

Owner: Swisspearl  
No.: MD-24127-EN  
Issued: 21-05-2025  
Valid to: 21-05-2030

3<sup>rd</sup> PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



## Owner of declaration

Swisspearl Danmark A/S  
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# SWISSPEARL

## Programme

EPD Danmark  
[www.epddanmark.dk](http://www.epddanmark.dk)



- ☐ Industry EPD  
☒ Product EPD

## Declared product(s)

Panel

Number of declared datasets/product variations: 1

## Production site

TPI Fiber Cement Plant 99 Moo 7 T.Bankaeng A.Chalermprakiat  
Saraburi, Thailand

## Use of Guarantees of Origin

- ☒ No certificates used  
☐ Electricity covered by GoO  
☐ Biogas covered by GoO

## Declared/ functional unit

1 m<sup>2</sup> of fiber cement Panel

## Year of production site data (A3)

1<sup>st</sup> of January 2022 to 31<sup>st</sup> of December 2022

## EPD version

EPD version [1]

## Issued:

21-05-2025

## Valid to:

21-05-2030

## Basis of calculation

This EPD is developed and verified in accordance with the European standard EN 15804+A2.

## Comparability

EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

## Validity

This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

## Use

The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

## EPD type

- ☐ Cradle-to-gate with modules C1-C4 and D  
☐ Cradle-to-gate with options, modules C1-C4 and D  
☒ Cradle-to-grave and module D  
☐ Cradle-to-gate  
☐ Cradle-to-gate with options

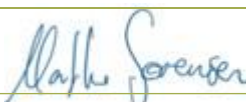
CEN standard EN 15804 serves as the core PCR

Independent verification of the declaration and data, according to EN ISO 14025

☐ internal ☒ external

Third party verifier:

  
Linda Høiby

  
Martha Katrine Sørensen  
EPD Danmark

| System boundary (X = included in LCA; MND = module not declared) |           |               |                      |                           |     |             |        |             |               |                        |                       |                            |           |                  |          |                                      |
|------------------------------------------------------------------|-----------|---------------|----------------------|---------------------------|-----|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|--------------------------------------|
| Product                                                          |           |               | Construction process |                           | Use |             |        |             |               |                        |                       | End of life                |           |                  |          | Beyond system boundary               |
| 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 |
| A1                                                               | A2        | A3            | A4                   | A5                        | B1  | B2          | B3     | B4          | B5            | B6                     | B7                    | C1                         | C2        | C3               | C4       | D                                    |
| X                                                                | X         | X             | X                    | X                         | X   | X           | X      | X           | X             | X                      | X                     | X                          | X         | X                | X        | X                                    |

# Product information

## Product description

The main product components per declared unit are shown in the table below.

| Material            | Weight-% of declared product |
|---------------------|------------------------------|
| Cement CEM I        | 30%                          |
| Silica sand         | 43%                          |
| Cellulose           | 7%                           |
| Aluminium Hydroxide | 3%                           |
| Water               | 15%                          |
| Paint               | 2%                           |
| SUM                 | 100%                         |

The construction of the production plant, the production of machinery, screws for installation of the product, and lubricants for the machines are excluded due to lack of data and because their impacts are not relevant because they are under the cut-off rule.

## Product packaging:

The composition of the product packaging per declared unit is shown in the table below.

| Material         | Weight of packaging material (kg) | Weight-% of packaging |
|------------------|-----------------------------------|-----------------------|
| Wooden pallet    | 0.538                             | 92%                   |
| PE foam          | 0.001                             | 0.17%                 |
| Cover film       | 0.005                             | 1%                    |
| Coner paper      | 0.003                             | 1%                    |
| Cardboard        | 0.001                             | 0.17%                 |
| Plastic strap    | 0.002                             | 0.34%                 |
| Trim for bracing | 0.032                             | 5%                    |
| <b>SUM</b>       | <b>0.582</b>                      | <b>100%</b>           |

## Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of the fiber cement Panel on the production site located in Thailand. Product specific data are based on average values collected in the period 2022. Background data are based on GaBi Sphera Professional 2024 and Ecoinvent v3.10 and are less than 10 years old.

Generally, most of the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

Geographical representativeness: The production of the Panel takes place in Thailand and the use and end of life takes place in Denmark. Most of the processes used for Thailand are global processes. Most of the processes used for Denmark are either Danish or European processes. Most of the processes in this study therefore have a geographical representativeness which is evaluated to be "good" because they cover a larger area in which the area under study is included.

Foreground system: The product is produced using residual electricity from grid in Thailand. Background system: Upstream and downstream processes are modelled using electricity grid mix.

Database(s) and LCA software used: Generic data and background data are based on the GaBi Sphera professional database version 2023 and the Ecoinvent 3.10 database.

## Hazardous substances

The Swisspearl Panel contains less than 0.1% (w/w) of substances listed on the "Candidate List of Substances of Very High Concern for authorisation"

(<http://echa.europa.eu/candidate-list-table>)

## Product(s) use

The Swisspearl Panel can be used on building facades.

