



# ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Wood framed windows, representative product MSE window  
AS Viljandi Aken ja Uks



## EPD HUB, HUB-3740

Publishing date 21 September 2025, last updated on 21 September 2025, valid until 20 September 2030.

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

## GENERAL INFORMATION

### MANUFACTURER

|                 |                                   |
|-----------------|-----------------------------------|
| Manufacturer    | AS Viljandi Aken ja Uks           |
| Address         | Puidu 6, 71020, Viljandi, Estonia |
| Contact details | vau@vau.ee                        |
| Website         | www.vau.ee                        |

### EPD STANDARDS, SCOPE AND VERIFICATION

|                    |  |
|--------------------|--|
| Program operator   | EPD Hub, hub@epdhub.com  |
| Reference standard | EN 15804:2012+A2:2019/AC:2021 and ISO 14025  |
| PCR                | EPD Hub Core PCR Version 1.2, 24 Mar 2025  |
| Sector             | Construction product   |
| Category of EPD    | Third party verified EPD   |
| Parent EPD number  | -  |
| Scope of the EPD   | Cradle to gate with options, A4-A5, and modules C1-C4, D   |
| EPD author         | Pirjo Kespre-Betzer, AS Viljandi Aken ja Uks   |
| EPD verification   | Independent verification of this EPD and data, according to ISO 14025:<br><input type="checkbox"/> Internal verification <input checked="" type="checkbox"/> External verification |
| EPD verifier       | Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited  |

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. 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.

### PRODUCT

|  |  |
|--|--|
| Product name                               | Wood framed windows, representative product MSE window |
| Additional labels                          | MS window, VDF window, VKF window, VHE window          |
| Product reference                          | -  |
| Place(s) of raw material origin            | Estonia, Lithuania, Finland, Sweden                    |
| Place of production                        | Puidu 6, Viljandi, Estonia 71020                       |
| Place(s) of installation and use           | Estonia, Finland, Sweden, Denmark, Norway              |
| Period for data                            | Calendar year of 2023                                  |
| Averaging in EPD                           | Multiple products                                      |
| Variation in GWP-fossil for A1-A3 (%)      | +24,63/-46,40  |
| GTIN (Global Trade Item Number)            | -  |
| NOBB (Norwegian Building Product Database) | -  |
| A1-A3 Specific data (%)                    | 71,8   |

**ENVIRONMENTAL DATA SUMMARY**

|  |                              |
|--|------------------------------|
| <b>Declared unit</b>                             | 1 square meter of MSE window |
| <b>Declared unit mass</b>                        | 35,41 kg                     |
| <b>GWP-fossil, A1-A3 (kgCO<sub>2</sub>e)</b>     | 7,10E+01                     |
| <b>GWP-total, A1-A3 (kgCO<sub>2</sub>e)</b>      | 5,29E+01                     |
| <b>Secondary material, inputs (%)</b>            | 2,03                         |
| <b>Secondary material, outputs (%)</b>           | 100                          |
| <b>Total energy use, A1-A3 (kWh)</b>             | 282                          |
| <b>Net freshwater use, A1-A3 (m<sup>3</sup>)</b> | 0,62                         |

## PRODUCT AND MANUFACTURER

### ABOUT THE MANUFACTURER

Viljandi Aken ja Uks has been one of the largest producers of windows and doors in the Baltic for thirty years, with the aim of producing high-quality windows and doors. The company has seen consistent growth over the years, which has resulted in us becoming one of the largest Scandinavian producers of windows and doors. Currently, you can find our production units in Viljandi, Võru County and Latvia. Our sales offices are in Viljandi, Tallinn, Stockholm, Riga, Vilnius and Klaipeda. Starting with 35 employees in 1990, we are now one of the largest employers in Viljandi County, providing employment for more than 600 people. The range of products has been constantly expanding based on customer needs and market demand. The company has implemented a quality management system in accordance with the requirements of the ISO 9001 standard. Due to the growth of the company, we have constantly expanded our production areas, which today make up over 51,600m<sup>2</sup>. Over time, we have invested in modern equipment and production lines to provide our customers with faster delivery times and production that meets today's standards and quality requirements.

