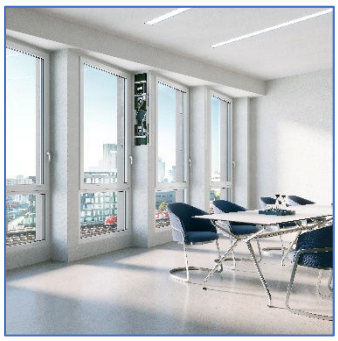
# Environmental Product Declaration (EPD)

Declaration code EPD-SIL-GB-75.0.02

**Note:** This EPD was created on the basis of an LCA tool.



SIEGENIA brings spaces to life

**SIEGENIA-AUBI KG**

ECO PLATFORM EPD VERIFIED

# Decentralised ventilation units

# AEROMAT VT System (2 blower)

**Basis:**

DIN EN ISO 14025
EN 15804 + A2

Company EPD **E**nvironmental **P**roduct **D**eclaration

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09.12.2024

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09.12.2029

www.ift-rosenheim.de/
erstellte-epds

ift Rosenheim GmbH
Theodor-Gietl-Str. 7-9
83026 Rosenheim
GERMANY

Contact
+49 8031 261-0
info@ift-rosenheim.de
www.ift-rosenheim.de

Testing + Calibration – EN ISO/IEC 17025
Inspection – EN ISO/IEC 17020
Product Certification – EN ISO/IEC 17065
Certification of Management Systems – EN ISO/IEC 17021

Notified Body 0757
PÜZ-Stelle BAY 18

# Environmental Product Declaration (EPD)

## Declaration code EPD-SIL-GB-75.0.02

| | |
|---|---|
| **Programme operator** | ift Rosenheim GmbH<br>Theodor-Gietl-Straße 7-9<br>83026 Rosenheim, Germany |
| **Tool creator / Practitioner of LCA** | Sphera Solutions GmbH<br>Hauptstraße 111-113<br>70771 Leinfelden-Echterdingen, Germany |
| **Tool holder / declaration holder** | SIEGENIA-AUBI KG<br>Industriestraße 1-3<br>57234 Wilnsdorf, Germany<br>www.siegenia.com |
| **Declaration code** | EPD-SIL-GB-75.0.02 |
| **Designation of declared product** | AEROMAT VT System (2 blower) |
| **Scope** | Decentralised ventilation unit |
| **Basis** | This EPD was prepared on the basis of EN ISO 14025:2011 and DIN EN 15804:2012+A2:2019. In addition, the "Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen" (General guideline for preparation of Type III Environmental Product Declarations) applies. The declaration is based on the PCR documents "PCR Part A" PCR-A-1.0:2023 and "Fans and ventilation systems" PCR-LS-1.0:2022. |
| **Validity** | Publication date: 09.12.2024 / Last revision: 13.12.2024 / Valid until: 09.12.2029<br>This verified Company Environmental Product Declaration (company EPD) applies solely to the specified products and is valid for a period of five years from the date of publication in accordance with DIN EN 15804. |
| **LCA Basis** | The LCA was prepared in accordance with DIN EN ISO 14040 and DIN EN ISO 14044. The data collected from the production plants of the company SIEGENIA-AUBI KG were used as a data basis, as well as generic data from the database “Sphera - LCA for Expert Content version 2023.1". The calculation was carried out using the Siegenia LCA tool Sphera - LCA for Expert Content version 2023.1. LCA calculations were carried out for the “cradle to gate” life cycle with options (cradle to gate with options) including all upstream chains (e.g. raw material extraction, etc.). |
| **Notes** | The ift-Guidance Sheet “Conditions and Guidance for the Use of ift Test Documents” applies. The declaration holder assumes full liability for the underlying data, certificates and verifications. |

| | | |
|---|---|---|
| Christoph Seehauser<br>Deputy Head for Sustainability | Dr. Torsten Mielecke<br>Chairman of Expert Committee<br>ift-EPD and PCR | Susanne Volz<br>External Verifier |

# 1 General Product Information

**Product definition**

The EPD relates to the product group Decentralised ventilation units and applies to:

**1 pc Decentralised ventilation unit**
**of company SIEGENIA-AUBI KG**

The functional unit is obtained by summing up:

| Assessed product | Declared unit | Unit weight |
|---|---|---|
| AEROMAT VT WRG | 1 pc | 22.59 kg/pc |

**Table 1** Product groups

The average unit is declared as follows:
Directly used material flows are determined by means of manufactured masses (kg) and allocated to the declared unit. All other inputs and outputs in the manufacture were scaled to the declared unit as a whole, since no direct assignment to the average size is possible. The reference period is the year 2022.

The validity of the EPD is restricted to the following series:

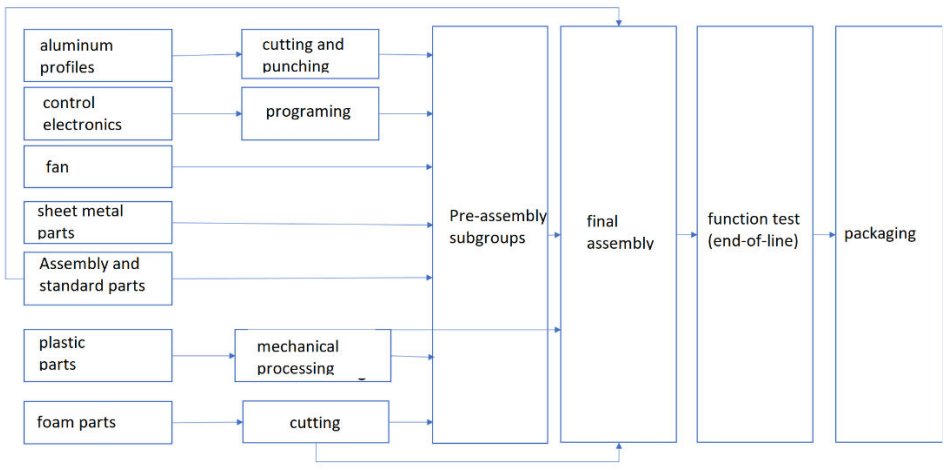
- AEROMAT VT WRG
- AEROMAT VT WRG plus
- AEROMAT VT A2
- AEROMAT VT Z2