## Essential characteristics

Because of the properties of fibre cement, the Swisspearl Panel does not rot, crack, or require repainting. Main components are cement, silica sand, cellulose fibers, water and selected additives and can be mounted both horizontally and vertically. Ideal for replacement of wood on

the facade due to the limited maintenance required.

Swisspearl facade boards are covered by the harmonised technical specification EN 12467.

Further technical information can be obtained by contacting the manufacturer or on the manufacturers website: [Swisspearl Fibre Cement - Panel Original facade board - Swisspearl](#).

Declaration of performance is according to EU regulation 305/2011 is available for all declared product variations of the Panel.

## Reference Service Life (RSL)

The reference service life is 50 years or higher according to the table published by the BBSR<sup>1</sup>.

## Picture of product(s)



<sup>1</sup> [BNB Nutzungsdauern von Bauteilen 2017-02-24.xls \(nachhaltigesbauen.de\)](#) Code 335.551

## LCA background

### Declared unit

The LCI and LCIA results in this EPD relates to 1 m<sup>2</sup> of fiber cement Panel.

| Name                       | Value | Unit              |
|----------------------------|-------|-------------------|
| Declared unit              | 1     | m <sup>2</sup>    |
| Density                    | 11.96 | Kg/m <sup>2</sup> |
| Conversion factor to 1 kg. | 0.08  | -                 |

### Functional unit

Not defined.

### PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804.

### Energy modelling principles

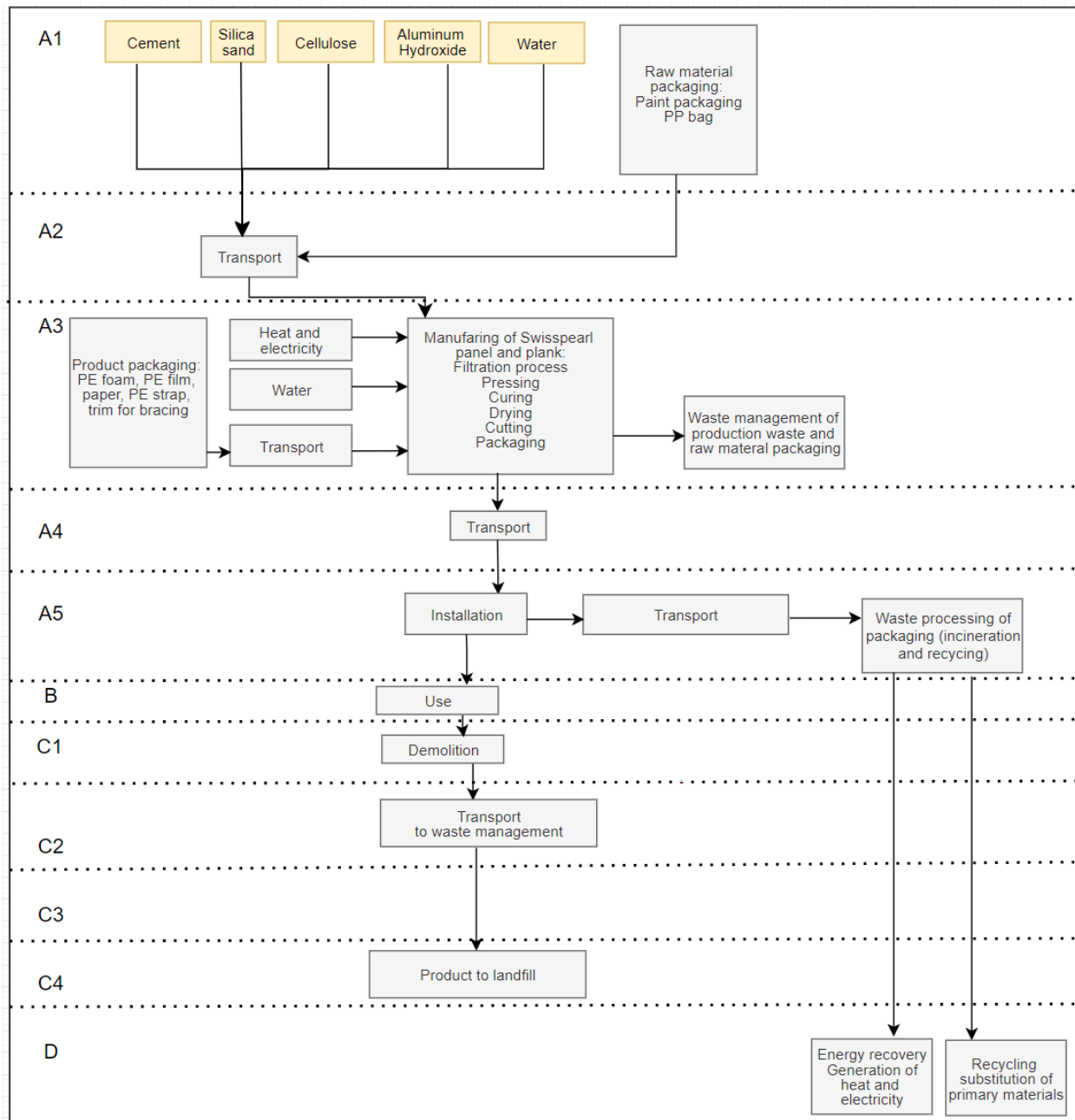
Foreground system:

The product is produced using heat from, oil and electricity from the Thailand residual grid for the production of the fiber cement Panel.

