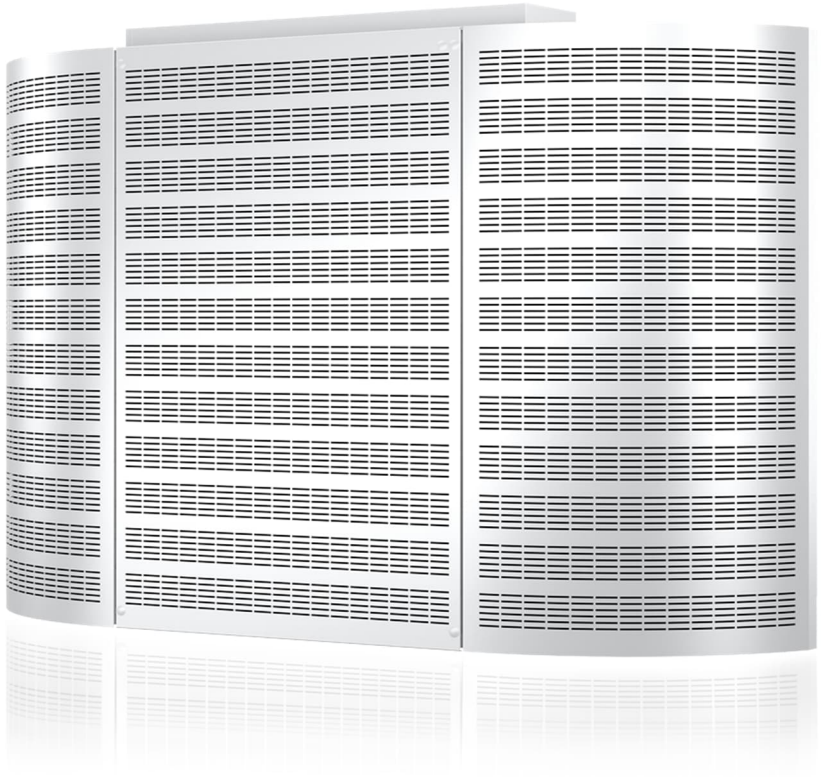
# ENVIRONMENTAL PRODUCT DECLARATION

## IN ACCORDANCE WITH EN 15804+A2 & ISO 14025



**CLIMECON OY**

DINO-A

Product EPD

Rakennustieto EPD

EPD Number: RTS_470.5_26

Publication date: 08.05.2026

Valid until: 08.05.2031

Climecon Oy

# GENERAL INFORMATION

## MANUFACTURER INFORMATION

| | |
|---|---|
| **Manufacturer** | Climecon Oy |
| **Address** | Lämmittäjänkatu 4 A, 00880 Helsinki |
| **Contact details** | Emma Piha, emma.piha@climecon.fi |
| **Website** | https://climeconair.com/ |

## PRODUCT IDENTIFICATION

| | |
|---|---|
| **Component-based EPD tool product group** | Ventilation products |
| **Product name** | DINO-A<br>The results presented in this EPD are based on the representative product DINO-A-700x150. Results for other product variations can be derived using the scaling table provided in Annex 1 |
| **Product number** | See Annex 1 |
| **Place of production** | Kausala, Finland |
| **Geographical area** | Product stage, A1-A3: Finland<br>Life cycle stage A4: Finland<br>Life cycle stages A5, C1-C4, D: Europe |

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. EN15804 impact assessment indicators are based on EF 3.1. EPD of construction products may not be comparable if they do not comply with EN15804 and seen in a building context.

# EPD INFORMATION

| | |
|---|---|
| **EPD program operator** | Rakennustieto EPD, Malminkatu 16 A, 00100 Helsinki, Finland<br>https://ymparisto.rakennustieto.fi/ |
| **EPD standards** | This EPD is in accordance with EN 15804+A2 and ISO 14025 standards. |
| **Product category rules** | The CEN standard EN15804+A2:2019 serves as the core PCR.<br>RTS EPD PCR 2024 (ver.121124, 20.12.2024)<br>Rakennustieto component-based EPD tool guideline (ver. 121124, 22.9.2025) |
| **Component-based EPD-Tool number** | RTS_470.0_26 |
| **Product EPD number** | RTS_470.5_26 |
| **Product EPD verifier** | Anni Viitala, Granlund Oy |
| **Product EPD publishing date** | 08.05.2026 |
| **Product EPD valid until** | 08.05.2031 |

Jukka Seppänen
RTS EPD Committee Secretary

Laura Apilo
Managing Director

# VERIFICATION STATEMENT

| Verified according to the requirements of EN 15804+A2 (product category rules)<br><br>Independent verification of the declaration, according to EN ISO 14025:2010 | |
|---|---|
| ☒ External | ☐ Internal |
| Third party verifier:<br><br>  <br><br>Anni Viitala, Granlund Oy | |

# PRODUCT INFORMATION

## PRODUCT DESCRIPTION

**DINO-A**

DINO displacement diffusers are the best solution for displacement ventilation. The products of the series combine practical design, flexibility and high capacity. The low-built DINO-A is designed for surface mounting on a wall. The displacement diffusers of the DINO series provide premises with silent and draught-free air distribution in places where large air volumes are needed, such as classrooms, meeting rooms, restaurants, and fitness and industrial premises.