**Product description**

Decentralised sound-insulated ventilation unit with or without heat recovery (depending on product type). Enables controlled ventilation through aeration and ventilation. Casing made of aluminum profiles with thermal separation through casing cover and base. Supply air and exhaust air filters depending on product type.

For a detailed product description refer to the manufacturer specifications or the product specifications of the respective offer/quotation.

**Product manufacture**




**Application**

Suitable for demand-based ventilation of residential buildings

**Management systems**

The following management systems are held:

- Quality management system as per DIN EN ISO 9001:2015
- Environmental management system as per DIN EN ISO 14001:2015
- Occupational health and safety management system as per DIN EN ISO 45001:2018

**Additional information**

For additional verifications of applicability or conformity refer to the CE marking and the documents accompanying the product, if applicable.

## 2 Materials used

**Primary materials**

The raw materials used can be found in Section 6.2 Inventory analysis (Inputs).
The raw materials used can be found in the life cycle assessment.

**Declarable substances**

It contains substances according to the REACH candidate list (declaration of 31.01.2023).

All relevant safety data sheets and in particular the RoHS-REACH declaration of conformity can be obtained from SIEGENIA-AUBI KG. For this, see https://www.siegenia.com.

## 3 Construction process stage

**Processing recommendations, installation**

Observe the instructions for assembly/installation, operation, maintenance and disassembly, provided by the manufacturer. For this, see https://www.siegenia.com.

## 4 Use stage

**Emissions to the environment**

No emissions to indoor air, water and soil are known. There may be VOC emissions.

**Reference service life (RSL)**

The RSL information was provided by the manufacturer. The RSL must be established under specified reference conditions of use and relate to the declared technical and functional performance of the product within the building. It must be determined according to all specific rules given in European product standards or, if none are available, according to a c-PCR. It must also take into account ISO 15686-1, -2, -7 and -8. If there is guidance on deriving RSLs from European Product Standards or a c-PCR, then such guidance must take precedence.
If it is not possible to determine the service life as the RSL in accordance with ISO 15686, the BBSR table “Nutzungsdauer von Bauteilen zur Lebenszyklusanalyse nach BNB” (service life of building components for life cycle assessment in accordance with the sustainable construction evaluation system) can be used. For further information and explanations refer to www.nachhaltigesbauen.de.

For this EPD the following applies:
For an EPD "cradle to factory gate with options", with modules C1-C4 and module D (A1-A3 + C + D and one or more additional modules from A4 to B7), the specification of a reference service life (RSL) is only possible if the reference service life conditions are specified.
The service life of the AEROMAT VT System (2 blower) from SIEGENIA-AUBI KG is optionally specified as 10 years in accordance with product standards.

The service life is dependent on the characteristics of the product and in-use conditions. The conditions and characteristics described in the EPD are applicable, in particular the characteristics listed below:

- Outdoor environment: Weather conditions can have a negative effect on the service life.
- Indoor environment: No impacts (e.g. humidity, temperature) known that have a negative effect on the service life.

The service life solely applies to the characteristics specified in this EPD or the corresponding references.
The RSL does not reflect the actual life time, which is usually determined by the service life and the redevelopment of a building. It does not give any information on the useful life, warranty referring to performance characteristics or guarantees.

## 5 End-of-life stage

**Possible end-of-life stages**

AEROMAT VT System (2 blower) are sent to central collection points. There the products are usually shredded and sorted into their constituents. The end-of-life stage depends on the site where the products are used and is therefore subject to the local regulations. Observe the locally applicable regulatory requirements.

In this EPD, the modules of after-use are presented as follows:
Steel is recycled, plastics are thermally recycled. Inert residual fractions are sent to landfill.

**Disposal routes**

The LCA includes the average disposal routes.

**All life cycle scenarios are detailed in the Annex.**

# 6 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle assessments (LCAs) which use material and energy flows for the calculation and subsequent representation of environmental impacts.

As a basis for this, life cycle assessments were prepared for AEROMAT VT System (2 blower) using an LCA tool. These LCAs are in conformity with the requirements set out in DIN EN 15804 and the international standards DIN EN ISO 14040, DIN EN ISO 14044, ISO 21930 and EN ISO 14025.

The LCA is representative of the products presented in the Declaration and the specified reference period.

## 6.1 Definition of goal and scope

**Aim**

The goal of the LCA is to demonstrate the environmental impacts of the products. In accordance with DIN EN 15804, the environmental impacts covered by this Environmental Product Declaration are presented for the entire product life cycle in the form of basic information. No other additional environmental impacts are specified.

**Data quality, data availability and geographical and time-related system boundaries**

The specific data originate exclusively from the fiscal year 2022. They were collected on-site at the plants located in DE-57234 Wilnsdorf and in PL-46-203 Kluczbork and originate in parts from company records and partly from values directly obtained by measurement. The data was checked for validity by the tool creator / practitioner of LCA.

