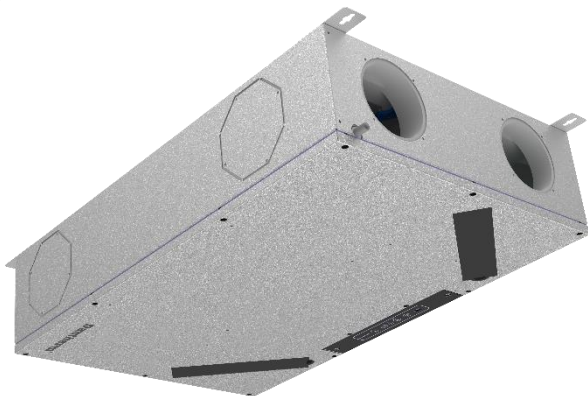


Owner: Dantherm A/S  
No.: MD-23226-EN  
Issued: 12-03-2024  
Valid to: 12-03-2029

3<sup>rd</sup> PARTY VERIFIED

**EPD**

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



**Owner of declaration**

Dantherm A/S  
Marienlystvej 65, 7800 Skive,  
Denmark  
CVR no: 20864591



**Issued:**

12-03-2024

**Valid to:**

12-03-2029

**Programme**

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



- Industry EPD  
 Product EPD

**Basis of calculation**

This EPD is developed in accordance with the European standard EN 15804+A2 and cPCR EN50693:2019.

**Comparability**

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

**Validity**

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

**Use**

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

**Declared product(s)**

- Dantherm RCV320 P1, P2 and E1
- Dantherm RCC130 P2/RCC220 P2

Number of declared datasets: 2  
Number of product variations: 5

The results for the 2 product groups included in this EPD is based on calculation for the 5 product variations.

**EPD type**

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

**Production site**

Marienlystvej 65,  
7800 Skive  
Denmark

**Product(s) use**

The products are designed to effectively improve indoor air quality. Constant ventilation supplies fresh, filtered outdoor air and removes humid air from the residence. Through a heat exchanger, the energy from the air being extracted is transferred to the fresh outdoor air supplied to the dwelling.

Intelligent control ensures optimal performance, measures humidity levels, and its features contribute to a comfortable indoor environment.

These decentralized ventilation systems are particularly used for residential ventilation in either apartments or houses.

**Functional unit**

One decentralised ventilation unit with an operation time of 8,760 hours per year, a specific power input at 70% rated flow and 50 Pa, with an air capacity of

- 84 m<sup>3</sup>/h for unit RCC
- 140 m<sup>3</sup>/h for unit RCV 320 P1, P2 and E1

**Year of production site data (A3)**

2022

**EPD version**

No. 1, March 2024

CEN standard EN 15804 serves as the core PCR

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

- internal  external

Third party verifier:

  
Linda Høiby

  
Marthe Katrine Sørensen  
EPD Danmark

Life cycle stages and modules (MND = module not declared)

Product			Construction process		Use							End of life			Beyond the system boundary	
Raw material supply	Transport	Manufacturing	Transport	Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use, recovery and recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>

# Product information

## Product description

The results for the two product groups of this EPD is included based on calculations conducted for the five product variations (further described in the paragraph *'Calculation of product groups'*).

The dimensions and weights of the 5 product variations are listed below:

Unit	Dimension	Weight [kg]
RCC 130/220	580 x 200 x 900 mm	17.3
RCV 320 P1	600 x 603 x 526 mm	30.9
RCV 320 P2	600 x 603 x 526 mm	28.3
RCV 320 E1	600 x 603 x 526 mm	31.7

The function of the RCC and RCV units is to improve indoor air quality. Constant ventilation supplies fresh, filtered air by circulating air and exhaust filters, and removes humid air from the residence.

The main product components are shown in the table below.

Material	Weight-% of declared product	
	RCC	RCV
Galvanised steel for the cabinet	45.3	52.8
Expanded polystyrene core	10.7	6.3
PS Exchanger	14.7	25.2
Ventilator	7.5	6.8
Electronics	4.5	3.6
Plastics	17.3	5.3

## Product packaging:

The composition of the sales- and transport packaging of the product is shown in the following table. The RCC 130/220 is modelled with 1.52 kg of packaging. For the RCV units, the packaging weight varies depending on the unit, ranging from 1.6 to 8 kilograms.

Decentralised ventilation unit	RCC	RCV 320 P1	RCV 320 P2	RCV 320 E1
Material	Weight of packaging [kg]			
LDPE film	0.10	0.02	0.06	0.12
PET band	0.02	0.04	0.04	0.04
SBR Tape	-	0.04	0.04	0.04
Wooden pallet	1.50	2.75	1.50	3.00
Corrugated cardboard	0.05	5.13	0.10	0.10

## Representativity

This declaration, including data collection and the modelled foreground system including results, represents the production, use and end-of-life of RCC 130/220 and RCV 320 P1, P2 and E1 on the production site located in Denmark. Product specific data are based on average values collected in the period January to December 2022. Background data are based on LCA for Experts database and EcoInvent and are less than 10 years old. Except for the datasets regarding POM and PU plastic, where no newer datasets were available. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old.

## Hazardous substances

RCC 130/220 and RCV 320 P1, P2 and E1 does not contain substances listed on the "Candidate List of Substances of Very High Concern for authorisation" (<http://echa.europa.eu/candidate-list-table>) in concentration above 0.1% (w/w).

