

# Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

TVT-D



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**TROX®** TECHNIK  
The art of handling air

**Owner of the declaration:**

TROX Group

**Product:**

TVT-D

**Declared unit:**

1 pcs

**This declaration is based on Product Category Rules:**

CEN Standard EN 15804:2012+A2:2019 serves as core PCR

NPCR 030:2021 Part B for ventilation components

**Program operator:**

The Norwegian EPD Foundation

**Declaration number:**

NEPD-5684-4942-EN

**Registration number:**

NEPD-5684-4942-EN

**Issue date:** 02.01.2024

**Valid to:** 02.01.2029

ver-190624

**EPD software:**

LCAno EPD generator ID: 167685

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The Norwegian EPD Foundation

## General information

### Product

TVT-D

### Program operator:

The Norwegian EPD Foundation  
Post Box 5250 Majorstuen, 0303 Oslo, Norway  
Phone: +47 977 22 020  
web: [www.epd-norge.no](http://www.epd-norge.no)

### Declaration number:

NEPD-5684-4942-EN

### This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR  
NPCR 030:2021 Part B for ventilation components

### Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

### Declared unit:

1 pcs TVT-D

### Declared unit with option:

A1-A3,A4,C1,C2,C3,C4,D

### Functional unit:

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### General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Verification of each EPD is made according to EPD-Norway's guidelines for verification and approval requiring that tools are i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD-Norway, and iii) the process is reviewed annually by an independent third party verifier. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools

### Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPD-Norway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Alexander Borg, Asplan Viak AS

(no signature required)

### Owner of the declaration:

TROX Group  
Contact person: Alina Buchner  
Phone: +49 2845 2020  
e-mail: [productsustainability-de@troxgroup.com](mailto:productsustainability-de@troxgroup.com)

### Manufacturer:

TROX Group

### Place of production:

TROX Group  
Heinrich-Trox-Platz 1  
47506 Neukirchen-Vluyn, Germany

### Management system:

ISO 9001, ISO 14001:2015, ISO 50001:2018

### Organisation no:

DE 120250070

### Issue date:

02.01.2024

### Valid to:

02.01.2029

### Year of study:

2022

### Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.

### Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system and has been approved by EPD Norway.

Developer of EPD: Philipp Ceulaers

Reviewer of company-specific input data and EPD: Alina Buchner

### Approved:



Håkon Hauan  
Managing Director of EPD-Norway

## Product

### Product description:

For normal and high volume flow rate ranges and low-leakage shut-off.

Rectangular air terminal units for standard applications in supply air or extract air systems with variable volume flow rates, suitable for low-leakage shut-off.

For more information see: <https://www.trox.de/en/vav-terminal-units/tvt-2512f87247b59aee>

### Product specification

Rectangular VAV terminal units for variable and constant air volume systems, suitable for supply or extract air, available in 36 nominal sizes. High volume flow rate control accuracy. Ready-to-commission unit which consists of the mechanical parts and the electronic control components. Each unit contains an averaging effective pressure sensor for volume flow rate measurement and damper blades. Factory mounted control components complete with wiring and tubing. Effective pressure sensor with 3 mm measuring holes, hence resistant to contamination. Position of the damper blades indicated externally at the shaft extension. The damper blade is factory set to open position, which allows a ventilation airflow even without control; this does not apply to variants with defined safe position NC (normally closed).

This EPD includes the environmental data of the product series TVT-D.