The generic data originates from the professional database and building materials database software “Sphera - LCA for Experts Content version 2023.1”. The last update of both databases was in 2023. Data from before this date originate also from these databases and are not more than five years old. No other generic data were used for the calculation.

Generic data are selected as accurately as possible in terms of geographic reference. If no country-specific data sets are available or if the regional reference cannot be determined, European or globally valid data sets are used.

Data gaps were either filled with comparable data or conservative assumptions, or the data were cut off in compliance with the 1% rule.

The life cycle was modelled using the sustainability software tool “Sphera - LCA for Experts Content version 2023.1” for the development of life cycle assessments. The LCA was calculated using the Siegenia LCA tool version Sphera - LCA for Expert Content version 2023.1.

**Scope / system boundaries**

The system boundaries refer to the supply of raw materials and purchased parts, manufacture/production, use and end-of-life stage of the AEROMAT VT System (2 blower).
No additional data from pre-suppliers/subcontractors or other sites were taken into consideration.

**Cut-off criteria**

All company data collected, i.e. all commodities/input and raw materials used, the thermal energy and electricity consumption, were taken into consideration.

The following data was truncated:

- Production of packaging for pre-products
- Transportation of the packaging of the end product
- Ancillary materials and consumables
- Transportation of spare parts (Module B2)

The boundaries cover only the product-relevant data. Building sections/parts of facilities that are not relevant to the manufacture of the products, were excluded.

The transport distances of the pre-products used were taken into consideration as a function of 100% of the mass of the products.

The criteria for the exclusion of inputs and outputs as set out in DIN EN 15804 are fulfilled. From the data analysis it can be assumed that the total of negligible processes per life cycle stage does not exceed 1% of the mass/primary energy. This way the total of negligible processes does not exceed 5% of the energy and mass input. The life cycle calculation also includes material and energy flows that account for less than 1%.

## 6.2 Inventory analysis

**Aim**

All material and energy flows are described below. The processes covered are presented as input and output parameters and refer to the declared/functional units.

**Life cycle stages**

The complete life cycle of AEROMAT VT System (2 blower) is shown in the annex. The product stage "A1 – A3", construction process stage "A4 – A5", use stage “B2 and B6", end-of-life stage "C1 – C4" and the benefits and loads beyond the system boundaries "D" are considered.

**Benefits**

The below benefits have been defined as per DIN EN 15804:

- Benefits from recycling
- Benefits (thermal and electrical) from incineration

**Allocation of co-products**

No allocations occur during production.

**Allocations for re-use, recycling and recovery**

If the products are reused/recycled and recovered during the product stage (rejects), the elements are shredded, if necessary and then sorted into their constituents. This is done by various process plants, e.g. magnetic separators.
The system boundaries were set following their disposal, reaching the end-of-waste status.

**Allocations beyond life cycle boundaries**

The use of recycled materials in the manufacturing process was based on the current market-specific situation. In parallel to this, a recycling potential was taken into consideration that reflects the economic value of the product after recycling (recyclate).
Secondary material designated as inputs to AEROMAT VT System (2 blower) is calculated as input without loads. No benefits are assigned to Module D, but consumption to Modules C3 and C4 (worst case consideration).
The system boundary set for the recycled material refers to collection.

**Secondary material**

The use of secondary material by SIEGENIA-AUBI KG was not considered in Module A3. Secondary material is used:

- Waste paper in the production of packaging cardboard

**Inputs**

The following manufacturing-related inputs were included in the LCA per 1 pc Decentralised ventilation unit:

**Energy**
For the input material gas, "natural gas Germany" as well as "natural gas Poland" was assumed. For the electricity mix, the "Residiual grid mix Germany" as well as "Residiual grid mix Poland" was assumed. The input material of “light heating oil” is based on “light heating oil Germany”, and the input material “biogas” is based on “biogas Germany”.

A portion of the process heat is used for space heating. This can, however, not be quantified, hence a “worst case” figure was taken into account for the product.

**Water**
There is no water consumption in the individual process steps for production.
The consumption of fresh water specified in Section 6.3 originates (among others) from the process chain of the pre-products.

**Raw material / pre-products**
The charts below show the share of raw materials/pre-products in percent.

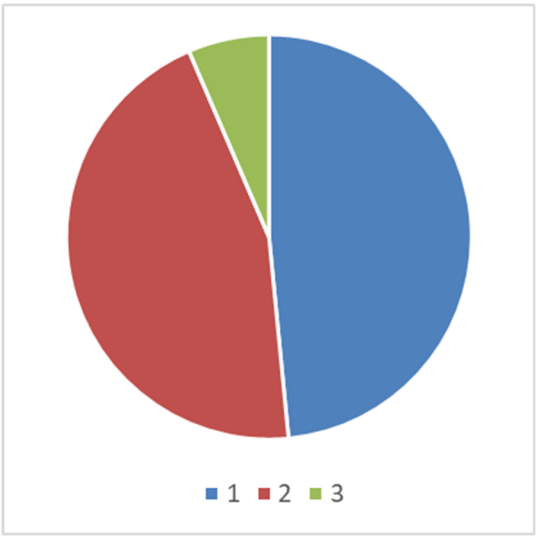



**Illustration 1** Percentage of individual materials per declared unit

| No. | Material | Mass in % |
|---|---|---|
| 1 | Plastics | 45% |
| 2 | Metals | 48% |
| 3 | Electrical components | 6 % |

**Table 2** Percentage of individual materials per declared unit

**Ancillary materials and consumables**
Ancillary materials and consumables are cut off.

**Product packaging**
The amounts used for product packaging are as follows:

| No. | Material | Mass in g |
|---|---|---|
| 1 | Wood | 7.34 |
| 2 | Cardboard | 632.35 |
| 3 | PE film | 4.65 |

