Environmental Product Declaration (EPD)

Declaration code EPD-ESS-GB-29.2

EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG

industrial doors and gates

High-speed spiral doors and turbo doors

Basis:

DIN EN ISO 14025
EN 15804 + A2

Company EPD
Environmental
Product **D**eclaration

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

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

Notified Body 0757
PÜZ-Stelle BAY 18

Accredited Certification Body
Products + Services
EN ISO/IEC 17065

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Programme operator	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 83026 Rosenheim, Germany
Practitioner of LCA	ift Rosenheim GmbH Theodor-Gietl-Straße 7-9 83026 Rosenheim, Germany
Declaration holder	EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG Fliederstrasse 14 84079 Bruckberg, Germany www.efaflex.com
Declaration code	EPD-ESS-GB-29.2
Designation of declared product	High-speed spiral doors and turbo doors
Scope	EFAFLEX high-speed doors for exterior and interior use as an energy-saving closure for building openings
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 Document "PCR Part A" PCR-A-1.0:2023 and "Doors and Gates" PCR-TT-3.0:2023.
Validity	Publication date: 22.02.2024 — Last revision: 25.06.2024 — Valid until: 22.02.2029 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 EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG and EFAFLEX - CZ s.r.o., Olší 55, 391 61 Opařany (Czech Republic) were used as a data basis, as well as generic data from the database "LCA for Experts 10". LCA calculations were carried out for the included "cradle to gate" 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 Deaputy Head of Certification and Surveillance Body	Dr. Torsten Mielecke Chairman of Expert Committee ift-EPD and PCR	Patrick Wortner External verifier

1 General Product Information

Product definition

The EPD belongs to the product group industrial doors and gates and applies to

1 m² high-speed spiral doors and turbo door
of company EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG

The declared unit is obtained by summing up:

Assessed product	Declared unit	Surface weight	Reference product
Product group 1 High-speed spiral doors Aluminium	1 m²	88.894 kg/m²	6.3 m² (2.3m x 2.75m)
Product group 2 High-speed spiral doors Steel	1 m²	83.108 kg/m²	14.3 m² (3.75m x 3.8m)
Product group 3 High-speed turbo doors Aluminium	1 m²	85.080 kg/m²	15.2 m² (4m x 3.8m)

Table 1 Product groups

The average unit is declared as follows:
Directly used material flows are determined by means of produced areas 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 2021.

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

- High-speed spiral doors EFA-SST® EFA-THERM® aluminium and EFA-ALUX
- High-speed spiral doors EFA-SST® EFA-THERM® steel
- High-speed turbo doors EFA-STT® EFA-CLEAR® aluminium

Product description

EFA-SST® Classic:
EFAFLEX high-speed doors with extruded aluminium slats in a robust design. The door leaf is rolled up without contact. The individual EFA-Alux slats are connected to each other via a hinge chain, the gaps are sealed and stiffened by rubber hinges. The EFA-Alux slats have a pitch of 151 mm and are available in thicknesses 20 mm, 30 mm and 40 mm and are rolled up without contact. The surface of the slats is natural anodized, E6/EV1. The slats can also be powder-coated in RAL colors.

EFA-SST® Premium - ECO - Basic:
EFAFLEX high-speed doors with highly insulating EFA-THERM(R) slats. The door leaf is rolled up without contact. The individual EFA-THERM(R) slats are connected to each other via a hinge chain, the gaps are sealed and stiffened by rubber hinges. The EFA-THERM(R) slats have a pitch of 225 mm and are available in thicknesses 40 mm, 60 mm, 80 mm and 100 mm.

Door frames
The frames are folded from Sendzimir galvanized sheet steel and are self-supporting. The guide, the springs and the optical safety devices are located inside the frame.

Weight compensation
The tension springs are installed in the door frames and connected to the synchronizer shaft via heavy-duty belts. The springs support the drive unit and serve to balance the weight of the door leaf.