Additional information regarding dimensions and throw pattern available at https://climeconair.com/.

No harmonised test standard for indoor-air is applicable to this product category.

# PRODUCT COMPONENTS

| Component | Description | Declared unit | Raw Materials | Weight-% | Origin | Renewable material content (%) | Non-renewable content (%) | Recycled material content (%) |
|---|---|---|---|---|---|---|---|---|
| **Aluminium components** | Aluminium components covers all aluminium materials and their processing used in Kausala production site in 2024. It also covers transport of aluminium components and end of life of aluminium. | 1 kg | Aluminium | 100 | Finland | 0 | 100 | 14 |
| **Coating** | Coating component covers all coating and processing related to coating used in Kausala production site in 2024. It also covers transport of components and end of life. | 1 kg | Coating powder | 100 | Finland, Sweden | 0 | 100 | 0 |
| **Electronic components** | Electronic components covers all electronic components and their processing used in Kausala production site in 2024. It also covers transport of components and end of life of electronic components. | 1 kg | Polyvinylchloride | 39.4 | Finland | 0 | 100 | 0 |
| | | | Cables | 16.2 | Finland | 0 | 100 | 0 |
| | | | Galvanised steel | 10.5 | Finland | 0 | 100 | 0 |
| | | | Building automation controller | 29.8 | Finland | 0 | 100 | 0 |
| | | | Rubber | 4.1 | Finland | 0 | 100 | 0 |
| **Insulation** | Insulation component covers all insulation used in the products in 2024 and its end of life. | 1 kg | Polyurethane | 42.8 | Finland | 0 | 100 | 0 |
| | | | polyethylene terephthalate | 12.1 | Sweden | 0 | 100 | 100 |
| | | | Stone wool | 26.3 | Finland | 0 | 100 | 0 |
| | | | Mineral wool | 18.8 | Finland | 0 | 100 | 70 |
| **Magnetic strip** | Covers magnetic strip production and their processing in Kausala production site in 2024. It also covers transport and the end of life. | 1 kg | Rubber | 10 | GB | 0 | 100 | 0 |
| | | | Ferrite | 81 | GB | 0 | 100 | 0 |
| | | | Strontium carbonate | 9 | GB | 0 | 100 | 0 |
| **Polymer components** | Polymer components covers all plastic materials and their processing used in Kausala production site in 2024. It also covers transport of plastic components and their end of life. | 1 kg | Polypropylene | 40.4 | Finland | 0 | 100 | 0 |
| | | | Polyethylene | 10 | Finland | 0 | 100 | 0 |
| | | | Polyvinylidenchloride | 9.7 | Finland | 0 | 100 | 0 |
| | | | Polyamide | 1.1 | Finland | 0 | 100 | 0 |
| | | | Rubber | 3.5 | Finland, France | 0 | 100 | 0 |
| | | | Biocomposite | 35.2 | Finland | 40 | 60 | 0 |
| **Steel components** | Steel components covers all steel materials and their processing used in Kausala production site in 2024. It covers waste steel handling, transport of steel components and end of life of steel. | 1 kg | Stainless steel | 18.7 | Finland | 0 | 100 | 4 |
| | | | Galvanized steel | 81.3 | Finland, Europe | 0 | 100 | 4 |
| **Energy use** | Includes product energy use in B6 | 1 kWh | | | | | | |

## PACKAGING MATERIAL COMPOSITION

Product packaging materials per kilogram of product are presented in the table below.

| Material | Quantity [kg] | Weight % of total |
|---|---|---|
| **Euro pallet** | 0.0785 | 56.2 |
| **Plastics** | 0.0113 | 8.1 |
| **Paper** | 0.0003 | 0.2 |
| **Cardboard** | 0.0497 | 35.5 |
| **Total weight** | 0,01 kg | |

## PRODUCT COMPOSITION

Product components per declared unit are presented in the Annex 1. For the representative product the component composition is:

| Component | Component mass [kg] | Weight % of total |
|---|---|---|
| Polymer components | 1.62 | 4.6 % |
| Steel components | 33.90 | 95.4 % |
| **Total** | 35.52 | |

## REFERENCE SERVICE LIFE (RSL)

Reference service life is set to 20 years, which is the normal expected service life for air handling units and equipment, according to Building Construction Emissions Database CO2data.fi.

During this period, the products are used as ventilation equipment in indoor conditions. It is assumed that the product is produced and installed as expected and instructed, without flaws in materials. It is assumed that the product is not put under such mechanical stresses that would cause a failure. RSL applies for the reference in-use conditions only.