### PRODUCT DESCRIPTION

This EPD is calculated as a single manufacturing site average and uses a representative product to present the impacts in A1-A5, C1-C4 and D modules. The representative window for this average product EPD is an MSE inward-opening double-framed wooden window. This version represents approximately 40% of the wood frame windows manufactured in 2023 and is highly typical in the material composition and GWP (fossil) content within the possible combination of components.

In order to create a representative average, the following product systems were considered:

- \* MS - inward-opening double-framed wooden window
- \* MSE - inward-opening double-framed wooden window

- \* VDF - outward-opening single-framed wooden window
- \* VKF - outward-opening double-framed wooden window
- \* VHE - outward-opening single-framed wooden window

Representative window MSE is an inward-opening double-framed wooden window. Manufactured following EN 14351-1 requirements. Intended to be used in the outer perimeter of a building.

Size: 320-2300 x 320-2500mm, maximum sash size 4 m<sup>2</sup>

Opening: opens for washing and ventilation

Frame: pine, depth 130, 170, 210mm

Fittings: Lock casing for washing and long closure for ventilation.

Handle: Fiskostar 501, bolt hinges

Glass: glass in outer sash up to 6mm, double or triple glazing in inner sash up to 42mm thick

Further information can be found at [www.vau.ee](http://www.vau.ee).

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### PRODUCT RAW MATERIAL MAIN COMPOSITION

| Raw material category | Amount, mass % | Material origin |
|-----------------------|----------------|-----------------|
| Metals                | 4              | EU              |
| Minerals              | 67             | EU              |
| Fossil materials      | 5              | EU              |
| Bio-based materials   | 24             | EU              |

### BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

|  |      |
|--|------|
| Biogenic carbon content in product, kg C   | 4,25 |
| Biogenic carbon content in packaging, kg C | 0,76 |

### FUNCTIONAL UNIT AND SERVICE LIFE

|                        |                              |
|------------------------|------------------------------|
| Declared unit          | 1 square meter of MSE window |
| Mass per declared unit | 35,41 kg                     |
| Functional unit        | -                            |
| Reference service life | -                            |

### 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

## SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

| 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                            |          |           |
| X             | X         | X             | X              | X        | MND       | MND         | MND    | MND         | MND           | MND                    | MND                   | X                          | X         | X                | X        | X                            |          |           |
| Raw materials | Transport | Manufacturing | Transport      | Assembly | Use       | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction/ demolition | Transport | Waste processing | Disposal | Reuse                        | Recovery | Recycling |

Modules not declared = MND. Modules not relevant = MNR

## MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

Co-product allocation has not been used.

Raw materials are transported from the manufacturer's site to the window factory by lorry, and the calculations take into account the distances travelled by sea ferry.

The production process begins with unpacking raw materials. After processing raw materials, the window frame will be assembled and glued together by the pressing method. After the window frame is pressed, it will get a surface coating. After surface coating, windows will dry and will be equipped with the necessary ironmongery, glazing and seals. Final quality checks will be conducted before packing the window onto transportation pallets. After that, the products will be ready for transportation to the construction site.

Production losses have been considered in ancillary and manufacturing wastes. Metal waste consists of production leftovers (ironmongery) and steel paint cans. These are modelled in approximately 60% paint cans to 40% ironmongery leftovers ratio. Aluminium profiles have an average of 7% production loss, which is considered in A3 waste management (factory-based data). Wood shavings and small pieces of wood have not been considered manufacturing losses since these are used to heat the factory during the winter months. Surface coating emits emissions to air when drying; these have been considered separately in declared unit weight and the weight of chemicals being used (paint, primer and impregnation). Paint leftovers and paint-contaminated materials have been considered hazardous waste.

