/m<sup>2</sup>.

#### Specification of the declared unit

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Conversion factor to 1 kg	-	-
Raw density	13.2	kg/m <sup>2</sup>

EGGER PerfectSense Gloss and Matt Lacquered Board is made at the Brilon (DE) plant. The surface weight of the PerfectSense Lacquered Board was calculated surface weighted. The calculations of the EURODEKOR products are again based on the averaging of the chipboard and MDF boards, which is volume-weighted. The glue mix of the products was also included in the calculation as a weighted average. The average for the impregnation used for coating was also based on annual production. Given that in this case the quantities of melamine and urea saturating resin depends on the product, the quantities used for the calculation reflect the annual average pro rata.

### 3.2 System boundary

The LCA of the EGGER PerfectSense Gloss and Matt Lacquered Boards 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 for the supply of raw materials (round wood, production of the basic chemicals used for the gluing systems of the wood-based materials, the components of the impregnation such as decorative and kraft paper, production of the paint, auxiliary materials, etc.) as well as the associated transport 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. The EURODEKOR products are also finished by applying an impregnation in the short-cycle presses and then packaged. In the case of PerfectSense Lacquered Boards, the EURODEKOR products are additionally coated with a paint layer. The glue system used is not manufactured on site. 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 removal was assumed for the PerfectSense Lacquered Board. 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 treatment

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)	5.3	kg C/m <sup>2</sup>
Stored carbon dioxide (in the product)	19.3	kg CO <sub>2</sub> -Äq./m <sup>2</sup>

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).

In case a **reference service life** according to applicable ISO standards is declared then the assumptions and in-use conditions underlying the determined RSL shall be declared. In addition, it shall be stated that the RSL applies for the reference conditions only.

The same holds for a service life declared by the manufacturer. Corresponding information related to in-use conditions needs not be provided if a service life taken from the list on service life by BNB is declared.

### 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 EGGER Eurodekor/ Eurodekor Plus, available on <a href="http://www.egger.com">www.egger.com</a>	-
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 Chemical exposure according to EN 12720	Class 1B	-
Usage conditions, e.g. frequency of use, mechanical exposure Behaviour under scratching stress according to EN 15186	Class 4B (matt), 4C (gloss)	-
Maintenance e.g. required frequency, type and quality and replacement of components	regular visual inspection and replacement in case of damage	-

You can find detailed processing and usage instructions for download on the product pages at [www.egger.com](http://www.egger.com).

**End of life cycle (C1-C4)**

Name	Value	Unit
For energy recovery [balance moisture 12%]	14	kg/m <sup>2</sup>

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

Name	Value	Unit
Net flow in module D [balance moisture 12 %]	13.2	kg/m <sup>2</sup>
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 PerfectSense Gloss and Matt Lacquered Boards, 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 PerfectSense Gloss and Matt Lacquered Boards is focussed on Europe. The scenario foresees a processing rate of the PerfectSense Lacquered Boards 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 life cycle assessment results for a declared unit of one square meter of EGGER PerfectSense Gloss and Matt Lacquered Boards produced with an average grammage of 13.2 kg/m<sup>2</sup>.