Background system:

Upstream and downstream processes are modelled using electricity grid mix.

## Flowdiagram



## System boundary

The LCA is cradle to grave and includes all modules, from A1 to D. However, B1-B7 are not relevant, since the products do not require any maintenance, replacement, or refurbishment in their reference service life. 99.994 weight-% of the product has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

According to the rules in EN 15804:2012+A2:2019, 6.3.5, in case of insufficient input data or data gaps for the unit process, the cut-off criteria shall be 1% of renewable and non-renewable primary energy usage and 1% of the total mass input of that unit process.

### Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

Swisspearl Panel is produced by the use of the Hatschek method: the base materials (binder, fibres, etc) are processed into a homogeneous mixture with water and transferred to the vats of the Hatschek machine.

Rotating sieve cylinders in the vats collect a thin layer of solid material and transfer the layer to a rotating felt for dewatering and further on to the accumulating format roller. The format roller is gradually covered by layers of fiber cement. Once the required thickness of the boards is reached, the fiber cement layer, still moist and mouldable, is unwound and taken from the roll<sup>2</sup>.

After the pre-curing period, the fibre-cement boards are dried. The Panel is dried by use of an

Autoclave machine. Autoclaves create a high-pressure, high-temperature environment that accelerates the chemical reactions between the cement and the fibres. This process turns the wet mixture into a hard, durable material.

After the drying process the products are ready to be sanded, trimmed edges, cut to customised size, painted, edge-sealed, hydrophobated and finished with quality controls and packing processes.

Waste during production and raw material packaging is waste handled in A3. The waste is sent to recycling. Credit is not given in A3.

### Construction process stage (A4-A5) includes:

Module A4 includes transportation from the production site in Thailand to Denmark. This contains a distance of 18,263 km with a container ship and 250 km with a truck. Module A5 also accounts for the environmental impacts connected to installation of the product.

The installation process takes place in Denmark. The installation requires 1050 W of electrical energy for an electric screwdriver for the Swisspearl Panel. The screwdriver is estimated by Swisspearl to be used for 5 minutes/m<sup>2</sup>. Thereby, a total of 87.5 watt-hours is used. The electricity consumption for installation is accounted for, but the machinery itself is not accounted for because it is under the cut-off, and it is therefore modelled as an empty <us-o> process in GaBi Sphera. The electricity is modelled as Danish grid mix because the product is installed and used in Denmark.

Module A5 also accounts for the environmental impacts associated with the disposal of packaging handled at the construction site meaning the waste management of the final product packaging materials.

<sup>2</sup>

<http://www.fibreconsulting.com/publications/011011.hatschekfilmsummary.pdf>

Recycling rates of packaging materials are based on Eurostat data from 2020 for Denmark.

It is assumed that packaging material which is not recycled is incinerated with energy recovery.

The distance to the incineration plants is assumed to be 60 km. The distance to the recycling station is based on a study of waste management by Bassi et al. from 2017. It has not been possible to find a source on what the average distance to the recycling station is in Denmark. 100 km has therefore been assumed based on input from professionals in COWI working with resources and recycling.

#### **Use stage (B1-B7) includes:**

As there is no maintenance, repair, refurbishment or any operational water or energy consumption related to the use of the Panel during their reference service life, all modules in the use stage (B1-B7) are considered to have no environmental impact.

#### **End of Life (C1-C4) includes:**

Module C1 accounts for the environmental impacts associated with dismantling and demolition of the facade boards. Demolition requires 1050 W of electrical energy for an electric screwdriver for the Swisspearl Panel. Thereby, a total of 87.5 watt-hours is used. The electricity consumption for installation is accounted for, but the machinery itself is not accounted for because it is under the cut-off, and it is therefore modelled as an empty <us-o> process in GaBi Sphera. The electricity is modelled as Danish grid mix because the product is installed and used in Denmark.

The average distance to waste handling facilities is the same for C2 as for A5 which is 60 km. The truck type for all product types is the GLO: Truck, Euro 6 A-C, 28 - 32t gross weight. The utilisation rate is 61%, which is the default value including empty runs in GaBi.

The Panel is sent to landfill and therefore there are no environmental impacts associated with

waste processing of materials flows intended for reuse, recycling or energy recovery.

In C4, the disposal module, the product is waste handled. 100% of the product goes to landfill. The landfill process includes percolate. It is assumed that the biogenic carbon of the cellulose contained in the fiber cement Panel is released as CO<sub>2</sub>.

#### **Re-use, recovery and recycling potential (D) includes:**

Module D – The Panel is sent to landfill after use. The product has therefore no impact during this stage and no associated environmental impacts. The credits in module D therefore stem from incineration of the packaging disposed in A5.