### Essential characteristics

RCC 130/220 and RCV 320 are covered by harmonised technical specification EN 1886:2008 and EN 13414-7:2021. Additionally, the units comply with the following EU directives:

- 2014/35/EU Low Voltage Directive
- 2014/30/EU EMC-directive
- 2014/53/EU Radio Equipment Directive (RED)
- 2009/125/EC Eco Design-directive
- 2011/65/EU RoHS-directive (Restriction of hazardous substances)
- 1907/2006/EC REACH-Regulation

Further technical information can be obtained by contacting the manufacturer or on the manufacturer's website:

<https://catalogue.dantherm.com/dantherm/dantherm-catalogue-residential-ventilation-dk/>

### Reference Service Life (RSL)

The results included in this EPD are calculated for one year of operation.

### Expected life span of the units

The life span of the units covered by this EPD is set to 25 years, based on [BUILD Report 2021:32](#) by Department of the Built Environment (Aalborg University).

### Picture of product(s)

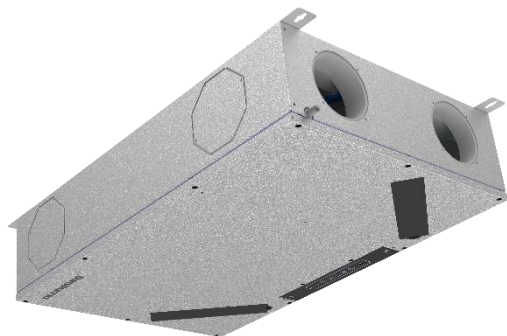


Figure 1 RCC 130/220



Figure 2 RCV 320

# LCA background

## Functional unit

One decentralised ventilation unit with an operation time of 8,760 hours per year, a specific power input at 70% rated flow and 50 Pa, with an air capacity of

- 84 m<sup>3</sup>/h for unit RCC
- 140 m<sup>3</sup>/h for unit RCV 320 P1, P2 and E1

Name	Value	Unit
RCC		
Declared unit	1	Unit
Density	17.30	Kg
Conversion factor to 1 kg.	0.06	-
RCV 320 P1		
Declared unit	1	Unit
Density	30.90	Kg
Conversion factor to 1 kg.	0.03	-
RCV 320 P2		
Declared unit	1	Unit
Density	28.32	Kg
Conversion factor to 1 kg.	0.04	-
RCV 320 E1		
Declared unit	1	Unit
Density	31.70	Kg
Conversion factor to 1 kg.	0.03	-

## PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804 +A2:2019. Furthermore, the waste scenario is based on the *c-PCR for life cycle assessment of electronic and electrical products and systems in EN 50693:2019*.

## Guarantee of Origin – certificates

Foreground system:

The products are produced without using any GO's. The energy process is modelled using 'electricity, medium voltage, residual mix' for Denmark from EcoInvent.

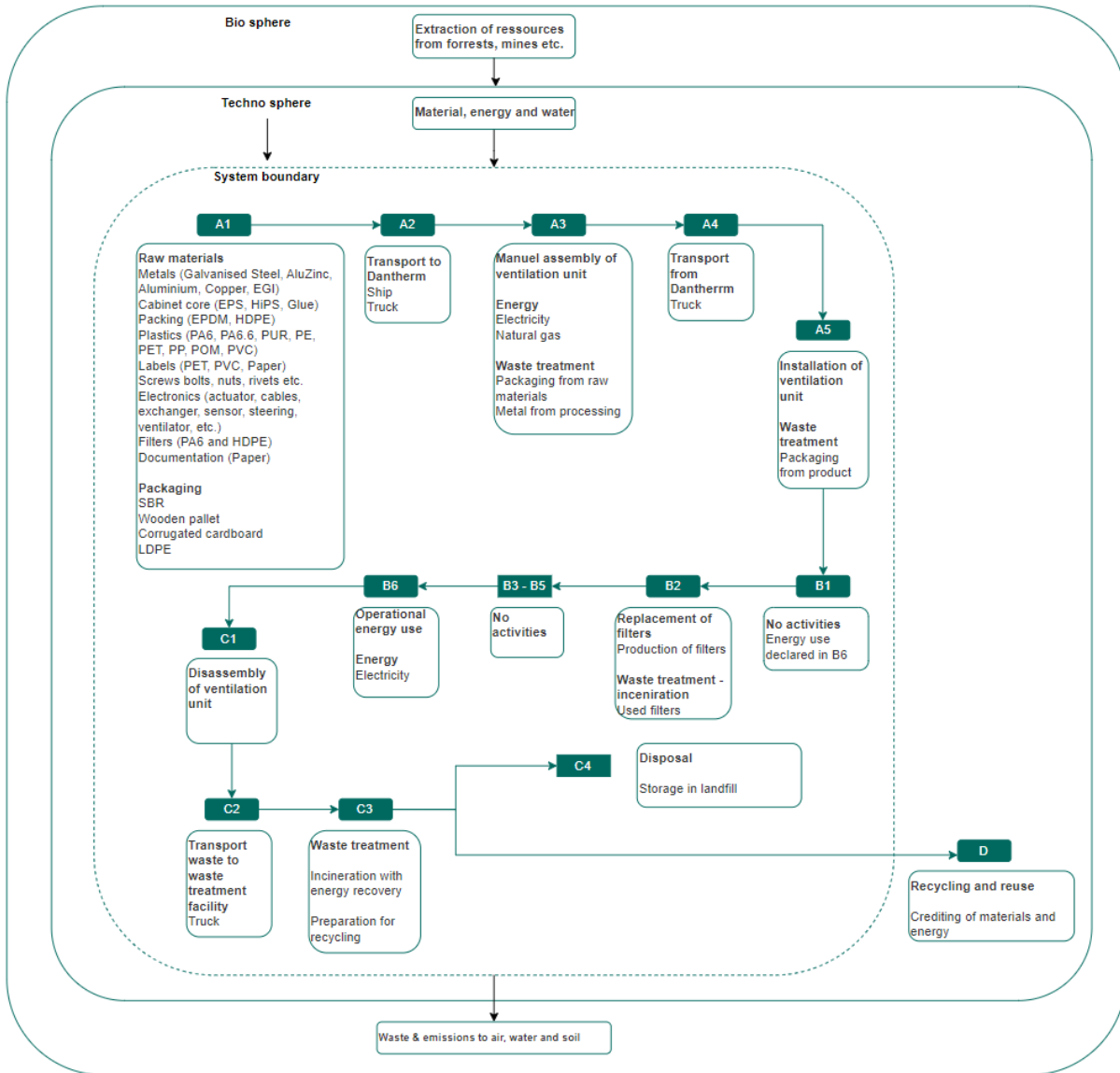
Background system:

Most of the upstream processes have electricity included modelled using the grid mix. For some specific processes where it has been possible to define the specific electricity mix, these were modelled as such. E.g., the production of filters in Poland, was modelled using the dataset for Polish electricity grid mix. Downstream processes are modelled using electricity grid mix for RER.

## Geographical area

The geographical area is Europe.

Flowdiagram



## System boundary

This EPD is based on a cradle-to-grave with module D, in which 100 weight-% of the mass of the declared products has been accounted for.

## Cut-off criteria

The general rules apply for the exclusion of inputs and outputs in the LCA, which is in compliance with the rules in EN 15804:2012+A2:2019, 6.3.6, in case of insufficient input data gaps for unit process, the cut-off criteria shall be 1% of renewable and non-renewable primary energy usage and 1% of the total mass input of that unit process. The total of neglected input flows per module, e.g., per module A1-A3, A4-A5, B1-B5, B6-B7, C1-C4 and module D shall be a maximum of 5% of energy usage and mass.

## Excluded processes

- Use of electric screwdrivers during installation (module A5), and disassembly (module C1)
- Use of screws for installation (module A5)
- Energy use, waste usage and sewage in and for the administration (A3)
- Potential and accidental damage occurring when installing the unit at the building site (A5)

## Product stage (A1-A3) includes:

A1 – Extraction and processing of raw materials

A2 – Transport to the production site

A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and waste processing up to the "end-of-waste" state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

*Galvanised steel:* The RCC 130/220 and RCV 320 variations have a steel cabinet which account for the majority of the weight. The steel is modelled as primary steel. The cabinet sheets are bended and processed at Dantherm. Loss occurs during this process due to adjustments and errors. It is

possible to replace specific parts of the cabinet. It is estimated by Dantherm that the lost amount of metal accumulates to 0.3%.

*Plastic:* There are several types of plastic components in the RCC 130/220 and RCV 320. The plastic types which represent more than 90% of the total amount of plastic are Polystyrene (13.54 – 24.63 weight-%), Expanded Polystyrene (4.46 – 9.84 weight-%), and PE (3.75 – 4.24 weight-%). Additionally, PP is present in the RCC 130/220 (12.35 weight-%). The components are produced based on primary resources.

*Electronic:* As RCC 130/220 and RCV 320 are electronic ventilation units, several electronic components are present in the unit e.g. cables, printed circuit boards etc. The components are manufactured using primary resources.

Generally, the components of the RCC 130/220 and RCV 320 unit are premanufactured and assembled manually at the production facility in Skive (DK). The energy consumption at Dantherm is allocated based on m<sup>2</sup> and energy used for processing of the specific ventilation units. The finished RCC 130/220 and RCV 320 are packed before distribution.

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

Module A4 includes the impacts associated with the transportation of the finished product. The finished product is distributed to different markets in EU. The utilization capacity of the truck (including empty returns) is 47.8%.

A weighted average distance has been calculated based on Dantherm's market distribution. Losses occur during transport due to damage. For certain units, only the packaging is damaged. To compensate for this, an additional 0.2% of cardboard was added. In other cases, damage occurred to the cabinet. To cover the replacement of the specific part of the cabinet, an additional 0.04% of galvanized steel was added.

The installation of RCC 130/220 and RCV 320 is done manually. Additionally, screws are needed for installation. These two processes are excluded due to the negligible impacts.

Module A5 includes the end-of-life treatment of the packaging. Hence, cardboard and LDPE are



assumed 64% recycled and 36% incinerated (Eurostat, 2023). The units are distributed on customized pallets which are assumed incinerated.

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

**B1:** No activity occurs in module B1.

**B2:** To maintain the performance of the decentralised ventilation units and ensure a continuous supply of fresh ventilated air continuously throughout their lifetime, it is necessary to replace ventilation filter. Dantherm estimates a replacement of the two filters, twice a year to maintain an optimal performance. The production of new filters is included in B2. The waste treatment of the replaced filters is also included in B2. It is important to note that B2 is modelled for one year and does not represent the lifespan of 25 years.

