Environmental Product Declaration (EPD)

Declaration code EPD-SFS-GB-75.0.01

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

SIEGENIA brings spaces to life

SIEGENIA-AUBI KG

Electromechanical accessories

Smart window handle

Basis:

DIN EN ISO 14025
EN 15804 + A2

Company EPD
Environmental
Product **D**eclaration

Publication date:
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Valid until:
09.12.2029

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Environmental Product Declaration (EPD)

Declaration code EPD-SFS-GB-75.0.01

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Declaration code	EPD-SFS-GB-75.0.01
Designation of declared product	Smart window handle
Scope	The smart window handle can be installed in both tilt-turn windows and sliding windows.
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 "Lock and hardware" PCR-SB-3.0:2022.
Validity	Publication date: 09.12.2024 — Last revision: 10.12.2025 — Valid until: 09.12.2029 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 Deputy Head for Sustainability	Dr. Torsten Mielecke Chairman of Expert Committee ift-EPD and PCR	Susanne Volz External Verifier

1 General Product Information

Product definition

The EPD belongs to the product group Electromechanically operated locks and strike plates and applies to

1 pc Smart window handle
of company SIEGENIA-AUBI KG

The functional unit is obtained by summing up:

Assessed product	Declared unit	Unit weight
Smart window handle	1 pc	0.396 kg/pc

Table 1 Product groups

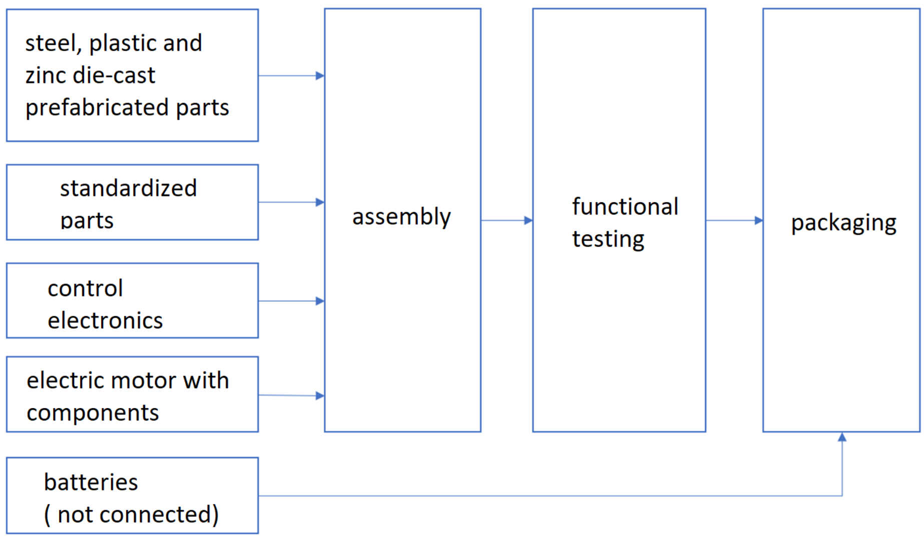
The average unit is declared as follows:
Directly used material flows are determined by means of manufactured masses (kg) and allocated to the declared unit. All other inputs and outputs in the manufacture were scaled to the declared unit as a whole, since no direct assignment to the average size is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

Product description

The smart window handle is used to automatically open and lock windows without a mechanical key. Monitoring is carried out via smartphone with the SIEGENIA app manufacturer or through integration into a smart home system in accordance with the Matter standard.

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

Product manufacture



Application

The smart window handle can be installed in both tilt-turn windows and sliding windows.

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 Life Cycle Inventory (Inputs).

Declarable substances

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

All relevant safety data sheets are available from SIEGENIA-AUBI KG.

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 Smart window handle of company 1 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 conditions: 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

The smart window handles 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.