**Table 3** Weight in kg of packaging per declared unit

**Biogenic carbon content**
Only the biogenic carbon content of the associated packaging is reported, as the total mass of biogenic carbon-containing materials is less than 5% of the total mass of the product and associated packaging. According to EN 16449, the following amounts of biogenic carbon are generated for packaging:

| No. | Part | Content in kg C per pc |
|---|---|---|
| 1 | In the corresponding packaging | 0.302 |

**Table 4** Biogenic carbon content of the packaging at the factory gate

**Outputs**

The LCA includes the following production-relevant outputs per of 1 pc blower:

**Waste**
Secondary raw materials were included in the benefits.
See Section 6.3 Impact assessment.

**Waste water**
No waste water is produced during the manufacturing process.

## 6.3 Impact assessment

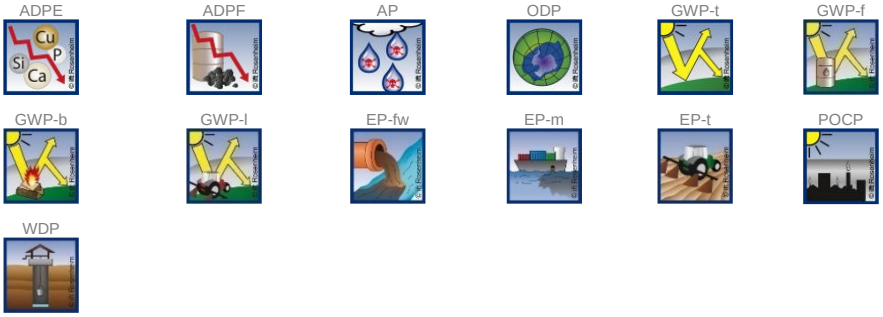
**Aim**

The impact assessment covers both inputs and outputs. The impact categories applied are stated below:

**Core indicators**

The models for impact assessment were applied as described in DIN EN 15804-A2.
The core indicators presented in the EPD are as follows:

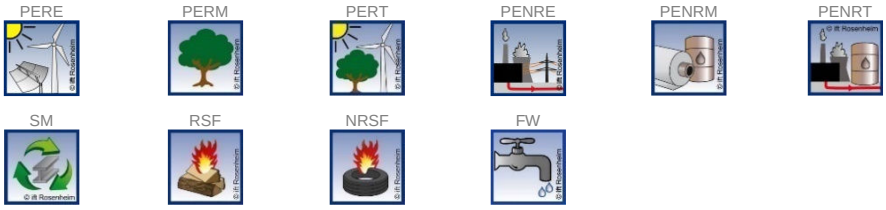
- Depletion of abiotic resources - minerals and metals (ADPE)
- Depletion of abiotic resources - fossil fuels (ADPF)
- Acidification (AP)
- Ozone depletion (ODP)
- Climate change - total (GWP-t)
- Climate change - fossil (GWP-f)
- Climate change - biogenic (GWP-b)
- Climate change - land use & land use change (GWP-l)
- Eutrophication freshwater (EP-fw)
- Eutrophication salt water (EP-m)
- Eutrophication land (EP-t)
- Photochemical ozone creation (POCP)
- Water use (WDP)



**Resource management**

The models for impact assessment were applied as described in DIN EN 15804-A2.
The following resource use indicators are presented in the EPD:

- Renewable primary energy as energy source (PERE)
- Renewable primary energy for material use (PERM)
- Total use of renewable primary energy (PERT)
- Non-renewable primary energy as energy source (PENRE)
- Renewable primary energy for material use (PENRM)
- Total use of non-renewable primary energy (PENRT)
- Use of secondary materials (SM)
- Use of renewable secondary fuels (RSF)
- Use of non-renewable secondary fuels (NRSF)
- Net use of freshwater resources (FW)

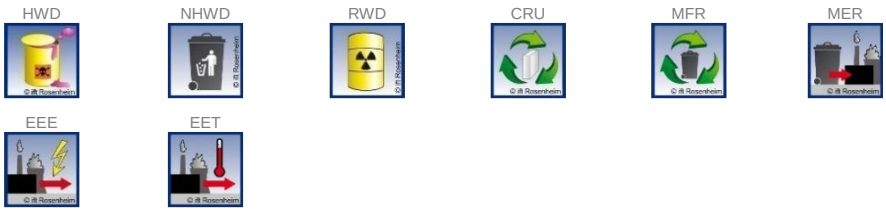



**Waste**

The waste generated during the production of 1 pc Decentralised ventilation unit is evaluated and shown separately for the fractions trade wastes, special wastes and radioactive wastes. Since waste handling is modelled within the system boundaries, the amounts shown refer to the deposited wastes. A portion of the waste indicated is generated during the manufacture of the pre-products.