The transportation for manufacturing waste has been calculated based on the distance between the factory and the waste processing facilities in Estonia. It is assumed that metals will be recycled and everything else incinerated.

The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

### TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The transportation distance is defined according to EPD Hub Limited PCR. The typical installation distance was assumed to be a weighted average. According to the manufacturer, transportation doesn't cause losses as products are packaged properly. The final representative product is transported 231 km by freight, lorry >32 metric ton, EURO5 and 151 km by freight sea ferry.

Environmental impacts from installation into the building (A5) include emissions from energy use in installation and the generation of waste at the construction site. No product waste is generated during installation. Packaging waste comes from the packaging used for the final products. No water is needed for the installation process. Installation foam has been included in the study. The fasteners and electricity for tools being used during installation have been excluded as the cut-off has been applied.

Packaging waste is presumed to be collected and transported to the waste facility, an average distance of 50 km has been presumed. The waste treatment scenario uses OneClickLCA datapoints for an average scenario in Europe.

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

This EPD does not cover the use phase.

Air, soil, and water impacts during the use phase have not been studied.

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

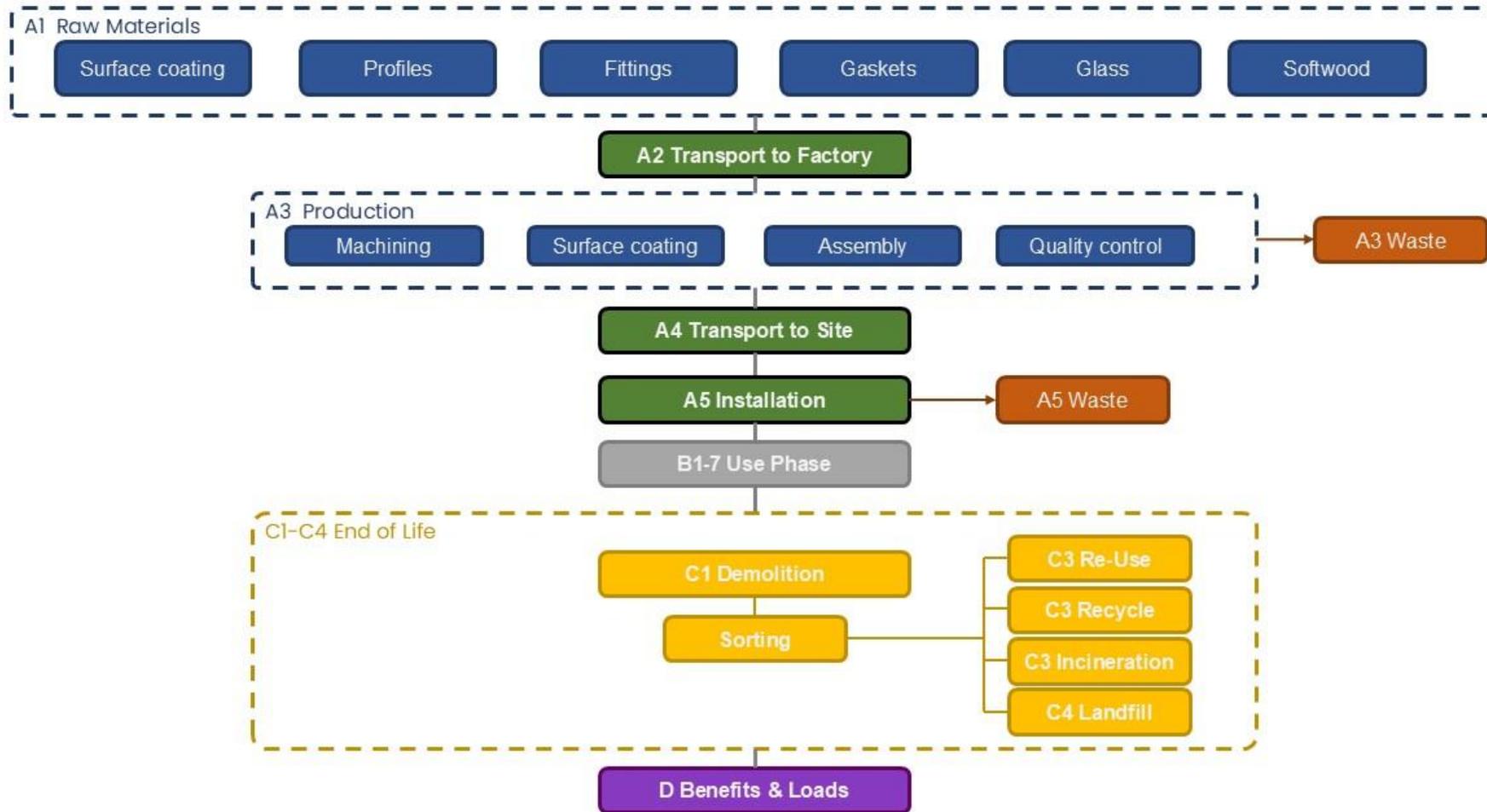
Product End of Life starts on the building site where the product is dismantled from the building, separated by material type, sorted, and the sorted materials are transported to a waste treatment facility. The majority of windows are sold to Scandinavian and Nordic countries: Sweden, Norway, Denmark and Finland.

