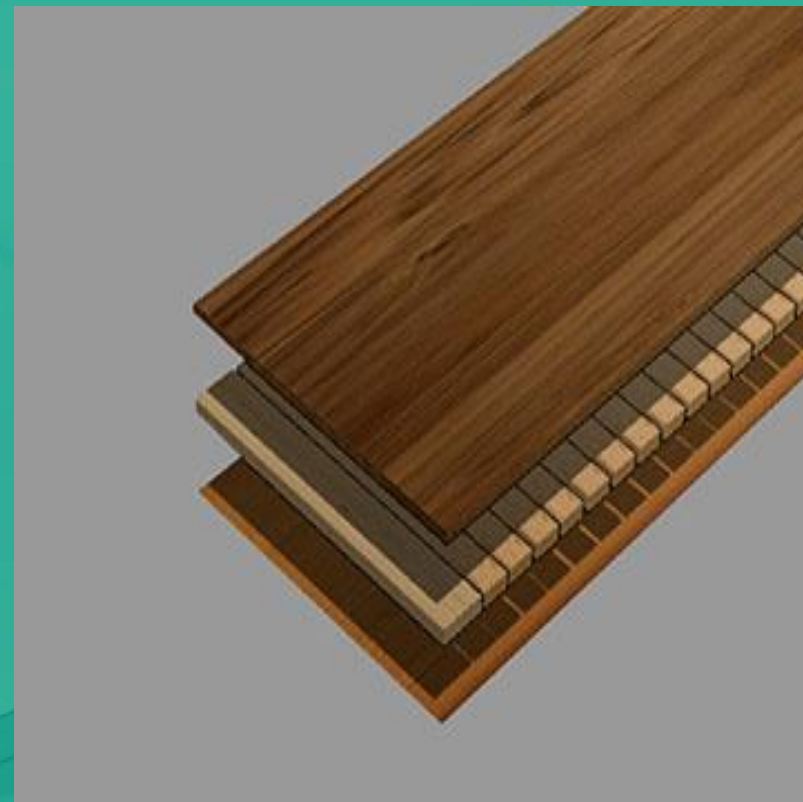


# ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930



15MM, 14MM, 13MM  
ENGINEERED WOOD FLOORS  
RAW A/S



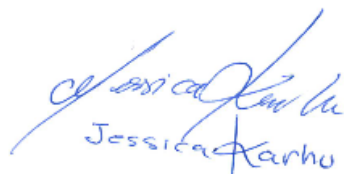
## GENERAL INFORMATION

### MANUFACTURER INFORMATION

|                        |                                     |
|------------------------|-------------------------------------|
| <b>Manufacturer</b>    | Kährs Group for RAW A/S             |
| <b>Address</b>         | Ångbåtsbron 1, 211 20 Malmö, Sweden |
| <b>Contact details</b> | info@kahrs.se                       |
| <b>Website</b>         | www.kahrs.com                       |

### PRODUCT IDENTIFICATION

|                                   |                                                                   |
|-----------------------------------|-------------------------------------------------------------------|
| <b>Product name</b>               | Kährs 15mm, 14mm, 13mm Engineered Wood Floors                     |
| <b>Additional label(s)</b>        | RAW                                                               |
| <b>Product number / reference</b> | Wood floor coverings according to EN 13489:2017 and EN 14342:2013 |
| <b>Place(s) of production</b>     | Nybro, Sweden                                                     |



Jessica Karhu

RTS EPD Committee secretary



Laura Apilo

Managing Director

### EPD INFORMATION

EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

|                               |                                                                                                                                                                                     |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EPD program operator</b>   | Building Information Foundation RTS sr / Building Information Ltd<br>Malminkatu 16 A, 00100 Helsinki, Finland<br><a href="http://cer.rts.fi">http://cer.rts.fi</a>                  |
| <b>EPD standards</b>          | This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.                                                                                                                 |
| <b>Product category rules</b> | The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version 26.8.2020) is used.                                                                     |
| <b>EPD author</b>             | Bruce Uhler, Kährs Group,<br>bruce.uhler@kahrs.com                                                                                                                                  |
| <b>EPD verification</b>       | Independent verification of this EPD and data, according to ISO 14025:<br><input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification |
| <b>Verification date</b>      | 27.04.2021                                                                                                                                                                          |
| <b>EPD verifier</b>           | Silvia Vilčeková, Silcert, s.r.o.                                                                                                                                                   |
| <b>EPD number</b>             | RTS_117_21                                                                                                                                                                          |
| <b>Publishing date</b>        | 29.04.2021                                                                                                                                                                          |
| <b>EPD valid until</b>        | 27.04.2026                                                                                                                                                                          |

## PRODUCT INFORMATION

### PRODUCT DESCRIPTION

Kährs 3-layer floors consist of a surface layer, core layer, and backing. The core material is made from pine/spruce lamella. The total thickness of the floor is 13 mm, 14 mm, 15 mm. The surface layer can be re-sanded 3-4 times. Our 3-layer floors can both be installed floating on a level, solid surface such as concrete, particleboard, wood or glued down. Products can have either an oil or lacquer surface treatment and various species. Our lamella-constructed wood floors are not only strong and stable, they also use raw materials more effectively so they have a lower environmental impact.

### PRODUCT APPLICATION

The multi-layered engineered flooring board was originally invented by Kährs. Its use and design possibilities combined with ease of installation and long-lasting beauty has made this type of wood flooring the most preferred choice globally, for homes and commercial use.

### TECHNICAL SPECIFICATIONS

All Kährs lamella floors are constructed in three layers. The surface layer that you see and walk on every day is always made of solid wood. The other two layers make up the floor's foundation and the material of these layers varies depending on the manufacturer. Ours are made from pinewood and spruce. All the layers have a combined thickness of between 13 and 15 millimetres. You can lay the floors floating or glue them down.

## PRODUCT STANDARDS

Kährs is certified at all sites ISO 9001, ISO 14001. All sites are certified to FSC and PEFC TM. The parquet meets the requirements of EN13489 and the CE DOP.

## PHYSICAL PROPERTIES OF THE PRODUCT

<https://www.kahrs.com/en/how-to/technical-documentation/>

## ADDITIONAL TECHNICAL INFORMATION

Further information can be found at [www.kahrs.com](http://www.kahrs.com).

## PRODUCT RAW MATERIAL COMPOSITION

| Material<br>(for 13-15 mm) | Weight, kg | Post<br>consumer<br>% | Renewable<br>% | Country /<br>Region of<br>origin |
|----------------------------|------------|-----------------------|----------------|----------------------------------|
| Wood                       | 6.6 - 7.9  | 0                     | 100            | EU                               |
| Other                      | 0.4        | 0                     | 0              | EU                               |

## PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category<br>(for 13-15 mm) | Amount, mass- % | Material origin |
|-----------------------------------------|-----------------|-----------------|
| Metals                                  | -               | -               |
| Minerals                                | -               | -               |
| Fossil materials                        | 5% - 6%         | EU              |
| Bio-based materials                     | 94% - 95%       | EU              |

## SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

## PRODUCT LIFE-CYCLE

### MANUFACTURING AND PACKAGING (A1-A3)

Quality control is involved with every process step of production. The raw material is sourced from hundreds of forest owners each year as logs and also sourced as sawn planks or backside veneers. The material is sawn and dried for core and top layer material. The surface material is graded, then strip glued then glued to core/backside material. Then as needed filler, sanding, lacquering/oil applied. Profiling of the board. Final inspection and then packing of flooring, then placed in our warehouse and shipped to the customer.

