ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	GEZE GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-GEZ-20250050-IBC1-EN
Issue date	25.06.2025
Valid to	24.06.2030

Automatic sliding door

GEZE GmbH

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

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1. General Information

GEZE GmbH

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-GEZ-20250050-IBC1-EN

This declaration is based on the product category rules:

Automatic doors, automatic gates, and revolving door systems, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

25.06.2025

Valid to

24.06.2030

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

Automatic sliding door

Owner of the declaration

GEZE GmbH
Reinhold-Vöster-Str. 21-29
71229 Leonberg
Germany

Declared product / declared unit

1 piece automatic sliding door with a weighted average weight of 149 kg. Included in the declared unit are two door leaves including the profile system, seals and glazing; one sliding door drive, including the motor-gear-unit, control unit, battery, transformer, toothed belt, roller carriage, locking mechanism and track and cover.

Scope:

This EPD refers to the entire life cycle of a weighted average GEZE automatic sliding door system, based upon ten individual variants from the GEZE product portfolio. This includes:

- ECdrive T2 (FR)-ISO
- ECdrive T2(FR)-ESG
- ECdrive T2(FR)-GCprofile Therm
- Slimdrive SL NT (FR)-ISO
- Slimdrive SLT(FR)-ISO
- Slimdrive SL-BO
- Slimdrive SC(R)/RC2 (FR)
- Powerdrive PL(FR)-ESG
- Powerdrive PL(FR)-ISO

These variants all consist of the same materials, to varying mass percentages, and are manufactured at the GEZE production facility (Reinhold-Vöster-Str. 21-29 in Leonberg, Germany). Green electricity is used at the production facility for all products, including the ones listed above. The material and energy flows were taken into consideration accordingly.
The standard GEZE automatic sliding door consists of a sliding door drive and two sliding door leaves with a clear opening height of 2.3 m and a clear opening width of 1.5 m.
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Dr.-Ing. Wolfram Trinius,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Information about the enterprise

GEZE GmbH is a family-operated business that has been offering innovative solutions in the area of door and window technology since 1863. With over 3,000 employees and 37 subsidiaries worldwide, the technological advancements of the GEZE portfolio are well-developed and have secured GEZE's role as a leading producer of custom products.

Product description/Product definition

Within the GEZE automatic sliding door product portfolio, three main product families can be identified: ECdrive, Slimdrive, and Powerdrive.

- The Slimdrive automatic sliding door system is designed to fit perfectly into glass facades, with a very smooth running, low-wear DC drive and self-cleaning roller carriages. Its very low overall height of 70 mm and overall slim design allows for its installation in interior and exterior applications with high access frequency.
- The ECdrive automatic sliding door systems are the most frequently installed product from the GEZE sliding door portfolio. With a cover height of 100 mm, the ECdrive can be installed flexibly in a wide variety of installation situations.
- The Powerdrive sliding door system has an extremely powerful drive unit, which allows it to power large, heavy door leaves and ensure large opening widths. This product family is particularly appropriate for use in buildings in which heavy door leaves are installed such as in industrial buildings or in the medical sector.

From these families, ten variants have been selected as they are the most often sold variants from these families and are an appropriate representation of the overall automatic sliding door portfolio. Thus this average EPD applies to all of the following GEZE automatic sliding door systems:

- ECdrive T2 (FR)-ISO
- ECdrive T2(FR)-ESG
- ECdrive T2 (FR)-GCprofile Therm
- Slimdrive SL NT (FR)-ISO
- Slimdrive SL-RC2 (FR)
- Slimdrive SLT (FR)-ISO
- Slimdrive SL-BO
- Slimdrive SC(R)/RC2 (FR)
- Powerdrive PL (FR)-ESG
- Powerdrive PL (FR)-ISO

For the use and application of the product the respective national provisions at the place of use apply, in Germany for example the building codes of the federal states and the corresponding national specifications.
For details see the product specific declaration of conformity.
The CE-marking takes into account the proof of conformity with the respective harmonized standards based on appropriate legal provisions.