EOL scenarios have been based on reasonable conclusions by studying Scandinavian waste sorting regulations, where it is common that building products dismantled from the building will have to be separated by material type and sorted at the building site. It is estimated that there is no mass loss during the use phase of the product. Therefore, the end-of-life product is assumed to have the same weight as the declared product. Losses in the dismantling and material separation process are assumed to be very small and not considered in the assessment.

It is assumed that at the end-of-life, 100% of wood framed windows are demounted using electric tools (module C1), materials are separated on-site according to local waste ordinance rules, sorted and then transported to a waste processing plant with an average distance of 50 km by >32 t lorry (Euro 5) (module C2). Materials recovered from dismantled products are considered not to have any losses and are being collected, sorted or incinerated (module C3).

Module D considers the benefits and energy recovery (thermal and electrical) of recyclable waste generated in Modules A5 and C3. It assumes that glass is used as aggregate and metals are remelted. Plastics and timber are considered and documented with the OneClick LCA module D wood and plastic packaging EU scenarios.

# MANUFACTURING PROCESS



## LIFE-CYCLE ASSESSMENT

### CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

On factory waste generation, we have excluded waste materials (water, general waste) that can be traced to the offices and employee communal facilities, e.g. dressing rooms, eating areas, etc. Excluded are sorted packaging and construction wastes from repair and maintenance works in offices and communal areas for employees. The municipal waste contains waterborne paint wastes from the painting line, which is included in the study. Leftover wood from production (ca 46%) is being used in our furnaces to produce heat for the factory. Therefore, we only buy municipal heat during very cold winters.

Fuels bought (diesel and propane) are converted from KG to MJ using information from this table <https://world-nuclear.org/information-library/facts-and-figures/heat-values-of-various-fuels>

The Swedish waste ordinance declares that building products dismantled from the building will have to be separated by material type and sorted at the site.

Reference:

[https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/avfallsforordning-2020614\\_sfs-2020-614/#K3](https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/avfallsforordning-2020614_sfs-2020-614/#K3)

### VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

## ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

| Data type                      | Allocation                  |
|--------------------------------|-----------------------------|
| Raw materials                  | No allocation               |
| Packaging material             | Allocated by mass or volume |
| Ancillary materials            | Allocated by mass or volume |
| Manufacturing energy and waste | Allocated by mass or volume |

Fuels bought (diesel and propane) are converted from KG to MJ using information from this table

<https://world-nuclear.org/information-library/facts-and-figures/heat-values-of-various-fuels>

## PRODUCT & MANUFACTURING SITES GROUPING

|                                      |                                   |
|--------------------------------------|-----------------------------------|
| Type of grouping                     | Multiple products                 |
| Grouping method                      | Based on a representative product |
| Variation in GWP-fossil for A1-A3, % | +24,63/-46,40                     |

This is a single manufacturing site EPD with a representative product for averaging wood-framed windows.