### TRANSPORT AND INSTALLATION (A4-A5)

Transportation of warehouse material is shipped to customers. Initially, shipment is by truck/lorry to either end-user customer or taken to a harbor for shipment to overseas markets. (A4) covers all transport from the factory to the final customer. Installing a wood floor from Kährs is quick and simple and glueless, thanks to our innovative locking joint system Woodloc®. The Woodloc-system locks the boards together mechanically, eliminating gapping in between the boards. The superior fit also enhances the floors performance and durability. Environmental impacts from installation into the building (A5) include the product installation losses and packaging waste of the product.

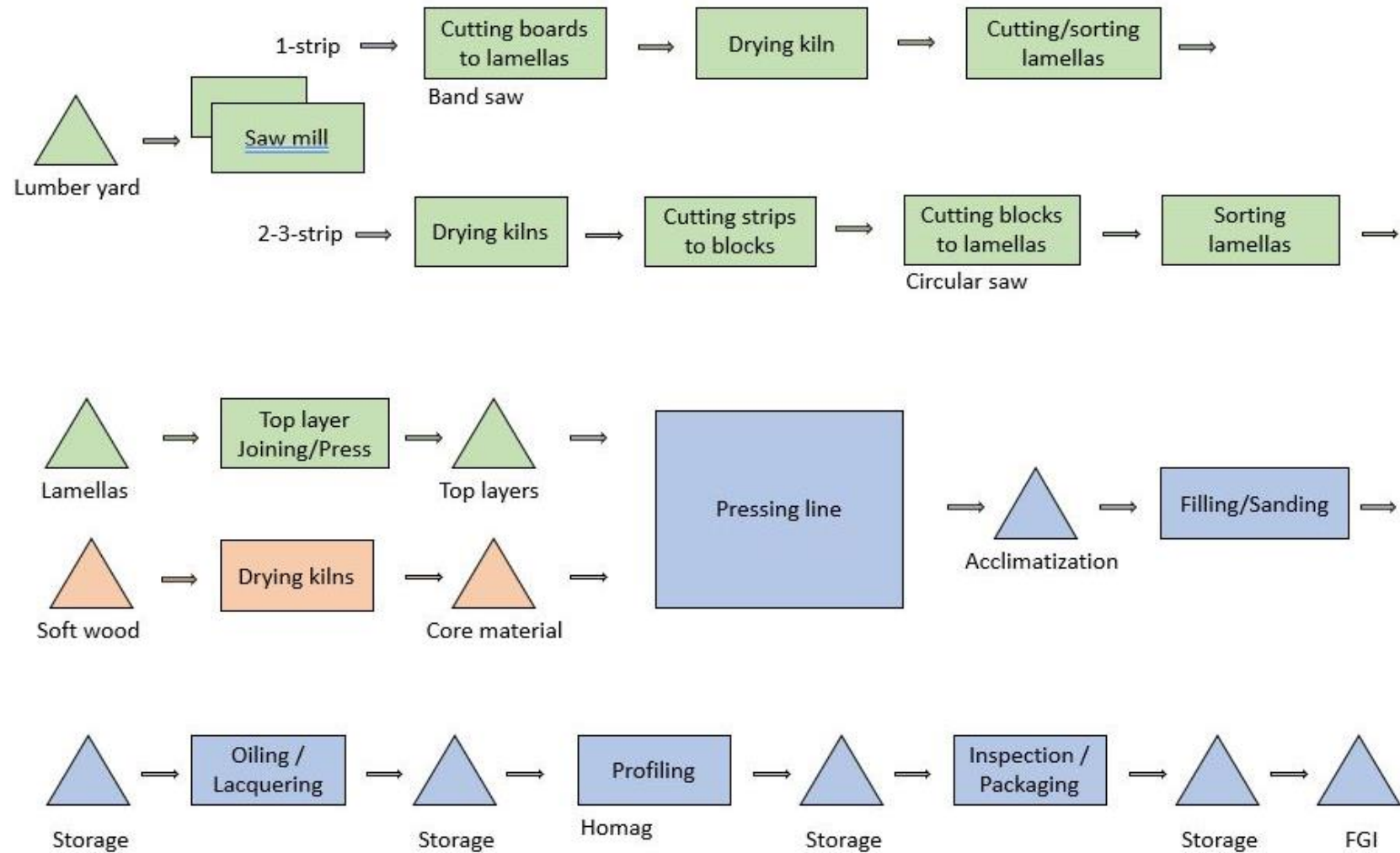
### PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover use phase. Air, soil and water impacts during the use phase have not been studied.

### PRODUCT END OF LIFE (C1-C4, D)

All of the end-of-life product is assumed to be sent to the closest facility. End-of-life scenarios for wood products is almost 100% incineration with energy recovery, as it is assumed that it is the most probable treatment for the product. The transport between a construction site and waste/energy facility is by truck.

## MANUFACTURING PROCESS



# LIFE-CYCLE ASSESSMENT

## LIFE-CYCLE ASSESSMENT INFORMATION

**Period for data** Calendar year 2019

## DECLARED AND FUNCTIONAL UNIT

|                               |                          |
|-------------------------------|--------------------------|
| <b>Declared unit</b>          | 1 square meter           |
| <b>Mass per declared unit</b> | 7,0 kg (13 mm thickness) |
| <b>Mass per declared unit</b> | 7,9 kg (14 mm thickness) |
| <b>Mass per declared unit</b> | 8,3 kg (15 mm thickness) |

## BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

|                                                   |                      |
|---------------------------------------------------|----------------------|
| <b>Biogenic carbon content in product, kg C</b>   | 3,30 (13 mm)         |
| <b>Biogenic carbon content in product, kg C</b>   | 3,76 (14 mm)         |
| <b>Biogenic carbon content in product, kg C</b>   | 3,96 (15 mm)         |
| <b>Biogenic carbon content in packaging, kg C</b> | 0,06 (13, 14, 15 mm) |

## SYSTEM BOUNDARY

This EPD covers cradle to gate with options scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included.

| Product stage |           |               | Assembly stage |          | Use stage |             |        |             |               |                        |                       |                | End of life stage |                  |          |       | Beyond the system boundaries |           |  |
|---------------|-----------|---------------|----------------|----------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------|-------------------|------------------|----------|-------|------------------------------|-----------|--|
| A1            | A2        | A3            | A4             | A5       | B1        | B2          | B3     | B4          | B5            | B6                     | B7                    | C1             | C2                | C3               | C4       | D     | D                            | D         |  |
| x             | x         | x             | x              | x        | MND       | MND         | MND    | MND         | MND           | MND                    | MND                   | x              | x                 | x                | x        | x     | x                            |           |  |
| Raw materials | Transport | Manufacturing | Transport      | Assembly | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstr./demo | Transport         | Waste processing | Disposal | Reuse | Recovery                     | Recycling |  |

Modules not declared = MND. Modules not relevant = MNR.

## CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes which data are available for are included in the calculation. There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows do also not exceed 5% of energy usage or mass. The life cycle analysis includes all industrial processes from raw material acquisition to production, distribution and end-of-life stages.



## ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is based on annual production rate and made with high accuracy and precision. The values for 1 m<sup>2</sup> of the produced product which is used within this study are calculated by considering the total product area per annual production. The product output is fixed to 1 m<sup>2</sup> and the corresponding amount of product is used in the calculations.

In the production plants, same products with 3 different thickness are produced; since the production processes of these products are same, the annual production percentages are taken into consideration for allocation of raw materials. Energy consumption and packaging materials do not differ as per the thickness, so the allocation is based on the annual production.

There is no waste as an output since the only outputs are the product itself and by-product wood chip which is sold to a pellet factory for fuel production. Allocation for by-product is handled by mass ratio. Since the shares of raw materials in the main product and by-product is known, allocation is done considering these shares, energy consumption is allocated considering final produced amounts.

Electricity is contracted from green hydropower. Independent research suggests that use of hydropower instead of fossil fuels for electricity generation has helped to avoid more than 100 billion tonnes of carbon dioxide in the past 50 years alone, exceedingly even the emissions averted by nuclear power. That's roughly equivalent to the total annual carbon footprint of the United States for 20 years.

All estimates and assumptions are given below:

- Module A2, A4 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality it may vary but as the role of transportation emission in total results is small and so the variety in load assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by transportation companies to serve the needs of other clients.
- Module A4: Transportation doesn't cause losses as products are packaged properly. The volume capacity utilisation factor is assumed to be 1 for the nested packaged products. Additionally, transportation distances and vehicle types are assumed according to the exports in the last year.
- Module A5: The impacts of the ancillary materials and consumed energy during installation are assumed zero since they are negligible. Weight loss from product is assumed as 1% by mass.
- Module C1: The impacts of the disassembly stage are assumed zero, since the consumption of energy and natural resources for disassembling the end-of-life product is negligible.
- Module C2: Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is assumed as lorry which is the most common.
- Module C3, C4, D: 100% of the end-of-life product is assumed to be recovered to energy.

# ENVIRONMENTAL IMPACT DATA

NOTE: ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930 ARE PRESENTED IN ANNEX.

## 15 MM CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

| Impact category                       | Unit      | A1        | A2       | A3        | A1-A3     | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3        | C4       | D         |
|---------------------------------------|-----------|-----------|----------|-----------|-----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|-----------|----------|-----------|
| Climate change – total                | kg CO2e   | -1.53E+01 | 8.31E-01 | 1.11E-01  | -1.44E+01 | 2.88E-01 | 3.83E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.26E-02 | 1.68E+01  | 0.00E+00 | -7.05E+00 |
| Climate change – fossil               | kg CO2e   | 1.38E+00  | 8.30E-01 | 2.94E-01  | 2.51E+00  | 2.88E-01 | 1.29E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.25E-02 | 1.20E-01  | 0.00E+00 | -7.05E+00 |
| Climate change – biogenic             | kg CO2e   | -1.67E+01 | 4.91E-04 | -1.84E-01 | -1.69E+01 | 1.76E-04 | 2.54E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 3.21E-05 | 1.66E+01  | 0.00E+00 | -3.36E-03 |
| Climate change – LULUC                | kg CO2e   | 8.71E-03  | 3.06E-04 | 1.06E-03  | 1.01E-02  | 9.90E-05 | 2.19E-06 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.85E-05 | 2.32E-05  | 0.00E+00 | -2.92E-04 |
| Ozone depletion                       | kg CFC11e | 4.92E-07  | 1.89E-07 | 3.28E-08  | 7.14E-07  | 6.66E-08 | 1.11E-09 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.20E-08 | 9.61E-09  | 0.00E+00 | -1.45E-06 |
| Acidification                         | mol H+e   | 7.87E-03  | 3.69E-03 | 2.69E-03  | 1.43E-02  | 2.12E-03 | 7.21E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.16E-04 | 1.35E-03  | 0.00E+00 | -3.66E-02 |
| Eutrophication, aquatic freshwater    | kg PO4e   | 9.88E-05  | 7.09E-06 | 3.79E-05  | 1.44E-04  | 2.23E-06 | 9.15E-08 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 4.53E-07 | 1.60E-06  | 0.00E+00 | -1.38E-05 |
| Eutrophication, aquatic marine        | kg Ne     | 1.59E-03  | 1.08E-03 | 7.27E-04  | 3.40E-03  | 5.81E-04 | 3.23E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.40E-05 | 6.38E-04  | 0.00E+00 | -6.66E-03 |
| Eutrophication, terrestrial           | mol Ne    | 1.74E-02  | 1.19E-02 | 1.03E-02  | 3.97E-02  | 6.44E-03 | 3.40E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 7.07E-04 | 6.79E-03  | 0.00E+00 | -6.78E-02 |
| Photochemical ozone formation         | kg NMVOCe | 6.77E-03  | 3.64E-03 | 2.35E-03  | 1.28E-02  | 1.89E-03 | 8.56E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.22E-04 | 1.67E-03  | 0.00E+00 | -1.91E-02 |
| Abiotic depletion, minerals & metals  | kg Sbe    | 3.00E-05  | 2.12E-05 | 3.59E-06  | 5.47E-05  | 4.60E-06 | 1.45E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.31E-06 | 1.58E-06  | 0.00E+00 | -4.13E-06 |
| Abiotic depletion of fossil resources | MJ        | 2.69E+01  | 1.25E+01 | 6.22E+00  | 4.56E+01  | 4.39E+00 | 8.55E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 8.01E-01 | 1.05E+00  | 0.00E+00 | -8.97E+01 |
| Water use                             | m3e depr. | 8.73E-01  | 4.19E-02 | 1.57E-01  | 1.07E+00  | 1.57E-02 | 4.22E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.84E-03 | -9.29E-02 | 0.00E+00 | -2.64E+00 |

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Eutrophication aquatic freshwater is reported as *kg PO4eq*, although the reference given (“EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe”) uses the unit *kg P eq*.



