

# Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

## 1 m<sup>2</sup> of melamine faced particleboard

EPD of multiple products, based on a representative product from

**Cleaf S.p.A.**



The complete list of products can be found in the Product Information section

|                          |                                                                                          |
|--------------------------|------------------------------------------------------------------------------------------|
| Programme:               | The International EPD System, <a href="http://www.environdec.com">www.environdec.com</a> |
| Programme operator:      | EPD International AB                                                                     |
| Type of EPD:             | EPD of multiple products from a company                                                  |
| EPD registration number: | EPD-IES-0025873:001                                                                      |
| Version date:            | 2025-09-23                                                                               |
| Validity date:           | 2030-09-22                                                                               |

*An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see [www.environdec.com](http://www.environdec.com)*



## GENERAL INFORMATION

| Programme Information |                                                                     |
|-----------------------|---------------------------------------------------------------------|
| <b>Programme:</b>     | The International EPD® System                                       |
| <b>Address:</b>       | EPD International AB<br>Box 210 60<br>SE-100 31 Stockholm<br>Sweden |
| <b>Website:</b>       | <a href="http://www.environdec.com">www.environdec.com</a>          |
| <b>E-mail:</b>        | <a href="mailto:support@environdec.com">support@environdec.com</a>  |

| Product Category Rules (PCR)                                                                        |
|-----------------------------------------------------------------------------------------------------|
| <b>CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</b>                        |
| <b>Product Category Rules (PCR): PCR 2019:14 v2.0.1</b>                                             |
| <b>PCR review was conducted by:</b> <i>Technical committee of the International EPD® System</i>     |
| <b>c-PCR:</b> <i>Wood and wood-based products for use in construction, c-PCR-006, version 1.0.0</i> |

| Third-party Verification                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:                                                                                      |
| <input checked="" type="checkbox"/> <b>Individual EPD verification without a pre-verified LCA/EPD tool</b><br>Third-party verifier: Guido Croce<br>Approved by: International EPD System |
| Procedure for follow-up of data during EPD validity involves third party verifier:<br><br><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No                            |

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

Technical support and LCA study development: Studio Fieschi & Soci S.r.l. – [www.studiofieschi.it](http://www.studiofieschi.it)

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison.

For further information about comparability, see EN 15804 and ISO 14025.

## INFORMATION ABOUT EPD OWNER

Owner of the EPD: Cleaf S.p.A.

Address: Via Bottego 15 20851 Lissone MB Italia

Contact: Lorena De Sario, Quality and After-Sales Services Manager

LCA practitioner:

Giulia Messina, Marco Chiappero

Studio Fieschi & soci srl

Corso Vittorio Emanuele II, 18 10123 Torino, Italy

Description of the organisation: Cleaf is a 50-year-old family-owned Italian company specializing in the production of surfaces and solutions for the furniture and interior design sectors. The manufacturing process is organized across four production sites in the Brianza area, each dedicated to one of the following divisions: faced panels, laminates, edges, and semi-finished products. This flexible model enables continuous experimentation to impart intense tactile and visual sensations to the surface coverings.

Product-related or management system-related certifications: Cleaf operates in compliance with an organisational, management and control model pursuant to Legislative Decree No. 231 of 8 June 2001, which includes:

- the Code of Ethics
- the whistleblowing policy
- the policy of adherence to the Declaration on Fundamental Principles and Rights at Work of the International Labour Organisation (ILO-1998).

Cleaf has a chain of custody management system that complies with the FSC-STD-40-004 standard.

Cleaf puts on the market melamine faced panels that comply with European regulations and those of the world's leading countries:

- Regulation (EU) No. 305/2011 of the European parliament and of the council of 9 March 2011 (CPR) on construction products (CE marking; EN 13986)
- EPA TSCA Title VI – CARB P2
- BAnz AT26.11.2018 B2
- Regulation (EC) No. 1907/2006 (REACH)
- Regulation (EU) No. 2019/1021 (POP)
- Commission Delegated Directive (EU) No. 2015/863 (RoHS III)
- Regulation (EU) No. 528/2012 (BPR)

## PRODUCT INFORMATION

Product name: Melamine faced particleboard.

Product identification: Melamine faced particleboard available in single- or double-sided texture. The decorative surface consists of thermoset resin-impregnated paper, in a solid colour or printed design, with a surface texture. It may also include resin-impregnated kraft barrier layers.

UN CPC code: 31431 – Particleboard

Product description:

The company offers over 60 textures characterized by a three-dimensional structure, achieved by engraved pressing plates for faced panels, release rolls for laminates, and mechanical embossing for edges. The textures can be combined with over 800 decor papers mostly designed by Cleaf, after impregnation with water-based thermosetting resins. Decor paper can be mass-dyed solid colours or prints from rotogravure or digital printing.

This product is designed for use in the manufacture of interior furniture, fittings and non-load bearing construction products. The product range includes specific items with improved resistance to humidity or fire. It is not intended for exterior use.



*Figure 1 - Visual representation of the product*

The product is available in thicknesses ranging from 6 to 40 millimeters, with corresponding densities ranging from 800 to 590 kg/m<sup>3</sup>.

The EPD covers all combinations of thicknesses (range from 6 to 40 mm), decors (over 800), textures (over 60), and variants (for use in dry conditions, for use in humid conditions and fire retardant) of melamine faced particleboard, identified by the code NT\*. "NT" refers to melamine faced particleboard, while "\*" represents the specific product code — i.e. the specific combination of the aforementioned features.

Based on sales volumes during the reference year, the declared product was identified as the most sold configuration within the product range: dimensions 18 × 5610 × 2070 mm, with a particleboard core of 18 mm thickness and 650 kg/m<sup>3</sup> density. The panel has a single layer of resin-impregnated decorative paper on both sides.

Name and location of production site:

All products covered by this EPD are manufactured at the plant called “C1” located at Via Bottego 15, 20851 Lissone MB, Italy.

More information and explanatory materials can be found at: [www.cleaf.it](http://www.cleaf.it)

Manufacturing process:

The manufacturing process begins with the retrieval of raw materials from storage. The layers for each panel are arranged according to the required specifications, which may include a particleboard core, decorative resin-impregnated paper, and, if the desired texture requires it, up to three resin-impregnated kraft barrier sheets per side.

The stacked layers are hot-pressed under controlled temperature, pressure and time. This process bonds the layers together, cures the resin, and can impart the desired surface texture using engraved press plates.

After pressing, the panels are optionally cut to customer’s specified dimensions, cooled, packaged for shipment and stored inside indoor warehouses.

## CONTENT DECLARATION

The content declaration refers to 1 m<sup>2</sup> of the representative product, packed and ready for delivery, consisting of a panel with dimensions of 18 × 5610 × 2070 mm. The panel features a particleboard core with a thickness of 18 mm. The panel is faced on both sides with a single layer of resin-impregnated decorative paper.

The representative product was selected as the most sold configuration based on sales volume during the reference year.

The total weight of the product per declared unit equals to 12,44 kg/m<sup>2</sup>.

The moisture content of the panel is in the range of 5–13%, in accordance with EN 312 and EN 322.

| Product content           | Mass, kg                     | Post-consumer recycled material, mass-% of product | Biogenic material, mass-% of product | Biogenic material, kg C/product or declared unit |
|---------------------------|------------------------------|----------------------------------------------------|--------------------------------------|--------------------------------------------------|
| Particleboard             | <b>12,28</b> (5,46 / 27,28)* | 49,8%                                              | 41,2%                                | 5,12                                             |
| Impregnated paper         | <b>0,16</b> (0,16 / 0,16)*   | 0,0%                                               | 0,2%                                 | 0,02                                             |
| Impregnated paper barrier | <b>0,00</b> (0,00 / 0,46)*   | 0,0%                                               | 0,0%                                 | -                                                |
| <b>TOTAL</b>              | <b>12,44</b> (5,62 / 27,90)* | <b>49,8%</b>                                       | <b>41,4%</b>                         | <b>5,14</b>                                      |

\* The mass (kg) range of materials for products included in the EPD is indicated in brackets, in addition to the weight for the representative product in bold.

| Packaging materials | Mass, kg    | Mass-% (versus the product) | Biogenic material, kg C/product or declared unit |
|---------------------|-------------|-----------------------------|--------------------------------------------------|
| Cardboard           | 0,06        | 0,5%                        | 0,02                                             |
| Plastic             | 0,003       | 0,02%                       | -                                                |
| Particle board      | 0,33        | 2,7%                        | 0,14                                             |
| <b>TOTAL</b>        | <b>0,40</b> | <b>3,2%</b>                 | <b>0,16</b>                                      |

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO<sub>2</sub>.