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 Smart window handle 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 as well as 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 smart window handle.
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. Gebäude- bzw. Anlagenteile. die nicht für die Produktherstellung relevant sind. wurden ausgeschlossen.
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. In der Summe werden für die vernachlässigten Prozesse 5 % des Energie- und Masseeinsatzes eingehalten. 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 Smart window handle 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).
The secondary material included as inputs in Smart window handle, 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 Smart window handle:

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 0 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.

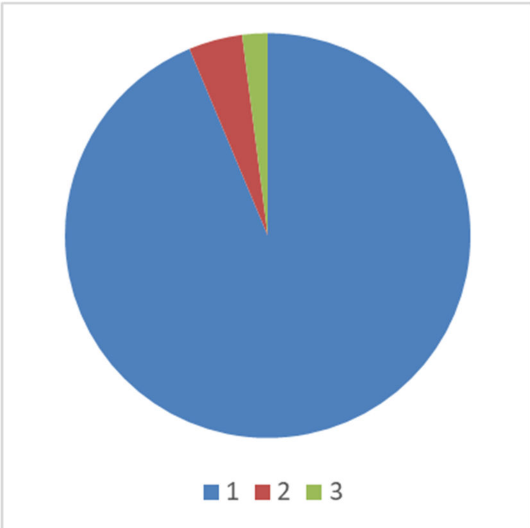


Illustration 2 Percentage of individual materials per declared unit

No.	Material	Mass in %
1	Metals	94%
2	Plastic parts	4%
3	Electronic components	2%

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	Wooden pallets	8.06
2	PE film	1.00
3	Cardboard	12.95

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	0.009

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 0 Impact assessment.

Waste water

No waste water is produced during the manufacturing process.

6.3 Impact assessment

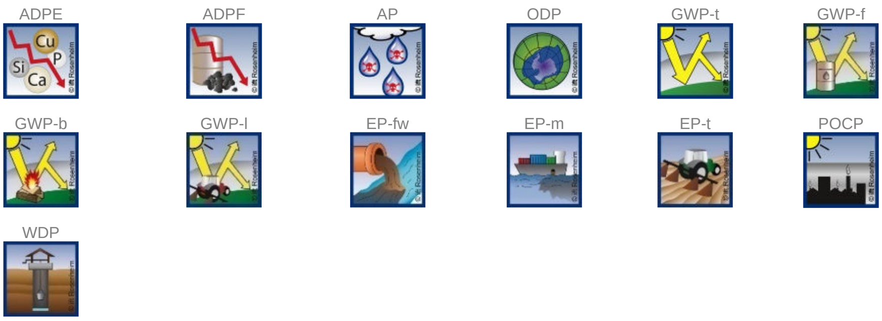
Aim

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:

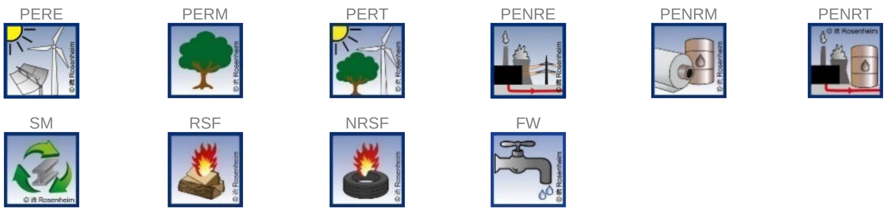
- Depletion of abiotic resources - minerals and metals (ADPE)
- Depletion of abiotic resources - fossil fuels (ADPF)
- Acidification (AP)
- Ozone depletion (ODP)
- Climate change - total (GWP-t)
- Climate change - fossil (GWP-f)
- Climate change - biogenic (GWP-b)
- Climate change - land use & land use 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)
- Non-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)