### 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 m<sup>2</sup> PerfectSense Lacquered Board (13.2 kg/m<sup>2</sup>)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO <sub>2</sub> eq	-1.02E+01	0	4.19E-02	1.94E+01	0	-9.4E+00
Global Warming Potential fossil fuels (GWP-fossil)	kg CO <sub>2</sub> eq	8.87E+00	0	4.17E-02	1.12E-01	0	-9.37E+00
Global Warming Potential biogenic (GWP-biogenic)	kg CO <sub>2</sub> eq	-1.91E+01	0	-6.95E-05	1.93E+01	0	-2.86E-02
Global Warming Potential luluc (GWP-luluc)	kg CO <sub>2</sub> eq	4.11E-02	0	3.35E-04	1.62E-04	0	-9.27E-03
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	2.21E-08	0	7.6E-18	2.46E-15	0	-1.39E-13
Acidification potential of land and water (AP)	mol H <sup>+</sup> eq	2.77E-02	0	1.41E-04	2.47E-04	0	7.63E-03
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	3.42E-05	0	1.26E-07	2.99E-07	0	-1.7E-05
Eutrophication potential aquatic marine (EP-marine)	kg N eq	1.18E-02	0	6.35E-05	5.5E-05	0	1.94E-03
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	1.16E-01	0	7.1E-04	5.77E-04	0	2.3E-02
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	3.08E-02	0	1.25E-04	1.51E-04	0	8.18E-03
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	4.61E-06	0	3.35E-09	3.24E-08	0	-2.09E-06
Abiotic depletion potential for fossil resources (ADPF)	MJ	1.6E+02	0	5.53E-01	1.97E+00	0	-1.96E+02
Water use (WDP)	m <sup>3</sup> world eq deprived	4.47E-01	0	4.04E-04	2.44E-02	0	-6.41E-01

### RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m<sup>2</sup> PerfectSense Lacquered Board (13.2 kg/m<sup>2</sup>)

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	3.18E+01	0	3.2E-02	1.96E+02	0	-4.94E+01
Renewable primary energy resources as material utilization (PERM)	MJ	2.34E+02	0	0	-1.95E+02	0	0
Total use of renewable primary energy resources (PERT)	MJ	2.66E+02	0	3.2E-02	8.73E-01	0	-4.94E+01

Non renewable primary energy as energy carrier (PENRE)	MJ	1.27E+02	0	5.55E-01	3.46E+01	0	-1.96E+02
Non renewable primary energy as material utilization (PENRM)	MJ	3.36E+01	0	0	-3.26E+01	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	1.6E+02	0	5.55E-01	1.97E+00	0	-1.96E+02
Use of secondary material (SM)	kg	0	0	0	0	0	0
Use of renewable secondary fuels (RSF)	MJ	1.34E+01	0	0	0	0	1.83E+02
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	3.07E+01
Use of net fresh water (FW)	m <sup>3</sup>	3.51E-02	0	3.72E-05	1.01E-03	0	-3.99E-02

**RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2:  
1 m<sup>2</sup> PerfectSense Lacquered Board (13.2 kg/m<sup>2</sup>)**

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	2.06E-05	0	2.57E-08	8.16E-10	0	-6.63E-08
Non hazardous waste disposed (NHWD)	kg	1.44E-01	0	8.8E-05	1.4E-03	0	7.17E-03
Radioactive waste disposed (RWD)	kg	5.25E-03	0	1.02E-06	2.99E-04	0	-1.69E-02
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	1.39E+01	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 m<sup>2</sup> PerfectSense Lacquered Board (13.2 kg/m<sup>2</sup>)**

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Incidence of disease due to PM emissions (PM)	Disease incidence	2.8E-07	0	7.96E-10	2.08E-09	0	-4.13E-08
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	5.28E-01	0	1.51E-04	4.9E-02	0	-2.77E+00
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	4.92E+01	0	4.14E-01	8.44E-01	0	-4.8E+01
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	4.34E-08	0	8.55E-12	2.33E-11	0	-1.9E-10
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	8.93E-08	0	4.92E-10	8.58E-10	0	5.55E-08
Soil quality index (SQP)	SQP	1.46E+03	0	1.94E-01	6.27E-01	0	-3.6E+01

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 m<sup>2</sup> average EGGER PerfectSense Gloss and Matt Lacquered Boards.