For construction products with EPDs that comply with the EN 15804 standard, the EPD must declare the substances contained in the products that are listed on the "Candidate List of Substances of Very High Concern for Authorization" when their content exceeds the thresholds for registration with the European Chemicals Agency (0.1% by weight/weight).

The articles produced by CLEAF and included in the present EPD do not contain any substances listed on the SVHC list in concentration > 0.1% w/w.

Other information on substances with hazardous and toxic properties:

Formaldehyde emissions are within the limits of:

- EN 13986, EN 14322, EN ISO 12460-3: ≤ 3.5 mg/(m<sup>2</sup>·h), Class E1 (EN 13986)

- BAnz AT26.11.2018 B2, EN ISO 16516:  $\leq 0.1$  ppm, Class E1 (BAnz AT26.11.2018 B2 – E05)
- EPA TSCA Title VI / ASTM E1333-96:  $\leq 0.09$  ppm (CARB Phase 2 – EPA TSCA Title VI).

## LCA INFORMATION

Declared unit: 1 m<sup>2</sup> of faced particleboard.

The representative product selected has a thickness of 18 mm and a mass of 12,44 kg/m<sup>2</sup>.

Time representativeness: May 2024-April 2025

Geographical scope: Europe for Modules A1 and A2, Italy for Module A3, Global for Modules, A5, C1-C4 and D.

Database and LCA software used: Ecoinvent 3.10 – Allocation, cut-off U; SimaPro Craft, v. 10.2.0.2

EN 15804 reference package: EF 3.1

Description of system boundaries: cradle-to-gate with options, modules C1-C4, module D and optional module A5. Module A4 and modules B1-B7 are excluded.

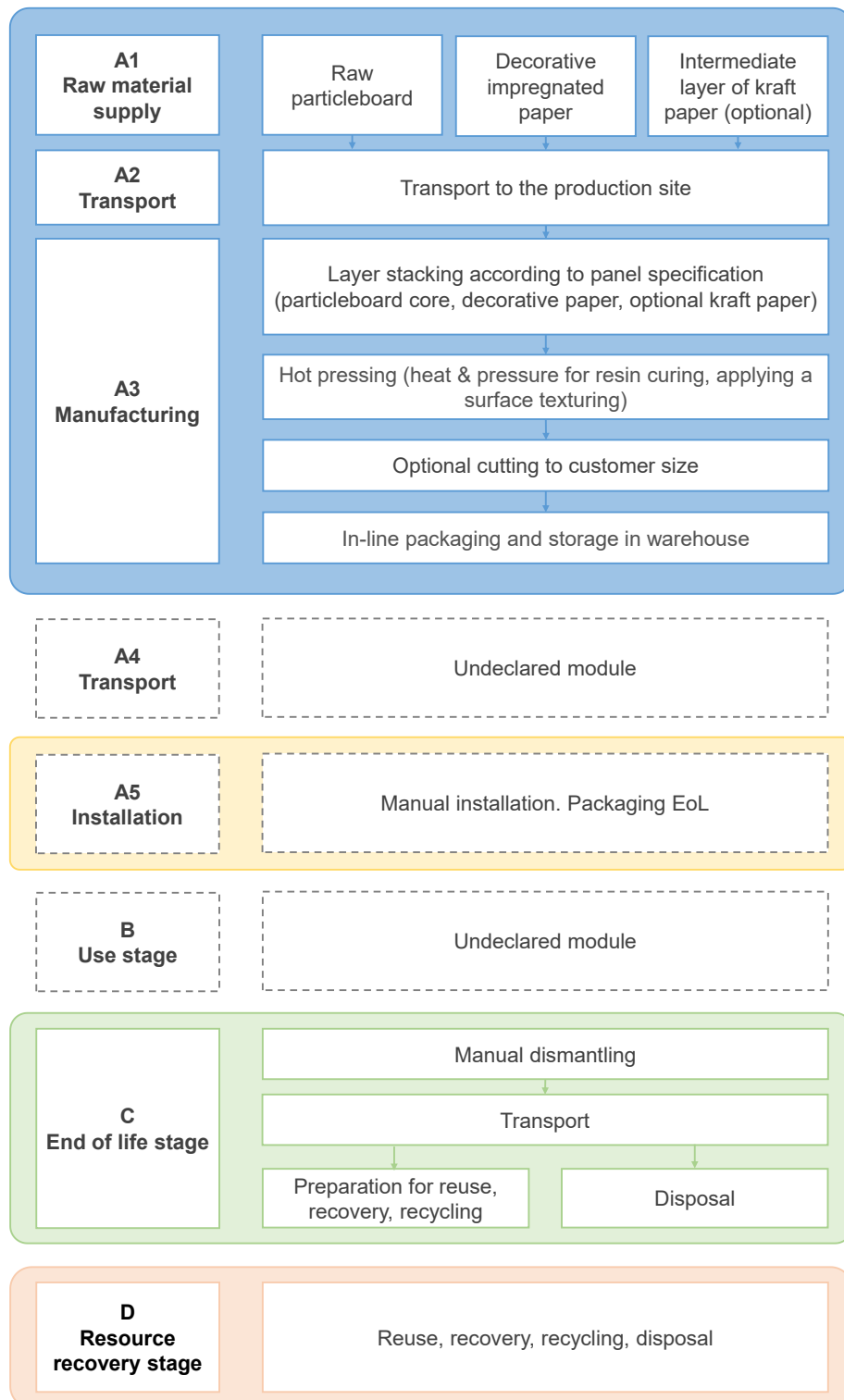
System boundaries include:

- **A1** – Raw material extraction and processing;
- **A2** – Transport of raw materials to Cleaf site;
- **A3** – Manufacturing: Manufacturing of the product, including energy use, water use, auxiliaries, emissions to air, water discharges and waste to be recovered or disposed, upstream production and transport of any losses; upstream production and transport of packaging; production of energy used in manufacturing processes;
- **A5** – Manual assembly and packaging disposal;
- **C1** – Manual disassembly;
- **C2** – Transport of waste products to treatment or disposal facilities;
- **C3** – Waste processing for reuse, recovery and/or recycling;
- **C4** – Final disposal;
- **D** – Estimate of the potential benefits and/or impacts beyond the system boundaries, related to recycling, recovery and incineration at the end of life.

System boundaries do not include:

- Infrastructure and capital goods, with exception for electricity and heat in A3 Module.
- Input and output flows related to personnel (e.g. energy used in offices, transports of employees to and from workplace, water use for toilets, etc).

## Process flow diagram



#### More information:

#### CUT-OFF RULES

Cut-off allows the exclusion of negligible material and energy flows, provided that their omission does not significantly affect the overall results. The rules defined in EN 15804:2012 + A2:2019 §6.3.6 and in PCR 2019:14 §4.4 apply.

Accordingly, the following cut-off were applied: cutting fluid, degreasers, lubricants and release agents used during the manufacturing process in Module A3.

#### ALLOCATION METHODS

A multi-functional process is a process or system that performs more than one function. When it happens, it is necessary to decide how to properly attribute the environmental impacts generated by the system to each single product or co-product. Multifunctional processes were managed as follows:

- Manufacturing-related waste derived from raw materials (e.g., sawdust, wood shavings) was allocated based on the mass of products and co-products.
- Other manufacturing-related input and output flows, excluding the aforementioned, were allocated based on the surface area of products and co-products. This approach reflects the surface-dependent nature of the production process (e.g., hot pressing), where variations are influenced more by area than by mass.

#### RECYCLED MATERIALS

In accordance with the polluter pays principle (PCR 2019:14 §4.5.2), system boundaries are set at the end-of-waste state. For waste to recycling, only transport and preparation for recycling are attributed to the waste producer; impacts from the recycling process itself are assigned to the recycled material.