## SUBSTANCES, REACH - VERY HIGH CONCERN

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

# LIFE-CYCLE ASSESSMENT

## LIFE-CYCLE ASSESSMENT INFORMATION

| | |
|---|---|
| **Period for data** | 1 year, 2024 |
| **Geographical area** | Product stage, A1-A3: Finland<br>Life cycle stage A4: Finland<br>Life cycle stages A5, C1-C4, D: Europe |

## DECLARED UNIT

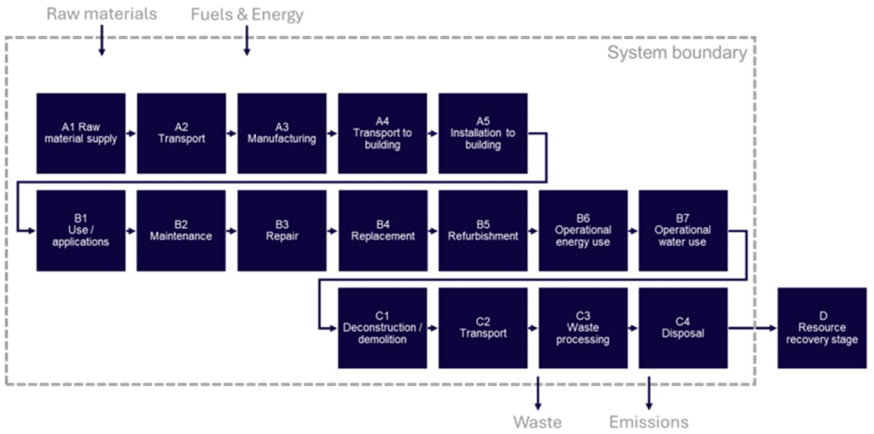
| | |
|---|---|
| **Declared unit** | 1 unit |
| **Mass per declared unit [kg/unit]** | See Annex 1. |
| **Reference service life** | 20 years |

## SYSTEM BOUNDARY

| | Product Stage | | | Construction Process Stage | | Use Stage | | | | | | | End-of-Life Stage | | | | Benefits and loads beyond the system boundary | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Raw material supply | Transport | Manufacturing | Transport to building | Installation to building | Use/applications | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction/demolition | Transport | Waste processing | Disposal | Reuse | Recovery | Recycling |
| Stage | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | D | D |
| Included | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Declared | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D | D |

Mandatory
Mandatory as per the RTS PCR section 6.2.1 rules and terms
Optional modules based on scenarios

The studied system boundary was cradle to gate with options. Studied system covers the following steps of life cycle according to EN 15804: **A1** Raw material supply, **A2** Transport, **A3** Manufacturing, **A4** Transport to building, **A5** Installation to building, **B1** Use, **B2** Maintenance, **B3** Repairs, **B4** Replacement, **B5** Refurbishment, **B6** Operational energy use, **B7** Operational water use, **C1** Deconstruction, **C2** Transportation of end-of-life **C3** Waste processing and **C4** Disposal. The benefits and loads beyond the system boundary are included to stage **D**, which consist of product reuse, recovery and recycling. The life cycle stages are presented in the following figure.




*LCA System Boundary of studied products*

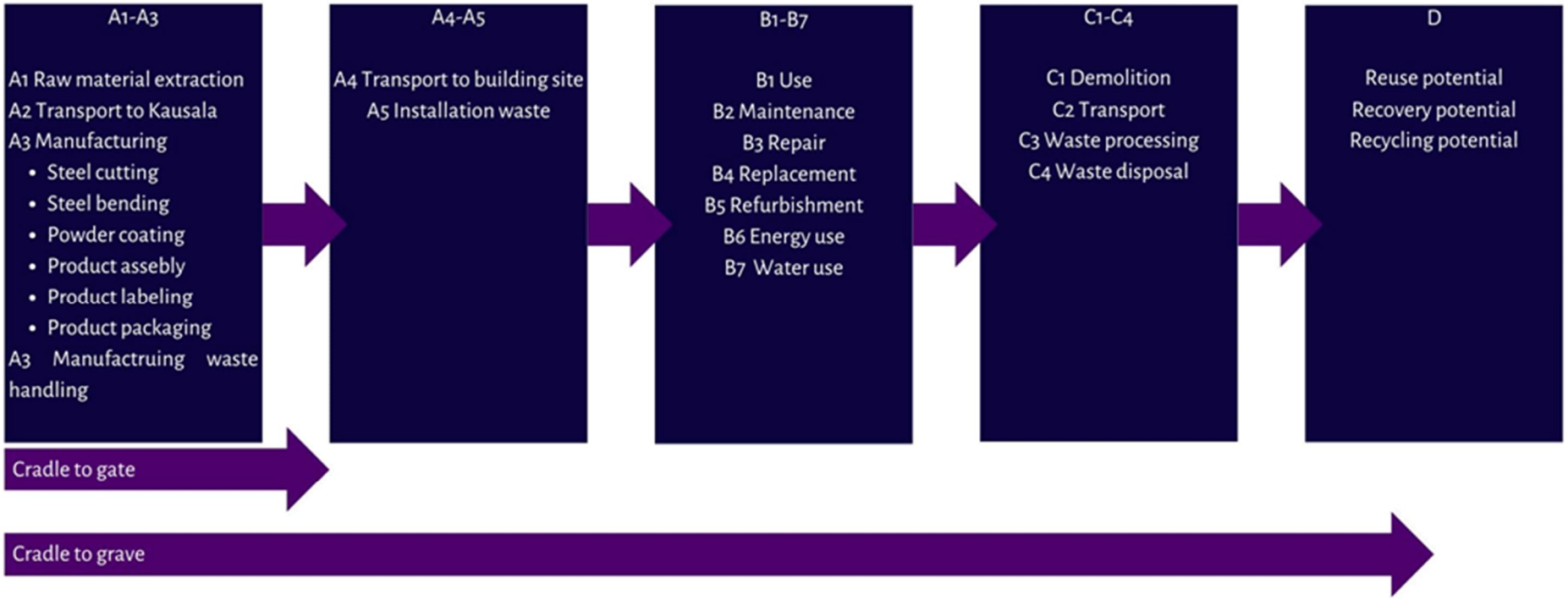
The study does not omit any life cycle stages, processes or data needs that are mandatory according to EN 15804 and RTS PCR.