The representative window for this average product EPD is an MSE - MSE-inward-opening double-framed wooden window. This is the most sold product in this product grouping, making out 40% of all production. In order to calculate variation for the representative average, the following product systems were considered:

- \* MS - inward-opening double-framed wooden window
- \* MSE - inward-opening double-framed wooden window
- \* VDF - outward-opening single-framed wooden window
- \* VKF - outward-opening double-framed wooden window
- \* VHE - outward-opening single-framed wooden window

## LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

Reference:

[https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/avfallsforordning-2020614\\_sfs-2020-614/#K3](https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/avfallsforordning-2020614_sfs-2020-614/#K3)

# ENVIRONMENTAL IMPACT DATA

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

## CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2

| Impact category                     | Unit                    | A1        | A2       | A3        | A1-A3     | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|-------------------------------------|-------------------------|-----------|----------|-----------|-----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| GWP – total <sup>1)</sup>           | kg CO <sub>2</sub> e    | 3,84E+01  | 1,16E+00 | 1,34E+01  | 5,29E+01  | 1,57E+00 | 7,50E+00 | MND | 3,25E-03 | 1,95E-01 | 1,88E+01 | 0,00E+00 | -3,63E+01 |
| GWP – fossil                        | kg CO <sub>2</sub> e    | 5,39E+01  | 1,16E+00 | 1,60E+01  | 7,10E+01  | 1,57E+00 | 4,72E+00 | MND | 3,24E-03 | 1,94E-01 | 4,49E+00 | 0,00E+00 | -3,61E+01 |
| GWP – biogenic                      | kg CO <sub>2</sub> e    | -1,56E+01 | 2,35E-04 | -2,54E+00 | -1,82E+01 | 2,86E-04 | 2,78E+00 | MND | 7,32E-06 | 3,12E-05 | 1,44E+01 | 0,00E+00 | -1,34E-01 |
| GWP – LULUC                         | kg CO <sub>2</sub> e    | 6,14E-02  | 5,03E-04 | 9,50E-03  | 7,14E-02  | 6,63E-04 | 5,09E-03 | MND | 1,00E-05 | 7,31E-05 | 3,27E-04 | 0,00E+00 | -6,30E-02 |
| Ozone depletion pot.                | kg CFC <sub>-11</sub> e | 5,71E-06  | 1,83E-08 | 5,90E-07  | 6,32E-06  | 2,78E-08 | 1,73E-07 | MND | 5,61E-11 | 3,91E-09 | 1,08E-08 | 0,00E+00 | -6,11E-07 |
| Acidification potential             | mol H <sup>+</sup> e    | 5,39E-01  | 4,61E-03 | 8,56E-02  | 6,29E-01  | 2,25E-02 | 2,00E-02 | MND | 1,65E-05 | 6,27E-04 | 4,24E-03 | 0,00E+00 | -3,15E-01 |
| EP-freshwater <sup>2)</sup>         | kg Pe                   | 2,19E-03  | 8,64E-05 | 5,33E-02  | 5,56E-02  | 8,00E-05 | 1,64E-03 | MND | 2,89E-06 | 1,31E-05 | 2,53E-04 | 0,00E+00 | -8,91E-03 |
| EP-marine                           | kg Ne                   | 8,00E-02  | 1,46E-03 | 1,27E-02  | 9,42E-02  | 5,94E-03 | 3,92E-03 | MND | 2,86E-06 | 2,13E-04 | 1,74E-03 | 0,00E+00 | -4,94E-02 |
| EP-terrestrial                      | mol Ne                  | 9,42E-01  | 1,60E-02 | 1,27E-01  | 1,09E+00  | 6,57E-02 | 4,05E-02 | MND | 2,49E-05 | 2,32E-03 | 1,71E-02 | 0,00E+00 | -5,78E-01 |
| POCP (“smog”) <sup>3)</sup>         | kg NMVOCe               | 2,68E-01  | 6,34E-03 | 2,66E-01  | 5,40E-01  | 1,96E-02 | 1,78E-02 | MND | 8,24E-06 | 1,02E-03 | 4,98E-03 | 0,00E+00 | -1,68E-01 |
| ADP-minerals & metals <sup>4)</sup> | kg Sbe                  | 4,93E+00  | 3,17E-06 | 2,64E-05  | 4,93E+00  | 3,09E-06 | 8,04E-05 | MND | 7,22E-09 | 5,37E-07 | 4,18E-06 | 0,00E+00 | -2,07E-04 |
| ADP-fossil resources                | MJ                      | 7,28E+02  | 1,67E+01 | 2,39E+02  | 9,84E+02  | 2,12E+01 | 8,97E+01 | MND | 7,65E-02 | 2,82E+00 | 7,64E+00 | 0,00E+00 | -4,16E+02 |
| Water use <sup>5)</sup>             | m <sup>3</sup> e depr.  | 1,64E+01  | 8,24E-02 | 1,03E+02  | 1,20E+02  | 8,81E-02 | 1,66E+00 | MND | 1,98E-03 | 1,44E-02 | 1,35E+00 | 0,00E+00 | -1,15E+01 |