2.2 Application

The automatic sliding doors have a wide range of applications for pedestrian accessibility. They can be installed in buildings that require an easily accessible, barrier-free point of entry. This includes apartment buildings, hotels, schools, federal buildings, etc. The application areas are continuously being developed, as the GEZE clientele continues to grow.

2.3 Technical Data

The following table represents the technical properties of an average GEZE automatic sliding door

Features

Name	Value	Unit
Size door leaf: WxH	2300 x 775	mm
Clear opening: WxH	2300 x 1500	mm
Recommended max. leaf weight	120	kg/leaf
Opening/closing speed	0.8	m/s
Hold-open time	0 to 60	s
Adjustable opening and closing force (max.)	150	N
IP Rating	IP 20	-
Ambient temperature	-15 to 50	°C
Glass type	22 (insulated)	mm

Each door can be customized per the customers' needs. However, for this study, the dimensions of the most often purchased door system have been described. This includes a default glazing option of having two 6 mm thick ESG panes with an insulating layer of 10 mm air.

Products are not harmonised in accordance with the CPR but in accordance with other provisions for harmonization of the EU. Per product, conformity declarations are available in which relevant standards and provisions are detailed. These are regularly updated, as per changes in the standards.

2.4 Delivery status

All GEZE automatic sliding door systems are delivered ready for installation. The systems are highly customized, with sizes specified for each application individually. The average sliding door is specified with a sliding door drive and 2 sliding leaves and has the dimensions as described above.

2.5 Base materials/Ancillary materials

Name	Value	Unit
Glass	67.2	%
Aluminum	25.8	%
Electronic components (other than motor-gear-unit)	2.25	%
Plastics	1.5	%
Steel	1.52	%
Motor-gear-unit	1.73	%

This product/article/at least one partial article contains substances listed in *the candidate list* 1907/2006 (date: 01.10.2024) exceeding 0.1 percentage by mass: Yes. In the Slimdrive SL-RC2 (FR) system, lead can be found with a max of 3.5 % by mass.

This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on *the candidate list*, exceeding 0.1 percentage by mass: no

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) *Ordinance on Biocide Products No. 528/2012)*: no
The Candidate List can be found on the *ECHA* website address: https://echa.europa.eu/de/home

2.6 Manufacture

The manufacturing process of the GEZE automatic sliding doors begins with the gathering of the individual raw materials

needed. This includes extruded, alloyed aluminum, bent and rolled steel, coated and tempered glass, as well as the electronic and the battery needed for the motor. Additional inputs such as adhesives and plastics, including synthetic rubber are also required. These processes (rolling of steel, tempering of glass, etc.) are not performed at the GEZE production site and are thus part of the background supply chain.

Once these have been gathered in the production facility, the aluminum is sawn and cut to size and is given a powder coating. The steel and some of the plastics are also cut to size. The energetical requirements for these manufacturing steps are covered by electricity and gas inputs. The supply of electricity stems to 100 % from Scandinavian hydroelectric power plants. This electricity is procured and supplied on the basis of green electricity certificates (proofs of origin) that comply with the currently applicable EU directive on the use of energy from renewable sources and are managed via the Federal Environment Agency's proof of origin register. A delivery certificate from the electricity provider (MVV Energie) is available. Furthermore, the GEZE factory in Leonberg has a photovoltaic system installed on their roof, which covers 12 % of GEZE's overall energy needs.

Once these steps are completed, the doors are assembled and packed in plastic and cardboard packaging for their transport to the construction site. The Leonberg production site is operated with a certified Quality Management System in accordance with *ISO 9001*.

2.7 Environment and health during manufacturing

Environment: The GEZE plant in Leonberg, Germany is a certified production facility in accordance with *ISO 14001* and *ISO 50001*.

Health protection: There are no measures beyond the national regulations. GEZE is committed to a safe working environment and health protection is part of the management principles.