Descriptions of End-of-Waste points that specify the system boundary are presented below.

- A1 module: The end of waste point of the post-consumer recycled content of the goods is after the waste processing in the previous life cycle. The post-consumer recycled content enters the system burden free. The supply transportation of the post-consumer recycled content is included to the system along with the respective materials.
- A3 module: The end of waste point of the production scraps is the point where it is processed to be ready to use in following life cycles. For example, for incinerated waste streams, it is the incineration of the materials, which results as energy that is then available for consumption in the following life cycle. For paper waste, it is ready to be used as secondary raw material after sorting.
- A5 module: End of waste point of the packaging materials in A5 module is the point where it is processed and to be ready to use in following life cycles.
- C3-C4 module: End of waste point of the studied product is the step when materials are collected and handled in the sorting plant. For metal-based materials, the end of waste point is when materials are sorted and pressed and available to be used to replace primary materials.

# THE PRODUCTION PROCESSES OF THE STUDIED PRODUCT

Production stage (A3) of Manufacturer' production site covers the following manufacturing processes; raw material supply, processing and packaging the final product. After that, products are transported to the customer. The production processes of the studied product are presented in the following figure.



## CUT-OFF CRITERIA

This study follows the cut-off criteria stated in RTS PCR and EN 15804 -standard. This study does not exclude any modules or processes which represent more than 1 % of the emissions of the studied life cycle stage. The study does not exclude any hazardous materials or substances.

Excluded processes and the criteria for exclusion are given in the following table

| Process excluded from study | Cut-off criteria | Quantified contribution from process |
|---|---|---|
| Capital goods (machinery and building) | Contribution per declared unit is negligible and well below 1 %. | < 1% |

## ALLOCATION

Allocation rules used are made according to ISO14044:2006. Allocation is avoided when possible and when necessary, allocation is made based on physical shares while also avoiding double calculations. Allocation is required if the production process produces more than one product and the flows of materials, energy and waste cannot be separately measured for the studied product. Allocation used in generic data sources follows the requirements of the EN 15804 -standard. It should be noticed that the allocation method 'Allocation, cut-off, EN15804' has been used for EcoInvent 3.10.1 data, which complies with EN 15804.

Allocation could not be avoided for the following inputs as the information was only measured at a factory process level. The inputs were allocated to studied product components based on production volume in kilograms.

- Electricity: only measured on factory level.
- Heating: only measured on factory level.
- Production waste flows: only measured on factory level.
- Production water consumption: only measured on factory level.
- Packaging materials: only measured on factory level.
- Ancillary materials: only measured on factory level.

According to EN 15804, flows leaving the system at the end-of-waste boundary of the product stage (A1-A3) are allocated as co-products. According to EN 15804, processes that have a very low contribution to the overall revenue may be neglected in co-product allocation.

# KEY ASSUMPTIONS

The scenarios included are currently in use and are representative for one of the most likely scenario alternatives.

**A4 Transport to building:** Transport to the building site was assessed based on the transportation distance from Climecon's production site to Helsinki. Scenario parameters are presented in the Scenario documentation section.

**A5 Installation to building:** As the products are made-to-measure, installed without machinery that consumes energy and there is no installation waste. Therefore, the Installation to building A5 consists of only treatment of the packaging materials.

- A5 Transportation: Transportation distance 75 km road driving by lorry. (SYKE 2021.)
- A5 Waste treatment and final disposal:
    - Wood: 95% reused (Co2data.fi), 0,15% recycled, 4,85% incinerated (Statistics Finland)
    - Plastics: 73,45 % recycled, 12,45 % incinerated, 13,7% incinerated without energy recovery, 0,39 % landfilled, according to Statistics Finland
    - Cardboard: 96% recycled, 4% incinerated (Statistics Finland)

**B1-B7 Use stage:** Stages B1-B5 and B7 were assessed, and they did not have any inputs. Based on sales data of 2024, 93 % of the products were sold to residential customers and 7 % others. It is assumed that the residential buildings are running the low voltage and others are running medium voltage. B6 stage is included as a separate EPD component into the system as not all products consume energy. Scenario parameters are presented in the Scenario documentation section.