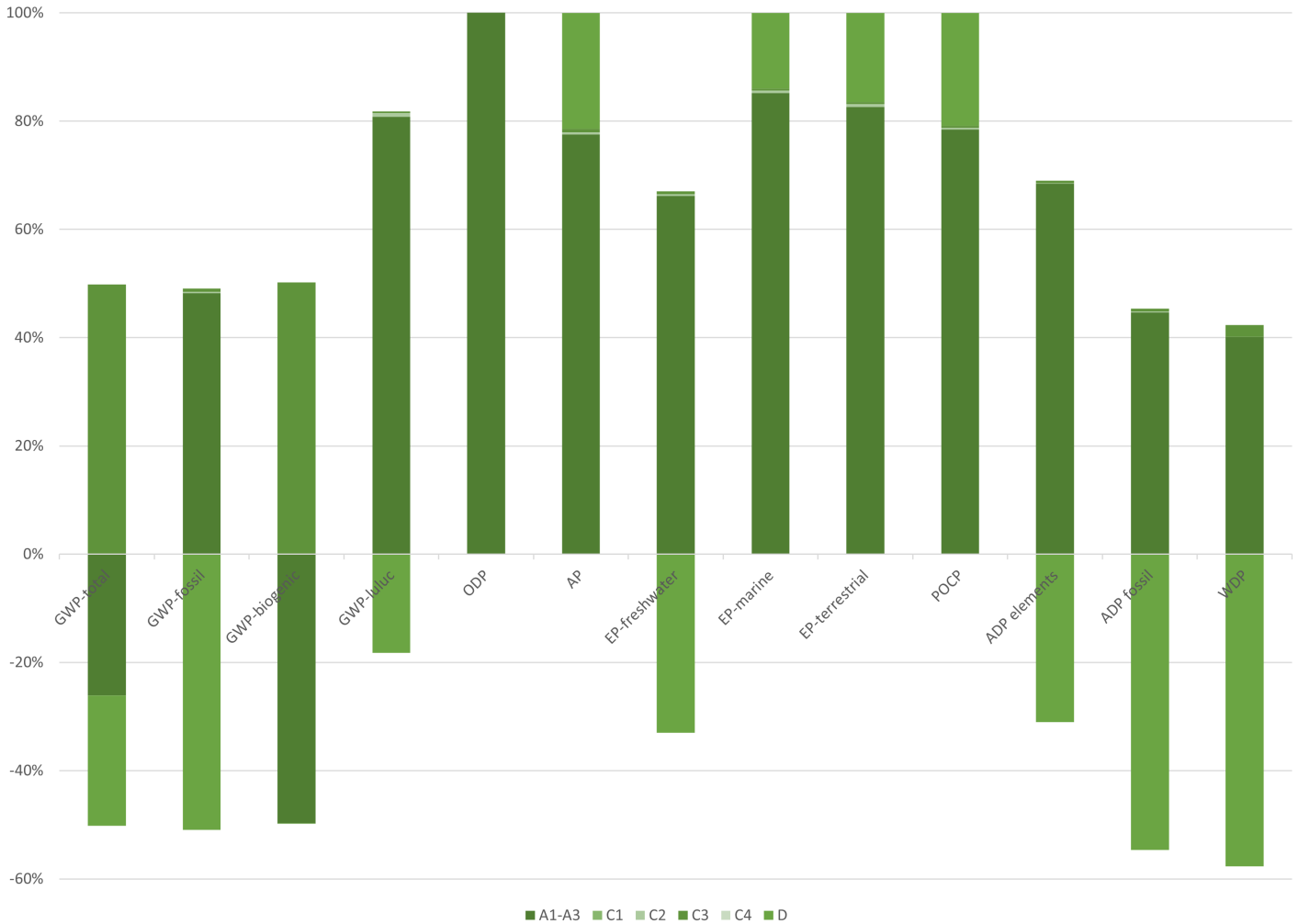
For the global warming potential (GWP) during the production phase (Module A1-A3) of the EGGER PerfectSense Gloss and

Matt Lacquered 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.

The environmental impact (AP, EP, POCP) in Module D is due mainly to emissions from the combustion of the biomass.

Hot-spot analysis of PerfectSense Lacquered Boards



In the production of lacquered PerfectSense products, the manufacture of raw MDF boards, the paint system and the impregnation, including their upstream chains, can be identified as the most significant influencing factors. Electricity and steam supply as well as the upstream costs for the production of the UMF gluing system have the greatest influence on the potential environmental impact from the production of the raw MDF board. In the case of impregnation, the decorative paper as well as urea and melamine impregnation resin play a dominant role with regard to

the environmental indicators considered. The potential depletion of the stratospheric ozone layer (ODP) and

the greenhouse gas emissions from land use change (GWP-luluc) are caused to a good extent by the texture generator used in production.