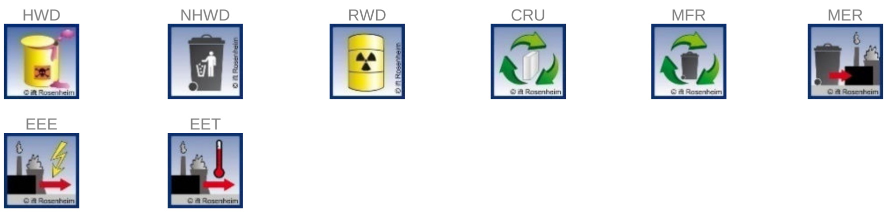


Waste

The waste generated during the production of 1 pc Smart window handle 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)

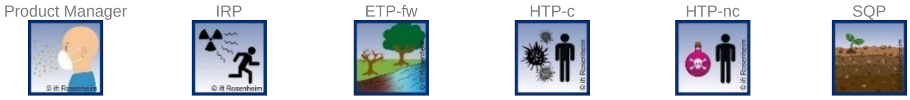


Additional environmental impact indicators

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)



	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Results per 1 pc AREOMAT																
Core indicators																
GWP-t	kg CO_2 equivalent	2.64	3.36E-03	3.45E-02	ND	0.96	ND	ND	ND	0.00	ND	0.00	1.59E-03	3.22E-02	0.00	-1.12
GWP-f	kg CO_2 equivalent	2.67	3.33E-03	3.41E-03	ND	0.96	ND	ND	ND	0.00	ND	0.00	1.58E-03	3.22E-02	0.00	-1.12
GWP-b	kg CO_2 equivalent	-2.57E-02	3.48E-07	3.11E-02	ND	5.20E-04	ND	ND	ND	0.00	ND	0.00	1.65E-07	2.83E-06	0.00	-2.58E-03
GWP-l	kg CO_2 equivalent	1.71E-03	3.08E-05	8.57E-07	ND	5.84E-04	ND	ND	ND	0.00	ND	0.00	1.46E-05	1.85E-07	0.00	-5.45E-04
ODP	kg CFC-11-eq.	9.00E-12	4.33E-16	1.25E-15	ND	2.38E-12	ND	ND	ND	0.00	ND	0.00	2.05E-16	4.14E-15	0.00	-4.95E-12
AP	mol H^+-eq.	1.54E-02	4.87E-06	2.24E-06	ND	8.70E-03	ND	ND	ND	0.00	ND	0.00	2.31E-06	2.15E-05	0.00	-5.83E-03
EP-fw	kg P-eq.	5.36E-06	1.22E-08	6.63E-10	ND	8.84E-07	ND	ND	ND	0.00	ND	0.00	5.76E-09	1.32E-09	0.00	-3.27E-06
EP-m	kg N-eq.	2.59E-03	1.76E-06	6.28E-07	ND	1.29E-03	ND	ND	ND	0.00	ND	0.00	8.34E-07	1.05E-05	0.00	-8.03E-04
EP-t	mol N-eq.	2.79E-02	2.09E-05	9.46E-06	ND	1.40E-02	ND	ND	ND	0.00	ND	0.00	9.88E-06	1.20E-04	0.00	-8.62E-03
POCP	kg NMVOC-eq.	7.36E-03	4.26E-06	1.72E-06	ND	3.95E-03	ND	ND	ND	0.00	ND	0.00	2.02E-06	2.69E-05	0.00	-2.85E-03
ADPE*²	kg Sb equivalent	6.17E-04	2.19E-10	1.74E-11	ND	3.89E-05	ND	ND	ND	0.00	ND	0.00	1.04E-10	3.49E-11	0.00	-4.54E-04
ADPF*²	MJ	34.79	4.53E-02	4.32E-03	ND	11.91	ND	ND	ND	0.00	ND	0.00	2.15E-02	1.14E-02	0.00	-14.53
WDP*²	m^3 world-eq. deprived	0.59	4.02E-05	1.50E-03	ND	0.15	ND	ND	ND	0.00	ND	0.00	1.90E-05	4.29E-03	0.00	-0.28
Resource management																
PERE	MJ	9.96	3.30E-03	0.35	ND	1.57	ND	ND	ND	0.00	ND	0.00	1.56E-03	2.46E-03	0.00	-3.89
PERM	MJ	0.35	0.00	-0.35	ND	0.00	ND	ND	ND	0.00	ND	0.00	0.00	0.00	0.00	0.00
PERT	MJ	10.31	3.30E-03	8.69E-04	ND	1.57	ND	ND	ND	0.00	ND	0.00	1.56E-03	2.46E-03	0.00	-3.89
PENRE	MJ	34.51	4.55E-02	5.03E-02	ND	11.92	ND	ND	ND	0.00	ND	0.00	2.16E-02	0.47	0.00	-14.55
PENRM	MJ	0.51	0.00	-4.60E-02	ND	0.00	ND	ND	ND	0.00	ND	0.00	0.00	-0.46	0.00	0.00
PENRT	MJ	35.01	4.55E-02	4.33E-03	ND	11.92	ND	ND	ND	0.00	ND	0.00	2.16E-02	1.14E-02	0.00	-14.55
SM	kg	4.71E-02	0.00	0.00	ND	0.00	ND	ND	ND	0.00	ND	0.00	0.00	0.00	0.00	0.34
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	2.29E-02	3.61E-06	3.52E-05	ND	4.27E-03	ND	ND	ND	0.00	ND	0.00	1.71E-06	1.01E-04	0.00	-7.92E-03
Categories of waste																
HWD	kg	5.77E-06	1.41E-13	7.43E-14	ND	2.88E-08	ND	ND	ND	0.00	ND	0.00	6.67E-14	8.05E-13	0.00	5.06E-10
NHWD	kg	0.71	6.94E-06	2.29E-04	ND	10.02	ND	ND	ND	0.00	ND	0.00	3.29E-06	1.37E-03	0.00	2.16E-02
RWD	kg	1.70E-03	8.51E-08	1.81E-07	ND	2.41E-04	ND	ND	ND	0.00	ND	0.00	4.03E-08	4.87E-07	0.00	-7.55E-04
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	0.37	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	2.20E-02	ND	0.00	ND	ND	ND	0.00	ND	0.00	0.00	8.17E-02	0.00	0.00
EET	MJ	0.00	0.00	3.94E-02	ND	0.00	ND	ND	ND	0.00	ND	0.00	0.00	0.15	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