Sealants
Vertical sealants:
- Mounted on door frames and frame covers - Sealing to door leaf

Horizontal sealants:
- Mounted on bottom or top slat - Sealing to floor and lintel

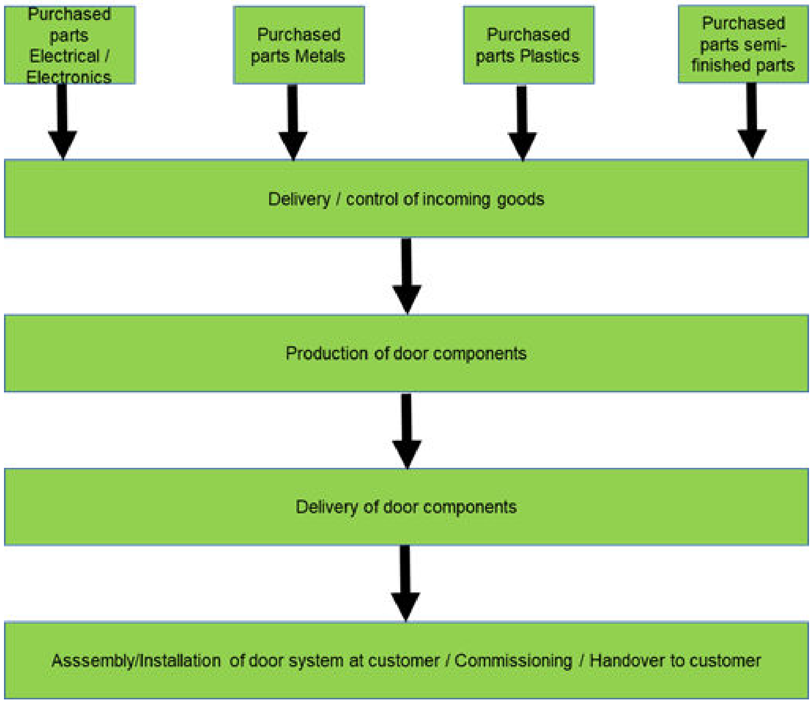
Hinge rubbers:
- Serve as a horizontal sealing between the individual slats

Safety equipment
Door light grid in closing level
Light barriers in and next to closing level
Safety switching strip on bottom edge of door leaf

Performance
The door size-dependent speeds and performance characteristics can be viewed at www.efaflex.com. Detailed product descriptions are available.

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

Product manufacture



Application

EFAFLEX high-speed doors for exterior and interior use as an energy-saving closure for building openings. The high-speed doors can be used in industrial, commercial and private sectors.

Test evidence / reports

The following verifications are held:

- QM 301 – Burglar resistant components as per EN 1627
- QM 317 – Product quality as per DIN EN 13241

For information on further and updated verifications (including other national approvals) refer to www.efaflex.com.

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 primary materials used are listed in the LCA (see Section 7).

Declarable substances

The products are configured according to customer requirements and may therefore contain different components. In accordance with Article 33 of REACH Regulation (EC) No. 1907/2006 and EU Directive 2011/65/EU (RoHS II, application of exemptions 6a, b, c), the customer will be informed via the delivery documents if a delivered product contains substances on the SVHC candidate list in a concentration of more than 0.1% by mass (w/w).
If the products are used as intended in accordance with the operating instructions (including compliance with the operator obligations specified therein), no substances are intentionally released under normal or reasonably foreseeable conditions of use. (Declaration dated December 18, 2023).

All relevant safety data sheets can be obtained from company EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG.

3 Construction process stage

Processing recommendations, installation

The operating instructions must be consulted for installation, operation, maintenance and dismantling. Additional information can be found at www.efaflex.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:
No reference service life (RSL) can be determined for a “Cradle to gate” EPD with the Modules C1-C4 and Module D (A1-A3 + C + D), because no reference use conditions are stated.
The reference service life (RSL) of high-speed doors made by EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG is not specified.

5 End-of-life stage

Possible end-of-life stages

High-speed spiral doors and turbo doors 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 according to the market situation.
Steel, aluminium and electronic components as well as motors are recycled to certain parts. Residual fractions are sent to landfill or, in part, 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 High-speed spiral doors and turbo doors. 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 2021 fiscal year. They were collected on-site at the plant located in Bruckberg (Germany) and in Opařany (Czech Republic) and originate in parts from company records and partly from values directly obtained by measurement. Validity of the data was checked by the ift Rosenheim.

The generic data originates from the professional database and building materials database software “LCA for Experts 10”. The last update of both databases was in 2023. Data from before this date originate also from these databases and are not more than three 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 “LCA for Experts” for the development of life cycle assessments.

The data quality complies with the requirements of prEN 15941:2022.