2.8 Product processing/Installation

The automatic sliding door systems are installed and commissioned by GEZE-trained assembly technicians. The installation involves drilling holes into the ceilings and floor and screwing the doors into said holes. These activities are carried out with hand-held power tools. The power consumption of these tools is included in the calculation.

2.9 Packaging

The GEZE automatic sliding doors are packaged to protect them from damages occurring during transportation. The doors are packaged in plastic film and corrugated cardboard. The materials are sent to municipal incineration facilities for thermal use in other applications.

2.10 Condition of use

To ensure the longevity of the product, regular inspections should be carried out as per national regulations and product documentation by a trained and qualified technician, who understands the GEZE automatic sliding door systems. The number of service visits should be in accordance with national requirements and production documentation, as described in the GEZE service offers. The owner of the product should perform regular inspections and clean the doors as per GEZE recommendations.

2.11 Environment and health during use

There is no harmful emissive potential. If doors are correctly configured and maintenance recommendations are carried out, there is a minimal risk for personal injury.

2.12 Reference service life

The product has a reference service life of approximately 10 years of average daily use with the recommended maintenance and service program. This has been determined by the manufacturer in accordance with *ISO 15686-1, -2, -7- and -8*.

2.13 Extraordinary effects

Fire

The product is not tested or certified according to *EN 13501:1*. The product primarily consists of glass, aluminum and steel which are considered non-flammable or flame-retardant.

Water

No foreseeable negative impacts are expected when the product is exposed to water.

Mechanical destruction

Not relevant

2.14 Re-use phase

It is possible to reuse the product during its reference service life and for it to be moved from one entrance to another.

2.15 Disposal

All materials are sent to a recycling unit where they are either recycled (aluminum, glass, steel, electronics) or incinerated for energy recovery (plastics, adhesives, and cardboard).

Waste codes according to *European Waste Catalogue* in the states of manufacturing, use and end of life:

- 08 04 10 - Waste adhesives
- 16 02 14 - Electronic equipment
- 16 06 02 - NiCd Batteries
- 17 02 02 - Glass
- 17 04 02 - Aluminum
- 17 04 05 - Iron and steel
- 20 01 39 - Plastics
- 15 01 01 - Cardboard packaging
- 15 01 02 - Plastic packaging

2.16 Further information

For futher information and additional contact:GEZE GmbH
Reinhold-Vöster-Str. 21-29
71229 Leonberg
Germany
info.de@geze.com
www.geze.com

3. LCA: Calculation rules

3.1 Declared Unit

The declaration refers to the declared unit of 1 piece of GEZE automatic sliding door system (clear opening height 2.3 m, clear opening width 1.5 m) as specified in *IBU PCR Part B*.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	pce.
Mass reference (without packaging)	148.9	kg/pce
Mass packaging	11.3	kg

This EPD is based on ten variants from three product families. To calculate the life cycle assessments of the average door, a

life cycle assessment was first conducted separately for each variant of the three product families under consideration. The weighted average was then calculated according to the production volume in Germany. All variants are produced in the same facility and with the same type of inputs. Only the components (mass fractions) of the individual variants differ.

3.2 System boundary

Type of EPD: cradle to grave.
The following life cycle stages were considered:

Production Stage:

- A1 - Raw material extraction and processing
- A2 - Transport of raw material to manufacturer
- A3 - Manufacturing

Construction Stage:

- A4 - Transport of manufactured product to construction site
- A5 - Packaging waste processing and installation

Use stage related to the operation of the building:

- B4 - Replacement
- B6 - Operational energy use (energy consumption for operation)

End of Life Stage:

- C1 - Demolition
- C2 - Transport to waste processing
- C3 - Waste processing for recycling
- C4 - Landfill

This includes provision of all materials, products and energy, as well as the processing and transport of packaging, plus all waste processing up to the end-of-waste state.