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO<sub>4</sub>e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and 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.

### ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2

| Impact category                  | Unit          | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|----------------------------------|---------------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| Particulate matter               | Incidence     | 4,89E-06 | 1,14E-07 | 5,37E-07 | 5,54E-06 | 1,09E-07 | 1,50E-07 | MND | 5,76E-11 | 1,94E-08 | 5,54E-08 | 0,00E+00 | -3,29E-06 |
| Ionizing radiation <sup>6)</sup> | kBq<br>I1235e | 3,25E+00 | 1,55E-02 | 2,24E+00 | 5,51E+00 | 1,91E-02 | 6,36E-01 | MND | 2,14E-03 | 3,40E-03 | 3,86E-02 | 0,00E+00 | -2,54E+00 |
| Ecotoxicity (freshwater)         | CTUe          | 2,10E+03 | 2,27E+00 | 4,74E+01 | 2,15E+03 | 2,12E+00 | 2,22E+02 | MND | 8,07E-03 | 3,32E-01 | 4,42E+01 | 0,00E+00 | -1,89E+02 |
| Human toxicity, cancer           | CTUh          | 8,05E-08 | 1,92E-10 | 2,48E-09 | 8,32E-08 | 2,85E-10 | 1,09E-08 | MND | 6,72E-13 | 3,20E-11 | 2,49E-08 | 0,00E+00 | -8,02E-09 |
| Human tox. non-cancer            | CTUh          | 2,40E-06 | 1,07E-08 | 1,33E-07 | 2,55E-06 | 1,04E-08 | 5,92E-08 | MND | 2,89E-11 | 1,83E-09 | 3,05E-08 | 0,00E+00 | -2,15E-07 |
| SQP <sup>7)</sup>                | -             | 3,92E+02 | 1,65E+01 | 1,32E+02 | 5,40E+02 | 1,38E+01 | 1,84E+01 | MND | 1,30E-02 | 2,84E+00 | 6,74E+00 | 0,00E+00 | -1,41E+02 |