The incineration process and recycling processes take place in A5 and the energy credit and material credit take place in module D.

Regarding crediting for recycling of paper and board in the packaging, the ecoinvent process for kraft paper used for credit has been edited, so only the virgin wooden inputs are credited, not all other inputs in the process e.g. energy.

# LCA results

## Results for Panel

### Core environmental impact indicators for Panel

| ENVIRONMENTAL IMPACTS PER M <sup>2</sup> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |           |           |           |          |          |          |           |          |          |           |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|----------|----------|----------|-----------|----------|----------|-----------|
| Parameter                                | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | A1        | A2        | A3        | A4        | A5       | B1-B7    | C1       | C2        | C3       | C4       | D         |
| GWP-total                                | [kg CO <sub>2</sub> eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3.80E+00  | 2.46E-01  | 2.32E+00  | 2.70E+00  | 1.15E+00 | 0.00E+00 | 1.63E-01 | 6.51E-02  | 0.00E+00 | 1.45E+00 | -4.09E-02 |
| GWP-fossil                               | [kg CO <sub>2</sub> eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 5.09E+00  | 2.46E-01  | 3.31E+00  | 2.70E+00  | 1.99E-01 | 0.00E+00 | 1.62E-01 | 6.56E-02  | 0.00E+00 | 1.79E-01 | -4.06E-02 |
| GWP-biogenic                             | [kg CO <sub>2</sub> eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | -1.29E+00 | -1.99E-03 | -9.84E-01 | -5.04E-03 | 9.56E-01 | 0.00E+00 | 1.17E-03 | -1.64E-03 | 0.00E+00 | 1.27E+00 | -2.00E-04 |
| GWP-luluc                                | [kg CO <sub>2</sub> eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.20E-03  | 1.40E-03  | -6.47E-04 | 4.79E-03  | 1.28E-04 | 0.00E+00 | 5.94E-05 | 1.07E-03  | 0.00E+00 | 5.22E-04 | -1.18E-04 |
| ODP                                      | [kg CFC 11 eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2.13E-08  | 2.46E-14  | 6.47E-08  | 2.26E-13  | 5.14E-12 | 0.00E+00 | 5.03E-12 | 9.41E-15  | 0.00E+00 | 6.72E-16 | -1.11E-04 |
| AP                                       | [mol H <sup>+</sup> eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.97E-02  | 3.12E-03  | 1.36E-02  | 4.54E-02  | 4.82E-04 | 0.00E+00 | 3.21E-04 | 1.00E-04  | 0.00E+00 | 1.30E-03 | -1.66E-04 |
| EP-freshwater                            | [kg P eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 6.52E-04  | 3.98E-07  | 5.00E-04  | 1.84E-06  | 1.53E-06 | 0.00E+00 | 1.49E-06 | 2.73E-07  | 0.00E+00 | 3.12E-07 | -1.11E-04 |
| EP-marine                                | [kg N eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 4.51E-03  | 1.31E-03  | 2.25E-03  | 1.92E-02  | 1.51E-04 | 0.00E+00 | 1.04E-04 | 3.84E-05  | 0.00E+00 | 3.35E-04 | -1.28E-04 |
| EP-terrestrial                           | [mol N eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4.95E-02  | 1.44E-02  | 2.33E-02  | 2.10E-01  | 1.65E-03 | 0.00E+00 | 9.74E-04 | 4.51E-04  | 0.00E+00 | 3.68E-03 | -2.85E-04 |
| POCP                                     | [kg NMVOC eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1.45E-02  | 3.60E-03  | 8.11E-03  | 5.25E-02  | 3.70E-04 | 0.00E+00 | 2.39E-04 | 9.96E-05  | 0.00E+00 | 1.01E-03 | -1.64E-04 |
| ADPm <sup>1</sup>                        | [kg Sb eq.]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6.22E-05  | 1.08E-08  | 1.24E-06  | 7.72E-08  | 8.82E-08 | 0.00E+00 | 8.67E-08 | 5.57E-09  | 0.00E+00 | 1.63E-08 | -1.11E-04 |
| ADPf <sup>1</sup>                        | [MJ]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4.34E+01  | 2.99E+00  | 4.95E+01  | 3.21E+01  | 2.34E+00 | 0.00E+00 | 2.06E+00 | 8.42E-01  | 0.00E+00 | 2.38E+00 | -5.45E-01 |
| WDP <sup>1</sup>                         | [m <sup>3</sup> world eq. deprived]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 9.70E-01  | 1.58E-03  | 6.10E-01  | 8.72E-03  | 1.28E-01 | 0.00E+00 | 2.43E-02 | 9.90E-04  | 0.00E+00 | 1.90E-02 | -3.22E-03 |
| Caption                                  | GWP-total = Globale Warming Potential - total; 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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication - aquatic freshwater; EP-marine = Eutrophication - aquatic marine; EP-terrestrial = Eutrophication - terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential - minerals and metals; ADPf = Abiotic Depletion Potential - fossil fuels; WDP = Water Depletion Potential |           |           |           |           |          |          |          |           |          |          |           |
|                                          | The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 <sup>2</sup> or 195, while 1.12E-11 is the same as 1.12*10 <sup>-11</sup> or 0.0000000000112.                                                                                                                                                                                                                                                                                                                                                                                                  |           |           |           |           |          |          |          |           |          |          |           |
| Disclaimer                               | <sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.                                                                                                                                                                                                                                                                                                                                                                                                                      |           |           |           |           |          |          |          |           |          |          |           |