Benefits and loads beyond the system boundaries:

- D - Declaration of all benefits and loads

3.3 Estimates and assumptions

Transportation
For those raw materials for which the transport distances are not known, a transport with a EURO6 lorry over a distance of 100 km was assumed.

Use Phase
As per the PCR, the electricity needed for the use of the door over 10 years is modelled with a European grid mix. The use of the door is driven exclusively by the power supply of the building in which the door has been installed. The battery, which is included in each automatic sliding door variant system serves as a back-up source of power should it come to a temporary power outage in the building, ensuring that the doors can still open and close.

EoL Phase
In the End-of-Life stage, a recycling scenario with a 100 % collection rate was assumed for all components of the doors which can be mechanically or thermally recycled. This includes the steel, aluminum, glass, adhesive, plastic as well electronic components. The plastic and adhesive components are sent to energy recovery within a waste incineration process. The remaining materials are recycled.
These processes are assumed to happen within Europe. Furthermore, a transport distance with a EURO6 lorry of 100 km has been assumed.

3.4 Cut-off criteria

In this study, data that could be directly gathered by GEZE from its in-house production processes is considered, meaning all raw materials used and electric power consumption. This includes those flows contributing less than 1% mass or energy (if available).
Impacts relating to the production of machines and facilities required during production are out of the scope of this assessment.

3.5 Background data

For the life cycle modeling of the products analyzed, the *Ecoinvent 3.10.1 Databank* developed by GreenDelta was used. Furthermore, the *EN 15804* Add-on from GreenDelta was used as well. To ensure comparability of the results in the LCA, generic RER or German datasets were used for energy, transportation and materials.

3.6 Data quality

The requirements for data quality and background data correspond to the specifications of the *IBU PCR Part A*. Throughout the selection of datasets from the *Ecoinvent 3.10.1.* databank, reviews were conducted regarding the regionality and age of said datasets. It was the aim of this study to as accurately reflect the individual processes along the life cycle of the product as possible. The information describing the actual production process, i.e. information on any co-products that are created and energy requirements, comes directly from the manufacturer GEZE.

All datasets are complete and conform to the system boundaries and the criteria for exclusion of inputs and outputs.

3.7 Period under review

The period under review, used for the gathering of data on the aforementioned 9 sliding doors, is 2023 - 2024 (12 month average).

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Germany

3.9 Allocation

As during Module A3, aluminum scrap is created which can be recycled in other processes and thus reaches its end-of-waste status, a co-product allocation was carried out for all aluminum processes, including the production of primary aluminum in Module A1, the transport of aluminum in module A2, and the recycling of the aluminum scrap in Module A3. This allocation is a mass-based allocation as a physical relationship between the two co-products can be determined. Based upon the relative mass of each product, 93 % of the emissions were allocated to the aluminum used in the door and 7 % to the aluminum scrap. The benefits and loads from the co-product aluminum are not included in Modul D. For the packaging materials and for all wastes occurring within the system boundary, a recycling rate of 100 % is assumed. For all plastic and rubber components, 100 % of the masses are incinerated. For the metallic and electronic parts, 100 % are mechanically recycled. The emissions from the combustion and the credits are fully allocated to the product system. Specific information on allocation within the background data can be found in the *Ecoinvent* dataset documentation.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. All relevant background datasets are taken from *Ecoinvent 3.10.1* with the *EN 15804+A2* add-on.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	5.51	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

Transport to the building site (A4)

Name	Value	Unit
Litres of fuel	4.36	l/100km
Transport distance	100	km
Capacity utilisation (including empty runs)	61	%

The above fuel consumption applies per ton transported. The utilization is calculated from the average utilization in tons and the total weight of the vehicle. Both values are taken from the corresponding transport data set in the *Ecoinvent* database.

Installation into the building (A5)

Name	Value	Unit
Electricity consumption	0.018	kWh
Waste packaging (paper/cardboard)	11.2	kg
Waste packaging (plastic)	0.116	kg

Replacement (B4)

Name	Value	Unit
Replacement cycle	4	Number/RSL
Replacement of worn parts	2.32	kg

Over the entire lifetime of the automatic sliding doors, 5 batteries are required.