In the case of post-consumer recycled material of uncoated panels, preparation for recycling, such as sorting and shredding of wood waste (including e.g. coated panels), is allocated to the waste producer, in agreement with EN16485:2014 §6.4.5. The recycling process, i.e. the production of the uncoated panel, is attributed to the recycled material. The GWP-GHG intensity of the uncoated panel made with 100% post-consumer material is around 414 kgCO<sub>2</sub>eq/tonne.

#### ELECTRICITY MIX

The CLEAF C1 plant in Lissone uses self-consumed electricity from a photovoltaic plant on the roof of the building and purchased electricity without specific contractual instruments. The GWP-GHG of the electricity mix used is 0.551 kg CO<sub>2</sub>/kWh.

#### MODELLING OF INFRASTRUCTURE/CAPITAL GOODS

In accordance with Section 4.3.6 of PCR 2019:14 version 2.0.1, the datasets used for modelling electricity and heat include the impacts associated with the construction of the related infrastructure.

#### END OF LIFE SCENARIO (C1-C4)

Assumptions for the *end-of-life* scenario:

- **Module C1:** Manual dismantling is assumed for the product with negligible inputs and outputs.
- **Module C2:** A distance of 80 km (for materials not to be incinerated) and 130 km (for materials to be incinerated) by truck (16-32 metric ton, Euro 5) was assumed for the transport of materials to waste processing or disposal (PCR 2019:14, Section 4.8.4).
- **Modules C3-C4:** Waste treatment for recovery (C3) and final disposal (C4) was modelled based on the product's distribution during the reference year. End-of-life scenarios were defined per destination country, using data for the 'waste wood' category—including recycling,

energy recovery, incineration, and landfill. For products shipped within Europe, country specific Eurostat data<sup>1</sup> were used. For products shipped outside Europe, wood waste country-specific data were applied for UK<sup>2</sup> and US<sup>3</sup>, while regional based statistics for municipal were applied for other extra-Europe countries. Weighted average scenarios were developed for Europe and Extra-Europe regions, based on country-specific or regional statistics.

**BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (MODULE D)**

The scenario modelling for potential net benefits and impacts from reuse, recovery, recycling, and incineration was carried out in accordance with EN 15804:2012 + A2:2019 + AC, Annex D, and PCR 2019:14 §4.8.5.

The analysis focused exclusively on raw materials listed in the product’s Bill of Materials (BoM), excluding process waste generated in Modules A1–A3.

It includes net benefits and impacts from material recycling, energy recovery, and incineration.

Net flows of materials across the system boundary were calculated as the amount of material leaving the system for recycling or recovery, minus the amount of recycled material used in production.

For chipped wood, no losses in mass or material properties were assumed during recycling, resulting in a yield factor of Y = 1, as specified in PCR 2019:14 §4.8.5.

Summary of Data Quality Assessment:

As required by section 4.6.5 of the PCR, the following table provides a summary of the data quality assessment (DQA) for the datasets that contribute to at least 80% of the results for each of the declared environmental impact indicators.

| Data Quality Aspect                                   | Details / Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Data Quality Scheme                                   | EN 15804:2012+A2:2019, Annex E, Table E.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Use of poor/very poor data                            | The datasets used to model the HDPE straps used for packaging and the incineration of wood in EoL show limited geographical representativeness. In particular, the datasets are based on global average data, which may not fully reflect the regional context of the study.                                                                                                                                                                                                                                     |
| Use of Fair data with more than 30 % of a core impact | No fair data used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Data Collection period for raw data                   | 1/5/2024-30/4/2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Geography                                             | The product is manufactured in the Italy and commercialised worldwide (mainly EU).                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Technology                                            | The panels consist of an assembly of a particleboard core and a resin-impregnated decorative paper sheet. Optionally, up to three intermediate barrier sheets may be inserted between the decorative surface and the core. The layers are hot-pressed to cure the resin and bond the materials together.                                                                                                                                                                                                         |
| Geography and technology                              | This EPD covers particleboard panels manufactured by CLEAF with the finishes described above, produced at the “C1” plant located in Via Bottego 15, 20851 Lissone (MB), Italy.<br>The variation in GWP-GHG results in modules A1–A3 for the product variants (worst-case and best-case) relative to the representative product amounts to -45%/99%.<br>All constituent elements of the finished panel — in the case of the representative product, the panel core and the decorative paper — were modelled as an |

<sup>1</sup> Eurostat, 2025. Treatment of waste by waste category, hazardousness and waste management operations. env\_wastrt. [https://doi.org/10.2908/ENV\\_WASTRT](https://doi.org/10.2908/ENV_WASTRT)
<sup>2</sup> UK DEFRA, 2025. UK Statistics on Waste. <https://www.gov.uk/government/statistics/uk-waste-data>
<sup>3</sup> US EPA, 2024. Wood: Material-Specific Data. <https://www.epa.gov/facts-and-figures-about-materials-waste-and-recycling/wood-material-specific-data>

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | average of the total input material for the respective element, considering supplies from multiple providers. This approach reflects the weighted average composition and recycled content percentages of all particleboard cores and decorative papers procured during the reference period.                                                                                                                                                                                                                                                                                        |
| <b>LCI/LCA database</b>   | Ecoinvent 3.10 – Allocation, cut-off U; SimaPro Craft, v. 10.2.0.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>EPD used</b>           | Fritz EGGER GmbH & Co. OG, EPD n°EGG-20200249-IBC3-EN for product Eurospan Raw Chipboard, expires 09.05.2027                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Other informations</b> | End-of-life scenarios were defined per destination country, using data for the 'waste wood' category—including recycling, energy recovery, incineration, and landfill. For products shipped within Europe, country specific Eurostat data were used. For products shipped outside Europe, wood waste country-specific data were applied for UK and US, while regional based statistics for municipal were applied for other extra-Europe countries. Weighted average scenarios were developed for Europe and Extra-Europe regions, based on country-specific or regional statistics. |

The data quality information presented in this EPD has been prepared and reported in accordance with the requirements set forth in UNI EN 15941:2024 and complies with the data quality criteria specified in EN 15804:2012+A2:2019

As requested by PCR, the following table provides information on the quality of the data used for processes contributing more than 10% to the overall GWP-GHG indicator value for the product considered.

| Process                                                          | Source type | Source                     | Reference year | Data category  | Share of primary data, of GWP-GHG results for A1-A3 |
|------------------------------------------------------------------|-------------|----------------------------|----------------|----------------|-----------------------------------------------------|
| <b>Production of particleboard core (upstream EPD)</b>           | EPD         | EPD-EGG-20200249-IBC3-EN   | 2021           | Secondary data | 0%                                                  |
| <b>Production of particleboard core (no upstream EPD)</b>        | Database    | Ecoinvent v3.10            | 2024           | Secondary data | 0%                                                  |
| <b>Transport of raw materials to manufacturing site</b>          | Database    | EPD Owner, Ecoinvent v3.10 | 2024           | Primary data   | 15%                                                 |
| <b>Total share of primary data, of GWP-GHG results for A1-A3</b> |             |                            |                |                | 15%*                                                |

\*The reported share of primary data is associated with uncertainty, as the EPD used as data source lacks information on the share of primary data.

\*\*The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

A conservative approach has been adopted and only processes for which a 100% of primary data could be assessed contributes to the declared share of primary data. For this reason, primary data includes:

- Generation of electricity used in manufacturing of product;
- Transport of raw materials to manufacturing site.