**B3:** No activity occurs in module B3.

**B4:** No activity occurs in module B4.

**B5:** No activity occurs in module B5.

**B6:** No specification regarding use is described in EN 50693:2019. Therefore, the Ecodesign Directive (COMMISSION REGULATION (EU) No 1253/2014 of 7 July 2014 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for ventilation units) is used to determine the reference capacity and thus the energy use of the ventilation units. The Ecodesign requirements specify a reference flow rate set at 70% of the maximum flow rate. The annual operating hours are set to 8,760 hours per year as a conservative approach which is in accordance with the default value that is used in the Ecodesign directive to calculate the SEC (specific energy consumption). The RER electricity mix is applied to model the energy consumption since the units are sold in various European countries. B6 is modelled for 1 year.

**B7:** No activity occurs in module B7.

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

For the end-of-life scenario, a collection rate of 100% is assumed.

No impacts from dismantling have been included in module C1 as this is done manually.

Module C2 includes the impacts associated with the transport of the waste from the dismantling to the waste handling. The product is placed on different European markets, average distances to waste handling for countries have been included to account for the different distances. For energy recovery an average of 45 km is modelled. For landfilling an average of 250 km is modelled. For recycling 285 – 455 km is modelled depending on the specific waste fraction to account for the transportation of materials to recycling facilities.

Waste fraction	Distance to recycling facility [km]
Paper	433
Cardboard	455
LDPE, HDPE, PET	365
Aluminium	450
Ferrous metals	500
Mixed metals	285

Module C3 contains the impacts of waste handling. Here, the impacts of recycling and incineration are modelled. 56 -63% of the units are recycled and 9.6 – 17% is modelled as incinerated.

Module C4 covers the impacts of landfilling. Following waste treatment rates (recycling, incineration, and landfilling) are included in the waste treatment, the distribution is based on EN 50693:2019.

Materials	Recycling rate (%)	Incineration rate (%)	Landfilling Rate (%)
Steel	80	0	20
Aluminium	70	0	30
Plastics	20	40	40
Metals in printed circuit board	50	0	50
Non-metallic support (Plastic, epoxy resins and glass) in printed circuit boards	0	0	100

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

In module D potential benefits from recovery and recycling of materials from the product are calculated. The materials are either used as secondary material in a new product system, thus substituting virgin material, or incinerated with energy recovery. To avoid double counting, the amount of scrap in the galvanised steel aluminium is not credited in module D.

**Calculation and forming of product groups**

First, calculations were conducted for the four product variations, with the detail that RCC 220 is the worst case of the two RCC variations. Hereafter the simple average for module A1-C4 was calculated for the three variations of RCV 320 to determine if the demand of establishing a product group was met (no more than +/-10% variation of each of the core indicators from the simple average). The product group for RCC is based on the worst-case scenario. The process of grouping follows the guidelines from EPD Denmark.

# LCA results

## RCC

ENVIRONMENTAL IMPACTS PER RCC														
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	B6	B7	C1	C2	C3	C4	D
GWP-total	[kg CO <sub>2</sub> eq.]	1.75E+02	5.82E-01	2.44E+00	0.00E+00	3.01E+00	0.00E+00	6.66E+01	0.00E+00	0.00E+00	2.14E-01	9.94E+00	2.88E-01	-1.16E+01
GWP-fossil	[kg CO <sub>2</sub> eq.]	1.78E+02	5.75E-01	1.84E-01	0.00E+00	3.00E+00	0.00E+00	6.60E+01	0.00E+00	0.00E+00	2.11E-01	9.94E+00	2.91E-01	-1.15E+01
GWP-biogenic	[kg CO <sub>2</sub> eq.]	-1.47E+00	1.32E-03	1.47E+00	0.00E+00	9.43E-03	0.00E+00	5.75E-01	0.00E+00	0.00E+00	4.84E-04	6.14E-04	-3.59E-03	-5.86E-02
GWP-luluc	[kg CO <sub>2</sub> eq.]	3.01E-01	5.39E-03	1.46E-04	0.00E+00	1.61E-04	0.00E+00	7.20E-03	0.00E+00	0.00E+00	1.98E-03	3.79E-05	2.58E-04	-6.53E-03
ODP	[kg CFC 11 eq.]	7.35E-06	7.57E-14	2.43E-13	0.00E+00	5.91E-12	0.00E+00	1.22E-09	0.00E+00	0.00E+00	2.78E-14	1.38E-12	4.87E-13	-9.56E-11
AP	[mol H <sup>+</sup> eq.]	1.07E+00	3.10E-03	4.86E-04	0.00E+00	3.64E-03	0.00E+00	1.41E-01	0.00E+00	0.00E+00	1.14E-03	1.63E-03	8.94E-04	-3.97E-02
EP-freshwater	[kg P eq.]	1.84E-01	2.13E-06	1.22E-07	0.00E+00	2.81E-06	0.00E+00	2.47E-04	0.00E+00	0.00E+00	7.82E-07	3.65E-07	3.83E-05	-3.99E-05
EP-marine	[kg N eq.]	2.18E-01	1.49E-03	1.54E-04	0.00E+00	8.63E-04	0.00E+00	3.37E-02	0.00E+00	0.00E+00	5.48E-04	5.26E-04	2.11E-04	-6.92E-03
EP-terrestrial	[mol N eq.]	2.33E+00	1.66E-02	2.13E-03	0.00E+00	8.46E-03	0.00E+00	3.52E-01	0.00E+00	0.00E+00	6.10E-03	7.79E-03	2.32E-03	-7.26E-02
POCP	[kg NMVOC eq.]	6.96E-01	2.93E-03	3.93E-04	0.00E+00	2.91E-03	0.00E+00	8.99E-02	0.00E+00	0.00E+00	1.08E-03	1.43E-03	6.68E-04	-3.23E-02
ADPm <sup>1</sup>	[kg Sb eq.]	6.82E-02	3.86E-08	3.22E-09	0.00E+00	9.26E-08	0.00E+00	1.02E-05	0.00E+00	0.00E+00	1.42E-08	1.13E-08	7.80E-09	-8.28E-04
ADPF <sup>1</sup>	[MJ]	2.99E+03	7.92E+00	8.04E-01	0.00E+00	4.15E+01	0.00E+00	1.39E+03	0.00E+00	0.00E+00	2.91E+00	2.51E+00	4.36E+00	-2.31E+02
WDP <sup>1</sup>	[m <sup>3</sup> world eq. deprived]	4.88E+01	7.03E-03	2.66E-01	0.00E+00	1.25E-01	0.00E+00	1.45E+01	0.00E+00	0.00E+00	2.59E-03	9.27E-01	-4.07E-03	-1.86E+00
Caption	GWP-total = Globale Warming Potential – total; GWP-fossil = Global Warming Potential – fossil fuels; GWP-biogenic = Global Warming Potential – biogenic; GWP-luluc = Global Warming Potential – land use and land use change; ODP = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water depletion potential													
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.													
Disclaimer	<sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.													