Reference service life

Name	Value	Unit
Reference service life (according to ISO 15686-1, -2, -7 and -8)	10	a

Operational energy use (B6)

The GEZE automatic sliding doors do not have a standby mode in accordance with the Regulation (EU) 2023/826.

Name	Value	Unit
Electricity consumption per RSL (10 years, 365 days per year)	1545	kWh
Days per year in use	365	days
Active mode per day	13	h
Energy saving mode per day	11	h
Active mode power	19.05	W
Inactive mode power	14.56	W
Power for one cycle (opening and closing)	1.96	W
Number of cycles per year	200,000	cycles

Total energy consumed during the product lifetime was calculated using the following formula:

*(W_active_mode*h_active_mode*
*+W_energysaving_mode*h_energysaving_mode*
+((W_Cycle#_Cycle)*Life_span)*Life_span*days_year*0.001*

Where:

- W_active_mode - Energy consumption in active mode in W
- h_active_mode - Operation time in active mode in hours
- W_energysaving_mode - Energy consumption in active mode in W
- h_energysaving_mode - Operation time in energy-saving mode in hours
- W_cycle - Energy consumption per opening and closing cycle
- #_cycle - Number of cycles of opening and closing per year
- Life_span - Reference service life
- days_year - Operation days per year
- 0.001 - conversion factor from Wh to kWh

End of life (C1-C4)

The product dismantling from the building is done with power-tools. The necessary electricity is included in the calculation.

Name	Value	Unit
Collected separately waste type	148.9	kg
Energy Recovery	2.34	kg
Recycling	146.5	kg
Electricity consumption	0.009	kWh
Transport to waste management	100	km

The product is disassembled in a recycling process. Material recycling is assumed for metals, electronics, and glass. The plastic components are assumed to be incinerated with energy recovery.

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Net aluminum recycling	16.6	kg
Net glass recycling	99.6	kg
Net steel recycling	7.13	kg
Net electronics recycling	1.26	kg
Incineration of plastic parts	2.34	kg
Incineration of plastic packaging	0.116	kg
Incineration of cardboard packaging	11.2	kg

The credits are generated by the incineration of the packaging film and cardboard and the resulting displacement of natural gas combustion. Credits for recycling are awarded after deducting the secondary content already contained in the product. This is 58 % secondary aluminum and 20 % secondary aluminum.
For the calculation of the thermal energy benefits from the thermal incineration, an efficiency of 0.6 for the waste incineration plant (WIP) was assumed. The WIP generates both electricity and heat, with a ratio of 1:2 according to the Ecoinvent dataset used, meaning that the recovered energy is 33.3 % electrical and 66.6 % thermal.

5. LCA: Results

Results shown are calculated according to EN 15804+A2

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MNR	X	MNR	X	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece Automatic sliding door