The models for impact assessment were applied as described in DIN EN 15804-A2.
The following waste categories and indicators for output closures are presented in the EPD:

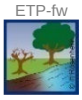
- Disposed hazardous waste (HWD)
- Non-hazardous waste disposed (NHWD)
- Radioactive waste disposed (RWD)
- Components for re-use (CRU)
- Materials for recycling (MFR)
- Materials for energy recovery (MER)
- Exported electrical energy (EEE)
- Exported thermal energy (EET)



**Additional environmental impact indicators**

The models for impact assessment were applied as described in DIN EN 15804-A2.
The additional impact categories presented in the EPD are as follows:

- Particulate matter emissions (PM)
- Ionizing radiation, human health (IRP)
- Ecotoxicity – freshwater (ETP-fw)
- Human toxicity, carcinogenic effects (HTP-c)
- Human toxicity, non-carcinogenic effects (HTP-nc)
- Impacts associated with land use/soil quality (SQP)

Product Manager 
IRP 
ETP-fw 
HTP-c 
HTP-nc 
SQP 

| | Results per 1 AREOMAT VT WRG | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Unit** | **A1-A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| **Core indicators** | | | | | | | | | | | | | | | | |
| **GWP-t** | kg $CO_2$ equivalent | 115.05 | 0.19 | 1.11 | ND | 10.65 | ND | ND | ND | 11.65 | ND | 1.29E-03 | 9.08E-02 | 22.85 | 6.03E-05 | -62.60 |
| **GWP-f** | kg $CO_2$ equivalent | 115.91 | 0.19 | 2.04E-02 | ND | 10.64 | ND | ND | ND | 11.64 | ND | 1.29E-03 | 9.00E-02 | 22.84 | 6.01E-05 | -62.41 |
| **GWP-b** | kg $CO_2$ equivalent | -0.99 | 1.94E-05 | 1.09 | ND | 1.75E-02 | ND | ND | ND | 5.80E-03 | ND | 6.42E-07 | 9.39E-06 | 2.42E-03 | 7.85E-13 | -0.18 |
| **GWP-l** | kg $CO_2$ equivalent | 0.13 | 1.72E-03 | 2.67E-05 | ND | 3.51E-04 | ND | ND | ND | 1.07E-03 | ND | 1.18E-07 | 8.33E-04 | 6.08E-04 | 1.87E-07 | -1.54E-02 |
| **ODP** | kg CFC-11-eq. | 3.10E-10 | 2.41E-14 | 2.36E-14 | ND | 1.55E-11 | ND | ND | ND | 1.15E-10 | ND | 1.27E-14 | 1.17E-14 | 6.60E-12 | 1.53E-16 | -1.40E-10 |
| **AP** | mol $H^+$-eq. | 0.43 | 2.71E-04 | 2.39E-05 | ND | 8.97E-03 | ND | ND | ND | 1.77E-02 | ND | 1.96E-06 | 1.32E-04 | 1.28E-02 | 4.26E-07 | -0.26 |
| **EP-fw** | kg P-eq. | 1.76E-04 | 6.78E-07 | 1.46E-08 | ND | 4.95E-06 | ND | ND | ND | 1.15E-05 | ND | 1.27E-09 | 3.29E-07 | 1.96E-06 | 1.21E-10 | -4.26E-05 |
| **EP-m** | kg N-eq. | 7.65E-02 | 9.81E-05 | 7.06E-06 | ND | 2.46E-03 | ND | ND | ND | 5.00E-03 | ND | 5.54E-07 | 4.76E-05 | 6.01E-03 | 1.10E-07 | -3.60E-02 |
| **EP-t** | mol N-eq. | 0.82 | 1.16E-03 | 9.82E-05 | ND | 2.78E-02 | ND | ND | ND | 5.28E-02 | ND | 5.85E-06 | 5.63E-04 | 6.95E-02 | 1.21E-06 | -0.39 |
| **POCP** | kg NMVOC-eq. | 0.24 | 2.37E-04 | 1.90E-05 | ND | 1.06E-02 | ND | ND | ND | 1.38E-02 | ND | 1.53E-06 | 1.15E-04 | 1.56E-02 | 3.32E-07 | -0.11 |
| **ADPF*²** | MJ | 1.60E-03 | 1.22E-08 | 3.48E-10 | ND | 1.88E-07 | ND | ND | ND | 5.64E-07 | ND | 6.24E-11 | 5.92E-09 | 5.89E-08 | 2.77E-12 | -6.14E-04 |
| **ADPE*²** | kg Sb equivalent | 1981.52 | 2.53 | 9.36E-02 | ND | 163.66 | ND | ND | ND | 255.76 | ND | 2.83E-02 | 1.22 | 15.97 | 8.00E-04 | -860.35 |
| **WDP*²** | $m^3$ world-eq. deprived | 14.82 | 2.24E-03 | 1.25E-02 | ND | 1.33 | ND | ND | ND | 0.98 | ND | 1.08E-04 | 1.09E-03 | 2.61 | 6.60E-06 | -9.23 |
| **Resource management** | | | | | | | | | | | | | | | | |
| **PERE** | MJ | 466.33 | 0.18 | 12.48 | ND | 6.84 | ND | ND | ND | 35.04 | ND | 3.88E-03 | 8.91E-02 | 3.56 | 1.30E-04 | -349.08 |
| **PERM** | MJ | 12.47 | 0.00 | -12.47 | ND | 0.00 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **PERT** | MJ | 478.80 | 0.18 | 1.34E-02 | ND | 6.84 | ND | ND | ND | 35.04 | ND | 3.88E-03 | 8.91E-02 | 3.56 | 1.30E-04 | -349.08 |
| **PENRE** | MJ | 1696.10 | 2.54 | 0.31 | ND | 163.93 | ND | ND | ND | 255.81 | ND | 2.83E-02 | 1.23 | 304.80 | 8.01E-04 | -861.95 |
| **PENRM** | MJ | 289.05 | 0.00 | -0.21 | ND | 0.00 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | -288.83 | 0.00 | 0.00 |
| **PENRT** | MJ | 1985.14 | 2.54 | 9.38E-02 | ND | 163.93 | ND | ND | ND | 255.81 | ND | 2.83E-02 | 1.23 | 15.97 | 8.01E-04 | -861.95 |
| **SM** | kg | 5.25 | 0.00 | 0.00 | ND | 0.00 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 0.00 | 0.00 | 7.26 |
| **RSF** | MJ | 0.00 | 0.00 | 0.00 | ND | 0.00 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **NRSF** | MJ | 0.00 | 0.00 | 0.00 | ND | 0.00 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **FW** | $m^3$ | 1.06 | 2.01E-04 | 3.00E-04 | ND | 3.56E-02 | ND | ND | ND | 5.86E-02 | ND | 6.49E-06 | 9.76E-05 | 6.25E-02 | 2.02E-07 | -0.77 |
| **Categories of waste** | | | | | | | | | | | | | | | | |
| **HWD** | kg | 1.34E-04 | 7.85E-12 | 2.37E-12 | ND | 7.31E-09 | ND | ND | ND | 1.48E-08 | ND | 1.64E-12 | 3.81E-12 | 4.60E-10 | 1.74E-14 | 6.02E-08 |
| **NHWD** | kg | 18.03 | 3.87E-04 | 2.04E-03 | ND | 7.92E-02 | ND | ND | ND | 5.64E-02 | ND | 6.24E-06 | 1.87E-04 | 3.39 | 4.00E-03 | -13.53 |
| **RWD** | kg | 8.57E-02 | 4.75E-06 | 6.01E-06 | ND | 4.45E-03 | ND | ND | ND | 3.98E-02 | ND | 4.41E-06 | 2.30E-06 | 4.97E-04 | 9.13E-09 | -5.38E-02 |
| **Output material flows** | | | | | | | | | | | | | | | | |
| **CRU** | kg | 0.00 | 0.00 | 0.00 | ND | 0.00 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **MFR** | kg | 0.00 | 0.00 | 0.00 | ND | 0.00 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 12.01 | 0.00 | 0.00 |
| **MER** | kg | 0.00 | 0.00 | 0.00 | ND | 0.00 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **EEE** | MJ | 0.00 | 0.00 | 0.17 | ND | 12.88 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 52.17 | 0.00 | 0.00 |
| **EET** | MJ | 0.00 | 0.00 | 0.31 | ND | 22.91 | ND | ND | ND | 0.00 | ND | 0.00 | 0.00 | 94.69 | 0.00 | 0.00 |