The following represents a representative dataset of the most sold variant in the declared sales year (TVT-D/300x200/BCO).

| Materials                                       | kg           | %             |
|---|--------------|---------------|
| Electronic - Unspecified                        | 0,73         | 5,46          |
| Insulation, Mineral based                       | 0,17         | 1,29          |
| Metal - Aluminium                               | 0,69         | 5,19          |
| Metal - Galvanized Steel                        | 10,66        | 79,76         |
| Metal - Stainless steel                         | 0,53         | 3,95          |
| Plastic - Acrylonitrile butadiene styrene (ABS) | 0,34         | 2,51          |
| Plastic - Polybutylene terephthalate (PBT)      | 0,00         | 0,03          |
| Plastic - Polycarbonate (PC)                    | 0,10         | 0,78          |
| Plastic - Polyethylene                          | 0,10         | 0,78          |
| Plastic - Polypropylene (PP)                    | 0,01         | 0,10          |
| Plastic - Polyurethane (PUR)                    | 0,02         | 0,15          |
| <b>Total</b>                                    | <b>13,37</b> | <b>100,00</b> |

| Packaging                    | kg           | %             |
|------------------------------|--------------|---------------|
| Packaging - Cardboard        | 0,75         | 28,57         |
| Packaging - Pallet           | 1,75         | 66,67         |
| Packaging - Paper            | 0,13         | 4,76          |
| <b>Total incl. packaging</b> | <b>15,99</b> | <b>100,00</b> |

### Technical data:

Nominal sizes: 200 × 100 to 1000 × 600 mm

Volume flow rate range: 45 – 6100 l/s or 162 – 21960 m<sup>3</sup> /h

Volume flow rate control range (unit with dynamic differential pressure measurement): Approx. 20 to 100 % of the nominal volume flow rate

Minimum differential pressure: 5 – 40 Pa

Maximum differential pressure: 1000 Pa

Operating temperature: 10 – 50 °C

For more technical data see: [https://cdn.trox.de/508ea8afc1967cc4/0c538160c9af/TVT\\_PD\\_2022\\_01\\_17\\_DE\\_enpdf.pdf](https://cdn.trox.de/508ea8afc1967cc4/0c538160c9af/TVT_PD_2022_01_17_DE_enpdf.pdf)

The distribution of materials in the products is approximately the same; only the total weight varies. The EPD is created for TVT-D/300x200. The factors in the table below can be used to scale LCA data for a new dimension.

| Product        | Weight (kg) | Factor |
|----------------|-------------|--------|
| TVT-D/200x100  | 9           | 0,60   |
| TVT-D/300x100  | 11          | 0,73   |
| TVT-D/400x100  | 12          | 0,80   |
| TVT-D/500x100  | 14          | 0,93   |
| TVT-D/600x100  | 15          | 1      |
| TVT-D/200x200  | 14          | 0,93   |
| TVT-D/300x200  | 15          | 1      |
| TVT-D/400x200  | 17          | 1,13   |
| TVT-D/500x200  | 18          | 1,20   |
| TVT-D/600x200  | 20          | 1,33   |
| TVT-D/700x200  | 21          | 1,40   |
| TVT-D/800x200  | 23          | 1,53   |
| TVT-D/300x300  | 15          | 1      |
| TVT-D/400x300  | 17          | 1,13   |
| TVT-D/500x300  | 18          | 1,20   |
| TVT-D/600x300  | 20          | 1,33   |
| TVT-D/700x300  | 22          | 1,47   |
| TVT-D/800x300  | 24          | 1,60   |
| TVT-D/900x300  | 26          | 1,73   |
| TVT-D/1000x300 | 29          | 1,93   |
| TVT-D/400x400  | 21          | 1,40   |
| TVT-D/500x400  | 23          | 1,53   |
| TVT-D/600x400  | 24          | 1,60   |
| TVT-D/700x400  | 26          | 1,73   |
| TVT-D/900x400  | 29          | 1,93   |
| TVT-D/1000x400 | 32          | 2,13   |
| TVT-D/500x500  | 28          | 1,87   |
| TVT-D/600x500  | 30          | 2,00   |
| TVT-D/700x500  | 32          | 2,13   |
| TVT-D/800x500  | 35          | 2,33   |
| TVT-D/900x500  | 37          | 2,47   |
| TVT-D/1000x500 | 39          | 2,60   |
| TVT-D/600x600  | 29          | 1,93   |
| TVT-D/800x600  | 35          | 2,33   |
| TVT-D/1000x600 | 41          | 2,73   |