Parameter	Unit	A1	A2	A3	A4	A5	B4	B6	C1	C2	C3	C4	D
GWP-total	kg CO_2 eq	4.71E+02	6.3E+00	5.73E+01	3.09E+00	1.84E+01	4.57E+01	5.25E+02	7.57E-03	2.88E+00	2.31E+01	0	-2.96E+02
GWP-fossil	kg CO_2 eq	4.66E+02	6.29E+00	5.97E+01	3.09E+00	6.66E-01	4.56E+01	5.06E+02	7.58E-03	2.87E+00	2.25E+01	0	-2.95E+02
GWP-biogenic	kg CO_2 eq	1.01E+00	3.28E-03	-2.58E+00	2.09E-03	1.77E+01	8.71E-02	1.78E+01	-1.47E-05	1.94E-03	5.45E-01	0	-7.01E-01
GWP-luluc	kg CO_2 eq	3.29E+00	2.23E-03	1.24E-01	1.03E-03	9.82E-05	4.89E-02	1.54E+00	7.47E-07	9.5E-04	1.46E-02	0	-3.77E-01
ODP	kg CFC11 eq	8.46E-06	1.31E-07	2.11E-06	6.14E-08	5.3E-09	4.74E-07	9.31E-06	6.7E-11	5.71E-08	1.67E-07	0	-5.28E-06
AP	mol H^+ eq	4.26E+00	1.48E-02	1.04E-01	6.43E-03	3.19E-03	1.5E+00	2.97E+00	2.02E-05	5.99E-03	5.97E-02	0	-2.4E+00
EP-freshwater	kg P eq	2.42E-01	4.4E-04	8.38E-03	2.1E-04	5.27E-05	2.68E-02	4.71E-01	3.19E-06	1.9E-04	3.12E-03	0	-1.4E-01
EP-marine	kg N eq	6.76E-01	3.88E-03	3.97E-02	1.55E-03	1.64E-03	4.79E-02	4.67E-01	4.59E-06	1.44E-03	1.37E-02	0	-3.77E-01
EP-terrestrial	mol N eq	6.3E+00	4.19E-02	3.55E-01	1.67E-02	1.43E-02	5.08E-01	4.18E+00	4.59E-05	1.55E-02	1.47E-01	0	-4.3E+00
POCP	kg NMVOC eq	2E+00	2.57E-02	1.44E-01	1.07E-02	3.65E-03	2.45E-01	1.38E+00	1.39E-05	9.95E-03	4.86E-02	0	-1.27E+00
ADPE	kg Sb eq	2.19E-02	1.22E-05	8.19E-05	7.15E-06	5.27E-07	2.7E-03	2.87E-03	1.37E-08	6.65E-06	9.69E-05	0	-1.62E-02
ADPF	MJ	5.71E+03	9.43E+01	8.85E+02	4.35E+01	2.93E+00	6.31E+02	1.18E+04	9.98E-02	4.04E+01	1.25E+02	0	-3.39E+03
WDP	m^3 world eq deprived	2.38E+02	4.73E-01	2.85E+02	2.12E-01	8.4E-01	5.86E+01	3.2E+02	6.7E-04	1.98E-01	3.08E+00	0	-7.85E+01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece Automatic sliding door

Parameter	Unit	A1	A2	A3	A4	A5	B4	B6	C1	C2	C3	C4	D
PERE	MJ	1.6E+03	1.5E+00	1.02E+03	7.46E-01	1.12E-01	1.66E+02	3.23E+03	9.2E-04	6.94E-01	1.14E+01	0	-3.2E+02
PERM	MJ	0	0	1.9E+02	0	0	0	0	0	0	0	0	0
PERT	MJ	1.6E+03	1.5E+00	1.21E+03	7.46E-01	1.11E-01	1.66E+02	3.23E+03	9.2E-04	6.94E-01	1.14E+01	0	-3.2E+02
PENRE	MJ	5.71E+03	9.43E+01	8.85E+02	4.35E+01	2.93E+00	6.31E+02	1.18E+04	9.98E-02	4.04E+01	1.25E+02	0	-3.39E+03
PENRM	MJ	2.92E+01	0	3.47E+00	0	0	0	0	0	0	0	0	0
PENRT	MJ	5.74E+03	9.43E+01	8.89E+02	4.35E+01	2.93E+00	6.31E+02	1.18E+04	9.98E-02	4.04E+01	1.25E+02	0	-3.39E+03
SM	kg	2.35E+01	0	0	0	0	ND	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	ND	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	ND	0	0	0	0	0	0
FW	m^3	7.65E+00	1.67E-02	6.8E+00	7.25E-03	2.13E-02	2.05E+00	1.13E+01	7.76E-05	6.75E-03	1.23E-01	0	-2.81E+00

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 = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece Automatic sliding door