## 14 MM CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

| Impact category                       | Unit                   | A1        | A2       | A3        | A1-A3     | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3        | C4       | D         |
|---------------------------------------|------------------------|-----------|----------|-----------|-----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|-----------|----------|-----------|
| Climate change – total                | kg CO <sub>2</sub> e   | -1.44E+01 | 7.85E-01 | 1.06E-01  | -1.35E+01 | 2.75E-01 | 3.77E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.00E-02 | 1.59E+01  | 0.00E+00 | -6.72E+00 |
| Climate change – fossil               | kg CO <sub>2</sub> e   | 1.37E+00  | 7.84E-01 | 2.89E-01  | 2.45E+00  | 2.75E-01 | 1.29E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.00E-02 | 1.14E-01  | 0.00E+00 | -6.72E+00 |
| Climate change – biogenic             | kg CO <sub>2</sub> e   | -1.58E+01 | 4.66E-04 | -1.84E-01 | -1.60E+01 | 1.68E-04 | 2.48E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 3.06E-05 | 1.58E+01  | 0.00E+00 | -3.20E-03 |
| Climate change – LULUC                | kg CO <sub>2</sub> e   | 8.37E-03  | 2.89E-04 | 1.02E-03  | 9.67E-03  | 9.44E-05 | 2.16E-06 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.76E-05 | 2.21E-05  | 0.00E+00 | -2.78E-04 |
| Ozone depletion                       | kg CFC11e              | 4.89E-07  | 1.78E-07 | 3.15E-08  | 6.99E-07  | 6.35E-08 | 1.09E-09 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.15E-08 | 9.15E-09  | 0.00E+00 | -1.38E-06 |
| Acidification                         | mol H <sup>+</sup> e   | 7.87E-03  | 3.50E-03 | 2.56E-03  | 1.39E-02  | 2.02E-03 | 7.13E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.06E-04 | 1.28E-03  | 0.00E+00 | -3.49E-02 |
| Eutrophication, aquatic freshwater    | kg PO <sub>4</sub> e   | 9.68E-05  | 6.70E-06 | 3.56E-05  | 1.39E-04  | 2.12E-06 | 9.03E-08 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 4.32E-07 | 1.52E-06  | 0.00E+00 | -1.31E-05 |
| Eutrophication, aquatic marine        | kg Ne                  | 1.57E-03  | 1.02E-03 | 6.88E-04  | 3.28E-03  | 5.54E-04 | 3.20E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.10E-05 | 6.08E-04  | 0.00E+00 | -6.35E-03 |
| Eutrophication, terrestrial           | mol Ne                 | 1.72E-02  | 1.13E-02 | 9.64E-03  | 3.82E-02  | 6.14E-03 | 3.36E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.74E-04 | 6.47E-03  | 0.00E+00 | -6.46E-02 |
| Photochemical ozone formation         | kg NMVOCe              | 6.66E-03  | 3.44E-03 | 2.24E-03  | 1.23E-02  | 1.80E-03 | 8.46E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.11E-04 | 1.59E-03  | 0.00E+00 | -1.82E-02 |
| Abiotic depletion, minerals & metals  | kg Sbe                 | 2.99E-05  | 1.99E-05 | 3.52E-06  | 5.34E-05  | 4.39E-06 | 1.43E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.25E-06 | 1.50E-06  | 0.00E+00 | -3.94E-06 |
| Abiotic depletion of fossil resources | MJ                     | 2.67E+01  | 1.18E+01 | 6.16E+00  | 4.47E+01  | 4.19E+00 | 8.44E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 7.63E-01 | 1.00E+00  | 0.00E+00 | -8.55E+01 |
| Water use                             | m <sup>3</sup> e depr. | 8.74E-01  | 3.96E-02 | 1.55E-01  | 1.07E+00  | 1.49E-02 | 4.26E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.71E-03 | -8.85E-02 | 0.00E+00 | -2.52E+00 |

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Eutrophication aquatic freshwater is reported as *kg PO<sub>4</sub>eq*, although the reference given (“EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe”) uses the unit *kg P eq*.

## 13 MM CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

| Impact category                       | Unit                   | A1        | A2       | A3        | A1-A3     | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3        | C4       | D         |
|---------------------------------------|------------------------|-----------|----------|-----------|-----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|-----------|----------|-----------|
| Climate change – total                | kg CO <sub>2</sub> e   | -1.27E+01 | 7.08E-01 | 1.01E-01  | -1.18E+01 | 2.44E-01 | 3.64E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 4.43E-02 | 1.41E+01  | 0.00E+00 | -5.95E+00 |
| Climate change – fossil               | kg CO <sub>2</sub> e   | 1.37E+00  | 7.07E-01 | 2.84E-01  | 2.36E+00  | 2.44E-01 | 1.29E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 4.43E-02 | 1.01E-01  | 0.00E+00 | -5.95E+00 |
| Climate change – biogenic             | kg CO <sub>2</sub> e   | -1.41E+01 | 4.14E-04 | -1.84E-01 | -1.42E+01 | 1.49E-04 | 2.35E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.71E-05 | 1.40E+01  | 0.00E+00 | -2.84E-03 |
| Climate change – LULUC                | kg CO <sub>2</sub> e   | 7.50E-03  | 2.60E-04 | 9.72E-04  | 8.74E-03  | 8.39E-05 | 2.11E-06 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.56E-05 | 1.96E-05  | 0.00E+00 | -2.47E-04 |
| Ozone depletion                       | kg CFC11e              | 4.87E-07  | 1.61E-07 | 3.03E-08  | 6.78E-07  | 5.65E-08 | 1.06E-09 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.02E-08 | 8.11E-09  | 0.00E+00 | -1.23E-06 |
| Acidification                         | mol H <sup>+</sup> e   | 8.02E-03  | 3.14E-03 | 2.43E-03  | 1.36E-02  | 1.80E-03 | 6.93E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.82E-04 | 1.14E-03  | 0.00E+00 | -3.09E-02 |
| Eutrophication, aquatic freshwater    | kg PO <sub>4</sub> e   | 9.24E-05  | 6.03E-06 | 3.33E-05  | 1.32E-04  | 1.89E-06 | 8.77E-08 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 3.83E-07 | 1.35E-06  | 0.00E+00 | -1.16E-05 |
| Eutrophication, aquatic marine        | kg Ne                  | 1.54E-03  | 9.19E-04 | 6.49E-04  | 3.11E-03  | 4.93E-04 | 3.11E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.40E-05 | 5.39E-04  | 0.00E+00 | -5.62E-03 |
| Eutrophication, terrestrial           | mol Ne                 | 1.69E-02  | 1.02E-02 | 9.00E-03  | 3.60E-02  | 5.46E-03 | 3.27E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.97E-04 | 5.73E-03  | 0.00E+00 | -5.73E-02 |
| Photochemical ozone formation         | kg NMVOCe              | 6.40E-03  | 3.09E-03 | 2.12E-03  | 1.16E-02  | 1.60E-03 | 8.22E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.87E-04 | 1.41E-03  | 0.00E+00 | -1.61E-02 |
| Abiotic depletion, minerals & metals  | kg Sbe                 | 3.02E-05  | 1.81E-05 | 3.45E-06  | 5.18E-05  | 3.90E-06 | 1.39E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.11E-06 | 1.33E-06  | 0.00E+00 | -3.49E-06 |
| Abiotic depletion of fossil resources | MJ                     | 2.68E+01  | 1.07E+01 | 6.10E+00  | 4.36E+01  | 3.72E+00 | 8.19E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.76E-01 | 8.86E-01  | 0.00E+00 | -7.57E+01 |
| Water use                             | m <sup>3</sup> e depr. | 8.91E-01  | 3.56E-02 | 1.54E-01  | 1.08E+00  | 1.33E-02 | 4.35E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.40E-03 | -7.84E-02 | 0.00E+00 | -2.23E+00 |