Scope / system boundaries

The system boundaries refer to the supply of raw materials and purchased parts, manufacture and end-of-life stage of High-speed spiral doors and turbo doors (cradle to gate) in plants of EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG in 84079 Bruckberg (Germany) and EFAFLEX - CZ s.r.o., Olší 55, 391 61 Opařany (Czech Republic).

Additional specific data for the production of high-speed doors at the pre-supplier are included in the LCA. This is 26.8% recycled content of the steel, as confirmed by the pre-suppliers. No additional data from pre-suppliers 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 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 raw materials, ancillary materials and packaging were taken into account. The transport routes indicated refer to the transport routes to the plant in 39164 Opařany (Czech Republic), as these represent the higher transport distances. The transport distances were not averaged in relation to the quantities delivered. This is a word-case analysis for the transport routes.
In addition to the transport distances for pre-products, transport distances for waste were also taken into account. The transport of waste in A3 was mapped with the following standard scenario according to the manufacturer:

- Transport to collection point with 40 t truck (Euro 0-6 Mix), diesel, 27 t payload, 50 % capacity used, 100 km.

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 units.

Life cycle stages

The life cycle of the High-speed spiral doors and turbo doors is shown in the Annex. The product stage "A1 – A3", 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 materials that enter the production process as input are calculated in module A1 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 EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG was considered in Module A3. Secondary material is used.

Inputs

The following manufacturing-related inputs were included in the LCA per 1 **m²** high-speed spiral doors and turbo door:

Energy
The input material of natural gas is based on “RER: Thermische Energie aus Erdgas” (thermal energy for natural gas). The "RER: Strom Mix Sphera" is used for the electricity mix.

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
The water consumed by the individual process steps for the manufacture amounts to a total of 1,43 l per m² of the element.
The consumption of fresh water specified in Section 6.3 originates (among others) from the process chain of the pre-products and the process water for cooling.

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

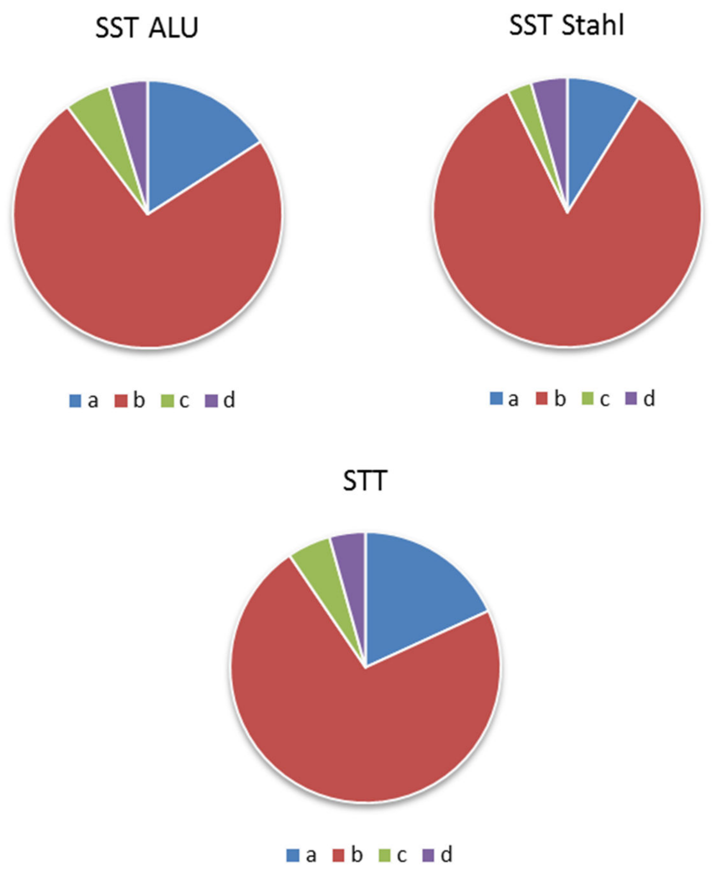


Illustration 1 Percentage of individual materials per declared unit

No.	Material	Mass in %		
		SST ALU	SST steel	STT
A	Aluminium	15.9	8.9	18.2
B	Steel	73.9	83.8	72.3
C	Electrical components	5.5	2.9	5.2
D	Plastics	4.7	4.4	4.3

Table 2 Percentage of individual materials per declared unit

Ancillary materials and consumables

5.76 kg of ancillary materials and consumables per 1 m² high-speed door are used.