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

### 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         |
|------------------------------------|----------------|----------|----------|----------|----------|----------|-----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|-----------|----------|-----------|
| Renew. PER as energy <sup>8)</sup> | MJ             | 9,65E+01 | 2,35E-01 | 1,27E+01 | 1,09E+02 | 2,70E-01 | -6,61E+00 | MND | 1,79E-02 | 4,59E-02 | -1,46E+02 | 0,00E+00 | -4,86E+01 |
| Renew. PER as material             | MJ             | 1,35E+02 | 0,00E+00 | 2,33E+01 | 1,58E+02 | 0,00E+00 | -2,33E+01 | MND | 0,00E+00 | 0,00E+00 | -1,35E+02 | 0,00E+00 | 2,27E-01  |
| Total use of renew. PER            | MJ             | 2,31E+02 | 2,35E-01 | 3,60E+01 | 2,67E+02 | 2,70E-01 | -2,99E+01 | MND | 1,79E-02 | 4,59E-02 | -2,80E+02 | 0,00E+00 | -4,84E+01 |
| Non-re. PER as energy              | MJ             | 6,75E+02 | 1,67E+01 | 2,14E+02 | 9,05E+02 | 2,12E+01 | 5,16E+01  | MND | 7,65E-02 | 2,82E+00 | -4,33E+01 | 0,00E+00 | -4,16E+02 |
| Non-re. PER as material            | MJ             | 4,57E+01 | 0,00E+00 | 1,21E+01 | 5,78E+01 | 0,00E+00 | -1,21E+01 | MND | 0,00E+00 | 0,00E+00 | -4,57E+01 | 0,00E+00 | 1,94E+00  |
| Total use of non-re. PER           | MJ             | 7,20E+02 | 1,67E+01 | 2,26E+02 | 9,63E+02 | 2,12E+01 | 3,95E+01  | MND | 7,65E-02 | 2,82E+00 | -8,90E+01 | 0,00E+00 | -4,14E+02 |
| Secondary materials                | kg             | 7,18E-01 | 7,15E-03 | 1,57E-01 | 8,82E-01 | 9,21E-03 | 2,55E-02  | MND | 8,22E-06 | 1,22E-03 | 7,91E-03  | 0,00E+00 | 1,35E+00  |
| Renew. secondary fuels             | MJ             | 2,85E-02 | 8,91E-05 | 6,17E-02 | 9,03E-02 | 7,95E-05 | 3,21E-04  | MND | 3,38E-08 | 1,54E-05 | 1,73E-04  | 0,00E+00 | -1,34E-02 |
| Non-ren. secondary fuels           | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | MND | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00  |
| Use of net fresh water             | m <sup>3</sup> | 4,73E-01 | 2,44E-03 | 1,49E-01 | 6,25E-01 | 2,45E-03 | 4,60E-02  | MND | 6,36E-05 | 4,16E-04 | 1,46E-02  | 0,00E+00 | -3,23E-01 |

8) PER = Primary energy resources.

### 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   | 1,73E+00 | 2,74E-02 | 3,94E-01 | 2,15E+00 | 2,88E-02 | 2,89E-01 | MND | 1,74E-04 | 4,08E-03 | 9,80E-01 | 0,00E+00 | -2,23E+00 |
| Non-hazardous waste | kg   | 5,15E+01 | 5,12E-01 | 3,10E+01 | 8,31E+01 | 5,13E-01 | 2,20E+01 | MND | 1,42E-02 | 8,16E-02 | 3,20E+01 | 0,00E+00 | -5,22E+01 |
| Radioactive waste   | kg   | 6,05E-03 | 3,81E-06 | 3,09E-04 | 6,36E-03 | 4,71E-06 | 1,67E-04 | MND | 5,49E-07 | 8,40E-07 | 9,90E-06 | 0,00E+00 | -6,55E-04 |

### 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 re-use         | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for recycling       | kg   | 2,87E-01 | 0,00E+00 | 2,80E-01 | 5,67E-01 | 0,00E+00 | 4,80E-01 | MND | 0,00E+00 | 0,00E+00 | 2,51E+01 | 0,00E+00 | 0,00E+00 |
| Materials for energy rec      | kg   | 4,71E-04 | 0,00E+00 | 0,00E+00 | 4,71E-04 | 0,00E+00 | 3,60E-01 | MND | 0,00E+00 | 0,00E+00 | 1,12E+01 | 0,00E+00 | 0,00E+00 |
| Exported energy               | MJ   | 6,40E-03 | 0,00E+00 | 0,00E+00 | 6,40E-03 | 0,00E+00 | 3,05E+00 | MND | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy – Electricity | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,28E+00 | MND | 0,00E+00 | 0,00E+00 | 1,83E+01 | 0,00E+00 | 0,00E+00 |
| Exported energy – Heat        | MJ   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,77E+00 | MND | 0,00E+00 | 0,00E+00 | 1,03E+02 | 0,00E+00 | 0,00E+00 |