**Market:**

Europe

**Reference service life, product**

25 years

**Reference service life, building or construction works**

60 years

**LCA: Calculation rules**

**Declared unit:**

1 pcs TVT-D

**Cut-off criteria:**

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

**Allocation:**

The allocation is made in accordance with the provisions of EN 15804. Energy, water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

**Data quality:**

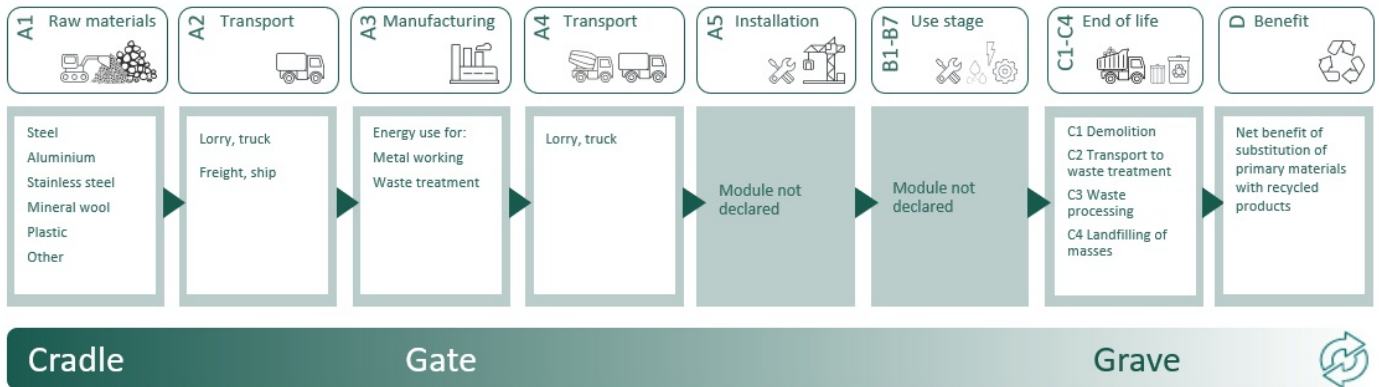
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases. The data quality of the raw materials in A1 is presented in the table below.

| Materials                                       | Source        | Data quality | Year |
|---|---------------|--------------|------|
| Electronic - Unspecified                        | ecoinvent 3.6 | Database     | 2019 |
| Insulation, Mineral based                       | ecoinvent 3.6 | Database     | 2019 |
| Metal - Aluminium                               | ecoinvent 3.6 | database     | 2019 |
| Metal - Galvanized Steel                        | ecoinvent 3.6 | Database     | 2020 |
| Metal - Stainless steel                         | ecoinvent 3.6 | Database     | 2019 |
| Packaging - Cardboard                           | ecoinvent 3.6 | Database     | 2019 |
| Packaging - Pallet                              | ecoinvent 3.6 | Database     | 2019 |
| Packaging - Paper                               | ecoinvent 3.6 | Database     | 2019 |
| Plastic - Acrylonitrile butadiene styrene (ABS) | ecoinvent 3.6 | Database     | 2019 |
| Plastic - Polybutylene terephthalate (PBT)      | ecoinvent 3.6 | Database     | 2019 |
| Plastic - Polycarbonate (PC)                    | ecoinvent 3.6 | Database     | 2019 |
| Plastic - Polyethylene                          | ecoinvent 3.6 | Database     | 2019 |
| Plastic - Polypropylene (PP)                    | ecoinvent 3.6 | Database     | 2019 |
| Plastic - Polyurethane (PUR)                    | ecoinvent 3.6 | Database     | 2019 |

**System boundaries (X=included, MND=module not declared, MNR=module not relevant)**

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

**System boundary:**



**Additional technical information:**

Rectangular air terminal units for standard applications in supply air or extract air systems with variable volume flow rates, suitable for low-leakage shut-off.