Production of raw materials has been modelled using both datasets from Ecoinvent and primary data on composition.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

|                      | Product stage       |           |               | Construction process stage |                           | Use stage |             |        |             |               |                        |                       | End of life stage          |           |                  |          | Resource recovery stage            |
|----------------------|---------------------|-----------|---------------|----------------------------|---------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|------------------------------------|
|                      | Raw material supply | Transport | Manufacturing | Transport                  | Construction installation | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| Module               | A1                  | A2        | A3            | A4                         | A5                        | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                         | C2        | C3               | C4       | D                                  |
| Modules declared     | X                   | X         | X             | ND                         | X                         | ND        | ND          | ND     | ND          | ND            | ND                     | ND                    | X                          | X         | X                | X        | X                                  |
| Geography            | EU 27               | EU 27     | Italy         | -                          | Global                    | -         | -           | -      | -           | -             | -                      | -                     | Global                     | Global    | Global           | Global   | Global                             |
| Specific data used   | 15%                 |           |               | -                          | -                         | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -                | -        | -                                  |
| Variation – products | -45%/+99%           |           |               | -                          | -                         | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -                | -        | -                                  |
| Variation – sites    | N/A                 |           |               | -                          | -                         | -         | -           | -      | -           | -             | -                      | -                     | -                          | -         | -                | -        | -                                  |

## ENVIRONMENTAL PERFORMANCE

### LCA results of the product(s) - main environmental performance results

The following chapter presents the results of the LCA analysis for the products covered by the EPD, in accordance with EN 15804:2012 + A2:2019 + AC and PCR 2019:14.

All results are expressed per the declared unit of the product under study.

The results presented in the following sections refer to the representative product analysed. Please refer to the following chapter, entitled 'Additional LCA results', for a comparison with the results for the worst-case and best-case products, together with the results for the 100% scenarios.

The difference between the declared product GWP-GHG result, and the products with GWP-GHG results furthest away, for modules A1-A3, is -45/+99%. This variation is primarily due to differences in panel weight per square meter, which depend on thickness.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

Some upstream datasets used to model incoming raw materials are based on the supplier's EPDs, developed using EF 3.0, which is considered a more conservative method compared to the current EF methodology. According to the assessment performed, the use of these datasets is expected to result in environmental impacts that are equal to or more conservative than those obtained using datasets fully aligned with the current EF version, in accordance with PCR 2019:14 §4.6.4.

The primary energy use indicators are calculated according to Annex 3 of PCR 2019:14 v2.0.1, Option B.

### Mandatory impact category indicators according to EN 15804

| Results per declared unit |                        |           |          |          |          |          |          |           |
|---------------------------|------------------------|-----------|----------|----------|----------|----------|----------|-----------|
| Indicator                 | Unit                   | A1-A3     | A5       | C1       | C2       | C3       | C4       | D         |
| GWP-total                 | kg CO <sub>2</sub> eq. | -1,39E+01 | 6,27E-01 | 0,00E+00 | 1,77E-01 | 1,66E+01 | 2,92E+00 | -1,72E+00 |
| GWP-fossil                | kg CO <sub>2</sub> eq. | 6,00E+00  | 1,80E-02 | 0,00E+00 | 1,77E-01 | 8,69E-02 | 1,24E-02 | -1,72E+00 |
| GWP-biogenic              | kg CO <sub>2</sub> eq. | -1,99E+01 | 6,09E-01 | 0,00E+00 | 6,68E-06 | 1,65E+01 | 2,91E+00 | -1,81E-03 |
| GWP-luluc                 | kg CO <sub>2</sub> eq. | 5,23E-03  | 7,87E-06 | 0,00E+00 | 4,35E-06 | 1,97E-04 | 5,77E-06 | -2,59E-03 |
| ODP                       | kg CFC 11 eq.          | 1,58E-07  | 2,62E-10 | 0,00E+00 | 3,62E-09 | 1,36E-09 | 3,35E-10 | -4,96E-08 |
| AP                        | mol H+ eq.             | 2,62E-02  | 7,28E-05 | 0,00E+00 | 4,41E-04 | 6,77E-04 | 9,00E-05 | -4,55E-03 |
| EP-freshwater             | kg P eq.               | 1,51E-04  | 2,51E-07 | 0,00E+00 | 1,49E-07 | 6,28E-06 | 2,11E-07 | -7,43E-05 |
| EP-marine                 | kg N eq.               | 7,46E-03  | 3,42E-05 | 0,00E+00 | 1,69E-04 | 2,29E-04 | 6,04E-05 | -8,10E-04 |
| EP-terrestrial            | mol N eq.              | 8,99E-02  | 3,05E-04 | 0,00E+00 | 1,85E-03 | 2,45E-03 | 3,85E-04 | -8,93E-03 |
| POCP                      | kg NMVOC eq.           | 3,46E-02  | 1,03E-04 | 0,00E+00 | 7,70E-04 | 6,37E-04 | 1,57E-04 | -3,85E-03 |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |           |          |          |          |           |           |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|----------|----------|----------|-----------|-----------|
| ADP-minerals&metals* | kg Sb eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2,36E-06 | 1,25E-09  | 0,00E+00 | 5,85E-09 | 7,61E-09 | 4,70E-09  | -5,21E-08 |
| ADP-fossil*          | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1,18E+02 | 2,13E-01  | 0,00E+00 | 2,34E+00 | 1,68E+00 | 2,85E-01  | -3,25E+01 |
| WDP*                 | m³                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3,44E+00 | -3,72E-03 | 0,00E+00 | 9,94E-04 | 2,03E-02 | -1,97E-01 | -2,15E-01 |
| Acronyms             | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption |          |           |          |          |          |           |           |

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

## Additional mandatory and voluntary impact category indicators

| Results per declared unit |                        |          |          |          |          |          |          |           |
|---------------------------|------------------------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator                 | Unit                   | A1-A3    | A5       | C1       | C2       | C3       | C4       | D         |
| GWP-GHG <sup>4</sup>      | kg CO <sub>2</sub> eq. | 6,01E+00 | 2,65E-02 | 0,00E+00 | 1,77E-01 | 8,73E-02 | 8,80E-02 | -1,72E+00 |

Additional voluntary environmental impact indicators are not declared in this EPD.

## Resource use indicators

| Results per declared unit |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |          |           |          |          |           |           |           |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|----------|----------|-----------|-----------|-----------|
| Indicator                 | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | A1-A3    | A5        | C1       | C2       | C3        | C4        | D         |
| PERE                      | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3,72E+01 | 1,21E-02  | 0,00E+00 | 8,28E-03 | 3,55E-01  | 2,87E-03  | -1,88E+00 |
| PERM                      | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1,72E+02 | -4,43E+00 | 0,00E+00 | 0,00E+00 | -1,12E+02 | -5,04E-02 | 0,00E+00  |
| PERT                      | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2,09E+02 | -4,41E+00 | 0,00E+00 | 8,28E-03 | -1,11E+02 | -4,75E-02 | -1,88E+00 |
| PENRE                     | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 9,78E+01 | 2,13E-01  | 0,00E+00 | 2,34E+00 | 1,68E+00  | 2,85E-01  | -3,25E+01 |
| PENRM                     | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1,97E+01 | -1,04E-01 | 0,00E+00 | 0,00E+00 | -1,10E+01 | -4,98E-03 | 0,00E+00  |
| PENRT                     | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1,18E+02 | 1,08E-01  | 0,00E+00 | 2,34E+00 | -9,36E+00 | 2,80E-01  | -3,25E+01 |
| SM                        | kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 7,43E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00  | 0,00E+00  |
| RSF                       | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00  | 0,00E+00  |
| NRSF                      | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00  | 0,00E+00  |
| FW                        | m³                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1,46E+00 | 6,19E-04  | 0,00E+00 | 4,25E-04 | 1,69E-02  | -4,26E-03 | -5,94E-01 |
| Acronyms                  | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water |          |           |          |          |           |           |           |

<sup>4</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.

## Waste indicators

| Results per declared unit      |      |          |          |          |          |          |          |           |
|--------------------------------|------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator                      | Unit | A1-A3    | A5       | C1       | C2       | C3       | C4       | D         |
| Hazardous waste disposed *     | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| Non-hazardous waste disposed * | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| Radioactive waste disposed     | kg   | 5,50E-04 | 3,56E-07 | 0,00E+00 | 2,20E-07 | 1,09E-05 | 5,36E-08 | -1,22E-04 |

\* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

## Output flow indicators

| Results per declared unit     |      |          |          |          |          |          |          |          |
|-------------------------------|------|----------|----------|----------|----------|----------|----------|----------|
| Indicator                     | Unit | A1-A3    | A5       | C1       | C2       | C3       | C4       | D        |
| Components for re-use         | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling        | kg   | 2,56E-01 | 2,09E-01 | 0,00E+00 | 0,00E+00 | 7,44E+00 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported electrical energy    | MJ   | 0,00E+00 | 4,44E-01 | 0,00E+00 | 0,00E+00 | 7,43E+00 | 0,00E+00 | 0,00E+00 |
| Exported thermal energy       | MJ   | 0,00E+00 | 9,01E-01 | 0,00E+00 | 0,00E+00 | 1,51E+01 | 0,00E+00 | 0,00E+00 |

## Additional LCA results of the product(s)

As per the PCR, complementary results for the 100% recycling, 100% energy recovery, 100% incineration and 100% landfill end-of-life scenarios are provided below for moules C and D.