Parameter	Unit	A1	A2	A3	A4	A5	B4	B6	C1	C2	C3	C4	D
HWD	kg	1.05E-01	6.2E-04	2.92E-02	2.9E-04	3.13E-05	8.67E-03	2.53E-02	1.43E-07	2.7E-04	2.53E-01	0	-5.44E-02
NHWD	kg	3.19E+01	7.97E+00	9.64E+00	2.1E+00	2.85E-01	7.09E+00	3.85E+01	2.5E-04	1.95E+00	1.09E+02	0	-1.97E+01
RWD	kg	1.73E-02	2.84E-05	8.2E-04	1.4E-05	1.77E-06	1.79E-03	8.35E-02	2.15E-07	1.3E-05	1.8E-04	0	-5.1E-03
CRU	kg	0	0	0	0	0	ND	0	0	0	0	0	0
MFR	kg	0	0	4.03E+00	0	0	ND	0	0	0	1.48E+02	0	0
MER	kg	0	0	0	0	0	ND	0	0	0	0	0	0

EEE	MJ	0	0	0	0	0	ND	0	0	0	0	0	0
EET	MJ	0	0	2.24E+01	0	1.94E+02	ND	0	0	0	9.52E+01	0	0

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 OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 piece Automatic sliding door

Parameter	Unit	A1	A2	A3	A4	A5	B4	B6	C1	C2	C3	C4	D
PM	Disease incidence	5.99E-05	4.65E-07	1.04E-06	1.82E-07	2.62E-08	2.56E-06	1.04E-05	6.72E-11	1.7E-07	8.63E-07	0	-3.17E-05
IR	kBq U235 eq	5.75E+01	1.15E-01	3.53E+00	5.64E-02	6.68E-03	6.02E+00	3.25E+02	7.1E-04	5.24E-02	7.07E-01	0	-1.99E+01
ETP-fw	CTUe	4.78E+03	1.33E+01	1.48E+02	6.9E+00	2.02E+01	6.87E+02	1.86E+03	1.69E-02	6.41E+00	1.24E+02	0	-2.94E+03
HTP-c	CTUh	3.82E-07	9.25E-10	8.76E-09	4.58E-10	9.26E-10	4.05E-08	1.33E-07	8.6E-13	4.26E-10	4.02E-09	0	-1.45E-07
HTP-nc	CTUh	9.47E-06	5.25E-08	2.52E-07	2.39E-08	3.73E-08	7.54E-07	6.27E-06	5.58E-11	2.23E-08	2.35E-07	0	-5.26E-06
SQP	SQP	1.88E+03	9.39E+01	3.77E+02	2.63E+01	8.71E-01	1.5E+02	2.62E+03	9.98E-03	2.44E+01	1.32E+02	0	-1.08E+03

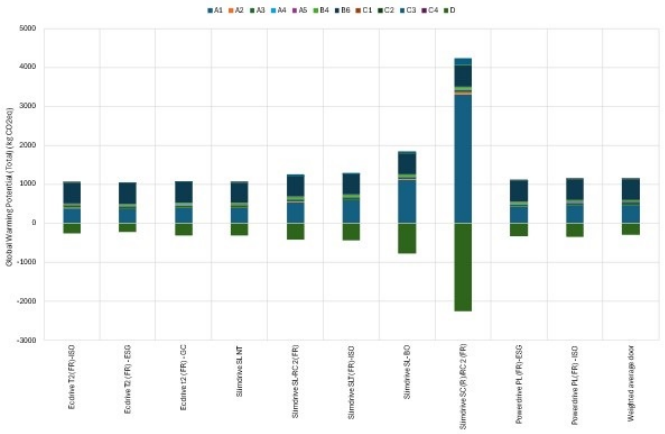
PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. 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 or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