EN 15804+A2 disclaimer for Abiotic depletion and Water use indicators and all optional indicators except Particulate matter and Ionizing radiation, human health: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Eutrophication aquatic freshwater is reported as *kg PO<sub>4</sub>eq*, although the reference given (“EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe”) uses the unit *kg P eq*

## 15 MM USE OF NATURAL RESOURCES

| Impact category                   | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|-----------------------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Renewable PER used as energy      | MJ   | 1.65E+01 | 1.80E-01 | 2.89E+01 | 4.56E+01 | 5.28E-02 | 1.95E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.14E-02 | 2.40E-02 | 0.00E+00 | -2.53E-01 |
| Renewable PER used as materials   | MJ   | 1.72E+02 | 0.00E+00 | 1.79E+00 | 1.74E+02 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Total use of renewable PER        | MJ   | 1.89E+02 | 1.80E-01 | 3.07E+01 | 2.20E+02 | 5.28E-02 | 1.95E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.14E-02 | 2.40E-02 | 0.00E+00 | -2.53E-01 |
| Non-renew. PER used as energy     | MJ   | 1.91E+01 | 1.25E+01 | 3.79E+00 | 3.55E+01 | 4.39E+00 | 8.55E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 8.01E-01 | 1.05E+00 | 0.00E+00 | -8.97E+01 |
| Non-renew. PER used as materials  | MJ   | 7.73E+00 | 0.00E+00 | 2.42E+00 | 1.02E+01 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Total use of non-renewable PER    | MJ   | 2.69E+01 | 1.25E+01 | 6.22E+00 | 4.56E+01 | 4.39E+00 | 8.55E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 8.01E-01 | 1.05E+00 | 0.00E+00 | -8.97E+01 |
| Use of secondary materials        | kg   | 6.13E-03 | 0.00E+00 | 8.10E-04 | 6.94E-03 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of renewable secondary fuels  | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of non-renew. secondary fuels | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of net fresh water            | m3   | 9.67E-03 | 2.21E-03 | 2.66E-03 | 1.45E-02 | 8.67E-04 | 2.59E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.52E-04 | 2.10E-03 | 0.00E+00 | -1.07E-02 |

PER abbreviation stands for primary energy resources

## 14 MM USE OF NATURAL RESOURCES

| Impact category                   | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|-----------------------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Renewable PER used as energy      | MJ   | 1.59E+01 | 1.70E-01 | 2.66E+01 | 4.27E+01 | 5.04E-02 | 1.93E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.08E-02 | 2.28E-02 | 0.00E+00 | -2.41E-01 |
| Renewable PER used as materials   | MJ   | 1.63E+02 | 0.00E+00 | 1.79E+00 | 1.65E+02 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Total use of renewable PER        | MJ   | 1.79E+02 | 1.70E-01 | 2.84E+01 | 2.07E+02 | 5.04E-02 | 1.93E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.08E-02 | 2.28E-02 | 0.00E+00 | -2.41E-01 |
| Non-renew. PER used as energy     | MJ   | 1.90E+01 | 1.18E+01 | 3.73E+00 | 3.46E+01 | 4.19E+00 | 8.44E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 7.63E-01 | 1.00E+00 | 0.00E+00 | -8.55E+01 |
| Non-renew. PER used as materials  | MJ   | 7.70E+00 | 0.00E+00 | 2.42E+00 | 1.01E+01 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Total use of non-renewable PER    | MJ   | 2.67E+01 | 1.18E+01 | 6.16E+00 | 4.47E+01 | 4.19E+00 | 8.44E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 7.63E-01 | 1.00E+00 | 0.00E+00 | -8.55E+01 |
| Use of secondary materials        | kg   | 6.21E-03 | 0.00E+00 | 8.10E-04 | 7.02E-03 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of renewable secondary fuels  | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of non-renew. secondary fuels | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of net fresh water            | m3   | 9.65E-03 | 2.09E-03 | 2.62E-03 | 1.44E-02 | 8.27E-04 | 2.57E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.45E-04 | 2.00E-03 | 0.00E+00 | -1.02E-02 |

PER abbreviation stands for primary energy resources

## 13 MM USE OF NATURAL RESOURCES

| Impact category                   | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|-----------------------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Renewable PER used as energy      | MJ   | 1.48E+01 | 1.53E-01 | 2.43E+01 | 3.92E+01 | 4.48E-02 | 1.88E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 9.60E-03 | 2.02E-02 | 0.00E+00 | -2.13E-01 |
| Renewable PER used as materials   | MJ   | 1.45E+02 | 0.00E+00 | 1.79E+00 | 1.46E+02 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Total use of renewable PER        | MJ   | 1.59E+02 | 1.53E-01 | 2.61E+01 | 1.86E+02 | 4.48E-02 | 1.88E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 9.60E-03 | 2.02E-02 | 0.00E+00 | -2.13E-01 |
| Non-renew. PER used as energy     | MJ   | 1.91E+01 | 1.07E+01 | 3.67E+00 | 3.34E+01 | 3.72E+00 | 8.19E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.76E-01 | 8.86E-01 | 0.00E+00 | -7.57E+01 |
| Non-renew. PER used as materials  | MJ   | 7.73E+00 | 0.00E+00 | 2.42E+00 | 1.02E+01 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Total use of non-renewable PER    | MJ   | 2.68E+01 | 1.07E+01 | 6.10E+00 | 4.36E+01 | 3.72E+00 | 8.19E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.76E-01 | 8.86E-01 | 0.00E+00 | -7.57E+01 |
| Use of secondary materials        | kg   | 6.58E-03 | 0.00E+00 | 8.10E-04 | 7.39E-03 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of renewable secondary fuels  | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of non-renew. secondary fuels | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00  |
| Use of net fresh water            | m3   | 9.70E-03 | 1.88E-03 | 2.58E-03 | 1.42E-02 | 7.35E-04 | 2.55E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.28E-04 | 1.78E-03 | 0.00E+00 | -9.06E-03 |