Product packaging

The amounts used for product packaging are as follows:

Material	Mass in kg per 1 m²		
	SST ALU	SST steel	STT
Wood	0	0,52	0,55

Table 3 Weight in kg of packaging per 1 m²

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.	Component	Content in kg C per m²		
		PG 1	PG 2	PG 3
1	In the corresponding packaging	0	0,23	0,25

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

Outputs

The following manufacturing-related outputs were included in the LCA per 1 m² high-speed spiral doors and turbo doors:

Waste

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

Waste water

During production, 1,43 l of wastewater per 1 m² are generated.

6.3 Impact assessment

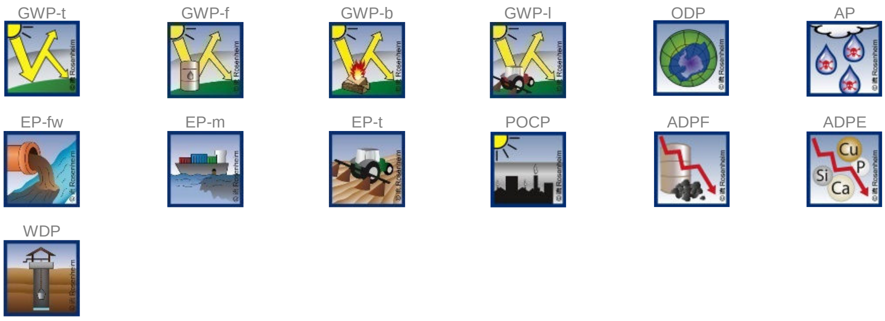
Aim

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 impact categories presented for the core indicators in the EPD are as follows:

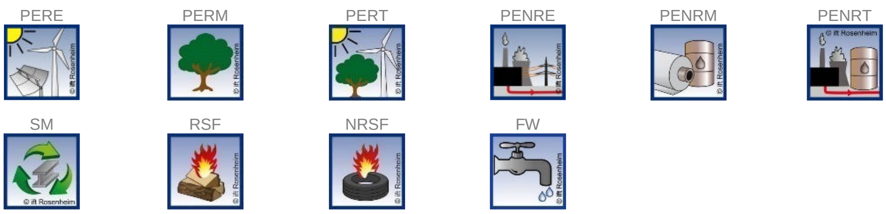
- Climate change - total (GWP-t)
- Climate change - fossil (GWP-f)
- Climate change - biogenic (GWP-b)
- Climate change - land use & land use change (GWP-l)
- Ozone depletion (ODP)
- Acidification (AP)
- Eutrophication freshwater (EP-fw)
- Eutrophication salt water (EP-m)
- Eutrophication land (EP-t)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

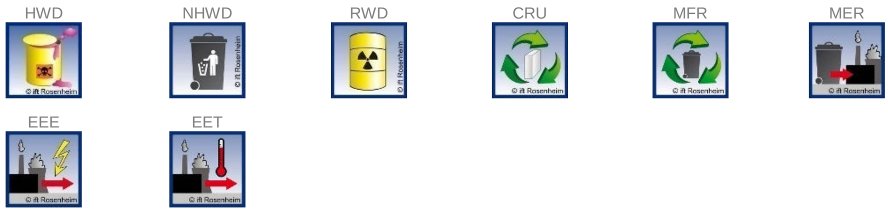


Waste

The waste generated during the production of 1 m² high-speed spiral doors and turbo door 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 waste categories and indicators for output material flows presented in the EPD are as follows:

- 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)