**Key:**
**GWP-t** – global warming potential - total **GWP-f** – global warming potential fossil fuels **GWP-b** – global warming potential - biogenic **GWP-l** – global warming potential - land use and land use change **ODP** – ozone depletion potential **AP** - acidification potential **EP-fw** - eutrophication potential - aquatic freshwater **EP-m** - eutrophication potential - aquatic marine **EP-t** - feutrophication potential - terrestrial **POCP** - photochemical ozone formation potential **ADPF*²** - abiotic depletion potential – fossil resources **ADPE*²** - abiotic depletion potential – minerals&metals **WDP*²** – Water (user) deprivation potential **PERE** - Use of renewable primary energy **PERM** - use of renewable primary energy resources **PERT** - total use of renewable primary energy resources **PENRE** - use of non-renewable primary energy **PENRM** - use of non-renewable primary energy resources **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 **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

| | Results per 1 AREOMAT VT WRG | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Unit** | **A1-A3** | **A4** | **A5** | **B1** | **B2** | **B3** | **B4** | **B5** | **B6** | **B7** | **C1** | **C2** | **C3** | **C4** | **D** |
| **Additional environmental impact indicators** | | | | | | | | | | | | | | | | |
| **PM** | Disease incidence | 4.48E-06 | 2.33E-09 | 1.72E-10 | ND | 8.24E-08 | ND | ND | ND | 1.60E-07 | ND | 1.77E-11 | 1.13E-09 | 7.52E-08 | 5.24E-12 | -2.89E-06 |
| **IRP*[1]** | kBq U235-eq. | 14.65 | 7.08E-04 | 9.17E-04 | ND | 0.68 | ND | ND | ND | 5.98 | ND | 6.62E-04 | 3.43E-04 | 6.61E-02 | 1.05E-06 | -10.52 |
| **ETP-fw*[2]** | CTUe | 810.20 | 1.79 | 4.81E-02 | ND | 80.47 | ND | ND | ND | 73.26 | ND | 8.11E-03 | 0.87 | 9.34 | 4.37E-04 | -282.51 |
| **HTP-c*[2]** | CTUh | 6.10E-07 | 3.67E-11 | 1.86E-12 | ND | 1.78E-09 | ND | ND | ND | 1.32E-09 | ND | 1.46E-13 | 1.78E-11 | 4.27E-10 | 6.72E-14 | -3.50E-08 |
| **HTP-nc*[2]** | CTUh | 1.43E-06 | 1.96E-09 | 1.11E-10 | ND | 7.37E-08 | ND | ND | ND | 6.77E-08 | ND | 7.49E-12 | 9.49E-10 | 3.99E-08 | 7.39E-12 | -7.08E-07 |
| **SQP*[2]** | dimensionless | 272.06 | 1.06 | 2.81E-02 | ND | 5.69 | ND | ND | ND | 34.61 | ND | 3.83E-03 | 0.51 | 3.44 | 1.94E-04 | -76.52 |

**Key:**
**PM** – particulate matter emissions potential **IRP*[1]** – ionizing radiation potential – human health **ETP-fw*[2]** - Eco-toxicity potential – freshwater **HTP-c*[2]** - Human toxicity potential – cancer effects **HTP-nc*[2]** - Human toxicity potential – non-cancer effects **SQP*[2]** – soil quality potential

**Disclaimers:**

*1 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 ionising radiation from the soil, from radon and from some building materials is also not measured by this indicator.

*2 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 experience with the indicator.