PER abbreviation stands for primary energy resources

## 15 MM END OF LIFE – WASTE

| Impact category     | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|---------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Hazardous waste     | kg   | 9.33E-02 | 1.30E-02 | 1.56E-02 | 1.22E-01 | 4.35E-03 | 2.68E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 8.33E-04 | 0.00E+00 | 0.00E+00 | -2.94E-02 |
| Non-hazardous waste | kg   | 2.06E+00 | 9.36E-01 | 4.56E-01 | 3.45E+00 | 4.34E-01 | 2.26E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.92E-02 | 0.00E+00 | 0.00E+00 | -4.31E-01 |
| Radioactive waste   | kg   | 5.65E-05 | 8.59E-05 | 1.21E-05 | 1.54E-04 | 3.02E-05 | 3.85E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.47E-06 | 0.00E+00 | 0.00E+00 | -6.50E-04 |

## 14 MM END OF LIFE – WASTE

| Impact category     | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|---------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Hazardous waste     | kg   | 9.37E-02 | 1.23E-02 | 1.53E-02 | 1.21E-01 | 4.14E-03 | 2.66E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 7.93E-04 | 0.00E+00 | 0.00E+00 | -2.80E-02 |
| Non-hazardous waste | kg   | 2.06E+00 | 8.87E-01 | 4.48E-01 | 3.39E+00 | 4.14E-01 | 2.22E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.60E-02 | 0.00E+00 | 0.00E+00 | -4.10E-01 |
| Radioactive waste   | kg   | 5.57E-05 | 8.10E-05 | 1.17E-05 | 1.48E-04 | 2.88E-05 | 3.80E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.22E-06 | 0.00E+00 | 0.00E+00 | -6.19E-04 |

## 13 MM END OF LIFE – WASTE

| Impact category     | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|---------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Hazardous waste     | kg   | 9.67E-02 | 1.10E-02 | 1.49E-02 | 1.23E-01 | 3.69E-03 | 2.61E-03 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 7.03E-04 | 0.00E+00 | 0.00E+00 | -2.48E-02 |
| Non-hazardous waste | kg   | 2.10E+00 | 7.91E-01 | 4.40E-01 | 3.33E+00 | 3.68E-01 | 2.13E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.85E-02 | 0.00E+00 | 0.00E+00 | -3.64E-01 |
| Radioactive waste   | kg   | 5.43E-05 | 7.31E-05 | 1.13E-05 | 1.39E-04 | 2.56E-05 | 3.68E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 4.62E-06 | 0.00E+00 | 0.00E+00 | -5.49E-04 |

## 15 MM END OF LIFE – OUTPUT FLOWS

| Impact category               | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D        |
|-------------------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|----------|
| Components for reuse          | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for recycling       | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 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 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

## 14 MM END OF LIFE – OUTPUT FLOWS

| Impact category               | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D        |
|-------------------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|----------|
| Components for reuse          | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for recycling       | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 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 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

## 13 MM END OF LIFE – OUTPUT FLOWS

| Impact category               | Unit | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D        |
|-------------------------------|------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|----------|
| Components for reuse          | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Materials for recycling       | kg   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 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 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Exported energy               | MJ   | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

## 15 MM KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

| Impact category                       | Unit      | A1        | A2       | A3       | A1-A3     | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3        | C4       | D         |
|---------------------------------------|-----------|-----------|----------|----------|-----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|-----------|----------|-----------|
| Climate change – total                | kg CO2e   | -1.84E+00 | 9.99E-02 | 1.34E-02 | -1.73E+00 | 3.46E-02 | 4.60E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.31E-03 | 1.46E+00  | 0.00E+00 | -8.48E-01 |
| Abiotic depletion, minerals & metals  | kg Sbe    | 3.61E-06  | 2.54E-06 | 4.32E-07 | 6.58E-06  | 5.53E-07 | 1.74E-08 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.57E-07 | 1.89E-07  | 0.00E+00 | -4.97E-07 |
| Abiotic depletion of fossil resources | MJ        | 3.23E+00  | 1.51E+00 | 7.47E-01 | 5.49E+00  | 5.28E-01 | 1.03E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 9.62E-02 | 1.26E-01  | 0.00E+00 | -1.08E+01 |
| Water use                             | m3e depr. | 1.05E-01  | 5.04E-03 | 1.88E-02 | 1.29E-01  | 1.88E-03 | 5.07E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 3.42E-04 | -1.12E-02 | 0.00E+00 | -3.18E-01 |
| Use of secondary materials            | kg        | 7.37E-04  | 0.00E+00 | 9.74E-05 | 8.34E-04  | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| Biogenic carbon content in product    | kg C      | N/A       | N/A      | 4.75E-01 | N/A       | N/A      | N/A      | MND | MND | MND | MND | MND | MND | MND | N/A      | N/A      | N/A       | N/A      | N/A       |
| Biogenic carbon content in packaging  | kg C      | N/A       | N/A      | 7.20E-03 | N/A       | N/A      | N/A      | MND | MND | MND | MND | MND | MND | MND | N/A      | N/A      | N/A       | N/A      | N/A       |

## 14 MM KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

| Impact category                       | Unit      | A1        | A2       | A3       | A1-A3     | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3        | C4       | D         |
|---------------------------------------|-----------|-----------|----------|----------|-----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|-----------|----------|-----------|
| Climate change – total                | kg CO2e   | -1.82E+00 | 9.90E-02 | 1.34E-02 | -1.71E+00 | 3.47E-02 | 4.76E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.31E-03 | 1.46E+00  | 0.00E+00 | -8.48E-01 |
| Abiotic depletion, minerals & metals  | kg Sbe    | 3.78E-06  | 2.51E-06 | 4.44E-07 | 6.73E-06  | 5.54E-07 | 1.80E-08 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.57E-07 | 1.89E-07  | 0.00E+00 | -4.97E-07 |
| Abiotic depletion of fossil resources | MJ        | 3.37E+00  | 1.49E+00 | 7.77E-01 | 5.65E+00  | 5.28E-01 | 1.06E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 9.62E-02 | 1.26E-01  | 0.00E+00 | -1.08E+01 |
| Water use                             | m3e depr. | 1.10E-01  | 5.00E-03 | 1.96E-02 | 1.35E-01  | 1.89E-03 | 5.37E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 3.42E-04 | -1.12E-02 | 0.00E+00 | -3.18E-01 |
| Use of secondary materials            | kg        | 7.84E-04  | 0.00E+00 | 1.02E-04 | 8.86E-04  | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| Biogenic carbon content in product    | kg C      | N/A       | N/A      | 4.73E-01 | N/A       | N/A      | N/A      | MND | MND | MND | MND | MND | MND | MND | N/A      | N/A      | N/A       | N/A      | N/A       |
| Biogenic carbon content in packaging  | kg C      | N/A       | N/A      | 7.55E-03 | N/A       | N/A      | N/A      | MND | MND | MND | MND | MND | MND | MND | N/A      | N/A      | N/A       | N/A      | N/A       |