Results per 1 m^2 high-speed spiral door aluminium															
	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	210,39	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,75	10,30	7,17E-02	-146,00
GWP-f	kg CO_2 equivalent	208,27	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,75	10,20	7,39E-02	-146,00
GWP-b	kg CO_2 equivalent	1,30	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	-1,04E-02	4,39E-02	-2,45E-03	4,87E-02
GWP-l	kg CO_2 equivalent	7,77E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	6,86E-03	4,64E-04	2,30E-04	-3,17E-02
ODP	kg CFC-11-eq.	7,68E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,64E-14	7,37E-11	1,88E-13	-3,96E-07
AP	mol H^+-eq.	0,86	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,29E-04	1,03E-02	5,24E-04	-0,53
EP-fw	kg P-eq.	8,67E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	2,71E-06	1,50E-05	1,49E-07	-8,37E-05
EP-m	kg N-eq.	0,14	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,23E-04	2,58E-03	1,35E-04	-9,46E-02
EP-t	mol N-eq.	1,44	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,79E-03	2,98E-02	1,49E-03	-1,02
POCP	kg NMVOC-eq.	0,42	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	8,18E-04	6,85E-03	4,09E-04	-0,29
ADPF*[2]	MJ	2914,60	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	10,10	84,60	0,98	-1860,00
ADPE*[2]	kg Sb equivalent	4,23E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	4,88E-08	6,19E-07	3,41E-09	-2,19E-03
WDP*[2]	m^3 world-eq. deprived	42,30	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	8,96E-03	1,52	8,11E-03	-11,90
Resource management																
PERE	MJ	1025,38	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,74	50,10	0,16	-520,00
PERM	MJ	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
PERT	MJ	1025,38	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,74	50,10	0,16	-520,00
PENRE	MJ	2838,50	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	10,10	168,95	1,84	-1860,00
PENRM	MJ	85,20	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	-84,35	-0,85	0,00
PENRT	MJ	2923,70	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	10,10	84,60	0,99	-1860,00
SM	kg	17,60	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
RSF	MJ	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
NRSF	MJ	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
FW	m^3	2,41	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	8,05E-04	5,50E-02	2,49E-04	-1,16
Categories of waste																
HWD	kg	1,04E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,14E-11	-6,47E-09	2,14E-11	-3,38E-07
NHWD	kg	37,50	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,54E-03	0,19	4,93	-24,70
RWD	kg	0,16	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,90E-05	1,32E-02	1,12E-05	-0,12
Output material flows																
CRU	kg	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
MFR	kg	16,80	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	81,30	0,00	0,00
MER	kg	1,69	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	2,72	0,00	0,00
EEE	MJ	5,25	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	10,50	0,00	0,00
EET	MJ	9,45	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	24,00	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 m² High-speed spiral door aluminium														
	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Additional environmental impact indicators																
PM	Disease incidence	9,82E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	6,51E-09	8,09E-08	6,45E-09	-5,83E-06
IRP*1	kBq U235-eq.	27,67	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	2,83E-03	2,20	1,30E-03	-26,20
ETP-fw*2	CTUe	1404,50	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	7,17	37,20	0,54	-698,00
HTP-c*2	CTUh	3,82E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,47E-10	1,29E-09	8,27E-11	-8,37E-08
HTP-nc*2	CTUh	3,08E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	7,85E-09	3,40E-08	9,09E-09	-1,48E-06
SQP*2	dimensionless	380,70	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	4,22	33,10	0,24	-119,00

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.

Results per 1 m² High-speed spiral door steel

	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	137,35	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,70	9,23	5,99E-02	-87,10
GWP-f	kg CO_2 equivalent	137,23	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,71	9,19	6,18E-02	-87,10
GWP-b	kg CO_2 equivalent	0,49	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	-9,74E-03	4,10E-02	-2,05E-03	3,72E-02
GWP-l	kg CO_2 equivalent	5,53E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	6,42E-03	4,32E-04	1,92E-04	-2,09E-02
ODP	kg CFC-11-eq.	3,39E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,02E-14	6,89E-11	1,57E-13	-1,75E-07
AP	mol H^+-eq.	0,50	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	8,69E-04	9,48E-03	4,38E-04	-0,30
EP-fw	kg P-eq.	8,79E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	2,53E-06	1,40E-05	1,24E-07	-4,44E-05
EP-m	kg N-eq.	8,70E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,02E-04	2,38E-03	1,13E-04	-5,48E-02
EP-t	mol N-eq.	0,90	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,54E-03	2,73E-02	1,25E-03	-0,59
POCP	kg NMVOC-eq.	0,26	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	7,65E-04	6,32E-03	3,42E-04	-0,17
ADPF*2	MJ	1964,10	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,44	79,00	0,82	-1060,00
ADPE*2	kg Sb equivalent	2,16E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	4,56E-08	5,78E-07	2,85E-09	-1,12E-03
WDP*2	m³ world-eq. deprived	29,60	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	8,37E-03	1,38	6,78E-03	-6,19
Resource management																
PERE	MJ	664,08	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,69	46,80	0,13	-263,00
PERM	MJ	8,26	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
PERT	MJ	672,34	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,69	46,80	0,13	-263,00
PENRE	MJ	1898,66	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,48	152,79	1,57	-1060,00
PENRM	MJ	74,54	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	-73,79	-0,75	0,00
PENRT	MJ	1973,20	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,48	79,00	0,82	-1060,00
SM	kg	18,70	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
RSF	MJ	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
NRSF	MJ	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
FW	m³	1,46	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	7,52E-04	5,06E-02	2,08E-04	-0,61
Categories of waste																
HWD	kg	6,17E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	2,93E-11	-6,05E-09	1,79E-11	-1,90E-07
NHWD	kg	18,80	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,44E-03	0,17	4,11	-11,80
RWD	kg	0,10	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,77E-05	1,24E-02	9,38E-06	-6,39E-02
Output material flows																
CRU	kg	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
MFR	kg	16,80	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	76,60	0,00	0,00
MER	kg	1,69	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	2,38	0,00	0,00
EEE	MJ	5,25	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	9,15	0,00	0,00
EET	MJ	9,45	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	21,00	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 m² High-speed spiral door steel															
	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Additional environmental impact indicators																
PM	Disease incidence	5,90E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	6,08E-09	7,50E-08	5,39E-09	-3,34E-06
IRP*1	kBq U235-eq.	17,17	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	2,64E-03	2,06	1,08E-03	-13,70
ETP-fw*2	CTUe	985,10	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	6,70	34,70	0,45	-375,00
HTP-c*2	CTUh	2,61E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,37E-10	1,20E-09	6,91E-11	-5,94E-08
HTP-nc*2	CTUh	2,15E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	7,33E-09	3,15E-08	7,60E-09	-8,28E-07
SQP*2	dimensionless	459,50	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,94	30,90	0,20	-58,70