### Additional environmental impact indicators for Panel

| ADDITIONAL ENVIRONMENTAL IMPACTS PER M <sup>2</sup> |                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |          |          |          |          |          |          |          |          |          |           |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter                                           | Unit                                                                                                                                                                                                                                                                                                                                                                                                                                         | A1       | A2       | A3       | A4       | A5       | B1-B7    | C1       | C2       | C3       | C4       | D         |
| PM                                                  | [Disease incidence]                                                                                                                                                                                                                                                                                                                                                                                                                          | 2.23E-07 | 8.08E-08 | 3.93E-08 | 1.20E-06 | 3.84E-09 | 0.00E+00 | 2.74E-09 | 1.06E-09 | 0.00E+00 | 1.61E-08 | -1.11E-04 |
| IRP <sup>2</sup>                                    | [kBq U235 eq.]                                                                                                                                                                                                                                                                                                                                                                                                                               | 9.91E-02 | 5.89E-04 | 1.28E-02 | 5.48E-03 | 2.68E-02 | 0.00E+00 | 2.48E-02 | 2.22E-04 | 0.00E+00 | 2.78E-03 | -1.37E-03 |
| ETP-fw <sup>1</sup>                                 | [CTUe]                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2.19E+01 | 2.21E+00 | 1.36E+01 | 2.37E+01 | 7.21E-01 | 0.00E+00 | 5.84E-01 | 6.25E-01 | 0.00E+00 | 1.36E+00 | -2.15E-01 |
| HTP-c <sup>1</sup>                                  | [CTUh]                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.19E-09 | 4.17E-11 | 2.25E-09 | 4.35E-10 | 1.50E-10 | 0.00E+00 | 1.39E-10 | 1.26E-11 | 0.00E+00 | 2.02E-10 | -1.11E-04 |
| HTP-nc <sup>1</sup>                                 | [CTUh]                                                                                                                                                                                                                                                                                                                                                                                                                                       | 4.13E-08 | 1.54E-09 | 1.34E-08 | 1.46E-08 | 1.44E-09 | 0.00E+00 | 8.70E-10 | 5.66E-10 | 0.00E+00 | 2.13E-08 | -1.11E-04 |
| SQP <sup>1</sup>                                    | -                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.30E+01 | 5.45E-01 | 2.22E+01 | 1.92E+00 | 4.63E+00 | 0.00E+00 | 4.54E+00 | 4.14E-01 | 0.00E+00 | 4.96E-01 | -6.03E-01 |
| Caption                                             | PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)                                                                                                                                                                                                    |          |          |          |          |          |          |          |          |          |          |           |
|                                                     | The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10 <sup>2</sup> or 195, while 1.12E-11 is the same as 1.12*10 <sup>-11</sup> or 0.0000000000112.                                                                                                                                                                                                                                   |          |          |          |          |          |          |          |          |          |          |           |
| Disclaimers                                         | <sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.                                                                                                                                                                                                                                                       |          |          |          |          |          |          |          |          |          |          |           |
|                                                     | <sup>2</sup> This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator. |          |          |          |          |          |          |          |          |          |          |           |

### Parameters describing resource use for Panel

| RESOURCE USE PER M <sup>2</sup> |                   |          |          |          |          |           |          |          |          |          |          |           |
|---------------------------------|-------------------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|-----------|
| Parameter                       | Unit              | A1       | A2       | A3       | A4       | A5        | B1-B7    | C1       | C2       | C3       | C4       | D         |
| PERE                            | [MJ]              | 2.88E+00 | 1.04E-01 | 1.73E+00 | 4.60E-01 | 7.77E+00  | 0.00E+00 | 7.70E+00 | 7.25E-02 | 0.00E+00 | 0.00E+00 | -4.70E-01 |
| PERM                            | [MJ]              | 1.42E+01 | 0.00E+00 | 1.03E+01 | 0.00E+00 | 1.03E+01  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PERT                            | [MJ]              | 1.71E+01 | 1.04E-01 | 1.20E+01 | 4.60E-01 | 2.54E+00  | 0.00E+00 | 7.70E+00 | 7.25E-02 | 0.00E+00 | 0.00E+00 | -4.70E-01 |
| PENRE                           | [MJ]              | 4.34E+01 | 2.99E+00 | 4.95E+01 | 3.21E+01 | 2.34E+00  | 0.00E+00 | 2.06E+00 | 8.42E-01 | 0.00E+00 | 0.00E+00 | -5.45E-01 |
| PENRM                           | [MJ]              | 3.05E+00 | 0.00E+00 | 3.17E-01 | 0.00E+00 | -3.17E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| PENRT                           | [MJ]              | 4.64E+01 | 2.99E+00 | 4.98E+01 | 3.21E+01 | 2.02E+00  | 0.00E+00 | 2.06E+00 | 8.42E-01 | 0.00E+00 | 0.00E+00 | -5.45E-01 |
| SM                              | [kg]              | 7.90E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | -1.11E-04 |
| RSF                             | [MJ]              | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 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 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| FW                              | [m <sup>3</sup> ] | 1.87E-02 | 1.17E-04 | 1.44E-02 | 5.29E-04 | 5.24E-03  | 0.00E+00 | 2.81E-03 | 8.08E-05 | 0.00E+00 | 6.00E-04 | -3.07E-04 |