For volume flow rate ranges up to 28836 m<sup>3</sup>/h or 8010 l/s.

Suitable for the control of volume flow rate, room pressure or duct pressure.

Electronic control components for different applications (Easy, Compact, Universal, and LABCONTROL).

High control accuracy.

Closed blade air leakage to EN 1751, class 3.

Casing air leakage to EN 1751, up to class C.

Optional equipment and accessories.

Acoustic cladding for the reduction of case-radiated noise.

Secondary silencer Type TX for the reduction of air-regenerated noise.

Hot water heat exchanger of Type WT for reheating the airflow.









## LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

| Transport from production place to user (A4)  | Capacity utilisation (incl. return) % | Distance (km) | Fuel/Energy Consumption | Unit  | Value (Liter/tonne) |
|---|---------------------------------------|---------------|-------------------------|-------|---------------------|
| Truck, 16-32 tonnes, EURO 6 (km)  | 36,7 %                                | 800           | 0,043                   | l/tkm | 34,40               |
| De-construction demolition (C1)   |                                       | Unit          | Value                   |       |                     |
| Demolition of building per kg of ventilation product (kg)   |                                       | kg/DU         | 13,37                   |       |                     |
| Transport to waste processing (C2)  | Capacity utilisation (incl. return) % | Distance (km) | Fuel/Energy Consumption | Unit  | Value (Liter/tonne) |
| Truck, 16-32 tonnes, EURO 6 (km)  | 36,7 %                                | 50            | 0,043                   | l/tkm | 2,15                |
| Waste processing (C3)   |                                       | Unit          | Value                   |       |                     |
| Materials to recycling (kg)   |                                       | kg            | 10,72                   |       |                     |
| Waste treatment per kg Electronic scrap, incineration (kg)  |                                       | kg            | 0,73                    |       |                     |
| Waste treatment per kg plastic, industrial electronics, municipal incineration with fly ash extraction (kg)                             |                                       | kg            | 0,13                    |       |                     |
| Waste treatment per kg Plastics, incineration (kg)  |                                       | kg            | 0,10                    |       |                     |
| Waste treatment per kg Polyethylene (PE), incineration (kg)   |                                       | kg            | 0,05                    |       |                     |
| Waste treatment per kg Polypropylene (PP), incineration (kg)  |                                       | kg            | 0,01                    |       |                     |
| Disposal (C4)   |                                       | Unit          | Value                   |       |                     |
| Landfilling of ashes from incineration of Electronic scrap, process of ashes and residues (kg)  |                                       | kg            | 0,51                    |       |                     |
| Landfilling of ashes from incineration of Plastics, process per kg ashes and residues (kg)  |                                       | kg            | 0,00                    |       |                     |
| Landfilling of ashes from incineration of Polyethylene (PE), process per kg ashes and residues (kg)                                     |                                       | kg            | 0,00                    |       |                     |
| Landfilling of ashes from incineration of Polypropylene (PP), process per kg ashes and residues (kg)                                    |                                       | kg            | 0,00                    |       |                     |
| Landfilling of ashes from incineration per kg plastic, industrial electronics, From municipal incineration with fly ash extraction (kg) |                                       | kg            | 0,01                    |       |                     |
| Waste, aluminium, to landfill (kg)  |                                       | kg            | 0,05                    |       |                     |
| Waste, mineral wool, to landfill (kg)   |                                       | kg            | 0,17                    |       |                     |
| Waste, plastic, mixture, to landfill (kg)   |                                       | kg            | 0,29                    |       |                     |
| Waste, scrap steel, to landfill (kg)  |                                       | kg            | 1,12                    |       |                     |
| Benefits and loads beyond the system boundaries (D)   |                                       | Unit          | Value                   |       |                     |
| Substitution of electricity (MJ)  |                                       | MJ            | 0,33                    |       |                     |
| Substitution of primary aluminium with net scrap (kg)   |                                       | kg            | 0,62                    |       |                     |
| Substitution of primary steel with net scrap (kg)   |                                       | kg            | 2,55                    |       |                     |
| Substitution of thermal energy, district heating (MJ)   |                                       | MJ            | 4,97                    |       |                     |

## LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

| Environmental impact   |                        |          |          |          |          |          |          |           |  |
|--|------------------------|----------|----------|----------|----------|----------|----------|-----------|--|
| Indicator  | Unit                   | A1-A3    | A4       | C1       | C2       | C3       | C4       | D         |  |
|  GWP-total                        | kg CO <sub>2</sub> -eq | 9,14E+01 | 2,09E+00 | 1,76E-02 | 1,31E-01 | 1,58E+00 | 1,01E-01 | -8,48E+00 |  |
|  GWP-fossil                       | kg CO <sub>2</sub> -eq | 9,00E+01 | 2,09E+00 | 1,76E-02 | 1,31E-01 | 1,58E+00 | 1,01E-01 | -8,35E+00 |  |
|  GWP-biogenic                     | kg CO <sub>2</sub> -eq | 1,10E+00 | 8,65E-04 | 3,30E-06 | 5,41E-05 | 1,23E-04 | 1,03E-04 | -2,70E-02 |  |
|  GWP-luluc                        | kg CO <sub>2</sub> -eq | 2,33E-01 | 7,44E-04 | 1,39E-06 | 4,65E-05 | 3,00E-05 | 2,57E-05 | -1,07E-01 |  |
|  ODP                              | kg CFC11 -eq           | 7,85E-06 | 4,73E-07 | 3,81E-09 | 2,96E-08 | 6,03E-09 | 6,58E-09 | -2,10E-03 |  |
|  AP                               | mol H+ -eq             | 7,90E-01 | 6,01E-03 | 1,84E-04 | 3,75E-04 | 4,37E-04 | 1,97E-04 | -5,15E-02 |  |
|  EP-FreshWater                    | kg P -eq               | 8,87E-03 | 1,67E-05 | 6,42E-08 | 1,04E-06 | 1,11E-06 | 8,46E-07 | -3,88E-04 |  |
|  EP-Marine                        | kg N -eq               | 1,05E-01 | 1,19E-03 | 8,14E-05 | 7,43E-05 | 1,94E-04 | 9,31E-05 | -7,67E-03 |  |
|  EP-Terrestrial                   | mol N -eq              | 2,14E+00 | 1,33E-02 | 8,93E-04 | 8,31E-04 | 1,97E-03 | 6,51E-04 | -8,22E-02 |  |
|  POCP                             | kg NMVOC -eq           | 3,58E-01 | 5,09E-03 | 2,46E-04 | 3,18E-04 | 4,81E-04 | 1,90E-04 | -3,18E-02 |  |
|  ADP-minerals&metals <sup>1</sup> | kg Sb-eq               | 5,41E-02 | 5,77E-05 | 2,70E-08 | 3,61E-06 | 4,10E-07 | 3,53E-07 | -4,01E-05 |  |
|  ADP-fossil <sup>1</sup>          | MJ                     | 1,22E+03 | 3,16E+01 | 2,43E-01 | 1,97E+00 | 4,58E-01 | 5,44E-01 | -9,42E+01 |  |
|  WDP <sup>1</sup>                 | m <sup>3</sup>         | 7,49E+03 | 3,06E+01 | 5,15E-02 | 1,91E+00 | 1,33E+00 | 2,18E+00 | -3,02E+03 |  |

GWP-total = Global Warming Potential total; GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"