ADDITIONAL ENVIRONMENTAL IMPACTS PER RCC														
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	B6	B7	C1	C2	C3	C4	D
PM	[Disease incidence]	8.17E-06	1.52E-08	3.03E-09	0.00E+00	2.87E-08	0.00E+00	1.18E-06	0.00E+00	0.00E+00	5.60E-09	1.06E-08	9.00E-09	-3.57E-07
IRP <sup>2</sup>	[kBq U235 eq.]	1.77E+01	2.22E-03	5.47E-03	0.00E+00	3.41E-02	0.00E+00	3.66E+01	0.00E+00	0.00E+00	8.17E-04	3.42E-02	7.59E-03	-1.55E+00
ETP-fw <sup>1</sup>	[CTUe]	4.21E+03	5.68E+00	3.90E-01	0.00E+00	1.65E+01	0.00E+00	3.86E+02	0.00E+00	0.00E+00	2.09E+00	1.07E+00	2.94E+00	-9.53E+01
HTP-c <sup>1</sup>	[CTUh]	8.49E-07	1.15E-10	2.81E-11	0.00E+00	5.02E-10	0.00E+00	2.04E-08	0.00E+00	0.00E+00	4.24E-11	9.57E-11	1.79E-10	-4.34E-09
HTP-nc <sup>1</sup>	[CTUh]	5.54E-06	5.13E-09	1.45E-09	0.00E+00	1.77E-08	0.00E+00	3.25E-07	0.00E+00	0.00E+00	1.89E-09	3.06E-09	1.50E-08	-2.05E-07
SQP <sup>1</sup>	-	1.33E+03	3.31E+00	2.66E-01	0.00E+00	3.73E+00	0.00E+00	5.47E+02	0.00E+00	0.00E+00	1.22E+00	8.05E-01	3.87E-01	-1.12E+02
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)													
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.													
Disclaimers	<sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.													
	<sup>2</sup> This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.													

RESOURCE USE PER RCC														
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	3.28E+02	5.77E-01	1.65E-01	0.00E+00	3.87E+00	0.00E+00	8.30E+02	0.00E+00	0.00E+00	2.12E-01	8.86E-01	3.92E-01	-7.81E+01
PERM	[MJ]	7.94E+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
PERT	[MJ]	4.08E+02	5.77E-01	1.65E-01	0.00E+00	3.87E+00	0.00E+00	8.30E+02	0.00E+00	0.00E+00	2.12E-01	8.86E-01	3.92E-01	-7.81E+01
PENRE	[MJ]	2.99E+03	7.95E+00	8.05E-01	0.00E+00	4.15E+01	0.00E+00	1.39E+03	0.00E+00	0.00E+00	2.93E+00	2.52E+00	4.36E+00	-2.31E+02
PENRM	[MJ]	5.80E+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
PENRT	[MJ]	3.58E+03	7.95E+00	8.05E-01	0.00E+00	4.15E+01	0.00E+00	1.39E+03	0.00E+00	0.00E+00	2.93E+00	2.52E+00	4.36E+00	-2.31E+02
SM	[kg]	2.20E-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
RSF	[MJ]	7.28E-22	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
NRSF	[MJ]	8.55E-21	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
FW	[m <sup>3</sup> ]	1.23E+00	6.32E-04	6.28E-03	0.00E+00	7.91E-03	0.00E+00	6.67E-01	0.00E+00	0.00E+00	2.32E-04	2.19E-02	4.49E-05	-6.76E-02
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water													
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.													