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Caption | <p>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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water</p> |
|         | <p>The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10<sup>2</sup> or 195, while 1.12E-11 is the same as 1.12*10<sup>-11</sup> or 0.0000000000112.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## End-of-life (waste categories and output flows) for Panel

| WASTE CATEGORIES AND OUTPUT FLOWS PER M <sup>2</sup> |      |          |          |          |          |          |          |          |          |          |          |           |
|------------------------------------------------------|------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|
| Parameter                                            | Unit | A1       | A2       | A3       | A4       | A5       | B1-B7    | C1       | C2       | C3       | C4       | D         |
| HWD                                                  | [kg] | 4.17E-01 | 1.01E-10 | 7.20E-02 | 1.03E-09 | 1.88E-08 | 0.00E+00 | 1.87E-08 | 3.22E-11 | 0.00E+00 | 3.63E-08 | -1.11E-04 |
| NHWD                                                 | [kg] | 8.20E-01 | 3.60E-04 | 3.05E-03 | 3.33E-03 | 3.05E-02 | 0.00E+00 | 1.08E-02 | 1.37E-04 | 0.00E+00 | 1.20E+01 | -1.36E-03 |
| RWD                                                  | [kg] | 2.40E-04 | 4.17E-06 | 4.46E-05 | 3.94E-05 | 2.26E-04 | 0.00E+00 | 2.14E-04 | 1.53E-06 | 0.00E+00 | 2.70E-05 | -1.21E-04 |

|         |                                                                                                                                                                                                                                                                                |          |          |          |          |          |          |          |          |          |          |          |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| CRU     | [kg]                                                                                                                                                                                                                                                                           | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR     | [kg]                                                                                                                                                                                                                                                                           | 0.00E+00 | 0.00E+00 | 5.20E-01 | 0.00E+00 | 4.60E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MER     | [kg]                                                                                                                                                                                                                                                                           | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EEE     | [MJ]                                                                                                                                                                                                                                                                           | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.32E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EET     | [MJ]                                                                                                                                                                                                                                                                           | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.37E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Caption | <p>HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy</p> |          |          |          |          |          |          |          |          |          |          |          |
|         | <p>The numbers are declared in scientific notation, e.g., 1.95E+02. This number can also be written as: 1.95*10<sup>2</sup> or 195, while 1.12E-11 is the same as 1.12*10<sup>-11</sup> or 0.0000000000112.</p>                                                                |          |          |          |          |          |          |          |          |          |          |          |

## Biogenic carbon content at factory gate for Panel

| BIOGENIC CARBON CONTENT PER m <sup>2</sup> Panel  |                                                                   |                     |
|---------------------------------------------------|-------------------------------------------------------------------|---------------------|
| Parameter                                         | Unit                                                              | At the factory gate |
| Biogenic carbon content in product                | [kg C]                                                            | 0.35                |
| Biogenic carbon content in accompanying packaging | [kg C]                                                            | 0.26                |
| Note                                              | 1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub> |                     |

# Additional information

## LCA interpretation

The results in this EPD relates to 1 m<sup>2</sup> fiber cement Panel with a reference service life of 50 years/product. The Panel has a climate change impact of GWP-total of 11.86 kg CO<sub>2</sub> eq./m<sup>2</sup>. This result is for the entire life cycle of the product including module D.

The production of cement in A1 and the shipping of the product from Thailand to Denmark A4 are the main contributors to most impact categories. It is the cement production that is the largest contributor to climate change with 29% for the Panel, but the shipping accounts for 20% which is also a large fraction of the overall impact on climate change.

The biogenic carbon emissions mainly stem from incineration of the wood packaging in A5 and release of biogenic carbon in the landfill.

## Allocation

The factory in Thailand has an overall production of 281,414 tonnes of Fiber cement plank and panel products. The factory produces 3,758 tonnes of Swisspearl Plank and 247 tonnes of Swisspearl Panels.

The raw materials and packaging input for the production of the Swisspearl Panel and Plank are based on exact and specific data for the production for the Swisspearl Panel and Plank production for 2022. Specific data is also provided for the output of the production in terms of Panel and Plank produced per tonnes and per square meter. Furthermore, the production of waste and waste handling at the factory is also given specifically with exact numbers for the Swisspearl Panel and Plank production.