\*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

## Remarks to environmental impacts



### Additional environmental impact indicators










| Indicator   | Unit              | A1-A3    | A4       | C1       | C2       | C3       | C4       | D         |
|---|-------------------|----------|----------|----------|----------|----------|----------|-----------|
|  PM                  | Disease incidence | 7,19E-06 | 1,28E-07 | 4,88E-09 | 8,00E-09 | 2,35E-09 | 2,87E-09 | -6,32E-07 |
|  IRP <sup>2</sup>    | kgBq U235 -eq     | 5,26E+00 | 1,38E-01 | 1,04E-03 | 8,63E-03 | 1,57E-03 | 2,42E-03 | -2,98E-01 |
|  ETP-fw <sup>1</sup> | CTUe              | 4,66E+03 | 2,34E+01 | 1,33E-01 | 1,46E+00 | 3,18E+00 | 3,20E+01 | -2,42E+02 |
|  HTP-c <sup>1</sup>  | CTUh              | 3,64E-07 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 1,19E-10 | 1,50E-11 | -2,75E-08 |
|  HTP-nc <sup>1</sup> | CTUh              | 5,10E-06 | 2,56E-08 | 1,20E-10 | 1,60E-09 | 1,01E-08 | 7,53E-10 | 1,28E-07  |
|  SQP <sup>1</sup>    | dimensionless     | 7,82E+02 | 2,21E+01 | 3,08E-02 | 1,38E+00 | 1,48E-01 | 1,06E+00 | -5,12E+00 |

PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

1. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
2. 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.




| Resource use  |                |          |          |          |          |           |          |           |  |
|---|----------------|----------|----------|----------|----------|-----------|----------|-----------|--|
| Indicator   | Unit           | A1-A3    | A4       | C1       | C2       | C3        | C4       | D         |  |
|  PERE  | MJ             | 1,76E+02 | 4,52E-01 | 1,31E-03 | 2,83E-02 | 2,91E-02  | 2,92E-02 | -2,99E+01 |  |
|  PERM  | MJ             | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00  | 0,00E+00 | 0,00E+00  |  |
|  PERT  | MJ             | 2,08E+02 | 4,52E-01 | 1,31E-03 | 2,83E-02 | 2,91E-02  | 2,92E-02 | -2,99E+01 |  |
|  PENRE | MJ             | 1,21E+03 | 3,16E+01 | 2,43E-01 | 1,97E+00 | 4,58E-01  | 5,44E-01 | -9,42E+01 |  |
|  PENRM | MJ             | 2,37E+01 | 0,00E+00 | 0,00E+00 | 0,00E+00 | -2,23E+01 | 0,00E+00 | 0,00E+00  |  |
|  PENRT | MJ             | 1,23E+03 | 3,16E+01 | 2,43E-01 | 1,97E+00 | -2,18E+01 | 5,44E-01 | -9,42E+01 |  |
|  SM    | kg             | 8,61E+00 | 0,00E+00 | 1,19E-04 | 0,00E+00 | 0,00E+00  | 3,88E-05 | 0,00E+00  |  |
|  RSF   | MJ             | 4,55E+00 | 1,62E-02 | 3,23E-05 | 1,01E-03 | 7,23E-04  | 6,78E-04 | 9,03E-02  |  |
|  NRSF  | MJ             | 2,06E+01 | 5,79E-02 | 4,75E-04 | 3,62E-03 | -4,56E-04 | 5,11E-04 | 2,83E+00  |  |
|  FW    | m <sup>3</sup> | 1,16E+00 | 3,38E-03 | 1,25E-05 | 2,11E-04 | 1,99E-03  | 1,64E-03 | -1,48E-01 |  |