WASTE CATEGORIES AND OUTPUT FLOWS PER RCC														
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	5.43E-01	2.46E-11	1.44E-11	0.00E+00	2.96E-09	0.00E+00	-1.08E-07	0.00E+00	0.00E+00	9.06E-12	-1.17E-11	3.65E-10	-1.87E-06
NHWD	[kg]	2.76E+00	1.21E-03	4.69E-02	0.00E+00	1.99E-02	0.00E+00	1.02E+00	0.00E+00	0.00E+00	4.46E-04	2.55E-01	4.87E+00	-6.19E-01
RWD	[kg]	1.93E-02	1.49E-05	3.42E-05	0.00E+00	3.28E-04	0.00E+00	2.20E-01	0.00E+00	0.00E+00	5.48E-06	2.11E-04	5.13E-05	-1.02E-02

CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	5.50E+00	0.00E+00	1.55E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.73E+00	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	3.45E+00	0.00E+00	2.05E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E+01	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	6.34E+00	0.00E+00	4.73E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.40E+01	0.00E+00	0.00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy													
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.													

BIOGENIC CARBON CONTENT PER RCC		
Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0
Biogenic carbon content in accompanying packaging	[kg C]	0.68
Note		1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>

## RCV 320

ENVIRONMENTAL IMPACTS PER RCV 320														
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	B6	B7	C1	C2	C3	C4	D
GWP-total	[kg CO <sub>2</sub> eq.]	2.11E+02	3.69E+00	5.51E+00	0.00E+00	6.69E+00	0.00E+00	8.29E+01	0.00E+00	0.00E+00	3.65E-01	1.56E+01	4.82E-01	-2.01E+01
GWP-fossil	[kg CO <sub>2</sub> eq.]	2.16E+02	3.64E+00	2.97E-01	0.00E+00	6.66E+00	0.00E+00	8.22E+01	0.00E+00	0.00E+00	3.60E-01	1.56E+01	4.88E-01	-2.00E+01
GWP-biogenic	[kg CO <sub>2</sub> eq.]	-3.18E+00	8.36E-03	3.65E+00	0.00E+00	2.11E-02	0.00E+00	7.16E-01	0.00E+00	0.00E+00	8.25E-04	9.59E-04	-6.02E-03	-2.12E-02
GWP-luluc	[kg CO <sub>2</sub> eq.]	2.94E-01	3.41E-02	4.59E-04	0.00E+00	3.58E-04	0.00E+00	8.96E-03	0.00E+00	0.00E+00	3.38E-03	4.67E-05	4.37E-04	-1.18E-02
ODP	[kg CFC 11 eq.]	7.36E-06	4.80E-13	5.83E-13	0.00E+00	1.31E-11	0.00E+00	1.52E-09	0.00E+00	0.00E+00	4.75E-14	2.07E-12	8.16E-13	-1.72E-10
AP	[mol H <sup>+</sup> eq.]	1.18E+00	1.96E-02	1.31E-03	0.00E+00	8.10E-03	0.00E+00	1.75E-01	0.00E+00	0.00E+00	1.94E-03	2.16E-03	1.50E-03	-6.21E-02
EP-freshwater	[kg P eq.]	1.85E-01	1.35E-05	3.41E-07	0.00E+00	6.25E-06	0.00E+00	3.08E-04	0.00E+00	0.00E+00	1.33E-06	5.15E-07	5.99E-05	-8.51E-05
EP-marine	[kg N eq.]	2.42E-01	9.44E-03	4.54E-04	0.00E+00	1.92E-03	0.00E+00	4.20E-02	0.00E+00	0.00E+00	9.34E-04	6.43E-04	3.57E-04	-1.30E-02
EP-terrestrial	[mol N eq.]	2.62E+00	1.05E-01	5.92E-03	0.00E+00	1.88E-02	0.00E+00	4.39E-01	0.00E+00	0.00E+00	1.04E-02	1.02E-02	3.92E-03	-1.36E-01
POCP	[kg NMVOC eq.]	7.76E-01	1.86E-02	1.14E-03	0.00E+00	6.47E-03	0.00E+00	1.12E-01	0.00E+00	0.00E+00	1.84E-03	1.77E-03	1.13E-03	-5.16E-02
ADPm <sup>1</sup>	[kg Sb eq.]	8.29E-02	2.44E-07	8.37E-09	0.00E+00	2.06E-07	0.00E+00	1.27E-05	0.00E+00	0.00E+00	2.42E-08	1.73E-08	1.31E-08	-9.81E-04
ADPF <sup>1</sup>	[MJ]	3.63E+03	5.02E+01	2.10E+00	0.00E+00	9.23E+01	0.00E+00	1.73E+03	0.00E+00	0.00E+00	4.97E+00	3.65E+00	7.30E+00	-3.85E+02
WDP <sup>1</sup>	[m <sup>3</sup> world eq. deprived]	5.24E+01	4.45E-02	6.21E-01	0.00E+00	2.78E-01	0.00E+00	1.81E+01	0.00E+00	0.00E+00	4.41E-03	1.36E+00	-6.81E-03	-2.97E+00
Caption	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 = Ozone Depletion; AP = Acidification; EP-freshwater = Eutrophication – aquatic freshwater; EP-marine = Eutrophication – aquatic marine; EP-terrestrial = Eutrophication – terrestrial; POCP = Photochemical zone formation; ADPm = Abiotic Depletion Potential – minerals and metals; ADPF = Abiotic Depletion Potential – fossil fuels; WDP = water depletion potential													
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.													
Disclaimer	<sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.													