This means that no mass allocation has been needed between the Swisspearl Panel and Plank and the production of other products due to specific and clear data for the production of Swisspearl products in particular going into and out of the production factory.

The electricity, heat and water consumption are based on a one-year cycle for the entire factory. The inputs have been divided by the production output for one year to allocate the energy consumption per ton of the product. Revenue is not driven by the Swisspearl Panel or Plank and the factory's other fibre cement panels and planks, since they are similar in price and the products are similar. Therefore, mass allocation is used consistently throughout the LCA for the allocation of electricity, heat and water consumption.

## Technical information on scenarios

### Transport to the building site (A4) per declared unit.

| Scenario information                        | Value                                                                        | Unit              |
|---------------------------------------------|------------------------------------------------------------------------------|-------------------|
| <b>Road transport</b>                       | 28 - 32t gross weight / 22t payload capacity/utilization factor              |                   |
| Fuel type                                   | Diesel                                                                       | -                 |
| Vehicle type                                | Truck                                                                        | -                 |
| Transport distance                          | 227                                                                          | km                |
| Capacity utilisation (including empty runs) | 61                                                                           | %                 |
| Gross density of products transported       | 1495                                                                         | kg/m <sup>3</sup> |
| <b>Sea transport</b>                        | Container ship, 5,000 to 200,00 dwt payload capacity, deep sea Sphera <u>so> |                   |
| Fuel type                                   | Heavy fuel oil                                                               | -                 |
| Vehicle type                                | EURO 6                                                                       | -                 |
| Weighted transport distance                 | 18,263                                                                       | km                |
| Capacity utilization (including empty runs) | 70                                                                           | %                 |
| Gross density of products transported       | 1495                                                                         | kg/m <sup>3</sup> |

### Installation of the product in the building (A5)

| Scenario information        | Value | Unit |
|-----------------------------|-------|------|
| Electricity for screwdriver | 87.5  | Wh   |

### Reference service life

| RSL information               | Panel and Panel                                                                                                                                                                            | Unit  |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Reference service Life        | 50                                                                                                                                                                                         | Years |
| Declared product properties   | The Panel complies with the DS/EN 12467:2012+A2:2018 Plane plader af fibrement – Produktspecifikation og prøvningsmetoder. See also section 3.1.2 for technical properties of the product. | -     |
| Design application parameters | DS/EN 12467:2012+A2:2018 described in section 3.1.2 technical specifications and section 1.6 for the product use.                                                                          | -     |
| Assumed quality of work       | DS/EN 12467:2012+A2:2018 and described section 3.1.2 technical specifications of the product.                                                                                              | -     |
| Outdoor environment           | 50                                                                                                                                                                                         | years |
| Indoor environment            | not to be used indoor                                                                                                                                                                      |       |
| Usage conditions              | No conditions for usage of the declared unit of fiber cement Panel.                                                                                                                        | -     |
| Maintenance                   | No maintenance is needed.                                                                                                                                                                  | -     |

| RSL information               | Panel and Panel                                                                                                                                                                                    | Unit           |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Reference service Life        | 50                                                                                                                                                                                                 | Years          |
| Declared product properties   | The Panel and Panel comply with the DS/EN 12467:2012+A2:2018 Plane plader af fibrement – Produktspecifikation og prøvningsmetoder. See also section 3.1.2 for technical properties of the product. | As appropriate |
| Design application parameters | DS/EN 12467:2012+A2:2018 described in section 3.1.2 technical specifications and section 1.6 for the product use.                                                                                  | As appropriate |
| Assumed quality of work       | DS/EN 12467:2012+A2:2018 and described section 3.1.2 technical specifications of the product.                                                                                                      | As appropriate |
| Outdoor environment           | 50                                                                                                                                                                                                 | years          |
| Indoor environment            | not to be used indoor                                                                                                                                                                              |                |
| Usage conditions              | No conditions for usage of the declared unit of fiber cement panel and Panel.                                                                                                                      | As appropriate |
| Maintenance                   | No maintenance is needed.                                                                                                                                                                          | As appropriate |

### Use (B1-B7)

As there is no maintenance, repair, refurbishment or any operational water or energy consumption related to the use of the fiber cement Panel during their reference service life, all modules in the use stage (B1-B7) are considered to have no environmental impact.