## Mandatory impact category indicators according to EN 15804 – 100% recycling

| Results per declared unit |                        |          |          |          |          |           |
|---------------------------|------------------------|----------|----------|----------|----------|-----------|
| Indicator                 | Unit                   | C1       | C2       | C3       | C4       | D         |
| GWP-total                 | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 1,95E+01 | 0,00E+00 | -9,68E-03 |
| GWP-fossil                | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 9,82E-02 | 0,00E+00 | -7,86E-03 |
| GWP-biogenic              | kg CO <sub>2</sub> eq. | 0,00E+00 | 6,68E-06 | 1,94E+01 | 0,00E+00 | -2,06E-04 |
| GWP-luluc                 | kg CO <sub>2</sub> eq. | 0,00E+00 | 4,35E-06 | 2,39E-04 | 0,00E+00 | -1,62E-03 |
| ODP                       | kg CFC 11 eq.          | 0,00E+00 | 3,62E-09 | 1,18E-09 | 0,00E+00 | -2,75E-11 |
| AP                        | mol H <sup>+</sup> eq. | 0,00E+00 | 4,41E-04 | 4,80E-04 | 0,00E+00 | -3,79E-05 |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |          |          |          |           |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|-----------|
| EP-freshwater        | kg P eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,00E+00 | 1,49E-07 | 7,70E-06 | 0,00E+00 | -2,76E-05 |
| EP-marine            | kg N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,00E+00 | 1,69E-04 | 7,18E-05 | 0,00E+00 | -3,74E-06 |
| EP-terrestrial       | mol N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0,00E+00 | 1,85E-03 | 8,01E-04 | 0,00E+00 | 6,31E-05  |
| POCP                 | kg NMVOC eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 7,70E-04 | 2,53E-04 | 0,00E+00 | -4,80E-04 |
| ADP-minerals&metals* | kg Sb eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0,00E+00 | 5,85E-09 | 5,41E-09 | 0,00E+00 | -2,83E-09 |
| ADP-fossil*          | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0,00E+00 | 2,34E+00 | 1,95E+00 | 0,00E+00 | -2,19E-01 |
| WDP*                 | m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0,00E+00 | 9,94E-04 | 2,16E-02 | 0,00E+00 | -1,31E-02 |
| Acronyms             | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-landuse = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption |          |          |          |          |           |

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

## Additional mandatory and voluntary impact category indicators – 100% recycling

| Results per declared unit |                        |          |          |          |          |           |
|---------------------------|------------------------|----------|----------|----------|----------|-----------|
| Indicator                 | Unit                   | C1       | C2       | C3       | C4       | D         |
| GWP-GHG <sup>5</sup>      | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 9,86E-02 | 0,00E+00 | -9,68E-03 |

Additional voluntary environmental impact indicators are not declared in this EPD.

## Resource use indicators – 100% recycling

| Results per declared unit |                |          |          |           |          |           |
|---------------------------|----------------|----------|----------|-----------|----------|-----------|
| Indicator                 | Unit           | C1       | C2       | C3        | C4       | D         |
| PERE                      | MJ             | 0,00E+00 | 8,28E-03 | 4,04E-01  | 0,00E+00 | -1,95E+01 |
| PERM                      | MJ             | 0,00E+00 | 0,00E+00 | -1,54E+02 | 0,00E+00 | 0,00E+00  |
| PERT                      | MJ             | 0,00E+00 | 8,28E-03 | -1,54E+02 | 0,00E+00 | -1,95E+01 |
| PENRE                     | MJ             | 0,00E+00 | 2,34E+00 | 1,95E+00  | 0,00E+00 | -2,19E-01 |
| PENRM                     | MJ.            | 0,00E+00 | 0,00E+00 | -1,53E+01 | 0,00E+00 | 0,00E+00  |
| PENRT                     | MJ             | 0,00E+00 | 2,34E+00 | -1,33E+01 | 0,00E+00 | -2,19E-01 |
| SM                        | kg             | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00  |
| RSF                       | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00  |
| NRSF                      | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00  |
| FW                        | m <sup>3</sup> | 0,00E+00 | 4,25E-04 | 1,65E-02  | 0,00E+00 | -2,38E-03 |

<sup>5</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acronyms | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Waste indicators – 100% recycling

| Results per declared unit      |      |          |          |          |          |           |
|--------------------------------|------|----------|----------|----------|----------|-----------|
| Indicator                      | Unit | C1       | C2       | C3       | C4       | D         |
| Hazardous waste disposed *     | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| Non-hazardous waste disposed * | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| Radioactive waste disposed     | kg   | 0,00E+00 | 2,20E-07 | 1,20E-05 | 0,00E+00 | -1,84E-06 |

\* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

## Output flow indicators – 100% recycling

| Results per declared unit     |      |          |          |          |          |          |
|-------------------------------|------|----------|----------|----------|----------|----------|
| Indicator                     | Unit | C1       | C2       | C3       | C4       | D        |
| Components for re-use         | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling        | kg   | 0,00E+00 | 0,00E+00 | 1,24E+01 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported electrical energy    | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported thermal energy       | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

## Mandatory impact category indicators according to EN 15804 – 100% Energy recovery

| Results per declared unit |                        |          |          |          |          |           |
|---------------------------|------------------------|----------|----------|----------|----------|-----------|
| Indicator                 | Unit                   | C1       | C2       | C3       | C4       | D         |
| GWP-total                 | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 1,96E+01 | 0,00E+00 | -7,60E+00 |
| GWP-fossil                | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 2,13E-01 | 0,00E+00 | -7,58E+00 |
| GWP-biogenic              | kg CO <sub>2</sub> eq. | 0,00E+00 | 6,68E-06 | 1,94E+01 | 0,00E+00 | -7,32E-03 |
| GWP-luluc                 | kg CO <sub>2</sub> eq. | 0,00E+00 | 4,35E-06 | 2,46E-04 | 0,00E+00 | -9,70E-03 |
| ODP                       | kg CFC 11 eq.          | 0,00E+00 | 3,62E-09 | 2,95E-09 | 0,00E+00 | -2,01E-07 |
| AP                        | mol H <sup>+</sup> eq. | 0,00E+00 | 4,41E-04 | 2,22E-03 | 0,00E+00 | -2,09E-02 |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |          |          |          |          |           |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|-----------|
| EP-freshwater        | kg P eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,00E+00 | 1,49E-07 | 8,71E-06 | 0,00E+00 | -3,08E-04 |
| EP-marine            | kg N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0,00E+00 | 1,69E-04 | 9,68E-04 | 0,00E+00 | -3,68E-03 |
| EP-terrestrial       | mol N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,00E+00 | 1,85E-03 | 1,03E-02 | 0,00E+00 | -4,07E-02 |
| POCP                 | kg NMVOC eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0,00E+00 | 7,70E-04 | 2,57E-03 | 0,00E+00 | -1,68E-02 |
| ADP-minerals&metals* | kg Sb eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,00E+00 | 5,85E-09 | 2,65E-08 | 0,00E+00 | -2,15E-07 |
| ADP-fossil*          | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0,00E+00 | 2,34E+00 | 2,79E+00 | 0,00E+00 | -1,38E+02 |
| WDP*                 | m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0,00E+00 | 9,94E-04 | 4,65E-02 | 0,00E+00 | -9,41E-01 |
| Acronyms             | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-land use = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption |          |          |          |          |           |

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

## Additional mandatory and voluntary impact category indicators – 100% Energy recovery

| Results per declared unit |                        |          |          |          |          |           |
|---------------------------|------------------------|----------|----------|----------|----------|-----------|
| Indicator                 | Unit                   | C1       | C2       | C3       | C4       | D         |
| GWP-GHG <sup>6</sup>      | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 2,13E-01 | 0,00E+00 | -7,60E+00 |

Additional voluntary environmental impact indicators are not declared in this EPD.