**C1-C4, D End of life scenario**: End of life scenario was assumed based on the common practices of construction products in Finland and product's market area in Europe (SYKE 2021.)

At the end of its life cycle, the product is dismantled from the building and transported for further processing, where the material fractions are separated from each other. At the product level, the End-of-Waste point is reached once the waste has been treated by material fraction and has potentially been directed to further use.

- C1 Deconstruction/demolition: During the demolition phase C1, the entire final product is dismantled, using the mass of the final product as the input data. The energy use (diesel usage) in the demolition stage is assumed at 1.3 kWh/t (Erlandsson, M. & Pettersson, D., 2015.)
- C2 Transportation: Transportation distance 75 km road driving by lorry. (SYKE 2021.)
- C3-C4 Waste treatment and final disposal (see treatment processes in Table 22):
    - Steel: 95 % recycled, 5 % landfilled, according to CO2data.fi
    - Aluminium: 96 % recycled, 4 % landfilled, according to CO2data.fi
    - Plastics: 73,45 % recycled, 12,45 % incinerated, 13,7% incinerated without energy recovery, 0,39 % landfilled, according to Statistic Finland
    - SER waste: 100 % recycled, according to Statistics Finland
    - Insulation: 100 % final disposal
    - Coating: 100 % final disposal
    - Magnetic strip: 100% recycled, according to Statistics Finland
- Module D covers the net benefits and loads arising from the reuse of products or the recycling or recovery of energy from end-of-waste state materials.
    - Recovery: when a product is incinerated at its end-of-life and the produced heat is recovered, the benefits can include avoiding the production of energy.
    - Plastics: Net calorific value as received of the plastic waste was, according to the EcoInvent's dataset "Treatment of waste plastic, mixture, municipal incineration", 3.93MJ/kg electric energy and 7.67MJ/kg thermal energy
    - Recycling: Benefits from the recycling of materials were included to the assessment. Only share of primary raw materials in the product composition were included to the component D.
    - Electronic waste: Benefits from avoided primary electronics production due to the recycling of electronics at the end of life.
    - Aluminium and steel components: Benefits from avoided primary metal production due to the recycling of materials at the end of life.
    - Magnetic strip: Benefits from avoided primary metal production due to the recycling of materials end of life was included.

# DATA QUALITY

The quality requirements for the life cycle assessment were set according to the EN ISO 14044 standard (4.2.3.6) and EN 15804 standard (6.3.7).

This LCA study follows the standard EN 15804:2012+A2:2019 and PCR and no decisions are made based on the values.

## PROCEDURED FOR COLLECTION PROCESS SPECIFIC DATA

Production specific data was collected directly from the manufacturer's production plant. The data represents the production of the studied product at the plant from the materials transported to the facility and represents 1 year average. The data represents the year 2024, which was the latest year with full year data. All gathered data was used without excluding categories in advance following the system boundaries set in earlier chapters.

## CRITERIA FOR CHOOSING THE GENERIC DATA

Generic data that was used for upstream and downstream processes represents complementary data from EcoInvent database.

The datasets were chosen to represent the studied system as closely as possible. When available supplier specific information was used for instance in form of EN 15804 EPDs or emissions profile of local energy supplier. When supplier-specific information was not available the information sources were chosen based on their technical and geographical representativeness. Only when country specific or European data has not been available has global level data been used (concerns mainly data from EcoInvent).

As up-to-date data as possible was chosen and no more than five years old for producer specific data and ten years for generic data was used.