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

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

### End of life - Waste






| Indicator  | Unit | A1-A3    | A4       | C1       | C2       | C3       | C4       | D         |
|--|------|----------|----------|----------|----------|----------|----------|-----------|
|  HWD  | kg   | 6,75E-01 | 1,63E-03 | 7,14E-06 | 1,02E-04 | 2,43E-03 | 2,46E-02 | 8,69E-03  |
|  NHWD | kg   | 2,59E+01 | 1,54E+00 | 2,87E-04 | 9,60E-02 | 3,45E-01 | 1,99E+00 | -2,76E+00 |
|  RWD  | kg   | 4,54E-03 | 2,15E-04 | 1,68E-06 | 1,35E-05 | 1,39E-06 | 1,90E-06 | -2,81E-04 |

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed

\*Reading example: 9,0 E-03 =  $9,0 \cdot 10^{-3} = 0,009$

\*INA Indicator Not Assessed

### End of life - Output flow

| Indicator   | Unit | A1-A3    | A4       | C1       | C2       | C3       | C4       | D        |
|---|------|----------|----------|----------|----------|----------|----------|----------|
|  CRU | kg   | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
|  MFR | kg   | 7,51E-01 | 0,00E+00 | 1,17E-04 | 0,00E+00 | 1,07E+01 | 3,25E-05 | 0,00E+00 |
|  MER | kg   | 2,99E-02 | 0,00E+00 | 3,63E-07 | 0,00E+00 | 1,90E-01 | 6,90E-07 | 0,00E+00 |
|  EEE | MJ   | 2,16E-02 | 0,00E+00 | 1,24E-06 | 0,00E+00 | 7,39E-01 | 4,18E-05 | 0,00E+00 |
|  EET | MJ   | 3,27E-01 | 0,00E+00 | 1,88E-05 | 0,00E+00 | 1,12E+01 | 6,32E-04 | 0,00E+00 |

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported energy electrical; EET = Exported energy thermal

\*Reading example: 9,0 E-03 =  $9,0 \cdot 10^{-3} = 0,009$

\*INA Indicator Not Assessed

### Biogenic Carbon Content

| Indicator   | Unit | At the factory gate |
|---|------|---------------------|
| Biogenic carbon content in product                | kg C | 0,00E+00            |
| Biogenic carbon content in accompanying packaging | kg C | 0,00E+00            |

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>

## Additional requirements

### Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

| Electricity mix                         | Source        | Amount | Unit                      |
|---|---------------|--------|---------------------------|
| Electricity, market mix (kWh) - Germany | ecoinvent 3.6 | 585,93 | g CO <sub>2</sub> -eq/kWh |

### Dangerous substances

The product contains dangerous substances, more than 0,1% by weight, given by the REACH Candidate List, see table:

| Name  | CASNo      | Amount                    |
|---|------------|---------------------------|
| Lead  | 7439-92-1  | > 0.1% w/w                |
| Perfluorobutane sulfonic acid (PFBS) and its salts        |            | > 0.1% w/w and < 0.3% w/w |
| 2-methylimidazole   | 693-98-1   | > 0.1% w/w                |
| Potassium 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphonate | 29429-49-3 | > 0.1% w/w                |
| Lead monoxide (lead oxide)                                | 1317-36-8  | > 0.1% w/w                |
| Diboron trioxide  | 1303-86-2  | > 0.1% w/w                |
| Lead titanium trioxide                                    | 12060-00-3 | > 0.1% w/w                |

### Indoor environment






## Additional Environmental Information

| Additional environmental impact indicators required in NPCR Part A for construction products |                        |          |          |          |          |          |          |           |
|--|------------------------|----------|----------|----------|----------|----------|----------|-----------|
| Indicator  | Unit                   | A1-A3    | A4       | C1       | C2       | C3       | C4       | D         |
| GWPIOBC  | kg CO <sub>2</sub> -eq | 9,13E+01 | 2,09E+00 | 1,76E-02 | 1,31E-01 | 1,58E+00 | 1,01E-01 | -9,62E+00 |

GWPI-IOBC: Global warming potential calculated according to the principle of instantaneous oxidation. In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

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