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.

Results per 1 m² High-speed turbo door aluminium

	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	219,33	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,72	9,39	6,76E-02	-157,00
GWP-f	kg CO_2 equivalent	219,21	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,72	9,34	6,97E-02	-157,00
GWP-b	kg CO_2 equivalent	0,31	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	-9,97E-03	4,19E-02	-2,31E-03	7,62E-02
GWP-l	kg CO_2 equivalent	7,70E-02	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	6,57E-03	4,42E-04	2,17E-04	-3,12E-02
ODP	kg CFC-11-eq.	1,30E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,23E-14	7,05E-11	1,77E-13	-6,72E-07
AP	mol H^+-eq.	0,96	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	8,89E-04	9,68E-03	4,94E-04	-0,60
EP-fw	kg P-eq.	5,41E-04	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	2,59E-06	1,43E-05	1,40E-07	-8,56E-05
EP-m	kg N-eq.	0,14	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,10E-04	2,43E-03	1,28E-04	-0,10
EP-t	mol N-eq.	1,53	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,62E-03	2,79E-02	1,41E-03	-1,11
POCP	kg NMVOC-eq.	0,45	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	7,83E-04	6,45E-03	3,85E-04	-0,31
ADPF*²	MJ	3053,70	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,66	80,90	0,93	-2010,00
ADPE*²	kg Sb equivalent	3,40E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	4,67E-08	5,92E-07	3,21E-09	-1,75E-03
WDP*²	m³ world-eq. deprived	43,60	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	8,57E-03	1,40	7,65E-03	-13,80
Resource management																
PERE	MJ	1075,47	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,70	47,90	0,15	-565,00
PERM	MJ	8,85	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
PERT	MJ	1084,32	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,70	47,90	0,15	-565,00
PENRE	MJ	2977,42	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,70	155,52	1,68	-2020,00
PENRM	MJ	75,38	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	-74,62	-0,75	0,00
PENRT	MJ	3052,80	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	9,70	80,90	0,93	-2020,00
SM	kg	16,50	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
RSF	MJ	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
NRSF	MJ	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
FW	m³	2,54	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	7,70E-04	5,16E-02	2,34E-04	-1,27
Categories of waste																
HWD	kg	1,55E-03	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	3,00E-11	-6,19E-09	2,02E-11	-3,00E-07
NHWD	kg	39,80	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,48E-03	0,18	4,64	-26,70
RWD	kg	0,17	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,82E-05	1,27E-02	1,06E-05	-0,14
Output material flows																
CRU	kg	0,00	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	0,00	0,00	0,00
MFR	kg	16,80	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	78,00	0,00	0,00
MER	kg	1,69	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	2,40	0,00	0,00
EEE	MJ	5,25	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	9,26	0,00	0,00
EET	MJ	9,45	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	0,00	21,20	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 m² High-speed turbo door aluminium																
Additional environmental impact indicators																
PM	Disease incidence	1,09E-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	6,23E-09	7,67E-08	6,08E-09	-6,50E-06
IRP*1	kBq U235-eq.	30,07	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	2,71E-03	2,11	1,22E-03	-28,80
ETP-fw*2	CTUe	1443,90	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	6,86	35,50	0,51	-791,00
HTP-c*2	CTUh	2,74E-07	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	1,40E-10	1,23E-09	7,79E-11	-8,54E-08
HTP-nc*2	CTUh	3,16E-06	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	7,51E-09	3,22E-08	8,57E-09	-1,59E-06
SQP*2	dimensionless	536,40	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.00	4,04	31,60	0,23	-125,00