# ENVIRONMENTAL IMPACT DATA

## CLIMECON DINO-A, 1 UNIT

### CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

| Impact category | Unit | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GWP – total1) | kg CO2e | 1,46E+02 | 4,22E-01 | 4,97E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,67E-02 | 2,87E-01 | 1,86E+00 | 6,04E-01 | -5,68E+01 |
| GWP – fossil | kg CO2e | 1,49E+02 | 4,22E-01 | 6,39E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,67E-02 | 2,87E-01 | 1,53E+00 | 5,50E-01 | -5,68E+01 |
| GWP – biogenic | kg CO2e | -2,62E+00 | 9,53E-05 | 4,33E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,70E-06 | 6,50E-05 | 3,28E-01 | 5,41E-02 | 0,00E+00 |
| GWP – LULUC | kg CO2e | 1,63E-01 | 1,88E-04 | 4,64E-05 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,63E-06 | 1,28E-04 | 1,14E-03 | 1,02E-05 | -1,82E-02 |
| Ozone depletion pot. | kg CFC-11e | 5,53E-05 | 6,21E-09 | 8,20E-10 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,55E-10 | 4,23E-09 | 1,01E-08 | 5,07E-10 | -3,11E-07 |
| Acidification potential | mol H+e | 5,70E-01 | 1,43E-03 | 4,05E-04 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,50E-04 | 9,77E-04 | 9,77E-03 | 1,99E-04 | -2,26E-01 |
| EP-freshwater2) | kg Pe | 1,12E-02 | 3,27E-05 | 1,35E-05 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 4,78E-07 | 2,23E-05 | 4,96E-04 | 2,87E-06 | -2,34E-02 |
| EP-marine | kg Ne | 1,09E-01 | 4,72E-04 | 1,93E-04 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 6,96E-05 | 3,21E-04 | 2,34E-03 | 9,88E-05 | -4,98E-02 |
| EP-terrestrial | mol Ne | 1,10E+00 | 5,12E-03 | 1,52E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 7,64E-04 | 3,49E-03 | 2,49E-02 | 9,10E-04 | -5,48E-01 |
| POCP (“smog”)3) | kg NMVOCe | 3,47E-01 | 2,11E-03 | 4,65E-04 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,28E-04 | 1,44E-03 | 7,34E-03 | 2,62E-04 | -1,96E-01 |
| ADP-minerals & metals4) | kg Sbe | 3,39E-03 | 1,17E-06 | 4,34E-07 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 5,97E-09 | 7,99E-07 | 5,23E-05 | 1,68E-08 | -5,35E-04 |
| ADP-fossil resources | MJ | 1,37E+03 | 6,10E+00 | 7,96E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,18E-01 | 4,15E+00 | 1,10E+01 | 3,66E-01 | -5,87E+02 |
| Water use5) | m3e depr. | 4,07E+02 | 3,02E-02 | 5,26E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 5,43E-04 | 2,06E-02 | 2,22E-01 | 3,62E-02 | -1,02E+01 |

1)GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) 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 experienced with the indicator. 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get $PO_4e$.

## USE OF NATURAL RESOURCES

| Impact category | Unit | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Renew. PER as energy8) | MJ | 3,28E+02 | 8,36E-02 | -2,19E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,38E-03 | 5,72E-02 | 1,69E+00 | 6,86E-03 | -6,61E+01 |
| Renew. PER as material | MJ | 3,73E+01 | 0,00E+00 | -3,73E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Total use of renew. PER | MJ | 3,65E+02 | 8,36E-02 | -5,92E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,38E-03 | 5,72E-02 | 1,69E+00 | 6,86E-03 | -6,61E+01 |
| Non-re. PER as energy | MJ | 1,33E+03 | 6,10E+00 | -9,91E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,18E-01 | 4,15E+00 | -4,62E+01 | -7,87E+00 | -5,98E+02 |
| Non-re. PER as material | MJ | 5,63E+01 | 0,00E+00 | -1,35E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | -3,68E+01 | -6,03E+00 | 0,00E+00 |
| Total use of non-re. PER | MJ | 1,38E+03 | 6,10E+00 | -2,34E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,18E-01 | 4,15E+00 | -8,30E+01 | -1,39E+01 | -5,98E+02 |
| Secondary materials | kg | 5,51E+00 | 2,60E-03 | 1,13E-03 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 9,06E-05 | 1,77E-03 | 1,60E-02 | 1,62E-04 | 3,01E+01 |
| Renew. secondary fuels | MJ | 9,16E-01 | 3,30E-05 | 9,84E-06 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,37E-07 | 2,35E-05 | 5,77E-04 | 4,50E-06 | -9,50E-01 |
| Non-ren. secondary fuels | MJ | 7,22E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Use of net fresh water | m3 | 1,05E+01 | 9,03E-04 | 9,24E-04 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,44E-05 | 6,14E-04 | 5,46E-03 | 8,61E-04 | -1,54E-01 |

1)PER = primary energy resources; Non-ren = Non renewable

## END OF LIFE – WASTE

| Impact category | Unit | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hazardous waste | kg | 5,33E+00 | 1,04E-02 | 1,58E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,42E-04 | 7,03E-03 | 1,01E-01 | 9,59E-03 | -1,75E+01 |
| Non-hazardous waste | kg | 2,92E+02 | 1,91E-01 | 5,15E-01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,30E-03 | 1,30E-01 | 2,87E+00 | 2,80E-01 | -1,57E+02 |
| Radioactive waste | kg | 1,69E-02 | 1,30E-06 | 4,71E-07 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 2,37E-08 | 8,78E-07 | 1,05E-05 | 8,84E-08 | 4,31E-04 |

## END OF LIFE – OUTPUT FLOWS

| Impact category | Unit | A1-A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Components for re-use | kg | 5,12E-02 | 0,00E+00 | 1,89E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Materials for recycling | kg | 8,31E+00 | 0,00E+00 | 1,27E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 3,34E+01 | 0,00E+00 | 0,00E+00 |
| Materials for energy recovery | kg | 1,28E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Exported energy – Electricity | MJ | 0,00E+00 | 0,00E+00 | 1,21E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 7,65E-01 | 0,00E+00 | 0,00E+00 |
| Exported energy – Heat | MJ | 0,00E+00 | 0,00E+00 | 2,38E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,49E+00 | 0,00E+00 | 0,00E+00 |