## 6.4 Interpretation, LCA presentation and critical review

**Evaluation**

It can be seen that the manufacturing phase dominates the product system (modules A1-A3). The end-of-life phase (module C3) is the second largest contributor to the GWP impact due to the combustion emissions of plastics. The recycling of metal parts and the avoided pollution contribute to the considerable credits in Module D.
The results for modules B2 and B6 are given for the RSL of 10 years and have little impact on the life cycle. Modules A4, A5, C1, C2 and C4 have a negligible impact overall.

The following figure shows the results of the individual modules as an example of the global warming potential.

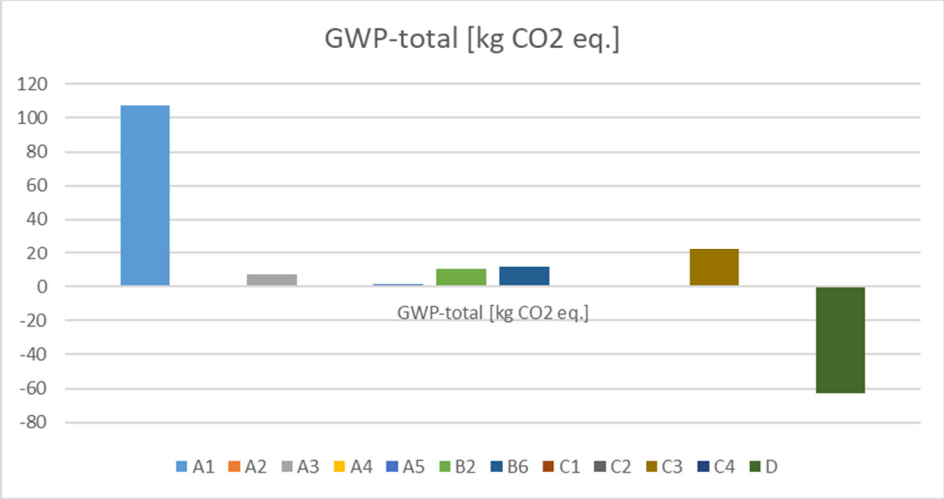



**Illustration 2** Absolute values of the modules of the GWP total

**The values obtained from the LCA calculation are suitable for the certification of buildings.**

**Report**

The LCA report underlying this EPD was developed according to the requirements of DIN EN ISO 14040 and DIN EN ISO 14044 as well as DIN EN 15804 and DIN EN ISO 14025. It is deposited with the tool owner and tool creator. The results of the study are not designed to be used for comparative statements intended for publication.

**Critical review**

The critical review of the LCA and the report took place in the course of verification of the EPD and was carried out by the external verifier Susanne Volz, M Sc. Environmental Sciences

# 7 General information regarding the EPD

**Comparability**

This EPD was prepared according to DIN EN 15804 and is therefore only comparable to those EPDs that also comply with the requirements set out in DIN EN 15804.
Any comparison must refer to the building context and the same boundary conditions of the various life cycle stages.
For comparing EPDs of construction products, the rules set out in DIN EN 15804, Clause 5.3, apply.

**Communication**

The communications format of this EPD meets the requirements of EN 15942:2012 and is therefore the basis for B2B communication. Only the nomenclature has been changed according to DIN EN 15804.

**Verification**

Verification of the Environmental Product Declaration is documented in accordance with the ift "Richtlinie zur Erstellung von Typ III Umweltproduktdeklarationen" (Guidance on preparing Type III Environmental Product Declarations) in accordance with the requirements set out in DIN EN ISO 14025.

This declaration is based on the PCR documents "PCR Part A" PCR-A-1.0:2023 and "Fans and ventilation systems" PCR-LS-1.0:2022.

| |
|---|
| The European standard EN 15804 serves as the core PCR [a)] |
| Independent verification of the declaration and statement according to EN ISO 14025:2010 |
| Independent third party verifier: [b)]<br>Susanne Volz |
| [a)] Product category rules<br>[b)] Optional for business-to-business communication<br>Mandatory for business-to-consumer communication<br>(see EN ISO 14025:2010. 9.4). |

**Revisions of this document**

| No. | Date | Note: | Practitioner of the LCA | Verifier/s |
|---|---|---|---|---|
| 1 | 09.12.2024 | External verification | Dumproff | Volz |
| 2 | 13.12.2024 | Formal adjustments | Dumproff | - |

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# 9 Annex

## Description of life cycle scenarios for AEROMAT VT System (2 blower)

| Product stage | | | Con-struction process stage | | Use stage* | | | | | | | End-of-life stage | | | | Benefits and loads beyond system boundaries |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Raw material supply | Transport | production | Transport | Construction/installation process | Use | maintenance | Repair | replacement | Refurbishment | Operational energy use | Operational water use | Deconstruction/demolition | Transport | Waste processing | Disposal | Reuse Recovery Recycling potential |
| ✓ | ✓ | ✓ | ✓ | ✓ | — | ✓ | — | — | — | ✓ | — | ✓ | ✓ | ✓ | ✓ | ✓ |

**Table 5** Overview of applied life cycle stages

The scenarios were calculated taking into account the defined RSL (see 4 Use stage).

The scenarios were based on information provided by the manufacturer.

Note: The standard scenarios selected are presented in bold type. They were also used for calculating the indicators in the summary table.

✓ Included in the LCA
— Not included in the LCA

**A4 Transport to construction site**

| No. | Scenario | Description |
|---|---|---|
| A4 | Small series - direct marketing | 40 t truck (Euro 6), 24.7 t payload, 61% capacity used, approx. 50 km to site and empty return trip |

| A4 Transport to construction site | Transport weight [kg/pc] | Density [kg/m³] |
|---|---|---|
| PG1 | 23.30 | 213.25 |

Since this is a single scenario, the results are shown in the relevant summary table.