## Resource use indicators – 100% Energy recovery

| Results per declared unit |                |          |          |           |          |           |
|---------------------------|----------------|----------|----------|-----------|----------|-----------|
| Indicator                 | Unit           | C1       | C2       | C3        | C4       | D         |
| PERE                      | MJ             | 0,00E+00 | 8,28E-03 | 4,18E-01  | 0,00E+00 | -1,64E+01 |
| PERM                      | MJ             | 0,00E+00 | 0,00E+00 | -9,27E+01 | 0,00E+00 | 0,00E+00  |
| PERT                      | MJ             | 0,00E+00 | 8,28E-03 | -9,23E+01 | 0,00E+00 | -1,64E+01 |
| PENRE                     | MJ             | 0,00E+00 | 2,34E+00 | 2,79E+00  | 0,00E+00 | -1,38E+02 |
| PENRM                     | MJ.            | 0,00E+00 | 0,00E+00 | -9,16E+00 | 0,00E+00 | 0,00E+00  |
| PENRT                     | MJ             | 0,00E+00 | 2,34E+00 | -6,37E+00 | 0,00E+00 | -1,38E+02 |
| SM                        | kg             | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00  |
| RSF                       | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00  |
| NRSF                      | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00  |
| FW                        | m <sup>3</sup> | 0,00E+00 | 4,25E-04 | 3,53E-02  | 0,00E+00 | -2,45E+00 |

<sup>6</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.

|          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acronyms | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Waste indicators – 100% Energy recovery

| Results per declared unit      |      |          |          |          |          |           |
|--------------------------------|------|----------|----------|----------|----------|-----------|
| Indicator                      | Unit | C1       | C2       | C3       | C4       | D         |
| Hazardous waste disposed *     | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| Non-hazardous waste disposed * | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| Radioactive waste disposed     | kg   | 0,00E+00 | 2,20E-07 | 1,22E-05 | 0,00E+00 | -4,89E-04 |

\* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

## Output flow indicators – 100% Energy recovery

| Results per declared unit     |      |          |          |          |          |          |
|-------------------------------|------|----------|----------|----------|----------|----------|
| Indicator                     | Unit | C1       | C2       | C3       | C4       | D        |
| Components for re-use         | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling        | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported electrical energy    | MJ   | 0,00E+00 | 0,00E+00 | 3,56E+01 | 0,00E+00 | 0,00E+00 |
| Exported thermal energy       | MJ   | 0,00E+00 | 0,00E+00 | 7,22E+01 | 0,00E+00 | 0,00E+00 |

## Mandatory impact category indicators according to EN 15804 – 100% Landfill

| Results per declared unit |                        |          |          |          |          |          |
|---------------------------|------------------------|----------|----------|----------|----------|----------|
| Indicator                 | Unit                   | C1       | C2       | C3       | C4       | D        |
| GWP-total                 | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 0,00E+00 | 2,03E+01 | 0,00E+00 |
| GWP-fossil                | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 0,00E+00 | 1,16E-01 | 0,00E+00 |
| GWP-biogenic              | kg CO <sub>2</sub> eq. | 0,00E+00 | 6,68E-06 | 0,00E+00 | 2,01E+01 | 0,00E+00 |
| GWP-luluc                 | kg CO <sub>2</sub> eq. | 0,00E+00 | 4,35E-06 | 0,00E+00 | 1,82E-05 | 0,00E+00 |
| ODP                       | kg CFC 11 eq.          | 0,00E+00 | 3,62E-09 | 0,00E+00 | 3,84E-09 | 0,00E+00 |
| AP                        | mol H <sup>+</sup> eq. | 0,00E+00 | 4,41E-04 | 0,00E+00 | 7,65E-04 | 0,00E+00 |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          |          |          |           |          |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|-----------|----------|
| EP-freshwater        | kg P eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,00E+00 | 1,49E-07 | 0,00E+00 | 8,69E-07  | 0,00E+00 |
| EP-marine            | kg N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0,00E+00 | 1,69E-04 | 0,00E+00 | 5,59E-04  | 0,00E+00 |
| EP-terrestrial       | mol N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0,00E+00 | 1,85E-03 | 0,00E+00 | 3,56E-03  | 0,00E+00 |
| POCP                 | kg NMVOC eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 7,70E-04 | 0,00E+00 | 1,60E-03  | 0,00E+00 |
| ADP-minerals&metals* | kg Sb eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0,00E+00 | 5,85E-09 | 0,00E+00 | 5,11E-08  | 0,00E+00 |
| ADP-fossil*          | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0,00E+00 | 2,34E+00 | 0,00E+00 | 2,74E+00  | 0,00E+00 |
| WDP*                 | m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0,00E+00 | 9,94E-04 | 0,00E+00 | -4,22E-01 | 0,00E+00 |
| Acronyms             | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-landuse = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption |          |          |          |           |          |

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

## Additional mandatory and voluntary impact category indicators – 100% Landfill

| Results per declared unit |                        |          |          |          |          |          |
|---------------------------|------------------------|----------|----------|----------|----------|----------|
| Indicator                 | Unit                   | C1       | C2       | C3       | C4       | D        |
| GWP-GHG <sup>7</sup>      | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 0,00E+00 | 8,76E-01 | 0,00E+00 |

Additional voluntary environmental impact indicators are not declared in this EPD.

## Resource use indicators – 100% Landfill

| Results per declared unit |                                                                                                                                                                                                     |          |          |          |           |          |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|-----------|----------|
| Indicator                 | Unit                                                                                                                                                                                                | C1       | C2       | C3       | C4        | D        |
| PERE                      | MJ                                                                                                                                                                                                  | 0,00E+00 | 8,28E-03 | 0,00E+00 | 5,76E-02  | 0,00E+00 |
| PERM                      | MJ                                                                                                                                                                                                  | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 |
| PERT                      | MJ                                                                                                                                                                                                  | 0,00E+00 | 8,28E-03 | 0,00E+00 | 5,76E-02  | 0,00E+00 |
| PENRE                     | MJ                                                                                                                                                                                                  | 0,00E+00 | 2,34E+00 | 0,00E+00 | 2,74E+00  | 0,00E+00 |
| PENRM                     | MJ                                                                                                                                                                                                  | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 |
| PENRT                     | MJ                                                                                                                                                                                                  | 0,00E+00 | 2,34E+00 | 0,00E+00 | 2,74E+00  | 0,00E+00 |
| SM                        | kg                                                                                                                                                                                                  | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 |
| RSF                       | MJ                                                                                                                                                                                                  | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 |
| NRSF                      | MJ                                                                                                                                                                                                  | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 |
| FW                        | m <sup>3</sup>                                                                                                                                                                                      | 0,00E+00 | 4,25E-04 | 0,00E+00 | -5,19E-02 | 0,00E+00 |
| Acronyms                  | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use |          |          |          |           |          |

<sup>7</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.

of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

## Waste indicators – 100% Landfill

| Results per declared unit      |      |          |          |          |          |          |
|--------------------------------|------|----------|----------|----------|----------|----------|
| Indicator                      | Unit | C1       | C2       | C3       | C4       | D        |
| Hazardous waste disposed *     | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Non-hazardous waste disposed * | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Radioactive waste disposed     | kg   | 0,00E+00 | 2,20E-07 | 0,00E+00 | 7,63E-07 | 0,00E+00 |

\* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

## Output flow indicators – 100% Landfill

| Results per declared unit     |      |          |          |          |          |          |
|-------------------------------|------|----------|----------|----------|----------|----------|
| Indicator                     | Unit | C1       | C2       | C3       | C4       | D        |
| Components for re-use         | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling        | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported electrical energy    | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported thermal energy       | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