## BIOGENIC CARBON CONTENT

| Impact category | Unit | A1-A3 |
|---|---|---|
| Biogenic carbon content in product | kgC | 9,72E-02 |
| Biogenic carbon content in accompanying packaging | kgC | 1,07E+00 |

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of $CO_2$

# SCENARIO DOCUMENTATION

**Manufacturing (A3) energy scenario documentation**

| Scenario parameter | Value |
|---|---|
| **Electricity data source and quality** | Electricity production, wind, >3MW turbine, onshore Ecoinvent 3.10.1, 2024, Finland |
| **Electricity $CO_2e$ / kWh** | 0,0316 |
| **Own electricity production data source and quality** | Electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted, Ecoinvent 3.10.1, 2024, Finland |
| **Electricity CO2e / kWh** | 0,0802 |
| **District heating data source and quality** | Heat production, light fuel oil, at industrial furnace 1MW Ecoinvent 3.10.1, 2024, Europe |
| | Heat production, at coal coke industrial furnace 1-10MW Ecoinvent 3.10.1, 2024, World |
| | Heat production, softwood chips from forest, at furnace 1000kW Ecoinvent 3.10.1, 2024, World |
| **Energy $CO_2e$ / kWh** | 0,49 |

**Transport scenario documentation (A4)**

| Scenario parameter | Value |
|---|---|
| **Specific transport CO2e emissions, kg CO2e / tkm** | Truck: diesel, load capacity 32 t.<br>Specific transport emissions 0,11 kgCO2e / tkm |
| **Average transport distance, km** | 100 |
| **Capacity utilization (including empty return) %** | 45 % for truck |
| **Weight of transported products [kg] (including product and packaging)** | See Annex 1. |
| **Volume capacity utilization factor** | Not applicable |

**Installation scenario of the product in the building (A5)**

| Scenario parameter | Value | |
|---|---|---|
| **Ancillary materials for installation** | - | |
| **Water use** | - | |
| **Other resource use** | - | |
| **Quantitative description of energy type (regional mix) and consumption during the installation process** | - | |
| **Waste materials on the building site before waste processing, generated by the product's installation** | Packaging materials per 1 kg of product: | |
| | Euro pallet | 0,0561 |
| | Plastics | 0,0081 |
| | Paper | 0,0002 |
| | Cardboard | 0,0355 |
| **Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)** | - | |
| **Direct emissions to ambient air, soil and water** | - | |

**Use scenario (B6-B7)**

| B6-B7 Scenario information | Unit | | |
|---|---|---|---|
| **Ancillary materials** | 0 kg | | |
| **Net freshwater consumption** | 0 m3 | | |
| **Type of energy carrier** | Electricity | 0.0 | kWh |
| **Power output of equipment** | | | |
| **Characteristic performance, e.g. energy efficiency, emissions, variation of performance with capacity utilisation etc.** | Modelled with | | |
| | 7 % | Market group for electricity, medium voltage, Europe | 0,3 kgCO2eq/kWh |
| | 93 % | Market group for electricity, low voltage, Europe | |
| | | Ecoinvent 3.10.1, 2024 | |
| **Further assumptions for scenario development, e.g. frequency and period of use, number of occupants** | - | | |

**End of life scenario documentation C1-C4**

**Product components**

| | | Aluminium | Coating | Insulation | Electronics | Magnetic strip | Polymers | Steel |
|---|---|---|---|---|---|---|---|---|
| **Process flow** | | | | | | | | |
| **Collection process specified by type** | kg collected separately | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 | 1,0 |
| | kg collected with mixed construction waste | | | | | | | |
| **Recovery system specified by type** | kg for reuse | | | | | | | |
| | kg for recycling | 0,96 | | | 1,0 | 1,0 | 0,7345 | 0,95 |
| | kg for energy recovery | | | | | | 0,1245 | |
| **Disposal specified by type** | kg material for final deposition | 0,04 | 1,0 | 1,0 | 0 | 0 | 0,141 | 0,05 |
| **Assumptions for scenario development** | units as appropriate | Waste materials are transported 75 km by truck to recycling facility with a truck capacity utilization of 45% | | | | | | |

**Packaging materials**

| | | Cardboard | Euro pallet | Polypropylene | Polyethylene |
|---|---|---|---|---|---|
| **Process flow** | | | | | |
| **Collection process specified by type** | kg collected separately | 1,0 | 1,0 | 1,0 | 1,0 |
| | kg collected with mixed construction waste | | | | |
| **Recovery system specified by type** | kg for reuse | | 0,95 | | |
| | kg for recycling | 0,96 | 0,0015 | 0,84 | 0,84 |
| | kg for energy recovery | 0,04 | 0,048 | 0,16 | 0,16 |
| **Disposal specified by type** | kg material for final deposition | | | | |
| **Assumptions for scenario development** | units as appropriate | Waste materials are transported 75 km by truck to recycling facility with a truck capacity utilization of 45% | | | |