**A5 Construction/Installation**

| No. | Scenario | Description |
|---|---|---|
| A5 | Manual with power tool | According to the manufacturer, the products are installed using electrical tools but without additional lifting and auxiliary devices.<br>Energy consumption of the power tools:<br>0.011 MJ/pc<br>Electricity mix (RER) |

In case of deviating consumption during installation/assembly of the products which forms part of the site management, they are covered at the building level.

Ancillary materials, consumables, use of water, other resource use, material losses, direct emissions as well as waste materials during construction/installation are negligible.

It is assumed that the packaging material in the Module construction / installation is sent to waste handling. Waste is only thermally recycled or deposited in line with the conservative approach: Foils / protective covers, wood and cardboard in incineration plants. Benefits from A5 are specified in module D. Benefits from waste incineration: Benefits from waste incineration: electricity replaces electricity mix (RER); thermal energy replaces thermal energy from European natural gas (RER).
Transport to the recycling plants is not taken into account.

Since this is a single scenario, the results are shown in the relevant summary table.

**B2 Inspection, maintenance, cleaning**

Since this is a single scenario, the results are shown in the relevant summary table.

**B2.2 Maintenance**

| No. | Scenario | Description |
|---|---|---|
| B2.2.1 | Normal use | Annual replacement of the filter |

Ancillary materials, consumables, use of energy and water, waste, material losses and transport distances during maintenance are negligible.

**B6 Operational energy use**

| No. | Scenario | Description |
|---|---|---|
| B6 | Power-operated normal use | Total power consumption: 99.36 MJ / 10 a electricity (including standby mode)<br><br>Electricity mix (RER) |

Since this is a single scenario, the results are shown in the relevant summary table.

**C1 Deconstruction**

| No. | Scenario | Description |
|---|---|---|
| C1 | Mechanical deconstruction | Facade ventilator: 100% deconstruction<br><br>The products are dismantled manually using power tools. This results in a total energy consumption of 0.011 MJ.<br><br>Further deconstruction rates are possible, give adequate reasons. |

Since this is a single scenario, the results are shown in the relevant summary table.

In case of deviating consumption the removal of the products forms part of site management and is covered at the building level.

**C2 Transport**

| No. | Scenario | Description |
|---|---|---|
| C2 | Transport | Transport to collection point using 40 t truck (Euro 6), diesel, 24.7 t payload, 61% capacity used, 50 km |

Since this is a single scenario, the results are shown in the relevant summary table.

**C3 Waste management**

| No. | Scenario | Description |
|---|---|---|
| C3 | Utilization | Share for recirculation of materials:<br>• Metals: 100% recycling<br>• Plastics: 100% thermal recycling |

Average expenses for separating and sorting the materials are assumed.
As the products are sold throughout Europe, the disposal scenario was based on average data sets for Europe or average data sets for Germany if no European data sets are available.

The 100% scenarios differ from the current average recovery shown here. The evaluation of each scenario is described in the background report.

Since this is a single scenario, the results are shown in the summary table.

**C4 Disposal**

| No. | Scenario | Description |
|---|---|---|
| C4 | Disposal | **Materials without calorific value (except metals) and the non-recordable amounts and losses within the re-use/recycling chain (C1 and C3) are modelled as "disposed" (RER).** |

The 100% scenarios differ from the current average recovery shown here. The evaluation of each scenario is described in the background report.

The consumption in scenario C4 results from physical pre-treatment, waste recycling and management of the disposal site. The benefits obtained here from the substitution of primary material production are allocated to Module D, e.g. electricity and heat from waste incineration.

Since this is a single scenario, the results are shown in the summary table.

**D Benefits and loads from beyond the system boundaries**

| No. | Scenario | Description |
|---|---|---|
| D | Recycling potential | **Debits and credits from the recycling of metals**<br><br>**Benefits from incineration plant: Benefits from waste incineration: electricity replaces electricity mix (RER); thermal energy replaces thermal energy from European natural gas (RER).** |

The values in Module D result from recycling of the packaging material in Module A5 and from deconstruction at the end of service life.

The 100% scenarios differ from the current average recovery shown here. The evaluation of each scenario is described in the background report.

Since this is a single scenario, the results are shown in the summary table.

## Imprint

**Tool creator / Practitioner of LCA**
Sphera Solutions GmbH
Hauptstraße 111-113
70771 Leinfelden-Echterdingen, Germany

**Programme operator**
ift Rosenheim GmbH
Theodor-Gietl-Straße 7-9
83026 Rosenheim, Germany
Phone +49 (0)8031/261-0
Fax: +49 (0)8031/261-290
E-Mail: info@ift-rosenheim.de
www.ift-rosenheim.de

**Declaration holder**
SIEGENIA-AUBI KG
Industriestraße 1-3
57234 Wilnsdorf, Germany

**Notes**
This EPD is mainly based on the work and findings of Institut für Fenstertechnik e.V., Rosenheim (ift Rosenheim) and specifically on ift-Guideline NA-01/3 “Allgemeiner Leitfaden zur Erstellung von Typ III Umweltproduktdeklarationen” (Guidance on preparing Type III Environmental Product Declarations).
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ift Rosenheim GmbH
Theodor-Gietl-Straße 7-9
83026 Rosenheim, Germany
Phone: +49 (0) 80 31/261-0
Fax: +49 (0) 80 31/261-290
E-Mail: info@ift-rosenheim.de
www.ift-rosenheim.de