## Mandatory impact category indicators according to EN 15804 – 100% Incineration

| Results per declared unit |                        |          |          |          |          |           |
|---------------------------|------------------------|----------|----------|----------|----------|-----------|
| Indicator                 | Unit                   | C1       | C2       | C3       | C4       | D         |
| GWP-total                 | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 0,00E+00 | 1,95E+01 | -6,33E+00 |
| GWP-fossil                | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 0,00E+00 | 1,15E-01 | -6,32E+00 |
| GWP-biogenic              | kg CO <sub>2</sub> eq. | 0,00E+00 | 6,68E-06 | 0,00E+00 | 1,94E+01 | -6,10E-03 |
| GWP-luluc                 | kg CO <sub>2</sub> eq. | 0,00E+00 | 4,35E-06 | 0,00E+00 | 7,16E-06 | -8,09E-03 |
| ODP                       | kg CFC 11 eq.          | 0,00E+00 | 3,62E-09 | 0,00E+00 | 1,77E-09 | -1,67E-07 |
| AP                        | mol H <sup>+</sup> eq. | 0,00E+00 | 4,41E-04 | 0,00E+00 | 1,74E-03 | -1,75E-02 |
| EP-freshwater             | kg P eq.               | 0,00E+00 | 1,49E-07 | 0,00E+00 | 1,01E-06 | -2,57E-04 |

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |          |          |          |           |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|-----------|
| EP-marine            | kg N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0,00E+00 | 1,69E-04 | 0,00E+00 | 8,96E-04 | -3,07E-03 |
| EP-terrestrial       | mol N eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0,00E+00 | 1,85E-03 | 0,00E+00 | 9,50E-03 | -3,39E-02 |
| POCP                 | kg NMVOC eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0,00E+00 | 7,70E-04 | 0,00E+00 | 2,31E-03 | -1,40E-02 |
| ADP-minerals&metals* | kg Sb eq.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0,00E+00 | 5,85E-09 | 0,00E+00 | 2,11E-08 | -1,79E-07 |
| ADP-fossil*          | MJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0,00E+00 | 2,34E+00 | 0,00E+00 | 8,42E-01 | -1,15E+02 |
| WDP*                 | m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,00E+00 | 9,94E-04 | 0,00E+00 | 2,49E-02 | -7,84E-01 |
| Acronyms             | GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption |          |          |          |          |           |

\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

## Additional mandatory and voluntary impact category indicators – 100% Incineration

| Results per declared unit |                        |          |          |          |          |           |
|---------------------------|------------------------|----------|----------|----------|----------|-----------|
| Indicator                 | Unit                   | C1       | C2       | C3       | C4       | D         |
| GWP-GHG <sup>8</sup>      | kg CO <sub>2</sub> eq. | 0,00E+00 | 1,77E-01 | 0,00E+00 | 1,15E-01 | -6,33E+00 |

Additional voluntary environmental impact indicators are not declared in this EPD.

## Resource use indicators – 100% Incineration

| Results per declared unit |                                                                                                                                                                                                                                                                                                       |          |          |          |           |           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|-----------|-----------|
| Indicator                 | Unit                                                                                                                                                                                                                                                                                                  | C1       | C2       | C3       | C4        | D         |
| PERE                      | MJ                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 8,28E-03 | 0,00E+00 | 1,40E-02  | -1,37E+01 |
| PERM                      | MJ                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 0,00E+00 | 0,00E+00 | -7,72E+01 | 0,00E+00  |
| PERT                      | MJ                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 8,28E-03 | 0,00E+00 | -7,72E+01 | -1,37E+01 |
| PENRE                     | MJ                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 2,34E+00 | 0,00E+00 | 8,42E-01  | -1,15E+02 |
| PENRM                     | MJ.                                                                                                                                                                                                                                                                                                   | 0,00E+00 | 0,00E+00 | 0,00E+00 | -7,63E+00 | 0,00E+00  |
| PENRT                     | MJ                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 2,34E+00 | 0,00E+00 | -6,79E+00 | -1,15E+02 |
| SM                        | kg                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00  |
| RSF                       | MJ                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00  |
| NRSF                      | MJ                                                                                                                                                                                                                                                                                                    | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00  |
| FW                        | m <sup>3</sup>                                                                                                                                                                                                                                                                                        | 0,00E+00 | 4,25E-04 | 0,00E+00 | 1,88E-02  | -2,04E+00 |
| Acronyms                  | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non- |          |          |          |           |           |

<sup>8</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.

renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

## Waste indicators – 100% Incineration

| Results per declared unit      |      |          |          |          |          |           |
|--------------------------------|------|----------|----------|----------|----------|-----------|
| Indicator                      | Unit | C1       | C2       | C3       | C4       | D         |
| Hazardous waste disposed *     | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| Non-hazardous waste disposed * | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  |
| Radioactive waste disposed     | kg   | 0,00E+00 | 2,20E-07 | 0,00E+00 | 2,56E-07 | -4,08E-04 |

\* The indicators "Hazardous waste disposed" and "Non-hazardous waste disposed" are set to 0 because all relevant waste treatment processes are included within the system boundaries.

## Output flow indicators – 100% Incineration

| Results per declared unit     |      |          |          |          |          |          |
|-------------------------------|------|----------|----------|----------|----------|----------|
| Indicator                     | Unit | C1       | C2       | C3       | C4       | D        |
| Components for re-use         | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Material for recycling        | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported electrical energy    | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported thermal energy       | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |

## Variations among the included products

The aggregated results of environmental impact indicators across all included modules (from A to C) are presented for the products furthest away from the declared results (specifically, those with lowest and the highest panel thickness) in the following table. This variation is primarily due to differences in panel weight per square meter, which depend on thickness.

| LCA result of one declared unit product (A-C) | Unit          | Min      | Representative product | Max      | Variation (%) |
|-----------------------------------------------|---------------|----------|------------------------|----------|---------------|
| GWP-total                                     | kg CO2 eq.    | 3,50E+00 | 6,45E+00               | 1,30E+01 | -46% / +101%  |
| GWP-fossil                                    | kg CO2 eq.    | 3,42E+00 | 6,29E+00               | 1,26E+01 | -46% / +100%  |
| GWP-biogenic                                  | kg CO2 eq.    | 7,52E-02 | 1,52E-01               | 3,50E-01 | -51% / +130%  |
| GWP-luluc                                     | kg CO2 eq.    | 2,72E-03 | 5,45E-03               | 1,29E-02 | -50% / +136%  |
| ODP                                           | kg CFC 11 eq. | 9,35E-08 | 1,63E-07               | 3,28E-07 | -43% / +101%  |
| AP                                            | mol H+ eq.    | 1,43E-02 | 2,75E-02               | 5,74E-02 | -48% / +109%  |
| EP-freshwater                                 | kg P eq.      | 8,45E-05 | 1,58E-04               | 3,60E-04 | -46% / +128%  |
| EP- marine                                    | kg N eq.      | 4,03E-03 | 7,95E-03               | 1,63E-02 | -49% / +105%  |