	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Results per 1 pc AREOMAT																
Additional environmental impact indicators																
PM	Disease incidence	1.80E-07	4.19E-11	1.50E-11	ND	7.58E-08	ND	ND	ND	0.00	ND	0.00	1.98E-11	8.89E-11	0.00	-7.60E-08
IRP*1	kBq U235-eq.	0.18	1.27E-05	2.89E-05	ND	2.66E-02	ND	ND	ND	0.00	ND	0.00	6.01E-06	7.50E-05	0.00	-8.40E-02
ETP-fw*2	CTUe	13.01	3.22E-02	2.32E-03	ND	3.17	ND	ND	ND	0.00	ND	0.00	1.52E-02	5.44E-03	0.00	-7.68
HTP-c*2	CTUh	7.62E-08	6.59E-13	1.55E-13	ND	3.74E-10	ND	ND	ND	0.00	ND	0.00	3.12E-13	3.19E-13	0.00	4.02E-09
HTP-nc*2	CTUh	1.76E-07	3.51E-11	9.31E-12	ND	2.55E-08	ND	ND	ND	0.00	ND	0.00	1.66E-11	2.72E-11	0.00	4.94E-07
SQP*2	dimensionless	12.80	1.89E-02	1.46E-03	ND	2.58	ND	ND	ND	0.00	ND	0.00	8.97E-03	2.76E-03	0.00	-1.22

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

The illustration below shows the results of the GWP-total per module. The production phase (A1-A3) and the utilisation phase (B2) play a major role. Phases A5, C3 and D have less influence. Phases A4, C1, C2 and C4 have an almost negligible effect. Module B6 of the utilisation phase has no influence.