The use of renewable primary energy (PERT) is due to the material use of biomass in the product. Looking at the use of non-renewable primary energy (PENRT), this is mainly allocated for the production of the rawboards.

## 7. Requisite evidence

As a general rule, all statements must be documented with measured data (presented by the corresponding test certificates). The methods of evidence and the test conditions have to be described together with the results.

If substances are not detected, the limit of detection must be included in the declaration.

Interpreting statements such as "... free of ..." or "... are entirely harmless ..." are not allowed.

If evidence required by the specific PCR part B is not provided, this has to be justified under the respective title for the required evidence.

If relevant for the scope of application of the declared product, or if derivable from its material composition, it is recommended to provide additional adequate evidence.

### Formaldehyde emissions

*Measurement centre:* TCLab Unterradlberg

*Test report:* CTR\_BRI\_E1\_501\_PerfectSenseHochglanz\_19mm\_20200603

*Test basis:* Formaldehyde release of the lacquered board according to chamber method EN 717-1:2004

*Test result:* Measured value 0.015 mg/m<sup>3</sup> and 0.012 ppm. The limit value for formaldehyde class E1 according to the ChemVerbotsV is complied with. **MDI emissions**

The glue system of PerfectSense Lacquered Boards does not contain MDI. Proof is therefore not required. **Testing for pre-treatment of input materials Measurement in accordance with the Waste Wood Ordinance (AltholzVO)**

The MDF coreboard of the PerfectSense Lacquered Board does not contain any waste wood as a raw material. No testing

according to the AltholzVO is required.

### VOC emissions:

#### Measurement

*centre:* Fraunhofer Institut für Holzforschung Wilhelm-Klauditz-Institut WKI Braunschweig, D

*Test report:* No. MAIC-2020-0184 of 15.01.2020

#### Method: Testing

and evaluation of a lacquered wood-based material sample according to *AgBB* scheme 2018

*Test result:* The product tested meets the requirements of the principles for the health assessment of building products (*AgBB* scheme 2018, NIK list 2018).

#### AgBB result overview (28 days [µg/m<sup>3</sup>])

Name	Value	Unit
TVOC (C6 - C16)	≤ 1000	µg/m <sup>3</sup>
Sum SVOC (C16 - C22)	≤ 100	µg/m <sup>3</sup>
R (dimensionless)	≤ 1	-
VOC without NIK	≤ 100	µg/m <sup>3</sup>
Carcinogenic Substances	≤ 1	µg/m <sup>3</sup>

#### AgBB result overview (3 days [µg/m<sup>3</sup>])

Name	Value	Unit
TVOC (C6 - C16)	≤ 300	µg/m <sup>3</sup>
Sum SVOC (C16 - C22)	≤ 30	µg/m <sup>3</sup>
R (dimensionless)	0.602	-
VOC without NIK	≤ 50	µg/m <sup>3</sup>
Carcinogenic Substances	≤ 1	µg/m <sup>3</sup>

## 8. References

## Standards

### ASTM E1333

ASTM E1333:2014, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.

### DIN 68800-2

DIN 68800-2:2012-02, Wood preservation - Part 2: Preventive constructional measures in buildings.

### EN 310

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

### EN 311

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

### EN 322

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

### EN 323

DIN EN 323:2005, Wood-based panels - Determination of density.

### EN 324

DIN EN 324-1:2005, Wood-based panels; determination of dimensions of boards - Part 1: determination of thickness, width and length.

### EN 622-5

DIN EN 622-3:2006-09, Fibreboards - Specifications - Part 5: Requirements for dry process boards (MDF).

### EN 717-1

EN 717-1:2004, Wood-based panels - Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method.

### EN 12524

DIN EN 12524:2000-09-01, Building materials and products - Hygrothermal properties - Tabulated design values.