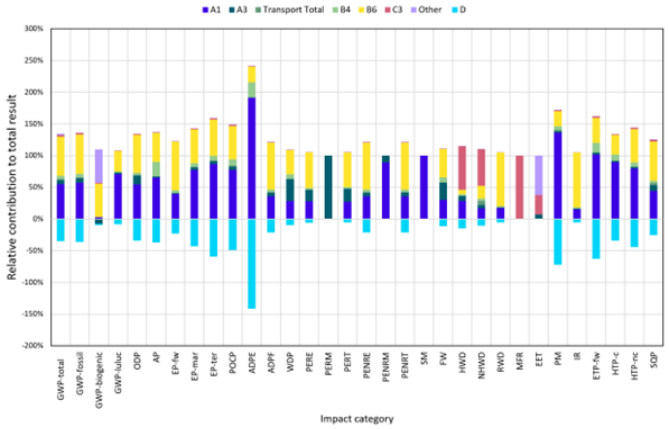
Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

This chapter contains an interpretation of the Life Cycle Impact Assessment categories. Stated categories in the whole interpretation are related to the overall life cycle.
The total global warming potential of all ten variants was determined, to ensure the plausibility of including all these variants in an average EPD. As the following diagram shows, the variants all have similar total Global Warming Potentials (GWPt) with the exception of the variant Slimdrive SC(R)/RC2 (FR).



The spread is between 765 kg CO_{2eq}./door - 1980 kg CO_{2eq}.
The outlier variant has a greater overall mass than the other nine variants and has overall more glass and aluminum as part of its design. However, based upon the overall similarity of the variant results, it is plausible to include all ten variants in this one average EPD.



Overall, across all categories, it can be said that largest share of impact is attributable to either Module A1 or Module B6, as shown in the figure above (28 categories from a total of 32 shown). This is to be expected given the numerous global production steps required to produce the diverse raw materials needed plus the amount of energy needed over 10 years of the door's usage. It can be noted that the transportation processes as well as the installation and deinstallation of the doors, i.e. Modules A5 and C1, had negligible impact across the impact categories.
When only the impact categories above are taken into account for which either Module A1 or Module B6 had the greatest impact, then Module A1 has the greatest impact in 46 % of the categories (13 from 28) and Module B6 in 54 % (15 from 28)
The total global warming potential consists to 95 % of the fossil global warming potential, 4 % to biogenic global warming potential, and 1 % to the land use or land use change global warming potential. When looking at the main contributors to the

fossil global warming potential, it is again clear, that Modules A1 and B6 had the most significant impact.

Module B6 relies entirely on the market group for low-voltage electricity, which represents the European grid mix. This dataset from Ecoinvent is based upon data collected in 2020 and includes data on the electricity mixes of 40 various countries, each with their unique sources of electricity. When looking at the top three countries which contribute the most electricity to this dataset, it is clear that they still rely on fossil fuels which leads to the overall large contribution of Module B6 to the impact category GWPfossil, which in turn contributes the greatest impact to the GWP total impact category. Germany provides about 19 % of the total result, Poland about 14 %, and Italy about 10 %. The remaining 48 % are split between the remaining 37 countries. The data used as part of the *Ecoinvent* Dataset stems from 2020 and indicated that for the top three countries, at least half of the country-specific grid mix is reliant on fossil sources. Given these shares of fossil energy sources for electricity generation across Europe, it is expected that Module B6 has the greatest impact in terms of global warming potential.

With a more detailed analysis of the relative contribution of each material modelled in Module A1, it is clear that the input aluminum had the greatest share of impact across almost all categories. This can be led back to the multiple manufacturing steps and materials required to produce the aluminum alloy including aluminum oxide, aluminum hydroxide, bauxite, quicklime, etc. Almost every metallurgical intermediate step requires an input of heat and electricity, which in turn are heavily reliant on fossil fuels, as already seen in Module B6. The dataset selected includes primary aluminum produced in the IAI Area, EU27 & EFTA which represents a European aluminum production. This dataset is based upon data collected in 2016 but was reviewed in 2022 and is still considered as representative.

It can thus be summarized that the global warming potential is dependent on the raw materials used to construct the GEZE automatic sliding door, in particular the amount of aluminum, and where the doors are used i.e. which electricity mix is used to power the doors over their lifetime.

7. Requisite evidence

8. References

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