## 13 MM KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

| Impact category                       | Unit      | A1        | A2       | A3       | A1-A3     | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3        | C4       | D         |
|---------------------------------------|-----------|-----------|----------|----------|-----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|-----------|----------|-----------|
| Climate change – total                | kg CO2e   | -1.81E+00 | 1.01E-01 | 1.43E-02 | -1.69E+00 | 3.48E-02 | 5.18E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.31E-03 | 1.46E+00  | 0.00E+00 | -8.48E-01 |
| Abiotic depletion, minerals & metals  | kg Sbe    | 4.31E-06  | 2.58E-06 | 4.91E-07 | 7.38E-06  | 5.56E-07 | 1.98E-08 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.57E-07 | 1.89E-07  | 0.00E+00 | -4.97E-07 |
| Abiotic depletion of fossil resources | MJ        | 3.82E+00  | 1.52E+00 | 8.68E-01 | 6.21E+00  | 5.30E-01 | 1.17E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 9.62E-02 | 1.26E-01  | 0.00E+00 | -1.08E+01 |
| Water use                             | m3e depr. | 1.27E-01  | 5.06E-03 | 2.20E-02 | 1.54E-01  | 1.89E-03 | 6.20E-04 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 3.42E-04 | -1.12E-02 | 0.00E+00 | -3.18E-01 |
| Use of secondary materials            | kg        | 9.37E-04  | 0.00E+00 | 1.15E-04 | 1.05E-03  | 0.00E+00 | 0.00E+00 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 0.00E+00 | 0.00E+00  | 0.00E+00 | 0.00E+00  |
| Biogenic carbon content in product    | kg C      | N/A       | N/A      | 4.70E-01 | N/A       | N/A      | N/A      | MND | MND | MND | MND | MND | MND | MND | N/A      | N/A      | N/A       | N/A      | N/A       |
| Biogenic carbon content in packaging  | kg C      | N/A       | N/A      | 8.55E-03 | N/A       | N/A      | N/A      | MND | MND | MND | MND | MND | MND | MND | N/A      | N/A      | N/A       | N/A      | N/A       |

## SCENARIO DOCUMENTATION

### Manufacturing energy scenario documentation

| Scenario parameter                       | Value                                                                                                                                    |
|------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Electricity data source and quality      | Electricity production, hydro, run-of-river, Ecoinvent v3.6, Sweden data has been used as per the LCA model                              |
| Electricity CO2e / kWh                   | 0.0039 kg CO2e /kWh                                                                                                                      |
| District heating data source and quality | Heat and power co-generation, wood chips, 6667 kw, state-of-the-art 2014, Ecoinvent v3.6, Sweden data has been used as per the LCA model |
| District heating CO2e / kWh              | 0.0009 kg CO2e /kWh                                                                                                                      |

### Transport scenario documentation

| Scenario parameter                                  | Value  |
|-----------------------------------------------------|--------|
| A4 specific transport CO2e emissions, kg CO2e / tkm | 0,0819 |
| A4 average transport distance, km                   | 733    |

### End of life scenario documentation

| Scenario parameter                                 | Value                                                          |
|----------------------------------------------------|----------------------------------------------------------------|
| Collection process – kg collected separately       | 7.6895                                                         |
| Collection process – kg collected with mixed waste | 0                                                              |
| Recovery process – kg for re-use                   | 0                                                              |
| Recovery process – kg for recycling                | 0                                                              |
| Recovery process – kg for energy recovery          | 7.6895                                                         |
| Disposal (total) – kg for final deposition         | 0                                                              |
| Scenario assumptions e.g. transportation           | End-of-life product is transported 50 km with an average lorry |

## BIBLIOGRAPHY

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

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

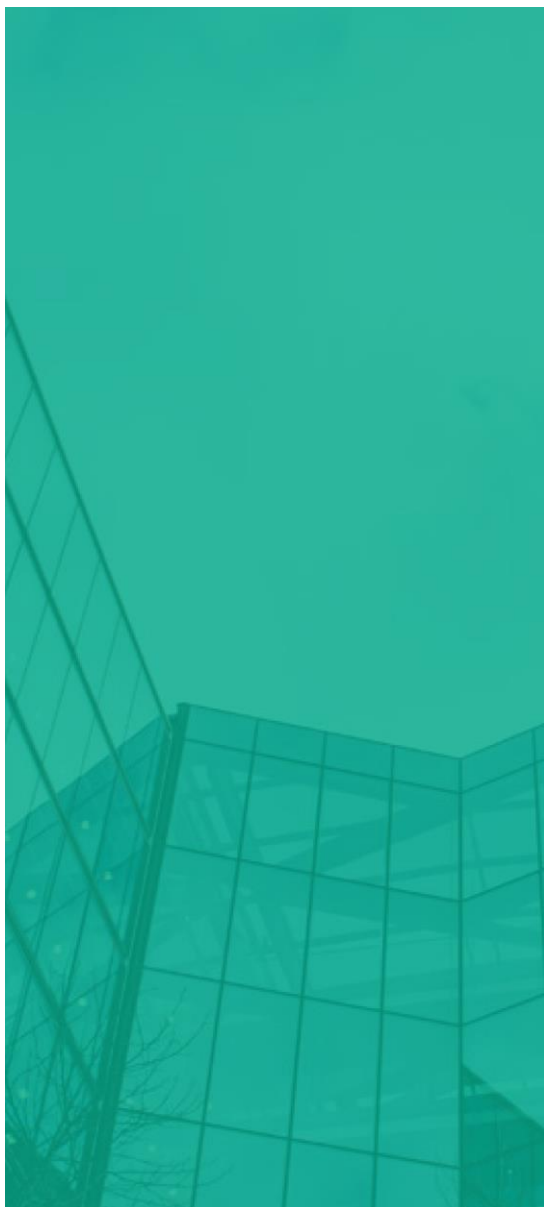
EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

RTS PCR EN 15804:2019 RTS PCR in line with EN 15804+A2. Published by the Building Information Foundation RTS 26.8.2020.

Ecoinvent database v3.6

Eriksson, O & Finnveden, G. 2017: Energy Recovery from Waste Incineration—The Importance of Technology Data and System Boundaries on CO2 Emissions

VTT. 2016: Properties of indigenous fuels in Finland



## ABOUT THE MANUFACTURER

Kährs has been working with wood for more than 160 years and is today one of the oldest and most innovative manufacturers of engineered wood floors in the world. Kährs' long history is lined with a series of innovations that have shaped the entire global wood flooring industry over the years – from the invention of the multi-layer board to the glue-less Woodloc® locking joint. The wood knowledge we have accumulated over the years has been passed down from generation to generation. We are constantly discussing new ideas how to improve our floors. At work, we are trying, testing and eventually succeeding. But the goal is always the same: how to find ways to make our floors even better looking, stronger, easier to install and more sustainable. We're proud that people all over the world appreciate the result. Today, our floors can be found in homes, offices, shops, hotels, concert halls, theaters and sports arenas from Europe and Asia to the Americas. Kährs supplies products to more than 70 countries and holds a leading market position in Sweden and a strong presence in Europe and the UK. Over the decades, Kährs, in cooperation with its customers, became a leader in providing flooring offering high expectations of quality and design and innovative and sustainable solutions. Sustainability and environmental actions are at the heart of Kährs Group.