**EN 12720**

DIN EN 12720:2014-02, Furniture -  
Assessment of surface resistance to cold liquids.

**EN 13501-1**

DIN EN 13501-1:2007-05+A1:2009, Fire  
classification of construction products and building elements -  
Part 1:  
classification with the results of tests on the reaction to fire of  
building  
products.

**EN 13986**

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

**EN 14322**

EN 14322: 2017-03, Wood-based panels -  
Melamine faced boards for interior uses - Definition,  
requirements and  
classification.

**EN 14323**

EN 14323:2017, Wood-based panels -

Melamine faced boards for interior uses - Test methods.

**EN 15186**

EN 15186:2012, Furniture - Assessment  
of the surface resistance to scratching.

**EN 15804**

DIN EN 15804:2012+A2:2019, Sustainability of construction  
works -  
Environmental product declarations - Core rules for the product  
category of  
construction products.

**EN 1995**

DIN EN 1995-1-1:2010-12, Eurocode 5: Design of timber  
structures - Part 1-1:  
General - Common rules and rules for buildings

**ISO 9001**

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

**ISO 12460-5**

ISO 12460-5:2015, Wood-based panels —  
Determination of formaldehyde release — Part 5: Extraction  
method (called the  
perforator method).

## ISO 14001

ISO 14001:2015, Environmental management systems — Requirements with guidance for use.

## ISO 14025

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

## ISO 14044

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

## ISO 15686

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

## 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.

### AMK-MB-009

AMK Leaflet 009:2013-04, Kitchen furniture - Assessment of kitchen furniture surfaces. Arbeitsgemeinschaft Die Moderne Küche e.V.

### BBSR

BBSR 2017, Useful lives of building components for life cycle analyses according to the Sustainable Building Assessment System, 2017, BBSR Germany 2017.

### 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

European Waste Catalogue, Ordinance on the European Waste Catalogue (Waste Catalogue Ordinance - AVV), reference Federal Official Journal I 2001, 3379.

### GaBi

GaBi 9, Software-System and Database for Life Cycle Engineering. DB v8.7 SP 40. Stuttgart, Echterdingen: thinkstep AG, 1992--2020. Available in: <http://documentation.gabi-software.com>.

### **Hasch 2002, Rüter & Albrecht 2007**

Ökologische Betrachtung von Holzspan und Holzfaserplatten  
(Ecological  
Evaluation of Particleboard and Wood Fibreboard, dissertation,  
Hamburg  
University – revised 2007: Rüter, S. (BFH HAMBURG;  
Holztechnologie), Albrecht,  
S. (Uni Stuttgart, GaBi).

### **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).

### **IBU 2016**

Institut Bauen und Umwelt e.V.:  
General EPD Programme Guidance of the Institut Bauen und  
Umwelt e.V.. (IBU).  
Version 1.1, Berlin: Institut Bauen und Umwelt e.V., 2016.  
[www.ibu-epd.com](http://www.ibu-epd.com).

### **PCR Part A**

Product category rules for building-related products and  
services. PART A:  
Calculation rules for the ecological balancing and requirements  
towards the  
project report according to EN 15804+A2:2019. Version 1.0.  
Berlin: Institut  
Bauen und Umwelt e.V. (eds.), 2020.

### **PCR: Wood-based materials**

Product category rules for building-related products and  
services. PART B: Requirements  
of EPD wood-based materials. Version 1.1. Berlin: Institut  
Bauen und Umwelt  
e.V., 12.2018.

### **Rüter & Diederichs 2012**

Life cycle assessment basic data for building  
products made of wood. Arbeitsbericht  
aus dem Institut für Holztechnologie und Holzbiologie Nr.  
2012/1. Hamburg:  
Johann Heinrich von Thünen-Institut.

The literature referred to in the Environmental Product  
Declaration must be listed in full. Standards already fully quoted



in the EPD do not need to be listed here again.  
The current version of PCR Part A and PCR Part B of the PCR

document on which they are based must be referenced.



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