ADDITIONAL ENVIRONMENTAL IMPACTS PER RCV 320														
Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	B6	B7	C1	C2	C3	C4	D
PM	[Disease incidence]	8.83E-06	9.64E-08	7.86E-09	0.00E+00	6.38E-08	0.00E+00	1.47E-06	0.00E+00	0.00E+00	9.54E-09	1.37E-08	1.52E-08	-6.25E-07
IRP <sup>2</sup>	[kBq U235 eq.]	1.92E+01	1.41E-02	1.30E-02	0.00E+00	7.57E-02	0.00E+00	4.56E+01	0.00E+00	0.00E+00	1.39E-03	5.31E-02	1.27E-02	-2.70E+00
ETP-fw <sup>1</sup>	[CTUe]	4.39E+03	3.60E+01	1.06E+00	0.00E+00	3.67E+01	0.00E+00	4.80E+02	0.00E+00	0.00E+00	3.56E+00	1.46E+00	4.75E+00	-1.56E+02
HTP-c <sup>1</sup>	[CTUh]	8.66E-07	7.31E-10	6.42E-11	0.00E+00	1.12E-09	0.00E+00	2.54E-08	0.00E+00	0.00E+00	7.23E-11	1.34E-10	2.97E-10	-6.83E-09
HTP-nc <sup>1</sup>	[CTUh]	5.68E-06	3.25E-08	3.12E-09	0.00E+00	3.93E-08	0.00E+00	4.05E-07	0.00E+00	0.00E+00	3.21E-09	3.33E-09	2.52E-08	-3.30E-07
SQP <sup>1</sup>	-	1.71E+03	2.10E+01	7.05E-01	0.00E+00	8.28E+00	0.00E+00	6.80E+02	0.00E+00	0.00E+00	2.08E+00	1.20E+00	6.50E-01	-1.97E+02
Caption	PM = Particulate Matter emissions; IRP = Ionizing radiation – human health; ETP-fw = Eco toxicity – freshwater; HTP-c = Human toxicity – cancer effects; HTP-nc = Human toxicity – non cancer effects; SQP = Soil Quality (dimensionless)													
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.													
Disclaimers	<sup>1</sup> The results of this environmental indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.													
	<sup>2</sup> This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.													

**RESOURCE USE PER RCV 320**

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	4.12E+02	3.65E+00	4.00E-01	0.00E+00	7.86E+00	0.00E+00	1.03E+03	0.00E+00	0.00E+00	3.62E-01	1.34E+00	6.58E-01	-1.38E+02
PERM	[MJ]	1.27E+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
PERT	[MJ]	5.39E+02	3.65E+00	4.00E-01	0.00E+00	7.86E+00	0.00E+00	1.03E+03	0.00E+00	0.00E+00	3.62E-01	1.34E+00	6.58E-01	-1.38E+02
PENRE	[MJ]	3.13E+03	5.03E+01	2.07E+00	0.00E+00	8.87E+01	0.00E+00	1.73E+03	0.00E+00	0.00E+00	4.99E+00	3.65E+00	7.30E+00	-3.86E+02
PENRM	[MJ]	4.18E+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
PENRT	[MJ]	3.55E+03	5.03E+01	2.07E+00	0.00E+00	8.87E+01	0.00E+00	1.73E+03	0.00E+00	0.00E+00	4.99E+00	3.65E+00	7.30E+00	-3.86E+02
SM	[kg]	4.33E-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
RSF	[MJ]	9.55E-22	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
NRSF	[MJ]	1.68E-20	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
FW	[m <sup>3</sup> ]	1.38E+00	4.00E-03	1.46E-02	0.00E+00	1.76E-02	0.00E+00	8.31E-01	0.00E+00	0.00E+00	3.96E-04	3.22E-02	7.58E-05	-1.20E-01
Caption	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Net use of fresh water													
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.													

**WASTE CATEGORIES AND OUTPUT FLOWS PER RCV 320**

Parameter	Unit	A1-A3	A4	A5	B1	B2	B3-B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	1.07E+00	1.56E-10	3.90E-11	0.00E+00	6.59E-09	0.00E+00	-1.35E-07	0.00E+00	0.00E+00	1.54E-11	-3.69E-11	6.11E-10	-4.82E-08
NHWD	[kg]	4.42E+00	7.67E-03	1.26E-01	0.00E+00	4.42E-02	0.00E+00	1.27E+00	0.00E+00	0.00E+00	7.60E-04	2.80E-01	8.32E+00	-8.31E-01
RWD	[kg]	3.14E-02	9.42E-05	8.15E-05	0.00E+00	7.29E-04	0.00E+00	2.74E-01	0.00E+00	0.00E+00	9.33E-06	3.26E-04	8.59E-05	-1.80E-02
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	8.70E+00	0.00E+00	1.81E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E+01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	7.84E+00	0.00E+00	4.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.82E+01	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	1.43E+01	0.00E+00	1.05E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.03E+01	0.00E+00	0.00E+00
Caption	HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy													
	The numbers are declared in scientific notation, fx 1,95E+02. This number can also be written as: 1,95*10 <sup>2</sup> or 195, while 1,12E-11 is the same as 1,12*10 <sup>-11</sup> or 0,0000000000112.													