| Scenario information                                       | Value                    | Unit           |
|------------------------------------------------------------|--------------------------|----------------|
| <b>B1 – Use</b>                                            |                          |                |
|                                                            |                          |                |
| <b>B2 - Maintenance</b>                                    |                          |                |
| Maintenance process                                        | Description or reference | -              |
| Maintenance cycle                                          | 0                        | /year          |
| Ancillary materials for maintenance (specify which)        | 0                        | kg/cycle       |
| Waste materials resulting from maintenance (specify which) | 0                        | kg             |
| Net freshwater consumption during maintenance              | 0                        | m <sup>3</sup> |
| Energy input during maintenance                            | 0                        | kWh            |
| <b>B3 – Repair</b>                                         |                          |                |
| Repair process                                             | Description or reference | -              |
| Inspection process                                         | Description or reference | -              |
| Repair cycle                                               | 0                        | /year          |
| Ancillary materials (specify which)                        | 0                        | kg/cycle       |
| Waste materials (specify which)                            | 0                        | kg             |
| Net freshwater consumption during repair                   | 0                        | m <sup>3</sup> |
| Energy input during repair                                 | 0                        | kg/cycle       |
| <b>B4 – Replacement</b>                                    |                          |                |
| Replacement cycle                                          | 0                        | /year          |
| Energy input during replacement                            | 0                        | kWh            |
| Exchange of worn parts during products life cycle          | 0                        | kg             |
| <b>B5 - Refurbishment</b>                                  |                          |                |
| Refurbishment process                                      |                          |                |
| Refurbishment cycle                                        | 0                        | /year          |
| Energy input during refurbishment                          | 0                        | kWh            |
| Material input for refurbishment (specify which)           | 0                        | kg/cycle       |
| Waste materials resulting from refurbishment               | 0                        | kg             |
| Further assumptions for scenario development               | 0                        | As appropriate |
| <b>B6 + B7 – Use of energy and water</b>                   |                          |                |
| Ancillary materials specified by material                  | 0                        | kg             |
| Net freshwater consumption                                 | 0                        | m <sup>3</sup> |
| Type of energy carrier                                     | 0                        | kWh            |
| Power output of equipment                                  | 0                        | kW             |
| Characteristic performance                                 | 0                        | As appropriate |
| Further assumptions for scenario development               | 0                        | As appropriate |

### End of life (C1-C4)

| Scenario information                 | Value                                                                                                                                         | Unit |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------|
| Collected separately                 | 11.96                                                                                                                                         | kg   |
| Collected with mixed waste           | 0                                                                                                                                             | kg   |
| For reuse                            | 0                                                                                                                                             | kg   |
| For recycling                        | 0                                                                                                                                             | kg   |
| For energy recovery                  | 0                                                                                                                                             | kg   |
| For final disposal                   | 11.96                                                                                                                                         | kg   |
| Assumptions for scenario development | Cellulose released as CO <sub>2</sub> instead of CH <sub>4</sub> at the final disposal due to assumption that sufficient oxygen is available. |      |

### Re-use, recovery and recycling potential (D)

| Scenario information/Materiel           | Value | Unit |
|-----------------------------------------|-------|------|
| Displaced material                      | 0.004 | kg   |
| Energy recovery from waste incineration | 1.06  | MJ   |

**Indoor air**

*The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.1.*

**Soil and water**

*The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on the relevant measurements are not available. Read more in EN15804+A1 chapter 7.4.2.*

# References

|                                       |                                                                                                                                                                                            |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Publisher</b>                      |  epddanmark<br><a href="http://www.epddanmark.dk">www.epddanmark.dk</a><br><i>Template version 2023.2</i> |
| <b>Programme operator</b>             | Danish Technological Institute<br>Gregersensvej<br>DK-2630 Taastrup<br><a href="http://www.teknologisk.dk">www.teknologisk.dk</a>                                                          |
| <b>LCA-practitioner</b>               | <i>Cecilie Holm Arentoft</i><br>COWI A/S                                                                                                                                                   |
| <b>LCA software / background data</b> | GaBi professional database version 2023 and the<br>EcolInvent 3.10 database.<br><i>EN 15804 reference package 3.1</i>                                                                      |
| <b>3<sup>rd</sup> party verifier</b>  | <i>Linda Højbye</i><br>Life Cycle Assessment Consulting                                                                                                                                    |

## General programme instructions

General Programme Instructions, version 2.0, spring 2020  
[www.epddanmark.dk](http://www.epddanmark.dk)

### EN 15804

DS/EN 15804 + A2:2019 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

### EN 15942

DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

### ISO 14025

DS/EN ISO 14025:2010 – " Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

### ISO 14040

DS/EN ISO 14040:2008 – " Environmental management – Life cycle assessment – Principles and framework"

### ISO 14044

DS/EN ISO 14044:2008 – " Environmental management – Life cycle assessment – Requirements and guidelines"

### GaBi 2024 Professional Database

<http://www.gabi-software.com/nw-eu-danish/databases/gabi-databases/professional/>

**Ecoinvent database version 3.10 Database** – ecoinvent

**Eurostat**

[ec.europa.eu/eurostat/databrowser/view/ENV\\_WASPACR\\_\\_custom\\_7591581/default/table?lang=en](http://ec.europa.eu/eurostat/databrowser/view/ENV_WASPACR__custom_7591581/default/table?lang=en)

**Andreasi Bassi et al., 2017,**

Environmental Performance of household waste management in Europe – An example of 7 countries.

<https://doi.org/10.1016/j.wasman.2017.07.042>

**Production of fiber cement Panel**

<http://www.fibrementconsulting.com/publications/011011.hatschekfilmsummary.pdf>

**DS/EN 12467:2012+A2:2018**

Plane plader af fiber cement – Produktspecifikation og prøvningsmetoder