### ENVIRONMENTAL IMPACTS – GWP-GHG

| Impact category       | Unit                 | A1       | A2       | A3       | A1-A3    | A4       | A5       | B1  | B2  | B3  | B4  | B5  | B6  | B7  | C1       | C2       | C3       | C4       | D         |
|-----------------------|----------------------|----------|----------|----------|----------|----------|----------|-----|-----|-----|-----|-----|-----|-----|----------|----------|----------|----------|-----------|
| GWP-GHG <sup>9)</sup> | kg CO <sub>2</sub> e | 5,40E+01 | 1,16E+00 | 1,60E+01 | 7,11E+01 | 1,57E+00 | 4,72E+00 | MND | 3,25E-03 | 1,95E-01 | 4,49E+00 | 0,00E+00 | -3,61E+01 |

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterization factors for the flows - CH<sub>4</sub> fossil, CH<sub>4</sub> biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO<sub>2</sub> is set to zero.

## SCENARIO DOCUMENTATION

### Manufacturing energy scenario documentation

| Scenario parameter                       | Value   |
|--|---|
| Electricity data source and quality      | Electricity, Estonia, residual mix, 2023 (One Click LCA)  |
| Electricity CO2e / kWh                   | 0,68  |
| District heating data source and quality | Market for heat, district or industrial, other than natural gas (Reference product: heat, district or industrial, other than natural gas), Ecoinvent 3.10.1 |
| District heating CO2e / kWh              | 0,0707  |

### Transport scenario documentation A4

| Scenario parameter  | Value   |
|---|---|
| Fuel and vehicle type. Eg, electric truck, diesel powered truck | Transport, freight, lorry >32 metric ton, EURO5 |
| Average transport distance, km                                  | 231   |
| Capacity utilization (including empty return) %                 | 50  |
| Bulk density of transported products                            | -   |
| Volume capacity utilization factor                              | -   |

### Installation scenario documentation A5

| Scenario information   | Value   |
|--|---|
| Ancillary materials for installation (specified by material) / kg or other units as appropriate  | Market for polyurethane, flexible foam (Reference product: polyurethane, flexible foam) / 0,88 kg |
| Water use / m <sup>3</sup>   | 0   |
| Other resource use / kg  | 0   |
| Quantitative description of energy type (regional mix) and consumption during the installation process / kWh or MJ   | -   |
| Waste materials on the building site before waste processing, generated by the product's installation (specified by type) / kg   | 0   |
| Output materials (specified by type) as result of waste processing at the building site e.g. collection for recycling, for energy recovery, disposal (specified by route) / kg | Plastic / 0,28 kg<br>Cardboard / 0,12 kg<br>Wood / 0,84 kg  |
| Direct emissions to ambient air, soil and water / kg   | 0   |

### End of life scenario documentation

| Scenario information                               | Value   |
|--|---|
| Collection process – kg collected separately       | 25,06 kg  |
| Collection process – kg collected with mixed waste | 11,23 kg  |
| Recovery process – kg for re-use                   | 0 kg  |
| Recovery process – kg for recycling                | 25,06 kg  |
| Recovery process – kg for energy recovery          | 11,23 kg  |
| Disposal (total) – kg for final deposition         | 0 kg  |
| Scenario assumptions e.g. transportation           | Transport, freight, lorry >32 metric ton, EURO5, average 50 km as the distance is unknown |

## THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15802+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

### [Verified tools](#)

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited  
21.09.2025