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

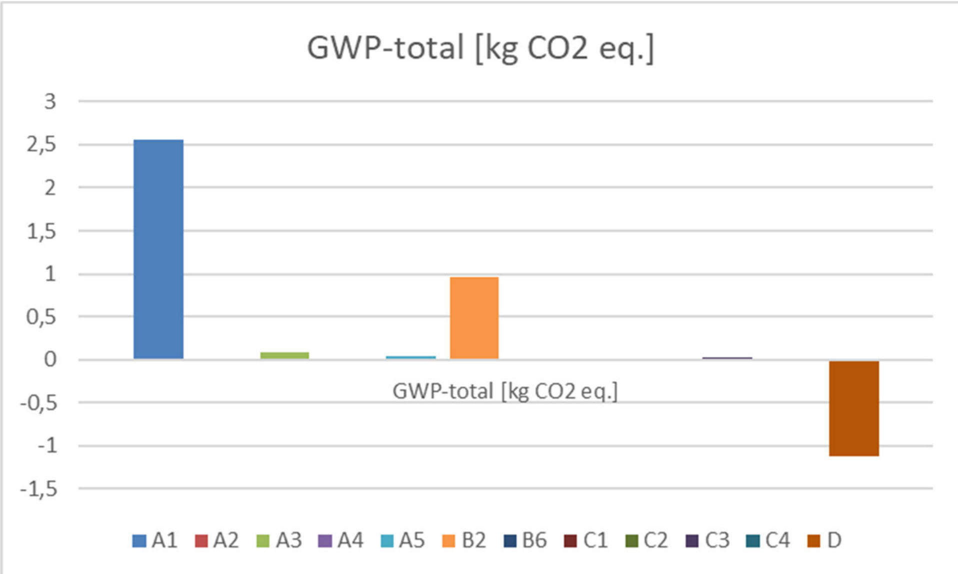


Illustration 3 Absolute values of the modules of the GWP total

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. (Graduate Business Lawyer).

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 "Lock and hardware" PCR-SB-3.0:2022.

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)] Susanne Volz
[a)] Product category rules [b)] Optional for business-to-business communication Mandatory for business-to-consumer communication (see EN ISO 14025:2010. 9.4).

Revisions of this document

No.	Date	Note	Person in charge	Verifier/s
1	09.12.2024	External verification	Dumproff	Volz
2	13.12.2024	Formal adjustments	Dumproff	-
3	10.12.2025	Correction ADPE, ADPF	Brechleiter	-

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9 Annex

Description of the life cycle scenarios for Smart window handle

Product stage			Construction 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), diesel, 24.7 t payload, 61% capacity used, approx. 100 km to site and empty return trip

A4 Transport to construction site	Transport weight [kg/pc]	Density [kg/m³]
PG1	0.42	227.49

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

A5 Construction/Installation

No.	Scenario	Description
A5	Manual	According to the manufacturer, the products are installed without additional lifting and auxiliary devices

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 battery (type LR03)

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

B6 Operational energy use

There is no energy used during normal use. The products are opened by manual control.
There is no transport consumption for energy use in buildings. Ancillary materials, consumables and water, waste materials and other scenarios are negligible.

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

C1 Deconstruction

No.	Scenario	Description
C1	Mechanical deconstruction	**Smart window handle: 100% deconstruction** **The products are dismantled manually without the aid of power tools. No energy is consumed in the process.** **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:** • **Metals: 100% recycled** • **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.
Since this is a single scenario, the results are shown in the summary table.

C4 Disposal

No.	Scenario	Description
C4	**Disposal**	**Other non-recyclable parts are modeled as "landfilled" (RER).**

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** **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.

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

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Notes
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