| LCA result of one declared unit product (A-C) | Unit         | Min      | Representative product | Max      | Variation (%) |
|-----------------------------------------------|--------------|----------|------------------------|----------|---------------|
| EP-terrestrial                                | mol N eq.    | 4,83E-02 | 9,49E-02               | 1,95E-01 | -49% / +105%  |
| POCP                                          | kg NMVOC eq. | 1,85E-02 | 3,63E-02               | 7,53E-02 | -49% / +108%  |
| ADP-minerals&metals*                          | kg Sb eq.    | 1,61E-06 | 2,38E-06               | 4,24E-06 | -32% / +78%   |
| ADP-fossil*                                   | kg CO2 eq.   | 6,56E+01 | 1,22E+02               | 2,57E+02 | -46% / +111%  |
| WDP*                                          | kg CO2 eq.   | 1,83E+00 | 3,26E+00               | 6,67E+00 | -44% / +105%  |
| GWP-GHG                                       | kg CO2 eq.   | 3,47E+00 | 6,39E+00               | 1,28E+01 | -46% / +101%  |
| PERE                                          | MJ           | 1,74E+01 | 3,76E+01               | 8,69E+01 | -54% / +131%  |
| PERM                                          | MJ           | 2,55E+01 | 5,53E+01               | 1,22E+02 | -54% / +121%  |
| PERT                                          | MJ           | 4,30E+01 | 9,29E+01               | 2,09E+02 | -54% / +125%  |
| PENRE                                         | MJ           | 5,60E+01 | 1,02E+02               | 2,12E+02 | -45% / +107%  |
| PENRM                                         | MJ           | 4,52E+00 | 8,59E+00               | 1,97E+01 | -47% / +130%  |
| PENRT                                         | MJ           | 6,05E+01 | 1,11E+02               | 2,32E+02 | -45% / +109%  |
| SM                                            | kg           | 3,36E+00 | 7,43E+00               | 1,63E+01 | -55% / +120%  |
| RSF                                           | MJ           | 0,00E+00 | 0,00E+00               | 0,00E+00 | 0% / +0%      |
| NRSF                                          | MJ           | 0,00E+00 | 0,00E+00               | 0,00E+00 | 0% / +0%      |
| FW                                            | m3           | 8,81E-01 | 1,47E+00               | 3,02E+00 | -40% / +105%  |
| HWD                                           | kg           | 0,00E+00 | 0,00E+00               | 0,00E+00 | 0% / +0%      |
| NHWD                                          | kg           | 0,00E+00 | 0,00E+00               | 0,00E+00 | 0% / +0%      |
| RWD                                           | kg           | 2,58E-04 | 5,61E-04               | 1,25E-03 | -54% / +122%  |
| CRU                                           | kg           | 0,00E+00 | 0,00E+00               | 0,00E+00 | 0% / +0%      |
| MFR                                           | kg           | 3,76E+00 | 7,90E+00               | 1,71E+01 | -52% / +117%  |
| MER                                           | kg           | 0,00E+00 | 0,00E+00               | 0,00E+00 | 0% / +0%      |
| EEE                                           | MJ           | 3,64E+00 | 7,87E+00               | 1,68E+01 | -54% / +113%  |
| EET                                           | MJ           | 7,39E+00 | 1,60E+01               | 3,41E+01 | -54% / +113%  |

*\* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

## ABBREVIATIONS

| Abbreviation                                      | Definition                                                                                                      |
|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>General Abbreviations</b>                      |                                                                                                                 |
| EN                                                | European Norm (Standard)                                                                                        |
| EPD                                               | Environmental Product Declaration                                                                               |
| EF                                                | Environmental Footprint                                                                                         |
| GPI                                               | General Programme Instructions                                                                                  |
| ISO                                               | International Organization for Standardization                                                                  |
| LCA                                               | Life Cycle Assessment                                                                                           |
| PCR                                               | Product Category Rules                                                                                          |
| c-PCR                                             | Complementary Product Category Rules                                                                            |
| CEN                                               | European Committee for Standardization                                                                          |
| CLC                                               | Co-location centre                                                                                              |
| CPC                                               | Central product classification                                                                                  |
| GHS                                               | Globally harmonized system of classification and labelling of chemicals                                         |
| GRI                                               | Global Reporting Initiative                                                                                     |
| <b>Environmental Impact Indicators (EN 15804)</b> |                                                                                                                 |
| GHG                                               | Greenhouse gas                                                                                                  |
| GWP                                               | Global Warming Potential (kg CO <sub>2</sub> eq.)                                                               |
| GWP-fossil                                        | Global Warming Potential from fossil sources (kg CO <sub>2</sub> eq.)                                           |
| GWP-biogenic                                      | Global Warming Potential from biogenic sources (kg CO <sub>2</sub> eq.)                                         |
| GWP-luluc                                         | Global Warming Potential from land use and land use change (kg CO <sub>2</sub> eq.)                             |
| GWP-total                                         | Total Global Warming Potential (kg CO <sub>2</sub> eq.)                                                         |
| GWP-GHG                                           | Global Warming Potential for greenhouse gases (kg CO <sub>2</sub> eq.)                                          |
| ODP                                               | Ozone Depletion Potential (kg CFC-11 eq.)                                                                       |
| AP                                                | Acidification Potential (mol H <sup>+</sup> eq.)                                                                |
| EP                                                | Eutrophication Potential                                                                                        |
| EP-freshwater                                     | Freshwater eutrophication potential (kg P eq.)                                                                  |
| EP-marine                                         | Marine eutrophication potential (kg N eq.)                                                                      |
| EP-terrestrial                                    | Terrestrial eutrophication potential (mol N eq.)                                                                |
| POCP                                              | Photochemical Ozone Creation Potential (kg NMVOC eq.)                                                           |
| ADP                                               | Abiotic Depletion Potential                                                                                     |
| ADP-minerals&metals                               | Abiotic depletion potential for non-fossil resources (kg Sb eq.)                                                |
| ADP-fossil                                        | Abiotic depletion potential for fossil resources (MJ)                                                           |
| WDP                                               | Water Deprivation Potential (m <sup>3</sup> )                                                                   |
| <b>Resource Use Indicators</b>                    |                                                                                                                 |
| PERE                                              | Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)         |
| PERM                                              | Use of renewable primary energy resources used as raw materials (MJ)                                            |
| PERT                                              | Total use of renewable primary energy resources (MJ)                                                            |
| PENRE                                             | Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ) |
| PENRM                                             | Use of non-renewable primary energy resources used as raw materials (MJ)                                        |
| PENRT                                             | Total use of non-renewable primary energy resources (MJ)                                                        |
| SM                                                | Use of secondary material (kg)                                                                                  |
| RSF                                               | Use of renewable secondary fuels (MJ)                                                                           |
| NRSF                                              | Use of non-renewable secondary fuels (MJ)                                                                       |
| FW                                                | Use of net fresh water (m <sup>3</sup> )                                                                        |
| <b>Waste Indicators</b>                           |                                                                                                                 |
| HW                                                | Hazardous Waste (disposed) (kg)                                                                                 |
| NHW                                               | Non-Hazardous Waste (disposed) (kg)                                                                             |
| RW                                                | Radioactive Waste (disposed) (kg)                                                                               |
| <b>Output Flow Indicators</b>                     |                                                                                                                 |
| CFR                                               | Components for Reuse (kg)                                                                                       |

|                                   |                                        |
|-----------------------------------|----------------------------------------|
| MR                                | Material for Recycling (kg)            |
| MER                               | Materials for Energy Recovery (kg)     |
| EEE                               | Exported Energy, Electricity (MJ)      |
| EET                               | Exported Energy, Thermal (MJ)          |
| <b>Lifecycle Stages / Modules</b> |                                        |
| A1                                | Raw material supply                    |
| A2                                | Transport                              |
| A3                                | Manufacturing                          |
| A4                                | Transport to site                      |
| A5                                | Construction/Installation              |
| B1                                | Use                                    |
| B2                                | Maintenance                            |
| B3                                | Repair                                 |
| B4                                | Replacement                            |
| B5                                | Refurbishment                          |
| B6                                | Operational energy use                 |
| B7                                | Operational water use                  |
| C1                                | Deconstruction/Demolition              |
| C2                                | Transport to waste processing          |
| C3                                | Waste processing                       |
| C4                                | Disposal                               |
| D                                 | Reuse-Recovery-Recycling potential     |
| <b>Other Relevant Terms</b>       |                                        |
| SVHC                              | Substances of Very High Concern        |
| EC No.                            | European Community Number              |
| CAS No.                           | Chemical Abstracts Service Number      |
| MJ                                | Megajoule                              |
| kg                                | Kilogram                               |
| m <sup>3</sup>                    | Cubic Meter                            |
| NM VOC                            | Non-Methane Volatile Organic Compounds |
| Sb eq.                            | Antimony Equivalents                   |
| P eq.                             | Phosphorus Equivalents                 |
| N eq.                             | Nitrogen Equivalents                   |
| CFC-11 eq.                        | Chlorofluorocarbon-11 Equivalents      |
| CO <sub>2</sub> eq.               | Carbon Dioxide Equivalents             |
| kg C                              | Kilograms of Carbon                    |
| kg CO <sub>2</sub> eq.            | Kilograms of Carbon Dioxide Equivalent |
| ND                                | Not Declared                           |

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## VERSION HISTORY

Original Version of the EPD, 2025-09-23.