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 environmental impacts of

- High-speed spiral doors aluminium
- High-speed spiral doors steel
- High-speed turbo door aluminium

differ strongly/significantly from each other. The differences lie in the mass of the pre-products and raw materials used in each case. Above all, the deviation in the mass of aluminum used led us to expect this.

In the area of production, the environmental impact of the high-speed doors mainly results from the use of aluminium and steel or its pre-chains.

In scenario C4, only marginal expenditures for the physical pretreatment and the landfill operation are to be expected. Allocation to individual products is almost impossible for site disposal.

For the recycling of products, around 30% of aluminium for the spiral doors aluminum, around 24% for the spiral doors steel, and around 32% for the turbo doors aluminium can be credited for the environmental impacts of the core indicators (without WDP, as not supported by the software) occurring during the life cycle in scenario D.

Some LCA results differ considerably from the results presented in the EPD prepared five years ago. The reasons for this are that other, more suitable „LCA for Experts“ data sets were used, the background data in „LCA for Experts“ has changed and a new data collection of the more energy-efficient production was carried out by the declaration holder.

The charts below show the allocation of the main environmental impacts.

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

Diagrams

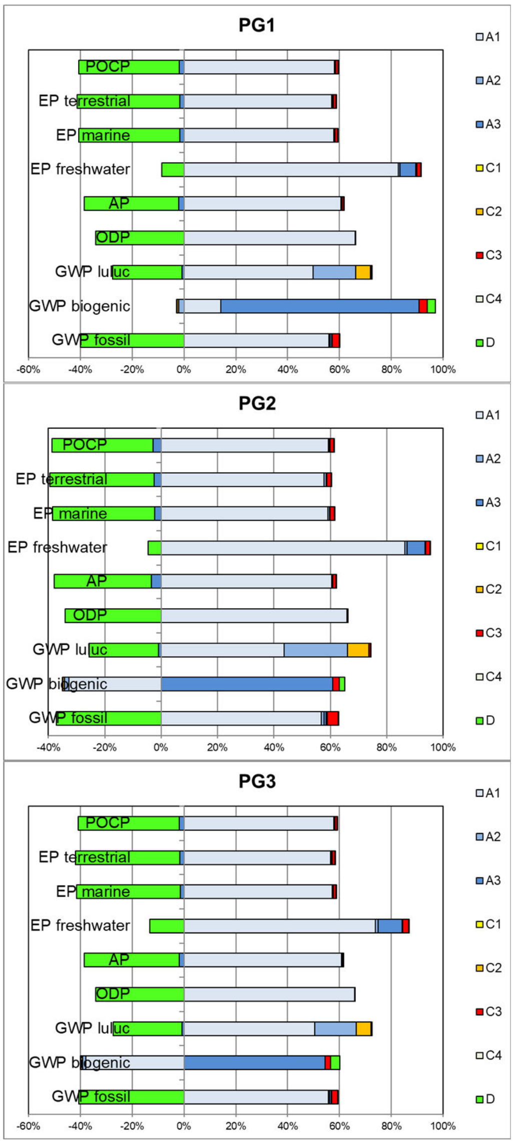


Illustration 2 Percentage of the modules in selected environmental impact indicators

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 ift Rosenheim. The results and conclusions reported to the target group are complete, correct, without bias and transparent. 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 of the report took place in the course of verification of the EPD and was carried out by the external auditor Patrick Wortner.

7 General information regarding the EPD

Comparability

This EPD was prepared in accordance with 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.