**BIOGENIC CARBON CONTENT PER RCV320**

Parameter	Unit	At the factory gate
Biogenic carbon content in product	[kg C]	0
Biogenic carbon content in accompanying packaging	[kg C]	2.14
Note	1 kg biogenic carbon is equivalent to 44/12 kg of CO <sub>2</sub>	

# Additional information

## LCA interpretation

The results of the EPD shows the potential environmental impact associated with one RCC or RCV decentralised ventilation unit. Through a contribution analysis, the production of the printed circuit boards is the most dominant source of impact. Next to PCB, the production of steel contributes the most.

## Technical information on scenarios

### Transport to the building site (A4)

Scenario information	Truck	Unit
Fuel type	Diesel	-
Vehicle type	Truck, Euro 5, 28 - 32t gross weight / 18.4t payload capacity	-
Transport distance	265 – 1159.6	km
Capacity utilisation (including empty runs)	47.8	%
Gross density of products transported	19 - 31	kg/m <sup>3</sup>

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

Scenario information	Value	Unit
Ancillary materials	0	kg
Water use	0	m <sup>3</sup>
Other resource use	0	kg
Energy type and consumption	0	kWh
Waste materials	1.5 - 8	kg
Output materials	0	kg
Direct emissions to air, soil or water	0	kg

## Reference service life

RSL information	Unit
Reference service Life	1 Year
Life span of the units	25 Years
Declared product properties	The declared unit is one RCC 130/220 or RCV 320 P1, P2 or E1 decentralised ventilation unit with an air capacity of 50 – 360 m <sup>3</sup> /h.
Assumed quality of work	Technical specification and guidance can be obtained at <a href="https://catalogue.dantherm.com/dantherm/dantherm-catalogue-residential-ventilation-dk/">https://catalogue.dantherm.com/dantherm/dantherm-catalogue-residential-ventilation-dk/</a> or by directly contacting Dantherm A/S
Maintenance	The RCC or RCV variations requires change of filters twice per year during its lifespan.

### Use (B1-B7)

Scenario information	Value	Unit
<b>B2 - Maintenance</b>		
Maintenance process	To maintain RCC or RCV variations, it is necessary to replace filters twice a year throughout its lifespan.	
Maintenance cycle	2	/year
Ancillary materials for maintenance (specify which)	0	kg/cycle
Waste materials resulting from maintenance (specify which)	RCC	0.36
	RCV	0.8
<b>B6 + B7 – Use of energy and water</b>		
Electricity	84 - 140	kWh
Further assumptions for scenario development	The scenario is based on the ventilation units being used 8760 hours (1 year) at a 70% performance of maximum flow rate, as prescribed in COMMISSION REGULATION (EU) No 1253/2014.	

### End of life (C1-C4)

Scenario information	Value	Unit
Collected separately	17.30 – 31.70	kg
Collected with mixed waste	0	kg
For reuse	0	kg
For recycling	8.98 -17.35	kg
For energy recovery	3.65 – 7.97	kg
For final disposal	4.60 – 8.57	kg
Assumptions for scenario development	45 km to waste incineration, 285 – 455 km depending on waste material, to recycling facility	

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

Scenario information/Materiel (energy recovery)	Value	Unit
Module A5	Wooden Pallet	1.36 – 2.97
Module B2	Filters	0.80 - 0.36
Module C3	Plastics (EPS, PA, PE, PET, PP, PS, PVC, plastics in wire)	52.8 – 82.00

Scenario information/Materiel (recycling)	Value	Unit
Module A5	LDPE, corrugated cardboard	0.16 - 5.28
Module C3	Steel, Aluminium, Copper, recyclable plastic (PA, PE, PET, PP, PVC, PS)	8.98 – 17.35



#### **Indoor air**

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

#### **Soil and water**

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

## References

<b>Publisher</b>	 epddanmark <a href="http://www.epddanmark.dk">www.epddanmark.dk</a> <small>Template version 2023.1</small>
<b>Programme operator</b>	Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup <a href="http://www.teknologisk.dk">www.teknologisk.dk</a>
<b>LCA-practitioner</b>	Artelia A/S Mariane Thomsens Gade 1c 8000 Aarhus C Denmark Sabine Kristensen
<b>LCA software / background data</b>	Sphera LCA for Experts vers. 10.7, professional database, version 2023.1 and EcoInvent vers. 3.9.1
<b>3<sup>rd</sup> party verifier</b>	Life Cycle Assessment Consulting Linda Høibye

### General programme instructions

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

#### EN 15804

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

#### EN 15942

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

#### EN 50693

DS/EN 50693:2019 – "Product category rules for life cycle assessments of electronic and electrical products and systems"

#### ISO 14025

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

#### ISO 14040

---

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

**ISO 14044**

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

**Sphera LCA for Experts (formerly GaBi) version 10.7**

Professional Database, version 2023.1 <https://sphera.com/product-sustainability-software/>

**EcoInvent**

Ecoinvent version 3.9.1

**Eurostat**

Treatment of waste by waste category, hazardousness and waste management operations

[https://ec.europa.eu/eurostat/databrowser/view/env\\_wasrt/default/table?lang=en&category=env.env\\_was.env\\_wasgt](https://ec.europa.eu/eurostat/databrowser/view/env_wasrt/default/table?lang=en&category=env.env_was.env_wasgt)