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# ANNEX 1: PRODUCT COVERAGE & SCALING FACTORS

| Coverage | DINO-A-300x60 | DINO-A-400x100 | DINO-A-700x150 | DINO-A-1000x200 |
|---|---|---|---|---|
| Product number | 8636806 | 8636807 | 8636808 | 8636809 |
| Product weight [kg] | 9,46 | 17,5 | 35,52 | 66,96 |
| Product weight with packaging materials [kg] | 9,555 | 17,675 | 35,875 | 67,630 |
| Aluminium components [kg] | 0 | 0 | 0 | 0 |
| Coating [kg] | 0 | 0 | 0 | 0 |
| Electronic components [kg] | 0 | 0 | 0 | 0 |
| Insulation [kg] | 0 | 0 | 0 | 0 |
| Magnetic strip [kg] | 0 | 0 | 0 | 0 |
| Polymer components [kg] | 0,36 | 0,6 | 1,62 | 2,86 |
| Steel components [kg] | 9,1 | 16,9 | 33,9 | 64,1 |
| Energy use [kWh] | 0 | 0 | 0 | 0 |

| Impact category | Unit | DINO-A-300x60 | DINO-A-400x100 | DINO-A-700x150 | DINO-A-1000x200 |
|---|---|---|---|---|---|
| GWP – total1) | kg CO2e | 0,27 | 0,49 | 1,00 | 1,88 |
| GWP – fossil | kg CO2e | 0,27 | 0,49 | 1,00 | 1,88 |
| GWP – biogenic | kg CO2e | 0,26 | 0,47 | 1,00 | 1,86 |
| GWP – LULUC | kg CO2e | 0,27 | 0,49 | 1,00 | 1,88 |
| Ozone depletion pot. | kg CFC-11e | 0,27 | 0,50 | 1,00 | 1,89 |
| Acidification potential | mol H+e | 0,27 | 0,49 | 1,00 | 1,88 |
| EP-freshwater2) | kg Pe | 0,26 | 0,48 | 1,00 | 1,87 |
| EP-marine | kg Ne | 0,27 | 0,49 | 1,00 | 1,88 |
| EP-terrestrial | mol Ne | 0,27 | 0,49 | 1,00 | 1,88 |
| POCP (“smog”)3) | kg NMVOCe | 0,26 | 0,49 | 1,00 | 1,88 |
| ADP-minerals & metals4) | kg Sbe | 0,27 | 0,50 | 1,00 | 1,89 |
| ADP-fossil resources | MJ | 0,26 | 0,48 | 1,00 | 1,88 |
| Water use5) | m3e depr. | 0,27 | 0,50 | 1,00 | 1,89 |
| Renew. PER as energy8) | MJ | 0,27 | 0,49 | 1,00 | 1,88 |
| Renew. PER as material | MJ | 0,27 | 0,49 | 1,00 | 1,89 |
| Total use of renew. PER | MJ | 0,27 | 0,49 | 1,00 | 1,88 |
| Non-re. PER as energy | MJ | 0,26 | 0,49 | 1,00 | 1,88 |
| Non-re. PER as material | MJ | 0,23 | 0,40 | 1,00 | 1,79 |
| Total use of non-re. PER | MJ | 0,26 | 0,48 | 1,00 | 1,88 |
| Secondary materials | kg | 0,27 | 0,49 | 1,00 | 1,88 |
| Renew. secondary fuels | MJ | 0,27 | 0,49 | 1,00 | 1,88 |
| Non-ren. secondary fuels | MJ | 0,27 | 0,50 | 1,00 | 1,89 |

| Impact category | Unit | DINO-A-300x60 | DINO-A-400x100 | DINO-A-700x150 | DINO-A-1000x200 |
|---|---|---|---|---|---|
| Use of net fresh water | m3 | 0,27 | 0,50 | 1,00 | 1,89 |
| Hazardous waste | kg | 0,26 | 0,49 | 1,00 | 1,88 |
| Non-hazardous waste | kg | 0,26 | 0,48 | 1,00 | 1,88 |
| Radioactive waste | kg | 0,27 | 0,50 | 1,00 | 1,89 |
| Components for re-use | kg | 0,27 | 0,50 | 1,00 | 1,89 |
| Materials for recycling | kg | 0,27 | 0,50 | 1,00 | 1,89 |
| Materials for energy recovery | kg | 0,27 | 0,49 | 1,00 | 1,89 |
| Exported energy - Electricity | MJ | 1,00 | 1,00 | 1,00 | 1,00 |
| Exported energy - Heat | MJ | 1,00 | 1,00 | 1,00 | 1,00 |
| Biogenic carbon content in product | kg | 0,22 | 0,37 | 1,00 | 1,77 |
| Biogenic carbon content in accompanying packaging | kg | 0,27 | 0,49 | 1,00 | 1,89 |