The detailed individual results of the products were summarised on the basis of conservative assumptions and differ from the average results. Identification of the product groups and the resulting variations are documented in the background report.

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 PCR documents "PCR Part A" PCR-A-1.0: 2023 and “Doors and Gates" PCR TT-3.0:2023.

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] [Patrick, Wortner]
[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	Testing personnel
1	22.02.2024	External verification	Dumproff	Wortner
2	07.03.2024	Adjustment REACH statement	Dumproff	Wortner
3	12.03.2024	Formal change	Dumproff	
4	25.06.2024	Revision	Dumproff	Wortner

8 Bibliography

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9 Annex

Description of life cycle scenarios for high-speed spiral doors and turbo doors

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
✓	✓	✓	—	—	—	—	—	—	—	—	—	✓	✓	✓	✓	✓

* For declared B-modules, the calculation of the results is performed taking into account the specified RSL related to one year

Table 5 Overview of applied life cycle stages

The scenarios were furthermore based on the research project “EPDs for transparent building components”. (1)

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

A5 Construction/installation - not considered, informative module

No.	Scenario	Description
A5	Disposal of packaging	Packaging is disposed according to the on-site waste management

In the selected scenario, environmental impacts arise from the use of packaging.

In the selected scenario, environmental impacts arise from the use of packaging.

The amounts used for product packaging are as follows, which were accounted for in A1-A3:

Material	Mass in kg per 1 m²		
	PG 1	PG 2	PG 3
Timber	0.000	0,52	0,55

C1 Deconstruction

No.	Scenario	Description
C1	Deconstruction	99 % according to manufacturer Further deconstruction rates are possible, give adequate reasons.

No relevant inputs or outputs apply to the scenario selected. The energy consumed for deconstruction is negligible. Any arising consumption is marginal.

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 34-40 t truck (Euro 0-6 mix), diesel, 27 t payload, 50% capacity used, 100 km (1)

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

C3 Waste management

No.	Scenario	Description
C3	Current market situation	**Share for recirculation of materials:** • **98% steel in melt** (UBA, 2017) • **95% aluminium in melt** (GDA, 2018) • **Plastics 66 % thermal recycling in incineration plants** (Zukunft Bauen, 2017) • **Electrical components 87%** (based on waste electrical equipment 87%; UBA, 2018) • **Remainder to landfill/disposal,**

Electricity consumption of recycling plant: 0.5 MJ/kg.

As the products are placed on the European market, the disposal scenario is based on average European data sets. Where no European data sets were available, German data sets were used.

The below table presents the disposal processes and their percentage by mass/weight. The calculation is based on the above mentioned shares in percent related to the declared unit of the product system.

C3 Disposal	Unit	C3		
		PG1	**PG2**	**PG3**
Collection process, collected separately	kg	88.0	82.30	84.2
Collection process, collected as mixed construction waste	kg	0.89	0.83	0.85
Recovery system, for re-use	kg	0.00	0.00	0.00
Recovery system, for recycling	kg	81.23	76.63	78.01
Recovery system, for energy recovery	kg	2.72	2.38	2.40
Disposal	kg	4.03	3.28	3.79

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

C4 Disposal

No.	Scenario	Description
C4	Disposal	**The non-recordable amounts and losses within the re-use/recycling chain (C1 and C3) are modelled as “disposed” (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	Steel scrap from C3 excluding the scrap used in A3 replaces 70.2% of steel; Aluminium scrap from C3 excluding the scrap used in A3 replaces 70.2% of aluminium; Control system from C3 excluding the scrap used in A3 replaces 60% of control system; Copper cable from C3 excluding the scrap used in A3 replaces 60% of copper cable; Drive unit from C3 excluding the scrap used in A3 replaces 60% of drive unit; 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 de-construction at the end of service life.

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

Imprint

Practitioner of the LCA
ift Rosenheim GmbH
Theodor-Gietl-Straße 7-9
83026 Rosenheim, 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
EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG
Fliederstrasse 14
84079 Bruckberg, Germany

Notes
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EFAFLEX Tor- und Sicherheitssysteme GmbH & Co. KG

ift Rosenheim GmbH
Theodor-Gietl-Straße 7-9
83026 Rosenheim
Phone: +49 (0) 80 31/261-0
Fax: +49 (0) 80 31/261-290
E-Mail: info@ift-rosenheim.de
www.ift-rosenheim.de