## EPD AUTHOR AND CONTRIBUTORS

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| <b>EPD program operator</b> | Building Information Foundation RTS sr / Building Information Ltd<br>Malminkatu 16 A, 00100 Helsinki, Finland<br><a href="http://cer.rts.fi">http://cer.rts.fi</a>                                   |
| <b>Background data</b>      | This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.                                                                                                                            |
| <b>LCA software</b>         | The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Wood and Plant Fiber Based Products                                                                             |

## ANNEX: ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

### 15 MM ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

| Impact category                       | Unit      | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|---------------------------------------|-----------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Global warming potential              | kg CO2e   | 1.33E+00 | 8.23E-01 | 2.83E-01 | 2.44E+00 | 2.86E-01 | 1.29E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.20E-02 | 1.17E-01 | 0.00E+00 | -7.02E+00 |
| Depletion of stratospheric ozone      | kg CFC11e | 7.23E-07 | 1.50E-07 | 3.26E-08 | 9.06E-07 | 5.29E-08 | 9.74E-10 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 9.57E-09 | 8.08E-09 | 0.00E+00 | -1.15E-06 |
| Acidification                         | kg SO2e   | 6.46E-03 | 1.92E-03 | 1.83E-03 | 1.02E-02 | 1.36E-03 | 4.61E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.07E-04 | 9.36E-04 | 0.00E+00 | -3.06E-02 |
| Eutrophication                        | kg PO4 3e | 2.09E-03 | 3.74E-04 | 6.90E-04 | 3.15E-03 | 1.98E-04 | 4.52E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.22E-05 | 1.05E-03 | 0.00E+00 | -3.05E-03 |
| Photochemical ozone formation         | kg C2H4e  | 6.36E-04 | 1.15E-04 | 1.35E-04 | 8.87E-04 | 5.48E-05 | 1.30E-06 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.91E-06 | 1.94E-05 | 0.00E+00 | -1.03E-03 |
| Abiotic depletion of non-fossil res.  | kg Sbe    | 3.00E-05 | 2.12E-05 | 3.59E-06 | 5.47E-05 | 4.60E-06 | 1.45E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.31E-06 | 1.58E-06 | 0.00E+00 | -4.13E-06 |
| Abiotic depletion of fossil resources | MJ        | 2.69E+01 | 1.25E+01 | 6.22E+00 | 4.56E+01 | 4.39E+00 | 8.55E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 8.01E-01 | 1.05E+00 | 0.00E+00 | -8.97E+01 |

MND abbreviation stands for Module Not Declared

### 14 MM ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

| Impact category                       | Unit      | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|---------------------------------------|-----------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Global warming potential              | kg CO2e   | 1.33E+00 | 7.77E-01 | 2.78E-01 | 2.38E+00 | 2.72E-01 | 1.29E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 4.95E-02 | 1.12E-01 | 0.00E+00 | -6.68E+00 |
| Depletion of stratospheric ozone      | kg CFC11e | 7.19E-07 | 1.42E-07 | 3.14E-08 | 8.93E-07 | 5.05E-08 | 9.63E-10 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 9.12E-09 | 7.70E-09 | 0.00E+00 | -1.09E-06 |
| Acidification                         | kg SO2e   | 6.50E-03 | 1.82E-03 | 1.75E-03 | 1.01E-02 | 1.30E-03 | 4.55E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.02E-04 | 8.92E-04 | 0.00E+00 | -2.91E-02 |
| Eutrophication                        | kg PO4 3e | 2.07E-03 | 3.54E-04 | 6.62E-04 | 3.09E-03 | 1.89E-04 | 4.45E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 2.12E-05 | 1.00E-03 | 0.00E+00 | -2.90E-03 |
| Photochemical ozone formation         | kg C2H4e  | 6.27E-04 | 1.09E-04 | 1.32E-04 | 8.68E-04 | 5.23E-05 | 1.28E-06 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.58E-06 | 1.85E-05 | 0.00E+00 | -9.83E-04 |
| Abiotic depletion of non-fossil res.  | kg Sbe    | 2.99E-05 | 1.99E-05 | 3.52E-06 | 5.34E-05 | 4.39E-06 | 1.43E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.25E-06 | 1.50E-06 | 0.00E+00 | -3.94E-06 |
| Abiotic depletion of fossil resources | MJ        | 2.67E+01 | 1.18E+01 | 6.16E+00 | 4.47E+01 | 4.19E+00 | 8.44E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 7.63E-01 | 1.00E+00 | 0.00E+00 | -8.55E+01 |

MND abbreviation stands for Module Not Declared

## 13 MM ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930

| Impact category                       | Unit      | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|---------------------------------------|-----------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Global warming potential              | kg CO2e   | 1.32E+00 | 7.01E-01 | 2.73E-01 | 2.30E+00 | 2.42E-01 | 1.29E-01 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 4.39E-02 | 9.88E-02 | 0.00E+00 | -5.92E+00 |
| Depletion of stratospheric ozone      | kg CFC11e | 7.20E-07 | 1.28E-07 | 3.02E-08 | 8.78E-07 | 4.49E-08 | 9.39E-10 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 8.08E-09 | 6.82E-09 | 0.00E+00 | -9.70E-07 |
| Acidification                         | kg SO2e   | 6.71E-03 | 1.63E-03 | 1.67E-03 | 1.00E-02 | 1.15E-03 | 4.43E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 9.03E-05 | 7.90E-04 | 0.00E+00 | -2.58E-02 |
| Eutrophication                        | kg PO4 3e | 2.07E-03 | 3.18E-04 | 6.34E-04 | 3.02E-03 | 1.68E-04 | 4.31E-05 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.88E-05 | 8.87E-04 | 0.00E+00 | -2.57E-03 |
| Photochemical ozone formation         | kg C2H4e  | 6.06E-04 | 9.80E-05 | 1.29E-04 | 8.33E-04 | 4.65E-05 | 1.25E-06 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 5.84E-06 | 1.64E-05 | 0.00E+00 | -8.71E-04 |
| Abiotic depletion of non-fossil res.  | kg Sbe    | 3.02E-05 | 1.81E-05 | 3.45E-06 | 5.18E-05 | 3.90E-06 | 1.39E-07 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 1.11E-06 | 1.33E-06 | 0.00E+00 | -3.49E-06 |
| Abiotic depletion of fossil resources | MJ        | 2.68E+01 | 1.07E+01 | 6.10E+00 | 4.36E+01 | 3.72E+00 | 8.19E-02 | MND | MND | MND | MND | MND | MND | MND | 0.00E+00 | 6.76E-01 | 8.86E-01 | 0.00E+00 | -7.57E+01 |

MND abbreviation stands for Module Not Declared